Fireplace Products International, Ltd.

Project # 18-414
Model: F2500
Type: Catalytic Wood-Fired Room Heater
July 16, 2018
Revised: July 7, 2021
February 16, 2022

ASTM E3053 Standard Test Method for Determining Particulate Matter Emissions from Wood Heaters Using Cordwood Test Fuel (EPA ALT-125)

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Revision Summary

Date: 7/16/2018 – Original Issue

Date: 7/7/2021 – The following revisions were made per EPA request:

-The manufacturer's written test instructions were added to Appendix A, see page 26 of Non-CBI report.

-The owner's manual in Appendix B was updated to provided further detail on proper operation and air settings, see owner's manual page 25, page 247 of Non-CBI report.

-Added statement in foot note in Settings & Run Notes section clarifying low burn test setting is the lowest achievable setting, see page 10.

-Added a drawing of the firebox to main body of the test report, see page 12.

Date: 2/16/2022 – The following revisions were made per EPA request:

-Sample calculations were added to Appendix A, see page 186 of Non-CBI report.

-The "Test Run Narrative" section was edited to clarify that test run 3 was appropriate and valid, see page 9.

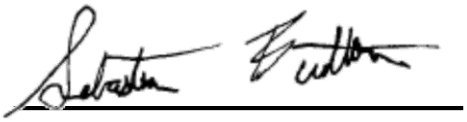
Contents

Affidavit

PFS-TECO was contracted by Fireplace Products International Ltd. (FPI) to provide testing services for the F2500 Catalytic Wood-Fired Room Heater per ASTM E3053, *Standard Test Method for Determining Particulate Matter Emissions from Wood Heaters Using Cordwood Test Fuel*, which was approved for use under EPA ALT-125. All testing and associated procedures were conducted at PFS-TECO's Portland Laboratory beginning on 6/25/2018 and ending on 6/27/2018. PFS-TECO's Portland Laboratory is located at 11785 SE Highway 212 – Suite 305, Clackamas, Oregon 97015. Testing procedures followed ASTM E3053 with the exception of caveats described in EPA ALT-125. Particulate sampling was performed per ASTM E2515, *Standard Test Method for Determination of Particulate Matter Emissions Collected by a Dilution Tunnel,* with the exception of caveats described in EPA ALT-125.

PFS-TECO is accredited by the U.S. Environmental Protection Agency for the certification and auditing of wood heaters pursuant to subpart AAA of 40 CFR Part 60, New Source Performance Standards for Residential Wood Heaters and subpart QQQQ of 40 CFR Part 60, Standards of Performance for New Hydronic Heaters and Forced Air Furnaces, Methods 28R, 28WHH, 28 WHH-PTS, and all methods listed in Sections 60.534 and 60.5476. PFS-TECO holds EPA Accreditation Certificate Numbers 4 and 4M (mobile). PFS-TECO is accredited by IAS to ISO 17020:2012 "Criteria for Bodies Performing Inspections, By A2LA to ISO 17025:2005 "Requirements for Testing Laboratories", and by Standards Council of Canada to ISO 17065:2012 "Requirements for Bodies Operating Product Certification Systems".

The following people were associated with the testing, analysis and report writing associated with this project.



Sebastian Button, Laboratory Supervisor

Introduction

FPI-Regency Fireplaces Products of Delta, BC, contracted with PFS-TECO to perform EPA certification testing on F2500 Catalytic Wood-Fired Room Heater. All testing was performed at PFS-TECO's Portland Laboratory. Testing was performed by Mr. Sebastian Button.

Notes

- Prior to start of testing, 50 hours of conditioning was performed by the manufacturer at a medium air setting, per ASTM E3053.
- Prior to start of testing, the dilution tunnel was cleaned with a steel brush.
- Front filters were changed on sample train A at one hour for all 3 test runs.
- A total of 3 test runs were performed in accordance with ASTM E3053, no anomalies occurred, no additional tests performed, see Run Narrative section for further detail on each run.

Wood Heater Identification and Testing

- Appliance Tested: ***F2500***
- Serial Number: ***Un-serialized Prototype – PFS Tracking Number 003***
- Manufacturer*:* ***FPI-Regency Fireplace Products***
- Catalyst: ***Yes***
- Heat exchange blower: ***Optional***
- Type: ***Wood Stove***
- Style: ***Free Standing***
- Date Received: ***Thursday, June 21, 2018***
- Wood Heater Aging: ***June 1, 2018 - June 18, 2018***
- Testing Period – Start: ***Monday, June 25, 2018*** Finish: ***Wednesday, June 27, 2018***
- Test Location: ***PFS-TECO Portland Laboratory, 11785 SE HWY 212 - Suite 305, Clackamas, OR 97015***
- Elevation: ***≈131 Feet above sea level***
- Test Technician(s): ***Sebastian Button***
- Observers: ***Dave Lal and Radu Costei of FPI.***

Test Procedures and Equipment

All Sampling and analytical procedures were performed by Sebastian Button. All procedures used are directly from ASTM E3053 and ASTM E2515. See the list below for equipment used. See Appendix C submitted with this report for calibration data.

Equipment List:

Equipment ID#	Equipment Description
041	Rice Lake 3'x3' floor scale w/digital weight indicator
050	Digiweigh DWP12i Platform Scale
053	APEX XC-60 Digital Emissions Sampling Box A
054	APEX XC-60 Digital Emissions Sampling Box B
055	APEX Ambient sampling box
057	California Analytical ZRE CO2/CO/O2 IR ANALYZER
109A/B	Troemner 100mg/200mg Audit Weights
107	Sartorius Analytical Balance
051	10 lb audit weight
090	Dewalt Tape Measure
092	Digital Calipers
095	Anemometer
111	Microtector
CC144992	Gas Analyzer Calibration Span Gas
CC332147	Gas Analyzer Calibration Mid Gas

Results

The weighted average emissions rate for the 3 run test series was measured to be **1.0 g/hr** with a Higher Heating Value efficiency of **76.0%.** The average CO emission rate for the 3 tests was **0.48 g/min.** The FPI F2500 Catalytic Wood-Fired Room Heater meets the 2020 cordwood PM emission standard of ≤ 2.5 g/hr per CFR 40 part 60, §60.532 (c).

Detailed individual run data can be found in Appendix A submitted with this report.

Summary Table

	High Fire Test	Low Fire Test	Medium Fire Test
Date	6/25/18	6/26/18	6/27/18
Run Number	1	2	3
PM Emission Rate (g/hr)	2.82	0.67	0.50
Burn Rate (kg/hr)	3.50	1.04	1.16
Heat Output (BTU/hr)	50,349	14,944	16,746
HHV Efficiency (%)	74.3	76.3	76.6
LHV Efficiency (%)	79.5	81.6	81.9
CO Emissions (g/MJ output)	0.47	2.83	0.99
CO Emissions (g/kg dry fuel)	6.98	43.12	15.06
CO Emissions (g/min)	0.42	0.74	0.29
First Hour Emission Rate (g/hr)	5.14	4.54	1.37
Weighting Factor (%)	20	40	40

Test Run Narrative

Run 1

Run 1 was performed on 6/25/2018 as a high fire test run per ASTM E3053. Emissions sampling began from a cold start ignition of kindling and start-up fuel. The test fuel load was loaded 38 minutes into the test. Testing was completed when 90% of the test fuel load was consumed. Total test time was 164 minutes, main test fuel load burn time was 126 min. The particulate emissions rate from kindling ignition to test completion was 2.82 g/hr. The burn rate of the test fuel load was 3.50 kg/hr. The main test load portion of the run had an overall HHV efficiency of 74.3%. The train A front filter was changed at 1 hr. All test results were appropriate and valid. There were no anomalies and all test criteria were met.

Run 2

Run 2 was performed on 6/26/2018 as a low fire test run per ASTM E3053. The overall test duration was 576 minutes (9.6 hours). The burn rate for the test run was 1.04 kg/hr, therefore the low fire category requirements were met, greater than 8 hours, less than 1.5 kg/hr. The particulate emissions rate for the integrated test run was 0.67 g/hr. The run had an overall HHV efficiency of 76.3%. The train A front filter was changed at 1 hr. All test results were appropriate and valid. There were no anomalies and all test criteria were met.

Run 3

Run 3 was performed on 6/27/2018 as a medium fire test run per ASTM E3053. The overall test duration was 506 minutes. The burn rate for the test run was 1.16 kg/hr, therefore the medium fire category requirements were met, less than the mid-point of the high and low burn rates (2.27 kg/hr). The particulate emissions rate for the test run was 0.50 g/hr. The run had an overall HHV efficiency of 76.6%. The train A front filter was changed at 1 hr. All test results were appropriate and valid. There were no anomalies and all criteria were met.

Test Conditions Summary

Testing conditions for all runs fell within allowable specifications of ASTM E3053 and ASTM E2515. A summary of facility conditions, fuel burned, and run times is listed below.

Runs	Ambient (°F)		Relative Humidity (%)		Average Barometric Pressure (In. Hg.)	Preburn Fuel Weight (lbs)	Test Fuel Weight (lbs)	Test Fuel Moisture (%DB)	Test Run Time (Min)
	Pre	Post	Pre	Post					
1	71	79	46.9	42.1	29.94	9.7[1]	22.0	20.2	164[2]
2	75	78	36.1	25.4	29.99	31.17	26.3	20.2	576
3	76	76	36.8	26.4	29.88	31.0	26.2	21.6	506

[1]This is the weight of the kindling and startup fuel

[2]Total test time was 164 min, high fire test load burn duration was 126 min.

Appliance Operation and Test Settings

The appliance was operated according to procedures as described in the Operations Manual, found in Appendix B submitted with this report. Detailed run information can be found in Appendix A submitted with this report.

Settings & Run Notes

	Pre-Burn Air Setting	Test Run Air and Fan Settings[1]
Run 1	N/A – Cold Start Ignition	Air control set to high fire test setting (2.114” open from fully closed), blower off for first 20 min, then set to high.
Run 2	Air control set to High Fire Setting in accordance with ASTM E3053	Air control set to low fire test setting (0.707” open from fully closed), blower off for first 20 min, then set to high.
Run 3	Air control set to High Fire Setting in accordance with ASTM E3053	Air control set to medium fire test setting (1.244” open from fully closed), blower off for first 20 min, then set to high.

[1]The air control openings documented above are applicable for the tested stove only, which is a prototype design. Production models have the same inlet opening area at fully open and fully closed positions. See drawings in Appendix D of both prototype and production designs for further detail. Testing was performed at the lowest possible air setting available to consumers for in-home use.

Appliance Description

Model(s): F2500

Additional Models Discussion: None

Appliance Type: Catalytic Wood-Fired Room Heater

Firebox Volume: 2.24 ft^3

Air Introduction System: Primary Air enters the firebox from the front bottom of the appliance and is channeled up the sides on the appliance and down through the air wash, as well as through a pilot air opening in the front of the firebox. Primary air is controlled via a damper arm located below the ashlip which moves left (open) to right (closed). Secondary air is pulled through a fixed opening in to rear bottom of the appliance and channeled up through 4 secondary air tubes. Dimensions on all these features can be found in Appendix D.

Baffles: A pair of 9.4" x 15" x 0.98" vermiculite panels mate together to form a baffle which rests on top of the secondary air tubes.

Flue Outlet: 6-inch exhaust outlet located on the top of the appliance.

Catalytic Combustor: 5.66" x 2" 25 cell ceramic substrate Applied Ceramics combustor is located directly below the flue exit. The combustor housing is connected to a bypass rod which slides the whole combustor towards the front of the stove, out of flue gas pathway until activation temperatures have been obtained. A catalyst temperature probe is provided with the appliance to monitor exit temperatures within 1" of the combustor.

Fan: The F2500 is optionally offered with a convection fan that attached to the bottom rear on the appliance.

Gasketing:

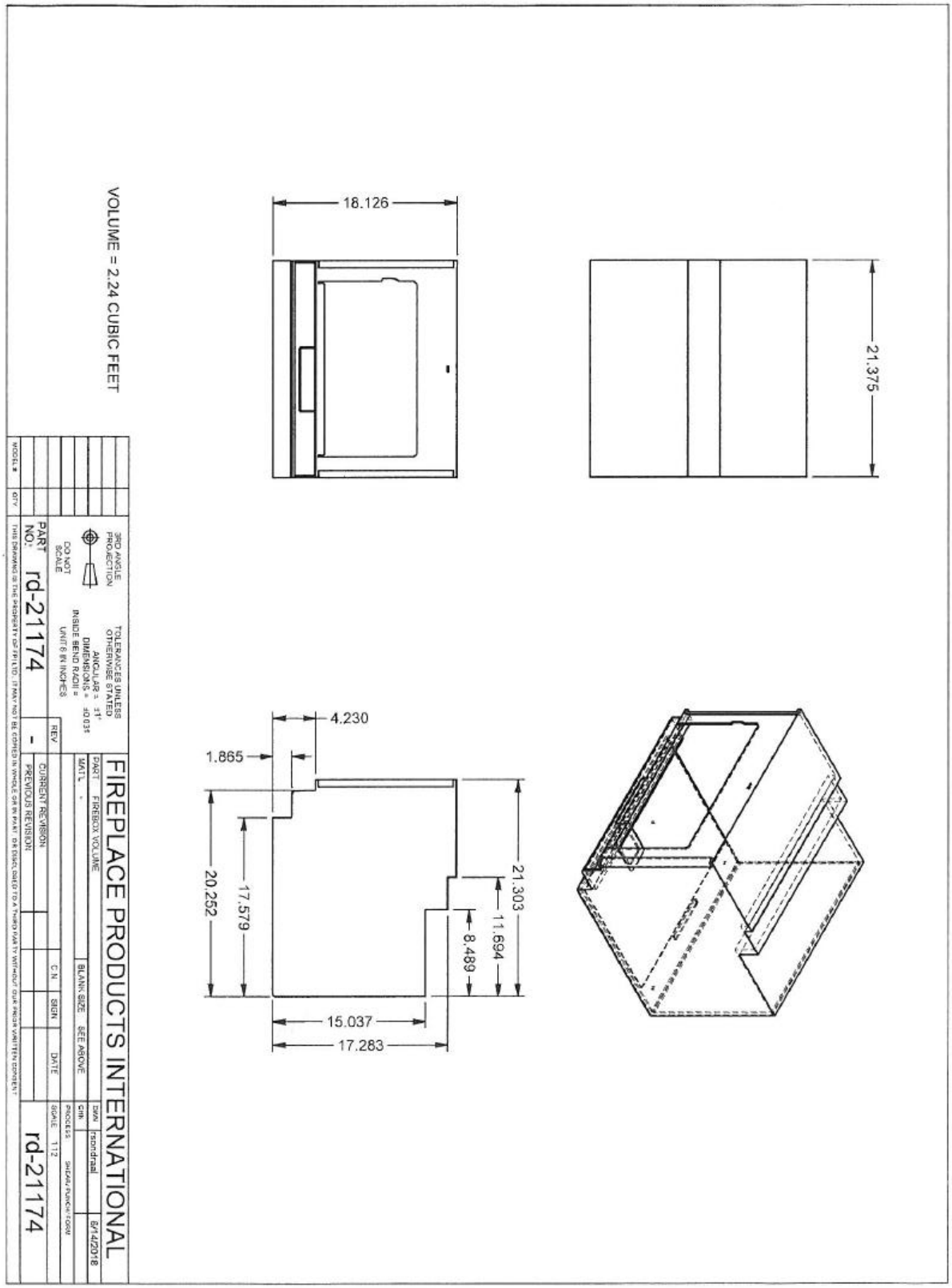
Appliance Dimensions

F2500 Unit Dimensions

Height	Width	Depth	Firebox Volume	Weight
32.25"	24"	24.75"	2.24 ft^3	328 lbs

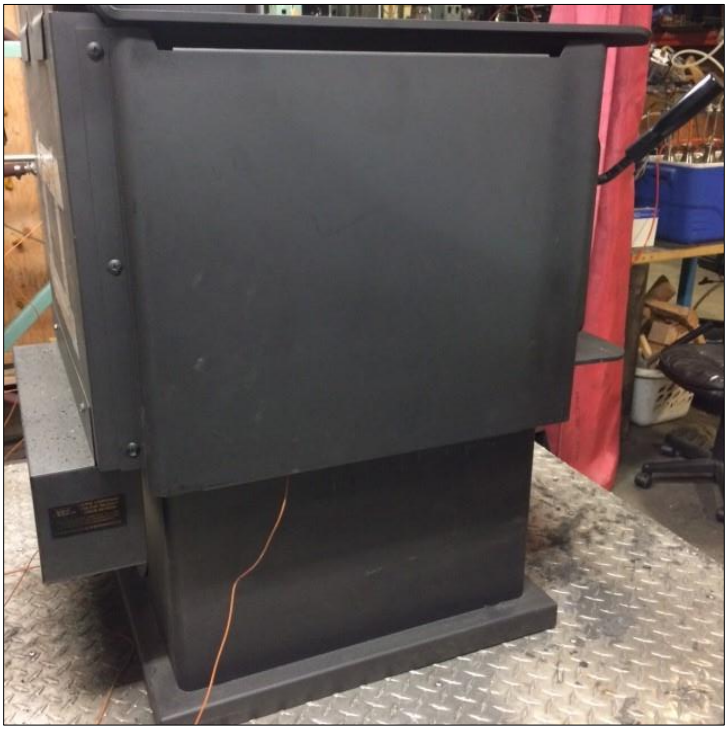
Appliance design drawings can be found in Appendix D submitted with the CBI copy of this report.

Firebox Volume

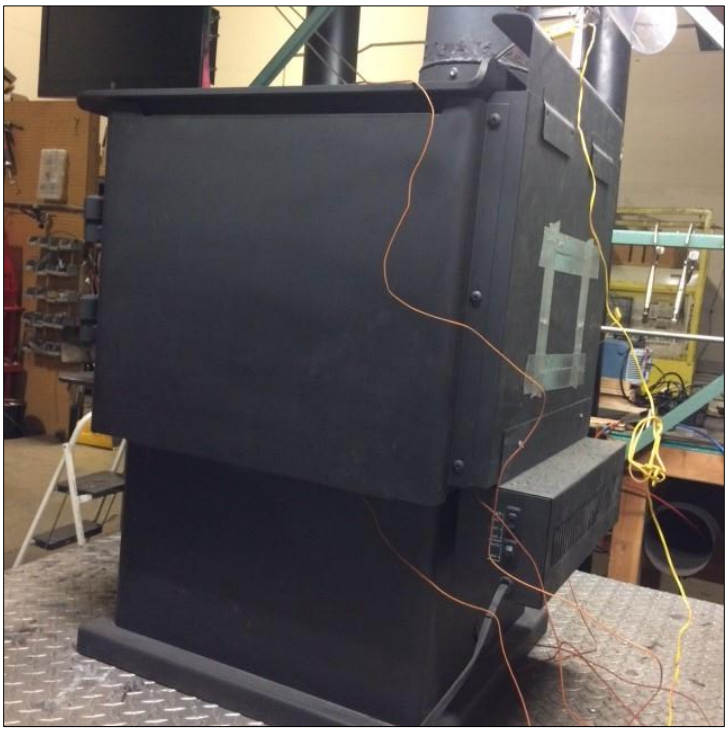


Appliance Front

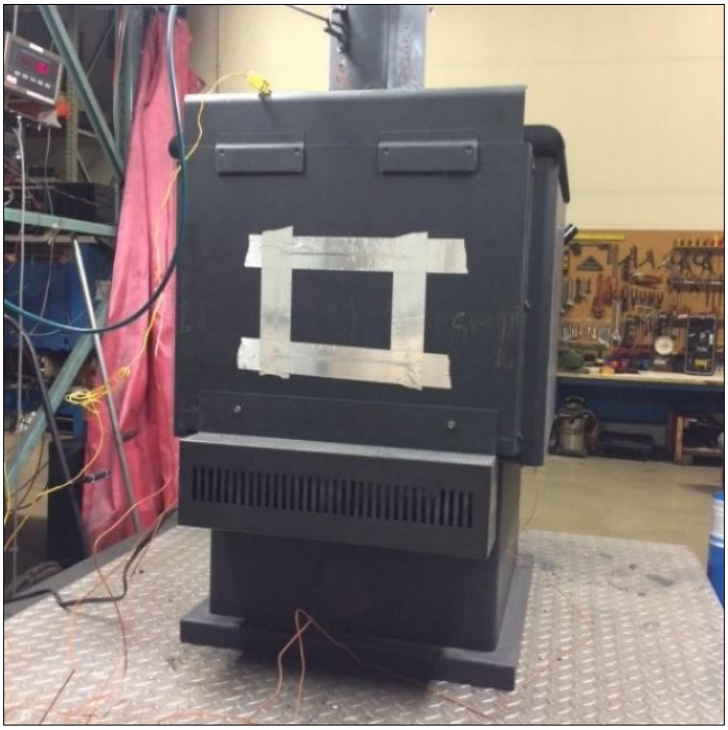
Appliance Left



Appliance Right



Appliance Rear



Test Fuel Properties

Test fuel used was Maple cordwood, split and air-dried to the specified moisture content range. Typical fuel loads are pictured below:

Typical Kindling Load

Typical Startup Load

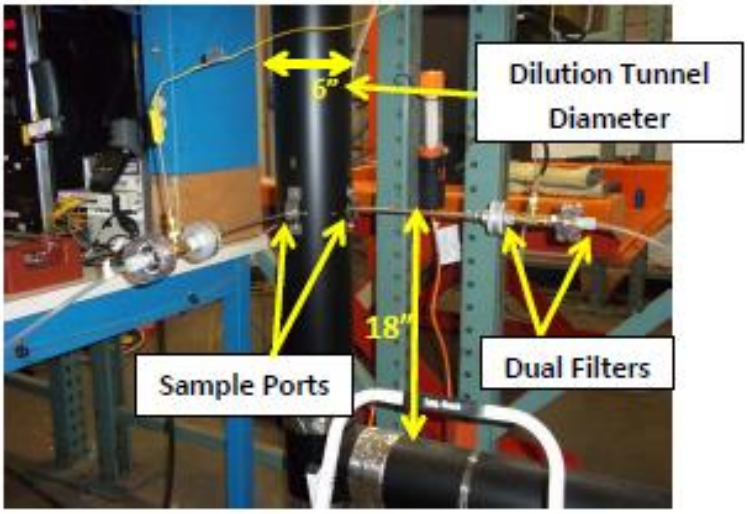
Typical High Fire Load

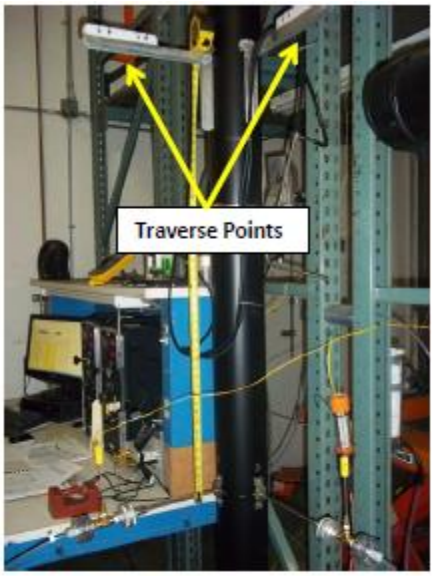
Typical Low Fire Load

Sampling Locations and Descriptions

Sample ports are located 16.5 feet downstream from any disturbances and 1 foot upstream from any disturbances. Flow rate traverse data was collected 12 feet downstream from any disturbances and 5.5 feet upstream from any disturbances. (See below).

Sample Points





Sampling Methods

ASTM E2515 was used in collecting particulate samples. The dilution tunnel is 6 inches in diameter. All sampling conditions per ASTM E2515 were followed. No alternate procedures were used with the exception of caveats described in ALT-125: Pall TX40 Emfab filters were used, filter temperatures were maintained between 80 and 90°F for all tests, filters were weighed in pairs where applicable, and no sampling intervals fell outside of proportional rates of +/- 10%.

Analytical Methods Description

All sample recovery and analysis procedures followed ASTM E2515 procedures. At the end of each test run, filters, O-Rings and probes were removed from their housings, dessicated for a minimum of 24 hours, and then weighed at 6 hour intervals to a constant weight per ASTM E2515-11 Section 10.

Calibration, Quality Control and Assurances

Calibration procedures and results were conducted per EPA Method 28R, ASTM E2515-11 and ASTM E3053. Test method quality control procedures (leak checks, volume meter checks, stratification checks, proportionality results) followed the procedures outlined.

Appliance Sealing and Storage

Upon completion of testing, the appliance was secured with metal strapping and the seal below was applied, the appliance was then returned to the manufacturer's location at: 6988 Venture St, Delta, BC V4G 1H4, Canada, for archival.

Sealing Label

ATTENTION:

THIS SEAL IS NOT TO BE BROKEN WITHOUT PRIOR AUTHORIZATION FROM THE UNITED STATES ENVIRONMENTAL PROTECTION AGENCY.

THIS APPLIANCE HAS BEEN SEALED INACCORDANCE WITH REQUIREMNTS OF 40CFR PART 60 SUBPART AAA §60.535 (a)(2)(vii)

REPORT #_____ DATE SEALED_____

MANUFACTURER_____ MODEL #_____

Sealed Unit

List of Appendices

The following appendices have been submitted electronically in conjunction with this report:

Appendix A – Test Run Data, Technician Notes, Sample Analysis, and Alternate Test Method Approval

Appendix B – Labels and Manuals

Appendix C –Equipment Calibration Records

Appendix D – Design Drawings (CBI Report Only)

Appendix E – Manufacturer QAP (CBI Report Only)

Conditioning Data

Client: FPI
Model: F2500
Job #: 18-414
Technician: SJB
Date(s): 6/1/18 - 6/18/2018

		Average:	388.7	72.2	719
Elapsed Time (hrs)	Scale Reading (lbs)	Weight Change (lbs)	Flue (°F)	Ambient (°F)	Catalyst Exit (°F)
0	26.3	-	650	71	1012
1	15.0	-11.3	527	72	953
2	8.3	-6.7	419	73	742
3	5.7	-2.6	345	72	617
4	4.5	-1.2	311	71	556
5	26.3	21.8	416	73	664
6	14.6	-11.7	496	73	955
7	7.0	-7.6	427	73	797
8	4.7	-2.3	319	73	599
9	3.4	-1.3	306	72	580
10	2.3	-1.1	272	72	513
11	1.9	-0.4	266	71	500
12	11.4	9.5	490	68	861
13	5.0	-6.4	361	69	721
14	7.6	2.6	359	67	723
15	12.3	4.7	367	67	653
16	6.0	-6.3	373	70	690
17	11.8	5.8	446	69	817
18	7.9	-3.9	358	70	644
19	6.8	-1.1	341	70	617
20	26.8	20.0	434	71	670
21	16.2	-10.6	491	75	952
22	8.8	-7.4	376	75	698
23	6.3	-2.5	352	74	684
24	5.0	-1.3	261	73	535
25	3.9	-1.1	283	72	541
26	9.8	5.9	522	67	682
27	3.3	-6.5	335	69	632
28	5.0	1.7	354	69	665
29	11.8	6.8	490	70	910
30	6.2	-5.6	331	70	631
31	7.8	1.6	397	71	744
32	9.1	1.3	451	73	866
33	7.9	-1.2	357	73	680
34	7.7	-0.2	349	74	627
35	25.5	17.8	454	74	853
36	17.0	-8.5	393	77	775
37	11.8	-5.2	351	77	692
38	8.6	-3.2	365	77	776
39	6.7	-1.9	286	77	576
40	5.7	-1.0	264	77	524
41	5.0	-0.7	254	76	501
42	6.0	1.0	619	70	864
43	2.9	-3.1	396	72	734
44	8.2	5.3	375	71	719
45	11.0	2.8	419	71	794
46	13.7	2.7	380	73	665
47	6.7	-7.0	346	74	864
48	22.0	15.3	479	74	972
49	11.1	-10.9	465	76	955
50	5.7	-5.4	345	76	699

Signature/Date: 6/29/18

WOOD HEATER TESTING SUMMARY

SECTION 1 – Model Identification

Model Name(s)/Number(s)	F2500
Manufacturer	FPI - Regency Fireplaces Products
Address 1	6988 Venture St.
Address 2	Delta, BC V4G 1H4
Appliance Category(s) (Free-standing, Insert, etc.)	Freestanding Woodstove
Usable Firebox Volume - ft^3	2.24
Catalytic/Non-Cat	Catalytic
Convection Air Fan (No, Standard, Optional)	Optional

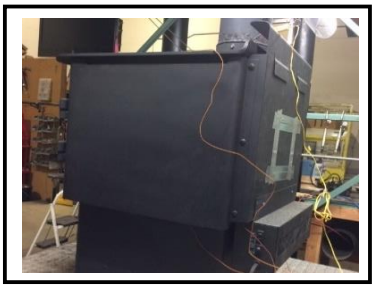
SECTION 1B – Laboratory Information

Testing Laboratory	PFS-TECO
Address 1	11785 SE Hwy 212 Ste 305
Address 2	Clackamas, OR 97015
ISO/Accreditation Info	ISO 17025
Dates Tested	6/25/18 - 6/27/18
Test Methods/Standards	ASTM E3053 (ALT-125), ASTM E2515
Dilution Tunnel Inside Diameter - in.	6.00
Fliter Diameter - mm	47
Filter Material	Pall Type TX40

Test Configuration Photographs

Stove Front

Stove Left



Stove Right

Typical Kindling Load

Typical Start-up Load

Typical High Fire Load

Typical High Fire Coal Bed

Typical Low/Med Fire Load

Typical Low Fire Coal Bed

SECTION 2 – Test Conditions Summary

Model Name(s)/Number(s)	F2500			
Usable Firebox Volume - ft^3	2.24			
Convection Air Fan (No, Standard, Optional)	Optional			
Test Run #	1	2	3	
Date Tested	6/25/2018	6/26/2018	6/27/2018	
Test Run Category (L, M, H)	H	L	M	
Average Barometric Pressure - in Hg	29.94	29.99	29.88	
Max. Observed Ambient Temp - °F	80	78	80	
Min. Observed Ambient Temp - °F	71	74	75	
Max. Observed Filter Temp - °F	87	87	87	
Test Run Air Settings				
Primary (measured up from minimum)	Maximum*	1.244"*	Minimum*	
Secondary (measured up from minimum)	Fixed	Fixed	Fixed	
Convection Air Fan Setting	High	High	High	
Test Fuel Load				
Cordwood Fuel Species	Maple	Maple	Maple	
Specific Gravity (from Table 1)	0.6	0.6	0.6	
Higher Heating Value - Btu/lb (from Annex A1)	8587	8587	8587	
Nom. Test Fuel Load Piece Length - in.	16	16	16	
Number of Test Fuel Pieces	5	5	5	
Test Fuel Weight				
Kindling - As Fired lb	3.92	na	4.80	
Kindling Wt. - As % of Test Fuel Load	18%	na	na	
Kindling Moisture - % DB	10%	na	10%	
Kindling - kg DB	1.62	na	na	
SU Fuel - As Fired lb	5.82	na	7.52	
SU Fuel Wt. - As % of Test Fuel Load	27%	na	na	
SU Fuel Moisture - % DB	21%	na	23.4%	
SU Fuel - kg DB	2.18	na	na	
Test Fuel Load - As Fired lb	21.96	26.28	26.15	
Ave. Test Fuel Load MC % DB	20.2%	20.2%	21.6%	
Test Fuel Load - kg DB	8.30	9.94	9.77	
Test Fuel Loading Density - lb/ft^3	9.80	11.73	11.67	
Residual SU Fuel Wt. - As Fired lb	2.30	na	na	
Residual SU Fuel Wt. - As % of Test Fuel Load	10%	na	na	
Test Run Duration - minutes	164	576	506	
Test Run Duration - h	2.73	9.60	8.43	
Test Fuel Load Wt. at End of Test - As Fired lb	2.1	0	0	
Total Total Fuel Burned - kg DB	10.11	9.94	9.77	
% Test Fuel Load Wt. at End of Test	9.6%	0.0%	0.0%	

