Non-Confidential Business Information (Non-CBI)

Certification Test Report

Valley Comfort Systems Inc.

Fireplace Insert Wood Stove

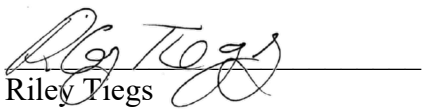
Model: PI29

Prepared for:	Valley Comfort Systems Inc. 1290 Commercial Way Penticton, BC V2A 3H5 Canada
Prepared by:	OMNI-Test Laboratories, Inc. 13327 NE Airport Way Portland, OR 97230 (503) 643-3788
Test Period:	January 22, 2018 – January 25, 2018
Report Date:	April 2018
Report Revision Date:	February 27, 2023
Report Number:	0142WN019E
Project Number:	0142WN019E

AUTHORIZED SIGNATORIES

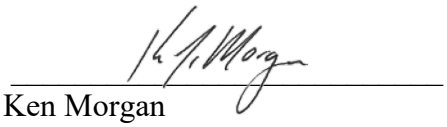
This report has been reviewed and approved by the following authorized signatories:

Technician:



Riley Tiegs
OMNI-Test Laboratories, Inc.

Evaluator:



Ken Morgan
OMNI-Test Laboratories, Inc.

TABLE OF CONTENTS

PREFACE ..... (3 pages)

1. SAMPLING PROCEDURES AND TEST RESULTS 4
   Introduction, Sampling Procedure, Results 5
   Individual Run Summaries 6

   Summary Tables
   Table 1 - Particulate Emissions Results 7
   Table 2 - Test Facility Conditions 8
   Table 3 - Fuel Measurements and Crib Descriptions - Pretest 8
   Table 4 - Fuel Measurements and Crib Descriptions - Test 8
   Table 5 - Dilution Tunnel Gas Measurements and Sampling Data 8
   Table 6 – Average Temperature Data 8
   Table 7 - Pretest Configurations 9
   Table 8 - Test Configurations 9

2. PHOTOGRAPHS/APPLIANCE DESCRIPTION/DRAWINGS 10
   Appliance Photographs 11
   Fuel Photographs 12
   Appliance Description 15

3. TEST DATA 16
   Instructions, Conditioning, Weighted Average 17
   Run 1 22
   Run 2 38
   Run 3 61
   Run 4 87

4. QUALITY ASSURANCE/QUALITY CONTROL 104
   Sample Analysis 106
   Calibrations – EPA Method 28R, ASTM E2515, ASTM E2780 116
   Example Calculations 140

Appendix A. ..... Labeling & Owner's Manual
Appendix B. ..... Firebox Volume Calculation
Appendix C. ..... Revision History

Section 1

Introduction
Sampling Procedures
Summary of Results
Individual Run Summaries
Summary Tables

INTRODUCTION

Valley Comfort Systems Inc. retained *OMNI* to perform U.S. Environmental Protection Agency (EPA) certification testing on the Blaze King PI29 wood-burning fireplace insert. The Blaze King PI29 inser is a catalytic-type room heater. The firebox is constructed of mild steel. Usable firebox volume was measured to be 2.6 cubic feet and the stove is vented through 6" collar located on the top of the appliance.

The testing was performed at Blaze King Industries located at 146 A St., in Walla Walla Washington. The altitude of the laboratory is 1,191 feet above sea level. The unit was received in good condition and logged in on 1/22/2018, and labeled with *OMNI* ID # VC-18-1. *OMNI* representative Aaron Kravitz completed all testing by January 25, 2017.

This report is organized in accordance with the EPA-recommended outline and is summarized in the Table of Contents immediately preceding this section. The results in this report are limited to the item submitted.

SAMPLING PROCEDURE

The Blaze King PI29 wood stove was tested in accordance with the U.S. EPA 40 CFR Part 60, Subpart AAA – Standards of Performance for New Residential Wood Heaters using EPA Method 28R, ASTM E2515 and ASTM E2780. Particulate emissions were measured using sampling trains consisting of two filters (front and back).

Efficiency results were calculated using B415.1 spread sheet Version 2.2 created 12/14/2009 and distributed by CSA.

SUMMARY OF RESULTS

The weighted average emissions of the four test runs included in the results indicate a particulate emission rate of 1.26 grams per hour. Testing on the Blaze King PI29 consisted of four certification tests, all of which are used for a weighted average. The PI29 results are within the emission limit of 2.0 g/h. for affected appliances manufactured on or after May 15, 2020.

The proportionality results for all 4 test runs were acceptable. Quality check results for each test run are presented in Section 4 of this report.

INDIVIDUAL RUN SUMMARIES

Run 1 - Attempted category 4 burn rate at primary air setting of -10 degrees from vertical setting on thermostat (the maximum possible). Observed burn rate of 2.00 kg/hr. (category 4). Between minutes 188 and 193 of sampling time, the optical encoder for sample box A did not record changes in sample volume. However, the sample vacuum remained constant throughout this period. A visual inspection confirmed that the output shaft of the dry gas meter remained turning, but the encoder was stuck. Once freed, the digital logging returned to the sample rate it had maintained prior to minute 188. Therefore, a constant sample rate was assumed for this period and used for the emissions calculations. No other sampling anomalies occurred, this test run is valid and appropriate for inclusion in the weighted average.

Run 2 - Attempted category 2 burn rate at primary air setting of 110 degrees from vertical setting on thermostat. Observed burn rate of 0.83 kg/hr. (category 2). Due a data logging glitch, test minute 427 recorded no change in sample volume for both sample boxes. However, the proportional rates for both samples are within tolerance for the 420 - 429 10-minute sample interval. No additional sampling anomalies occurred, this test run is valid and appropriate for inclusion in the weighted average.

Run 3 - Attempted category 1 burn rate at primary air setting of 125 degrees from vertical setting on thermostat. Observed burn rate of 0.65 kg/hr. (category 1). No sampling anomalies occurred, this test run is valid and appropriate for inclusion in the weighted average.

Run 4 - Attempted category 3 burn rate at primary air setting of 57 degrees from vertical; Observed burn rate of 1.46 kg/hr. (category 3). No sampling anomalies occurred, this test run is valid and appropriate for inclusion in the weighted average.

SUMMARY TABLES

Table 1 - Summary Results – Adjustable Wood Burning Stoves

Category 1 < 0.80 kg/hr		Category 2 .80 to 1.25 kg/hr		Category 3 1.25 to 1.90 kg/hr		Category 4 Maximum Burn Rate	
Date	1/24/2018	Date	1/23/2018	Date	1/25/2018	Date	1/22/2018
Run Number	3	Run Number	2	Run Number	4	Run Number	1
Emission Rate g/hr	1.59	Emission Rate g/hr	0.72	Emission Rate g/hr	1.27	Emission Rate g/hr	2.19
Emission Rate g/hr (Uncorrected)	1.59	Emission Rate g/hr (Uncorrected)	0.76	Emission Rate g/hr (Uncorrected)	1.27	Emission Rate g/hr (Uncorrected)	2.19
Burn Rate kg/hr	0.65	Burn Rate kg/hr	0.83	Burn Rate kg/hr	1.46	Burn Rate kg/hr	2.00
Heat Output Rate BTU/hr (HHV)	9,694	Heat Output Rate BTU/hr (HHV)	12,207	Heat Output Rate BTU/hr (HHV)	20,410	Heat Output Rate BTU/hr (HHV)	24,348
Overall Efficiency (%)(HHV)	80.26%	Overall Efficiency (%)(HHV)	78.75%	Overall Efficiency (%)(HHV)	74.81%	Overall Efficiency (%)(HHV)	65.06%
CO Emissions (g/MJ Output)	1.85	CO Emissions (g/MJ Output)	1.30	CO Emissions (g/MJ Output)	1.67	CO Emissions (g/MJ Output)	3.78
CO Emissions (g/kg Dry Fuel)	29.4	CO Emissions (g/kg Dry Fuel)	20.3	CO Emissions (g/kg Dry Fuel)	24.7	CO Emissions (g/kg Dry Fuel)	48.7
CO Emissions (g/min)	0.31	CO Emissions (g/min)	0.28	CO Emissions (g/min)	0.60	CO Emissions (g/min)	1.62
ASTM E2515 PM Emissions – First Hour (g/hr)	15.43	ASTM E2515 PM Emissions – First Hour (g/hr)	4.33	ASTM E2515 PM Emissions – First Hour (g/hr)	3.13	ASTM E2515 PM Emissions – First Hour (g/hr)	4.16

Weighted particulate emission average of 4 test runs: 1.26 grams per hour

Overall average efficiency using HHV of 4 test runs: 74.72% (arithmetic)

Overall average efficiency using HHV of 4 test runs: 75.40% (weighted)

Total CO emission (CSA B415.1): 0.70 g/min (arithmetic average)

Total CO emission (CSA B415.1): 0.61 g/min (weighted average)

Table 2 – Test Facility Conditions

Run	Room Temp (°F)		Barometric Pressure (Hg)		Air Velocity (ft/min)	
	Before	After	Before	After	Before	After
1	72	70	28.69	28.64	<50	<50
2	68	66	28.96	28.86	<50	<50
3	68	69	28.56	28.97	<50	<50
4	70	71	28.50	28.56	<50	<50

Table 3 – Fuel Measurement and Crib Description Summary – PRETEST

Run	Pretest Fuel Weight (lbs)	Pretest Moisture (Dry basis - %)	Coal Bed Weight (lbs)
1	18.9	19.92	4.1
2	19.1	21.88	4.6
3	18.6	19.50	4.5
4	19.0	20.82	4.1

Table 4 – Fuel Measurement and Crib Description Summary – TEST

Run	Test Fuel Wet Basis (lbs)	Test Fuel Dry Basis (lbs)	Loading Density Wet Basis (lbs/ft^3)	Length (in)	2x4s Used	4x4s Used
1	17.3	14.51	6.76	16	4	2
2	17.0	14.03	6.64	16	4	2
3	17.0	14.18	6.64	16	4	2
4	16.4	13.53	6.41	16	4	2

Table 5 – Average Dilution Tunnel Gas Measurements

Run	Static Pressure (in. H_2O)	Velocity (ft/sec)	Flow Rate (dscf/min)	Temperature (°F)
1	-0.17	14.47	148.57	108.8
2	-0.18	13.76	148.99	83.9
3	-0.18	13.78	148.64	83.3
4	-0.18	13.81	144.55	95.2

Table 6 - Average Temperature Data

Run	Surface Δ T (°F)
1	46.6
2	9.2
3	43.8
4	17.4

Table 7 – Pretest Configuration

Run	Combustion Air	Fuel Added	Fuel Removed	Time (min)
1	-10° from vertical (maximum)	N/A	N/A	88
2	110° from vertical	N/A	N/A	62
3	125° from vertical	N/A	N/A	88
4	57° from vertical	N/A	N/A	109

Table 8 – Test Configurations

Run	Five-Minute Startup Procedures		Combustion Air
1	Fuel Loading: Bypass: Door: Primary Air: Fan:	Fuel loaded by 30 seconds. Closed entire test. Open for 35 seconds then closed for remainder of test. Set for entire duration. On maximum for entire duration.	-10° from vertical (maximum)
2	Fuel Loading: Bypass: Door: Primary Air: Fan:	Fuel loaded by 40 seconds. Closed at 1:40. Closed at 2:10. Fully open until 4:00 minutes then quickly set to test setting. On medium low for entire duration.	110° from vertical
3	Fuel Loading: Bypass: Door: Primary Air: Fan:	Fuel loaded by 40 seconds. Closed at 2:25. Closed at 3:30. Fully open until 4:30 minutes then quickly set to test setting. On low for entire duration.	125° from vertical
4	Fuel Loading: Bypass: Door: Primary Air: Fan:	Fuel loaded by 35 seconds. Closed entire test. Closed at 0:40. Set for entire duration. On medium high for entire duration.	57° from vertical

Section 2

Appliance Photographs
Fuel Photographs
Appliance Description

APPLIANCE PHOTOGRAPHS

Appliance Front

Appliance Rear

Appliance Left

Appliance Right

FUEL PHOTOGRAPHS

Test Dates: January 22-25, 2018

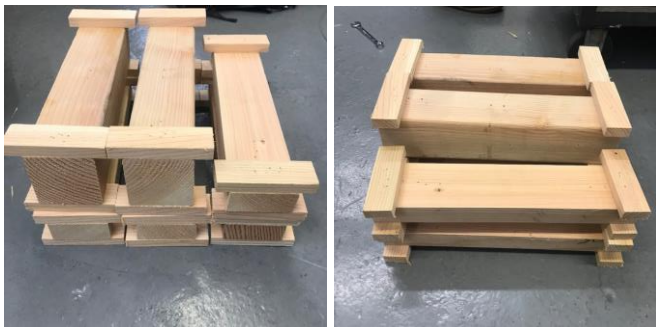
Run 1 – Fuel

Run 1 – Newly Loaded Stove

Run 2 – Fuel

Run 2 – Newly Loaded Stove

Run 3 – Fuel



Run 3 – Newly Loaded Stove

Run 4 – Fuel

Run 4 – Newly Loaded Stove

APPLIANCE PHOTOGRAPHS – SEALED

Sealed Unit – Front

Sealed Unit - Top

APPLIANCE DESCRIPTION

Appliance Manufacturer: Valley Comfort Systems Inc.

Appliance Model: PI29

Type: Catalytic, thermostatic, wood-fired fireplace insert with a factory-installed room air blower.

Materials of Construction: The unit is constructed primarily of mild steel with folder sheet steel shrouds and shields. The firebox is lined with pumice firebrick that measures 9" by 4.5" of 1.25" thickness. The feed door has a 17.75-inch by 11.00-inch panel of 5mm borosilicate glass sealed by a 7/8-inch rope gasket.

Air Introduction System: Air enters the firebox through an opening located at the rear/bottom of the appliance.

Combustion Control Mechanisms: The combustion air inlet is controlled by a dial knob on the right side of the appliance.

Combustor: Applied Ceramics – 10.65" x 4" x 2" ceramic combustor

Internal Baffles: A steel baffle is mounted in the upper portion of the firebox. The flame path is forced to the front of the firebox where it travels up through the opening into the catalyst.

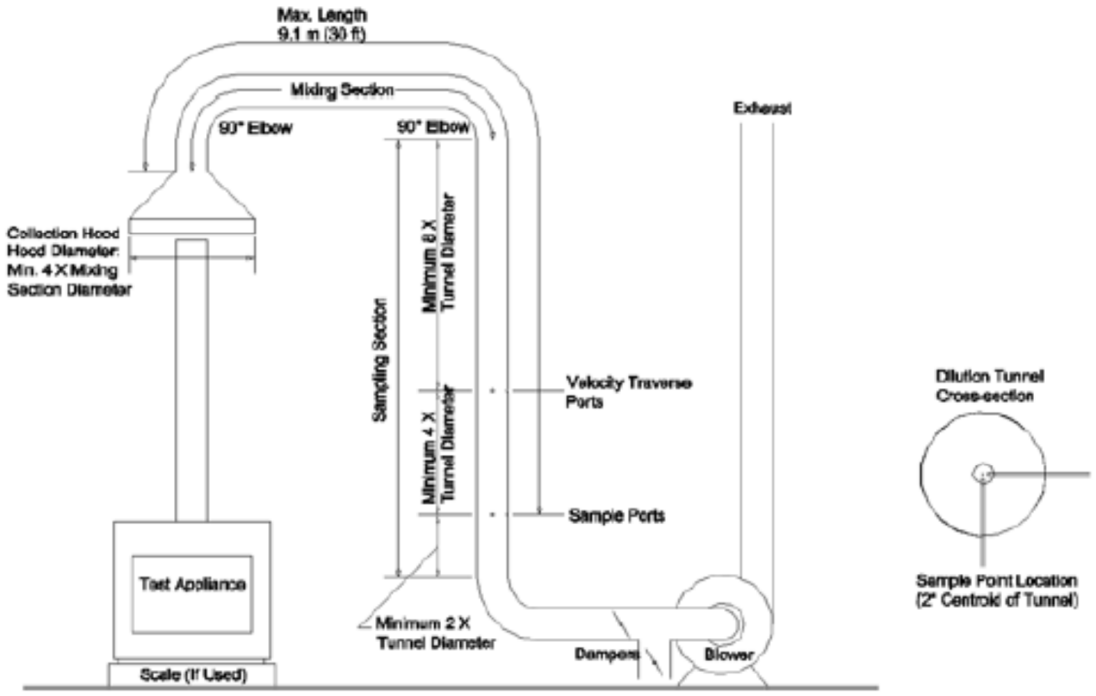
Flue Outlet: The 6-inch diameter flue outlet is located at the top of the unit, inclined so as to better interface with chimney liner systems.

Specific Written Instructions: See Appendix A of this report. All markings and instruction materials were reviewed for content prior to printing.

Section 3

Instructions, Conditioning, Weighted Average
Test Data by Run

Example of ASTM E2515-11 Dilution Tunnel



Prior to testing, sample point and travers point locations are verified to ensure placement is within specifications. Collection hood, tunnel diameter, and mixing section length are also verified to be within specifications.

Jan 18, 2018
Prepared by Ashnil Reddy
Product Development, Blaze King Industries

Blaze King PI29 EPA Test Burn Instructions

The following literature shall be used as a guideline when operating a Blaze King Princess PI29 during an EPA 5G Wood Heater Test.

** before starting any test run ensure unit is clean; use vacuum to remove any material left from previous burns and zero scale**

Kindling Load

- prepare 12 lbs of Douglas Fir cordwood (kindling load)
- with the thermostat set to high and the bypass door open, light the fire
- leave the loading door cracked open until fire is well established
- once loading door is closed and combustor temperature begins to climb, close the bypass door (ensure bypass is latched shut), turn fan on to high
- once load has burned down to 1.0-1.5 lbs, open bypass door and then loading door and break down load into chunks of coal
- scoop out coals (as much as possible) and zero scale reading to eliminate any weight from moisture loss accumulated in unit/stack before fire was lit
- place coals back in unit and flatten to make an even coal bed; rake hotter coals to front of unit for better preburn light off.
- close loading door and bypass door and prepare to load preburn.

Preburn Load

- when ready to load preburn, open bypass door followed by loading door and place 6 pieces onto coal bed in a front-to-back orientation, evenly spaced, then place 6 pieces on top in a side-to-side orientation, evenly spaced, with the front piece placed down flat. Close loading door and then bypass door and ensure thermostat and fan are both set to high. It is important to keep loading time to a minimum.
- let unit burn down to specified turn down range (listed below) prior to setting thermostat to desired burn rate setting.
    - low burn = 21-23% of test load weight
    - medium low burn = 20-22% of test load weight
    - medium high burn = 23-25% of test load weight
    - high burn = no turn down
    - **note: turn down weight is based on fuel load weight (variable)
- at turn down time, fan speed is also reduced respectively:
    - low burn = rheostat knob at lowest point
    - medium low burn = rheostat knob 1/3 open
    - medium high burn = rheostat knob 2/3 open
    - high burn = rheostat knob fully open

- once preburn load has burned down to desired coal bed weight (60-90 min after turndown), open the loading door only (bypass door stays closed) and flatten down preburn load into a coal bed. Rake the hotter coals to towards the front of the stove with a slight angle forward (helps prevent test load from rolling forward into door glass). Close loading door immediately after rake and observe the fire. Once a satisfactory coal bed has been achieved, prepare to load the test fuel. Once again, it is important to keep the period in which the loading door is open to a minimum (less than 30 seconds).

Test Load

- when ready to load; turn thermostat knob to high, turn fan off, open bypass door, open loading door and load test fuel (four 2x4's and two 4x4's) making sure to slightly angle the front two stacked 2x4's back into the stove to help prevent them from rolling forward into the door glass.
- for high burn, close loading door and bypass door as soon as test fuel is loaded. It is important to keep loading time to less than 30 seconds to minimize the amount of room air that will flood the combustor. Turn the fan back on to high.
- for medium high burn, close the loading door and bypass door as soon as test fuel as loaded. The thermostat can be left at the medium high setting during loading. Turn fan back to 2/3 open as soon as loading door is shut.
- for medium low and low burns, leave the bypass door open and loading door slightly cracked open after test fuel is loaded. Once the fuel load establishes decent flame (1-3 minutes or when combustor temp reaches 500F), close the loading door followed by the bypass door. Once the fire appears to be well established (within the 5-minute start up period) set the thermostat to the respected test setting. Turn fan back on to the respected test setting as soon as loading door is shut.

Conditioning Data - ASTM E2780/ ASTM E2515

Manufacturer:	Valley Comfort, Inc.
Model:	PI29
Tracking No.:	VC-18-1
Project No.:	0142WN019E
Test Date:	1/5/2018 - 1/8/2019
Technician:	Charlie Bishop
Operation Category:	II-III

Elapsed Time (hr)	Flue Gas Temp (° F)	Catalyst Exit Temp (° F)
0	382.7	964.5
1	289.8	1042.0
2	256.8	1034.0
3	232.6	889.2
4	227.1	918.1
5	240.7	925.7
6	224.6	827.3
7	214.2	814.4
8	240.8	1000.0
9	257.3	1022.0
10	248.3	999.2
11	244.4	993.0
12	239.4	951.9
13	205.5	751.6
14	182.6	628.1
15	172.7	581.5
16	193.3	630.5
17	191.2	597.2
18	179.9	529.7
19	201.7	709.7
20	315.8	1084.0
21	278.7	1069.0
22	256.2	1001.0
23	254.1	992.8
24	218.8	832.2
25	204.8	756.4

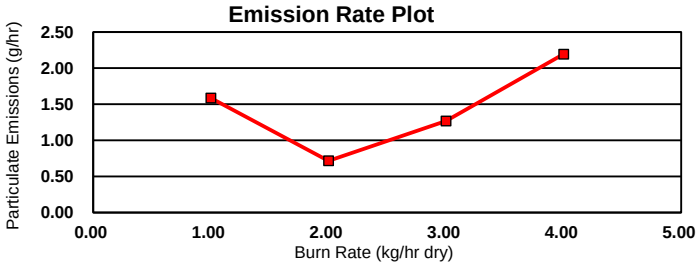
Elapsed Time (hr)	Flue Gas Temp (° F)	Catalyst Exit Temp (° F)
26	202.3	758.5
27	199.5	746.2
28	197.3	743.3
29	186.3	677.3
30	199.6	751.7
31	196.3	765.8
32	189.2	715.2
33	191.6	725.9
34	176.9	615.8
35	173.7	601.8
36	183.2	603.8
37	171.8	530.4
38	467.2	1092.0
39	289.4	965.1
40	216.4	857.3
41	198.5	849.4
42	258.5	1002.0
43	241.7	997.5
44	209.8	899.5
45	183.3	742.5
46	177.6	706.4
47	181.9	756.8
48	212.1	954.3
49	220.2	914.0
50	223.8	941.3

Technician Signature: 

EPA Weighted Average Emissions
EPA Method 28R

Client:	Valley Comfort	Status:	Final
Stove Model:	PI29	Stove Type:	Catalytic Stove
Test Dates:	1/22-25/2018		
Project Number:	0142WN019E		
Tracking Number:	VC-18-1		

Weighted Averages	**Emissions (g/hr):**	**1.26**
	HHV Efficeincy:	**75.40%**
	CO (g/min)	**0.61**



Run #	3	
Burn Rate (dry kg/hr)	0.65	
Category	1	
HHV Efficiency	80.26%	
Emissions (g/hr)	1.59	
CO (g/min)	0.31	
Weighting Factor	0.240	13.39%

Run #	2	
Burn Rate (dry kg/hr)	0.83	
Category	2	
HHV Efficiency	78.75%	
Emissions (g/hr)	0.72	
CO (g/min)	0.28	
Weighting Factor	0.611	34.02%

Run #	4	
Burn Rate (dry kg/hr)	1.46	
Category	3	
HHV Efficiency	74.81%	
Emissions (g/hr)	1.27	
CO (g/min)	0.60	
Weighting Factor	0.672	37.41%

Run #	1	
Burn Rate (dry kg/hr)	2.00	
Category	4	
HHV Efficiency	65.06%	
Emissions (g/hr)	2.19	
CO (g/min)	1.62	
Weighting Factor	0.272	15.17%

RUN 1

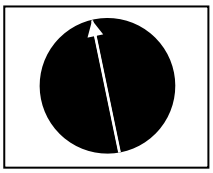
Wood Heater Run Notes

Air Control Settings

Primary:

Maximum:

-10° from vertical



Secondary: Auto

Tertiary/Pilot: Fixed

Fan: On Max

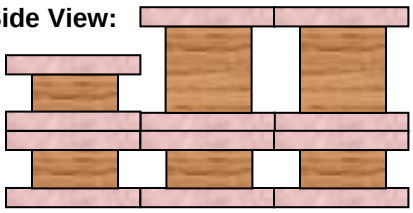
Preburn Notes

Time	Notes
	-None-

Test Notes

Sketch test fuel configuration:

Side View:



Start up procedures & Timeline:

Bypass: **Closed**
Fuel loaded by: **0:30**
Door closed at: **0:35**
Primary air: **Set @ 0:00**

Notes: **None**

Time	Notes
60:00	Changed Filter A
188:00-193:00	Optical encoder sticking, assume constant sample rate

2/23/18

Wood Heater Supplemental Data

Start Time: 14:24

Stop Time: 17:51

Booth #: N/A (site testing)

Stack Gas Leak Check:

Initial: 0 Final: 0

Sample Train Leak Check:

A: 0 @ -11 "Hg

B: 0 @ -9 "Hg

Calibrations: Span Gas CO_2: 17.00 CO: 4.267

	Pre Test		Post Test	
	Zero	Span	Zero	Span
Time	7:50	7:55	18:00	18:04
CO_2	0.00	17.00	0.15	16.97
CO	0.000	4.267	0.021	4.274

Air Velocity (ft/min): Initial: <50 Final: <50

Scale Audit (lbs): Initial: 10.0 Final: 10.0

Pitot Tube Leak Test: Initial: 0 Final: 0

Stack Diameter (in): 6

Induced Draft: 0

% Smoke Capture: 100

Flue Pipe Cleaned Prior to First Test in Series:

Date: 1/22/18 Initials:

	Initial	Middle	Ending
P_b (in/Hg)	29.08	29.09	29.11
RH (%)	26	25	36
Ambient (°F)	72	73	70

Tunnel Traverse

Microtector Reading	dP (in H_2O)	T(°F)
1	0.034	105
2	0.052	105
3	0.038	105
4	0.034	105
5	0.034	105
6	0.052	105
7	0.054	105
8	0.034	105
Center:		
-	.054	105

Tunnel Static Pressure (in H_20):	
Beginning of Test	End of Test
-0.17	-0.17

Background Filter Volume: N/A

2/23/18

Wood Heater Preburn Data - ASTM E2780

Run:	1

Technician Signature: _____

Manufacturer:	Valley Comfort
Model:	PI29
Tracking No.:	VC-18-1
Project No.:	0142WN019E
Test Date:	1/22/18
Beginning Clock Time:	13:05

Preburn Fuel Data

Fuel Piece Lengths (in.):	16		
Total Preburn Weight (lb):	18.9		
Fuel Moisture Readings (% DB):	18.8	19.5	19
	19.7	19.2	19.6
	19.3	23.8	18.9
	19.7	22.4	19.1
Avg Preburn Moisture (% DB):	19.92		

Coal Bed Range (lb):	3.5 (min)	4.3 (max)

			Temperatures (°F)							
Elapsed Time (min)	Scale (lb)	Stack Draft (in H_2O)	FB Top	FB Bottom	FB Back	FB Left	FB Right	Avg. FB	Stack	Ambient
0	13.2	-0.037	729	348	460	302	457	459.2	572	71
1	13	-0.036	730	346	463	305	460	460.8	568	71
2	12.9	-0.036	732	344	465	308	464	462.6	566	71
3	12.7	-0.037	734	343	468	311	468	464.8	567	71
4	12.5	-0.037	737	342	471	313	471	466.8	567	71
5	12.4	-0.036	740	340	473	316	475	468.8	568	71
6	12.2	-0.036	745	339	477	318	478	471.4	567	71
7	12	-0.037	749	338	479	321	482	473.8	564	71
8	11.9	-0.036	754	336	483	323	485	476.2	563	71
9	11.8	-0.036	758	335	487	326	489	479	560	71
10	11.6	-0.035	761	334	491	329	493	481.6	549	71
11	11.5	-0.035	762	333	496	333	496	484	540	71
12	11.3	-0.034	761	332	500	336	499	485.6	532	71
13	11.2	-0.027	760	331	504	339	502	487.2	526	72
14	11.1	-0.028	758	330	508	342	504	488.4	524	72
15	11	-0.027	756	329	510	344	506	489	520	73
16	10.9	-0.026	753	329	512	345	508	489.4	515	72
17	10.7	-0.026	750	328	514	347	510	489.8	514	71
18	10.6	-0.026	748	328	516	348	512	490.4	511	71
19	10.5	-0.026	746	328	518	348	514	490.8	507	71
20	10.4	-0.025	744	327	519	349	515	490.8	504	71
21	10.3	-0.026	743	327	520	350	517	491.4	506	71
22	10.2	-0.026	742	326	521	350	518	491.4	506	71
23	10	-0.026	741	326	523	351	519	492	508	71
24	9.9	-0.027	741	326	524	351	521	492.6	512	71
25	9.8	-0.027	741	325	525	353	522	493.2	509	71
26	9.7	-0.027	740	325	527	354	524	494	506	71
27	9.6	-0.026	739	325	528	356	525	494.6	504	71
28	9.4	-0.027	738	324	530	358	527	495.4	502	72
29	9.3	-0.026	736	324	533	361	529	496.6	501	72
30	9.2	-0.026	733	323	535	363	530	496.8	499	72
31	9.1	-0.026	732	323	538	366	532	498.2	496	72
32	9	-0.026	730	322	541	368	534	499	496	72
33	8.8	-0.026	728	322	544	370	536	500	497	73
34	8.7	-0.026	727	322	547	372	538	501.2	497	73
35	8.6	-0.025	725	322	550	375	539	502.2	495	72
36	8.5	-0.026	723	322	553	377	542	503.4	493	72
37	8.3	-0.025	722	322	557	380	544	505	490	72
38	8.2	-0.026	721	322	560	382	546	506.2	490	71

Wood Heater Preburn Data - ASTM E2780

Run:	1

Technician Signature: _____

Manufacturer:	Valley Comfort
Model:	PI29
Tracking No.:	VC-18-1
Project No.:	0142WN019E
Test Date:	1/22/18
Beginning Clock Time:	13:05

Preburn Fuel Data

Fuel Piece Lengths (in.):	16		
Total Preburn Weight (lb):	18.9		
Fuel Moisture Readings (% DB):	18.8	19.5	19
	19.7	19.2	19.6
	19.3	23.8	18.9
	19.7	22.4	19.1
Avg Preburn Moisture (% DB):	19.92		

Coal Bed Range (lb):	3.5 (min)	4.3 (max)

			Temperatures (°F)							
Elapsed Time (min)	Scale (lb)	Stack Draft (in H_2O)	FB Top	FB Bottom	FB Back	FB Left	FB Right	Avg. FB	Stack	Ambient
39	8.1	-0.026	720	322	563	385	548	507.6	491	72
40	8	-0.026	720	322	566	388	550	509.2	489	72
41	7.9	-0.025	720	322	568	389	552	510.2	484	71
42	7.8	-0.025	719	322	570	392	555	511.6	483	71
43	7.6	-0.026	719	322	572	393	557	512.6	484	71
44	7.5	-0.025	719	322	575	394	559	513.8	486	71
45	7.4	-0.025	718	322	576	395	561	514.4	484	71
46	7.3	-0.025	716	323	577	395	562	514.6	479	71
47	7.2	-0.025	716	323	577	396	564	515.2	481	71
48	7.1	-0.025	716	322	578	396	566	515.6	481	71
49	7	-0.025	717	323	579	395	568	516.4	484	72
50	6.9	-0.025	719	324	580	395	570	517.6	483	72
51	6.8	-0.025	720	324	581	395	573	518.6	483	72
52	6.7	-0.026	723	325	582	394	576	520	484	72
53	6.6	-0.025	725	325	583	394	579	521.2	483	72
54	6.5	-0.026	729	326	584	394	581	522.8	485	72
55	6.4	-0.026	731	327	586	394	584	524.4	483	72
56	6.3	-0.026	732	327	588	395	587	525.8	480	72
57	6.3	-0.027	732	328	594	396	593	528.6	479	72
58	6.1	-0.028	729	329	600	397	599	530.8	476	72
59	6.1	-0.028	724	329	604	398	605	532	474	72
60	6	-0.028	720	329	608	399	612	533.6	470	72
61	5.9	-0.027	717	330	611	400	618	535.2	470	72
62	5.8	-0.034	715	330	612	400	624	536.2	465	72
63	5.7	-0.034	712	330	613	401	628	536.8	462	73
64	5.6	-0.034	710	331	614	402	632	537.8	460	72
65	5.5	-0.033	708	332	613	402	635	538	455	72
66	5.4	-0.033	706	333	613	402	637	538.2	450	72
67	5.3	-0.036	703	334	613	403	639	538.4	448	72
68	5.3	-0.035	700	335	612	402	640	537.8	446	72
69	5.2	-0.035	698	336	611	402	641	537.6	444	72
70	5.1	-0.036	695	337	610	401	642	537	442	72
71	5	-0.035	693	338	609	399	642	536.2	437	72
72	5	-0.035	691	340	607	397	642	535.4	438	72
73	4.9	-0.036	689	341	605	395	641	534.2	435	72
74	4.8	-0.033	688	342	603	393	642	533.6	435	72
75	4.8	-0.033	685	343	602	390	642	532.4	431	72
76	4.7	-0.032	684	343	600	389	641	531.4	432	70
77	4.6	-0.018	683	342	598	388	639	530	430	70

Wood Heater Preburn Data - ASTM E2780

Run:	1

Technician Signature: _____

Manufacturer:	Valley Comfort
Model:	PI29
Tracking No.:	VC-18-1
Project No.:	0142WN019E
Test Date:	1/22/18
Beginning Clock Time:	13:05

Preburn Fuel Data

Fuel Piece Lengths (in.):	16		
Total Preburn Weight (lb):	18.9		
Fuel Moisture Readings (% DB):	18.8	19.5	19
	19.7	19.2	19.6
	19.3	23.8	18.9
	19.7	22.4	19.1
Avg Preburn Moisture (% DB):	19.92		

Coal Bed Range (lb):	3.5 (min)	4.3 (max)

			Temperatures (°F)							
Elapsed Time (min)	Scale (lb)	Stack Draft (in H_2O)	FB Top	FB Bottom	FB Back	FB Left	FB Right	Avg. FB	Stack	Ambient
78	4.6	-0.018	682	343	596	387	637	529	429	70
79	4.5	-0.018	681	344	594	385	635	527.8	428	70
80	4.4	-0.018	680	344	592	383	633	526.4	428	70
81	4.4	-0.018	678	343	590	382	632	525	428	69
82	4.3	-0.018	676	344	589	380	631	524	425	69
83	4.3	-0.017	673	347	586	379	630	523	425	71
84	4.2	-0.018	671	350	584	376	630	522.2	423	71
85	4.2	-0.017	668	352	582	375	629	521.2	422	72
86	4.1	-0.017	667	354	581	373	627	520.4	424	71
87	4.1	-0.017	666	356	578	372	624	519.2	424	71
88	4	-0.017	666	358	577	371	621	518.6	425	72

Wood Heater Test Fuel Data - ASTM E2780

Manufacturer:	**Valley Comfort**
Model:	**PI29**
Tracking No.:	**VC-18-1**
Project No.:	**0142WN019E**
Test Date:	**1/22/2018**
Run No.:	**1**

Firebox Volume (ft^3):	**2.56**
Fuel Piece Length (in):	**16**
2x4 Crib Weight (lb):	**9**
4x4 Crib Weight (lb):	**8.3**

Total Fuel Weight (Dry Basis, lb):	**14.5**	
Fuel Density (lb/ft^3, Dry Basis):	**28.43**	**OK**
Loading Density (lb/ft^3, Wet Basis):	**6.76**	**OK**
2x4 Percentage:	**52%**	**OK**

Coal Bed Range (20-25%): 3.46 - 4.325

Test Fuel Piece	Weight (lb)	Size	Readings (Dry Basis %)			Dry Weight (lb)
1	3.7	4"x 4"	19.4	20.8	20.0	3.08
2	3.7	4"x 4"	20.3	22.0	22.0	3.05
3	1.7	2"x 4"	20.5	19.8	18.7	1.42
4	1.7	2"x 4"	20.7	19.2	19.5	1.42
5	1.8	2"x 4"	20.3	19.1	18.4	1.51
6	1.8	2"x 4"	20.3	19.2	20.5	1.50

Spacer Readings (Dry Basis %)			
13.1	1.3		
17.2	18.2		
14.1	17.2		
14.8	18.3		
12.0	10.8		
12.7	12.4		
14.0	14.4		
14.0	14.8		
19.2	13.8		
17.9	17.9		
13.2	17.9		
14.8	12.0		

Technician Signature: _____

Wood Heater Test Data - ASTM E2780 / ASTM E2515

Run: 1

Manufacturer: Valley Comfort
Model: PI29
Tracking No.: VC-18-1
Project No.: 0142WN019E
Test Date: 22-Jan-18
Beginning Clock Time: 14:34

Total Sampling Time: 197 min
Recording Interval: 1 min
Background Sample Volume: 0 cubic feet

Meter Box Y Factor: 0.997 (1) 0.981 (2) _____ (Amb)

Barometric Pressure:	Begin	Middle	End	Average
	28.69	28.68	28.64	28.67 "Hg

OMNI Equipment Numbers: 410, 283A, 132, 576, 318, 432, 419, 371, 372, 296-T32, 559, 592, 637

PM Control Modules: 371/372
Dilution Tunnel MW(dry): 29.00 lb/lb-mole
Dilution Tunnel MW(wet): 28.78 lb/lb-mole
Dilution Tunnel H2O: 2.00 percent
Dilution Tunnel Static: -0.170 "H2O
Tunnel Area: 0.19635 ft2
Pitot Tube Cp: 0.99

Avg. Tunnel Velocity: 14.47 ft/sec.
Initial Tunnel Flow: 146.7 scfm
Average Tunnel Flow: 148.6 scfm
Post-Test Leak Check (1): 0.000 cfm @ -15 in. Hg
Post-Test Leak Check (2): 0.000 cfm @ -17 in. Hg
Average Test Piece Fuel Moisture: 20.04 Dry Basis %

Technician Signature: _____

Velocity Traverse Data	Pt.1	Pt.2	Pt.3	Pt.4	Pt.5	Pt.6	Pt.7	Pt.8	Center	
Initial dP	0.034	0.052	0.038	0.034	0.034	0.052	0.054	0.034	0.054	"H2O
Temp:	105	105	105	105	105	105	105	105	105	°F

V_{strav} 14.42 ft/sec V_{scent} 16.27 ft/sec F_p 0.886

	Particulate Sampling Data														Fuel Weight (lb)		Temperature Data (°F)													Stack Gas Data		
Elapsed Time (min)	Gas Meter 1 (ft^3)	Gas Meter 2 (ft^3)	Sample Rate 1 (cfm)	Sample Rate 2 (cfm)	Orifice dH 1 ("H_2O)	Meter 1 Temp (°F)	Meter 1 Vacuum ("Hg)	Orifice dH 2 ("H_2O)	Meter 2 Temp (°F)	Meter 2 Vacuum ("Hg)	Dilution Tunnel (°F)	Dilution Tunnel Center dP	Pro. Rate 1	Pro. Rate 2	Scale Reading	Weight Change	Firebox Top	Firebox Bottom	Firebox Back	Firebox Left	Firebox Right	Avg. Stove Surface	Catalyst Exit	Stack	Filter 1	Dryer Exit 1	Filter 2	Dryer Exit 2	Ambient	Draft ("H_2O)	CO_2 (%)	CO (%)
0	0.000	0.000			0.55	69	0.93	1.00	71	0.4	133	0.054			17.3		675	363	588	407	620	531	719	522	73	70	74	69	72	-0.019	5.83	0
1	0.115	0.130	0.12	0.13	0.91	69	0.91	1.35	71	0.3	146	0.054	82	92	17.3	0	665	366	594	413	617	531	623	520	74	69	76	70	72	-0.021	3.98	0.02
2	0.231	0.276	0.12	0.15	1.22	69	0.91	1.35	71	0.3	123	0.054	81	101	17.1	-0.2	653	368	583	392	606	520	677	474	75	69	76	69	71	-0.023	2.93	0.04
3	0.352	0.422	0.12	0.15	1.66	69	0.73	1.34	71	0.3	120	0.054	84	101	16.9	-0.2	654	370	570	376	593	513	794	484	75	70	76	69	72	-0.024	6.92	0.23
4	0.473	0.567	0.12	0.15	1.35	69	0.67	1.34	71	0.3	119	0.054	84	100	16.7	-0.2	660	372	557	362	579	506	846	501	75	70	76	69	72	-0.024	6.93	0.35
5	0.623	0.713	0.15	0.15	1.56	69	0.58	1.33	71	0.3	119	0.054	104	100	16.5	-0.2	668	374	548	349	566	501	867	511	76	70	76	69	72	-0.024	7.18	0.55
6	0.774	0.858	0.15	0.15	1.95	69	0.56	1.33	71	0.3	119	0.054	105	100	16.3	-0.2	676	376	540	338	554	497	875	520	76	70	77	69	72	-0.025	7.35	0.53
7	0.921	1.004	0.15	0.15	1.62	69	0.54	1.33	71	0.3	120	0.054	102	101	16.1	-0.2	681	378	533	329	543	493	870	526	76	69	77	69	72	-0.026	7.41	0.66
8	1.078	1.149	0.16	0.15	1.71	70	0.47	1.32	71	0.3	121	0.054	109	100	15.8	-0.3	686	379	526	321	534	489	870	529	77	69	77	69	72	-0.026	7.42	1.04
9	1.234	1.295	0.16	0.15	1.63	69	0.78	1.33	71	0.3	121	0.054	108	101	15.6	-0.2	690	380	521	314	525	486	870	531	77	69	77	69	72	-0.026	7.53	1.02
10	1.353	1.440	0.12	0.15	1.28	69	0.78	1.32	71	0.3	122	0.054	83	100	15.4	-0.2	694	382	517	309	518	484	870	535	76	69	77	69	72	-0.026	7.58	0.88
11	1.490	1.586	0.14	0.15	1.62	69	0.52	1.33	71	0.3	122	0.054	95	101	15.2	-0.2	697	382	514	304	512	482	873	539	77	69	77	69	72	-0.027	7.6	0.87
12	1.646	1.731	0.16	0.15	1.78	69	0.5	1.33	71	0.3	123	0.054	109	100	14.9	-0.3	701	383	511	301	507	481	877	542	77	69	77	69	71	-0.027	7.68	0.91
13	1.792	1.876	0.15	0.15	1.67	69	0.6	1.33	71	0.3	123	0.054	102	100	14.7	-0.2	705	384	509	298	502	480	880	545	77	69	78	69	72	-0.027	7.69	0.97
14	1.934	2.021	0.14	0.15	1.84	69	0.6	1.33	71	0.3	124	0.054	99	100	14.5	-0.2	708	384	508	296	499	479	885	549	77	69	78	69	72	-0.027	7.66	0.86
15	2.077	2.166	0.14	0.15	1.81	69	0.59	1.32	71	0.3	124	0.054	100	100	14.2	-0.3	712	384	506	294	495	478	886	552	77	69	78	69	72	-0.027	7.75	0.95
16	2.219	2.310	0.14	0.14	1.48	69	0.59	1.32	71	0.3	125	0.054	99	100	14.0	-0.2	716	383	504	293	493	478	886	554	78	69	78	69	72	-0.028	7.77	0.91
17	2.362	2.455	0.14	0.15	1.41	69	0.59	1.32	71	0.3	125	0.054	100	100	13.8	-0.2	720	383	502	293	491	478	887	553	78	69	78	69	72	-0.028	7.75	0.85
18	2.504	2.600	0.14	0.15	1.21	69	0.6	1.31	71	0.3	125	0.054	99	100	13.6	-0.2	723	383	501	293	489	478	888	555	78	69	78	69	72	-0.027	7.82	0.81
19	2.645	2.744	0.14	0.14	1.39	69	0.6	1.31	71	0.3	125	0.054	98	100	13.3	-0.3	726	382	499	293	489	478	888	554	78	68	78	69	72	-0.027	7.82	0.81
20	2.788	2.889	0.14	0.15	1.42	69	0.59	1.31	71	0.3	125	0.054	100	100	13.1	-0.2	730	381	499	294	488	478	888	555	78	68	79	69	72	-0.027	7.86	0.74
21	2.930	3.033	0.14	0.14	1.00	69	0.59	1.31	71	0.3	125	0.054	99	100	12.9	-0.2	732	381	498	294	489	479	887	552	78	68	79	69	72	-0.028	7.81	0.71
22	3.073	3.178	0.14	0.15	1.23	69	0.59	1.31	71	0.3	125	0.054	100	100	12.7	-0.2	735	380	498	295	490	480	887	551	78	68	79	69	72	-0.027	7.84	0.67
23	3.215	3.322	0.14	0.14	0.98	69	0.59	1.30	71	0.3	125	0.054	99	100	12.5	-0.2	736	379	498	296	491	480	887	546	78	68	79	69	72	-0.027	7.81	0.65
24	3.356	3.467	0.14	0.15	1.14	69	0.59	1.30	71	0.3	125	0.054	98	100	12.3	-0.2	738	378	498	296	492	480	887	547	78	68	79	69	72	-0.027	7.89	0.66
25	3.498	3.611	0.14	0.14	1.12	69	0.59	1.29	71	0.3	125	0.054	99	100	12.1	-0.2	740	377	499	297	494	481	888	547	78	68	79	69	72	-0.027	7.95	0.66
26	3.641	3.756	0.14	0.15	0.89	69	0.58	1.29	71	0.3	125	0.054	100	100	11.9	-0.2	742	376	500	298	496	482	890	544	78	68	79	69	72	-0.027	7.95	0.75
27	3.783	3.900	0.14	0.14	0.98	69	0.58	1.30	71	0.3	125	0.054	99	100	11.7	-0.2	744	375	501	300	498	484	891	544	78	68	79	69	73	-0.027	8.02	0.9
28	3.925	4.044	0.14	0.14	1.35	69	0.57	1.30	71	0.3	125	0.054	99	100	11.5	-0.2	745	375	503	301	501	485	889	539	79	68	79	69	72	-0.027	8.04	1.04
29	4.065	4.188	0.14	0.14	1.04	69	0.58	1.29	71	0.3	124	0.054	98	100	11.3	-0.2	746	374	505	302	503	486	887	535	79	68	79	69	73	-0.026	8.05	1.06
30	4.207	4.333	0.14	0.15	0.99	69	0.56	1.33	71	0.2	124	0.054	99	100	11.1	-0.2	747	373	509	304	507	488	878	532	79	68	79	69	72	-0.026	8.1	0.99
31	4.351	4.480	0.14	0.15	1.10	69	0.56	1.34	71	0.2	124	0.054	100	102	10.9	-0.2	746	372	514	306	511	490	859	527	79	68	79	68	73	-0.026	8.24	0.99
32	4.494	4.626	0.14	0.15	0.99	69	0.56	1.34	71	0.2	123	0.054	100	101	10.7	-0.2	745	371	519	309	516	492	849	522	79	68	79	68	73	-0.026	8.1	1.02
33	4.637	4.773	0.14	0.15	0.99	69	0.56	1.34	71	0.2	122	0.054	99	101	10.5	-0.2	743	370	525	312	522	494	844	516	79	68	79	68	73	-0.025	8	0.94
34	4.780	4.919	0.14	0.15	1.18	69	0.56	1.33	71	0.2	121	0.054	99	101	10.4	-0.1	742	370	532	316	528	498	841	510	79	68	79	68	72	-0.025	7.98	0.88
35	4.923	5.065	0.14	0.15	0.86	69	0.56	1.34	71	0.2	121	0.054	99	101	10.2	-0.2	741	369	538	319	535	500	840	503	79	68	79	68	72	-0.024	7.98	0.79
36	5.065	5.211	0.14	0.15	0.90	69	0.55	1.33	71	0.2	120	0.054	99	101	10.0	-0.2	740	368	543	322	541	503	840	497	79	68	79	68	73	-0.024	7.92	0.72
37	5.209	5.358	0.14	0.15	1.01	69	0.55	1.32	71	0.2	119	0.054	100	101	9.9	-0.1	740	368	548	325	547	506	843	491	79	68	79	68	73	-0.023	7.97	0.69

Wood Heater Test Data - ASTM E2780 / ASTM E2515

Run: 1

Manufacturer: Valley Comfort
Model: PI29
Tracking No.: VC-18-1
Project No.: 0142WN019E
Test Date: 22-Jan-18
Beginning Clock Time: 14:34

Total Sampling Time: 197 min
Recording Interval: 1 min
Background Sample Volume: 0 cubic feet

Meter Box Y Factor: 0.997 (1) 0.981 (2) _____ (Amb)

Barometric Pressure:	Begin	Middle	End	Average
	28.69	28.68	28.64	28.67 "Hg

OMNI Equipment Numbers: 410, 283A, 132, 576, 318, 432, 419, 371, 372, 296-T32, 559, 592, 637

PM Control Modules: 371/372
Dilution Tunnel MW(dry): 29.00 lb/lb-mole
Dilution Tunnel MW(wet): 28.78 lb/lb-mole
Dilution Tunnel H2O: 2.00 percent
Dilution Tunnel Static: -0.170 "H2O
Tunnel Area: 0.19635 ft2
Pitot Tube Cp: 0.99

Avg. Tunnel Velocity: 14.47 ft/sec.
Initial Tunnel Flow: 146.7 scfm
Average Tunnel Flow: 148.6 scfm
Post-Test Leak Check (1): 0.000 cfm @ -15 in. Hg
Post-Test Leak Check (2): 0.000 cfm @ -17 in. Hg
Average Test Piece Fuel Moisture: 20.04 Dry Basis %

Technician Signature: _____

Velocity Traverse Data	Pt.1	Pt.2	Pt.3	Pt.4	Pt.5	Pt.6	Pt.7	Pt.8	Center	
Initial dP	0.034	0.052	0.038	0.034	0.034	0.052	0.054	0.034	0.054	"H2O
Temp:	105	105	105	105	105	105	105	105	105	°F

V_{strav} 14.42 ft/sec V_{scent} 16.27 ft/sec F_p 0.886

	Particulate Sampling Data														Fuel Weight (lb)		Temperature Data (°F)												Stack Gas Data		
Elapsed Time (min)	Gas Meter 1 (ft^3)	Gas Meter 2 (ft^3)	Sample Rate 1 (cfm)	Sample Rate 2 (cfm)	Orifice dH 1 ("H_2O)	Meter 1 Temp (°F)	Meter 1 Vacuum ("Hg)	Orifice dH 2 ("H_2O)	Meter 2 Temp (°F)	Meter 2 Vacuum ("Hg)	Dilution Tunnel (°F)	Dilution Tunnel Center dP	Pro. Rate 1	Pro. Rate 2	Scale Reading	Weight Change	Firebox Top	Firebox Bottom	Firebox Back	Firebox Left	Firebox Right	Avg. Stove Surface	Catalyst Exit	Stack	Filter 1	Dryer Exit 1	Filter 2	Dryer Exit 2	Ambient	Draft ("H_2O)	CO_2 (%)	CO (%)
38	5.353	5.504	0.14	0.15	0.99	69	0.55	1.33	71	0.2	118	0.054	100	100	9.7	-0.2	741	367	552	328	552	508	852	485	79	68	79	68	73	-0.023	7.99	0.61
39	5.496	5.651	0.14	0.15	1.01	69	0.55	1.34	71	0.2	117	0.054	99	101	9.6	-0.1	742	366	554	330	557	510	861	477	79	68	79	68	73	-0.023	8.04	0.36
40	5.639	5.797	0.14	0.15	1.06	69	0.55	1.34	71	0.2	117	0.054	99	100	9.5	-0.1	743	366	557	333	561	512	859	471	79	68	79	68	72	-0.022	7.83	0.21
41	5.782	5.943	0.14	0.15	0.91	69	0.55	1.34	71	0.2	116	0.054	99	100	9.4	-0.1	744	365	559	335	565	514	853	468	79	67	79	68	73	-0.023	7.53	0.12
42	5.925	6.090	0.14	0.15	0.90	69	0.55	1.34	71	0.2	116	0.054	99	101	9.3	-0.1	744	364	559	336	570	515	848	466	79	67	79	68	72	-0.023	7.37	0.14
43	6.068	6.236	0.14	0.15	1.03	69	0.55	1.33	71	0.2	115	0.054	99	100	9.1	-0.2	743	363	559	338	574	515	844	462	79	67	79	68	73	-0.023	7.27	0.18
44	6.212	6.382	0.14	0.15	1.20	69	0.55	1.33	71	0.2	114	0.054	99	100	9.0	-0.1	743	363	559	340	578	517	842	457	78	67	79	68	73	-0.022	7.28	0.11
45	6.355	6.529	0.14	0.15	0.77	69	0.55	1.32	71	0.2	114	0.054	99	101	8.9	-0.1	742	361	559	341	582	517	839	455	78	67	79	68	73	-0.022	7.18	0.06
46	6.499	6.675	0.14	0.15	0.83	69	0.55	1.33	72	0.2	112	0.054	99	100	8.8	-0.1	741	357	559	343	586	517	838	455	78	68	79	69	72	-0.022	7.24	0.05
47	6.642	6.822	0.14	0.15	1.03	69	0.55	1.34	72	0.2	112	0.054	99	100	8.7	-0.1	740	355	559	343	589	517	839	456	78	68	79	69	72	-0.022	7.25	0.04
48	6.786	6.969	0.14	0.15	1.05	69	0.55	1.35	72	0.2	111	0.054	99	100	8.6	-0.1	740	352	559	344	592	517	842	455	78	68	79	69	72	-0.022	7.35	0.05
49	6.929	7.116	0.14	0.15	1.06	69	0.55	1.34	72	0.2	111	0.054	98	100	8.5	-0.1	740	350	559	345	594	518	845	454	78	68	79	69	71	-0.022	7.39	0.06
50	7.072	7.262	0.14	0.15	0.86	69	0.55	1.34	72	0.2	111	0.054	98	100	8.4	-0.1	740	348	559	345	597	518	845	455	78	68	79	69	70	-0.022	7.44	0.08
51	7.216	7.409	0.14	0.15	0.97	69	0.55	1.34	72	0.2	110	0.054	99	100	8.3	-0.1	740	347	558	345	599	518	839	453	78	68	79	69	71	-0.021	7.48	0.1
52	7.360	7.555	0.14	0.15	0.88	69	0.55	1.32	72	0.2	110	0.054	99	100	8.2	-0.1	738	347	558	344	601	518	832	454	78	68	78	69	71	-0.022	7.48	0.06
53	7.504	7.703	0.14	0.15	1.10	69	0.55	1.34	72	0.2	110	0.054	99	101	8.1	-0.1	736	346	557	344	603	517	824	452	78	68	78	69	70	-0.022	7.45	0.07
54	7.648	7.850	0.14	0.15	1.25	70	0.55	1.34	72	0.2	110	0.054	99	100	8.0	-0.1	734	346	557	344	605	517	818	453	78	68	78	69	71	-0.022	7.46	0.07
55	7.792	7.997	0.14	0.15	0.81	69	0.55	1.35	72	0.2	111	0.054	99	100	7.9	-0.1	732	347	556	344	607	517	818	454	78	68	78	69	72	-0.022	7.37	0.11
56	7.935	8.144	0.14	0.15	0.96	69	0.55	1.34	72	0.2	111	0.054	98	100	7.7	-0.2	730	347	557	344	607	517	820	451	78	68	78	69	72	-0.022	7.51	0.43
57	8.078	8.291	0.14	0.15	0.98	69	0.55	1.34	72	0.2	112	0.054	99	100	7.6	-0.1	728	347	557	344	607	517	825	449	78	68	78	69	72	-0.022	7.63	0.29
58	8.221	8.437	0.14	0.15	0.86	69	0.55	1.34	72	0.2	111	0.054	98	100	7.5	-0.1	727	347	558	344	607	517	826	448	77	68	78	69	73	-0.022	7.37	0.36
59	8.366	8.584	0.15	0.15	0.93	69	0.55	1.33	72	0.2	111	0.054	100	100	7.4	-0.1	726	347	559	344	607	517	825	444	78	68	78	69	73	-0.020	7.33	0.25
60	8.510	8.731	0.14	0.15	0.94	69	0.55	1.34	72	0.2	111	0.054	99	100	7.3	-0.1	725	347	560	345	608	517	825	443	77	68	78	69	73	-0.020	7.39	0.17
61	8.661	8.878	0.15	0.15	1.20	69	0.75	1.34	72	0.2	111	0.054	104	100	7.2	-0.1	724	347	560	346	609	517	824	442	77	68	78	69	72	-0.021	7.38	0.09
62	8.808	9.025	0.15	0.15	1.70	69	0.61	1.34	72	0.2	111	0.054	101	100	7.1	-0.1	723	346	559	347	610	517	822	439	78	68	78	69	73	-0.022	7.41	0.05
63	8.954	9.173	0.15	0.15	1.36	69	0.61	1.35	72	0.2	111	0.054	101	101	7.0	-0.1	722	345	559	347	611	517	819	437	78	68	78	69	72	-0.021	7.15	0.01
64	9.101	9.319	0.15	0.15	1.04	69	0.61	1.34	72	0.2	110	0.054	101	100	6.9	-0.1	721	345	559	347	612	517	815	439	79	68	78	69	73	-0.020	7.05	0
65	9.248	9.466	0.15	0.15	0.97	69	0.61	1.34	72	0.2	110	0.054	101	100	6.8	-0.1	720	344	558	347	613	516	813	437	79	68	78	69	72	-0.020	6.96	0
66	9.394	9.613	0.15	0.15	0.97	69	0.61	1.34	72	0.2	110	0.054	100	100	6.7	-0.1	718	344	557	347	614	516	811	438	79	68	78	69	73	-0.020	6.81	0
67	9.541	9.761	0.15	0.15	1.31	69	0.61	1.34	72	0.2	110	0.054	101	101	6.7	0	717	343	556	347	615	516	806	438	78	68	78	69	72	-0.020	6.78	0.01
68	9.688	9.908	0.15	0.15	1.08	69	0.61	1.35	72	0.2	110	0.054	101	100	6.6	-0.1	715	343	555	346	616	515	800	436	78	68	78	69	73	-0.020	6.67	0.01
69	9.835	10.055	0.15	0.15	1.01	69	0.61	1.35	72	0.2	109	0.054	101	100	6.5	-0.1	712	340	554	346	617	514	794	435	78	68	78	69	71	-0.020	6.65	0.01
70	9.981	10.202	0.15	0.15	1.06	69	0.61	1.35	72	0.2	108	0.054	100	100	6.4	-0.1	710	337	553	345	617	512	789	435	78	68	78	69	71	-0.021	6.46	0.01
71	10.128	10.349	0.15	0.15	1.02	70	0.61	1.34	73	0.2	107	0.054	101	100	6.3	-0.1	707	336	552	344	617	511	785	433	78	68	78	69	71	-0.020	6.5	0.01
72	10.275	10.496	0.15	0.15	1.40	69	0.61	1.33	73	0.2	108	0.054	101	100	6.2	-0.1	705	336	550	343	617	510	781	433	78	68	78	69	72	-0.020	6.28	0
73	10.422	10.644	0.15	0.15	0.85	69	0.61	1.33	73	0.2	108	0.054	101	101	6.1	-0.1	702	337	550	342	616	509	775	434	78	68	78	69	73	-0.020	6.5	0
74	10.569	10.791	0.15	0.15	0.82	69	0.61	1.33	73	0.2	108	0.054	101	100	6.1	0	699	338	550	341	616	509	768	432	78	68	78	69	72	-0.020	6.41	0
75	10.716	10.938	0.15	0.15	0.87	69	0.61	1.34	73	0.2	108	0.054	101	100	6.0	-0.1	697	338	549	341	616	508	769	433	78	68	78	69	72	-0.020	6.35	0

Wood Heater Test Data - ASTM E2780 / ASTM E2515

Run: 1

Manufacturer: Valley Comfort
Model: PI29
Tracking No.: VC-18-1
Project No.: 0142WN019E
Test Date: 22-Jan-18
Beginning Clock Time: 14:34

Total Sampling Time: 197 min
Recording Interval: 1 min
Background Sample Volume: 0 cubic feet

Meter Box Y Factor: 0.997 (1) 0.981 (2) _____ (Amb)

Barometric Pressure:

Begin	Middle	End	Average
28.69	28.68	28.64	28.67 "Hg

OMNI Equipment Numbers: 410, 283A, 132, 576, 318, 432, 419, 371, 372, 296-T32, 559, 592, 637

PM Control Modules: 371/372
Dilution Tunnel MW(dry): 29.00 lb/lb-mole
Dilution Tunnel MW(wet): 28.78 lb/lb-mole
Dilution Tunnel H2O: 2.00 percent
Dilution Tunnel Static: -0.170 "H2O
Tunnel Area: 0.19635 ft2
Pitot Tube Cp: 0.99

Avg. Tunnel Velocity: 14.47 ft/sec.
Initial Tunnel Flow: 146.7 scfm
Average Tunnel Flow: 148.6 scfm
Post-Test Leak Check (1): 0.000 cfm @ -15 in. Hg
Post-Test Leak Check (2): 0.000 cfm @ -17 in. Hg
Average Test Piece Fuel Moisture: 20.04 Dry Basis %

Technician Signature: _____

Velocity Traverse Data

	Pt.1	Pt.2	Pt.3	Pt.4	Pt.5	Pt.6	Pt.7	Pt.8	Center	
Initial dP	0.034	0.052	0.038	0.034	0.034	0.052	0.054	0.034	0.054	"H2O
Temp:	105	105	105	105	105	105	105	105	105	°F

V_{strav} 14.42 ft/sec V_{scent} 16.27 ft/sec F_p 0.886

	Particulate Sampling Data														Fuel Weight (lb)		Temperature Data (°F)												Stack Gas Data		
Elapsed Time (min)	Gas Meter 1 (ft^3)	Gas Meter 2 (ft^3)	Sample Rate 1 (cfm)	Sample Rate 2 (cfm)	Orifice dH 1 ("H_2O)	Meter 1 Temp (°F)	Meter 1 Vacuum ("Hg)	Orifice dH 2 ("H_2O)	Meter 2 Temp (°F)	Meter 2 Vacuum ("Hg)	Dilution Tunnel (°F)	Dilution Tunnel Center dP	Pro. Rate 1	Pro. Rate 2	Scale Reading	Weight Change	Firebox Top	Firebox Bottom	Firebox Back	Firebox Left	Firebox Right	Avg. Stove Surface	Catalyst Exit	Stack	Filter 1	Dryer Exit 1	Filter 2	Dryer Exit 2	Ambient	Draft ("H_2O)	CO_2 (%)	CO (%)
76	10.863	11.085	0.15	0.15	1.11	69	0.61	1.35	72	0.2	108	0.054	101	100	5.9	-0.1	695	338	549	340	616	508	772	435	78	68	78	69	73	-0.020	6.24	0
77	11.010	11.232	0.15	0.15	1.00	69	0.61	1.34	73	0.2	108	0.054	101	100	5.8	-0.1	693	337	548	340	615	507	773	434	78	68	78	69	72	-0.020	6.35	0
78	11.157	11.379	0.15	0.15	1.06	70	0.61	1.34	73	0.2	107	0.054	101	100	5.7	-0.1	691	335	547	339	615	505	771	434	78	68	78	69	71	-0.020	6.19	0
79	11.304	11.526	0.15	0.15	0.87	69	0.62	1.34	73	0.2	107	0.054	101	100	5.7	0	688	333	546	338	614	504	771	432	77	68	78	69	70	-0.019	6.31	0
80	11.451	11.675	0.15	0.15	0.91	69	0.61	1.35	73	0.2	107	0.054	101	101	5.6	-0.1	687	334	546	337	614	504	771	432	77	68	78	69	71	-0.020	6.45	0
81	11.598	11.822	0.15	0.15	0.80	69	0.61	1.35	73	0.2	107	0.054	101	100	5.5	-0.1	685	335	546	336	615	503	771	434	77	68	78	69	72	-0.020	6.39	0
82	11.745	11.969	0.15	0.15	0.85	69	0.61	1.35	73	0.2	107	0.054	101	100	5.4	-0.1	683	336	546	336	616	503	769	432	77	68	78	69	73	-0.020	6.42	0
83	11.892	12.116	0.15	0.15	1.07	69	0.61	1.34	73	0.2	108	0.054	101	100	5.3	-0.1	680	336	547	336	617	503	766	433	77	68	78	69	73	-0.020	6.59	0
84	12.040	12.264	0.15	0.15	0.97	69	0.61	1.34	73	0.2	108	0.054	102	101	5.3	0	679	337	546	336	619	503	765	433	77	68	78	69	72	-0.020	6.48	0
85	12.186	12.411	0.15	0.15	0.89	69	0.61	1.34	73	0.2	107	0.054	100	100	5.2	-0.1	677	337	547	336	620	503	764	431	77	68	78	68	73	-0.019	6.45	0
86	12.334	12.559	0.15	0.15	0.62	69	0.61	1.35	73	0.2	108	0.054	102	101	5.1	-0.1	675	337	547	336	622	503	764	431	77	68	78	68	72	-0.019	6.48	0
87	12.481	12.706	0.15	0.15	0.74	69	0.62	1.35	73	0.2	107	0.054	101	100	5.0	-0.1	674	337	548	336	624	504	763	428	77	68	78	68	72	-0.019	6.36	0
88	12.628	12.854	0.15	0.15	0.65	69	0.61	1.35	73	0.2	107	0.054	101	100	4.9	-0.1	672	337	548	336	626	504	759	426	77	68	78	68	72	-0.019	6.4	0
89	12.775	13.001	0.15	0.15	0.90	69	0.62	1.34	72	0.2	107	0.054	101	100	4.9	0	670	338	548	336	627	504	751	423	77	68	78	68	72	-0.019	6.14	0
90	12.922	13.148	0.15	0.15	0.75	69	0.62	1.34	72	0.2	106	0.054	101	100	4.8	-0.1	668	336	548	335	628	503	749	421	77	68	78	68	72	-0.019	5.94	0.02
91	13.069	13.296	0.15	0.15	0.97	69	0.62	1.35	73	0.2	106	0.054	101	100	4.7	-0.1	666	334	548	334	627	502	750	419	77	68	78	68	70	-0.020	5.91	0.02
92	13.216	13.444	0.15	0.15	0.93	69	0.62	1.35	73	0.2	105	0.054	101	100	4.7	0	664	333	547	334	624	500	749	419	77	68	77	68	70	-0.019	5.71	0.02
93	13.364	13.591	0.15	0.15	1.12	69	0.61	1.36	73	0.2	105	0.054	101	100	4.6	-0.1	662	332	546	333	621	499	745	416	77	68	77	68	70	-0.019	5.63	0.02
94	13.511	13.739	0.15	0.15	0.69	69	0.61	1.35	73	0.2	104	0.054	101	100	4.6	0	660	332	545	332	618	497	738	413	77	68	77	68	71	-0.019	5.55	0.02
95	13.659	13.886	0.15	0.15	1.03	70	0.61	1.35	73	0.2	104	0.054	101	99	4.5	-0.1	657	332	543	331	614	495	733	413	77	68	77	68	70	-0.019	5.42	0.02
96	13.806	14.034	0.15	0.15	0.97	70	0.61	1.33	73	0.2	104	0.054	100	100	4.5	0	654	331	541	330	611	493	733	409	77	68	77	68	70	-0.019	5.2	0.02
97	13.954	14.182	0.15	0.15	0.66	69	0.62	1.35	73	0.2	104	0.054	101	100	4.4	-0.1	651	330	538	328	607	491	734	409	76	67	77	68	70	-0.019	5.21	0.02
98	14.101	14.330	0.15	0.15	0.83	70	0.62	1.36	73	0.2	104	0.054	100	100	4.4	0	649	330	536	328	604	489	735	409	76	67	77	68	69	-0.018	5.24	0.02
99	14.249	14.478	0.15	0.15	0.98	69	0.61	1.36	73	0.2	103	0.054	101	100	4.3	-0.1	646	330	533	327	600	487	736	408	76	67	77	68	70	-0.018	5.26	0.02
100	14.396	14.626	0.15	0.15	1.06	69	0.61	1.35	73	0.2	103	0.054	101	100	4.3	0	644	331	531	326	597	486	740	410	76	67	77	68	70	-0.018	5.22	0.02
101	14.543	14.773	0.15	0.15	1.05	69	0.61	1.35	73	0.2	104	0.054	101	99	4.2	-0.1	642	331	529	326	593	484	743	410	76	67	76	68	69	-0.018	5.21	0.02
102	14.691	14.921	0.15	0.15	0.65	69	0.61	1.35	73	0.2	104	0.054	101	100	4.2	0	639	329	526	324	590	482	743	408	76	67	76	68	70	-0.018	5.21	0.02
103	14.838	15.070	0.15	0.15	0.85	69	0.61	1.36	73	0.2	104	0.054	101	101	4.1	-0.1	638	329	525	324	587	481	742	410	76	67	76	68	70	-0.018	5.21	0.02
104	14.986	15.217	0.15	0.15	0.90	69	0.61	1.36	73	0.2	104	0.054	101	99	4.1	0	635	329	524	323	585	479	739	411	76	67	76	68	70	-0.017	5.25	0.02
105	15.133	15.365	0.15	0.15	0.87	69	0.61	1.36	73	0.2	104	0.054	101	100	4.0	-0.1	633	329	523	323	582	478	736	414	76	67	76	68	70	-0.018	5.32	0.02
106	15.281	15.513	0.15	0.15	0.37	69	0.61	1.35	73	0.2	104	0.054	101	100	3.9	-0.1	630	330	522	322	581	477	733	416	76	67	76	68	70	-0.018	5.43	0.02
107	15.428	15.661	0.15	0.15	0.69	69	0.61	1.33	73	0.2	105	0.054	101	100	3.9	0	628	332	522	322	579	477	731	418	75	67	76	68	71	-0.018	5.48	0.02
108	15.575	15.809	0.15	0.15	0.35	69	0.61	1.35	73	0.2	105	0.054	101	100	3.8	-0.1	626	333	522	322	578	476	729	420	76	67	76	68	71	-0.017	5.58	0.02
109	15.722	15.957	0.15	0.15	-0.06	69	0.61	1.36	73	0.2	105	0.054	101	100	3.7	-0.1	624	334	523	323	577	476	726	420	76	67	76	68	72	-0.017	5.73	0.02
110	15.869	16.104	0.15	0.15	0.78	69	0.61	1.35	73	0.2	105	0.054	101	100	3.7	0	622	335	524	323	577	476	724	420	76	67	76	68	72	-0.018	5.74	0.02
111	16.016	16.251	0.15	0.15	0.74	69	0.61	1.33	73	0.2	106	0.054	101	100	3.6	-0.1	621	336	525	324	578	477	727	423	76	67	76	68	72	-0.018	5.61	0.02
112	16.163	16.398	0.15	0.15	0.74	69	0.61	1.34	73	0.2	105	0.054	101	100	3.6	0	619	336	527	326	580	478	727	422	76	67	76	68	72	-0.018	5.96	0.02
113	16.311	16.546	0.15	0.15	0.28	69	0.61	1.33	73	0.2	105	0.054	101	100	3.5	-0.1	618	337	529	328	582	479	722	423	76	67	76	67	71	-0.018	5.73	0.02

Wood Heater Test Data - ASTM E2780 / ASTM E2515

Run: 1

Manufacturer: Valley Comfort
Model: PI29
Tracking No.: VC-18-1
Project No.: 0142WN019E
Test Date: 22-Jan-18
Beginning Clock Time: 14:34

Total Sampling Time: 197 min
Recording Interval: 1 min
Background Sample Volume: 0 cubic feet

Meter Box Y Factor: 0.997 (1) 0.981 (2) _____ (Amb)

Barometric Pressure:	Begin	Middle	End	Average
	28.69	28.68	28.64	28.67 "Hg

OMNI Equipment Numbers: 410, 283A, 132, 576, 318, 432, 419, 371, 372, 296-T32, 559, 592, 637

PM Control Modules: 371/372
Dilution Tunnel MW(dry): 29.00 lb/lb-mole
Dilution Tunnel MW(wet): 28.78 lb/lb-mole
Dilution Tunnel H2O: 2.00 percent
Dilution Tunnel Static: -0.170 "H2O
Tunnel Area: 0.19635 ft2
Pitot Tube Cp: 0.99

Avg. Tunnel Velocity: 14.47 ft/sec.
Initial Tunnel Flow: 146.7 scfm
Average Tunnel Flow: 148.6 scfm
Post-Test Leak Check (1): 0.000 cfm @ -15 in. Hg
Post-Test Leak Check (2): 0.000 cfm @ -17 in. Hg
Average Test Piece Fuel Moisture: 20.04 Dry Basis %

Technician Signature: _____

Velocity Traverse Data	Pt.1	Pt.2	Pt.3	Pt.4	Pt.5	Pt.6	Pt.7	Pt.8	Center	
Initial dP	0.034	0.052	0.038	0.034	0.034	0.052	0.054	0.034	0.054	"H2O
Temp:	105	105	105	105	105	105	105	105	105	°F

V_{strav} 14.42 ft/sec V_{scent} 16.27 ft/sec F_p 0.886

	Particulate Sampling Data														Fuel Weight (lb)		Temperature Data (°F)													Stack Gas Data		
Elapsed Time (min)	Gas Meter 1 (ft^3)	Gas Meter 2 (ft^3)	Sample Rate 1 (cfm)	Sample Rate 2 (cfm)	Orifice dH 1 ("H_2O)	Meter 1 Temp (°F)	Meter 1 Vacuum ("Hg)	Orifice dH 2 ("H_2O)	Meter 2 Temp (°F)	Meter 2 Vacuum ("Hg)	Dilution Tunnel (°F)	Dilution Tunnel Center dP	Pro. Rate 1	Pro. Rate 2	Scale Reading	Weight Change	Firebox Top	Firebox Bottom	Firebox Back	Firebox Left	Firebox Right	Avg. Stove Surface	Catalyst Exit	Stack	Filter 1	Dryer Exit 1	Filter 2	Dryer Exit 2	Ambient	Draft ("H_2O)	CO_2 (%)	CO (%)
114	16.458	16.694	0.15	0.15	0.99	69	0.61	1.35	73	0.2	105	0.054	101	100	3.4	-0.1	617	338	532	329	584	480	719	422	76	67	76	68	72	-0.018	5.68	0.02
115	16.604	16.841	0.15	0.15	0.44	69	0.61	1.34	73	0.2	106	0.054	100	100	3.4	0	615	339	535	331	587	481	714	421	76	67	76	67	72	-0.018	5.75	0.02
116	16.751	16.988	0.15	0.15	0.76	69	0.61	1.34	73	0.2	106	0.054	101	100	3.3	-0.1	614	340	539	333	591	483	706	422	76	67	76	68	72	-0.018	5.92	0.02
117	16.898	17.135	0.15	0.15	0.67	69	0.61	1.34	72	0.2	106	0.054	101	100	3.3	0	612	341	543	334	596	485	697	420	76	67	76	67	72	-0.018	6.07	0.02
118	17.045	17.282	0.15	0.15	0.94	69	0.61	1.34	72	0.2	106	0.054	101	100	3.2	-0.1	610	343	547	336	601	487	690	418	76	67	76	67	72	-0.018	6.09	0.02
119	17.192	17.429	0.15	0.15	0.43	69	0.6	1.33	72	0.2	105	0.054	101	100	3.1	-0.1	608	344	551	338	605	489	686	415	76	67	76	67	71	-0.018	6.19	0.02
120	17.339	17.577	0.15	0.15	0.02	69	0.61	1.34	72	0.2	105	0.054	101	100	3.1	0	606	344	555	341	610	491	680	413	76	67	76	67	71	-0.018	6.27	0.02
121	17.486	17.724	0.15	0.15	0.23	69	0.61	1.35	73	0.2	104	0.054	101	99	3.0	-0.1	604	344	560	344	613	493	676	410	76	67	76	67	70	-0.018	6.36	0.02
122	17.634	17.872	0.15	0.15	-0.18	69	0.61	1.35	73	0.2	104	0.054	101	100	2.9	-0.1	603	345	565	347	616	495	671	406	76	67	76	67	70	-0.017	6.03	0.02
123	17.781	18.019	0.15	0.15	0.72	69	0.61	1.35	73	0.2	104	0.054	101	99	2.9	0	602	346	567	350	617	496	668	403	76	67	76	67	70	-0.019	5.43	0.02
124	17.928	18.167	0.15	0.15	0.27	69	0.61	1.35	73	0.2	103	0.054	101	100	2.9	0	601	347	569	352	617	497	671	399	76	67	76	67	69	-0.017	5.19	0.02
125	18.075	18.314	0.15	0.15	-0.12	69	0.61	1.34	73	0.2	103	0.054	101	99	2.8	-0.1	600	348	569	354	616	497	676	399	75	67	76	67	69	-0.018	5.19	0.02
126	18.222	18.462	0.15	0.15	-0.46	69	0.61	1.35	73	0.2	103	0.054	101	100	2.7	-0.1	599	349	569	354	615	497	683	399	75	67	76	67	69	-0.018	5.26	0.02
127	18.369	18.610	0.15	0.15	0.27	69	0.61	1.36	73	0.2	103	0.054	101	100	2.7	0	600	351	568	355	613	497	693	397	75	67	76	67	69	-0.017	5.11	0.02
128	18.516	18.757	0.15	0.15	-0.15	69	0.61	1.35	73	0.2	102	0.054	100	99	2.6	-0.1	600	351	567	354	611	497	701	399	75	67	76	67	69	-0.017	5.14	0.02
129	18.663	18.905	0.15	0.15	-0.50	69	0.61	1.34	73	0.2	102	0.054	100	100	2.6	0	601	353	566	353	609	496	706	398	75	67	76	67	70	-0.017	5.24	0.02
130	18.811	19.052	0.15	0.15	0.59	69	0.61	1.34	73	0.2	102	0.054	101	99	2.5	-0.1	601	352	565	353	606	495	711	401	75	67	76	67	69	-0.017	5.23	0.02
131	18.958	19.199	0.15	0.15	0.58	69	0.61	1.33	73	0.2	103	0.054	101	99	2.5	0	602	352	565	352	604	495	712	403	75	67	76	67	69	-0.018	5.17	0.02
132	19.105	19.348	0.15	0.15	0.80	69	0.61	1.35	73	0.2	102	0.054	100	101	2.4	-0.1	601	352	565	352	602	494	707	406	75	67	76	67	69	-0.017	5.19	0.02
133	19.252	19.495	0.15	0.15	0.50	69	0.61	1.35	73	0.2	103	0.054	101	99	2.4	0	601	354	568	351	600	495	698	408	75	67	76	67	69	-0.017	5.28	0.02
134	19.399	19.642	0.15	0.15	0.52	69	0.61	1.35	73	0.2	103	0.054	101	99	2.3	-0.1	599	355	574	350	599	495	687	407	75	67	75	67	69	-0.018	5.47	0.02
135	19.547	19.790	0.15	0.15	0.55	69	0.61	1.34	73	0.2	102	0.054	101	100	2.3	0	597	354	582	350	599	496	680	405	75	67	75	67	69	-0.017	5.54	0.02
136	19.694	19.937	0.15	0.15	0.61	69	0.61	1.34	73	0.2	102	0.054	100	99	2.2	-0.1	596	355	589	349	598	497	679	406	75	67	75	67	69	-0.017	5.56	0.02
137	19.841	20.084	0.15	0.15	0.48	69	0.61	1.33	73	0.2	102	0.054	100	99	2.2	0	594	356	593	348	598	498	680	407	75	67	75	67	70	-0.018	5.59	0.02
138	19.988	20.233	0.15	0.15	0.41	69	0.61	1.35	73	0.2	102	0.054	100	101	2.1	-0.1	593	355	595	349	597	498	678	406	75	67	75	67	69	-0.017	5.58	0.02
139	20.135	20.380	0.15	0.15	0.24	69	0.61	1.35	73	0.2	102	0.054	100	99	2.1	0	592	355	593	348	596	497	679	406	75	67	75	67	69	-0.017	5.47	0.02
140	20.282	20.528	0.15	0.15	0.81	69	0.61	1.36	73	0.2	102	0.054	100	100	2.0	-0.1	592	355	590	348	594	496	690	407	75	67	75	67	69	-0.017	5.23	0.02
141	20.429	20.675	0.15	0.15	0.66	69	0.61	1.35	73	0.2	103	0.054	101	99	2.0	0	592	357	586	347	592	495	695	411	75	67	75	67	70	-0.018	5.13	0.02
142	20.576	20.822	0.15	0.15	0.18	69	0.61	1.34	73	0.2	103	0.054	101	99	2.0	0	592	358	581	346	590	493	689	412	75	67	75	67	71	-0.017	5	0.02
143	20.723	20.970	0.15	0.15	0.30	69	0.61	1.35	73	0.2	103	0.054	101	100	1.9	-0.1	590	360	578	345	588	492	679	409	75	67	75	67	71	-0.017	4.91	0.02
144	20.870	21.118	0.15	0.15	0.45	69	0.61	1.35	73	0.2	104	0.054	101	100	1.9	0	588	361	575	344	586	491	671	408	75	67	75	67	71	-0.017	4.93	0.02
145	21.017	21.265	0.15	0.15	0.31	69	0.61	1.35	73	0.2	103	0.054	101	99	1.9	0	585	362	572	343	585	489	664	405	75	67	75	67	71	-0.017	4.81	0.02
146	21.164	21.413	0.15	0.15	0.54	69	0.61	1.35	73	0.2	103	0.054	101	100	1.8	-0.1	582	364	570	342	583	488	659	403	75	67	75	67	71	-0.017	4.81	0.02
147	21.311	21.560	0.15	0.15	0.85	69	0.62	1.35	72	0.2	103	0.054	101	100	1.8	0	579	365	568	341	582	487	655	400	75	67	75	67	71	-0.017	4.74	0.02
148	21.458	21.707	0.15	0.15	0.55	69	0.62	1.33	72	0.2	103	0.054	101	100	1.8	0	576	365	567	341	581	486	651	398	75	67	75	67	70	-0.017	4.88	0.02
149	21.605	21.855	0.15	0.15	0.29	69	0.61	1.35	72	0.2	103	0.054	101	100	1.7	-0.1	573	366	566	340	580	485	649	397	75	67	75	67	70	-0.017	4.93	0.02
150	21.752	22.003	0.15	0.15	0.46	69	0.61	1.35	72	0.2	103	0.054	101	100	1.7	0	570	367	565	340	579	484	647	397	75	67	75	67	71	-0.016	4.93	0.02
151	21.899	22.150	0.15	0.15	0.07	69	0.61	1.35	72	0.2	103	0.054	101	100	1.6	-0.1	568	368	564	339	578	483	645	394	75	67	76	67	71	-0.016	4.97	0.02

Wood Heater Test Data - ASTM E2780 / ASTM E2515

Run: 1

Manufacturer: Valley Comfort
Model: PI29
Tracking No.: VC-18-1
Project No.: 0142WN019E
Test Date: 22-Jan-18
Beginning Clock Time: 14:34

Total Sampling Time: 197 min
Recording Interval: 1 min
Background Sample Volume: 0 cubic feet

Meter Box Y Factor: 0.997 (1) 0.981 (2) _____ (Amb)

Barometric Pressure:

Begin	Middle	End	Average
28.69	28.68	28.64	28.67 "Hg

OMNI Equipment Numbers: 410, 283A, 132, 576, 318, 432, 419, 371, 372, 296-T32, 559, 592, 637

PM Control Modules: 371/372
Dilution Tunnel MW(dry): 29.00 lb/lb-mole
Dilution Tunnel MW(wet): 28.78 lb/lb-mole
Dilution Tunnel H2O: 2.00 percent
Dilution Tunnel Static: -0.170 "H2O
Tunnel Area: 0.19635 ft2
Pitot Tube Cp: 0.99

Avg. Tunnel Velocity: 14.47 ft/sec.
Initial Tunnel Flow: 146.7 scfm
Average Tunnel Flow: 148.6 scfm
Post-Test Leak Check (1): 0.000 cfm @ -15 in. Hg
Post-Test Leak Check (2): 0.000 cfm @ -17 in. Hg
Average Test Piece Fuel Moisture: 20.04 Dry Basis %

Technician Signature: _____

Velocity Traverse Data

	Pt.1	Pt.2	Pt.3	Pt.4	Pt.5	Pt.6	Pt.7	Pt.8	Center	
Initial dP	0.034	0.052	0.038	0.034	0.034	0.052	0.054	0.034	0.054	"H2O
Temp:	105	105	105	105	105	105	105	105	105	°F

V_{strav} 14.42 ft/sec V_{scent} 16.27 ft/sec F_p 0.886

	Particulate Sampling Data														Fuel Weight (lb)		Temperature Data (°F)													Stack Gas Data		
Elapsed Time (min)	Gas Meter 1 (ft^3)	Gas Meter 2 (ft^3)	Sample Rate 1 (cfm)	Sample Rate 2 (cfm)	Orifice dH 1 ("H_2O)	Meter 1 Temp (°F)	Meter 1 Vacuum ("Hg)	Orifice dH 2 ("H_2O)	Meter 2 Temp (°F)	Meter 2 Vacuum ("Hg)	Dilution Tunnel (°F)	Dilution Tunnel Center dP	Pro. Rate 1	Pro. Rate 2	Scale Reading	Weight Change	Firebox Top	Firebox Bottom	Firebox Back	Firebox Left	Firebox Right	Avg. Stove Surface	Catalyst Exit	Stack	Filter 1	Dryer Exit 1	Filter 2	Dryer Exit 2	Ambient	Draft ("H_2O)	CO_2 (%)	CO (%)
152	22.046	22.298	0.15	0.15	-0.29	69	0.61	1.35	72	0.2	103	0.054	101	100	1.6	0	565	369	563	339	577	483	643	392	75	67	76	67	71	-0.016	4.88	0.02
153	22.193	22.445	0.15	0.15	0.27	69	0.61	1.34	72	0.2	103	0.054	101	100	1.6	0	562	369	562	338	576	481	641	391	75	67	76	67	71	-0.016	4.84	0.02
154	22.340	22.592	0.15	0.15	-0.14	69	0.62	1.34	72	0.2	103	0.054	101	100	1.6	0	560	370	561	338	576	481	639	389	75	67	76	67	70	-0.016	4.88	0.02
155	22.486	22.740	0.15	0.15	-0.47	69	0.62	1.35	72	0.2	103	0.054	100	100	1.5	-0.1	558	371	560	338	575	480	637	391	75	67	76	67	71	-0.016	4.85	0.02
156	22.634	22.888	0.15	0.15	0.60	69	0.61	1.36	72	0.2	102	0.054	101	100	1.5	0	555	371	559	338	575	480	633	389	75	67	76	67	71	-0.016	4.7	0.02
157	22.780	23.035	0.15	0.15	0.21	69	0.61	1.35	72	0.2	102	0.054	100	99	1.4	-0.1	553	372	559	337	574	479	628	389	75	67	76	67	71	-0.016	4.67	0.02
158	22.927	23.182	0.15	0.15	0.02	69	0.61	1.35	72	0.2	102	0.054	100	99	1.4	0	550	373	559	337	574	479	625	389	75	67	76	67	71	-0.016	4.69	0.02
159	23.074	23.330	0.15	0.15	0.32	69	0.62	1.35	72	0.2	103	0.054	101	100	1.4	0	548	374	560	337	574	479	621	389	75	67	76	67	71	-0.016	4.86	0.02
160	23.221	23.477	0.15	0.15	-0.11	69	0.61	1.33	72	0.2	102	0.054	100	99	1.3	-0.1	546	374	561	337	574	478	618	387	75	67	76	67	70	-0.016	4.78	0.02
161	23.368	23.625	0.15	0.15	0.25	69	0.61	1.35	72	0.2	102	0.054	100	100	1.3	0	544	375	561	337	574	478	615	387	75	67	76	67	71	-0.016	4.76	0.02
162	23.515	23.772	0.15	0.15	-0.15	69	0.62	1.36	72	0.2	102	0.054	100	99	1.2	-0.1	542	376	562	337	574	478	613	386	75	67	76	67	71	-0.016	4.88	0.02
163	23.662	23.920	0.15	0.15	0.14	69	0.62	1.35	72	0.2	102	0.054	100	100	1.2	0	540	377	563	337	574	478	611	387	75	67	76	67	70	-0.016	4.72	0.02
164	23.809	24.067	0.15	0.15	-0.26	69	0.62	1.35	72	0.2	102	0.054	100	99	1.2	0	538	378	564	337	574	478	610	386	75	67	76	67	70	-0.016	4.79	0.02
165	23.956	24.214	0.15	0.15	-0.58	69	0.62	1.35	72	0.2	102	0.054	100	99	1.1	-0.1	536	379	564	337	574	478	609	384	75	67	76	67	71	-0.015	4.69	0.02
166	24.103	24.362	0.15	0.15	0.20	69	0.62	1.33	72	0.2	102	0.054	100	100	1.1	0	535	380	565	337	574	478	609	384	75	67	76	67	70	-0.015	4.74	0.02
167	24.250	24.510	0.15	0.15	-0.21	69	0.61	1.35	72	0.2	102	0.054	100	100	1.1	0	534	380	565	337	574	478	609	384	75	67	76	67	70	-0.015	4.76	0.02
168	24.397	24.657	0.15	0.15	-0.54	69	0.62	1.35	72	0.2	102	0.054	100	99	1.0	-0.1	532	381	566	336	573	478	608	384	75	67	76	67	70	-0.016	4.69	0.02
169	24.544	24.805	0.15	0.15	-0.83	69	0.62	1.35	72	0.2	102	0.054	100	100	1.0	0	531	382	568	337	573	478	607	383	75	67	76	67	70	-0.015	4.79	0.02
170	24.691	24.952	0.15	0.15	0.13	69	0.62	1.35	72	0.2	102	0.054	100	99	1.0	0	530	383	569	336	573	478	606	383	75	67	76	67	70	-0.015	4.68	0.02
171	24.838	25.099	0.15	0.15	-0.24	69	0.62	1.34	72	0.2	102	0.054	100	99	0.9	-0.1	529	384	570	336	573	478	605	384	75	67	76	67	70	-0.015	4.69	0.02
172	24.985	25.247	0.15	0.15	-0.57	69	0.62	1.33	72	0.2	101	0.054	100	100	0.9	0	527	382	571	336	573	478	604	381	75	67	76	67	68	-0.016	4.67	0.02
173	25.132	25.395	0.15	0.15	0.61	69	0.62	1.35	72	0.2	101	0.054	100	100	0.9	0	526	383	572	336	573	478	602	383	75	67	76	67	70	-0.015	4.6	0.02
174	25.279	25.542	0.15	0.15	0.13	69	0.61	1.36	72	0.2	101	0.054	100	99	0.8	-0.1	525	385	573	335	572	478	600	381	75	67	75	67	70	-0.015	4.64	0.02
175	25.426	25.690	0.15	0.15	-0.27	69	0.62	1.36	72	0.2	101	0.054	100	100	0.8	0	524	386	573	335	572	478	598	381	75	67	75	67	70	-0.015	4.58	0.02
176	25.573	25.838	0.15	0.15	-0.59	69	0.62	1.35	72	0.2	101	0.054	100	100	0.8	0	523	387	573	335	571	478	597	381	75	67	75	67	70	-0.015	4.58	0.02
177	25.720	25.985	0.15	0.15	-0.88	69	0.62	1.35	72	0.2	101	0.054	100	99	0.7	-0.1	522	388	573	335	571	478	597	380	75	67	75	67	70	-0.015	4.63	0.02
178	25.868	26.132	0.15	0.15	-1.12	69	0.62	1.34	72	0.2	101	0.054	101	99	0.7	0	521	389	573	334	571	478	597	381	75	67	75	67	70	-0.015	4.6	0.02
179	26.015	26.280	0.15	0.15	-1.29	69	0.62	1.35	72	0.2	101	0.054	100	100	0.7	0	520	390	574	334	571	478	597	381	75	67	75	67	70	-0.015	4.55	0.02
180	26.162	26.428	0.15	0.15	-1.46	69	0.62	1.35	72	0.2	101	0.054	100	100	0.6	-0.1	520	391	574	333	571	478	597	380	75	67	75	67	70	-0.015	4.69	0.02
181	26.309	26.576	0.15	0.15	0.02	69	0.62	1.35	72	0.2	101	0.054	100	100	0.6	0	519	392	574	333	571	478	597	381	75	67	75	67	71	-0.015	4.72	0.02
182	26.456	26.723	0.15	0.15	-0.37	69	0.62	1.35	72	0.2	101	0.054	100	99	0.6	0	518	393	574	333	570	478	597	381	75	67	75	67	70	-0.015	4.67	0.02
183	26.603	26.870	0.15	0.15	-0.69	69	0.62	1.34	72	0.2	101	0.054	100	99	0.5	-0.1	517	394	575	333	571	478	598	380	75	67	75	67	70	-0.015	4.68	0.02
184	26.750	27.018	0.15	0.15	-0.96	69	0.61	1.34	72	0.2	101	0.054	100	100	0.5	0	517	395	575	333	571	478	599	381	75	67	75	67	70	-0.015	4.75	0.02
185	26.897	27.166	0.15	0.15	0.82	69	0.61	1.35	72	0.2	101	0.054	100	100	0.5	0	517	396	576	333	571	479	600	380	75	67	75	67	70	-0.015	4.71	0.02
186	27.044	27.313	0.15	0.15	0.33	69	0.62	1.35	72	0.2	101	0.054	100	99	0.4	-0.1	517	397	578	332	572	479	600	381	75	67	75	67	70	-0.015	4.62	0.02
187	27.191	27.461	0.15	0.15	-0.08	69	0.62	1.35	72	0.2	101	0.054	100	100	0.4	0	516	398	579	333	571	479	599	381	75	67	75	67	70	-0.015	4.71	0.02
188	27.338	27.609	0.15	0.15	-0.43	69	0.62	1.34	72	0.2	101	0.054	100	100	0.4	0	516	399	580	332	572	480	599	382	75	67	75	67	69	-0.015	4.67	0.02
189	27.485	27.756	0.15	0.15	-0.71	69	0.61	1.34	72	0.2	101	0.054	100	99	0.3	-0.1	516	400	582	333	571	480	598	381	75	67	75	67	70	-0.015	4.62	0.02

Wood Heater Test Data - ASTM E2780 / ASTM E2515

Run: 1

Manufacturer: Valley Comfort
Model: PI29
Tracking No.: VC-18-1
Project No.: 0142WN019E
Test Date: 22-Jan-18
Beginning Clock Time: 14:34

Total Sampling Time: 197 min
Recording Interval: 1 min
Background Sample Volume: 0 cubic feet

Meter Box Y Factor: 0.997 (1) 0.981 (2) _____ (Amb)

Barometric Pressure:	Begin	Middle	End	Average
	28.69	28.68	28.64	28.67 "Hg

OMNI Equipment Numbers: 410, 283A, 132, 576, 318, 432, 419, 371, 372, 296-T32, 559, 592, 637

PM Control Modules: 371/372
Dilution Tunnel MW(dry): 29.00 lb/lb-mole
Dilution Tunnel MW(wet): 28.78 lb/lb-mole
Dilution Tunnel H2O: 2.00 percent
Dilution Tunnel Static: -0.170 "H2O
Tunnel Area: 0.19635 ft2
Pitot Tube Cp: 0.99

Avg. Tunnel Velocity: 14.47 ft/sec.
Initial Tunnel Flow: 146.7 scfm
Average Tunnel Flow: 148.6 scfm
Post-Test Leak Check (1): 0.000 cfm @ -15 in. Hg
Post-Test Leak Check (2): 0.000 cfm @ -17 in. Hg
Average Test Piece Fuel Moisture: 20.04 Dry Basis %

Technician Signature: _____

Velocity Traverse Data

	Pt.1	Pt.2	Pt.3	Pt.4	Pt.5	Pt.6	Pt.7	Pt.8	Center	
Initial dP	0.034	0.052	0.038	0.034	0.034	0.052	0.054	0.034	0.054	"H2O
Temp:	105	105	105	105	105	105	105	105	105	°F

V_{strav} 14.42 ft/sec V_{scent} 16.27 ft/sec F_p 0.886

	Particulate Sampling Data														Fuel Weight (lb)		Temperature Data (°F)														Stack Gas Data		
Elapsed Time (min)	Gas Meter 1 (ft^3)	Gas Meter 2 (ft^3)	Sample Rate 1 (cfm)	Sample Rate 2 (cfm)	Orifice dH 1 ("H_2O)	Meter 1 Temp (°F)	Meter 1 Vacuum ("Hg)	Orifice dH 2 ("H_2O)	Meter 2 Temp (°F)	Meter 2 Vacuum ("Hg)	Dilution Tunnel (°F)	Dilution Tunnel Center dP	Pro. Rate 1	Pro. Rate 2	Scale Reading	Weight Change	Firebox Top	Firebox Bottom	Firebox Back	Firebox Left	Firebox Right	Avg. Stove Surface	Catalyst Exit	Stack	Filter 1	Dryer Exit 1	Filter 2	Dryer Exit 2	Ambient	Draft ("H_2O)	CO_2 (%)	CO (%)
190	27.633	27.904	0.15	0.15	-0.94	69	0.61	1.35	72	0.2	101	0.054	101	100	0.3	0	516	401	584	333	571	481	598	381	75	67	75	67	70	-0.015	4.7	0.02
191	27.780	28.052	0.15	0.15	-1.12	69	0.62	1.35	72	0.2	101	0.054	100	100	0.3	0	515	401	586	333	571	481	599	382	75	67	75	67	70	-0.015	4.62	0.02
192	27.927	28.199	0.15	0.15	-1.24	69	0.62	1.36	72	0.2	101	0.054	100	99	0.2	-0.1	515	402	587	333	571	482	598	383	75	67	75	67	70	-0.015	4.65	0.02
193	28.074	28.347	0.15	0.15	0.26	69	0.61	1.35	72	0.2	101	0.054	100	100	0.2	0	515	403	589	333	571	482	598	383	75	67	75	67	70	-0.015	4.67	0.02
194	28.221	28.494	0.15	0.15	0.67	69	0.61	1.34	72	0.2	101	0.054	100	99	0.2	0	515	404	591	333	571	483	597	384	75	67	75	67	70	-0.015	4.66	0.02
195	28.368	28.642	0.15	0.15	0.19	69	0.61	1.33	72	0.2	101	0.054	100	100	0.1	-0.1	515	404	593	333	571	483	596	382	75	67	75	67	70	-0.015	4.62	0.02
196	28.515	28.790	0.15	0.15	-0.21	69	0.61	1.35	72	0.2	101	0.054	100	100	0.1	0	514	405	594	334	571	484	596	383	75	67	75	67	70	-0.015	4.78	0.02
197	28.662	28.938	0.15	0.15	-0.55	69	0.62	1.36	72	0.2	101	0.054	100	100	0.0	-0.1	514	406	595	334	571	484	597	382	75	67	75	67	70	-0.015	4.7	0.02
Avg/Tot	28.662	28.938	0.15	0.15	0.61	69		1.34	72		109	0.054	100	100								46.6				68	77	68	71	-0.020		

Wood Heater Lab Data - ASTM E2780 / ASTM E2515

Manufacturer:	Valley Comfort	Equipment Numbers:	283A, 592, 637
Model:	PI29		
Tracking No.:	VC-18-1		
Project No.:	0142WN019E		
Run #:	1		
Date:	1/22/18		

TRAIN 1 (First Hour emissions)

Sample Component	Reagent	Filter, Probe or Dish #	Weights		
			Final, mg	Tare, mg	Particulate, mg
B. Front filter catch	Filter	D383	115.0	111.2	3.8
C. Rear filter catch	Filter				0.0
D. Probe catch*	Probe				0.0
E. Filter seals catch*	Seals				0.0

Sub-Total	Total Particulate, mg:	3.8

TRAIN 1 (Post First Hour Change-out)

Sample Component	Reagent	Filter, Probe or Dish #	Weights		
			Final, mg	Tare, mg	Particulate, mg
B. Front filter catch	Filter	D394	241.1	239.4	1.7
C. Rear filter catch	Filter	D395			0.0
D. Probe catch*	Probe	23	114077.6	114077.5	0.1
E. Filter seals catch*	Seals	R563	3377.1	3376.2	0.9

Sub-Total	Total Particulate, mg:	2.7
Train 1 Aggregate	Total Particulate, mg:	6.5

TRAIN 2

Sample Component	Reagent	Filter, Probe or Dish #	Weights		
			Final, mg	Tare, mg	Particulate, mg
A. Front filter catch	Filter	D396	245.2	239.7	5.5
B. Rear filter catch	Filter	D397			0.0
C. Probe catch*	Probe	25	114300.0	114299.4	0.6
D. Filter seals catch*	Seals	R564	3396.3	3395.5	0.8

Total Particulate, mg:	6.9

AMBIENT

Sample Component	Reagent	Filter # or Probe #	Weights		
			Final, mg	Tare, mg	Particulate, mg
A. Front filter catch*	Filter				0.0

Total Particulate, mg:	0.0

*Particulate catch that results in a negative number, is assumed to be zero for probes and seals, negative numbers for filters are assumed to be part of the seal weight.