*See test report for description of air settings on prototype test unit versus production models

SECTION 3 – Test Run Results Summary

Model Name(s)/Number(s)	F2500			
Usable Firebox Volume - ft^3	2.24			
Convection Air Fan (No, Standard, Optional)	Optional			
Test Run #	1	2	3	
Date Tested	6/25/18	6/26/18	6/27/18	
Test Run Category	H	L	M	
Burn Rate - kg/h DB	3.50	1.04	1.16	
Burn Rate - As % of Low to High Midpoint	na	na	51%	
Burn Duration - h	2.73	9.60	8.43	
Heat Output - Btu/h	50349	14944	16746	
Average Dilution Tunnel Flow Rate - dscfm	140.78	148.13	148.06	
Average Sample Flow Rates - dscfm				
Train 1	0.142	0.141	0.145	
Train 2	0.138	0.143	0.141	
Total PM Emissions - g				
Train 1	7.77	6.45	3.89	
Train 2	7.65	6.36	4.57	
Average	7.710	6.405	4.230	
PM Emission Train Precision - %	0.8%	0.7%	-8.0%	
PM Emission Train Precision - g/kg	0.01	0.01	-0.07	
PM Emission Rate - g/h	2.82	0.67	0.50	
Total CO Emissions - g	52	428	147	
CO Emissions Rate - g/h	25	45	17	
Overall Efficiency - CSA B415.1-10				
% HHV Basis	74.3	76.3	76.6	
% LHV Basis	79.5	81.6	81.9	

SECTION 4 - Weighted Average Summary

Model Name(s)/Number(s)	F2500		
Usable Firebox Volume - ft_3	2.24		
Convection Air Fan (No, Standard, Optional)	Optional		
Average for Each Test Run Category	L	M	H
Burn Rate - kg/h DB	1.04	1.16	3.50
PM Emission Rate - g/h	0.67	0.50	2.82
CO Emissions Rate - g/h	44.6	17.4	24.8
Overall Efficiency - CSA B415.1-10			
% HHV Basis	76.3	76.6	74.3
% LHV Basis	81.6	81.9	79.5
Heat Output - Btu/h	14900	16800	50300
Category Weighting	40%	40%	20%

ASTM E XXXX Weighted Averages			
PM Emission Rate - g/h	1.0		
CO Emissions Rate - g/h	30		
Overall Efficiency - CSA B415.1-10			
% HHV Basis	76		
% LHV Basis	81		
Heat Output Range - Btu/h	14900	to	50300

Conditioning Data

Client: FPI
Model: F2500
Job #: 18-414
Technician: SJB
Date(s): 6/1/18 - 6/18/2018

		Average:	388.7	72.2	719
Elapsed Time (hrs)	Scale Reading (lbs)	Weight Change (lbs)	Flue (°F)	Ambient (°F)	Catalyst Exit (°F)
0	26.3	-	650	71	1012
1	15.0	-11.3	527	72	953
2	8.3	-6.7	419	73	742
3	5.7	-2.6	345	72	617
4	4.5	-1.2	311	71	556
5	26.3	21.8	416	73	664
6	14.6	-11.7	496	73	955
7	7.0	-7.6	427	73	797
8	4.7	-2.3	319	73	599
9	3.4	-1.3	306	72	580
10	2.3	-1.1	272	72	513
11	1.9	-0.4	266	71	500
12	11.4	9.5	490	68	861
13	5.0	-6.4	361	69	721
14	7.6	2.6	359	67	723
15	12.3	4.7	367	67	653
16	6.0	-6.3	373	70	690
17	11.8	5.8	446	69	817
18	7.9	-3.9	358	70	644
19	6.8	-1.1	341	70	617
20	26.8	20.0	434	71	670
21	16.2	-10.6	491	75	952
22	8.8	-7.4	376	75	698
23	6.3	-2.5	352	74	684
24	5.0	-1.3	261	73	535
25	3.9	-1.1	283	72	541
26	9.8	5.9	522	67	682
27	3.3	-6.5	335	69	632
28	5.0	1.7	354	69	665
29	11.8	6.8	490	70	910
30	6.2	-5.6	331	70	631
31	7.8	1.6	397	71	744
32	9.1	1.3	451	73	866
33	7.9	-1.2	357	73	680
34	7.7	-0.2	349	74	627
35	25.5	17.8	454	74	853
36	17.0	-8.5	393	77	775
37	11.8	-5.2	351	77	692
38	8.6	-3.2	365	77	776
39	6.7	-1.9	286	77	576
40	5.7	-1.0	264	77	524
41	5.0	-0.7	254	76	501
42	6.0	1.0	619	70	864
43	2.9	-3.1	396	72	734
44	8.2	5.3	375	71	719
45	11.0	2.8	419	71	794
46	13.7	2.7	380	73	665
47	6.7	-7.0	346	74	864
48	22.0	15.3	479	74	972
49	11.1	-10.9	465	76	955
50	5.7	-5.4	345	76	699

Signature/Date: 6/29/18

Emission testing instructions F2500

Volume: 2.24 cu.ft.

Low and Medium

High before Low and Medium – no sampling. Air set to High Setting

Fan on high at 20 min after loading main fuel load

Kindling – 3.7lb

Startup fuel – 5.9lb

Procedure

Start with ~1lb startup on the bottom (2 – 3 smaller pieces), 6 – pieces crumbled paper in between and 2.0 lbs kindling on top. Total 3.0lb. Adjust the door opening for less smoke and establish a good fire. Keep the door open in that position for 3 – 4 min. Once door is closed, close bypass.

At 1lb load the remainder of the kindling, and 1.5 lbs of start-up fuel, more to the back. Close door soon after loading to keep the catalyst from cooling down.

At 1.6lb load 1.5lb SU fuel, load center back and close the door right away after loading. Put smaller pieces and leave the bigger ones for the next load.

At 2lb level the burning wood and load the remaining of SU fuel more to the back. Close the door immediately after loading, and load quickly.

At low end of coal bed range load the high load. Close the door right away.

At 20 min turn on the fan on high.

Around 9-10lbs adjust the load. Lift the unburned pieces out from the coals and bring unburned pieces to center front to ensure full charcoalization.

At top end of load range. when everything is burned, and almost no flames left rake the coals, zero the scale and follow the standard loading procedure.

Low and Medium test load

Load heavier logs to the sides.

Keep the door open a couple seconds so there is a strong fire going.

Air adjustment

Medium

At 6 – 7 min set the air to medium air setting.

Fan on high at 20 min

Low

At 6 – 7 min set to Low setting gradually:

Fan on high at 00 min.

WOOD STOVE TEST DATA PACKET
ASTM E3053/E2515

Run 1 Data Summary

Client: FPI
Model: F2500
Job #: 18-414
Tracking #: 003
Test Date: 6/27/2018

6/28/2018

Techician Signature Date

TEST RESULTS - ASTM E3053 / ASTM E2515

Client: FPI
Model: F2500
Run #: 1

Job #: 18-414
Tracking #: 003
Technician: SJB
Date: 6/27/2018

Burn Rate (kg/hr):	3.50

	Ambient Sample	Sample Train A	Sample Train B	1st Hour Filter
Total Sample Volume (ft^3)	26.644	23.318	22.713	8.443
Average Gas Velocity in Dilution Tunnel (ft/sec)	13.6			
Average Gas Flow Rate in Dilution Tunnel (dscf/hr)	8446.9			
Average Gas Meter Temperature (°F)	76.3	81.4	91.4	79.1
Total Sample Volume (dscf)	26.212	22.904	21.795	8.329
Average Tunnel Temperature (°F)	131.0			
Total Time of Test (min)	164			
Total Particulate Catch (mg)	0.1	7.8	7.3	5.1
Particulate Concentration, dry-standard (g/dscf)	0.0000038	0.0003405	0.0003349	0.0006123
Total PM Emissions (g)	0.09	7.77	7.65	5.14
Particulate Emission Rate (g/hr)	0.03	2.84	2.80	5.14
Emissions Factor (g/kg)	-	0.70	0.69	-
Difference from Average Total Particulate Emissions (g)	-	0.06	0.06	-
Difference from Average Emissions Factor (g/kg)	-	0.01	0.01	-

Final Average Results	
Total Particulate Emissions (g)	7.71
Particulate Emission Rate (g/hr)	2.82
Emissions Factor (g/kg)	0.69
HHV Efficiency (%)	74.3%
LHV Efficiency (%)	79.5%
CO Emissions (g/min)	0.42

Quality Checks	Requirement	Observed	Result
Dual Train Precision	Each train within 7.5% of average emissions (in grams), or emission factors within 0.5 g/kg	See Above	OK
Filter Temps	>80 °F, <90 °F	Min: 80 / Max: 87	OK
Face Velocity	< 30 ft/min	7.9	OK
Leakage Rate	Less than 4% of average sample rate	0 cfm	OK
Ambient Temp	55-90 °F	Min: 71 / Max: 80	OK
Negative Probe Weight Evaluation	<5% of Total Catch	Probe Catch Not Negative	OK
Pro-Rate Variation	90% of readings between 90-110%; none greater than 120% or less than 80%	See Data Tabs	OK

B415.1 Efficiency Results

Manufacturer:	FPI
Model:	F2500
Date:	06/27/18
Run:	1
Control #:	18-414
Test Duration:	126
Output Category:	High

Test Results in Accordance with CSA B415.1-09

	HHV Basis	LHV Basis
Overall Efficiency	74.3%	79.5%
Combustion Efficiency	99.5%	99.5%
Heat Transfer Efficiency	74.7%	79.9%

Output Rate (kJ/h)	53,077	50,349	**(Btu/h)**
Burn Rate (kg/h)	3.58	7.88	**(lb/h)**
Input (kJ/h)	71,389	67,720	**(Btu/h)**

Test Load Weight (dry kg)	7.51	16.55	**dry lb**
MC wet (%)	16.81		
MC dry (%)	20.21		
Particulate (g)	7.71		
CO (g)	52		
Test Duration (h)	2.10		

Emissions	**Particulate**	**CO**
g/MJ Output	0.07	0.47
g/kg Dry Fuel	1.03	6.98
g/h	3.67	24.97
g/min	0.06	0.42
lb/MM Btu Output	0.16	1.09

Air/Fuel Ratio (A/F)	9.27

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

Adjunct to ASTM E 3053 Wood Heater Cordwood Test Method - May 10, 2017 Version

Cordwood Fuel Load Calculators - 10 lb/ft^3 Nominal Load Density

Core 45-65% of Total Load Weight, Remainder 35-55% of Total Load Weight

Values to be input manually

For All Usable Firebox Volumes - High Fire Test Only

Nominal Required Load Density (wet basis)	10	lb/ft^3				
Usable Firebox Volume	2.24	ft^3				
Total Nom. Load Wt. Target	22.40	lb				
Total Load Wt. Allowable Range	21.30	to	23.50	lb		
Core Target Wt. Allowable Range	10.10	to	14.60	lb		
Remainder Load Wt. Allowable Range	7.80	to	12.30	lb		
						Mid-Point
Core Load Pc. Wt. Allowable Range	3.40	to	5.60	lb		4.50
Remainder Load Pc. Wt. Allowable Range	2.20	to	12.30	lb		7.25
	Pc. #					
Core Load Piece Wt. Actual	1	4.83	lb		In Range	
	2	3.81	lb		In Range	
	3	4.10	lb		In Range	
Core Load Total. Wt. Actual		12.74	lb		In Range	
	Pc. #					
Remainder Load Piece Wt.	1	3.42	lb		In Range	
(1 to 3 Pcs.)	2	5.80	lb		In Range	
	3		lb		NA	
Remainder Load Tot. Wt. Act		9.22	lb		In Range	
Total Load Wt. Actual		21.96	lb		In Range	
Core % of Total Wt.		58%			In Range	45-65%
Remainder % of Total Wt.		42%			In Range	35-55%
Actual Load % of Nominal Target		98%			In Range	95-105%
Actual Fuel Load Density		9.8	lb/ft^3			
Kindling and Start-up Fuel						
Maximim Kindling Wt. (20% of Tot. Load Wt.)		4.39	lb			
Actual Kindling Wt.		3.92	lb		In Range	17.9%
Maximum Start-up Fuel Wt. (30% of Tot. Load Wt.)		6.59	lb			
Actual Start-up Fuel Wt.		5.82	lb		In Range	26.5%
Allowable Residual Start-up Fuel Wt. Range	2.2	to	4.4	lb		Mid-Point
Actual Residual Start-up Fuel Wt.		2.3	lb		In Range	3.3
Total Wt. All Fuel Added (wet basis)		31.70	lb			
High Fire Test Run End Point Range	Low		High			Mid-Point
Based on Fuel Load Wt. (w/tares)	2.0	to	2.4	lb		2.2
Actual Fuel Load Ending Wt.		2.1	lb		In Range	

Fuel Piece Moisture Reading (%-dry basis)								
1	2	3	Ave.		Pc. Wt. Dry Basis			
24.7	19.1	19.8	21.2	In Range	3.99	lb	1.81	kg
18.4	18.7	20.6	19.2	In Range	3.20	lb	1.45	kg
22.6	22.5	19.3	21.5	In Range	3.38	lb	1.53	kg
19.6	19.1	19.1	19.3	In Range	2.87	lb	1.30	kg
20.2	20	19	19.7	In Range	4.84	lb	2.20	kg
			NA	NA	NA	lb	NA	kg
Total Load Ave. MC (%-dry basis)			20.2	In Range				
Total Load Ave. MC % (wet basis)			16.8					
Total Test Load Weight (dry basis) →					18.27	lb	8.29	kg
Kindling Moisture (%-dry basis)								
10	10	10	10.0	In Range	3.56	lb	1.62	kg
Start-up Fuel Moisture Readings (%-dry basis)								
19.4	22.4	20.8	20.9	In Range	4.82	lb	2.18	kg
Total Wt. All Fuel Added (dry basis) →					26.65	lb	12.09	kg
Total Wt. All Fuel Burned (dry basis) →					22.2	lb	10.1	kg

WOODSTOVE PREBURN DATA

Client:	FPI	Job #:	18-414
Model:	F2500	Tracking #:	003
Run #:	1	Technician:	SJB
		Date:	6/27/2018

High Fire Test Begins from Cold Start, No Preburn is Performed

DILUTION TUNNEL & MISC. DATA - ASTM E3053 / E2515

Client:	FPI	Job #:	18-414
Model:	F2500	Tracking #:	003
Run #:	1	Technician:	SJB
Test Start Time:	8:35	Date:	6/27/2018
Test Type:	High Fire		

Recording Interval (min):	1
Total Sampling Time (min):	164
High Fire Test Load Time (min):	38

	Beginning	Middle	End	Avg.
P_{bar} (in Hg):	29.94	29.94	29.94	29.94

Meter Box γ Factor:	1.002	(A)
Meter Box γ Factor:	0.997	(B)
Meter Box γ Factor:	0.999	(Amb)

Dilution Tunnel MW(dry):	29.00	lb/lb-mole		
Dilution Tunnel MW(wet):	28.78	lb/lb-mole		
Tunnel Area:	0.1963	ft^2		
Dilution Tunnel H_2O:	2.00	percent		
Tunnel Diameter:	6	inches		
Pitot Tube Cp:	0.99			
Dilution Tunnel Static:	-0.130	in H_2O		

Post-Test Leak Check

(A)	0.000	cfm @	-16	in. Hg
(B)	0.000	cfm @	-13	in. Hg
(AMB)	0.000	cfm @	-14	in. Hg

Ambient Sample Volume (ft^3): 26.644 ft^3

Tunnel Traverse Information

	Pt.1	Pt.2	Pt.3	Pt.4	Pt.5	Pt.6	Pt.7	Pt.8	Center
dP (in H_2O)	0.028	0.036	0.044	0.040	0.030	0.040	0.044	0.036	0.045
Tunnel Temp (°F)	75	75	75	75	75	75	75	75	75

V_{strav}:	12.98	ft/sec	F_p:	0.917 [ratio]
V_{scent}:	14.15	ft/sec	Initial Tunnel Flow:	146.3 scf/min

Default Wood Fuel Values

Fuel Type:	D. Fir	Oak
HHV (kJ/kg)	19,810	19,887
%C	48.73	50
%H	6.87	6.6
%O	43.9	42.9
%Ash	0.5	0.5

Actual

Fuel Type:	Maple
HHV (kJ/kg)	19,960
%C	50.64
%H	6.02
%O	41.74
%Ash	1.35

BOX A TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: F2500
Run #: 1

Job #: 18-414
Tracking #: 003
Technician: SJB
Date: 6/27/2018

	Particulate Sampling Data							Fuel Weight (lb)		Temperature Data (°F)			
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Dilution Tunnel dP (in H_2O)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Scale Reading	Weight Change	Dilution Tunnel	Flue	Filter	Ambient
0	0.000		0.045	0.00	78	-0.12		2.9		75	73	84	71
1	0.136	0.136	0.045	2.06	78	-0.92	92	2.8	-0.1	79	110	86	71
2	0.276	0.140	0.045	2.05	78	-1.49	96	2.5	-0.3	92	194	86	71
3	0.416	0.140	0.045	2.04	78	-0.34	98	2.3	-0.2	118	343	85	71
4	0.557	0.141	0.045	2.03	78	-1.35	99	1.9	-0.4	124	456	83	71
5	0.694	0.137	0.045	1.99	78	-0.66	96	1.7	-0.2	117	467	84	71
6	0.834	0.140	0.045	1.97	78	-0.41	97	1.4	-0.3	112	472	85	71
7	0.973	0.139	0.045	2.10	78	-1.22	97	1.3	-0.1	109	475	86	72
8	1.119	0.146	0.045	2.13	78	-1.94	101	1.2	-0.1	107	456	86	72
9	1.260	0.141	0.045	2.10	78	-1.46	98	1.0	-0.2	106	436	84	72
10	1.404	0.144	0.045	2.08	78	-1.59	101	3.5	2.5	126	504	83	72
11	1.544	0.140	0.045	2.09	78	-1.59	98	3.3	-0.2	116	495	84	72
12	1.686	0.142	0.045	2.08	78	-0.93	99	3.0	-0.3	117	540	86	72
13	1.829	0.143	0.045	2.07	78	-1.86	100	2.8	-0.2	119	575	86	72
14	1.970	0.141	0.045	2.08	78	-1.98	99	2.6	-0.2	121	584	85	72
15	2.114	0.144	0.045	2.05	79	-1.82	101	2.4	-0.2	123	578	83	72
16	2.252	0.138	0.045	2.08	78	-1.95	97	2.3	-0.1	123	579	84	72
17	2.396	0.144	0.045	2.07	79	-1.23	101	2.1	-0.2	124	573	85	72
18	2.535	0.139	0.045	2.08	78	-0.59	98	1.9	-0.2	125	574	86	72
19	2.679	0.144	0.045	2.07	77	-2	102	1.8	-0.1	127	594	86	72
20	2.819	0.140	0.045	2.03	79	-1.06	99	1.6	-0.2	128	600	84	72
21	2.959	0.140	0.045	2.04	78	-1.33	100	3.2	1.6	140	673	83	73
22	3.101	0.142	0.045	2.04	78	-0.58	101	3.6	0.4	135	622	84	73
23	3.242	0.141	0.045	2.04	79	-2.13	100	3.4	-0.2	134	616	86	73
24	3.384	0.142	0.045	2.03	79	-1.74	100	3.2	-0.2	133	611	86	73
25	3.521	0.137	0.045	2.03	79	-1.11	97	3.0	-0.2	132	604	85	73
26	3.665	0.144	0.045	2.02	79	-1.78	102	2.8	-0.2	132	598	84	73
27	3.804	0.139	0.045	2.02	79	-1.87	98	2.6	-0.2	133	599	84	73
28	3.946	0.142	0.045	2.01	79	-2.09	100	2.5	-0.1	133	612	86	73
29	4.085	0.139	0.045	2.02	79	-1.41	98	2.3	-0.2	134	618	86	73
30	4.225	0.140	0.045	2.02	78	-0.7	99	2.2	-0.1	133	610	85	74
31	4.368	0.143	0.045	2.02	79	-0.75	101	1.9	-0.3	132	595	84	74
32	4.507	0.139	0.045	2.02	79	-1.98	98	1.8	-0.1	131	579	84	74

BOX A TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: F2500
Run #: 1

Job #: 18-414
Tracking #: 003
Technician: SJB
Date: 6/27/2018

	Particulate Sampling Data							Fuel Weight (lb)		Temperature Data (°F)			
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Dilution Tunnel dP (in H_2O)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Scale Reading	Weight Change	Dilution Tunnel	Flue	Filter	Ambient
33	4.650	0.143	0.045	2.00	79	-1.24	102	3.2	1.4	142	621	85	74
34	4.787	0.137	0.045	2.01	79	-1.73	97	3.0	-0.2	139	622	86	74
35	4.931	0.144	0.045	2.01	79	-1.87	102	2.8	-0.2	138	627	86	74
36	5.070	0.139	0.045	2.01	79	-1.54	99	2.6	-0.2	137	631	85	75
37	5.211	0.141	0.045	2.01	80	-1.18	100	2.4	-0.2	137	628	84	75
38	5.351	0.140	0.045	2.01	80	-2.11	100	22.0	19.6	141	643	84	75
39	5.491	0.140	0.045	2.01	80	-2.2	101	21.6	-0.4	162	681	86	75
40	5.633	0.142	0.045	1.98	80	-1.65	101	21.4	-0.2	145	614	87	75
41	5.771	0.138	0.045	2.00	79	-1.06	98	21.3	-0.1	140	588	86	75
42	5.914	0.143	0.045	1.99	79	-1.46	102	21.1	-0.2	138	573	85	75
43	6.053	0.139	0.045	2.01	80	-2.22	98	21.0	-0.1	136	566	84	75
44	6.195	0.142	0.045	1.99	80	-1.46	101	20.8	-0.2	137	559	85	75
45	6.334	0.139	0.045	2.01	80	-1.47	98	20.7	-0.1	135	557	86	74
46	6.474	0.140	0.045	1.99	80	-1.57	99	20.5	-0.2	135	557	87	75
47	6.617	0.143	0.045	1.99	80	-1.9	101	20.4	-0.1	135	555	86	75
48	6.755	0.138	0.045	1.99	80	-1.65	98	20.2	-0.2	134	553	84	74
49	6.898	0.143	0.045	2.00	80	-0.82	101	20.1	-0.1	134	551	84	75
50	7.036	0.138	0.045	1.99	80	-1.2	98	20.0	-0.1	134	555	86	74
51	7.179	0.143	0.045	1.99	80	-2.21	101	19.7	-0.3	134	557	86	75
52	7.318	0.139	0.045	2.00	80	-2.27	98	19.6	-0.1	134	555	86	75
53	7.460	0.142	0.045	2.00	80	-2.24	100	19.4	-0.2	133	556	85	75
54	7.600	0.140	0.045	1.98	80	-2.26	99	19.2	-0.2	135	573	84	74
55	7.739	0.139	0.045	1.99	80	-1.36	99	19.0	-0.2	137	600	84	74
56	7.883	0.144	0.045	1.99	80	-1.18	102	18.7	-0.3	138	612	86	75
57	8.020	0.137	0.045	1.99	81	-1.97	97	18.4	-0.3	140	615	86	75
58	8.162	0.142	0.045	1.98	81	-2.17	101	18.3	-0.1	140	617	86	76
59	8.301	0.139	0.045	1.98	81	-1.44	99	18.1	-0.2	140	617	85	76
60	8.443	0.142	0.045	1.97	81	-0.87	101	17.9	-0.2	140	615	84	75
61	8.589	0.146	0.045	2.20	81	-0.33	104	17.7	-0.2	140	616	80	75
62	8.736	0.147	0.045	2.12	81	-1.29	104	17.4	-0.3	141	617	82	75
63	8.879	0.143	0.045	2.10	81	-0.49	101	17.2	-0.2	141	617	85	75
64	9.024	0.145	0.045	2.07	81	-1.08	103	17.0	-0.2	141	617	86	76
65	9.168	0.144	0.045	2.09	81	-1.99	102	16.7	-0.3	141	615	87	76

BOX A TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: F2500
Run #: 1

Job #: 18-414
Tracking #: 003
Technician: SJB
Date: 6/27/2018

	Particulate Sampling Data							Fuel Weight (lb)		Temperature Data (°F)			
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Dilution Tunnel dP (in H_2O)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Scale Reading	Weight Change	Dilution Tunnel	Flue	Filter	Ambient
66	9.311	0.143	0.045	2.07	81	-1.04	101	16.5	-0.2	141	614	86	76
67	9.456	0.145	0.045	2.06	81	-0.8	103	16.3	-0.2	141	612	86	76
68	9.599	0.143	0.045	2.06	81	-1.01	101	16.0	-0.3	140	610	84	77
69	9.744	0.145	0.045	2.07	81	-0.67	103	15.8	-0.2	140	608	85	76
70	9.887	0.143	0.045	2.08	81	-0.55	101	15.6	-0.2	139	607	84	76
71	10.033	0.146	0.045	2.08	81	-2.1	103	15.4	-0.2	139	603	86	77
72	10.174	0.141	0.045	2.06	81	-1.77	100	15.2	-0.2	139	599	87	76
73	10.320	0.146	0.045	2.06	81	-2.01	103	15.0	-0.2	139	595	86	76
74	10.460	0.140	0.045	2.06	81	-1.85	99	14.8	-0.2	138	592	85	77
75	10.606	0.146	0.045	2.06	81	-2.03	103	14.6	-0.2	138	589	85	77
76	10.747	0.141	0.045	2.06	81	-1.1	100	14.4	-0.2	137	586	84	76
77	10.893	0.146	0.045	2.06	82	-1.9	103	14.2	-0.2	137	583	84	76
78	11.035	0.142	0.045	2.06	82	-0.77	100	14.0	-0.2	137	581	85	76
79	11.180	0.145	0.045	2.05	82	-2.01	102	13.8	-0.2	137	579	86	77
80	11.322	0.142	0.045	2.04	82	-1.99	100	13.6	-0.2	137	579	87	77
81	11.465	0.143	0.045	2.04	82	-0.94	101	13.4	-0.2	137	579	87	76
82	11.608	0.143	0.045	2.05	82	-2	101	13.2	-0.2	137	577	85	76
83	11.751	0.143	0.045	2.07	82	-1.64	101	13.0	-0.2	137	576	84	77
84	11.895	0.144	0.045	2.05	82	-0.64	102	12.9	-0.1	137	577	84	77
85	12.038	0.143	0.045	2.05	82	-1.82	101	12.6	-0.3	137	578	85	77
86	12.183	0.145	0.045	2.04	82	-1.29	102	12.5	-0.1	137	579	86	77
87	12.323	0.140	0.045	2.04	82	-2.12	99	12.3	-0.2	138	580	86	77
88	12.468	0.145	0.045	2.05	82	-1.82	102	12.1	-0.2	137	582	87	77
89	12.608	0.140	0.045	2.03	82	-0.81	99	11.9	-0.2	137	583	84	78
90	12.754	0.146	0.045	2.03	82	-0.78	103	11.7	-0.2	137	582	84	77
91	12.895	0.141	0.045	2.04	82	-0.97	99	11.4	-0.3	136	578	84	77
92	13.041	0.146	0.045	2.04	82	-0.99	103	11.2	-0.2	136	575	85	77
93	13.181	0.140	0.045	2.04	82	-2.06	99	11.1	-0.1	135	570	86	77
94	13.325	0.144	0.045	2.04	82	-0.73	102	10.9	-0.2	135	568	86	77
95	13.466	0.141	0.045	2.03	82	-1.53	99	10.6	-0.3	135	568	86	78
96	13.609	0.143	0.045	2.02	82	-1.01	101	10.6	0	135	569	85	77
97	13.753	0.144	0.045	2.03	82	-1.31	102	10.4	-0.2	135	568	85	78
98	13.894	0.141	0.045	2.02	82	-0.77	99	10.2	-0.2	135	569	84	78

BOX A TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: F2500
Run #: 1

Job #: 18-414
Tracking #: 003
Technician: SJB
Date: 6/27/2018

	Particulate Sampling Data							Fuel Weight (lb)		Temperature Data (°F)			
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Dilution Tunnel dP (in H_2O)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Scale Reading	Weight Change	Dilution Tunnel	Flue	Filter	Ambient
99	14.039	0.145	0.045	2.02	82	-2.18	102	10.0	-0.2	135	571	84	78
100	14.178	0.139	0.045	2.00	83	-1.29	98	9.7	-0.3	135	573	85	78
101	14.322	0.144	0.045	2.01	83	-1.98	101	9.6	-0.1	135	575	87	78
102	14.462	0.140	0.045	2.01	83	-2.13	99	9.5	-0.1	136	575	86	78
103	14.607	0.145	0.045	2.02	82	-2.16	102	9.2	-0.3	136	574	86	78
104	14.748	0.141	0.045	1.99	83	-0.78	99	9.1	-0.1	135	570	85	77
105	14.891	0.143	0.045	2.02	82	-1.52	101	8.9	-0.2	135	567	85	78
106	15.032	0.141	0.045	2.01	83	-2.14	99	8.8	-0.1	135	566	84	78
107	15.174	0.142	0.045	2.03	83	-0.72	100	8.6	-0.2	135	563	84	78
108	15.317	0.143	0.045	2.00	83	-1.43	101	8.4	-0.2	134	560	85	78
109	15.459	0.142	0.045	2.03	83	-0.85	100	8.3	-0.1	134	559	86	78
110	15.603	0.144	0.045	2.00	83	-0.98	101	8.1	-0.2	134	556	87	78
111	15.742	0.139	0.045	2.01	83	-2.09	98	8.0	-0.1	134	555	86	78
112	15.887	0.145	0.045	2.01	83	-2.02	102	7.7	-0.3	134	553	85	78
113	16.026	0.139	0.045	2.02	83	-1.03	98	7.7	0	134	554	85	78
114	16.171	0.145	0.045	2.02	83	-1.52	102	7.5	-0.2	134	552	83	78
115	16.313	0.142	0.045	2.03	83	-2.17	100	7.3	-0.2	134	555	84	77
116	16.457	0.144	0.045	2.01	83	-1.74	101	7.2	-0.1	134	554	84	79
117	16.598	0.141	0.045	2.01	83	-0.73	99	7.0	-0.2	133	552	86	78
118	16.740	0.142	0.045	2.02	83	-2.18	100	6.9	-0.1	133	551	87	78
119	16.883	0.143	0.045	2.02	83	-1.75	100	6.6	-0.3	133	551	87	78
120	17.025	0.142	0.045	2.01	83	-0.86	100	6.6	0	132	550	86	78
121	17.170	0.145	0.045	2.02	84	-1.14	102	6.4	-0.2	132	550	86	79
122	17.310	0.140	0.045	2.01	83	-0.66	98	6.3	-0.1	133	550	85	78
123	17.455	0.145	0.045	2.00	83	-0.74	102	6.1	-0.2	132	548	84	78
124	17.594	0.139	0.045	2.02	83	-1.94	98	6.0	-0.1	132	547	84	78
125	17.740	0.146	0.045	2.02	83	-2.01	102	5.9	-0.1	132	549	84	79
126	17.880	0.140	0.045	2.03	83	-1.8	98	5.7	-0.2	132	549	85	78
127	18.026	0.146	0.045	2.02	83	-0.85	102	5.6	-0.1	132	549	85	79
128	18.167	0.141	0.045	2.03	83	-0.92	99	5.4	-0.2	132	552	84	79
129	18.311	0.144	0.045	2.02	83	-0.58	101	5.3	-0.1	133	553	85	78
130	18.452	0.141	0.045	2.01	83	-0.8	99	5.1	-0.2	132	552	83	78
131	18.594	0.142	0.045	2.03	83	-1.01	100	5.0	-0.1	132	550	83	79

BOX A TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: F2500
Run #: 1

Job #: 18-414
Tracking #: 003
Technician: SJB
Date: 6/27/2018

	Particulate Sampling Data							Fuel Weight (lb)		Temperature Data (°F)			
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Dilution Tunnel dP (in H_2O)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Scale Reading	Weight Change	Dilution Tunnel	Flue	Filter	Ambient
132	18.738	0.144	0.045	2.01	83	-2.09	101	4.8	-0.2	132	547	84	80
133	18.880	0.142	0.045	2.02	84	-0.77	99	4.8	0	131	543	86	79
134	19.025	0.145	0.045	2.00	84	-2.11	101	4.6	-0.2	131	539	87	80
135	19.165	0.140	0.045	2.01	84	-1.99	98	4.5	-0.1	130	535	86	78
136	19.310	0.145	0.045	2.02	84	-1.32	101	4.4	-0.1	131	533	85	79
137	19.449	0.139	0.045	2.01	84	-0.68	97	4.2	-0.2	130	531	84	79
138	19.595	0.146	0.045	2.02	84	-1.2	102	4.1	-0.1	130	528	84	79
139	19.736	0.141	0.045	2.03	84	-1.95	99	4.0	-0.1	129	524	83	79
140	19.882	0.146	0.045	2.02	84	-2.13	102	3.9	-0.1	129	519	84	80
141	20.023	0.141	0.045	2.01	84	-2.09	99	3.8	-0.1	129	515	86	79
142	20.167	0.144	0.045	2.01	84	-1.22	101	3.7	-0.1	128	510	87	80
143	20.308	0.141	0.045	2.00	84	-2.16	98	3.5	-0.2	127	505	86	80
144	20.451	0.143	0.045	2.03	84	-2.15	100	3.4	-0.1	127	499	85	80
145	20.595	0.144	0.045	2.01	84	-0.99	100	3.4	0	126	496	85	80
146	20.737	0.142	0.045	2.01	84	-1.51	99	3.3	-0.1	126	493	84	80
147	20.883	0.146	0.045	2.02	84	-1.17	102	3.1	-0.2	125	490	83	80
148	21.023	0.140	0.045	2.03	84	-0.75	97	3.0	-0.1	125	485	84	80
149	21.169	0.146	0.045	2.02	84	-1.53	102	3.0	0	125	481	85	80
150	21.308	0.139	0.045	2.02	84	-1.84	97	2.9	-0.1	124	478	86	80
151	21.454	0.146	0.045	2.02	84	-0.84	102	2.9	0	123	473	86	80
152	21.594	0.140	0.045	2.01	84	-0.9	97	2.8	-0.1	122	470	85	80
153	21.741	0.147	0.045	2.03	84	-2.17	102	2.7	-0.1	122	465	85	79
154	21.883	0.142	0.045	2.01	84	-0.81	99	2.7	0	121	460	84	79
155	22.027	0.144	0.045	2.02	84	-0.72	100	2.6	-0.1	121	454	84	80
156	22.169	0.142	0.045	2.02	85	-1.46	98	2.5	-0.1	121	450	84	80
157	22.312	0.143	0.045	2.03	85	-2.12	99	2.5	0	120	446	85	78
158	22.455	0.143	0.045	2.02	85	-1.27	99	2.4	-0.1	120	444	86	79
159	22.598	0.143	0.045	2.04	85	-1.56	99	2.5	0.1	119	442	86	80
160	22.743	0.145	0.045	2.03	84	-2.02	100	2.3	-0.2	119	440	85	79
161	22.886	0.143	0.045	2.02	84	-2.1	99	2.3	0	119	438	85	79
162	23.031	0.145	0.045	2.04	84	-2.14	100	2.2	-0.1	118	433	84	79
163	23.172	0.141	0.045	2.03	84	-2.11	98	2.2	0	118	429	83	80
164	23.318	0.146	0.045	2.02	84	-2.13	101	2.1	-0.1	117	426	83	79

BOX A TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: F2500
Run #: 1

Job #: 18-414
Tracking #: 003
Technician: SJB
Date: 6/27/2018

	Particulate Sampling Data							Fuel Weight (lb)		Temperature Data (°F)			
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Dilution Tunnel dP (in H_2O)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Scale Reading	Weight Change	Dilution Tunnel	Flue	Filter	Ambient
Avg/Tot	23.318	0.142	0.045	2.02	81	-1.45	100			131	548	85	76.3

BOX B TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: F2500
Run #: 1

Job #: 18-414
Tracking #: 003
Technician: SJB
Date: 6/27/2018

	Particulate Sampling Data							Flue Gas Data		
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Filter (°F)	Flue Draft (in H_2O)	CO_2 (%)	CO (%)
0	0.000		0.00	77	1		84	0.000	0.01	0.02
1	0.114	0.114	2.06	77	0.93	81	84	0.000	1.43	0.18
2	0.251	0.137	2.04	76	2.55	98	83	-0.030	2.47	0.16
3	0.389	0.138	2.03	76	2.57	101	83	-0.060	4.61	0.12
4	0.526	0.137	2.01	76	2.37	101	84	-0.070	10.12	0.23
5	0.661	0.135	1.98	77	2.55	99	85	-0.060	13.04	0.89
6	0.798	0.137	1.96	77	1.67	100	84	-0.060	13.14	0.45
7	0.933	0.135	2.02	77	2.75	98	84	-0.060	12.46	0.12
8	1.069	0.136	2.01	77	1.66	99	83	-0.050	11.21	0.08
9	1.207	0.138	2.00	77	2.29	100	83	-0.050	9.34	0.08
10	1.342	0.135	1.98	77	2.58	100	84	-0.060	8.56	0.12
11	1.480	0.138	1.99	77	0.82	101	84	-0.060	11.58	0.19
12	1.615	0.135	1.98	77	0.8	99	84	-0.070	14.08	0.41
13	1.750	0.135	1.96	78	2.56	99	84	-0.070	15.25	1.11
14	1.889	0.139	1.97	78	2.71	102	83	-0.070	15.00	0.29
15	2.021	0.132	1.97	78	2.44	97	84	-0.060	14.76	0.16
16	2.159	0.138	1.96	78	2.7	101	84	-0.070	14.33	0.15
17	2.294	0.135	1.96	79	2.64	99	85	-0.060	13.54	0.13
18	2.428	0.134	1.96	79	2.75	98	84	-0.070	12.90	0.12
19	2.567	0.139	1.97	79	0.92	102	83	-0.070	12.17	0.09
20	2.699	0.132	1.95	80	0.86	97	83	-0.070	12.65	0.09
21	2.836	0.137	1.94	80	0.82	102	84	-0.080	13.20	0.61
22	2.971	0.135	1.96	80	1.06	100	85	-0.070	12.88	0.38
23	3.106	0.135	1.95	80	1.01	100	85	-0.070	12.35	0.18
24	3.243	0.137	1.94	81	1.3	101	84	-0.070	11.44	0.18
25	3.378	0.135	1.95	81	2.84	99	83	-0.070	11.15	0.76
26	3.512	0.134	1.93	81	2.83	99	83	-0.070	11.52	1.06
27	3.650	0.138	1.94	82	2.31	102	84	-0.070	11.51	0.99
28	3.783	0.133	1.93	82	2.6	98	85	-0.070	11.32	0.75
29	3.921	0.138	2.05	82	2.77	102	85	-0.070	10.86	0.43
30	4.059	0.138	2.05	83	2.93	101	84	-0.070	10.50	0.22
31	4.198	0.139	2.04	83	1.04	102	83	-0.070	10.30	0.14

BOX B TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: F2500
Run #: 1

Job #: 18-414
Tracking #: 003
Technician: SJB
Date: 6/27/2018

	Particulate Sampling Data							Flue Gas Data		
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Filter (°F)	Flue Draft (in H_2O)	CO_2 (%)	CO (%)
32	4.339	0.141	2.05	83	2.29	103	84	-0.060	10.27	0.13
33	4.477	0.138	2.04	84	2.68	102	85	-0.070	10.27	0.14
34	4.618	0.141	2.01	84	1.55	104	85	-0.070	10.32	0.15
35	4.754	0.136	2.02	84	2.06	100	84	-0.070	10.34	0.15
36	4.896	0.142	2.02	85	2.68	104	83	-0.070	10.33	0.15
37	5.034	0.138	2.03	85	1.16	101	84	-0.070	10.42	0.16
38	5.171	0.137	2.02	85	3.09	101	85	-0.070	10.44	0.17
39	5.312	0.141	2.03	85	1.13	106	85	-0.070	10.44	0.17
40	5.449	0.137	2.01	86	1.18	101	85	-0.070	10.49	0.17
41	5.589	0.140	2.01	86	0.98	103	84	-0.070	10.49	0.18
42	5.727	0.138	2.00	86	2.76	101	83	-0.070	10.40	0.18
43	5.867	0.140	2.00	87	1.48	102	84	-0.060	9.94	0.14
44	6.005	0.138	1.99	87	1.09	101	85	-0.070	9.94	0.03
45	6.143	0.138	2.00	87	3.02	101	85	-0.070	9.94	0.02
46	6.285	0.142	2.00	87	2.93	104	85	-0.070	9.94	0.03
47	6.420	0.135	1.99	88	3.05	98	84	-0.060	9.94	0.03
48	6.562	0.142	1.98	88	1.15	103	83	-0.060	9.94	0.03
49	6.700	0.138	1.99	88	2.63	101	84	-0.060	9.94	0.03
50	6.839	0.139	1.99	88	2.61	101	85	-0.070	9.94	0.03
51	6.978	0.139	2.00	89	1.53	101	85	-0.070	9.94	0.04
52	7.116	0.138	2.01	89	2.28	100	85	-0.060	9.94	0.02
53	7.256	0.140	1.98	89	3.06	102	84	-0.060	9.94	0.04
54	7.393	0.137	1.99	89	1.8	100	83	-0.060	9.94	0.05
55	7.534	0.141	1.99	90	3.02	103	84	-0.070	9.94	0.05
56	7.671	0.137	1.98	90	2.57	100	85	-0.070	9.94	0.05
57	7.808	0.137	1.97	90	2.19	100	85	-0.070	9.94	0.06
58	7.950	0.142	1.98	90	2.45	104	84	-0.070	10.52	0.07
59	8.085	0.135	1.97	90	3.07	98	83	-0.070	12.76	0.13
60	8.225	0.140	1.96	91	1.63	102	84	-0.080	13.72	0.18
61	8.362	0.137	1.94	91	2.65	100	85	-0.070	13.83	0.14
62	8.499	0.137	1.96	91	1.6	100	85	-0.070	13.65	0.12
63	8.637	0.138	1.95	91	3.04	101	85	-0.070	13.43	0.11

BOX B TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: F2500
Run #: 1

Job #: 18-414
Tracking #: 003
Technician: SJB
Date: 6/27/2018

	Particulate Sampling Data							Flue Gas Data		
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Filter (°F)	Flue Draft (in H_2O)	CO_2 (%)	CO (%)
64	8.773	0.136	1.92	91	3.16	99	84	-0.070	13.23	0.11
65	8.911	0.138	1.92	91	2.66	101	84	-0.070	13.02	0.11
66	9.047	0.136	1.92	92	1.85	99	85	-0.070	13.02	0.04
67	9.182	0.135	1.91	92	3.17	98	85	-0.070	13.02	0.04
68	9.321	0.139	1.92	92	2.82	101	85	-0.070	13.02	0.05
69	9.455	0.134	1.91	92	1.51	97	84	-0.070	14.14	0.14
70	9.593	0.138	1.92	92	1.65	100	84	-0.070	15.87	0.12
71	9.730	0.137	2.15	92	1.47	99	84	-0.070	15.92	0.10
72	9.870	0.140	2.00	93	1.99	101	85	-0.070	15.81	0.09
73	10.010	0.140	2.01	93	3.24	101	85	-0.070	15.77	0.08
74	10.148	0.138	2.00	93	2.2	100	85	-0.070	15.64	0.09
75	10.290	0.142	1.99	93	1.89	103	84	-0.070	15.56	0.08
76	10.426	0.136	1.99	93	1.72	98	83	-0.070	15.45	0.08
77	10.568	0.142	2.00	93	2.75	103	85	-0.070	15.39	0.08
78	10.707	0.139	1.99	94	3.28	100	85	-0.070	15.33	0.09
79	10.846	0.139	1.98	94	2.58	100	85	-0.070	15.22	0.09
80	10.986	0.140	1.99	94	2.84	101	85	-0.070	15.25	0.08
81	11.125	0.139	2.00	94	1.44	100	84	-0.060	15.35	0.08
82	11.267	0.142	2.00	94	1.36	103	83	-0.070	15.90	0.09
83	11.403	0.136	1.98	94	2.53	98	85	-0.070	16.88	0.07
84	11.544	0.141	1.99	94	2.8	102	85	-0.070	16.54	0.08
85	11.683	0.139	1.99	94	3.11	100	86	-0.070	15.94	0.08
86	11.821	0.138	1.98	94	1.4	100	85	-0.070	15.46	0.09
87	11.962	0.141	1.98	95	1.44	102	84	-0.070	15.15	0.08
88	12.101	0.139	1.97	95	1.47	100	83	-0.070	14.91	0.08
89	12.242	0.141	1.98	95	1.95	102	84	-0.070	14.77	0.09
90	12.378	0.136	1.99	95	1.63	98	86	-0.070	14.70	0.09
91	12.520	0.142	1.98	95	1.44	102	86	-0.070	14.56	0.10
92	12.659	0.139	1.98	95	3.2	100	85	-0.070	14.56	0.03
93	12.796	0.137	1.98	95	2.14	99	84	-0.070	14.09	0.09
94	12.938	0.142	1.99	95	3.27	102	84	-0.070	14.52	0.08
95	13.075	0.137	1.98	95	1.94	99	85	-0.070	14.78	0.09

BOX B TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: F2500
Run #: 1

Job #: 18-414
Tracking #: 003
Technician: SJB
Date: 6/27/2018

	Particulate Sampling Data							Flue Gas Data		
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Filter (°F)	Flue Draft (in H_2O)	CO_2 (%)	CO (%)
96	13.216	0.141	1.97	95	1.74	101	86	-0.070	14.86	0.08
97	13.354	0.138	1.97	96	3.35	99	85	-0.070	14.98	0.08
98	13.495	0.141	1.96	96	2.4	101	84	-0.070	15.04	0.08
99	13.633	0.138	1.98	96	2.61	99	84	-0.070	15.12	0.09
100	13.771	0.138	1.97	96	1.51	99	84	-0.070	15.21	0.09
101	13.913	0.142	1.98	96	2.57	102	85	-0.070	15.27	0.09
102	14.050	0.137	1.97	96	1.81	99	85	-0.070	15.44	0.09
103	14.190	0.140	1.98	96	1.46	101	85	-0.070	16.34	0.09
104	14.328	0.138	1.99	96	2.04	99	85	-0.070	15.81	0.07
105	14.469	0.141	1.96	96	2.81	101	84	-0.070	15.27	0.08
106	14.607	0.138	1.96	96	3.34	99	84	-0.070	14.91	0.07
107	14.745	0.138	1.96	96	2.59	99	85	-0.070	14.63	0.07
108	14.887	0.142	1.97	97	1.5	102	85	-0.070	14.50	0.06
109	15.024	0.137	1.97	97	3.09	98	85	-0.070	14.34	0.07
110	15.165	0.141	1.97	97	2.8	101	85	-0.070	14.32	0.07
111	15.304	0.139	1.98	97	1.49	100	84	-0.070	14.26	0.07
112	15.443	0.139	1.97	97	1.45	100	84	-0.070	14.24	0.07
113	15.582	0.139	1.97	97	3.06	100	85	-0.070	14.13	0.06
114	15.720	0.138	1.97	97	1.49	99	86	-0.060	14.06	0.07
115	15.862	0.142	1.97	97	2.72	102	85	-0.070	14.01	0.07
116	15.998	0.136	1.96	97	1.67	97	84	-0.070	13.97	0.07
117	16.140	0.142	1.97	97	1.73	102	84	-0.060	13.97	0.06
118	16.279	0.139	1.97	98	3.21	99	84	-0.060	13.95	0.07
119	16.418	0.139	1.96	97	1.8	100	85	-0.070	13.86	0.07
120	16.558	0.140	1.98	98	1.49	100	86	-0.060	13.89	0.06
121	16.696	0.138	1.98	98	2.67	99	85	-0.060	13.96	0.06
122	16.837	0.141	1.96	98	1.7	101	85	-0.070	13.90	0.06
123	16.974	0.137	1.97	98	2.46	98	84	-0.070	13.87	0.06
124	17.115	0.141	1.97	98	3.16	101	84	-0.060	13.76	0.07
125	17.254	0.139	1.96	98	1.43	99	85	-0.070	13.65	0.07
126	17.392	0.138	1.96	98	1.51	99	86	-0.070	13.56	0.07
127	17.533	0.141	1.96	98	2.32	101	86	-0.070	13.64	0.06

BOX B TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: F2500
Run #: 1

Job #: 18-414
Tracking #: 003
Technician: SJB
Date: 6/27/2018

	Particulate Sampling Data							Flue Gas Data		
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Filter (°F)	Flue Draft (in H_2O)	CO_2 (%)	CO (%)
128	17.671	0.138	1.94	98	3.29	99	84	-0.070	13.67	0.06
129	17.813	0.142	1.97	98	3.25	101	84	-0.070	13.69	0.07
130	17.950	0.137	1.97	98	1.72	98	83	-0.060	13.77	0.05
131	18.091	0.141	1.97	98	1.8	101	85	-0.070	13.70	0.07
132	18.230	0.139	1.97	98	2.72	99	85	-0.070	13.68	0.07
133	18.368	0.138	1.96	98	3.3	98	85	-0.060	13.67	0.07
134	18.510	0.142	1.97	98	1.94	101	85	-0.060	13.74	0.05
135	18.647	0.137	1.98	98	2.09	98	84	-0.070	13.69	0.06
136	18.790	0.143	1.97	98	2.21	102	84	-0.060	13.73	0.06
137	18.927	0.137	1.97	99	1.85	97	84	-0.060	13.69	0.06
138	19.069	0.142	1.97	98	3.14	101	85	-0.060	13.72	0.06
139	19.208	0.139	1.97	99	1.56	99	86	-0.060	13.68	0.06
140	19.345	0.137	1.98	99	2.86	97	85	-0.060	13.65	0.07
141	19.487	0.142	1.98	99	3.11	101	85	-0.060	13.59	0.07
142	19.626	0.139	1.98	99	2.98	99	84	-0.060	13.58	0.06
143	19.768	0.142	1.97	99	2.63	101	84	-0.060	13.53	0.06
144	19.905	0.137	1.99	99	3.34	97	85	-0.060	13.43	0.06
145	20.048	0.143	1.98	99	2.11	101	86	-0.060	13.28	0.07
146	20.187	0.139	1.97	99	3.07	99	85	-0.060	13.14	0.06
147	20.325	0.138	1.97	99	1.64	98	85	-0.060	12.88	0.06
148	20.467	0.142	1.98	99	2.3	101	84	-0.060	12.63	0.05
149	20.606	0.139	1.99	99	2.56	98	84	-0.060	12.41	0.04
150	20.749	0.143	1.98	99	3.34	101	84	-0.050	12.12	0.05
151	20.885	0.136	1.98	99	1.91	96	85	-0.060	11.85	0.05
152	21.028	0.143	1.98	99	3.25	101	86	-0.060	11.65	0.04
153	21.168	0.140	1.98	99	1.54	99	85	-0.060	11.33	0.05
154	21.308	0.140	1.98	100	2.97	99	84	-0.060	11.09	0.05
155	21.448	0.140	1.98	99	1.47	99	84	-0.050	10.79	0.04
156	21.587	0.139	1.98	99	3.08	98	84	-0.050	10.49	0.05
157	21.731	0.144	1.96	100	1.82	101	85	-0.050	10.19	0.04
158	21.869	0.138	1.98	100	2.98	97	86	-0.060	9.88	0.04
159	22.011	0.142	1.98	100	2.99	100	85	-0.060	9.51	0.04

BOX B TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: F2500
Run #: 1

Job #: 18-414
Tracking #: 003
Technician: SJB
Date: 6/27/2018

	Particulate Sampling Data							Flue Gas Data		
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Filter (°F)	Flue Draft (in H_2O)	CO_2 (%)	CO (%)
160	22.150	0.139	1.99	100	3.22	98	85	-0.050	9.21	0.04
161	22.292	0.142	1.97	100	3.26	100	84	-0.050	8.83	0.04
162	22.432	0.140	1.98	100	2.82	98	83	-0.050	8.53	0.04
163	22.571	0.139	1.99	100	1.85	98	84	-0.050	8.23	0.04
164	22.713	0.142	2.00	100	1.52	100	85	-0.050	8.04	0.03
Avg/Tot	22.713	0.138	1.97	91	2.24	100			12.61	0.13

WOODSTOVE SURFACE TEMPERATURE DATA

Client: FPI
Model: F2500
Run #: 1

Job #: 18-414
Tracking #: 003
Technician: SJB
Date: 6/27/2018

	Temperature Data (°F)						
Elapsed Time (min)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
0	73	73	73	73	73	73.0	73
1	73	73	73	74	73	73.2	87
2	74	73	74	77	73	74.2	115
3	77	76	78	85	73	77.8	187
4	82	81	84	105	73	85.0	284
5	90	88	90	134	73	95.0	383
6	99	97	96	171	74	107.4	691
7	109	106	103	208	75	120.2	704
8	118	117	110	239	77	132.2	647
9	127	127	117	262	79	142.4	612
10	137	137	122	280	82	151.6	654
11	146	147	128	308	86	163.0	735
12	153	157	133	339	90	174.4	842
13	160	166	137	371	94	185.6	932
14	166	174	141	402	98	196.2	921
15	173	181	147	432	103	207.2	890
16	181	189	151	458	108	217.4	887
17	189	197	156	481	113	227.2	866
18	198	205	161	501	117	236.4	888
19	207	214	167	522	122	246.4	966
20	217	223	172	541	128	256.2	964
21	228	232	179	557	132	265.6	977
22	240	242	186	576	137	276.2	1009
23	251	252	192	593	142	286.0	1021
24	261	261	199	609	147	295.4	986
25	271	270	205	623	152	304.2	949
26	279	278	210	635	157	311.8	937
27	288	286	217	641	161	318.6	964
28	296	294	222	648	166	325.2	1016
29	304	302	228	654	170	331.6	1011
30	311	310	234	658	174	337.4	996
31	319	319	239	661	178	343.2	944
32	327	327	246	663	182	349.0	905
33	334	335	252	663	186	354.0	975
34	342	342	258	666	191	359.8	1030
35	349	349	264	672	194	365.6	1049
36	357	356	270	677	198	371.6	1060
37	364	361	274	683	202	376.8	1059
38	372	369	279	691	206	383.4	1057
39	378	376	286	691	210	388.2	975
40	384	383	292	676	214	389.8	985
41	389	388	297	662	217	390.6	929
42	391	391	300	649	221	390.4	905
43	392	390	301	638	224	389.0	887
44	392	391	303	631	228	389.0	873
45	390	388	302	629	231	388.0	873
46	388	388	302	628	233	387.8	870
47	385	386	302	627	236	387.2	866

WOODSTOVE SURFACE TEMPERATURE DATA

Client: FPI
Model: F2500
Run #: 1

Job #: 18-414
Tracking #: 003
Technician: SJB
Date: 6/27/2018

	Temperature Data (°F)						
Elapsed Time (min)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
48	382	384	300	625	238	385.8	862
49	378	382	298	623	240	384.2	859
50	375	379	296	624	242	383.2	862
51	371	378	294	628	244	383.0	866
52	368	377	292	629	246	382.4	863
53	365	376	290	630	246	381.4	866
54	362	375	288	637	248	382.0	918
55	359	374	285	647	249	382.8	992
56	358	374	285	658	250	385.0	992
57	358	373	284	669	250	386.8	985
58	358	376	285	679	251	389.8	988
59	359	375	201	677	252	372.8	994
60	360	375	184	680	253	370.4	1003
61	362	376	173	681	253	369.0	1016
62	364	378	164	682	254	368.4	1026
63	366	379	160	685	254	368.8	1032
64	368	379	156	685	255	368.6	1036
65	372	382	153	686	255	369.6	1034
66	374	383	151	687	255	370.0	1028
67	377	384	149	686	255	370.2	1025
68	379	385	148	686	256	370.8	1020
69	382	386	146	685	256	371.0	1013
70	385	388	147	688	257	373.0	1005
71	388	390	147	688	257	374.0	997
72	390	391	146	687	257	374.2	988
73	393	392	147	688	258	375.6	980
74	395	394	147	686	258	376.0	974
75	398	395	146	684	259	376.4	968
76	400	397	147	682	259	377.0	962
77	403	397	148	682	259	377.8	959
78	405	399	147	681	260	378.4	955
79	408	400	148	680	261	379.4	953
80	410	403	148	678	262	380.2	954
81	412	404	148	679	263	381.2	951
82	415	405	149	678	263	382.0	949
83	417	406	148	678	264	382.6	950
84	418	407	149	677	265	383.2	951
85	421	408	149	677	265	384.0	954
86	423	410	150	674	266	384.6	955
87	425	412	151	676	268	386.4	958
88	427	413	150	676	268	386.8	963
89	429	415	151	676	269	388.0	966
90	431	416	152	676	270	389.0	963
91	433	417	151	675	271	389.4	955
92	436	418	152	672	272	390.0	947
93	437	420	153	673	274	391.4	943
94	440	420	152	671	275	391.6	939
95	441	421	154	669	276	392.2	939

WOODSTOVE SURFACE TEMPERATURE DATA

Client: FPI
Model: F2500
Run #: 1

Job #: 18-414
Tracking #: 003
Technician: SJB
Date: 6/27/2018

	Temperature Data (°F)						
Elapsed Time (min)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
96	443	423	153	668	278	393.0	941
97	445	424	153	667	279	393.6	943
98	447	426	153	665	280	394.2	946
99	448	427	154	663	282	394.8	956
100	451	428	154	663	283	395.8	964
101	452	429	154	661	284	396.0	966
102	454	430	155	659	286	396.8	962
103	456	432	156	658	287	397.8	957
104	458	431	156	660	289	398.8	950
105	459	433	155	659	291	399.4	946
106	460	433	156	657	292	399.6	941
107	462	435	157	657	293	400.8	935
108	463	436	157	656	295	401.4	929
109	464	437	157	654	297	401.8	924
110	466	437	157	653	298	402.2	922
111	468	439	158	652	300	403.4	918
112	469	439	158	652	301	403.8	916
113	470	441	158	651	303	404.6	920
114	472	440	159	652	304	405.4	925
115	473	442	159	651	306	406.2	928
116	475	444	159	651	308	407.4	926
117	476	444	160	647	310	407.4	922
118	478	446	160	649	311	408.8	918
119	478	446	161	648	313	409.2	918
120	480	448	161	649	315	410.6	921
121	482	449	162	648	317	411.6	921
122	483	449	161	648	319	412.0	917
123	484	452	162	649	321	413.6	913
124	486	453	163	648	322	414.4	914
125	487	454	164	648	325	415.6	917
126	488	454	164	650	326	416.4	920
127	490	455	165	651	328	417.8	922
128	491	456	165	651	330	418.6	925
129	492	457	165	652	332	419.6	929
130	493	458	165	654	334	420.8	926
131	494	460	167	654	335	422.0	921
132	496	460	166	655	337	422.8	916
133	497	462	168	652	339	423.6	909
134	498	463	168	651	341	424.2	902
135	500	463	169	649	343	424.8	897
136	500	464	169	648	345	425.2	895
137	502	465	168	646	347	425.6	892
138	503	466	170	640	349	425.6	885
139	504	466	169	636	351	425.2	874
140	504	467	169	631	353	424.8	864
141	504	466	169	628	355	424.4	856
142	505	468	171	622	357	424.6	845
143	505	468	171	617	359	424.0	838

WOODSTOVE SURFACE TEMPERATURE DATA

Client: FPI
Model: F2500
Run #: 1

Job #: 18-414
Tracking #: 003
Technician: SJB
Date: 6/27/2018

	Temperature Data (°F)						
Elapsed Time (min)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
144	506	469	172	611	361	423.8	834
145	506	470	173	606	363	423.6	826
146	507	469	171	600	364	422.2	822
147	507	470	172	593	366	421.6	817
148	507	470	171	587	367	420.4	809
149	506	470	172	580	369	419.4	803
150	507	471	170	574	370	418.4	797
151	506	470	171	566	371	416.8	790
152	505	471	169	559	372	415.2	785
153	504	471	170	551	373	413.8	777
154	503	470	170	543	374	412.0	765
155	501	471	169	536	375	410.4	753
156	499	471	169	528	376	408.6	745
157	498	469	169	520	377	406.6	740
158	495	470	168	512	377	404.4	736
159	493	470	168	505	378	402.8	733
160	491	470	168	497	379	401.0	730
161	489	469	167	492	380	399.4	723
162	487	469	167	487	381	398.2	711
163	486	468	167	480	382	396.6	703
164	483	468	166	475	383	395.0	702
Average	389	376	179	596	257	359	884

LAB SAMPLE DATA - ASTM E2515

Client: FPI
Job #: 18-414
Model: F2500
Tracking #: 003
Run #: 1
Technician: SJB
Date: 6/27/2018

TRAIN A (1st Hour)

Sample Component	Sample Type	Filter, Probe, or O-Ring #	Weights		
			Final, mg	Tare, mg	Particulate, mg
A. Front filter catch	Filter	T001	91.1	86	5.1
B. Rear filter catch	Filter				0.0
C. Probe catch*	Probe				0.0
D. O-Ring catch*	O-Ring				0.0

Sub-Total	Total Particulate, mg:	5.1

TRAIN A (Post 1st hour)

Sample Component	Sample Type	Filter, Probe, or O-Ring #	Weights		
			Final, mg	Tare, mg	Particulate, mg
A. Front filter catch	Filter	T002	172.5	86	1.2
B. Rear filter catch	Filter	T003		85.3	
C. Probe catch*	Probe	2A	116237.9	116237.5	0.4
D. O-Ring catch*	O-Ring	2A	3551.6	3550.5	1.1

Sub-Total	Total Particulate, mg:	2.7
Train A Aggregate	Total Particulate, mg:	**7.8**

TRAIN B

Sample Component	Reagent	Filter, Probe, or O-Ring #	Weights		
			Final, mg	Tare, mg	Particulate, mg
A. Front filter catch	Filter	T004	181.2	87.1	6.5
B. Rear filter catch	Filter	T005		87.6	
C. Probe catch*	Probe	2B	116328.9	116328.5	0.4
D. O-Ring catch*	O-Ring	2B	3569.6	3569.2	0.4

Total Particulate, mg:	**7.3**

AMBIENT

Sample Component	Reagent	Filter, Probe, or O-Ring #	Weights		
			Final, mg	Tare, mg	Particulate, mg
A. Filter catch*	Filter	T006	87.9	87.8	0.1

Total Particulate, mg:	**0.1**

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

ASTM E3053 Wood Heater Run Sheets

Client: FPI | Job Number: 18-414 | Tracking #: 003
Model: F2500 | Run Number: 1 | Test Date: 6/25/2018

Wood Heater Run Notes

Pre-Test Notes

Pre-Test Start Time: N/A
Air Control Setting: N/A

Time	Notes
N/A	High Burn test performed from cold start, no Preburn.