Component	Equations:
A. Front filter catch	Final (mg) - Tare (mg) = Particulate, mg
B. Rear filter catch	Final (mg) - Tare (mg) = Particulate, mg
C. Probe catch	Final (mg) - Tare (mg) = Particulate, mg

Technician Signature: 

Wood Heater Test Results - ASTM E2780 / ASTM E2515

Manufacturer: Valley Comfort
Model: PI29
Project No.: 0142WN019E
Tracking No.: VC-18-1
Run: 1
Test Date: 01/22/18

Burn Rate	**2.00 kg/hr dry**
Average Tunnel Temperature	109 degrees Fahrenheit
Average Gas Velocity in Dilution Tunnel - vs	14.47 feet/second
Average Gas Flow Rate in Dilution Tunnel - Qsd	8914.3 dscf/hour
Average Delta p	0.054 inches H20
Total Time of Test	197 minutes

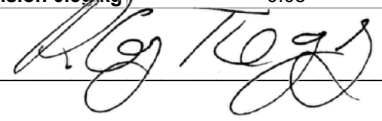
	AMBIENT	SAMPLE TRAIN 1	SAMPLE TRAIN 2	FIRST HOUR FILTER (TRAIN 1)
Total Sample Volume - Vm	0.000 cubic feet	28.662 cubic feet	28.938 cubic feet	8.510 cubic feet
Average Gas Meter Temperature	71 degrees Fahrenheit	69 degrees Fahrenheit	72 degrees Fahrenheit	69 degrees Fahrenheit
Total Sample Volume (Standard Conditions) - Vmstd	0.000 dscf	27.361 dscf	27.074 dscf	8.135 dscf
Total Particulates - m_n	0 mg	6.5 mg	6.9 mg	3.8 mg
Particulate Concentration (dry-standard) - C_f/C_s	0.000000 grams/dscf	0.00024 grams/dscf	0.00025 grams/dscf	0.00047 grams/dscf
Total Particulate Emissions - E_T	0.00 grams	6.95 grams	7.46 grams	4.16 grams
Particulate Emission Rate	0.00 grams/hour	2.12 grams/hour	2.27 grams/hour	4.16 grams/hour
Emissions Factor		1.06 g/kg	1.13 g/kg	1.10 g/kg
Difference from Average Total Particulate Emissions		0.25 grams	0.25 grams	
		Dual Train Comparison Results Are Acceptable		

FINAL AVERAGE RESULTS

Complete Test Run	
Total Particulate Emissions - E_T	7.21 grams
Particulate Emission Rate	**2.19 grams/hour**
Emissions Factor	1.09 grams/kg
First Hour Emissions	
Total Particulate Emissions - E_T	4.16 grams
Particulate Emission Rate	4.16 grams/hour
Emissions Factor	1.10 grams/kg
7.5% of Average Total Particulate Emissions	0.54 grams

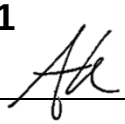
QUALITY CHECKS

Filter Temps < 90 °F	OK
Filter Face Velocity (47 mm)	OK
Dryer Exit Temp < 80F	OK
Leakage Rate	OK
Ambient Temp (55-90°F)	OK
Negative Probe Weight Eval.	OK
Pro-Rate Variation	OK
Stove Surface ΔT	OK
Train Precesion 7.5%	3.51
Train Precision 0.5g/kg	0.08

Technician Signature: 

Wood Heater Efficiency Results - CSA B415.1

Manufacturer: Valley Comfort
Model: PI29
Date: 01/22/18
Run: 1
Control #: 0142WN019E
Test Duration: 197
Output Category: IV

Technician Signature: 

Test Results in Accordance with CSA B415.1-09

	HHV Basis	LHV Basis
Overall Efficiency	65.1%	70.3%
Combustion Efficiency	97.0%	97.0%
Heat Transfer Efficiency	67%	72.5%

Output Rate (kJ/h)	25,667	24,348	(Btu/h)
Burn Rate (kg/h)	1.99	4.39	(lb/h)
Input (kJ/h)	39,453	37,426	(Btu/h)

Test Load Weight (dry kg)	6.54	14.41	dry lb
MC wet (%)	16.69366409		
MC dry (%)	20.04		
Particulate (g)	2.19		
CO (g)	318		
Test Duration (h)	3.28		

Emissions	Particulate	CO
g/MJ Output	0.03	3.78
g/kg Dry Fuel	0.34	48.66
g/h	0.67	96.92
lb/MM Btu Output	0.06	8.78

Air/Fuel Ratio (A/F)	17.15

VERSION: 2.2 12/14/2009

RUN 2

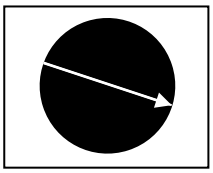
Wood Heater Run Notes

Air Control Settings

Primary:

Med Low:

110° from vertical



Secondary: Auto

Tertiary/Pilot: Fixed

Fan: On Med Low

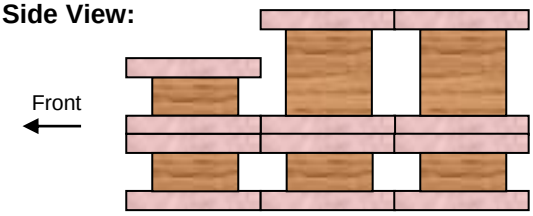
Preburn Notes

Time	Notes
0:00-20:00	Logger File lost- turned to test setting @10:02 AM
20:00-60:00	Continued logger issues, created two separate log files

Test Notes

Sketch test fuel configuration:

Side View:



Start up procedures & Timeline:

Bypass: **Closed @ 1:40**
Fuel loaded by: **0:40**
Door closed at: **2:10**
Primary air: **Set @ 4:00**

Notes: **None**

Time	Notes
60:00	Changed Filter A

2/23/18

Wood Heater Supplemental Data

Start Time: 11:04

Stop Time: 18:42

Booth #: N/A (site testing)

Stack Gas Leak Check:

Initial: 0 Final: 0

Sample Train Leak Check:

A: 0 @ -11 "Hg

B: 0 @ -10 "Hg

Calibrations: Span Gas CO_2: 17.00 CO: 4.267

	Pre Test		Post Test	
	Zero	Span	Zero	Span
Time	9:34	9:37	18:59	18:56
CO_2	0.00	17.00	0.13	16.77
CO	0.000	4.267	0.036	4.274

Air Velocity (ft/min): Initial: <50 Final: <50

Scale Audit (lbs): Initial: 10.0 Final: 10.0

Pitot Tube Leak Test: Initial: 0 Final: 0

Stack Diameter (in): 6

Induced Draft: 0

% Smoke Capture: 100

Flue Pipe Cleaned Prior to First Test in Series:

Date: 1/22/18 Initials:

	Initial	Middle	Ending
P_b (in/Hg)	28.96	28.91	28.86
RH (%)	33	30	35
Ambient (°F)	68	72	66

Tunnel Traverse

Microtector Reading	dP (in H_2O)	T(°F)
1	0.034	79
2	0.05	79
3	0.036	79
4	0.03	79
5	0.038	79
6	0.05	79
7	0.048	79
8	0.03	79
Center:		
-	0.052	79

Tunnel Static Pressure (in H_20):	
Beginning of Test	End of Test
-0.17	-0.17

Background Filter Volume: N/A

2/23/18

Wood Heater Preburn Data - ASTM E2780

Run:	2

Technician Signature: _____

Manufacturer:	Valley Comfort
Model:	PI29
Tracking No.:	VC-18-1
Project No.:	0142WN019E
Test Date:	1/23/18
Beginning Clock Time:	10:02

Coal Bed Range (lb):	3.4 (min)	4.3 (max)

Preburn Fuel Data

Fuel Piece Lengths (in.):	16		
Total Preburn Weight (lb):	19.1		
Fuel Moisture Readings (% DB):	21.9	21.5	20
	21.4	20.2	19.8
	24	20.5	22.4
	23.8	22.5	24.5
Avg Preburn Moisture (% DB):	21.88		

			Temperatures (°F)							
Elapsed Time (min)	Scale (lb)	Stack Draft (in H_2O)	FB Top	FB Bottom	FB Back	FB Left	FB Right	Avg. FB	Stack	Ambient
0-19	*Note: Data log file lost for initial 20 minutes of preburn. See test run notes.*									
20	4.6	-0.027	573	338	531	382	524	469.6	121	69
21	4.5	-0.027	564	339	524	378	517	464.4	120	69
22	4.5	-0.027	556	339	518	373	510	459	120	69
23	4.5	-0.026	547	343	512	367	503	454.6	119	69
24	4.5	-0.026	539	343	507	362	496	449.5	118	69
25	4.5	-0.026	531	343	501	357	490	444.5	117	69
26	4.5	-0.012	523	343	496	352	483	439.5	115	68
27	4.5	-0.025	516	343	490	347	477	434.5	115	69
28	4.5	-0.025	508	342	485	343	471	429.7	114	69
29	4.5	-0.025	501	342	480	338	465	425	114	69
30	4.5	-0.024	493	341	475	333	459	420.3	113	69
31	4.5	-0.024	486	341	469	328	453	415.5	114	69
32	4.5	-0.024	480	340	464	324	447	411	116	69
33	4.5	-0.025	473	339	460	320	442	406.7	119	69
34	4.5	-0.025	467	338	455	315	437	402.3	124	69
35	4.5	-0.025	461	337	451	311	431	398.2	128	68
36	4.5	-0.025	455	336	447	307	427	394.3	132	68
37	4.5	-0.025	450	335	443	303	422	390.5	137	68
38	4.5	-0.025	444	334	439	300	418	387	141	68
39	4.5	-0.025	440	333	436	296	413	383.7	146	68
40	4.5	-0.025	436	331	434	293	409	380.7	151	69
41	4.5	-0.026	433	330	431	290	406	378	156	68
42	4.5	-0.026	430	328	428	285	401	374.5	168	68
43	4.4	-0.027	431	327	427	283	398	373	175	68
44	4.4	-0.027	432	326	427	281	396	372.4	182	68
45	4.4	-0.028	436	325	428	280	395	372.6	192	68
46	4.4	-0.029	439	324	430	279	394	373.2	200	68
47	4.3	-0.03	441	323	433	279	394	374.1	208	68
48	4.3	-0.03	442	322	436	279	395	375	213	68
49	4.3	-0.03	442	322	441	279	397	376.2	217	68
50	4.2	-0.031	442	322	445	279	399	377.4	220	68
51	4.2	-0.031	441	322	450	280	402	379.1	224	68
52	4.2	-0.032	440	322	455	281	406	380.9	224	68
53	4.2	-0.031	439	322	461	282	409	382.7	225	68
54	4.1	-0.031	438	323	466	283	414	384.8	227	68
55	4.1	-0.031	438	323	472	285	418	387.1	230	68
56	4.1	-0.032	437	324	478	286	423	389.4	230	68
57	4.1	-0.032	436	326	483	287	427	391.9	231	68

Wood Heater Preburn Data - ASTM E2780

Run:	2

Technician Signature: _____

Manufacturer:	Valley Comfort
Model:	PI29
Tracking No.:	VC-18-1
Project No.:	0142WN019E
Test Date:	1/23/18
Beginning Clock Time:	10:02

Coal Bed Range (lb):	3.4 (min)	4.3 (max)

Preburn Fuel Data

Fuel Piece Lengths (in.):	16		
Total Preburn Weight (lb):	19.1		
Fuel Moisture Readings (% DB):	21.9	21.5	20
	21.4	20.2	19.8
	24	20.5	22.4
	23.8	22.5	24.5
Avg Preburn Moisture (% DB):	21.88		

			Temperatures (°F)							
Elapsed Time (min)	Scale (lb)	Stack Draft (in H_2O)	FB Top	FB Bottom	FB Back	FB Left	FB Right	Avg. FB	Stack	Ambient
58	4	-0.032	436	327	488	289	432	394.5	233	68
59	4	-0.032	435	329	494	290	437	397.1	234	68
60	4	-0.032	435	331	499	292	442	399.7	234	68
61	4	-0.032	435	333	504	293	447	402.4	235	67
62	3.9	-0.032	435	335	509	295	451	404.9	233	68

Wood Heater Test Fuel Data - ASTM E2780

Manufacturer:	**Valley Comfort**
Model:	**PI29**
Tracking No.:	**VC-18-1**
Project No.:	**0142WN019E**
Test Date:	**1/23/2018**
Run No.:	**2**

Firebox Volume (ft^3):	**2.56**
Fuel Piece Length (in):	**16**
2x4 Crib Weight (lb):	**8.9**
4x4 Crib Weight (lb):	**8.1**

Total Fuel Weight (Dry Basis, lb):	**14.0**	
Fuel Density (lb/ft^3, Dry Basis):	**27.24**	**OK**
Loading Density (lb/ft^3, Wet Basis):	**6.64**	**OK**
2x4 Percentage:	**52%**	**OK**

Coal Bed Range (20-25%): 3.4 - 4.25

Test Fuel Piece	Weight (lb)	Size	Readings (Dry Basis %)			Dry Weight (lb)
1	3.6	4"x 4"	22.0	19.6	22.1	2.97
2	3.6	4"x 4"	22.8	21.4	20.3	2.96
3	1.7	2"x 4"	22.5	23.8	21.7	1.39
4	1.5	2"x 4"	21.9	23.1	21.9	1.23
5	1.8	2"x 4"	22.2	23.8	24.5	1.46
6	1.8	2"x 4"	21.9	22.7	22.1	1.47

Spacer Readings (Dry Basis %)			
16.4	9.9		
18.7	15.3		
15.0	21.1		
22.0	17.3		
16.4	17.4		
18.9	18.8		
18.7	16.1		
16.7	20.1		
19.4	18.3		
18.3	16.5		
18.2	20.4		
12.2	16.5		

Technician Signature: _____

Wood Heater Test Data - ASTM E2780 / ASTM E2515

Run: 2

Manufacturer: Valley Comfort
Model: PI29
Tracking No.: VC-18-1
Project No.: 0142WN019E
Test Date: 23-Jan-18
Beginning Clock Time: 11:04

Total Sampling Time: 459 min
Recording Interval: 1 min
Background Sample Volume: 0 cubic feet

Meter Box Y Factor: 0.997 (1) 0.981 (2) _____ (Amb)

Barometric Pressure:

Begin	Middle	End	Average
28.96	28.91	28.86	28.91 "Hg

OMNI Equipment Numbers: 410, 283A, 132, 576, 318, 432, 419, 371, 372, 296-T32, 559, 592, 637

PM Control Modules: 371/372
Dilution Tunnel MW(dry): 29.00 lb/lb-mole
Dilution Tunnel MW(wet): 28.78 lb/lb-mole
Dilution Tunnel H2O: 2.00 percent
Dilution Tunnel Static: -0.180 "H2O
Tunnel Area: 0.19635 ft2
Pitot Tube Cp: 0.99

Avg. Tunnel Velocity: 13.76 ft/sec.
Initial Tunnel Flow: 147.2 scfm
Average Tunnel Flow: 149.0 scfm
Post-Test Leak Check (1): 0.000 cfm @ -15 in. Hg
Post-Test Leak Check (2): 0.000 cfm @ -17 in. Hg
Average Test Piece Fuel Moisture: 22.24 Dry Basis %

Technician Signature: _____

Velocity Traverse Data

	Pt.1	Pt.2	Pt.3	Pt.4	Pt.5	Pt.6	Pt.7	Pt.8	Center	
Initial dP	0.034	0.050	0.036	0.030	0.038	0.050	0.048	0.030	0.052	"H2O
Temp:	79	79	79	79	79	79	79	79	79	°F

V_{strav} 13.69 ft/sec V_{scent} 15.52 ft/sec F_p 0.882

	Particulate Sampling Data														Fuel Weight (lb)		Temperature Data (°F)													Stack Gas Data		
Elapsed Time (min)	Gas Meter 1 (ft^3)	Gas Meter 2 (ft^3)	Sample Rate 1 (cfm)	Sample Rate 2 (cfm)	Orifice dH 1 ("H_2O)	Meter 1 Temp (°F)	Meter 1 Vacuum ("Hg)	Orifice dH 2 ("H_2O)	Meter 2 Temp (°F)	Meter 2 Vacuum ("Hg)	Dilution Tunnel (°F)	Dilution Tunnel Center dP	Pro. Rate 1	Pro. Rate 2	Scale Reading	Weight Change	Firebox Top	Firebox Bottom	Firebox Back	Firebox Left	Firebox Right	Avg. Stove Surface	Catalyst Exit	Stack	Filter 1	Dryer Exit 1	Filter 2	Dryer Exit 2	Ambient	Draft ("H_2O)	CO_2 (%)	CO (%)
0	0.000	0.000			1.90	69	0.62	1.41	73	0.4	135	0.052			17.0		437	341	515	297	457	409	465	326	70	69	70	68	68	-0.035	6	0.02
1	0.123	0.137	0.12	0.14	1.90	69	0.62	1.39	73	0.3	133	0.052	88	95	16.9	-0.1	437	341	514	297	457	409	463	330	70	69	71	68	68	-0.036	5.87	0.03
2	0.271	0.288	0.15	0.15	1.89	69	0.61	1.40	73	0.3	132	0.052	106	105	16.7	-0.2	436	345	507	295	456	408	464	381	71	68	71	68	68	-0.041	3.83	0.11
3	0.418	0.438	0.15	0.15	1.89	69	0.61	1.40	73	0.3	109	0.052	103	102	16.6	-0.1	438	347	503	291	455	407	515	382	71	68	71	68	68	-0.037	2.63	0.18
4	0.565	0.588	0.15	0.15	1.90	69	0.62	1.40	73	0.3	96	0.052	102	101	16.5	-0.1	441	350	500	288	454	407	554	326	71	68	71	68	68	-0.030	2.94	0.23
5	0.712	0.738	0.15	0.15	1.88	69	0.62	1.39	73	0.4	90	0.052	101	100	16.4	-0.1	444	352	493	284	450	405	573	277	71	68	71	68	68	-0.030	5.26	0.09
6	0.859	0.888	0.15	0.15	1.88	69	0.62	1.40	73	0.4	87	0.052	101	100	16.3	-0.1	448	354	486	281	446	403	593	254	71	68	71	68	67	-0.028	5.54	0.03
7	1.006	1.038	0.15	0.15	1.87	69	0.63	1.40	73	0.4	86	0.052	101	100	16.3	0	453	355	478	277	440	401	607	243	71	68	71	68	67	-0.028	4.93	0.01
8	1.152	1.187	0.15	0.15	1.86	69	0.63	1.38	73	0.4	85	0.052	100	99	16.2	-0.1	457	357	471	273	434	398	615	237	71	68	71	68	68	-0.028	4.5	0.01
9	1.299	1.336	0.15	0.15	1.86	69	0.63	1.39	73	0.4	85	0.052	101	99	16.2	0	461	359	464	269	428	396	620	237	71	68	71	68	68	-0.027	4.43	0.01
10	1.445	1.486	0.15	0.15	1.85	69	0.63	1.40	73	0.4	85	0.052	100	100	16.1	-0.1	465	361	457	266	423	394	623	240	71	68	71	68	68	-0.028	4.48	0.01
11	1.592	1.636	0.15	0.15	1.85	69	0.63	1.39	73	0.4	84	0.052	101	100	16.0	-0.1	468	363	451	263	418	393	625	242	71	68	71	68	67	-0.028	4.69	0.01
12	1.738	1.785	0.15	0.15	1.85	69	0.63	1.39	73	0.4	84	0.052	100	99	16.0	0	470	364	445	260	413	390	625	245	71	68	71	68	68	-0.028	4.84	0.01
13	1.884	1.934	0.15	0.15	1.82	69	0.63	1.38	72	0.4	84	0.052	100	99	15.9	-0.1	472	365	439	257	409	388	626	246	71	68	71	68	67	-0.028	4.96	0.01
14	2.031	2.084	0.15	0.15	1.82	69	0.63	1.40	72	0.4	84	0.052	101	100	15.8	-0.1	474	366	434	254	405	387	626	249	71	68	71	68	68	-0.028	5.05	0.01
15	2.177	2.232	0.15	0.15	1.82	69	0.63	1.37	72	0.4	84	0.052	100	99	15.8	0	475	366	429	252	401	385	627	250	71	68	71	68	68	-0.028	4.98	0.01
16	2.323	2.381	0.15	0.15	1.84	69	0.63	1.38	72	0.3	84	0.052	100	99	15.7	-0.1	476	367	425	250	398	383	631	257	71	68	71	68	67	-0.028	4.98	0.01
17	2.469	2.530	0.15	0.15	1.84	69	0.63	1.38	72	0.4	85	0.052	100	100	15.6	-0.1	478	367	421	248	395	382	636	265	71	68	71	68	68	-0.029	5.02	0.01
18	2.615	2.680	0.15	0.15	1.84	68	0.63	1.39	72	0.4	85	0.052	101	100	15.5	-0.1	479	367	418	247	392	381	638	269	71	67	71	67	68	-0.029	5.08	0.01
19	2.761	2.829	0.15	0.15	1.84	68	0.63	1.38	72	0.3	85	0.052	101	100	15.5	0	480	367	414	245	389	379	640	271	71	67	71	67	67	-0.029	5.19	0.01
20	2.907	2.978	0.15	0.15	1.84	68	0.63	1.38	72	0.4	85	0.052	101	100	15.4	-0.1	481	366	411	244	387	378	642	274	71	67	71	67	67	-0.030	5.22	0.01
21	3.053	3.127	0.15	0.15	1.84	68	0.63	1.37	72	0.4	85	0.052	101	100	15.3	-0.1	482	366	409	243	385	377	643	278	71	67	71	67	67	-0.030	5.17	0.01
22	3.199	3.277	0.15	0.15	1.84	69	0.63	1.38	72	0.3	86	0.052	100	100	15.2	-0.1	483	365	407	242	383	376	646	280	71	67	71	67	67	-0.030	5.21	0.01
23	3.345	3.426	0.15	0.15	1.80	69	0.63	1.38	72	0.4	86	0.052	100	100	15.1	-0.1	485	365	405	242	381	376	652	282	71	67	71	67	67	-0.030	5.51	0.01
24	3.491	3.574	0.15	0.15	1.80	69	0.63	1.38	72	0.3	86	0.052	100	99	15.0	-0.1	486	364	404	241	380	375	656	284	71	67	71	67	67	-0.030	5.53	0.01
25	3.637	3.723	0.15	0.15	1.80	69	0.63	1.37	72	0.3	86	0.052	100	100	15.0	0	488	363	402	241	379	375	658	285	71	67	71	67	68	-0.030	5.4	0.01
26	3.783	3.873	0.15	0.15	1.81	69	0.63	1.38	72	0.3	86	0.052	100	100	14.9	-0.1	489	362	401	241	377	374	660	287	71	67	71	67	67	-0.030	5.41	0.01
27	3.928	4.022	0.15	0.15	1.80	69	0.63	1.38	72	0.3	86	0.052	100	100	14.8	-0.1	491	362	400	241	376	374	662	289	71	67	71	67	68	-0.031	5.49	0.01
28	4.074	4.171	0.15	0.15	1.80	69	0.63	1.38	72	0.3	86	0.052	100	100	14.7	-0.1	493	360	399	241	376	374	666	290	71	67	71	67	68	-0.030	5.53	0.01
29	4.220	4.320	0.15	0.15	1.79	69	0.63	1.36	72	0.4	86	0.052	100	100	14.6	-0.1	494	360	398	242	375	374	669	292	71	67	71	67	67	-0.030	5.56	0.01
30	4.366	4.469	0.15	0.15	1.81	69	0.63	1.38	72	0.3	86	0.052	100	100	14.6	0	496	359	398	242	374	374	672	293	71	67	71	67	67	-0.030	5.55	0.01
31	4.512	4.618	0.15	0.15	1.80	69	0.63	1.38	72	0.3	86	0.052	100	100	14.5	-0.1	498	358	397	243	374	374	675	295	71	67	71	67	67	-0.031	5.61	0.01
32	4.659	4.767	0.15	0.15	1.80	69	0.63	1.37	72	0.3	86	0.052	101	100	14.4	-0.1	500	357	398	243	374	374	678	296	71	67	71	67	68	-0.031	5.66	0.01
33	4.805	4.916	0.15	0.15	1.80	69	0.63	1.37	72	0.3	87	0.052	101	100	14.3	-0.1	502	356	398	244	374	375	681	299	71	67	71	67	68	-0.031	5.71	0.01
34	4.951	5.065	0.15	0.15	1.83	69	0.63	1.38	72	0.3	88	0.052	101	100	14.2	-0.1	504	355	400	245	375	376	689	308	71	66	71	67	68	-0.032	5.82	0.01
35	5.097	5.215	0.15	0.15	1.83	69	0.62	1.38	72	0.3	88	0.052	101	100	14.0	-0.2	509	354	404	247	376	378	707	315	71	66	71	67	68	-0.033	6.15	0.01
36	5.243	5.364	0.15	0.15	1.83	69	0.62	1.37	72	0.3	88	0.052	101	100	13.9	-0.1	516	353	410	248	378	381	729	318	71	66	71	67	68	-0.032	7.24	0.2
37	5.390	5.512	0.15	0.15	1.82	69	0.62	1.37	72	0.3	88	0.052	101	99	13.9	0	524	352	414	250	380	384	752	319	71	66	71	67	68	-0.033	7.77	0.88

Wood Heater Test Data - ASTM E2780 / ASTM E2515

Run: 2

Manufacturer: Valley Comfort
Model: PI29
Tracking No.: VC-18-1
Project No.: 0142WN019E
Test Date: 23-Jan-18
Beginning Clock Time: 11:04

Total Sampling Time: 459 min
Recording Interval: 1 min
Background Sample Volume: 0 cubic feet

Meter Box Y Factor: 0.997 (1) 0.981 (2) _____ (Amb)

Barometric Pressure:	Begin	Middle	End	Average
	28.96	28.91	28.86	28.91 "Hg

OMNI Equipment Numbers: 410, 283A, 132, 576, 318, 432, 419, 371, 372, 296-T32, 559, 592, 637

PM Control Modules: 371/372
Dilution Tunnel MW(dry): 29.00 lb/lb-mole
Dilution Tunnel MW(wet): 28.78 lb/lb-mole
Dilution Tunnel H2O: 2.00 percent
Dilution Tunnel Static: -0.180 "H2O
Tunnel Area: 0.19635 ft2
Pitot Tube Cp: 0.99

Avg. Tunnel Velocity: 13.76 ft/sec.
Initial Tunnel Flow: 147.2 scfm
Average Tunnel Flow: 149.0 scfm
Post-Test Leak Check (1): 0.000 cfm @ -15 in. Hg
Post-Test Leak Check (2): 0.000 cfm @ -17 in. Hg
Average Test Piece Fuel Moisture: 22.24 Dry Basis %

Technician Signature: _____

Velocity Traverse Data

	Pt.1	Pt.2	Pt.3	Pt.4	Pt.5	Pt.6	Pt.7	Pt.8	Center	
Initial dP	0.034	0.050	0.036	0.030	0.038	0.050	0.048	0.030	0.052	"H2O
Temp:	79	79	79	79	79	79	79	79	79	°F

V_{strav} 13.69 ft/sec V_{scent} 15.52 ft/sec F_p 0.882

	Particulate Sampling Data														Fuel Weight (lb)		Temperature Data (°F)												Stack Gas Data		
Elapsed Time (min)	Gas Meter 1 (ft^3)	Gas Meter 2 (ft^3)	Sample Rate 1 (cfm)	Sample Rate 2 (cfm)	Orifice dH 1 ("H_2O)	Meter 1 Temp (°F)	Meter 1 Vacuum ("Hg)	Orifice dH 2 ("H_2O)	Meter 2 Temp (°F)	Meter 2 Vacuum ("Hg)	Dilution Tunnel (°F)	Dilution Tunnel Center dP	Pro. Rate 1	Pro. Rate 2	Scale Reading	Weight Change	Firebox Top	Firebox Bottom	Firebox Back	Firebox Left	Firebox Right	Avg. Stove Surface	Catalyst Exit	Stack	Filter 1	Dryer Exit 1	Filter 2	Dryer Exit 2	Ambient	Draft ("H_2O)	CO_2 (%)	CO (%)
38	5.536	5.661	0.15	0.15	1.82	69	0.62	1.36	72	0.3	88	0.052	101	100	13.7	-0.2	533	351	417	252	382	387	778	321	71	66	71	67	68	-0.033	7.96	0.82
39	5.682	5.811	0.15	0.15	1.82	69	0.62	1.37	72	0.3	88	0.052	101	100	13.6	-0.1	543	350	419	254	385	390	793	324	71	66	71	67	68	-0.033	7.84	0.32
40	5.828	5.960	0.15	0.15	1.84	69	0.62	1.38	72	0.3	88	0.052	101	100	13.5	-0.1	551	349	421	256	388	393	796	323	71	66	71	67	68	-0.033	7.52	0.09
41	5.974	6.108	0.15	0.15	1.83	68	0.62	1.37	72	0.3	89	0.052	101	99	13.4	-0.1	559	348	423	258	390	396	797	323	71	66	71	67	68	-0.033	7.36	0.04
42	6.120	6.257	0.15	0.15	1.83	69	0.62	1.35	72	0.3	89	0.052	101	100	13.3	-0.1	566	347	426	261	393	399	795	323	71	66	72	67	68	-0.033	7.41	0.03
43	6.266	6.407	0.15	0.15	1.83	69	0.63	1.37	72	0.3	89	0.052	101	101	13.2	-0.1	572	347	429	263	397	402	788	322	71	66	72	67	68	-0.033	7.61	0.05
44	6.413	6.556	0.15	0.15	1.84	68	0.62	1.38	72	0.3	89	0.052	102	100	13.1	-0.1	577	346	433	266	400	404	779	321	71	66	72	67	68	-0.033	7.75	0.14
45	6.559	6.705	0.15	0.15	1.84	68	0.63	1.37	72	0.3	89	0.052	101	100	13.0	-0.1	580	345	438	269	404	407	766	319	71	66	72	67	68	-0.033	7.83	0.36
46	6.705	6.854	0.15	0.15	1.84	68	0.62	1.37	72	0.3	89	0.052	101	100	12.8	-0.2	582	344	443	272	408	410	752	317	71	66	72	67	68	-0.033	7.83	0.67
47	6.852	7.003	0.15	0.15	1.82	68	0.62	1.37	72	0.3	89	0.052	102	100	12.7	-0.1	583	343	449	275	413	413	736	315	71	66	72	67	68	-0.033	7.57	1.25
48	6.998	7.152	0.15	0.15	1.82	68	0.63	1.38	72	0.3	89	0.052	101	100	12.6	-0.1	583	343	453	278	418	415	722	310	71	66	72	67	68	-0.033	7.22	1.91
49	7.144	7.301	0.15	0.15	1.82	68	0.62	1.37	72	0.3	88	0.052	101	100	12.5	-0.1	583	342	457	282	422	417	711	301	71	66	72	67	68	-0.033	6.97	2.38
50	7.291	7.450	0.15	0.15	1.83	69	0.62	1.36	72	0.3	88	0.052	101	100	12.4	-0.1	582	341	459	284	425	418	704	294	71	65	72	67	68	-0.032	6.83	2.57
51	7.437	7.599	0.15	0.15	1.83	69	0.62	1.36	72	0.3	87	0.052	101	100	12.3	-0.1	580	341	460	287	429	419	703	286	71	65	72	67	68	-0.031	6.73	2.37
52	7.584	7.748	0.15	0.15	1.83	69	0.62	1.38	72	0.3	87	0.052	101	100	12.2	-0.1	580	340	459	288	431	420	704	277	71	65	72	67	68	-0.030	6.92	1.71
53	7.730	7.898	0.15	0.15	1.83	69	0.63	1.38	72	0.3	86	0.052	100	100	12.1	-0.1	579	339	458	290	434	420	706	267	71	65	72	67	68	-0.029	6.95	1.24
54	7.876	8.046	0.15	0.15	1.83	69	0.62	1.37	72	0.3	86	0.052	100	99	12.1	0	580	339	456	291	436	420	708	255	71	65	72	67	68	-0.029	6.89	1.04
55	8.022	8.196	0.15	0.15	1.83	69	0.63	1.36	72	0.3	85	0.052	100	100	12.0	-0.1	581	338	453	292	437	420	708	245	71	65	72	67	68	-0.028	6.64	0.96
56	8.169	8.345	0.15	0.15	1.83	69	0.63	1.38	72	0.3	85	0.052	101	100	11.9	-0.1	581	337	451	292	438	420	706	234	71	65	72	67	68	-0.027	6.41	0.87
57	8.315	8.495	0.15	0.15	1.83	69	0.62	1.37	72	0.3	85	0.052	100	100	11.9	0	581	336	447	292	439	419	702	223	71	65	72	67	67	-0.027	6.29	0.72
58	8.462	8.644	0.15	0.15	1.83	69	0.63	1.37	72	0.3	84	0.052	101	99	11.8	-0.1	581	336	444	291	439	418	697	213	71	65	72	67	67	-0.025	6.14	0.59
59	8.608	8.793	0.15	0.15	1.83	69	0.63	1.36	72	0.3	84	0.052	100	99	11.8	0	580	335	441	291	438	417	693	205	71	65	72	67	68	-0.025	5.98	0.5
60	8.755	8.943	0.15	0.15	1.84	69	0.63	1.38	72	0.3	83	0.052	101	100	11.8	0	580	335	438	290	437	416	692	201	71	65	72	67	68	-0.024	5.84	0.41
61	8.905	9.092	0.15	0.15	1.83	69	0.62	1.38	72	0.3	83	0.052	103	99	11.7	-0.1	579	334	435	289	436	415	696	196	72	65	72	67	68	-0.024	5.82	0.27
62	9.051	9.241	0.15	0.15	1.82	69	0.62	1.37	72	0.3	83	0.052	100	99	11.7	0	578	333	432	288	434	413	701	192	73	65	72	67	68	-0.023	5.8	0.14
63	9.197	9.390	0.15	0.15	1.82	69	0.62	1.37	72	0.3	83	0.052	100	99	11.6	-0.1	578	333	430	287	432	412	704	189	73	65	72	67	68	-0.023	5.81	0.08
64	9.344	9.540	0.15	0.15	1.81	69	0.62	1.38	72	0.3	82	0.052	101	100	11.6	0	578	332	427	286	430	411	704	187	73	65	71	67	68	-0.022	5.73	0.05
65	9.490	9.690	0.15	0.15	1.82	69	0.62	1.38	72	0.3	82	0.052	100	100	11.6	0	577	331	424	285	428	409	701	185	73	65	71	67	68	-0.022	5.66	0.03
66	9.636	9.839	0.15	0.15	1.82	69	0.62	1.37	72	0.3	82	0.052	100	99	11.5	-0.1	576	331	422	283	426	408	697	184	72	65	71	67	68	-0.021	5.63	0.02
67	9.782	9.988	0.15	0.15	1.81	69	0.62	1.36	72	0.3	82	0.052	100	99	11.5	0	575	330	420	282	424	406	691	182	72	65	71	67	68	-0.021	5.61	0.02
68	9.928	10.138	0.15	0.15	1.79	69	0.62	1.38	72	0.3	82	0.052	100	100	11.4	-0.1	573	330	418	281	422	405	687	183	72	65	71	67	68	-0.021	5.68	0.02
69	10.074	10.287	0.15	0.15	1.79	69	0.62	1.38	72	0.3	82	0.052	100	99	11.4	0	571	329	415	280	420	403	686	183	72	65	71	67	68	-0.021	5.68	0.01
70	10.221	10.436	0.15	0.15	1.79	69	0.62	1.37	72	0.3	81	0.052	101	99	11.4	0	570	328	413	279	418	402	688	184	72	65	71	67	68	-0.021	5.75	0.02
71	10.367	10.586	0.15	0.15	1.80	69	0.62	1.36	72	0.3	81	0.052	100	100	11.3	-0.1	569	327	411	277	416	400	692	183	72	65	71	67	68	-0.021	5.9	0.04
72	10.513	10.736	0.15	0.15	1.79	69	0.62	1.38	72	0.3	81	0.052	100	100	11.3	0	569	327	409	276	414	399	699	184	72	65	71	67	68	-0.021	6.02	0.07
73	10.659	10.885	0.15	0.15	1.78	69	0.62	1.38	72	0.3	81	0.052	100	99	11.2	-0.1	569	326	407	275	411	398	708	187	72	65	71	67	68	-0.021	6.16	0.11
74	10.805	11.034	0.15	0.15	1.79	69	0.62	1.37	72	0.3	82	0.052	100	99	11.2	0	571	325	405	274	410	397	719	191	72	65	71	67	68	-0.021	6.27	0.08
75	10.951	11.184	0.15	0.15	1.78	69	0.62	1.37	72	0.3	82	0.052	100	100	11.2	0	574	324	403	273	408	396	731	195	71	65	71	67	68	-0.021	6.34	0.06

Wood Heater Test Data - ASTM E2780 / ASTM E2515

Run: 2

Manufacturer: Valley Comfort
Model: PI29
Tracking No.: VC-18-1
Project No.: 0142WN019E
Test Date: 23-Jan-18
Beginning Clock Time: 11:04

Total Sampling Time: 459 min
Recording Interval: 1 min
Background Sample Volume: 0 cubic feet

Meter Box Y Factor: 0.997 (1) 0.981 (2) _____ (Amb)

Barometric Pressure:

Begin	Middle	End	Average
28.96	28.91	28.86	28.91 "Hg

OMNI Equipment Numbers: 410, 283A, 132, 576, 318, 432, 419, 371, 372, 296-T32, 559, 592, 637

PM Control Modules: 371/372
Dilution Tunnel MW(dry): 29.00 lb/lb-mole
Dilution Tunnel MW(wet): 28.78 lb/lb-mole
Dilution Tunnel H2O: 2.00 percent
Dilution Tunnel Static: -0.180 "H2O
Tunnel Area: 0.19635 ft2
Pitot Tube Cp: 0.99

Avg. Tunnel Velocity: 13.76 ft/sec.
Initial Tunnel Flow: 147.2 scfm
Average Tunnel Flow: 149.0 scfm
Post-Test Leak Check (1): 0.000 cfm @ -15 in. Hg
Post-Test Leak Check (2): 0.000 cfm @ -17 in. Hg
Average Test Piece Fuel Moisture: 22.24 Dry Basis %

Technician Signature: _____

Velocity Traverse Data

	Pt.1	Pt.2	Pt.3	Pt.4	Pt.5	Pt.6	Pt.7	Pt.8	Center	
Initial dP	0.034	0.050	0.036	0.030	0.038	0.050	0.048	0.030	0.052	"H2O
Temp:	79	79	79	79	79	79	79	79	79	°F

V_{strav} 13.69 ft/sec V_{scent} 15.52 ft/sec F_p 0.882

	Particulate Sampling Data														Fuel Weight (lb)		Temperature Data (°F)												Stack Gas Data		
Elapsed Time (min)	Gas Meter 1 (ft^3)	Gas Meter 2 (ft^3)	Sample Rate 1 (cfm)	Sample Rate 2 (cfm)	Orifice dH 1 ("H_2O)	Meter 1 Temp (°F)	Meter 1 Vacuum ("Hg)	Orifice dH 2 ("H_2O)	Meter 2 Temp (°F)	Meter 2 Vacuum ("Hg)	Dilution Tunnel (°F)	Dilution Tunnel Center dP	Pro. Rate 1	Pro. Rate 2	Scale Reading	Weight Change	Firebox Top	Firebox Bottom	Firebox Back	Firebox Left	Firebox Right	Avg. Stove Surface	Catalyst Exit	Stack	Filter 1	Dryer Exit 1	Filter 2	Dryer Exit 2	Ambient	Draft ("H_2O)	CO_2 (%)	CO (%)
76	11.098	11.334	0.15	0.15	1.78	69	0.62	1.39	72	0.3	81	0.052	101	100	11.1	-0.1	577	324	402	272	406	396	740	201	71	65	71	67	68	-0.021	6.53	0.05
77	11.244	11.483	0.15	0.15	1.77	69	0.62	1.38	72	0.3	81	0.052	100	99	11.1	0	580	323	401	272	405	396	749	205	71	65	71	67	68	-0.021	6.74	0.05
78	11.390	11.633	0.15	0.15	1.78	69	0.62	1.38	72	0.3	81	0.052	100	100	11.0	-0.1	583	322	401	271	404	396	749	206	71	65	71	67	68	-0.021	6.99	0.06
79	11.536	11.782	0.15	0.15	1.78	69	0.62	1.37	72	0.3	81	0.052	100	99	11.0	0	585	321	400	271	403	396	742	208	71	65	71	67	68	-0.021	6.99	0.03
80	11.683	11.932	0.15	0.15	1.79	69	0.62	1.39	73	0.3	81	0.052	101	100	10.9	-0.1	586	321	399	270	402	396	734	210	71	65	71	67	68	-0.021	6.84	0.01
81	11.829	12.082	0.15	0.15	1.79	69	0.62	1.38	72	0.3	81	0.052	100	100	10.9	0	585	320	399	271	402	395	727	210	71	65	71	67	68	-0.021	6.81	0.01
82	11.975	12.231	0.15	0.15	1.80	69	0.62	1.37	73	0.3	81	0.052	100	99	10.9	0	585	319	399	270	402	395	723	211	71	65	71	67	68	-0.021	6.72	0.01
83	12.122	12.381	0.15	0.15	1.80	69	0.62	1.38	73	0.3	81	0.052	101	100	10.8	-0.1	584	318	398	270	401	394	721	212	71	65	71	67	68	-0.021	6.63	0.01
84	12.268	12.531	0.15	0.15	1.79	69	0.62	1.39	73	0.3	82	0.052	100	100	10.8	0	584	318	398	270	401	394	721	212	71	65	71	67	68	-0.021	6.62	0.01
85	12.415	12.680	0.15	0.15	1.79	69	0.62	1.38	73	0.3	82	0.052	101	99	10.7	-0.1	584	317	398	270	401	394	722	212	71	65	71	67	68	-0.022	6.57	0.01
86	12.561	12.829	0.15	0.15	1.82	69	0.62	1.37	73	0.3	82	0.052	100	99	10.7	0	583	316	398	270	400	393	724	213	71	65	71	67	68	-0.022	6.5	0.01
87	12.707	12.979	0.15	0.15	1.81	69	0.61	1.38	73	0.3	83	0.052	100	100	10.6	-0.1	583	316	398	270	400	393	725	214	71	65	71	67	68	-0.020	6.48	0.01
88	12.854	13.129	0.15	0.15	1.81	69	0.62	1.38	73	0.3	83	0.052	101	100	10.6	0	583	315	399	271	400	394	726	218	71	65	71	67	68	-0.022	6.5	0.01
89	13.000	13.279	0.15	0.15	1.81	70	0.62	1.38	73	0.3	83	0.052	100	100	10.6	0	583	314	399	271	400	393	727	222	71	65	71	67	68	-0.022	6.41	0.01
90	13.146	13.428	0.15	0.15	1.82	70	0.62	1.36	73	0.3	84	0.052	100	99	10.5	-0.1	583	314	400	271	400	394	728	225	71	65	71	67	68	-0.022	6.4	0.01
91	13.293	13.578	0.15	0.15	1.82	70	0.62	1.38	73	0.3	84	0.052	101	100	10.5	0	583	313	400	272	400	394	726	228	71	65	71	67	68	-0.022	6.35	0.01
92	13.439	13.727	0.15	0.15	1.82	70	0.62	1.38	73	0.3	84	0.052	100	99	10.4	-0.1	583	312	401	273	400	394	721	227	71	65	71	67	69	-0.022	6.35	0.01
93	13.585	13.877	0.15	0.15	1.82	70	0.62	1.38	73	0.3	85	0.052	100	100	10.4	0	582	311	401	273	400	393	715	226	71	65	71	67	69	-0.022	6.4	0.01
94	13.732	14.026	0.15	0.15	1.82	71	0.61	1.36	73	0.3	86	0.052	101	99	10.3	-0.1	581	309	401	274	401	393	712	223	71	65	71	66	69	-0.022	6.43	0.01
95	13.877	14.176	0.15	0.15	1.81	71	0.61	1.38	73	0.3	86	0.052	99	100	10.3	0	581	307	400	274	400	392	708	223	71	65	71	67	69	-0.021	6.27	0.01
96	14.023	14.325	0.15	0.15	1.82	72	0.62	1.38	73	0.3	86	0.052	100	99	10.3	0	581	306	399	275	400	392	707	224	71	65	71	67	70	-0.022	6.21	0.01
97	14.170	14.474	0.15	0.15	1.82	72	0.61	1.37	73	0.3	87	0.052	101	100	10.2	-0.1	580	305	399	275	400	392	708	226	71	65	71	67	70	-0.024	6.19	0.01
98	14.316	14.623	0.15	0.15	1.82	73	0.62	1.36	74	0.3	87	0.052	100	99	10.2	0	580	303	398	275	400	391	710	225	71	65	71	67	70	-0.022	6.28	0.02
99	14.462	14.773	0.15	0.15	1.81	73	0.62	1.37	74	0.3	87	0.052	100	100	10.1	-0.1	580	302	398	275	400	391	717	226	71	65	72	67	70	-0.022	6.26	0.02
100	14.609	14.922	0.15	0.15	1.81	74	0.62	1.38	74	0.3	87	0.052	100	99	10.1	0	581	301	397	275	399	391	729	227	71	65	72	67	70	-0.022	6.32	0.03
101	14.755	15.072	0.15	0.15	1.82	74	0.61	1.37	74	0.3	87	0.052	100	100	10.1	0	584	299	396	275	399	391	742	227	71	65	72	67	70	-0.022	6.38	0.07
102	14.901	15.220	0.15	0.15	1.82	74	0.62	1.36	74	0.3	87	0.052	100	99	10.0	-0.1	588	299	395	275	399	391	754	229	71	65	72	67	70	-0.022	6.43	0.11
103	15.047	15.370	0.15	0.15	1.81	75	0.62	1.37	74	0.3	88	0.052	99	100	10.0	0	591	298	395	275	398	391	762	230	72	65	72	67	70	-0.022	6.53	0.11
104	15.193	15.519	0.15	0.15	1.81	75	0.61	1.38	74	0.3	88	0.052	99	99	9.9	-0.1	595	297	394	276	398	392	767	231	72	65	72	67	70	-0.022	6.6	0.11
105	15.340	15.669	0.15	0.15	1.81	75	0.61	1.38	75	0.3	88	0.052	100	100	9.9	0	598	297	394	275	398	392	771	233	72	65	72	67	70	-0.022	6.6	0.12
106	15.486	15.818	0.15	0.15	1.81	76	0.61	1.36	75	0.3	88	0.052	99	99	9.9	0	602	296	393	275	398	393	773	235	72	65	72	67	71	-0.022	6.64	0.14
107	15.632	15.967	0.15	0.15	1.81	76	0.61	1.38	75	0.3	88	0.052	99	99	9.8	-0.1	604	296	393	276	398	393	775	234	72	65	72	67	71	-0.022	6.67	0.15
108	15.778	16.117	0.15	0.15	1.81	76	0.61	1.38	75	0.3	88	0.052	99	100	9.8	0	607	295	392	276	398	394	776	235	72	66	72	67	71	-0.022	6.74	0.16
109	15.924	16.266	0.15	0.15	1.81	77	0.61	1.37	75	0.3	88	0.052	99	99	9.7	-0.1	609	294	392	276	398	394	776	235	72	66	72	67	70	-0.022	6.73	0.16
110	16.070	16.415	0.15	0.15	1.79	77	0.61	1.37	75	0.3	88	0.052	99	99	9.7	0	611	293	392	276	398	394	777	235	72	66	73	67	70	-0.022	6.8	0.17
111	16.217	16.564	0.15	0.15	1.81	77	0.62	1.36	76	0.3	87	0.052	100	99	9.6	-0.1	612	292	391	276	398	394	776	236	72	66	73	67	69	-0.022	6.78	0.16
112	16.363	16.714	0.15	0.15	1.82	77	0.62	1.38	76	0.3	86	0.052	99	100	9.6	0	613	291	391	276	398	394	774	231	72	66	73	67	68	-0.022	6.73	0.13
113	16.509	16.863	0.15	0.15	1.79	77	0.62	1.37	76	0.3	86	0.052	99	99	9.5	-0.1	614	290	391	276	398	394	771	228	72	66	73	67	68	-0.022	6.72	0.13

Wood Heater Test Data - ASTM E2780 / ASTM E2515

Run: 2

Manufacturer: Valley Comfort
Model: PI29
Tracking No.: VC-18-1
Project No.: 0142WN019E
Test Date: 23-Jan-18
Beginning Clock Time: 11:04

Total Sampling Time: 459 min
Recording Interval: 1 min
Background Sample Volume: 0 cubic feet

Meter Box Y Factor: 0.997 (1) 0.981 (2) _____ (Amb)

Barometric Pressure:

Begin	Middle	End	Average
28.96	28.91	28.86	28.91 "Hg

OMNI Equipment Numbers: 410, 283A, 132, 576, 318, 432, 419, 371, 372, 296-T32, 559, 592, 637

PM Control Modules: 371/372
Dilution Tunnel MW(dry): 29.00 lb/lb-mole
Dilution Tunnel MW(wet): 28.78 lb/lb-mole
Dilution Tunnel H2O: 2.00 percent
Dilution Tunnel Static: -0.180 "H2O
Tunnel Area: 0.19635 ft2
Pitot Tube Cp: 0.99

Avg. Tunnel Velocity: 13.76 ft/sec.
Initial Tunnel Flow: 147.2 scfm
Average Tunnel Flow: 149.0 scfm
Post-Test Leak Check (1): 0.000 cfm @ -15 in. Hg
Post-Test Leak Check (2): 0.000 cfm @ -17 in. Hg
Average Test Piece Fuel Moisture: 22.24 Dry Basis %

Technician Signature: _____

Velocity Traverse Data

	Pt.1	Pt.2	Pt.3	Pt.4	Pt.5	Pt.6	Pt.7	Pt.8	Center	
Initial dP	0.034	0.050	0.036	0.030	0.038	0.050	0.048	0.030	0.052	"H2O
Temp:	79	79	79	79	79	79	79	79	79	°F

V_{strav} 13.69 ft/sec V_{scent} 15.52 ft/sec F_p 0.882

	Particulate Sampling Data														Fuel Weight (lb)		Temperature Data (°F)												Stack Gas Data		
Elapsed Time (min)	Gas Meter 1 (ft^3)	Gas Meter 2 (ft^3)	Sample Rate 1 (cfm)	Sample Rate 2 (cfm)	Orifice dH 1 ("H_2O)	Meter 1 Temp (°F)	Meter 1 Vacuum ("Hg)	Orifice dH 2 ("H_2O)	Meter 2 Temp (°F)	Meter 2 Vacuum ("Hg)	Dilution Tunnel (°F)	Dilution Tunnel Center dP	Pro. Rate 1	Pro. Rate 2	Scale Reading	Weight Change	Firebox Top	Firebox Bottom	Firebox Back	Firebox Left	Firebox Right	Avg. Stove Surface	Catalyst Exit	Stack	Filter 1	Dryer Exit 1	Filter 2	Dryer Exit 2	Ambient	Draft ("H_2O)	CO_2 (%)	CO (%)
114	16.656	17.012	0.15	0.15	1.79	77	0.62	1.36	76	0.3	85	0.052	100	99	9.5	0	615	289	391	276	398	394	768	224	72	66	73	67	69	-0.022	6.6	0.13
115	16.802	17.162	0.15	0.15	1.79	77	0.62	1.38	76	0.3	85	0.052	99	99	9.5	0	614	288	390	277	398	393	765	223	72	66	72	67	68	-0.022	6.47	0.13
116	16.949	17.312	0.15	0.15	1.79	76	0.62	1.38	76	0.3	85	0.052	100	99	9.4	-0.1	614	290	390	277	398	394	762	221	72	66	72	67	69	-0.022	6.4	0.11
117	17.095	17.462	0.15	0.15	1.78	76	0.61	1.38	76	0.3	85	0.052	99	99	9.4	0	614	291	390	277	398	394	760	221	72	66	72	67	69	-0.022	6.35	0.1
118	17.242	17.611	0.15	0.15	1.79	76	0.61	1.37	76	0.3	86	0.052	100	99	9.4	0	614	292	390	277	398	394	759	222	71	66	72	67	69	-0.022	6.37	0.1
119	17.388	17.761	0.15	0.15	1.79	76	0.62	1.38	75	0.3	86	0.052	99	100	9.3	-0.1	614	293	390	278	398	395	758	222	71	66	72	67	69	-0.022	6.28	0.08
120	17.535	17.910	0.15	0.15	1.77	76	0.62	1.38	75	0.3	85	0.052	100	99	9.3	0	613	294	389	278	398	394	758	225	71	66	72	67	69	-0.022	6.34	0.07
121	17.681	18.061	0.15	0.15	1.78	75	0.62	1.37	75	0.3	85	0.052	99	100	9.2	-0.1	613	294	389	278	399	395	758	224	71	66	72	67	69	-0.022	6.36	0.06
122	17.828	18.210	0.15	0.15	1.79	75	0.62	1.36	75	0.3	85	0.052	100	99	9.2	0	613	294	389	278	399	395	758	225	71	66	72	67	69	-0.022	6.37	0.06
123	17.975	18.360	0.15	0.15	1.80	75	0.61	1.38	75	0.3	85	0.052	100	100	9.2	0	613	295	389	279	399	395	758	227	71	66	72	67	69	-0.022	6.34	0.06
124	18.121	18.509	0.15	0.15	1.78	75	0.61	1.38	75	0.3	85	0.052	99	99	9.1	-0.1	613	295	389	279	399	395	758	227	71	66	72	67	69	-0.022	6.42	0.06
125	18.268	18.659	0.15	0.15	1.79	74	0.61	1.37	75	0.3	85	0.052	100	100	9.1	0	612	296	389	279	400	395	759	226	71	66	72	67	69	-0.022	6.5	0.07
126	18.415	18.809	0.15	0.15	1.79	74	0.62	1.36	75	0.3	84	0.052	100	100	9.0	-0.1	612	296	389	280	400	395	759	228	71	66	72	67	69	-0.023	6.53	0.07
127	18.562	18.959	0.15	0.15	1.78	74	0.62	1.39	75	0.3	85	0.052	100	100	9.0	0	612	296	390	280	400	396	760	228	71	66	72	67	69	-0.022	6.39	0.06
128	18.708	19.109	0.15	0.15	1.78	74	0.62	1.38	75	0.3	85	0.052	99	100	9.0	0	613	296	390	280	400	396	760	229	71	66	72	67	69	-0.023	6.37	0.05
129	18.855	19.258	0.15	0.15	1.79	74	0.62	1.37	75	0.3	85	0.052	100	99	8.9	-0.1	613	297	391	281	400	396	761	231	71	66	72	67	69	-0.023	6.36	0.04
130	19.002	19.408	0.15	0.15	1.79	73	0.62	1.37	75	0.3	85	0.052	100	100	8.9	0	613	297	391	281	400	396	762	232	71	66	72	67	69	-0.023	6.36	0.04
131	19.149	19.558	0.15	0.15	1.78	73	0.62	1.38	74	0.3	84	0.052	100	100	8.8	-0.1	613	297	392	282	401	397	761	234	71	66	72	67	68	-0.023	6.39	0.03
132	19.295	19.708	0.15	0.15	1.78	73	0.62	1.38	74	0.3	84	0.052	99	100	8.8	0	613	297	393	283	401	397	759	234	71	66	72	67	68	-0.023	6.45	0.03
133	19.442	19.857	0.15	0.15	1.79	73	0.62	1.37	74	0.3	84	0.052	100	99	8.7	-0.1	612	297	394	284	402	398	753	232	71	66	72	67	68	-0.023	6.45	0.03
134	19.589	20.007	0.15	0.15	1.78	73	0.62	1.38	74	0.3	84	0.052	100	100	8.7	0	611	297	395	284	402	398	747	232	71	66	72	67	68	-0.023	6.26	0.02
135	19.736	20.157	0.15	0.15	1.78	73	0.62	1.38	74	0.3	84	0.052	100	100	8.7	0	609	297	396	285	403	398	740	231	71	66	72	67	69	-0.022	6.19	0.01
136	19.883	20.307	0.15	0.15	1.79	72	0.62	1.38	74	0.3	84	0.052	100	100	8.6	-0.1	607	297	397	286	403	398	735	228	71	66	72	67	69	-0.023	6.15	0.01
137	20.030	20.456	0.15	0.15	1.80	72	0.61	1.37	74	0.3	84	0.052	100	99	8.6	0	605	298	398	287	404	398	732	229	71	66	72	67	68	-0.022	6.09	0.01
138	20.176	20.607	0.15	0.15	1.78	72	0.62	1.38	74	0.3	84	0.052	100	100	8.5	-0.1	602	298	399	288	404	398	729	228	71	66	72	67	69	-0.023	6.12	0.01
139	20.323	20.756	0.15	0.15	1.79	72	0.62	1.38	74	0.3	84	0.052	100	99	8.5	0	600	298	400	289	404	398	728	227	71	66	72	67	68	-0.023	6.14	0.01
140	20.470	20.906	0.15	0.15	1.79	72	0.62	1.37	74	0.3	84	0.052	100	100	8.4	-0.1	598	298	401	289	405	398	726	227	71	66	72	67	69	-0.023	6.12	0.01
141	20.617	21.056	0.15	0.15	1.78	72	0.62	1.37	74	0.3	84	0.052	100	100	8.4	0	597	297	401	290	405	398	726	228	71	66	72	67	69	-0.022	6.15	0.01
142	20.763	21.206	0.15	0.15	1.78	72	0.62	1.38	74	0.3	85	0.052	100	100	8.4	0	596	297	401	291	405	398	729	225	71	66	72	67	69	-0.022	6.1	0.01
143	20.910	21.356	0.15	0.15	1.79	72	0.62	1.38	74	0.3	85	0.052	100	100	8.3	-0.1	596	297	401	291	405	398	733	222	71	66	72	67	69	-0.022	6.26	0.02
144	21.056	21.505	0.15	0.15	1.79	72	0.62	1.38	74	0.3	85	0.052	100	99	8.3	0	596	297	401	291	405	398	737	222	71	66	72	67	69	-0.021	6.32	0.03
145	21.203	21.655	0.15	0.15	1.78	72	0.62	1.37	74	0.3	84	0.052	100	100	8.2	-0.1	596	295	401	291	405	398	739	220	71	66	72	67	69	-0.022	6.27	0.02
146	21.350	21.805	0.15	0.15	1.77	72	0.62	1.39	74	0.3	84	0.052	100	100	8.2	0	596	295	401	292	405	398	740	219	71	66	72	67	69	-0.022	6.2	0.02
147	21.496	21.955	0.15	0.15	1.78	72	0.62	1.38	74	0.3	84	0.052	100	100	8.1	-0.1	597	295	401	291	405	398	741	218	71	66	72	67	70	-0.021	6.17	0.02
148	21.642	22.104	0.15	0.15	1.78	72	0.62	1.37	74	0.3	85	0.052	100	99	8.1	0	597	295	399	292	405	398	741	218	71	66	72	67	70	-0.022	6.26	0.01
149	21.789	22.254	0.15	0.15	1.78	72	0.61	1.37	74	0.3	85	0.052	100	100	8.1	0	598	295	398	291	404	397	743	220	71	66	72	67	70	-0.022	6.18	0.01
150	21.936	22.404	0.15	0.15	1.78	72	0.62	1.39	74	0.3	85	0.052	100	100	8.0	-0.1	598	294	397	292	404	397	745	222	71	66	72	67	69	-0.022	6.12	0.01
151	22.082	22.553	0.15	0.15	1.79	72	0.62	1.38	74	0.3	85	0.052	100	99	8.0	0	599	295	396	291	404	397	747	221	71	66	72	67	69	-0.022	6.1	0

Wood Heater Test Data - ASTM E2780 / ASTM E2515

Run: 2

Manufacturer: Valley Comfort
Model: PI29
Tracking No.: VC-18-1
Project No.: 0142WN019E
Test Date: 23-Jan-18
Beginning Clock Time: 11:04

Total Sampling Time: 459 min
Recording Interval: 1 min
Background Sample Volume: 0 cubic feet

Meter Box Y Factor: 0.997 (1) 0.981 (2) _____ (Amb)

Barometric Pressure:

Begin	Middle	End	Average
28.96	28.91	28.86	28.91 "Hg

OMNI Equipment Numbers: 410, 283A, 132, 576, 318, 432, 419, 371, 372, 296-T32, 559, 592, 637

PM Control Modules: 371/372
Dilution Tunnel MW(dry): 29.00 lb/lb-mole
Dilution Tunnel MW(wet): 28.78 lb/lb-mole
Dilution Tunnel H2O: 2.00 percent
Dilution Tunnel Static: -0.180 "H2O
Tunnel Area: 0.19635 ft2
Pitot Tube Cp: 0.99

Avg. Tunnel Velocity: 13.76 ft/sec.
Initial Tunnel Flow: 147.2 scfm
Average Tunnel Flow: 149.0 scfm
Post-Test Leak Check (1): 0.000 cfm @ -15 in. Hg
Post-Test Leak Check (2): 0.000 cfm @ -17 in. Hg
Average Test Piece Fuel Moisture: 22.24 Dry Basis %

Technician Signature: _____

Velocity Traverse Data

	Pt.1	Pt.2	Pt.3	Pt.4	Pt.5	Pt.6	Pt.7	Pt.8	Center	
Initial dP	0.034	0.050	0.036	0.030	0.038	0.050	0.048	0.030	0.052	"H2O
Temp:	79	79	79	79	79	79	79	79	79	°F

V_{strav} 13.69 ft/sec V_{scent} 15.52 ft/sec F_p 0.882

	Particulate Sampling Data														Fuel Weight (lb)		Temperature Data (°F)												Stack Gas Data		
Elapsed Time (min)	Gas Meter 1 (ft^3)	Gas Meter 2 (ft^3)	Sample Rate 1 (cfm)	Sample Rate 2 (cfm)	Orifice dH 1 ("H_2O)	Meter 1 Temp (°F)	Meter 1 Vacuum ("Hg)	Orifice dH 2 ("H_2O)	Meter 2 Temp (°F)	Meter 2 Vacuum ("Hg)	Dilution Tunnel (°F)	Dilution Tunnel Center dP	Pro. Rate 1	Pro. Rate 2	Scale Reading	Weight Change	Firebox Top	Firebox Bottom	Firebox Back	Firebox Left	Firebox Right	Avg. Stove Surface	Catalyst Exit	Stack	Filter 1	Dryer Exit 1	Filter 2	Dryer Exit 2	Ambient	Draft ("H_2O)	CO_2 (%)	CO (%)
152	22.229	22.703	0.15	0.15	1.79	72	0.61	1.37	74	0.3	85	0.052	100	100	7.9	-0.1	599	294	395	292	404	397	749	223	71	66	72	67	70	-0.022	6.16	0
153	22.375	22.853	0.15	0.15	1.79	72	0.62	1.38	74	0.3	85	0.052	100	100	7.9	0	600	294	395	292	404	397	752	223	71	66	72	67	70	-0.022	6.24	0
154	22.522	23.002	0.15	0.15	1.78	72	0.62	1.38	74	0.3	85	0.052	100	99	7.9	0	601	294	394	292	404	397	755	224	71	66	72	67	70	-0.022	6.34	0
155	22.668	23.152	0.15	0.15	1.80	72	0.62	1.38	74	0.3	85	0.052	100	100	7.8	-0.1	602	294	394	292	404	397	758	227	72	66	72	67	69	-0.022	6.45	0
156	22.815	23.302	0.15	0.15	1.79	72	0.61	1.37	74	0.3	85	0.052	100	100	7.8	0	604	295	394	292	404	398	762	228	72	66	72	67	70	-0.022	6.48	0.01
157	22.962	23.452	0.15	0.15	1.79	72	0.62	1.38	74	0.3	85	0.052	100	100	7.7	-0.1	605	295	393	292	404	398	765	226	71	66	72	67	70	-0.022	6.66	0.01
158	23.108	23.601	0.15	0.15	1.81	72	0.62	1.38	74	0.3	85	0.052	100	99	7.7	0	607	295	393	292	404	398	768	227	72	67	72	67	70	-0.022	6.74	0.01
159	23.255	23.751	0.15	0.15	1.81	72	0.61	1.37	74	0.3	85	0.052	100	100	7.6	-0.1	609	296	393	293	405	399	769	226	72	67	72	67	69	-0.022	6.74	0.01
160	23.402	23.900	0.15	0.15	1.80	72	0.61	1.37	74	0.3	85	0.052	100	99	7.6	0	610	295	393	293	405	399	772	225	72	67	72	67	69	-0.022	6.82	0.02
161	23.548	24.051	0.15	0.15	1.79	72	0.62	1.38	74	0.3	85	0.052	100	100	7.5	-0.1	612	295	393	293	405	400	773	224	72	67	72	67	70	-0.022	6.86	0.03
162	23.695	24.200	0.15	0.15	1.81	72	0.61	1.38	74	0.3	85	0.052	100	99	7.5	0	614	294	393	293	405	400	774	224	72	67	72	67	70	-0.022	6.86	0.04
163	23.841	24.350	0.15	0.15	1.81	72	0.61	1.37	74	0.3	85	0.052	100	100	7.5	0	615	294	392	294	405	400	776	223	72	67	72	67	70	-0.022	6.82	0.05
164	23.988	24.499	0.15	0.15	1.80	72	0.61	1.37	74	0.3	85	0.052	100	99	7.4	-0.1	617	295	392	294	406	401	778	223	72	67	72	67	70	-0.022	6.94	0.07
165	24.134	24.649	0.15	0.15	1.81	72	0.61	1.38	74	0.3	85	0.052	100	100	7.4	0	618	294	392	294	406	401	780	223	72	67	72	67	70	-0.022	6.98	0.08
166	24.281	24.799	0.15	0.15	1.81	72	0.61	1.38	74	0.3	85	0.052	100	100	7.3	-0.1	620	294	392	295	406	401	783	224	72	67	72	67	70	-0.022	7.04	0.09
167	24.427	24.948	0.15	0.15	1.82	72	0.61	1.37	74	0.3	85	0.052	100	99	7.3	0	622	294	392	295	406	402	785	225	72	67	72	67	70	-0.022	6.99	0.11
168	24.574	25.098	0.15	0.15	1.81	72	0.61	1.36	74	0.3	85	0.052	100	100	7.2	-0.1	624	294	393	295	407	403	789	227	72	67	72	67	70	-0.023	7	0.13
169	24.721	25.248	0.15	0.15	1.82	72	0.61	1.38	74	0.3	85	0.052	100	100	7.2	0	626	294	393	296	407	403	794	230	72	67	72	67	70	-0.023	7.08	0.16
170	24.867	25.397	0.15	0.15	1.82	72	0.61	1.38	74	0.3	85	0.052	100	99	7.1	-0.1	629	294	393	296	407	404	798	231	72	67	72	67	70	-0.023	7.26	0.18
171	25.014	25.547	0.15	0.15	1.81	72	0.61	1.37	74	0.3	86	0.052	101	100	7.1	0	631	294	393	297	408	405	802	232	72	67	73	67	70	-0.023	7.29	0.2
172	25.160	25.697	0.15	0.15	1.82	72	0.61	1.37	74	0.3	85	0.052	100	100	7.0	-0.1	634	294	394	297	409	406	806	233	72	67	73	67	70	-0.023	7.3	0.23
173	25.307	25.846	0.15	0.15	1.80	72	0.61	1.38	74	0.3	86	0.052	101	99	7.0	0	637	295	394	298	410	407	809	234	72	67	73	67	70	-0.023	7.23	0.26
174	25.453	25.996	0.15	0.15	1.81	72	0.61	1.38	74	0.3	86	0.052	100	100	6.9	-0.1	640	296	394	298	410	408	811	234	72	67	73	67	70	-0.022	7.33	0.25
175	25.599	26.145	0.15	0.15	1.81	72	0.61	1.37	74	0.3	87	0.052	100	99	6.9	0	642	296	395	298	410	408	810	232	72	67	73	67	70	-0.022	7.31	0.25
176	25.746	26.295	0.15	0.15	1.81	72	0.61	1.38	74	0.3	87	0.052	101	100	6.8	-0.1	644	296	395	299	410	409	809	231	72	67	73	67	71	-0.022	7.28	0.23
177	25.892	26.445	0.15	0.15	1.81	73	0.61	1.38	75	0.3	87	0.052	100	100	6.8	0	645	297	396	299	411	410	808	231	72	67	73	67	71	-0.022	7.28	0.21
178	26.038	26.595	0.15	0.15	1.81	73	0.61	1.37	75	0.3	88	0.052	100	100	6.7	-0.1	646	297	396	300	411	410	808	232	72	67	73	67	71	-0.022	7.28	0.21
179	26.185	26.744	0.15	0.15	1.82	73	0.61	1.36	75	0.3	88	0.052	101	99	6.7	0	647	297	397	300	412	411	808	233	72	67	73	67	71	-0.022	7.23	0.2
180	26.331	26.894	0.15	0.15	1.82	73	0.61	1.37	75	0.3	88	0.052	100	100	6.6	-0.1	648	297	397	301	412	411	808	232	73	67	73	67	71	-0.022	7.3	0.25
181	26.477	27.043	0.15	0.15	1.82	74	0.61	1.38	75	0.3	88	0.052	100	99	6.6	0	649	297	397	301	412	411	808	231	73	67	73	67	71	-0.022	7.25	0.28
182	26.624	27.193	0.15	0.15	1.81	74	0.61	1.37	75	0.3	89	0.052	100	100	6.5	-0.1	650	296	398	302	413	412	809	231	73	67	73	67	71	-0.022	7.14	0.3
183	26.770	27.342	0.15	0.15	1.82	74	0.61	1.36	75	0.3	89	0.052	100	99	6.5	0	651	296	399	302	413	412	809	230	73	67	73	67	71	-0.022	7.12	0.29
184	26.917	27.493	0.15	0.15	1.82	74	0.61	1.40	75	0.3	88	0.052	100	101	6.4	-0.1	652	296	399	302	413	412	808	229	73	67	73	68	71	-0.022	7.17	0.27
185	27.063	27.644	0.15	0.15	1.82	74	0.61	1.40	75	0.3	88	0.052	100	101	6.4	0	653	297	400	303	414	413	806	228	73	67	73	68	71	-0.022	7.21	0.26
186	27.210	27.795	0.15	0.15	1.80	74	0.61	1.39	75	0.3	88	0.052	100	101	6.4	0	652	297	400	303	414	413	801	224	73	67	73	68	71	-0.021	7.13	0.25
187	27.356	27.947	0.15	0.15	1.80	74	0.61	1.40	75	0.3	88	0.052	100	101	6.3	-0.1	652	296	400	304	414	413	796	223	73	67	73	68	71	-0.021	7.04	0.23
188	27.503	28.097	0.15	0.15	1.81	74	0.61	1.40	75	0.3	88	0.052	100	100	6.3	0	651	296	401	304	414	413	790	220	73	67	74	68	71	-0.021	6.91	0.2
189	27.649	28.248	0.15	0.15	1.82	74	0.61	1.39	75	0.3	88	0.052	100	101	6.2	-0.1	649	295	401	304	415	413	784	218	73	67	74	68	71	-0.021	6.84	0.15

Wood Heater Test Data - ASTM E2780 / ASTM E2515

Run: 2

Manufacturer: Valley Comfort
Model: PI29
Tracking No.: VC-18-1
Project No.: 0142WN019E
Test Date: 23-Jan-18
Beginning Clock Time: 11:04

Total Sampling Time: 459 min
Recording Interval: 1 min
Background Sample Volume: 0 cubic feet

Meter Box Y Factor: 0.997 (1) 0.981 (2) _____ (Amb)

Barometric Pressure:

Begin	Middle	End	Average
28.96	28.91	28.86	28.91 "Hg

OMNI Equipment Numbers: 410, 283A, 132, 576, 318, 432, 419, 371, 372, 296-T32, 559, 592, 637

PM Control Modules: 371/372
Dilution Tunnel MW(dry): 29.00 lb/lb-mole
Dilution Tunnel MW(wet): 28.78 lb/lb-mole
Dilution Tunnel H2O: 2.00 percent
Dilution Tunnel Static: -0.180 "H2O
Tunnel Area: 0.19635 ft2
Pitot Tube Cp: 0.99

Avg. Tunnel Velocity: 13.76 ft/sec.
Initial Tunnel Flow: 147.2 scfm
Average Tunnel Flow: 149.0 scfm
Post-Test Leak Check (1): 0.000 cfm @ -15 in. Hg
Post-Test Leak Check (2): 0.000 cfm @ -17 in. Hg
Average Test Piece Fuel Moisture: 22.24 Dry Basis %

Technician Signature: _____

Velocity Traverse Data

	Pt.1	Pt.2	Pt.3	Pt.4	Pt.5	Pt.6	Pt.7	Pt.8	Center	
Initial dP	0.034	0.050	0.036	0.030	0.038	0.050	0.048	0.030	0.052	"H2O
Temp:	79	79	79	79	79	79	79	79	79	°F

V_{strav} 13.69 ft/sec V_{scent} 15.52 ft/sec F_p 0.882

	Particulate Sampling Data														Fuel Weight (lb)		Temperature Data (°F)												Stack Gas Data		
Elapsed Time (min)	Gas Meter 1 (ft^3)	Gas Meter 2 (ft^3)	Sample Rate 1 (cfm)	Sample Rate 2 (cfm)	Orifice dH 1 ("H_2O)	Meter 1 Temp (°F)	Meter 1 Vacuum ("Hg)	Orifice dH 2 ("H_2O)	Meter 2 Temp (°F)	Meter 2 Vacuum ("Hg)	Dilution Tunnel (°F)	Dilution Tunnel Center dP	Pro. Rate 1	Pro. Rate 2	Scale Reading	Weight Change	Firebox Top	Firebox Bottom	Firebox Back	Firebox Left	Firebox Right	Avg. Stove Surface	Catalyst Exit	Stack	Filter 1	Dryer Exit 1	Filter 2	Dryer Exit 2	Ambient	Draft ("H_2O)	CO_2 (%)	CO (%)
190	27.796	28.399	0.15	0.15	1.81	74	0.61	1.40	75	0.3	87	0.052	100	100	6.2	0	647	295	401	304	415	412	779	217	73	67	74	68	71	-0.021	6.65	0.12
191	27.942	28.551	0.15	0.15	1.80	74	0.61	1.39	75	0.3	87	0.052	100	101	6.2	0	645	296	402	305	415	413	775	218	73	67	74	68	71	-0.021	6.58	0.1
192	28.088	28.701	0.15	0.15	1.80	74	0.61	1.39	75	0.3	87	0.052	100	100	6.1	-0.1	643	296	402	305	415	412	772	218	73	67	74	68	71	-0.021	6.51	0.08
193	28.235	28.852	0.15	0.15	1.81	74	0.61	1.39	76	0.3	87	0.052	100	100	6.1	0	641	296	402	305	415	412	768	217	73	67	74	68	71	-0.021	6.48	0.05
194	28.381	29.003	0.15	0.15	1.81	74	0.61	1.40	75	0.3	88	0.052	100	101	6.1	0	639	296	402	305	415	411	764	217	73	67	74	68	71	-0.020	6.41	0.03
195	28.528	29.154	0.15	0.15	1.81	74	0.61	1.39	76	0.3	88	0.052	100	100	6.0	-0.1	636	296	402	306	415	411	761	216	73	67	74	68	71	-0.020	6.36	0.02
196	28.674	29.306	0.15	0.15	1.81	74	0.61	1.39	75	0.3	88	0.052	100	101	6.0	0	633	296	402	306	415	410	758	219	73	67	74	68	71	-0.020	6.26	0.02
197	28.820	29.457	0.15	0.15	1.81	75	0.61	1.40	75	0.3	88	0.052	99	101	6.0	0	631	296	402	306	415	410	753	216	73	67	74	68	72	-0.020	6.16	0.01
198	28.967	29.608	0.15	0.15	1.81	75	0.61	1.39	76	0.3	88	0.052	100	100	5.9	-0.1	628	296	402	306	414	409	748	217	73	67	74	68	72	-0.020	6.08	0.01
199	29.113	29.758	0.15	0.15	1.81	75	0.61	1.39	76	0.3	88	0.052	99	100	5.9	0	624	297	402	306	414	409	743	212	73	67	74	68	72	-0.019	6.01	0.01
200	29.260	29.910	0.15	0.15	1.80	75	0.61	1.40	76	0.3	88	0.052	100	101	5.9	0	621	297	402	306	414	408	735	212	73	67	74	68	72	-0.019	5.88	0.01
201	29.406	30.061	0.15	0.15	1.81	75	0.61	1.40	76	0.3	88	0.052	99	100	5.9	0	616	297	401	306	413	407	728	209	73	67	74	68	72	-0.019	5.75	0
202	29.552	30.212	0.15	0.15	1.80	76	0.61	1.38	76	0.3	88	0.052	99	100	5.8	-0.1	612	295	401	306	413	405	720	206	73	67	74	68	72	-0.019	5.7	0
203	29.699	30.363	0.15	0.15	1.81	76	0.61	1.41	76	0.3	89	0.052	100	100	5.8	0	608	294	401	306	413	404	713	208	73	68	74	68	71	-0.019	5.61	0
204	29.845	30.514	0.15	0.15	1.78	76	0.62	1.39	76	0.3	88	0.052	99	100	5.8	0	603	295	401	306	412	403	708	206	73	68	74	68	72	-0.018	5.58	0
205	29.992	30.665	0.15	0.15	1.78	76	0.62	1.38	76	0.3	88	0.052	100	100	5.8	0	599	296	400	306	411	402	702	204	74	68	74	68	72	-0.018	5.54	0
206	30.138	30.816	0.15	0.15	1.79	76	0.62	1.40	76	0.3	88	0.052	99	100	5.7	-0.1	594	296	400	305	411	401	696	202	74	68	74	68	72	-0.018	5.63	0
207	30.285	30.968	0.15	0.15	1.77	76	0.62	1.40	76	0.3	88	0.052	100	101	5.7	0	590	296	399	305	410	400	691	201	74	68	74	68	72	-0.018	5.56	0
208	30.431	31.118	0.15	0.15	1.78	76	0.61	1.39	76	0.3	87	0.052	99	100	5.7	0	586	296	399	304	409	399	685	202	74	68	74	68	71	-0.018	5.53	0
209	30.578	31.270	0.15	0.15	1.78	76	0.62	1.39	76	0.3	87	0.052	100	101	5.7	0	581	296	399	304	408	398	680	199	74	68	74	68	72	-0.018	5.51	0
210	30.724	31.421	0.15	0.15	1.78	76	0.61	1.40	76	0.3	87	0.052	99	100	5.6	-0.1	577	296	398	304	408	397	675	199	74	68	74	68	72	-0.018	5.51	0
211	30.871	31.572	0.15	0.15	1.77	76	0.62	1.39	76	0.3	87	0.052	100	100	5.6	0	573	297	398	304	407	396	671	197	74	68	74	68	72	-0.018	5.47	0
212	31.017	31.723	0.15	0.15	1.78	76	0.62	1.40	76	0.3	86	0.052	99	100	5.6	0	569	296	397	303	406	394	667	197	74	68	74	68	72	-0.018	5.44	0
213	31.163	31.875	0.15	0.15	1.78	76	0.61	1.40	76	0.3	87	0.052	99	101	5.6	0	565	295	397	303	405	393	663	193	74	68	74	68	72	-0.018	5.47	0
214	31.310	32.025	0.15	0.15	1.76	76	0.62	1.40	76	0.3	86	0.052	100	100	5.6	0	562	295	396	302	404	392	660	196	74	68	74	68	72	-0.018	5.36	0
215	31.456	32.177	0.15	0.15	1.77	75	0.62	1.40	76	0.3	86	0.052	99	101	5.5	-0.1	558	294	395	302	403	390	658	196	74	68	74	68	72	-0.018	5.35	0
216	31.603	32.328	0.15	0.15	1.78	75	0.61	1.40	76	0.3	86	0.052	100	100	5.5	0	555	294	395	302	402	390	657	198	74	68	74	69	72	-0.018	5.44	0
217	31.749	32.479	0.15	0.15	1.78	75	0.62	1.39	76	0.3	86	0.052	99	100	5.5	0	553	294	394	301	401	389	659	199	74	68	74	69	72	-0.018	5.46	0
218	31.896	32.630	0.15	0.15	1.77	75	0.62	1.40	76	0.3	86	0.052	100	100	5.5	0	550	294	394	301	399	388	663	203	74	68	74	69	72	-0.018	5.63	0
219	32.042	32.781	0.15	0.15	1.76	75	0.61	1.40	76	0.3	86	0.052	99	100	5.4	-0.1	549	294	394	301	398	387	668	206	74	68	74	69	72	-0.018	5.72	0
220	32.188	32.932	0.15	0.15	1.77	75	0.62	1.39	76	0.3	86	0.052	99	100	5.4	0	548	294	393	300	397	386	674	209	74	68	74	69	72	-0.019	5.82	0
221	32.335	33.083	0.15	0.15	1.78	75	0.61	1.39	76	0.3	86	0.052	100	100	5.4	0	548	294	393	300	397	386	680	210	74	68	74	69	72	-0.018	5.89	0
222	32.482	33.235	0.15	0.15	1.78	75	0.61	1.40	76	0.3	86	0.052	100	101	5.3	-0.1	548	293	393	300	396	386	685	211	74	68	74	69	71	-0.019	5.99	0
223	32.628	33.386	0.15	0.15	1.78	75	0.62	1.39	76	0.3	86	0.052	99	100	5.3	0	549	293	393	300	395	386	691	212	74	68	74	69	72	-0.019	6.05	0
224	32.775	33.537	0.15	0.15	1.79	74	0.61	1.40	76	0.3	85	0.052	100	100	5.3	0	550	292	393	300	394	386	696	212	74	68	74	69	72	-0.019	6.13	0
225	32.921	33.688	0.15	0.15	1.78	74	0.61	1.40	76	0.3	85	0.052	99	100	5.2	-0.1	551	292	393	300	394	386	701	213	74	68	74	69	72	-0.019	6.23	0
226	33.068	33.839	0.15	0.15	1.78	74	0.61	1.39	76	0.3	86	0.052	100	100	5.2	0	552	292	393	300	393	386	707	214	74	68	74	69	72	-0.019	6.31	0
227	33.214	33.990	0.15	0.15	1.78	74	0.61	1.39	76	0.3	86	0.052	99	100	5.2	0	554	292	393	300	392	386	713	216	74	68	74	69	72	-0.019	6.34	0

Wood Heater Test Data - ASTM E2780 / ASTM E2515

Run: 2

Manufacturer: Valley Comfort
Model: PI29
Tracking No.: VC-18-1
Project No.: 0142WN019E
Test Date: 23-Jan-18
Beginning Clock Time: 11:04

Total Sampling Time: 459 min
Recording Interval: 1 min
Background Sample Volume: 0 cubic feet

Meter Box Y Factor: 0.997 (1) 0.981 (2) _____ (Amb)

Barometric Pressure:

Begin	Middle	End	Average
28.96	28.91	28.86	28.91 "Hg

OMNI Equipment Numbers: 410, 283A, 132, 576, 318, 432, 419, 371, 372, 296-T32, 559, 592, 637

PM Control Modules: 371/372
Dilution Tunnel MW(dry): 29.00 lb/lb-mole
Dilution Tunnel MW(wet): 28.78 lb/lb-mole
Dilution Tunnel H2O: 2.00 percent
Dilution Tunnel Static: -0.180 "H2O
Tunnel Area: 0.19635 ft2
Pitot Tube Cp: 0.99

Avg. Tunnel Velocity: 13.76 ft/sec.
Initial Tunnel Flow: 147.2 scfm
Average Tunnel Flow: 149.0 scfm
Post-Test Leak Check (1): 0.000 cfm @ -15 in. Hg
Post-Test Leak Check (2): 0.000 cfm @ -17 in. Hg
Average Test Piece Fuel Moisture: 22.24 Dry Basis %

Technician Signature: _____

Velocity Traverse Data

	Pt.1	Pt.2	Pt.3	Pt.4	Pt.5	Pt.6	Pt.7	Pt.8	Center	
Initial dP	0.034	0.050	0.036	0.030	0.038	0.050	0.048	0.030	0.052	"H2O
Temp:	79	79	79	79	79	79	79	79	79	°F

V_{strav} 13.69 ft/sec V_{scent} 15.52 ft/sec F_p 0.882

	Particulate Sampling Data														Fuel Weight (lb)		Temperature Data (°F)												Stack Gas Data		
Elapsed Time (min)	Gas Meter 1 (ft^3)	Gas Meter 2 (ft^3)	Sample Rate 1 (cfm)	Sample Rate 2 (cfm)	Orifice dH 1 ("H_2O)	Meter 1 Temp (°F)	Meter 1 Vacuum ("Hg)	Orifice dH 2 ("H_2O)	Meter 2 Temp (°F)	Meter 2 Vacuum ("Hg)	Dilution Tunnel (°F)	Dilution Tunnel Center dP	Pro. Rate 1	Pro. Rate 2	Scale Reading	Weight Change	Firebox Top	Firebox Bottom	Firebox Back	Firebox Left	Firebox Right	Avg. Stove Surface	Catalyst Exit	Stack	Filter 1	Dryer Exit 1	Filter 2	Dryer Exit 2	Ambient	Draft ("H_2O)	CO_2 (%)	CO (%)
228	33.361	34.142	0.15	0.15	1.80	74	0.62	1.41	76	0.3	86	0.052	100	101	5.1	-0.1	556	291	394	300	392	387	719	217	74	68	74	69	72	-0.020	6.31	0
229	33.507	34.293	0.15	0.15	1.79	74	0.61	1.39	76	0.3	86	0.052	99	100	5.1	0	558	291	394	301	391	387	725	219	74	68	74	69	71	-0.019	6.43	0
230	33.654	34.444	0.15	0.15	1.78	74	0.61	1.39	76	0.3	86	0.052	100	100	5.1	0	561	290	394	301	391	387	731	223	74	68	74	69	72	-0.019	6.5	0
231	33.801	34.596	0.15	0.15	1.81	74	0.61	1.40	76	0.3	86	0.052	100	101	5.0	-0.1	564	290	395	301	391	388	737	225	74	68	74	69	72	-0.020	6.59	0
232	33.947	34.747	0.15	0.15	1.80	75	0.61	1.40	76	0.3	87	0.052	99	100	5.0	0	567	289	395	301	390	388	743	224	74	68	74	69	72	-0.020	6.76	0.01
233	34.094	34.898	0.15	0.15	1.80	75	0.61	1.38	76	0.3	87	0.052	100	100	4.9	-0.1	570	289	396	301	390	389	748	227	74	68	74	69	72	-0.020	6.78	0.01
234	34.241	35.050	0.15	0.15	1.79	75	0.61	1.41	76	0.3	87	0.052	100	101	4.9	0	573	289	396	302	390	390	752	229	74	68	74	69	72	-0.020	6.74	0.01
235	34.387	35.201	0.15	0.15	1.81	75	0.61	1.39	76	0.3	88	0.052	99	100	4.9	0	577	288	397	303	390	391	756	229	74	68	74	69	72	-0.020	6.82	0.02
236	34.534	35.352	0.15	0.15	1.81	75	0.61	1.39	76	0.3	88	0.052	100	100	4.8	-0.1	580	288	398	303	390	392	760	230	74	68	74	69	72	-0.020	6.86	0.03
237	34.681	35.503	0.15	0.15	1.80	75	0.61	1.40	76	0.3	88	0.052	100	100	4.8	0	583	288	398	303	390	392	763	232	74	68	74	69	72	-0.020	6.9	0.03
238	34.827	35.655	0.15	0.15	1.81	75	0.61	1.40	76	0.3	87	0.052	99	101	4.8	0	586	288	399	303	390	393	766	234	74	68	74	69	72	-0.021	6.84	0.03
239	34.974	35.805	0.15	0.15	1.81	75	0.61	1.39	76	0.3	87	0.052	100	100	4.7	-0.1	589	288	400	304	390	394	768	235	74	68	74	69	71	-0.021	6.88	0.04
240	35.121	35.957	0.15	0.15	1.81	75	0.61	1.40	76	0.3	87	0.052	100	101	4.7	0	591	288	400	304	390	395	770	235	74	68	74	69	72	-0.021	6.87	0.04
241	35.267	36.108	0.15	0.15	1.81	75	0.61	1.40	76	0.3	87	0.052	99	100	4.6	-0.1	594	288	401	304	390	395	772	237	74	68	74	69	72	-0.021	6.83	0.04
242	35.414	36.259	0.15	0.15	1.81	75	0.61	1.38	76	0.3	87	0.052	100	100	4.6	0	597	287	402	305	390	396	774	239	74	68	74	69	72	-0.021	6.75	0.04
243	35.561	36.411	0.15	0.15	1.81	75	0.61	1.40	76	0.3	87	0.052	100	101	4.6	0	599	287	403	306	390	397	776	240	74	68	74	69	72	-0.021	6.76	0.04
244	35.708	36.562	0.15	0.15	1.80	75	0.61	1.40	76	0.3	87	0.052	100	100	4.5	-0.1	601	288	404	306	391	398	778	242	74	68	74	69	72	-0.021	6.71	0.04
245	35.854	36.713	0.15	0.15	1.82	75	0.61	1.39	76	0.3	87	0.052	99	100	4.5	0	603	288	405	307	391	399	779	241	74	68	74	69	71	-0.021	6.7	0.04
246	36.001	36.865	0.15	0.15	1.81	74	0.61	1.39	76	0.3	87	0.052	100	101	4.4	-0.1	605	289	406	308	391	400	780	241	74	68	74	69	71	-0.022	6.73	0.05
247	36.147	37.016	0.15	0.15	1.81	74	0.61	1.40	76	0.3	87	0.052	100	100	4.4	0	607	288	407	308	392	400	781	241	74	68	74	69	72	-0.022	6.72	0.05
248	36.294	37.167	0.15	0.15	1.81	74	0.61	1.38	76	0.3	87	0.052	100	100	4.4	0	609	288	408	309	392	401	781	240	74	68	74	69	72	-0.022	6.71	0.05
249	36.441	37.319	0.15	0.15	1.81	74	0.61	1.40	76	0.3	87	0.052	100	101	4.3	-0.1	610	288	409	310	393	402	781	241	74	68	74	69	72	-0.022	6.69	0.05
250	36.587	37.470	0.15	0.15	1.81	74	0.61	1.40	76	0.3	87	0.052	100	100	4.3	0	612	289	409	310	393	403	781	240	74	68	74	69	72	-0.022	6.67	0.05
251	36.734	37.621	0.15	0.15	1.81	74	0.61	1.39	76	0.3	87	0.052	100	100	4.3	0	613	288	410	311	393	403	780	241	74	68	74	69	72	-0.022	6.68	0.04
252	36.880	37.773	0.15	0.15	1.81	74	0.61	1.39	76	0.3	87	0.052	100	101	4.2	-0.1	614	289	411	312	394	404	780	241	74	68	74	69	71	-0.022	6.62	0.03
253	37.027	37.924	0.15	0.15	1.81	74	0.61	1.40	76	0.3	87	0.052	100	100	4.2	0	615	290	413	313	394	405	779	241	74	68	74	69	72	-0.021	6.64	0.03
254	37.174	38.075	0.15	0.15	1.81	74	0.61	1.39	76	0.3	88	0.052	100	100	4.2	0	615	289	414	314	395	405	777	239	74	68	74	69	72	-0.021	6.55	0.02
255	37.320	38.227	0.15	0.15	1.81	74	0.61	1.40	76	0.3	88	0.052	100	101	4.1	-0.1	615	289	415	314	395	406	775	239	74	68	74	69	72	-0.021	6.59	0.02
256	37.467	38.378	0.15	0.15	1.81	74	0.61	1.40	76	0.3	88	0.052	100	100	4.1	0	616	289	416	315	396	406	774	238	74	68	74	69	72	-0.021	6.57	0.02
257	37.613	38.528	0.15	0.15	1.82	74	0.61	1.40	76	0.3	88	0.052	100	100	4.1	0	616	288	417	316	396	407	772	236	74	68	74	69	72	-0.021	6.64	0.01
258	37.759	38.680	0.15	0.15	1.81	74	0.61	1.39	76	0.3	88	0.052	100	101	4.0	-0.1	615	288	418	316	397	407	770	235	74	68	74	69	72	-0.021	6.6	0.01
259	37.906	38.831	0.15	0.15	1.81	74	0.61	1.39	76	0.3	88	0.052	100	100	4.0	0	615	288	419	317	397	407	769	237	74	68	74	69	72	-0.021	6.56	0.01
260	38.052	38.982	0.15	0.15	1.81	75	0.61	1.39	76	0.3	89	0.052	100	100	4.0	0	615	288	420	317	398	408	767	236	74	68	74	69	72	-0.021	6.55	0.01
261	38.199	39.134	0.15	0.15	1.81	75	0.61	1.40	76	0.3	88	0.052	100	101	3.9	-0.1	614	288	421	318	398	408	766	237	74	68	74	69	72	-0.021	6.58	0.01
262	38.345	39.285	0.15	0.15	1.81	75	0.61	1.40	76	0.3	88	0.052	99	100	3.9	0	614	288	422	319	398	408	765	235	74	68	74	69	72	-0.021	6.54	0
263	38.492	39.436	0.15	0.15	1.81	75	0.61	1.39	76	0.3	88	0.052	100	100	3.9	0	613	288	423	320	399	409	763	235	74	68	74	69	72	-0.021	6.58	0
264	38.638	39.587	0.15	0.15	1.81	75	0.61	1.39	76	0.3	88	0.052	99	100	3.8	-0.1	613	288	424	320	399	409	761	235	74	68	74	69	72	-0.021	6.64	0
265	38.785	39.739	0.15	0.15	1.81	75	0.61	1.39	76	0.3	88	0.052	100	101	3.8	0	612	289	425	321	400	409	759	235	74	68	74	69	72	-0.021	6.5	0

Wood Heater Test Data - ASTM E2780 / ASTM E2515

Run: 2

Manufacturer: Valley Comfort
Model: PI29
Tracking No.: VC-18-1
Project No.: 0142WN019E
Test Date: 23-Jan-18
Beginning Clock Time: 11:04

Total Sampling Time: 459 min
Recording Interval: 1 min
Background Sample Volume: 0 cubic feet

Meter Box Y Factor: 0.997 (1) 0.981 (2) _____ (Amb)

Barometric Pressure:	Begin	Middle	End	Average
	28.96	28.91	28.86	28.91 "Hg

OMNI Equipment Numbers: 410, 283A, 132, 576, 318, 432, 419, 371, 372, 296-T32, 559, 592, 637

PM Control Modules: 371/372
Dilution Tunnel MW(dry): 29.00 lb/lb-mole
Dilution Tunnel MW(wet): 28.78 lb/lb-mole
Dilution Tunnel H2O: 2.00 percent
Dilution Tunnel Static: -0.180 "H2O
Tunnel Area: 0.19635 ft2
Pitot Tube Cp: 0.99

Avg. Tunnel Velocity: 13.76 ft/sec.
Initial Tunnel Flow: 147.2 scfm
Average Tunnel Flow: 149.0 scfm
Post-Test Leak Check (1): 0.000 cfm @ -15 in. Hg
Post-Test Leak Check (2): 0.000 cfm @ -17 in. Hg
Average Test Piece Fuel Moisture: 22.24 Dry Basis %

Technician Signature: _____

Velocity Traverse Data	Pt.1	Pt.2	Pt.3	Pt.4	Pt.5	Pt.6	Pt.7	Pt.8	Center	
Initial dP	0.034	0.050	0.036	0.030	0.038	0.050	0.048	0.030	0.052	"H2O
Temp:	79	79	79	79	79	79	79	79	79	°F