Test Notes

Test Burn Start Time: 8:35
Air Control Setting: High Setting - Fully Open

Time	Notes
0 min	Started sampling/kindling ignition with propane torch for 1 min. Door cracked open 3.5", bypass open, air control set to test position, blower off.
2 min	Door closed to 1"
3.5 min	Door closed/not latched
4.5 min	Door latched closed
5 min	Catalyst bypass closed
9 min	At 1.1 lbs, added 2.7 lbs of start-up fuel, door closed within 60 seconds
20 min	At 1.6 lbs, added 1.6 lbs of start-up fuel, door closed within 60 seconds
32 min	At 1.8 lbs, added 1.7 lbs of start-up fuel, door closed within 30 seconds
37 min	At 2.4 lbs, leveled coal bed, zeroed scale
38 min	Loaded test fuel, done in 30 seconds, door closed at 1 min from loading
58 min	Blower fan turned on to high
60 min	Changed 1 hour filter

Test Burn End Time: 11:19

Background Filter Volume (ft^3): 26.644

Filter Data

Train	A	A	A	A	A	B	B	B	B	AMB
Element	Front Filter (First Hour)	Front Filter (Remainder)	Rear Filter	Probe	O-Ring Pair	Front Filter	Rear Filter	Probe	O-Ring Pair	Filter
ID #	T001	T002	T003	2A	2A	T004	T005	2B	2B	T006
Tare (mg)	86.0	86.0	85.3	116237.5	3550.5	87.1	87.6	116238.5	3569.2	87.8
Final Weight (mg)	91.1	172.5		116237.9	3551.6	181.2		116328.9	3569.6	87.9

Sample Train Leak Check: A: 0.000 @ -16 "Hg B: 0.000 @ -13 "Hg

Technician Signature:  Date: 6/28/2018

ASTM E3053 Wood Heater Run Sheets

Client: FPI Job Number: 18-414 Tracking #: 003
Model: F2500 Run Number: 1 Test Date: 6/25/2018

Flue Gas Concentration Measurement

Calibration Gas Values: Span Gas CO_2 (%): 17.06 CO (%): 4.25
Mid Gas CO_2 (%): 10.02 CO (%): 2.52

Calibration Results:

	Pre Test			Post Test		
	Zero	Mid	Span	Zero	Mid	Span
Time	7:08	7:11	7:15	11:50	11:42	12:00
CO_2	0.00	10.05	17.06	0.05	10.20	17.20
CO	0.000	2.487	4.248	-0.058	2.555	4.315

Flue Gas Probe Leak Check: Initial: No Leakage Final: No Leakage

Dilution Tunnel Flow

Pitot Tube Leak Test: Initial: No Leakage Final: No Leakage

Velocity Traverse Data

	Pt.1	Pt.2	Pt.3	Pt.4	Pt.5	Pt.6	Pt.7	Pt.8	Center
dP (inH_2O):	0.028	0.036	0.044	0.040	0.030	0.040	0.044	0.036	0.045
Temp (°F):	75	75	75	75	75	75	75	75	75

Dilution Tunnel Static Pressure (inH_2O): -0.130

Supplemental Data

Room Air Velocity (ft/min): Initial: <50 Final: <50
Scale Audit (lbs): Initial: 10 Final: 10
Stack Diameter (in): 6
Induced Draft (in H_2O): 0
% Smoke Capture: 100
Flue Pipe Cleaned Prior to First Test in Series: Date: 6/22/2018

	Initial	Middle	Ending
P_b (inHg)	29.94	29.94	29.94
RH (%)	46.9	44.0	42.1

Technician Signature: Date: 6/28/2018

WOOD STOVE TEST DATA PACKET
ASTM E3053/E2515

Run 2 Data Summary

Client: FPI
Model: F2500
Job #: 18-414
Tracking #: 003
Test Date: 6/26/2018

6/29/2018

Techician Signature Date

TEST RESULTS - ASTM E3053 / ASTM E2515

Client: FPI
Model: F2500
Run #: 2

Job #: 18-414
Tracking #: 003
Technician: SJB
Date: 6/26/2018

Burn Rate (kg/hr):	**1.04**

	Ambient Sample	Sample Train A	Sample Train B	1st Hour Filter
Total Sample Volume (ft^3)	94.733	81.316	82.217	8.295
Average Gas Velocity in Dilution Tunnel (ft/sec)	13.5			
Average Gas Flow Rate in Dilution Tunnel (dscf/hr)	8887.5			
Average Gas Meter Temperature (°F)	76.7	84.3	98.5	77.8
Total Sample Volume (dscf)	93.281	79.570	78.021	8.214
Average Tunnel Temperature (°F)	97.7			
Total Time of Test (min)	576			
Total Particulate Catch (mg)	0.1	6.1	5.9	4.2
Particulate Concentration, dry-standard (g/dscf)	0.0000011	0.0000767	0.0000756	0.0005113
Total PM Emissions (g)	0.09	6.45	6.36	4.54
Particulate Emission Rate (g/hr)	0.01	0.67	0.66	4.54
Emissions Factor (g/kg)	-	0.65	0.64	-
Difference from Average Total Particulate Emissions (g)	-	0.04	0.04	-
Difference from Average Emissions Factor (g/kg)	-	0.00	0.00	-

Final Average Results	
Total Particulate Emissions (g)	6.40
Particulate Emission Rate (g/hr)	0.67
Emissions Factor (g/kg)	0.64
HHV Efficiency (%)	76.3%
LHV Efficiency (%)	81.6%
CO Emissions (g/min)	0.74

Quality Checks	**Requirement**	**Observed**	**Result**
Dual Train Precision	Each train within 7.5% of average emissions (in grams), or emission factors within 0.5 g/kg	See Above	OK
Filter Temps	>80 °F, <90 °F	Min: 82 / Max: 87	OK
Face Velocity	< 30 ft/min	8.2	OK
Leakage Rate	Less than 4% of average sample rate	0.001 cfm	OK
Ambient Temp	55-90 °F	Min: 74 / Max: 78	OK
Negative Probe Weight Evaluation	<5% of Total Catch	Probe Catch Not Negative	OK
Pro-Rate Variation	90% of readings between 90-110%; none greater than 120% or less than 80%	See Data Tabs	OK

B415.1 Efficiency Results

Manufacturer:	FPI
Model:	F2500
Date:	06/26/18
Run:	2
Control #:	18-414
Test Duration:	576
Output Category:	Low

Test Results in Accordance with CSA B415.1-09

	HHV Basis	LHV Basis
Overall Efficiency	76.3%	81.6%
Combustion Efficiency	97.2%	97.2%
Heat Transfer Efficiency	78.5%	83.9%

Output Rate (kJ/h)	15,754	14,944	**(Btu/h)**
Burn Rate (kg/h)	1.03	2.28	**(lb/h)**
Input (kJ/h)	20,648	19,587	**(Btu/h)**

Test Load Weight (dry kg)	9.93	21.89	**dry lb**
MC wet (%)	16.78		
MC dry (%)	20.16		
Particulate (g)	6.40		
CO (g)	428		
Test Duration (h)	9.60		

Emissions	**Particulate**	**CO**
g/MJ Output	0.04	2.83
g/kg Dry Fuel	0.64	43.12
g/h	0.67	44.60
g/min	0.01	0.74
lb/MM Btu Output	0.10	6.58

Air/Fuel Ratio (A/F)	16.17

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

Adjunct to ASTM E 3053 Wood Heater Cordwood Test Method - May 10, 2017 Version

Cordwood Fuel Load Calculators - 10 lb/ft^3 Nominal Load Density

Core 45-65% of Total Load Weight, Remainder 35-55% of Total Load Weight

Values to be input manually

For All Usable Firebox Volumes - High Fire Test Only

Nominal Required Load Density (wet basis)	10	lb/ft^3				
Usable Firebox Volume	2.24	ft^3				
Total Nom. Load Wt. Target	22.40	lb				
Total Load Wt. Allowable Range	21.30	to	23.50	lb		
Core Target Wt. Allowable Range	10.10	to	14.60	lb		
Remainder Load Wt. Allowable Range	7.80	to	12.30	lb		
						Mid-Point
Core Load Pc. Wt. Allowable Range	3.40	to	5.60	lb		4.50
Remainder Load Pc. Wt. Allowable Range	2.20	to	12.30	lb		7.25
	Pc. #					
Core Load Piece Wt. Actual	1	4.19	lb	In Range		
	2	4.06	lb	In Range		
	3	4.41	lb	In Range		
Core Load Total. Wt. Actual		12.66	lb	In Range		
	Pc. #					
Remainder Load Piece Wt.	1	2.43	lb	In Range		
(1 to 3 Pcs.)	2	3.40	lb	In Range		
	3	3.22	lb	In Range		
Remainder Load Tot. Wt. Act		9.05	lb	In Range		
Total Load Wt. Actual		21.71	lb	In Range		
Core % of Total Wt.		58%		In Range		45-65%
Remainder % of Total Wt.		42%		In Range		35-55%
Actual Load % of Nominal Target		97%		In Range		95-105%
Actual Fuel Load Density		9.7	lb/ft^3			
Kindling and Start-up Fuel						
Maximim Kindling Wt. (20% of Tot. Load Wt.)		4.34	lb			
Actual Kindling Wt.		3.62	lb	In Range		16.7%
Maximum Start-up Fuel Wt. (30% of Tot. Load Wt.)		6.51	lb			
Actual Start-up Fuel Wt.		5.84	lb	In Range		26.9%
Allowable Residual Start-up Fuel Wt. Range	2.2	to	4.3	lb		Mid-Point
Actual Residual Start-up Fuel Wt.		2.6	lb	In Range		3.3
Total Wt. All Fuel Added (wet basis)		31.17	lb			
High Fire Test Run End Point Range	Low		High			Mid-Point
Based on Fuel Load Wt. (w/tares)	2.0	to	2.4	lb		2.2
Actual Fuel Load Ending Wt.			lb	Out of Range		

Fuel Piece Moisture Reading (%-dry basis)								
1	2	3	Ave.		Pc. Wt. Dry Basis			
19.4	18.7	19.9	19.3	In Range	3.51	lb	1.59	kg
18.3	22.6	19.1	20.0	In Range	3.38	lb	1.53	kg
20.4	24.7	22.1	22.4	In Range	3.60	lb	1.63	kg
18.9	19.1	19.7	19.2	In Range	2.04	lb	0.92	kg
20.4	25	18	21.1	In Range	2.81	lb	1.27	kg
19	22.1	18.6	19.9	In Range	2.69	lb	1.22	kg
Total Load Ave. MC (%-dry basis)			20.4	In Range				
Total Load Ave. MC % (wet basis)			17.0					
Total Test Load Weight (dry basis) →					18.03	lb	8.18	kg
Kindling Moisture (%-dry basis)								
10	10	10	10.0	In Range	3.29	lb	1.49	kg
Start-up Fuel Moisture Readings (%-dry basis)								
19.4	22.1	18.4	20.0	In Range	4.87	lb	2.21	kg
Total Wt. All Fuel Added (dry basis) →					26.19	lb	11.88	kg
Total Wt. All Fuel Burned (dry basis) →					23.6	lb	10.7	kg

Adjunct to ASTM E 3053 Wood Heater Cordwood Test Method - May 10, 2017 Version

Cordwood Fuel Load Calculators - 12 lb/ft^3 Nominal Load Density

Core 45-65% of Total Load Weight, Remainder 35-55% of Total Load Weight

Values to be input manually

For Usable Firebox Volumes up to 3.0 ft^3 - Low and Medium Fire						
Nominal Required Load Density (wet basis)	12	lb/ft^3				
Usable Firebox Volume	2.24	ft^3				
Total Nom. Load Wt. Target	26.88	lb				
Total Load Wt. Allowable Range	25.54	to	28.22	lb		
Core Target Wt. Allowable Range	12.096	to	17.47	lb		
Remainder Load Wt. Allowable Range	9.41	to	14.78	lb		
						Mid-Point
Core Load Fuel Pc. Wt. Allowable Range	4.03	to	6.72	lb		5.38
Remainder Load Pc. Wt. Allowable Range	2.69	to	8.06	lb		5.38
	Pc. #					
Core Load Piece Wt. Actual	1	4.70	lb	In Range		
	2	6.68	lb	In Range		
	3	5.38	lb	In Range		
Core Load Total. Wt. Actual		16.76	lb	In Range		
	Pc. #					
Remainder Load Piece Wt.	1	5.84	lb	In Range		
(2 or 3 Pcs.)	2	3.68	lb	In Range		
	3		lb	NA		
Remainder Load Piece Weight Ratio - Small/Large		63%		In Range		≤ 67%
Remainder Load Tot. Wt. Act		9.52	lb	In Range		
Total Load Wt. Actual		26.28	lb	In Range		
Core % of Total Wt.		64%		In Range		45-65%
Remainder % of Total Wt.		36%		In Range		35-55%
Actual Load % of Nominal Target		98%		In Range		95-105%
Actual Fuel Load Density		11.7	lb/ft^3			
Allowable Charcoal Bed Wt. Range (lb)	2.7	to	5.2			Mid-Point
Actual Charcoal Bed Wt.		4.9	lb	In Range		3.9
Actual Fuel Load Ending Wt.		0.0	lb	Valid Test		≥ 90%
Total Wt. of Fuel Burned During Test Run lb.		26.3	lb			

Fuel Piece Moisture Reading (%-dry basis)								
1	2	3	Ave.		Pc. Wt. Dry Basis			
19.8	18.7	19.4	19.3	In Range	3.94	lb	1.79	kg
20.5	19.1	24.6	21.4	In Range	5.50	lb	2.50	kg
20	18.2	24.3	20.8	In Range	4.45	lb	2.02	kg
20.2	19.6	18.4	19.4	In Range	4.89	lb	2.22	kg
19.2	18.2	20.4	19.3	In Range	3.09	lb	1.40	kg
			NA	NA	NA	lb	NA	kg
Total Load Ave. MC % (dry basis)			20.2	In Range				
Total Load Ave. MC % (wet basis)			16.8					
Total Test Load Weight (dry basis) →					21.87	lb	9.92	kg
Total Fuel Weight Burned During Test Run (dry basis)					21.9	lb	9.92	kg

For Usable Firebox Volumes above 3.0 ft^3 - Low and Medium Fire						
Nominal Required Load Density (wet basis)	12	lb/ft^3				
Usable Firebox Volume		ft^3				
Total Nom. Load Wt. Target	0	lb				
Total Load Wt. Allowable Range	0.00	to	0.00	lb		
Core Target Wt. Allowable Range	0.00	to	0.00	lb		
Remainder Load Wt. Allowable Range	0.00	to	0.00	lb		
						Mid-Point
Core Load Fuel Pc. Wt. Allowable Range	0.00	to	0.00	lb		0.00
Remainder Load Pc. Wt. Allowable Range	0.00	to	0.00	lb		0.00
	Pc. #					
Core Load Piece Wt. Actual	1			lb	In Range	
	2			lb	In Range	
	3			lb	In Range	
Core Load Total. Wt. Actual		0.00		lb	In Range	
	Pc. #					
Remainder Load Piece Wt.	1			lb	In Range	
(3 or 4 Pcs.)	2			lb	In Range	
	3			lb	In Range	
	4			lb	NA	
Remainder Load Piece Weight Ratio - Small/Large		#NUM!			#NUM!	≤ 67%
Remainder Load Tot. Wt. Act		0.00		lb	In Range	
Total Load Wt. Actual		0.00		lb	In Range	
Core % of Total Wt.		#DIV/0!			#DIV/0!	45-65%
Remainder % of Total Wt.		#DIV/0!			#DIV/0!	35-55%
Actual Load % of Nominal Target		#DIV/0!			#DIV/0!	95-105%
Actual Fuel Load Density		#DIV/0!		lb/ft^3		
Allowable Charcoal Bed Wt. Range (lb)	0.1	to	-0.1			Mid-Point
Actual Charcoal Bed Wt.				lb	Out of Range	0.0
Actual Fuel Load Ending Wt.				lb	Valid Test	≥ 90%
Total Wt. of Fuel Burned During Test Run lb.		0.0		lb		

Fuel Piece Moisture Reading (%-dry basis)									
1	2	3	Ave.			Pc. Wt. Dry Basis			
			#DIV/0!		#DIV/0!	#DIV/0!	lb	#DIV/0!	kg
			#DIV/0!		#DIV/0!	#DIV/0!	lb	#DIV/0!	kg
			#DIV/0!		#DIV/0!	#DIV/0!	lb	#DIV/0!	kg
			#DIV/0!		#DIV/0!	#DIV/0!	lb	#DIV/0!	kg
			#DIV/0!		#DIV/0!	#DIV/0!	lb	#DIV/0!	kg
			#DIV/0!		#DIV/0!	#DIV/0!	lb	#DIV/0!	kg
			NA	NA		NA	lb	NA	kg
Total Load Ave. MC % (dry basis)			#DIV/0!		#DIV/0!				
Total Load Ave. MC % (wet basis)			#DIV/0!						
Total Test Load Weight (dry basis) →						#DIV/0!	lb	#DIV/0!	kg
Total Fuel Weight Burned During Test Run (dry basis)						#DIV/0!	lb	#DIV/0!	kg

WOODSTOVE PREBURN DATA

Client: FPI
Model: F2500
Run #: 2

Job #: 18-414
Tracking #: 003
Technician: SJB
Date: 6/26/2018

Preburn Start Time: 8:14
Recording Interval (min): 1
Run Time (min): 122

			Temperatures (°F)							
Elapsed Time (min)	**Scale Reading (lbs)**	**Flue Draft (in H_2O)**	**FB Left**	**FB Right**	**FB Back**	**FB Top**	**FB Bottom**	**Stove Surface Average**	**Flue**	**Ambient**
0	2.9	0.013	71	71	71	71	71	71.0	71	68
1	3.0	-0.027	71	71	72	73	71	71.6	138	68
2	2.5	-0.056	73	72	72	78	71	73.2	250	68
3	2.3	-0.067	77	76	76	87	71	77.4	344	67
4	2.0	-0.064	83	81	80	105	71	84.0	440	67
5	1.8	-0.051	90	87	84	130	72	92.6	402	67
6	1.7	-0.054	99	94	89	153	72	101.4	389	67
7	1.6	-0.053	108	102	94	175	73	110.4	381	67
8	1.4	-0.045	117	112	100	194	75	119.6	373	67
9	4.1	-0.051	127	121	105	214	76	128.6	413	67
10	4.0	-0.066	137	131	110	230	79	137.4	463	67
11	3.8	-0.059	144	140	115	249	81	145.8	466	67
12	3.5	-0.062	151	148	120	275	84	155.6	504	68
13	3.2	-0.073	157	156	125	309	88	167.0	562	67
14	3.0	-0.071	162	163	130	345	91	178.2	590	68
15	2.7	-0.068	169	171	136	379	95	190.0	599	68
16	2.5	-0.074	177	180	142	410	99	201.6	603	68
17	2.2	-0.073	186	189	148	441	103	213.4	601	68
18	2.1	-0.070	195	200	154	470	107	225.2	602	68
19	1.9	-0.069	206	210	161	495	111	236.6	605	68
20	1.7	-0.064	216	221	168	517	116	247.6	592	68
21	1.6	-0.064	226	233	175	536	121	258.2	568	68
22	1.4	-0.067	236	245	182	550	125	267.6	549	68
23	4.6	-0.074	247	256	190	561	131	277.0	613	68
24	4.4	-0.069	258	265	197	570	136	285.2	576	68
25	4.1	-0.071	268	274	205	582	141	294.0	586	68
26	4.0	-0.072	276	284	211	595	147	302.6	601	68
27	3.6	-0.074	285	292	218	608	152	311.0	613	68
28	3.4	-0.074	293	300	224	619	157	318.6	619	68
29	3.1	-0.072	301	309	230	629	163	326.4	621	68
30	2.9	-0.073	309	316	237	639	167	333.6	621	68
31	2.6	-0.075	317	324	242	647	172	340.4	620	68
32	5.1	-0.075	326	332	249	655	176	347.6	634	67
33	24.7	-0.083	335	340	255	665	180	355.0	687	68
34	23.6	-0.074	344	348	262	666	184	360.8	633	68
35	23.3	-0.074	352	357	267	671	188	367.0	625	68
36	23.0	-0.078	359	361	271	678	192	372.2	628	67
37	22.8	-0.079	363	365	275	684	196	376.6	629	67
38	22.5	-0.076	366	369	280	689	200	380.8	630	67
39	22.2	-0.077	369	373	282	694	203	384.2	630	67
40	22.0	-0.080	371	373	284	697	206	386.2	630	67
41	21.7	-0.074	372	376	288	699	209	388.8	631	67
42	21.5	-0.079	373	376	291	703	212	391.0	632	67
43	21.2	-0.076	374	376	291	705	215	392.2	635	67

WOODSTOVE PREBURN DATA

Client: FPI
Model: F2500
Run #: 2

Job #: 18-414
Tracking #: 003
Technician: SJB
Date: 6/26/2018

Preburn Start Time: 8:14
Recording Interval (min): 1
Run Time (min): 122

			Temperatures (°F)							
Elapsed Time (min)	**Scale Reading (lbs)**	**Flue Draft (in H_2O)**	**FB Left**	**FB Right**	**FB Back**	**FB Top**	**FB Bottom**	**Stove Surface Average**	**Flue**	**Ambient**
44	20.8	-0.075	375	379	292	708	218	394.4	637	66
45	20.7	-0.075	377	379	294	712	220	396.4	640	66
46	20.4	-0.074	378	382	296	716	223	399.0	643	66
47	20.1	-0.078	379	383	298	720	226	401.2	645	66
48	19.8	-0.077	380	384	298	724	227	402.6	646	66
49	19.6	-0.078	381	386	299	728	229	404.6	647	66
50	19.3	-0.076	383	388	300	731	232	406.8	648	65
51	19.0	-0.079	384	390	301	733	233	408.2	648	65
52	18.7	-0.073	385	392	302	736	235	410.0	647	65
53	18.4	-0.083	387	392	210	728	237	390.8	643	65
54	18.2	-0.076	388	396	194	726	245	389.8	635	73
55	17.8	-0.078	390	397	179	725	240	386.2	628	64
56	17.6	-0.077	391	400	171	722	242	385.2	623	64
57	17.3	-0.075	393	402	164	720	244	384.6	619	64
58	17.0	-0.078	395	403	161	720	246	385.0	618	64
59	16.8	-0.077	397	405	158	719	248	385.4	617	65
60	16.5	-0.078	399	408	155	719	250	386.2	615	65
61	16.1	-0.072	400	410	153	717	252	386.4	613	64
62	16.0	-0.074	402	412	152	715	253	386.8	610	64
63	15.7	-0.076	404	414	151	715	255	387.8	609	64
64	15.5	-0.076	406	416	150	711	257	388.0	607	64
65	15.2	-0.075	408	418	149	710	259	388.8	606	64
66	14.9	-0.076	409	419	149	710	260	389.4	605	63
67	14.6	-0.070	411	422	149	708	262	390.4	605	63
68	14.3	-0.078	413	425	149	705	265	391.4	604	63
69	14.1	-0.073	415	426	149	705	267	392.4	603	63
70	13.9	-0.075	417	428	150	703	268	393.2	602	63
71	13.6	-0.074	419	431	150	703	270	394.6	603	63
72	13.4	-0.073	421	433	150	703	272	395.8	603	63
73	13.1	-0.075	423	434	150	701	274	396.4	603	63
74	12.9	-0.072	425	435	151	703	276	398.0	602	63
75	12.6	-0.073	427	438	151	701	278	399.0	603	63
76	12.3	-0.071	429	440	152	702	280	400.6	604	63
77	12.2	-0.072	431	441	153	704	282	402.2	604	63
78	12.0	-0.071	433	444	153	703	284	403.4	604	63
79	11.6	-0.076	434	445	153	703	286	404.2	605	63
80	11.5	-0.076	436	447	154	703	288	405.6	605	63
81	11.3	-0.076	438	449	155	702	290	406.8	605	62
82	11.1	-0.074	440	451	155	703	291	408.0	603	62
83	10.9	-0.073	442	452	156	703	293	409.2	602	62
84	10.5	-0.074	444	455	157	702	295	410.6	600	62
85	10.4	-0.072	446	456	156	702	297	411.4	598	62
86	10.1	-0.073	448	458	157	702	298	412.6	598	62
87	10.0	-0.070	450	460	158	704	300	414.4	595	62

WOODSTOVE PREBURN DATA

Client: FPI
Model: F2500
Run #: 2

Job #: 18-414
Tracking #: 003
Technician: SJB
Date: 6/26/2018

Preburn Start Time: 8:14
Recording Interval (min): 1
Run Time (min): 122

			Temperatures (°F)							
Elapsed Time (min)	**Scale Reading (lbs)**	**Flue Draft (in H_2O)**	**FB Left**	**FB Right**	**FB Back**	**FB Top**	**FB Bottom**	**Stove Surface Average**	**Flue**	**Ambient**
88	9.9	-0.071	452	461	158	704	301	415.2	593	62
89	9.6	-0.073	455	464	159	704	303	417.0	591	62
90	9.4	-0.074	457	464	159	705	304	417.8	590	62
91	9.2	-0.081	459	467	160	706	306	419.6	668	62
92	8.7	-0.074	461	471	160	716	309	423.4	635	62
93	8.4	-0.072	463	474	162	722	311	426.4	600	62
94	8.1	-0.069	465	475	162	723	313	427.6	585	62
95	7.9	-0.069	467	478	162	722	314	428.6	581	62
96	7.6	-0.072	468	478	163	719	315	428.6	583	62
97	7.4	-0.069	470	480	163	717	317	429.4	583	62
98	7.3	-0.069	472	482	165	714	318	430.2	584	62
99	7.0	-0.072	474	482	164	712	319	430.2	584	62
100	6.9	-0.071	476	484	164	710	319	430.6	584	62
101	6.7	-0.071	478	483	165	709	320	431.0	585	62
102	6.6	-0.073	480	485	166	709	321	432.2	588	62
103	6.4	-0.071	482	487	166	707	321	432.6	586	62
104	6.3	-0.071	485	486	167	709	322	433.8	583	62
105	6.1	-0.070	487	487	168	708	322	434.4	581	62
106	6.0	-0.067	490	488	168	707	323	435.2	578	62
107	5.7	-0.069	492	489	168	706	323	435.6	573	62
108	5.7	-0.068	495	489	168	698	323	434.6	559	62
109	5.6	-0.067	498	490	168	692	323	434.2	539	62
110	5.5	-0.066	500	491	169	683	324	433.4	522	62
111	5.5	-0.062	503	492	169	672	324	432.0	508	62
112	5.4	-0.061	505	492	169	659	324	429.8	497	62
113	5.4	-0.060	507	491	170	648	324	428.0	489	62
114	5.3	-0.061	509	491	169	635	324	425.6	482	62
115	5.3	-0.059	510	490	170	623	324	423.4	475	62
116	5.2	-0.059	511	491	168	611	324	421.0	467	62
117	5.1	-0.059	511	488	169	600	324	418.4	460	62
118	5.1	-0.055	512	487	167	586	324	415.2	478	62
119	5.1	-0.053	512	486	168	574	325	413.0	451	62
120	5.0	-0.055	512	483	167	563	325	410.0	442	62
121	5.0	-0.054	511	480	166	551	325	406.6	438	62
122	4.9	-0.052	509	478	165	543	325	404.0	435	62

DILUTION TUNNEL & MISC. DATA - ASTM E3053 / E2515

Client:	FPI	Job #:	18-414
Model:	F2500	Tracking #:	003
Run #:	2	Technician:	SJB
Test Start Time:	10:17	Date:	6/26/2018
Test Type:	Low Fire		

Recording Interval (min):	1
Total Sampling Time (min):	576

	Beginning	Middle	End	Avg.
P_{bar} (in Hg):	30.06	29.99	29.91	29.99

Meter Box γ Factor:	1.002	(A)
Meter Box γ Factor:	0.997	(B)
Meter Box γ Factor:	0.999	(Amb)

Post-Test Leak Check

(A)	0.001	cfm @	-15	in. Hg
(B)	0.000	cfm @	-15	in. Hg
(AMB)	0.000	cfm @	-13	in. Hg

Dilution Tunnel MW(dry):	29.00	lb/lb-mole
Dilution Tunnel MW(wet):	28.78	lb/lb-mole
Tunnel Area:	0.1963	ft^2
Dilution Tunnel H_2O:	2.00	percent
Tunnel Diameter:	6	inches
Pitot Tube Cp:	0.99	
Dilution Tunnel Static:	-0.130	in H_2O
Ambient Sample Volume (ft^3):	94.733	ft^3

Tunnel Traverse Information

	Pt.1	Pt.2	Pt.3	Pt.4	Pt.5	Pt.6	Pt.7	Pt.8	Center
dP (in H_2O)	0.032	0.038	0.046	0.040	0.032	0.038	0.044	0.042	0.045
Tunnel Temp (°F)	72	72	72	72	72	72	72	72	72

V_{strav}:	13.19	ft/sec	F_p:	0.937 [ratio]
V_{scent}:	14.08	ft/sec	Initial Tunnel Flow:	150.4 scf/min

Default Wood Fuel Values

Fuel Type:	D. Fir	Oak
HHV (kJ/kg)	19,810	19,887
%C	48.73	50
%H	6.87	6.6
%O	43.9	42.9
%Ash	0.5	0.5

Actual

Fuel Type:	Maple
HHV (kJ/kg)	19,960
%C	50.64
%H	6.02
%O	41.74
%Ash	1.35

BOX A TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: F2500
Run #: 2

Job #: 18-414
Tracking #: 003
Technician: SJB
Date: 6/26/2018

	Particulate Sampling Data							Fuel Weight (lb)		Temperature Data (°F)			
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Dilution Tunnel dP (in H_2O)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Scale Reading	Weight Change	Dilution Tunnel	Flue	Filter	Ambient
0	0.198		0.045	0.01	76	-0.05		26.3		123	445	86	75
1	0.323	0.125	0.045	2.02	76	-1.58	93	26.1	-0.2	138	460	85	75
2	0.458	0.135	0.045	2.00	76	-0.42	100	26.0	-0.1	129	460	84	75
3	0.599	0.141	0.045	1.97	76	-1.69	104	25.7	-0.3	128	497	83	76
4	0.733	0.134	0.045	1.96	76	-0.61	99	25.5	-0.2	131	548	85	75
5	0.871	0.138	0.045	2.05	76	-1.83	102	25.3	-0.2	134	579	86	75
6	1.013	0.142	0.045	2.02	76	-1.37	106	24.9	-0.4	136	580	85	76
7	1.148	0.135	0.045	2.00	76	-1.48	100	24.7	-0.2	130	533	84	76
8	1.288	0.140	0.045	1.96	76	-1.97	103	24.4	-0.3	127	511	83	76
9	1.424	0.136	0.045	2.05	76	-0.73	100	24.2	-0.2	125	506	84	76
10	1.563	0.139	0.045	2.02	76	-1.03	102	24.0	-0.2	125	501	85	75
11	1.701	0.138	0.045	1.97	76	-1.02	102	23.8	-0.2	124	501	86	75
12	1.837	0.136	0.045	1.96	76	-1.05	100	23.6	-0.2	124	502	85	75
13	1.978	0.141	0.045	2.00	76	-2.15	104	23.4	-0.2	124	504	85	75
14	2.114	0.136	0.045	2.00	77	-1.1	100	23.2	-0.2	123	505	84	75
15	2.255	0.141	0.045	1.97	76	-1.28	104	23.1	-0.1	122	504	84	74
16	2.391	0.136	0.045	1.95	77	-1.54	100	22.8	-0.3	122	505	85	75
17	2.528	0.137	0.045	1.93	77	-1.76	100	22.5	-0.3	122	504	86	75
18	2.667	0.139	0.045	1.94	77	-2.76	102	22.4	-0.1	122	507	86	75
19	2.800	0.133	0.045	1.97	77	-1.51	98	22.2	-0.2	122	508	85	75
20	2.942	0.142	0.045	1.99	77	-2.61	104	22.0	-0.2	122	509	84	75
21	3.078	0.136	0.045	1.97	76	-2.08	100	21.8	-0.2	121	508	83	75
22	3.215	0.137	0.045	1.98	77	-2.73	100	21.6	-0.2	120	505	84	76
23	3.356	0.141	0.045	1.96	77	-1.74	103	21.5	-0.1	120	503	85	75
24	3.490	0.134	0.045	1.96	77	-2.79	98	21.3	-0.2	120	503	86	75
25	3.632	0.142	0.045	1.97	78	-2.74	104	21.1	-0.2	120	503	86	75
26	3.768	0.136	0.045	1.96	78	-2.12	99	20.9	-0.2	119	504	85	75
27	3.905	0.137	0.045	1.97	78	-2.5	100	20.7	-0.2	119	505	84	74
28	4.046	0.141	0.045	1.98	78	-2.53	103	20.6	-0.1	119	505	84	75
29	4.181	0.135	0.045	1.99	78	-1.52	99	20.4	-0.2	119	506	84	75
30	4.321	0.140	0.045	1.95	78	-1.43	102	20.2	-0.2	119	507	86	75
31	4.458	0.137	0.045	1.97	78	-1.47	100	20.1	-0.1	119	505	86	75
32	4.597	0.139	0.045	1.97	78	-2.48	101	19.9	-0.2	119	501	85	75