V_{strav} 13.69 ft/sec V_{scent} 15.52 ft/sec F_p 0.882

	Particulate Sampling Data														Fuel Weight (lb)		Temperature Data (°F)												Stack Gas Data		
Elapsed Time (min)	Gas Meter 1 (ft^3)	Gas Meter 2 (ft^3)	Sample Rate 1 (cfm)	Sample Rate 2 (cfm)	Orifice dH 1 ("H_2O)	Meter 1 Temp (°F)	Meter 1 Vacuum ("Hg)	Orifice dH 2 ("H_2O)	Meter 2 Temp (°F)	Meter 2 Vacuum ("Hg)	Dilution Tunnel (°F)	Dilution Tunnel Center dP	Pro. Rate 1	Pro. Rate 2	Scale Reading	Weight Change	Firebox Top	Firebox Bottom	Firebox Back	Firebox Left	Firebox Right	Avg. Stove Surface	Catalyst Exit	Stack	Filter 1	Dryer Exit 1	Filter 2	Dryer Exit 2	Ambient	Draft ("H_2O)	CO_2 (%)	CO (%)
266	38.931	39.889	0.15	0.15	1.81	75	0.61	1.39	76	0.3	88	0.052	99	100	3.8	0	611	289	427	322	400	410	755	234	74	68	74	69	72	-0.020	6.43	0
267	39.078	40.041	0.15	0.15	1.81	75	0.61	1.39	76	0.3	87	0.052	100	101	3.7	-0.1	610	289	428	322	401	410	751	230	74	68	74	69	72	-0.021	6.41	0
268	39.225	40.192	0.15	0.15	1.81	75	0.61	1.40	76	0.3	87	0.052	100	100	3.7	0	608	290	429	323	401	410	746	229	74	68	74	69	72	-0.020	6.35	0
269	39.371	40.343	0.15	0.15	1.81	75	0.61	1.39	76	0.3	87	0.052	99	100	3.7	0	606	290	430	323	402	410	740	226	74	68	74	69	72	-0.020	6.24	0
270	39.518	40.495	0.15	0.15	1.81	74	0.61	1.39	76	0.3	87	0.052	100	101	3.7	0	604	290	431	324	402	410	734	223	74	68	74	69	71	-0.020	6.22	0
271	39.665	40.646	0.15	0.15	1.81	74	0.61	1.40	76	0.3	86	0.052	100	100	3.6	-0.1	602	291	431	324	402	410	729	221	74	68	74	69	71	-0.020	6.12	0
272	39.811	40.797	0.15	0.15	1.82	74	0.61	1.40	76	0.3	86	0.052	99	100	3.6	0	599	292	432	325	402	410	723	219	74	68	74	69	70	-0.020	6	0
273	39.958	40.949	0.15	0.15	1.80	74	0.61	1.39	76	0.3	85	0.052	100	101	3.6	0	596	293	433	325	402	410	717	216	74	68	74	69	70	-0.020	5.91	0
274	40.105	41.100	0.15	0.15	1.81	74	0.61	1.40	76	0.3	85	0.052	100	100	3.6	0	593	293	434	325	402	409	711	213	74	68	74	69	70	-0.020	5.91	0
275	40.252	41.251	0.15	0.15	1.82	74	0.61	1.40	76	0.3	85	0.052	100	100	3.5	-0.1	590	294	434	325	402	409	704	212	74	68	74	69	70	-0.020	5.9	0
276	40.399	41.403	0.15	0.15	1.82	73	0.61	1.39	76	0.3	84	0.052	100	101	3.5	0	587	294	435	326	402	409	698	208	73	68	74	69	70	-0.019	5.81	0
277	40.545	41.555	0.15	0.15	1.82	73	0.61	1.40	75	0.3	84	0.052	99	101	3.5	0	583	295	435	326	402	408	692	205	73	68	74	69	70	-0.019	5.78	0
278	40.692	41.706	0.15	0.15	1.82	73	0.61	1.40	75	0.3	84	0.052	100	100	3.5	0	579	295	435	326	402	407	687	204	73	68	74	69	70	-0.019	5.75	0
279	40.839	41.857	0.15	0.15	1.82	73	0.61	1.40	75	0.3	84	0.052	100	100	3.5	0	576	295	436	327	402	407	682	204	73	68	74	69	70	-0.018	5.73	0
280	40.986	42.009	0.15	0.15	1.81	73	0.61	1.41	75	0.3	84	0.052	100	101	3.5	0	573	296	436	327	402	407	677	204	73	68	74	69	70	-0.018	5.72	0
281	41.133	42.160	0.15	0.15	1.82	73	0.61	1.40	75	0.3	83	0.052	100	100	3.4	-0.1	570	296	436	327	402	406	673	201	73	68	73	69	70	-0.018	5.75	0
282	41.280	42.312	0.15	0.15	1.82	73	0.61	1.40	75	0.3	83	0.052	100	101	3.4	0	567	296	436	327	401	405	669	201	73	68	73	69	70	-0.018	5.7	0
283	41.427	42.464	0.15	0.15	1.82	72	0.61	1.40	75	0.3	83	0.052	100	101	3.4	0	564	297	437	327	401	405	666	200	73	68	73	69	69	-0.018	5.7	0
284	41.574	42.615	0.15	0.15	1.82	72	0.61	1.40	75	0.3	83	0.052	100	100	3.4	0	561	297	437	327	401	405	663	198	73	68	73	69	69	-0.018	5.76	0
285	41.721	42.767	0.15	0.15	1.83	72	0.61	1.40	75	0.3	83	0.052	100	101	3.4	0	558	298	437	327	400	404	661	197	73	68	73	69	70	-0.018	5.71	0
286	41.867	42.918	0.15	0.15	1.83	72	0.61	1.40	75	0.3	83	0.052	100	100	3.3	-0.1	555	298	437	327	400	403	658	197	73	68	73	69	70	-0.018	5.65	0
287	42.014	43.069	0.15	0.15	1.82	72	0.61	1.39	75	0.3	82	0.052	100	100	3.3	0	553	297	437	327	400	403	657	196	72	68	73	69	69	-0.018	5.69	0
288	42.161	43.222	0.15	0.15	1.83	72	0.61	1.40	75	0.3	82	0.052	100	101	3.3	0	550	295	437	327	399	402	655	197	72	68	73	69	69	-0.018	5.72	0
289	42.308	43.373	0.15	0.15	1.83	72	0.61	1.40	75	0.3	81	0.052	100	100	3.3	0	548	294	437	327	399	401	654	197	72	68	73	69	68	-0.018	5.74	0
290	42.455	43.524	0.15	0.15	1.83	72	0.61	1.40	75	0.3	81	0.052	100	100	3.2	-0.1	546	293	437	327	399	400	653	195	72	68	73	69	69	-0.018	5.81	0
291	42.602	43.677	0.15	0.15	1.83	71	0.61	1.40	74	0.3	81	0.052	100	101	3.2	0	544	292	437	326	398	399	652	195	72	68	73	69	69	-0.017	5.8	0
292	42.749	43.828	0.15	0.15	1.83	71	0.61	1.40	74	0.3	81	0.052	100	100	3.2	0	542	291	438	326	398	399	650	196	72	68	73	69	69	-0.018	5.75	0
293	42.896	43.980	0.15	0.15	1.83	71	0.61	1.39	74	0.3	80	0.052	100	101	3.2	0	540	291	438	326	398	399	649	198	72	68	72	69	68	-0.018	5.78	0
294	43.043	44.132	0.15	0.15	1.83	71	0.61	1.41	74	0.3	81	0.052	100	101	3.2	0	538	293	439	326	398	399	642	198	72	68	72	69	69	-0.017	5.79	0.01
295	43.190	44.284	0.15	0.15	1.83	71	0.61	1.41	74	0.3	81	0.052	100	101	3.2	0	534	294	439	326	398	398	629	198	71	68	72	68	69	-0.017	5.63	0
296	43.337	44.435	0.15	0.15	1.83	71	0.61	1.40	74	0.3	81	0.052	100	100	3.2	0	530	293	440	326	398	397	616	199	71	68	72	68	69	-0.017	5.57	-0.01
297	43.484	44.587	0.15	0.15	1.83	71	0.61	1.41	74	0.3	80	0.052	100	101	3.1	-0.1	526	292	441	326	398	397	604	199	71	68	72	68	69	-0.018	5.59	-0.01
298	43.631	44.738	0.15	0.15	1.83	71	0.61	1.41	74	0.3	80	0.052	100	100	3.1	0	521	292	442	327	399	396	594	199	71	68	72	68	68	-0.018	5.63	-0.01
299	43.778	44.890	0.15	0.15	1.83	70	0.61	1.39	74	0.3	80	0.052	100	101	3.1	0	517	293	442	327	399	396	585	196	71	68	72	68	69	-0.017	5.61	-0.01
300	43.925	45.042	0.15	0.15	1.82	70	0.61	1.41	74	0.3	80	0.052	100	101	3.1	0	512	293	443	327	399	395	579	196	71	68	72	68	68	-0.018	5.59	-0.01
301	44.072	45.194	0.15	0.15	1.83	70	0.61	1.40	74	0.3	80	0.052	100	101	3.1	0	508	292	444	327	399	394	573	195	71	68	72	68	68	-0.017	5.55	-0.01
302	44.220	45.345	0.15	0.15	1.83	70	0.61	1.39	74	0.3	79	0.052	101	100	3.0	-0.1	504	291	445	327	400	393	568	194	71	68	72	68	68	-0.017	5.56	-0.01
303	44.367	45.497	0.15	0.15	1.82	70	0.61	1.41	74	0.3	79	0.052	100	101	3.0	0	501	291	446	327	400	393	564	194	71	68	72	68	68	-0.017	5.56	-0.01

Wood Heater Test Data - ASTM E2780 / ASTM E2515

Run: 2

Manufacturer: Valley Comfort
Model: PI29
Tracking No.: VC-18-1
Project No.: 0142WN019E
Test Date: 23-Jan-18
Beginning Clock Time: 11:04

Total Sampling Time: 459 min
Recording Interval: 1 min
Background Sample Volume: 0 cubic feet

Meter Box Y Factor: 0.997 (1) 0.981 (2) _____ (Amb)

Barometric Pressure:

Begin	Middle	End	Average
28.96	28.91	28.86	28.91 "Hg

OMNI Equipment Numbers: 410, 283A, 132, 576, 318, 432, 419, 371, 372, 296-T32, 559, 592, 637

PM Control Modules: 371/372
Dilution Tunnel MW(dry): 29.00 lb/lb-mole
Dilution Tunnel MW(wet): 28.78 lb/lb-mole
Dilution Tunnel H2O: 2.00 percent
Dilution Tunnel Static: -0.180 "H2O
Tunnel Area: 0.19635 ft2
Pitot Tube Cp: 0.99

Avg. Tunnel Velocity: 13.76 ft/sec.
Initial Tunnel Flow: 147.2 scfm
Average Tunnel Flow: 149.0 scfm
Post-Test Leak Check (1): 0.000 cfm @ -15 in. Hg
Post-Test Leak Check (2): 0.000 cfm @ -17 in. Hg
Average Test Piece Fuel Moisture: 22.24 Dry Basis %

Technician Signature: _____

Velocity Traverse Data

	Pt.1	Pt.2	Pt.3	Pt.4	Pt.5	Pt.6	Pt.7	Pt.8	Center	
Initial dP	0.034	0.050	0.036	0.030	0.038	0.050	0.048	0.030	0.052	"H2O
Temp:	79	79	79	79	79	79	79	79	79	°F

V_{strav} 13.69 ft/sec V_{scent} 15.52 ft/sec F_p 0.882

	Particulate Sampling Data														Fuel Weight (lb)		Temperature Data (°F)													Stack Gas Data		
Elapsed Time (min)	Gas Meter 1 (ft^3)	Gas Meter 2 (ft^3)	Sample Rate 1 (cfm)	Sample Rate 2 (cfm)	Orifice dH 1 ("H_2O)	Meter 1 Temp (°F)	Meter 1 Vacuum ("Hg)	Orifice dH 2 ("H_2O)	Meter 2 Temp (°F)	Meter 2 Vacuum ("Hg)	Dilution Tunnel (°F)	Dilution Tunnel Center dP	Pro. Rate 1	Pro. Rate 2	Scale Reading	Weight Change	Firebox Top	Firebox Bottom	Firebox Back	Firebox Left	Firebox Right	Avg. Stove Surface	Catalyst Exit	Stack	Filter 1	Dryer Exit 1	Filter 2	Dryer Exit 2	Ambient	Draft ("H_2O)	CO_2 (%)	CO (%)
304	44.514	45.649	0.15	0.15	1.83	70	0.61	1.40	74	0.3	79	0.052	100	101	3.0	0	497	290	447	328	400	392	561	192	71	68	72	68	68	-0.017	5.59	-0.01
305	44.661	45.801	0.15	0.15	1.83	70	0.61	1.40	74	0.3	79	0.052	100	101	3.0	0	494	291	447	328	400	392	559	192	70	67	71	68	68	-0.017	5.61	-0.01
306	44.808	45.952	0.15	0.15	1.82	70	0.61	1.41	74	0.3	79	0.052	100	100	3.0	0	491	291	448	328	400	392	557	191	70	67	71	68	67	-0.017	5.56	-0.01
307	44.955	46.104	0.15	0.15	1.83	70	0.61	1.41	74	0.3	79	0.052	100	101	3.0	0	488	291	449	329	400	391	555	192	70	67	71	68	67	-0.017	5.65	-0.01
308	45.102	46.256	0.15	0.15	1.83	70	0.61	1.40	74	0.3	79	0.052	100	101	2.9	-0.1	486	291	450	329	400	391	554	191	70	67	71	68	67	-0.017	5.65	-0.01
309	45.249	46.408	0.15	0.15	1.83	70	0.61	1.41	74	0.3	79	0.052	100	101	2.9	0	484	291	450	329	401	391	553	191	70	67	71	68	67	-0.017	5.62	-0.01
310	45.396	46.559	0.15	0.15	1.83	70	0.61	1.41	73	0.3	79	0.052	100	100	2.9	0	481	291	451	330	401	391	552	192	70	67	71	68	67	-0.017	5.67	-0.01
311	45.543	46.711	0.15	0.15	1.82	69	0.61	1.40	73	0.3	79	0.052	100	101	2.9	0	480	293	452	330	400	391	551	190	70	67	71	68	68	-0.016	5.72	-0.01
312	45.690	46.863	0.15	0.15	1.83	69	0.61	1.40	73	0.3	80	0.052	101	101	2.9	0	478	293	452	330	401	391	550	192	70	67	71	68	68	-0.017	5.7	-0.01
313	45.837	47.014	0.15	0.15	1.83	69	0.61	1.40	73	0.3	80	0.052	101	100	2.9	0	476	294	453	330	401	391	550	194	70	67	71	68	68	-0.017	5.72	-0.01
314	45.984	47.167	0.15	0.15	1.83	69	0.61	1.41	73	0.3	80	0.052	101	102	2.8	-0.1	475	295	454	330	401	391	549	195	70	67	71	68	68	-0.016	5.78	-0.01
315	46.131	47.318	0.15	0.15	1.83	69	0.61	1.41	73	0.3	80	0.052	101	100	2.8	0	473	296	454	331	401	391	549	195	70	67	71	68	68	-0.017	5.79	-0.01
316	46.278	47.469	0.15	0.15	1.83	69	0.61	1.40	73	0.3	80	0.052	101	100	2.8	0	472	297	455	332	401	391	548	197	70	67	70	68	68	-0.017	5.8	-0.01
317	46.425	47.622	0.15	0.15	1.83	69	0.61	1.40	73	0.3	80	0.052	101	102	2.8	0	471	297	456	333	401	392	548	198	70	67	71	68	68	-0.017	5.88	-0.01
318	46.571	47.773	0.15	0.15	1.83	69	0.61	1.41	73	0.3	80	0.052	100	100	2.8	0	470	294	457	333	402	391	548	197	70	67	71	68	68	-0.017	5.9	-0.01
319	46.718	47.924	0.15	0.15	1.82	69	0.61	1.39	73	0.3	79	0.052	100	100	2.7	-0.1	469	293	457	334	402	391	548	196	70	67	71	68	67	-0.017	5.95	-0.01
320	46.865	48.076	0.15	0.15	1.83	69	0.61	1.41	73	0.3	80	0.052	101	101	2.7	0	469	294	458	334	402	391	549	196	70	67	71	68	68	-0.017	5.91	-0.01
321	47.012	48.228	0.15	0.15	1.82	69	0.61	1.41	73	0.3	80	0.052	101	101	2.7	0	468	295	459	335	402	392	549	195	70	67	70	67	68	-0.017	5.87	-0.01
322	47.159	48.379	0.15	0.15	1.83	69	0.61	1.40	73	0.3	80	0.052	101	100	2.7	0	467	296	460	335	402	392	550	197	70	67	70	67	68	-0.017	5.89	-0.01
323	47.306	48.531	0.15	0.15	1.83	69	0.61	1.41	73	0.3	80	0.052	101	101	2.7	0	467	297	461	336	403	393	550	198	70	67	70	67	68	-0.017	5.91	0
324	47.453	48.683	0.15	0.15	1.82	69	0.61	1.40	73	0.3	80	0.052	101	101	2.6	-0.1	467	298	461	337	403	393	551	199	70	67	70	67	67	-0.017	5.92	0
325	47.600	48.834	0.15	0.15	1.83	69	0.61	1.40	73	0.3	80	0.052	101	100	2.6	0	466	298	462	338	403	393	551	199	70	67	70	67	68	-0.017	5.97	0
326	47.746	48.986	0.15	0.15	1.83	69	0.61	1.41	73	0.3	80	0.052	100	101	2.6	0	466	299	463	339	403	394	552	200	70	66	70	67	68	-0.017	5.96	0
327	47.893	49.138	0.15	0.15	1.82	69	0.61	1.40	73	0.3	80	0.052	101	101	2.6	0	465	297	465	340	404	394	552	201	70	67	70	67	67	-0.017	5.98	0
328	48.040	49.289	0.15	0.15	1.81	69	0.61	1.39	73	0.3	79	0.052	100	100	2.6	0	465	294	466	342	404	394	551	201	70	67	70	67	67	-0.017	5.98	0
329	48.187	49.441	0.15	0.15	1.82	69	0.61	1.41	73	0.3	79	0.052	100	101	2.5	-0.1	465	296	467	343	404	395	550	199	69	66	70	67	68	-0.017	6.02	0
330	48.334	49.593	0.15	0.15	1.82	69	0.61	1.40	73	0.3	80	0.052	101	101	2.5	0	464	297	469	344	405	396	550	199	70	66	70	67	67	-0.017	5.96	0
331	48.481	49.744	0.15	0.15	1.82	69	0.61	1.39	73	0.3	80	0.052	101	100	2.5	0	464	298	469	344	405	396	549	199	69	66	70	67	68	-0.017	5.94	0
332	48.627	49.896	0.15	0.15	1.83	69	0.61	1.41	73	0.3	80	0.052	100	101	2.5	0	464	299	470	344	406	397	547	201	69	66	70	67	67	-0.017	5.82	-0.01
333	48.774	50.048	0.15	0.15	1.83	69	0.61	1.40	73	0.3	80	0.052	101	101	2.5	0	463	299	471	344	406	397	544	200	69	66	70	67	67	-0.017	5.86	-0.01
334	48.921	50.199	0.15	0.15	1.82	69	0.61	1.39	73	0.3	80	0.052	101	100	2.4	-0.1	462	300	472	344	407	397	541	200	69	66	70	67	68	-0.017	5.88	-0.01
335	49.068	50.351	0.15	0.15	1.83	69	0.61	1.41	73	0.3	80	0.052	101	101	2.4	0	461	300	472	344	407	397	538	203	70	66	70	67	68	-0.017	5.86	-0.01
336	49.215	50.503	0.15	0.15	1.83	69	0.61	1.40	73	0.3	80	0.052	101	101	2.4	0	460	301	473	344	408	397	537	203	69	66	70	67	68	-0.017	5.91	-0.01
337	49.362	50.654	0.15	0.15	1.82	69	0.61	1.40	73	0.3	80	0.052	101	100	2.4	0	460	301	474	344	409	398	536	203	69	66	70	67	67	-0.017	5.9	0
338	49.508	50.806	0.15	0.15	1.81	69	0.61	1.41	73	0.3	80	0.052	100	101	2.3	-0.1	459	302	475	345	409	398	536	204	69	66	70	67	67	-0.017	5.91	0
339	49.655	50.957	0.15	0.15	1.82	69	0.61	1.41	73	0.3	80	0.052	101	100	2.3	0	459	302	475	345	410	398	537	204	69	66	70	67	68	-0.017	5.89	0
340	49.802	51.109	0.15	0.15	1.82	69	0.61	1.41	73	0.3	80	0.052	101	101	2.3	0	458	303	476	346	411	399	538	206	70	66	70	67	68	-0.017	5.89	0
341	49.949	51.261	0.15	0.15	1.82	69	0.61	1.41	73	0.3	80	0.052	101	101	2.3	0	458	303	477	346	412	399	538	206	69	66	70	67	68	-0.017	5.84	0

Wood Heater Test Data - ASTM E2780 / ASTM E2515

Run: 2

Manufacturer: Valley Comfort
Model: PI29
Tracking No.: VC-18-1
Project No.: 0142WN019E
Test Date: 23-Jan-18
Beginning Clock Time: 11:04

Total Sampling Time: 459 min
Recording Interval: 1 min
Background Sample Volume: 0 cubic feet

Meter Box Y Factor: 0.997 (1) 0.981 (2) _____ (Amb)

Barometric Pressure:

Begin	Middle	End	Average
28.96	28.91	28.86	28.91 "Hg

OMNI Equipment Numbers: 410, 283A, 132, 576, 318, 432, 419, 371, 372, 296-T32, 559, 592, 637

PM Control Modules: 371/372
Dilution Tunnel MW(dry): 29.00 lb/lb-mole
Dilution Tunnel MW(wet): 28.78 lb/lb-mole
Dilution Tunnel H2O: 2.00 percent
Dilution Tunnel Static: -0.180 "H2O
Tunnel Area: 0.19635 ft2
Pitot Tube Cp: 0.99

Avg. Tunnel Velocity: 13.76 ft/sec.
Initial Tunnel Flow: 147.2 scfm
Average Tunnel Flow: 149.0 scfm
Post-Test Leak Check (1): 0.000 cfm @ -15 in. Hg
Post-Test Leak Check (2): 0.000 cfm @ -17 in. Hg
Average Test Piece Fuel Moisture: 22.24 Dry Basis %

Technician Signature: _____

Velocity Traverse Data

	Pt.1	Pt.2	Pt.3	Pt.4	Pt.5	Pt.6	Pt.7	Pt.8	Center	
Initial dP	0.034	0.050	0.036	0.030	0.038	0.050	0.048	0.030	0.052	"H2O
Temp:	79	79	79	79	79	79	79	79	79	°F

V_{strav} 13.69 ft/sec V_{scent} 15.52 ft/sec F_p 0.882

	Particulate Sampling Data														Fuel Weight (lb)		Temperature Data (°F)												Stack Gas Data		
Elapsed Time (min)	Gas Meter 1 (ft^3)	Gas Meter 2 (ft^3)	Sample Rate 1 (cfm)	Sample Rate 2 (cfm)	Orifice dH 1 ("H_2O)	Meter 1 Temp (°F)	Meter 1 Vacuum ("Hg)	Orifice dH 2 ("H_2O)	Meter 2 Temp (°F)	Meter 2 Vacuum ("Hg)	Dilution Tunnel (°F)	Dilution Tunnel Center dP	Pro. Rate 1	Pro. Rate 2	Scale Reading	Weight Change	Firebox Top	Firebox Bottom	Firebox Back	Firebox Left	Firebox Right	Avg. Stove Surface	Catalyst Exit	Stack	Filter 1	Dryer Exit 1	Filter 2	Dryer Exit 2	Ambient	Draft ("H_2O)	CO_2 (%)	CO (%)
342	50.096	51.412	0.15	0.15	1.83	69	0.61	1.41	73	0.3	80	0.052	101	100	2.2	-0.1	458	303	477	347	413	400	539	207	70	66	70	67	68	-0.018	5.82	0
343	50.243	51.564	0.15	0.15	1.82	69	0.61	1.41	72	0.3	80	0.052	101	101	2.2	0	458	304	478	347	414	400	540	208	69	66	70	67	68	-0.018	5.92	0
344	50.389	51.716	0.15	0.15	1.82	69	0.62	1.40	72	0.3	80	0.052	100	101	2.2	0	458	304	479	348	415	401	541	209	69	66	70	67	68	-0.018	5.93	0
345	50.536	51.867	0.15	0.15	1.81	69	0.61	1.40	72	0.3	80	0.052	101	100	2.2	0	457	305	480	348	416	401	543	208	70	66	70	67	68	-0.018	5.89	0
346	50.683	52.019	0.15	0.15	1.82	69	0.61	1.40	72	0.3	80	0.052	101	101	2.1	-0.1	458	305	480	348	417	402	544	209	69	66	70	67	67	-0.018	5.89	0
347	50.830	52.171	0.15	0.15	1.82	69	0.61	1.41	72	0.3	80	0.052	101	101	2.1	0	458	306	481	349	419	403	545	209	70	66	70	67	67	-0.018	5.95	0
348	50.977	52.322	0.15	0.15	1.82	69	0.61	1.40	72	0.3	80	0.052	101	100	2.1	0	458	306	482	349	420	403	546	208	70	66	70	67	67	-0.018	5.96	0
349	51.123	52.474	0.15	0.15	1.83	69	0.61	1.41	72	0.3	80	0.052	100	101	2.1	0	458	307	483	349	421	404	547	209	70	66	70	67	67	-0.018	5.95	0
350	51.270	52.625	0.15	0.15	1.82	69	0.61	1.41	72	0.3	80	0.052	101	100	2.1	0	459	307	484	350	423	405	548	208	70	66	70	67	67	-0.018	5.97	0
351	51.417	52.776	0.15	0.15	1.82	69	0.61	1.40	72	0.3	80	0.052	101	100	2.0	-0.1	459	308	485	350	424	405	549	208	70	66	70	67	67	-0.018	6	0
352	51.564	52.929	0.15	0.15	1.81	69	0.61	1.41	72	0.3	80	0.052	101	102	2.0	0	460	308	486	349	426	406	549	209	70	66	70	67	67	-0.018	6.01	0
353	51.711	53.080	0.15	0.15	1.82	69	0.62	1.41	72	0.3	80	0.052	101	100	2.0	0	460	309	487	349	427	406	549	208	70	66	70	67	67	-0.018	6.08	0
354	51.857	53.231	0.15	0.15	1.82	69	0.61	1.40	72	0.3	80	0.052	100	100	1.9	-0.1	461	309	489	349	428	407	550	210	70	66	70	67	68	-0.018	6.06	0
355	52.004	53.383	0.15	0.15	1.82	69	0.61	1.40	72	0.3	80	0.052	101	101	1.9	0	461	310	491	350	430	408	549	209	70	66	70	67	67	-0.018	6.02	0
356	52.151	53.535	0.15	0.15	1.83	69	0.62	1.41	72	0.3	80	0.052	101	101	1.9	0	461	310	493	350	431	409	549	209	70	66	70	67	67	-0.018	5.99	0
357	52.298	53.686	0.15	0.15	1.82	69	0.61	1.39	72	0.3	80	0.052	101	100	1.9	0	461	311	495	350	432	410	548	209	69	66	70	67	67	-0.018	5.98	0
358	52.444	53.838	0.15	0.15	1.82	69	0.61	1.41	73	0.3	80	0.052	100	101	1.9	0	462	312	497	351	433	411	548	208	69	66	70	67	67	-0.018	6.02	0
359	52.591	53.990	0.15	0.15	1.82	69	0.61	1.40	73	0.3	80	0.052	101	101	1.8	-0.1	462	312	500	351	434	412	548	208	69	66	70	67	67	-0.018	6.14	0
360	52.738	54.141	0.15	0.15	1.83	69	0.61	1.39	73	0.3	80	0.052	101	100	1.8	0	462	313	502	352	435	413	547	209	70	66	70	67	67	-0.018	6.11	0
361	52.884	54.293	0.15	0.15	1.82	68	0.61	1.41	73	0.3	80	0.052	100	101	1.8	0	462	314	505	353	436	414	548	208	69	66	70	67	67	-0.018	6.15	0
362	53.031	54.445	0.15	0.15	1.82	68	0.61	1.41	73	0.3	80	0.052	101	101	1.8	0	463	314	508	353	437	415	548	208	69	66	70	67	67	-0.018	6.16	0
363	53.178	54.596	0.15	0.15	1.82	68	0.61	1.39	73	0.3	80	0.052	101	100	1.7	-0.1	463	315	511	353	438	416	548	208	69	66	70	67	67	-0.018	6.22	0
364	53.324	54.748	0.15	0.15	1.83	68	0.61	1.41	73	0.3	80	0.052	100	101	1.7	0	463	315	515	354	439	417	549	207	69	66	70	67	67	-0.018	6.32	0
365	53.471	54.900	0.15	0.15	1.83	68	0.62	1.40	73	0.3	80	0.052	101	101	1.7	0	463	316	519	354	440	418	551	208	69	66	70	67	67	-0.018	6.32	0
366	53.618	55.051	0.15	0.15	1.82	68	0.61	1.40	73	0.3	80	0.052	101	100	1.7	0	464	316	524	355	440	420	552	208	69	66	70	67	68	-0.018	6.41	0
367	53.765	55.203	0.15	0.15	1.83	68	0.61	1.41	73	0.3	80	0.052	101	101	1.6	-0.1	465	317	530	355	441	422	555	206	69	66	70	67	67	-0.018	6.46	0
368	53.911	55.355	0.15	0.15	1.83	68	0.62	1.40	73	0.3	80	0.052	100	101	1.6	0	465	317	536	355	441	423	557	206	69	66	70	67	67	-0.018	6.51	0
369	54.058	55.507	0.15	0.15	1.82	68	0.61	1.40	73	0.3	80	0.052	101	101	1.6	0	466	318	541	355	442	424	559	207	69	66	70	67	67	-0.018	6.5	0
370	54.205	55.659	0.15	0.15	1.82	68	0.61	1.41	73	0.3	80	0.052	101	101	1.6	0	467	318	546	356	442	426	561	207	69	66	70	67	67	-0.018	6.6	0
371	54.351	55.810	0.15	0.15	1.82	68	0.61	1.40	73	0.3	80	0.052	100	100	1.5	-0.1	468	319	550	356	443	427	562	207	69	66	70	67	67	-0.017	6.62	0
372	54.498	55.962	0.15	0.15	1.83	68	0.61	1.41	73	0.3	80	0.052	101	101	1.5	0	469	320	554	356	444	429	562	207	69	66	70	67	68	-0.018	6.65	0
373	54.645	56.113	0.15	0.15	1.83	68	0.61	1.41	73	0.3	80	0.052	101	100	1.5	0	470	320	558	356	444	430	563	208	69	66	70	67	67	-0.018	6.64	0
374	54.791	56.265	0.15	0.15	1.82	68	0.61	1.40	73	0.3	80	0.052	100	101	1.5	0	471	321	561	356	445	431	563	208	69	66	70	67	67	-0.017	6.66	0
375	54.938	56.417	0.15	0.15	1.82	68	0.61	1.40	73	0.3	80	0.052	101	101	1.4	-0.1	471	321	564	356	446	432	562	208	69	66	70	66	67	-0.018	6.63	0
376	55.085	56.569	0.15	0.15	1.83	68	0.61	1.41	73	0.3	80	0.052	101	101	1.4	0	472	322	566	356	447	433	562	209	69	66	70	66	67	-0.018	6.69	0
377	55.231	56.720	0.15	0.15	1.83	68	0.61	1.40	73	0.3	80	0.052	100	100	1.4	0	473	322	568	356	448	433	562	207	69	66	70	67	67	-0.018	6.67	0
378	55.378	56.872	0.15	0.15	1.82	68	0.61	1.40	72	0.3	80	0.052	101	101	1.4	0	473	323	569	356	449	434	562	206	69	66	70	67	67	-0.017	6.69	0
379	55.525	57.024	0.15	0.15	1.82	68	0.61	1.41	73	0.3	80	0.052	101	101	1.4	0	474	323	570	356	450	435	562	206	69	66	70	67	67	-0.018	6.62	0

Wood Heater Test Data - ASTM E2780 / ASTM E2515

Run: 2

Manufacturer: Valley Comfort
Model: PI29
Tracking No.: VC-18-1
Project No.: 0142WN019E
Test Date: 23-Jan-18
Beginning Clock Time: 11:04

Total Sampling Time: 459 min
Recording Interval: 1 min
Background Sample Volume: 0 cubic feet

Meter Box Y Factor: 0.997 (1) 0.981 (2) _____ (Amb)

Barometric Pressure:

Begin	Middle	End	Average
28.96	28.91	28.86	28.91 "Hg

OMNI Equipment Numbers: 410, 283A, 132, 576, 318, 432, 419, 371, 372, 296-T32, 559, 592, 637

PM Control Modules: 371/372
Dilution Tunnel MW(dry): 29.00 lb/lb-mole
Dilution Tunnel MW(wet): 28.78 lb/lb-mole
Dilution Tunnel H2O: 2.00 percent
Dilution Tunnel Static: -0.180 "H2O
Tunnel Area: 0.19635 ft2
Pitot Tube Cp: 0.99

Avg. Tunnel Velocity: 13.76 ft/sec.
Initial Tunnel Flow: 147.2 scfm
Average Tunnel Flow: 149.0 scfm
Post-Test Leak Check (1): 0.000 cfm @ -15 in. Hg
Post-Test Leak Check (2): 0.000 cfm @ -17 in. Hg
Average Test Piece Fuel Moisture: 22.24 Dry Basis %

Technician Signature: _____

Velocity Traverse Data

	Pt.1	Pt.2	Pt.3	Pt.4	Pt.5	Pt.6	Pt.7	Pt.8	Center	
Initial dP	0.034	0.050	0.036	0.030	0.038	0.050	0.048	0.030	0.052	"H2O
Temp:	79	79	79	79	79	79	79	79	79	°F

V_{strav} 13.69 ft/sec V_{scent} 15.52 ft/sec F_p 0.882

	Particulate Sampling Data														Fuel Weight (lb)		Temperature Data (°F)													Stack Gas Data		
Elapsed Time (min)	Gas Meter 1 (ft^3)	Gas Meter 2 (ft^3)	Sample Rate 1 (cfm)	Sample Rate 2 (cfm)	Orifice dH 1 ("H_2O)	Meter 1 Temp (°F)	Meter 1 Vacuum ("Hg)	Orifice dH 2 ("H_2O)	Meter 2 Temp (°F)	Meter 2 Vacuum ("Hg)	Dilution Tunnel (°F)	Dilution Tunnel Center dP	Pro. Rate 1	Pro. Rate 2	Scale Reading	Weight Change	Firebox Top	Firebox Bottom	Firebox Back	Firebox Left	Firebox Right	Avg. Stove Surface	Catalyst Exit	Stack	Filter 1	Dryer Exit 1	Filter 2	Dryer Exit 2	Ambient	Draft ("H_2O)	CO_2 (%)	CO (%)
380	55.671	57.175	0.15	0.15	1.83	68	0.62	1.41	72	0.3	80	0.052	100	100	1.3	-0.1	474	324	572	356	451	435	560	206	69	66	70	67	67	-0.018	6.45	0
381	55.818	57.327	0.15	0.15	1.83	68	0.61	1.40	72	0.3	80	0.052	101	101	1.3	0	474	325	572	357	452	436	559	206	69	66	70	66	67	-0.017	6.53	0
382	55.964	57.479	0.15	0.15	1.82	68	0.61	1.41	72	0.3	80	0.052	100	101	1.3	0	474	325	573	356	454	436	557	207	69	66	70	66	67	-0.017	6.5	0
383	56.111	57.630	0.15	0.15	1.81	68	0.61	1.40	72	0.3	80	0.052	101	100	1.2	-0.1	474	326	575	356	455	437	555	207	69	66	70	66	67	-0.017	6.55	0
384	56.258	57.782	0.15	0.15	1.83	68	0.62	1.41	72	0.3	80	0.052	101	101	1.2	0	474	326	577	356	456	438	553	206	69	66	70	66	67	-0.017	6.64	0
385	56.404	57.933	0.15	0.15	1.83	68	0.61	1.41	72	0.3	80	0.052	100	100	1.2	0	474	327	579	356	457	439	551	204	69	66	70	67	67	-0.018	6.62	0
386	56.551	58.085	0.15	0.15	1.83	68	0.61	1.40	72	0.3	79	0.052	101	101	1.2	0	474	328	581	356	458	439	550	205	69	66	70	66	67	-0.018	6.65	0
387	56.697	58.237	0.15	0.15	1.83	68	0.61	1.40	72	0.3	79	0.052	100	101	1.1	-0.1	473	328	583	356	460	440	549	205	69	66	70	67	67	-0.018	6.62	0
388	56.844	58.388	0.15	0.15	1.83	68	0.61	1.41	72	0.3	79	0.052	101	100	1.1	0	473	329	584	356	461	441	547	203	69	66	70	66	67	-0.017	6.57	0
389	56.991	58.539	0.15	0.15	1.83	68	0.61	1.39	72	0.3	80	0.052	101	100	1.1	0	473	329	585	355	462	441	546	201	69	66	70	67	67	-0.017	6.5	0
390	57.137	58.692	0.15	0.15	1.83	68	0.61	1.41	72	0.3	80	0.052	100	102	1.1	0	473	330	585	355	463	441	544	201	69	66	70	66	67	-0.017	6.47	0
391	57.284	58.843	0.15	0.15	1.83	68	0.61	1.40	72	0.3	80	0.052	101	100	1.0	-0.1	472	331	586	355	464	442	542	202	69	66	70	66	67	-0.017	6.41	0
392	57.431	58.994	0.15	0.15	1.83	68	0.61	1.40	72	0.3	80	0.052	101	100	1.0	0	472	331	586	354	465	442	541	200	69	66	70	66	67	-0.017	6.38	0
393	57.577	59.147	0.15	0.15	1.83	68	0.62	1.41	72	0.3	80	0.052	100	102	1.0	0	472	332	586	354	466	442	539	200	69	66	70	66	67	-0.017	6.34	0
394	57.724	59.298	0.15	0.15	1.83	68	0.61	1.40	72	0.3	80	0.052	101	100	1.0	0	471	333	586	354	467	442	538	198	69	66	70	66	67	-0.017	6.3	0
395	57.871	59.450	0.15	0.15	1.83	68	0.61	1.39	72	0.3	79	0.052	101	101	1.0	0	471	333	586	353	467	442	536	199	69	66	70	66	67	-0.017	6.3	0
396	58.017	59.602	0.15	0.15	1.83	68	0.61	1.41	72	0.3	79	0.052	100	101	1.0	0	470	334	586	353	468	442	535	197	69	66	70	66	67	-0.017	6.23	0
397	58.164	59.753	0.15	0.15	1.83	68	0.61	1.40	72	0.3	79	0.052	101	100	0.9	-0.1	470	334	586	353	468	442	534	197	69	66	70	66	67	-0.017	6.25	0
398	58.311	59.905	0.15	0.15	1.83	68	0.61	1.40	72	0.3	79	0.052	101	101	0.9	0	470	335	586	352	469	442	533	195	69	66	70	66	67	-0.016	6.29	0
399	58.458	60.056	0.15	0.15	1.83	68	0.61	1.41	72	0.3	79	0.052	101	100	0.9	0	469	336	586	351	469	442	532	195	69	66	70	66	67	-0.016	6.22	0
400	58.604	60.208	0.15	0.15	1.83	68	0.61	1.40	72	0.3	79	0.052	100	101	0.9	0	469	336	585	350	470	442	531	195	69	66	70	66	67	-0.017	6.19	0
401	58.751	60.360	0.15	0.15	1.83	68	0.61	1.39	72	0.3	79	0.052	101	101	0.9	0	468	337	585	350	470	442	531	195	69	66	70	66	67	-0.016	6.24	0
402	58.898	60.511	0.15	0.15	1.83	68	0.61	1.41	72	0.3	79	0.052	101	100	0.9	0	468	338	585	349	470	442	530	193	69	66	70	66	67	-0.016	6.19	0
403	59.044	60.663	0.15	0.15	1.83	68	0.62	1.40	72	0.3	79	0.052	100	101	0.8	-0.1	468	338	584	349	471	442	530	193	69	66	70	66	67	-0.016	6.22	0
404	59.191	60.815	0.15	0.15	1.83	68	0.61	1.40	72	0.3	79	0.052	101	101	0.8	0	467	339	584	349	471	442	529	192	69	66	70	66	67	-0.016	6.14	0
405	59.338	60.967	0.15	0.15	1.83	68	0.61	1.40	72	0.3	79	0.052	101	101	0.8	0	467	340	584	348	471	442	529	192	69	66	70	66	67	-0.016	6.2	0
406	59.485	61.118	0.15	0.15	1.83	68	0.61	1.40	72	0.3	79	0.052	101	100	0.8	0	467	340	583	347	471	442	529	192	69	66	70	66	67	-0.016	6.16	0
407	59.631	61.270	0.15	0.15	1.83	68	0.61	1.40	72	0.3	79	0.052	100	101	0.8	0	466	341	583	347	471	442	528	192	69	66	70	66	67	-0.016	6.22	0
408	59.778	61.422	0.15	0.15	1.82	68	0.61	1.41	72	0.3	79	0.052	101	101	0.7	-0.1	466	341	582	346	471	441	528	191	69	66	70	66	67	-0.016	6.21	0
409	59.925	61.573	0.15	0.15	1.83	68	0.62	1.40	72	0.3	79	0.052	101	100	0.7	0	466	342	582	346	471	441	528	191	69	66	70	66	67	-0.016	6.15	0
410	60.071	61.725	0.15	0.15	1.83	68	0.61	1.41	72	0.3	79	0.052	100	101	0.7	0	466	342	581	345	471	441	528	191	69	66	70	66	67	-0.016	6.11	0
411	60.218	61.877	0.15	0.15	1.83	68	0.61	1.41	72	0.3	79	0.052	101	101	0.7	0	465	343	581	344	471	441	528	190	69	66	70	66	67	-0.016	6.16	0
412	60.365	62.028	0.15	0.15	1.82	68	0.62	1.40	72	0.3	79	0.052	101	100	0.7	0	465	343	579	344	471	440	528	191	69	66	70	66	67	-0.016	6.15	0
413	60.512	62.180	0.15	0.15	1.83	68	0.61	1.41	72	0.3	79	0.052	101	101	0.7	0	465	344	578	343	470	440	527	191	69	66	70	66	67	-0.016	6.11	0
414	60.658	62.332	0.15	0.15	1.83	68	0.61	1.41	72	0.3	79	0.052	100	101	0.7	0	464	344	576	342	470	439	526	192	69	66	70	66	67	-0.016	6.15	0
415	60.805	62.483	0.15	0.15	1.81	68	0.61	1.40	72	0.3	79	0.052	101	100	0.7	0	464	345	574	341	470	439	522	192	69	66	70	66	67	-0.016	6.14	0
416	60.952	62.635	0.15	0.15	1.82	68	0.61	1.41	72	0.3	79	0.052	101	101	0.6	-0.1	463	345	572	340	470	438	517	191	69	66	70	66	67	-0.015	6.22	0
417	61.098	62.787	0.15	0.15	1.83	68	0.61	1.40	72	0.3	79	0.052	100	101	0.6	0	462	345	571	340	469	437	513	191	69	66	70	66	67	-0.016	6.22	0

Wood Heater Test Data - ASTM E2780 / ASTM E2515

Run: 2

Manufacturer: Valley Comfort
Model: PI29
Tracking No.: VC-18-1
Project No.: 0142WN019E
Test Date: 23-Jan-18
Beginning Clock Time: 11:04

Total Sampling Time: 459 min
Recording Interval: 1 min
Background Sample Volume: 0 cubic feet

Meter Box Y Factor: 0.997 (1) 0.981 (2) _____ (Amb)

Barometric Pressure:

Begin	Middle	End	Average
28.96	28.91	28.86	28.91 "Hg

OMNI Equipment Numbers: 410, 283A, 132, 576, 318, 432, 419, 371, 372, 296-T32, 559, 592, 637

PM Control Modules: 371/372
Dilution Tunnel MW(dry): 29.00 lb/lb-mole
Dilution Tunnel MW(wet): 28.78 lb/lb-mole
Dilution Tunnel H2O: 2.00 percent
Dilution Tunnel Static: -0.180 "H2O
Tunnel Area: 0.19635 ft2
Pitot Tube Cp: 0.99

Avg. Tunnel Velocity: 13.76 ft/sec.
Initial Tunnel Flow: 147.2 scfm
Average Tunnel Flow: 149.0 scfm
Post-Test Leak Check (1): 0.000 cfm @ -15 in. Hg
Post-Test Leak Check (2): 0.000 cfm @ -17 in. Hg
Average Test Piece Fuel Moisture: 22.24 Dry Basis %

Technician Signature: _____

Velocity Traverse Data

	Pt.1	Pt.2	Pt.3	Pt.4	Pt.5	Pt.6	Pt.7	Pt.8	Center	
Initial dP	0.034	0.050	0.036	0.030	0.038	0.050	0.048	0.030	0.052	"H2O
Temp:	79	79	79	79	79	79	79	79	79	°F

V_{strav} 13.69 ft/sec V_{scent} 15.52 ft/sec F_p 0.882

	Particulate Sampling Data														Fuel Weight (lb)		Temperature Data (°F)												Stack Gas Data		
Elapsed Time (min)	Gas Meter 1 (ft^3)	Gas Meter 2 (ft^3)	Sample Rate 1 (cfm)	Sample Rate 2 (cfm)	Orifice dH 1 ("H_2O)	Meter 1 Temp (°F)	Meter 1 Vacuum ("Hg)	Orifice dH 2 ("H_2O)	Meter 2 Temp (°F)	Meter 2 Vacuum ("Hg)	Dilution Tunnel (°F)	Dilution Tunnel Center dP	Pro. Rate 1	Pro. Rate 2	Scale Reading	Weight Change	Firebox Top	Firebox Bottom	Firebox Back	Firebox Left	Firebox Right	Avg. Stove Surface	Catalyst Exit	Stack	Filter 1	Dryer Exit 1	Filter 2	Dryer Exit 2	Ambient	Draft ("H_2O)	CO_2 (%)	CO (%)
418	61.245	62.938	0.15	0.15	1.82	68	0.62	1.39	72	0.3	79	0.052	101	100	0.6	0	461	346	570	339	469	437	509	190	69	66	70	66	67	-0.016	6.16	0
419	61.392	63.090	0.15	0.15	1.81	68	0.61	1.40	72	0.3	79	0.052	101	101	0.6	0	460	346	569	337	469	436	507	189	69	66	70	66	67	-0.015	6.1	0
420	61.538	63.242	0.15	0.15	1.81	68	0.62	1.41	72	0.3	79	0.052	100	101	0.6	0	458	347	567	337	469	436	505	188	69	66	70	66	67	-0.016	6.07	0
421	61.685	63.393	0.15	0.15	1.83	68	0.61	1.39	72	0.3	79	0.052	101	100	0.5	-0.1	457	347	566	336	469	435	503	188	69	66	70	66	66	-0.015	6.06	0
422	61.832	63.545	0.15	0.15	1.82	68	0.61	1.42	72	0.3	80	0.052	101	101	0.5	0	456	347	565	335	469	434	502	186	69	66	70	66	67	-0.015	6.04	0
423	61.979	63.697	0.15	0.15	1.81	68	0.61	1.40	72	0.3	80	0.052	101	101	0.5	0	455	348	564	335	469	434	502	186	69	66	70	66	67	-0.015	5.99	0
424	62.125	63.848	0.15	0.15	1.81	69	0.61	1.40	72	0.3	80	0.052	100	100	0.5	0	454	348	563	334	469	434	501	186	69	66	70	66	67	-0.015	5.95	0
425	62.272	64.000	0.15	0.15	1.83	69	0.61	1.41	72	0.3	80	0.052	101	101	0.5	0	453	349	562	333	468	433	500	184	69	66	70	66	67	-0.015	5.96	0
426	62.418	64.151	0.15	0.15	1.82	69	0.61	1.40	72	0.3	80	0.052	100	100	0.5	0	452	344	561	333	468	432	500	183	69	66	70	66	66	-0.015	5.94	0
427	62.419	64.152	0.00	0.00	1.82	69	0.61	1.40	72	0.3	80	0.052	1	1	0.5	0	452	344	561	333	468	432	500	183	69	66	70	66	66	-0.015	5.94	0
428	62.565	64.303	0.15	0.15	1.81	70	0.61	1.40	72	0.3	80	0.052	100	100	0.5	0	451	344	560	332	468	431	499	179	69	66	70	66	66	-0.014	5.97	0
429	62.712	64.455	0.15	0.15	1.81	70	0.61	1.41	73	0.3	80	0.052	100	101	0.5	0	451	346	559	331	467	431	499	179	69	66	70	66	67	-0.014	5.91	0
430	62.859	64.607	0.15	0.15	1.83	70	0.62	1.40	73	0.3	80	0.052	100	101	0.5	0	450	347	557	330	467	430	499	177	69	66	70	66	67	-0.014	5.87	0
431	63.005	64.758	0.15	0.15	1.82	70	0.61	1.40	73	0.3	80	0.052	100	100	0.5	0	449	348	556	329	466	430	500	176	69	66	70	66	66	-0.014	5.93	0
432	63.152	64.910	0.15	0.15	1.82	70	0.61	1.41	73	0.3	80	0.052	100	101	0.4	-0.1	449	348	554	328	466	429	501	176	69	66	70	66	67	-0.014	5.9	0
433	63.299	65.062	0.15	0.15	1.83	70	0.61	1.40	73	0.3	80	0.052	100	101	0.4	0	449	349	553	327	465	429	503	177	69	66	70	66	67	-0.014	5.91	0
434	63.446	65.214	0.15	0.15	1.83	70	0.61	1.39	73	0.3	80	0.052	100	101	0.4	0	448	349	551	326	464	428	504	179	69	66	70	66	67	-0.014	5.9	0
435	63.592	65.365	0.15	0.15	1.82	70	0.61	1.40	73	0.3	80	0.052	100	100	0.4	0	448	350	550	324	464	427	506	178	69	66	70	66	66	-0.014	5.89	0
436	63.739	65.517	0.15	0.15	1.81	70	0.62	1.41	73	0.3	80	0.052	100	101	0.4	0	448	350	548	323	463	426	507	177	69	66	70	66	67	-0.014	5.89	0
437	63.886	65.669	0.15	0.15	1.83	70	0.61	1.40	73	0.3	80	0.052	100	101	0.4	0	448	351	547	322	463	426	508	179	69	66	70	66	67	-0.014	5.9	0
438	64.033	65.820	0.15	0.15	1.83	70	0.61	1.41	73	0.3	80	0.052	100	100	0.4	0	448	351	545	322	462	426	510	179	69	66	70	66	67	-0.014	5.94	0
439	64.179	65.972	0.15	0.15	1.81	70	0.61	1.39	73	0.3	80	0.052	100	101	0.4	0	448	351	544	320	461	425	510	179	69	66	70	66	67	-0.014	6	0
440	64.326	66.124	0.15	0.15	1.83	70	0.61	1.40	73	0.3	79	0.052	100	101	0.3	-0.1	447	352	543	320	461	425	509	178	69	66	70	66	67	-0.014	5.9	0
441	64.473	66.275	0.15	0.15	1.82	70	0.61	1.40	73	0.3	79	0.052	100	100	0.3	0	447	352	542	319	460	424	507	179	69	66	70	66	67	-0.014	5.91	0
442	64.619	66.426	0.15	0.15	1.82	70	0.61	1.40	73	0.3	79	0.052	100	100	0.3	0	446	352	541	318	459	423	506	180	69	66	70	66	67	-0.015	5.92	0
443	64.766	66.579	0.15	0.15	1.82	70	0.61	1.40	73	0.3	79	0.052	100	101	0.3	0	446	352	540	317	459	423	504	180	69	66	70	66	67	-0.015	5.96	0
444	64.913	66.731	0.15	0.15	1.83	70	0.62	1.40	73	0.3	79	0.052	100	101	0.3	0	445	352	539	316	459	422	503	182	69	66	70	66	67	-0.015	5.99	0
445	65.059	66.882	0.15	0.15	1.83	70	0.61	1.39	73	0.3	79	0.052	100	100	0.3	0	445	353	538	315	458	422	502	184	69	66	70	66	67	-0.015	5.94	0
446	65.206	67.034	0.15	0.15	1.83	69	0.61	1.41	73	0.3	79	0.052	100	101	0.3	0	444	353	538	315	458	422	501	185	69	66	70	66	67	-0.015	5.91	0
447	65.353	67.185	0.15	0.15	1.83	69	0.61	1.41	73	0.3	79	0.052	100	100	0.2	-0.1	443	353	537	314	458	421	501	185	69	66	70	66	66	-0.015	5.91	0
448	65.499	67.337	0.15	0.15	1.83	69	0.61	1.40	73	0.3	79	0.052	100	101	0.2	0	443	353	537	313	458	421	501	186	69	66	70	66	67	-0.015	5.94	0
449	65.646	67.489	0.15	0.15	1.83	69	0.61	1.41	73	0.3	79	0.052	100	101	0.2	0	442	353	536	313	458	420	501	186	69	66	70	66	66	-0.015	5.98	0
450	65.793	67.640	0.15	0.15	1.82	69	0.61	1.40	73	0.3	79	0.052	100	100	0.2	0	442	353	536	312	458	420	501	186	69	66	70	66	66	-0.015	5.91	0
451	65.940	67.792	0.15	0.15	1.83	69	0.61	1.39	73	0.3	79	0.052	100	101	0.2	0	441	354	535	311	459	420	502	187	69	66	70	66	66	-0.015	5.86	0
452	66.086	67.944	0.15	0.15	1.83	69	0.61	1.41	73	0.3	79	0.052	100	101	0.2	0	441	354	533	311	461	420	502	188	69	66	70	66	66	-0.015	5.85	0
453	66.233	68.096	0.15	0.15	1.83	69	0.62	1.41	73	0.3	78	0.052	100	101	0.1	-0.1	441	354	532	310	462	420	502	190	69	66	70	66	66	-0.015	5.87	0
454	66.380	68.247	0.15	0.15	1.83	69	0.61	1.39	72	0.3	79	0.052	100	100	0.1	0	440	354	530	309	463	419	501	190	69	66	70	66	66	-0.015	5.92	0
455	66.526	68.399	0.15	0.15	1.83	69	0.61	1.41	72	0.3	79	0.052	100	101	0.1	0	440	355	529	309	464	419	500	190	69	66	70	66	66	-0.015	5.85	0

Wood Heater Test Data - ASTM E2780 / ASTM E2515

Run: 2

Manufacturer: Valley Comfort
Model: PI29
Tracking No.: VC-18-1
Project No.: 0142WN019E
Test Date: 23-Jan-18
Beginning Clock Time: 11:04

Total Sampling Time: 459 min
Recording Interval: 1 min
Background Sample Volume: 0 cubic feet

Meter Box Y Factor: 0.997 (1) 0.981 (2) _____ (Amb)

Barometric Pressure:	Begin	Middle	End	Average
	28.96	28.91	28.86	28.91 "Hg

OMNI Equipment Numbers: 410, 283A, 132, 576, 318, 432, 419, 371, 372, 296-T32, 559, 592, 637

PM Control Modules: 371/372
Dilution Tunnel MW(dry): 29.00 lb/lb-mole
Dilution Tunnel MW(wet): 28.78 lb/lb-mole
Dilution Tunnel H2O: 2.00 percent
Dilution Tunnel Static: -0.180 "H2O
Tunnel Area: 0.19635 ft2
Pitot Tube Cp: 0.99

Avg. Tunnel Velocity: 13.76 ft/sec.
Initial Tunnel Flow: 147.2 scfm
Average Tunnel Flow: 149.0 scfm
Post-Test Leak Check (1): 0.000 cfm @ -15 in. Hg
Post-Test Leak Check (2): 0.000 cfm @ -17 in. Hg
Average Test Piece Fuel Moisture: 22.24 Dry Basis %

Technician Signature: _____

Velocity Traverse Data

	Pt.1	Pt.2	Pt.3	Pt.4	Pt.5	Pt.6	Pt.7	Pt.8	Center	
Initial dP	0.034	0.050	0.036	0.030	0.038	0.050	0.048	0.030	0.052	"H2O
Temp:	79	79	79	79	79	79	79	79	79	°F

V_{strav} 13.69 ft/sec V_{scent} 15.52 ft/sec F_p 0.882

	Particulate Sampling Data														Fuel Weight (lb)		Temperature Data (°F)													Stack Gas Data		
Elapsed Time (min)	Gas Meter 1 (ft^3)	Gas Meter 2 (ft^3)	Sample Rate 1 (cfm)	Sample Rate 2 (cfm)	Orifice dH 1 ("H_2O)	Meter 1 Temp (°F)	Meter 1 Vacuum ("Hg)	Orifice dH 2 ("H_2O)	Meter 2 Temp (°F)	Meter 2 Vacuum ("Hg)	Dilution Tunnel (°F)	Dilution Tunnel Center dP	Pro. Rate 1	Pro. Rate 2	Scale Reading	Weight Change	Firebox Top	Firebox Bottom	Firebox Back	Firebox Left	Firebox Right	Avg. Stove Surface	Catalyst Exit	Stack	Filter 1	Dryer Exit 1	Filter 2	Dryer Exit 2	Ambient	Draft ("H_2O)	CO_2 (%)	CO (%)
456	66.673	68.551	0.15	0.15	1.83	68	0.62	1.40	72	0.3	79	0.052	101	101	0.1	0	439	355	528	308	465	419	499	190	69	66	70	66	66	-0.015	5.81	0
457	66.820	68.702	0.15	0.15	1.83	68	0.61	1.40	72	0.3	79	0.052	101	100	0.1	0	439	355	527	308	465	419	498	190	69	66	70	66	67	-0.015	5.83	0
458	66.967	68.854	0.15	0.15	1.82	68	0.62	1.41	72	0.3	79	0.052	101	101	0.1	0	438	355	526	307	466	418	498	191	69	66	70	66	67	-0.015	5.82	0
459	67.113	69.006	0.15	0.15	1.83	68	0.62	1.40	72	0.3	78	0.052	100	101	0.0	-0.1	438	356	525	307	467	419	497	190	69	66	70	66	66	-0.015	5.8	0
Avg/Tot	67.113	69.006	0.15	0.15	1.81	71		1.39	74		84	0.052	100	100								9.2				67	72	67	69	-0.021		

Wood Heater Lab Data - ASTM E2780 / ASTM E2515

Manufacturer:	Valley Comfort	Equipment Numbers:	283A, 592, 637
Model:	PI29		
Tracking No.:	VC-18-1		
Project No.:	0142WN019E		
Run #:	2		
Date:	1/23/18		

TRAIN 1 (First Hour emissions)

Sample Component	Reagent	Filter, Probe or Dish #	Weights		
			Final, mg	Tare, mg	Particulate, mg
B. Front filter catch	Filter	D384	114.8	110.7	4.1
C. Rear filter catch	Filter				0.0
D. Probe catch*	Probe				0.0
E. Filter seals catch*	Seals				0.0

Sub-Total	Total Particulate, mg:	4.1

TRAIN 1 (Post First Hour Change-out)

Sample Component	Reagent	Filter, Probe or Dish #	Weights		
			Final, mg	Tare, mg	Particulate, mg
B. Front filter catch	Filter	D398	238.3	238.9	-0.6
C. Rear filter catch	Filter	D399			0.0
D. Probe catch*	Probe	37	114465.9	114465.8	0.1
E. Filter seals catch*	Seals	R565	4142.1	4140.6	1.5

Sub-Total	Total Particulate, mg:	1.0
Train 1 Aggregate	Total Particulate, mg:	5.1

TRAIN 2

Sample Component	Reagent	Filter, Probe or Dish #	Weights		
			Final, mg	Tare, mg	Particulate, mg
A. Front filter catch	Filter	D400	244.0	240.2	3.8
B. Rear filter catch	Filter	D401			0.0
C. Probe catch*	Probe	38	114151.0	114151.1	0.0
D. Filter seals catch*	Seals	R566	4136.7	4135.2	1.5

	Total Particulate, mg:	5.3

AMBIENT

Sample Component	Reagent	Filter # or Probe #	Weights		
			Final, mg	Tare, mg	Particulate, mg
A. Front filter catch*	Filter				0.0

	Total Particulate, mg:	0.0

*Particulate catch that results in a negative number, is assumed to be zero for probes and seals, negative numbers for filters are assumed to be part of the seal weight.

Component	Equations:
A. Front filter catch	Final (mg) - Tare (mg) = Particulate, mg
B. Rear filter catch	Final (mg) - Tare (mg) = Particulate, mg
C. Probe catch	Final (mg) - Tare (mg) = Particulate, mg

Technician Signature:_____ _____

Wood Heater Test Results - ASTM E2780 / ASTM E2515

Manufacturer: Valley Comfort
Model: PI29
Project No.: 0142WN019E
Tracking No.: VC-18-1
Run: 2
Test Date: 01/23/18

Burn Rate	**0.83 kg/hr dry**
Average Tunnel Temperature	84 degrees Fahrenheit
Average Gas Velocity in Dilution Tunnel - vs	13.76 feet/second
Average Gas Flow Rate in Dilution Tunnel - Qsd	8939.4 dscf/hour
Average Delta p	0.052 inches H20
Total Time of Test	459 minutes

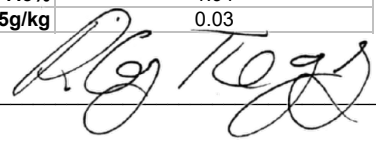
	AMBIENT	SAMPLE TRAIN 1	SAMPLE TRAIN 2	FIRST HOUR FILTER (TRAIN 1)
Total Sample Volume - Vm	0.000 cubic feet	67.113 cubic feet	69.006 cubic feet	8.755 cubic feet
Average Gas Meter Temperature	69 degrees Fahrenheit	71 degrees Fahrenheit	74 degrees Fahrenheit	69 degrees Fahrenheit
Total Sample Volume (Standard Conditions) - Vmstd	0.000 dscf	64.553 dscf	64.919 dscf	8.457 dscf
Total Particulates - m_n	0 mg	5.07 mg	5.3 mg	4.1 mg
Particulate Concentration (dry-standard) - C_r/C_s	0.000000 grams/dscf	0.00008 grams/dscf	0.00008 grams/dscf	0.00048 grams/dscf
Total Particulate Emissions - E_T	0.00 grams	5.37 grams	5.58 grams	4.33 grams
Particulate Emission Rate	0.00 grams/hour	0.70 grams/hour	0.73 grams/hour	4.33 grams/hour
Emissions Factor		0.84 g/kg	0.88 g/kg	2.25 g/kg
Difference from Average Total Particulate Emissions		0.11 grams	0.11 grams	
	Dual Train Comparison Results Are Acceptable			

FINAL AVERAGE RESULTS

Complete Test Run	
Total Particulate Emissions - E_T	5.48 grams
Particulate Emission Rate	**0.72 grams/hour**
Emissions Factor	0.86 grams/kg
First Hour Emissions	
Total Particulate Emissions - E_T	4.33 grams
Particulate Emission Rate	4.33 grams/hour
Emissions Factor	2.25 grams/kg
7.5% of Average Total Particulate Emissions	0.41 grams

QUALITY CHECKS

Filter Temps < 90 °F	OK
Filter Face Velocity (47 mm)	OK
Dryer Exit Temp < 80F	OK
Leakage Rate	OK
Ambient Temp (55-90°F)	OK
Negative Probe Weight Eval.	OK
Pro-Rate Variation	ECK 10 MIN. INTERVAL PRO-RAT
Stove Surface ΔT	OK
Train Precesion 7.5%	1.94
Train Precision 0.5g/kg	0.03

Technician Signature: 

Wood Heater Test Results - ASTM E2780 / ASTM E2515

Manufacturer: Valley Comfort
Model: PI29
Project No.: 0142WN019E
Tracking No.: VC-18-1
Run: 2
Test Date: 01/23/18

Uncorrected

Burn Rate	**0.83 kg/hr dry**
Average Tunnel Temperature	84 degrees Fahrenheit
Average Gas Velocity in Dilution Tunnel - vs	13.76 feet/second
Average Gas Flow Rate in Dilution Tunnel - Qsd	8939.4 dscf/hour
Average Delta p	0.052 inches H20
Total Time of Test	459 minutes

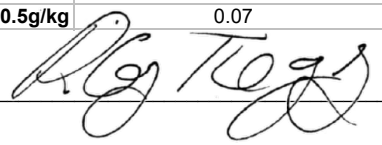
	AMBIENT	SAMPLE TRAIN 1	SAMPLE TRAIN 2	FIRST HOUR FILTER (TRAIN 1)
Total Sample Volume - Vm	0.000 cubic feet	67.113 cubic feet	69.006 cubic feet	8.755 cubic feet
Average Gas Meter Temperature	69 degrees Fahrenheit	71 degrees Fahrenheit	74 degrees Fahrenheit	69 degrees Fahrenheit
Total Sample Volume (Standard Conditions) - Vmstd	0.000 dscf	64.553 dscf	64.919 dscf	8.457 dscf
Total Particulates - m_n	0 mg	5.67 mg	5.3 mg	4.1 mg
Particulate Concentration (dry-standard) - C_f/C_s	0.000000 grams/dscf	0.00009 grams/dscf	0.00008 grams/dscf	0.00048 grams/dscf
Total Particulate Emissions - E_T	0.00 grams	6.01 grams	5.58 grams	4.33 grams
Particulate Emission Rate	0.00 grams/hour	0.79 grams/hour	0.73 grams/hour	4.33 grams/hour
Emissions Factor		0.94 g/kg	0.88 g/kg	2.25 g/kg
Difference from Average Total Particulate Emissions		0.21 grams	0.21 grams	
	Dual Train Comparison Results Are Acceptable			

FINAL AVERAGE RESULTS

Complete Test Run	
Total Particulate Emissions - E_T	5.79 grams
Particulate Emission Rate	**0.76 grams/hour**
Emissions Factor	0.91 grams/kg
First Hour Emissions	
Total Particulate Emissions - E_T	4.33 grams
Particulate Emission Rate	4.33 grams/hour
Emissions Factor	2.25 grams/kg
7.5% of Average Total Particulate Emissions	0.43 grams

QUALITY CHECKS

Filter Temps < 90 °F	OK
Filter Face Velocity (47 mm)	OK
Dryer Exit Temp < 80F	OK
Leakage Rate	OK
Ambient Temp (55-90°F)	OK
Negative Probe Weight Eval.	OK
Pro-Rate Variation	ECK 10 MIN. INTERVAL PRO-RAT
Stove Surface ΔT	OK
Train Precesion 7.5%	3.66
Train Precision 0.5g/kg	0.07

Technician Signature: 

Wood Heater Efficiency Results - CSA B415.1

Manufacturer:	**Valley Comfort**
Model:	**PI29**
Date:	**01/23/18**
Run:	**2**
Control #:	**0142WN019E**
Test Duration:	**459**
Output Category:	**II**

Technician Signature: _____

Test Results in Accordance with CSA B415.1-09

	HHV Basis	LHV Basis
Overall Efficiency	**78.8%**	**85.1%**
Combustion Efficiency	**99.2%**	**99.2%**
Heat Transfer Efficiency	**79%**	**85.8%**

Output Rate (kJ/h)	**12,868**	**12,207**	**(Btu/h)**
Burn Rate (kg/h)	**0.82**	**1.82**	**(lb/h)**
Input (kJ/h)	**16,340**	**15,500**	**(Btu/h)**

Test Load Weight (dry kg)	**6.31**	**13.91**	**dry lb**
MC wet (%)	**18.19297369**		
MC dry (%)	**22.24**		
Particulate (g)	**0.72**		
CO (g)	**128**		
Test Duration (h)	**7.65**		

Emissions	Particulate	CO
g/MJ Output	**0.01**	**1.30**
g/kg Dry Fuel	**0.11**	**20.30**
g/h	**0.09**	**16.74**
lb/MM Btu Output	**0.02**	**3.02**

Air/Fuel Ratio (A/F)	**17.07**

VERSION: **2.2** **12/14/2009**

RUN 3

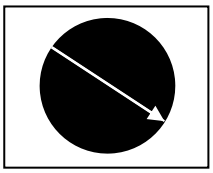
Wood Heater Run Notes

Air Control Settings

Primary:

Low:

125° from vertical



Secondary: Auto

Tertiary/Pilot: Fixed

Fan: Low

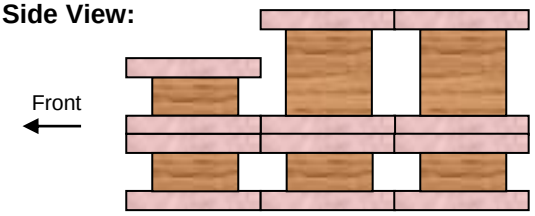
Preburn Notes

Time	Notes
63:00	Turndown to test setting

Test Notes

Sketch test fuel configuration:

Side View:



Start up procedures & Timeline:

Bypass: **Closed @ 2:25**
Fuel loaded by: **0:40**
Door closed at: **3:30**
Primary air: **Set @ 4:30**

Notes: **None**

Time	Notes
60:00	Changed Filter A

2/23/18

Wood Heater Supplemental Data

Start Time: 11:17

Stop Time: 21:14

Booth #: N/A (site testing)

Stack Gas Leak Check:

Initial: 0 Final: 0

Sample Train Leak Check:

A: 0 @ -9 "Hg

B: 0 @ -10 "Hg

Calibrations: Span Gas CO_2: 17.00 CO: 4.267

	Pre Test		Post Test	
	Zero	Span	Zero	Span
Time	8:07	8:13	19:25	19:30
CO_2	0.00	17.00	0.02	16.93
CO	0.000	4.267	-0.010	4.254

Air Velocity (ft/min): Initial: <50 Final: <50

Scale Audit (lbs): Initial: 10.0 Final: 10.0

Pitot Tube Leak Test: Initial: 0 Final: 0

Stack Diameter (in): 6

Induced Draft: 0

% Smoke Capture: 100

Flue Pipe Cleaned Prior to First Test in Series:

Date: 1/22/18 Initials:

	Initial	Middle	Ending
P_b (in/Hg)	28.56	28.80	28.97
RH (%)	27	35	29
Ambient (°F)	68	71	79

Tunnel Traverse

Microtector Reading	dP (in H_2O)	T(°F)
1	0.034	77
2	0.052	77
3	0.034	77
4	0.028	77
5	0.038	77
6	0.048	77
7	0.050	77
8	0.032	77
Center:		
-	.052	77

Tunnel Static Pressure (in H_20):	
Beginning of Test	End of Test
-0.18	-0.18

Background Filter Volume: N/A

2/23/18

Wood Heater Preburn Data - ASTM E2780

Run:	3

Technician Signature: _____

Manufacturer:	Valley Comfort
Model:	PI29
Tracking No.:	VC-18-1
Project No.:	0142WN019E
Test Date:	1/24/18
Beginning Clock Time:	8:45

Coal Bed Range (lb):	3.4 (min)	4.3 (max)

Preburn Fuel Data

Fuel Piece Lengths (in.):	16		
Total Preburn Weight (lb):	18.6		
Fuel Moisture Readings (% DB):	19.1	20.4	19.7
	19.7	19.2	19.6
	18.8	20.6	18.8
	19.3	19.6	19.2
Avg Preburn Moisture (% DB):	19.50		

			Temperatures (°F)							
Elapsed Time (min)	Scale (lb)	Stack Draft (in H_2O)	FB Top	FB Bottom	FB Back	FB Left	FB Right	Avg. FB	Stack	Ambient
0	4.3	-0.024	614	343	618	368	602	509	346	69
1	4.3	-0.023	609	345	620	368	602	508.8	268	69
2	4.3	-0.021	611	348	626	394	602	516.2	224	70
3	4.3	-0.02	609	351	624	404	599	517.4	197	70
4	4.3	-0.019	605	354	620	409	594	516.4	180	70
5	4.3	-0.018	601	357	616	411	588	514.6	166	69
6	4.3	-0.016	596	359	610	412	582	511.8	157	69
7	4.3	-0.015	590	362	604	410	575	508.2	149	69
8	4.3	-0.015	584	364	598	408	568	504.4	143	69
9	4.3	-0.014	577	366	592	405	560	500	138	69
10	4.3	-0.013	570	368	585	403	553	495.8	134	69
11	4.3	-0.013	563	369	579	399	546	491.2	130	69
12	4.3	-0.012	557	370	572	395	539	486.6	127	69
13	4.3	-0.012	550	371	566	392	532	482.2	125	70
14	4.3	-0.011	543	372	559	387	525	477.2	123	70
15	4.3	-0.01	536	372	552	383	518	472.2	121	69
16	4.3	-0.01	529	372	546	378	512	467.4	119	69
17	4.4	-0.009	522	372	539	374	505	462.4	118	69
18	4.4	-0.009	516	371	533	370	499	457.8	117	69
19	4.4	-0.009	509	370	527	365	493	452.8	115	69
20	4.4	-0.008	502	369	521	360	486	447.6	115	68
21	4.4	-0.008	496	368	515	356	480	443	114	69
22	4.4	-0.008	490	366	509	352	474	438.2	113	69
23	4.4	-0.007	483	365	503	347	468	433.2	112	68
24	4.4	-0.007	477	364	497	343	463	428.8	111	68
25	4.4	-0.007	471	362	491	339	457	424	110	69
26	4.4	-0.007	465	361	485	335	452	419.6	110	68
27	4.4	-0.014	459	359	480	331	446	415	109	68
28	4.4	-0.01	453	357	474	327	441	410.4	108	69
29	4.4	-0.009	447	355	468	323	436	405.8	108	69
30	4.4	-0.009	442	354	463	319	430	401.6	107	68
31	4.4	-0.009	436	352	458	315	425	397.2	106	68
32	4.4	-0.009	431	350	453	311	420	393	105	68
33	4.4	-0.009	426	348	447	307	415	388.6	105	68
34	4.4	-0.008	420	347	442	304	411	384.8	105	68
35	4.4	-0.008	415	344	437	300	406	380.4	103	68
36	4.4	-0.008	410	343	432	297	401	376.6	103	68
37	4.4	-0.008	405	341	428	293	397	372.8	102	68
38	4.4	-0.008	400	339	423	290	392	368.8	102	67

Wood Heater Preburn Data - ASTM E2780

Run:	3

Technician Signature: _____

Manufacturer:	Valley Comfort
Model:	PI29
Tracking No.:	VC-18-1
Project No.:	0142WN019E
Test Date:	1/24/18
Beginning Clock Time:	8:45

Preburn Fuel Data

Fuel Piece Lengths (in.):	16		
Total Preburn Weight (lb):	18.6		
Fuel Moisture Readings (% DB):	19.1	20.4	19.7
	19.7	19.2	19.6
	18.8	20.6	18.8
	19.3	19.6	19.2
Avg Preburn Moisture (% DB):	19.50		

Coal Bed Range (lb):	3.4 (min)	4.3 (max)

			Temperatures (°F)							
Elapsed Time (min)	Scale (lb)	Stack Draft (in H_2O)	FB Top	FB Bottom	FB Back	FB Left	FB Right	Avg. FB	Stack	Ambient
39	4.5	-0.008	396	339	418	287	388	365.6	102	68
40	4.5	-0.007	391	338	414	284	383	362	102	68
41	4.5	-0.007	386	336	409	281	379	358.2	103	68
42	4.5	-0.008	382	334	405	277	375	354.6	105	67
43	4.5	-0.008	378	332	400	274	371	351	106	67
44	4.5	-0.007	374	330	396	271	367	347.6	109	68
45	4.5	-0.007	370	329	392	268	363	344.4	111	68
46	4.5	-0.008	366	327	388	265	359	341	113	68
47	4.5	-0.008	362	326	385	263	356	338.4	116	68
48	4.5	-0.008	358	324	381	260	352	335	118	68
49	4.5	-0.008	355	322	377	257	349	332	121	68
50	4.5	-0.009	351	321	374	254	345	329	123	68
51	4.6	-0.008	347	319	371	252	342	326.2	126	68
52	4.5	-0.009	344	318	367	249	339	323.4	129	68
53	4.6	-0.009	341	316	364	247	336	320.8	131	68
54	4.6	-0.009	338	314	361	244	333	318	134	68
55	4.6	-0.009	335	313	358	242	330	315.6	137	68
56	4.6	-0.009	332	311	355	239	328	313	140	68
57	4.6	-0.01	330	309	353	237	325	310.8	143	68
58	4.6	-0.01	328	307	350	235	323	308.6	143	68
59	4.6	-0.01	325	306	348	232	320	306.2	147	68
60	4.6	-0.01	324	304	345	230	318	304.2	149	68
61	4.6	-0.011	322	302	343	228	316	302.2	151	68
62	4.6	-0.011	320	300	341	226	314	300.2	154	68
63	4.6	-0.011	319	299	339	224	312	298.6	156	68
64	4.6	-0.012	318	297	337	222	310	296.8	158	68
65	4.6	-0.012	316	295	335	220	308	294.8	160	68
66	4.6	-0.012	315	294	333	218	306	293.2	162	68
67	4.6	-0.012	314	292	331	216	304	291.4	165	68
68	4.6	-0.012	313	291	329	215	303	290.2	166	68
69	4.6	-0.013	311	290	328	213	301	288.6	167	68
70	4.6	-0.013	311	288	326	211	300	287.2	169	68
71	4.6	-0.013	310	287	325	210	299	286.2	171	68
72	4.6	-0.013	309	286	324	208	298	285	174	69
73	4.6	-0.013	309	285	323	206	297	284	175	68
74	4.6	-0.013	309	284	323	205	296	283.4	178	68
75	4.5	-0.013	308	283	322	203	295	282.2	180	68
76	4.6	-0.014	308	282	322	202	295	281.8	182	68
77	4.5	-0.014	308	282	323	201	294	281.6	183	68

Wood Heater Preburn Data - ASTM E2780

Run:	3

Technician Signature: _____

Manufacturer:	Valley Comfort
Model:	PI29
Tracking No.:	VC-18-1
Project No.:	0142WN019E
Test Date:	1/24/18
Beginning Clock Time:	8:45

Preburn Fuel Data

Fuel Piece Lengths (in.):	16		
Total Preburn Weight (lb):	18.6		
Fuel Moisture Readings (% DB):	19.1	20.4	19.7
	19.7	19.2	19.6
	18.8	20.6	18.8
	19.3	19.6	19.2
Avg Preburn Moisture (% DB):	19.50		

Coal Bed Range (lb):	3.4 (min)	4.3 (max)

			Temperatures (°F)							
Elapsed Time (min)	Scale (lb)	Stack Draft (in H_2O)	FB Top	FB Bottom	FB Back	FB Left	FB Right	Avg. FB	Stack	Ambient
78	4.5	-0.014	307	281	325	200	295	281.6	184	68
79	4.5	-0.014	307	281	326	199	295	281.6	186	68
80	4.5	-0.014	307	281	329	198	297	282.4	187	68
81	4.5	-0.014	307	281	331	197	298	282.8	189	68
82	4.5	-0.014	307	281	335	196	300	283.8	190	68
83	4.5	-0.014	308	281	339	196	303	285.4	192	68
84	4.4	-0.014	309	282	344	196	307	287.6	194	68
85	4.4	-0.015	310	283	350	196	311	290	196	68
86	4.4	-0.015	312	285	358	197	316	293.6	198	68
87	4.4	-0.015	314	286	367	198	321	297.2	201	68
88	4.3	-0.015	316	288	377	198	327	301.2	203	68

Wood Heater Test Fuel Data - ASTM E2780

Manufacturer:	**Valley Comfort**
Model:	**PI29**
Tracking No.:	**VC-18-1**
Project No.:	**0142WN019E**
Test Date:	**1/24/2018**
Run No.:	**3**

Firebox Volume (ft^3):	**2.56**
Fuel Piece Length (in):	**16**
2x4 Crib Weight (lb):	**8.7**
4x4 Crib Weight (lb):	**8.3**

Total Fuel Weight (Dry Basis, lb):	**14.18**	
Fuel Density (lb/ft^3, Dry Basis):	**27.79**	**OK**
Loading Density (lb/ft^3, Wet Basis):	**6.64**	**OK**
2x4 Percentage:	**51%**	**OK**

Coal Bed Range (20-25%): 3.4 - 4.25

Test Fuel Piece	Weight (lb)	Size	Readings (Dry Basis %)			Dry Weight (lb)
1	3.6	4"x 4"	19.3	19.4	20.0	3.01
2	3.7	4"x 4"	20.0	19.4	22.2	3.07
3	1.7	2"x 4"	23.8	23.2	22.2	1.38
4	1.7	2"x 4"	22.7	19.7	19.0	1.41
5	1.8	2"x 4"	19.0	20.4	19.8	1.50
6	1.6	2"x 4"	21.1	20.9	18.8	1.33

Spacer Readings (Dry Basis %)			
16.1	18.3		
20.4	15.3		
11.2	16.8		
17.7	16.7		
22.4	11.1		
21.9	16.9		
15.5	17.5		
22.8	19.2		
15.3	18.9		
19.3	18.9		
17.0	12.3		
17.2	17.1		

Technician Signature: _____

Wood Heater Test Data - ASTM E2780 / ASTM E2515

Run: 3

Manufacturer: Valley Comfort
Model: PI29
Tracking No.: VC-18-1
Project No.: 0142WN019E
Test Date: 24-Jan-18
Beginning Clock Time: 11:17

Total Sampling Time: 597 min
Recording Interval: 1 min
Background Sample Volume: 0 cubic feet

Meter Box Y Factor: 0.997 (1) 0.981 (2) _____ (Amb)

Barometric Pressure:	Begin	Middle	End	Average
	28.56	28.8	28.97	28.78 "Hg

OMNI Equipment Numbers: 410, 283A, 132, 576, 318, 432, 419, 371, 372, 296-T32, 559, 592, 637

PM Control Modules: 371/372
Dilution Tunnel MW(dry): 29.00 lb/lb-mole
Dilution Tunnel MW(wet): 28.78 lb/lb-mole
Dilution Tunnel H2O: 2.00 percent
Dilution Tunnel Static: -0.180 "H2O
Tunnel Area: 0.19635 ft2
Pitot Tube Cp: 0.99

Avg. Tunnel Velocity: 13.78 ft/sec.
Initial Tunnel Flow: 147.0 scfm
Average Tunnel Flow: 148.6 scfm
Post-Test Leak Check (1): 0.000 cfm @ -9 in. Hg
Post-Test Leak Check (2): 0.000 cfm @ -10 in. Hg
Average Test Piece Fuel Moisture: 20.61 Dry Basis %

Technician Signature: _____

Velocity Traverse Data	Pt.1	Pt.2	Pt.3	Pt.4	Pt.5	Pt.6	Pt.7	Pt.8	Center	
Initial dP	0.034	0.052	0.034	0.028	0.038	0.048	0.050	0.032	0.052	"H2O
Temp:	77	77	77	77	77	77	77	77	77	°F

V_{strav} 13.75 ft/sec V_{scent} 15.60 ft/sec F_p 0.881

	Particulate Sampling Data														Fuel Weight (lb)		Temperature Data (°F)												Stack Gas Data		
Elapsed Time (min)	Gas Meter 1 (ft^3)	Gas Meter 2 (ft^3)	Sample Rate 1 (cfm)	Sample Rate 2 (cfm)	Orifice dH 1 ("H_2O)	Meter 1 Temp (°F)	Meter 1 Vacuum ("Hg)	Orifice dH 2 ("H_2O)	Meter 2 Temp (°F)	Meter 2 Vacuum ("Hg)	Dilution Tunnel (°F)	Dilution Tunnel Center dP	Pro. Rate 1	Pro. Rate 2	Scale Reading	Weight Change	Firebox Top	Firebox Bottom	Firebox Back	Firebox Left	Firebox Right	Avg. Stove Surface	Catalyst Exit	Stack	Filter 1	Dryer Exit 1	Filter 2	Dryer Exit 2	Ambient	Draft ("H_2O)	CO_2 (%)	CO (%)
0	0.000	0.000			1.82	69	0.72	1.42	72	0.4	113	0.052			17.0		324	294	392	201	341	310	395	248	69	67	69	65	68	-0.046	5.93	0.07
1	0.122	0.138	0.12	0.14	1.81	69	0.71	1.42	72	0.4	109	0.052	86	94	16.9	-0.1	324	295	391	201	341	310	392	246	69	66	69	65	68	-0.046	5.36	0.09
2	0.270	0.289	0.15	0.15	1.84	69	0.71	1.42	72	0.4	107	0.052	105	103	16.8	-0.1	322	298	383	201	342	309	376	254	69	66	70	65	69	-0.048	2.76	0.17
3	0.417	0.442	0.15	0.15	1.81	69	0.7	1.42	72	0.3	112	0.052	104	105	16.7	-0.1	323	301	378	200	342	309	377	293	70	66	70	65	69	-0.054	2.43	0.26
4	0.564	0.593	0.15	0.15	1.82	69	0.7	1.42	72	0.3	101	0.052	103	102	16.5	-0.2	326	304	375	199	341	309	414	291	70	66	70	65	68	-0.049	3.08	0.31
5	0.711	0.744	0.15	0.15	1.81	69	0.71	1.40	72	0.3	91	0.052	102	101	16.5	0	327	307	372	199	339	309	447	260	70	66	70	65	68	-0.046	3.54	0.38
6	0.858	0.896	0.15	0.15	1.78	69	0.71	1.42	72	0.3	87	0.052	102	102	16.4	-0.1	328	310	368	198	337	308	469	240	70	66	70	65	69	-0.045	4.76	0.77
7	1.004	1.047	0.15	0.15	1.79	69	0.71	1.41	72	0.3	85	0.052	101	101	16.3	-0.1	331	312	364	198	335	308	480	229	70	66	70	65	68	-0.044	4.68	0.82
8	1.150	1.198	0.15	0.15	1.78	69	0.71	1.40	72	0.3	84	0.052	101	101	16.3	0	332	315	360	197	332	307	487	224	70	66	70	65	68	-0.044	4.56	0.79
9	1.296	1.350	0.15	0.15	1.78	69	0.71	1.41	72	0.3	83	0.052	101	101	16.2	-0.1	334	317	356	197	330	307	492	222	70	66	70	65	68	-0.044	4.58	0.78
10	1.442	1.501	0.15	0.15	1.77	69	0.71	1.41	72	0.4	83	0.052	101	101	16.1	-0.1	336	319	352	197	327	306	495	220	70	66	70	65	68	-0.043	4.64	0.76
11	1.588	1.652	0.15	0.15	1.78	69	0.71	1.39	72	0.3	83	0.052	101	101	16.1	0	338	321	349	196	325	306	499	219	70	66	70	65	68	-0.044	4.68	0.75
12	1.733	1.803	0.15	0.15	1.77	69	0.71	1.40	72	0.3	82	0.052	100	101	16.0	-0.1	340	323	345	196	322	305	503	219	70	65	70	65	68	-0.043	4.76	0.74
13	1.878	1.954	0.15	0.15	1.74	69	0.71	1.40	72	0.4	82	0.052	100	101	15.9	-0.1	342	324	342	196	320	305	508	220	70	65	70	65	68	-0.044	4.79	0.72
14	2.024	2.104	0.15	0.15	1.74	69	0.71	1.39	72	0.3	82	0.052	101	100	15.8	-0.1	344	325	339	197	318	305	513	221	70	65	70	65	68	-0.045	4.91	0.68
15	2.169	2.255	0.15	0.15	1.72	69	0.71	1.38	72	0.4	82	0.052	100	101	15.8	0	346	326	337	197	317	305	516	222	70	65	70	65	68	-0.044	4.96	0.63
16	2.313	2.406	0.14	0.15	1.73	68	0.71	1.40	72	0.3	82	0.052	100	101	15.7	-0.1	348	327	335	198	315	305	517	224	70	65	70	64	68	-0.044	4.99	0.57
17	2.458	2.557	0.15	0.15	1.73	68	0.71	1.39	72	0.3	82	0.052	100	101	15.6	-0.1	350	328	333	199	314	305	516	225	70	65	70	64	68	-0.044	5.05	0.53
18	2.604	2.707	0.15	0.15	1.74	68	0.71	1.38	72	0.3	82	0.052	101	100	15.5	-0.1	352	329	331	199	313	305	515	227	70	65	70	64	68	-0.044	5.05	0.5
19	2.749	2.858	0.15	0.15	1.75	68	0.71	1.40	72	0.3	82	0.052	100	101	15.5	0	354	329	330	200	312	305	515	229	70	65	70	64	68	-0.045	5.08	0.48
20	2.895	3.008	0.15	0.15	1.75	68	0.71	1.40	72	0.3	82	0.052	101	100	15.4	-0.1	356	330	329	201	312	306	516	231	70	65	70	64	68	-0.045	5.06	0.46
21	3.040	3.159	0.15	0.15	1.75	68	0.71	1.38	72	0.3	82	0.052	100	101	15.3	-0.1	358	330	328	202	311	306	516	233	70	65	70	64	68	-0.045	5.07	0.42
22	3.185	3.310	0.15	0.15	1.76	68	0.71	1.39	72	0.3	82	0.052	100	101	15.2	-0.1	360	330	327	203	311	306	515	234	70	65	70	64	68	-0.045	5.11	0.39
23	3.330	3.461	0.15	0.15	1.76	68	0.71	1.40	72	0.3	82	0.052	100	101	15.1	-0.1	362	330	326	204	311	307	515	235	70	65	70	64	68	-0.045	5.15	0.37
24	3.476	3.611	0.15	0.15	1.75	68	0.71	1.38	72	0.3	83	0.052	101	100	15.1	0	364	330	326	205	310	307	516	236	70	65	70	64	68	-0.045	5.11	0.35
25	3.621	3.762	0.15	0.15	1.73	68	0.7	1.39	72	0.3	82	0.052	100	101	15.0	-0.1	366	331	326	206	310	308	519	238	70	65	70	64	68	-0.045	5.06	0.33
26	3.766	3.912	0.15	0.15	1.75	68	0.71	1.40	72	0.3	83	0.052	101	100	14.9	-0.1	368	331	325	207	310	308	523	240	70	65	70	64	68	-0.046	5.15	0.32
27	3.911	4.063	0.15	0.15	1.75	68	0.71	1.38	72	0.3	83	0.052	101	101	14.8	-0.1	371	331	326	208	310	309	529	243	70	65	71	64	68	-0.046	5.22	0.32
28	4.056	4.213	0.15	0.15	1.75	68	0.71	1.37	72	0.3	83	0.052	101	100	14.7	-0.1	374	330	328	209	310	310	539	247	70	65	70	64	68	-0.046	5.41	0.31
29	4.201	4.364	0.15	0.15	1.73	68	0.71	1.39	72	0.3	83	0.052	101	101	14.6	-0.1	378	330	330	210	310	312	552	250	70	65	70	64	68	-0.047	5.93	0.3
30	4.346	4.515	0.15	0.15	1.72	68	0.71	1.39	72	0.3	84	0.052	101	101	14.6	0	382	330	332	212	311	313	565	255	70	65	70	64	68	-0.047	6.08	0.29
31	4.491	4.665	0.15	0.15	1.71	68	0.71	1.37	72	0.3	84	0.052	101	100	14.5	-0.1	386	329	334	214	311	315	574	260	70	65	71	64	67	-0.047	6.1	0.27
32	4.636	4.817	0.15	0.15	1.72	68	0.71	1.39	72	0.3	84	0.052	101	101	14.4	-0.1	390	329	336	216	312	317	582	263	70	65	71	64	68	-0.047	6.28	0.24
33	4.781	4.967	0.15	0.15	1.72	68	0.71	1.39	72	0.3	84	0.052	101	100	14.3	-0.1	394	329	338	218	312	318	590	267	70	65	71	64	68	-0.048	6.41	0.22
34	4.927	5.117	0.15	0.15	1.74	68	0.7	1.38	72	0.3	84	0.052	101	100	14.2	-0.1	399	329	339	220	313	320	598	271	70	65	71	64	68	-0.048	6.47	0.19
35	5.072	5.268	0.15	0.15	1.75	68	0.7	1.38	72	0.3	84	0.052	101	101	14.1	-0.1	403	328	341	222	314	322	608	275	70	65	71	64	67	-0.048	6.56	0.15
36	5.218	5.418	0.15	0.15	1.75	68	0.71	1.39	72	0.3	85	0.052	101	100	14.1	0	409	328	343	224	315	324	617	279	70	65	71	64	68	-0.049	6.65	0.1
37	5.363	5.569	0.15	0.15	1.74	68	0.7	1.38	72	0.3	85	0.052	101	101	14.0	-0.1	414	327	345	226	315	325	625	284	70	66	71	64	68	-0.049	6.84	0.05

Wood Heater Test Data - ASTM E2780 / ASTM E2515

Run: 3

Manufacturer: Valley Comfort
Model: PI29
Tracking No.: VC-18-1
Project No.: 0142WN019E
Test Date: 24-Jan-18
Beginning Clock Time: 11:17

Total Sampling Time: 597 min
Recording Interval: 1 min
Background Sample Volume: 0 cubic feet

Meter Box Y Factor: 0.997 (1) 0.981 (2) _____ (Amb)

Barometric Pressure:	Begin	Middle	End	Average
	28.56	28.8	28.97	28.78 "Hg

OMNI Equipment Numbers: 410, 283A, 132, 576, 318, 432, 419, 371, 372, 296-T32, 559, 592, 637

PM Control Modules: 371/372
Dilution Tunnel MW(dry): 29.00 lb/lb-mole
Dilution Tunnel MW(wet): 28.78 lb/lb-mole
Dilution Tunnel H2O: 2.00 percent
Dilution Tunnel Static: -0.180 "H2O
Tunnel Area: 0.19635 ft2
Pitot Tube Cp: 0.99

Avg. Tunnel Velocity: 13.78 ft/sec.
Initial Tunnel Flow: 147.0 scfm
Average Tunnel Flow: 148.6 scfm
Post-Test Leak Check (1): 0.000 cfm @ -9 in. Hg
Post-Test Leak Check (2): 0.000 cfm @ -10 in. Hg
Average Test Piece Fuel Moisture: 20.61 Dry Basis %

Technician Signature: _____

Velocity Traverse Data

	Pt.1	Pt.2	Pt.3	Pt.4	Pt.5	Pt.6	Pt.7	Pt.8	Center	
Initial dP	0.034	0.052	0.034	0.028	0.038	0.048	0.050	0.032	0.052	"H2O
Temp:	77	77	77	77	77	77	77	77	77	°F

V_{strav} 13.75 ft/sec V_{scent} 15.60 ft/sec F_p 0.881

	Particulate Sampling Data														Fuel Weight (lb)		Temperature Data (°F)													Stack Gas Data		
Elapsed Time (min)	Gas Meter 1 (ft^3)	Gas Meter 2 (ft^3)	Sample Rate 1 (cfm)	Sample Rate 2 (cfm)	Orifice dH 1 ("H_2O)	Meter 1 Temp (°F)	Meter 1 Vacuum ("Hg)	Orifice dH 2 ("H_2O)	Meter 2 Temp (°F)	Meter 2 Vacuum ("Hg)	Dilution Tunnel (°F)	Dilution Tunnel Center dP	Pro. Rate 1	Pro. Rate 2	Scale Reading	Weight Change	Firebox Top	Firebox Bottom	Firebox Back	Firebox Left	Firebox Right	Avg. Stove Surface	Catalyst Exit	Stack	Filter 1	Dryer Exit 1	Filter 2	Dryer Exit 2	Ambient	Draft ("H_2O)	CO_2 (%)	CO (%)
38	5.508	5.720	0.15	0.15	1.76	68	0.7	1.37	72	0.3	85	0.052	101	101	13.9	-0.1	420	327	349	228	317	328	634	289	70	66	71	64	68	-0.049	7.17	0.03
39	5.654	5.871	0.15	0.15	1.76	68	0.7	1.40	72	0.3	85	0.052	101	101	13.8	-0.1	426	326	352	230	318	330	646	294	70	66	71	65	68	-0.049	7.56	0.02
40	5.799	6.021	0.15	0.15	1.75	68	0.7	1.39	72	0.3	86	0.052	101	100	13.7	-0.1	433	326	355	232	320	333	662	299	70	66	71	64	68	-0.051	7.69	0.02
41	5.945	6.172	0.15	0.15	1.75	68	0.7	1.38	72	0.3	87	0.052	102	101	13.5	-0.2	441	326	359	235	322	337	676	310	70	66	71	65	68	-0.051	7.71	0.02
42	6.090	6.323	0.15	0.15	1.75	68	0.7	1.38	72	0.3	87	0.052	101	101	13.4	-0.1	451	326	361	237	323	340	688	313	70	66	71	65	68	-0.052	8.77	0.28
43	6.235	6.474	0.15	0.15	1.75	68	0.7	1.39	72	0.3	87	0.052	101	101	13.3	-0.1	461	326	362	240	325	343	704	317	71	66	71	65	68	-0.052	9.16	0.47
44	6.380	6.624	0.15	0.15	1.75	68	0.7	1.38	72	0.3	88	0.052	101	100	13.2	-0.1	472	325	363	242	326	346	716	318	71	66	71	65	68	-0.052	8.89	0.28
45	6.526	6.775	0.15	0.15	1.72	68	0.7	1.39	72	0.3	88	0.052	102	101	13.1	-0.1	484	325	364	243	328	349	722	319	71	66	71	65	68	-0.051	8.45	0.15
46	6.670	6.926	0.14	0.15	1.72	68	0.71	1.39	72	0.3	88	0.052	100	101	13.0	-0.1	494	325	366	245	329	352	723	320	71	66	71	65	68	-0.052	8.16	0.09
47	6.815	7.076	0.15	0.15	1.71	68	0.7	1.38	72	0.3	88	0.052	101	100	12.9	-0.1	503	325	368	247	330	355	723	320	71	66	71	65	68	-0.052	7.94	0.05
48	6.960	7.227	0.15	0.15	1.72	68	0.71	1.38	72	0.3	88	0.052	101	101	12.8	-0.1	511	325	370	249	332	357	724	319	71	66	71	65	68	-0.052	7.89	0.05
49	7.106	7.378	0.15	0.15	1.73	68	0.7	1.39	72	0.3	88	0.052	102	101	12.7	-0.1	519	324	373	250	333	360	730	318	71	66	71	65	68	-0.052	8.01	0.06
50	7.252	7.529	0.15	0.15	1.74	68	0.7	1.38	72	0.3	88	0.052	102	101	12.6	-0.1	527	324	377	253	335	363	743	318	71	66	71	65	68	-0.052	8.11	0.06
51	7.397	7.679	0.15	0.15	1.74	68	0.7	1.37	72	0.3	88	0.052	101	100	12.6	0	536	324	382	255	337	367	758	316	71	66	71	65	68	-0.052	8.63	0.09
52	7.543	7.830	0.15	0.15	1.74	68	0.7	1.39	72	0.3	88	0.052	102	101	12.4	-0.2	544	324	388	258	339	371	768	315	71	66	71	65	68	-0.052	8.93	0.15
53	7.688	7.981	0.15	0.15	1.75	68	0.7	1.39	72	0.3	88	0.052	101	101	12.4	0	551	324	395	261	342	375	771	316	71	66	71	65	68	-0.052	9.07	0.21
54	7.833	8.132	0.15	0.15	1.75	68	0.7	1.38	72	0.3	88	0.052	101	101	12.3	-0.1	558	324	402	264	345	379	769	316	71	66	71	65	68	-0.052	9.28	0.26
55	7.979	8.283	0.15	0.15	1.75	68	0.7	1.39	72	0.3	88	0.052	102	101	12.2	-0.1	563	325	407	268	349	382	765	315	71	66	71	65	68	-0.052	9.35	0.24
56	8.125	8.434	0.15	0.15	1.75	68	0.7	1.39	72	0.3	88	0.052	102	101	12.1	-0.1	569	326	411	271	352	386	763	313	71	66	71	65	68	-0.052	9.38	0.2
57	8.270	8.584	0.15	0.15	1.74	68	0.7	1.38	72	0.3	88	0.052	101	100	12.0	-0.1	574	326	413	275	356	389	769	309	71	66	71	65	68	-0.051	9.37	0.17
58	8.416	8.735	0.15	0.15	1.75	68	0.7	1.39	72	0.3	88	0.052	102	101	11.9	-0.1	579	326	415	279	359	392	778	305	71	66	71	65	68	-0.050	9.31	0.12
59	8.561	8.886	0.15	0.15	1.75	68	0.7	1.39	72	0.3	88	0.052	101	101	11.8	-0.1	586	326	415	283	362	394	787	302	71	67	72	65	68	-0.053	9.05	0.07
60	8.706	9.037	0.15	0.15	1.75	68	0.7	1.37	72	0.3	87	0.052	101	101	11.7	-0.1	593	325	416	286	365	397	792	297	71	67	72	65	69	-0.052	8.77	0.04
61	8.856	9.187	0.15	0.15	1.88	68	0.83	1.37	72	0.3	87	0.052	104	100	11.7	0	598	325	417	289	368	399	796	293	71	67	72	65	68	-0.051	8.63	0.03
62	9.001	9.339	0.15	0.15	1.74	68	0.69	1.38	72	0.3	87	0.052	101	102	11.6	-0.1	603	325	417	292	370	401	798	292	72	67	72	65	68	-0.053	8.58	0.03
63	9.146	9.490	0.15	0.15	1.75	68	0.69	1.37	72	0.3	87	0.052	101	101	11.5	-0.1	609	324	418	294	372	403	798	287	72	67	72	66	68	-0.050	8.64	0.06
64	9.291	9.640	0.15	0.15	1.71	68	0.69	1.37	72	0.3	87	0.052	101	100	11.4	-0.1	614	324	418	296	374	405	802	283	72	67	72	66	68	-0.049	8.51	0.1
65	9.435	9.791	0.14	0.15	1.70	68	0.69	1.38	72	0.3	87	0.052	100	101	11.3	-0.1	621	324	417	298	376	407	816	284	72	67	72	66	68	-0.050	8.31	0.29
66	9.580	9.942	0.15	0.15	1.71	68	0.69	1.39	72	0.3	87	0.052	101	101	11.2	-0.1	628	323	418	299	377	409	828	283	72	67	72	66	68	-0.050	8.38	0.47
67	9.724	10.093	0.14	0.15	1.71	68	0.69	1.38	72	0.3	87	0.052	100	101	11.1	-0.1	635	323	418	300	379	411	834	280	72	67	72	66	68	-0.050	8.4	0.51
68	9.870	10.244	0.15	0.15	1.72	68	0.69	1.38	72	0.3	87	0.052	102	101	11.1	0	641	323	418	300	380	412	834	277	72	67	72	66	68	-0.049	8.17	0.79
69	10.015	10.395	0.15	0.15	1.74	68	0.69	1.39	72	0.3	87	0.052	101	101	11.0	-0.1	647	322	418	301	381	414	829	274	72	67	72	66	69	-0.049	7.92	1.21
70	10.160	10.546	0.15	0.15	1.73	68	0.68	1.38	72	0.3	86	0.052	101	101	10.9	-0.1	652	322	418	301	382	415	822	271	72	67	72	66	68	-0.049	7.72	1.58
71	10.305	10.697	0.15	0.15	1.74	68	0.68	1.38	72	0.3	87	0.052	101	101	10.8	-0.1	656	322	418	302	383	416	816	272	72	67	72	66	68	-0.049	7.42	1.82
72	10.450	10.848	0.15	0.15	1.75	68	0.68	1.39	72	0.3	87	0.052	101	101	10.7	-0.1	658	322	418	302	384	417	813	270	72	67	72	66	68	-0.049	7.54	1.91
73	10.596	10.999	0.15	0.15	1.74	68	0.69	1.38	72	0.3	87	0.052	102	101	10.7	0	661	321	417	303	385	417	810	266	72	67	72	66	68	-0.048	7.47	1.9
74	10.741	11.149	0.15	0.15	1.72	68	0.69	1.38	72	0.3	87	0.052	101	100	10.6	-0.1	662	321	417	303	386	418	806	260	72	67	72	66	68	-0.047	7.39	1.8
75	10.886	11.301	0.15	0.15	1.73	69	0.68	1.38	72	0.3	87	0.052	101	102	10.5	-0.1	664	321	416	303	387	418	801	254	72	67	72	66	69	-0.046	7.34	1.64