BOX A TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: F2500
Run #: 2

Job #: 18-414
Tracking #: 003
Technician: SJB
Date: 6/26/2018

	Particulate Sampling Data							Fuel Weight (lb)		Temperature Data (°F)			
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Dilution Tunnel dP (in H_2O)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Scale Reading	Weight Change	Dilution Tunnel	Flue	Filter	Ambient
33	4.735	0.138	0.045	1.97	78	-2.84	101	19.8	-0.1	119	497	85	75
34	4.873	0.138	0.045	1.98	78	-2.89	101	19.6	-0.2	118	495	84	74
35	5.013	0.140	0.045	1.97	78	-1.53	102	19.4	-0.2	118	490	84	75
36	5.149	0.136	0.045	1.96	78	-2.75	99	19.3	-0.1	118	485	84	75
37	5.291	0.142	0.045	2.00	78	-1.71	104	19.1	-0.2	118	481	86	75
38	5.427	0.136	0.045	1.96	79	-2.81	99	19.0	-0.1	118	476	86	74
39	5.565	0.138	0.045	1.97	78	-1.7	101	18.8	-0.2	117	473	86	75
40	5.706	0.141	0.045	1.96	79	-2.24	103	18.7	-0.1	117	469	85	75
41	5.842	0.136	0.045	1.97	79	-1.66	99	18.5	-0.2	116	466	84	75
42	5.983	0.141	0.045	1.99	79	-2.74	102	18.3	-0.2	116	462	84	75
43	6.121	0.138	0.045	1.97	78	-2.08	100	18.2	-0.1	116	459	84	75
44	6.262	0.141	0.045	1.97	79	-2.82	102	18.1	-0.1	116	455	85	75
45	6.399	0.137	0.045	1.98	79	-2.76	99	18.0	-0.1	115	452	86	75
46	6.538	0.139	0.045	1.98	79	-2.61	101	17.9	-0.1	115	448	86	75
47	6.680	0.142	0.045	1.97	79	-2.68	103	17.7	-0.2	114	444	85	75
48	6.816	0.136	0.045	1.96	79	-1.78	99	17.6	-0.1	114	441	84	75
49	6.958	0.142	0.045	1.99	79	-2.54	103	17.5	-0.1	114	439	83	75
50	7.096	0.138	0.045	1.99	79	-1.48	100	17.3	-0.2	113	437	84	75
51	7.236	0.140	0.045	1.98	79	-2.35	101	17.1	-0.2	113	435	85	76
52	7.375	0.139	0.045	1.97	80	-2.73	101	17.1	0	113	435	86	76
53	7.514	0.139	0.045	2.00	80	-2.27	100	16.9	-0.2	112	434	85	75
54	7.656	0.142	0.045	1.97	80	-2.43	103	16.8	-0.1	112	432	84	75
55	7.792	0.136	0.045	1.98	80	-1.63	98	16.7	-0.1	113	432	84	75
56	7.935	0.143	0.045	1.98	80	-2.57	103	16.4	-0.3	112	430	84	75
57	8.074	0.139	0.045	2.00	80	-2.53	100	16.4	0	112	428	85	75
58	8.215	0.141	0.045	1.97	80	-2.78	102	16.3	-0.1	112	427	86	76
59	8.353	0.138	0.045	1.97	80	-2.77	100	16.2	-0.1	112	426	85	75
60	8.493	0.140	0.045	2.00	80	-1.65	101	16.0	-0.2	111	425	85	75
61	8.646	0.153	0.045	2.34	80	-0.41	111	15.9	-0.1	111	425	82	75
62	8.796	0.150	0.045	2.29	80	-1.54	108	15.8	-0.1	111	425	84	75
63	8.943	0.147	0.045	1.99	80	-0.71	106	15.7	-0.1	111	424	86	75
64	9.083	0.140	0.045	2.01	81	-1.68	101	15.6	-0.1	111	424	86	75
65	9.226	0.143	0.045	2.02	81	-0.46	103	15.4	-0.2	111	423	85	76

BOX A TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: F2500
Run #: 2

Job #: 18-414
Tracking #: 003
Technician: SJB
Date: 6/26/2018

	Particulate Sampling Data							Fuel Weight (lb)		Temperature Data (°F)			
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Dilution Tunnel dP (in H_2O)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Scale Reading	Weight Change	Dilution Tunnel	Flue	Filter	Ambient
66	9.364	0.138	0.045	1.99	81	-1.13	100	15.1	-0.3	111	422	84	75
67	9.508	0.144	0.045	2.01	80	-1.67	104	15.2	0.1	110	422	83	75
68	9.645	0.137	0.045	2.00	80	-0.75	99	15.0	-0.2	111	422	84	75
69	9.789	0.144	0.045	2.02	81	-0.33	104	14.9	-0.1	111	423	85	75
70	9.928	0.139	0.045	2.01	81	-0.6	100	14.8	-0.1	111	425	86	75
71	10.070	0.142	0.045	2.01	81	-1.81	102	14.6	-0.2	111	425	85	76
72	10.210	0.140	0.045	1.99	80	-1.01	101	14.5	-0.1	111	427	85	76
73	10.350	0.140	0.045	2.00	81	-1.64	101	14.4	-0.1	111	430	84	76
74	10.494	0.144	0.045	1.99	81	-0.82	104	14.3	-0.1	111	434	84	76
75	10.631	0.137	0.045	1.98	81	-1.76	99	14.1	-0.2	111	435	85	76
76	10.774	0.143	0.045	1.98	81	-0.79	103	14.0	-0.1	111	432	86	76
77	10.912	0.138	0.045	1.99	81	-1.37	99	13.9	-0.1	110	423	86	75
78	11.056	0.144	0.045	1.98	81	-0.55	104	13.8	-0.1	110	416	85	76
79	11.194	0.138	0.045	1.98	81	-0.55	99	13.8	0	110	412	84	76
80	11.334	0.140	0.045	1.98	81	-0.74	101	13.6	-0.2	110	409	83	75
81	11.475	0.141	0.045	2.00	82	-1.18	101	13.4	-0.2	109	408	84	75
82	11.615	0.140	0.045	1.96	81	-1.75	101	13.3	-0.1	109	406	85	75
83	11.757	0.142	0.045	1.98	82	-1.65	102	13.2	-0.1	109	404	86	75
84	11.894	0.137	0.045	1.99	82	-0.73	98	13.1	-0.1	109	401	85	75
85	12.038	0.144	0.045	1.99	81	-1.77	104	12.9	-0.2	108	398	85	76
86	12.177	0.139	0.045	1.97	82	-0.81	100	12.9	0	108	395	84	75
87	12.318	0.141	0.045	1.96	82	-0.38	101	12.8	-0.1	108	392	84	75
88	12.458	0.140	0.045	1.96	82	-1.3	100	12.8	0	107	391	85	76
89	12.597	0.139	0.045	1.97	82	-1.54	100	12.5	-0.3	107	388	86	76
90	12.740	0.143	0.045	1.99	82	-0.44	103	12.4	-0.1	107	386	85	76
91	12.878	0.138	0.045	1.98	82	-1.44	99	12.4	0	106	385	85	76
92	13.021	0.143	0.045	1.97	82	-1.51	102	12.3	-0.1	106	384	84	76
93	13.159	0.138	0.045	1.97	82	-1.33	99	12.2	-0.1	106	382	84	76
94	13.302	0.143	0.045	1.97	82	-0.78	102	12.0	-0.2	106	382	85	76
95	13.441	0.139	0.045	1.97	82	-1.42	100	12.0	0	106	381	86	76
96	13.581	0.140	0.045	1.98	82	-1.32	100	11.9	-0.1	106	380	86	75
97	13.723	0.142	0.045	1.98	82	-0.91	102	11.8	-0.1	106	381	85	76
98	13.862	0.139	0.045	1.98	82	-1.73	100	11.7	-0.1	106	380	84	76

BOX A TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: F2500
Run #: 2

Job #: 18-414
Tracking #: 003
Technician: SJB
Date: 6/26/2018

	Particulate Sampling Data							Fuel Weight (lb)		Temperature Data (°F)			
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Dilution Tunnel dP (in H_2O)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Scale Reading	Weight Change	Dilution Tunnel	Flue	Filter	Ambient
99	14.005	0.143	0.045	1.98	82	-1.76	102	11.6	-0.1	106	381	83	76
100	14.142	0.137	0.045	1.98	82	-0.37	98	11.5	-0.1	106	379	84	76
101	14.285	0.143	0.045	1.97	82	-1.5	102	11.4	-0.1	105	379	85	76
102	14.425	0.140	0.045	1.97	82	-1.86	100	11.3	-0.1	105	379	86	76
103	14.566	0.141	0.045	1.97	82	-0.29	101	11.2	-0.1	105	378	85	76
104	14.706	0.140	0.045	1.99	82	-1.49	100	11.1	-0.1	105	377	85	76
105	14.845	0.139	0.045	1.97	82	-0.41	100	11.0	-0.1	105	376	84	76
106	14.989	0.144	0.045	1.97	82	-0.45	103	10.9	-0.1	105	377	84	76
107	15.126	0.137	0.045	1.95	82	-0.36	98	10.9	0	105	376	85	76
108	15.269	0.143	0.045	1.97	82	-0.5	102	10.8	-0.1	105	375	86	76
109	15.407	0.138	0.045	1.99	82	-0.53	99	10.7	-0.1	105	374	86	76
110	15.551	0.144	0.045	1.96	82	-0.53	103	10.6	-0.1	105	373	85	76
111	15.690	0.139	0.045	1.98	82	-0.58	100	10.5	-0.1	105	372	84	76
112	15.830	0.140	0.045	1.97	82	-1.31	100	10.4	-0.1	105	371	84	76
113	15.971	0.141	0.045	1.96	82	-1.42	101	10.3	-0.1	105	371	84	76
114	16.112	0.141	0.045	1.97	82	-1.02	101	10.2	-0.1	105	370	86	75
115	16.254	0.142	0.045	1.97	82	-0.45	102	10.1	-0.1	104	370	86	76
116	16.391	0.137	0.045	1.98	83	-0.31	98	10.0	-0.1	104	369	85	75
117	16.535	0.144	0.045	1.95	82	-1.57	103	10.0	0	104	368	84	75
118	16.674	0.139	0.045	1.99	82	-1.69	99	9.9	-0.1	104	368	84	76
119	16.816	0.142	0.045	1.98	83	-0.42	101	9.8	-0.1	104	366	84	76
120	16.955	0.139	0.045	1.96	82	-0.36	99	9.7	-0.1	104	364	85	76
121	17.095	0.140	0.045	1.97	83	-0.85	100	9.6	-0.1	104	363	86	76
122	17.239	0.144	0.045	1.98	83	-1.83	103	9.6	0	104	362	85	76
123	17.377	0.138	0.045	1.97	83	-1.07	99	9.5	-0.1	104	360	84	76
124	17.520	0.143	0.045	1.98	83	-1.77	102	9.3	-0.2	103	360	84	76
125	17.658	0.138	0.045	1.99	83	-1.83	99	9.2	-0.1	104	360	84	75
126	17.802	0.144	0.045	1.98	83	-0.36	103	9.3	0.1	104	361	85	76
127	17.940	0.138	0.045	1.97	83	-0.42	98	9.2	-0.1	103	360	86	75
128	18.081	0.141	0.045	1.97	83	-1.39	101	9.1	-0.1	103	360	86	76
129	18.222	0.141	0.045	1.98	83	-1.74	101	9.0	-0.1	103	360	85	76
130	18.362	0.140	0.045	1.97	83	-0.34	100	8.9	-0.1	103	360	84	76
131	18.505	0.143	0.045	1.99	83	-1	102	8.7	-0.2	103	359	83	76

BOX A TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: F2500
Run #: 2

Job #: 18-414
Tracking #: 003
Technician: SJB
Date: 6/26/2018

	Particulate Sampling Data							Fuel Weight (lb)		Temperature Data (°F)			
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Dilution Tunnel dP (in H_2O)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Scale Reading	Weight Change	Dilution Tunnel	Flue	Filter	Ambient
132	18.643	0.138	0.045	1.97	83	-0.35	98	8.6	-0.1	103	360	84	76
133	18.786	0.143	0.045	1.95	83	-1.86	102	8.7	0.1	103	361	86	76
134	18.924	0.138	0.045	1.97	83	-0.97	98	8.6	-0.1	103	360	86	76
135	19.068	0.144	0.045	1.97	83	-1.82	103	8.4	-0.2	103	359	85	76
136	19.207	0.139	0.045	1.96	83	-1.34	99	8.2	-0.2	103	357	84	76
137	19.346	0.139	0.045	1.97	83	-0.33	99	8.4	0.2	103	356	83	76
138	19.489	0.143	0.045	2.00	83	-0.34	102	8.3	-0.1	103	354	84	76
139	19.629	0.140	0.045	1.94	83	-0.39	100	8.2	-0.1	102	352	86	76
140	19.771	0.142	0.045	1.96	83	-1.42	101	8.2	0	102	349	86	75
141	19.908	0.137	0.045	1.95	83	-1.09	98	8.1	-0.1	102	347	85	75
142	20.052	0.144	0.045	1.96	83	-1.15	103	8.0	-0.1	102	344	84	76
143	20.192	0.140	0.045	1.95	83	-0.94	100	8.0	0	102	342	84	76
144	20.334	0.142	0.045	1.98	83	-0.74	101	7.9	-0.1	101	341	84	76
145	20.473	0.139	0.045	1.95	83	-1.04	99	7.8	-0.1	101	339	85	76
146	20.612	0.139	0.045	1.95	83	-0.82	99	7.8	0	101	338	86	76
147	20.756	0.144	0.045	1.98	83	-1.45	103	7.7	-0.1	101	338	86	76
148	20.894	0.138	0.045	1.97	83	-1.7	98	7.6	-0.1	101	338	85	76
149	21.036	0.142	0.045	1.98	83	-0.35	101	7.6	0	101	338	84	76
150	21.175	0.139	0.045	1.95	83	-1.4	99	7.5	-0.1	101	338	84	76
151	21.319	0.144	0.045	1.97	83	-0.8	103	7.4	-0.1	101	336	85	76
152	21.457	0.138	0.045	1.95	83	-0.62	98	7.4	0	101	335	86	76
153	21.597	0.140	0.045	1.97	83	-1.06	100	7.3	-0.1	101	335	86	76
154	21.739	0.142	0.045	1.97	83	-0.87	101	7.3	0	101	334	85	76
155	21.879	0.140	0.045	1.96	83	-1.48	100	7.2	-0.1	101	334	84	76
156	22.021	0.142	0.045	1.97	83	-0.8	101	7.1	-0.1	101	334	84	76
157	22.158	0.137	0.045	1.95	83	-0.54	98	7.1	0	101	334	84	76
158	22.302	0.144	0.045	1.98	83	-0.34	103	7.0	-0.1	101	335	86	76
159	22.441	0.139	0.045	1.96	83	-1.91	99	6.9	-0.1	100	335	86	76
160	22.583	0.142	0.045	1.95	83	-0.44	101	6.9	0	100	335	85	76
161	22.722	0.139	0.045	1.97	83	-1.27	99	6.8	-0.1	100	335	84	77
162	22.863	0.141	0.045	1.96	83	-1.19	100	6.8	0	100	335	84	76
163	23.006	0.143	0.045	1.96	84	-1.6	102	6.7	-0.1	100	335	84	76
164	23.144	0.138	0.045	1.96	83	-1.82	98	6.7	0	100	335	86	76

BOX A TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: F2500
Run #: 2

Job #: 18-414
Tracking #: 003
Technician: SJB
Date: 6/26/2018

	Particulate Sampling Data							Fuel Weight (lb)		Temperature Data (°F)			
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Dilution Tunnel dP (in H_2O)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Scale Reading	Weight Change	Dilution Tunnel	Flue	Filter	Ambient
165	23.287	0.143	0.045	1.96	83	-1.58	102	6.6	-0.1	100	335	86	76
166	23.425	0.138	0.045	1.96	83	-1.16	98	6.5	-0.1	100	334	85	76
167	23.568	0.143	0.045	1.97	83	-0.32	102	6.5	0	100	333	84	76
168	23.708	0.140	0.045	1.96	84	-0.38	99	6.3	-0.2	100	333	84	76
169	23.849	0.141	0.045	1.97	84	-0.56	100	6.5	0.2	100	333	84	76
170	23.989	0.140	0.045	1.96	84	-1.84	99	6.3	-0.2	100	332	85	76
171	24.129	0.140	0.045	1.97	84	-0.4	99	6.3	0	100	331	86	76
172	24.272	0.143	0.045	1.96	84	-1.85	102	6.2	-0.1	100	330	86	76
173	24.410	0.138	0.045	1.96	84	-1.87	98	6.2	0	100	329	85	76
174	24.553	0.143	0.045	1.95	84	-0.66	102	6.0	-0.2	100	328	84	76
175	24.691	0.138	0.045	1.96	84	-1.99	98	6.1	0.1	99	327	84	76
176	24.835	0.144	0.045	1.95	84	-1.83	102	6.1	0	99	326	84	76
177	24.974	0.139	0.045	1.96	84	-1.8	99	6.0	-0.1	99	324	86	76
178	25.114	0.140	0.045	1.97	84	-0.71	99	6.0	0	99	323	86	76
179	25.256	0.142	0.045	1.96	84	-1.7	101	6.0	0	99	323	85	76
180	25.396	0.140	0.045	1.97	84	-1.85	99	5.9	-0.1	99	322	84	76
181	25.539	0.143	0.045	1.95	84	-1.32	101	5.7	-0.2	99	322	84	76
182	25.676	0.137	0.045	1.95	84	-0.57	97	5.8	0.1	99	321	85	76
183	25.820	0.144	0.045	1.98	84	-1.77	102	5.8	0	99	319	86	76
184	25.959	0.139	0.045	1.96	84	-1.63	99	5.8	0	98	317	86	76
185	26.102	0.143	0.045	1.96	84	-1.77	101	5.8	0	98	315	85	76
186	26.241	0.139	0.045	1.96	84	-1.81	99	5.6	-0.2	98	317	84	76
187	26.381	0.140	0.045	1.96	84	-1.92	99	5.7	0.1	98	317	84	76
188	26.524	0.143	0.045	1.97	84	-1.23	101	5.7	0	98	316	85	76
189	26.663	0.139	0.045	1.98	84	-0.44	99	5.7	0	98	315	86	75
190	26.806	0.143	0.045	1.97	84	-1.81	101	5.6	-0.1	98	313	86	76
191	26.944	0.138	0.045	1.96	84	-0.65	98	5.6	0	98	309	85	76
192	27.088	0.144	0.045	1.97	84	-0.42	102	5.6	0	98	306	84	76
193	27.227	0.139	0.045	1.95	84	-0.76	98	5.6	0	97	304	84	76
194	27.369	0.142	0.045	1.96	84	-1.81	101	5.6	0	97	305	84	76
195	27.509	0.140	0.045	1.96	84	-0.35	99	5.5	-0.1	97	306	86	76
196	27.649	0.140	0.045	1.94	84	-1.59	99	5.5	0	97	307	86	76
197	27.793	0.144	0.045	1.97	84	-0.61	102	5.6	0.1	97	308	85	76

BOX A TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: F2500
Run #: 2

Job #: 18-414
Tracking #: 003
Technician: SJB
Date: 6/26/2018

	Particulate Sampling Data							Fuel Weight (lb)		Temperature Data (°F)			
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Dilution Tunnel dP (in H_2O)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Scale Reading	Weight Change	Dilution Tunnel	Flue	Filter	Ambient
198	27.931	0.138	0.045	1.96	84	-0.35	98	5.4	-0.2	97	308	84	76
199	28.074	0.143	0.045	1.95	84	-1.74	101	5.4	0	97	307	84	76
200	28.213	0.139	0.045	1.96	84	-0.38	98	5.3	-0.1	97	306	84	76
201	28.356	0.143	0.045	1.96	84	-0.6	101	5.4	0.1	97	304	86	76
202	28.496	0.140	0.045	1.95	84	-0.35	99	5.4	0	97	305	86	76
203	28.637	0.141	0.045	1.97	84	-1.11	100	5.4	0	97	304	85	77
204	28.777	0.140	0.045	1.95	84	-1.51	99	5.3	-0.1	97	304	84	76
205	28.918	0.141	0.045	1.97	84	-0.4	100	5.3	0	97	303	84	76
206	29.061	0.143	0.045	1.96	84	-1.7	101	5.3	0	97	302	84	76
207	29.199	0.138	0.045	1.94	84	-1.83	98	5.3	0	97	301	85	76
208	29.342	0.143	0.045	1.96	84	-1.7	101	5.3	0	97	299	86	76
209	29.481	0.139	0.045	1.94	84	-0.61	98	5.1	-0.2	96	296	85	76
210	29.625	0.144	0.045	1.97	84	-0.47	102	5.2	0.1	96	294	84	76
211	29.764	0.139	0.045	1.96	84	-1.37	98	5.1	-0.1	96	292	84	76
212	29.905	0.141	0.045	1.96	84	-1.82	100	5.2	0.1	96	291	84	76
213	30.047	0.142	0.045	1.96	84	-1.51	100	5.2	0	96	290	85	76
214	30.187	0.140	0.045	1.98	84	-1.18	99	5.2	0	96	289	86	76
215	30.330	0.143	0.045	1.95	84	-1.53	101	5.1	-0.1	96	287	86	76
216	30.468	0.138	0.045	1.94	84	-1.34	98	5.0	-0.1	95	288	85	77
217	30.611	0.143	0.045	1.95	84	-1.95	101	5.1	0.1	96	287	84	77
218	30.750	0.139	0.045	1.97	84	-1.23	98	5.1	0	95	286	83	76
219	30.894	0.144	0.045	1.95	84	-1.01	102	5.1	0	95	284	84	76
220	31.034	0.140	0.045	1.96	84	-1.36	99	5.1	0	95	283	86	76
221	31.173	0.139	0.045	1.96	84	-1.42	98	5.0	-0.1	95	282	86	76
222	31.316	0.143	0.045	1.94	84	-1.33	101	5.0	0	95	280	85	76
223	31.456	0.140	0.045	1.95	84	-0.43	99	5.0	0	95	279	84	76
224	31.599	0.143	0.045	1.96	84	-1.29	101	5.0	0	95	278	83	76
225	31.737	0.138	0.045	1.97	84	-1.84	98	5.0	0	95	277	84	76
226	31.881	0.144	0.045	1.98	84	-0.44	102	5.0	0	95	276	85	76
227	32.020	0.139	0.045	1.97	84	-1.45	98	5.0	0	94	275	86	76
228	32.163	0.143	0.045	1.95	84	-0.3	101	4.9	-0.1	94	275	85	76
229	32.302	0.139	0.045	1.95	85	-1.83	98	4.9	0	94	274	84	76
230	32.442	0.140	0.045	1.97	84	-0.86	99	4.9	0	94	273	84	76

BOX A TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: F2500
Run #: 2

Job #: 18-414
Tracking #: 003
Technician: SJB
Date: 6/26/2018

	Particulate Sampling Data							Fuel Weight (lb)		Temperature Data (°F)			
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Dilution Tunnel dP (in H_2O)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Scale Reading	Weight Change	Dilution Tunnel	Flue	Filter	Ambient
231	32.585	0.143	0.045	1.95	84	-1.8	101	4.9	0	94	272	84	76
232	32.725	0.140	0.045	1.95	84	-0.55	99	4.9	0	94	272	86	76
233	32.868	0.143	0.045	1.96	85	-1.92	101	4.8	-0.1	94	271	86	76
234	33.005	0.137	0.045	1.96	84	-0.42	97	4.8	0	94	270	85	77
235	33.150	0.145	0.045	1.97	85	-0.84	102	4.8	0	94	270	84	76
236	33.289	0.139	0.045	1.97	85	-0.61	98	4.8	0	94	269	84	76
237	33.431	0.142	0.045	1.97	84	-0.52	100	4.8	0	94	269	84	76
238	33.571	0.140	0.045	1.95	85	-1.47	99	4.8	0	94	268	86	76
239	33.711	0.140	0.045	1.96	84	-1.58	99	4.8	0	94	268	86	76
240	33.854	0.143	0.045	1.97	84	-1.89	101	4.7	-0.1	94	267	85	76
241	33.993	0.139	0.045	1.95	85	-0.71	98	4.7	0	94	267	84	76
242	34.137	0.144	0.045	1.95	85	-0.48	102	4.7	0	94	266	84	76
243	34.274	0.137	0.045	1.96	85	-0.75	97	4.7	0	93	265	84	76
244	34.418	0.144	0.045	1.96	85	-1.31	101	4.7	0	93	263	86	76
245	34.558	0.140	0.045	1.97	84	-1.58	99	4.7	0	93	263	86	76
246	34.700	0.142	0.045	1.96	85	-1.86	100	4.6	-0.1	93	263	85	76
247	34.840	0.140	0.045	1.95	85	-1.86	99	4.6	0	93	262	84	76
248	34.980	0.140	0.045	1.97	85	-0.47	99	4.6	0	93	262	84	76
249	35.124	0.144	0.045	1.98	85	-0.82	101	4.6	0	93	261	84	76
250	35.262	0.138	0.045	1.97	85	-0.56	97	4.6	0	93	260	85	76
251	35.406	0.144	0.045	1.96	85	-0.97	101	4.6	0	93	260	86	77
252	35.543	0.137	0.045	1.97	85	-1.17	97	4.6	0	93	260	85	77
253	35.688	0.145	0.045	1.97	85	-0.41	102	4.5	-0.1	93	259	84	77
254	35.827	0.139	0.045	1.95	85	-1.12	98	4.5	0	93	259	84	77
255	35.969	0.142	0.045	1.95	85	-1.77	100	4.5	0	93	259	84	77
256	36.109	0.140	0.045	1.95	85	-0.58	99	4.5	0	93	259	86	76
257	36.249	0.140	0.045	1.94	85	-1.78	99	4.4	-0.1	93	259	86	77
258	36.393	0.144	0.045	1.97	85	-1.09	101	4.4	0	93	259	85	76
259	36.532	0.139	0.045	1.96	85	-1.01	98	4.4	0	93	259	84	76
260	36.675	0.143	0.045	1.95	85	-1.12	101	4.4	0	93	259	84	77
261	36.813	0.138	0.045	1.97	85	-0.37	97	4.4	0	93	259	84	77
262	36.957	0.144	0.045	1.96	85	-1.75	101	4.4	0	93	259	85	77
263	37.096	0.139	0.045	1.96	85	-0.72	98	4.4	0	93	259	86	76

BOX A TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: F2500
Run #: 2

Job #: 18-414
Tracking #: 003
Technician: SJB
Date: 6/26/2018

	Particulate Sampling Data							Fuel Weight (lb)		Temperature Data (°F)			
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Dilution Tunnel dP (in H_2O)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Scale Reading	Weight Change	Dilution Tunnel	Flue	Filter	Ambient
264	37.238	0.142	0.045	1.96	85	-1.53	100	4.4	0	93	259	85	76
265	37.379	0.141	0.045	1.97	85	-1.85	99	4.2	-0.2	92	259	84	77
266	37.519	0.140	0.045	1.96	85	-0.59	99	4.3	0.1	93	259	84	76
267	37.663	0.144	0.045	1.98	85	-1.58	101	4.3	0	93	259	84	76
268	37.801	0.138	0.045	1.96	85	-1.76	97	4.3	0	93	260	85	76
269	37.945	0.144	0.045	1.94	85	-1.92	101	4.3	0	93	260	86	76
270	38.083	0.138	0.045	1.97	85	-1.19	97	4.3	0	93	259	86	76
271	38.227	0.144	0.045	1.96	85	-1.61	101	4.3	0	92	260	85	76
272	38.367	0.140	0.045	1.97	85	-0.68	99	4.2	-0.1	93	261	84	76
273	38.508	0.141	0.045	1.97	85	-0.37	99	4.2	0	93	260	84	77
274	38.649	0.141	0.045	1.97	85	-1.8	99	4.2	0	93	260	85	76
275	38.789	0.140	0.045	1.97	85	-1.45	99	4.3	0.1	93	261	86	76
276	38.933	0.144	0.045	1.96	85	-1.7	101	4.2	-0.1	92	261	86	76
277	39.071	0.138	0.045	1.95	85	-1.14	97	4.2	0	93	261	85	77
278	39.214	0.143	0.045	1.96	85	-1.88	101	4.1	-0.1	93	261	84	76
279	39.353	0.139	0.045	1.98	85	-0.82	98	4.1	0	93	262	84	77
280	39.497	0.144	0.045	1.96	85	-1.73	101	4.1	0	93	263	85	77
281	39.637	0.140	0.045	1.97	85	-0.47	99	4.1	0	93	264	86	77
282	39.778	0.141	0.045	1.97	85	-1.16	99	4.0	-0.1	93	264	86	77
283	39.919	0.141	0.045	1.96	85	-1.57	99	4.0	0	93	265	85	76
284	40.059	0.140	0.045	1.97	85	-1.89	99	4.0	0	93	265	84	76
285	40.203	0.144	0.045	1.93	85	-0.38	101	4.0	0	93	266	84	77
286	40.341	0.138	0.045	1.97	85	-0.5	97	4.0	0	93	266	85	76
287	40.484	0.143	0.045	1.96	85	-0.7	101	4.0	0	93	267	86	77
288	40.623	0.139	0.045	1.97	85	-0.97	98	3.9	-0.1	93	268	86	77
289	40.767	0.144	0.045	1.96	85	-1.55	101	3.9	0	93	269	85	76
290	40.906	0.139	0.045	1.96	85	-1.35	98	3.9	0	93	269	84	76
291	41.047	0.141	0.045	1.94	85	-1.77	99	3.9	0	93	269	84	76
292	41.188	0.141	0.045	1.95	85	-0.82	99	3.9	0	93	269	85	77
293	41.328	0.140	0.045	1.96	85	-1.43	99	3.9	0	93	268	86	77
294	41.471	0.143	0.045	1.96	85	-1.38	101	3.9	0	93	268	86	77
295	41.609	0.138	0.045	1.95	85	-0.61	97	3.8	-0.1	93	267	85	77
296	41.752	0.143	0.045	1.96	85	-0.71	101	3.8	0	93	267	84	77