Wood Heater Test Data - ASTM E2780 / ASTM E2515

Run: 3

Manufacturer: Valley Comfort
Model: PI29
Tracking No.: VC-18-1
Project No.: 0142WN019E
Test Date: 24-Jan-18
Beginning Clock Time: 11:17

Total Sampling Time: 597 min
Recording Interval: 1 min
Background Sample Volume: 0 cubic feet

Meter Box Y Factor: 0.997 (1) 0.981 (2) _____ (Amb)

Barometric Pressure:

Begin	Middle	End	Average
28.56	28.8	28.97	28.78 "Hg

OMNI Equipment Numbers: 410, 283A, 132, 576, 318, 432, 419, 371, 372, 296-T32, 559, 592, 637

PM Control Modules: 371/372
Dilution Tunnel MW(dry): 29.00 lb/lb-mole
Dilution Tunnel MW(wet): 28.78 lb/lb-mole
Dilution Tunnel H2O: 2.00 percent
Dilution Tunnel Static: -0.180 "H2O
Tunnel Area: 0.19635 ft2
Pitot Tube Cp: 0.99

Avg. Tunnel Velocity: 13.78 ft/sec.
Initial Tunnel Flow: 147.0 scfm
Average Tunnel Flow: 148.6 scfm
Post-Test Leak Check (1): 0.000 cfm @ -9 in. Hg
Post-Test Leak Check (2): 0.000 cfm @ -10 in. Hg
Average Test Piece Fuel Moisture: 20.61 Dry Basis %

Technician Signature: _____

Velocity Traverse Data

	Pt.1	Pt.2	Pt.3	Pt.4	Pt.5	Pt.6	Pt.7	Pt.8	Center	
Initial dP	0.034	0.052	0.034	0.028	0.038	0.048	0.050	0.032	0.052	"H2O
Temp:	77	77	77	77	77	77	77	77	77	°F

V_{strav} 13.75 ft/sec V_{scent} 15.60 ft/sec F_p 0.881

	Particulate Sampling Data														Fuel Weight (lb)		Temperature Data (°F)													Stack Gas Data		
Elapsed Time (min)	Gas Meter 1 (ft^3)	Gas Meter 2 (ft^3)	Sample Rate 1 (cfm)	Sample Rate 2 (cfm)	Orifice dH 1 ("H_2O)	Meter 1 Temp (°F)	Meter 1 Vacuum ("Hg)	Orifice dH 2 ("H_2O)	Meter 2 Temp (°F)	Meter 2 Vacuum ("Hg)	Dilution Tunnel (°F)	Dilution Tunnel Center dP	Pro. Rate 1	Pro. Rate 2	Scale Reading	Weight Change	Firebox Top	Firebox Bottom	Firebox Back	Firebox Left	Firebox Right	Avg. Stove Surface	Catalyst Exit	Stack	Filter 1	Dryer Exit 1	Filter 2	Dryer Exit 2	Ambient	Draft ("H_2O)	CO_2 (%)	CO (%)
76	11.031	11.451	0.15	0.15	1.74	69	0.69	1.39	72	0.3	88	0.052	101	100	10.5	0	664	321	414	303	387	418	796	247	72	67	72	66	69	-0.046	7.16	1.51
77	11.176	11.602	0.15	0.15	1.72	69	0.69	1.38	72	0.3	88	0.052	101	101	10.4	-0.1	665	320	413	303	388	418	789	242	72	67	72	66	69	-0.046	7.15	1.31
78	11.321	11.753	0.15	0.15	1.71	69	0.69	1.39	72	0.3	88	0.052	101	101	10.4	0	664	320	412	303	388	417	784	235	72	67	72	66	69	-0.045	7.14	1.11
79	11.465	11.904	0.14	0.15	1.70	70	0.69	1.38	72	0.3	88	0.052	100	101	10.3	-0.1	663	320	410	303	389	417	779	232	72	67	72	66	70	-0.044	6.96	0.91
80	11.610	12.055	0.15	0.15	1.70	70	0.69	1.37	72	0.3	88	0.052	101	101	10.2	-0.1	661	320	409	303	389	416	776	226	72	67	72	66	70	-0.044	7.06	0.73
81	11.755	12.206	0.15	0.15	1.71	70	0.69	1.38	72	0.3	88	0.052	101	101	10.2	0	660	320	408	303	389	416	774	219	72	67	72	66	70	-0.043	6.97	0.57
82	11.900	12.357	0.15	0.15	1.72	71	0.68	1.38	72	0.3	86	0.052	100	101	10.1	-0.1	657	316	407	303	389	414	771	215	72	67	72	66	68	-0.043	6.87	0.48
83	12.046	12.508	0.15	0.15	1.73	71	0.69	1.37	72	0.3	86	0.052	101	101	10.1	0	654	314	405	303	389	413	767	210	72	67	72	67	68	-0.043	6.74	0.42
84	12.191	12.659	0.15	0.15	1.73	71	0.69	1.39	73	0.3	85	0.052	100	101	10.0	-0.1	651	311	404	302	389	411	760	205	71	67	72	67	67	-0.042	6.72	0.39
85	12.336	12.810	0.15	0.15	1.74	72	0.69	1.38	73	0.3	85	0.052	100	101	10.0	0	648	311	402	302	389	410	753	200	71	68	72	67	68	-0.041	6.7	0.34
86	12.481	12.960	0.15	0.15	1.74	72	0.69	1.38	73	0.3	86	0.052	100	100	10.0	0	645	312	400	302	389	410	747	194	71	67	72	67	69	-0.041	6.52	0.2
87	12.627	13.112	0.15	0.15	1.74	72	0.69	1.39	73	0.3	86	0.052	101	101	9.9	-0.1	641	313	398	301	388	408	740	192	71	67	72	67	69	-0.041	6.39	0.13
88	12.772	13.263	0.15	0.15	1.73	72	0.69	1.39	73	0.3	86	0.052	100	101	9.9	0	637	313	396	300	388	407	734	189	71	68	72	67	70	-0.040	6.3	0.08
89	12.917	13.413	0.15	0.15	1.74	73	0.69	1.38	73	0.3	86	0.052	100	100	9.9	0	633	313	395	300	387	406	728	188	71	68	72	67	70	-0.040	6.13	0.05
90	13.062	13.565	0.15	0.15	1.74	73	0.69	1.38	73	0.3	87	0.052	100	101	9.8	-0.1	629	314	392	299	386	404	721	187	71	68	72	67	70	-0.039	6	0.03
91	13.207	13.716	0.15	0.15	1.74	73	0.69	1.38	73	0.3	87	0.052	100	101	9.8	0	624	314	391	299	386	403	714	186	71	68	72	67	70	-0.039	6	0.02
92	13.352	13.866	0.15	0.15	1.71	73	0.69	1.38	73	0.3	87	0.052	100	100	9.8	0	619	313	389	298	385	401	706	183	71	68	72	67	70	-0.039	5.92	0.02
93	13.497	14.017	0.15	0.15	1.69	73	0.69	1.37	73	0.3	87	0.052	100	101	9.7	-0.1	614	313	387	297	384	399	698	183	71	68	72	67	70	-0.039	5.76	0.02
94	13.642	14.168	0.15	0.15	1.70	73	0.69	1.38	73	0.3	87	0.052	100	101	9.7	0	609	312	385	297	383	397	690	181	72	68	72	67	70	-0.038	5.68	0.01
95	13.787	14.319	0.15	0.15	1.70	73	0.69	1.38	73	0.3	86	0.052	100	101	9.7	0	603	312	383	296	382	395	682	178	72	68	72	67	70	-0.038	5.64	0.01
96	13.932	14.470	0.15	0.15	1.73	74	0.69	1.37	73	0.3	86	0.052	100	101	9.6	-0.1	598	312	381	295	381	393	675	177	72	68	72	67	70	-0.038	5.51	0.01
97	14.078	14.621	0.15	0.15	1.73	74	0.69	1.39	73	0.3	86	0.052	100	101	9.6	0	592	312	380	294	381	392	668	177	72	68	73	67	70	-0.037	5.39	0.01
98	14.223	14.773	0.15	0.15	1.73	74	0.68	1.38	73	0.3	86	0.052	100	101	9.6	0	587	312	378	293	380	390	661	176	72	68	73	67	70	-0.038	5.36	0.01
99	14.369	14.923	0.15	0.15	1.74	74	0.69	1.37	73	0.3	86	0.052	100	100	9.6	0	581	311	377	292	379	388	655	175	72	68	73	67	70	-0.037	5.34	0.01
100	14.514	15.074	0.15	0.15	1.74	74	0.69	1.39	73	0.3	86	0.052	100	101	9.5	-0.1	576	311	375	291	378	386	648	175	72	68	73	67	70	-0.037	5.34	0.01
101	14.659	15.225	0.15	0.15	1.74	75	0.69	1.38	73	0.3	87	0.052	100	101	9.5	0	570	311	374	290	376	384	643	174	72	68	73	67	71	-0.036	5.26	0.01
102	14.805	15.376	0.15	0.15	1.74	75	0.69	1.36	74	0.3	87	0.052	100	101	9.5	0	565	310	372	289	375	382	638	174	72	68	73	67	71	-0.037	5.26	0.01
103	14.950	15.527	0.15	0.15	1.74	75	0.69	1.39	74	0.3	86	0.052	99	101	9.5	0	560	309	371	289	374	381	633	174	72	68	73	67	71	-0.037	5.23	0.01
104	15.096	15.678	0.15	0.15	1.74	76	0.69	1.38	74	0.3	87	0.052	100	101	9.4	-0.1	555	308	370	288	373	379	629	175	72	68	73	67	71	-0.036	5.22	0.01
105	15.241	15.829	0.15	0.15	1.74	76	0.69	1.38	74	0.3	87	0.052	99	101	9.4	0	551	308	368	287	372	377	626	177	72	68	73	67	71	-0.037	5.27	0.01
106	15.386	15.980	0.15	0.15	1.74	76	0.69	1.38	75	0.3	87	0.052	99	100	9.4	0	546	307	367	287	371	376	623	178	72	68	73	67	71	-0.037	5.39	0.01
107	15.531	16.131	0.15	0.15	1.71	76	0.69	1.38	75	0.3	87	0.052	99	100	9.4	0	542	307	366	286	370	374	620	177	72	68	73	67	71	-0.036	5.43	0.01
108	15.677	16.282	0.15	0.15	1.71	76	0.69	1.38	75	0.3	87	0.052	100	100	9.3	-0.1	538	307	365	285	369	373	617	178	72	68	73	68	71	-0.036	5.39	0.01
109	15.822	16.433	0.15	0.15	1.70	76	0.69	1.38	75	0.3	87	0.052	99	100	9.3	0	535	306	364	284	368	371	615	179	72	68	73	68	70	-0.037	5.43	0.01
110	15.967	16.584	0.15	0.15	1.71	76	0.69	1.38	75	0.3	86	0.052	99	100	9.3	0	531	305	363	284	367	370	614	181	72	68	73	68	70	-0.036	5.46	0.01
111	16.112	16.735	0.14	0.15	1.70	76	0.69	1.37	75	0.3	86	0.052	99	100	9.3	0	528	305	362	283	366	369	612	181	72	68	73	68	71	-0.036	5.5	0.01
112	16.257	16.886	0.15	0.15	1.71	76	0.69	1.37	75	0.3	86	0.052	99	100	9.2	-0.1	525	304	361	283	366	368	611	181	72	68	73	68	71	-0.036	5.53	0.01
113	16.403	17.037	0.15	0.15	1.71	76	0.69	1.39	76	0.3	86	0.052	100	100	9.2	0	522	304	360	282	365	367	610	181	72	68	73	68	71	-0.036	5.57	0.01

Wood Heater Test Data - ASTM E2780 / ASTM E2515

Run: 3

Manufacturer: Valley Comfort
Model: PI29
Tracking No.: VC-18-1
Project No.: 0142WN019E
Test Date: 24-Jan-18
Beginning Clock Time: 11:17

Total Sampling Time: 597 min
Recording Interval: 1 min
Background Sample Volume: 0 cubic feet

Meter Box Y Factor: 0.997 (1) 0.981 (2) _____ (Amb)

Barometric Pressure:

Begin	Middle	End	Average
28.56	28.8	28.97	28.78 "Hg

OMNI Equipment Numbers: 410, 283A, 132, 576, 318, 432, 419, 371, 372, 296-T32, 559, 592, 637

PM Control Modules: 371/372
Dilution Tunnel MW(dry): 29.00 lb/lb-mole
Dilution Tunnel MW(wet): 28.78 lb/lb-mole
Dilution Tunnel H2O: 2.00 percent
Dilution Tunnel Static: -0.180 "H2O
Tunnel Area: 0.19635 ft2
Pitot Tube Cp: 0.99

Avg. Tunnel Velocity: 13.78 ft/sec.
Initial Tunnel Flow: 147.0 scfm
Average Tunnel Flow: 148.6 scfm
Post-Test Leak Check (1): 0.000 cfm @ -9 in. Hg
Post-Test Leak Check (2): 0.000 cfm @ -10 in. Hg
Average Test Piece Fuel Moisture: 20.61 Dry Basis %

Technician Signature: _____

Velocity Traverse Data

	Pt.1	Pt.2	Pt.3	Pt.4	Pt.5	Pt.6	Pt.7	Pt.8	Center	
Initial dP	0.034	0.052	0.034	0.028	0.038	0.048	0.050	0.032	0.052	"H2O
Temp:	77	77	77	77	77	77	77	77	77	°F

V_{strav} 13.75 ft/sec V_{scent} 15.60 ft/sec F_p 0.881

	Particulate Sampling Data														Fuel Weight (lb)		Temperature Data (°F)													Stack Gas Data		
Elapsed Time (min)	Gas Meter 1 (ft^3)	Gas Meter 2 (ft^3)	Sample Rate 1 (cfm)	Sample Rate 2 (cfm)	Orifice dH 1 ("H_2O)	Meter 1 Temp (°F)	Meter 1 Vacuum ("Hg)	Orifice dH 2 ("H_2O)	Meter 2 Temp (°F)	Meter 2 Vacuum ("Hg)	Dilution Tunnel (°F)	Dilution Tunnel Center dP	Pro. Rate 1	Pro. Rate 2	Scale Reading	Weight Change	Firebox Top	Firebox Bottom	Firebox Back	Firebox Left	Firebox Right	Avg. Stove Surface	Catalyst Exit	Stack	Filter 1	Dryer Exit 1	Filter 2	Dryer Exit 2	Ambient	Draft ("H_2O)	CO_2 (%)	CO (%)
114	16.549	17.188	0.15	0.15	1.74	76	0.69	1.37	76	0.3	86	0.052	100	100	9.2	0	519	304	359	282	364	366	610	181	72	68	73	68	71	-0.036	5.62	0.01
115	16.695	17.339	0.15	0.15	1.74	76	0.69	1.37	76	0.3	86	0.052	100	100	9.2	0	517	303	358	281	363	364	609	181	72	68	73	68	71	-0.036	5.57	0.01
116	16.840	17.490	0.15	0.15	1.74	76	0.69	1.38	76	0.3	86	0.052	99	100	9.1	-0.1	515	302	357	280	362	363	608	182	72	68	73	68	71	-0.036	5.59	0.01
117	16.986	17.641	0.15	0.15	1.74	76	0.69	1.38	76	0.3	86	0.052	100	100	9.1	0	513	302	356	280	362	363	608	181	72	68	73	68	71	-0.036	5.62	0.01
118	17.131	17.792	0.15	0.15	1.74	75	0.69	1.37	76	0.3	86	0.052	99	100	9.1	0	510	302	355	280	361	362	608	181	72	68	73	68	71	-0.037	5.61	0.01
119	17.277	17.943	0.15	0.15	1.74	75	0.69	1.38	76	0.3	86	0.052	100	100	9.1	0	508	302	354	279	360	361	609	184	73	68	74	68	71	-0.036	5.53	0.01
120	17.422	18.094	0.15	0.15	1.74	75	0.68	1.38	76	0.3	86	0.052	99	100	9.0	-0.1	506	301	354	279	359	360	608	185	73	68	74	68	71	-0.036	5.53	0.01
121	17.568	18.245	0.15	0.15	1.73	75	0.69	1.36	76	0.3	85	0.052	100	100	9.0	0	505	301	353	278	359	359	607	187	73	68	74	68	71	-0.037	5.56	0.01
122	17.714	18.396	0.15	0.15	1.73	75	0.68	1.38	76	0.3	86	0.052	100	100	9.0	0	503	300	352	278	358	358	606	186	73	68	74	68	72	-0.036	5.56	0.01
123	17.859	18.548	0.15	0.15	1.74	75	0.69	1.38	76	0.3	86	0.052	99	101	9.0	0	502	300	352	277	357	358	606	186	73	68	74	68	72	-0.037	5.62	0.01
124	18.004	18.698	0.15	0.15	1.72	75	0.68	1.38	76	0.3	86	0.052	99	99	8.9	-0.1	500	300	351	277	357	357	607	187	73	68	74	68	72	-0.037	5.7	0.01
125	18.149	18.850	0.15	0.15	1.71	75	0.69	1.38	76	0.3	86	0.052	99	101	8.9	0	499	299	351	277	356	356	608	189	73	68	74	68	72	-0.037	5.78	0.01
126	18.295	19.000	0.15	0.15	1.71	75	0.69	1.38	76	0.3	86	0.052	100	99	8.9	0	499	299	350	277	356	356	609	190	73	68	74	68	72	-0.037	5.81	0.01
127	18.440	19.151	0.15	0.15	1.71	75	0.69	1.37	76	0.3	86	0.052	99	100	8.8	-0.1	498	299	350	276	355	356	611	190	73	68	74	68	72	-0.037	5.86	0.01
128	18.585	19.302	0.15	0.15	1.70	75	0.69	1.38	76	0.3	86	0.052	99	100	8.8	0	498	299	349	276	355	355	613	191	73	68	74	68	72	-0.037	5.88	0.01
129	18.730	19.453	0.15	0.15	1.70	75	0.69	1.38	76	0.3	86	0.052	99	100	8.8	0	497	298	349	276	355	355	616	192	73	68	74	68	72	-0.037	5.92	0.01
130	18.875	19.604	0.15	0.15	1.70	75	0.69	1.36	76	0.3	86	0.052	99	100	8.8	0	497	298	348	276	354	355	619	194	73	69	74	68	72	-0.037	5.99	0.01
131	19.021	19.755	0.15	0.15	1.73	75	0.69	1.37	76	0.3	86	0.052	100	100	8.7	-0.1	498	298	348	275	354	355	622	196	73	69	74	68	72	-0.037	6.03	0.01
132	19.167	19.905	0.15	0.15	1.73	75	0.69	1.37	76	0.3	86	0.052	100	99	8.7	0	498	298	347	275	354	354	625	196	73	69	74	68	72	-0.037	6.11	0.01
133	19.313	20.056	0.15	0.15	1.73	75	0.69	1.37	76	0.3	86	0.052	100	100	8.7	0	498	298	347	275	353	354	628	196	73	69	74	68	72	-0.037	6.04	0.01
134	19.458	20.206	0.15	0.15	1.74	75	0.68	1.36	76	0.3	86	0.052	99	99	8.6	-0.1	499	298	346	275	353	354	631	196	73	69	74	68	72	-0.037	6.05	0.01
135	19.603	20.357	0.15	0.15	1.74	75	0.68	1.38	76	0.3	86	0.052	99	100	8.6	0	500	298	346	274	353	354	635	198	73	69	74	68	71	-0.038	6.06	0.01
136	19.749	20.508	0.15	0.15	1.74	75	0.69	1.37	76	0.3	86	0.052	100	100	8.6	0	501	298	346	274	353	354	639	201	74	69	74	68	72	-0.038	6.06	0.01
137	19.895	20.658	0.15	0.15	1.74	75	0.69	1.37	76	0.3	85	0.052	100	99	8.5	-0.1	502	297	345	274	353	354	643	203	74	69	74	68	71	-0.038	6.18	0.01
138	20.040	20.809	0.15	0.15	1.72	75	0.69	1.37	76	0.3	85	0.052	99	100	8.5	0	504	297	345	274	353	355	648	204	74	69	74	68	72	-0.038	6.21	0.01
139	20.186	20.960	0.15	0.15	1.72	75	0.68	1.37	76	0.3	86	0.052	100	100	8.5	0	505	297	345	274	353	355	652	206	73	69	74	68	72	-0.038	6.29	0.01
140	20.332	21.110	0.15	0.15	1.73	74	0.68	1.37	76	0.3	85	0.052	100	99	8.4	-0.1	507	297	344	274	352	355	656	208	74	69	74	68	72	-0.039	6.29	0.01
141	20.477	21.261	0.15	0.15	1.73	74	0.68	1.37	76	0.3	85	0.052	100	100	8.4	0	509	297	344	274	353	355	661	208	74	69	74	68	72	-0.039	6.28	0.01
142	20.622	21.412	0.15	0.15	1.74	74	0.69	1.37	76	0.3	85	0.052	100	100	8.4	0	511	297	344	274	352	356	666	212	73	69	74	68	72	-0.038	6.32	0.01
143	20.768	21.563	0.15	0.15	1.73	74	0.69	1.37	76	0.3	86	0.052	100	100	8.3	-0.1	513	297	344	274	353	356	672	212	73	69	74	68	72	-0.039	6.91	0.01
144	20.913	21.713	0.15	0.15	1.71	74	0.69	1.35	76	0.3	86	0.052	100	99	8.3	0	516	297	344	274	353	357	680	213	74	69	74	68	72	-0.039	7.43	0.01
145	21.058	21.864	0.15	0.15	1.69	74	0.69	1.37	76	0.3	86	0.052	100	100	8.3	0	519	297	344	275	353	358	686	216	74	69	74	68	71	-0.039	7.56	0.01
146	21.203	22.015	0.15	0.15	1.69	74	0.69	1.37	76	0.3	86	0.052	100	100	8.2	-0.1	522	297	344	275	354	358	684	216	74	69	74	68	72	-0.039	7.29	0.01
147	21.349	22.165	0.15	0.15	1.69	74	0.69	1.36	76	0.3	86	0.052	100	99	8.2	0	523	297	344	276	355	359	678	216	74	69	74	68	72	-0.039	7.08	0.01
148	21.494	22.316	0.15	0.15	1.72	74	0.69	1.37	76	0.3	85	0.052	100	100	8.1	-0.1	525	297	344	276	355	359	672	216	74	69	74	68	72	-0.040	6.94	0.01
149	21.640	22.467	0.15	0.15	1.72	74	0.68	1.37	76	0.3	84	0.052	100	100	8.1	0	524	296	344	277	356	359	667	216	74	69	74	68	71	-0.040	6.89	0.01
150	21.785	22.617	0.15	0.15	1.73	74	0.69	1.37	76	0.3	85	0.052	100	99	8.1	0	524	296	345	277	357	360	663	216	73	69	74	68	71	-0.040	6.85	0.01
151	21.931	22.768	0.15	0.15	1.73	74	0.69	1.37	76	0.3	85	0.052	100	100	8.0	-0.1	524	297	345	278	358	360	659	215	73	69	74	68	71	-0.040	6.75	0.01

Wood Heater Test Data - ASTM E2780 / ASTM E2515

Run: 3

Manufacturer: Valley Comfort
Model: PI29
Tracking No.: VC-18-1
Project No.: 0142WN019E
Test Date: 24-Jan-18
Beginning Clock Time: 11:17

Total Sampling Time: 597 min
Recording Interval: 1 min
Background Sample Volume: 0 cubic feet

Meter Box Y Factor: 0.997 (1) 0.981 (2) _____ (Amb)

Barometric Pressure:

Begin	Middle	End	Average
28.56	28.8	28.97	28.78 "Hg

OMNI Equipment Numbers: 410, 283A, 132, 576, 318, 432, 419, 371, 372, 296-T32, 559, 592, 637

PM Control Modules: 371/372
Dilution Tunnel MW(dry): 29.00 lb/lb-mole
Dilution Tunnel MW(wet): 28.78 lb/lb-mole
Dilution Tunnel H2O: 2.00 percent
Dilution Tunnel Static: -0.180 "H2O
Tunnel Area: 0.19635 ft2
Pitot Tube Cp: 0.99

Avg. Tunnel Velocity: 13.78 ft/sec.
Initial Tunnel Flow: 147.0 scfm
Average Tunnel Flow: 148.6 scfm
Post-Test Leak Check (1): 0.000 cfm @ -9 in. Hg
Post-Test Leak Check (2): 0.000 cfm @ -10 in. Hg
Average Test Piece Fuel Moisture: 20.61 Dry Basis %

Technician Signature: _____

Velocity Traverse Data

	Pt.1	Pt.2	Pt.3	Pt.4	Pt.5	Pt.6	Pt.7	Pt.8	Center	
Initial dP	0.034	0.052	0.034	0.028	0.038	0.048	0.050	0.032	0.052	"H2O
Temp:	77	77	77	77	77	77	77	77	77	°F

V_{strav} 13.75 ft/sec V_{scent} 15.60 ft/sec F_p 0.881

	Particulate Sampling Data														Fuel Weight (lb)		Temperature Data (°F)													Stack Gas Data		
Elapsed Time (min)	Gas Meter 1 (ft^3)	Gas Meter 2 (ft^3)	Sample Rate 1 (cfm)	Sample Rate 2 (cfm)	Orifice dH 1 ("H_2O)	Meter 1 Temp (°F)	Meter 1 Vacuum ("Hg)	Orifice dH 2 ("H_2O)	Meter 2 Temp (°F)	Meter 2 Vacuum ("Hg)	Dilution Tunnel (°F)	Dilution Tunnel Center dP	Pro. Rate 1	Pro. Rate 2	Scale Reading	Weight Change	Firebox Top	Firebox Bottom	Firebox Back	Firebox Left	Firebox Right	Avg. Stove Surface	Catalyst Exit	Stack	Filter 1	Dryer Exit 1	Filter 2	Dryer Exit 2	Ambient	Draft ("H_2O)	CO_2 (%)	CO (%)
152	22.077	22.919	0.15	0.15	1.73	74	0.69	1.37	76	0.3	85	0.052	100	100	8.0	0	524	296	345	278	358	360	656	215	73	69	74	68	71	-0.040	6.48	0
153	22.222	23.069	0.15	0.15	1.73	74	0.68	1.37	76	0.3	85	0.052	100	99	8.0	0	524	296	345	279	359	361	654	213	73	69	74	68	71	-0.039	4.73	0
154	22.367	23.220	0.15	0.15	1.74	74	0.68	1.37	76	0.3	85	0.052	100	100	7.9	-0.1	523	297	345	279	359	361	651	212	73	69	74	68	71	-0.039	5.97	0
155	22.513	23.371	0.15	0.15	1.74	74	0.68	1.37	76	0.3	85	0.052	100	100	7.9	0	523	297	346	280	360	361	648	210	73	69	74	68	71	-0.040	6.27	0
156	22.659	23.522	0.15	0.15	1.73	74	0.69	1.37	76	0.3	85	0.052	100	100	7.9	0	523	297	346	280	360	361	646	208	73	69	74	68	71	-0.039	6.23	0
157	22.805	23.672	0.15	0.15	1.73	73	0.68	1.36	76	0.3	85	0.052	100	99	7.8	-0.1	522	297	346	280	360	361	643	205	73	69	74	68	71	-0.039	6.26	0
158	22.950	23.823	0.15	0.15	1.72	73	0.68	1.37	76	0.3	84	0.052	100	100	7.8	0	522	297	346	280	361	361	641	204	73	69	74	68	71	-0.039	6.23	0
159	23.096	23.974	0.15	0.15	1.74	73	0.68	1.37	76	0.3	85	0.052	100	100	7.8	0	520	297	346	280	361	361	639	203	73	69	74	68	71	-0.039	6.11	0
160	23.241	24.125	0.15	0.15	1.73	73	0.69	1.36	76	0.3	85	0.052	100	100	7.8	0	520	297	345	280	361	361	637	200	73	69	74	68	71	-0.038	6.18	0
161	23.387	24.276	0.15	0.15	1.73	73	0.69	1.37	76	0.3	85	0.052	100	100	7.7	-0.1	519	297	345	280	361	360	635	199	73	69	74	68	71	-0.038	6.07	0
162	23.532	24.427	0.15	0.15	1.71	73	0.69	1.37	75	0.3	85	0.052	100	100	7.7	0	518	297	345	280	361	360	634	197	73	69	74	68	71	-0.038	6.09	0
163	23.678	24.577	0.15	0.15	1.70	74	0.69	1.37	76	0.3	85	0.052	100	99	7.7	0	517	298	344	280	361	360	632	196	73	69	74	68	71	-0.037	6.06	0
164	23.823	24.728	0.15	0.15	1.70	74	0.69	1.37	75	0.3	86	0.052	100	100	7.6	-0.1	516	298	344	280	362	360	630	194	73	69	74	68	72	-0.037	6.08	0
165	23.968	24.879	0.15	0.15	1.70	74	0.69	1.37	76	0.3	86	0.052	100	100	7.6	0	515	298	344	280	362	360	629	192	73	69	74	68	72	-0.037	6.08	0
166	24.113	25.029	0.15	0.15	1.70	74	0.69	1.37	75	0.3	86	0.052	100	100	7.6	0	514	298	344	280	362	360	627	190	73	69	74	68	71	-0.037	5.95	0
167	24.259	25.180	0.15	0.15	1.70	74	0.69	1.36	75	0.3	85	0.052	100	100	7.6	0	513	298	344	280	362	359	625	188	73	69	74	68	72	-0.037	5.92	0
168	24.405	25.331	0.15	0.15	1.71	74	0.69	1.37	75	0.3	85	0.052	100	100	7.5	-0.1	512	298	344	280	362	359	623	186	73	69	74	68	71	-0.037	5.9	0
169	24.550	25.482	0.15	0.15	1.73	74	0.68	1.37	75	0.3	85	0.052	100	100	7.5	0	511	298	344	280	362	359	621	185	73	69	74	68	71	-0.037	5.83	0
170	24.696	25.632	0.15	0.15	1.73	74	0.68	1.36	75	0.3	85	0.052	100	100	7.5	0	510	299	344	279	362	359	618	184	73	69	74	68	72	-0.037	5.81	0
171	24.842	25.783	0.15	0.15	1.73	74	0.69	1.37	76	0.3	85	0.052	100	100	7.5	0	508	299	343	279	362	358	616	183	73	69	74	68	72	-0.037	5.76	0
172	24.987	25.934	0.15	0.15	1.72	74	0.69	1.37	76	0.3	85	0.052	100	100	7.4	-0.1	508	299	343	279	362	358	614	182	73	69	74	68	71	-0.037	5.78	0
173	25.133	26.084	0.15	0.15	1.74	74	0.69	1.36	76	0.3	84	0.052	100	99	7.4	0	506	299	343	279	362	358	603	173	73	69	74	68	71	-0.034	5.74	0
174	25.278	26.236	0.15	0.15	1.74	74	0.69	1.36	76	0.3	83	0.052	99	101	7.4	0	503	299	342	278	361	357	578	156	73	69	74	68	72	-0.034	5.55	0
175	25.424	26.387	0.15	0.15	1.74	74	0.68	1.37	76	0.3	83	0.052	100	100	7.4	0	499	299	342	278	360	356	567	147	73	69	74	68	72	-0.033	4.55	0.01
176	25.570	26.537	0.15	0.15	1.72	74	0.69	1.37	76	0.3	83	0.052	100	99	7.4	0	494	300	341	278	360	355	554	141	73	69	74	68	72	-0.033	4.14	0.07
177	25.716	26.688	0.15	0.15	1.73	74	0.68	1.37	76	0.3	83	0.052	100	100	7.4	0	489	300	340	277	359	353	543	138	73	69	74	68	72	-0.033	4.19	0.09
178	25.861	26.839	0.15	0.15	1.73	74	0.68	1.37	76	0.3	83	0.052	99	100	7.4	0	484	300	339	276	357	351	534	136	73	69	74	68	72	-0.033	4.21	0.04
179	26.007	26.990	0.15	0.15	1.73	74	0.69	1.36	75	0.3	83	0.052	100	100	7.4	0	479	300	338	275	356	350	527	135	73	69	74	68	71	-0.033	4.21	0.02
180	26.152	27.140	0.15	0.15	1.73	73	0.69	1.36	75	0.3	83	0.052	100	99	7.4	0	474	300	337	274	355	348	521	134	73	69	74	68	71	-0.032	4.02	0.01
181	26.298	27.292	0.15	0.15	1.73	73	0.69	1.37	75	0.3	82	0.052	100	101	7.3	-0.1	469	300	336	273	353	346	516	133	73	69	74	68	72	-0.033	3.93	0.01
182	26.443	27.442	0.15	0.15	1.72	73	0.69	1.37	75	0.3	82	0.052	100	99	7.3	0	465	300	335	272	351	345	512	133	73	69	74	68	72	-0.033	3.83	0.01
183	26.589	27.592	0.15	0.15	1.69	73	0.69	1.36	75	0.3	82	0.052	100	99	7.3	0	461	300	334	271	350	343	508	133	73	69	73	68	71	-0.032	3.79	0.01
184	26.734	27.744	0.15	0.15	1.69	73	0.69	1.37	75	0.3	82	0.052	100	101	7.3	0	457	299	332	270	348	341	506	133	73	69	73	68	72	-0.032	3.81	0
185	26.879	27.895	0.15	0.15	1.68	73	0.69	1.37	75	0.3	82	0.052	100	100	7.3	0	453	299	331	268	346	339	504	132	73	69	73	68	71	-0.032	3.86	0
186	27.025	28.045	0.15	0.15	1.69	73	0.69	1.36	75	0.3	82	0.052	100	99	7.3	0	450	299	330	267	344	338	503	133	73	69	73	68	71	-0.032	3.91	0
187	27.170	28.197	0.15	0.15	1.72	73	0.69	1.37	75	0.3	82	0.052	100	101	7.3	0	446	298	329	266	343	336	502	134	73	69	73	68	71	-0.032	3.95	0
188	27.316	28.347	0.15	0.15	1.72	73	0.69	1.37	75	0.3	81	0.052	100	99	7.2	-0.1	443	298	328	265	341	335	503	134	73	69	73	68	71	-0.032	4.08	0
189	27.462	28.498	0.15	0.15	1.73	73	0.68	1.37	75	0.3	81	0.052	100	100	7.2	0	441	297	326	264	340	334	505	135	73	69	73	68	71	-0.026	4.25	0

Wood Heater Test Data - ASTM E2780 / ASTM E2515

Run: 3

Manufacturer: Valley Comfort
Model: PI29
Tracking No.: VC-18-1
Project No.: 0142WN019E
Test Date: 24-Jan-18
Beginning Clock Time: 11:17

Total Sampling Time: 597 min
Recording Interval: 1 min
Background Sample Volume: 0 cubic feet

Meter Box Y Factor: 0.997 (1) 0.981 (2) _____ (Amb)

Barometric Pressure:

Begin	Middle	End	Average
28.56	28.8	28.97	28.78 "Hg

OMNI Equipment Numbers: 410, 283A, 132, 576, 318, 432, 419, 371, 372, 296-T32, 559, 592, 637

PM Control Modules: 371/372
Dilution Tunnel MW(dry): 29.00 lb/lb-mole
Dilution Tunnel MW(wet): 28.78 lb/lb-mole
Dilution Tunnel H2O: 2.00 percent
Dilution Tunnel Static: -0.180 "H2O
Tunnel Area: 0.19635 ft2
Pitot Tube Cp: 0.99

Avg. Tunnel Velocity: 13.78 ft/sec.
Initial Tunnel Flow: 147.0 scfm
Average Tunnel Flow: 148.6 scfm
Post-Test Leak Check (1): 0.000 cfm @ -9 in. Hg
Post-Test Leak Check (2): 0.000 cfm @ -10 in. Hg
Average Test Piece Fuel Moisture: 20.61 Dry Basis %

Technician Signature: _____

Velocity Traverse Data

	Pt.1	Pt.2	Pt.3	Pt.4	Pt.5	Pt.6	Pt.7	Pt.8	Center	
Initial dP	0.034	0.052	0.034	0.028	0.038	0.048	0.050	0.032	0.052	"H2O
Temp:	77	77	77	77	77	77	77	77	77	°F

V_{strav} 13.75 ft/sec V_{scent} 15.60 ft/sec F_p 0.881

	Particulate Sampling Data														Fuel Weight (lb)		Temperature Data (°F)													Stack Gas Data		
Elapsed Time (min)	Gas Meter 1 (ft^3)	Gas Meter 2 (ft^3)	Sample Rate 1 (cfm)	Sample Rate 2 (cfm)	Orifice dH 1 ("H_2O)	Meter 1 Temp (°F)	Meter 1 Vacuum ("Hg)	Orifice dH 2 ("H_2O)	Meter 2 Temp (°F)	Meter 2 Vacuum ("Hg)	Dilution Tunnel (°F)	Dilution Tunnel Center dP	Pro. Rate 1	Pro. Rate 2	Scale Reading	Weight Change	Firebox Top	Firebox Bottom	Firebox Back	Firebox Left	Firebox Right	Avg. Stove Surface	Catalyst Exit	Stack	Filter 1	Dryer Exit 1	Filter 2	Dryer Exit 2	Ambient	Draft ("H_2O)	CO_2 (%)	CO (%)
190	27.608	28.649	0.15	0.15	1.73	73	0.69	1.37	75	0.3	81	0.052	100	100	7.2	0	439	296	325	262	338	332	507	136	73	69	73	68	71	-0.032	4.39	0
191	27.754	28.799	0.15	0.15	1.73	73	0.68	1.37	75	0.3	81	0.052	100	99	7.2	0	437	296	324	261	336	331	511	136	73	69	73	68	71	-0.032	4.54	0
192	27.899	28.950	0.15	0.15	1.72	73	0.68	1.37	75	0.3	81	0.052	99	100	7.2	0	435	296	323	260	335	330	515	136	73	69	73	68	71	-0.032	4.65	0
193	28.045	29.101	0.15	0.15	1.74	73	0.68	1.37	75	0.3	81	0.052	100	100	7.2	0	434	295	321	259	333	328	519	138	73	69	73	68	71	-0.032	4.73	0
194	28.191	29.252	0.15	0.15	1.74	73	0.68	1.37	75	0.3	81	0.052	100	100	7.1	-0.1	433	294	320	258	332	327	523	138	73	69	73	68	71	-0.032	4.8	0
195	28.337	29.403	0.15	0.15	1.74	73	0.69	1.37	75	0.3	81	0.052	100	100	7.1	0	433	294	319	257	331	327	527	140	73	69	73	68	71	-0.032	4.87	0
196	28.482	29.554	0.15	0.15	1.74	73	0.69	1.35	75	0.3	81	0.052	99	100	7.1	0	432	293	318	256	329	326	530	142	73	69	73	68	71	-0.032	4.86	0
197	28.628	29.705	0.15	0.15	1.73	73	0.68	1.38	75	0.3	81	0.052	100	100	7.1	0	432	292	317	254	328	325	533	143	73	69	73	68	71	-0.032	4.92	0
198	28.774	29.856	0.15	0.15	1.73	73	0.68	1.37	75	0.3	81	0.052	100	100	7.1	0	431	292	316	253	327	324	535	143	73	69	73	68	71	-0.032	5.02	0
199	28.920	30.006	0.15	0.15	1.73	73	0.69	1.35	75	0.3	81	0.052	100	99	7.1	0	431	291	315	252	326	323	537	145	73	69	73	68	71	-0.032	5.1	0
200	29.065	30.158	0.15	0.15	1.74	73	0.69	1.37	75	0.3	81	0.052	99	101	7.0	-0.1	431	290	314	251	325	322	539	146	73	69	73	68	71	-0.032	5.17	0
201	29.211	30.309	0.15	0.15	1.74	73	0.69	1.37	75	0.3	81	0.052	100	100	7.0	0	431	289	313	250	324	321	541	147	73	69	73	68	71	-0.032	5.22	0
202	29.357	30.459	0.15	0.15	1.74	73	0.69	1.36	75	0.3	80	0.052	100	99	7.0	0	431	288	312	249	323	321	543	149	73	69	73	68	71	-0.032	5.3	0
203	29.502	30.610	0.15	0.15	1.73	73	0.69	1.37	75	0.3	80	0.052	99	100	7.0	0	430	288	311	249	322	320	544	150	73	69	73	68	71	-0.032	5.31	0
204	29.648	30.762	0.15	0.15	1.70	73	0.69	1.37	75	0.3	80	0.052	100	100	7.0	0	430	287	311	248	322	320	545	149	73	69	73	68	71	-0.032	5.26	0
205	29.793	30.912	0.15	0.15	1.70	73	0.69	1.37	75	0.3	80	0.052	99	99	7.0	0	430	286	310	247	321	319	545	150	73	69	73	68	71	-0.032	5.25	0
206	29.939	31.063	0.15	0.15	1.70	73	0.69	1.37	75	0.3	81	0.052	100	100	7.0	0	430	285	309	246	320	318	545	154	72	69	73	68	70	-0.032	5.25	0
207	30.084	31.214	0.15	0.15	1.70	73	0.69	1.37	75	0.3	81	0.052	99	100	6.9	-0.1	429	285	308	245	320	317	545	153	72	69	73	68	70	-0.032	5.27	0
208	30.230	31.365	0.15	0.15	1.71	73	0.69	1.36	75	0.3	80	0.052	100	100	6.9	0	429	284	308	244	319	317	544	153	72	69	73	68	71	-0.032	5.24	0
209	30.376	31.516	0.15	0.15	1.71	73	0.69	1.36	75	0.3	80	0.052	100	100	6.9	0	428	284	307	244	319	316	542	154	72	69	73	68	70	-0.032	5.2	0
210	30.522	31.667	0.15	0.15	1.71	73	0.69	1.37	75	0.3	80	0.052	100	100	6.9	0	427	284	307	243	318	316	540	154	72	69	72	68	71	-0.032	5.19	0
211	30.667	31.818	0.15	0.15	1.73	73	0.69	1.36	75	0.3	80	0.052	99	100	6.9	0	427	283	306	242	318	315	539	155	72	69	72	68	70	-0.032	5.12	0
212	30.813	31.969	0.15	0.15	1.74	73	0.68	1.36	75	0.3	80	0.052	100	100	6.9	0	426	283	306	241	317	315	537	156	72	69	72	68	71	-0.032	5.14	0
213	30.959	32.120	0.15	0.15	1.74	73	0.69	1.37	75	0.3	80	0.052	100	100	6.9	0	425	283	305	241	317	314	535	157	72	69	72	68	71	-0.032	5.14	0
214	31.105	32.271	0.15	0.15	1.74	72	0.68	1.37	75	0.3	80	0.052	100	100	6.9	0	424	282	304	240	317	313	533	157	72	69	72	68	71	-0.032	5.14	0
215	31.250	32.421	0.15	0.15	1.74	72	0.69	1.36	75	0.3	80	0.052	100	99	6.8	-0.1	423	282	304	240	316	313	531	158	72	69	72	68	71	-0.032	5.11	0
216	31.396	32.573	0.15	0.15	1.74	72	0.69	1.37	75	0.3	80	0.052	100	100	6.8	0	422	282	303	239	316	312	529	158	72	69	72	68	70	-0.032	5.1	0
217	31.542	32.724	0.15	0.15	1.74	72	0.69	1.37	75	0.3	80	0.052	100	100	6.8	0	421	281	303	239	316	312	527	158	72	69	72	68	71	-0.032	5.1	0
218	31.688	32.874	0.15	0.15	1.73	73	0.69	1.36	75	0.3	80	0.052	100	99	6.8	0	420	281	303	239	315	312	524	158	72	69	72	68	70	-0.032	5.06	0
219	31.834	33.026	0.15	0.15	1.73	72	0.69	1.38	75	0.3	80	0.052	100	100	6.8	0	419	280	302	238	315	311	522	158	72	69	72	68	70	-0.032	4.99	0
220	31.980	33.177	0.15	0.15	1.72	73	0.69	1.37	75	0.3	80	0.052	100	100	6.8	0	418	280	302	238	315	311	519	158	72	69	72	68	70	-0.032	4.94	0
221	32.126	33.327	0.15	0.15	1.74	72	0.69	1.37	75	0.3	80	0.052	100	99	6.8	0	416	280	301	238	315	310	517	157	72	69	72	68	71	-0.032	4.9	0
222	32.271	33.478	0.15	0.15	1.74	73	0.69	1.37	75	0.3	80	0.052	99	100	6.8	0	415	279	301	238	314	309	514	157	72	69	72	68	70	-0.032	4.89	0
223	32.417	33.629	0.15	0.15	1.74	73	0.69	1.38	75	0.3	80	0.052	100	100	6.8	0	414	279	300	237	314	309	512	158	72	69	72	68	71	-0.032	4.89	0
224	32.562	33.780	0.14	0.15	1.74	73	0.69	1.37	75	0.3	80	0.052	99	100	6.7	-0.1	412	278	300	237	313	308	509	157	72	69	72	68	70	-0.032	4.83	0
225	32.708	33.931	0.15	0.15	1.71	73	0.69	1.37	75	0.3	80	0.052	100	100	6.7	0	411	278	299	236	313	307	507	158	72	69	72	68	70	-0.032	4.84	0
226	32.854	34.082	0.15	0.15	1.71	73	0.69	1.37	75	0.3	80	0.052	100	100	6.7	0	409	277	299	236	313	307	505	157	72	69	72	68	71	-0.031	4.87	0
227	33.000	34.233	0.15	0.15	1.71	73	0.69	1.36	75	0.3	80	0.052	100	100	6.7	0	408	276	298	236	312	306	503	157	72	69	72	68	71	-0.032	4.84	0

Wood Heater Test Data - ASTM E2780 / ASTM E2515

Run: 3

Manufacturer: Valley Comfort
Model: PI29
Tracking No.: VC-18-1
Project No.: 0142WN019E
Test Date: 24-Jan-18
Beginning Clock Time: 11:17

Total Sampling Time: 597 min
Recording Interval: 1 min
Background Sample Volume: 0 cubic feet

Meter Box Y Factor: 0.997 (1) 0.981 (2) _____ (Amb)

Barometric Pressure:

Begin	Middle	End	Average
28.56	28.8	28.97	28.78 "Hg

OMNI Equipment Numbers: 410, 283A, 132, 576, 318, 432, 419, 371, 372, 296-T32, 559, 592, 637

PM Control Modules: 371/372
Dilution Tunnel MW(dry): 29.00 lb/lb-mole
Dilution Tunnel MW(wet): 28.78 lb/lb-mole
Dilution Tunnel H2O: 2.00 percent
Dilution Tunnel Static: -0.180 "H2O
Tunnel Area: 0.19635 ft2
Pitot Tube Cp: 0.99

Avg. Tunnel Velocity: 13.78 ft/sec.
Initial Tunnel Flow: 147.0 scfm
Average Tunnel Flow: 148.6 scfm
Post-Test Leak Check (1): 0.000 cfm @ -9 in. Hg
Post-Test Leak Check (2): 0.000 cfm @ -10 in. Hg
Average Test Piece Fuel Moisture: 20.61 Dry Basis %

Technician Signature: _____

Velocity Traverse Data

	Pt.1	Pt.2	Pt.3	Pt.4	Pt.5	Pt.6	Pt.7	Pt.8	Center	
Initial dP	0.034	0.052	0.034	0.028	0.038	0.048	0.050	0.032	0.052	"H2O
Temp:	77	77	77	77	77	77	77	77	77	°F

V_{strav} 13.75 ft/sec V_{scent} 15.60 ft/sec F_p 0.881

	Particulate Sampling Data														Fuel Weight (lb)		Temperature Data (°F)													Stack Gas Data		
Elapsed Time (min)	Gas Meter 1 (ft^3)	Gas Meter 2 (ft^3)	Sample Rate 1 (cfm)	Sample Rate 2 (cfm)	Orifice dH 1 ("H_2O)	Meter 1 Temp (°F)	Meter 1 Vacuum ("Hg)	Orifice dH 2 ("H_2O)	Meter 2 Temp (°F)	Meter 2 Vacuum ("Hg)	Dilution Tunnel (°F)	Dilution Tunnel Center dP	Pro. Rate 1	Pro. Rate 2	Scale Reading	Weight Change	Firebox Top	Firebox Bottom	Firebox Back	Firebox Left	Firebox Right	Avg. Stove Surface	Catalyst Exit	Stack	Filter 1	Dryer Exit 1	Filter 2	Dryer Exit 2	Ambient	Draft ("H_2O)	CO_2 (%)	CO (%)
228	33.145	34.384	0.15	0.15	1.70	73	0.69	1.36	75	0.3	80	0.052	99	100	6.7	0	406	276	298	236	312	306	500	155	72	69	72	68	71	-0.031	4.82	0
229	33.290	34.536	0.14	0.15	1.70	73	0.69	1.37	75	0.3	80	0.052	99	100	6.7	0	405	276	298	235	311	305	498	155	72	69	72	68	71	-0.031	4.7	0
230	33.436	34.687	0.15	0.15	1.70	73	0.69	1.36	75	0.3	80	0.052	100	100	6.7	0	404	275	297	235	311	304	496	155	72	69	72	68	71	-0.032	4.7	0
231	33.582	34.838	0.15	0.15	1.70	73	0.69	1.36	75	0.3	80	0.052	100	100	6.7	0	402	275	297	235	310	304	494	154	72	69	72	68	71	-0.031	4.75	0
232	33.728	34.989	0.15	0.15	1.73	73	0.68	1.37	75	0.3	80	0.052	100	100	6.7	0	400	275	296	235	310	303	492	155	72	69	72	68	71	-0.031	4.72	0
233	33.874	35.140	0.15	0.15	1.73	73	0.68	1.37	75	0.3	80	0.052	100	100	6.7	0	399	274	295	235	309	302	490	154	72	69	72	68	70	-0.031	4.66	0
234	34.020	35.290	0.15	0.15	1.73	73	0.68	1.36	75	0.3	80	0.052	100	99	6.7	0	398	274	295	235	309	302	488	154	72	69	72	68	71	-0.031	4.64	0
235	34.166	35.442	0.15	0.15	1.73	73	0.68	1.38	75	0.3	80	0.052	100	100	6.6	-0.1	396	273	294	235	308	301	486	155	72	69	72	68	71	-0.031	4.61	0
236	34.311	35.593	0.15	0.15	1.73	73	0.69	1.38	75	0.3	80	0.052	99	100	6.6	0	395	273	294	234	307	301	484	156	72	69	72	68	70	-0.031	4.56	0
237	34.457	35.743	0.15	0.15	1.73	73	0.69	1.36	75	0.3	80	0.052	100	99	6.6	0	394	272	294	234	307	300	483	155	72	69	72	68	70	-0.032	4.66	0
238	34.603	35.895	0.15	0.15	1.73	73	0.68	1.38	75	0.3	80	0.052	100	100	6.6	0	392	272	293	234	306	299	481	155	72	69	72	68	71	-0.032	4.68	0
239	34.748	36.046	0.14	0.15	1.74	73	0.69	1.37	75	0.3	80	0.052	99	100	6.6	0	391	271	293	234	305	299	480	156	72	69	72	68	71	-0.031	4.68	0
240	34.894	36.196	0.15	0.15	1.74	73	0.69	1.37	75	0.3	80	0.052	100	99	6.6	0	390	271	293	234	305	299	480	156	72	69	72	68	71	-0.031	4.7	0
241	35.040	36.348	0.15	0.15	1.74	73	0.69	1.37	75	0.3	80	0.052	100	100	6.6	0	389	271	292	234	304	298	479	156	72	69	72	68	70	-0.031	4.72	0
242	35.186	36.499	0.15	0.15	1.73	73	0.69	1.37	75	0.3	80	0.052	100	100	6.6	0	388	270	292	234	304	298	479	157	72	69	72	68	70	-0.032	4.77	0
243	35.332	36.649	0.15	0.15	1.73	73	0.68	1.37	75	0.3	80	0.052	100	99	6.6	0	387	270	292	234	303	297	480	157	72	69	72	68	71	-0.032	4.8	0
244	35.478	36.800	0.15	0.15	1.73	73	0.69	1.38	75	0.3	80	0.052	100	100	6.6	0	386	270	291	234	303	297	480	157	72	69	72	68	71	-0.032	4.85	0.01
245	35.623	36.952	0.14	0.15	1.73	73	0.69	1.38	75	0.3	80	0.052	99	100	6.6	0	385	270	291	234	303	297	481	158	72	69	72	68	71	-0.032	4.89	0
246	35.769	37.102	0.15	0.15	1.74	73	0.69	1.37	75	0.3	80	0.052	100	99	6.5	-0.1	385	269	291	234	302	296	482	158	72	69	72	68	70	-0.032	4.97	0.01
247	35.915	37.253	0.15	0.15	1.74	73	0.69	1.36	75	0.3	80	0.052	100	100	6.5	0	385	269	291	234	302	296	484	159	72	69	72	68	71	-0.032	5.03	0.01
248	36.061	37.404	0.15	0.15	1.75	73	0.69	1.38	75	0.3	79	0.052	100	100	6.5	0	384	267	290	234	302	295	485	159	72	69	72	68	70	-0.032	5.05	0.01
249	36.206	37.556	0.15	0.15	1.71	73	0.69	1.36	75	0.3	79	0.052	99	100	6.5	0	384	266	290	234	302	295	487	160	72	69	72	68	70	-0.032	5.05	0
250	36.352	37.706	0.15	0.15	1.71	73	0.69	1.36	75	0.3	79	0.052	100	99	6.5	0	384	266	290	233	301	295	489	160	72	69	72	68	70	-0.032	5.12	0
251	36.497	37.858	0.15	0.15	1.71	73	0.69	1.38	75	0.3	79	0.052	99	100	6.5	0	384	265	290	233	301	295	491	161	72	69	72	68	70	-0.032	5.15	0
252	36.643	38.009	0.15	0.15	1.71	73	0.69	1.37	75	0.3	78	0.052	100	100	6.5	0	384	263	290	233	301	294	493	162	72	69	72	68	70	-0.032	5.18	0
253	36.788	38.159	0.14	0.15	1.71	72	0.69	1.37	75	0.3	78	0.052	99	99	6.4	-0.1	384	262	290	233	301	294	494	162	72	69	72	68	69	-0.032	5.24	0
254	36.934	38.311	0.15	0.15	1.71	72	0.69	1.37	75	0.3	78	0.052	100	100	6.4	0	385	263	290	233	301	294	496	162	71	69	72	68	70	-0.032	5.26	0
255	37.080	38.462	0.15	0.15	1.71	72	0.69	1.37	75	0.3	79	0.052	100	100	6.4	0	385	264	290	233	301	295	498	162	71	69	72	68	70	-0.032	5.29	0
256	37.226	38.613	0.15	0.15	1.74	72	0.69	1.36	75	0.3	79	0.052	100	100	6.4	0	386	265	290	233	301	295	500	163	71	69	72	68	70	-0.032	5.31	0
257	37.372	38.764	0.15	0.15	1.73	72	0.69	1.38	75	0.3	79	0.052	100	100	6.4	0	386	265	290	233	301	295	502	163	71	69	72	68	70	-0.032	5.39	0
258	37.518	38.915	0.15	0.15	1.73	72	0.68	1.37	75	0.3	80	0.052	100	100	6.4	0	387	266	290	233	301	295	504	164	71	68	72	68	70	-0.032	5.46	0
259	37.664	39.065	0.15	0.15	1.74	72	0.69	1.36	75	0.3	80	0.052	100	99	6.4	0	388	266	290	233	302	296	506	164	71	68	72	68	70	-0.032	5.57	0
260	37.810	39.217	0.15	0.15	1.74	72	0.68	1.37	75	0.3	80	0.052	100	100	6.4	0	388	266	291	234	302	296	509	165	71	68	72	68	70	-0.032	5.57	0.01
261	37.955	39.368	0.14	0.15	1.74	72	0.69	1.37	75	0.3	80	0.052	100	100	6.4	0	389	267	291	234	302	297	511	167	71	68	72	68	70	-0.032	5.68	0.01
262	38.101	39.518	0.15	0.15	1.74	72	0.69	1.37	75	0.3	80	0.052	100	99	6.3	-0.1	390	267	291	234	302	297	513	166	71	68	72	68	70	-0.032	5.69	0.01
263	38.247	39.670	0.15	0.15	1.74	72	0.68	1.37	75	0.3	80	0.052	100	100	6.3	0	391	266	292	234	303	297	516	168	71	68	72	68	69	-0.033	5.67	0.01
264	38.393	39.821	0.15	0.15	1.74	72	0.69	1.37	75	0.3	79	0.052	100	100	6.3	0	393	265	294	235	304	298	520	168	71	68	72	68	69	-0.032	5.75	0.01
265	38.539	39.972	0.15	0.15	1.74	72	0.69	1.37	75	0.3	78	0.052	100	100	6.3	0	394	263	296	235	305	299	525	170	71	68	72	68	69	-0.033	6.21	0.01

Wood Heater Test Data - ASTM E2780 / ASTM E2515

Run: 3

Manufacturer: Valley Comfort
Model: PI29
Tracking No.: VC-18-1
Project No.: 0142WN019E
Test Date: 24-Jan-18
Beginning Clock Time: 11:17

Total Sampling Time: 597 min
Recording Interval: 1 min
Background Sample Volume: 0 cubic feet

Meter Box Y Factor: 0.997 (1) 0.981 (2) _____ (Amb)

Barometric Pressure:

Begin	Middle	End	Average
28.56	28.8	28.97	28.78 "Hg

OMNI Equipment Numbers: 410, 283A, 132, 576, 318, 432, 419, 371, 372, 296-T32, 559, 592, 637

PM Control Modules: 371/372
Dilution Tunnel MW(dry): 29.00 lb/lb-mole
Dilution Tunnel MW(wet): 28.78 lb/lb-mole
Dilution Tunnel H2O: 2.00 percent
Dilution Tunnel Static: -0.180 "H2O
Tunnel Area: 0.19635 ft2
Pitot Tube Cp: 0.99

Avg. Tunnel Velocity: 13.78 ft/sec.
Initial Tunnel Flow: 147.0 scfm
Average Tunnel Flow: 148.6 scfm
Post-Test Leak Check (1): 0.000 cfm @ -9 in. Hg
Post-Test Leak Check (2): 0.000 cfm @ -10 in. Hg
Average Test Piece Fuel Moisture: 20.61 Dry Basis %

Technician Signature: _____

Velocity Traverse Data

	Pt.1	Pt.2	Pt.3	Pt.4	Pt.5	Pt.6	Pt.7	Pt.8	Center	
Initial dP	0.034	0.052	0.034	0.028	0.038	0.048	0.050	0.032	0.052	"H2O
Temp:	77	77	77	77	77	77	77	77	77	°F

V_{strav} 13.75 ft/sec V_{scent} 15.60 ft/sec F_p 0.881

	Particulate Sampling Data														Fuel Weight (lb)		Temperature Data (°F)												Stack Gas Data		
Elapsed Time (min)	Gas Meter 1 (ft^3)	Gas Meter 2 (ft^3)	Sample Rate 1 (cfm)	Sample Rate 2 (cfm)	Orifice dH 1 ("H_2O)	Meter 1 Temp (°F)	Meter 1 Vacuum ("Hg)	Orifice dH 2 ("H_2O)	Meter 2 Temp (°F)	Meter 2 Vacuum ("Hg)	Dilution Tunnel (°F)	Dilution Tunnel Center dP	Pro. Rate 1	Pro. Rate 2	Scale Reading	Weight Change	Firebox Top	Firebox Bottom	Firebox Back	Firebox Left	Firebox Right	Avg. Stove Surface	Catalyst Exit	Stack	Filter 1	Dryer Exit 1	Filter 2	Dryer Exit 2	Ambient	Draft ("H_2O)	CO_2 (%)	CO (%)
266	38.685	40.123	0.15	0.15	1.74	72	0.69	1.36	75	0.3	79	0.052	100	100	6.3	0	396	265	298	236	307	300	533	170	71	68	72	68	70	-0.032	6.96	0.01
267	38.830	40.274	0.14	0.15	1.73	72	0.69	1.38	75	0.3	79	0.052	99	100	6.2	-0.1	399	266	300	237	308	302	545	171	71	68	72	68	70	-0.032	7.19	0.01
268	38.976	40.425	0.15	0.15	1.74	72	0.69	1.37	75	0.3	80	0.052	100	100	6.2	0	402	267	302	238	309	304	557	173	71	68	72	68	70	-0.032	7.25	0.01
269	39.122	40.575	0.15	0.15	1.74	72	0.69	1.37	75	0.3	80	0.052	100	99	6.2	0	406	268	303	238	311	305	569	173	71	68	72	68	70	-0.033	7.38	0.01
270	39.267	40.727	0.15	0.15	1.74	72	0.69	1.38	75	0.3	80	0.052	100	100	6.2	0	410	268	305	239	313	307	580	175	71	68	72	68	70	-0.033	7.47	0.01
271	39.413	40.878	0.15	0.15	1.73	72	0.69	1.37	75	0.3	80	0.052	100	100	6.1	-0.1	415	269	307	240	314	309	590	178	71	68	72	68	70	-0.033	7.46	0.01
272	39.559	41.028	0.15	0.15	1.72	72	0.69	1.36	75	0.3	80	0.052	100	99	6.1	0	419	269	309	241	316	311	598	180	71	68	72	68	70	-0.033	7.53	0.01
273	39.705	41.180	0.15	0.15	1.71	72	0.69	1.38	75	0.3	80	0.052	100	100	6.1	0	424	270	310	242	317	313	605	180	71	68	72	68	70	-0.033	7.55	0.01
274	39.850	41.331	0.15	0.15	1.70	72	0.69	1.37	75	0.3	80	0.052	100	100	6.1	0	429	271	312	243	319	315	611	180	71	68	72	68	70	-0.033	7.42	0.01
275	39.995	41.482	0.14	0.15	1.70	72	0.69	1.36	75	0.3	80	0.052	100	100	6.1	0	433	271	314	244	320	316	615	183	71	68	72	68	70	-0.034	7.5	0.01
276	40.141	41.633	0.15	0.15	1.70	72	0.69	1.37	75	0.3	81	0.052	100	100	6.0	-0.1	437	272	315	246	322	318	619	184	71	68	72	68	70	-0.034	7.52	0.01
277	40.286	41.784	0.15	0.15	1.71	72	0.69	1.37	75	0.3	81	0.052	100	100	6.0	0	441	272	317	247	324	320	622	185	71	68	72	68	70	-0.034	7.43	0.01
278	40.432	41.934	0.15	0.15	1.71	72	0.69	1.37	75	0.3	81	0.052	100	99	6.0	0	445	273	318	248	325	322	625	186	71	68	72	68	70	-0.034	7.33	0.01
279	40.579	42.086	0.15	0.15	1.72	72	0.69	1.37	75	0.3	81	0.052	101	101	6.0	0	449	274	319	249	327	324	626	186	71	68	72	68	70	-0.034	7.3	0.01
280	40.724	42.237	0.14	0.15	1.74	72	0.69	1.37	75	0.3	81	0.052	100	100	5.9	-0.1	453	274	320	250	328	325	627	186	71	68	72	68	70	-0.034	7.38	0.01
281	40.870	42.387	0.15	0.15	1.74	72	0.68	1.37	75	0.3	81	0.052	100	99	5.9	0	456	274	321	251	330	326	627	186	71	68	72	68	70	-0.034	7.25	0.01
282	41.016	42.539	0.15	0.15	1.74	72	0.68	1.37	75	0.3	81	0.052	100	101	5.9	0	458	275	322	252	332	328	627	186	71	68	72	68	70	-0.034	7.15	0.01
283	41.162	42.690	0.15	0.15	1.74	72	0.68	1.37	75	0.3	81	0.052	100	100	5.9	0	461	275	323	253	333	329	627	186	71	68	72	68	70	-0.034	7.19	0.01
284	41.308	42.841	0.15	0.15	1.74	72	0.69	1.37	75	0.3	81	0.052	100	100	5.9	0	463	275	325	253	335	330	626	185	71	68	72	68	70	-0.034	7.21	0.01
285	41.453	42.992	0.15	0.15	1.74	72	0.69	1.36	75	0.3	81	0.052	100	100	5.8	-0.1	465	276	326	254	336	331	625	184	71	68	72	68	70	-0.034	7.12	0.01
286	41.599	43.143	0.15	0.15	1.74	72	0.68	1.37	75	0.3	81	0.052	100	100	5.8	0	467	276	327	255	338	333	623	183	71	68	72	68	70	-0.034	7.01	0.01
287	41.745	43.294	0.15	0.15	1.74	72	0.68	1.37	75	0.3	81	0.052	100	100	5.8	0	468	277	328	256	339	334	622	181	71	68	72	68	70	-0.034	6.91	0.01
288	41.891	43.444	0.15	0.15	1.73	72	0.68	1.36	75	0.3	82	0.052	100	99	5.8	0	470	277	329	257	340	335	620	181	72	68	72	68	70	-0.034	6.83	0.01
289	42.037	43.596	0.15	0.15	1.73	73	0.68	1.37	75	0.3	82	0.052	100	101	5.8	0	471	277	330	258	342	336	617	179	72	68	72	68	70	-0.034	6.82	0.01
290	42.183	43.747	0.15	0.15	1.74	73	0.69	1.37	75	0.3	83	0.052	100	100	5.7	-0.1	471	278	331	258	343	336	614	179	72	68	72	68	71	-0.033	6.79	0.01
291	42.328	43.897	0.15	0.15	1.73	73	0.69	1.36	75	0.3	83	0.052	100	99	5.7	0	472	278	332	259	344	337	611	178	72	68	72	68	71	-0.033	6.74	0.01
292	42.474	44.049	0.15	0.15	1.73	73	0.69	1.38	75	0.3	83	0.052	100	101	5.7	0	472	279	333	260	345	338	608	175	72	68	72	68	71	-0.034	6.75	0.01
293	42.619	44.199	0.15	0.15	1.73	74	0.68	1.37	75	0.3	84	0.052	99	99	5.7	0	472	280	334	261	346	339	605	175	72	68	72	68	71	-0.033	6.62	0.01
294	42.765	44.350	0.15	0.15	1.70	74	0.69	1.36	75	0.3	84	0.052	100	100	5.7	0	472	280	335	261	347	339	601	173	72	68	72	68	71	-0.033	6.53	0.01
295	42.911	44.501	0.15	0.15	1.70	74	0.69	1.37	75	0.3	84	0.052	100	100	5.6	-0.1	472	280	335	262	347	339	597	172	72	68	72	68	71	-0.033	6.49	0.01
296	43.056	44.652	0.14	0.15	1.70	74	0.69	1.37	75	0.3	84	0.052	99	100	5.6	0	471	280	336	262	348	339	594	171	72	68	72	68	71	-0.032	6.43	0.01
297	43.201	44.803	0.15	0.15	1.69	75	0.69	1.37	75	0.3	85	0.052	99	100	5.6	0	470	280	336	262	349	339	590	170	72	68	72	68	71	-0.032	6.4	0.01
298	43.346	44.954	0.14	0.15	1.70	75	0.69	1.37	75	0.3	85	0.052	99	100	5.6	0	469	281	336	263	349	340	586	168	72	68	72	68	71	-0.032	6.33	0.01
299	43.492	45.105	0.15	0.15	1.69	75	0.69	1.37	75	0.3	85	0.052	100	100	5.6	0	468	281	337	263	350	340	582	167	72	68	72	68	71	-0.032	6.28	0.01
300	43.638	45.255	0.15	0.15	1.69	76	0.69	1.37	76	0.3	85	0.052	100	99	5.6	0	466	282	337	263	350	340	578	166	72	68	73	68	71	-0.032	6.18	0.01
301	43.783	45.406	0.15	0.15	1.72	76	0.68	1.37	76	0.3	85	0.052	99	100	5.6	0	465	282	337	263	350	339	574	165	72	68	73	68	71	-0.032	6.05	0.01
302	43.929	45.557	0.15	0.15	1.73	76	0.68	1.38	76	0.3	85	0.052	100	100	5.5	-0.1	463	282	338	263	350	339	570	164	72	68	73	68	71	-0.032	6.1	0.01
303	44.075	45.708	0.15	0.15	1.72	77	0.68	1.37	76	0.3	85	0.052	100	100	5.5	0	462	282	338	263	350	339	566	164	72	68	73	68	71	-0.032	6.06	0.01

Wood Heater Test Data - ASTM E2780 / ASTM E2515

Run: 3

Manufacturer: Valley Comfort
Model: PI29
Tracking No.: VC-18-1
Project No.: 0142WN019E
Test Date: 24-Jan-18
Beginning Clock Time: 11:17

Total Sampling Time: 597 min
Recording Interval: 1 min
Background Sample Volume: 0 cubic feet

Meter Box Y Factor: 0.997 (1) 0.981 (2) _____ (Amb)

Barometric Pressure:

Begin	Middle	End	Average
28.56	28.8	28.97	28.78 "Hg

OMNI Equipment Numbers: 410, 283A, 132, 576, 318, 432, 419, 371, 372, 296-T32, 559, 592, 637

PM Control Modules: 371/372
Dilution Tunnel MW(dry): 29.00 lb/lb-mole
Dilution Tunnel MW(wet): 28.78 lb/lb-mole
Dilution Tunnel H2O: 2.00 percent
Dilution Tunnel Static: -0.180 "H2O
Tunnel Area: 0.19635 ft2
Pitot Tube Cp: 0.99

Avg. Tunnel Velocity: 13.78 ft/sec.
Initial Tunnel Flow: 147.0 scfm
Average Tunnel Flow: 148.6 scfm
Post-Test Leak Check (1): 0.000 cfm @ -9 in. Hg
Post-Test Leak Check (2): 0.000 cfm @ -10 in. Hg
Average Test Piece Fuel Moisture: 20.61 Dry Basis %

Technician Signature: _____

Velocity Traverse Data

	Pt.1	Pt.2	Pt.3	Pt.4	Pt.5	Pt.6	Pt.7	Pt.8	Center	
Initial dP	0.034	0.052	0.034	0.028	0.038	0.048	0.050	0.032	0.052	"H2O
Temp:	77	77	77	77	77	77	77	77	77	°F

V_{strav} 13.75 ft/sec V_{scent} 15.60 ft/sec F_p 0.881

	Particulate Sampling Data														Fuel Weight (lb)		Temperature Data (°F)													Stack Gas Data		
Elapsed Time (min)	Gas Meter 1 (ft^3)	Gas Meter 2 (ft^3)	Sample Rate 1 (cfm)	Sample Rate 2 (cfm)	Orifice dH 1 ("H_2O)	Meter 1 Temp (°F)	Meter 1 Vacuum ("Hg)	Orifice dH 2 ("H_2O)	Meter 2 Temp (°F)	Meter 2 Vacuum ("Hg)	Dilution Tunnel (°F)	Dilution Tunnel Center dP	Pro. Rate 1	Pro. Rate 2	Scale Reading	Weight Change	Firebox Top	Firebox Bottom	Firebox Back	Firebox Left	Firebox Right	Avg. Stove Surface	Catalyst Exit	Stack	Filter 1	Dryer Exit 1	Filter 2	Dryer Exit 2	Ambient	Draft ("H_2O)	CO_2 (%)	CO (%)
304	44.221	45.859	0.15	0.15	1.73	77	0.69	1.35	76	0.3	85	0.052	100	100	5.5	0	460	282	338	264	350	339	562	162	72	68	73	68	71	-0.032	5.99	0.01
305	44.366	46.009	0.15	0.15	1.74	77	0.69	1.37	76	0.3	85	0.052	99	99	5.5	0	458	283	338	264	350	339	558	161	72	68	73	68	71	-0.032	5.91	0.01
306	44.511	46.160	0.15	0.15	1.74	77	0.68	1.37	76	0.3	85	0.052	99	100	5.5	0	456	283	338	264	350	338	555	160	73	68	73	68	71	-0.032	5.82	0.01
307	44.657	46.311	0.15	0.15	1.74	77	0.68	1.35	76	0.3	85	0.052	100	100	5.5	0	455	283	338	264	350	338	552	160	73	68	73	68	72	-0.032	5.81	0.01
308	44.803	46.462	0.15	0.15	1.73	77	0.68	1.37	76	0.3	85	0.052	100	100	5.4	-0.1	453	283	338	263	350	337	548	160	73	68	73	68	72	-0.032	5.79	0.01
309	44.949	46.613	0.15	0.15	1.72	77	0.68	1.37	77	0.3	85	0.052	100	100	5.4	0	451	283	338	263	349	337	545	159	73	68	73	68	72	-0.032	5.76	0.01
310	45.095	46.763	0.15	0.15	1.72	77	0.69	1.36	77	0.3	85	0.052	100	99	5.4	0	449	283	338	263	349	336	542	159	73	68	73	68	72	-0.032	5.71	0.01
311	45.240	46.915	0.15	0.15	1.73	77	0.68	1.37	77	0.3	85	0.052	99	101	5.4	0	447	283	338	263	349	336	539	157	73	68	73	68	72	-0.032	5.69	0.01
312	45.385	47.065	0.14	0.15	1.73	77	0.69	1.37	77	0.3	85	0.052	99	99	5.4	0	446	283	338	263	349	336	536	156	73	68	73	68	72	-0.032	5.67	0.01
313	45.531	47.216	0.15	0.15	1.74	77	0.69	1.37	77	0.3	85	0.052	100	100	5.4	0	444	284	337	263	348	335	533	156	73	68	73	68	72	-0.032	5.6	0.01
314	45.676	47.366	0.15	0.15	1.74	77	0.69	1.37	77	0.3	85	0.052	99	99	5.4	0	442	284	337	263	348	335	530	155	73	68	73	68	72	-0.032	5.52	0.01
315	45.822	47.517	0.15	0.15	1.69	77	0.69	1.37	77	0.3	85	0.052	100	100	5.3	-0.1	440	284	337	263	347	334	527	156	73	68	73	68	72	-0.032	5.53	0.01
316	45.967	47.668	0.14	0.15	1.69	77	0.69	1.36	77	0.3	84	0.052	99	100	5.3	0	438	284	337	263	347	334	525	155	73	68	73	68	72	-0.032	5.5	0.01
317	46.112	47.819	0.15	0.15	1.69	77	0.69	1.35	77	0.3	84	0.052	99	100	5.3	0	436	284	337	262	346	333	523	155	73	68	73	68	72	-0.032	5.53	0.01
318	46.258	47.970	0.15	0.15	1.70	77	0.69	1.38	77	0.3	84	0.052	100	100	5.3	0	434	284	337	262	346	333	520	155	73	68	73	68	72	-0.032	5.55	0.01
319	46.403	48.121	0.14	0.15	1.70	77	0.69	1.37	77	0.3	84	0.052	99	100	5.3	0	433	284	336	262	345	332	518	154	73	68	74	68	72	-0.031	5.53	0
320	46.549	48.271	0.15	0.15	1.70	76	0.69	1.35	77	0.3	84	0.052	100	99	5.3	0	431	285	336	262	344	332	517	155	73	68	74	68	72	-0.032	5.46	0
321	46.695	48.422	0.15	0.15	1.71	76	0.68	1.37	77	0.3	83	0.052	100	100	5.3	0	429	285	336	261	344	331	515	153	73	68	74	68	72	-0.032	5.49	0
322	46.841	48.573	0.15	0.15	1.72	76	0.68	1.36	77	0.3	83	0.052	100	100	5.2	-0.1	428	285	336	261	343	331	514	154	73	68	74	68	72	-0.032	5.48	0
323	46.987	48.724	0.15	0.15	1.72	76	0.68	1.36	77	0.3	83	0.052	100	100	5.2	0	426	286	335	261	343	330	513	154	73	68	74	68	72	-0.032	5.44	0
324	47.132	48.875	0.14	0.15	1.72	76	0.69	1.37	77	0.3	83	0.052	99	100	5.2	0	425	285	335	260	342	329	513	153	73	68	74	68	72	-0.032	5.48	0
325	47.278	49.026	0.15	0.15	1.73	76	0.69	1.37	77	0.3	82	0.052	100	100	5.2	0	424	284	335	260	341	329	513	154	73	68	74	68	72	-0.032	5.55	0
326	47.423	49.176	0.15	0.15	1.73	76	0.68	1.37	77	0.3	82	0.052	99	99	5.2	0	423	284	335	260	341	329	514	155	73	68	74	68	71	-0.031	5.61	0
327	47.569	49.327	0.15	0.15	1.73	76	0.68	1.37	77	0.3	82	0.052	100	100	5.2	0	422	284	335	259	340	328	515	156	73	68	73	68	72	-0.031	5.7	0
328	47.715	49.478	0.15	0.15	1.73	75	0.68	1.37	77	0.3	82	0.052	100	100	5.1	-0.1	421	284	335	259	340	328	516	156	73	68	73	68	72	-0.031	5.8	0
329	47.861	49.629	0.15	0.15	1.72	75	0.68	1.37	77	0.3	82	0.052	100	100	5.1	0	421	284	335	259	339	328	518	156	73	68	73	68	71	-0.031	5.9	0.01
330	48.007	49.780	0.15	0.15	1.71	75	0.68	1.36	77	0.3	82	0.052	100	100	5.1	0	420	284	334	258	339	327	520	155	73	68	73	68	72	-0.032	5.96	0.01
331	48.153	49.931	0.15	0.15	1.71	75	0.68	1.37	77	0.3	82	0.052	100	100	5.1	0	420	284	334	258	338	327	523	156	73	69	73	68	71	-0.031	5.9	0.01
332	48.299	50.082	0.15	0.15	1.73	75	0.69	1.37	77	0.3	82	0.052	100	100	5.1	0	420	284	334	258	338	327	525	157	73	69	73	68	71	-0.031	6.02	0
333	48.445	50.232	0.15	0.15	1.73	75	0.69	1.36	77	0.3	82	0.052	100	99	5.0	-0.1	421	283	335	258	337	327	529	158	73	69	73	68	71	-0.031	6.1	0
334	48.590	50.384	0.15	0.15	1.73	75	0.68	1.38	77	0.3	82	0.052	99	100	5.0	0	422	283	335	258	337	327	532	158	73	69	73	68	71	-0.032	6.23	0
335	48.736	50.535	0.15	0.15	1.73	75	0.68	1.37	77	0.3	82	0.052	100	100	5.0	0	422	283	335	259	337	327	536	159	73	69	73	68	71	-0.032	6.22	0
336	48.882	50.685	0.15	0.15	1.70	75	0.68	1.36	77	0.3	82	0.052	100	99	5.0	0	423	283	335	259	336	327	541	161	73	69	73	68	72	-0.032	6.3	0
337	49.028	50.837	0.15	0.15	1.70	75	0.69	1.36	77	0.3	82	0.052	100	100	5.0	0	425	283	335	259	336	328	546	162	73	69	73	68	71	-0.033	6.42	0
338	49.174	50.988	0.15	0.15	1.70	75	0.69	1.37	77	0.3	82	0.052	100	100	4.9	-0.1	426	283	335	259	336	328	552	163	73	69	73	68	71	-0.033	6.49	0
339	49.319	51.138	0.15	0.15	1.68	75	0.68	1.36	77	0.3	81	0.052	99	99	4.9	0	428	283	336	259	336	328	559	166	73	69	73	68	71	-0.033	6.57	0
340	49.464	51.290	0.14	0.15	1.68	74	0.69	1.36	76	0.3	81	0.052	99	100	4.9	0	430	283	336	260	336	329	565	167	73	69	73	68	71	-0.033	6.79	0
341	49.610	51.441	0.15	0.15	1.69	74	0.69	1.37	76	0.3	81	0.052	100	100	4.8	-0.1	433	282	337	260	336	330	572	170	73	69	73	68	71	-0.033	6.85	0

Wood Heater Test Data - ASTM E2780 / ASTM E2515

Run: 3

Manufacturer: Valley Comfort
Model: PI29
Tracking No.: VC-18-1
Project No.: 0142WN019E
Test Date: 24-Jan-18
Beginning Clock Time: 11:17

Total Sampling Time: 597 min
Recording Interval: 1 min
Background Sample Volume: 0 cubic feet

Meter Box Y Factor: 0.997 (1) 0.981 (2) _____ (Amb)

Barometric Pressure:	Begin	Middle	End	Average
	28.56	28.8	28.97	28.78 "Hg

OMNI Equipment Numbers: 410, 283A, 132, 576, 318, 432, 419, 371, 372, 296-T32, 559, 592, 637

PM Control Modules: 371/372
Dilution Tunnel MW(dry): 29.00 lb/lb-mole
Dilution Tunnel MW(wet): 28.78 lb/lb-mole
Dilution Tunnel H2O: 2.00 percent
Dilution Tunnel Static: -0.180 "H2O
Tunnel Area: 0.19635 ft2
Pitot Tube Cp: 0.99

Avg. Tunnel Velocity: 13.78 ft/sec.
Initial Tunnel Flow: 147.0 scfm
Average Tunnel Flow: 148.6 scfm
Post-Test Leak Check (1): 0.000 cfm @ -9 in. Hg
Post-Test Leak Check (2): 0.000 cfm @ -10 in. Hg
Average Test Piece Fuel Moisture: 20.61 Dry Basis %

Technician Signature: _____

Velocity Traverse Data	Pt.1	Pt.2	Pt.3	Pt.4	Pt.5	Pt.6	Pt.7	Pt.8	Center	
Initial dP	0.034	0.052	0.034	0.028	0.038	0.048	0.050	0.032	0.052	"H2O
Temp:	77	77	77	77	77	77	77	77	77	°F

V_{strav} 13.75 ft/sec V_{scent} 15.60 ft/sec F_p 0.881

	Particulate Sampling Data														Fuel Weight (lb)		Temperature Data (°F)													Stack Gas Data		
Elapsed Time (min)	Gas Meter 1 (ft^3)	Gas Meter 2 (ft^3)	Sample Rate 1 (cfm)	Sample Rate 2 (cfm)	Orifice dH 1 ("H_2O)	Meter 1 Temp (°F)	Meter 1 Vacuum ("Hg)	Orifice dH 2 ("H_2O)	Meter 2 Temp (°F)	Meter 2 Vacuum ("Hg)	Dilution Tunnel (°F)	Dilution Tunnel Center dP	Pro. Rate 1	Pro. Rate 2	Scale Reading	Weight Change	Firebox Top	Firebox Bottom	Firebox Back	Firebox Left	Firebox Right	Avg. Stove Surface	Catalyst Exit	Stack	Filter 1	Dryer Exit 1	Filter 2	Dryer Exit 2	Ambient	Draft ("H_2O)	CO_2 (%)	CO (%)
342	49.756	51.591	0.15	0.15	1.69	74	0.69	1.37	76	0.3	82	0.052	100	99	4.8	0	435	282	338	260	336	330	579	171	73	69	73	68	71	-0.033	7.02	0
343	49.902	51.742	0.15	0.15	1.71	74	0.69	1.37	76	0.3	82	0.052	100	100	4.8	0	438	282	338	261	336	331	585	172	73	69	73	68	71	-0.033	7.21	0
344	50.048	51.894	0.15	0.15	1.71	74	0.68	1.37	76	0.3	82	0.052	100	100	4.8	0	441	282	339	261	337	332	591	172	73	69	73	68	71	-0.033	7.35	0
345	50.194	52.044	0.15	0.15	1.71	74	0.68	1.37	76	0.3	82	0.052	100	99	4.7	-0.1	445	282	340	261	337	333	598	175	73	69	73	68	71	-0.033	7.32	0
346	50.340	52.195	0.15	0.15	1.73	74	0.68	1.37	76	0.3	81	0.052	100	100	4.7	0	448	282	341	261	338	334	604	177	73	69	73	68	72	-0.034	7.37	0
347	50.486	52.347	0.15	0.15	1.73	74	0.68	1.37	76	0.3	82	0.052	100	100	4.7	0	451	282	343	262	338	335	611	179	73	69	73	68	71	-0.034	7.45	0
348	50.632	52.498	0.15	0.15	1.73	74	0.68	1.37	76	0.3	82	0.052	100	100	4.6	-0.1	455	282	344	262	339	336	617	181	73	69	73	68	71	-0.034	7.51	0
349	50.778	52.648	0.15	0.15	1.73	74	0.68	1.36	76	0.3	82	0.052	100	99	4.6	0	458	282	345	263	340	338	623	183	73	69	73	68	70	-0.035	7.56	0
350	50.924	52.800	0.15	0.15	1.73	74	0.68	1.38	76	0.3	82	0.052	100	100	4.6	0	462	282	346	263	341	339	628	184	73	69	73	68	70	-0.035	7.57	0
351	51.070	52.951	0.15	0.15	1.73	74	0.68	1.37	76	0.3	82	0.052	100	100	4.5	-0.1	466	282	347	264	342	340	634	185	73	69	73	68	70	-0.035	7.6	0
352	51.216	53.101	0.15	0.15	1.73	74	0.68	1.36	76	0.3	82	0.052	100	99	4.5	0	470	282	348	264	343	341	640	187	73	69	73	68	70	-0.035	7.6	0.01
353	51.362	53.253	0.15	0.15	1.74	74	0.68	1.37	76	0.3	82	0.052	100	100	4.5	0	474	282	349	264	344	343	646	188	73	69	73	68	71	-0.035	7.71	0.01
354	51.508	53.404	0.15	0.15	1.73	74	0.68	1.37	76	0.3	82	0.052	100	100	4.4	-0.1	478	283	350	265	345	344	651	190	73	69	73	68	71	-0.035	7.65	0.01
355	51.654	53.554	0.15	0.15	1.73	73	0.69	1.36	76	0.3	82	0.052	100	99	4.4	0	482	283	352	265	346	346	657	191	73	69	73	68	71	-0.036	7.69	0.02
356	51.800	53.706	0.15	0.15	1.73	73	0.68	1.37	76	0.3	82	0.052	100	100	4.4	0	486	283	353	266	347	347	662	192	72	69	73	68	70	-0.036	7.75	0.02
357	51.946	53.857	0.15	0.15	1.73	73	0.68	1.37	76	0.3	82	0.052	100	100	4.3	-0.1	490	283	354	266	348	348	668	193	72	69	73	68	71	-0.036	7.87	0.03
358	52.091	54.008	0.15	0.15	1.73	73	0.68	1.36	76	0.3	83	0.052	100	100	4.3	0	495	284	356	267	350	350	674	194	72	69	73	68	71	-0.036	8.29	0.05
359	52.237	54.159	0.15	0.15	1.73	73	0.68	1.37	76	0.3	83	0.052	100	100	4.2	-0.1	499	284	358	268	351	352	678	194	72	69	73	68	71	-0.036	8.4	0.07
360	52.383	54.310	0.15	0.15	1.73	74	0.69	1.37	76	0.3	83	0.052	100	100	4.2	0	503	285	359	268	353	354	682	192	72	69	73	68	71	-0.036	8.35	0.09
361	52.528	54.461	0.14	0.15	1.72	74	0.69	1.37	76	0.3	84	0.052	99	100	4.2	0	507	285	361	269	355	355	684	191	72	69	73	68	71	-0.036	8.26	0.09
362	52.674	54.612	0.15	0.15	1.71	74	0.69	1.37	76	0.3	83	0.052	100	100	4.1	-0.1	510	285	362	270	356	357	685	189	72	69	73	68	71	-0.036	7.99	0.11
363	52.820	54.763	0.15	0.15	1.69	74	0.69	1.37	76	0.3	84	0.052	100	100	4.1	0	514	286	364	271	358	359	685	190	72	69	73	68	71	-0.035	7.91	0.1
364	52.965	54.914	0.15	0.15	1.69	74	0.69	1.37	76	0.3	85	0.052	100	100	4.1	0	516	287	365	272	359	360	684	188	72	69	73	68	71	-0.035	7.86	0.09
365	53.110	55.065	0.14	0.15	1.68	74	0.69	1.37	76	0.3	85	0.052	100	100	4.0	-0.1	519	287	367	272	361	361	683	186	72	69	73	68	71	-0.035	7.9	0.07
366	53.256	55.216	0.15	0.15	1.68	75	0.69	1.37	76	0.3	85	0.052	100	100	4.0	0	521	288	368	273	362	362	682	186	73	69	73	68	71	-0.035	7.84	0.06
367	53.401	55.366	0.15	0.15	1.70	75	0.69	1.36	76	0.3	85	0.052	99	99	4.0	0	523	288	368	274	363	363	683	186	73	69	73	68	72	-0.036	7.78	0.07
368	53.547	55.517	0.15	0.15	1.71	75	0.68	1.36	76	0.3	85	0.052	100	100	3.9	-0.1	525	288	369	274	364	364	684	185	73	69	73	68	71	-0.036	7.83	0.1
369	53.693	55.669	0.15	0.15	1.71	75	0.68	1.38	76	0.3	85	0.052	100	101	3.9	0	526	289	370	274	365	365	685	185	73	68	73	68	71	-0.035	7.93	0.14
370	53.839	55.820	0.15	0.15	1.73	76	0.68	1.36	76	0.3	85	0.052	100	100	3.8	-0.1	528	289	370	275	366	366	686	185	73	68	73	68	72	-0.036	8.03	0.22
371	53.984	55.970	0.15	0.15	1.72	76	0.68	1.36	76	0.3	85	0.052	99	99	3.8	0	530	290	371	275	367	367	688	183	73	68	73	68	72	-0.035	7.98	0.28
372	54.130	56.121	0.15	0.15	1.72	76	0.68	1.38	76	0.3	86	0.052	100	100	3.8	0	532	290	372	275	368	367	689	183	73	68	73	68	72	-0.035	7.93	0.32
373	54.276	56.272	0.15	0.15	1.71	76	0.68	1.37	76	0.3	86	0.052	100	100	3.7	-0.1	534	291	372	275	369	368	690	181	73	68	73	68	72	-0.035	7.88	0.35
374	54.421	56.423	0.14	0.15	1.73	76	0.68	1.36	77	0.3	86	0.052	99	100	3.7	0	535	292	373	275	370	369	689	180	73	69	73	68	71	-0.035	7.88	0.39
375	54.567	56.574	0.15	0.15	1.73	76	0.68	1.36	77	0.3	86	0.052	100	100	3.6	-0.1	537	293	374	275	371	370	688	179	73	69	73	68	72	-0.035	7.83	0.43
376	54.713	56.725	0.15	0.15	1.73	76	0.68	1.38	77	0.3	86	0.052	100	100	3.6	0	537	294	374	276	371	370	686	177	73	69	73	68	72	-0.035	7.79	0.44
377	54.859	56.875	0.15	0.15	1.72	76	0.68	1.36	77	0.3	86	0.052	100	99	3.6	0	538	294	375	276	372	371	683	174	73	69	73	68	72	-0.035	7.69	0.4
378	55.005	57.027	0.15	0.15	1.72	76	0.68	1.36	77	0.3	85	0.052	100	101	3.5	-0.1	538	295	375	276	373	371	680	174	73	69	73	68	71	-0.035	7.6	0.37
379	55.150	57.177	0.14	0.15	1.72	76	0.68	1.37	77	0.3	85	0.052	99	99	3.5	0	538	296	376	276	373	372	676	173	73	69	73	68	71	-0.035	7.54	0.34

Wood Heater Test Data - ASTM E2780 / ASTM E2515

Run: 3

Manufacturer: Valley Comfort
Model: PI29
Tracking No.: VC-18-1
Project No.: 0142WN019E
Test Date: 24-Jan-18
Beginning Clock Time: 11:17

Total Sampling Time: 597 min
Recording Interval: 1 min
Background Sample Volume: 0 cubic feet

Meter Box Y Factor: 0.997 (1) 0.981 (2) _____ (Amb)

Barometric Pressure:	Begin	Middle	End	Average
	28.56	28.8	28.97	28.78 "Hg

OMNI Equipment Numbers: 410, 283A, 132, 576, 318, 432, 419, 371, 372, 296-T32, 559, 592, 637

PM Control Modules: 371/372
Dilution Tunnel MW(dry): 29.00 lb/lb-mole
Dilution Tunnel MW(wet): 28.78 lb/lb-mole
Dilution Tunnel H2O: 2.00 percent
Dilution Tunnel Static: -0.180 "H2O
Tunnel Area: 0.19635 ft2
Pitot Tube Cp: 0.99

Avg. Tunnel Velocity: 13.78 ft/sec.
Initial Tunnel Flow: 147.0 scfm
Average Tunnel Flow: 148.6 scfm
Post-Test Leak Check (1): 0.000 cfm @ -9 in. Hg
Post-Test Leak Check (2): 0.000 cfm @ -10 in. Hg
Average Test Piece Fuel Moisture: 20.61 Dry Basis %

Technician Signature: _____

Velocity Traverse Data	Pt.1	Pt.2	Pt.3	Pt.4	Pt.5	Pt.6	Pt.7	Pt.8	Center	
Initial dP	0.034	0.052	0.034	0.028	0.038	0.048	0.050	0.032	0.052	"H2O
Temp:	77	77	77	77	77	77	77	77	77	°F

V_{strav} 13.75 ft/sec V_{scent} 15.60 ft/sec F_p 0.881

	Particulate Sampling Data														Fuel Weight (lb)		Temperature Data (°F)													Stack Gas Data		
Elapsed Time (min)	Gas Meter 1 (ft^3)	Gas Meter 2 (ft^3)	Sample Rate 1 (cfm)	Sample Rate 2 (cfm)	Orifice dH 1 ("H_2O)	Meter 1 Temp (°F)	Meter 1 Vacuum ("Hg)	Orifice dH 2 ("H_2O)	Meter 2 Temp (°F)	Meter 2 Vacuum ("Hg)	Dilution Tunnel (°F)	Dilution Tunnel Center dP	Pro. Rate 1	Pro. Rate 2	Scale Reading	Weight Change	Firebox Top	Firebox Bottom	Firebox Back	Firebox Left	Firebox Right	Avg. Stove Surface	Catalyst Exit	Stack	Filter 1	Dryer Exit 1	Filter 2	Dryer Exit 2	Ambient	Draft ("H_2O)	CO_2 (%)	CO (%)
380	55.296	57.328	0.15	0.15	1.72	76	0.68	1.36	77	0.3	85	0.052	100	100	3.5	0	538	297	376	276	373	372	672	170	73	69	73	68	71	-0.034	7.48	0.28
381	55.442	57.479	0.15	0.15	1.73	76	0.68	1.36	77	0.3	85	0.052	100	100	3.4	-0.1	537	297	377	276	374	372	668	168	73	69	73	68	71	-0.034	7.35	0.23
382	55.587	57.630	0.15	0.15	1.73	76	0.69	1.37	77	0.3	84	0.052	99	100	3.4	0	536	298	377	276	374	372	664	167	73	69	74	68	71	-0.034	7.21	0.2
383	55.733	57.781	0.15	0.15	1.72	76	0.69	1.36	77	0.3	84	0.052	100	100	3.4	0	535	299	377	276	374	372	659	166	73	69	74	68	71	-0.034	7.26	0.17
384	55.879	57.932	0.15	0.15	1.69	75	0.69	1.37	77	0.3	84	0.052	100	100	3.4	0	533	299	377	276	374	372	654	164	73	69	74	68	71	-0.033	7.14	0.13
385	56.024	58.083	0.15	0.15	1.69	75	0.69	1.37	77	0.3	84	0.052	99	100	3.3	-0.1	532	300	377	276	374	372	649	162	73	69	74	68	71	-0.034	6.82	0.1
386	56.169	58.234	0.14	0.15	1.69	75	0.69	1.37	77	0.3	84	0.052	99	100	3.3	0	530	300	377	276	374	371	644	161	73	69	74	68	71	-0.034	6.66	0.08
387	56.315	58.384	0.15	0.15	1.69	75	0.69	1.35	77	0.3	83	0.052	100	99	3.3	0	528	301	377	275	373	371	639	158	73	69	74	68	71	-0.033	6.58	0.06
388	56.460	58.536	0.15	0.15	1.70	75	0.68	1.37	77	0.3	83	0.052	99	100	3.3	0	526	301	377	275	373	370	633	157	73	69	73	68	71	-0.033	6.45	0.05
389	56.606	58.687	0.15	0.15	1.70	75	0.68	1.36	77	0.3	83	0.052	100	100	3.2	-0.1	523	302	377	275	373	370	628	156	73	69	73	68	71	-0.033	6.38	0.04
390	56.752	58.838	0.15	0.15	1.70	75	0.68	1.35	77	0.3	83	0.052	100	100	3.2	0	520	301	377	275	372	369	622	154	73	69	73	68	71	-0.033	6.37	0.03
391	56.898	58.989	0.15	0.15	1.72	75	0.68	1.37	76	0.3	83	0.052	100	100	3.2	0	518	301	377	274	372	368	617	154	73	69	73	68	71	-0.032	6.21	0.02
392	57.044	59.140	0.15	0.15	1.72	75	0.68	1.37	76	0.3	83	0.052	100	100	3.2	0	515	302	376	274	371	368	611	152	73	69	73	68	72	-0.032	6.16	0.02
393	57.190	59.290	0.15	0.15	1.73	75	0.68	1.36	76	0.3	84	0.052	100	99	3.2	0	511	302	376	274	370	367	606	151	73	69	73	68	72	-0.032	6.06	0.01
394	57.335	59.442	0.15	0.15	1.73	75	0.68	1.37	76	0.3	84	0.052	99	101	3.2	0	509	302	376	273	369	366	600	149	73	69	73	68	72	-0.032	5.96	0.01
395	57.481	59.593	0.15	0.15	1.72	75	0.68	1.37	76	0.3	84	0.052	100	100	3.1	-0.1	505	302	375	273	368	365	595	149	73	69	73	68	72	-0.031	5.89	0.01
396	57.627	59.743	0.15	0.15	1.73	76	0.69	1.36	77	0.3	84	0.052	100	99	3.1	0	502	302	375	272	367	364	590	149	73	69	73	68	72	-0.032	5.77	0.01
397	57.772	59.895	0.14	0.15	1.72	76	0.68	1.37	77	0.3	84	0.052	99	100	3.1	0	498	303	375	271	366	363	584	148	73	69	73	68	72	-0.031	5.68	0.01
398	57.918	60.045	0.15	0.15	1.72	76	0.68	1.36	77	0.3	84	0.052	100	99	3.1	0	495	303	375	271	365	362	579	148	73	69	73	68	72	-0.031	5.6	0.01
399	58.064	60.196	0.15	0.15	1.71	76	0.68	1.36	77	0.3	84	0.052	100	100	3.1	0	491	302	375	270	364	360	574	149	73	69	73	68	72	-0.031	5.58	0
400	58.210	60.347	0.15	0.15	1.71	77	0.69	1.36	77	0.3	85	0.052	100	100	3.1	0	488	302	375	270	363	360	569	149	73	69	73	68	72	-0.031	5.56	0
401	58.356	60.498	0.15	0.15	1.72	77	0.68	1.37	77	0.3	85	0.052	100	100	3.1	0	484	302	375	269	362	358	564	148	73	69	74	69	72	-0.031	5.49	0
402	58.501	60.649	0.14	0.15	1.72	77	0.69	1.36	77	0.3	85	0.052	99	100	3.0	-0.1	480	302	375	269	361	357	558	147	73	69	74	69	72	-0.031	5.42	0
403	58.647	60.800	0.15	0.15	1.72	77	0.69	1.36	77	0.3	85	0.052	100	100	3.0	0	477	301	375	268	360	356	553	148	73	69	74	69	72	-0.031	5.46	0
404	58.792	60.951	0.15	0.15	1.72	77	0.68	1.37	77	0.3	85	0.052	99	100	3.0	0	473	301	375	268	359	355	549	149	73	69	74	69	72	-0.031	5.55	0
405	58.938	61.102	0.15	0.15	1.69	77	0.68	1.37	77	0.3	85	0.052	100	100	3.0	0	470	301	375	267	358	354	544	149	73	69	74	69	72	-0.031	5.56	0
406	59.084	61.252	0.15	0.15	1.69	77	0.69	1.36	77	0.3	85	0.052	100	99	3.0	0	466	301	375	267	356	353	540	148	73	69	74	69	72	-0.030	5.53	0
407	59.229	61.404	0.14	0.15	1.69	77	0.69	1.37	77	0.3	85	0.052	99	101	3.0	0	463	300	376	266	355	352	536	148	73	69	74	69	72	-0.030	5.51	0
408	59.374	61.555	0.15	0.15	1.69	77	0.69	1.37	77	0.3	84	0.052	99	100	3.0	0	459	300	377	266	354	351	533	149	73	69	74	69	71	-0.030	5.54	0
409	59.520	61.705	0.15	0.15	1.69	77	0.69	1.36	77	0.3	84	0.052	100	99	3.0	0	456	299	377	265	353	350	530	149	73	69	74	69	72	-0.030	5.6	0
410	59.665	61.857	0.14	0.15	1.69	77	0.69	1.37	77	0.3	84	0.052	99	100	2.9	-0.1	453	299	378	265	352	349	527	149	73	69	74	69	72	-0.030	5.63	0
411	59.811	62.008	0.15	0.15	1.69	77	0.68	1.37	77	0.3	84	0.052	100	100	2.9	0	450	299	379	264	352	349	525	151	73	69	74	69	72	-0.030	5.69	0
412	59.958	62.158	0.15	0.15	1.72	77	0.69	1.37	77	0.3	84	0.052	100	99	2.9	0	448	298	380	264	351	348	524	152	73	69	74	69	72	-0.030	5.76	0
413	60.103	62.309	0.15	0.15	1.72	77	0.68	1.37	77	0.3	84	0.052	99	100	2.9	0	445	298	381	264	350	348	523	151	73	69	74	69	72	-0.030	5.84	0
414	60.249	62.460	0.15	0.15	1.72	77	0.68	1.37	77	0.3	83	0.052	100	100	2.9	0	443	298	382	263	349	347	522	152	73	69	74	69	72	-0.030	5.89	0
415	60.395	62.611	0.15	0.15	1.72	77	0.68	1.36	77	0.3	83	0.052	100	100	2.9	0	441	298	384	263	348	347	522	152	73	69	74	69	72	-0.030	5.9	0
416	60.541	62.762	0.15	0.15	1.72	77	0.68	1.37	77	0.3	83	0.052	100	100	2.9	0	439	298	385	262	348	346	522	154	73	69	74	69	72	-0.031	5.91	0
417	60.687	62.913	0.15	0.15	1.73	76	0.68	1.37	77	0.3	83	0.052	100	100	2.8	-0.1	437	298	387	262	347	346	522	154	73	69	74	69	72	-0.031	5.97	0