BOX A TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: F2500
Run #: 2

Job #: 18-414
Tracking #: 003
Technician: SJB
Date: 6/26/2018

	Particulate Sampling Data							Fuel Weight (lb)		Temperature Data (°F)			
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Dilution Tunnel dP (in H_2O)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Scale Reading	Weight Change	Dilution Tunnel	Flue	Filter	Ambient
297	41.891	0.139	0.045	1.97	85	-1.94	98	3.8	0	93	266	84	76
298	42.035	0.144	0.045	1.93	85	-0.37	101	3.8	0	93	266	85	76
299	42.174	0.139	0.045	1.95	85	-1.42	98	3.8	0	93	265	86	76
300	42.314	0.140	0.045	1.97	85	-0.61	99	3.8	0	93	265	86	77
301	42.456	0.142	0.045	1.94	85	-1.62	100	3.7	-0.1	93	266	85	77
302	42.596	0.140	0.045	1.97	85	-0.61	99	3.7	0	93	266	84	77
303	42.740	0.144	0.045	1.96	85	-1.4	101	3.7	0	93	265	84	77
304	42.876	0.136	0.045	1.94	85	-1.76	96	3.7	0	93	265	84	77
305	43.021	0.145	0.045	1.96	85	-0.49	102	3.7	0	93	265	85	77
306	43.160	0.139	0.045	1.97	85	-0.88	98	3.6	-0.1	93	264	86	77
307	43.303	0.143	0.045	1.95	85	-0.46	101	3.6	0	93	265	86	77
308	43.442	0.139	0.045	1.94	85	-0.35	98	3.5	-0.1	93	266	85	77
309	43.582	0.140	0.045	1.97	85	-1.82	99	3.6	0.1	93	265	84	76
310	43.725	0.143	0.045	1.95	85	-0.92	101	3.6	0	93	266	84	76
311	43.864	0.139	0.045	1.95	85	-1	98	3.5	-0.1	93	265	85	76
312	44.008	0.144	0.045	1.93	85	-1.75	101	3.6	0.1	93	265	86	77
313	44.145	0.137	0.045	1.96	85	-0.44	97	3.5	-0.1	93	265	86	77
314	44.289	0.144	0.045	1.96	85	-1.9	101	3.5	0	93	265	85	76
315	44.429	0.140	0.045	1.96	85	-0.77	99	3.5	0	93	265	84	77
316	44.571	0.142	0.045	1.97	85	-0.42	100	3.5	0	93	265	84	76
317	44.711	0.140	0.045	1.96	85	-1.22	99	3.5	0	93	264	85	76
318	44.851	0.140	0.045	1.98	85	-0.42	99	3.4	-0.1	93	264	86	76
319	44.994	0.143	0.045	1.95	85	-1.72	101	3.4	0	93	264	86	77
320	45.133	0.139	0.045	1.95	85	-1.58	98	3.4	0	93	264	85	77
321	45.276	0.143	0.045	1.96	85	-1.09	101	3.4	0	93	265	84	77
322	45.414	0.138	0.045	1.96	85	-0.3	97	3.4	0	93	265	84	76
323	45.558	0.144	0.045	1.96	85	-1.84	101	3.4	0	93	265	85	77
324	45.698	0.140	0.045	1.94	85	-1.67	99	3.3	-0.1	93	265	86	77
325	45.840	0.142	0.045	1.94	85	-0.97	100	3.3	0	93	265	86	77
326	45.979	0.139	0.045	1.96	85	-1.29	98	3.3	0	93	264	85	77
327	46.119	0.140	0.045	1.93	85	-1.64	99	3.3	0	93	263	84	77
328	46.264	0.145	0.045	1.96	85	-0.68	102	3.3	0	93	263	84	77
329	46.401	0.137	0.045	1.95	85	-1.59	97	3.3	0	93	263	85	77

BOX A TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: F2500
Run #: 2

Job #: 18-414
Tracking #: 003
Technician: SJB
Date: 6/26/2018

	Particulate Sampling Data							Fuel Weight (lb)		Temperature Data (°F)			
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Dilution Tunnel dP (in H_2O)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Scale Reading	Weight Change	Dilution Tunnel	Flue	Filter	Ambient
330	46.545	0.144	0.045	1.94	85	-1.58	101	3.2	-0.1	93	263	86	77
331	46.683	0.138	0.045	1.95	85	-0.4	97	3.1	-0.1	93	263	86	77
332	46.827	0.144	0.045	1.96	85	-0.42	101	3.3	0.2	93	263	85	77
333	46.966	0.139	0.045	1.97	85	-0.83	98	3.2	-0.1	93	263	84	77
334	47.108	0.142	0.045	1.94	86	-0.42	100	3.2	0	93	263	84	77
335	47.248	0.140	0.045	1.97	85	-0.85	99	3.2	0	93	263	85	76
336	47.388	0.140	0.045	1.95	85	-1.82	99	3.1	-0.1	93	264	86	77
337	47.532	0.144	0.045	1.94	85	-1.7	101	3.2	0.1	93	264	86	77
338	47.670	0.138	0.045	1.96	85	-1.27	97	3.1	-0.1	93	264	85	77
339	47.813	0.143	0.045	1.95	85	-1.81	101	3.1	0	93	265	84	77
340	47.952	0.139	0.045	1.94	85	-0.43	98	3.1	0	93	265	84	77
341	48.096	0.144	0.045	1.96	85	-1.81	101	3.1	0	93	267	84	77
342	48.235	0.139	0.045	1.96	85	-0.36	98	3.0	-0.1	93	267	86	77
343	48.376	0.141	0.045	1.96	86	-1.77	99	3.0	0	93	267	86	76
344	48.518	0.142	0.045	1.94	85	-0.22	100	3.0	0	93	267	85	77
345	48.658	0.140	0.045	1.96	85	-1.89	99	3.0	0	93	266	84	77
346	48.801	0.143	0.045	1.94	85	-0.58	101	3.0	0	93	265	84	77
347	48.939	0.138	0.045	1.96	86	-1.81	97	2.9	-0.1	93	264	85	77
348	49.083	0.144	0.045	1.95	85	-0.91	101	2.9	0	93	264	86	77
349	49.221	0.138	0.045	1.95	85	-0.49	97	2.9	0	93	263	86	77
350	49.366	0.145	0.045	1.97	85	-0.42	102	2.9	0	93	261	85	77
351	49.505	0.139	0.045	1.95	85	-1.83	98	2.9	0	93	261	84	77
352	49.645	0.140	0.045	1.95	85	-1.73	99	2.8	-0.1	93	260	84	77
353	49.787	0.142	0.045	1.97	86	-0.85	100	2.9	0.1	93	259	84	77
354	49.927	0.140	0.045	1.95	86	-1.2	98	2.9	0	93	258	86	77
355	50.071	0.144	0.045	1.96	86	-0.41	101	2.9	0	93	258	86	77
356	50.209	0.138	0.045	1.95	85	-1.08	97	2.8	-0.1	93	257	85	77
357	50.352	0.143	0.045	1.98	86	-0.47	101	2.8	0	93	256	85	77
358	50.491	0.139	0.045	1.93	86	-1.36	98	2.8	0	93	256	84	77
359	50.635	0.144	0.045	1.94	86	-0.72	101	2.8	0	93	255	84	77
360	50.774	0.139	0.045	1.96	86	-0.75	98	2.7	-0.1	93	255	86	77
361	50.915	0.141	0.045	1.95	86	-1.52	99	2.8	0.1	92	255	86	77
362	51.057	0.142	0.045	1.96	86	-0.97	100	2.8	0	92	254	86	77

BOX A TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: F2500
Run #: 2

Job #: 18-414
Tracking #: 003
Technician: SJB
Date: 6/26/2018

	Particulate Sampling Data							Fuel Weight (lb)		Temperature Data (°F)			
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Dilution Tunnel dP (in H_2O)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Scale Reading	Weight Change	Dilution Tunnel	Flue	Filter	Ambient
363	51.197	0.140	0.045	1.97	86	-1.68	98	2.7	-0.1	92	254	85	77
364	51.341	0.144	0.045	1.94	86	-0.61	101	2.7	0	92	254	84	77
365	51.479	0.138	0.045	1.96	86	-1.12	97	2.7	0	93	253	84	77
366	51.622	0.143	0.045	1.96	86	-1.83	100	2.7	0	92	253	85	77
367	51.761	0.139	0.045	1.96	86	-0.9	98	2.7	0	92	253	86	77
368	51.905	0.144	0.045	1.94	86	-1.82	101	2.7	0	92	252	86	77
369	52.045	0.140	0.045	1.95	85	-1.84	99	2.6	-0.1	92	252	85	77
370	52.185	0.140	0.045	1.95	86	-0.35	98	2.6	0	92	252	84	77
371	52.327	0.142	0.045	1.94	86	-1.29	100	2.6	0	92	251	84	77
372	52.468	0.141	0.045	1.94	86	-0.79	99	2.6	0	92	251	84	77
373	52.611	0.143	0.045	1.96	86	-0.53	100	2.6	0	92	251	86	77
374	52.749	0.138	0.045	1.97	86	-1.92	97	2.6	0	92	251	86	77
375	52.893	0.144	0.045	1.96	86	-1.71	101	2.5	-0.1	92	250	86	77
376	53.032	0.139	0.045	1.96	86	-0.79	98	2.5	0	92	250	84	77
377	53.176	0.144	0.045	1.95	86	-1.29	101	2.5	0	92	250	84	77
378	53.315	0.139	0.045	1.94	86	-0.96	98	2.5	0	92	250	84	78
379	53.455	0.140	0.045	1.95	86	-0.69	98	2.5	0	92	250	86	77
380	53.598	0.143	0.045	1.99	86	-1.58	100	2.5	0	92	250	86	77
381	53.738	0.140	0.045	1.97	86	-0.62	98	2.5	0	92	250	86	77
382	53.882	0.144	0.045	1.95	86	-1.14	101	2.5	0	92	250	85	78
383	54.020	0.138	0.045	1.97	86	-1.79	97	2.4	-0.1	92	250	84	78
384	54.163	0.143	0.045	1.96	86	-1.28	100	2.4	0	92	250	84	78
385	54.302	0.139	0.045	1.95	86	-0.4	98	2.4	0	92	250	85	77
386	54.447	0.145	0.045	1.94	86	-1.53	102	2.4	0	92	250	86	77
387	54.586	0.139	0.045	1.95	86	-0.38	98	2.5	0.1	92	250	86	77
388	54.726	0.140	0.045	1.94	86	-1.46	98	2.4	-0.1	92	250	85	77
389	54.869	0.143	0.045	1.96	86	-1.48	100	2.4	0	92	250	84	77
390	55.009	0.140	0.045	1.96	86	-1.16	98	2.3	-0.1	92	251	84	77
391	55.152	0.143	0.045	1.95	86	-1.9	100	2.3	0	92	251	84	77
392	55.291	0.139	0.045	1.95	86	-0.57	98	2.3	0	92	251	86	77
393	55.434	0.143	0.045	1.94	86	-1.6	100	2.3	0	92	252	86	77
394	55.573	0.139	0.045	1.96	86	-0.69	98	2.3	0	92	251	85	77
395	55.718	0.145	0.045	1.94	86	-1.12	102	2.2	-0.1	92	251	84	77

BOX A TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: F2500
Run #: 2

Job #: 18-414
Tracking #: 003
Technician: SJB
Date: 6/26/2018

	Particulate Sampling Data							Fuel Weight (lb)		Temperature Data (°F)			
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Dilution Tunnel dP (in H_2O)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Scale Reading	Weight Change	Dilution Tunnel	Flue	Filter	Ambient
396	55.857	0.139	0.045	1.95	86	-0.64	98	2.2	0	92	252	84	77
397	55.997	0.140	0.045	1.94	86	-1.02	98	2.3	0.1	92	252	84	77
398	56.140	0.143	0.045	1.96	86	-1.11	100	2.2	-0.1	92	253	85	77
399	56.280	0.140	0.045	1.96	86	-1.35	98	2.1	-0.1	92	254	86	78
400	56.423	0.143	0.045	1.95	86	-1.4	100	2.2	0.1	92	255	85	78
401	56.562	0.139	0.045	1.97	86	-1.06	98	2.2	0	92	254	85	78
402	56.705	0.143	0.045	1.96	86	-1.11	100	2.2	0	92	253	84	77
403	56.844	0.139	0.045	1.96	86	-0.74	98	2.2	0	92	253	84	77
404	56.989	0.145	0.045	1.95	86	-1.83	102	2.1	-0.1	92	253	85	77
405	57.128	0.139	0.045	1.95	86	-1.69	98	2.1	0	92	253	87	78
406	57.268	0.140	0.045	1.94	86	-1.05	98	2.1	0	93	253	86	78
407	57.411	0.143	0.045	1.96	86	-1.5	100	2.0	-0.1	92	252	85	77
408	57.551	0.140	0.045	1.96	86	-0.44	98	2.1	0.1	92	252	84	77
409	57.695	0.144	0.045	1.95	86	-0.31	101	2.0	-0.1	92	252	84	77
410	57.833	0.138	0.045	1.95	86	-0.63	97	2.0	0	92	252	84	77
411	57.976	0.143	0.045	1.96	86	-0.67	100	2.0	0	92	253	86	78
412	58.115	0.139	0.045	1.93	86	-0.28	98	2.0	0	92	253	86	78
413	58.260	0.145	0.045	1.95	86	-1.81	102	2.0	0	92	253	86	78
414	58.399	0.139	0.045	1.96	86	-1.28	98	2.0	0	92	253	85	78
415	58.541	0.142	0.045	1.96	86	-0.86	100	1.9	-0.1	92	253	84	77
416	58.682	0.141	0.045	1.95	86	-1.81	99	1.9	0	92	253	84	78
417	58.822	0.140	0.045	1.96	86	-1.6	98	1.9	0	92	252	85	77
418	58.966	0.144	0.045	1.95	86	-0.64	101	1.8	-0.1	92	252	86	77
419	59.105	0.139	0.045	1.95	86	-0.74	98	1.9	0.1	92	251	86	78
420	59.248	0.143	0.045	1.95	86	-1.88	100	1.9	0	92	250	85	78
421	59.387	0.139	0.045	1.95	86	-1.12	98	1.9	0	92	250	84	77
422	59.532	0.145	0.045	1.97	86	-1.59	102	1.9	0	92	249	84	77
423	59.671	0.139	0.045	1.94	86	-0.37	98	1.9	0	92	249	85	78
424	59.813	0.142	0.045	1.95	86	-1.72	100	1.7	-0.2	92	249	86	78
425	59.954	0.141	0.045	1.96	86	-1.82	99	1.8	0.1	92	249	86	78
426	60.094	0.140	0.045	1.95	86	-1.35	98	1.8	0	92	249	85	78
427	60.239	0.145	0.045	1.95	86	-1.13	102	1.8	0	92	248	85	78
428	60.377	0.138	0.045	1.96	86	-0.92	97	1.8	0	92	248	84	78

BOX A TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: F2500
Run #: 2

Job #: 18-414
Tracking #: 003
Technician: SJB
Date: 6/26/2018

	Particulate Sampling Data							Fuel Weight (lb)		Temperature Data (°F)			
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Dilution Tunnel dP (in H_2O)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Scale Reading	Weight Change	Dilution Tunnel	Flue	Filter	Ambient
429	60.521	0.144	0.045	1.97	86	-1.13	101	1.8	0	92	248	84	78
430	60.659	0.138	0.045	1.93	86	-1.27	97	1.7	-0.1	92	248	85	78
431	60.803	0.144	0.045	1.96	86	-1.5	101	1.7	0	92	248	86	78
432	60.943	0.140	0.045	1.94	86	-1.36	98	1.7	0	92	248	86	78
433	61.086	0.143	0.045	1.94	86	-1.79	100	1.7	0	92	247	85	77
434	61.225	0.139	0.045	1.96	86	-0.5	98	1.7	0	92	248	84	78
435	61.367	0.142	0.045	1.97	86	-1.56	100	1.7	0	92	247	84	77
436	61.510	0.143	0.045	1.95	86	-0.47	100	1.7	0	92	247	84	78
437	61.649	0.139	0.045	1.95	86	-1.84	98	1.6	-0.1	92	246	86	78
438	61.793	0.144	0.045	1.95	86	-1.45	101	1.6	0	92	246	86	77
439	61.931	0.138	0.045	1.94	86	-0.35	97	1.6	0	92	245	85	78
440	62.075	0.144	0.045	1.96	86	-1.65	101	1.7	0.1	92	246	85	78
441	62.216	0.141	0.045	1.96	86	-1.45	99	1.6	-0.1	92	245	84	78
442	62.358	0.142	0.045	1.93	86	-1.81	100	1.6	0	92	245	84	78
443	62.498	0.140	0.045	1.95	87	-1.82	98	1.5	-0.1	92	245	85	77
444	62.639	0.141	0.045	1.94	87	-1.11	99	1.5	0	92	245	86	78
445	62.782	0.143	0.045	1.95	87	-1.52	100	1.5	0	92	245	86	78
446	62.921	0.139	0.045	1.94	87	-1.72	97	1.5	0	92	245	85	78
447	63.065	0.144	0.045	1.96	86	-0.34	101	1.5	0	92	244	84	78
448	63.203	0.138	0.045	1.95	86	-1.84	97	1.5	0	92	244	84	78
449	63.347	0.144	0.045	2.00	87	-1.03	101	1.5	0	92	244	84	78
450	63.487	0.140	0.045	1.95	87	-0.39	98	1.5	0	92	244	86	78
451	63.630	0.143	0.045	1.95	87	-1.64	100	1.5	0	92	244	86	78
452	63.770	0.140	0.045	1.95	87	-1.73	98	1.4	-0.1	92	244	85	78
453	63.910	0.140	0.045	1.95	87	-0.9	98	1.4	0	92	243	85	78
454	64.053	0.143	0.045	1.96	87	-0.41	100	1.5	0.1	92	242	84	78
455	64.194	0.141	0.045	1.97	87	-1.75	99	1.4	-0.1	92	241	84	78
456	64.337	0.143	0.045	1.95	87	-2.04	100	1.4	0	92	240	85	78
457	64.475	0.138	0.045	1.94	87	-1.44	97	1.3	-0.1	91	239	86	78
458	64.619	0.144	0.045	1.95	87	-0.65	101	1.4	0.1	91	238	86	78
459	64.758	0.139	0.045	1.97	87	-0.69	97	1.4	0	91	238	85	78
460	64.903	0.145	0.045	1.94	87	-1.84	102	1.4	0	91	237	84	78
461	65.042	0.139	0.045	1.96	87	-0.36	97	1.3	-0.1	91	236	84	78

BOX A TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: F2500
Run #: 2

Job #: 18-414
Tracking #: 003
Technician: SJB
Date: 6/26/2018

	Particulate Sampling Data							Fuel Weight (lb)		Temperature Data (°F)			
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Dilution Tunnel dP (in H_2O)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Scale Reading	Weight Change	Dilution Tunnel	Flue	Filter	Ambient
462	65.183	0.141	0.045	1.95	87	-1.49	99	1.3	0	91	236	84	78
463	65.326	0.143	0.045	1.97	87	-0.41	100	1.3	0	91	235	86	78
464	65.466	0.140	0.045	1.95	87	-1.17	98	1.3	0	91	235	86	78
465	65.610	0.144	0.045	1.95	87	-1.08	101	1.3	0	91	235	86	78
466	65.748	0.138	0.045	1.94	87	-1.68	97	1.3	0	91	235	85	78
467	65.892	0.144	0.045	1.94	87	-1.8	101	1.3	0	91	236	84	78
468	66.031	0.139	0.045	1.94	87	-0.34	97	1.2	-0.1	91	236	84	78
469	66.175	0.144	0.045	1.95	87	-0.57	101	1.2	0	91	235	85	78
470	66.315	0.140	0.045	1.95	87	-1.02	98	1.2	0	91	234	86	78
471	66.457	0.142	0.045	1.96	87	-1.87	99	1.2	0	91	234	86	78
472	66.598	0.141	0.045	1.96	87	-0.82	99	1.2	0	91	234	85	78
473	66.738	0.140	0.045	1.95	87	-1.93	98	1.2	0	91	232	84	78
474	66.883	0.145	0.045	1.95	87	-1.73	102	1.2	0	91	232	84	78
475	67.022	0.139	0.045	1.95	87	-0.95	97	1.2	0	91	233	84	78
476	67.165	0.143	0.045	1.95	87	-0.86	100	1.1	-0.1	91	233	85	78
477	67.304	0.139	0.045	1.94	87	-1.67	97	1.1	0	91	232	86	78
478	67.448	0.144	0.045	1.95	87	-1.81	101	1.1	0	91	232	86	78
479	67.588	0.140	0.045	1.95	87	-1.83	98	1.1	0	91	232	85	78
480	67.730	0.142	0.045	1.94	87	-0.37	99	1.1	0	91	231	84	78
481	67.871	0.141	0.045	1.94	87	-0.92	99	1.1	0	91	231	84	78
482	68.012	0.141	0.045	1.96	87	-1.27	99	1.1	0	91	230	84	78
483	68.156	0.144	0.045	1.94	87	-0.8	101	1.1	0	91	229	86	78
484	68.295	0.139	0.045	1.94	87	-1.62	97	1.1	0	91	228	86	78
485	68.439	0.144	0.045	1.94	87	-0.93	101	1.1	0	91	227	86	78
486	68.576	0.137	0.045	1.95	87	-1.82	96	1.0	-0.1	91	226	85	78
487	68.721	0.145	0.045	1.94	87	-0.62	102	1.0	0	91	225	84	78
488	68.859	0.138	0.045	1.95	87	-0.77	97	1.1	0.1	91	224	84	78
489	69.004	0.145	0.045	1.94	87	-1.63	102	1.0	-0.1	91	222	84	78
490	69.145	0.141	0.045	1.97	87	-1.69	99	1.0	0	91	221	86	78
491	69.285	0.140	0.045	1.96	87	-1.76	98	1.0	0	91	221	86	78
492	69.428	0.143	0.045	1.94	87	-0.6	100	1.0	0	90	220	86	78
493	69.569	0.141	0.045	1.95	87	-1.82	99	1.0	0	90	220	85	78
494	69.712	0.143	0.045	1.96	87	-1.18	100	1.0	0	90	219	84	78

BOX A TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: F2500
Run #: 2

Job #: 18-414
Tracking #: 003
Technician: SJB
Date: 6/26/2018

	Particulate Sampling Data							Fuel Weight (lb)		Temperature Data (°F)			
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Dilution Tunnel dP (in H_2O)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Scale Reading	Weight Change	Dilution Tunnel	Flue	Filter	Ambient
495	69.850	0.138	0.045	1.94	87	-0.35	97	0.9	-0.1	90	219	84	78
496	69.994	0.144	0.045	1.94	87	-1.68	101	0.9	0	90	219	84	78
497	70.133	0.139	0.045	1.96	87	-1.83	97	0.9	0	90	219	85	78
498	70.278	0.145	0.045	1.95	87	-0.47	101	0.9	0	90	219	86	78
499	70.417	0.139	0.045	1.94	87	-1.08	97	0.9	0	90	219	86	78
500	70.558	0.141	0.045	1.94	87	-0.48	99	0.8	-0.1	90	219	85	78
501	70.701	0.143	0.045	1.95	87	-1.75	100	0.9	0.1	90	219	84	78
502	70.841	0.140	0.045	1.93	87	-1	98	0.9	0	90	220	84	78
503	70.985	0.144	0.045	1.95	87	-0.54	101	0.8	-0.1	90	219	84	78
504	71.123	0.138	0.045	1.94	87	-0.36	97	0.9	0.1	90	219	86	78
505	71.267	0.144	0.045	1.95	87	-1.76	101	0.8	-0.1	90	219	86	78
506	71.406	0.139	0.045	1.94	87	-1.87	97	0.8	0	90	219	86	78
507	71.551	0.145	0.045	1.96	87	-1.46	101	0.8	0	90	219	85	78
508	71.691	0.140	0.045	1.95	87	-1.43	98	0.8	0	90	219	84	78
509	71.833	0.142	0.045	1.95	87	-1.72	99	0.8	0	91	219	84	78
510	71.973	0.140	0.045	1.95	87	-1.61	98	0.8	0	90	220	84	78
511	72.114	0.141	0.045	1.95	87	-0.36	99	0.8	0	90	220	86	78
512	72.259	0.145	0.045	1.98	87	-0.39	101	0.8	0	90	220	87	78
513	72.397	0.138	0.045	1.94	87	-0.45	97	0.9	0.1	90	219	86	78
514	72.541	0.144	0.045	1.93	87	-1.48	101	0.8	-0.1	90	219	85	78
515	72.680	0.139	0.045	1.97	87	-1.74	97	0.7	-0.1	90	219	84	78
516	72.824	0.144	0.045	1.97	87	-1.66	101	0.6	-0.1	90	218	84	78
517	72.964	0.140	0.045	1.95	87	-0.86	98	0.7	0.1	90	218	85	78
518	73.107	0.143	0.045	1.97	87	-1	100	0.7	0	90	217	86	78
519	73.247	0.140	0.045	1.95	87	-1.82	98	0.7	0	90	217	86	78
520	73.388	0.141	0.045	1.96	87	-1.7	99	0.7	0	90	217	85	78
521	73.531	0.143	0.045	1.98	87	-0.73	100	0.6	-0.1	90	217	85	78
522	73.671	0.140	0.045	1.96	87	-1.23	98	0.7	0.1	90	216	84	78
523	73.815	0.144	0.045	1.96	86	-0.91	101	0.6	-0.1	90	216	84	78
524	73.953	0.138	0.045	1.94	87	-1.21	97	0.6	0	90	216	85	78
525	74.098	0.145	0.045	1.95	87	-1.89	101	0.6	0	90	216	86	78
526	74.237	0.139	0.045	1.96	87	-0.55	97	0.6	0	90	215	86	78
527	74.381	0.144	0.045	1.95	87	-1.04	101	0.6	0	90	215	85	78

BOX A TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: F2500
Run #: 2

Job #: 18-414
Tracking #: 003
Technician: SJB
Date: 6/26/2018

	Particulate Sampling Data							Fuel Weight (lb)		Temperature Data (°F)			
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Dilution Tunnel dP (in H_2O)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Scale Reading	Weight Change	Dilution Tunnel	Flue	Filter	Ambient
528	74.521	0.140	0.045	1.96	87	-0.37	98	0.6	0	90	215	84	78
529	74.661	0.140	0.045	1.93	87	-1.83	98	0.6	0	90	214	84	78
530	74.804	0.143	0.045	1.94	87	-1.16	100	0.6	0	90	213	84	78
531	74.945	0.141	0.045	1.95	87	-1.81	99	0.7	0.1	90	211	86	78
532	75.089	0.144	0.045	1.95	87	-0.64	101	0.6	-0.1	90	210	86	78
533	75.227	0.138	0.045	1.96	87	-0.39	97	0.6	0	90	208	86	78
534	75.371	0.144	0.045	1.94	87	-1.51	101	0.5	-0.1	89	206	85	78
535	75.510	0.139	0.045	1.95	87	-1.54	97	0.5	0	89	204	84	78
536	75.655	0.145	0.045	1.96	88	-1.52	101	0.5	0	89	203	84	78
537	75.795	0.140	0.045	1.95	87	-1.5	98	0.5	0	89	201	84	78
538	75.937	0.142	0.045	1.95	87	-1.9	99	0.5	0	89	200	86	78
539	76.077	0.140	0.045	1.97	87	-1.55	98	0.5	0	89	200	86	78
540	76.218	0.141	0.045	1.94	87	-1.65	99	0.5	0	89	200	85	78
541	76.363	0.145	0.045	1.94	87	-1.76	101	0.5	0	89	200	84	78
542	76.501	0.138	0.045	1.97	87	-0.83	96	0.5	0	89	200	84	78
543	76.645	0.144	0.045	1.94	87	-0.41	101	0.3	-0.2	89	201	84	78
544	76.784	0.139	0.045	1.95	87	-1.68	97	0.5	0.2	89	201	85	78
545	76.928	0.144	0.045	1.95	87	-1.84	101	0.4	-0.1	89	202	86	78
546	77.069	0.141	0.045	1.92	88	-0.41	98	0.4	0	89	202	86	78
547	77.211	0.142	0.045	1.97	87	-1.81	99	0.4	0	89	203	85	78
548	77.351	0.140	0.045	1.94	87	-0.64	98	0.4	0	89	203	84	78
549	77.492	0.141	0.045	1.93	87	-1.84	99	0.4	0	89	204	84	78
550	77.636	0.144	0.045	1.94	87	-0.7	101	0.4	0	89	204	84	78
551	77.775	0.139	0.045	1.94	87	-0.42	97	0.4	0	89	205	86	78
552	77.919	0.144	0.045	1.94	87	-1.06	101	0.4	0	89	205	86	78
553	78.057	0.138	0.045	1.95	87	-0.39	96	0.4	0	89	205	85	78
554	78.202	0.145	0.045	1.96	87	-0.66	101	0.3	-0.1	89	205	84	78
555	78.342	0.140	0.045	1.96	88	-0.55	98	0.3	0	89	206	84	78
556	78.485	0.143	0.045	1.93	88	-1.82	100	0.3	0	89	206	84	78
557	78.625	0.140	0.045	1.95	88	-0.34	98	0.3	0	89	207	85	78
558	78.766	0.141	0.045	1.96	88	-1	98	0.3	0	89	208	86	78
559	78.909	0.143	0.045	1.94	88	-1.89	100	0.3	0	89	208	86	78
560	79.049	0.140	0.045	1.97	88	-1.75	98	0.3	0	89	209	85	78

BOX A TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: F2500
Run #: 2

Job #: 18-414
Tracking #: 003
Technician: SJB
Date: 6/26/2018

	Particulate Sampling Data							Fuel Weight (lb)		Temperature Data (°F)			
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Dilution Tunnel dP (in H_2O)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Scale Reading	Weight Change	Dilution Tunnel	Flue	Filter	Ambient
561	79.193	0.144	0.045	1.95	87	-0.56	101	0.3	0	89	209	84	78
562	79.331	0.138	0.045	1.96	88	-1.5	96	0.3	0	89	209	84	78
563	79.475	0.144	0.045	1.97	87	-1.34	101	0.2	-0.1	89	210	84	78
564	79.614	0.139	0.045	1.95	88	-0.47	97	0.2	0	89	210	86	78
565	79.759	0.145	0.045	1.95	87	-0.45	101	0.2	0	89	210	86	78
566	79.899	0.140	0.045	1.97	87	-0.7	98	0.2	0	89	211	85	78
567	80.041	0.142	0.045	1.96	88	-0.5	99	0.2	0	89	211	84	78
568	80.182	0.141	0.045	1.96	88	-0.65	98	0.2	0	89	211	84	78
569	80.322	0.140	0.045	1.96	88	-1.49	98	0.2	0	89	211	84	78
570	80.467	0.145	0.045	1.95	88	-1.89	101	0.2	0	89	211	85	78
571	80.606	0.139	0.045	1.95	88	-0.43	97	0.1	-0.1	89	211	86	78
572	80.749	0.143	0.045	1.94	88	-0.48	100	0.0	-0.1	89	212	86	78
573	80.888	0.139	0.045	1.94	88	-0.32	97	0.1	0.1	89	212	85	78
574	81.032	0.144	0.045	1.96	87	-0.37	101	0.1	0	89	212	84	78
575	81.173	0.141	0.045	1.94	87	-0.35	99	0.1	0	89	212	84	78
576	81.316	0.143	0.045	1.96	88	-0.53	100	0.0	-0.1	89	212	84	78
Avg/Tot	81.316	0.141	0.045	1.96	84	-1.22	100			98	300	85	76.7

BOX B TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: F2500
Run #: 2

Job #: 18-414
Tracking #: 003
Technician: SJB
Date: 6/26/2018

	Particulate Sampling Data							Flue Gas Data		
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Filter (°F)	Flue Draft (in H_2O)	CO_2 (%)	CO (%)
0	0.000		0.00	74	1		83	0.000	5.02	0.17
1	0.116	0.116	2.00	74	2.5	88	83	-0.050	3.89	0.19
2	0.249	0.133	1.98	74	2.28	100	84	-0.060	7.34	0.16
3	0.386	0.137	1.96	74	1.34	103	86	-0.060	13.85	0.14
4	0.521	0.135	1.95	74	2.63	102	86	-0.070	16.36	1.42
5	0.653	0.132	1.93	74	1.9	100	85	-0.070	16.79	2.30
6	0.792	0.139	2.00	75	1.78	105	84	-0.070	16.59	4.00
7	0.927	0.135	1.97	75	2.77	102	83	-0.060	15.62	5.00
8	1.060	0.133	1.92	75	2.58	100	83	-0.060	15.09	4.54
9	1.200	0.140	2.06	75	2.97	105	85	-0.060	15.01	4.51
10	1.335	0.135	2.00	75	2.96	101	86	-0.060	15.11	4.20
11	1.473	0.138	1.96	75	3.22	103	85	-0.060	15.20	3.81
12	1.607	0.134	1.91	76	1.33	100	84	-0.060	15.22	3.62
13	1.744	0.137	2.03	76	2.55	102	83	-0.060	15.21	3.50
14	1.883	0.139	1.98	76	3.53	104	83	-0.070	15.35	3.39
15	2.016	0.133	1.96	77	1.83	99	85	-0.060	15.46	3.08
16	2.154	0.138	1.95	77	3.17	103	86	-0.060	15.51	2.72
17	2.287	0.133	1.92	77	1.84	99	86	-0.070	15.48	2.56
18	2.421	0.134	1.92	78	3.4	100	84	-0.060	15.44	2.38
19	2.556	0.135	1.96	78	3.6	100	84	-0.060	15.49	2.16
20	2.691	0.135	1.95	78	3.07	100	83	-0.060	15.64	2.06
21	2.826	0.135	1.96	78	2.42	100	84	-0.070	15.37	1.70
22	2.963	0.137	1.94	79	3.55	101	85	-0.070	15.21	1.58
23	3.096	0.133	1.93	79	3.48	98	86	-0.060	15.23	1.38
24	3.233	0.137	1.94	79	2.38	101	85	-0.070	15.21	1.33
25	3.367	0.134	1.92	80	3.71	99	84	-0.070	15.32	1.00
26	3.500	0.133	1.93	80	3.79	98	83	-0.060	15.35	0.88
27	3.639	0.139	1.92	80	2.98	103	83	-0.070	15.38	0.69
28	3.771	0.132	1.94	81	1.91	97	84	-0.060	15.47	0.59
29	3.907	0.136	1.93	81	3.75	100	86	-0.070	15.48	0.42
30	4.042	0.135	1.93	82	3.81	99	86	-0.060	15.45	0.31
31	4.176	0.134	1.93	82	3.59	99	85	-0.060	15.25	0.27

BOX B TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: F2500
Run #: 2

Job #: 18-414
Tracking #: 003
Technician: SJB
Date: 6/26/2018

	Particulate Sampling Data							Flue Gas Data		
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Filter (°F)	Flue Draft (in H_2O)	CO_2 (%)	CO (%)
32	4.313	0.137	1.93	82	3.77	101	84	-0.060	15.16	0.24
33	4.447	0.134	1.93	83	3.75	98	83	-0.070	14.97	0.20
34	4.581	0.134	1.93	83	1.87	98	83	-0.060	14.78	0.15
35	4.720	0.139	1.92	83	1.98	102	85	-0.060	14.48	0.13
36	4.851	0.131	1.91	83	1.97	96	86	-0.060	14.24	0.10
37	4.990	0.139	1.93	84	1.95	102	85	-0.060	14.05	0.08
38	5.124	0.134	1.93	84	2.66	98	84	-0.060	13.85	0.09
39	5.258	0.134	1.93	84	3.21	98	83	-0.060	13.68	0.08
40	5.396	0.138	1.92	85	2.12	101	84	-0.060	13.58	0.07
41	5.529	0.133	1.92	85	2.28	97	85	-0.060	13.39	0.07
42	5.667	0.138	1.93	85	3.72	101	86	-0.060	13.18	0.08
43	5.802	0.135	1.93	86	3.72	98	85	-0.060	12.98	0.08
44	5.937	0.135	1.93	86	3.13	98	84	-0.060	12.81	0.07
45	6.074	0.137	1.92	86	3.47	100	83	-0.060	12.60	0.08
46	6.210	0.136	1.93	86	3.68	99	83	-0.060	12.48	0.07
47	6.346	0.136	1.93	87	3.57	99	85	-0.060	12.39	0.07
48	6.483	0.137	1.92	87	3.28	99	86	-0.060	12.35	0.07
49	6.618	0.135	1.93	87	1.94	98	86	-0.050	12.25	0.08
50	6.756	0.138	1.93	87	3.43	100	85	-0.050	12.20	0.07
51	6.891	0.135	1.93	88	3.77	98	83	-0.060	12.25	0.07
52	7.026	0.135	1.93	88	3.79	98	83	-0.060	12.24	0.07
53	7.167	0.141	2.02	88	2.42	102	84	-0.060	12.20	0.07
54	7.305	0.138	2.03	88	3.82	100	85	-0.060	12.25	0.07
55	7.447	0.142	2.02	89	1.97	103	86	-0.060	12.23	0.07
56	7.585	0.138	2.03	89	2.92	100	85	-0.060	12.08	0.08
57	7.727	0.142	2.02	89	3.75	103	84	-0.060	12.09	0.06
58	7.866	0.139	2.03	90	3.72	100	83	-0.060	12.06	0.07
59	8.004	0.138	2.02	90	1.96	99	84	-0.050	12.11	0.07
60	8.146	0.142	2.01	90	2.53	102	85	-0.060	12.06	0.08
61	8.285	0.139	2.02	90	3.34	100	86	-0.060	12.01	0.07
62	8.427	0.142	2.02	90	2.2	102	85	-0.050	12.15	0.07
63	8.564	0.137	2.03	90	2.27	99	84	-0.060	12.02	0.07

BOX B TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: F2500
Run #: 2

Job #: 18-414
Tracking #: 003
Technician: SJB
Date: 6/26/2018

	Particulate Sampling Data							Flue Gas Data		
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Filter (°F)	Flue Draft (in H_2O)	CO_2 (%)	CO (%)
64	8.706	0.142	2.02	91	2.58	102	83	-0.050	12.11	0.07
65	8.846	0.140	2.02	91	2.03	101	84	-0.060	12.01	0.07
66	8.986	0.140	2.02	91	1.98	101	85	-0.060	11.98	0.07
67	9.127	0.141	2.03	91	2.13	101	86	-0.050	12.07	0.07
68	9.266	0.139	2.04	92	3.77	100	86	-0.060	12.07	0.07
69	9.409	0.143	2.03	92	3.09	103	84	-0.060	12.29	0.08
70	9.547	0.138	2.04	92	3.66	99	83	-0.060	12.61	0.09
71	9.689	0.142	2.03	92	2.98	102	83	-0.060	12.75	0.07
72	9.828	0.139	2.04	92	1.96	100	84	-0.060	12.92	0.08
73	9.970	0.142	2.03	92	2.41	102	86	-0.050	13.28	0.08
74	10.111	0.141	2.03	92	3.69	101	86	-0.050	13.46	0.13
75	10.249	0.138	2.02	93	1.93	99	85	-0.060	13.43	0.11
76	10.392	0.143	2.04	93	3.76	102	84	-0.060	12.42	0.06
77	10.531	0.139	2.03	93	3.74	99	83	-0.060	11.78	0.07
78	10.674	0.143	2.02	93	2.36	102	83	-0.050	11.72	0.06
79	10.812	0.138	2.02	93	3.44	99	85	-0.060	11.78	0.06
80	10.954	0.142	2.03	93	2.25	102	86	-0.050	11.81	0.07
81	11.095	0.141	2.02	93	2.25	101	86	-0.060	11.83	0.06
82	11.235	0.140	2.03	94	1.95	100	85	-0.050	11.85	0.06
83	11.376	0.141	2.04	94	2.03	101	84	-0.050	11.60	0.07
84	11.515	0.139	2.04	94	2.12	99	83	-0.050	11.44	0.06
85	11.660	0.145	2.03	94	3.69	103	84	-0.050	11.33	0.07
86	11.798	0.138	2.04	94	2.21	98	86	-0.050	11.19	0.06
87	11.941	0.143	2.03	94	2.05	102	86	-0.050	11.17	0.06
88	12.080	0.139	2.03	94	3.76	99	85	-0.050	11.07	0.06
89	12.223	0.143	2.04	94	2.54	102	83	-0.050	11.03	0.05
90	12.363	0.140	2.03	95	3.65	100	83	-0.050	10.94	0.07
91	12.504	0.141	2.05	95	1.89	100	84	-0.050	10.92	0.06
92	12.646	0.142	2.04	95	2.47	101	86	-0.050	10.88	0.06
93	12.786	0.140	2.03	95	3.36	99	86	-0.050	10.92	0.07
94	12.930	0.144	2.01	95	2.55	102	85	-0.050	10.94	0.05
95	13.069	0.139	2.03	95	3.7	99	84	-0.050	10.95	0.08

BOX B TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: F2500
Run #: 2

Job #: 18-414
Tracking #: 003
Technician: SJB
Date: 6/26/2018

	Particulate Sampling Data							Flue Gas Data		
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Filter (°F)	Flue Draft (in H_2O)	CO_2 (%)	CO (%)
96	13.211	0.142	2.03	95	2.19	101	83	-0.050	11.04	0.06
97	13.351	0.140	2.03	95	3.76	99	84	-0.050	11.06	0.06
98	13.495	0.144	2.04	95	2.37	102	85	-0.050	11.10	0.06
99	13.635	0.140	2.04	95	1.81	99	86	-0.050	11.12	0.05
100	13.776	0.141	2.03	96	2.99	100	85	-0.050	11.08	0.06
101	13.918	0.142	2.03	96	3.63	101	84	-0.050	11.04	0.05
102	14.058	0.140	2.03	96	3.59	99	83	-0.050	10.95	0.06
103	14.203	0.145	2.05	96	1.86	103	84	-0.050	10.92	0.06
104	14.342	0.139	2.04	96	2.29	98	85	-0.050	10.90	0.05
105	14.486	0.144	2.05	96	3.6	102	86	-0.050	10.83	0.06
106	14.624	0.138	2.04	96	3	98	85	-0.050	10.88	0.06
107	14.768	0.144	2.04	96	2.43	102	84	-0.050	10.88	0.06
108	14.910	0.142	2.05	96	3.09	101	83	-0.050	10.94	0.05
109	15.052	0.142	2.02	96	3.57	101	83	-0.050	10.84	0.06
110	15.193	0.141	2.04	96	2.95	100	85	-0.050	10.89	0.06
111	15.333	0.140	2.04	96	3.29	99	86	-0.040	10.85	0.06
112	15.477	0.144	2.04	96	3.19	102	86	-0.040	10.82	0.06
113	15.618	0.141	2.03	97	3.28	100	85	-0.050	10.81	0.07
114	15.762	0.144	2.04	97	3.17	102	83	-0.050	10.86	0.06
115	15.901	0.139	2.03	97	2.31	98	83	-0.050	10.95	0.04
116	16.045	0.144	2.04	97	3.51	102	84	-0.050	10.73	0.06
117	16.186	0.141	2.05	97	3.57	100	86	-0.050	10.36	0.06
118	16.329	0.143	2.05	97	2.1	101	86	-0.050	10.04	0.06
119	16.471	0.142	2.04	97	1.97	100	85	-0.050	9.99	0.06
120	16.612	0.141	2.03	97	3.66	100	84	-0.050	10.04	0.04
121	16.754	0.142	2.03	97	1.97	100	83	-0.050	10.05	0.06
122	16.896	0.142	2.05	97	2.63	100	84	-0.050	10.10	0.06
123	17.039	0.143	2.05	97	1.93	101	86	-0.040	10.12	0.07
124	17.181	0.142	2.05	97	2.32	100	86	-0.050	10.21	0.06
125	17.325	0.144	2.04	97	2.46	102	85	-0.040	10.22	0.06
126	17.464	0.139	2.05	97	3.31	98	84	-0.050	10.18	0.06
127	17.608	0.144	2.04	97	3.08	102	83	-0.040	10.25	0.06

BOX B TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: F2500
Run #: 2

Job #: 18-414
Tracking #: 003
Technician: SJB
Date: 6/26/2018

	Particulate Sampling Data							Flue Gas Data		
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Filter (°F)	Flue Draft (in H_2O)	CO_2 (%)	CO (%)
128	17.749	0.141	2.04	98	3.76	99	84	-0.050	10.28	0.06
129	17.893	0.144	2.06	98	3.13	101	85	-0.050	10.31	0.05
130	18.034	0.141	2.04	98	2.03	99	86	-0.050	10.32	0.06
131	18.177	0.143	2.04	98	3.64	101	85	-0.050	10.33	0.06
132	18.319	0.142	2.06	98	2.94	100	84	-0.050	10.43	0.07
133	18.460	0.141	2.05	98	1.95	99	83	-0.050	10.44	0.05
134	18.604	0.144	2.05	98	2.05	101	84	-0.050	10.32	0.06
135	18.746	0.142	2.06	98	1.91	100	85	-0.050	10.25	0.04
136	18.890	0.144	2.04	98	3.41	101	86	-0.050	10.10	0.05
137	19.030	0.140	2.05	98	3.69	99	85	-0.050	9.98	0.05
138	19.173	0.143	2.05	98	2.11	101	84	-0.050	9.74	0.06
139	19.315	0.142	2.05	98	2.57	100	83	-0.050	9.55	0.06
140	19.459	0.144	2.04	98	2.73	101	83	-0.040	9.43	0.05
141	19.601	0.142	2.05	98	3.66	100	85	-0.040	9.32	0.05
142	19.743	0.142	2.05	98	2.44	100	86	-0.040	9.20	0.07
143	19.886	0.143	2.05	98	1.96	101	86	-0.040	9.15	0.06
144	20.026	0.140	2.05	98	3.61	98	85	-0.040	9.19	0.06
145	20.171	0.145	2.05	98	3.66	102	83	-0.040	9.16	0.07
146	20.312	0.141	2.06	98	2.56	99	83	-0.040	9.12	0.06
147	20.458	0.146	2.05	98	3.64	103	84	-0.050	9.08	0.07
148	20.597	0.139	2.05	98	1.88	98	86	-0.040	9.18	0.06
149	20.742	0.145	2.07	98	3.21	102	86	-0.040	9.14	0.07
150	20.882	0.140	2.06	98	3.66	98	85	-0.040	9.15	0.07
151	21.027	0.145	2.06	99	2.37	102	84	-0.040	9.13	0.07
152	21.168	0.141	2.06	99	1.86	99	83	-0.040	9.17	0.07
153	21.313	0.145	2.06	99	2.17	102	84	-0.040	9.15	0.07
154	21.455	0.142	2.06	99	3.63	100	85	-0.040	9.17	0.06
155	21.597	0.142	2.04	99	3.49	100	86	-0.040	9.16	0.07
156	21.740	0.143	2.05	99	2.03	100	85	-0.040	9.14	0.07
157	21.881	0.141	2.06	99	3.08	99	84	-0.050	9.16	0.07
158	22.026	0.145	2.06	99	2.37	102	83	-0.040	9.17	0.06
159	22.168	0.142	2.05	99	2.18	100	83	-0.040	9.19	0.05

BOX B TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: F2500
Run #: 2

Job #: 18-414
Tracking #: 003
Technician: SJB
Date: 6/26/2018

	Particulate Sampling Data							Flue Gas Data		
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Filter (°F)	Flue Draft (in H_2O)	CO_2 (%)	CO (%)
160	22.313	0.145	2.05	99	2.56	102	84	-0.040	9.16	0.07
161	22.453	0.140	2.06	99	2.26	98	86	-0.040	9.18	0.06
162	22.598	0.145	2.05	99	2.12	102	86	-0.040	9.12	0.08
163	22.738	0.140	2.05	99	1.89	98	85	-0.050	9.12	0.07
164	22.883	0.145	2.06	99	3.42	102	84	-0.050	9.07	0.07
165	23.025	0.142	2.07	99	3.39	100	83	-0.040	9.08	0.06
166	23.169	0.144	2.04	99	1.85	101	84	-0.040	9.07	0.07
167	23.311	0.142	2.07	99	2.14	100	85	-0.040	8.98	0.06
168	23.454	0.143	2.06	99	3.44	100	86	-0.040	8.88	0.07
169	23.597	0.143	2.05	99	2.52	100	85	-0.040	8.84	0.07
170	23.738	0.141	2.05	99	2.08	99	84	-0.040	8.83	0.07
171	23.883	0.145	2.07	99	1.98	102	83	-0.040	8.60	0.07
172	24.025	0.142	2.05	99	2.2	100	83	-0.040	8.54	0.07
173	24.170	0.145	2.06	99	3.1	102	85	-0.040	8.47	0.06
174	24.311	0.141	2.06	99	1.82	99	86	-0.040	8.45	0.06
175	24.456	0.145	2.07	99	2.3	102	86	-0.040	8.35	0.07
176	24.596	0.140	2.06	99	3.14	98	85	-0.040	8.12	0.07
177	24.741	0.145	2.06	99	2.15	102	83	-0.040	7.93	0.06
178	24.882	0.141	2.07	99	1.79	99	83	-0.040	7.82	0.07
179	25.028	0.146	2.07	99	3.23	102	84	-0.040	7.69	0.07
180	25.169	0.141	2.06	99	2.39	99	86	-0.040	7.73	0.07
181	25.312	0.143	2.06	99	3.26	100	86	-0.040	7.78	0.06
182	25.455	0.143	2.06	99	3.61	100	85	-0.040	7.64	0.07
183	25.597	0.142	2.06	99	2.58	100	84	-0.040	7.51	0.07
184	25.742	0.145	2.06	99	3.65	102	83	-0.040	7.34	0.06
185	25.884	0.142	2.07	99	2.86	99	84	-0.040	7.16	0.08
186	26.030	0.146	2.05	99	2.87	102	85	-0.040	7.03	0.07
187	26.170	0.140	2.05	100	1.78	98	86	-0.040	7.11	0.08
188	26.315	0.145	2.04	99	3.12	102	85	-0.040	7.07	0.08
189	26.455	0.140	2.06	100	3.17	98	84	-0.040	7.15	0.07
190	26.601	0.146	2.06	100	1.85	102	83	-0.040	7.05	0.07
191	26.742	0.141	2.07	100	1.99	99	83	-0.030	6.93	0.07

BOX B TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: F2500
Run #: 2

Job #: 18-414
Tracking #: 003
Technician: SJB
Date: 6/26/2018

	Particulate Sampling Data							Flue Gas Data		
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Filter (°F)	Flue Draft (in H_2O)	CO_2 (%)	CO (%)
192	26.887	0.145	2.07	100	3.6	101	85	-0.040	6.89	0.07
193	27.030	0.143	2.08	100	3.45	100	86	-0.030	6.78	0.09
194	27.173	0.143	2.06	100	3.61	100	86	-0.040	6.73	0.09
195	27.316	0.143	2.05	100	3.66	100	85	-0.040	6.65	0.09
196	27.458	0.142	2.07	100	3.17	99	84	-0.030	6.64	0.09
197	27.603	0.145	2.07	100	3.62	101	83	-0.040	6.61	0.08
198	27.745	0.142	2.08	100	1.98	99	84	-0.040	6.60	0.09
199	27.890	0.145	2.07	100	1.96	101	85	-0.040	6.45	0.10
200	28.032	0.142	2.07	100	2.27	99	86	-0.040	6.46	0.09
201	28.178	0.146	2.07	100	2.85	102	85	-0.040	6.32	0.10
202	28.319	0.141	2.06	100	2.26	98	84	-0.040	6.33	0.10
203	28.464	0.145	2.07	100	1.77	101	83	-0.040	6.34	0.09
204	28.604	0.140	2.06	100	1.8	98	84	-0.040	6.33	0.09
205	28.750	0.146	2.07	100	2.77	102	85	-0.040	6.24	0.10
206	28.892	0.142	2.07	100	1.8	99	86	-0.040	6.25	0.10
207	29.037	0.145	2.06	100	3.61	101	85	-0.030	6.27	0.08
208	29.179	0.142	2.06	100	2.5	99	84	-0.040	6.19	0.09
209	29.323	0.144	2.06	100	3.62	100	83	-0.030	6.20	0.09
210	29.466	0.143	2.07	100	2.22	100	83	-0.030	6.24	0.09
211	29.608	0.142	2.05	100	3.66	99	85	-0.030	6.23	0.08
212	29.753	0.145	2.07	100	1.82	101	86	-0.030	6.18	0.09
213	29.894	0.141	2.06	100	3.31	98	85	-0.030	6.17	0.09
214	30.040	0.146	2.07	100	2.94	102	84	-0.040	6.07	0.11
215	30.182	0.142	2.08	100	3.57	99	83	-0.040	6.05	0.09
216	30.327	0.145	2.06	100	2.96	101	83	-0.040	6.02	0.10
217	30.468	0.141	2.07	100	3.49	98	85	-0.030	5.97	0.09
218	30.614	0.146	2.07	100	3.38	102	86	-0.040	6.01	0.08
219	30.755	0.141	2.07	100	3.52	98	86	-0.030	5.91	0.10
220	30.901	0.146	2.07	100	1.76	102	84	-0.030	5.92	0.09
221	31.042	0.141	2.08	100	3.6	98	83	-0.030	5.93	0.09
222	31.188	0.146	2.07	100	1.78	102	83	-0.040	5.94	0.09
223	31.330	0.142	2.06	100	2.07	99	84	-0.030	5.95	0.09

BOX B TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: F2500
Run #: 2

Job #: 18-414
Tracking #: 003
Technician: SJB
Date: 6/26/2018

	Particulate Sampling Data							Flue Gas Data		
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Filter (°F)	Flue Draft (in H_2O)	CO_2 (%)	CO (%)
224	31.474	0.144	2.07	100	1.84	100	86	-0.030	5.88	0.09
225	31.617	0.143	2.06	100	2.27	100	86	-0.030	5.86	0.10
226	31.759	0.142	2.07	100	1.94	99	85	-0.040	5.86	0.09
227	31.904	0.145	2.07	100	2.5	101	84	-0.030	5.86	0.09
228	32.046	0.142	2.07	100	2.04	99	83	-0.040	5.82	0.09
229	32.192	0.146	2.08	100	2.36	102	84	-0.040	5.84	0.08
230	32.334	0.142	2.07	100	3.61	99	85	-0.030	5.82	0.10
231	32.479	0.145	2.06	100	3.57	101	86	-0.030	5.85	0.09
232	32.620	0.141	2.07	100	3.33	98	85	-0.030	5.83	0.09
233	32.766	0.146	2.08	100	3.44	102	84	-0.030	5.81	0.09
234	32.906	0.140	2.06	100	3.22	98	83	-0.030	5.86	0.09
235	33.052	0.146	2.07	100	3.69	102	84	-0.030	5.88	0.09
236	33.194	0.142	2.08	100	1.98	99	85	-0.030	5.92	0.08
237	33.340	0.146	2.07	100	3.33	102	86	-0.030	5.93	0.09
238	33.483	0.143	2.08	100	3.58	100	85	-0.030	5.96	0.09
239	33.626	0.143	2.07	100	2.17	100	84	-0.030	5.89	0.10
240	33.770	0.144	2.07	100	2.1	100	83	-0.030	5.89	0.09
241	33.913	0.143	2.08	100	2.81	100	84	-0.030	5.89	0.08
242	34.056	0.143	2.08	100	2.94	100	85	-0.030	5.86	0.10
243	34.199	0.143	2.07	100	3.13	99	86	-0.030	5.87	0.09
244	34.344	0.145	2.06	100	1.98	101	85	-0.030	5.82	0.09
245	34.486	0.142	2.07	100	3.61	99	84	-0.030	5.81	0.10
246	34.633	0.147	2.08	100	1.86	102	83	-0.030	5.82	0.08
247	34.773	0.140	2.07	100	2.61	97	83	-0.030	5.82	0.08
248	34.919	0.146	2.07	100	2.62	102	85	-0.030	5.80	0.08
249	35.060	0.141	2.07	100	3.63	98	86	-0.030	5.78	0.09
250	35.205	0.145	2.06	100	2.41	101	86	-0.030	5.77	0.09
251	35.347	0.142	2.07	100	3.55	99	85	-0.030	5.84	0.08
252	35.493	0.146	2.07	100	2.21	102	84	-0.030	5.83	0.08
253	35.635	0.142	2.08	100	3.58	99	83	-0.030	5.80	0.08
254	35.780	0.145	2.08	100	3.09	101	84	-0.030	5.82	0.08
255	35.923	0.143	2.07	100	1.84	99	86	-0.030	5.80	0.09

BOX B TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: F2500
Run #: 2

Job #: 18-414
Tracking #: 003
Technician: SJB
Date: 6/26/2018

	Particulate Sampling Data							Flue Gas Data		
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Filter (°F)	Flue Draft (in H_2O)	CO_2 (%)	CO (%)
256	36.067	0.144	2.07	100	3.09	100	86	-0.030	5.87	0.10
257	36.210	0.143	2.07	101	3.59	99	85	-0.030	5.83	0.09
258	36.352	0.142	2.07	101	3.49	99	84	-0.020	5.85	0.08
259	36.498	0.146	2.08	101	2.11	101	83	-0.030	5.86	0.08
260	36.639	0.141	2.06	101	3.31	98	84	-0.030	5.88	0.08
261	36.785	0.146	2.08	101	2.25	101	85	-0.030	5.86	0.08
262	36.928	0.143	2.08	101	2.17	99	86	-0.030	5.83	0.08
263	37.073	0.145	2.08	101	3.5	101	85	-0.030	5.86	0.08
264	37.215	0.142	2.08	101	1.98	99	84	-0.030	5.84	0.08
265	37.360	0.145	2.07	101	3.49	101	83	-0.030	5.80	0.08
266	37.501	0.141	2.07	101	1.67	98	84	-0.030	5.82	0.08
267	37.647	0.146	2.08	101	3.03	101	85	-0.030	5.83	0.08
268	37.789	0.142	2.08	101	2.68	99	86	-0.030	5.85	0.08
269	37.934	0.145	2.08	101	3.46	101	86	-0.030	5.86	0.09
270	38.078	0.144	2.09	101	2	100	84	-0.030	5.83	0.09
271	38.222	0.144	2.07	101	3.02	100	83	-0.030	5.87	0.08
272	38.365	0.143	2.08	101	3.59	99	83	-0.030	5.89	0.08
273	38.508	0.143	2.06	101	2.38	99	84	-0.030	5.91	0.08
274	38.652	0.144	2.07	101	3.61	100	86	-0.030	5.90	0.09
275	38.794	0.142	2.07	101	2.5	99	86	-0.030	5.89	0.08
276	38.940	0.146	2.09	101	2.67	101	85	-0.030	5.90	0.08
277	39.082	0.142	2.08	101	3.59	99	84	-0.030	5.92	0.09
278	39.229	0.147	2.08	101	1.93	102	83	-0.030	5.90	0.09
279	39.370	0.141	2.06	101	2.22	98	84	-0.030	5.91	0.08
280	39.516	0.146	2.08	101	2.84	101	85	-0.030	5.93	0.09
281	39.657	0.141	2.07	101	2.41	98	86	-0.030	5.94	0.08
282	39.803	0.146	2.09	101	1.86	101	85	-0.030	5.92	0.09
283	39.944	0.141	2.08	101	2.23	98	84	-0.030	5.89	0.08
284	40.090	0.146	2.07	101	2.87	101	83	-0.030	5.93	0.08
285	40.232	0.142	2.08	101	2.16	99	83	-0.030	5.91	0.09
286	40.378	0.146	2.09	101	3.03	101	85	-0.030	5.94	0.09
287	40.521	0.143	2.07	101	3.6	99	86	-0.030	5.97	0.08

BOX B TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: F2500
Run #: 2

Job #: 18-414
Tracking #: 003
Technician: SJB
Date: 6/26/2018

	Particulate Sampling Data							Flue Gas Data		
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Filter (°F)	Flue Draft (in H_2O)	CO_2 (%)	CO (%)
288	40.665	0.144	2.07	101	2.15	100	85	-0.030	5.93	0.08
289	40.809	0.144	2.08	101	2.39	100	84	-0.030	5.94	0.09
290	40.952	0.143	2.07	101	1.92	99	83	-0.030	5.94	0.09
291	41.096	0.144	2.06	101	2.66	100	83	-0.030	5.97	0.08
292	41.238	0.142	2.08	101	2.84	99	85	-0.030	5.94	0.09
293	41.384	0.146	2.08	101	1.76	101	86	-0.030	5.94	0.08
294	41.525	0.141	2.08	101	2.63	98	85	-0.030	5.96	0.08
295	41.672	0.147	2.08	101	1.81	102	84	-0.030	5.90	0.09
296	41.814	0.142	2.07	101	2.21	99	83	-0.030	5.90	0.09
297	41.960	0.146	2.07	101	2.66	101	83	-0.030	5.96	0.08
298	42.101	0.141	2.07	101	3.2	98	85	-0.030	5.96	0.07
299	42.247	0.146	2.09	101	2.28	101	86	-0.040	5.98	0.08
300	42.388	0.141	2.07	101	3.62	98	86	-0.030	5.97	0.08
301	42.534	0.146	2.08	101	3.4	101	85	-0.030	5.99	0.08
302	42.677	0.143	2.08	101	1.7	99	83	-0.030	6.00	0.08
303	42.822	0.145	2.08	101	2.1	101	83	-0.030	5.96	0.08
304	42.965	0.143	2.08	101	3.48	99	84	-0.030	5.94	0.09
305	43.110	0.145	2.06	101	2.43	101	86	-0.030	5.99	0.08
306	43.253	0.143	2.08	101	2.17	99	86	-0.030	6.11	0.08
307	43.397	0.144	2.07	101	1.8	100	85	-0.030	6.04	0.08
308	43.541	0.144	2.07	101	1.86	100	83	-0.030	6.09	0.08
309	43.683	0.142	2.09	101	3.29	99	83	-0.030	6.11	0.08
310	43.828	0.145	2.07	101	2.58	101	84	-0.030	6.07	0.08
311	43.970	0.142	2.07	101	1.82	99	86	-0.030	6.08	0.08
312	44.117	0.147	2.08	101	3.48	102	86	-0.030	6.12	0.08
313	44.259	0.142	2.08	101	2.22	99	85	-0.030	6.04	0.08
314	44.405	0.146	2.08	101	2.21	101	84	-0.030	6.01	0.09
315	44.546	0.141	2.08	101	3.47	98	83	-0.030	6.04	0.08
316	44.693	0.147	2.07	101	3.67	102	84	-0.030	6.07	0.08
317	44.834	0.141	2.07	101	3.54	98	86	-0.030	6.08	0.08
318	44.979	0.145	2.08	101	1.97	101	86	-0.030	6.06	0.08
319	45.122	0.143	2.08	101	3.38	99	85	-0.030	6.06	0.08