Wood Heater Test Data - ASTM E2780 / ASTM E2515

Run: 3

Manufacturer: Valley Comfort
Model: PI29
Tracking No.: VC-18-1
Project No.: 0142WN019E
Test Date: 24-Jan-18
Beginning Clock Time: 11:17

Total Sampling Time: 597 min
Recording Interval: 1 min
Background Sample Volume: 0 cubic feet

Meter Box Y Factor: 0.997 (1) 0.981 (2) _____ (Amb)

Barometric Pressure:	Begin	Middle	End	Average
	28.56	28.8	28.97	28.78 "Hg

OMNI Equipment Numbers: 410, 283A, 132, 576, 318, 432, 419, 371, 372, 296-T32, 559, 592, 637

PM Control Modules: 371/372
Dilution Tunnel MW(dry): 29.00 lb/lb-mole
Dilution Tunnel MW(wet): 28.78 lb/lb-mole
Dilution Tunnel H2O: 2.00 percent
Dilution Tunnel Static: -0.180 "H2O
Tunnel Area: 0.19635 ft2
Pitot Tube Cp: 0.99

Avg. Tunnel Velocity: 13.78 ft/sec.
Initial Tunnel Flow: 147.0 scfm
Average Tunnel Flow: 148.6 scfm
Post-Test Leak Check (1): 0.000 cfm @ -9 in. Hg
Post-Test Leak Check (2): 0.000 cfm @ -10 in. Hg
Average Test Piece Fuel Moisture: 20.61 Dry Basis %

Technician Signature: _____

Velocity Traverse Data	Pt.1	Pt.2	Pt.3	Pt.4	Pt.5	Pt.6	Pt.7	Pt.8	Center	
Initial dP	0.034	0.052	0.034	0.028	0.038	0.048	0.050	0.032	0.052	"H2O
Temp:	77	77	77	77	77	77	77	77	77	°F

V_{strav} 13.75 ft/sec V_{scent} 15.60 ft/sec F_p 0.881

	Particulate Sampling Data														Fuel Weight (lb)		Temperature Data (°F)													Stack Gas Data		
Elapsed Time (min)	Gas Meter 1 (ft^3)	Gas Meter 2 (ft^3)	Sample Rate 1 (cfm)	Sample Rate 2 (cfm)	Orifice dH 1 ("H_2O)	Meter 1 Temp (°F)	Meter 1 Vacuum ("Hg)	Orifice dH 2 ("H_2O)	Meter 2 Temp (°F)	Meter 2 Vacuum ("Hg)	Dilution Tunnel (°F)	Dilution Tunnel Center dP	Pro. Rate 1	Pro. Rate 2	Scale Reading	Weight Change	Firebox Top	Firebox Bottom	Firebox Back	Firebox Left	Firebox Right	Avg. Stove Surface	Catalyst Exit	Stack	Filter 1	Dryer Exit 1	Filter 2	Dryer Exit 2	Ambient	Draft ("H_2O)	CO_2 (%)	CO (%)
418	60.832	63.064	0.15	0.15	1.73	76	0.68	1.36	77	0.3	83	0.052	99	100	2.8	0	436	297	388	262	347	346	523	155	73	69	74	69	71	-0.030	5.98	0
419	60.978	63.215	0.15	0.15	1.74	76	0.68	1.36	77	0.3	83	0.052	100	100	2.8	0	435	297	389	262	346	346	524	155	73	69	74	69	72	-0.031	6.06	0
420	61.124	63.366	0.15	0.15	1.73	76	0.68	1.37	77	0.3	82	0.052	100	100	2.8	0	434	296	391	261	346	346	526	156	73	69	74	69	72	-0.031	6	0
421	61.270	63.517	0.15	0.15	1.73	76	0.68	1.37	77	0.3	82	0.052	100	100	2.8	0	433	296	393	261	345	346	528	158	73	69	74	69	72	-0.031	6.13	0
422	61.416	63.668	0.15	0.15	1.72	76	0.69	1.36	77	0.3	82	0.052	100	100	2.8	0	432	296	395	261	345	346	530	158	73	69	74	69	71	-0.031	6.11	0
423	61.562	63.819	0.15	0.15	1.72	76	0.68	1.38	77	0.3	82	0.052	100	100	2.8	0	432	296	397	261	344	346	533	159	73	69	74	69	71	-0.031	6.26	0
424	61.708	63.970	0.15	0.15	1.72	76	0.68	1.37	77	0.3	82	0.052	100	100	2.7	-0.1	432	296	399	261	344	346	536	159	73	69	74	69	71	-0.031	6.31	0
425	61.854	64.121	0.15	0.15	1.73	75	0.68	1.36	77	0.3	82	0.052	100	100	2.7	0	432	295	401	260	344	346	539	161	73	69	74	69	71	-0.031	6.39	0
426	62.000	64.272	0.15	0.15	1.73	75	0.68	1.37	77	0.3	82	0.052	100	100	2.7	0	432	295	403	260	343	347	542	162	73	69	74	69	70	-0.031	6.42	0
427	62.146	64.423	0.15	0.15	1.73	75	0.68	1.37	77	0.3	82	0.052	100	100	2.7	0	432	295	405	260	343	347	545	164	73	69	73	69	70	-0.031	6.47	0
428	62.292	64.574	0.15	0.15	1.73	75	0.69	1.36	77	0.3	82	0.052	100	100	2.7	0	433	295	407	260	343	348	549	164	73	69	73	69	71	-0.032	6.48	0
429	62.438	64.726	0.15	0.15	1.70	75	0.68	1.37	77	0.3	82	0.052	100	100	2.7	0	433	294	409	260	343	348	553	165	73	69	73	69	70	-0.031	6.5	0
430	62.583	64.877	0.14	0.15	1.70	75	0.69	1.37	77	0.3	82	0.052	99	100	2.6	-0.1	434	294	411	260	342	348	556	166	73	69	73	69	70	-0.031	6.52	0
431	62.729	65.027	0.15	0.15	1.70	75	0.69	1.37	77	0.3	81	0.052	100	99	2.6	0	435	294	412	260	342	349	559	166	73	69	73	69	71	-0.032	6.54	0
432	62.875	65.179	0.15	0.15	1.70	75	0.69	1.37	77	0.3	82	0.052	100	100	2.6	0	436	294	414	261	342	349	563	167	72	69	73	69	71	-0.032	6.61	0
433	63.020	65.330	0.15	0.15	1.69	75	0.69	1.37	77	0.3	82	0.052	99	100	2.6	0	437	295	416	261	343	350	566	167	72	69	73	69	71	-0.032	6.65	0
434	63.166	65.481	0.15	0.15	1.70	74	0.69	1.37	77	0.3	82	0.052	100	100	2.6	0	438	294	418	261	343	351	569	169	72	69	73	69	71	-0.032	6.58	0
435	63.311	65.632	0.15	0.15	1.70	74	0.69	1.37	77	0.3	82	0.052	99	100	2.6	0	440	294	419	261	343	351	572	170	72	69	73	69	70	-0.032	6.63	0
436	63.457	65.783	0.15	0.15	1.73	74	0.69	1.37	77	0.3	82	0.052	100	100	2.5	-0.1	441	294	421	262	343	352	575	171	72	69	73	69	71	-0.032	6.68	0
437	63.604	65.934	0.15	0.15	1.72	74	0.68	1.36	76	0.3	82	0.052	101	100	2.5	0	442	294	423	262	343	353	578	172	72	69	73	69	70	-0.032	6.73	0
438	63.749	66.085	0.15	0.15	1.72	74	0.68	1.36	76	0.3	81	0.052	99	100	2.5	0	444	294	424	263	344	354	581	174	72	69	73	69	71	-0.033	6.75	0
439	63.895	66.236	0.15	0.15	1.72	74	0.68	1.38	76	0.3	82	0.052	100	100	2.5	0	445	294	426	263	344	354	584	176	72	69	73	69	71	-0.033	6.8	0
440	64.041	66.387	0.15	0.15	1.72	74	0.68	1.36	76	0.3	82	0.052	100	100	2.4	-0.1	447	294	428	264	344	355	588	177	72	69	73	69	71	-0.033	6.8	0
441	64.187	66.538	0.15	0.15	1.72	74	0.68	1.36	76	0.3	81	0.052	100	100	2.4	0	449	294	430	264	345	356	592	178	72	69	73	69	70	-0.033	6.96	0
442	64.333	66.689	0.15	0.15	1.72	74	0.68	1.37	76	0.3	81	0.052	100	100	2.4	0	450	294	432	265	345	357	596	180	72	69	73	69	70	-0.033	6.92	0
443	64.479	66.841	0.15	0.15	1.73	74	0.68	1.37	76	0.3	81	0.052	100	100	2.4	0	453	294	434	265	346	358	600	181	72	69	73	69	71	-0.033	7.03	0
444	64.625	66.991	0.15	0.15	1.73	74	0.68	1.35	76	0.3	81	0.052	100	99	2.4	0	455	294	436	266	347	360	605	182	72	69	73	69	71	-0.033	7.12	0
445	64.771	67.143	0.15	0.15	1.73	74	0.68	1.38	76	0.3	81	0.052	100	100	2.3	-0.1	457	294	437	267	347	360	609	183	72	69	73	69	70	-0.034	7.13	0
446	64.917	67.294	0.15	0.15	1.73	74	0.68	1.37	76	0.3	81	0.052	100	100	2.3	0	459	294	439	267	348	361	614	184	72	69	73	69	71	-0.034	7.17	0
447	65.063	67.444	0.15	0.15	1.71	74	0.68	1.35	76	0.3	81	0.052	100	99	2.3	0	462	294	441	268	349	363	618	185	72	69	73	69	71	-0.034	7.15	0
448	65.209	67.596	0.15	0.15	1.71	74	0.68	1.38	76	0.3	82	0.052	100	100	2.3	0	464	295	443	269	350	364	621	185	72	69	73	69	71	-0.034	7.17	0
449	65.354	67.747	0.14	0.15	1.72	74	0.68	1.37	76	0.3	83	0.052	99	100	2.2	-0.1	467	295	445	270	351	366	624	187	72	69	73	68	71	-0.033	7.2	0
450	65.500	67.898	0.15	0.15	1.73	74	0.68	1.36	76	0.3	83	0.052	100	100	2.2	0	469	294	447	271	352	367	626	187	72	69	73	68	71	-0.034	7.21	0
451	65.646	68.049	0.15	0.15	1.73	74	0.68	1.37	76	0.3	84	0.052	100	100	2.2	0	471	295	449	271	353	368	628	188	72	69	73	68	71	-0.034	7.11	0
452	65.791	68.200	0.14	0.15	1.73	74	0.68	1.37	76	0.3	84	0.052	99	100	2.2	0	473	295	451	272	354	369	629	188	72	69	73	68	71	-0.034	7.11	0
453	65.937	68.351	0.15	0.15	1.73	75	0.68	1.36	76	0.3	84	0.052	100	100	2.2	0	475	295	453	273	355	370	630	188	72	69	73	68	71	-0.034	7.08	0
454	66.083	68.502	0.15	0.15	1.70	75	0.69	1.36	76	0.3	84	0.052	100	100	2.1	-0.1	477	295	456	273	356	371	630	189	72	69	73	68	71	-0.034	7.08	0
455	66.228	68.653	0.14	0.15	1.69	75	0.69	1.37	76	0.3	85	0.052	99	100	2.1	0	479	295	458	274	357	373	631	188	72	69	73	68	71	-0.034	7.18	0

Wood Heater Test Data - ASTM E2780 / ASTM E2515

Run: 3

Manufacturer: Valley Comfort
Model: PI29
Tracking No.: VC-18-1
Project No.: 0142WN019E
Test Date: 24-Jan-18
Beginning Clock Time: 11:17

Total Sampling Time: 597 min
Recording Interval: 1 min
Background Sample Volume: 0 cubic feet

Meter Box Y Factor: 0.997 (1) 0.981 (2) _____ (Amb)

Barometric Pressure:

Begin	Middle	End	Average
28.56	28.8	28.97	28.78 "Hg

OMNI Equipment Numbers: 410, 283A, 132, 576, 318, 432, 419, 371, 372, 296-T32, 559, 592, 637

PM Control Modules: 371/372
Dilution Tunnel MW(dry): 29.00 lb/lb-mole
Dilution Tunnel MW(wet): 28.78 lb/lb-mole
Dilution Tunnel H2O: 2.00 percent
Dilution Tunnel Static: -0.180 "H2O
Tunnel Area: 0.19635 ft2
Pitot Tube Cp: 0.99

Avg. Tunnel Velocity: 13.78 ft/sec.
Initial Tunnel Flow: 147.0 scfm
Average Tunnel Flow: 148.6 scfm
Post-Test Leak Check (1): 0.000 cfm @ -9 in. Hg
Post-Test Leak Check (2): 0.000 cfm @ -10 in. Hg
Average Test Piece Fuel Moisture: 20.61 Dry Basis %

Technician Signature: _____

Velocity Traverse Data

	Pt.1	Pt.2	Pt.3	Pt.4	Pt.5	Pt.6	Pt.7	Pt.8	Center	
Initial dP	0.034	0.052	0.034	0.028	0.038	0.048	0.050	0.032	0.052	"H2O
Temp:	77	77	77	77	77	77	77	77	77	°F

V_{strav} 13.75 ft/sec V_{scent} 15.60 ft/sec F_p 0.881

	Particulate Sampling Data														Fuel Weight (lb)		Temperature Data (°F)													Stack Gas Data		
Elapsed Time (min)	Gas Meter 1 (ft^3)	Gas Meter 2 (ft^3)	Sample Rate 1 (cfm)	Sample Rate 2 (cfm)	Orifice dH 1 ("H_2O)	Meter 1 Temp (°F)	Meter 1 Vacuum ("Hg)	Orifice dH 2 ("H_2O)	Meter 2 Temp (°F)	Meter 2 Vacuum ("Hg)	Dilution Tunnel (°F)	Dilution Tunnel Center dP	Pro. Rate 1	Pro. Rate 2	Scale Reading	Weight Change	Firebox Top	Firebox Bottom	Firebox Back	Firebox Left	Firebox Right	Avg. Stove Surface	Catalyst Exit	Stack	Filter 1	Dryer Exit 1	Filter 2	Dryer Exit 2	Ambient	Draft ("H_2O)	CO_2 (%)	CO (%)
456	66.374	68.804	0.15	0.15	1.69	75	0.69	1.37	76	0.3	85	0.052	100	100	2.1	0	480	296	460	275	358	374	631	189	72	69	73	68	71	-0.034	7.15	0
457	66.519	68.955	0.15	0.15	1.69	75	0.68	1.37	76	0.3	84	0.052	99	100	2.1	0	481	294	463	275	359	374	631	189	72	69	73	68	69	-0.034	7.1	0
458	66.665	69.106	0.15	0.15	1.69	76	0.69	1.37	76	0.3	84	0.052	100	100	2.1	0	483	294	465	276	360	376	631	188	72	69	73	68	71	-0.034	7.11	0
459	66.810	69.257	0.14	0.15	1.69	76	0.68	1.37	76	0.3	84	0.052	99	100	2.0	-0.1	484	294	467	276	361	376	630	188	72	69	73	68	71	-0.034	6.99	0
460	66.956	69.408	0.15	0.15	1.69	76	0.69	1.37	76	0.3	84	0.052	100	100	2.0	0	485	295	469	277	362	378	630	189	72	69	73	68	71	-0.034	6.9	0
461	67.102	69.559	0.15	0.15	1.72	76	0.68	1.37	76	0.3	85	0.052	100	100	2.0	0	486	296	472	278	363	379	629	188	72	69	73	68	71	-0.034	6.89	0
462	67.248	69.710	0.15	0.15	1.72	76	0.68	1.37	77	0.3	84	0.052	100	100	2.0	0	487	296	473	279	364	380	628	188	72	69	73	68	71	-0.035	6.88	0
463	67.394	69.861	0.15	0.15	1.72	76	0.68	1.35	77	0.3	85	0.052	100	100	2.0	0	487	296	475	279	365	380	627	185	72	69	73	68	71	-0.034	6.81	0
464	67.540	70.012	0.15	0.15	1.72	76	0.68	1.38	77	0.3	85	0.052	100	100	1.9	-0.1	488	297	477	280	366	382	625	186	72	69	73	68	71	-0.034	6.69	0
465	67.686	70.163	0.15	0.15	1.73	76	0.68	1.37	77	0.3	85	0.052	100	100	1.9	0	488	297	478	281	367	382	623	186	72	69	73	68	71	-0.034	6.76	0
466	67.831	70.313	0.14	0.15	1.73	76	0.68	1.35	77	0.3	84	0.052	99	99	1.9	0	488	297	480	281	368	383	621	186	72	69	73	68	71	-0.034	6.81	0
467	67.977	70.465	0.15	0.15	1.73	76	0.68	1.38	77	0.3	84	0.052	100	100	1.9	0	488	297	481	281	369	383	619	184	72	69	73	68	70	-0.034	6.73	0
468	68.123	70.616	0.15	0.15	1.73	75	0.68	1.36	77	0.3	84	0.052	100	100	1.9	0	488	298	482	282	370	384	616	183	72	69	73	68	70	-0.034	6.63	0
469	68.269	70.767	0.15	0.15	1.73	75	0.68	1.36	77	0.3	84	0.052	100	100	1.9	0	487	298	483	282	370	384	614	182	72	69	73	69	71	-0.034	6.54	0
470	68.415	70.918	0.15	0.15	1.73	75	0.68	1.36	77	0.3	83	0.052	100	100	1.8	-0.1	487	298	483	282	371	384	611	182	72	69	73	68	70	-0.034	6.37	0
471	68.561	71.069	0.15	0.15	1.72	75	0.69	1.37	77	0.3	84	0.052	100	100	1.8	0	486	299	484	283	372	385	608	179	72	68	73	68	71	-0.034	6.33	0
472	68.706	71.219	0.14	0.15	1.72	75	0.68	1.36	77	0.3	84	0.052	99	99	1.8	0	486	299	484	283	372	385	604	179	72	69	73	68	71	-0.033	6.33	0
473	68.852	71.371	0.15	0.15	1.72	75	0.68	1.36	77	0.3	84	0.052	100	100	1.8	0	485	299	484	283	372	385	601	178	72	68	73	68	71	-0.033	6.28	0
474	68.998	71.522	0.15	0.15	1.73	76	0.68	1.37	77	0.3	84	0.052	100	100	1.8	0	484	299	484	283	373	385	598	177	72	68	73	68	71	-0.033	6.25	0
475	69.143	71.672	0.14	0.15	1.73	76	0.68	1.37	77	0.3	84	0.052	99	99	1.8	0	483	299	484	283	373	384	595	175	72	68	73	68	71	-0.033	6.22	0
476	69.289	71.824	0.15	0.15	1.73	76	0.69	1.37	77	0.3	85	0.052	100	101	1.7	-0.1	481	299	483	283	373	384	591	174	72	68	73	68	71	-0.032	6.2	0
477	69.435	71.975	0.15	0.15	1.71	76	0.69	1.37	77	0.3	85	0.052	100	100	1.7	0	480	300	483	284	373	384	588	174	72	68	73	68	71	-0.033	6.18	0
478	69.581	72.125	0.15	0.15	1.69	76	0.68	1.37	77	0.3	85	0.052	100	99	1.7	0	479	300	483	284	374	384	585	174	72	68	73	68	71	-0.033	6.14	0
479	69.726	72.276	0.14	0.15	1.69	77	0.68	1.36	77	0.3	85	0.052	99	100	1.7	0	478	301	482	284	374	384	582	173	72	68	73	68	71	-0.032	6.15	0
480	69.871	72.427	0.14	0.15	1.68	77	0.68	1.37	77	0.3	85	0.052	99	100	1.7	0	476	301	481	284	374	383	580	173	72	68	73	69	71	-0.032	6.09	0
481	70.017	72.578	0.15	0.15	1.69	77	0.68	1.37	77	0.3	85	0.052	100	100	1.7	0	475	301	481	284	374	383	577	172	72	68	73	68	71	-0.033	6.04	0
482	70.162	72.729	0.15	0.15	1.70	77	0.69	1.35	77	0.3	85	0.052	99	100	1.7	0	473	301	480	284	374	382	575	172	72	68	74	69	71	-0.032	6.12	0
483	70.309	72.880	0.15	0.15	1.70	77	0.69	1.38	77	0.3	84	0.052	100	100	1.7	0	472	302	480	284	373	382	573	172	72	68	74	69	71	-0.033	6.12	0
484	70.455	73.032	0.15	0.15	1.70	76	0.68	1.37	77	0.3	84	0.052	100	100	1.6	-0.1	470	302	479	284	373	382	572	173	72	68	74	69	71	-0.033	6.14	0
485	70.600	73.182	0.14	0.15	1.73	76	0.68	1.35	77	0.3	84	0.052	99	99	1.6	0	469	302	479	285	373	382	570	173	72	69	74	69	71	-0.033	6.14	0
486	70.746	73.333	0.15	0.15	1.73	76	0.68	1.37	77	0.3	84	0.052	100	100	1.6	0	468	302	478	285	373	381	569	172	72	69	74	69	71	-0.032	6.13	0
487	70.892	73.484	0.15	0.15	1.72	76	0.68	1.36	77	0.3	84	0.052	100	100	1.6	0	467	302	477	285	373	381	569	172	72	69	74	69	71	-0.033	6.12	0
488	71.038	73.635	0.15	0.15	1.72	76	0.68	1.36	77	0.3	84	0.052	100	100	1.6	0	466	303	477	285	373	381	568	172	72	69	74	69	71	-0.033	6.16	0
489	71.183	73.786	0.15	0.15	1.73	76	0.68	1.37	77	0.3	84	0.052	99	100	1.6	0	465	303	476	285	373	380	568	171	72	69	74	69	71	-0.033	6.15	0
490	71.329	73.937	0.15	0.15	1.74	76	0.68	1.37	77	0.3	84	0.052	100	100	1.6	0	464	303	476	286	372	380	567	171	72	69	74	69	71	-0.033	6.12	0
491	71.475	74.088	0.15	0.15	1.74	75	0.68	1.36	77	0.3	83	0.052	100	100	1.5	-0.1	463	303	475	286	372	380	567	172	72	69	74	69	71	-0.032	6.13	0
492	71.621	74.239	0.15	0.15	1.74	75	0.68	1.37	77	0.3	83	0.052	100	100	1.5	0	462	303	475	286	372	380	566	170	72	69	74	69	71	-0.032	6.05	0
493	71.767	74.390	0.15	0.15	1.74	75	0.68	1.37	77	0.3	83	0.052	100	100	1.5	0	462	303	474	286	372	379	566	171	72	69	74	69	71	-0.033	6.02	0

Wood Heater Test Data - ASTM E2780 / ASTM E2515

Run: 3

Manufacturer: Valley Comfort
Model: PI29
Tracking No.: VC-18-1
Project No.: 0142WN019E
Test Date: 24-Jan-18
Beginning Clock Time: 11:17

Total Sampling Time: 597 min
Recording Interval: 1 min
Background Sample Volume: 0 cubic feet

Meter Box Y Factor: 0.997 (1) 0.981 (2) _____ (Amb)

Barometric Pressure:	Begin	Middle	End	Average
	28.56	28.8	28.97	28.78 "Hg

OMNI Equipment Numbers: 410, 283A, 132, 576, 318, 432, 419, 371, 372, 296-T32, 559, 592, 637

PM Control Modules: 371/372
Dilution Tunnel MW(dry): 29.00 lb/lb-mole
Dilution Tunnel MW(wet): 28.78 lb/lb-mole
Dilution Tunnel H2O: 2.00 percent
Dilution Tunnel Static: -0.180 "H2O
Tunnel Area: 0.19635 ft2
Pitot Tube Cp: 0.99

Avg. Tunnel Velocity: 13.78 ft/sec.
Initial Tunnel Flow: 147.0 scfm
Average Tunnel Flow: 148.6 scfm
Post-Test Leak Check (1): 0.000 cfm @ -9 in. Hg
Post-Test Leak Check (2): 0.000 cfm @ -10 in. Hg
Average Test Piece Fuel Moisture: 20.61 Dry Basis %

Technician Signature: _____

Velocity Traverse Data	Pt.1	Pt.2	Pt.3	Pt.4	Pt.5	Pt.6	Pt.7	Pt.8	Center	
Initial dP	0.034	0.052	0.034	0.028	0.038	0.048	0.050	0.032	0.052	"H2O
Temp:	77	77	77	77	77	77	77	77	77	°F

V_{strav} 13.75 ft/sec V_{scent} 15.60 ft/sec F_p 0.881

	Particulate Sampling Data														Fuel Weight (lb)		Temperature Data (°F)													Stack Gas Data		
Elapsed Time (min)	Gas Meter 1 (ft^3)	Gas Meter 2 (ft^3)	Sample Rate 1 (cfm)	Sample Rate 2 (cfm)	Orifice dH 1 ("H_2O)	Meter 1 Temp (°F)	Meter 1 Vacuum ("Hg)	Orifice dH 2 ("H_2O)	Meter 2 Temp (°F)	Meter 2 Vacuum ("Hg)	Dilution Tunnel (°F)	Dilution Tunnel Center dP	Pro. Rate 1	Pro. Rate 2	Scale Reading	Weight Change	Firebox Top	Firebox Bottom	Firebox Back	Firebox Left	Firebox Right	Avg. Stove Surface	Catalyst Exit	Stack	Filter 1	Dryer Exit 1	Filter 2	Dryer Exit 2	Ambient	Draft ("H_2O)	CO_2 (%)	CO (%)
494	71.913	74.541	0.15	0.15	1.73	75	0.68	1.36	77	0.3	83	0.052	100	100	1.5	0	461	303	473	286	371	379	566	171	72	69	74	69	71	-0.032	6.02	0
495	72.059	74.692	0.15	0.15	1.74	75	0.68	1.36	77	0.3	83	0.052	100	100	1.5	0	460	302	473	287	371	379	566	171	72	69	74	69	71	-0.032	6.05	0
496	72.205	74.843	0.15	0.15	1.74	75	0.68	1.37	77	0.3	83	0.052	100	100	1.5	0	460	302	472	287	371	378	565	171	72	69	74	69	71	-0.032	6.04	0
497	72.350	74.994	0.14	0.15	1.74	75	0.68	1.36	77	0.3	82	0.052	99	100	1.4	-0.1	459	302	472	287	371	378	565	171	72	69	74	69	70	-0.032	6.01	0
498	72.496	75.145	0.15	0.15	1.74	75	0.68	1.37	77	0.3	83	0.052	100	100	1.4	0	458	302	471	287	370	378	564	169	72	69	74	69	70	-0.032	6.03	0
499	72.642	75.296	0.15	0.15	1.72	74	0.68	1.37	77	0.3	82	0.052	100	100	1.4	0	458	301	471	287	370	377	563	168	72	69	74	69	71	-0.032	6	0
500	72.788	75.447	0.15	0.15	1.71	74	0.69	1.37	76	0.3	82	0.052	100	100	1.4	0	457	301	470	288	370	377	562	169	72	69	73	69	71	-0.032	5.91	0
501	72.934	75.598	0.15	0.15	1.71	74	0.68	1.36	76	0.3	82	0.052	100	100	1.4	0	456	301	469	288	370	377	561	168	72	69	73	69	71	-0.033	5.9	0
502	73.080	75.749	0.15	0.15	1.69	74	0.69	1.38	76	0.3	82	0.052	100	100	1.4	0	456	300	468	288	369	376	560	170	72	69	73	69	71	-0.032	5.95	0
503	73.225	75.901	0.14	0.15	1.69	74	0.69	1.36	76	0.3	82	0.052	99	100	1.4	0	455	300	468	289	369	376	560	169	72	69	73	69	71	-0.033	5.94	0
504	73.371	76.051	0.15	0.15	1.69	74	0.69	1.36	76	0.3	82	0.052	100	99	1.4	0	455	300	467	289	369	376	559	168	72	69	73	69	71	-0.032	5.91	0
505	73.516	76.203	0.15	0.15	1.69	74	0.69	1.37	76	0.3	82	0.052	99	100	1.3	-0.1	454	300	466	289	369	376	559	168	72	69	73	69	71	-0.032	5.9	0
506	73.662	76.354	0.15	0.15	1.70	74	0.68	1.37	76	0.3	82	0.052	100	100	1.3	0	453	299	465	289	369	375	558	169	72	69	73	69	70	-0.032	5.95	0
507	73.808	76.504	0.15	0.15	1.71	74	0.69	1.37	76	0.3	82	0.052	100	99	1.3	0	453	299	464	289	369	375	557	169	72	69	73	69	70	-0.032	5.95	0
508	73.954	76.656	0.15	0.15	1.71	74	0.68	1.36	76	0.3	82	0.052	100	100	1.3	0	452	299	463	290	369	375	557	168	72	69	73	69	70	-0.032	6.14	0
509	74.100	76.807	0.15	0.15	1.73	74	0.69	1.37	76	0.3	82	0.052	100	100	1.3	0	452	299	462	290	369	374	556	169	72	69	73	69	70	-0.032	6.21	0
510	74.246	76.958	0.15	0.15	1.73	73	0.68	1.36	76	0.3	82	0.052	100	100	1.3	0	452	298	461	290	369	374	556	168	72	69	73	69	70	-0.032	6.18	0
511	74.392	77.109	0.15	0.15	1.73	73	0.68	1.38	76	0.3	82	0.052	100	100	1.3	0	451	298	460	291	369	374	556	169	72	69	73	69	70	-0.032	6.04	0
512	74.538	77.261	0.15	0.15	1.73	73	0.68	1.37	76	0.3	82	0.052	100	100	1.2	-0.1	451	298	458	291	369	373	555	169	72	69	73	68	70	-0.032	6.04	0
513	74.683	77.411	0.15	0.15	1.73	73	0.68	1.37	76	0.3	82	0.052	100	99	1.2	0	450	297	458	291	369	373	554	167	72	69	73	69	71	-0.032	6.08	0
514	74.829	77.563	0.15	0.15	1.73	73	0.68	1.37	76	0.3	82	0.052	100	100	1.2	0	449	297	457	291	369	373	553	168	72	69	73	68	70	-0.032	6.01	0
515	74.975	77.714	0.15	0.15	1.73	73	0.68	1.37	76	0.3	82	0.052	100	100	1.2	0	449	297	456	291	369	372	552	169	72	69	73	68	70	-0.032	6.01	0
516	75.121	77.864	0.15	0.15	1.74	73	0.68	1.37	76	0.3	82	0.052	100	99	1.2	0	448	296	455	292	369	372	551	167	72	69	73	68	70	-0.032	5.97	0
517	75.267	78.016	0.15	0.15	1.73	73	0.68	1.37	76	0.3	82	0.052	100	100	1.2	0	448	296	454	292	369	372	550	168	72	69	73	68	70	-0.032	5.92	0
518	75.413	78.167	0.15	0.15	1.74	73	0.68	1.37	76	0.3	82	0.052	100	100	1.2	0	447	296	454	292	369	372	549	168	72	69	73	68	70	-0.032	5.92	0
519	75.559	78.318	0.15	0.15	1.73	73	0.68	1.36	76	0.3	82	0.052	100	100	1.2	0	447	296	453	292	369	371	548	168	72	69	73	68	70	-0.032	5.92	0
520	75.705	78.469	0.15	0.15	1.73	73	0.68	1.37	76	0.3	81	0.052	100	100	1.1	-0.1	446	295	452	292	368	371	548	169	72	69	73	68	71	-0.032	5.96	0
521	75.850	78.620	0.14	0.15	1.73	73	0.68	1.37	76	0.3	81	0.052	99	100	1.1	0	445	295	452	292	368	370	547	169	72	69	73	68	70	-0.032	5.93	0
522	75.996	78.771	0.15	0.15	1.74	73	0.68	1.37	76	0.3	81	0.052	100	100	1.1	0	445	295	451	292	368	370	546	168	72	69	73	68	70	-0.032	5.95	0
523	76.142	78.922	0.15	0.15	1.73	73	0.68	1.37	76	0.3	81	0.052	100	100	1.1	0	444	295	451	293	368	370	545	169	72	69	73	68	70	-0.032	5.9	0
524	76.287	79.073	0.15	0.15	1.72	73	0.69	1.37	76	0.3	81	0.052	99	100	1.1	0	444	295	451	293	368	370	545	170	72	69	73	68	70	-0.032	5.93	0
525	76.433	79.225	0.15	0.15	1.71	73	0.69	1.37	76	0.3	81	0.052	100	100	1.1	0	443	294	450	293	368	370	545	170	72	69	73	68	70	-0.032	5.92	0
526	76.579	79.375	0.15	0.15	1.69	73	0.69	1.35	76	0.3	81	0.052	100	99	1.1	0	443	293	450	293	368	369	544	170	72	69	73	68	70	-0.033	5.97	0
527	76.724	79.527	0.15	0.15	1.69	73	0.69	1.38	75	0.3	81	0.052	99	101	1.1	0	442	293	449	293	368	369	544	170	72	69	73	68	70	-0.032	5.93	0
528	76.870	79.678	0.15	0.15	1.68	72	0.69	1.37	75	0.3	81	0.052	100	100	1.0	-0.1	441	293	449	293	367	369	544	171	72	69	73	68	70	-0.032	5.85	0
529	77.015	79.829	0.14	0.15	1.69	73	0.69	1.36	75	0.3	81	0.052	99	100	1.0	0	441	293	449	294	367	369	543	171	72	69	73	68	70	-0.032	5.85	0
530	77.160	79.980	0.14	0.15	1.71	73	0.69	1.38	75	0.3	81	0.052	99	100	1.0	0	441	293	448	294	367	369	542	171	72	69	73	68	70	-0.033	5.86	0
531	77.306	80.132	0.15	0.15	1.71	73	0.68	1.37	75	0.3	81	0.052	100	101	1.0	0	440	293	448	294	367	368	542	171	72	69	73	68	70	-0.033	5.81	0

Wood Heater Test Data - ASTM E2780 / ASTM E2515

Run: 3

Manufacturer: Valley Comfort
Model: PI29
Tracking No.: VC-18-1
Project No.: 0142WN019E
Test Date: 24-Jan-18
Beginning Clock Time: 11:17

Total Sampling Time: 597 min
Recording Interval: 1 min
Background Sample Volume: 0 cubic feet

Meter Box Y Factor: 0.997 (1) 0.981 (2) _____ (Amb)

Barometric Pressure:

Begin	Middle	End	Average
28.56	28.8	28.97	28.78 "Hg

OMNI Equipment Numbers: 410, 283A, 132, 576, 318, 432, 419, 371, 372, 296-T32, 559, 592, 637

PM Control Modules: 371/372
Dilution Tunnel MW(dry): 29.00 lb/lb-mole
Dilution Tunnel MW(wet): 28.78 lb/lb-mole
Dilution Tunnel H2O: 2.00 percent
Dilution Tunnel Static: -0.180 "H2O
Tunnel Area: 0.19635 ft2
Pitot Tube Cp: 0.99

Avg. Tunnel Velocity: 13.78 ft/sec.
Initial Tunnel Flow: 147.0 scfm
Average Tunnel Flow: 148.6 scfm
Post-Test Leak Check (1): 0.000 cfm @ -9 in. Hg
Post-Test Leak Check (2): 0.000 cfm @ -10 in. Hg
Average Test Piece Fuel Moisture: 20.61 Dry Basis %

Technician Signature: _____

Velocity Traverse Data

	Pt.1	Pt.2	Pt.3	Pt.4	Pt.5	Pt.6	Pt.7	Pt.8	Center	
Initial dP	0.034	0.052	0.034	0.028	0.038	0.048	0.050	0.032	0.052	"H2O
Temp:	77	77	77	77	77	77	77	77	77	°F

V_{strav} 13.75 ft/sec V_{scent} 15.60 ft/sec F_p 0.881

	Particulate Sampling Data														Fuel Weight (lb)		Temperature Data (°F)													Stack Gas Data		
Elapsed Time (min)	Gas Meter 1 (ft^3)	Gas Meter 2 (ft^3)	Sample Rate 1 (cfm)	Sample Rate 2 (cfm)	Orifice dH 1 ("H_2O)	Meter 1 Temp (°F)	Meter 1 Vacuum ("Hg)	Orifice dH 2 ("H_2O)	Meter 2 Temp (°F)	Meter 2 Vacuum ("Hg)	Dilution Tunnel (°F)	Dilution Tunnel Center dP	Pro. Rate 1	Pro. Rate 2	Scale Reading	Weight Change	Firebox Top	Firebox Bottom	Firebox Back	Firebox Left	Firebox Right	Avg. Stove Surface	Catalyst Exit	Stack	Filter 1	Dryer Exit 1	Filter 2	Dryer Exit 2	Ambient	Draft ("H_2O)	CO_2 (%)	CO (%)
532	77.453	80.282	0.15	0.15	1.72	73	0.68	1.36	75	0.3	81	0.052	101	99	1.0	0	440	293	448	294	367	368	541	170	72	69	73	68	70	-0.032	5.85	0
533	77.598	80.434	0.14	0.15	1.73	73	0.68	1.38	75	0.3	81	0.052	99	101	1.0	0	440	292	447	294	367	368	541	170	72	69	73	68	70	-0.033	5.79	0
534	77.744	80.585	0.15	0.15	1.73	73	0.68	1.37	75	0.3	80	0.052	100	100	0.9	-0.1	439	291	447	294	367	368	540	170	72	69	73	68	70	-0.033	5.83	0
535	77.890	80.736	0.15	0.15	1.74	73	0.68	1.36	75	0.3	80	0.052	100	100	0.9	0	438	290	447	294	366	367	540	169	72	69	73	68	69	-0.033	5.82	0
536	78.036	80.887	0.15	0.15	1.73	72	0.68	1.37	75	0.3	80	0.052	100	100	0.9	0	438	290	446	294	366	367	539	170	72	69	72	68	70	-0.032	5.82	0
537	78.182	81.039	0.15	0.15	1.74	73	0.68	1.37	75	0.3	80	0.052	100	100	0.9	0	438	290	446	295	366	367	539	170	72	69	72	68	70	-0.033	5.81	0
538	78.327	81.189	0.14	0.15	1.74	73	0.69	1.35	76	0.3	80	0.052	99	99	0.9	0	438	290	446	295	366	367	539	169	72	69	72	68	70	-0.033	5.81	0
539	78.473	81.341	0.15	0.15	1.74	72	0.68	1.37	75	0.3	81	0.052	100	101	0.9	0	437	290	445	295	365	366	539	169	72	69	72	68	70	-0.032	5.74	0
540	78.619	81.492	0.15	0.15	1.74	73	0.68	1.37	75	0.3	81	0.052	100	100	0.9	0	437	290	445	295	365	366	538	170	72	69	72	68	70	-0.032	5.7	0
541	78.765	81.643	0.15	0.15	1.73	73	0.68	1.36	75	0.3	81	0.052	100	100	0.9	0	436	289	444	295	365	366	538	170	72	69	72	68	70	-0.032	5.67	0
542	78.911	81.795	0.15	0.15	1.73	73	0.68	1.37	75	0.3	80	0.052	100	100	0.8	-0.1	436	289	443	295	364	365	537	170	72	69	72	68	69	-0.032	5.62	0
543	79.057	81.946	0.15	0.15	1.73	73	0.68	1.37	75	0.3	81	0.052	100	100	0.8	0	435	289	443	295	364	365	536	170	72	69	72	68	70	-0.032	5.63	0
544	79.203	82.096	0.15	0.15	1.74	73	0.68	1.36	75	0.3	81	0.052	100	99	0.8	0	435	288	442	295	364	365	536	170	72	69	72	68	69	-0.032	5.64	0
545	79.349	82.248	0.15	0.15	1.74	73	0.68	1.38	75	0.3	81	0.052	100	101	0.8	0	435	288	442	295	363	365	535	171	72	69	72	68	70	-0.033	5.67	0
546	79.495	82.399	0.15	0.15	1.74	73	0.68	1.37	75	0.3	81	0.052	100	100	0.8	0	434	287	441	296	363	364	535	171	72	69	72	68	70	-0.033	5.63	0
547	79.640	82.550	0.14	0.15	1.72	73	0.68	1.37	75	0.3	80	0.052	99	100	0.8	0	434	287	440	296	363	364	535	172	72	69	72	68	70	-0.032	5.71	0
548	79.786	82.702	0.15	0.15	1.72	73	0.69	1.37	75	0.3	80	0.052	100	100	0.8	0	433	286	440	296	362	363	535	171	72	69	72	68	70	-0.033	5.72	0
549	79.932	82.853	0.15	0.15	1.71	73	0.69	1.37	75	0.3	80	0.052	100	100	0.8	0	433	286	439	297	362	363	535	170	71	69	72	68	70	-0.033	5.72	0
550	80.078	83.003	0.15	0.15	1.71	73	0.69	1.36	75	0.3	80	0.052	100	99	0.7	-0.1	433	286	439	297	362	363	536	171	71	69	72	68	70	-0.033	5.7	0
551	80.223	83.155	0.14	0.15	1.70	73	0.69	1.37	75	0.3	80	0.052	99	100	0.7	0	433	286	438	297	361	363	536	171	71	69	72	68	70	-0.032	5.74	0
552	80.369	83.306	0.15	0.15	1.69	73	0.68	1.38	75	0.3	80	0.052	100	100	0.7	0	433	285	438	297	361	363	537	171	71	69	72	68	70	-0.032	5.78	0
553	80.514	83.457	0.14	0.15	1.69	73	0.68	1.37	75	0.3	80	0.052	99	100	0.7	0	433	285	437	298	361	363	537	171	72	69	72	68	70	-0.033	5.8	0
554	80.660	83.608	0.15	0.15	1.71	73	0.69	1.37	75	0.3	81	0.052	100	100	0.7	0	432	284	436	298	360	362	538	171	71	69	72	68	70	-0.033	5.76	0
555	80.806	83.760	0.15	0.15	1.71	73	0.68	1.38	75	0.3	80	0.052	100	100	0.7	0	432	284	436	298	360	362	538	171	71	69	72	68	70	-0.033	5.68	0
556	80.952	83.911	0.15	0.15	1.71	73	0.68	1.37	75	0.3	80	0.052	100	100	0.7	0	433	284	435	299	359	362	538	171	71	69	72	68	69	-0.032	5.65	0
557	81.098	84.062	0.15	0.15	1.71	73	0.68	1.38	75	0.3	81	0.052	100	100	0.7	0	433	284	435	299	359	362	538	172	71	69	72	68	69	-0.033	5.73	0
558	81.244	84.213	0.15	0.15	1.74	73	0.68	1.38	75	0.3	81	0.052	100	100	0.6	-0.1	432	284	434	299	359	362	539	171	71	69	72	68	69	-0.033	5.74	0
559	81.390	84.365	0.15	0.15	1.73	73	0.68	1.36	75	0.3	80	0.052	100	100	0.6	0	432	283	434	299	358	361	539	172	71	69	72	68	69	-0.033	5.72	0
560	81.537	84.516	0.15	0.15	1.74	73	0.68	1.37	75	0.3	80	0.052	101	100	0.6	0	432	283	433	300	358	361	539	173	71	69	72	68	70	-0.033	5.71	0
561	81.683	84.667	0.15	0.15	1.74	73	0.68	1.38	75	0.3	80	0.052	100	100	0.6	0	432	283	433	300	358	361	540	173	71	69	72	68	69	-0.033	5.85	0
562	81.829	84.818	0.15	0.15	1.75	73	0.68	1.38	75	0.3	80	0.052	100	100	0.6	0	432	283	432	300	358	361	541	174	71	69	72	68	70	-0.033	5.87	0
563	81.974	84.970	0.15	0.15	1.75	72	0.68	1.37	75	0.3	80	0.052	100	100	0.6	0	432	282	432	300	357	361	542	176	71	69	72	68	70	-0.033	5.8	0
564	82.120	85.121	0.15	0.15	1.74	72	0.68	1.39	75	0.3	79	0.052	100	100	0.6	0	432	281	431	300	357	360	543	175	71	69	72	68	69	-0.033	5.83	0
565	82.266	85.273	0.15	0.15	1.75	72	0.68	1.38	75	0.3	80	0.052	100	100	0.5	-0.1	432	281	431	300	357	360	544	176	71	69	72	68	69	-0.033	5.83	0
566	82.413	85.424	0.15	0.15	1.75	72	0.68	1.37	75	0.3	80	0.052	101	100	0.5	0	433	280	430	300	357	360	545	177	71	69	72	68	69	-0.033	5.85	0
567	82.559	85.575	0.15	0.15	1.75	72	0.68	1.38	75	0.3	80	0.052	100	100	0.5	0	433	279	430	301	356	360	546	177	71	68	72	68	69	-0.033	5.87	0
568	82.705	85.727	0.15	0.15	1.73	72	0.68	1.37	75	0.3	80	0.052	100	100	0.5	0	433	279	429	301	356	360	547	177	71	68	72	68	69	-0.033	5.8	0
569	82.851	85.878	0.15	0.15	1.73	72	0.68	1.37	75	0.3	80	0.052	100	100	0.5	0	434	279	428	301	356	360	548	178	71	68	72	68	69	-0.033	5.79	0

Wood Heater Test Data - ASTM E2780 / ASTM E2515

Run: 3

Manufacturer: Valley Comfort
Model: PI29
Tracking No.: VC-18-1
Project No.: 0142WN019E
Test Date: 24-Jan-18
Beginning Clock Time: 11:17

Total Sampling Time: 597 min
Recording Interval: 1 min
Background Sample Volume: 0 cubic feet

Meter Box Y Factor: 0.997 (1) 0.981 (2) _____ (Amb)

Barometric Pressure:	Begin	Middle	End	Average
	28.56	28.8	28.97	28.78 "Hg

OMNI Equipment Numbers: 410, 283A, 132, 576, 318, 432, 419, 371, 372, 296-T32, 559, 592, 637

PM Control Modules: 371/372
Dilution Tunnel MW(dry): 29.00 lb/lb-mole
Dilution Tunnel MW(wet): 28.78 lb/lb-mole
Dilution Tunnel H2O: 2.00 percent
Dilution Tunnel Static: -0.180 "H2O
Tunnel Area: 0.19635 ft2
Pitot Tube Cp: 0.99

Avg. Tunnel Velocity: 13.78 ft/sec.
Initial Tunnel Flow: 147.0 scfm
Average Tunnel Flow: 148.6 scfm
Post-Test Leak Check (1): 0.000 cfm @ -9 in. Hg
Post-Test Leak Check (2): 0.000 cfm @ -10 in. Hg
Average Test Piece Fuel Moisture: 20.61 Dry Basis %

Technician Signature: _____

Velocity Traverse Data	Pt.1	Pt.2	Pt.3	Pt.4	Pt.5	Pt.6	Pt.7	Pt.8	Center	
Initial dP	0.034	0.052	0.034	0.028	0.038	0.048	0.050	0.032	0.052	"H2O
Temp:	77	77	77	77	77	77	77	77	77	°F

V_{strav} 13.75 ft/sec V_{scent} 15.60 ft/sec F_p 0.881

	Particulate Sampling Data														Fuel Weight (lb)		Temperature Data (°F)													Stack Gas Data		
Elapsed Time (min)	Gas Meter 1 (ft^3)	Gas Meter 2 (ft^3)	Sample Rate 1 (cfm)	Sample Rate 2 (cfm)	Orifice dH 1 ("H_2O)	Meter 1 Temp (°F)	Meter 1 Vacuum ("Hg)	Orifice dH 2 ("H_2O)	Meter 2 Temp (°F)	Meter 2 Vacuum ("Hg)	Dilution Tunnel (°F)	Dilution Tunnel Center dP	Pro. Rate 1	Pro. Rate 2	Scale Reading	Weight Change	Firebox Top	Firebox Bottom	Firebox Back	Firebox Left	Firebox Right	Avg. Stove Surface	Catalyst Exit	Stack	Filter 1	Dryer Exit 1	Filter 2	Dryer Exit 2	Ambient	Draft ("H_2O)	CO_2 (%)	CO (%)
570	82.997	86.029	0.15	0.15	1.73	72	0.68	1.38	75	0.3	80	0.052	100	100	0.5	0	433	279	428	302	355	359	549	179	71	68	72	68	69	-0.033	5.86	0
571	83.143	86.181	0.15	0.15	1.75	72	0.68	1.38	75	0.3	80	0.052	100	100	0.4	-0.1	434	279	427	302	355	359	550	180	71	68	72	68	68	-0.033	5.9	0
572	83.289	86.332	0.15	0.15	1.75	72	0.68	1.36	75	0.3	79	0.052	100	100	0.4	0	434	279	426	302	354	359	550	180	71	68	72	68	69	-0.033	5.91	0
573	83.435	86.483	0.15	0.15	1.75	72	0.68	1.39	75	0.3	80	0.052	100	100	0.4	0	435	279	426	303	354	359	551	180	71	68	72	68	69	-0.034	5.85	0
574	83.581	86.635	0.15	0.15	1.75	72	0.68	1.37	75	0.3	80	0.052	100	100	0.4	0	435	279	425	303	353	359	552	180	71	68	72	68	69	-0.033	5.81	0
575	83.727	86.786	0.15	0.15	1.75	72	0.68	1.37	75	0.3	80	0.052	100	100	0.4	0	435	279	424	303	353	359	552	180	71	68	72	68	69	-0.033	5.81	0
576	83.873	86.937	0.15	0.15	1.75	72	0.68	1.38	75	0.3	80	0.052	100	100	0.4	0	435	279	423	303	353	359	552	182	71	68	72	68	69	-0.034	5.76	0
577	84.019	87.089	0.15	0.15	1.75	72	0.68	1.38	75	0.3	80	0.052	100	100	0.3	-0.1	436	278	422	303	352	358	553	182	71	68	72	68	69	-0.033	5.78	0
578	84.165	87.240	0.15	0.15	1.71	72	0.68	1.36	75	0.3	80	0.052	100	100	0.3	0	436	278	421	303	352	358	554	182	71	68	72	68	69	-0.034	5.82	0
579	84.311	87.391	0.15	0.15	1.71	72	0.68	1.38	75	0.3	80	0.052	100	100	0.3	0	437	278	420	303	351	358	555	182	71	68	72	68	69	-0.034	5.87	0
580	84.456	87.543	0.14	0.15	1.71	72	0.68	1.38	75	0.3	80	0.052	100	100	0.3	0	437	278	420	304	351	358	556	182	71	68	72	68	69	-0.034	5.81	0
581	84.602	87.694	0.15	0.15	1.71	72	0.68	1.37	75	0.3	80	0.052	100	100	0.3	0	437	278	419	304	350	358	557	181	71	68	72	68	69	-0.034	5.74	0
582	84.748	87.845	0.15	0.15	1.71	72	0.68	1.38	75	0.3	80	0.052	100	100	0.3	0	438	278	418	304	350	358	558	182	71	68	72	68	69	-0.034	5.72	0
583	84.893	87.997	0.14	0.15	1.71	71	0.68	1.38	75	0.3	80	0.052	100	100	0.2	-0.1	438	277	417	304	350	357	558	182	71	68	71	68	69	-0.034	5.7	0
584	85.039	88.148	0.15	0.15	1.71	71	0.68	1.36	75	0.3	80	0.052	100	100	0.2	0	438	277	417	304	349	357	558	183	71	68	72	68	69	-0.034	5.63	0
585	85.185	88.299	0.15	0.15	1.74	71	0.68	1.38	75	0.3	80	0.052	100	100	0.2	0	439	277	416	304	349	357	557	183	71	68	71	68	69	-0.034	5.64	0
586	85.332	88.451	0.15	0.15	1.74	71	0.68	1.38	75	0.3	80	0.052	101	100	0.2	0	439	277	415	305	348	357	557	183	71	68	71	68	69	-0.034	5.62	0
587	85.478	88.602	0.15	0.15	1.74	71	0.68	1.36	75	0.3	80	0.052	100	100	0.2	0	439	276	415	305	348	357	556	182	71	68	72	68	69	-0.034	5.58	0
588	85.624	88.753	0.15	0.15	1.74	71	0.68	1.38	74	0.3	80	0.052	100	100	0.2	0	439	276	414	305	348	356	555	181	71	68	71	68	69	-0.034	5.56	0
589	85.770	88.905	0.15	0.15	1.74	71	0.68	1.37	75	0.3	80	0.052	100	100	0.2	0	439	276	413	305	347	356	555	183	71	68	71	68	69	-0.034	5.46	0
590	85.916	89.056	0.15	0.15	1.74	71	0.68	1.37	75	0.3	80	0.052	100	100	0.2	0	439	275	413	305	347	356	554	183	71	68	71	68	69	-0.034	5.48	0
591	86.062	89.207	0.15	0.15	1.74	71	0.68	1.38	74	0.3	80	0.052	100	100	0.1	-0.1	439	275	412	305	347	356	553	183	71	68	71	68	69	-0.034	5.47	0
592	86.207	89.358	0.14	0.15	1.75	71	0.68	1.38	74	0.3	80	0.052	100	100	0.1	0	439	275	411	305	346	355	552	182	71	68	71	68	69	-0.034	5.44	0
593	86.353	89.509	0.15	0.15	1.75	71	0.68	1.36	74	0.3	80	0.052	100	100	0.1	0	438	274	411	306	346	355	550	182	71	68	71	68	69	-0.034	5.43	0
594	86.499	89.661	0.15	0.15	1.75	71	0.68	1.38	74	0.3	80	0.052	100	101	0.1	0	438	274	410	306	346	355	550	182	71	68	72	68	69	-0.034	5.49	0
595	86.645	89.812	0.15	0.15	1.75	71	0.68	1.38	74	0.3	79	0.052	100	100	0.1	0	438	273	410	306	345	354	549	183	71	68	71	68	69	-0.034	5.46	0
596	86.791	89.963	0.15	0.15	1.74	71	0.68	1.37	74	0.3	80	0.052	100	100	0.1	0	437	273	409	307	345	354	548	183	71	68	71	68	69	-0.034	5.44	0
597	86.937	90.115	0.15	0.15	1.74	71	0.68	1.37	74	0.3	80	0.052	100	101	0.0	-0.1	437	273	409	307	345	354	546	183	71	68	71	68	69	-0.034	5.46	0
Avg/Tot	86.937	90.115	0.15	0.15	1.73	73		1.37	75		83	0.052	100	100								43.8				68	73	68	70	-0.036		

Wood Heater Lab Data - ASTM E2780 / ASTM E2515

Manufacturer:	Valley Comfort	Equipment Numbers:	283A, 592, 637
Model:	PI29		
Tracking No.:	VC-18-1		
Project No.:	0142WN019E		
Run #:	3		
Date:	1/24/18		

TRAIN 1 (First Hour emissions)

Sample Component	Reagent	Filter, Probe or Dish #	Weights		
			Final, mg	Tare, mg	Particulate, mg
B. Front filter catch	Filter	D385	125.7	111.2	14.5
C. Rear filter catch	Filter				0.0
D. Probe catch*	Probe				0.0
E. Filter seals catch*	Seals				0.0

Sub-Total	Total Particulate, mg:	14.5

TRAIN 1 (Post First Hour Change-out)

Sample Component	Reagent	Filter, Probe or Dish #	Weights		
			Final, mg	Tare, mg	Particulate, mg
B. Front filter catch	Filter	D402	240.8	239.8	1.0
C. Rear filter catch	Filter	D403			0.0
D. Probe catch*	Probe	62	117661.5	117661.5	0.0
E. Filter seals catch*	Seals	R567	3295.8	3295.9	0.0

Sub-Total	Total Particulate, mg:	1.0
Train 1 Aggregate	Total Particulate, mg:	15.5

TRAIN 2

Sample Component	Reagent	Filter, Probe or Dish #	Weights		
			Final, mg	Tare, mg	Particulate, mg
A. Front filter catch	Filter	D404	253.3	239.1	14.2
B. Rear filter catch	Filter	D405			0.0
C. Probe catch*	Probe	66	118455.6	118455.7	0.0
D. Filter seals catch*	Seals	R568	3367.2	3367.2	0.0

Total Particulate, mg:	14.2

AMBIENT

Sample Component	Reagent	Filter # or Probe #	Weights		
			Final, mg	Tare, mg	Particulate, mg
A. Front filter catch*	Filter				0.0

Total Particulate, mg:	0.0

*Particulate catch that results in a negative number, is assumed to be zero for probes and seals, negative numbers for filters are assumed to be part of the seal weight.

Component	Equations:
A. Front filter catch	Final (mg) - Tare (mg) = Particulate, mg
B. Rear filter catch	Final (mg) - Tare (mg) = Particulate, mg
C. Probe catch	Final (mg) - Tare (mg) = Particulate, mg

Technician Signature: _____

Wood Heater Test Results - ASTM E2780 / ASTM E2515

Manufacturer: Valley Comfort
Model: PI29
Project No.: 0142WN019E
Tracking No.: VC-18-1
Run: 3
Test Date: 01/24/18

Burn Rate	**0.65 kg/hr dry**
Average Tunnel Temperature	83 degrees Fahrenheit
Average Gas Velocity in Dilution Tunnel - vs	13.78 feet/second
Average Gas Flow Rate in Dilution Tunnel - Qsd	8918.2 dscf/hour
Average Delta p	0.052 inches H20
Total Time of Test	597 minutes

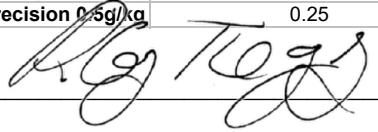
	AMBIENT	SAMPLE TRAIN 1	SAMPLE TRAIN 2	FIRST HOUR FILTER (TRAIN 1)
Total Sample Volume - Vm	0.000 cubic feet	86.937 cubic feet	90.115 cubic feet	8.706 cubic feet
Average Gas Meter Temperature	70 degrees Fahrenheit	73 degrees Fahrenheit	75 degrees Fahrenheit	68 degrees Fahrenheit
Total Sample Volume (Standard Conditions) - Vmstd	0.000 dscf	82.874 dscf	84.143 dscf	8.378 dscf
Total Particulates - m_n	0 mg	15.5 mg	14.2 mg	14.5 mg
Particulate Concentration (dry-standard) - C_f/C_s	0.000000 grams/dscf	0.00019 grams/dscf	0.00017 grams/dscf	0.00173 grams/dscf
Total Particulate Emissions - E_T	0.00 grams	16.60 grams	14.98 grams	15.43 grams
Particulate Emission Rate	0.00 grams/hour	1.67 grams/hour	1.51 grams/hour	15.43 grams/hour
Emissions Factor		2.58 g/kg	2.33 g/kg	7.74 g/kg
Difference from Average Total Particulate Emissions		0.81 grams	0.81 grams	
	Dual Train Comparison Results Are Acceptable			

FINAL AVERAGE RESULTS

Complete Test Run	
Total Particulate Emissions - E_T	15.79 grams
Particulate Emission Rate	**1.59 grams/hour**
Emissions Factor	2.45 grams/kg
First Hour Emissions	
Total Particulate Emissions - E_T	15.43 grams
Particulate Emission Rate	15.43 grams/hour
Emissions Factor	7.74 grams/kg
7.5% of Average Total Particulate Emissions	1.18 grams

QUALITY CHECKS

Filter Temps < 90 °F	OK
Filter Face Velocity (47 mm)	OK
Dryer Exit Temp < 80F	OK
Leakage Rate	OK
Ambient Temp (55-90°F)	OK
Negative Probe Weight Eval.	OK
Pro-Rate Variation	OK
Stove Surface ΔT	OK
Train Precesion 7.5%	5.13
Train Precision 0.5g/kg	0.25

Technician Signature: 

Wood Heater Efficiency Results - CSA B415.1

Manufacturer:	**Valley Comfort**
Model:	**PI29**
Date:	**01/24/18**
Run:	**3**
Control #:	**0142WN019E**
Test Duration:	**597**
Output Category:	**I**

Technician Signature: _____

Test Results in Accordance with CSA B415.1-09

	HHV Basis	LHV Basis
Overall Efficiency	**80.3%**	**86.7%**
Combustion Efficiency	**98.5%**	**98.5%**
Heat Transfer Efficiency	**81%**	**88.1%**

Output Rate (kJ/h)	**10,219**	**9,694**	**(Btu/h)**
Burn Rate (kg/h)	**0.64**	**1.42**	**(lb/h)**
Input (kJ/h)	**12,733**	**12,079**	**(Btu/h)**

Test Load Weight (dry kg)	**6.40**	**14.10**	**dry lb**
MC wet (%)	**17.08507992**		
MC dry (%)	**20.61**		
Particulate (g)	**1.59**		
CO (g)	**188**		
Test Duration (h)	**9.95**		

Emissions	Particulate	CO
g/MJ Output	**0.02**	**1.85**
g/kg Dry Fuel	**0.25**	**29.36**
g/h	**0.16**	**18.87**
lb/MM Btu Output	**0.04**	**4.29**

Air/Fuel Ratio (A/F)	**17.19**

VERSION: **2.2** **12/14/2009**

RUN 4

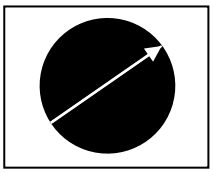
Wood Heater Run Notes

Air Control Settings

Primary:

Medium High:

57° from vertical



Secondary: Auto

Tertiary/Pilot: Fixed

Fan: Med High

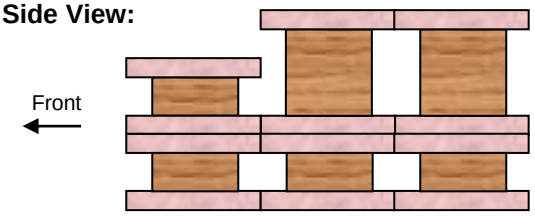
Preburn Notes

Time	Notes
47:00	Turndown to test setting

Test Notes

Sketch test fuel configuration:

Side View:



Start up procedures & Timeline:

Bypass: **Closed**
Fuel loaded by: **0:35**
Door closed at: **0:40**
Primary air: **Set @ 0:00**

Notes: **No fan adjustments**

Time	Notes
60:00	Changed Filter A

2/23/18

Wood Heater Supplemental Data

Start Time: 11:28

Stop Time: 15:40

Booth #: N/A (site testing)

Stack Gas Leak Check:

Initial: 0 Final: 0

Sample Train Leak Check:

A: 0 @ -10 "Hg

B: 0 @ -9 "Hg

Calibrations: Span Gas CO_2: 17.00 CO: 4.267

	Pre Test		Post Test	
	Zero	Span	Zero	Span
Time	9:05	9:03	15:47	15:52
CO_2	0.00	17.00	0.00	16.90
CO	0.000	4.267	-0.009	4.272

Air Velocity (ft/min): Initial: <50 Final: <50

Scale Audit (lbs): Initial: 10.0 Final: 10.0

Pitot Tube Leak Test: Initial: 0 Final: 0

Stack Diameter (in): 6

Induced Draft: 0

% Smoke Capture: 100

Flue Pipe Cleaned Prior to First Test in Series:

Date: 1/22/18 Initials:

	Initial	Middle	Ending
P_b (in/Hg)	28.50	28.53	28.53
RH (%)	25	21	20
Ambient (°F)	71	71	71

Tunnel Traverse

Microtector Reading	dP (in H_2O)	T(°F)
1	0.032	94
2	0.052	94
3	0.03	94
4	0.026	94
5	0.038	94
6	0.05	94
7	0.048	94
8	0.032	94
Center:		
-	0.052	94

Tunnel Static Pressure (in H_20):	
Beginning of Test	End of Test
-0.18	-0.18

Background Filter Volume: N/A

2/23/18

Wood Heater Preburn Data - ASTM E2780

Run:	4

Technician Signature: _____

Manufacturer:	Valley Comfort
Model:	PI29
Tracking No.:	VC-18-1
Project No.:	0142WN019E
Test Date:	1/25/18
Beginning Clock Time:	9:39

Preburn Fuel Data

Fuel Piece Lengths (in.):	16		
Total Preburn Weight (lb):	19		
Fuel Moisture Readings (% DB):	20	19.5	22.5
	21.7	19.1	19.5
	18.8	20.3	21
	23.8	18.9	24.7
Avg Preburn Moisture (% DB):	20.82		

Coal Bed Range (lb):	3.3 (min)	4.1 (max)

			Temperatures (°F)							
Elapsed Time (min)	Scale (lb)	Stack Draft (in H_2O)	FB Top	FB Bottom	FB Back	FB Left	FB Right	Avg. FB	Stack	Ambient
0	11.6	-0.044	758	369	483	309	509	485.6	514	69
1	11.4	-0.044	758	369	486	310	513	487.2	512	70
2	11.3	-0.044	758	368	488	311	517	488.4	512	70
3	11.1	-0.044	759	368	490	312	520	489.8	511	70
4	11	-0.043	761	367	492	313	523	491.2	507	69
5	10.8	-0.043	762	366	494	314	526	492.4	503	71
6	10.7	-0.043	762	366	495	315	528	493.2	501	70
7	10.5	-0.042	763	366	497	316	530	494.4	498	70
8	10.4	-0.043	764	365	498	317	532	495.2	496	71
9	10.2	-0.043	763	365	499	318	533	495.6	494	70
10	10.1	-0.042	763	364	500	319	533	495.8	492	71
11	9.9	-0.041	762	364	501	321	533	496.2	490	70
12	9.8	-0.041	761	364	503	322	534	496.8	488	70
13	9.7	-0.041	759	364	504	324	534	497	485	70
14	9.6	-0.042	758	364	506	326	535	497.8	484	70
15	9.4	-0.042	757	364	507	327	535	498	485	71
16	9.3	-0.041	757	364	508	329	536	498.8	486	70
17	9.1	-0.041	758	364	508	330	537	499.4	486	70
18	9	-0.041	759	364	509	331	537	500	485	71
19	8.9	-0.041	760	363	510	333	538	500.8	484	71
20	8.8	-0.041	760	363	511	334	539	501.4	480	71
21	8.6	-0.041	760	363	512	335	540	502	478	71
22	8.5	-0.041	760	363	514	337	542	503.2	477	71
23	8.4	-0.04	759	363	517	340	545	504.8	472	72
24	8.3	-0.04	757	362	523	342	549	506.6	469	71
25	8.2	-0.039	755	362	528	344	553	508.4	465	71
26	8	-0.039	752	361	533	347	557	510	462	71
27	7.9	-0.04	749	361	537	349	561	511.4	460	71
28	7.8	-0.039	746	360	539	351	563	511.8	458	71
29	7.7	-0.039	744	359	542	352	566	512.6	455	71
30	7.6	-0.039	742	359	545	354	568	513.6	453	71
31	7.5	-0.038	740	358	547	355	570	514	452	71
32	7.4	-0.038	736	358	549	356	572	514.2	451	71
33	7.3	-0.039	733	357	551	357	574	514.4	449	71
34	7.2	-0.038	730	356	553	358	577	514.8	448	71
35	7.1	-0.038	726	355	555	359	579	514.8	448	72
36	7	-0.038	724	355	557	359	582	515.4	446	72
37	6.9	-0.038	720	354	559	360	585	515.6	446	71
38	6.8	-0.037	717	353	562	360	589	516.2	442	70

Wood Heater Preburn Data - ASTM E2780

Run:	4

Technician Signature: _____

Manufacturer:	Valley Comfort
Model:	PI29
Tracking No.:	VC-18-1
Project No.:	0142WN019E
Test Date:	1/25/18
Beginning Clock Time:	9:39

Preburn Fuel Data

Fuel Piece Lengths (in.):	16		
Total Preburn Weight (lb):	19		
Fuel Moisture Readings (% DB):	20	19.5	22.5
	21.7	19.1	19.5
	18.8	20.3	21
	23.8	18.9	24.7
Avg Preburn Moisture (% DB):	20.82		

Coal Bed Range (lb):	3.3 (min)	4.1 (max)

			Temperatures (°F)							
Elapsed Time (min)	Scale (lb)	Stack Draft (in H_2O)	FB Top	FB Bottom	FB Back	FB Left	FB Right	Avg. FB	Stack	Ambient
39	6.7	-0.038	715	350	565	361	593	516.8	439	71
40	6.6	-0.038	712	348	567	361	596	516.8	435	70
41	6.5	-0.037	710	348	569	360	599	517.2	434	70
42	6.4	-0.037	709	348	572	360	601	518	431	72
43	6.4	-0.037	707	347	574	360	603	518.2	429	72
44	6.3	-0.037	706	346	576	361	605	518.8	426	71
45	6.2	-0.036	705	346	580	362	607	520	425	70
46	6.1	-0.036	703	346	584	363	610	521.2	422	71
47	5.7	-0.032	700	345	587	365	613	522	419	72
48	6	-0.029	696	345	587	366	614	521.6	322	71
49	5.9	-0.028	693	344	586	376	612	522.2	265	71
50	5.9	-0.027	688	344	580	381	608	520.2	233	71
51	5.9	-0.026	683	344	574	382	602	517	222	70
52	5.8	-0.025	677	344	569	382	595	513.4	220	70
53	5.8	-0.025	672	344	563	380	588	509.4	226	70
54	5.8	-0.025	669	344	558	378	582	506.2	235	70
55	5.8	-0.023	668	344	554	376	575	503.4	246	70
56	5.7	-0.024	672	344	551	374	570	502.2	257	70
57	5.7	-0.026	677	344	549	372	566	501.6	270	70
58	5.6	-0.026	679	343	547	369	562	500	279	70
59	5.6	-0.026	678	343	545	367	559	498.4	288	70
60	5.5	-0.026	675	343	543	365	557	496.6	294	70
61	5.5	-0.026	670	343	542	363	555	494.6	297	70
62	5.5	-0.026	664	343	540	361	553	492.2	300	70
63	5.5	-0.026	659	342	539	359	552	490.2	300	71
64	5.4	-0.026	654	342	537	358	550	488.2	300	71
65	5.4	-0.026	649	341	535	356	549	486	300	71
66	5.4	-0.026	645	341	532	355	547	484	300	70
67	5.3	-0.026	642	341	530	354	545	482.4	302	70
68	5.3	-0.026	639	341	528	352	542	480.4	306	70
69	5.3	-0.026	638	340	527	351	540	479.2	310	70
70	5.3	-0.026	635	340	525	350	538	477.6	312	70
71	5.2	-0.026	632	340	524	349	537	476.4	314	70
72	5.2	-0.026	628	340	523	349	536	475.2	317	70
73	5.2	-0.026	624	340	523	348	535	474	317	70
74	5.2	-0.026	619	340	522	347	534	472.4	319	70
75	5.1	-0.026	613	340	522	347	533	471	319	70
76	5.1	-0.026	608	340	522	347	533	470	320	70
77	5.1	-0.026	602	340	522	347	533	468.8	321	71

Wood Heater Preburn Data - ASTM E2780

Run:	4

Technician Signature: _____

Manufacturer:	Valley Comfort
Model:	PI29
Tracking No.:	VC-18-1
Project No.:	0142WN019E
Test Date:	1/25/18
Beginning Clock Time:	9:39

Preburn Fuel Data

Fuel Piece Lengths (in.):	16		
Total Preburn Weight (lb):	19		
Fuel Moisture Readings (% DB):	20	19.5	22.5
	21.7	19.1	19.5
	18.8	20.3	21
	23.8	18.9	24.7
Avg Preburn Moisture (% DB):	20.82		

Coal Bed Range (lb):	3.3 (min)	4.1 (max)

			Temperatures (°F)							
Elapsed Time (min)	Scale (lb)	Stack Draft (in H_2O)	FB Top	FB Bottom	FB Back	FB Left	FB Right	Avg. FB	Stack	Ambient
78	5.1	-0.027	597	340	523	348	533	468.2	321	70
79	5	-0.027	592	341	523	348	533	467.4	321	70
80	5	-0.027	588	341	524	348	533	466.8	323	70
81	5	-0.027	584	342	525	349	534	466.8	325	70
82	5	-0.027	581	342	527	349	535	466.8	326	70
83	4.9	-0.027	578	343	529	349	537	467.2	327	70
84	4.9	-0.027	575	344	530	350	538	467.4	329	71
85	4.9	-0.027	572	344	532	350	539	467.4	330	70
86	4.8	-0.027	570	345	535	351	540	468.2	331	70
87	4.8	-0.028	569	347	538	352	541	469.4	334	69
88	4.8	-0.028	568	348	542	353	542	470.6	334	70
89	4.7	-0.028	568	349	546	355	543	472.2	336	69
90	4.7	-0.028	567	350	551	357	545	474	336	70
91	4.7	-0.028	567	351	556	359	547	476	337	69
92	4.6	-0.028	567	353	562	360	549	478.2	338	70
93	4.6	-0.028	567	354	567	362	550	480	339	69
94	4.6	-0.028	567	355	572	363	552	481.8	339	70
95	4.5	-0.028	567	357	576	365	555	484	341	70
96	4.5	-0.028	567	358	581	367	556	485.8	341	70
97	4.4	-0.028	567	360	585	368	558	487.6	342	70
98	4.4	-0.028	567	362	588	369	561	489.4	343	70
99	4.4	-0.028	567	364	591	371	563	491.2	343	69
100	4.3	-0.028	567	365	594	373	564	492.6	342	70
101	4.3	-0.028	566	367	598	375	566	494.4	341	70
102	4.3	-0.028	566	369	601	377	568	496.2	339	70
103	4.2	-0.028	565	371	604	378	570	497.6	338	70
104	4.2	-0.028	565	373	607	379	571	499	337	70
105	4.2	-0.028	565	374	610	380	573	500.4	335	69
106	4.2	-0.027	564	376	612	381	574	501.4	335	70
107	4.1	-0.028	564	378	614	382	575	502.6	334	70
108	4.1	-0.027	564	380	617	383	576	504	334	70
109	4.1	-0.027	563	381	619	384	577	504.8	334	70

Wood Heater Test Fuel Data - ASTM E2780

Manufacturer:	**Valley Comfort**
Model:	**PI29**
Tracking No.:	**VC-18-1**
Project No.:	**0142WN019E**
Test Date:	**1/25/2018**
Run No.:	**4**

Firebox Volume (ft^3):	**2.56**
Fuel Piece Length (in):	**16**
2x4 Crib Weight (lb):	**8.5**
4x4 Crib Weight (lb):	**7.9**

Total Fuel Weight (Dry Basis, lb):	**13.53**	
Fuel Density (lb/ft^3, Dry Basis):	**26.77**	**OK**
Loading Density (lb/ft^3, Wet Basis):	**6.41**	**OK**
2x4 Percentage:	**52%**	**OK**

Coal Bed Range (20-25%): 3.28 - 4.1

Test Fuel Piece	Weight (lb)	Size	Readings (Dry Basis %)			Dry Weight (lb)
1	3.5	4"x 4"	23.6	22.6	23.8	2.84
2	3.5	4"x 4"	23.8	22.7	23.2	2.84
3	1.6	2"x 4"	20.1	20.9	22.3	1.32
4	1.6	2"x 4"	19.5	20.8	20.4	1.33
5	1.8	2"x 4"	19.0	23.0	23.0	1.48
6	1.8	2"x 4"	20.3	23.8	23.8	1.47

Spacer Readings (Dry Basis %)			
18.7	16.1		
12.0	12.1		
13.6	14.6		
18.7			
17.5			
15.8			
16.6			
15.3			
15.4			
15.1			
15.3			
16.0			
12.8			

Technician Signature: _____

Wood Heater Test Data - ASTM E2780 / ASTM E2515

Run: 4

Manufacturer: Valley Comfort
Model: PI29
Tracking No.: VC-18-1
Project No.: 0142WN019E
Test Date: 25-Jan-18
Beginning Clock Time: 11:28

Total Sampling Time: 252 min
Recording Interval: 1 min
Background Sample Volume: 0 cubic feet

Meter Box Y Factor: 0.997 (1) 0.981 (2) _____ (Amb)

Barometric Pressure:	Begin	Middle	End	Average
	28.50	28.53	28.56	28.53 "Hg

OMNI Equipment Numbers: 410, 283A, 132, 576, 318, 432, 419, 371, 372, 296-T32, 559, 592, 637

PM Control Modules: 371/372
Dilution Tunnel MW(dry): 29.00 lb/lb-mole
Dilution Tunnel MW(wet): 28.78 lb/lb-mole
Dilution Tunnel H2O: 2.00 percent
Dilution Tunnel Static: -0.180 "H2O
Tunnel Area: 0.19635 ft2
Pitot Tube Cp: 0.99

Avg. Tunnel Velocity: 13.81 ft/sec.
Initial Tunnel Flow: 142.0 scfm
Average Tunnel Flow: 144.5 scfm
Post-Test Leak Check (1): 0.000 cfm @ -15 in. Hg
Post-Test Leak Check (2): 0.000 cfm @ -17 in. Hg
Average Test Piece Fuel Moisture: 22.03 Dry Basis %

Technician Signature: _____

Velocity Traverse Data	Pt.1	Pt.2	Pt.3	Pt.4	Pt.5	Pt.6	Pt.7	Pt.8	Center	
Initial dP	0.032	0.052	0.030	0.026	0.038	0.050	0.048	0.032	0.052	"H2O
Temp:	94	94	94	94	94	94	94	94	94	°F

V_{strav} 13.81 ft/sec V_{scent} 15.87 ft/sec F_p 0.870

	Particulate Sampling Data														Fuel Weight (lb)		Temperature Data (°F)													Stack Gas Data		
Elapsed Time (min)	Gas Meter 1 (ft^3)	Gas Meter 2 (ft^3)	Sample Rate 1 (cfm)	Sample Rate 2 (cfm)	Orifice dH 1 ("H_2O)	Meter 1 Temp (°F)	Meter 1 Vacuum ("Hg)	Orifice dH 2 ("H_2O)	Meter 2 Temp (°F)	Meter 2 Vacuum ("Hg)	Dilution Tunnel (°F)	Dilution Tunnel Center dP	Pro. Rate 1	Pro. Rate 2	Scale Reading	Weight Change	Firebox Top	Firebox Bottom	Firebox Back	Firebox Left	Firebox Right	Avg. Stove Surface	Catalyst Exit	Stack	Filter 1	Dryer Exit 1	Filter 2	Dryer Exit 2	Ambient	Draft ("H_2O)	CO_2 (%)	CO (%)
0	0.000	0.000			1.80	68	0.7	1.39	70	0.3	142	0.052			16.4		563	387	618	383	576	505	544	441	71	66	72	66	70	-0.058	7.61	0.01
1	0.122	0.135	0.12	0.14	1.83	68	0.7	1.40	70	0.3	127	0.052	86	92	16.3	-0.1	561	388	615	383	574	504	544	420	71	66	73	66	70	-0.057	7.18	0.03
2	0.270	0.285	0.15	0.15	1.83	68	0.69	1.39	70	0.3	106	0.052	103	101	16.2	-0.1	556	390	599	378	565	498	552	378	71	66	73	66	70	-0.058	4.48	0.07
3	0.418	0.436	0.15	0.15	1.83	68	0.69	1.39	70	0.3	102	0.052	102	101	16.1	-0.1	554	392	581	369	553	490	585	367	72	66	73	65	69	-0.057	5.07	0.04
4	0.565	0.587	0.15	0.15	1.81	68	0.69	1.40	70	0.3	101	0.052	101	101	16.0	-0.1	555	394	564	360	540	483	624	369	72	66	73	65	70	-0.058	5.79	0.02
5	0.712	0.739	0.15	0.15	1.81	68	0.69	1.40	70	0.3	101	0.052	101	102	15.9	-0.1	557	395	549	351	527	476	655	378	72	66	73	65	70	-0.059	5.94	0.02
6	0.859	0.889	0.15	0.15	1.81	68	0.69	1.38	70	0.3	101	0.052	101	100	15.7	-0.2	561	397	539	342	517	471	678	388	72	66	73	65	70	-0.058	6.77	0.02
7	1.006	1.040	0.15	0.15	1.80	68	0.69	1.40	70	0.3	101	0.052	101	101	15.6	-0.1	566	398	529	334	507	467	690	391	72	66	73	65	69	-0.058	8.13	0.03
8	1.152	1.191	0.15	0.15	1.79	68	0.69	1.39	70	0.3	101	0.052	101	101	15.5	-0.1	569	399	519	327	499	463	692	393	72	66	73	65	69	-0.058	7.8	0.02
9	1.298	1.341	0.15	0.15	1.79	68	0.69	1.38	70	0.3	101	0.052	101	100	15.4	-0.1	572	400	510	320	491	459	690	393	72	66	73	65	69	-0.058	6.77	0.02
10	1.445	1.492	0.15	0.15	1.77	68	0.69	1.39	70	0.3	101	0.052	101	101	15.3	-0.1	574	400	501	315	484	455	691	397	72	66	73	65	69	-0.059	6.39	0.02
11	1.590	1.642	0.15	0.15	1.76	68	0.69	1.39	70	0.3	103	0.052	100	101	15.1	-0.2	577	401	496	310	478	452	712	405	72	66	73	65	69	-0.060	6.8	0.03
12	1.736	1.792	0.15	0.15	1.75	68	0.69	1.37	70	0.3	103	0.052	101	101	14.9	-0.2	583	401	495	306	474	452	747	415	73	66	74	65	69	-0.060	8.58	0.43
13	1.881	1.942	0.15	0.15	1.77	67	0.69	1.37	70	0.3	104	0.052	100	101	14.7	-0.2	590	401	494	304	471	452	764	423	73	66	74	65	69	-0.061	9.64	0.71
14	2.026	2.092	0.15	0.15	1.76	67	0.69	1.39	70	0.3	104	0.052	100	101	14.6	-0.1	597	401	495	301	469	453	770	429	73	66	74	65	70	-0.061	9.95	0.62
15	2.171	2.242	0.15	0.15	1.77	67	0.69	1.38	70	0.3	105	0.052	101	101	14.4	-0.2	604	401	493	300	468	453	772	431	73	66	74	65	70	-0.061	9.97	0.41
16	2.317	2.392	0.15	0.15	1.74	67	0.69	1.37	70	0.3	105	0.052	101	101	14.3	-0.1	611	401	490	298	466	453	771	433	73	66	74	65	69	-0.061	9.22	0.17
17	2.461	2.542	0.14	0.15	1.71	67	0.69	1.38	69	0.3	105	0.052	100	101	14.1	-0.2	615	400	488	296	465	453	765	436	73	65	74	65	70	-0.061	8.62	0.09
18	2.606	2.692	0.15	0.15	1.72	67	0.7	1.38	69	0.3	106	0.052	101	101	14.0	-0.1	619	399	488	296	465	453	766	438	73	65	74	65	70	-0.061	8.82	0.07
19	2.751	2.842	0.15	0.15	1.72	67	0.69	1.38	69	0.3	107	0.052	101	101	13.8	-0.2	624	399	490	295	465	455	775	440	73	65	74	65	70	-0.061	9.52	0.34
20	2.896	2.991	0.15	0.15	1.75	67	0.69	1.36	69	0.3	107	0.052	101	100	13.6	-0.2	629	398	491	295	466	456	783	442	74	65	74	65	70	-0.062	9.91	0.64
21	3.042	3.141	0.15	0.15	1.75	67	0.69	1.37	69	0.3	107	0.052	101	101	13.4	-0.2	633	397	493	296	467	457	786	442	74	66	75	65	70	-0.061	10.14	0.71
22	3.187	3.291	0.15	0.15	1.76	67	0.69	1.38	70	0.3	107	0.052	101	101	13.3	-0.1	637	395	496	297	469	459	788	443	74	66	75	65	70	-0.062	10.21	0.68
23	3.332	3.440	0.15	0.15	1.76	67	0.69	1.37	70	0.3	107	0.052	101	100	13.1	-0.2	642	394	499	298	472	461	789	443	74	66	75	65	70	-0.062	10.26	0.7
24	3.477	3.590	0.15	0.15	1.76	67	0.69	1.36	70	0.3	107	0.052	101	101	12.9	-0.2	646	393	503	299	475	463	792	443	74	66	75	65	70	-0.061	10.34	0.72
25	3.622	3.740	0.15	0.15	1.76	67	0.69	1.38	70	0.3	107	0.052	101	101	12.7	-0.2	650	392	506	301	478	465	794	442	74	66	75	65	70	-0.062	10.39	0.72
26	3.767	3.890	0.15	0.15	1.75	67	0.69	1.37	70	0.3	107	0.052	101	101	12.6	-0.1	654	391	510	303	481	468	796	440	74	66	75	65	70	-0.062	10.46	0.72
27	3.912	4.039	0.15	0.15	1.75	67	0.69	1.37	70	0.3	107	0.052	101	100	12.4	-0.2	658	389	513	305	485	470	801	438	74	66	75	65	70	-0.062	10.45	0.72
28	4.057	4.189	0.15	0.15	1.75	67	0.69	1.36	70	0.3	106	0.052	101	101	12.3	-0.1	662	388	516	307	489	472	804	437	74	66	75	65	69	-0.062	10.49	0.78
29	4.202	4.339	0.15	0.15	1.76	67	0.69	1.38	70	0.3	106	0.052	101	101	12.1	-0.2	665	387	519	309	492	474	802	435	74	66	75	65	69	-0.061	10.51	0.89
30	4.348	4.489	0.15	0.15	1.72	67	0.69	1.37	70	0.3	106	0.052	101	101	11.9	-0.2	668	385	521	311	496	476	797	432	74	66	75	65	69	-0.061	10.48	1.01
31	4.492	4.638	0.14	0.15	1.70	67	0.69	1.35	70	0.3	106	0.052	100	100	11.8	-0.1	670	384	524	313	499	478	794	428	74	66	75	65	69	-0.061	10.51	1.11
32	4.637	4.788	0.15	0.15	1.71	67	0.69	1.36	70	0.3	105	0.052	101	101	11.6	-0.2	672	383	526	316	502	480	789	424	74	66	75	65	69	-0.061	10.46	1.11
33	4.782	4.938	0.15	0.15	1.71	67	0.69	1.37	70	0.3	105	0.052	101	101	11.5	-0.1	674	381	528	318	505	481	783	420	74	66	75	65	69	-0.060	10.39	1.03
34	4.927	5.088	0.15	0.15	1.75	67	0.69	1.36	70	0.3	104	0.052	100	101	11.3	-0.2	675	379	529	320	507	482	779	416	74	66	75	66	70	-0.061	10.26	0.99
35	5.073	5.238	0.15	0.15	1.74	67	0.69	1.36	70	0.3	103	0.052	101	101	11.2	-0.1	676	378	529	322	510	483	779	413	74	66	75	66	69	-0.060	10.09	1.03
36	5.218	5.388	0.15	0.15	1.75	67	0.69	1.36	70	0.3	103	0.052	100	101	11.1	-0.1	678	376	529	324	512	484	781	409	74	66	75	66	70	-0.060	10	1.1

Wood Heater Test Data - ASTM E2780 / ASTM E2515

Run: 4

Manufacturer: Valley Comfort
Model: PI29
Tracking No.: VC-18-1
Project No.: 0142WN019E
Test Date: 25-Jan-18
Beginning Clock Time: 11:28

Total Sampling Time: 252 min
Recording Interval: 1 min
Background Sample Volume: 0 cubic feet

Meter Box Y Factor: 0.997 (1) 0.981 (2) _____ (Amb)

Barometric Pressure:	Begin	Middle	End	Average
	28.50	28.53	28.56	28.53 "Hg

OMNI Equipment Numbers: 410, 283A, 132, 576, 318, 432, 419, 371, 372, 296-T32, 559, 592, 637

PM Control Modules: 371/372
Dilution Tunnel MW(dry): 29.00 lb/lb-mole
Dilution Tunnel MW(wet): 28.78 lb/lb-mole
Dilution Tunnel H2O: 2.00 percent
Dilution Tunnel Static: -0.180 "H2O
Tunnel Area: 0.19635 ft2
Pitot Tube Cp: 0.99

Avg. Tunnel Velocity: 13.81 ft/sec.
Initial Tunnel Flow: 142.0 scfm
Average Tunnel Flow: 144.5 scfm
Post-Test Leak Check (1): 0.000 cfm @ -15 in. Hg
Post-Test Leak Check (2): 0.000 cfm @ -17 in. Hg
Average Test Piece Fuel Moisture: 22.03 Dry Basis %

Technician Signature: _____

Velocity Traverse Data	Pt.1	Pt.2	Pt.3	Pt.4	Pt.5	Pt.6	Pt.7	Pt.8	Center	
Initial dP	0.032	0.052	0.030	0.026	0.038	0.050	0.048	0.032	0.052	"H2O
Temp:	94	94	94	94	94	94	94	94	94	°F

V_{strav} 13.81 ft/sec V_{scent} 15.87 ft/sec F_p 0.870

	Particulate Sampling Data														Fuel Weight (lb)		Temperature Data (°F)												Stack Gas Data		
Elapsed Time (min)	Gas Meter 1 (ft^3)	Gas Meter 2 (ft^3)	Sample Rate 1 (cfm)	Sample Rate 2 (cfm)	Orifice dH 1 ("H_2O)	Meter 1 Temp (°F)	Meter 1 Vacuum ("Hg)	Orifice dH 2 ("H_2O)	Meter 2 Temp (°F)	Meter 2 Vacuum ("Hg)	Dilution Tunnel (°F)	Dilution Tunnel Center dP	Pro. Rate 1	Pro. Rate 2	Scale Reading	Weight Change	Firebox Top	Firebox Bottom	Firebox Back	Firebox Left	Firebox Right	Avg. Stove Surface	Catalyst Exit	Stack	Filter 1	Dryer Exit 1	Filter 2	Dryer Exit 2	Ambient	Draft ("H_2O)	CO_2 (%)	CO (%)
37	5.363	5.537	0.15	0.15	1.75	67	0.68	1.37	70	0.3	103	0.052	100	100	10.9	-0.2	679	375	528	325	514	484	782	404	74	66	75	66	70	-0.060	9.81	1.08
38	5.508	5.687	0.15	0.15	1.75	67	0.68	1.37	70	0.3	103	0.052	100	101	10.8	-0.1	681	374	526	326	516	485	783	401	74	66	75	66	70	-0.059	9.69	1.06
39	5.653	5.837	0.15	0.15	1.76	67	0.69	1.35	70	0.3	102	0.052	100	101	10.7	-0.1	682	373	525	327	517	485	785	397	74	66	75	66	71	-0.059	9.71	1.03
40	5.799	5.987	0.15	0.15	1.75	67	0.68	1.36	70	0.3	102	0.052	101	101	10.6	-0.1	684	372	523	329	518	485	787	394	74	66	75	66	69	-0.059	9.68	1.04
41	5.944	6.137	0.15	0.15	1.75	67	0.68	1.37	70	0.3	101	0.052	100	100	10.5	-0.1	686	371	521	329	519	485	789	389	74	66	75	66	70	-0.058	9.68	0.99
42	6.089	6.286	0.15	0.15	1.75	67	0.69	1.36	70	0.3	101	0.052	100	100	10.4	-0.1	687	370	518	330	520	485	793	384	74	66	75	66	70	-0.058	9.45	0.86
43	6.234	6.436	0.15	0.15	1.75	67	0.68	1.37	70	0.3	100	0.052	100	100	10.3	-0.1	688	369	516	331	520	485	793	379	74	66	75	66	70	-0.058	9.17	0.68
44	6.379	6.587	0.15	0.15	1.72	67	0.69	1.37	70	0.3	100	0.052	100	101	10.2	-0.1	689	368	513	332	520	484	791	376	74	66	75	66	70	-0.057	8.9	0.48
45	6.525	6.737	0.15	0.15	1.71	67	0.69	1.37	70	0.3	100	0.052	101	100	10.1	-0.1	690	367	511	332	520	484	789	372	74	67	75	66	69	-0.057	8.65	0.31
46	6.669	6.886	0.14	0.15	1.71	67	0.69	1.36	70	0.3	99	0.052	99	100	10.0	-0.1	690	366	508	332	519	483	789	369	74	67	75	66	70	-0.056	8.47	0.2
47	6.814	7.036	0.15	0.15	1.70	67	0.69	1.36	70	0.3	99	0.052	100	100	9.9	-0.1	690	365	507	332	519	483	793	365	74	67	75	66	70	-0.056	8.29	0.14
48	6.960	7.186	0.15	0.15	1.72	67	0.69	1.37	70	0.3	99	0.052	101	100	9.9	0	690	364	505	332	518	482	800	362	74	67	75	66	70	-0.055	8.06	0.1
49	7.105	7.336	0.15	0.15	1.73	67	0.68	1.36	70	0.3	99	0.052	100	100	9.8	-0.1	692	363	504	332	517	482	811	361	74	67	75	66	70	-0.056	7.85	0.06
50	7.251	7.486	0.15	0.15	1.74	67	0.69	1.36	70	0.3	98	0.052	101	100	9.7	-0.1	694	362	503	331	516	481	823	361	74	67	75	67	71	-0.056	7.81	0.04
51	7.397	7.637	0.15	0.15	1.74	67	0.68	1.37	70	0.3	98	0.052	101	101	9.6	-0.1	696	361	502	331	515	481	835	363	74	67	75	67	70	-0.056	7.82	0.03
52	7.542	7.787	0.15	0.15	1.74	67	0.69	1.37	70	0.3	98	0.052	100	100	9.6	0	699	360	502	331	514	481	842	365	74	67	75	67	71	-0.056	7.88	0.03
53	7.688	7.936	0.15	0.15	1.75	67	0.68	1.37	70	0.3	98	0.052	101	100	9.5	-0.1	702	359	502	331	513	481	848	367	74	67	75	67	70	-0.056	7.96	0.03
54	7.833	8.087	0.15	0.15	1.75	67	0.69	1.37	70	0.3	98	0.052	100	101	9.4	-0.1	704	358	502	330	513	481	851	369	74	67	75	67	70	-0.056	8.05	0.03
55	7.979	8.237	0.15	0.15	1.76	67	0.68	1.37	71	0.3	98	0.052	101	100	9.3	-0.1	707	357	502	330	513	482	852	372	74	67	75	67	70	-0.055	8.21	0.03
56	8.125	8.388	0.15	0.15	1.75	67	0.69	1.36	71	0.3	99	0.052	101	101	9.2	-0.1	708	356	503	330	513	482	852	375	74	67	75	67	70	-0.056	8.3	0.03
57	8.270	8.537	0.15	0.15	1.75	67	0.69	1.36	71	0.3	99	0.052	100	99	9.1	-0.1	709	356	504	331	514	483	851	376	74	67	75	67	71	-0.056	8.44	0.03
58	8.416	8.688	0.15	0.15	1.75	67	0.69	1.37	71	0.3	99	0.052	101	101	9.1	0	709	355	505	332	515	483	850	377	74	68	75	67	70	-0.056	8.63	0.04
59	8.562	8.838	0.15	0.15	1.75	67	0.69	1.37	71	0.3	99	0.052	101	100	9.0	-0.1	710	354	506	332	516	484	850	380	74	68	75	67	71	-0.056	8.75	0.04
60	8.707	8.988	0.15	0.15	1.75	67	0.69	1.37	71	0.3	99	0.052	100	100	8.9	-0.1	710	353	507	333	518	484	849	380	74	68	75	67	70	-0.055	8.84	0.05
61	8.857	9.138	0.15	0.15	1.75	67	0.69	1.37	71	0.3	99	0.052	103	100	8.8	-0.1	710	353	509	334	520	485	849	382	74	68	75	67	70	-0.056	8.86	0.06
62	9.002	9.289	0.15	0.15	1.75	68	0.69	1.37	71	0.3	99	0.052	100	101	8.7	-0.1	710	352	510	335	522	486	849	383	74	68	75	67	70	-0.056	9	0.07
63	9.148	9.439	0.15	0.15	1.75	68	0.69	1.36	71	0.3	99	0.052	101	100	8.6	-0.1	711	352	512	337	525	487	846	385	74	68	75	67	70	-0.056	9.14	0.08
64	9.293	9.589	0.15	0.15	1.75	68	0.68	1.36	71	0.3	99	0.052	100	100	8.5	-0.1	710	351	515	338	528	488	841	386	74	68	75	67	71	-0.056	9.29	0.1
65	9.439	9.740	0.15	0.15	1.72	68	0.68	1.37	71	0.3	99	0.052	101	101	8.4	-0.1	709	350	518	339	531	489	837	386	74	68	75	67	70	-0.056	9.57	0.14
66	9.584	9.890	0.15	0.15	1.72	68	0.69	1.37	71	0.3	99	0.052	100	100	8.3	-0.1	709	350	522	341	534	491	836	385	74	68	75	67	70	-0.056	9.69	0.2
67	9.730	10.040	0.15	0.15	1.72	68	0.69	1.37	71	0.3	99	0.052	101	100	8.2	-0.1	709	350	526	343	537	493	836	384	74	68	75	68	70	-0.056	9.72	0.28
68	9.875	10.190	0.15	0.15	1.71	68	0.69	1.37	71	0.3	99	0.052	100	100	8.1	-0.1	709	349	530	344	540	494	838	385	74	68	75	68	70	-0.056	9.79	0.38
69	10.020	10.340	0.15	0.15	1.71	68	0.68	1.37	71	0.3	99	0.052	100	100	8.0	-0.1	710	349	532	346	542	496	839	384	74	68	74	68	71	-0.056	9.82	0.41
70	10.165	10.491	0.15	0.15	1.71	68	0.68	1.36	71	0.3	99	0.052	100	101	7.9	-0.1	710	348	533	347	545	497	838	382	74	68	75	68	71	-0.056	9.78	0.35
71	10.311	10.641	0.15	0.15	1.71	68	0.69	1.36	71	0.3	99	0.052	101	100	7.9	0	711	348	533	349	547	498	834	379	74	68	75	68	71	-0.055	9.57	0.31
72	10.457	10.791	0.15	0.15	1.74	68	0.68	1.37	71	0.3	99	0.052	101	100	7.8	-0.1	711	348	532	350	548	498	834	380	74	68	75	68	70	-0.056	9.48	0.31
73	10.602	10.941	0.15	0.15	1.74	68	0.68	1.37	71	0.3	99	0.052	100	100	7.7	-0.1	712	347	530	351	550	498	832	378	74	68	75	68	70	-0.056	9.5	0.37

Wood Heater Test Data - ASTM E2780 / ASTM E2515

Run: 4

Manufacturer: Valley Comfort
Model: PI29
Tracking No.: VC-18-1
Project No.: 0142WN019E
Test Date: 25-Jan-18
Beginning Clock Time: 11:28

Total Sampling Time: 252 min
Recording Interval: 1 min
Background Sample Volume: 0 cubic feet

Meter Box Y Factor: 0.997 (1) 0.981 (2) _____ (Amb)

Barometric Pressure:	Begin	Middle	End	Average
	28.50	28.53	28.56	28.53 "Hg

OMNI Equipment Numbers: 410, 283A, 132, 576, 318, 432, 419, 371, 372, 296-T32, 559, 592, 637

PM Control Modules: 371/372
Dilution Tunnel MW(dry): 29.00 lb/lb-mole
Dilution Tunnel MW(wet): 28.78 lb/lb-mole
Dilution Tunnel H2O: 2.00 percent
Dilution Tunnel Static: -0.180 "H2O
Tunnel Area: 0.19635 ft2
Pitot Tube Cp: 0.99

Avg. Tunnel Velocity: 13.81 ft/sec.
Initial Tunnel Flow: 142.0 scfm
Average Tunnel Flow: 144.5 scfm
Post-Test Leak Check (1): 0.000 cfm @ -15 in. Hg
Post-Test Leak Check (2): 0.000 cfm @ -17 in. Hg
Average Test Piece Fuel Moisture: 22.03 Dry Basis %

Technician Signature: _____

Velocity Traverse Data

	Pt.1	Pt.2	Pt.3	Pt.4	Pt.5	Pt.6	Pt.7	Pt.8	Center	
Initial dP	0.032	0.052	0.030	0.026	0.038	0.050	0.048	0.032	0.052	"H2O
Temp:	94	94	94	94	94	94	94	94	94	°F

V_{strav} 13.81 ft/sec V_{scent} 15.87 ft/sec F_p 0.870

	Particulate Sampling Data														Fuel Weight (lb)		Temperature Data (°F)												Stack Gas Data		
Elapsed Time (min)	Gas Meter 1 (ft^3)	Gas Meter 2 (ft^3)	Sample Rate 1 (cfm)	Sample Rate 2 (cfm)	Orifice dH 1 ("H_2O)	Meter 1 Temp (°F)	Meter 1 Vacuum ("Hg)	Orifice dH 2 ("H_2O)	Meter 2 Temp (°F)	Meter 2 Vacuum ("Hg)	Dilution Tunnel (°F)	Dilution Tunnel Center dP	Pro. Rate 1	Pro. Rate 2	Scale Reading	Weight Change	Firebox Top	Firebox Bottom	Firebox Back	Firebox Left	Firebox Right	Avg. Stove Surface	Catalyst Exit	Stack	Filter 1	Dryer Exit 1	Filter 2	Dryer Exit 2	Ambient	Draft ("H_2O)	CO_2 (%)	CO (%)
74	10.748	11.091	0.15	0.15	1.75	68	0.68	1.37	71	0.3	99	0.052	101	100	7.6	-0.1	712	347	530	352	552	499	828	377	74	68	75	68	70	-0.055	9.62	0.59
75	10.893	11.242	0.15	0.15	1.75	68	0.68	1.37	71	0.3	99	0.052	100	101	7.5	-0.1	713	347	529	353	553	499	827	377	74	68	75	68	70	-0.055	9.71	0.65
76	11.039	11.392	0.15	0.15	1.75	68	0.68	1.37	71	0.3	99	0.052	101	100	7.4	-0.1	714	346	528	354	554	499	828	375	74	68	75	68	70	-0.055	9.78	0.56
77	11.184	11.542	0.15	0.15	1.75	68	0.68	1.37	71	0.3	98	0.052	100	100	7.3	-0.1	714	346	527	355	555	499	830	373	74	68	75	68	71	-0.056	9.69	0.53
78	11.330	11.692	0.15	0.15	1.75	68	0.68	1.36	71	0.3	98	0.052	100	100	7.2	-0.1	716	346	526	356	556	500	834	371	74	68	75	68	71	-0.056	9.56	0.41
79	11.476	11.843	0.15	0.15	1.73	68	0.68	1.37	71	0.3	98	0.052	100	101	7.1	-0.1	717	345	525	356	557	500	839	369	74	68	75	68	70	-0.056	9.45	0.28
80	11.622	11.994	0.15	0.15	1.74	68	0.68	1.37	72	0.3	98	0.052	100	100	7.1	0	719	345	524	356	557	500	842	367	74	68	75	68	71	-0.055	9.19	0.15
81	11.767	12.144	0.15	0.15	1.74	68	0.69	1.37	72	0.3	98	0.052	100	100	7.0	-0.1	719	345	523	356	558	500	840	362	74	68	75	68	71	-0.054	9.04	0.1
82	11.912	12.294	0.15	0.15	1.75	68	0.68	1.37	72	0.3	97	0.052	100	100	6.9	-0.1	719	344	522	356	558	500	835	359	74	68	75	68	70	-0.055	8.92	0.07
83	12.058	12.444	0.15	0.15	1.75	68	0.69	1.38	72	0.3	97	0.052	100	100	6.8	-0.1	718	344	521	356	558	499	828	354	74	68	74	68	70	-0.054	8.7	0.05
84	12.204	12.595	0.15	0.15	1.74	68	0.69	1.37	72	0.3	97	0.052	100	100	6.8	0	717	344	520	356	558	499	821	349	74	68	74	68	70	-0.054	8.65	0.03
85	12.349	12.745	0.15	0.15	1.73	68	0.68	1.36	72	0.3	97	0.052	100	100	6.7	-0.1	715	344	518	355	558	498	816	344	74	69	74	68	71	-0.053	8.6	0.03
86	12.495	12.896	0.15	0.15	1.71	68	0.69	1.37	72	0.3	97	0.052	100	100	6.6	-0.1	713	344	517	355	558	497	816	342	74	69	74	68	71	-0.054	8.59	0.02
87	12.640	13.046	0.15	0.15	1.70	68	0.68	1.37	72	0.3	96	0.052	100	100	6.6	0	712	343	516	354	557	496	822	340	73	69	74	68	71	-0.055	8.58	0.02
88	12.785	13.197	0.15	0.15	1.70	68	0.69	1.36	72	0.3	96	0.052	100	100	6.5	-0.1	712	343	515	353	556	496	829	338	73	68	74	68	70	-0.054	8.46	0.02
89	12.931	13.347	0.15	0.15	1.72	68	0.69	1.37	72	0.3	96	0.052	100	100	6.4	-0.1	713	343	513	352	556	495	834	335	73	68	74	68	71	-0.052	8.54	0.02
90	13.077	13.498	0.15	0.15	1.72	68	0.69	1.38	72	0.3	95	0.052	100	100	6.4	0	713	343	513	351	555	495	837	334	73	69	74	68	71	-0.052	8.68	0.02
91	13.223	13.648	0.15	0.15	1.72	68	0.68	1.36	72	0.3	95	0.052	100	100	6.3	-0.1	714	342	512	351	554	495	835	335	73	69	74	68	71	-0.053	8.65	0.02
92	13.369	13.798	0.15	0.15	1.73	68	0.68	1.36	71	0.3	95	0.052	100	100	6.2	-0.1	713	342	511	350	554	494	831	335	73	69	74	68	70	-0.052	8.72	0.02
93	13.515	13.950	0.15	0.15	1.75	68	0.69	1.38	71	0.3	95	0.052	100	101	6.1	-0.1	712	342	511	350	553	494	825	334	73	69	74	68	70	-0.051	8.78	0.02
94	13.661	14.100	0.15	0.15	1.75	68	0.68	1.37	71	0.3	95	0.052	100	100	6.1	0	711	342	511	350	553	493	818	333	73	69	74	68	71	-0.053	8.92	0.02
95	13.806	14.250	0.15	0.15	1.75	68	0.68	1.36	71	0.3	95	0.052	99	100	6.0	-0.1	709	341	511	350	553	493	811	331	73	69	74	68	71	-0.052	8.96	0.02
96	13.952	14.401	0.15	0.15	1.75	68	0.68	1.37	71	0.3	94	0.052	100	100	5.9	-0.1	707	341	511	349	554	492	806	328	73	69	74	68	71	-0.052	9.05	0.02
97	14.098	14.552	0.15	0.15	1.75	68	0.68	1.38	71	0.3	94	0.052	100	100	5.8	-0.1	704	341	510	349	554	492	803	326	73	69	74	68	70	-0.052	8.72	0.02
98	14.244	14.702	0.15	0.15	1.75	68	0.69	1.37	71	0.3	94	0.052	100	100	5.8	0	702	340	508	348	555	491	801	321	73	69	74	68	71	-0.050	8.27	0.01
99	14.390	14.853	0.15	0.15	1.75	68	0.68	1.37	71	0.3	94	0.052	100	100	5.7	-0.1	700	340	507	348	556	490	799	316	73	69	74	68	70	-0.051	7.99	0.01
100	14.536	15.003	0.15	0.15	1.75	68	0.68	1.38	71	0.3	93	0.052	100	100	5.7	0	698	340	505	346	555	489	799	312	73	68	74	68	70	-0.051	7.75	0.01
101	14.682	15.154	0.15	0.15	1.75	68	0.69	1.37	71	0.3	93	0.052	100	100	5.6	-0.1	696	340	503	345	555	488	801	308	73	68	74	68	70	-0.051	7.55	0.01
102	14.828	15.304	0.15	0.15	1.75	68	0.69	1.36	71	0.3	92	0.052	100	99	5.6	0	695	339	501	344	553	486	803	305	73	69	74	68	70	-0.051	7.39	0.01
103	14.974	15.456	0.15	0.15	1.74	68	0.68	1.38	71	0.3	92	0.052	100	101	5.5	-0.1	694	339	499	344	551	485	808	304	73	69	74	68	70	-0.050	7.36	0.01
104	15.120	15.606	0.15	0.15	1.75	68	0.68	1.38	71	0.3	92	0.052	100	99	5.5	0	693	339	497	342	549	484	811	304	73	69	74	68	71	-0.050	7.34	0.01
105	15.266	15.756	0.15	0.15	1.75	68	0.69	1.36	71	0.3	92	0.052	100	99	5.4	-0.1	693	338	495	341	547	483	812	306	73	69	74	68	71	-0.050	7.29	0.01
106	15.411	15.908	0.15	0.15	1.75	68	0.69	1.38	71	0.3	92	0.052	99	101	5.4	0	692	338	493	340	545	482	810	309	73	69	74	68	70	-0.050	7.27	0.01
107	15.557	16.058	0.15	0.15	1.75	68	0.69	1.38	71	0.3	92	0.052	100	99	5.3	-0.1	690	337	492	340	543	480	804	311	73	69	74	68	70	-0.050	7.31	0.01
108	15.703	16.209	0.15	0.15	1.76	68	0.69	1.36	71	0.3	92	0.052	100	100	5.3	0	688	336	490	339	541	479	798	313	73	68	74	68	70	-0.051	7.31	0.01
109	15.849	16.360	0.15	0.15	1.76	68	0.69	1.38	71	0.3	92	0.052	100	100	5.2	-0.1	685	336	489	339	540	478	792	314	73	69	74	68	70	-0.050	7.34	0.01
110	15.995	16.511	0.15	0.15	1.72	67	0.69	1.38	71	0.3	92	0.052	100	100	5.2	0	682	336	487	338	539	476	785	317	73	68	74	68	70	-0.051	7.35	0.01

Wood Heater Test Data - ASTM E2780 / ASTM E2515

Run: 4

Manufacturer: Valley Comfort
Model: PI29
Tracking No.: VC-18-1
Project No.: 0142WN019E
Test Date: 25-Jan-18
Beginning Clock Time: 11:28

Total Sampling Time: 252 min
Recording Interval: 1 min
Background Sample Volume: 0 cubic feet

Meter Box Y Factor: 0.997 (1) 0.981 (2) _____ (Amb)

Barometric Pressure:	Begin	Middle	End	Average
	28.50	28.53	28.56	28.53 "Hg

OMNI Equipment Numbers: 410, 283A, 132, 576, 318, 432, 419, 371, 372, 296-T32, 559, 592, 637

PM Control Modules: 371/372
Dilution Tunnel MW(dry): 29.00 lb/lb-mole
Dilution Tunnel MW(wet): 28.78 lb/lb-mole
Dilution Tunnel H2O: 2.00 percent
Dilution Tunnel Static: -0.180 "H2O
Tunnel Area: 0.19635 ft2
Pitot Tube Cp: 0.99

Avg. Tunnel Velocity: 13.81 ft/sec.
Initial Tunnel Flow: 142.0 scfm
Average Tunnel Flow: 144.5 scfm
Post-Test Leak Check (1): 0.000 cfm @ -15 in. Hg
Post-Test Leak Check (2): 0.000 cfm @ -17 in. Hg
Average Test Piece Fuel Moisture: 22.03 Dry Basis %

Technician Signature: _____

Velocity Traverse Data

	Pt.1	Pt.2	Pt.3	Pt.4	Pt.5	Pt.6	Pt.7	Pt.8	Center	
Initial dP	0.032	0.052	0.030	0.026	0.038	0.050	0.048	0.032	0.052	"H2O
Temp:	94	94	94	94	94	94	94	94	94	°F

V_{strav} 13.81 ft/sec V_{scent} 15.87 ft/sec F_p 0.870

	Particulate Sampling Data														Fuel Weight (lb)		Temperature Data (°F)												Stack Gas Data		
Elapsed Time (min)	Gas Meter 1 (ft^3)	Gas Meter 2 (ft^3)	Sample Rate 1 (cfm)	Sample Rate 2 (cfm)	Orifice dH 1 ("H_2O)	Meter 1 Temp (°F)	Meter 1 Vacuum ("Hg)	Orifice dH 2 ("H_2O)	Meter 2 Temp (°F)	Meter 2 Vacuum ("Hg)	Dilution Tunnel (°F)	Dilution Tunnel Center dP	Pro. Rate 1	Pro. Rate 2	Scale Reading	Weight Change	Firebox Top	Firebox Bottom	Firebox Back	Firebox Left	Firebox Right	Avg. Stove Surface	Catalyst Exit	Stack	Filter 1	Dryer Exit 1	Filter 2	Dryer Exit 2	Ambient	Draft ("H_2O)	CO_2 (%)	CO (%)
111	16.141	16.661	0.15	0.15	1.72	67	0.69	1.38	71	0.3	92	0.052	100	99	5.2	0	678	335	486	338	538	475	777	318	73	68	74	68	70	-0.051	7.37	0.01
112	16.287	16.812	0.15	0.15	1.72	67	0.69	1.37	71	0.3	92	0.052	100	100	5.1	-0.1	674	335	485	338	537	474	769	320	73	68	74	68	69	-0.050	7.33	0.01
113	16.433	16.963	0.15	0.15	1.72	67	0.69	1.38	71	0.3	92	0.052	100	100	5.1	0	670	334	484	337	537	472	761	320	73	68	74	68	69	-0.051	7.4	0.01
114	16.578	17.114	0.15	0.15	1.71	67	0.69	1.37	71	0.3	92	0.052	99	100	5.0	-0.1	666	333	484	337	537	471	754	321	73	68	74	68	70	-0.050	7.45	0.01
115	16.724	17.264	0.15	0.15	1.71	67	0.69	1.36	71	0.3	92	0.052	100	99	5.0	0	662	333	483	337	538	471	748	322	73	68	73	68	69	-0.050	7.5	0.01
116	16.870	17.415	0.15	0.15	1.71	67	0.69	1.38	71	0.3	92	0.052	100	100	4.9	-0.1	658	332	483	337	538	470	744	322	73	68	73	68	70	-0.051	7.51	0.01
117	17.016	17.566	0.15	0.15	1.73	67	0.69	1.38	71	0.3	92	0.052	100	100	4.9	0	654	332	482	337	539	469	741	323	73	68	73	68	69	-0.050	7.52	0.01
118	17.162	17.717	0.15	0.15	1.74	67	0.68	1.37	71	0.3	92	0.052	100	100	4.8	-0.1	651	331	482	337	539	468	739	324	73	68	73	68	70	-0.051	7.57	0.01
119	17.309	17.868	0.15	0.15	1.74	67	0.68	1.38	71	0.3	92	0.052	101	100	4.8	0	648	331	482	338	540	468	736	325	73	68	73	68	70	-0.050	7.61	0.01
120	17.455	18.018	0.15	0.15	1.74	67	0.68	1.38	71	0.3	92	0.052	100	99	4.7	-0.1	645	330	482	338	540	467	734	325	73	68	73	68	70	-0.051	7.65	0.01
121	17.601	18.169	0.15	0.15	1.75	67	0.68	1.37	71	0.3	92	0.052	100	100	4.7	0	643	330	482	338	541	467	731	326	73	68	73	68	70	-0.051	7.64	0.01
122	17.747	18.320	0.15	0.15	1.75	67	0.68	1.38	71	0.3	92	0.052	100	100	4.6	-0.1	640	330	482	339	542	467	728	326	73	68	73	68	70	-0.052	7.66	0.01
123	17.893	18.471	0.15	0.15	1.75	67	0.68	1.38	71	0.3	92	0.052	100	100	4.6	0	637	330	482	339	543	466	726	325	73	68	73	68	70	-0.052	7.71	0.01
124	18.039	18.621	0.15	0.15	1.76	67	0.68	1.38	71	0.3	92	0.052	100	99	4.5	-0.1	635	329	483	340	544	466	725	324	73	68	74	68	70	-0.052	7.69	0.01
125	18.185	18.772	0.15	0.15	1.76	67	0.68	1.37	71	0.3	92	0.052	100	100	4.5	0	633	329	483	340	545	466	722	325	73	68	73	68	70	-0.051	7.7	0.01
126	18.331	18.923	0.15	0.15	1.75	67	0.68	1.38	71	0.3	92	0.052	100	100	4.4	-0.1	631	329	484	341	547	466	718	325	73	68	73	68	70	-0.050	7.66	0
127	18.477	19.074	0.15	0.15	1.76	67	0.68	1.38	71	0.3	92	0.052	100	100	4.4	0	628	329	484	342	548	466	714	323	73	68	73	68	69	-0.051	7.74	0
128	18.623	19.225	0.15	0.15	1.76	67	0.69	1.36	71	0.3	92	0.052	100	100	4.3	-0.1	627	329	485	342	550	467	712	323	73	68	73	68	70	-0.051	7.81	0
129	18.769	19.376	0.15	0.15	1.76	67	0.69	1.38	71	0.3	92	0.052	100	100	4.3	0	625	329	485	343	551	467	710	323	73	68	73	68	70	-0.052	7.81	0
130	18.915	19.526	0.15	0.15	1.76	67	0.68	1.38	71	0.3	92	0.052	100	99	4.2	-0.1	623	329	486	344	553	467	709	323	73	68	73	68	69	-0.051	7.85	0
131	19.061	19.677	0.15	0.15	1.74	67	0.68	1.37	71	0.3	92	0.052	100	100	4.2	0	622	330	487	345	555	468	709	323	73	68	73	68	69	-0.051	7.9	0
132	19.207	19.828	0.15	0.15	1.74	67	0.68	1.38	71	0.3	92	0.052	100	100	4.1	-0.1	621	330	487	346	557	468	709	324	73	68	73	68	70	-0.051	7.94	0
133	19.353	19.979	0.15	0.15	1.75	67	0.69	1.38	71	0.3	92	0.052	100	100	4.1	0	620	330	488	346	558	468	711	322	73	68	73	68	69	-0.051	8.07	0
134	19.499	20.130	0.15	0.15	1.75	67	0.68	1.38	70	0.3	92	0.052	100	100	4.0	-0.1	620	331	489	347	560	469	714	322	73	68	73	68	69	-0.051	8.02	0
135	19.645	20.281	0.15	0.15	1.75	67	0.68	1.38	70	0.3	92	0.052	100	100	4.0	0	620	331	489	348	561	470	716	321	73	68	73	68	69	-0.051	7.99	0
136	19.791	20.432	0.15	0.15	1.76	67	0.68	1.38	70	0.3	91	0.052	100	100	3.9	-0.1	620	331	490	348	562	470	716	319	73	68	73	68	69	-0.051	7.92	0
137	19.937	20.582	0.15	0.15	1.76	67	0.68	1.38	70	0.3	91	0.052	100	100	3.9	0	620	332	491	349	562	471	717	319	73	68	73	68	69	-0.050	7.69	0
138	20.083	20.733	0.15	0.15	1.73	67	0.69	1.38	70	0.3	91	0.052	100	100	3.8	-0.1	620	332	492	350	562	471	720	318	73	68	73	68	69	-0.050	7.61	0
139	20.229	20.884	0.15	0.15	1.73	67	0.69	1.38	70	0.3	91	0.052	100	100	3.8	0	620	332	492	350	562	471	721	318	73	68	73	68	69	-0.050	7.65	0
140	20.375	21.035	0.15	0.15	1.73	67	0.69	1.37	70	0.3	91	0.052	100	100	3.8	0	620	332	493	351	561	471	718	317	73	68	73	68	69	-0.051	7.6	0
141	20.521	21.185	0.15	0.15	1.72	66	0.69	1.36	70	0.3	91	0.052	100	100	3.7	-0.1	619	333	494	352	561	472	714	316	73	68	73	68	69	-0.050	7.48	0
142	20.666	21.337	0.15	0.15	1.72	67	0.69	1.38	70	0.3	91	0.052	99	101	3.7	0	618	333	495	352	561	472	709	315	73	68	73	68	69	-0.050	7.42	0
143	20.812	21.488	0.15	0.15	1.72	67	0.69	1.38	70	0.3	91	0.052	100	100	3.6	-0.1	617	333	496	352	561	472	702	315	73	68	73	68	70	-0.050	7.36	0
144	20.958	21.638	0.15	0.15	1.72	67	0.69	1.36	70	0.3	91	0.052	100	100	3.6	0	615	334	497	352	561	472	696	314	72	68	73	68	70	-0.049	7.27	0
145	21.104	21.789	0.15	0.15	1.72	67	0.69	1.38	70	0.3	91	0.052	100	100	3.6	0	613	334	499	352	562	472	691	314	72	68	73	68	70	-0.050	7.24	0
146	21.250	21.940	0.15	0.15	1.72	67	0.68	1.38	70	0.3	91	0.052	100	100	3.5	-0.1	611	335	500	352	563	472	687	314	72	68	73	68	70	-0.050	7.33	0
147	21.396	22.091	0.15	0.15	1.72	67	0.69	1.37	70	0.3	91	0.052	100	100	3.5	0	608	335	501	352	564	472	684	314	72	68	73	68	69	-0.050	7.32	0

Wood Heater Test Data - ASTM E2780 / ASTM E2515

Run: 4

Manufacturer: Valley Comfort
Model: PI29
Tracking No.: VC-18-1
Project No.: 0142WN019E
Test Date: 25-Jan-18
Beginning Clock Time: 11:28

Total Sampling Time: 252 min
Recording Interval: 1 min
Background Sample Volume: 0 cubic feet

Meter Box Y Factor: 0.997 (1) 0.981 (2) _____ (Amb)

Barometric Pressure:	Begin	Middle	End	Average
	28.50	28.53	28.56	28.53 "Hg

OMNI Equipment Numbers: 410, 283A, 132, 576, 318, 432, 419, 371, 372, 296-T32, 559, 592, 637

PM Control Modules: 371/372
Dilution Tunnel MW(dry): 29.00 lb/lb-mole
Dilution Tunnel MW(wet): 28.78 lb/lb-mole
Dilution Tunnel H2O: 2.00 percent
Dilution Tunnel Static: -0.180 "H2O
Tunnel Area: 0.19635 ft2
Pitot Tube Cp: 0.99

Avg. Tunnel Velocity: 13.81 ft/sec.
Initial Tunnel Flow: 142.0 scfm
Average Tunnel Flow: 144.5 scfm
Post-Test Leak Check (1): 0.000 cfm @ -15 in. Hg
Post-Test Leak Check (2): 0.000 cfm @ -17 in. Hg
Average Test Piece Fuel Moisture: 22.03 Dry Basis %

Technician Signature: _____

Velocity Traverse Data

	Pt.1	Pt.2	Pt.3	Pt.4	Pt.5	Pt.6	Pt.7	Pt.8	Center	
Initial dP	0.032	0.052	0.030	0.026	0.038	0.050	0.048	0.032	0.052	"H2O
Temp:	94	94	94	94	94	94	94	94	94	°F

V_{strav} 13.81 ft/sec V_{scent} 15.87 ft/sec F_p 0.870

	Particulate Sampling Data														Fuel Weight (lb)		Temperature Data (°F)												Stack Gas Data		
Elapsed Time (min)	Gas Meter 1 (ft^3)	Gas Meter 2 (ft^3)	Sample Rate 1 (cfm)	Sample Rate 2 (cfm)	Orifice dH 1 ("H_2O)	Meter 1 Temp (°F)	Meter 1 Vacuum ("Hg)	Orifice dH 2 ("H_2O)	Meter 2 Temp (°F)	Meter 2 Vacuum ("Hg)	Dilution Tunnel (°F)	Dilution Tunnel Center dP	Pro. Rate 1	Pro. Rate 2	Scale Reading	Weight Change	Firebox Top	Firebox Bottom	Firebox Back	Firebox Left	Firebox Right	Avg. Stove Surface	Catalyst Exit	Stack	Filter 1	Dryer Exit 1	Filter 2	Dryer Exit 2	Ambient	Draft ("H_2O)	CO_2 (%)	CO (%)
148	21.542	22.242	0.15	0.15	1.75	66	0.69	1.38	70	0.3	91	0.052	100	100	3.4	-0.1	607	335	503	352	566	473	682	314	72	68	73	68	70	-0.050	7.35	0
149	21.688	22.393	0.15	0.15	1.75	66	0.68	1.38	70	0.3	91	0.052	100	100	3.4	0	605	335	505	352	567	473	681	314	72	68	73	68	70	-0.050	7.4	0
150	21.835	22.543	0.15	0.15	1.75	66	0.68	1.38	70	0.3	91	0.052	101	100	3.4	0	603	336	506	352	570	473	679	313	72	68	73	68	69	-0.050	7.33	0
151	21.981	22.694	0.15	0.15	1.75	66	0.68	1.38	70	0.3	91	0.052	100	100	3.3	-0.1	601	336	508	352	572	474	677	313	72	68	73	68	69	-0.050	7.41	0
152	22.127	22.846	0.15	0.15	1.76	66	0.68	1.38	70	0.3	91	0.052	100	101	3.3	0	600	336	510	352	574	474	675	313	72	68	73	68	69	-0.050	7.49	0
153	22.273	22.996	0.15	0.15	1.76	66	0.68	1.37	70	0.3	91	0.052	100	100	3.2	-0.1	598	337	511	352	577	475	674	313	72	68	73	67	69	-0.049	7.53	0
154	22.419	23.147	0.15	0.15	1.76	66	0.68	1.37	70	0.3	91	0.052	100	100	3.2	0	597	337	512	352	579	475	672	312	72	68	73	67	70	-0.050	7.55	0
155	22.565	23.298	0.15	0.15	1.76	66	0.68	1.39	70	0.3	91	0.052	100	100	3.1	-0.1	596	338	513	351	582	476	671	312	72	68	73	67	70	-0.049	7.57	0
156	22.711	23.449	0.15	0.15	1.76	66	0.68	1.38	70	0.3	91	0.052	100	100	3.1	0	595	338	514	351	584	476	671	312	72	68	73	67	70	-0.049	7.62	0
157	22.857	23.600	0.15	0.15	1.76	66	0.68	1.37	70	0.3	91	0.052	100	100	3.1	0	594	339	515	351	586	477	673	313	72	68	73	67	70	-0.049	7.66	0
158	23.003	23.751	0.15	0.15	1.76	66	0.68	1.38	70	0.3	91	0.052	100	100	3.0	-0.1	594	339	516	350	588	477	675	312	72	68	73	67	70	-0.049	7.77	0
159	23.149	23.902	0.15	0.15	1.76	66	0.68	1.37	70	0.3	91	0.052	100	100	3.0	0	594	340	517	350	590	478	676	312	72	68	73	67	70	-0.049	7.81	0
160	23.296	24.052	0.15	0.15	1.76	66	0.68	1.37	70	0.3	91	0.052	101	100	2.9	-0.1	594	341	519	350	593	479	674	311	72	67	73	67	70	-0.049	7.78	0
161	23.442	24.204	0.15	0.15	1.76	67	0.68	1.38	70	0.3	91	0.052	100	101	2.9	0	593	341	520	350	595	480	673	312	72	68	73	67	70	-0.049	7.83	0
162	23.588	24.354	0.15	0.15	1.75	67	0.68	1.38	70	0.3	91	0.052	100	100	2.8	-0.1	593	342	521	350	597	481	672	311	72	68	73	67	70	-0.049	7.89	0
163	23.734	24.505	0.15	0.15	1.75	67	0.68	1.37	70	0.3	91	0.052	100	100	2.8	0	593	342	523	350	599	481	671	310	72	68	73	67	70	-0.049	7.94	0
164	23.880	24.656	0.15	0.15	1.75	67	0.68	1.37	70	0.3	91	0.052	100	100	2.7	-0.1	593	343	524	350	601	482	672	310	72	68	73	67	70	-0.049	7.92	0
165	24.026	24.807	0.15	0.15	1.75	67	0.68	1.39	70	0.3	91	0.052	100	100	2.7	0	593	344	526	350	603	483	673	309	72	68	73	67	69	-0.049	7.99	0
166	24.172	24.957	0.15	0.15	1.76	67	0.68	1.38	70	0.3	91	0.052	100	100	2.6	-0.1	594	344	528	351	605	484	674	309	72	68	73	67	70	-0.049	8.09	0
167	24.318	25.109	0.15	0.15	1.76	67	0.68	1.37	70	0.3	91	0.052	100	101	2.6	0	594	345	530	351	607	485	675	308	72	68	73	67	70	-0.048	8.14	0
168	24.463	25.259	0.15	0.15	1.76	67	0.68	1.38	70	0.3	91	0.052	99	100	2.5	-0.1	595	345	532	351	609	486	676	308	72	68	73	67	71	-0.048	8.12	0
169	24.609	25.410	0.15	0.15	1.73	67	0.68	1.37	71	0.3	91	0.052	100	100	2.5	0	595	346	533	351	610	487	677	305	72	68	73	67	70	-0.049	8.14	0
170	24.755	25.561	0.15	0.15	1.73	68	0.68	1.37	71	0.3	91	0.052	100	100	2.4	-0.1	596	346	535	352	612	488	678	302	73	68	73	67	71	-0.048	8.19	0
171	24.901	25.712	0.15	0.15	1.73	68	0.68	1.38	71	0.3	91	0.052	100	100	2.4	0	597	347	536	352	613	489	679	301	73	68	73	67	71	-0.049	8.13	0
172	25.047	25.862	0.15	0.15	1.73	68	0.68	1.37	71	0.3	91	0.052	100	99	2.4	0	598	347	537	352	614	490	680	300	73	68	73	67	71	-0.048	8.07	0
173	25.193	26.013	0.15	0.15	1.71	68	0.68	1.36	71	0.3	91	0.052	100	100	2.3	-0.1	598	348	538	352	614	490	681	299	73	68	73	67	71	-0.047	7.98	0
174	25.339	26.164	0.15	0.15	1.71	69	0.68	1.37	72	0.3	91	0.052	100	100	2.3	0	599	349	539	352	615	491	682	297	73	68	73	67	71	-0.048	7.85	0
175	25.484	26.315	0.15	0.15	1.71	69	0.68	1.38	72	0.3	91	0.052	99	100	2.3	0	600	350	539	352	614	491	686	297	73	68	73	68	71	-0.047	7.81	0
176	25.630	26.465	0.15	0.15	1.72	69	0.68	1.37	72	0.3	91	0.052	100	99	2.2	-0.1	601	350	539	353	612	491	691	298	73	68	73	68	71	-0.047	7.69	0
177	25.776	26.616	0.15	0.15	1.73	69	0.68	1.38	72	0.3	91	0.052	100	100	2.2	0	602	350	539	354	610	491	694	298	73	68	74	68	71	-0.047	7.62	0
178	25.922	26.767	0.15	0.15	1.72	69	0.68	1.37	72	0.3	91	0.052	100	100	2.1	-0.1	602	350	539	354	607	490	693	298	73	68	74	68	70	-0.047	7.45	0
179	26.069	26.917	0.15	0.15	1.73	70	0.68	1.37	72	0.3	91	0.052	100	99	2.1	0	602	350	539	354	604	490	688	300	73	68	74	68	70	-0.047	7.29	0
180	26.215	27.068	0.15	0.15	1.75	70	0.68	1.37	72	0.3	91	0.052	99	100	2.1	0	601	350	539	354	601	489	682	300	73	68	74	68	70	-0.047	7.2	0
181	26.361	27.219	0.15	0.15	1.75	70	0.68	1.38	72	0.3	91	0.052	99	100	2.0	-0.1	600	351	539	354	598	488	675	300	73	68	74	68	70	-0.048	7.15	0
182	26.507	27.369	0.15	0.15	1.75	70	0.68	1.37	72	0.3	91	0.052	99	99	2.0	0	598	351	540	355	595	488	667	301	73	68	74	68	71	-0.048	7.08	0
183	26.653	27.519	0.15	0.15	1.75	70	0.68	1.36	73	0.3	91	0.052	99	99	2.0	0	596	351	540	355	592	487	659	300	73	68	74	68	70	-0.047	7.06	0
184	26.799	27.671	0.15	0.15	1.75	70	0.68	1.38	73	0.3	91	0.052	99	100	2.0	0	593	351	540	356	590	486	650	301	73	68	74	68	70	-0.048	6.96	0

Wood Heater Test Data - ASTM E2780 / ASTM E2515

Run: 4

Manufacturer: Valley Comfort
Model: PI29
Tracking No.: VC-18-1
Project No.: 0142WN019E
Test Date: 25-Jan-18
Beginning Clock Time: 11:28

Total Sampling Time: 252 min
Recording Interval: 1 min
Background Sample Volume: 0 cubic feet

Meter Box Y Factor: 0.997 (1) 0.981 (2) _____ (Amb)

Barometric Pressure:

Begin	Middle	End	Average
28.50	28.53	28.56	28.53 "Hg

OMNI Equipment Numbers: 410, 283A, 132, 576, 318, 432, 419, 371, 372, 296-T32, 559, 592, 637

PM Control Modules: 371/372
Dilution Tunnel MW(dry): 29.00 lb/lb-mole
Dilution Tunnel MW(wet): 28.78 lb/lb-mole
Dilution Tunnel H2O: 2.00 percent
Dilution Tunnel Static: -0.180 "H2O
Tunnel Area: 0.19635 ft2
Pitot Tube Cp: 0.99

Avg. Tunnel Velocity: 13.81 ft/sec.
Initial Tunnel Flow: 142.0 scfm
Average Tunnel Flow: 144.5 scfm
Post-Test Leak Check (1): 0.000 cfm @ -15 in. Hg
Post-Test Leak Check (2): 0.000 cfm @ -17 in. Hg
Average Test Piece Fuel Moisture: 22.03 Dry Basis %

Technician Signature: _____

Velocity Traverse Data

	Pt.1	Pt.2	Pt.3	Pt.4	Pt.5	Pt.6	Pt.7	Pt.8	Center	
Initial dP	0.032	0.052	0.030	0.026	0.038	0.050	0.048	0.032	0.052	"H2O
Temp:	94	94	94	94	94	94	94	94	94	°F

V_{strav} 13.81 ft/sec V_{scent} 15.87 ft/sec F_p 0.870

	Particulate Sampling Data														Fuel Weight (lb)		Temperature Data (°F)													Stack Gas Data		
Elapsed Time (min)	Gas Meter 1 (ft^3)	Gas Meter 2 (ft^3)	Sample Rate 1 (cfm)	Sample Rate 2 (cfm)	Orifice dH 1 ("H_2O)	Meter 1 Temp (°F)	Meter 1 Vacuum ("Hg)	Orifice dH 2 ("H_2O)	Meter 2 Temp (°F)	Meter 2 Vacuum ("Hg)	Dilution Tunnel (°F)	Dilution Tunnel Center dP	Pro. Rate 1	Pro. Rate 2	Scale Reading	Weight Change	Firebox Top	Firebox Bottom	Firebox Back	Firebox Left	Firebox Right	Avg. Stove Surface	Catalyst Exit	Stack	Filter 1	Dryer Exit 1	Filter 2	Dryer Exit 2	Ambient	Draft ("H_2O)	CO_2 (%)	CO (%)
185	26.945	27.821	0.15	0.15	1.75	70	0.68	1.37	73	0.3	91	0.052	99	99	1.9	-0.1	590	351	541	356	588	485	642	301	73	68	74	68	71	-0.048	6.83	0
186	27.091	27.971	0.15	0.15	1.76	70	0.68	1.37	73	0.3	91	0.052	99	99	1.9	0	587	352	541	357	585	484	635	301	73	68	74	68	71	-0.047	6.82	0
187	27.237	28.123	0.15	0.15	1.76	71	0.68	1.37	73	0.3	91	0.052	99	100	1.9	0	584	353	541	357	584	484	629	302	73	68	74	68	71	-0.047	6.82	0
188	27.383	28.273	0.15	0.15	1.76	71	0.68	1.37	73	0.3	91	0.052	99	99	1.9	0	581	353	541	358	582	483	624	301	73	68	74	68	70	-0.047	6.82	0
189	27.529	28.423	0.15	0.15	1.76	71	0.68	1.37	73	0.3	91	0.052	99	99	1.8	-0.1	578	354	540	358	580	482	620	302	73	68	74	68	70	-0.047	6.8	0
190	27.676	28.574	0.15	0.15	1.76	71	0.68	1.37	73	0.3	91	0.052	100	100	1.8	0	575	354	540	358	579	481	617	302	73	68	74	68	70	-0.047	6.8	0
191	27.822	28.725	0.15	0.15	1.76	71	0.68	1.38	73	0.3	91	0.052	99	100	1.8	0	573	355	540	358	578	481	614	303	73	68	74	68	71	-0.048	6.82	0
192	27.968	28.876	0.15	0.15	1.76	71	0.68	1.37	73	0.3	91	0.052	99	100	1.7	-0.1	570	355	540	358	577	480	612	304	73	68	74	68	71	-0.048	6.84	0
193	28.114	29.026	0.15	0.15	1.75	71	0.68	1.36	73	0.3	91	0.052	99	99	1.7	0	568	356	540	358	576	480	610	304	73	68	74	68	71	-0.048	6.91	0
194	28.260	29.177	0.15	0.15	1.75	71	0.68	1.38	73	0.3	92	0.052	99	100	1.7	0	565	357	540	358	575	479	607	305	73	68	74	68	71	-0.048	6.86	0
195	28.406	29.327	0.15	0.15	1.75	71	0.68	1.38	73	0.3	92	0.052	99	99	1.7	0	563	357	540	358	575	479	604	305	74	68	74	68	70	-0.048	6.85	0
196	28.552	29.478	0.15	0.15	1.75	71	0.68	1.36	73	0.3	92	0.052	99	100	1.6	-0.1	561	358	540	359	574	478	602	305	74	68	74	68	70	-0.048	6.87	0
197	28.698	29.629	0.15	0.15	1.76	71	0.68	1.37	74	0.3	92	0.052	99	100	1.6	0	559	358	540	359	574	478	601	306	74	68	74	68	70	-0.048	6.84	0
198	28.844	29.780	0.15	0.15	1.76	71	0.68	1.38	74	0.3	92	0.052	99	100	1.6	0	557	359	540	359	573	478	600	305	74	68	74	68	70	-0.048	6.9	0
199	28.990	29.930	0.15	0.15	1.76	71	0.68	1.37	74	0.3	92	0.052	99	99	1.6	0	555	359	540	360	573	477	600	306	74	68	74	68	70	-0.048	6.94	0
200	29.136	30.080	0.15	0.15	1.73	72	0.68	1.37	74	0.3	92	0.052	99	99	1.5	-0.1	554	360	540	360	572	477	600	306	74	68	74	68	71	-0.048	6.91	0
201	29.282	30.231	0.15	0.15	1.73	72	0.68	1.38	74	0.3	92	0.052	99	100	1.5	0	552	360	540	360	572	477	601	306	74	68	74	68	70	-0.047	6.87	0
202	29.428	30.382	0.15	0.15	1.73	72	0.68	1.36	74	0.3	92	0.052	99	100	1.5	0	551	361	541	360	572	477	601	307	74	69	74	68	70	-0.048	6.77	0
203	29.574	30.532	0.15	0.15	1.73	72	0.69	1.36	74	0.3	91	0.052	99	99	1.4	-0.1	550	360	541	361	571	477	601	306	74	69	74	68	70	-0.048	6.85	0
204	29.720	30.684	0.15	0.15	1.71	71	0.69	1.38	74	0.3	91	0.052	99	100	1.4	0	549	357	543	362	571	476	602	306	73	69	74	68	69	-0.049	6.81	0
205	29.866	30.834	0.15	0.15	1.72	71	0.68	1.38	74	0.3	90	0.052	99	99	1.4	0	548	354	544	362	570	476	601	307	73	69	74	69	69	-0.049	6.8	0
206	30.012	30.985	0.15	0.15	1.72	71	0.69	1.37	74	0.3	89	0.052	99	99	1.3	-0.1	547	352	546	363	570	476	601	307	73	69	74	69	69	-0.049	6.79	0
207	30.158	31.136	0.15	0.15	1.73	71	0.69	1.38	73	0.3	89	0.052	99	99	1.3	0	546	351	547	363	569	475	600	307	73	69	74	68	68	-0.049	6.72	0
208	30.304	31.287	0.15	0.15	1.73	70	0.68	1.38	73	0.3	89	0.052	99	99	1.3	0	546	349	549	363	569	475	600	307	73	69	74	68	69	-0.049	6.68	0
209	30.450	31.437	0.15	0.15	1.73	70	0.68	1.37	73	0.3	89	0.052	99	99	1.3	0	545	348	550	363	568	475	600	308	73	69	74	68	68	-0.049	6.69	0
210	30.596	31.589	0.15	0.15	1.73	70	0.68	1.38	73	0.3	89	0.052	99	100	1.3	0	544	347	552	364	567	475	601	310	73	69	74	68	68	-0.049	6.65	0
211	30.743	31.740	0.15	0.15	1.75	70	0.68	1.38	73	0.3	89	0.052	100	99	1.2	-0.1	544	347	553	363	567	475	602	310	73	68	74	68	68	-0.049	6.7	0
212	30.889	31.890	0.15	0.15	1.75	70	0.68	1.38	73	0.3	89	0.052	99	99	1.2	0	543	348	554	364	566	475	603	312	73	68	74	68	68	-0.049	6.78	0
213	31.036	32.042	0.15	0.15	1.74	69	0.68	1.38	73	0.3	89	0.052	100	100	1.2	0	543	349	554	363	565	475	604	313	72	68	73	68	68	-0.049	6.74	0
214	31.182	32.193	0.15	0.15	1.76	69	0.68	1.38	73	0.3	89	0.052	99	99	1.1	-0.1	542	350	555	363	565	475	604	313	72	68	73	68	69	-0.048	6.7	0
215	31.328	32.344	0.15	0.15	1.76	69	0.68	1.38	73	0.3	90	0.052	100	100	1.1	0	542	354	555	363	564	476	604	315	72	68	73	68	70	-0.048	6.6	0
216	31.475	32.495	0.15	0.15	1.76	69	0.68	1.38	73	0.3	90	0.052	100	100	1.1	0	541	354	556	362	564	475	604	315	72	68	73	68	69	-0.049	6.59	0
217	31.621	32.646	0.15	0.15	1.76	69	0.68	1.38	73	0.3	90	0.052	100	100	1.1	0	541	352	558	363	564	476	604	316	72	68	73	68	68	-0.049	6.63	0
218	31.768	32.797	0.15	0.15	1.76	69	0.68	1.38	73	0.3	90	0.052	100	100	1.0	-0.1	540	353	559	363	564	476	603	316	72	68	73	68	68	-0.049	6.65	0
219	31.914	32.948	0.15	0.15	1.76	70	0.68	1.37	73	0.3	90	0.052	99	100	1.0	0	539	352	560	364	563	476	601	315	72	68	73	68	68	-0.049	6.71	0
220	32.060	33.099	0.15	0.15	1.76	69	0.68	1.38	73	0.3	89	0.052	99	99	1.0	0	539	352	562	364	563	476	600	315	72	68	73	68	68	-0.049	6.76	0
221	32.207	33.250	0.15	0.15	1.77	69	0.68	1.37	73	0.3	89	0.052	100	99	1.0	0	538	353	563	364	563	476	599	314	72	68	73	68	68	-0.049	6.73	0

Wood Heater Test Data - ASTM E2780 / ASTM E2515

Run: 4

Manufacturer: Valley Comfort
Model: PI29
Tracking No.: VC-18-1
Project No.: 0142WN019E
Test Date: 25-Jan-18
Beginning Clock Time: 11:28

Total Sampling Time: 252 min
Recording Interval: 1 min
Background Sample Volume: 0 cubic feet

Meter Box Y Factor: 0.997 (1) 0.981 (2) _____ (Amb)

Barometric Pressure:	Begin	Middle	End	Average
	28.50	28.53	28.56	28.53 "Hg

OMNI Equipment Numbers: 410, 283A, 132, 576, 318, 432, 419, 371, 372, 296-T32, 559, 592, 637

PM Control Modules: 371/372
Dilution Tunnel MW(dry): 29.00 lb/lb-mole
Dilution Tunnel MW(wet): 28.78 lb/lb-mole
Dilution Tunnel H2O: 2.00 percent
Dilution Tunnel Static: -0.180 "H2O
Tunnel Area: 0.19635 ft2
Pitot Tube Cp: 0.99

Avg. Tunnel Velocity: 13.81 ft/sec.
Initial Tunnel Flow: 142.0 scfm
Average Tunnel Flow: 144.5 scfm
Post-Test Leak Check (1): 0.000 cfm @ -15 in. Hg
Post-Test Leak Check (2): 0.000 cfm @ -17 in. Hg
Average Test Piece Fuel Moisture: 22.03 Dry Basis %

Technician Signature: _____

Velocity Traverse Data	Pt.1	Pt.2	Pt.3	Pt.4	Pt.5	Pt.6	Pt.7	Pt.8	Center	
Initial dP	0.032	0.052	0.030	0.026	0.038	0.050	0.048	0.032	0.052	"H2O
Temp:	94	94	94	94	94	94	94	94	94	°F

V_{strav} 13.81 ft/sec V_{scent} 15.87 ft/sec F_p 0.870

	Particulate Sampling Data														Fuel Weight (lb)		Temperature Data (°F)													Stack Gas Data		
Elapsed Time (min)	Gas Meter 1 (ft^3)	Gas Meter 2 (ft^3)	Sample Rate 1 (cfm)	Sample Rate 2 (cfm)	Orifice dH 1 ("H_2O)	Meter 1 Temp (°F)	Meter 1 Vacuum ("Hg)	Orifice dH 2 ("H_2O)	Meter 2 Temp (°F)	Meter 2 Vacuum ("Hg)	Dilution Tunnel (°F)	Dilution Tunnel Center dP	Pro. Rate 1	Pro. Rate 2	Scale Reading	Weight Change	Firebox Top	Firebox Bottom	Firebox Back	Firebox Left	Firebox Right	Avg. Stove Surface	Catalyst Exit	Stack	Filter 1	Dryer Exit 1	Filter 2	Dryer Exit 2	Ambient	Draft ("H_2O)	CO_2 (%)	CO (%)
222	32.353	33.400	0.15	0.15	1.76	69	0.68	1.37	73	0.3	90	0.052	100	99	1.0	0	537	356	565	364	563	477	598	315	72	68	73	68	69	-0.049	6.71	0
223	32.499	33.552	0.15	0.15	1.75	69	0.68	1.39	73	0.3	91	0.052	100	100	0.9	-0.1	537	359	567	365	562	478	598	316	72	68	73	68	69	-0.049	6.75	0
224	32.646	33.703	0.15	0.15	1.77	70	0.68	1.38	73	0.3	91	0.052	100	100	0.9	0	536	361	570	366	562	479	598	317	72	68	73	68	70	-0.048	6.7	0
225	32.792	33.853	0.15	0.15	1.76	70	0.68	1.37	73	0.3	92	0.052	100	99	0.9	0	536	362	572	366	561	479	599	317	72	68	73	68	70	-0.048	6.66	0
226	32.938	34.005	0.15	0.15	1.76	70	0.68	1.37	73	0.3	92	0.052	100	100	0.8	-0.1	535	364	574	366	561	480	599	318	72	68	73	68	69	-0.048	6.62	0
227	33.084	34.155	0.15	0.15	1.76	70	0.68	1.38	73	0.3	92	0.052	100	99	0.8	0	535	365	576	366	560	480	600	320	72	68	73	68	70	-0.049	6.61	0
228	33.230	34.306	0.15	0.15	1.76	70	0.68	1.37	73	0.3	92	0.052	100	100	0.8	0	535	367	578	366	560	481	600	320	72	68	73	68	70	-0.049	6.63	0
229	33.377	34.457	0.15	0.15	1.77	70	0.68	1.38	73	0.3	92	0.052	100	100	0.7	-0.1	534	368	579	366	559	481	599	319	72	68	73	68	70	-0.049	6.63	0
230	33.523	34.608	0.15	0.15	1.77	70	0.68	1.38	73	0.3	92	0.052	100	100	0.7	0	534	369	580	367	559	482	596	319	72	68	73	68	70	-0.049	6.63	0
231	33.669	34.758	0.15	0.15	1.75	70	0.68	1.37	73	0.3	92	0.052	100	99	0.7	0	533	370	582	367	558	482	595	319	72	68	73	68	70	-0.048	6.59	0
232	33.815	34.909	0.15	0.15	1.75	70	0.68	1.37	73	0.3	92	0.052	100	100	0.7	0	533	371	583	368	558	483	594	319	73	68	73	68	70	-0.049	6.61	0
233	33.962	35.060	0.15	0.15	1.74	70	0.68	1.38	73	0.3	93	0.052	100	100	0.6	-0.1	532	372	585	368	558	483	595	320	73	68	73	68	70	-0.049	6.59	0
234	34.108	35.211	0.15	0.15	1.74	70	0.68	1.37	73	0.3	92	0.052	100	100	0.6	0	532	372	587	368	557	483	597	320	73	68	73	68	70	-0.049	6.51	0
235	34.253	35.361	0.15	0.15	1.76	70	0.68	1.37	73	0.3	93	0.052	99	99	0.6	0	532	373	588	369	556	484	598	319	73	68	73	68	70	-0.049	6.5	0
236	34.399	35.512	0.15	0.15	1.76	71	0.68	1.38	73	0.3	93	0.052	99	100	0.5	-0.1	532	374	590	369	555	484	600	320	73	68	73	68	70	-0.049	6.49	0
237	34.545	35.663	0.15	0.15	1.76	71	0.68	1.38	73	0.3	93	0.052	99	100	0.5	0	532	375	591	369	554	484	601	320	73	68	73	68	70	-0.049	6.35	0
238	34.691	35.813	0.15	0.15	1.74	71	0.68	1.37	73	0.3	93	0.052	99	99	0.5	0	532	376	593	369	553	485	601	320	73	68	74	68	69	-0.049	6.31	0
239	34.837	35.964	0.15	0.15	1.74	71	0.68	1.38	73	0.3	93	0.052	99	100	0.4	-0.1	532	376	595	369	552	485	600	320	73	68	74	68	70	-0.049	6.36	0
240	34.983	36.115	0.15	0.15	1.74	71	0.69	1.37	73	0.3	93	0.052	99	100	0.4	0	531	377	596	369	552	485	599	319	73	68	74	68	70	-0.049	6.35	0
241	35.129	36.265	0.15	0.15	1.74	71	0.69	1.37	73	0.3	93	0.052	99	99	0.4	0	531	377	598	370	551	485	598	320	73	68	74	68	70	-0.049	6.3	0
242	35.275	36.416	0.15	0.15	1.72	71	0.69	1.38	73	0.3	93	0.052	99	100	0.4	0	531	378	600	370	550	486	597	320	73	68	74	68	70	-0.049	6.31	0
243	35.421	36.567	0.15	0.15	1.72	71	0.69	1.38	73	0.3	93	0.052	99	100	0.3	-0.1	530	378	601	370	549	486	596	320	73	68	74	68	70	-0.049	6.37	0
244	35.567	36.717	0.15	0.15	1.72	71	0.68	1.37	73	0.3	93	0.052	99	99	0.3	0	530	379	603	370	548	486	596	320	73	68	74	68	70	-0.049	6.41	0
245	35.712	36.868	0.15	0.15	1.72	71	0.69	1.36	73	0.3	93	0.052	99	100	0.3	0	529	379	605	371	548	486	595	320	73	68	74	68	71	-0.049	6.35	0
246	35.858	37.019	0.15	0.15	1.73	71	0.68	1.38	73	0.3	93	0.052	99	100	0.2	-0.1	529	379	608	372	547	487	594	321	73	68	74	68	70	-0.050	6.31	0
247	36.004	37.170	0.15	0.15	1.72	71	0.68	1.37	73	0.3	93	0.052	99	100	0.2	0	528	380	610	371	547	487	593	322	73	68	74	68	70	-0.049	6.25	0
248	36.150	37.320	0.15	0.15	1.72	71	0.68	1.36	74	0.3	93	0.052	99	99	0.2	0	528	380	612	371	546	487	592	322	73	68	74	68	71	-0.049	6.23	0
249	36.297	37.471	0.15	0.15	1.75	71	0.68	1.38	74	0.3	93	0.052	100	100	0.2	0	527	380	614	371	546	488	592	322	73	68	74	68	70	-0.049	6.22	0
250	36.443	37.622	0.15	0.15	1.75	71	0.68	1.37	74	0.3	93	0.052	99	100	0.1	-0.1	527	381	616	370	545	488	591	323	73	68	74	68	70	-0.049	6.27	0
251	36.589	37.772	0.15	0.15	1.75	71	0.68	1.37	74	0.3	93	0.052	99	99	0.1	0	526	381	618	370	545	488	590	322	73	68	74	68	70	-0.049	6.25	0
252	36.735	37.923	0.15	0.15	1.76	71	0.68	1.38	74	0.3	93	0.052	99	100	0.0	-0.1	525	381	620	369	545	488	590	322	74	68	74	68	71	-0.049	6.32	0
Avg/Tot	36.735	37.923	0.15	0.15	1.75	68		1.37	71		95	0.052	100	100								17.4				68	74	67	70	-0.052		

Wood Heater Lab Data - ASTM E2780 / ASTM E2515

Manufacturer:	Valley Comfort	Equipment Numbers:	283A, 592, 637
Model:	PI29		
Tracking No.:	VC-18-1		
Project No.:	0142WN019E		
Run #:	4		
Date:	1/25/18		

TRAIN 1 (First Hour emissions)

Sample Component	Reagent	Filter, Probe or Dish #	Weights		
			Final, mg	Tare, mg	Particulate, mg
B. Front filter catch	Filter	D386	113.5	110.5	3.0
C. Rear filter catch	Filter				0.0
D. Probe catch*	Probe				0.0
E. Filter seals catch*	Seals				0.0

Sub-Total	Total Particulate, mg:	3.0

TRAIN 1 (Post First Hour Change-out)

Sample Component	Reagent	Filter, Probe or Dish #	Weights		
			Final, mg	Tare, mg	Particulate, mg
B. Front filter catch	Filter	D406	239.7	238.7	1.0
C. Rear filter catch	Filter	D407			0.0
D. Probe catch*	Probe	13	114321.6	114321.5	0.1
E. Filter seals catch*	Seals	R569	3355.6	3354.7	0.9

Sub-Total	Total Particulate, mg:	2.0
Train 1 Aggregate	Total Particulate, mg:	5.0

TRAIN 2

Sample Component	Reagent	Filter, Probe or Dish #	Weights		
			Final, mg	Tare, mg	Particulate, mg
A. Front filter catch	Filter	D408	242.2	238.1	4.1
B. Rear filter catch	Filter	D409			0.0
C. Probe catch*	Probe	14	114549.5	114549.4	0.1
D. Filter seals catch*	Seals	R570	3302.0	3300.9	1.1

	Total Particulate, mg:	5.3

AMBIENT

Sample Component	Reagent	Filter # or Probe #	Weights		
			Final, mg	Tare, mg	Particulate, mg
A. Front filter catch*	Filter				0.0

	Total Particulate, mg:	0.0

*Particulate catch that results in a negative number, is assumed to be zero for probes and seals, negative numbers for filters are assumed to be part of the seal weight.

Component	Equations:
A. Front filter catch	Final (mg) - Tare (mg) = Particulate, mg
B. Rear filter catch	Final (mg) - Tare (mg) = Particulate, mg
C. Probe catch	Final (mg) - Tare (mg) = Particulate, mg

Technician Signature: _____

Wood Heater Test Results - ASTM E2780 / ASTM E2515

Manufacturer: Valley Comfort
Model: PI29
Project No.: 0142WN019E
Tracking No.: VC-18-1
Run: 4
Test Date: 01/25/18

Burn Rate	**1.46 kg/hr dry**
Average Tunnel Temperature	95 degrees Fahrenheit
Average Gas Velocity in Dilution Tunnel - vs	13.81 feet/second
Average Gas Flow Rate in Dilution Tunnel - Qsd	8672.9 dscf/hour
Average Delta p	0.052 inches H20
Total Time of Test	252 minutes

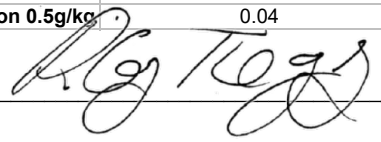
	AMBIENT	SAMPLE TRAIN 1	SAMPLE TRAIN 2	FIRST HOUR FILTER (TRAIN 1)
Total Sample Volume - Vm	0.000 cubic feet	36.735 cubic feet	37.923 cubic feet	8.707 cubic feet
Average Gas Meter Temperature	70 degrees Fahrenheit	68 degrees Fahrenheit	71 degrees Fahrenheit	67 degrees Fahrenheit
Total Sample Volume (Standard Conditions) - Vmstd	0.000 dscf	35.050 dscf	35.363 dscf	8.324 dscf
Total Particulates - m_n	0 mg	5 mg	5.3 mg	3 mg
Particulate Concentration (dry-standard) - C_r/C_s	0.000000 grams/dscf	0.00014 grams/dscf	0.00015 grams/dscf	0.00036 grams/dscf
Total Particulate Emissions - E_T	0.00 grams	5.20 grams	5.46 grams	3.13 grams
Particulate Emission Rate	0.00 grams/hour	1.24 grams/hour	1.30 grams/hour	3.13 grams/hour
Emissions Factor		0.85 g/kg	0.89 g/kg	1.12 g/kg
Difference from Average Total Particulate Emissions		0.13 grams	0.13 grams	
		Dual Train Comparison Results Are Acceptable		

FINAL AVERAGE RESULTS

Complete Test Run	
Total Particulate Emissions - E_T	5.33 grams
Particulate Emission Rate	**1.27 grams/hour**
Emissions Factor	0.87 grams/kg
First Hour Emissions	
Total Particulate Emissions - E_T	3.13 grams
Particulate Emission Rate	3.13 grams/hour
Emissions Factor	1.12 grams/kg
7.5% of Average Total Particulate Emissions	0.40 grams

QUALITY CHECKS

Filter Temps < 90 °F	OK
Filter Face Velocity (47 mm)	OK
Dryer Exit Temp < 80F	OK
Leakage Rate	OK
Ambient Temp (55-90°F)	OK
Negative Probe Weight Eval.	OK
Pro-Rate Variation	OK
Stove Surface ΔT	OK
Train Precesion 7.5%	2.47
Train Precision 0.5g/kg	0.04

Technician Signature: 

Wood Heater Efficiency Results - CSA B415.1

Manufacturer:	**Valley Comfort**
Model:	**PI29**
Date:	**01/25/18**
Run:	**4**
Control #:	**0142WN019E**
Test Duration:	**252**
Output Category:	**III**

Technician Signature: _____

Test Results in Accordance with CSA B415.1-09

	HHV Basis	LHV Basis
Overall Efficiency	**74.8%**	**80.9%**
Combustion Efficiency	**98.6%**	**98.6%**
Heat Transfer Efficiency	**76%**	**82.0%**

Output Rate (kJ/h)	**21,516**	**20,410**	**(Btu/h)**
Burn Rate (kg/h)	**1.45**	**3.20**	**(lb/h)**
Input (kJ/h)	**28,760**	**27,282**	**(Btu/h)**

Test Load Weight (dry kg)	**6.10**	**13.44**	**dry lb**
MC wet (%)	**18.05517618**		
MC dry (%)	**22.03**		
Particulate (g)	**1.27**		
CO (g)	**151**		
Test Duration (h)	**4.20**		

Emissions	Particulate	CO
g/MJ Output	**0.01**	**1.67**
g/kg Dry Fuel	**0.21**	**24.68**
g/h	**0.30**	**35.84**
lb/MM Btu Output	**0.03**	**3.87**

Air/Fuel Ratio (A/F)	**13.74**

VERSION: **2.2** **12/14/2009**

Section 4

Quality Assurance/Quality Control
Sample Analysis
Calibrations
Example Calculations

QUALITY ASSURANCE/QUALITY CONTROL

OMNI follows the guidelines of ISO/IEC 17025, "General Requirements for the Competence of Testing and Calibration Laboratories," and the quality assurance/quality control (QA/QC) procedures found in *OMNI*'s Quality Assurance Manual.

OMNI's scope of accreditation includes, but is not limited to, the following:

- ANSI (American National Standards Institute) for certification of product to safety standards.
- To perform product safety testing by the International Accreditation Service, Inc. (formerly ICBO ES) under accreditation as a testing laboratory designated TL-130.
- To perform product safety testing as a "Certification Organization" by the Standards Council of Canada (SCC).
- Serving as a testing laboratory for the certification of wood heaters by the U.S. Environmental Protection Agency.

This report is issued within the scope of *OMNI*'s accreditation. Accreditation certificates are available upon request.

The manufacturing facilities and quality control system for the production of the Blaze King PI29 at Valley Comfort Systems Inc. were evaluated to determine if sufficient to maintain conformance with OMNI's requirements for product certification. OMNI has concluded that the manufacturing facilities, processes, and quality control system are adequate to produce the appliance congruous with the standards and model codes to which it was evaluated.

SAMPLE ANALYSIS

Analysis Worksheets

Tared Filter, Probe, and O-Ring Data

OMNI-Test Laboratories, Inc. **ASTM E2780Wood Heater Run Sheets**

Client: **Valley Comfort Systems, Inc.** Project Number: **142WN019E** Run Number: **1**

Model: **PI29** Tracking Number: **VC-18-1** Date: **1/22/18**

Test Crew: **A. Kravitz**

OMNI Equipment ID numbers: 464, 410, 283A, 132, 576, 318, 432, 419, 371, 372, 432, 296-T32, 559, 592

ASTM E2515 Lab Sheet

Assembled By:

Aaron Kravitz

Date/Time in Dessicator:

1/29/2018 08:30

	Weighing #1	Weighing #2	Weighing #3	Weighing #4	Weighing #5
Date/Time:	2/4/18	2/5/18	2/7/18		
R/H %:	12.8	14.1	11.8		
Temp:	70.3	69.8	69.6		
200 mg Audit:	200.0	200.0	200.0		
2 g Audit:	1999.6	1999.8	1999.9		
100 g Audit:	99997.7	99997.6	99998.0		
Initials:	AK	A	A		

Train	Element	ID #	Tare (mg)	Weight (mg)	Weight (mg)	Weight (mg)	Weight (mg)	Weight (mg)
A (First Hour)	Front Filter	D383	111.2	115.1	115.0	–		
	Rear Filter	N/A	----	----	----	----	----	----
	Probe	N/A	----	----	----	----	----	----
	O-Ring Set	N/A	----	----	----	----	----	----
A (Remai-nder)	Front Filter	D394	239.4	241.2	241.1	–		
	Rear Filter	D395						
	Probe	23	114077.5	114077.5	114077.6	–		
	O-Ring Set	R563	3376.2	3378.8	3377.2	3377.1		
B	Front Filter	D396	239.7	245.3	245.2	–		
	Rear Filter	D397						
	Probe	25	114299.4	114300.7	114300.0	114300.0		
	O-Ring Set	R564	3395.5	3398.4	3396.4	3396.83		
BG	Filter	N/A	----	----	----	----	----	----

Technician Signature: _____ Date: 2/7/18

OMNI-Test Laboratories, Inc. **ASTM E2780Wood Heater Run Sheets**

Client: **Valley Comfort Systems, Inc.** Project Number: **142WN019E** Run Number: **2**

Model: **PI29** Tracking Number: **VC-18-1** Date: **1/23/18**

Test Crew: **A. Kravitz**

OMNI Equipment ID numbers: 464, 410, 283A, 132, 576, 318, 432, 419, 371, 372, 432, 296-T32, 559, 592

ASTM E2515 Lab Sheet

Assembled By:

Aaron Kravitz

Date/Time in Dessicator:

1/29/2018 08:30

	Weighing #1	Weighing #2	Weighing #3	Weighing #4	Weighing #5
Date/Time:	2/4/18	2/5/18	2/7/18		
R/H %:	12.8	14.1	11.8		
Temp:	70.3	69.8	69.6		
200 mg Audit:	200.0	200.0	200.0		
2 g Audit:	1999.8	1999.8	1999.9		
100 g Audit:	99997.7	100097.1	99998.0		
Initials:			A		

Train	Element	ID #	Tare (mg)	Weight (mg)	Weight (mg)	Weight (mg)	Weight (mg)	Weight (mg)
A (First Hour)	Front Filter	D384	110.7	115.0	114.8	–		
	Rear Filter	N/A	----------	----------	----------	----------	----------	----------
	Probe	N/A	----------	----------	----------	----------	----------	----------
	O-Ring Set	N/A	----------	----------	----------	----------	----------	----------
A (Remai-nder)	Front Filter	D398	238.9	238.4	238.3	–		
	Rear Filter	D399						
	Probe	37	114465.8	114465.7	114465.8	–		
	O-Ring Set	R565	4140.6	4143.0	4142.2	4142.1		
B	Front Filter	D400	240.2	244.0	244.0	–		
	Rear Filter	D401						
	Probe	38	114151.1	114150.9	114150.0	–		
	O-Ring Set	R566	4135.2	4137.3	4136.7	4136.7		
BG	Filter	N/A	----------	----------	----------	----------	----------	----------

Technician Signature: _____ Date: 2/7/18

OMNI-Test Laboratories, Inc. **ASTM E2780Wood Heater Run Sheets**

Client: **Valley Comfort Systems, Inc.** Project Number: **142WN019E** Run Number: **3**

Model: **PI29** Tracking Number: **VC-18-1** Date: **1/24/18**

Test Crew: **A. Kravitz**

OMNI Equipment ID numbers: 464, 410, 283A, 132, 576, 318, 432, 419, 371, 372, 432, 296-T32, 559, 592

ASTM E2515 Lab Sheet

Assembled By:

Aaron Kravitz

Date/Time in Dessicator:

1/29/2018 08:30

	Weighing #1	Weighing #2	Weighing #3	Weighing #4	Weighing #5
Date/Time:	2/4/18	2/5/18	2/7/18		
R/H %:	12.8	14.1	11.8		
Temp:	70.3	61.6	69.6		
200 mg Audit:	200.0	200.0	200.0		
2 g Audit:	1999.9	1999.8	1999.9		
100 g Audit:	99997.7	99997.9	99998.0		
Initials:	AK	AK	AK		

Train	Element	ID #	Tare (mg)	Weight (mg)	Weight (mg)	Weight (mg)	Weight (mg)	Weight (mg)
A (First Hour)	Front Filter	D385	111.2	126.4	125.8	125.7		
	Rear Filter	N/A	------	------	------	------	------	------
	Probe	N/A	------	------	------	------	------	------
	O-Ring Set	N/A	------	------	------	------	------	------
A (Remai-nder)	Front Filter	D402	238.8	240.8	240.8	-		
	Rear Filter	D403						
	Probe	62	117661.5	117661.4	117661.5	-		
	O-Ring Set	R567	3295.9	3297.1	3296.0	3295.9		
B	Front Filter	D404	239.1	253.3	253.3	-		
	Rear Filter	D405						
	Probe	66	118455.7	118455.6	118455.6	-		
	O-Ring Set	R568	3367.2	3369.2	3367.3	3367.2		
BG	Filter	N/A	------	------	------	------	------	------

Technician Signature: AK Date: 2/7/18

OMNI-Test Laboratories, Inc. **ASTM E2780Wood Heater Run Sheets**

Client: **Valley Comfort Systems, Inc.** Project Number: **142WN019E** Run Number: **4**

Model: **PI29** Tracking Number: **VC-18-1** Date: **1/25/18**

Test Crew: **A. Kravitz**

OMNI Equipment ID numbers: 464, 410, 283A, 132, 576, 318, 432, 419, 371, 372, 432, 296-T32, 559, 592

ASTM E2515 Lab Sheet

Assembled By:

Aaron Kravitz

Date/Time in Dessicator:

1/29/2018 08:30

	Weighing #1	Weighing #2	Weighing #3	Weighing #4	Weighing #5
Date/Time:	2/4/18	2/5/18	2/7/18		
R/H %:	12.8	14.1	11.8		
Temp:	70.3	69.8	69.6		
200 mg Audit:	200.0	200.0	200.0		
2 g Audit:	1999.9	1999.8	1999.9		
100 g Audit:	99997.7	99997.9	99996.0		
Initials:	A	A	A		

Train	Element	ID #	Tare (mg)	Weight (mg)	Weight (mg)	Weight (mg)	Weight (mg)	Weight (mg)
A (First Hour)	Front Filter	D386	110.5	~~230.7~~ 113.5	113.5	–		
	Rear Filter	N/A	----------	----------	----------	----------	----------	----------
	Probe	N/A	----------	----------	----------	----------	----------	----------
	O-Ring Set	N/A	----------	----------	----------	----------	----------	----------
A (Remai-nder)	Front Filter	D406	238.7	239.7	239.7	–		
	Rear Filter	D407						
	Probe	13	114321.5	114321.5	114321.6	–		
	O-Ring Set	R569	3354.7	3356.0	3355.5	3355.6		
B	Front Filter	D408	238.1	242.2	242.2	–		
	Rear Filter	D409						
	Probe	14	114549.4	114549.5	114549.5	–		
	O-Ring Set	R570	3300.9	3302.3	3302.0	3302.6		
BG	Filter	N/A	----------	----------	----------	----------	----------	----------

Technician Signature: _____ Date: 2/7/18

Tare Sheet: Probes___ 47mm Filters_✓_ 100mm Filters___ O-Ring Pair___

Date/time Placed in Dessicator: 1/4/18 1410

Thermohygrometer ID #: OMNI-00592

Prepared By: B Davis

Analytical Balance ID #: OMNI-00637

Audit Weight ID #/Mass: OMNI-00283A / 200 mg

ID #	Date: 1/5/18 Time: 1425 RH %: 19.8 T (°F): 71.2 Audit: 0.2001	Date: 1/8/18 Time: 10:20 RH %: 17.6 T (°F): 74.4 Audit: 0.2000	Date: 1/9/18 Time: 0820 RH %: 8.6 T (°F): 77 Audit: 0.2000	Date: Time: RH %: T (°F): Audit:	Date Used	Project Number	Run No.
D372	111.7	111.9	"		1/8/18	0135WS038E-CAT	4
D373	111.4	111.5	"		1/11/18	0226PS025E	1
D374	110.5	110.7	"		↓	↓	↓
D375	111.0	111.2	"				
D376	111.7	111.6	"				
D377	111.1	111.2	"				
D378	111.6	111.5	"		1/16/18	0135WS038E-CAT	5
D379	111.3	111.5	"		↓	↓	↓
D380	111.5	111.7	"				
D381	110.9	110.8	"				
D382	111.2	111.4	"				
D383	111.2	111.2	"		1/22/18	0142WN019E	1
D384	110.8	110.7	"		1/23/18	↓	2
D385	111.0	111.2	"		1/24/18	↓	3
D386	110.3	110.5	"		1/25/18	↓	4
D387	111.0	111.2	"		2/9/18	0061PS093N	1
D388	110.6	110.8	"		↓	↓	↓
D389	111.1	111.2	"				
D390	111.2	111.7	111.8				
D391	110.4	110.6	"		2/20/18		1
D392	111.2	111.4	"				
D393	110.9	111.1	"				
	Initials: BR	Initials: BR	Initials: BR	Initials:			

Final Technician Signature: _____ Date: 1/10/18

Control No. P-SFDP-0001.xls, Effective date: 9/9/2015

Evaluator signature: _____

Tare Sheet: (check one) Probes_____ 47mm Filters___✓___ 100mm Filters_____ O-Ring Pair_____

Prepared By: A. Kravitz Balance ID #: 637 Thermohygrometer ID #: 542 Audit Weight ID #/Mass: 283A / 200 mg

Placed in Dessicator: Date: 1/17/18 Time: 13:30 ID #	Date: 1/19/18 Time: 1000 RH %: 12.0 T (°F): 73.7 Audit: 200.0	Date: 1/19/18 Time: 1600 RH %: 14.2 T (°F): 74.7 Audit: 200.0	Date: 2/8/18 Time: 1500 RH %: 12.4 T (°F): 71.0 Audit: 200.0	Date: 2/12/18 Time: 0930 RH %: 10.5 T (°F): 66.9 Audit: 200.0	Date Used	Project Number	Run No.
D395/5	239.4	239.4			1/22/18	0142VNO1QE	1
D396/7	239.8	239.7			↓	↓	↓
D398/9	239.0	238.9			1/23/18	↓	2
D400/1	240.4	240.2			↓	↓	↓
D402/3	239.9	239.8			1/24/18	↓	3
D404/5	239.1	239.1			↓	↓	↓
D406/7	238.7	238.7			1/25/18	↓	4
D408/9	238.3	238.1			↓	↓	↓
[redacted]							
	Initials:	Initials:	Initials:	Initials:			

Final Technician Signature: _____ Date: 1/26/18 Evaluator signature: _____

T4 120.8 120.7

Tare Sheet: (check one) Probes ✓ 47mm Filters ____ 100mm Filters ____ O-Ring Pair ____

Prepared By: BDAUS Balance ID #: OMNI-00637 Thermohygrometer ID #: OMNI-00592 Audit Weight ID #/Mass: OMNI-00283A / 100 g mass

Placed in Dessicator: Date: Dec. 2017 Time: ~ ID #	Date: 1/3/18 Time: 0840 RH %: 10.2 T (°F): 71.1 Audit: 99.9980	Date: 1/4/18 Time: 0829 RH %: 18.4 T (°F): 69.6 Audit: 99.9980	Date: 1/5/18 Time: 0916 RH %: 27.5 T (°F): 70.5 Audit: 99.9980	Date: 1/10/18 Time: 0820 RH %: 6.7 T (°F): 67.9 Audit: 99.9980	Date Used	Project Number	Run No.
[redacted]							
23	114076.8	114077.4	114077.5	✓	1/22/18	0142WN01AE	1
24	114126.9	114127.5	114128.1	114127.2	Not used		
25	114299.9	114299.4	114299.4	✓	1/22/18	0142WN01AE	1
[redacted]							
37	114465.6	114465.8	✓		1/23/18	0142WN01AE	2
38	114151.0	114151.1	✓		〃	〃	〃
[redacted]							
62	~~118455.8~~ 117661.3	117661.7	117661.5	✓	1/24/18	0142WN01AE	3
66	~~117661.3~~ 118455.5	118455.7	✓		〃	〃	〃
	Initials: BA	Initials: BA	Initials: BA	Initials: BA			

Final Technician Signature: _____ Date: 1/16/18 Evaluator signature: _____

Tare Sheet: Probes ✓ 47mm Filters___ 100mm Filters___ O-Ring Pair___

Date/time Placed in Dessicator: 1/18/18 12:30

Prepared By: A. Krowitz

Analytical Balance ID #: 637

Thermohygrometer ID #: 592

Audit Weight ID #/Mass: 283A / 100g

ID #	Date: 1/17/18 Time: 12:30 RH %: T (°F): Audit:	Date: 1/17/18 Time: 13:45 RH %: 12.4 T (°F): 73.0 Audit: 99996.7	Date: 1/19/18 Time: 10:00 RH %: 12.6 T (°F): 73.7 Audit: 99997.8	Date: 1/19/18 Time: 16:00 RH %: 14.2 T (°F): 74.7 Audit: 99995.0	Date Used	Project Number	Run No.
13	~~114320.6~~ A	114320.3	114321.3	114321.5	1/25/18	0142WN019E	4
14	~~114548.8~~ A	114548.5	114549.3	114549.4	↓	↓	↓
[redacted]							
	Initials: A	Initials: A	Initials:	Initials:			

Final Technician Signature: [signature] Date: 1/19/18

Control No. P-SFDP-0001.xls, Effective date: 9/9/2015

Evaluator signature: [signature]

Tare Sheet: (check one) Probes_____ 47mm Filters_____ 100mm Filters_____ O-Ring Pair ✓

Prepared By: B Davis Balance ID #: Omni 00637 Thermohygrometer ID #: Omni - 00592 Audit Weight ID #/Mass: Omni-00283A / 5gram 50g

Placed in Dessicator: Date: Dec 2017 Time: – / ID #	Date: 1/4/18 Time: 0840 RH %: 19.6 T (°F): 73.4 Audit: 5.0001	Date: 1/5/18 Time: 0920 RH %: 20.4 T (°F): 71.4 Audit: 5.0000	Date: 1/8/18 Time: 0810 RH %: 18.9 T (°F): 70.6 Audit: 5.0000	Date: Time: RH %: T (°F): Audit:	Date Used	Project Number	Run No.
[redacted]							
R563	3376.0	3376.2	–		1/22/18	0142WN01AE	1
R564	3395.3	3395.5	–		↓	↓	↓
R565	4140.6	4140.6	–		1/23/18	↓	2
R566	4135.3	4135.6	4135.2		↓	↓	↓
R567	3295.7	3295.9	–		1/24/18	↓	3
R568	3367.0	3367.5	3367.2		↓	↓	↓
R569	3354.7	3355.2	3354.7		1/25/18	↓	4
R570	3301.0	3301.3	3300.9		↓	↓	↓
[redacted]							
–							
–							
–							
–							
	Initials: BR	Initials: BR	Initials: BR	Initials:			

Final Technician Signature: [signature] Date: 1/10/18 Evaluator signature: [signature]

CALIBRATIONS

Equipment used for Methods EPA 28R, ASTM E2515, ASTM E2780

ID #	Lab Name/Purpose	Log Name	Attachment Type
132	10 lb Weight	Weight Standard, 10 lb.	Calibration Log
283A	Audit Weights	21-piece weight set	Calibration Certificate
296-T56	Tape Measure	DeWalt Tape Measure	Calibration Log
318	Digital thermometer	Fluke 52II	Calibration Log
371	Sample Box / Dry Gas Meter	Apex Automated Emissions Sampling Box	Calibration Log
372	Sample Box / Dry Gas Meter	Apex Automated Emissions Sampling Box	Calibration Log
410	Microtector	Dwyer Microtector	Calibration Certificate
419	Combustion Gas Analyzer	Infrared Gas Analyzer	N/A - See Test Run Notes
432	Moisture Meter Calibrator	Delmhorst Moisture Content Calibrator	Calibration Log
559	Vaneometer	Dwyer Vaneometer	Equipment Record
567	Stopwatch	Robic Stopwatch SC-606W	Calibration Log
576	Caliper, 6”	6" Dial Caliper	Calibration Certificate
592	Thermohygrometer	Omega Digital Thermohygrometer	Calibration Log
637	Mettler Lab Scale	Analytical Balance	Calibration Certificate

SCALE WEIGHT CALIBRATION DATA SHEET

Weight to be calibrated: 10 lb

ID Number: 132

Standard Calibration Weight: 10 lb

ID Number: 256

Scale Used: MTW-150K

ID Number: 353

Date: 2/19/13 By: A. Kravitz

Standard Weight (A) (Lb.)	Weight Verified (B) (Lb.)	Difference (A - B)	% Error
10.0	10.0	0.0	0

*Acceptable tolerance is 1%.

This calibration is traceable to NIST using calibrated standard weights.

Technician signature: Date: 2/19/13

Certificate of Calibration

Certificate Number: **543402**

JJ Calibrations, Inc.
7007 SE Lake Rd
Portland, OR 97267-2105
Phone 503.786.3005
FAX 503.786.2994

Omni-Test Laboratories
13327 NE Airport Way
Portland, OR 97230

ACCREDITED
0723.01
Calibration

PO: OTL-13-031
Order Date: 09/27/2013
Authorized By: N/A

Property #: OMNI-00283A
User: N/A
Department: N/A
Make: Troemner Inc
Model: 1mg-100g (Class F)
Serial #: 47883
Description: Mass Set, 21 Pc.
Procedure: DCN 500901
Accuracy: Class F

Calibrated on: 10/09/2013
*Recommended Due: 10/09/2018
Environment: 20 °C 41 % RH
As Received: Other - See Remarks
As Returned: Within Tolerance
Action Taken: Calibrated
Technician: 34

Remarks: * Any number of factors may cause the calibration item to drift out of calibration before the recommended interval has expired

Changed set from a Class 4 to a Class F per Jeremy Clark.
Received missing 1g weight.
Refer to attachment for measurement results.

Standards Used

Std ID	Manufacturer	Model	Nomenclature	Due Date	Trace ID
432A	Sartorius	C-44	Microbalance 5.1g	03/11/2014	517747
479A	Sartorius	MC210S	Scale, 210g	02/22/2014	517755
503A	Rice Lake	1mg-200g (Class O)	Mass Set	12/07/2013	517746
723A	Rice Lake	1mg-200g (Class O)	Mass Set	09/05/2014	540048

JJ Calibrations, Inc. certifies that this instrument has been calibrated in accordance with the JJ Calibrations Quality Assurance Manual with the stated procedure using standards that are traceable to the National Institute of Standards and Technology (NIST), or other National Measurement Institutes (NMI's), or by using natural physical constants, intrinsic standards or ratio calibration techniques. The quality system and this certificate are in compliance with ANSI/NCSL Z540-1-1994, ISO/IEC 17025-2005, ISO 10012-1, the ISO 9000 family and QS 9000. The expanded uncertainties of measurements for this calibration are based upon 95% (2 sigma) confidence limits. Unless otherwise stated, a test accuracy ratio (TAR) of 4:1, if achievable, is maintained. The results reported herein apply only to the calibration of the item described above. This report may not be reproduced, except in full, without prior written consent of JJ Calibrations, Inc.
JJ Calibrations, Inc. quality system has been assessed and accredited to ISO/IEC 17025:2005.

Reviewer

3 Issued 10/11/2013 Rev # 14

Inspector

OMNI Environmental Services, Inc.
OMNI-Test Laboratories, Inc.

Tape Measure Calibration Log

Place the calibrated 12" ruler under the tape measure and verify that each ½" (i.e. 1.5", 2", 2.5") between 0 and 36" is within 1/8".

Calibrated using OMNI-00281

Tape Measure Number	Description	Cal Dates				Technician Initials			
OMNI-00296-T55	Dewalt 16' Tape Measure	12/12/16				[illegible]			
OMNI-00296-T56	Dewalt 25' Tape Measure	12/12/16				[illegible]			
OMNI-00296-T59	Dewalt 25' Tape Measures	12/12/16				[illegible]			
OMNI-00296-T58	Dewalt 25' Tape measure	3/9/17				[illegible]			
OMNI-00296-T40	Stanley FatMax Tape measurer 16'	11/17/17				NTS			
OMNI-00296-T31	Stanley Powerlock Tape Measurer	11/22/17				NTS			
OMNI-00296-T59	DeWalt 25' tape Measure	12/06/17				NTS			
OMNI-00296-T54	DeWalt 25' tape Measure	12/06/17				NTS			
OMNI-00296-T56	DeWalt 25' tape Measure	12/06/17				NTS			
OMNI-00296-T55	DeWalt 25' tape Measure	12/06/17				NTS			

OMNI Environmental Services, Inc.
OMNI-Test Laboratories, Inc.

Thermocouple Readout Calibration Log

Date: 2/13/14 OMNI Meter Identification Number: OMNI- 00318 Technician: Jeremy Clark

			Meter Response					Acceptable?		
		0	200	400	600	800	1000			
Date	Calibration Meter ID		± 3EF*	± 6EF	± 9EF	± 12EF	± 15EF	Yes	No	Initials
T1 2/13/14	OMNI - 00373	0.2	200.0	400.1	600.1	800.1	1001	✓		JC
T2 2/13/14	" "	0.3	200.0	400.1	600.1	800.1	1000	✓		JC
T1 2/3/15	OMNI - 00373	-0.1	199.9	399.9	599.9	800.0	1000	✓		JC
T2 2/3/15	OMNI - 00373	-0.1	199.9	400.0	600.0	800.1	1001	✓		JC
T1 2/29/16	OMNI - 00373	0.3	200.1	400.2	600.2	800.1	1000	✓		BR
T2 2/29/16	OMNI-00373	0.1	200.1	400.1	600.3	800.4	1001	✓		BR
T1 3/9/17	OMNI-00373	-2.4	197.6	397.5	597.5	797.5	9973	✓		BR
T2 3/9/17	OMNI-00373	-1.1	198.5	398.4	598.3	798.1	998.3	✓		BR

*Note: Acceptance Criteria are based on EPA Method 2 Section 4.3 (1.5% agreement of readings)

Technician signature: _____ Date: 2/13/14

Thermal Metering System Calibration
Y Factor

Manufacturer:	Apex
Model:	XC-60-EP
Serial Number:	0702003
OMNI Tracking No.:	OMNI-00371
Calibrated Orifice:	☐Yes

Previous Calibration Comparision

Date	7/20/2017	Acceptable Deviation (5%)	Deviation
y Factor	1.003	0.05015	0.006
Acceptance	Acceptable		

Current Calibration

Acceptable y Deviation	0.020
Maximum y Deviation	0.012
Acceptable dH@ Deviation	N/A
Maximum dH@ Deviation	N/A
Acceptance	Acceptable

Average Gas Meter y Factor	**Orifice Meter dH@**
0.997	**N/A**

Calibration Date:	01/16/18	
Calibrated by:	B. Davis	
Calibration Frequency:	6 months	
Next Calibration Due:	1/20/2018	
Instrument Range:	1.000	cfm
Standard Temp.:	68	oF
Standard Press.:	29.92	"Hg
Barometric Press., Pb:	30.32	"Hg
Signature/Date:		1/16/2018
		1/19/2018

Reference Standard *			
Standard Calibrator	Model	Standard Test Meter	
	S/N	OMNI-00001	
	Calib. Date	30-Oct-17	
	Calib. Value	0.9977	y factor (ref)

Calibration Parameters	Run 1	Run 2	Run 3
Reference Meter Pressure ("H2O), Pr	0.00	0.00	0.00
DGM Pressure ("H2O), Pd	3.29	1.70	1.00
Initial Reference Meter	156.6	163.2	170.4
Final Reference Meter	161.802	170.3	178.5
Initial DGM	0	0	0
Final DGM	5.157	7.164	8.357
Temp. Ref. Meter (°F), Tr	71.9	66.5	66.7
Temperature DGM (°F), Td	77.0	74.0	78.0
Time (min)	25.8	51.5	78.8
Net Volume Ref. Meter, Vr	5.202	7.100	8.100
Net Volume DGM, Vd	5.157	7.164	8.357
Gas Meter y Factor =	**1.008**	**0.999**	**0.985**
Gas Meter y Factor Deviation (from avg.)	0.011	0.001	0.012
Orifice dH@	**N/A**	**N/A**	**N/A**
Orifice dH@ Deviation (from avg.)	N/A	N/A	N/A

where:

1. Deviation = |Average value for all runs - current run value|

** 2. y = [Vr x (y factor (ref)) x (Pb + (Pr/ 13.6)) x (Td + 460)]/ [Vd x (Pb + (Pd / 13.6)) x (Tr + 460)]

** 3. dH@ = 0.0317 x Pd / (Pb (Td + 460)) x [(Tr + 460) x time) / Vr]^2

* Reference calibration is traceable to NIST through NIST Test # 40674, Kimble ASTM E1272, or NIST traceable laboratory

** Equations come from EPA Method 5

The uncertainty of measurement is ±0.14 ft^3/min. This is based on the reference standard having a TAR (Test Accuracy Ratio) of at least 4:1.

DIFFERENTIAL PRESSURE GAUGE CALIBRATION DATA SHEET

Instrument to be calibrated: Pressure Transducer

Maximum Range: 0-2" WC ID Number: OMNI-00371

Calibration Instrument: Digital Manometer ID Number: OMNI-00395

Date: 1/17/2018 By: B. Davis

This form is to be used only in conjunction with Standard Procedure C-SPC.

Range of Calibration Point ("WC)	Digital Manometer Input ("WC)	Pressure Gauge Response ("WC)	Difference (Input - Response)	% Error of Full Span*
0-20% Max. Range 0 - 0.4	0.23	0.231	0.001	0.05
20-40% Max. Range 0.4 - 0.8	0.52	0.519	0.001	0.05
40-60% Max. Range 0.8 – 1.2	1.01	1.018	0.008	0.40
60-80% Max. Range 1.2 – 1.6	1.29	1.301	0.011	0.55
80-100% Max. Range 1.6 – 2.0	1.92	1.930	0.010	0.50

*Acceptable tolerance is 4%.

The uncertainty of measurement is ±0.4" WC. This is based on the reference standard having a TAR (Test Accuracy Ratio) of at least 4:1.

Technician signature: _____ Date: 1/18/2018

Reviewed by: _____ Date: 1/19/2018

Temperature Calibration
EPA Method 28R, ASTM 2515

Booth:	Temperature Monitor Type:	Equipment Number:
E1	National Instruments Logger	00371, 00372

Reference Meter Equipment Number: 00373	Calibration Due Date: ~~8/02/17~~ 7/17/18

Calibration Performed By:	Date:	Ambient Temperature:	Barometric Pressure:
B. Davis	1/17/2018	68	29.87

Input Temperature (F)	Ambient	Meter A	Meter B	Filter A	Filter B	Tunnel	FB Interior
0	-1	-1	-1	-1	-1	-1	-1
100	99	99	99	99	99	99	100
300	299	299	299	299	299	299	299
500	499	499	499	499	499	499	499
700	699	699	699	699	699	699	699
1000	998	998	998	998	998	999	999

Input (F)	FB Top	FB Bottom	FB Back	FB Left	FB Right	Imp A	Imp B	Cat	Stack
0	-1	-1	-1	-1	-1	-1	-1	-1	-1
100	99	99	99	99	99	99	99	99	99
300	299	299	299	299	299	299	299	299	299
500	499	499	499	499	499	499	499	499	499
700	699	699	699	699	699	699	699	699	699
1000	999	999	999	999	999	999	998	998	999
1500								1498	
2000								1998	

Technician signature: _____ Date: 1/17/2018

Reviewed By: _____ Date: 1/19/2018

Thermal Metering System Calibration
Y Factor

Manufacturer:	Apex
Model:	XC-60-EP
Serial Number:	0702004
OMNI Tracking No.:	OMNI-00372
Calibrated Orifice:	☐Yes

Previous Calibration Comparision

Date	7/21/2017	Acceptable Deviation (5%)	Deviation
y Factor	0.997	0.04985	0.016
Acceptance	Acceptable		

Current Calibration

Acceptable y Deviation	0.020
Maximum y Deviation	0.011
Acceptable dH@ Deviation	N/A
Maximum dH@ Deviation	N/A
Acceptance	Acceptable

Average Gas Meter y Factor	Orifice Meter dH@
0.981	N/A

Calibration Date:	01/17/18	
Calibrated by:	B. Davis	
Calibration Frequency:	6 months	
Next Calibration Due:	7/17/2018	
Instrument Range:	1.000	cfm
Standard Temp.:	68	oF
Standard Press.:	29.92	"Hg
Barometric Press., Pb:	30.33	"Hg
Signature/Date:		1/18/2018
		1/19/2018

Reference Standard *			
Standard Calibrator	Model	Standard Test Meter	
	S/N	OMNI-00001	
	Calib. Date	27-Oct-16	
	Calib. Value	0.9977	y factor (ref)

Calibration Parameters	Run 1	Run 2	Run 3
Reference Meter Pressure ("H2O), Pr	0.00	0.00	0.00
DGM Pressure ("H2O), Pd	2.00	1.30	0.80
Initial Reference Meter	178.6	185.5	191.2
Final Reference Meter	185.4	191.1	196.305
Initial DGM	0	0	0
Final DGM	6.903	5.778	5.322
Temp. Ref. Meter (°F), Tr	65.5	65.3	65.5
Temperature DGM (°F), Td	73.0	74.0	75.0
Time (min)	37.8	40.5	47.3
Net Volume Ref. Meter, Vr	6.800	5.600	5.105
Net Volume DGM, Vd	6.903	5.778	5.322
Gas Meter y Factor =	**0.992**	**0.980**	**0.972**
Gas Meter y Factor Deviation (from avg.)	0.011	0.002	0.009
Orifice dH@	**N/A**	**N/A**	**N/A**
Orifice dH@ Deviation (from avg.)	N/A	N/A	N/A

where:

1. Deviation = |Average value for all runs - current run value|

** 2. y = [Vr x (y factor (ref)) x (Pb + (Pr/ 13.6)) x (Td + 460)]/ [Vd x (Pb + (Pd / 13.6)) x (Tr + 460)]

** 3. dH@ = 0.0317 x Pd / (Pb (Td + 460)) x [(Tr + 460) x time) / Vr]^2

* Reference calibration is traceable to NIST through NIST Test # 40674, Kimble ASTM E1272, or NIST traceable laboratory

** Equations come from EPA Method 5

The uncertainty of measurement is ±0.14 ft^3/min. This is based on the reference standard having a TAR (Test Accuracy Ratio) of at least 4:1.

DIFFERENTIAL PRESSURE GAUGE CALIBRATION DATA SHEET

Instrument to be calibrated: Pressure Transducer

Maximum Range: 0-2" WC ID Number: OMNI-00372

Calibration Instrument: Digital Manometer ID Number: OMNI-00395

Date: 1/17/2018 By: B. Davis

This form is to be used only in conjunction with Standard Procedure C-SPC.

Range of Calibration Point ("WC)	Digital Manometer Input ("WC)	Pressure Gauge Response ("WC)	Difference (Input - Response)	% Error of Full Span*
0-20% Max. Range 0 - 0.4	0.21	0.206	0.004	0.20
20-40% Max. Range 0.4 - 0.8	0.64	0.632	0.008	0.40
40-60% Max. Range 0.8 – 1.2	1.02	1.025	0.005	0.25
60-80% Max. Range 1.2 – 1.6	1.42	1.428	0.008	0.40
80-100% Max. Range 1.6 – 2.0	1.73	1.727	0.003	0.15

*Acceptable tolerance is 4%.

The uncertainty of measurement is ±0.4" WC. This is based on the reference standard having a TAR (Test Accuracy Ratio) of at least 4:1.

Technician signature: _____ Date: 1/18/2018

Reviewed by: _____ Date: 1/19/2018

Temperature Calibration
EPA Method 28R, ASTM 2515

Booth:	Temperature Monitor Type:	Equipment Number:
E1	National Instruments Logger	00371, 00372

Reference Meter Equipment Number: 00373	Calibration Due Date: ~~8/02/17~~ 7/17/18

Calibration Performed By:	Date:	Ambient Temperature:	Barometric Pressure:
B. Davis	1/17/2018	68	29.87

Input Temperature (F)	Ambient	Meter A	Meter B	Filter A	Filter B	Tunnel	FB Interior
0	-1	-1	-1	-1	-1	-1	-1
100	99	99	99	99	99	99	100
300	299	299	299	299	299	299	299
500	499	499	499	499	499	499	499
700	699	699	699	699	699	699	699
1000	998	998	998	998	998	999	999

Input (F)	FB Top	FB Bottom	FB Back	FB Left	FB Right	Imp A	Imp B	Cat	Stack
0	-1	-1	-1	-1	-1	-1	-1	-1	-1
100	99	99	99	99	99	99	99	99	99
300	299	299	299	299	299	299	299	299	299
500	499	499	499	499	499	499	499	499	499
700	699	699	699	699	699	699	699	699	699
1000	999	999	999	999	999	999	998	998	999
1500								1498	
2000								1998	

Technician signature: _____ Date: 1/17/2018

Reviewed By: _____ Date: 1/19/2018

Certificate of Calibration

Certificate Number: **629694**

JJ Calibrations, Inc.
7007 SE Lake Rd
Portland, OR 97267-2105
Phone 503.786.3005
FAX 503.786.2994

Omni-Test Laboratories
13327 NE Airport Way
Portland, OR 97230

0723.01
Calibration

PO: **160099**
Order Date: **08/18/2016**
Authorized By: **N/A**

Property #: **OMNI-00410**
User: **N/A**
Department: **N/A**
Make: **Dwyer**
Model: **1430**
Serial #: **OMNI-00410**
Description: **Microtector**
Procedure: **500908**
Accuracy: **±0.00025" WC**

Calibrated on: **08/29/2016**
*Recommended Due: **08/29/2017**
Environment: **19** °C **50** % RH
* As Received: **Other - See Remarks**
* As Returned: **Limited**
Action Taken: **Calibrated**
Technician: **34**

Remarks: * Many factors may cause the unit to drift out of calibration before the recommended due date. Any reported error is the absolute value between the reference and the unit. Uncertainties include the effects of the unit.

Calibrated micrometer head only per Bruce Davis.

Limited Calibration - Calibrated micrometer head only.

Standards Used

Std ID	Manufacturer	Model	Nomenclature	Due Date	Trace ID
541A	Select	E8FED2	8 Piece Gage Block Set	11/24/2016	607288

Measurement Data

Parameter / Measurement Description	Range Unit	Reference	Min	Max	Error	UUT	Uncertainty
Before/After							Accredited = ✓
Length							
	Inch	0.1300	0.129	0.131	0.000	0.130 Inch	1.1E-03 ✓
	Inch	0.3850	0.384	0.386	0.000	0.385 Inch	1.1E-03 ✓
	Inch	0.6150	0.614	0.616	0.000	0.615 Inch	1.1E-03 ✓
	Inch	0.8700	0.869	0.871	0.001	0.871 Inch	1.1E-03 ✓
	Inch	1.0000	0.999	1.001	0.001	1.001 Inch	1.1E-03 ✓

JJ Calibrations, Inc. certifies that this instrument has been calibrated in accordance with the JJ Calibrations Quality Assurance Manual with the stated procedure using standards that are traceable to the National Institute of Standards and Technology (NIST), or other National Measurement Institutes (NMI's), or by using natural physical constants, intrinsic standards or ratio calibration techniques. The quality system and this certificate are in compliance with ANSI/NCSL Z540-1-1994, ISO/IEC 17025-2005, ISO 10012-1, the ISO 9000 family and QS 9000. The expanded uncertainties of measurements for this calibration are based upon 95% (2 sigma) confidence limits. Unless otherwise stated, a test accuracy ratio (TAR) of 4:1, if achievable, is maintained. The results reported herein apply only to the calibration of the item described above. This report may not be reproduced, except in full, without prior written consent of JJ Calibrations, Inc.
JJ Calibrations, Inc. quality system has been assessed and accredited to ISO/IEC 17025:2005.

Reviewer

3 Issued 08/31/2016 Rev # 15

Stacy Heath
Inspector

WOOD MOISTURE CONTENT CALIBRATION WORKSHEET

Moisture Content Standard OMNI ID #: 00432

Reference Moisture Content Standard: **OMNI # 00430**

Date	Temp.	Barometric Pressure	Fixed Moisture %	Fixed Moisture %	Observed Moisture %		Initials
5/20/2016	69°F	29.90 in Hg	22%	12%	22.0 %	12.0 %	AL
11/14/16	68°F	30.10 in Hg	22%	12%	22.0 %	12.0 %	DR
5/10/17	70°F	30.14 in Hg	22%	12%	22.0 %	12.0 %	AL
			22%	12%			
			22%	12%			
			22%	12%			
			22%	12%			
			22%	12%			
			22%	12%			
			22%	12%			
			22%	12%			
			22%	12%			
			22%	12%			
			22%	12%			
			22%	12%			
			22%	12%			
			22%	12%			
			22%	12%			
			22%	12%			

Notes: _____

Technician signature: _____ Date: 5/20/16

OMNI Track #	OMNI-00559
Equipment Name/Description	Vaneometer, Air Vel. Meter - Dwyer
Equipment S/N:	T36Z
Comments	New vane installed
Status	Active
Part #	480

Reference Standard:		YES	X	NO	(Check 'X' for answer)

Location of Equipment:	Cab 1
Calibration Vendor	OMNI in house
Type of Calibration	6 month
Calibration Period (Months)	6
Date of Last Calibration	5/10/2017
Date of Next Calibration	11/10/2017

Do the following:

1) Complete Calibration documentation
2) Complete top half of this form
3) Attach appropriate calibration forms and save in following location
   \\omni-serv\Test Equipment\Equipment\OMNI-XXXXX - Equipment Name
4) Repopulate database with updated information
5) Print, laminate and adhere calibration tag to equipment

Six Month
OMNI-00559
Vaneometer

Last Cal Date: **5/10/2017**
Due Date of Cal: **11/10/17**

Six Month
OMNI-00559
Vaneometer

Last Cal Date: **5/10/2017**
Due Date of Cal: **11/10/2017**

NIST Stopwatch Calibration, Time Proficiency Testing Procedure and Data Sheet

Date: 8/7/17 User/Technician: N. Sodergren ☑ Pass ☐ Fail

NIST traceable stopwatch *OMNI* tracking number: 00565 Last Cal: 06/27/2017

Stopwatch to be tested for time proficiency *OMNI* tracking number: 00567

1. Start the NIST traceable stopwatch: at a predetermined time (i.e. 1.00 minutes), the technician shall start the watch being tested. When 15.00 seconds have passed (i.e. the NIST traceable stopwatch reads 1 minute, 15 seconds), the technician shall stop the watch being tested. Record the target time interval (i.e. 15.00 seconds). Repeat this step twice and record the data.

2. Repeat step #1 for each of the following target time intervals: 30.00 seconds, 10.00 minutes, and 30 minutes.

3. If the delta between the target time and measured time is less than 5% of the target time interval or 2.00 seconds (whichever is less), then the technician has demonstrated proficiency with the specific instrument utilized in the proficiency test. The proficiency is valid for a period of 12 months.

4. Archive the proficiency test data and information, including the effective date and expiration date of the proficiency, in the equipment record for the instrument involved.

Target time: 15.00 seconds	#1 Measured time:	15.05	#2 Measured time:	14.96	#3 Measured time:	15.00
Target time: 30.00 seconds	#1 Measured time:	30.19	#2 Measured time:	30.18	#3 Measured time:	29.84
Target time: 45.00 seconds	#1 Measured time:	44.98	#2 Measured time:	44.79	#3 Measured time:	44.89
Target time: 60.00 seconds	#1 Measured time:	59.97	#2 Measured time:	59.94	#3 Measured time:	59.97
Target time: 10.00 minutes	#1 Measured time:	9'59"78	#2 Measured time:	9'59"90	#3 Measured time:	10'00"15
Target time: 30.00 minutes	#1 Measured time:	~~9'59"90~~ 30'00"23	#2 Measured time:	30'00"06	#3 Measured time:	29'59"97

The uncertainty of measurement is ±1 sec. This is based on the reference standard having a TAR (Test Accuracy Ratio) of at least 4:1.

This calibration procedure is confirmed by the manufacturer as a proper method for evaluating the accuracy of timers.

Technician Signature: _____ Date: 8/7/17

Reviewed by: _____ Date: 8/7/17

Certificate of Calibration

Certificate Number: **666477**

JJ Calibrations, Inc.
7007 SE Lake Rd
Portland, OR 97267-2105
Phone 503.786.3005
FAX 503.786.2994

Omni-Test Laboratories
13327 NE Airport Way
Portland, OR 97230

ACCREDITED
0723.01
Calibration

PO: **180160**
Order Date: 01/11/2018
Authorized By: N/A

Property #: OMNI-00576
User: N/A
Department: N/A
Make: General
Model: 0-6"
Serial #: OMNI-00576
Description: Caliper 6"
Procedure: DCN 500777
Accuracy: ±0.001"

Calibrated on: 01/15/2018
*Recommended Due: 01/15/2019
Environment: 18 °C 46 % RH
* As Received: Limited
* As Returned: Limited
Action Taken: Calibrated
Technician: 111

Remarks: * Many factors may cause the unit to drift out of calibration before the recommended due date. Any reported error is the absolute value between the reference and the unit. Uncertainties include the effects of the unit.

Previous limitation of do not use OD Jaws past 3.0" continued.

Standards Used

Std ID	Manufacturer	Model	Nomenclature	Due Date	Trace ID
477A	Brown & Sharpe	599-1-31	Micrometer 0-1"	07/28/2018	654433
755A	MHC	81 Piece	Gage Block Set, 81 Pc.	11/30/2018	662825

Measurement Data

Parameter / Measurement Description	Range Unit	Reference	Min	Max	*Error	UUT	Uncertainty (Accredited = ✓)
Before/After							
Length - Outside							
	Inch	0.2500	0.249	0.251	0.000	0.250 Inch	1.1E-03 ✓
	Inch	0.5000	0.499	0.501	0.000	0.500 Inch	1.1E-03 ✓
	Inch	0.7500	0.749	0.751	0.000	0.750 Inch	1.1E-03 ✓
	Inch	1.0000	0.999	1.001	0.000	1.000 Inch	1.1E-03 ✓
	Inch	3.0000	2.999	3.001	0.001	3.001 Inch	1.1E-03 ✓
	Inch	6.0000	5.999	6.001	0.002	6.002 Inch	1.2E-03 ✓
Step	Inch	1.0000	0.999	1.001	0.001	0.999 Inch	1.1E-03 ✓
Depth Rod	Inch	1.0000	0.999	1.001	0.001	1.001 Inch	1.1E-03 ✓
Length inside ID jaws							
I.D. Jaws	Inch	0.5000	0.499	0.501	0.001	0.499 Inch	1.1E-03 ✓

JJ Calibrations, Inc. certifies that this instrument has been calibrated in accordance with the JJ Calibrations Quality Assurance Manual with the stated procedure using standards that are traceable to the National Institute of Standards and Technology (NIST), or other National Measurement Institutes (NMI's), or by using natural physical constants, intrinsic standards or ratio calibration techniques. The quality system and this certificate are in compliance with ANSI/NCSL Z540-1-1994, ISO/IEC 17025-2005, ISO 10012-1, the ISO 9000 family and QS 9000. The expanded uncertainties of measurements for this calibration are based upon 95% (2 sigma) confidence limits. Unless otherwise stated, a test accuracy ratio (TAR) of 4:1, if achievable, is maintained. The results reported herein apply only to the calibration of the item described above. This report may not be reproduced, except in full, without prior written consent of JJ Calibrations, Inc.
JJ Calibrations, Inc. quality system has been assessed and accredited to ISO/IEC 17025:2005.

Reviewer

3 Issued 01/15/2018 Rev # 15

Tracy A Chambers
Inspector

VWR Temperature Hygrometer Calibration Procedure and Data Sheet

Frequency: Every Two Years

Step 1: Locate NIST traceable standard.

Step 2: Place unit to be calibrated, tracking No. OMNI- 00592 , inside OMNI desiccate box on the same shelf with the NIST traceable standard.

Step 3: After a period of not less than four hours record the temperature and humidity of both units in the spaces provide below.

Step 4: If the unit to be calibrated matches the NIST standard within ± 4%, it is acceptable. If not, the unit needs to be sent to a repair company or replaced.

Verification Data:

Date: 1/8/2018 Technician: B Davis

Time in desiccate: 0910 Recording time: 1335

NIST Standard Temperature: 28.3 °F NIST Standard Humidity: 74.5

Test Unit Temperature Reading: 25.4 °F Test Unit Humidity Reading: 74.3

Test unit OMNI- 00592 is X or was not ___ within acceptable limits.

Technician Signature: [signature]

Comments: Full scale of OMNI-00592 is 90% RH, with a difference of 2.9 this gives a error percentage of 3.22 %. This value is within the allowable 4%.

Certificate of Calibration

Certificate Number: **655889**

JJ Calibrations, Inc.
7007 SE Lake Rd
Portland, OR 97267-2105
Phone 503.786.3005
FAX 503.786.2994

Omni-Test Laboratories
13327 NE Airport Way
Portland, OR 97230

OnSite

0723.01
Calibration

PO: **170142**
Order Date: **08/07/2017**
Authorized By: **N/A**

Property #: **OMNI-00637**
User: **N/A**
Department: **N/A**
Make: **Mettler Toledo**
Model: **MS104TS/00**
Serial #: **B729400181**
Description: **Scale, Analytical, 120g**
Procedure: **DCN 500887**
Accuracy: **±0.0005g**

Calibrated on: **08/07/2017**
*Recommended Due: **02/07/2018**
Environment: **22 °C 45 % RH**
* As Received: **Within Tolerance**
* As Returned: **Within Tolerance**
Action Taken: **Calibrated**
Technician: **34**

Remarks: * Many factors may cause the unit to drift out of calibration before the recommended due date. Any reported error is the absolute value between the reference and the unit. Uncertainties include the effects of the unit.

Standards Used

Std ID	Manufacturer	Model	Nomenclature	Due Date	Trace ID
256A	Rice Lake	W0133K	Mass Set	10/28/2017	616126

Measurement Data

Parameter / Measurement Description	Range Unit	Reference	Min	Max	*Error	UUT	Uncertainty Accredited = ✓
Before/After							
Force							
	g	10.00000	9.9995	10.0005	0.0001	10.0001 g	5.7E-04 ✓
	g	30.00000	29.9995	30.0005	0.0001	30.0001 g	5.7E-04 ✓
	g	60.00000	59.9995	60.0005	0.0003	60.0003 g	5.7E-04 ✓
	g	90.00000	89.9995	90.0005	0.0002	90.0002 g	5.7E-04 ✓
	g	120.00000	119.9995	120.0005	0.0003	120.0003 g	5.7E-04 ✓

JJ Calibrations, Inc. certifies that this instrument has been calibrated in accordance with the JJ Calibrations Quality Assurance Manual with the stated procedure using standards that are traceable to the National Institute of Standards and Technology (NIST), or other National Measurement Institutes (NMI's), or by using natural physical constants, intrinsic standards or ratio calibration techniques. The quality system and this certificate are in compliance with ANSI/NCSL Z540-1-1994, ISO/IEC 17025-2005, ISO 10012-1, the ISO 9000 family and QS 9000. The expanded uncertainties of measurements for this calibration are based upon 95% (2 sigma) confidence limits. Unless otherwise stated, a test accuracy ratio (TAR) of 4:1, if achievable, is maintained. The results reported herein apply only to the calibration of the item described above. This report may not be reproduced, except in full, without prior written consent of JJ Calibrations, Inc.
JJ Calibrations, Inc. quality system has been assessed and accredited to ISO/IEC 17025:2005.

Reviewer

3 Issued 08/14/2017 Rev # 15

Inspector

CORRELL'S SCALE SERVICE
INSTALLATION • SERVICE • REPAIRS • RENTAL • LEASE • SALES
An R.B. Pugh Company LLC
Celebrating Over 40 Years of Sales and Service in the Columbia Basin

Certificate of Calibration

4300 RD. K N.E.
Moses Lake,
Washington 98837
Ph: (509) 765-7754
Fax: (509) 765-4941
rpugh@nctv.com

Customer: BLAZE KING
Address: 146 A.STREET
City, State Zip: WALLA WALLA, WASHINGTON 99362

Certificate ID: BK-2171506
ISO Number:
Date 6/15/2017

Indicator Mfg.
Weigh-Tronix
Indicator Model
WI125
Indicator Serial
073824
Test Interval
1 Year

Base Mfg.
N/A
Base Model
N/A
Base Serial
N/A

Cal Date
6/15/2017
Due Date
6/15/2018
Procedure
-

Scale ID
BK-2
Scale Class
III
Scale Status
In Service

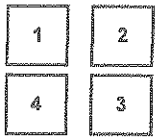
Scale Location
LAB
Scale Range
0 - 1000 lb x 0.1 lb

EQUIPMENT CONDITIONS

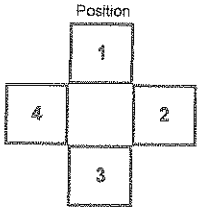
[Working] Non-Working [Clean] Dirty Out of Level Out of Service

SHIFT TEST **Shift Test Result:** [Pass] Fail Adjust Not Applicable **Shift Weight:** 100.0 lb

Position



Position



All tolerances calculated in conformance with Handbook 44 Table 6.

LOAD TEST

Preliminary Load Test		
Test Wt.	**Reading**	**Error**
50.0 lb	50.0 lb	0.0 lb
100.0 lb	100.0 lb	0.0 lb
200.0 lb	200.0 lb	0.0 lb
300.0 lb	299.9 lb	-0.1 lb
400.0 lb	399.9 lb	-0.1 lb
500.0 lb	499.9 lb	-0.1 lb

In acceptance tolerance? [Yes] No N/A

Final Load Test		
Test Wt.	**Reading**	**Error**
50.0 lb	50.0 lb	0.0 lb
100.0 lb	100.0 lb	0.0 lb
200.0 lb	200.0 lb	0.0 lb
300.0 lb	300.0 lb	0.0 lb
400.0 lb	400.0 lb	0.0 lb
500.0 lb	500.0 lb	0.0 lb

In acceptance tolerance? [Yes] No N/A

TEST INFORMATION

Test Weight Classification:	F
Traceability Certificate Number(s):	I-5743 Cal Date: 10/5/2016 Recal Date: 10/5/2018
Standards Used:	50 LB 50 lb #1, 2, 3, 4, 5, 6, 7, 8, 9, 10
Expanded Uncertainty:	Available on Request or Reported on this Document
Test Location:	[Onsite] Offsite
Overall Result:	[Pass] Fail Adjust
Was the scale within customers required accuracy?	[Y] N N/A
Environmental Conditions:	[Acceptable] Unacceptable
Comments / Notes:	TESTED AND ADJUSTED SCALE LEFT AS SHOWN
Technician:	Mike Pugh A0110
Certifying Technician:	Technician Signature not found.

Scales were calibrated with certified test weights. Adjustments made to restore and/or maintain the accuracy of the scale conform to the tolerances established by the National Institute of Standards and Technology as specified in Handbook 44 Section 2.2, or Manufacturers Specifications. Best measurement of uncertainty calculated using a coverage factor of K=2. This provides confidence level of 95%. This certificate shall not be reproduced, except in full, with the written approval of the laboratory. Measurement uncertainty available on request.

CORRELL'S SCALE SERVICE
INSTALLATION • SERVICE • REPAIR • RENTAL • LEASE • SALES
An R.B. Pugh Company LLC
Celebrating Over 40 Years of Sales and Service in the Columbia Basin

Certificate of Calibration

4300 RD. K N.E.
Moses Lake,
Washington 98837
Ph: (509) 765-7754
Fax: (509) 765-4941
rpugh@nctv.com

Customer: BLAZE KING
Address: 146 A.STREET
City, State Zip: WALLA WALLA, WASHINGTON 99362

Certificate ID: BK-1171506
ISO Number:
Date 6/15/2017

Indicator Mfg.
Weigh-Tronix
Indicator Model
WI125
Indicator Serial
123
Test Interval
1 Year

Base Mfg.
N/A
Base Model
N/A
Base Serial
N/A

Cal Date
6/15/2017
Due Date
6/15/2018
Procedure
-

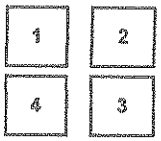
Scale ID
BK-1
Scale Class
III
Scale Status
Out Of Service

Scale Location
LAB
Scale Range
0 - 1000 lb x 0.1 lb

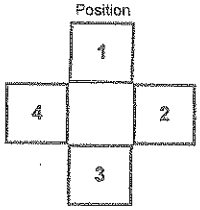
EQUIPMENT CONDITIONS
[Working] Non-Working **[Clean]** Dirty Out of Level Out of Service

SHIFT TEST **Shift Test Result:** **[Pass]** Fail Adjust Not Applicable **Shift Weight:** 100.0 lb

Position



Position



Shipping Scale

All tolerances calculated in conformance with Handbook 44 Table 6.

LOAD TEST

Preliminary Load Test		
Test Wt.	**Reading**	**Error**
50.0 lb	50.0 lb	0.0 lb
100.0 lb	100.0 lb	0.0 lb
200.0 lb	200.0 lb	0.0 lb
300.0 lb	300.0 lb	0.0 lb
400.0 lb	400.1 lb	0.1 lb
500.0 lb	500.0 lb	0.0 lb

In acceptance tolerance? **[Yes]** No N/A

Final Load Test		
Test Wt.	**Reading**	**Error**
50.0 lb	50.0 lb	0.0 lb
100.0 lb	100.0 lb	0.0 lb
200.0 lb	200.0 lb	0.0 lb
300.0 lb	300.0 lb	0.0 lb
400.0 lb	400.0 lb	0.0 lb
500.0 lb	500.0 lb	0.0 lb

In acceptance tolerance? **[Yes]** No N/A

TEST INFORMATION

Test Weight Classification: F
Traceability Certificate Number(s): I-5743 Cal Date: 10/5/2016 Recal Date: 10/5/2018
Standards Used: 50 LB 50 lb #1, 2, 3, 4, 5, 6, 7, 8, 9, 10
Expanded Uncertainty: Available on Request or Reported on this Document
Test Location: **[Onsite]** Offsite
Overall Result: **[Pass]** Fail Adjust
Was the scale within customers required accuracy? **[Y]** N N/A
Environmental Conditions: **[Acceptable]** Unacceptable
Comments / Notes: TESTED AND ADJUSTED SCALE LEFT AS SHOWN
Technician: Mike Pugh A0110
Certifying Technician: Technician Signature not found.

Scales were calibrated with certified test weights. Adjustments made to restore and/or maintain the accuracy of the scale conform to the tolerances established by the National Institute of Standards and Technology as specified in Handbook 44 Section 2.2, or Manufacturers Specifications. Best measurement of uncertainty calculated using a coverage factor of K=2. This provides confidence level of 95%. This certificate shall not be reproduced, except in full, with the written approval of the laboratory. Measurement uncertainty available on request.

Praxair
5700 South Alameda Street
Los Angeles, CA 90058
Tel: (323) 585-2154 Fax:(714) 542-6689
PGVPID: F22017

DocNumber: 000104669

CERTIFICATE OF ANALYSIS / EPA PROTOCOL GAS

Customer & Order Information:

PXPKG TUALATIN OR H
10450 SW TUALATIN SHERWOOD
TUALATIN OR 97062

Praxair Order Number: 70187070
Customer P. O. Number:
Customer Reference Number:

Fill Date: 1/27/2017
Part Number: NI CD10CO33E-AS
Lot Number: 109702715
Cylinder Style & Outlet: AS CGA 590
Cylinder Pressure & Volume: 2000 psig 140 cu. ft.

Certified Concentration:

Expiration Date:		2/22/2025	NIST Traceable
Cylinder Number:		CC76915	Analytical Uncertainty:
10.04	%	CARBON DIOXIDE	± 0.4 %
2.52	%	CARBON MONOXIDE	± 0.7 %
10.52	%	OXYGEN	± 0.2 %
Balance		NITROGEN	

Certifcation Information: *Certification Date:* 2/22/2017 *Term:* 96 Months *Expiration Date:* 2/22/2025

This cylinder was certified according to the 2012 EPA Traceability Protocol, Document #EPA-600/R-12/531, using Procedure G1. Do Not Use this Standard if Pressure is less than 100 PSIG.

CO2 responses have been corrected for O2 effect. O2 responses have been corrected for CO2 interference.

Analytical Data: *(R=Reference Standard, Z=Zero Gas, C=Gas Candidate)*

1. Component: CARBON DIOXIDE

Requested Concentration: 10 %
Certified Concentration: 10.04 %
Instrument Used: Horiba VIA-510 S/N 20C194WK
Analytical Method: NDIR
Last Multipoint Calibration: 2/10/2017

First Analysis Data: **Date:** 2/22/2017

Z:	0	R:	13.97	C:	10.02	Conc:	10.039
R:	13.96	Z:	0	C:	10.02	Conc:	10.039
Z:	0	C:	10.02	R:	13.96	Conc:	10.039

UOM: % **Mean Test Assay:** 10.039 %

Reference Standard Type: GMIS
Ref. Std. Cylinder # : CC283552
Ref. Std. Conc: 13.99%
Ref. Std. Traceable to SRM # : 1675b
SRM Sample # : 6-F-51
SRM Cylinder # : CAL014538

Second Analysis Data: **Date:**

Z:	0	R:	0	C:	0	Conc:	0
R:	0	Z:	0	C:	0	Conc:	0
Z:	0	C:	0	R:	0	Conc:	0

UOM: % **Mean Test Assay:** 0 %

2. Component: CARBON MONOXIDE

Requested Concentration: 2.5 %
Certified Concentration: 2.52 %
Instrument Used: Horiba VIA-510 S/N UB9UCSYX
Analytical Method: NDIR
Last Multipoint Calibration: 2/10/2017

First Analysis Data: **Date:** 2/22/2017

Z:	0	R:	2.013	C:	2.508	Conc:	2.513
R:	2.013	Z:	0	C:	2.519	Conc:	2.524
Z:	0	C:	2.508	R:	2.013	Conc:	2.513

UOM: % **Mean Test Assay:** 2.517 %

Reference Standard Type: GMIS
Ref. Std. Cylinder # : CC103175
Ref. Std. Conc: 2.017%
Ref. Std. Traceable to SRM # : 2640a
SRM Sample # : 53-C-38
SRM Cylinder # : CAL013925

Second Analysis Data: **Date:**

Z:	0	R:	0	C:	0	Conc:	0
R:	0	Z:	0	C:	0	Conc:	0
Z:	0	C:	0	R:	0	Conc:	0

UOM: % **Mean Test Assay:** 0 %

Praxair
5700 South Alameda Street
Los Angeles, CA 90058
Tel: (323) 585-2154 Fax:(714) 542-6689
PGVPID: F22017

DocNumber: 000104669

CERTIFICATE OF ANALYSIS / EPA PROTOCOL GAS

3. Component: OXYGEN

Requested Concentration:	10.5 %
Certified Concentration:	10.52 %
Instrument Used:	OXYMAT 5E
Analytical Method:	PARAMAGNETIC
Last Multipoint Calibration:	2/5/2017

Reference Standard Type:	GMIS
Ref. Std. Cylinder # :	CC111177
Ref. Std. Conc:	10.01%
Ref. Std. Traceable to SRM # :	2658a
SRM Sample # :	72-D-28
SRM Cylinder # :	CAL016862

First Analysis Data: **Date:** 2/22/2017

Z:	0	R:	10.02	C:	10.53	Conc:	10.519
R:	10.02	Z:	0	C:	10.53	Conc:	10.519
Z:	0	C:	10.53	R:	10.02	Conc:	10.519

UOM: % **Mean Test Assay:** 10.519 %

Second Analysis Data: **Date:**

Z:	0	R:	0	C:	0	Conc:	0
R:	0	Z:	0	C:	0	Conc:	0
Z:	0	C:	0	R:	0	Conc:	0

UOM: % **Mean Test Assay:** 0 %

Analyzed by: Ying Yu

Certified by: Nassim Haddad

PRAXAIR

Praxair
5700 South Alameda Street
Los Angeles, CA 90058
Tel: (323) 585-2154 Fax:(714) 542-6689
PGVPID: F22017

DocNumber: 000104682

CERTIFICATE OF ANALYSIS / EPA PROTOCOL GAS

Customer & Order Information:

PXPKG TUALATIN OR H
10450 SW TUALATIN SHERWOOD
TUALATIN OR 97062

Praxair Order Number: 70187071
Customer P. O. Number:
Customer Reference Number:

Fill Date: 1/24/2017
Part Number: NI CD17CO8E-AS
Lot Number: 109702414
Cylinder Style & Outlet: AS CGA 590
Cylinder Pressure & Volume: 2000 psig 140 cu. ft.

Certified Concentration:

Expiration Date:		2/22/2025	NIST Traceable
Cylinder Number:		CC153453	Analytical Uncertainty:
17.00	**%**	**CARBON DIOXIDE**	± 0.3 %
4.27	**%**	**CARBON MONOXIDE**	± 0.6 %
17.01	**%**	**OXYGEN**	± 0.1 %
	Balance	**NITROGEN**	

Certifcation Information: *Certification Date:* 2/22/2017 *Term:* 96 Months *Expiration Date:* 2/22/2025

This cylinder was certified according to the 2012 EPA Traceability Protocol, Document #EPA-600/R-12/531, using Procedure G1. Do Not Use this Standard if Pressure is less than 100 PSIG.

CO2 responses have been corrected for O2 effect. O2 responses have been corrected for CO2 interference.

Analytical Data: *(R=Reference Standard, Z=Zero Gas, C=Gas Candidate)*

1. Component: CARBON DIOXIDE

Requested Concentration: 17 %
Certified Concentration: 17.00 %
Instrument Used: Horiba VIA-510 S/N 20C194WK
Analytical Method: NDIR
Last Multipoint Calibration: 2/10/2017

First Analysis Data: **Date:** 2/22/2017

Z:	0	**R:**	20.01	**C:**	16.99	**Conc:**	16.998
R:	20.01	**Z:**	0	**C:**	17	**Conc:**	17.008
Z:	0	**C:**	16.99	**R:**	20.01	**Conc:**	16.998

UOM: % **Mean Test Assay:** 17.002 %

Reference Standard Type: GMIS
Ref. Std. Cylinder # : SA10234
Ref. Std. Conc: 20.02%
Ref. Std. Traceable to SRM # : RGM#CC28
SRM Sample # : N/A
SRM Cylinder # : RGM#CC28033

Second Analysis Data: **Date:**

Z:	0	**R:**	0	**C:**	0	**Conc:**	0
R:	0	**Z:**	0	**C:**	0	**Conc:**	0
Z:	0	**C:**	0	**R:**	0	**Conc:**	0

UOM: % **Mean Test Assay:** 0 %

2. Component: CARBON MONOXIDE

Requested Concentration: 4.25 %
Certified Concentration: 4.27 %
Instrument Used: Horiba VIA-510 S/N UB9UCSYX
Analytical Method: NDIR
Last Multipoint Calibration: 2/10/2017

First Analysis Data: **Date:** 2/22/2017

Z:	0	**R:**	4	**C:**	4.31	**Conc:**	4.263
R:	4	**Z:**	0	**C:**	4.32	**Conc:**	4.273
Z:	0	**C:**	4.31	**R:**	4.01	**Conc:**	4.263

UOM: % **Mean Test Assay:** 4.267 %

Reference Standard Type: GMIS
Ref. Std. Cylinder # : CC257812
Ref. Std. Conc: 3.96%
Ref. Std. Traceable to SRM # : 2641a
SRM Sample # : 59-C-02
SRM Cylinder # : FF13690

Second Analysis Data: **Date:**

Z:	0	**R:**	0	**C:**	0	**Conc:**	0
R:	0	**Z:**	0	**C:**	0	**Conc:**	0
Z:	0	**C:**	0	**R:**	0	**Conc:**	0

UOM: % **Mean Test Assay:** 0 %

Praxair
5700 South Alameda Street
Los Angeles, CA 90058
Tel: (323) 585-2154 Fax:(714) 542-6689
PGVPID: F22017

DocNumber: 000104682

CERTIFICATE OF ANALYSIS / EPA PROTOCOL GAS

3. Component: OXYGEN

Requested Concentration:	17 %
Certified Concentration:	17.01 %
Instrument Used:	OXYMAT 5E
Analytical Method:	PARAMAGNETIC
Last Multipoint Calibration:	2/5/2017

First Analysis Data:						**Date:**	2/22/2017
Z:	0	R:	19.74	C:	17.01	Conc:	17.016
R:	19.72	Z:	0	C:	16.99	Conc:	16.996
Z:	0	C:	17.01	R:	19.74	Conc:	17.016
UOM:	%			Mean Test Assay:			17.009 %

Analyzed by: Ying Yu

Reference Standard Type:	GMIS
Ref. Std. Cylinder # :	CC112100
Ref. Std. Conc:	19.74 %
Ref. Std. Traceable to SRM # :	2659a
SRM Sample # :	71-E-19
SRM Cylinder # :	FF22331

Second Analysis Data:						**Date:**	
Z:	0	R:	0	C:	0	Conc:	0
R:	0	Z:	0	C:	0	Conc:	0
Z:	0	C:	0	R:	0	Conc:	0
UOM:	%			Mean Test Assay:			0 %

Certified by: Nassim Haddad

EXAMPLE CALCULATIONS

Equations and Sample Calculations – ASTM E2780 & E2515

Manufacturer:	Valley Comfort
Model:	PI29
Run:	1
Category:	IV

Equations used to calculate the parameters listed below are described in this appendix. Sample calculations are provided for each equation. The raw data and printout results from a sample run are also provided for comparison to the sample calculations.

M_{Sdb} – Weight of test fuel spacers, dry basis, kg

M_{Cdb}– Weight of test fuel crib, excluding nails and spacers, dry basis, kg

D_{Cdb} - Density of fuel crib, excluding spacers and nails, dry basis, lbs/ft^3

M_{FTAdb} - Total weight of fuel crib excluding nails, dry basis, kg

BR – Dry burn rate, kg/hr

V_s – Average gas velocity in the dilution tunnel, ft/sec

Q_{sd} – Average gas flow rate in dilution tunnel, dscf/hr

$V_{m(std)}$ – Volume of gas sampled, corrected to dry standard conditions, dscf

m_n – Total particulate matter collected, mg

C_s - Concentration of particulate matter in tunnel gas, dry basis, corrected to standard conditions, g/dscf

E_T – Total particulate emissions, g

PR - Proportional rate variation

PM_R – Particulate emissions for test run, g/hr

PM_F – Particulate emission factor for test run, g/dry kg of fuel burned

M_{Sdb} – Weight of test fuel spacers, dry basis, kg
ASTM E2780 equation (1)

$$M_{Sdb} = (M_{Swb})(100/(100 + FM_S))$$

Where,

FM_S = average fuel moisture of test fuel spacers, % dry basis

M_{Swb} = weight of test fuel spacers, wet basis, kg

Sample Calculation:

FM_S = 14.4 %

M_{Swb} = 2.9 lbs

0.4536 = Conversion factor from lbs to kg

M_{Sdb} = [(2.9 x 0.4536) (100/(100 + 14.4)

M_{Sdb} = **1.15** kg

M_{Cdb}– Weight of test fuel crib, excluding nails and spacers, dry basis, kg
ASTM E2780 equation (2)

$$M_{Cdb} = \Sigma[(M_{CPnwb})(100/(100 + FM_{CPn}))]$$

Where,

M_{CPnwb} = weight of each test fuel piece n in fuel crib, excluding nails and spacers, wet basis, kg

FM_{CPn} = Average fuel moisture of test fuel n in fuel crib, % dry basis

Sample Calculation (test fuel piece 1):

MC_{Pnwb} = 3.7

FM_{CPn} = 20.1

= 3.7 (100/(100+ 20.1)

= 3.1 lbs

Total crib weight, excluding spacer: 11.98 lbs

M_{Cdb} = **5.43** kg

D_{Cdb} - Density of fuel crib, excluding spacers and nails, dry basis, lbs/ft^3
ASTM E2780 equation (3)

$$D_{Cdb} = M_{Cdb}/V_C$$

Where,

V_C = Volume of fuel crib, ft^3

Sample calculation:

V_C = 728 in^3

1728 = conversion from in^3 to ft^3

D_{Cdb} = #### / 728 * 1728

= **28.4** lbs/ft^3

M_{FTAdb} - Total weight of fuel crib excluding nails, dry basis, kg
ASTM E2780 equation (4)

$$M_{FTAdb} = M_{Sdb} + M_{Cdb}$$

Sample calculation:

$$M_{FTAdb} = 1.15 + 5.43$$

$$= \mathbf{6.58} \text{ kg}$$

BR – dry burn rate, kg/hr
ASTM E2780 equation (5)

$$BR = \frac{60\ M_{FTAdb}}{\theta}$$

Where,

θ = Total length of test run, min

Sample Calculation:

M_{Bdb} = 6.58 kg

θ = 197 min

$$BR = \frac{60 \times 6.58}{197}$$

BR = **2.00** kg/hr

V_s – Average gas velocity in the dilution tunnel, ft/sec
ASTM E2515 equations (9)

$$v_s = F_P \times k_p \times C_p \times (\sqrt{\Delta P})_{avg} \times \sqrt{\frac{T_{s(avg)}}{P_s \times M_s}}$$

Where:

F_p = Adjustment factor for center of tunnel pitot tube placement, $Fp = \frac{V_{strav}}{V_{scent}}$, ASTM E2515 Equation (1)

v_{scent} = Dilution tunnel velocity calculated after the multi-point pitot traverse at the center, ft/sec

v_{strav} = Dilution tunnel velocity calculated after the multi-point pitot traverse, ft/sec

k_p = Pitot tube constant, 85.49

C_p = Pitot tube coefficient: 0.99, unitless

ΔP* = Velocity pressure in the dilution tunnel, in H_2O

T_s = Absolute average gas temperature in the dilution tunnel, °R; (°R = °F + 460)

P_s = Absolute average gas static pressure in dilution tunnel, = $P_{bar} + P_g$, in Hg

P_{bar} = Barometric pressure at test site, in. Hg

P_g = Static pressure of tunnel, in. H_20; (in Hg = in H_20/13.6)

M_s = **The dilution tunnel wet molecular weight; M_s = 28.78 assuming a dry weight of 29 lb/lb-mole

Sample calculation:

$$Fp = \frac{14.42}{16.27} = 0.886$$

$$V_s = 0.886 \times 85.49 \times 0.99 \times 0.232 \times \left(\frac{108.8 + 460}{\left(28.67 + \frac{-0.17}{13.6}\right) \times 28.78} \right)^{1/2}$$

V_s = **14.47** ft/s

*The ASTM test standard mistakenly has the square root of the average delta p instead of the average of the square root of delta p. The current EPA Method 2 is also incorrect. This was verified by Mike Toney at EPA.

**The ASTM test standard mistakenly identifies Ms as the dry molecular weight. It should be the wet molecular weight as indicated in EPA Method 2.

Q_{sd} – Average gas flow rate in dilution tunnel, dscf/hr
ASTM E2515 equation (3)

$$Q_{sd} = 3600 \times (1 - B_{ws}) \times v_s \times A \times \frac{T_{std}}{T_{s(avg)}} \times \frac{P_s}{P_{std}}$$

Where:

3600	=	Conversion from seconds to hours (ASTM method uses 60 to convert in minutes)
B_{ws}	=	Water vapor in gas stream, proportion by volume; assume 2%
A	=	Cross sectional area of dilution tunnel, ft^2
T_{std}	=	Standard absolute temperature, 528 °R
P_s	=	Absolute average gas static pressure in dilution tunnel, = P_{bar} + P_g , in Hg
$T_{s(avg)}$	=	Absolute average gas temperature in the dilution tunnel, °R; (°R = °F + 460)
P_{std}	=	Standard absolute pressure, 29.92 in Hg

Sample calculation:

$$Q_{sd} = 3600 \times (1 - 0.02) \times 14.47 \times 0.196 \times \frac{528}{\#\#\#\# + 460} \times \frac{28.7 + \frac{-0.17}{13.6}}{29.92}$$

Q_{sd} = **8914.3** dscf/hr

$V_{m(std)}$ – Volume of Gas Sampled Corrected to Dry Standard Conditions, dscf
ASTM E2515 equation (6)

$$V_{m(std)} = K_1 \, V_m \, Y \frac{P_{bar} + \left(\frac{\Delta H}{13.6}\right)}{T_m}$$

Where:

K_1	=	17.64 °R/in. Hg
V_m	=	Volume of gas sample measured at the dry gas meter, dcf
Y	=	Dry gas meter calibration factor, dimensionless
P_{bar}	=	Barometric pressure at the testing site, in. Hg
ΔH	=	Average pressure differential across the orifice meter, in. H_2O
T_m	=	Absolute average dry gas meter temperature, °R

Sample Calculation:

Using equation for Train 1:

$$V_{m(std)} = 17.64 \times 28.662 \times 0.997 \times \frac{\left(28.67 + \frac{0.61}{13.6}\right)}{(69.0 + 460)}$$

$V_{m(std)}$ = **27.361** dscf

Using equation for Train 2:

$$V_{m(std)} = 17.64 \times 28.938 \times 0.981 \times \frac{\left(28.67 + \frac{1.34}{13.6}\right)}{(72.1 + 460)}$$

$V_{m(std)}$ = **27.074** dscf

Using equation for ambient train:

$$V_{m(std)} = 17.64 \times 0.00 \times 0 \times \frac{\left(\underline{28.67} + \frac{0.00}{13.6}\right)}{(71.1 + 460)}$$

$V_{m(std)}$ = **0** dscf

m_n – Total Particulate Matter Collected, mg
ASTM E2515 Equation (12)

$$m_n = m_p + m_f + m_g$$

Where:

m_p = mass of particulate matter from probe, mg

m_f = mass of particulate matter from filters, mg

m_g = mass of particulate matter from filter seals, mg

Sample Calculation:

Using equation for Train 1 (first hour):

m_n = 0.0 + 3.8 + 0.0

m_n = 3.8 mg

Using equation for Train 1 (post-first hour):

m_n = 0.1 + 1.7 + 0.9

m_n = 2.7 mg

Train 1 aggregate:

m_n = 3.8 + 2.7

m_n = **6.5** mg

Using equation for Train 2:

m_n = 0.6 + 5.5 + 0.8

m_n = **6.9** mg

C_s - Concentration of particulate matter in tunnel gas, dry basis, corrected to standard conditions, g/dsc
ASTM E2515 equation (13)

$$C_s = K_2 \times \frac{m_n}{V_{m(std)}}$$

Where:

K_2	=	Constant, 0.001 g/mg
m_n	=	Total mass of particulate matter collected in the sampling train, mg
$V_{m(std)}$	=	Volume of gas sampled corrected to dry standard conditions, dscf

Sample calculation:

For Train 1:

$$C_s = 0.001 \times \frac{6.5}{27.36}$$

C_s = **0.00024** g/dscf

For Train 2

$$C_s = 0.001 \times \frac{6.9}{27.07}$$

C_s = **0.00025** g/dscf

For Ambient Train

$$C_r = 0.001 \times \frac{0.0}{0}$$

C_r = **0** g/dscf

E_T – Total Particulate Emissions, g
ASTM E2515 equation (15)

$$E_T = (c_s - c_r) \times Q_{std} \times \theta$$

Where:

C_s	=	Concentration of particulate matter in tunnel gas, g/dscf
C_r	=	Concentration particulate matter room air, g/dscf
Q_{std}	=	Average dilution tunnel gas flow rate, dscf/hr
θ	=	Total time of test run, minutes

Sample calculation:

For Train 1

E_T = (0.000238 - 0) x 8914.3 x 197 /60

E_T = 6.95 g

For Train 2

E_T = (0.000255 - 0) x 8914.3 x 197 /60

E_T = 7.46 g

Average

E = 7.21 g

Total emission values shall not differ by more than 7.5% from the total average emissions

7.5% of the average =	0.54
Train 1 difference =	0.25
Train 2 difference =	0.25

PR - Proportional Rate Variation
ASTM E2515 equation (16)

$$PR = \left[\frac{\theta \times V_{mi} \times V_s \times T_m \times T_{si}}{\theta_i \times V_m \times V_{si} \times T_{mi} \times T_s} \right] \times 100$$

Where:

θ = Total sampling time, min

θ_i = Length of recording interval, min

V_{mi} = Volume of gas sample measured by the dry gas meter during the “ith” time interval, dcf

V_m = Volume of gas sample as measured by dry gas meter, dcf

V_{si} = Average gas velocity in the dilution tunnel during the "ith" time interval, ft/sec

V_s = Average gas velocity in the dilution tunnel, ft/sec

T_{mi} = Absolute average dry gas meter temperature during the "ith" time interval, ^oR

T_m = Absolute average dry gas meter temperature, ^oR

T_{si} = Absolute average gas temperature in the dilution tunnel during the "ith" time interval, ^oR

T_s = Absolute average gas temperature in the dilution tunnel, ^oR

Sample calculation (for the first 1 minute interval of Train 1):

$$PR = \left(\frac{197 \times 0.115 \times 14.47 \times (146.0 + 460) \times (69.0 + 460)}{1 \times 28.66 \times 14.94 \times (108.8 + 460) \times (69.0 + 460)} \right) \times 100$$

PR = 82 %

PM_R – Particulate emissions for test run, g/hr
ASTM E2780 equation (6)

$$PM_R = 60 (E_T/\theta)$$

Where,

E_T = Total particulate emissions, grams

θ = Total length of full integrated test run, min

Sample Calculation:

E_T (Dual train average) = 7.21 g

θ = 197 min

$PM_R = 60$ x (7.21 / 197)

PM_R = **2.19** g/hr

PM_F – Particulate emission factor for test run, g/dry kg of fuel burned
ASTM E2780 equation (7)

$$PM_F = E_T/M_{FTAdb}$$

Sample Calculation:

E_T (Dual train average) = 7.21 g

M_{Bdb} = 6.58 kg

PM_F = 7.21 / 6.58

PM_F = **1.09** g/kg

Appendix A

Labeling & Owner's Manual

Tested & Listed By O-T-L Portland Oregon USA C US

OMNI-Test Laboratories, Inc.

0142WN019E

0142WN019S

PRINCESS PI29

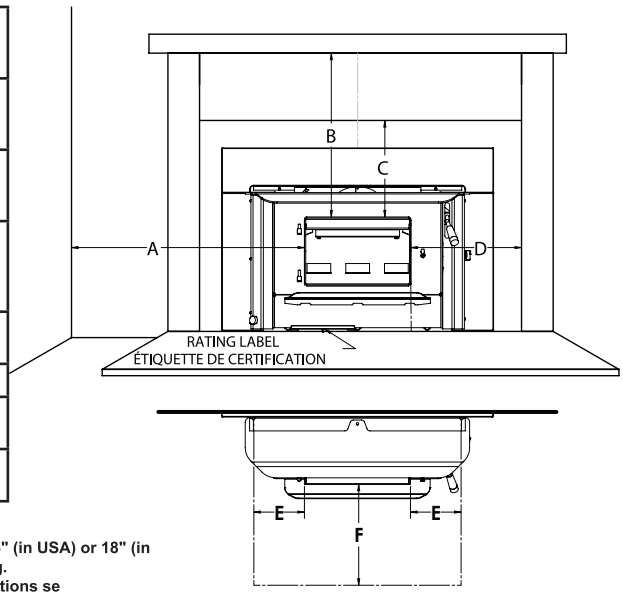
SN - 27.

BLAZE KING CATALYST STOVE - POÊLE À BOIS CATALYTIQUE

ROOM HEATER, SOLID FUEL TYPE / APPAREIL APPROUVÉ DE TYPE CARBURANT SOLIDE
MODEL / MODÈLE: PI29
Tested to / Testé: UL 1482-11(R2015) / ULC S627-00
CERTIFIED IN BOTH UNITED STATES AND CANADA / CERTIFIÉ POUR LES ÉTATS-UNIS ET LE CANADA

PREVENT HOUSE FIRES - Install and use only in accordance with Blaze King's installation and operation instructions. Install and use in a code complying fireplace only. Contact local building or fire officials about restrictions and installation inspection in your area. Do not remove bricks or mortar in masonry fireplace. Do not use grate or elevate fire. Inspect and clean chimney frequently - under certain conditions of use, creosote buildup may occur rapidly. CHIMNEYS: Do not connect this unit to a chimney flue serving another appliance. Do not over fire - if heater or chimney glows, you are over firing. COMPONENTS REQUIRED FOR INSTALLATION: 6" stainless steel liner - listed to: UL 1777, ULCS635 OR ULCS640.
PRÉVENTION DES INCENDIES- Installer et utiliser cet appareil conformément aux instructions d'installation et du mode de fonctionnement de Blaze King. Installer et utiliser seulement selon le code conforme, concernant les foyers. Contacter le code du bâtiment local ou le département des incendies à propos des restrictions et des inspections des installations de votre région. Ne pas retirer les briques ou le mortier dans votre foyer de maçonnerie. Ne pas utiliser de grille et ne pas surélever le feu. Inspecter et nettoyer votre cheminée fréquemment- dans certaines conditions d'utilisation, une accumulation de créosote peut se produire rapidement. Cheminées: Ne pas raccorder cet appareil à un conduit de cheminée desservant un autre appareil. Ne pas surchauffer- si l'appareil ou les conduits deviennent rougeoyants, vous êtes en surchauffe. Composantes requises pour l'installation: Gaine de 6po en acier inoxydable inscrite sous: UL 1777, ULCS635 Ou ULCS640.

Minimum clearances to combustibles, measured from firebox door flange / Dégagements minimum requis entre l'appareil à tout matériau combustible à partir du rebord de l'ouverture de porte de la chambre à combustion.		
A	Side of door flange to combustible wall. / Du côté du rebord de l'ouverture de porte à tout mur combustible.	17in / 432 mm
B	Top of door flange to bottom of 12" mantel shelf / Du dessus du rebord de l'ouverture de porte au dessous de la tablette du manteau de foyer.	26in / 660 mm
C	Top of door flange to combustible 3/4" facing and trim / Du dessus du rebord supérieur de la porte à tout matériau combustible de 3/4 po d'épaisseur façade et bordure.	14in / 356 mm
D	Side of door flange to combustible facing. / Du rebord de côté de la porte à tout matériau combustible.	15in / 381 mm
FLOOR PROTECTION / PROTECTION DU PLANCHER		
D	Minimum hearth side extension * / Extension latérale minimum du foyer *	8in*
E	Minimum hearth front extension / Extension frontale minimum du foyer	16in USA 18in CANADA



FLOOR PROTECTION / PROTECTION DU PLANCHER:
A non-combustible floor protection is required for all installations extending 16" (in USA) or 18" (in Canada) in front of the door and extending 8" to either side of the door opening.
Une protection non combustible de plancher est exigée pour toutes les installations se prolongeant de 18" devant la porte et se prolongeant de 8" à l'un ou l'autre des côtés de l'ouverture de la porte.

Electrical rating: (115 VAC, 60 Hz, 0.58 Amps. Risk of electrical shock. Disconnect power before servicing unit. Do not route power cord in front of or beneath heater). Do not remove bricks or mortar in masonry fireplace. Do not use grate or elevate fire. INSPECT AND CLEAN CHIMNEY FREQUENTLY. U.S. ENVIRONMENTAL PROTECTION AGENCY - Certified to comply with 2020 particulate emission standards using crib wood (EPA test methods 28R/5G, ASTM E2515, and ASTM E2780, with an emission-rate of 1.26 g/hr). This wood heater needs periodic inspection and repair for proper operation. Consult the owner's manual for further information. It is against federal regulations to operate this wood heater in a manner inconsistent with the operating instructions in the owner's manual, or if the catalytic element is deactivated or removed. *ONLY OPERATE WITH DOORS CLOSED. Open door to feed fire ONLY. *DO NOT OBSTRUCT COMBUSTION AIR OPENINGS. For Use With Solid Wood Fuel Only - Do not burn other fuels, this may make the catalyst in the combustor inactive. The performance of the catalytic device or its durability has not been evaluated as part of the certification. Combustor part number: 115-Z4400-G. Provide adequate outside air for combustion. *Replace with only ceramic glass, 5 mm. Thickness.

Estimation électrique: (115 VAC, 60 Hz, 0.58 Amps. Risque d'électrocution débrancher le courant avant de réparer l'unité. Ne pas faire courir le fil l'alimentation en avant ou en dessous de l'appareil de chauffage). Ne pas utiliser une grille pour surélever le feu, établir le feu directement sur les briques dans le fond du poêle. Inspecter et nettoyer VOTRE CHEMINÉE fréquemment.
L'AGENCE DE PROTECTION ENVIRONNEMENTALE DES U.S. - - Certifié conformément aux normes d'émission de particules 2020 , en utilisant du bois machiné (méthodes d'essai EPA 28R / 5G, ASTM E2515 et ASTM E2780, avec un taux d'émission de 1.26 g /hre). Cet appareil de chauffage au bois nécessite des inspections périodiques et des réparations pour un fonctionnement adéquat. Consulter le manuel du propriétaire pour plus d'informations. Il est contre les règlements fédéraux de faire fonctionner cet appareil de chauffage à l'encontre des instructions d'utilisation fournies dans le manuel du propriétaire, ou si l'élément catalytique a été enlevé ou désactivé. *UTILISER L'appareil UNIQUEMENT AVEC LES PORTES FERMÉES. Ouvrir la porte SEULEMENT pour alimenter le feu. *NE PAS OBSTRUER L'ENTRÉE D'AIR DE COMBUSTION. Fournir l'apport d'air extérieur adéquat pour alimenter la combustion. Utiliser uniquement avec des combustibles solides - ne pas brûler aucun autre combustible, ce qui pourrait désactiver le catalyseur de la chambre à combustion. La performance du catalyseur ou sa longévité n'a pas été évaluée dans le cadre de la certification. Numéro du catalyseur: 115-Z4400-G. Employer seulement un catalyseur en verre en céramique d'une épaisseur de 5mm si le remplacement de celui-ci est nécessaire.

CAUTION: HOT WHILE IN OPERATION. DO NOT TOUCH. KEEP CHILDREN, CLOTHING AND FURNITURE AWAY. CONTACT MAY CAUSE SKIN BURNS. READ THIS LABEL AND INSTRUCTION MANUAL BEFORE OPERATING HEATER
ATTENTION: CHAUD LORS DU FONCTIONNEMENT. GARDEZ LES ENFANTS, VÊTEMENTS ET MEUBLES ÉLOIGNÉS. UN CONTACT AVEC LA PEAU PEUT OCCASIONNER DES BRÛLURES. LIRE CETTE ÉTIQUETTE ET LES INSTRUCTIONS D'INSTALLATION AVANT DE FAIRE FONCTIONNER CET APPAREIL.

MANUFACTURED IN

☐ USA:
Blaze King Industries
146A Street
Walla Walla, WA. 99362

☐ CANADA:
Valley Comfort Systems
1290 Commercial Way
Penticton, B.C. V2A 3H5

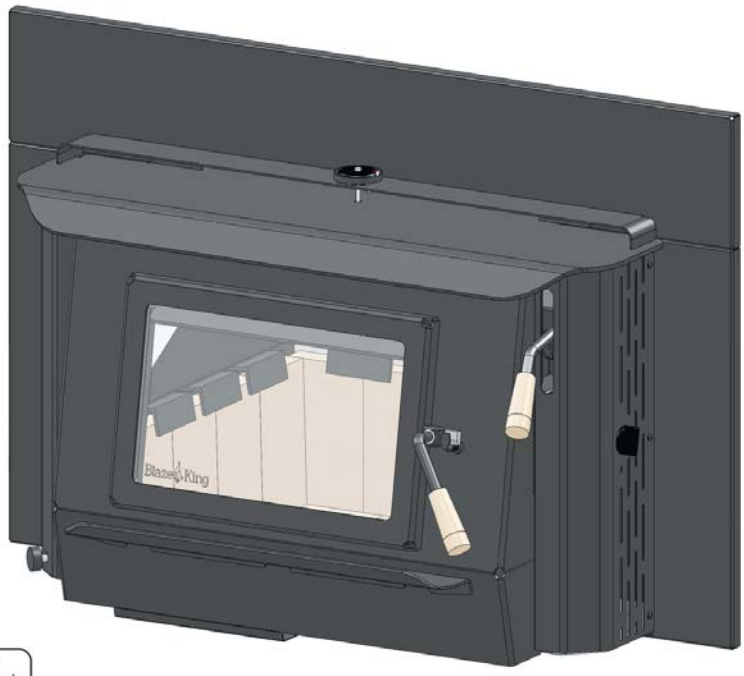
MANUFACTURE DATE

JAN ☐ FEB ☐ MAR ☐ APR ☐ MAY ☐ JUN ☐
JUL ☐ AUG ☐ SEP ☐ OCT ☐ NOV ☐ DEC ☐
2018 ☐ 2019 ☐ 2020 ☐ 2021 ☐ 2022 ☐ 2023 ☐

170-0241 [04 18]

PRINCESS PI29

SOLID FUEL WOOD CATALYTIC STOVE



We recommend that our woodburning hearth products be installed and serviced by professionals who are certified in the U.S. by the National Fireplace Institute® (NFI) as NFI Woodburning Specialists or who are certified in Canada by Wood Energy Technical Training (WETT).

U.S. Environmental Protection Agency certified to comply with 2020 particulate emission standards using crib wood.

Tested & Listed By O-T-L Portland Oregon USA
OMNI-Test Laboratories, Inc.
0142WN019E
0142WN019S

Installer: Please complete the details on the back cover and leave this manual with the homeowner.
Homeowner: Please SAVE THESE INSTRUCTIONS for future reference.

The authority having jurisdiction (such a municipal building department, fire department, etc.) should be consulted before installation to determine the need to obtain a permit.

OPERATION & INSTALLATION MANUAL

Manufactured By
Valley Comfort Systems Inc., 1290 Commercial Way, Penticton, BC, V2A 3H5, Canada
Phone: 250-493-7444 w Fax: 250-493-5833 w www.blazeking.com w info@blazeking.com

Pour la version française de nos manuels S.V.P. vous référez à notre site web: www.blazeking.com

180-PI29 v1.00 April 5, 2018

TABLE OF CONTENTS

INTRODUCTION 4
SPECIFICATIONS 5
EMISSIONS 5
APPLIANCE DIMENSIONS 6
S.Z4674 - 28 1/2" PI SHROUD 6
S.Z4676 - 32 1/2" PI SHROUD 7
CERTIFICATION LABEL 8
SAFETY PRECAUTIONS 9
INSTALLATION INSTRUCTIONS 12
PARTS INCLUDED WITH THE PRINCESS INSERT **12**
REQUIRED DOOR OPTIONS **12**
REQUIRED SHROUD OPTIONS **12**
FLOOR PROTECTION **12**
COMBUSTION AIR **14**
DRAFTING PERFORMANCE **14**
ROLE OF THE CHIMNEY **14**
INSPECT CHIMNEY **15**
PLANNING STOVE PLACEMENT **15**
STOVE ASSEMBLY **16**
CHIMNEY **18**
OPERATING INSTRUCTIONS 19
YOUR FIRST FIRE! **19**
THERMOSTAT **19**
BYPASS **19**
CATALYTIC THERMOMETER **19**
SELECTING WOOD **20**
HOW TO USE MOISTURE METERS **21**
EFFICIENCY **21**
LIGHTING THE FIRE **22**
RELOADING PROCEDURE (with the catalyst temperature in the ACTIVE ZONE) **23**
RELOADING PROCEDURE (with the catalyst temperature still in the INACTIVE ZONE) **23**
OPTIMAL THERMOSTAT SETTING **24**
FAN OPERATION **24**
ICE - FORMATION AND PREVENTION **24**
WOOD BURNING IN THE SHOULDER SEASON **25**
CATALYST MONITORING 26
CATALYTIC COMBUSTOR, TESTING **26**
CATALYTIC COMBUSTOR, CLEANING **26**
CATALYTIC COMBUSTOR, TROUBLESHOOTING **27**
CATALYTIC COMBUSTOR, REPLACEMENT **29**

MAINTENANCE 32
RUN-AWAY OR CHIMNEY FIRE **32**
CREOSOTE FORMATION AND REMOVAL **32**
CHIMNEY MAINTENANCE **33**
FIRE EXTINGUISHERS AND SMOKE DETECTORS **33**
ASH REMOVAL **33**
LOADING DOOR GASKET INSPECTION **34**
LOADING DOOR GASKET REPLACEMENT **34**
BYPASS DOOR GASKET REPLACEMENT **35**
DOOR GLASS GASKET INSPECTION **36**
DOOR GLASS GASKET REPLACEMENT **36**
DOOR GLASS, CLEANING **36**
LOADING DOOR TENSION ADJUSTMENT **37**
FAN ASSEMBLY **38**
THERMOMETER **38**
THERMOSTAT **38**
TROUBLESHOOTING 39
REPLACEMENT PARTS 42
WARRANTY 45
INSTALLER NOTES 52

⚠WARNING

- **THIS APPLIANCE IS HOT WHEN OPERATED AND CAN CAUSE SEVERE BURNS IF CONTACTED.**
- **ANY CHANGES OR ALTERATIONS TO THIS APPLIANCE OR ITS CONTROLS CAN BE DANGEROUS AND IS PROHIBITED BY FEDERAL AND STATE LAWS.**
- Do not operate appliance before reading and understanding operating instructions. Failure to operate appliance according to operating instructions could cause fire or injury.
- Before installing this appliance, contact the local building or fire authority and follow their guidelines.
- This appliance must be installed by a qualified installer.
- Risk of burns. The appliance should be turned off and cooled before servicing.
- Do not operate without fully assembling all components.
- Do not let the appliance become hot enough for any part to glow red.
- Do not install damaged, incomplete or substitute components.
- Risk of cuts and abrasions. Wear protective gloves and safety glasses during installation. Sheet metal edges may be sharp.
- Children and adults should be alerted to the hazards of high surface temperature and should stay away to avoid burns or clothing ignition.
- Young children should be carefully supervised when they are in the same room as the appliance. Toddlers, young children and others may be susceptible to accidental contact burns. A physical barrier is recommended if there are at risk individuals in the house. To restrict access to an appliance or appliance, install an adjustable safety gate to keep toddlers, young children and other at risk individuals out of the room and away from hot surfaces.
- Clothing or other flammable material should not be placed on or near the appliance. Objects placed in front of the appliance must be kept a minimum of 48” away from the front face of the appliance.
- Due to high temperatures, the appliance should be located out of traffic and away from furniture and draperies.
- Ensure you have incorporated adequate safety measure to protect infants / toddlers from touching hot surfaces.
- Even after the appliance is out, all surfaces, including the glass and/or any attachment will remain hot for an extended period of time.
- Check with your local hearth specialty dealer for safety hearth guards to protect children from hot surfaces. These guards must be fastened to a wall and/or to the floor.
- Any safety guard removed for servicing must be replaced prior to operating the appliance.
- Under no circumstances should this appliance be modified.
- This appliance must not be connected to a chimney flue pipe servicing a separate solid fuel burning appliance.
- Do not operate the appliance with the glass door removed, cracked or broken. Replacement of the glass should be done by a licensed or qualified service person.
- Do not strike or slam shut the appliance glass door.
- Operate only with the doors tightly closed.
- Appliance will over-fire if door is not shut and latched.
- Only certified doors / optional fronts / and surrounds for inserts with the unit are to be installed on the appliance.
- Keep the packaging material out of reach of children and dispose of the material in a safe manner. As with all plastic bags, these are not toys and should be kept away from children and infants.
- If the appliance is not properly installed, a house fire may result. Do not expose the appliance to the elements (rain, etc.) and keep the appliance dry at all times.
- The chimney must be sound and free of cracks and obstructions. Clean your chimney regularly as required.
- Never use gasoline, gasoline-type lantern fuel, kerosene, charcoal lighter fluid, or similar liquids to start or ‘freshen up’ a fire in this heater. Keep all such liquids well away from the heater while it is in use.
- Your appliance requires periodic maintenance and cleaning. Failure to maintain your appliance may lead to smoke spillage in your home.
- Higher efficiencies and lower emissions will generally result when burning air dried seasoned woods, as compared to wet, green or freshly cut wood. Burning wet unseasoned wood can cause excessive creosote accumulation. When ignited it can cause a chimney fire that may result in a serious house fire.
- The appliance is designed to burn seasoned wood only. Do not burn treated wood, coal, charcoal, colored paper, cardboard, solvents or garbage.
- Burn wood directly on the firebricks. Do not use a grate or elevate the fire.
- Do not store wood within appliance installation clearances or within the space required for re-fueling and ash removal.
- Ashes must be disposed in a metal container with a tight lid and placed on a non-combustible surface well away from the home or structure until completely cool.

SPECIFICATIONS

Model	PI29 (catalytic)
Overall height and width (S.Z4674 shroud)	28 3/8” x 43” (721 mm x 1093 mm)
Overall height and width (S.Z4676 shroud)	32 3/8” x 47” (823 mm x 1194 mm)
Width of firebox enclosure (behind shroud)	25 3/4” (654 mm)
Width of fan housing to thermostat housing	35 3/4” (908 mm)
Overall depth and height (firebox + conv. deck)	25 1/8” x 23 1/8” (639 mm x 588 mm)
Flue collar size and distance from shroud back	6” I.D., 8 3/4” (223 mm)
Fire door opening	16 3/8” x 8 3/4” (416 mm x 223 mm)
Firebox depth	18 1/2” (470 mm) brick to brick, 20 1/2” (521 mm) brick to glass
Firebox width	18 3/4” (477 mm)
Firebox height	13 1/8” (334 mm)
Fire box capacity	2.54 cu. ft.
Recommended Fuel length	16” max. (407 mm)
Wood capacity (approximate):	White oak - 60 lbs. (27.22 kg)
	Fir - 40 lbs. (18.14 kg)
Construction	10 gauge & 1/4” firebox, brick lined.
Shipping Weight (Firebox only)	325 lbs. (148 kg)
Chimney recommendation (Minimum)	15’ from stove top to chimney cap: Insulated liner recommended

This unit was tested and listed UL 1482-11(R2015) and ULC-S627-00 by OMNI-Test Laboratories.
This manual describes the installation and operation of the Princess PI29 catalytic equipped wood heater.
This heater is certified to comply with the 2020 U.S. Environmental Protection Agency’s particulate emission standards using crib wood.

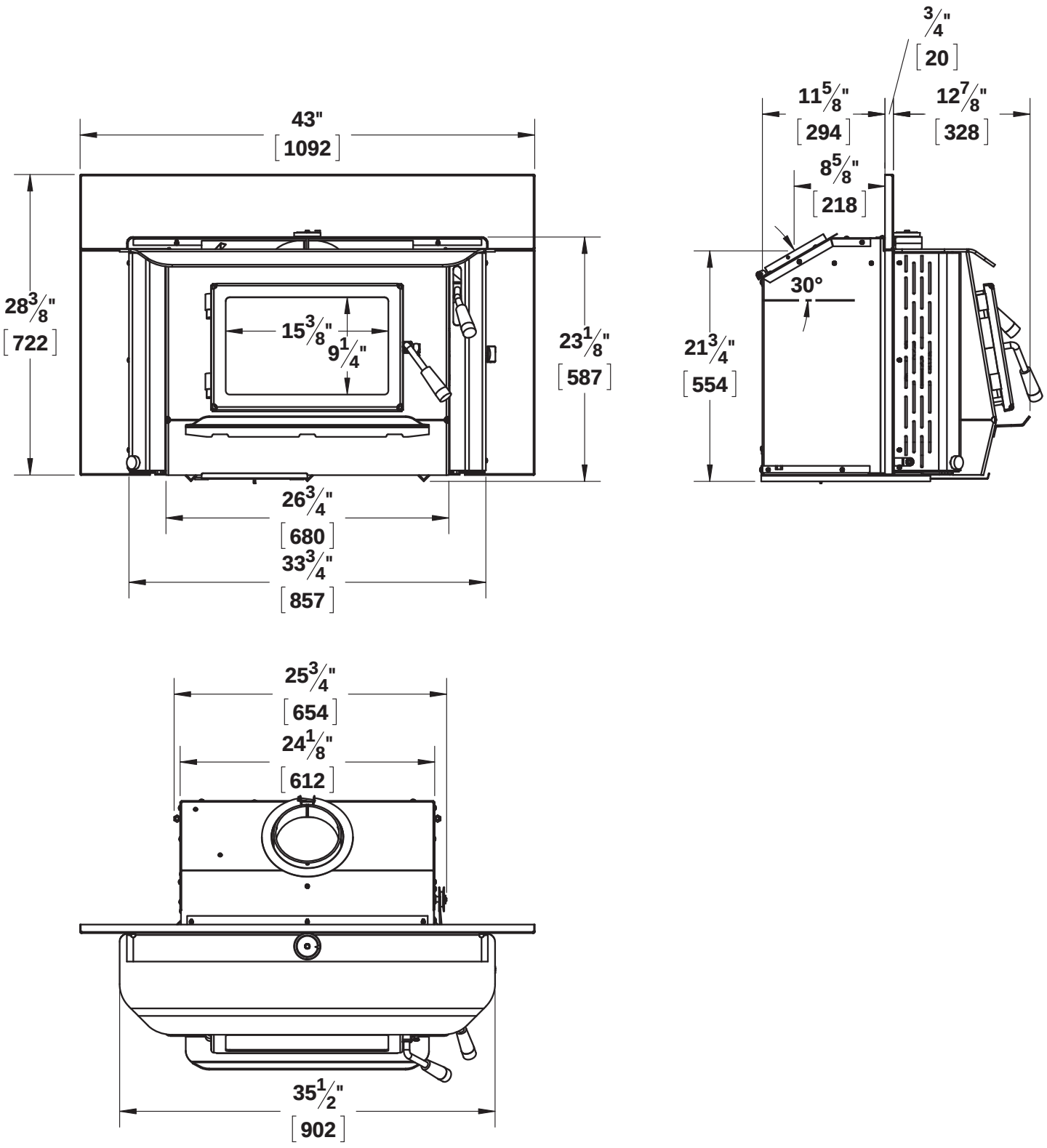
EMISSIONS	CO g/min	g/hr
Low Burn	0.31	1.59
Med-low Burn	0.28	0.72
Med-high Burn	0.60	1.27
High Burn	1.62	2.19

Under specific test conditions this heater has been shown to deliver heat at rates ranging from 12,279 to 37,426 Btu/hr.
This wood heater has a manufacturer-set minimum low burn rate that must not be altered. It is against federal regulations to alter this setting or otherwise operate this wood heater in a manner inconsistent with operating instructions in this manual.
This wood heater contains a catalytic combustor, which needs periodic inspection and replacement for proper operation. It is against federal regulations to operate this wood heater in a manner inconsistent with operating instructions in this manual, or if the catalytic element is deactivated or removed.
The combustor supplied with this heater is a 115-Z4400-G metal combustor. Consult the catalytic combustor warranty also supplied with this wood heater. Warranty claims should be addressed to:

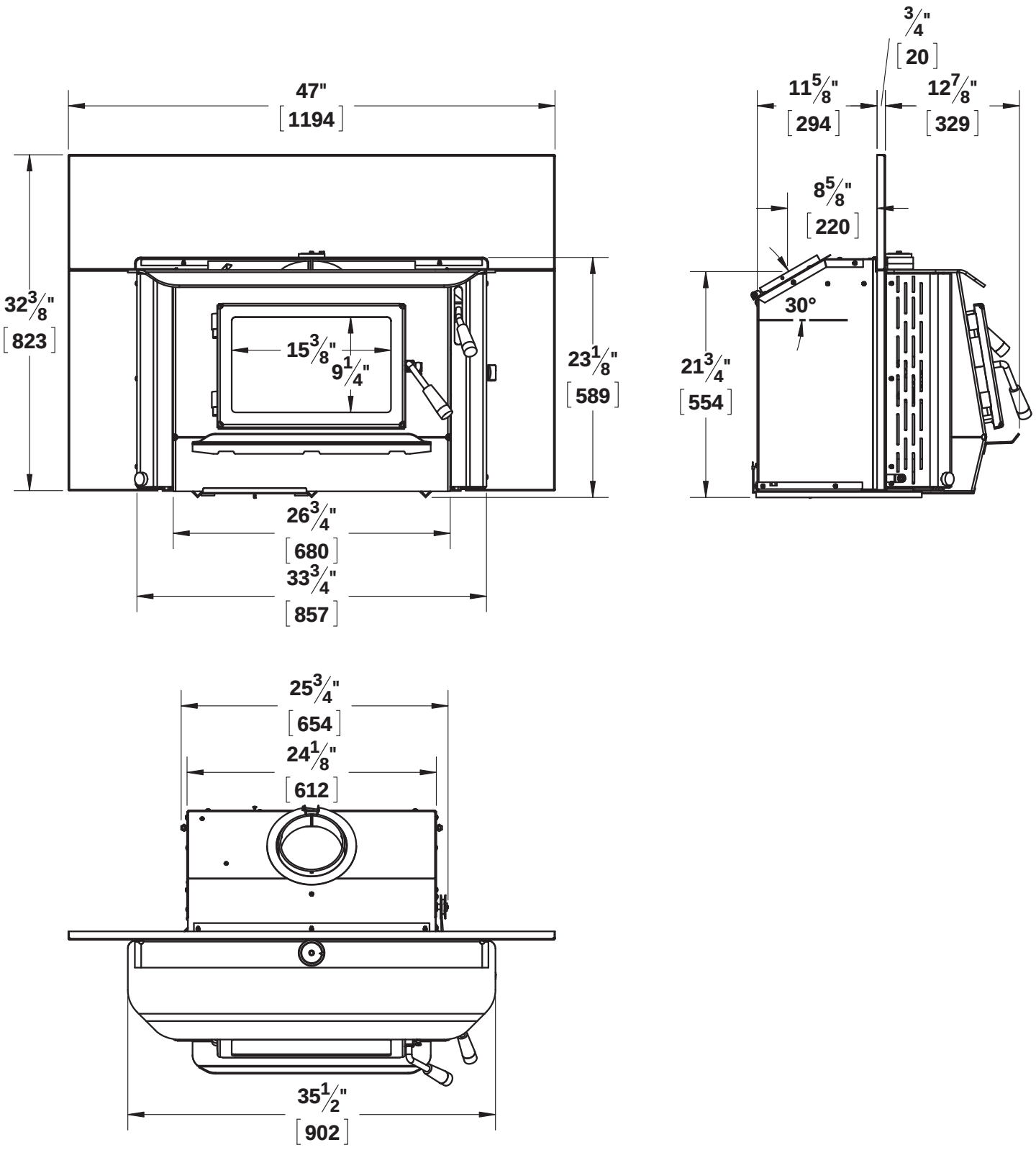
in Canada	**in USA**
Blaze King Industries / Valley Comfort Systems Warranty Department, 1290 Commercial Way Penticton, BC Canada V2A 3H5, Ph: 250-493-7444	Blaze King Industries Warranty Department, 146A Street Walla, Walla, Washington 99362, Ph: 509-522-2730

APPLIANCE DIMENSIONS

S.Z4674 - 28 1/2" PI SHROUD



S.Z4676 - 32 1/2" PI SHROUD



CERTIFICATION LABEL

Tested & Listed By O-TL Portland Oregon USA C US
OMNI-Test Laboratories, Inc.
0142WN019E
0142WN019S

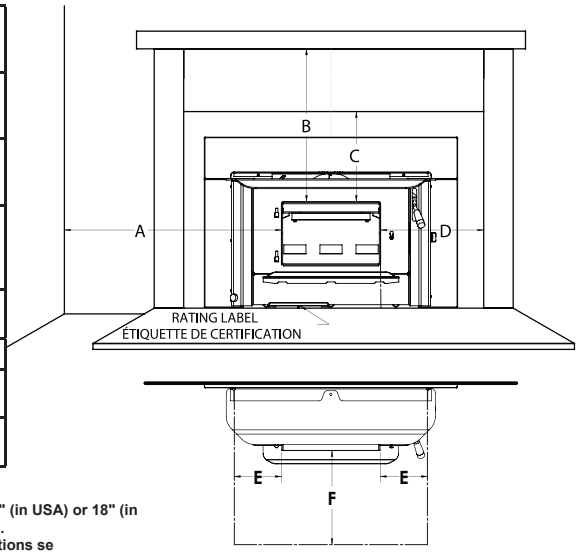
PRINCESS PI29

SN - 27.

BLAZE KING CATALYST STOVE - POÊLE À BOIS CATALYTIQUE
ROOM HEATER, SOLID FUEL TYPE / APPAREIL APPROUVÉ DE TYPE CARBURANT SOLIDE
MODEL / MODÈLE: PI29
Tested to / Testé: UL 1482-11(R2015) / ULC S627-00
CERTIFIED IN BOTH UNITED STATES AND CANADA / CERTIFIÉ POUR LES ÉTATS-UNIS ET LE CANADA

PREVENT HOUSE FIRES - Install and use only in accordance with Blaze King's installation and operation instructions. Install and use in a code complying fireplace only. Contact local building or fire officials about restrictions and installation inspection in your area. Do not remove bricks or mortar in masonry fireplace. Do not use grate or elevate fire. Inspect and clean chimney frequently - under certain conditions of use, creosote buildup may occur rapidly.
CHIMNEYS: Do not connect this unit to a chimney flue serving another appliance. Do not over fire - if heater or chimney glows, you are over firing.
COMPONENTS REQUIRED FOR INSTALLATION: 6" stainless steel liner - listed to: UL 1777, ULCS635 OR ULCS640.
PRÉVENTION DES INCENDIES- Installer et utiliser cet appareil conformément aux instructions d'installation et du mode de fonctionnement de Blaze King. Installer et utiliser seulement selon le code conforme, concernant les foyers. Contacter le code du bâtiment local ou le département des incendies à propos des restrictions et des inspections des installations de votre région. Ne pas retirer les briques ou le mortier dans votre foyer de maçonnerie. Ne pas utiliser de grille et ne pas surélever le feu. Inspecter et nettoyer votre cheminée fréquemment- dans certaines conditions d'utilisation, une accumulation de créosote peut se produire rapidement. Cheminées: Ne pas raccorder cet appareil à un conduit de cheminée desservant un autre appareil. Ne pas surchauffer- si l'appareil ou les conduits deviennent rougeoyants, vous êtes en surchauffe. Composantes requises pour l'installation: Gaine de 6po en acier inoxydable inscrite sous: UL 1777, ULCS635 Ou ULCS640.

Minimum clearances to combustibles, measured from firebox door flange / Dégagements minimum requis entre l'appareil à tout matériau combustible à partir du rebord de l'ouverture de porte de la chambre à combustion.		
A	Side of door flange to combustible wall. / Du côté du rebord de l'ouverture de porte à tout mur combustible.	17in / 432 mm
B	Top of door flange to bottom of 12" mantel shelf / Du dessus du rebord de l'ouverture de porte au dessous de la tablette du manteau de foyer.	26in / 660 mm
C	Top of door flange to combustible 3/4" facing and trim / Du dessus du rebord supérieur de la porte à tout matériau combustible de 3/4 po d'épaisseur façade et bordure.	14in / 356 mm
D	Side of door flange to combustible facing. / Du rebord de côté de la porte à tout matériau combustible.	15in / 381 mm
FLOOR PROTECTION / PROTECTION DU PLANCHER		
D	Minimum hearth side extension * / Extension latérale minimum du foyer *	8in*
E	Minimum hearth front extension / Extension frontale minimum du foyer	16in USA 18in CANADA



FLOOR PROTECTION / PROTECTION DU PLANCHER:
A non-combustible floor protection is required for all installations extending 16" (in USA) or 18" (in Canada) in front of the door and extending 8" to either side of the door opening.
Une protection non combustible de plancher est exigée pour toutes les installations se prolongeant de 18'' devant la porte et se prolongeant de 8'' à l'un ou l'autre des côtés de l'ouverture de la porte.

Electrical rating: (115 VAC, 60 Hz, 0.58 Amps. Risk of electrical shock. Disconnect power before servicing unit. Do not route power cord in front of or beneath heater). Do not remove bricks or mortar in masonry fireplace. Do not use grate or elevate fire. INSPECT AND CLEAN CHIMNEY FREQUENTLY.
U.S. ENVIRONMENTAL PROTECTION AGENCY - Certified to comply with 2020 particulate emission standards using crib wood (EPA test methods 28R/5G, ASTM E2515, and ASTM E2780, with an emission-rate of 1.26 g/hr). This wood heater needs periodic inspection and repair for proper operation. Consult the owner's manual for further information. It is against federal regulations to operate this wood heater in a manner inconsistent with the operating instructions in the owner's manual, or if the catalytic element is deactivated or removed. *ONLY OPERATE WITH DOORS CLOSED. Open door to feed fire ONLY. *DO NOT OBSTRUCT COMBUSTION AIR OPENINGS. For Use With Solid Wood Fuel Only - Do not burn other fuels, this may make the catalyst in the combustor inactive. The performance of the catalytic device or its durability has not been evaluated as part of the certification. Combustor part number: 115-Z4400-G. Provide adequate outside air for combustion. *Replace with only ceramic glass, 5 mm. Thickness.

Estimation électrique: (115 VAC, 60 Hz, 0.58 Amps. Risque d'électrocution débrancher le courant avant de réparer l'unité. Ne pas faire courir le fil d'alimentation en avant ou en dessous de l'appareil de chauffage). Ne pas utiliser une grille pour surélever le feu, établir le feu directement sur les briques dans le fond du poêle. Inspecter et nettoyer VOTRE CHEMINÉE fréquemment.
L'AGENCE DE PROTECTION ENVIRONNEMENTALE DES U.S. - - Certifié conformément aux normes d'émission de particules 2020 , en utilisant du bois machiné (méthodes d'essai EPA 28R / 5G, ASTM E2515 et ASTM E2780, avec un taux d'émission de 1.26 g /hre). Cet appareil de chauffage au bois nécessite des inspections périodiques et des réparations pour un fonctionnement adéquat. Consulter le manuel du propriétaire pour plus d'informations. Il est contre les règlements fédéraux de faire fonctionner cet appareil de chauffage à l'encontre des instructions d'utilisation fournies dans le manuel du propriétaire, ou si l'élément catalytique a été enlevé ou désactivé. *UTILISER L'appareil UNIQUEMENT AVEC LES PORTES FERMÉES. Ouvrir la porte SEULEMENT pour alimenter le feu. *NE PAS OBSTRUER L'ENTRÉE D'AIR DE COMBUSTION. Fournir l'apport d'air extérieur adéquat pour alimenter la combustion. Utiliser uniquement avec des combustibles solides - ne pas brûler aucun autre combustible, ce qui pourrait désactiver le catalyseur de la chambre à combustion. La performance du catalyseur ou sa longévité n'a pas été évaluée dans le cadre de la certification. Numéro du catalyseur: 115-Z4400-G. Employer seulement un catalyseur en verre en céramique d'une épaisseur de 5mm si le remplacement de celui-ci est nécessaire.

CAUTION: HOT WHILE IN OPERATION. DO NOT TOUCH. KEEP CHILDREN, CLOTHING AND FURNITURE AWAY. CONTACT MAY CAUSE SKIN BURNS. READ THIS LABEL AND INSTRUCTION MANUAL BEFORE OPERATING HEATER
ATTENTION: CHAUD LORS DU FONCTIONNEMENT. GARDEZ LES ENFANTS, VÊTEMENTS ET MEUBLES ÉLOIGNÉS. UN CONTACT AVEC LA PEAU PEUT OCCASIONNER DES BRÛLURES. LIRE CETTE ÉTIQUETTE ET LES INSTRUCTIONS D'INSTALLATION AVANT DE FAIRE FONCTIONNER CET APPAREIL.

MANUFACTURED IN

☐ USA:
Blaze King Industries
146A Street
Walla Walla, WA. 99362

☐ CANADA:
Valley Comfort Systems
1290 Commercial Way
Penticton, B.C. V2A 3H5

MANUFACTURE DATE

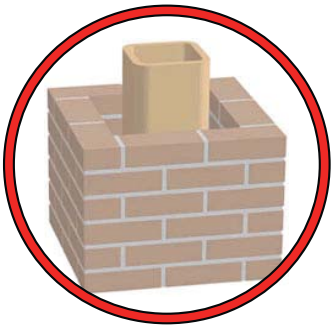
JAN ☐ FEB ☐ MAR ☐ APR ☐ MAY ☐ JUN ☐
JUL ☐ AUG ☐ SEP ☐ OCT ☐ NOV ☐ DEC ☐
2018 ☐ 2019 ☐ 2020 ☐ 2021 ☐ 2022 ☐ 2023 ☐

170-0241[0418].indd

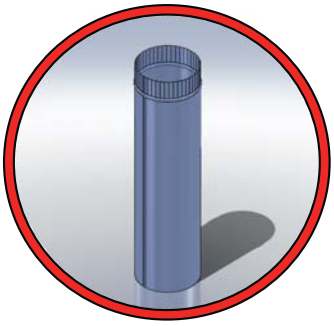
SAFETY PRECAUTIONS

IF THIS BLAZE KING APPLIANCE IS NOT PROPERLY INSTALLED OR OPERATED, A HOUSE FIRE MAY RESULT. TO REDUCE THE RISK OF FIRE, FOLLOW THE INSTALLATION INSTRUCTIONS. CONTACT LOCAL BUILDING OR FIRE OFFICIALS ABOUT RESTRICTIONS AND INSTALLATION INSPECTION REQUIREMENTS IN YOUR AREA.

PLEASE READ THIS ENTIRE MANUAL BEFORE YOU INSTALL AND USE YOUR NEW APPLIANCE. FAILURE TO FOLLOW INSTRUCTIONS MAY RESULT IN PROPERTY DAMAGE, BODILY INJURY, OR EVEN DEATH.



This appliance must be connected to a listed high temperature **(ULC629 IN CANADA OR UL-103HT IN THE USA)** residential type factory built solid fuel chimney or an approved masonry chimney with a flue liner.
Chimney and chimney connector must be in good condition and kept clean.
NEVER vent the stove to other rooms of the building. Must be vented to the outside ONLY.
NEVER use a chimney or chimney connector smaller then the stove exhaust, unless approved by your local inspector.
NEVER vent the stove into a “Class B” gas vent chimney.
DO NOT CONNECT IN CONJUNCTION WITH ANY AIR DISTRIBUTION DUCTWORK UNLESS SPECIFICALLY APPROVED FOR SUCH INSTALLATIONS.



Inspect the chimney connector and chimney regularly during each burning season and clean when necessary.
DO NOT CONNECT THIS UNIT TO A CHIMNEY FLUE SERVING ANOTHER APPLIANCE.

NEVER intentionally start a chimney fire to clean the flue.

When installed in a mobile home, this appliance must be bolted to the floor and provided with outside air.

WARNING: DO NOT INSTALL IN A SLEEPING ROOM
CAUTION: THE STRUCTURAL INTEGRITY OF THE MOBILE HOME FLOOR, WALL, AND CEILING/ROOF MUST BE MAINTAINED.

Check with local building officials.

If the Optional Fan Kit is installed, connect this unit to a properly grounded, 110-volt electrical outlet. Do not route the power cord in front of or under the appliance.

Do not make any changes or modifications to an existing masonry fireplace or chimney to install this appliance. Do not make any changes to the appliance to increase combustion air.

SAFETY PRECAUTIONS

Never try to repair or replace any part of this appliance unless instructions are given in this manual. All other work must be done by a trained technician.

Do not place clothing or other flammable items on or near this appliance.

Allow the appliance to cool down before carrying out any maintenance or cleaning.

DO NOT OVER FIRE THIS HEATER. Attempts to achieve heat output rates that exceed heater design specifications can result in permanent damage to the heater and to the catalytic combustor. Over firing the appliance may cause a house fire. Never burn the appliance so hot that the appliance or chimney connector begins to glow.

Maintain the door and glass seal and keep them in good condition. A leaking door seal will shorten burn times and may harm the combustor.

Avoid placing wood against the glass when loading. Do not slam the door or strike the glass.

Do not use a grate or other device to elevate the fire off of the firebox floor. Burn the fire directly on the bricks.

Do not throw this manual away. This manual has important operating and maintenance instructions that you will need at a later time. Always follow the instructions in this manual.

Ashes should be placed in a steel container with a tightly fitting lid and moved outdoors immediately. If the ashes are disposed of by burial in soil or otherwise locally dispersed, they should be retained in the closed container until all cinders have thoroughly cooled. Other waste shall not be placed in this container.

It is required in some jurisdictions to install smoke and carbon monoxide detectors where heaters are installed. Install at least one smoke detector on each floor of your home to ensure your safety. It should be located away from the wood appliance and close to the sleeping areas. Locating a smoke detector too close to a wood appliance can cause the smoke detector alarm to sound if a puff of smoke is emitted while the wood appliance door is open during reloading. Follow the smoke detector manufacturers placement, installation, and maintenance instructions.

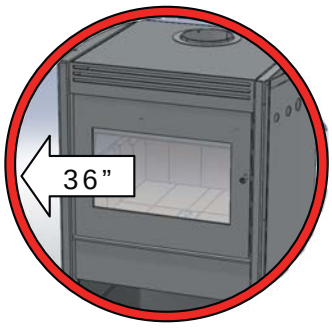
This appliance is designed and approved for burning cord wood only. DO NOT burn trash, garbage; artificial or paper logs; gift wrappings; coal; lighter fluids; chemical cleaners; chemical starters; treated or painted wood; salt water driftwood or foil-backed paper such as gum wrappers or cigarette packages; lawn clippings or yard waste; materials containing rubber (including tires), plastic, asbestos; waste petroleum products, paints or paint thinners, or asphalt products; construction or demolition debris; railroad ties or pressure-treated wood; manure or animal remains; unseasoned wood or paper products, cardboard, plywood, or particleboard. The prohibition against burning these materials does not prohibit the use of fire starters made from paper, cardboard, saw dust, wax and similar substances for the purpose of starting a fire in an affected wood heater. Burning these materials may result in the release of toxic fumes or render the heater ineffective and cause smoke. Burn natural wood only. It will void all warranties and safety listings and may damage the combustor.

Never burn the appliance with the loading door open. Leaving the door cracked open may damage the combustor.

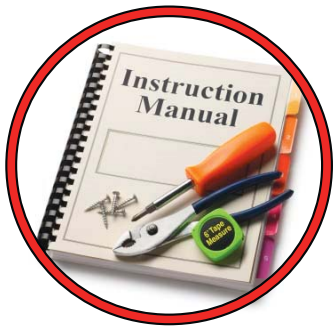
Never block free airflow through vents on this appliance.

Do not use chemicals or fluids to start the fire. Never use gasoline, gasoline-type lantern fuel, kerosene, charcoal lighter fluid, or similar liquids to start or 'freshen up' a fire in this heater. Keep all such liquids well away from the heater while it is in use. Some fuels could generate carbon monoxide and are very dangerous.

HOT WHILE IN OPERATION. KEEP CHILDREN, CLOTHING AND FURNITURE AWAY.
CONTACT MAY CAUSE SKIN BURNS.
Do not touch the appliance when it is hot and educate all children of the danger of a high temperature appliance. Young children should be supervised when they are in the same room as the appliance.



Keep furniture, curtains, wood, paper and other combustibles a minimum of 36in (914mm) away from the front of the appliance. ALSO, DO NOT STORE COMBUSTIBLES UNDER THE APPLIANCE (WOOD, PAPER etc.).



This appliance must be properly installed to prevent the possibility of a house fire. The instructions must be strictly adhered to. Do not use makeshift methods or compromise in the installation.

Contact local building officials to obtain a permit and information on any installation restriction or inspection requirements in your area. Notify your insurance company as well.

⚠WARNING

- **BEFORE INSTALLING THIS APPLIANCE, CONTACT THE LOCAL BUILDING OR FIRE OR OTHER AUTHORITY HAVING JURISDICTION AND FOLLOW THEIR GUIDELINES.**
- **THIS APPLIANCE MUST BE INSTALLED BY A QUALIFIED INSTALLER. FOLLOW THE INSTALLATION DIRECTIONS. DO NOT OPERATE WITHOUT FULLY ASSEMBLING ALL COMPONENTS.**
- **IF THIS APPLIANCE IS NOT PROPERLY INSTALLED, A HOUSE FIRE MAY RESULT.**
- **THIS APPLIANCE IS HOT WHEN OPERATED AND CAN CAUSE SEVERE BURNS IF CONTACTED. CHILDREN AND PETS MUST BE KEPT FROM TOUCHING THE APPLIANCE WHEN IT IS HOT.**
- **COMBUSTIBLE MATERIAL SUCH AS FIRE WOOD, WET CLOTHING, ETC. PLACED TOO CLOSE CAN CATCH FIRE. OBJECTS PLACED IN FRONT OF THE APPLIANCE MUST BE KEPT A MINIMUM OF 48”(1219 MM) FROM THE FRONT OF THE APPLIANCE.**

Blaze King grants no warranty, implied or stated, for the installation or maintenance of the appliance and assumes no responsibility of any consequential damage(s).

NATIONAL FIREPLACE INSTITUTE NFI CERTIFIED www.nficertified.org

We recommend that our products be installed and serviced by professionals who are certified in the U.S. by the National Fireplace Institute® (NFI) as NFI Specialists or who are certified in Canada by Wood Energy Technical Training (WETT).

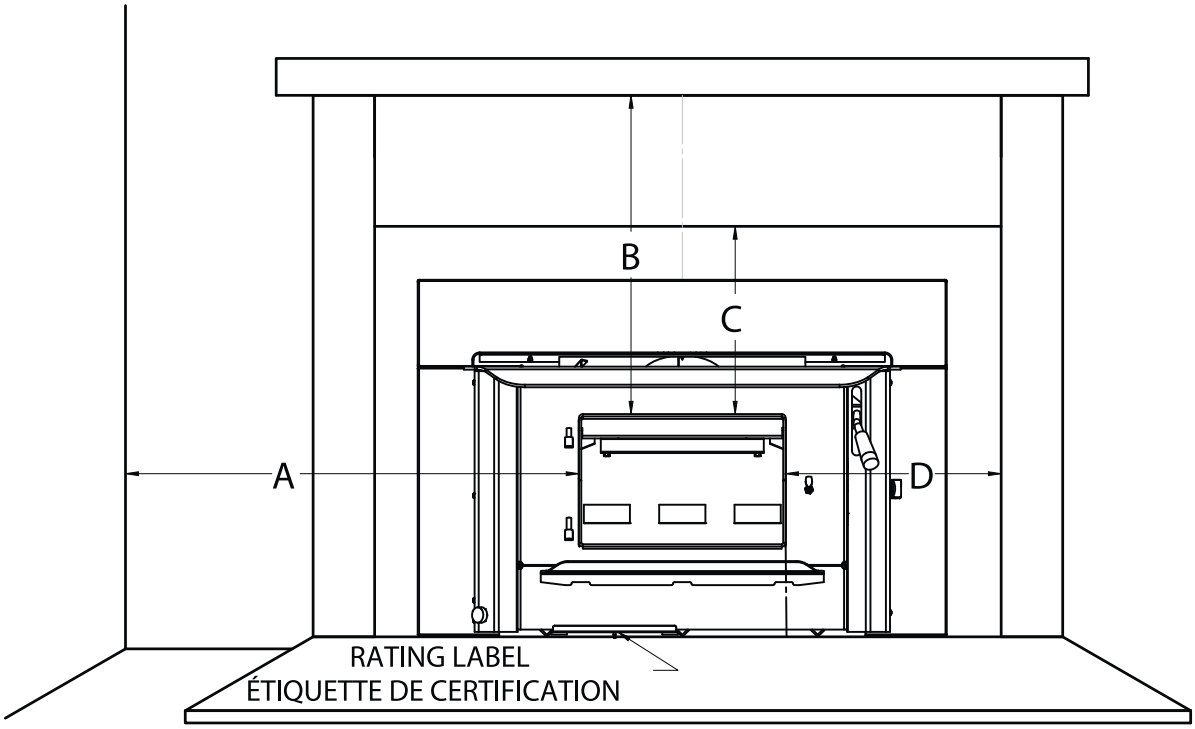
Wood Energy Technical Training www.wettinc.ca

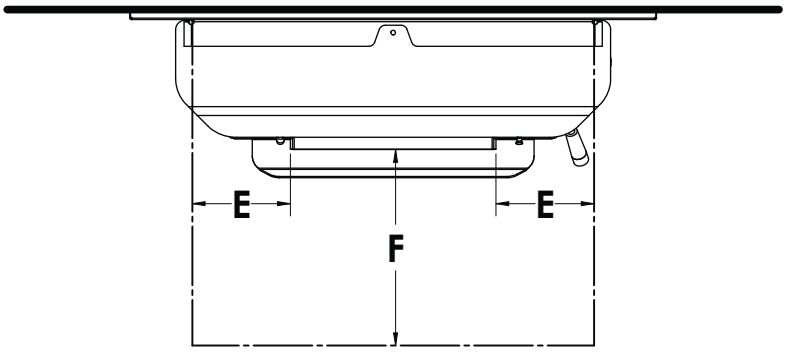
PARTS INCLUDED WITH THE PRINCESS INSERT	
1. Poker	
2. Manual Kit (w/ warranty cards, thermometer, fire starter, labels, leveling bolts)	
REQUIRED DOOR OPTIONS	
1. Black Painted Door (S.Z4786.BK)	2. Gold Door (S.Z4786.G)
3. Satin Door (S.Z4786SA.C)	4. Black Solid Door (S.Z4786.SO)
REQUIRED SHROUD OPTIONS	
1. Shroud PI 28 1/2” (S.Z4674)	2. Shroud PI 32 1/2” (S.Z4647)

FLOOR PROTECTION

A non-combustible floor protection is required for all installations extending 16” (in USA) or 18” (in Canada) in front of the door and extending 8” to either side of the door opening.

Minimum clearances to combustibles		
A	**Side of door flange to combustible wall.**	**17in / 432 mm**
B	**Top of door flange to bottom of 12” deep mantel shelf.**	**26in / 660 mm**
C	**Top of door flange to combustible facing and trim (3/4” thick).**	**14in / 356 mm**
D	**Side of door flange to side combustible facing.**	**15in / 381 mm**
E	**Minimum hearth side extension**	**8"**
F	**Minimum hearth front extension**	**16" USA 18" CANADA**





COMBUSTION AIR

Ensure adequate combustion air allowing for all other exhausting type appliances in the dwelling (range hoods, dryers, etc.). In air tight homes and modern constructions, careful considerations must be taken into account when using a wood burning appliance. Heat recovery ventilators (HRV) systems along with constant running pan motors in air handlers must be taken into account when balancing the system. Failure to do so may result in air starvation, smoke spillage and carbon monoxide threats. Consult a HVAC specialist for proper installation. Ensure adequate combustion air allowing for all other exhausting type appliances in the dwelling (range hoods, dryers, etc.). In airtight houses it is recommended to install a fresh air inlet into the room where the appliance is located, to prevent air starvation.

DRAFTING PERFORMANCE

Draft is the force which moves air into the appliance up through the chimney. The amount of draft created by your chimney depends upon length, offsets, insulating properties, obstructions (such as architectural design, trees), local geography and other factors.

External forces, such as outdoor temperature, wind, barometric pressure, topography, or factors inside the home (negative pressure from exhaust fans, chimneys, air infiltration, etc) may adversely affect draft.

Too much draft may cause excessive temperatures in the appliance and may damage the heater. An uncontrollable burn or excessive temperature indicates excessive draft.

Inadequate draft may cause back puffing (spillage) into the room and plugging of the chimney, chimney cap or spark arrestor screen. Inadequate draft may cause smoke to leak into the room through appliance or chimney connector joints. Poor draft can also lead to poor heat production and the inability for the combustor to remain active in lower burn rate settings.

High efficiency appliances, such as your Blaze King stove, may require some fine tuning of your chimney system in order to maximize performance.

Blaze King cannot be responsible for external forces leading to less than optimal performance.

ROLE OF THE CHIMNEY

Without a proper installed chimney, this appliance will not burn correctly.

The role of the chimney is to pull the proper amount of air into the firebox for the purpose of complete combustion. Incomplete combustion will lead to more smoke and pollution of the outside air. A proper operating chimney will allow the user to enjoy peak performance at all burn operating levels from low to high. Blaze King therefore recommends vertical installations with a minimum length of 15’ from stove top to chimney cap. In all freestanding stove installations, use double wall stove pipe from the stove top to the ceiling support box. The use of double wall stove pipe does allow for reduced clearances, however most importantly, it helps to keep the chimney warm and improve draft.

For wall exits, the same suggestion applies. With the addition of the recommendation to use two 45 degree elbows rather than a single 90 degree elbow. The use of two 45 degree elbows will allow for both a smoother transition to the exterior chimney and will also shorten the horizontal run to the outside chimney. A minimum 36” rise is recommended prior to any elbows being used. When possible, outside chimney systems should be isolated from direct exposure to winter weather by building a chase around the chimney, observing all clearances as specified by the venting manufacturer. Doing so will help to keep the chimney warmer and improve draft.

INSPECT CHIMNEY

Before connecting any wood-burning unit to an existing chimney, inspect the chimney to be sure that it is in good condition. There must be no cracks or holes. The cross-sectional area can differ from the flue collar as long as sufficient draw is maintained and local codes and jurisdiction are observed.. A proper chimney is crucial for safe, satisfactory operation of any wood heating system. Relining or rebuilding may be necessary to make the chimney safe, efficient, and in conformity with local codes.

Masonry Chimneys that have a very large cross-section , particularly exterior chimneys, may experience poor draft and may require relining to reduce the cross-section-and provide a proper draft. This is also an ideal time to clean the existing chimney. For peak efficiency, a clean chimney flue is essential. A qualified professional chimney sweep can perform both inspection and cleaning. If you choose to clean your own chimney use the proper tools. Homemade cleaners may damage your chimney.

PLANNING STOVE PLACEMENT

NOTE: THIS INSERT IS SUITABLE FOR INSTALLATION IN EITHER:
A FACTORY BUILT FIREPLACE LISTED TO UL 127 OR ULC S20
A CODE-APPROVED MASONRY CHIMNEY WITH A FLUE LINER. MANDATORY in CANADA, recommended in USA.

Check the fireplace and insert dimensions to ensure the insert will fit properly. While planning your installation keep in mind the required clearances as shown on the stove label.

Plan ahead to be certain that furniture will have ample clearance, and that drapes and curtains cannot come in contact with the room heater. Refer to the approval label on the stove for correct clearances to combustibles.

This stove must be connected to a chimney. It must be vented to the outside.

⚠WARNING

NEVER PERMIT YOUR STOVE TO VENTILATE INTO ANY ROOM IN THE BUILDING

.

Consult the stove label to ensure that you install your stove the proper minimum distances from combustible materials.

Minimum fireplace opening size is 25” (w) x 23” (h) x 12.5”(d)

Electrical Power - The stove is equipped with a fan assembly with a seven-foot electrical cord. Do not route the cord in front of the stove.

STOVE ASSEMBLY

1. Carefully remove and inspect the S.Z4674 or S.Z4676 shroud parts in the shipping packages. The parts should include 2 shroud side panels, 1 shroud top panel, 1 shroud convection deck, and 4 #6-32 screws.

2. Place the fireplace insert on the work area. **Note: This unit is shipped without any shroud parts in place**. Attach the two-shroud side panels to the unit by sliding them onto the four protruding screws on the back of the firebox, then slide the panels down. (**Fig. 1**) The screws can now be tightened.

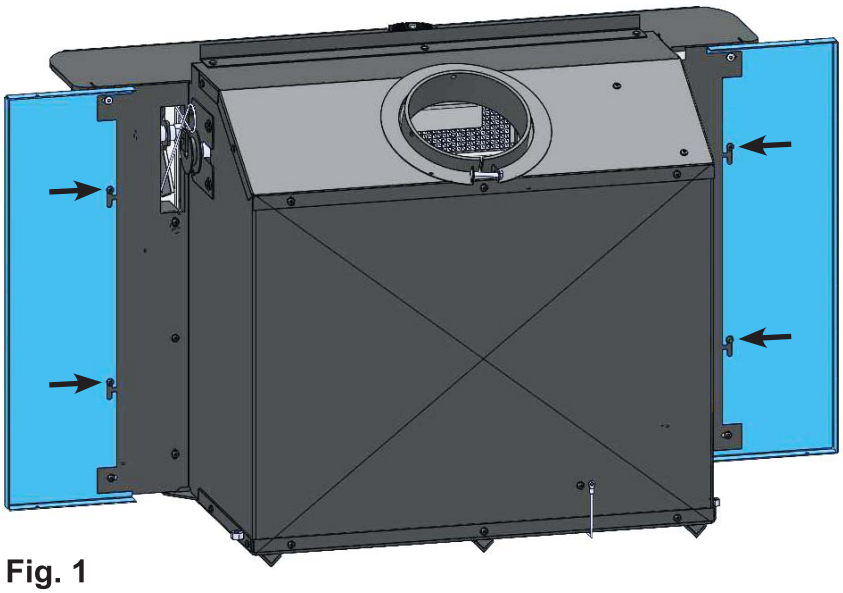


Fig. 1

3. Exact placement of the insert is determined by the overall shape of your fireplace opening and surround etc. First determine whether you will need leveling bolts installed or other devices to ensure a proper level installation of the unit. This is determined by your fireplace construction. Sometimes the hearth is raised from the bottom of the fireplace and sometimes it is lowered. Only use non-combustible material to fill any space under the insert (such as firebricks) to support the bottom of the firebox. The insert must sit level with, or slightly higher than, the hearth front. On each corner of the underside of the fireplace insert there is a 3/8" NC nut. If required a 3/8" bolt of determined length can be threaded into these nuts to assist in leveling the unit.
   NOTE: Blaze King strongly recommends that you install a complete insulated stainless steel flue liner system. This is the safest installation and will ensure proper draft control for ideal and consistent burn times. An approved liner system is required by code for all installations in Canada. The installation codes in some USA locations do not require a full insulated stainless steel liner system, but it is recommended.

4. Slide the unit into the fireplace opening and attach the chimney liner or flue connector system as required. Work through the opening above the unit where the top shroud panel will fit. If access to the flue outlet on the insert is restricted by fireplace opening height you may need to temporarily remove a side panel (as fitted in step 2) to allow enough work area to properly connect the insulated stainless steel flue liner. Depending upon the particular installation the unit may need to be pulled out slightly away from the front of the fireplace.
   In some installations the leveling bolts might make it difficult to slide the unit into a fireplace with a rough hearth. We have provided two metal strips approximately 3" x 16" to help with this problem. Lay the strips down and slide the unit on them. This may not be required in all circumstances. If they are not required discard the strips.

5. Place the shroud top onto unit sliding it down so the tabs on the back of the shroud top slide over the tabs flange on the unit. (**Fig. 2**)

6. Screw the shroud top to the shroud sides. (2 screws) (**Fig. 2**)

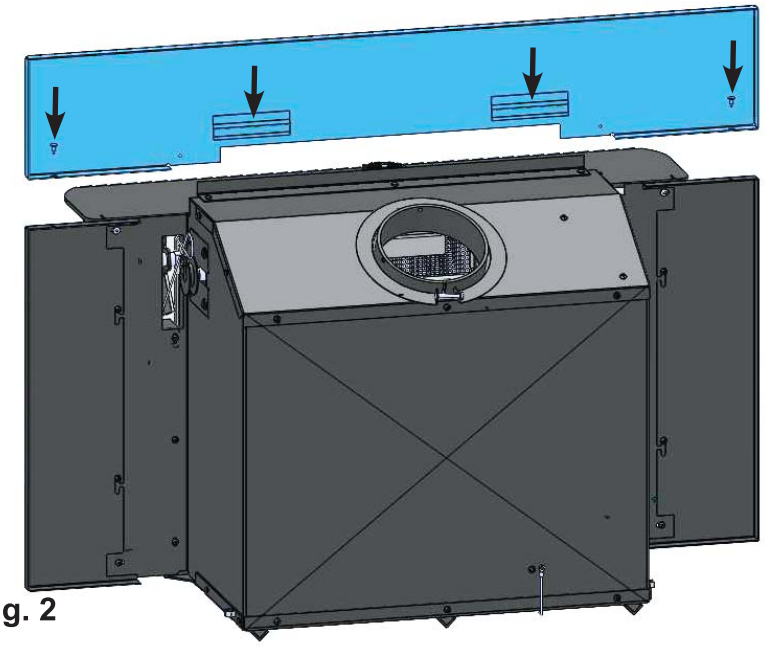


Fig. 2

7. Align the convection deck holes with the holes in the top shroud.

8. Fasten the convection deck to the shroud top. (2 screws) (**Fig. 3**)

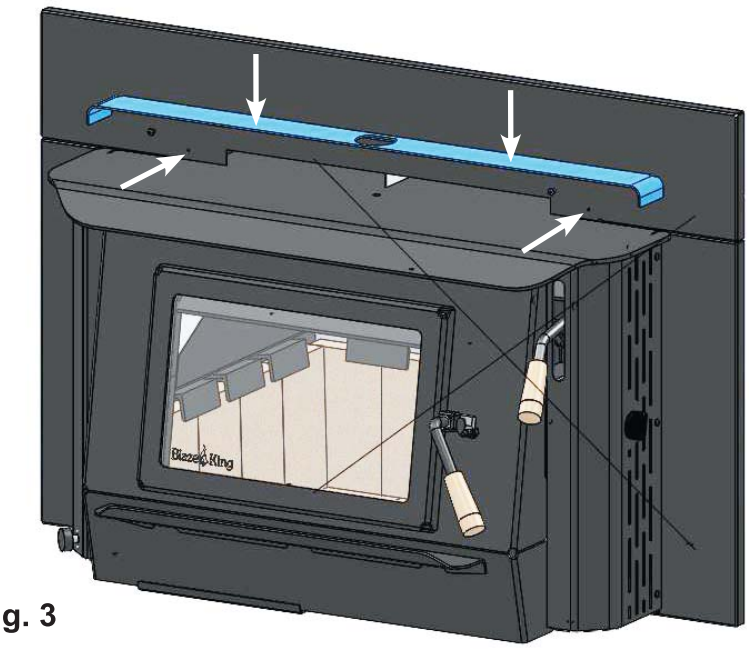


Fig. 3

CHIMNEY

FACTORY-BUILT FIREPLACE

In Canada and in the USA: This insert may be installed into a compliant factory built fireplace providing the chimney is lined from the outlet of the insert to the top of the chimney using an insulated stainless steel liner which meets UL1777 or ULC S635. The liner must be securely attached to both the insert and the chimney top. In both Canada and the U.S.A. the existing fireplace damper must be secured in the open position. If this is not possible the damper must be removed. Any openings between the masonry of the fireplace and the facing masonry must be sealed.

⚠WARNING

THE FIREPLACE CANNOT BE MODIFIED IN ANY WAY TO FIT THE INSERT

GENERAL CHIMNEY INSTALLATION

Connect the venting system to the flue collar of the insert using three sheet metal screws. There are three predrilled holes in the flue collar. Place a bead of furnace cement around the flue collar connection to ensure the flue pipe is properly connected, secured and sealed.

If this stove and its chimney components are not properly installed, a house fire may result. For your safety, follow the installation directions. Contact local building or fire officials about restrictions and installation requirements in your area.

We recommend that the inside your chimney be at least the same diameter as the flue of your stove. If you plan to use an existing masonry chimney, be sure it is free of cracks and loose joints. Gases traveling through a chimney can reach extremely high temperatures. Cracks or loose mortar can allow hot gases to reach the wood portion of the structure surrounding the chimney. These toxic gases can also re-enter the house through cracks and small holes in the chimney, or cause back-puffing which will result in excessive smoking. Be on the safe side and have your chimney inspected by a certified chimney sweep. A 6 inch insulated stainless steel chimney liner with a direct connection to the stove is recommended for masonry chimney installations. A chimney must extend at least three feet above the highest point where it passes through the roof and at least two feet higher than any portion of the building within ten feet of the chimney. Smoke travels up the chimney in a circular, spiraling motion. A 6 inch round insulated stainless steel liner allows the smoke to travel with less resistance. A rough masonry chimney without a good smooth liner can result in the rapid build up creosote.

⚠WARNING

- **BEFORE YOU BEGIN CHECK ALL LOCAL CODES AND REGULATIONS REGARDING YOUR INSTALLATION.**
- **DO NOT CONNECT THIS UNIT TO A CHIMNEY FLUE SERVING ANOTHER APPLIANCE**

YOUR FIRST FIRE!

The following pages contain information on the major components and operation of your heater. Please take time to read about them as it will give you a better understanding of how your appliance works. This understanding will help you to operate your appliance properly thus will extend the life of your appliance and allow you to get the highest efficiencies from your heater.

THERMOSTAT

The thermostat knob is located on the right side of the stove. (**Fig. 7 #1**) It controls the burn rate of the stove Any thermostat position between **LOW** and **HIGH** will produce the desired clean burning characteristics. However, since each installation is different, you may find it necessary to operate the thermostat to suit your situation. A **HIGH** thermostat setting will produce maximum heat which is more than suitable for heating the average size home. All adjustments to the thermostat should be done gradually. When you first light the stove set the thermostat to **HIGH** setting for 20-30 minutes, or until the fire is well established. Once the fire is established turn the thermostat to **MED** for 5 minutes and then to a **LOW** setting or the desired setting. Too rapid an adjustment may cause the stove to operate improperly. The most common mistake new owners make is continually adjusting the thermostat.

BYPASS

Most catalytic wood burning appliances have a bypass device to allow the smoke from the fire to temporarily bypass, or go around, the catalytic combustor. The bypass door is located inside the firebox at the top of the stove (**Fig. 7 #2**). The bypass is a steel plate door, hinged inside the stove, and is controlled by the bypass handle on the right side of the stove. When the handle is up, the bypass is open, when the handle is down, the bypass is closed. **NEVER OPEN THE LOADING DOOR WITHOUT OPENING THE BYPASS DOOR**
Note: To ensure the bypass is closed push down on the bypass handle until you hear a positive click.

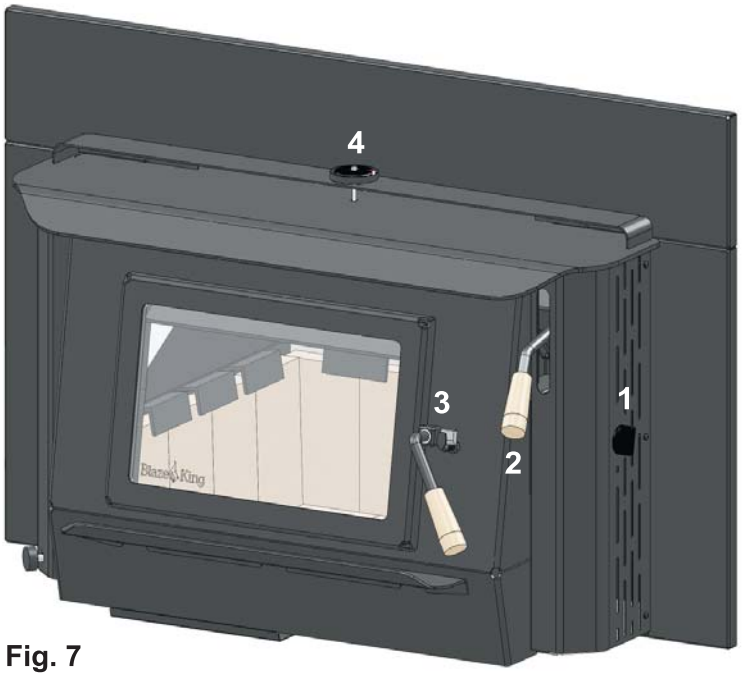


Fig. 7

CATALYTIC THERMOMETER **(Fig. 7 #4)**

This thermometer is located on the top of the stove. It's purpose is to show you if the combustor is active. Always operate the stove in the "active" zone. When the combustor is not active the stove will emit smoke and will not be efficient. For an accurate reading, turn fans off for approximately 10 minutes and then read the thermometer.

SELECTING WOOD

⚠WARNING

- **THIS APPLIANCE IS DESIGNED TO BURN NATURAL WOOD ONLY. DO NOT BURN TREATED WOOD, COAL, CHARCOAL, COLORED PAPER, CARDBOARD, SOLVENTS OR GARBAGE.**
- **HIGHER EFFICIENCIES AND LOWER EMISSIONS WILL GENERALLY RESULT WHEN BURNING AIR DRIED SEASONED WOODS, AS COMPARED TO WET, GREEN OR FRESHLY CUT WOODS.**
- **BURNING WET UNSEASONED WOOD CAN CAUSE EXCESSIVE CREOSOTE ACCUMULATION. WHEN IGNITED IT CAN CAUSE A CHIMNEY FIRE THAT MAY RESULT IN A SERIOUS HOUSE FIRE.**

Use dry seasoned wood, split and stacked and protected from rain for at least 24 months with a moisture content of 20% or lower. It takes a great deal of energy to evaporate the moisture contained in green wood and that energy will not be heating your house. Also, green or wet wood will greatly increase creosote problems. The only accurate method to determine moisture content in wood is to use a moisture meter. Never burn salt-water driftwood. It is very corrosive and will damage the firebox. Burning salty wood also voids the warranty.

This controlled combustion firebox has been designed for high efficiency and long burn times.

The proper time to add more wood is when the last charge has been reduced to a glowing charcoal bed and while the catalytic thermometer is still active range. There will be very little smoke at this stage in the burn cycle.

Both hardwood and softwood burn equally well in this appliance but hardwood, which is more dense, will weigh more per cord and burn a little slower and longer. Firewood should be split and stacked in a manner that air can get to all parts of it and covered in early spring to be ready for burning that fall.

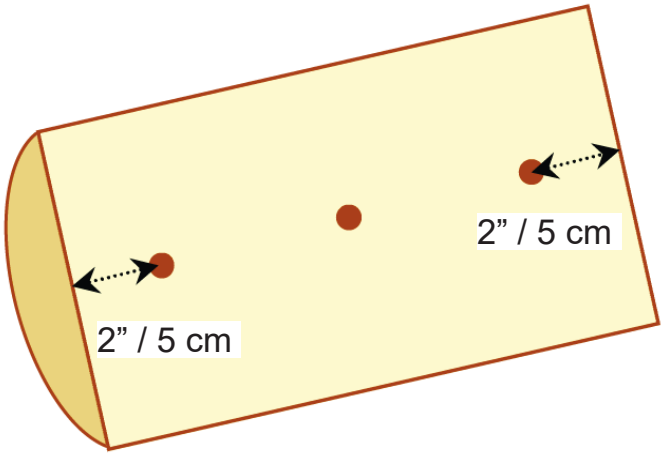
The only accurate way to determine wood moisture is to purchase a moisture meter.

⚠WARNING

- **NEVER START A FIRE UNLESS ALL BRICKS ARE CORRECTLY PLACED INSIDE THE FIREBOX. CHECK THE INSTALLATION INSTRUCTIONS CAREFULLY.**
- **ALWAYS OPEN THE BYPASS DOOR BEFORE OPENING THE LOADING DOOR.**
- **ONCE THE LOADING DOOR IS CLOSED, CLOSE THE BYPASS DOOR DIRECTLY AFTER THE CATALYTIC THERMOMETER NEEDLE IS IN THE ACTIVE ZONE**.

HOW TO USE MOISTURE METERS

1. Take a random selection of around 3-4 logs per cubic yard or cubic meter.
2. Split each log down the middle.
3. In the center of log push pins of meter along grain - three measurements are taken on the freshly split surface: 2” or 5 cm in from each end of the log and in the middle of the split surface with sufficient contact (see figure).
4. Do this to all the logs and take an average of the readings (this will be only an approximate indication but a good guide).



EFFICIENCY

Efficiency was determined using the method outlined in B415.1-10 test method. It is represented by the Higher Heating Value (HHV) as the fuel used during testing contains between 19% - 25% water moisture included in the total calculated fuel weight. (Other test methods such as LHV or Low Heating Value, do not take the water moisture into account).

Annual Fuel Utilization Efficiency (AFUE) attempts to represent the actual, season long, average efficiency of an appliance. HHV is the actual, calculated average efficiency obtained under test conditions. Using correctly seasoned wood is important when trying to gain efficiency. The more seasoned (dry) the wood, the higher the efficiency (less energy wasted on eliminating moisture during combustion). Operating your Blaze King at lower settings will result in higher efficiencies as the fuel will undergo a more complete combustion.

LIGHTING THE FIRE

NOTE: As you heat up the stove for the first time, the paint will go through a curing process and will give off an odor. To minimize the inconvenience, burn the stove at a low temperature setting for several hours. It is advisable to open a door or window until the odor dissipates. You may also notice a change in color as the paint cures, this is normal and will appear uniform after subsequent firings.

1. **DO NOT USE A GRATE. BUILD THE FIRE DIRECTLY ON THE BRICK IN THE BOTTOM OF THE APPLIANCE.**
2. Set the thermostat to **HIGH** (maximum) position and turn the fan **OFF**.
3. Open **BOTH** the loading door and the bypass door.
4. Place 10-20 balls of non-glossy paper on the floor of the firebox, or use a Blaze King fire starter puck, and then stack 8-10 lbs of kindling on top of the paper in a crisscross fashion. Be sure to space out the kindling to allow air to flow throughout the firebox.
5. Light the balls of paper, or starter puck, and leave the loading door cracked at least 2" to allow the kindling to fully ignite. This should take approximately 5 minutes. **DO NOT LEAVE THE APPLIANCE UNATTENDED**.
6. Once the kindling load is fully engulfed, latch the loading door shut **BUT** keep the bypass door open in order to get the catalytic combustor up to operating temperature. This is signified by the needle on the catalytic thermometer moving towards the red "active" zone. This should take no longer than 10 minutes.
7. After 10 minutes and/or once the needle on the catalytic thermometer is in the red "active" zone, close the bypass door. **LEAVE THE THERMOSTAT ON HIGH**.
8. Let the kindling load burn down to small chunks of wood in order to build a 2-3" thick coal bed. This should take 15-25 minutes of continuous burning on **HIGH**.
9. While waiting for the kindling load to burn down, **PREP YOUR MAIN FIREWOOD LOAD**. The ideal wood load for this unit consists of: 3-4 pieces cut to 16" for the bottom row (to be placed into the unit in a front to back orientation) and 1-2 pieces cut to 18-20" for the top row (to be placed into the unit in a side to side orientation). The main load should weigh 20lb – 40lb (will vary based on wood species used).
10. Once satisfied that a suitable coal bed can be achieved, **OPEN THE BYPASS DOOR AND THEN THE LOADING DOOR** and stir up the kindling to form the coal bed. Ensure it is evenly distributed over the entire firebox floor.
11. With both the loading door and bypass door still open, insert your main firewood load (see step 9 for ideal orientation). Once loaded, **CLOSE YOUR LOADING DOOR AND THEN YOUR BYPASS DOOR IMMEDIATELY**.
12. Let the appliance burn with the thermostat set to **HIGH** for 10 – 20 minutes or until the fire is well established. Turning the thermostat down too soon could cause the fire to go out.
13. Once satisfied that the fire is fully established, the thermostat can be adjusted down to the desired heat output setting.
14. The fan can be turned on once the appliance is hot or 20-30 minutes after the initial loading period.

It is good burning practice to burn the stove on **HIGH** for 20 to 30 minutes after every refuelling, this will help to condition the wood load for optimum combustion. The temperature in the stove and the gases entering the combustor must be raised to at least 500° (indicated by the thermometer needle in the active red zone) for catalytic activity to be initiated. During the start-up of a cold stove, a high fire must be maintained for at least 20-30 minutes. This ensures that the stove, catalyst, and fuel are all stabilized at proper operating temperatures. Even though it is possible for flue gas temperatures to reach 600° within 5 minutes of a fire being started. If the fire is allowed to die down immediately (thermostat set to a **LOW** setting too soon), it may go out or the combustor may stop working, indicated by the thermometer needle being in the inactive zone. Once the combustor starts working, heat generated in it, by burning the exhaust smoke, will keep it working.

Probably the least understood requirement in maintaining a good fire is that of establishing a good base of coals or embers. A good bed of hot coals or embers will maintain a more even temperature as well as getting the new load of wood started easily. Put as much fuel into the stove as it will hold. Don't be afraid to fill it completely. With the Blaze King automatic thermostat, the wood will only burn at the rate set on the thermostat. Once the full load is established, the stove should be left to complete the full burn cycle. This is evident by either a coal bed (ember bed) remaining or the catalyst's thermometer hovers just inside the active zone. This procedure will maximize the efficiency of the combustor as well as limit chimney emissions and smoke spillage.

⚠WARNING

DO NOT USE THE APPLIANCE WITHOUT A COMBUSTOR

RELOADING PROCEDURE (with the catalyst temperature in the ACTIVE ZONE)

1. Have your next load of wood ready before beginning. Turn the thermostat to **HIGH** and the fan(if fitted) **OFF**. Wait 2 minutes for the air flow to stabilize.
2. Open the bypass door (rotate the bypass lever forward, on Princess Insert pull handle up) and again wait 2 minutes for the air flow to stabilize.
3. Unlatch the loading door and open just a crack to allow the ambient room air to be introduced to the firebox, this may take a few seconds to stabilize.
4. Slowly open the loading door and proceed to reload the firebox. If you experience excessive smoke spillage, slightly close the loading door to re-establish a draft through the chimney.
5. Once loaded, latch the loading door shut and close the bypass door (rotate the bypass handle backwards, on Princes Insert push handle down). Let the fire burn on the **HIGH** thermostat setting for 20 to 30 minutes **OR** until the fire is very well established. At that point, turn the thermostat down to the desired setting. Keep in mind you may not see a large amount of flame activity in the lower thermostat setting. The thermometer needle will remain in the active zone indicating that the burn cycle is continuing.
6. Should you burn the stove on a very low setting for extended periods of time, you will begin to see creosote deposits forming on the glass door. To remove these deposits, simple run the stove on **HIGH** for approximately 30 minutes. The **HIGH** setting will burn off most of the deposits

As every pile of wood is different you will learn, over time, which settings are necessary to achieve the optimal fire. This will be based on the type of wood, installation, weather conditions and the desired room temperature.

RELOADING PROCEDURE (with the catalyst temperature still in the INACTIVE ZONE)

Follow the procedure for “LIGHTING THE FIRE” on the previous page.

OPTIMAL THERMOSTAT SETTING

Any thermostat position between **LOW** and **HIGH** will produce the desired clean burning characteristics. However, since each application can vary, you may find it necessary to operate the thermostat to suit your application. A thermostat setting on **HIGH** will produce a maximum heat which is more than suitable for heating the average size home and offer the cleanest door glass.

1. Starting the fire. Each stove, home, installation, chimney installation, and homeowner combination works a little differently. The first several times you fuel the stove, it may not react as you expect. A little experimentation may be needed to find the right combination of fuel and thermostat setting to achieve the maximum efficiency. This is one of the joys of burning wood. You, the wood burner, make it work. And you can see what happens as it is working. Be patient, the air / fuel mixture and temperature must be stabilized before maximum combustion efficiency can be achieved.
2. As the combustor temperature (as indicated by the thermometer on top of the stove) passes into the active zone, further adjustment to achieve the desired room temperature should be made in small increments for the most effective cleaner burning operation. Changes should be made as few times each day as possible. When the thermostat knob is moved from high to low, more gases are produced, so the combustor has more fuel; consequently the combustor thermometer may register a higher heat for several hours after the thermostat is turned down.
3. Keep hot coals active so when you reload the stove you will reduce the time necessary to maintain an active combustor.
4. The thermostat is set at the factory. **DO NOT TAMPER WITH THE THERMOSTAT**, this will result in a malfunctioning thermostat.

FAN OPERATION

The fan is located on the left-hand side of the stove, it recirculates room air across the back and top. This design allows the air to travel the farthest distance across the hot surfaces resulting in super heated air, most of which can be felt exiting the right-hand side of the stove. The fan should be off until the stove reaches normal operating temperatures. After approximately 30 minutes, the fan speed adjustment should match the thermostat control setting, i.e. if your stove is set at medium then your fan should also be set at medium, low—low, high—high etc.

ICE - FORMATION AND PREVENTION

Most of what you see coming from the chimney of a properly operating catalytic appliance is water vapor. In extremely cold weather - and with some exterior chimneys - this vapor may freeze in the chimney to the point of actually blocking the chimney and extinguishing the fire. In such weather, occasionally burn the appliance for 4 or 5 minutes with the thermostat setting on **HIGH** to melt any possible ice buildup.

WOOD BURNING IN THE SHOULDER SEASON

There are things to consider if you decide to light a fire in the spring and fall or when the outside temperature is milder, perhaps 55°F to 70°F (13°C to 21°C).

As you light the fire, with the loading door open, you may notice spillage, this is when a small amount of smoke comes back into the living space. When your fire begins to warm the chimney and the draft improves, spillage is greatly reduced. After a short period of time you can adjust the thermostat to a **LOW** setting and maintain a comfortable temperature in your home.

In reducing the thermostat setting you have also reduced the flue temperatures and your chimney begins to cool down. At this time the amount of draft is also decreasing and spillage may occur. The differences between the flue temperature and the outdoor air temperatures causes your chimney to draw and vent the flue gasses to the outside. This air movement, sometimes referred to as Stack Effect, is also influenced by air density and moisture differences. Small temperature differences produce less draw in your chimney system than large temperature differences.

General Rules for burning in the shoulder season:

- Run your appliance on high for 30 minutes after start up and reloading.
- Slowly turn the thermostat down to the desired heat setting.
- The heat setting needs to be high enough to keep the thermometer in the active zone.
- If the thermometer does not stay in the active zone turn the thermostat to a higher setting. Wait 15 minutes then confirm that the thermometer remains in the active zone. Repeat as needed.
- If your appliance is producing too much heat, build smaller hotter fires.
- Build smaller hotter fires on milder days in the spring and fall.

CATALYST MONITORING

It is important to periodically monitor the operation of the catalytic combustor to ensure that it is functioning properly. A non-functioning combustor will result in a loss of heating efficiency, and an increase in creosote and emissions. Following is a list of items that should be checked on a periodic basis:

- Combustors should be visually inspected at least three times during the heating season to determine if physical degradation has occurred. Actual removal of the combustor is not recommended unless more detailed inspection is warranted because of decreased performance. Refer to “CATALYTIC COMBUSTOR TROUBLESHOOTING” on next page.
- This catalytic heater is equipped with a temperature probe to monitor catalyst operation. Properly functioning combustors typically maintain temperatures in excess of 500°F (indicated by the thermometer needle in the active zone), and often reach temperatures in excess of 1000°F. If catalyst temperatures fall below 500°F (indicated by the thermometer needle in the inactive zone), refer to next step and to “CATALYTIC COMBUSTOR, TESTING” below.
- You can get an indication of whether the catalyst is working by comparing the amount of smoke leaving the chimney when the smoke is going through the combustor and catalyst light-off has been achieved, to the amount of smoke leaving the chimney when smoke is not routed through the combustor (bypass mode):
  - Light the appliance as per the lighting instructions (see “LIGHTING THE FIRE”). With smoke routed through the catalyst, go outside and observe the emissions leaving the chimney.
  - Open the bypass mechanism, wait approximately 15 minutes, and again observe the emissions leaving the chimney. Significantly more smoke will be seen when the exhaust is not routed through the combustor (bypass mode). Some smoke may be visible shortly after you start the fire and shortly after reloading the fire. Allow 20 to 30 minutes for the fire to stabilize before making observations.

CATALYTIC COMBUSTOR, TESTING

Light the fire as per the lighting instructions (see “LIGHTING THE FIRE”). Then set the thermostat knob on a MED setting. When the fire is well established (within one to three hours) turn the thermostat knob between **LOW** and **MED**. A properly operating combustor will remain active, and the combustor thermometer will remain in the “active” zone until the wood load is mostly consumed. A “tired” or “dead” combustor will, with the thermostat on **MED** or lower, go out completely, and the thermometer needle will fall into the “inactive” zone. Repeat this procedure several times over several days (Remember that the combustor thermometer has a built-in lag of 4-8 minutes.) If, after several test burns, the thermometer will not indicate an “active” combustor, it may require cleaning or replacement. It is also possible that the thermometer, itself, may not be reading accurately. Before condemning the combustor, read “THERMOMETER”. If, after cleaning has been performed, your combustor is still not working you can Contact Blaze King for a replacement combustor. Please read “REPLACEMENT PARTS” section in this owners’ manual.

CATALYTIC COMBUSTOR, CLEANING

Under certain conditions, ash particles may become attached to the face of the combustor. These may be seen while the combustor is in the glowing stage, or when the fire is out. Any deposit on the visible face of the combustor should be removed. Wait until the fire is out and the appliance is cold before performing any cleaning. Brushing the combustor with a soft bristle paint brush will remove some deposits. Passing a vacuum cleaner wand or brush near the face of the combustor will remove most deposits. (Hot ash in a vacuum cleaner bag will burn, may melt the vacuum or cause a house fire. Exercise caution and never clean the appliance when the appliance or ashes are hot.) Never scrape the combustor with any hard tool or brush. Never run pipe cleaner through the individual cells of the combustor. This is not needed, and may do more harm than good. Limit cleaning to the face of the combustor. **NOTE: Never remove a combustor without approved combustor gasket in hand as original gasket will fall apart when removed from** appliance. Remember to re-install the Flame Shield (the perforated plate) in same position it was found.
TIP: A hot fire will usually prove to be the best method of cleaning the combustor of deposits.

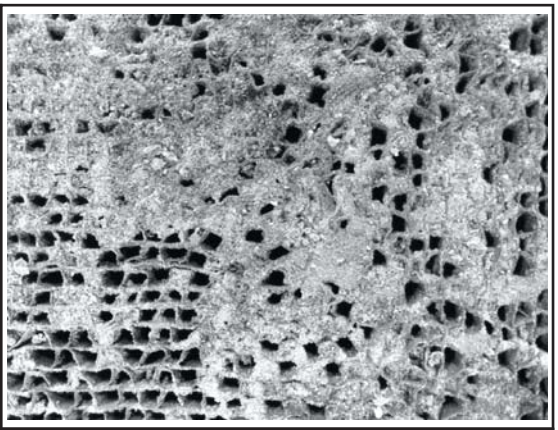
CATALYTIC COMBUSTOR, TROUBLESHOOTING

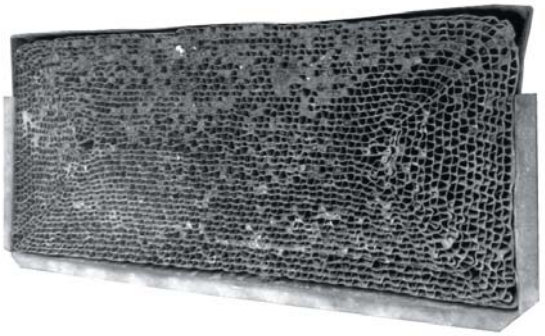
PROBLEM - CREOSOTE PLUGGING

Possible Cause: Burning materials that produce a lot of char and fly-ash.
Solution: Do not burn materials such as garbage, gift wrap, or cardboard.

Possible Cause: Burning wet, pitchy woods or burning large loads of small diameter wood with the combustor in the operating position without the thermostat needle in the active zone.
Solution: Burn dry, seasoned wood, don't engage the bypass until the temperatures are high enough to initiate light-off (indicated by the thermostat needle in the active zone).

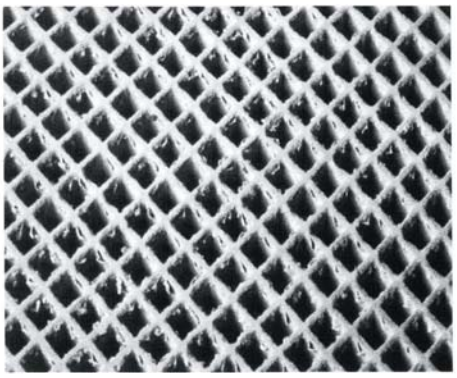
Possible Cause: Combustor not functioning. If proper burning procedures have been followed to no avail, the combustor is not functioning.
Solution: Replace the combustor with a genuine Blaze King combustor (failure to do so will void your warranty).





PROBLEM - CATALYST PEELING

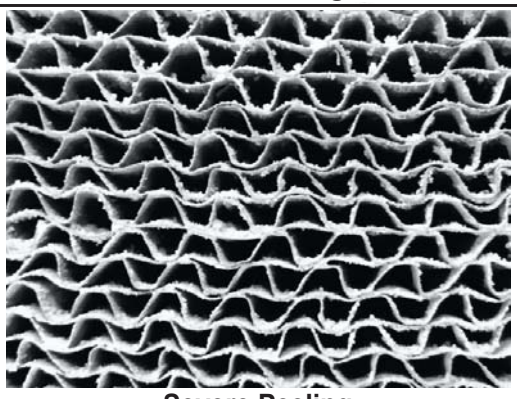
Possible Cause: Extreme temperatures (above 1800°F, or 1000°C.) at combustor surface can cause the catalysts to peel. Over firing and flame impingement on the combustor are primary causes. Minor peeling photo shows minor peeling that is normal and does not affect function. Severe peeling photo shows that are closed or plugged.
Solution: Avoid extreme temperatures and flame impingement. If peeling is severe, remove and replace combustor.



Minor Peeling

PROBLEM - CATALYST DEACTIVATION

Possible Cause: Burning large quantities of trash, pressure-treated lumber, or painted woods.
Solution: Burn quality woods available in your area. If you decide the catalyst has been deactivated, replace combustor with a genuine Blaze King combustor (failure to do so will void your warranty).

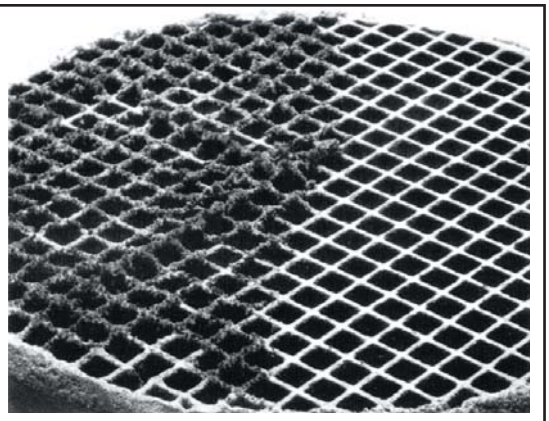


Severe Peeling

CATALYST MONITORING

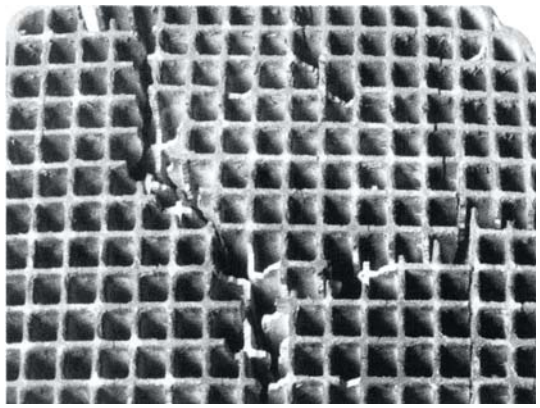
PROBLEM - CATALYST MASKING
(The catalyst is coated with a layer of fly-ash or soot which prevents catalytic activity)

Possible Cause: Accumulation of fly-ash
Solution: Brush cooled combustor with a soft-bristled brush or vacuum lightly at least once per burning season.



PROBLEM - THERMAL CRACKING

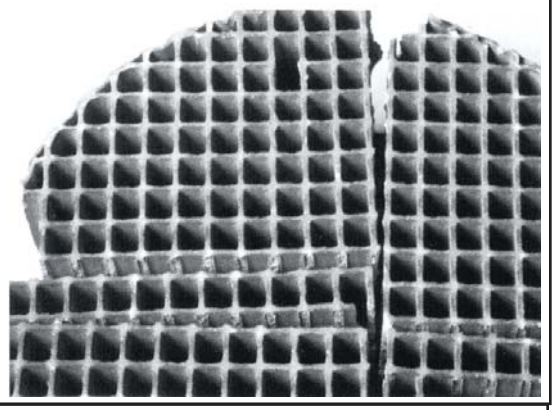
Possible Cause: Normal operation, as long as the combustor remains intact.
Solution: If cracking causes large pieces to fall out, replace the combustor.



PROBLEM - MECHANICAL CRACKING

Possible Cause: Mishandling, abuse, or operating without a properly gasket sealed combustor.
Solution: Handle with care

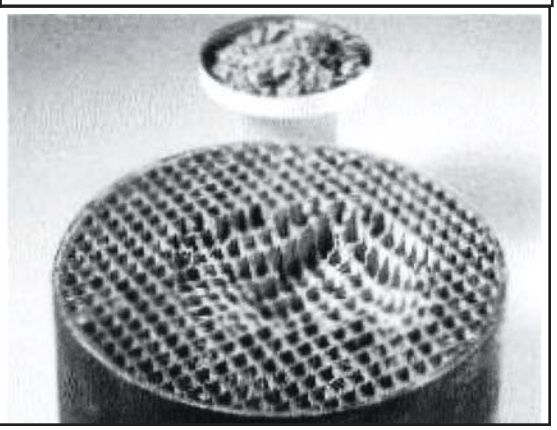
Possible Cause: Distortion of holding collar.
Solution: Combustor should be held firmly in its can. It should slide easily into and out of the holding collar of the appliance. If severe cracking has resulted in loss of large chunks of combustor, replace combustor. Also replace any warped appliance parts.



PROBLEM - CRUMBLING

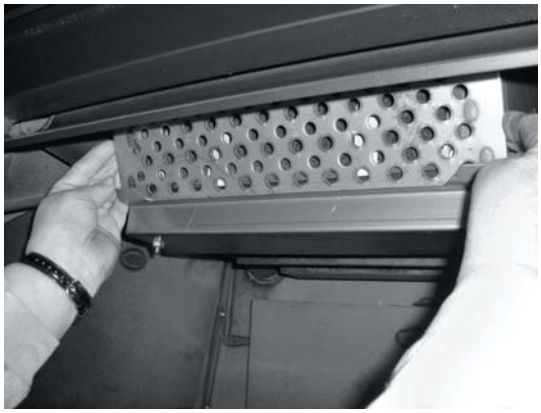
Possible Cause: Air leaks
Solution: Inspect door gasket, see “MAINTENANCE cont.” on page 35.

Possible Cause: High draft
Solution: Do not exceed .06” of water draft.



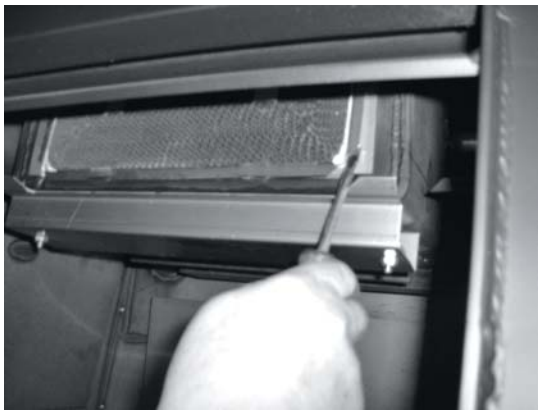
CATALYTIC COMBUSTOR, REPLACEMENT
BLAZE KING RECOMMENDS YOUR DEALER PERFORM THIS TASK

The catalytic thermometer on top of the stove should read in the active zone after the stove has been in operation for several hours. If the thermometer's indicator needle does not stay in the active zone, even with a hot fire, over a 7-10 day period of regular use, the combustor may need replacement or cleaning, see "CATALYST MONITORING". If the combustor needs replacing then discontinue use of the appliance until the combustor is replaced. If the combustor must be examined or replaced contact your Blaze King dealer.

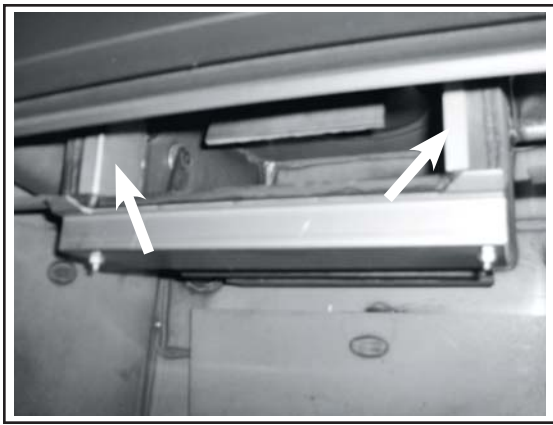


1. The removal of a Blaze King Catalytic combustor requires a small flat blade screwdriver or pocket knife. The stove fire must be out for at least 12 hours prior to the removal process. A combustor can reach 1400°F and hold high temperatures for several hours even after the fire is out. After waiting 12 hours, first remove the flame shield by simply lifting the shield off the two tabs at either side. Pay particular attention to orientation as there is a top and bottom edge to the flame shield.

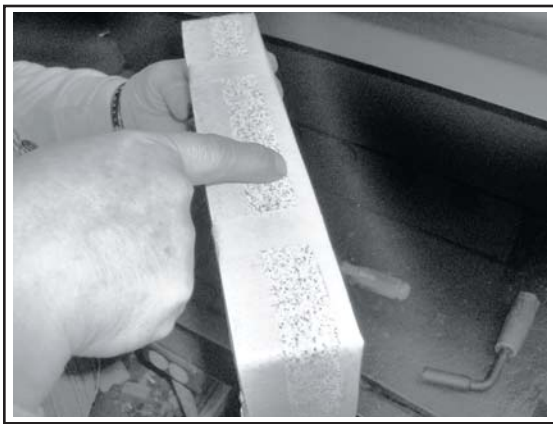
2. Once you remove the flame shield, you'll find the combustor. The honeycomb combustor can be made of different materials such as cordierite, mulite or even stainless steel. They are all the same with regard to removal and caution should be taken so as to not drop or damage the combustor. If your combustor has never been cleaned according the manufacturers directions, you may wish to clean the combustor before replacing it with a new combustor, see "CATALYTIC COMBUSTOR CLEANING".



3. The combustor has a metal tab across the bottom and on each side of the combustor. Using a flat blade screwdriver or pocket knife blade, slide the blade behind the metal tab and the heavy steel dome of the stove. The dome is the housing that surrounds the combustor. Apply slight pressure until the combustor begins to move forward, about 1/4". Repeat the process on the opposite end tab. By working back and forth the combustor will work free of the dome housing. It is normal for the gasket surrounding the metal band to fall apart during this process. New combustors are shipped with a new gasket.



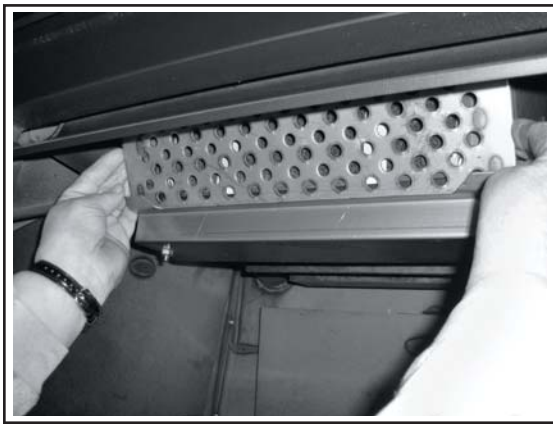
4. Now that the combustor has been removed you'll be able to see one stainless bypass retainer on each side. These can remain in place and do not need to be removed. These clips are not fixed in position and can fall into the firebox. Make sure they are in position before replacing the combustor. Using the same screwdriver or pocket knife, scrape any old gasket from the surface areas of the dome. The dome is the housing that surrounds the combustor. If you clean your existing combustor, you'll need to order replacement combustor gasket. It is always a good idea to have a spare combustor gasket on hand prior to performing any maintenance. If you purchase a new combustor a new gasket will already be applied to the combustor.



5. This new combustor already has the gasket installed. Note the 1" wide masking tape. This tape will help to keep the leading edge of the gasket from snagging during installation. If you've cleaned your combustor, wrap the combustor gasket as you see here and use the 1" masking tape around the perimeter front and rear. During the first fire the masking tape will burn off and the combustor gasket will swell providing a tight seal. It is this tight seal that improves efficiency and performance. You should never burn your stove without a combustor gasket installed.

6. Since the combustor is only 2" deep, there is ample room to lift the new combustor into place. **REMEMBER TO HAVE THE TAB ACROSS THE BOTTOM EDGE OF THE COMBUSTOR AS IT IS INSTALLED**. Slowly push the combustor in at the top apply even pressure to the left and right corners. This will allow for a better view of the bottom edge for the final fitting. **DO NOT FORCE THE COMBUSTOR INTO THE DOME. TAKE YOUR TIME AND WORK IT INTO PLACE SLOWLY.**

7. Once the combustor is installed completely so that all three tabs at touching the face of the dome, replace the flame shield. Note the brackets welded to the back flame shield are shaped like a triangle.The point of the triangle should face down when installed correctly. Never operate your stove without the flame shield in place. The flame shield will protect the face of the combustor against damages from wood when loading and other possible damages that can occur during the cleaning process.



8. The flame shield will rest on the two tabs located on the dome guard and lean slightly forward. Now that your combustor has been installed you can relight your stove. You will continue to receive excellent efficiency and clean burning for years to come. A few reminders, never burn anything other than dry, seasoned cordwood. Burning anything else may contaminate or ruin your new combustor. Also remember to keep your front loading door gasket seal properly adjusted, see “LOADING DOOR TENSION ADJUSTMENT”. Doing so will improve burn times and extend combustor life span.

The combustor supplied with this heater is either a 115.Z4400-G metal combustor. Consult the catalytic combustor warranty also supplied with this wood heater. Warranty claims should be addressed to:

in Canada	in USA
Blaze King Industries / Valley Comfort Systems Warranty Department, 1290 Commercial Way Penticton, BC Canada V2A 3H5, Ph: 250-493-7444	Blaze King Industries Warranty Department, 146A Street Walla, Walla, Washington 99362, Ph: 509-522-2730

RUN-AWAY OR CHIMNEY FIRE

⚠WARNING

A CHIMNEY FIRE CAN PERMANENTLY DAMAGE YOUR CHIMNEY SYSTEM. THIS DAMAGE CAN ONLY BE REPAIRED BY REPLACING THE DAMAGED COMPONENT PARTS. CHIMNEY FIRE DAMAGE IS NOT COVERED BY THE LIMITED WARRANTY.

CAUSES:

1. Using incorrect fuel, or small fuel pieces which would normally be used as kindling.
2. Leaving the door ajar too long and creating extreme temperatures as the air rushes in the open door.
3. Improperly installed or worn gaskets.
4. Creosote build up in the chimney.

SOLUTIONS:

1. Do not burn treated or processed wood, coal, charcoal, colored paper or cardboard.
2. Be careful not to over fire the appliance by leaving the door open too long after the initial start-up.
3. Replace worn, dried out (inflexible) gaskets.
4. Have your chimney cleaned regularly.

WHAT TO DO IF A RUN-AWAY OR CHIMNEY FIRE STARTS:

1. Close the draft fully (lowest position) by shutting off thermostat, and make sure firebox is closed tightly.
2. Call the local fire department.
3. Examine the chimney, attic and roof of the house, to see if any part has become hot enough to catch fire. If necessary spray with a fire extinguisher or water from a garden hose.
4. Do not operate the appliance again until you are certain the chimney has not been damaged.

CREOSOTE FORMATION AND REMOVAL

When wood is burned slowly, it produces tar and other organic vapors which combine with expelled moisture to form creosote. These vapors condense in the relatively cooler chimney flue of a slow burning fire and when ignited, make an extremely hot fire. Check your chimney for creosote and soot regularly, until a safe frequency for cleaning is established. The chimney connector and chimney should be inspected regularly during the heating season to determine if a creosote build up has occurred. Be aware that the hotter the fire, the less creosote is deposited.

If accumulation is excessive, clean the chimney. You may want to call a professional chimney sweep to clean it. Both the chimney and the appliance have to be cleaned at least once a year or as often as necessary. Have a clearly understood plan to handle a chimney fire.

CHIMNEY MAINTENANCE

The most efficient method to sweep the chimney is using a hard brush. Brush downwards so soot and creosote residues will come off the inner surface and fall to the bottom of the chimney where they can be removed easily.

The chimney must be checked regularly and if creosote has accumulated, it must be removed without delay. Cleaning on a regular basis should be sufficient during the coldest months. **ENSURE THE BYPASS DOOR IS OPEN PRIOR TO CLEANING THE CHIMNEY SO THE SOOT AND CREOSOTE FALLS INTO THE FIREBOX.**

Chimney / Flue Inspection:

1. The chimney should be inspected regularly during the heating season.
2. If possible, the chimney should be dismantled and cleaned.
3. The chimney should be inspected for possible damage.
4. If it is in good condition, put the chimney back in place; otherwise, it must be replaced.

FIRE EXTINGUISHERS AND SMOKE DETECTORS

All homes with a solid fuel burning appliance should have at least one fire extinguisher in a central location, known to all, and at least one smoke detector in the room containing the appliance. If it sounds an alarm, correct the cause but do not de-activate or relocate the smoke detector.

ASH REMOVAL

This appliance is required to be cleaned frequently because soot, creosote and ash may accumulate. Wait until the appliance is fully cooled off before the removal of ashes. **ALWAYS REMOVE THE ASH BUCKET IMMEDIATELY AFTER FILLING**. Ashes should be removed any time they come within one inch of the door opening. It is not necessary or advisable to completely remove all of the ashes when cleaning this appliance. Wood burns best in a bed of ashes 1/2” thick. Ashes should be placed in a metal container with a tight fitting lid. The closed container of ashes should be placed on a noncombustible floor or on the ground (outside), well away from all combustible materials, pending final disposal. If the ashes are disposed of by burial in soil or otherwise locally dispersed, they should be retained in the closed container until all cinders have thoroughly cooled. Other waste shall not be placed in this container.

⚠WARNING

NEVER STORE HOT ASHES IN A GARAGE OR BASEMENT. HOT ASHES WILL GENERATE CARBON MONOXIDE AND / OR FLAMMABLE GASES. THESE GASES MAY CAUSE SUFFOCATION AND POSSIBLE DEATH.

LOADING DOOR GASKET INSPECTION

Inspect the door gasket for physical deterioration, missing sections or obvious leakage. The appliance front should make a groove in the gasket material - one side of the groove (toward the inside) will often be dark or black, and the other side (toward the outside) should be light or white. Dark smudges on the outside of the groove may indicate an air leak. If the groove is very shallow or missing, or if there is a heavy ash or creosote deposit along the bottom edge of the gasket, it may need to be replaced. Frayed or broken gasket material, or a gasket that is hard and unyielding, will also indicate need for replacement. Any time a piece of gasket is missing or is broken anywhere, the entire gasket must be replaced.

To check the gasket further, wait until the appliance is cooled and insert a piece of paper (a dollar bill will work) into the door opening and close and latch the door. Obvious resistance should be felt when pulling the paper out Repeat this check several times around the perimeter of the door.

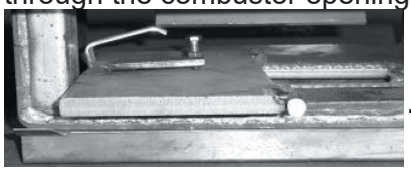
LOADING DOOR GASKET REPLACEMENT

BLAZE KING RECOMMENDS YOUR DEALER PERFORM THIS TASK

1. If the door gasket is to be replaced, be sure you have Blaze King 7/8” fiber glass gasket ready to re-install, as well as high temperature adhesive. See your Blaze King dealer.
2. Be sure the fire is out and the stove has cooled down. The door should be removed by lifting up and out, off of the hinge pins. Then lay the door flat.
3. With a pair of pliers, pull the old door gasket out of the channel and dispose of it.
4. Thoroughly clean out the channel so the new silicone adhesive will adhere and the gasket will fit smoothly.
5. Dry fit the new gasket first to ensure proper fit. Do not stretch or cut the gasket. Distribute the gasket evenly around the frame.
6. Run a small bead of a high temperature silicone adhesive along the center of the channel. **DO NOT USE HOUSEHOLD SILICONE CAULKING**. High temperature silicone may be obtained from wood stove dealer.
7. Start the new gasket in the lower right corner. Do not stretch or cut the gasket. Distribute the gasket evenly around the frame.
8. Allow the adhesive to dry before closing the loading door. The loading door tension may need to be adjusted, see “LOADING DOOR TENSION ADJUSTMENT”.
9. Check the fit of the door gasket. Insert a narrow strip of paper into the door opening and close and latch the door. Obvious resistance should be felt when pulling the paper out. Repeat this check several times around the perimeter of the door. If no resistance is felt, adjust door latch catch, see “LOADING DOOR TENSION ADJUSTMENT”.
10. A tight sealing door extends the burn times & protects the combustor.

BYPASS DOOR GASKET REPLACEMENT
BLAZE KING RECOMMENDS YOUR DEALER PERFORM THIS TASK

1. Will require THERMOSEAL® 1000SF high-temperature resistant cement and Blaze King 5/8" dense fiber glass gasket. See your Blaze King dealer. You will also require masking tape and combustor gasket as disassembly of the combustor will result in a damaged combustor gasket.
2. Be sure the fire is out and the stove has cooled down.
3. You will need to remove the liner from the collar of the stove, and have the ability to see straight down into the stove box through the collar.
4. Please follow steps on "CATALYTIC COMBUSTOR, REPLACEMENT" on how to remove your combustor.
5. After removing the combustor you will notice stainless bypass retainers on the left and right sides of the combustor opening. These tabs prevent the bypass door from popping out of its hinge holding pins during operation. Remove the stainless bypass retainers by pulling inwards. This will allow the bypass door to pop out of its hinge holding pins.
6. To remove the bypass door, move the bypass rod out of the way using the bypass handle on the side of the stove. Looking down through the collar, lift one end of the bypass door for clearance to turn inside the top assembly. Once the bypass plate is in this position, remove the plate through the combustor opening.

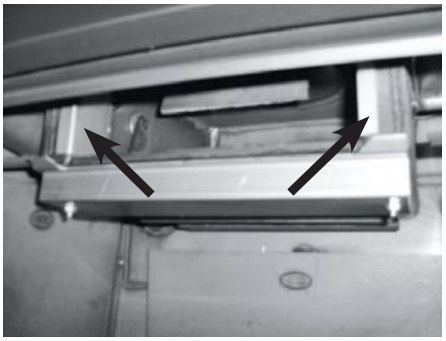


BYPASS DOOR REMOVAL THROUGH COMBUSTOR OPENING

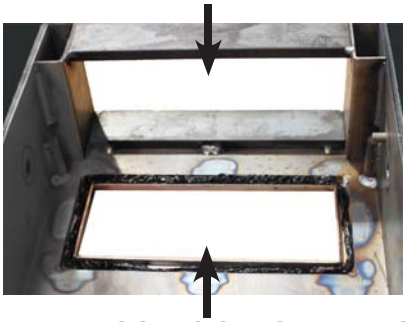
7. Remove the old gasket and apply the THERMOSEAL® 1000SF high-temperature resistant cement along the door opening edge.
8. Place the gasket along the cement, and tap it in to seat it securely in the channel.
9. Replace bypass retainers.
10. Reverse method of removing bypass door to put it back in place.
11. Prior to reconnecting the liner, you will need to adjust the bypass ramp bolt. You must first loosen the retaining nut located under the head of the adjustment bolt. Then using a 7/16" box wrench, tighten the bolt until the bypass handle, when closed, has a slight cam-over feel. Do not over tighten.
12. Secure bolt adjustment by tightening the 7/16" nut against the ramp as seen in the photo to the left. Now work the bypass handle several times to make certain the bypass operation is smooth and working properly. When you are satisfied with the operation of the bypass, please lower the venting. Important: Apply high temp anti-seize lubricant to the under side of the bypass ramp where the rod contacts.
13. Please follow steps 5-8 on pages 30 & 31 to return the combustor into place. Please note that if the gasket of the combustor is damaged, it will have to be replaced.

VIEW OF BYPASS DOOR AND CRANK THOUGH COLLAR

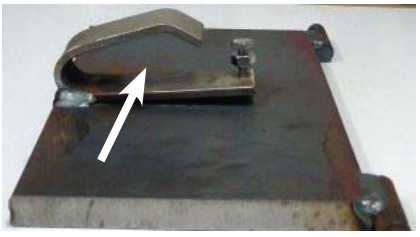
BYPASS RETAINERS



COMBUSTOR OPENING



BYPASS DOOR OPENING



APPLY LUBE TO THE UNDER SIDE OF THE BYPASS RAMP

DOOR GLASS GASKET INSPECTION

When the appliance is cold, hold the glass by placing the palm of each hand on either side of the glass. Press firmly and try to move the glass. If the glass moves the door glass retainers may need to be tightened or the door glass gasket may need to be replaced.

1. Inspect the door glass gasket. If the gasket is frayed or missing sections replace the gasket.
2. Inspect the glass retainers and ensure the screws holding the retainers in place are tight. Hand tighten plus 1/4 turn. Do not over tighten.

DOOR GLASS GASKET REPLACEMENT
BLAZE KING RECOMMENDS YOUR DEALER PERFORM THIS TASK

1. You will require Blaze King glass gasket and Blaze King door gasket. Please see your Blaze King dealer.
2. Remove the old glass gasket.
3. Starting at the corner opposite of the “Blaze King” logo, carefully wrap the gasket around the edges, pressing firmly onto the sides of the glass with the gasket centered on the edge. Finish the wrapping with a 1/2” overlap. Ensure the thickness of the gasket remains consistent and uniform.
4. Install glass with the “Blaze King” logo to the lower left corner of the door. Install the glass retainers with original fasteners. Ensure the glass is parallel to the frame and tighten the fasteners evenly.
5. Follow steps on “**LOADING DOOR GASKET REPLACEMENT”**.

DOOR GLASS, CLEANING

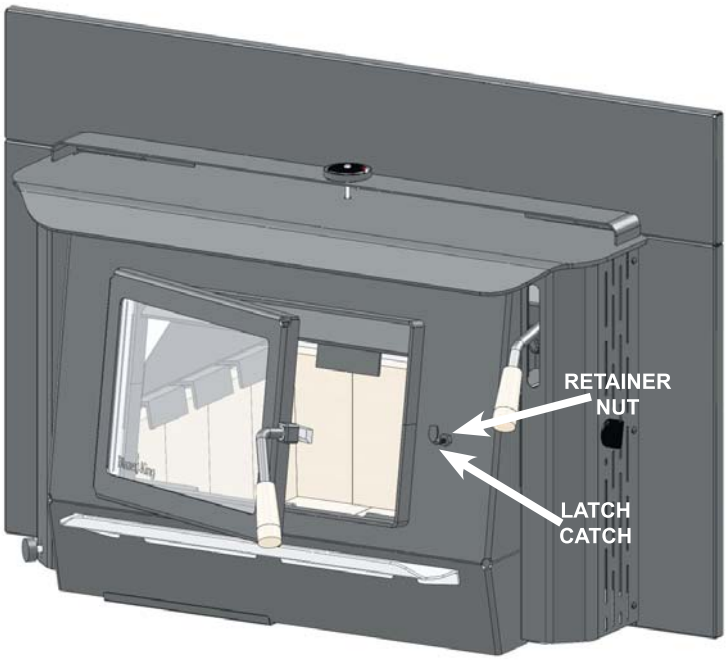
The best way to keep the glass clean is to leave the appliance on high burn for a period of time after each reloading The moisture which is driven from a new load of wood contributes much of the creosote on the inside of the glass. Removing that moisture at the beginning of the burn cycle helps to keep the glass clean. Leaving the thermostat on a higher setting for 30 minutes to an hour before turning to low for an overnight burn will also help. Heavier deposits may require hand cleaning. Manual glass cleaning should be done when the appliance and glass are cool. **DO NOT CLEAN THE GLASS WHILE IT IS HOT**. **WARNING: Do not use abrasive cleaners to clean the glass**. Use a soft cloth. After using any cleaner, thoroughly rinse the glass with water to remove any deposits left by the cleaner. Failure to remove all traces of glass cleaner will result in the glass cleaner residue baking on. This residue may be very difficult to remove.

LOADING DOOR TENSION ADJUSTMENT

To tighten the seal, use a 9/16” wrench to loosen retainer nut on the outside and tighten nut on inside firebox to move latch catch in (see figure beside). Secure retainer nut and (repeat) paper test (see “LOADING DOOR GASKET INSPECTION”.

Use penetrating oil if necessary to make turning easier.

DO NOT FORCE !!



⚠WARNING

DO NOT OPERATE THIS WOOD STOVE IF THE DOOR GASKET IS MISSING OR DAMAGED DANGEROUS OVER FIRING CAN OCCUR WHICH CAN DAMAGE THE APPLIANCE OR IGNITE CREOSOTE IN THE CHIMNEY, POSSIBLY CAUSING A HOUSE FIRE. IF ANY PART OF THE WOODSTOVE OR FLUE SYSTEM IS GLOWING THE STOVE IS BEING OVER FIRED.

FAN ASSEMBLY
Routine maintenance of the fan assembly on the side of the stove is not required. However, should it become necessary to replace an individual fan or rheostat, contact your local dealer.

THERMOMETER
The combustor thermometer tells you what was happening 4-8 minutes ago, and remember, it is only an indication of the temperatures of the gasses after they pass through the combustor. The thermometer probe, the part that fits into the stove, must be cleaned at least once a year. Lift it from the stove (be careful, it may be hot) and wipe or scrape it clean. At room temperature, away from the stove, the indicator should point near the bottom of the “Inactive” zone. If, after several years use, you find that the needle no longer points to the bottom of the “Inactive” zone when the thermometer has been at room temperature for 10 minutes or longer, it may need adjustment. Holding the probe with a pair of pliers, loosen the bolt on the top of the dial. Turn the dial to align the pointer with the bottom of the “Inactive” zone, then retighten the bolt.
NOTE: IF YOUR BLAZE KING IS EQUIPPED WITH FANS, TURN OFF FANS AND WAIT 10 MINUTES PRIOR TO READING CATALYTIC THERMOMETER INDICATOR. AIR MOVEMENT ACROSS THE TOP OF THE STOVE MAY PROVIDE FALSE READING.

THERMOSTAT
This wood heater thermostat has a manufacturer-set minimum low burn rate that must not be altered. It is against federal regulations to alter this setting or otherwise operate this wood heater in a manner inconsistent with operating instructions in this manual. If the thermostat malfunctions contact your dealer for replacement by a qualified installer.

Your Blaze King is designed to allow a wide selection of heat output levels. If you begin to lose control of the amount of heat the stove is emitting, determine the cause early so that major problems may be avoided.
The six major needs of a well-controlled fire are:

1. Knowledgeable operator.
2. Adequate air supply.
3. Firewood of good quality and proper size.
4. Catalytic combustor in good condition.
5. Clean chimney, properly sized and installed.
6. Door gasket tight and firm.

Considering all of the above, number one is the most important for safe and efficient operation of any woodstove. Please study the operation instructions carefully. Consult your BLAZE KING dealer or call the Customer Service Department at Blaze King in the U.S.A. at 509-522-2730 or in Canada at 250-493-7444 if you have any questions not answered in this manual.

All of the six above mentioned needs are interrelated. A deficiency in any one will affect all of the others. If you encounter a problem, determine the source of the problem and then follow-up by checking the other needs as possible contributing factors.

PROBLEM: Chimney Fire	
CAUSE Act immediately regardless of cause	**SOLUTION** Turn the thermostat to lowest setting, check loading door to be sure it is tightly closed. **Call Fire Department.**
After the fire is out, have your chimney and flue connector inspected by a certified chimney sweep. A damaged masonry chimney should be repaired or rebuilt. A prefabricated chimney (factory built) that is damaged should be replaced. Any damage to the flue connector should be corrected before the system is used again. Possible causes of a chimney fire, and remedies for those causes, can be found further in this section: “Excessive Creosote Formation”, and “Spots of Creosote Accumulation in Chimney or Flue Connector”.	

PROBLEM: Not enough heat.	
CAUSE Green or wet wood. Not enough fuel in stove.	**SOLUTION** Use seasoned wood. Don’t be afraid to FULLY load the stove. A FULL load of wood won’t burn any hotter than the thermostat is set.
Obstruction in chimney or cap screen. Combustor plugged or coated.	Remove obstruction. See “COMBUSTOR, TESTING” See “COMBUSTOR, CLEANING”
Combustor not functioning.	See “COMBUSTOR, TESTING”. If needed, replace combustor, See”“COMBUSTOR, REPLACING”.
Thermostat set too low.	Raise thermostat setting.
Thermostat not operating properly.	Consult your Blaze King dealer.
Poor draft caused by an oversize flue	Measure draft with Manometer. See “CHIMNEY DRAFTS” Consult your Blaze King dealer or a chimney sweep.
Strong, gusting winds causing downdraft in chimney	Install wind-resistant chimney cap. Directional caps may not stay freely rotating. If you have a directional cap, check it frequently.
Tightly sealed house, inadequate air supply.	Slightly open a window, near the stove or install an outside air kit.
Reloading too much wood on top of too few coals.	Allow a larger bed of coals to build up.

PROBLEM: Too much heat.	
CAUSE By-Pass door left open.	**SOLUTION** Close the by-pass door.
Thermostat set too high.	Lower thermostat setting.
Loading door gasket leaking, admitting excess air into firebox.	Replace door gasket and/or adjust door. See “GASKET INSPECTION”
Excessive draft in the chimney.	Measure draft with a Manometer. See “DRAFTS”. Consult your Blaze King dealer or a chimney sweep. Install a cap.
Thermostat not operating properly.	Consult your Blaze King dealer.
Wood is too small.	Use larger pieces.

PROBLEM: One or both fans will not run, or there is no adjustment for fan speed.	
CAUSE Fans mounted improperly.	**SOLUTION** Check that fan blade’s not touch edges of hole.
Fan speed control.	Consult your Blaze King dealer for replacement.

PROBLEM: Fans minimum speed too fast or maximum speed too slow.	
CAUSE Fan speed control out of adjustment.	**SOLUTION** Consult your Blaze King Dealer.

PROBLEM: Excessive creosote formation in chimney and chimney Connector.	
CAUSE By-pass door left open.	**SOLUTION** Close by-pass door.
By-pass door not sealing tightly.	Inspect by-pass door and seal for warping. Ash or creosote buildup may occur on door or seat. With stove cold scrape and vacuum area around by-pass. Be sure all mating steel surfaces are clean and smooth.
Improper operation.	Check thermostat setting and operating procedures. See “THERMOSTAT & OPTIMAL THERMOSTAT SETTING”
Wood too green or wet.	Use seasoned wood. Use a moisture meter to confirm.
Catalytic combustor not operating properly.	Inspect the combustor. See “CATALYTIC COMBUSTOR, TESTING”
Poor draft caused by an oversize or short flue, etc.	Measure draft with Manometer. See “DRAFTS”. Consult your Blaze King dealer or a chimney sweep.
Chimney too cold or poorly insulated.	Upgrade chimney system. Consult your Blaze King dealer or a chimney sweep.

PROBLEM: Catalytic combustor thermometer (on top of stove) does not go into "Active" zone, or does not stay there for long. (Fans must be in “off” position for 10 minutes prior to checking)	
CAUSE Improper operation.	**SOLUTION** Check thermostat setting and operating procedures. See “THERMOSTAT & OPTIMAL THERMOSTAT SETTING”
Obstruction in chimney or cap.	Clean chimney, remove obstructions.
Faulty combustor thermometer.	Replace thermometer and Recheck combustor operating Temperature.
Wood too green or wet.	Use seasoned wood.

Combustor plugged or coated.	Clean combustor. See “CATALYTIC COMBUSTOR TESTING”
Combustor not functioning.	Check and test combustor. If needed replace combustor. See “CATALYTIC COMBUSTOR, REPLACING”
Thermostat not operating properly.	Consult your blaze King Dealer.
By-pass door leaking or not closing completely.	Inspect and clean area around by-pass doors. Adjust or replace gasket if necessary. Consult your Blaze King Dealer.

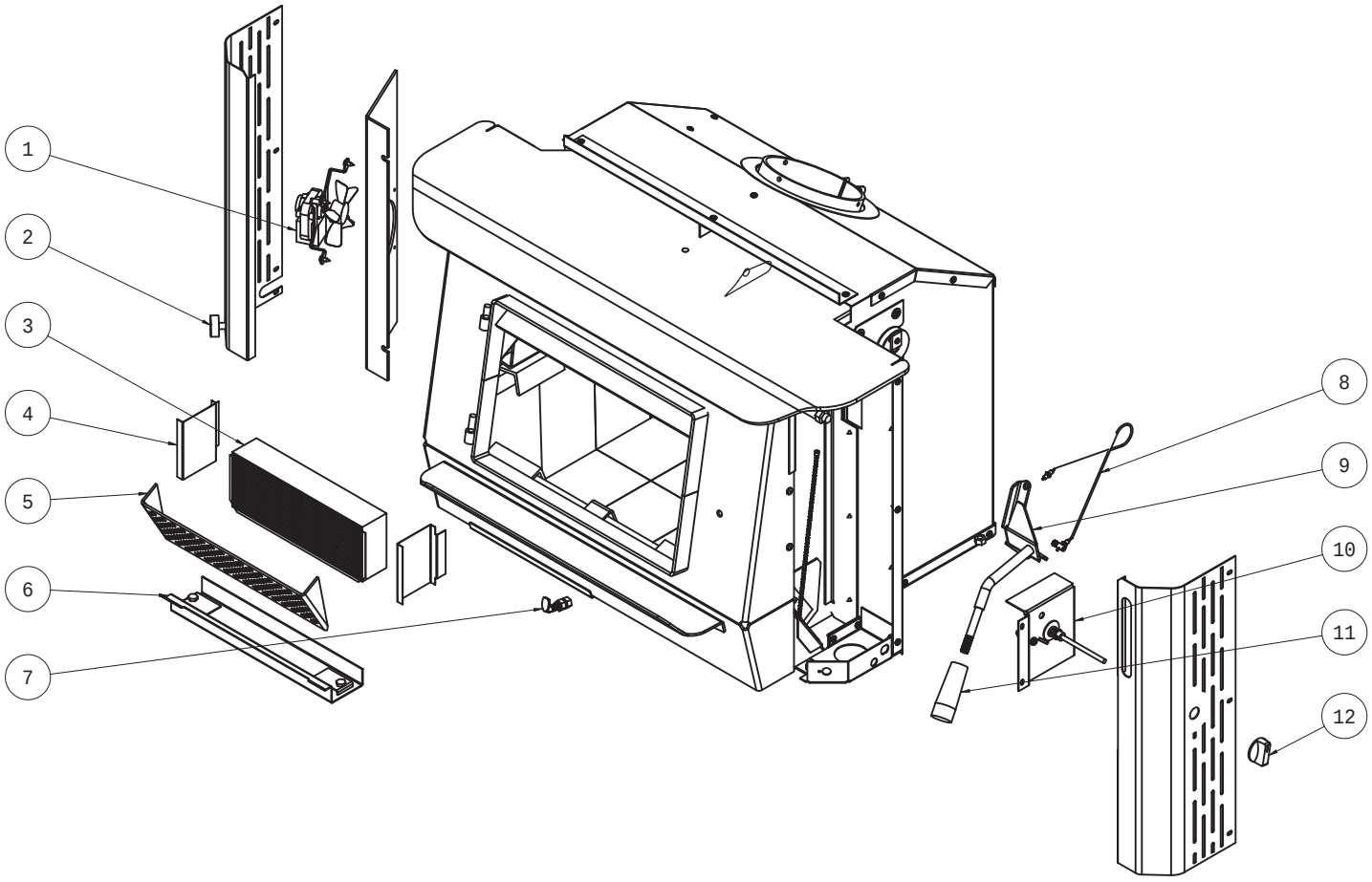
PROBLEM: Spots of creosote accumulation in chimney or chimney connector.	
CAUSE Air leaks in chimney or chimney connector.	**SOLUTION** Inspect chimney and / or chimney connector. Repair or replace as necessary. Check to be sure that the chimney connector is installed correctly.
CAUTION: a leaking chimney connector is a fire hazard and demands immediate attention.	
Poor draft caused by an oversize flue, single wall pipe, to many elbows, etc.	Measure draft with Manometer. See “DRAFTS”. Consult your Blaze King dealer or a chimney sweep.

PROBLEM: Door glass quickly becomes coated with creosote.	
CAUSE Low thermostat setting or lowering the thermostat setting too far, too quickly.	**SOLUTION** Turn the thermostat to the warmest setting during the first 20-30 minutes or until the fire is well established after each reloading.
Poor draft caused by an oversize or short flue, etc.	Measure draft with Manometer. See “DRAFTS”. Consult your Blaze King dealer or a chimney sweep.
Obstruction in chimney or cap screen.	Remove obstruction. Clean chimney and/or cap screen.
Strong, gusting winds causing downdraft in chimney.	Install wind-resistant chimney cap.
Tightly sealed house, inadequate air supply.	Open a window, slightly, near the stove.
Burning poorly seasoned wet wood, or wood with high pitch content.	Use seasoned wood with low pitch content, such as some types of pine.

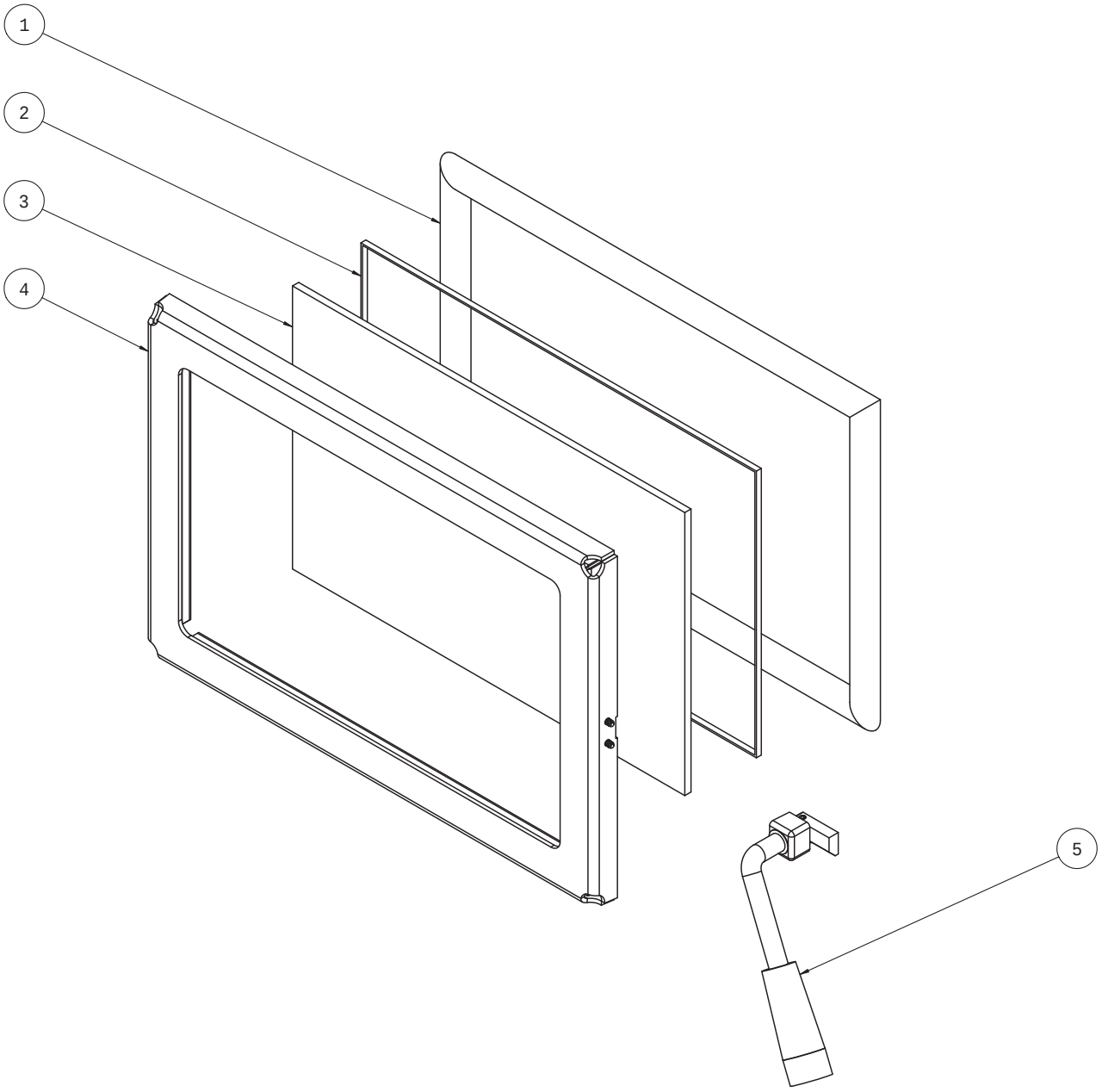
PROBLEM: The combustor temperature cannot be controlled. Turning the thermostat down often makes the combustor temperature go up.
CAUSE Turning the thermostat down, particularly in the first half of the burn cycle, causes the fire to emit more smoke, which is fuel for the combustor. The combustor temperature therefore climbs for up to several hours. This is normal, and is of no concern. As long as only the combustor temperature is elevated, there is nothing to worry about.

PROBLEM: Smoke spills from door opening when loading fuel	
CAUSE Spark arrestor screen on cap plugged.	**SOLUTION** Clean spark arrestor screen to bare metal wire.
Chimney too cold.	Make certain double wall stove pipe is used in installation.
Not enough vertical rise.	Make certain a minimum vertical rise of 36” is observed prior to elbows. Use two 45 elbows instead of 90 elbow.
Chimney not drafting.	Turn thermostat to highest setting, open bypass, leave loading door closed and wait 5-10 minutes to increase chimney or flue temperature.

REPLACEMENT PARTS

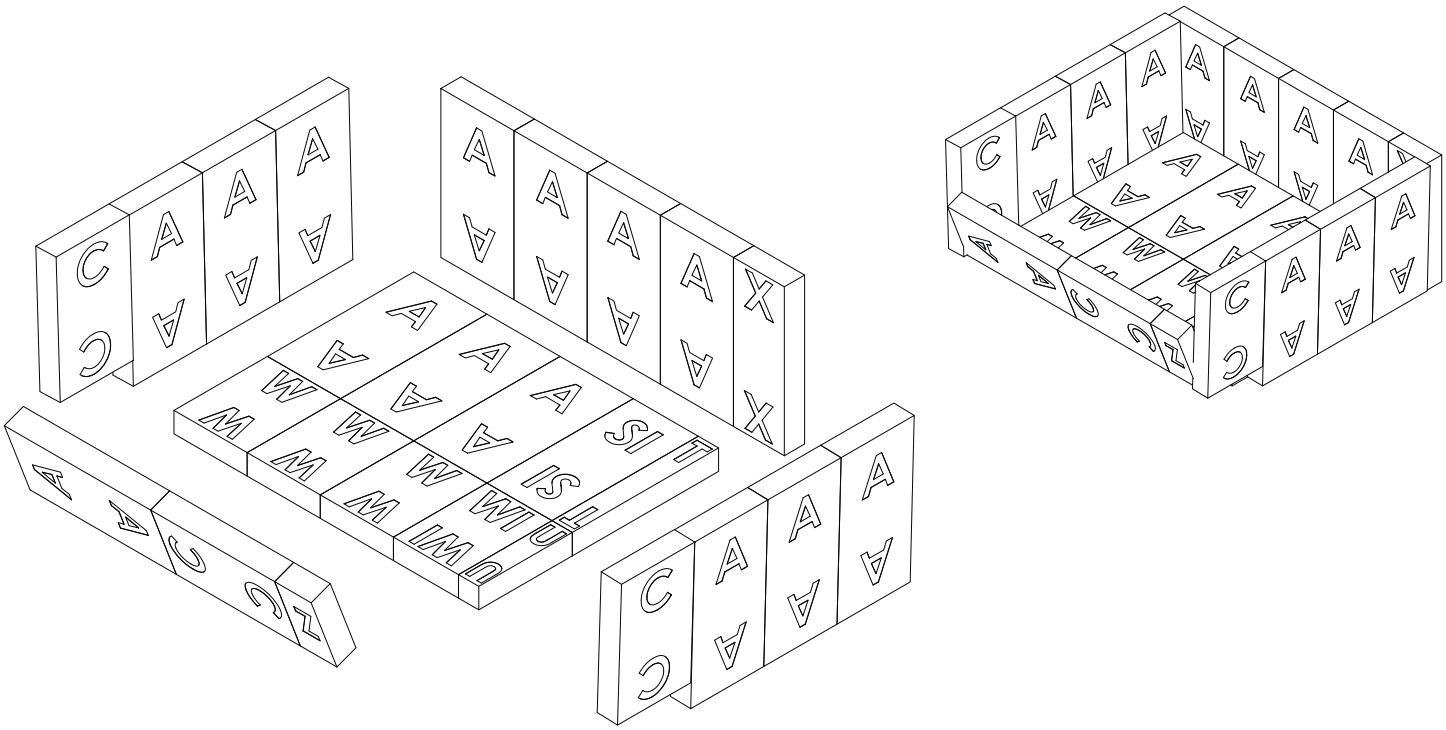


No. exploded view	Part #	Description	QTY
1	150-0175-C	Axial spider mount fan	1
2	220-0137	Rheostat with Off switch	1
3	155-Z0444	PE 2020 ceramic combustor assembly	1
4	S.Z4498	Replacement bypass retainers	1
5	4687.1	PI Flame sheld wing	1
6	S.Z4551	Dome guard replacement kit	1
7	S.0693	Latch catch	1
8	S.Z0053	PI bypass cable repair kit	1
9	S.Z4625	PI29 bypass lever assembly	1
10	Z4THERM	PI thermostat	1
11	220-2821-M	Handle wood hard maple	1
12	220-0102	Knob black 1.5dx.75 high	1



No. exploded view	Part #	Description	QTY
1	155-0186	Gasket 7/8” round black-6ft	1
2	155-0254-AS	Gasket 1/8 x 3/4 W/PSA Spec-6ft	1
3	130-0246	Class ceramic 5mm PE	1
4	S.Z4786.BK	Door complete	1
5	Z5785.1	Door handle assembly PE32/PI29	1

Brick Layout



ITEM NO.	PART NUMBER	QTY.
1	A Size Brick	14
2	C Size Brick	3
3	SI Size Brick	1
4	T Size Brick	1
5	U Size Brick	1
6	W Size Brick	3
7	WI Size Brick	1
8	X Size Brick	1
9	Z Size Brick	1

BLAZE KING WOOD LIMITED WARRANTY

Blaze King and Valley Comfort's respective brands extend the following warranty for wood fired appliances purchased from an authorized Blaze King / Valley Comfort dealer and installed in the United States of America or Canada. Warranty starts with date of purchase by the original owner (End User) except as noted for replacement parts.

Warranty Period		Components Covered	
Parts	Labor	Wood	
1 Year		X	All parts, materials and surface finishes (flaking and peeling) Subject to Conditions, Exclusion, and Limitations listed.
2 Years		X	Fan assemblies and motors, thermal sensors, catalytic thermometer, bi-metallic thermostat assembly, door handle metal components.
5 Years	2 Years	X	Firebox & Heat Exchanger, Bypass Door Steel Components
6 Years		X	Catalyst Combustor (see Conditions, Exclusions, and Limitations)
1 Year		X	Other Replacement Parts
See Conditions, Exclusions, and Limitations			

Blaze King Wood Limited 5 Year Warranty

Blaze King is the manufacturer of the Blaze King line of heating products. At Blaze King, our commitment to the highest level of quality and customer service is the most important thing we do. Each Blaze King stove is built on a tradition of using only the finest materials and is backed by our limited warranty to the original purchaser. With Blaze King, you're not just buying a stove; you're buying a company with years of unequalled performance and quality.

Limited Six (6) Year Warranty:
The CATALYTIC COMBUSTOR is under warranty by Blaze King for six (6) years from the date of original retail purchase. The purchaser shall pay the following share of the then current retail price for the combustor: The first three (3) years no charge, 4th year 60%; 5th year 70%, 6th year 80%. The Combustor must be returned to your dealer along with a completed COMBUSTOR FAILURE REPORT and original proof of purchase document.

Limited (5) Year Warranty:
Under this warranty, Blaze King covers the stove body and accessories against defects in materials and workmanship, for part repair or replacement for the first five (5) years *** to the original purchaser. This Warranty covers: All Steel firebox components against defects in material and workmanship. Please see the exclusions and limitation section below as certain restrictions and exclusions apply this warranty.

Limited Two (2) Year Warranty:
Under this warranty, Blaze King covers, fan assemblies , modular thermostat and door handle steel components against defects in materials and workmanship, for part repair or replacement and limited labor for the first two (2) years to the original purchaser. Please see the exclusions and limitation section below as certain restrictions and exclusions apply to this warranty.

Limited One (1) Year Warranty:
Under this warranty, Blaze King covers all parts and materials against defects in materials and workmanship including exterior paint finishes, for part repair or replacement and limited labor for the first year to the original purchaser. Please see the exclusions and limitation section below as certain restrictions and exclusions apply to this warranty.

How the Warranty Works

1. All warranties by the manufacturer are set herein and no claim shall be made against the manufacturer on any oral warranty or representation. All claims under this Limited Warranty must be made in writing by your dealer.
2. Any stove or part thereof that is repaired or replaced during the Limited Warranty period will be warranted under the terms of the Limited Warranty for a period not exceeding the remaining term of the original Limited Warranty or six (6) months, whichever is longer.
3. For any part or parts of this stove, which in our judgment show evidence of defects, Blaze King reserves the option to repair or to replace the defective part(s) through an accredited distributor or agent, provided the defective part is returned to the distributor or agent, transportation prepaid, if requested.
4. If you discover a problem that you think may be covered by the Limited Warranty, you MUST REPORT it to your Blaze King dealer WITHIN 30 DAYS from the date the problem was first detected, giving them proof of purchase and the date of purchase. The dealer will investigate the problem and work with Blaze King to determine whether the problem:
   a) Is covered by the Limited Warranty or
   b) Can be fixed in your home or does the product need to be returned to Blaze King for repair.
5. If Blaze King determines that the stove needs to be returned to Blaze King for repair, the customer has the responsibility and the expense of removing it from their home and shipping it to Blaze King. If the problem is covered by the Warranty, Blaze King will repair or replace the item at their discretion and the customer will be responsible for return shipping and re-installation in their home.
6. If the problem is not covered by the Limited Warranty, the customer will be responsible for all repair costs, as well as all storage, shipping and the cost of removing and re-installing the stove.
   If you are not satisfied with the service provided by the Blaze King dealer, write to Blaze King at the address listed on the last page of the Owner's Manual. Include a copy of the original purchase invoice and a description of the problem.

Exclusions and Limitations:

1. This Warranty does not cover tarnish, discoloration or wear on the plated surfaces Painted finishes will change color after initial firing and will continue to change through the lifetime of the stove. This is normal occurrence for all high temperature coatings.
2. This Warranty does not cover gasket material or firebrick.
3. Blaze King strongly recommends installation by a certified installer. Failure to comply may adversely affect coverage under the terms of this warranty. This Limited Warranty covers defects in materials and workmanship only if the product has been installed in accordance with local building and fire codes; in their absence refer to the owner's manual. If the product is damaged or broken as a result of any alteration, wilful abuse, mishandling, accident, neglect, or misuse of the product, the Limited Warranty does not apply.
4. The stove must be operated and maintained at all times in accordance with the instructions in the Owner's Manual. If the unit shows signs of neglect or misuse, it is not covered under the terms of this Warranty policy. Performance problems due to operator error will not be covered by the Limited Warranty policy.
   Some minor expansion, contraction, or movement of certain parts and resulting noise, is normal and not a defect and, therefore, is not covered under this Limited Warranty.
5. Misuse includes over-firing. Over-firing can be identified later by warped plates and paint pigment being burnt off. Over-firing this appliance can cause serious damage and will nullify the Limited Warranty.
6. The Limited Warranty will cover glass thermal breakage only and will not cover misuse of the stove glass, including but not limited to:
   a) Glass that is struck, has surface contaminates or has had harsh or abrasive cleaners used on it.
   b) If the door is slammed or is closed while wood in the firebox is protruding out the stove opening thus striking the glass.
7. This warranty does not cover products made or provided by other manufacturers and used in conjunction with the operation of this stove without prior authorization from Blaze King The use of such products may nullify the Limited Warranty on this stove. If unsure as to the extent of this Limited Warranty, contact your authorized Blaze King dealer before installation.
8. Blaze King will not be responsible for inadequate performance caused by environmental conditions.
9. The Limited Warranty does not cover installation and operational related problems such as use of downdrafts or spillage caused by environmental conditions. Environmental conditions include but are not limited to nearby trees, buildings, roof tops, wind, hills, mountains, inadequate venting or ventilation, excessive offsets, negative air pressures or other influences caused by mechanical systems such as furnaces, fans, clothes dryers etc.
10. The Limited Warranty does not cover damage caused by burning salt-saturated wood, corrosive driftwood, chemically treated wood or any fuel not recommended in the Owner's Manual (use cord wood only).
11. The Limited Warranty is void if:
    a) The stove has been operated in atmospheres contaminated by chlorine, fluorine or other damaging chemicals.
    b) The stove is subject to submersion in water or prolonged periods of dampness or condensation.
    c) Any damage to the unit, combustion chamber or other components due to water, or weather damage which is the result of, but not limited to, improper chimney/venting installation.
    d) Salt air in coastal areas or high humidity can be corrosive to the finish; these environmental conditions can cause rusting. Damage caused by salt air or high humidity is not covered by the Limited Warranty.
12. Exclusions to the Limited Warranty include: injury, loss of use, damage, failure to function due to accident, negligence, misuse, improper installation, alteration or adjustment of the manufacturer's settings of components, lack of proper and regular maintenance, alteration, or act of God.
13. The Limited Warranty does not cover damage caused to the stove while in transit. If this occurs, do not operate the stove and contact your courier and/or dealer.
14. The Limited Warranty does not extend to or include paint, door or glass gaskets or firebricks damage caused by normal wear and tear, such as paint discoloration or chipping, worn or torn gaskets, chipped or cracked firebrick, etc.
15. The Limited Warranty does not include damage to the unit caused by abuse, improper installation, or modification of the unit.
16. Damage to plated surfaces caused by fingerprints, scratches, melted items, or other external scores and residues left on the plated surfaces from the use of abrasive cleaners or polishes is not covered in this warranty.

17. Blaze King is free of liability for any damages caused by the stove, as well as inconvenience expenses and materials. The Limited Warranty does not cover incidental or consequential damages.
18. The Limited Warranty does not cover any loss or damage incurred by the use or removal of any component or apparatus to or from the Blaze King stove without the express written permission of Blaze King and bearing a Blaze King label of approval.
19. Any statement or representation of Blaze King Products and their performance contained in Blaze King advertising, packaging literature, or printed material is not part of the Limited Warranty.
20. The Limited Warranty is automatically voided if the stove's serial number has been removed or altered in any way. If the stove is used for commercial purposes, it is excluded from the Limited Warranty.
21. No dealer, distributor, or similar person has the authority to represent or warrant Blaze King Products beyond the terms contained within the Limited Warranty. Blaze King assumes no liability for such warranties or representations.
22. Blaze King will not cover the cost of the removal or re-installation of the stove, hearth, facing, mantels, venting or other components.
23. Labor to replace or repair items under this Limited Warranty will be covered per our warranty service fee reimbursement and labor rates are set per component schedule. Labor rates vary from location to location and as such total labor costs may not be covered. Please consult with your dealer or service technician for any additional charges such as travel time or additional labor charges that may apply.
24. For parts of the Blaze King woodstove or fireplace insert warranted beyond the first year, the five year limited warranty will have the same obligations as described in this document, provided, however that the purchaser shall pay the following percentage of the then current retail cost of the repair or the replacement, according to the year after purchase in the which the defect is brought to the attention of Blaze King.*** During the 2nd year----purchaser pays 20%. 3rd year ----purchaser pays 40%. 4th year -----purchaser pays 60%. 5th year---- purchaser pays 80%.
25. If a defect or problem is determined by Blaze King to be non warrantable, Blaze King is not liable for travel costs for service work. In the event of in-home repair work, the customer will pay any in-home travel fees or service charges required by the Authorized Dealer.
26. At no time will Blaze King be liable for any consequential damages which exceed the purchase price of the unit. Blaze King has no obligation to enhance or modify any stove once manufactured (example: as a stove model evolves, field modifications or upgrades will not be performed).
27. This Limited Warranty is applicable only to the original purchaser and it is nontransferable.
28. This warranty only covers Blaze King Products that are purchased through an authorized Blaze King dealer.
29. If for any reason any section of the Limited Warranty is declared invalid, the balance of the warranty remains in effect and all other clauses shall remain in effect.
30. The Limited Warranty is the only warranty supplied by Blaze King, the manufacturer of the stove. All other warranties, whether express or implied, are hereby expressly disclaimed and the purchaser's recourse is expressly limited to the Limited Warranty.
31. Blaze King and its employees or representatives will not assume any liability for damages, either directly or indirectly, caused by improper usage, operation, installation, servicing or maintenance of this stove.
32. Blaze King reserves the right to make changes without notice. Please complete and mail the warranty registration card and have the installer fill in the installation data sheet in the back of the manual for warranty and future reference.
33. Blaze King is responsible for stocking parts for a maximum of seven (7) years after discontinuing the manufacture or incorporation of the item into its products. An exception to this would be if an OEM supplier is not able to supply a part.

NOTES

NOTES

NOTES

INSTALLER NOTES

Installer: Please complete the following information

Dealer Name & Address:_____

_____

Installer (print): _____

Installer (sign): _____

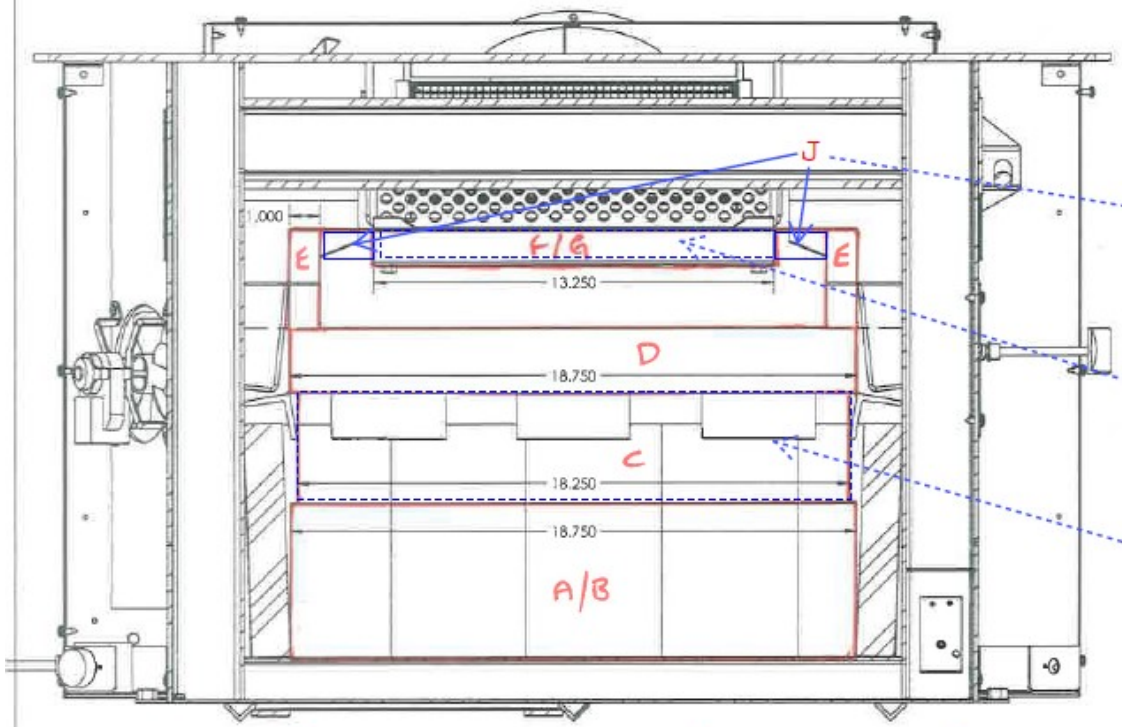
Phone #: _____

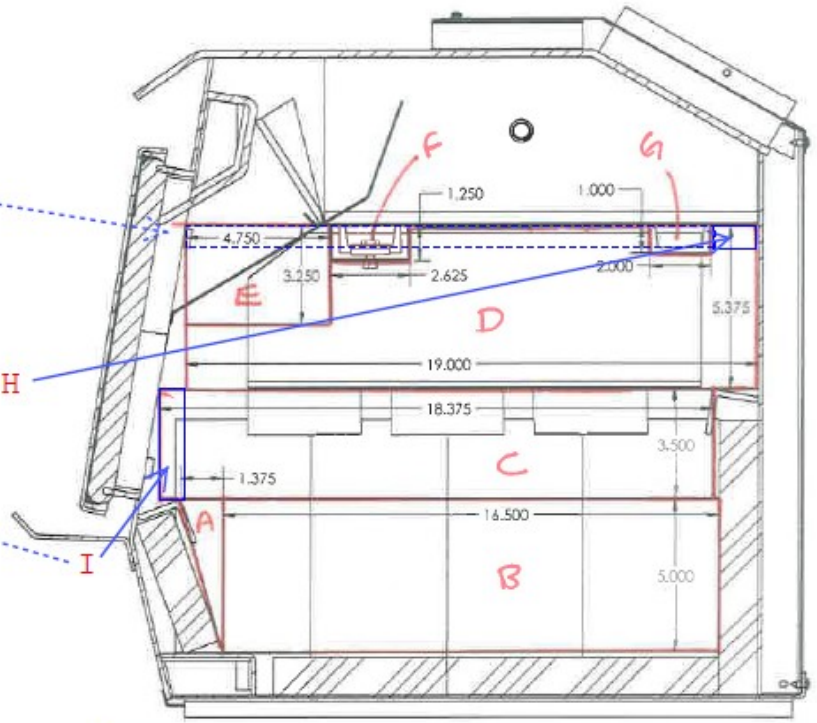
Date Installed:_____

Serial No.: _____

Appendix B

Firebox Volume Calculation





A = (1.375" x 5")/2 = 3.4375 in^2 x 18.75" = 64.453125 in^3

B = 16.5" x 5" = 82.5 in^2 x 18.75" = 1546.875 in^3

C = 18.375" x 3.5" = 64.3126 in^2 x 18.25" = 1173.703125 in^3

D = 19" x 5.375" = 102.125 in^2 x 18.75" = 1914.84375 in^3

E = 4.75" x 3.25" = 15.4375 in^2 x 1" = 15.4375 in^3

F = 2.625" x 1.25" = 3.28125 in^2 x 13.25" = 43.47656625 in^3

G = 2" x 1" = 2 in^2 x 13.25" = 26.5 in^3

VOLUME = A+B+C+D-E-E-F-G

= 4599.0234375 in^3

```
H = 1*18.75*1.125 = 21.09 in^3
I = 1[?]*18.25*3.5 = 63.875 in^3
J = 1.75*18*1 x 2 = 63 in^3
  = 4599.02 - 147.97 in^3 = 2.57 ft^3
```

Valley Comfort Systems Inc 1290 Commercial way Penticton, BC V2A 3H5			
Part Name			Part Number
PI29 Firebox Volume Calc			
Date	Rev Date	Model	
Nov 7 17	??	PI29	
Drawn By	QTY Per	Material	Thickness
AR	1		
WEIGHT:			
PUNCH BLANK SIZE:			
LASER BLANK SIZE:			

All Dimensions in Inches			
Tolerance			
General	Hole Size	Hole Pos	Angles
+/- 0.03	+/- 0.005	+/- 0.03	+/- 0.5

Appendix C

Revision History

Date	Project No.	Tech. & Evaluator	Report Sect.	Summary of Changes
04/20/2018	0142WN019E	Aaron Kravitz Ken Morgan	All	Original report was generated.
11/02/2022	0142WN019E (Edition 001)	Riley Tiegs Ken Morgan	B	Revision History Appendix created
			1	Edited validity of Individual Test Run summaries (pg 6)
			1	Added dilution tunnel schematic pg 17
			1	Uncorrected Emission Values included in Table 1
			3	Included data for each test run with Train Precision pg 36, 58, 85, 102
			3	Uncorrected Emission results added for Run 2 pg 59
			1	B415 statement modified Pg 5
02/27/2023	0142WN019E (Edition 002)	Riley Tiegs Ken Morgan	Appendix B & C	Revision history was moved to (New) Appendix C, Appendix B changed to firebox volume calculation