BOX B TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Job #: 18-414
Model: F2500
Tracking #: 003
Run #: 2
Technician: SJB
Date: 6/26/2018

	Particulate Sampling Data							Flue Gas Data		
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Filter (°F)	Flue Draft (in H_2O)	CO_2 (%)	CO (%)
320	45.267	0.145	2.08	101	3.56	101	84	-0.030	6.04	0.08
321	45.410	0.143	2.08	101	3.63	99	83	-0.030	6.10	0.08
322	45.556	0.146	2.07	101	3.5	101	83	-0.030	6.13	0.09
323	45.699	0.143	2.07	101	2.75	99	85	-0.030	6.09	0.08
324	45.843	0.144	2.07	101	2.44	100	86	-0.030	6.06	0.09
325	45.986	0.143	2.08	101	3.11	99	86	-0.030	6.08	0.09
326	46.129	0.143	2.07	101	2.91	99	85	-0.030	6.03	0.09
327	46.274	0.145	2.09	101	3.49	101	83	-0.030	6.02	0.08
328	46.417	0.143	2.08	101	2.91	99	83	-0.030	6.03	0.08
329	46.562	0.145	2.08	101	3.44	101	84	-0.030	6.01	0.08
330	46.705	0.143	2.10	101	1.78	99	86	-0.030	6.05	0.09
331	46.852	0.147	2.09	101	3.3	102	86	-0.030	5.98	0.08
332	46.993	0.141	2.07	101	3.07	98	85	-0.030	6.02	0.08
333	47.139	0.146	2.08	101	3.5	101	84	-0.030	6.04	0.07
334	47.280	0.141	2.08	101	3.63	98	83	-0.030	5.99	0.07
335	47.426	0.146	2.07	101	2.25	101	84	-0.030	6.00	0.07
336	47.568	0.142	2.08	101	2.84	99	85	-0.030	6.02	0.07
337	47.714	0.146	2.08	101	3.51	101	86	-0.030	5.97	0.08
338	47.856	0.142	2.06	101	3.55	99	85	-0.030	5.97	0.07
339	48.002	0.146	2.08	101	3.58	101	84	-0.030	6.07	0.08
340	48.145	0.143	2.09	101	1.78	99	83	-0.030	5.97	0.09
341	48.290	0.145	2.08	101	2.42	101	83	-0.030	5.93	0.08
342	48.433	0.143	2.08	101	3.47	99	85	-0.030	5.87	0.09
343	48.577	0.144	2.08	102	2.59	100	86	-0.030	5.82	0.09
344	48.721	0.144	2.07	101	1.8	100	85	-0.030	5.86	0.08
345	48.863	0.142	2.08	101	3.18	99	84	-0.030	5.81	0.08
346	49.009	0.146	2.08	101	3.54	101	83	-0.030	5.79	0.08
347	49.151	0.142	2.08	101	1.69	99	83	-0.030	5.77	0.08
348	49.298	0.147	2.08	101	3.6	102	85	-0.030	5.77	0.09
349	49.440	0.142	2.08	101	2.07	99	86	-0.030	5.76	0.08
350	49.586	0.146	2.08	101	1.88	101	85	-0.040	5.75	0.08
351	49.728	0.142	2.08	101	2.62	99	84	-0.030	5.75	0.07

BOX B TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: F2500
Run #: 2

Job #: 18-414
Tracking #: 003
Technician: SJB
Date: 6/26/2018

	Particulate Sampling Data							Flue Gas Data		
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Filter (°F)	Flue Draft (in H_2O)	CO_2 (%)	CO (%)
352	49.874	0.146	2.07	101	2.3	101	83	-0.030	5.65	0.09
353	50.016	0.142	2.09	101	1.85	99	83	-0.030	5.70	0.07
354	50.161	0.145	2.07	101	3.06	101	84	-0.030	5.67	0.08
355	50.304	0.143	2.08	102	3.35	99	86	-0.030	5.70	0.06
356	50.450	0.146	2.09	101	3.37	101	86	-0.030	5.64	0.08
357	50.592	0.142	2.08	101	1.9	99	85	-0.030	5.70	0.07
358	50.738	0.146	2.08	102	3.33	101	84	-0.030	5.67	0.08
359	50.881	0.143	2.07	101	2.29	99	83	-0.030	5.69	0.07
360	51.025	0.144	2.08	102	2.8	100	84	-0.030	5.68	0.07
361	51.169	0.144	2.08	102	1.77	100	85	-0.030	5.64	0.08
362	51.313	0.144	2.08	102	2.57	100	86	-0.030	5.67	0.08
363	51.457	0.144	2.06	102	3.12	100	85	-0.030	5.65	0.07
364	51.599	0.142	2.07	102	3.59	98	84	-0.030	5.68	0.07
365	51.746	0.147	2.08	102	1.64	102	83	-0.030	5.66	0.07
366	51.887	0.141	2.09	102	3.47	98	84	-0.030	5.69	0.07
367	52.034	0.147	2.08	102	2.33	102	85	-0.030	5.70	0.06
368	52.177	0.143	2.10	102	1.81	99	86	-0.020	5.72	0.07
369	52.322	0.145	2.08	102	3.5	100	85	-0.030	5.69	0.07
370	52.464	0.142	2.08	102	3.12	98	84	-0.030	5.67	0.07
371	52.611	0.147	2.08	102	2.74	102	83	-0.030	5.64	0.08
372	52.752	0.141	2.08	102	1.77	98	84	-0.030	5.67	0.08
373	52.898	0.146	2.09	102	1.74	101	86	-0.030	5.69	0.06
374	53.040	0.142	2.08	102	2.17	98	86	-0.030	5.67	0.07
375	53.186	0.146	2.08	102	2.75	101	85	-0.030	5.66	0.07
376	53.329	0.143	2.09	102	2.68	99	84	-0.030	5.69	0.07
377	53.475	0.146	2.08	102	3.56	101	83	-0.030	5.72	0.06
378	53.618	0.143	2.06	102	2.86	99	84	-0.030	5.70	0.07
379	53.762	0.144	2.08	102	2.84	100	85	-0.030	5.75	0.08
380	53.907	0.145	2.08	102	3.57	100	86	-0.030	5.75	0.07
381	54.050	0.143	2.08	102	2.99	99	85	-0.020	5.74	0.08
382	54.194	0.144	2.07	102	1.8	100	85	-0.030	5.69	0.08
383	54.337	0.143	2.09	102	2.39	99	83	-0.030	5.63	0.07

BOX B TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: F2500
Run #: 2

Job #: 18-414
Tracking #: 003
Technician: SJB
Date: 6/26/2018

	Particulate Sampling Data							Flue Gas Data		
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Filter (°F)	Flue Draft (in H_2O)	CO_2 (%)	CO (%)
384	54.483	0.146	2.08	102	2.03	101	84	-0.030	5.67	0.07
385	54.625	0.142	2.07	102	1.98	98	85	-0.030	5.68	0.07
386	54.772	0.147	2.08	102	3.58	102	86	-0.020	5.66	0.07
387	54.914	0.142	2.07	102	2.89	98	86	-0.030	5.70	0.06
388	55.061	0.147	2.07	102	2.79	102	85	-0.020	5.74	0.07
389	55.202	0.141	2.08	102	1.78	98	84	-0.030	5.78	0.07
390	55.349	0.147	2.08	102	3.33	102	83	-0.030	5.81	0.07
391	55.490	0.141	2.09	102	3.39	98	84	-0.030	5.81	0.07
392	55.636	0.146	2.07	102	3.35	101	85	-0.030	5.82	0.07
393	55.778	0.142	2.08	102	2	98	86	-0.030	5.79	0.06
394	55.925	0.147	2.09	102	2.92	102	85	-0.030	5.75	0.07
395	56.067	0.142	2.08	102	2.24	98	84	-0.030	5.79	0.07
396	56.213	0.146	2.08	102	3.55	101	83	-0.030	5.84	0.06
397	56.357	0.144	2.09	102	3.57	100	83	-0.030	5.73	0.08
398	56.501	0.144	2.07	102	3.47	100	85	-0.030	5.60	0.08
399	56.645	0.144	2.08	102	1.91	100	86	-0.030	5.62	0.08
400	56.789	0.144	2.07	102	3.51	100	86	-0.020	5.67	0.07
401	56.933	0.144	2.08	102	3.49	100	85	-0.030	5.66	0.08
402	57.076	0.143	2.08	102	3.13	99	84	-0.030	5.70	0.08
403	57.221	0.145	2.07	102	3.45	100	83	-0.030	5.72	0.06
404	57.364	0.143	2.09	102	3.51	99	84	-0.030	5.71	0.07
405	57.510	0.146	2.09	102	1.83	101	85	-0.030	5.64	0.09
406	57.653	0.143	2.07	102	2.36	99	86	-0.030	5.66	0.08
407	57.800	0.147	2.10	102	2.24	102	85	-0.030	5.71	0.06
408	57.941	0.141	2.08	102	1.92	98	84	-0.030	5.68	0.07
409	58.088	0.147	2.08	102	3.53	102	83	-0.030	5.65	0.08
410	58.230	0.142	2.07	102	2.58	98	84	-0.030	5.69	0.08
411	58.376	0.146	2.09	102	2.44	101	85	-0.030	5.69	0.07
412	58.517	0.141	2.07	102	2.34	98	86	-0.030	5.69	0.07
413	58.664	0.147	2.08	102	3.22	102	86	-0.030	5.64	0.08
414	58.807	0.143	2.09	102	3.48	99	85	-0.030	5.64	0.08
415	58.952	0.145	2.07	102	2.2	100	83	-0.030	5.64	0.08

BOX B TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: F2500
Run #: 2

Job #: 18-414
Tracking #: 003
Technician: SJB
Date: 6/26/2018

	Particulate Sampling Data							Flue Gas Data		
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Filter (°F)	Flue Draft (in H_2O)	CO_2 (%)	CO (%)
416	59.096	0.144	2.09	102	1.85	100	84	-0.030	5.61	0.07
417	59.242	0.146	2.09	102	3.48	101	85	-0.030	5.61	0.07
418	59.385	0.143	2.08	102	1.85	99	86	-0.030	5.56	0.08
419	59.529	0.144	2.08	102	2.1	100	86	-0.030	5.58	0.07
420	59.674	0.145	2.08	102	2.95	100	85	-0.030	5.56	0.07
421	59.817	0.143	2.09	102	3.44	99	84	-0.030	5.59	0.07
422	59.961	0.144	2.08	102	3.34	100	83	-0.030	5.57	0.08
423	60.105	0.144	2.07	102	3.51	100	84	-0.020	5.59	0.07
424	60.251	0.146	2.08	102	3.58	101	86	-0.030	5.56	0.07
425	60.393	0.142	2.07	102	2.58	98	86	-0.030	5.57	0.07
426	60.540	0.147	2.08	102	3.3	102	85	-0.030	5.59	0.06
427	60.682	0.142	2.07	102	3.11	98	84	-0.020	5.60	0.07
428	60.829	0.147	2.07	102	2.73	102	83	-0.030	5.57	0.07
429	60.970	0.141	2.08	102	2.9	98	84	-0.030	5.54	0.08
430	61.117	0.147	2.08	102	2.83	102	85	-0.030	5.55	0.07
431	61.259	0.142	2.08	103	2.38	98	86	-0.030	5.50	0.08
432	61.405	0.146	2.07	103	2.19	101	86	-0.030	5.52	0.08
433	61.547	0.142	2.07	103	1.82	98	85	-0.030	5.53	0.07
434	61.694	0.147	2.09	103	3.3	102	84	-0.030	5.52	0.07
435	61.836	0.142	2.09	103	3.58	98	83	-0.030	5.49	0.07
436	61.982	0.146	2.09	103	2.82	101	84	-0.030	5.47	0.07
437	62.126	0.144	2.09	103	3.26	100	86	-0.030	5.55	0.07
438	62.272	0.146	2.09	103	1.81	101	86	-0.030	5.53	0.07
439	62.415	0.143	2.08	103	1.76	99	85	-0.030	5.52	0.07
440	62.559	0.144	2.07	103	2.33	100	84	-0.040	5.47	0.07
441	62.704	0.145	2.07	103	3.02	100	83	-0.030	5.49	0.07
442	62.847	0.143	2.08	103	1.78	99	84	-0.030	5.47	0.07
443	62.992	0.145	2.07	103	2.66	100	85	-0.020	5.53	0.07
444	63.135	0.143	2.08	103	1.75	99	86	-0.020	5.48	0.06
445	63.281	0.146	2.08	103	2.56	101	86	-0.030	5.53	0.07
446	63.423	0.142	2.07	103	3.23	98	85	-0.030	5.51	0.07
447	63.570	0.147	2.10	103	3.08	102	84	-0.030	5.54	0.06

BOX B TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: F2500
Run #: 2

Job #: 18-414
Tracking #: 003
Technician: SJB
Date: 6/26/2018

	Particulate Sampling Data							Flue Gas Data		
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Filter (°F)	Flue Draft (in H_2O)	CO_2 (%)	CO (%)
448	63.713	0.143	2.09	103	2.76	99	83	-0.030	5.55	0.07
449	63.860	0.147	2.06	103	3.25	102	84	-0.030	5.48	0.07
450	64.001	0.141	2.08	103	3.57	97	85	-0.030	5.12	0.07
451	64.148	0.147	2.07	103	3.16	102	86	-0.030	5.05	0.07
452	64.289	0.141	2.07	103	1.88	97	85	-0.030	4.99	0.08
453	64.436	0.147	2.09	103	1.95	102	84	-0.030	4.98	0.07
454	64.577	0.141	2.08	103	3.13	97	83	-0.030	4.91	0.07
455	64.724	0.147	2.08	103	2.65	102	83	-0.030	4.92	0.07
456	64.867	0.143	2.09	103	2.92	99	85	-0.030	4.91	0.07
457	65.012	0.145	2.09	103	1.72	100	86	-0.020	4.91	0.07
458	65.156	0.144	2.09	103	2.72	99	86	-0.030	4.90	0.07
459	65.302	0.146	2.08	103	3.18	101	85	-0.020	4.90	0.07
460	65.445	0.143	2.06	103	3.64	99	84	-0.030	4.85	0.08
461	65.590	0.145	2.10	103	3.59	100	83	-0.020	4.90	0.06
462	65.734	0.144	2.08	103	2.98	99	84	-0.020	4.83	0.08
463	65.878	0.144	2.08	103	3.07	99	85	-0.030	4.85	0.07
464	66.023	0.145	2.08	103	2.03	100	86	-0.020	4.88	0.08
465	66.166	0.143	2.09	103	2	99	86	-0.020	4.89	0.08
466	66.312	0.146	2.08	103	2.12	101	85	-0.030	5.07	0.08
467	66.455	0.143	2.10	103	2.8	99	84	-0.030	5.02	0.08
468	66.601	0.146	2.09	103	3.57	101	83	-0.030	4.87	0.07
469	66.744	0.143	2.09	103	2.03	99	85	-0.020	4.85	0.08
470	66.891	0.147	2.08	103	3.41	102	86	-0.030	4.98	0.08
471	67.033	0.142	2.07	103	3.15	98	86	-0.030	4.83	0.07
472	67.180	0.147	2.08	103	3.08	102	85	-0.020	4.76	0.08
473	67.322	0.142	2.08	103	2.17	98	84	-0.020	4.84	0.07
474	67.468	0.146	2.09	103	3.29	101	83	-0.030	4.95	0.09
475	67.610	0.142	2.08	103	2.33	98	84	-0.030	4.94	0.09
476	67.756	0.146	2.08	103	1.83	101	85	-0.030	4.93	0.07
477	67.899	0.143	2.08	103	3.1	99	86	-0.030	4.80	0.09
478	68.046	0.147	2.09	103	2.81	102	86	-0.020	4.84	0.08
479	68.188	0.142	2.09	103	2.13	98	84	-0.030	4.80	0.09

BOX B TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: F2500
Run #: 2

Job #: 18-414
Tracking #: 003
Technician: SJB
Date: 6/26/2018

	Particulate Sampling Data							Flue Gas Data		
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Filter (°F)	Flue Draft (in H_2O)	CO_2 (%)	CO (%)
480	68.334	0.146	2.09	103	1.78	101	83	-0.020	4.71	0.10
481	68.478	0.144	2.08	103	3.18	99	83	-0.020	4.74	0.09
482	68.623	0.145	2.07	103	2.41	100	85	-0.030	4.59	0.12
483	68.767	0.144	2.08	103	3.52	99	86	-0.020	4.56	0.11
484	68.911	0.144	2.07	103	3.32	99	86	-0.020	4.57	0.13
485	69.056	0.145	2.08	103	1.9	100	85	-0.030	4.56	0.14
486	69.199	0.143	2.10	103	1.81	99	84	-0.020	4.65	0.16
487	69.344	0.145	2.08	103	3.59	100	83	-0.020	4.56	0.17
488	69.485	0.141	2.09	103	2.99	97	84	-0.020	4.55	0.16
489	69.634	0.149	2.09	103	2.79	103	85	-0.020	4.50	0.19
490	69.776	0.142	2.08	103	3.05	98	86	-0.020	4.51	0.18
491	69.923	0.147	2.08	103	2.62	102	86	-0.030	4.52	0.18
492	70.066	0.143	2.09	103	1.71	99	85	-0.020	4.52	0.17
493	70.213	0.147	2.07	103	3.02	101	84	-0.020	4.48	0.16
494	70.355	0.142	2.09	103	3.57	98	83	-0.020	4.52	0.16
495	70.502	0.147	2.08	103	3.57	101	84	-0.020	4.52	0.14
496	70.644	0.142	2.07	103	2.43	98	85	-0.020	4.54	0.14
497	70.791	0.147	2.09	103	3.34	101	86	-0.030	4.57	0.13
498	70.932	0.141	2.07	103	3.32	97	86	-0.020	4.51	0.12
499	71.079	0.147	2.09	103	1.76	101	85	-0.020	4.54	0.12
500	71.222	0.143	2.09	103	2.16	99	84	-0.020	4.57	0.11
501	71.368	0.146	2.07	103	1.67	101	83	-0.020	4.50	0.12
502	71.511	0.143	2.09	103	3.45	99	84	-0.020	4.57	0.11
503	71.657	0.146	2.09	103	2.39	101	85	-0.020	4.58	0.11
504	71.801	0.144	2.09	104	3.54	99	86	-0.020	4.53	0.11
505	71.946	0.145	2.07	103	3.59	100	85	-0.020	4.50	0.10
506	72.090	0.144	2.08	103	2.76	99	84	-0.020	4.53	0.11
507	72.235	0.145	2.08	103	1.72	100	84	-0.020	4.58	0.11
508	72.379	0.144	2.08	103	2.77	99	83	-0.020	4.56	0.11
509	72.523	0.144	2.08	103	1.7	99	85	-0.020	4.60	0.11
510	72.668	0.145	2.08	103	2.65	100	86	-0.030	4.58	0.10
511	72.812	0.144	2.08	103	1.98	99	86	-0.020	4.53	0.11

BOX B TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: F2500
Run #: 2

Job #: 18-414
Tracking #: 003
Technician: SJB
Date: 6/26/2018

	Particulate Sampling Data							Flue Gas Data		
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Filter (°F)	Flue Draft (in H_2O)	CO_2 (%)	CO (%)
512	72.958	0.146	2.09	103	2.22	101	85	-0.020	4.53	0.10
513	73.101	0.143	2.07	103	3.37	99	84	-0.030	4.53	0.11
514	73.248	0.147	2.08	103	2.55	101	83	-0.020	4.49	0.09
515	73.391	0.143	2.10	103	3.04	99	84	-0.020	4.51	0.10
516	73.538	0.147	2.09	103	1.88	101	85	-0.020	4.50	0.10
517	73.680	0.142	2.09	103	2.41	98	86	-0.030	4.49	0.09
518	73.827	0.147	2.10	103	2.5	101	86	-0.020	4.46	0.09
519	73.969	0.142	2.08	103	2.93	98	84	-0.020	4.40	0.11
520	74.116	0.147	2.09	103	3.04	101	83	-0.020	4.46	0.09
521	74.258	0.142	2.08	103	3	98	83	-0.030	4.45	0.11
522	74.404	0.146	2.08	103	1.79	101	84	-0.020	4.47	0.10
523	74.547	0.143	2.08	103	2.43	99	86	-0.020	4.42	0.12
524	74.694	0.147	2.09	103	1.67	101	86	-0.020	4.34	0.12
525	74.836	0.142	2.06	104	2.54	98	85	-0.020	4.38	0.10
526	74.983	0.147	2.09	103	3.33	101	84	-0.020	4.43	0.13
527	75.127	0.144	2.09	104	2.87	99	84	-0.020	4.40	0.13
528	75.273	0.146	2.09	104	3.54	101	83	-0.020	4.44	0.13
529	75.416	0.143	2.07	103	2.89	99	84	-0.020	4.37	0.14
530	75.561	0.145	2.09	104	1.8	100	86	-0.030	4.37	0.17
531	75.706	0.145	2.09	104	3.56	100	86	-0.020	4.36	0.18
532	75.849	0.143	2.08	104	2.31	99	85	-0.020	4.30	0.22
533	75.994	0.145	2.10	104	2.16	100	84	-0.020	4.32	0.23
534	76.137	0.143	2.08	104	3.23	98	84	-0.020	4.23	0.26
535	76.284	0.147	2.07	104	2.8	101	83	-0.020	4.22	0.28
536	76.427	0.143	2.09	104	1.83	98	84	-0.020	4.25	0.29
537	76.573	0.146	2.07	104	2.22	101	86	-0.020	4.20	0.30
538	76.716	0.143	2.09	104	3.37	98	86	-0.020	4.25	0.30
539	76.864	0.148	2.10	104	1.91	102	85	-0.020	4.29	0.28
540	77.006	0.142	2.09	104	1.6	98	84	-0.020	4.28	0.27
541	77.153	0.147	2.08	104	2.3	101	84	-0.020	4.30	0.26
542	77.295	0.142	2.09	104	3.43	98	83	-0.020	4.35	0.24
543	77.442	0.147	2.08	104	1.95	101	84	-0.020	4.28	0.24

BOX B TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: F2500
Run #: 2

Job #: 18-414
Tracking #: 003
Technician: SJB
Date: 6/26/2018

	Particulate Sampling Data							Flue Gas Data		
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Filter (°F)	Flue Draft (in H_2O)	CO_2 (%)	CO (%)
544	77.584	0.142	2.08	104	2.03	98	86	-0.020	4.34	0.22
545	77.732	0.148	2.09	104	1.77	102	86	-0.010	4.31	0.21
546	77.873	0.141	2.08	104	3.53	97	85	-0.020	4.27	0.21
547	78.020	0.147	2.08	104	2.61	101	84	-0.020	4.36	0.20
548	78.163	0.143	2.09	104	1.68	98	83	-0.020	4.33	0.19
549	78.310	0.147	2.09	104	3.42	101	83	-0.020	4.34	0.18
550	78.453	0.143	2.09	104	1.97	98	85	-0.030	4.29	0.19
551	78.599	0.146	2.08	104	2.86	101	86	-0.020	4.29	0.19
552	78.743	0.144	2.08	104	2.74	99	86	-0.020	4.39	0.17
553	78.889	0.146	2.08	104	3.32	101	85	-0.020	4.36	0.17
554	79.033	0.144	2.08	104	1.76	99	84	-0.020	4.36	0.17
555	79.177	0.144	2.08	104	2.12	99	84	-0.020	4.39	0.16
556	79.322	0.145	2.08	104	2.03	100	83	-0.020	4.33	0.16
557	79.466	0.144	2.08	104	3.48	99	84	-0.020	4.46	0.16
558	79.611	0.145	2.08	104	3.2	100	86	-0.020	4.39	0.15
559	79.754	0.143	2.09	104	2.85	98	86	-0.020	4.40	0.16
560	79.901	0.147	2.09	104	1.69	101	85	-0.020	4.38	0.14
561	80.044	0.143	2.08	104	3.21	98	84	-0.020	4.41	0.14
562	80.190	0.146	2.08	104	3.51	101	83	-0.020	4.40	0.15
563	80.333	0.143	2.09	104	2.25	98	83	-0.020	4.45	0.13
564	80.481	0.148	2.10	104	2.5	102	84	-0.020	4.41	0.13
565	80.623	0.142	2.09	104	2.02	98	86	-0.020	4.41	0.12
566	80.770	0.147	2.07	104	3.18	101	86	-0.020	4.36	0.12
567	80.912	0.142	2.08	104	1.82	98	85	-0.020	4.42	0.12
568	81.060	0.148	2.07	104	3.52	102	84	-0.020	4.37	0.12
569	81.202	0.142	2.08	104	1.72	98	83	-0.020	4.38	0.12
570	81.349	0.147	2.09	104	3.56	101	83	-0.020	4.41	0.11
571	81.491	0.142	2.07	104	3.46	98	85	-0.020	4.36	0.12
572	81.638	0.147	2.07	104	3.48	101	86	-0.020	4.39	0.11
573	81.780	0.142	2.09	104	2.01	98	86	-0.020	4.40	0.11
574	81.927	0.147	2.09	104	3.55	101	85	-0.020	4.39	0.10
575	82.070	0.143	2.08	104	2.22	98	84	-0.020	4.36	0.10

BOX B TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: F2500
Run #: 2

Job #: 18-414
Tracking #: 003
Technician: SJB
Date: 6/26/2018

	Particulate Sampling Data							Flue Gas Data		
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Filter (°F)	Flue Draft (in H_2O)	CO_2 (%)	CO (%)
576	82.217	0.147	2.09	104	2.7	101	83	-0.020	4.34	0.12
Avg/Tot	82.217	0.143	2.05	99	2.74	100			7.37	0.20

WOODSTOVE SURFACE TEMPERATURE DATA

Client: FPI
Model: F2500
Run #: 2

Job #: 18-414
Tracking #: 003
Technician: SJB
Date: 6/26/2018

	Temperature Data (°F)						
Elapsed Time (min)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
0	506	475	220	537	326	412.8	715
1	503	473	242	529	327	414.8	656
2	500	471	258	521	328	415.6	756
3	496	468	270	530	328	418.4	871
4	491	464	282	552	329	423.6	1001
5	485	458	288	575	329	427.0	1012
6	478	452	293	596	330	429.8	987
7	471	448	298	610	331	431.6	918
8	466	442	302	622	332	432.8	903
9	461	436	303	630	332	432.4	913
10	456	432	307	639	332	433.2	925
11	452	428	310	646	333	433.8	937
12	448	424	313	652	333	434.0	949
13	444	421	314	658	334	434.2	956
14	441	418	315	664	334	434.4	956
15	438	414	317	670	334	434.6	961
16	436	411	318	674	335	434.8	973
17	433	409	320	678	335	435.0	983
18	431	406	322	682	335	435.2	991
19	429	403	322	687	334	435.0	998
20	428	401	323	691	334	435.4	998
21	427	398	223	685	334	413.4	1008
22	425	396	204	683	333	408.2	1015
23	424	396	190	680	333	404.6	1021
24	423	393	183	678	332	401.8	1023
25	422	392	177	674	331	399.2	1026
26	422	391	172	674	330	397.8	1032
27	421	391	169	670	329	396.0	1033
28	420	388	165	668	328	393.8	1033
29	420	387	163	668	327	393.0	1031
30	419	386	161	664	326	391.2	1022
31	418	385	159	662	324	389.6	1011
32	417	384	158	661	323	388.6	1000
33	417	383	158	659	322	387.8	989
34	416	382	156	656	320	386.0	976
35	415	381	154	654	318	384.4	965
36	414	380	153	652	317	383.2	953
37	414	379	154	648	315	382.0	943
38	413	378	153	644	314	380.4	932
39	412	378	153	639	312	378.8	924
40	411	377	152	635	311	377.2	920
41	410	376	152	631	309	375.6	913
42	409	376	150	627	308	374.0	903
43	408	374	151	621	306	372.0	895
44	407	374	150	616	305	370.4	889
45	407	374	149	611	303	368.8	882
46	406	372	149	607	301	367.0	874
47	404	371	149	603	300	365.4	866

WOODSTOVE SURFACE TEMPERATURE DATA

Client: FPI
Model: F2500
Run #: 2

Job #: 18-414
Tracking #: 003
Technician: SJB
Date: 6/26/2018

	Temperature Data (°F)						
Elapsed Time (min)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
48	404	371	148	599	298	364.0	860
49	403	370	148	596	297	362.8	855
50	402	370	147	592	295	361.2	853
51	401	369	147	587	294	359.6	853
52	400	368	148	585	292	358.6	852
53	399	367	146	582	291	357.0	850
54	399	366	146	579	290	356.0	850
55	398	364	146	577	289	354.8	846
56	397	364	145	576	287	353.8	841
57	396	362	145	573	286	352.4	839
58	396	362	144	570	284	351.2	837
59	395	361	144	569	283	350.4	838
60	395	360	145	569	282	350.2	838
61	395	360	144	566	280	349.0	835
62	394	359	143	564	279	347.8	834
63	394	358	144	562	278	347.2	833
64	393	358	143	559	276	345.8	829
65	393	358	143	558	275	345.4	826
66	392	357	142	556	274	344.2	827
67	392	356	142	554	273	343.4	827
68	392	356	143	552	272	343.0	829
69	393	355	143	550	271	342.4	834
70	393	356	143	549	270	342.2	839
71	392	355	143	550	269	341.8	841
72	393	354	143	550	268	341.6	845
73	393	355	143	552	267	342.0	853
74	393	354	143	553	266	341.8	860
75	394	354	143	557	265	342.6	862
76	395	354	144	558	264	343.0	842
77	396	354	144	557	263	342.8	818
78	397	353	144	555	262	342.2	804
79	397	354	144	554	261	342.0	796
80	397	355	145	553	260	342.0	792
81	398	354	145	552	260	341.8	790
82	399	354	145	549	259	341.2	787
83	399	354	146	546	258	340.6	786
84	399	353	145	545	257	339.8	781
85	400	353	145	543	256	339.4	778
86	400	353	145	540	256	338.8	775
87	400	353	145	536	255	337.8	770
88	401	353	145	534	254	337.4	764
89	401	353	145	530	253	336.4	761
90	401	352	146	527	253	335.8	759
91	401	352	144	523	252	334.4	755
92	402	353	146	520	252	334.6	752
93	402	352	146	517	251	333.6	751
94	401	352	145	515	250	332.6	750
95	402	351	145	513	250	332.2	751

WOODSTOVE SURFACE TEMPERATURE DATA

Client: FPI
Model: F2500
Run #: 2

Job #: 18-414
Tracking #: 003
Technician: SJB
Date: 6/26/2018

	Temperature Data (°F)						
Elapsed Time (min)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
96	401	351	146	512	249	331.8	752
97	401	352	146	509	248	331.2	752
98	402	351	145	508	248	330.8	751
99	401	351	146	508	247	330.6	749
100	402	352	145	506	247	330.4	749
101	401	351	146	505	246	329.8	748
102	402	351	146	504	246	329.8	747
103	401	351	147	503	245	329.4	746
104	401	351	145	501	245	328.6	744
105	401	351	146	500	244	328.4	742
106	401	352	145	498	244	328.0	746
107	401	351	146	497	244	327.8	746
108	401	352	146	495	243	327.4	745
109	401	352	146	493	243	327.0	744
110	400	353	146	493	242	326.8	740
111	401	352	146	492	242	326.6	738
112	401	352	146	491	242	326.4	737
113	400	353	146	490	242	326.2	739
114	401	352	147	489	241	326.0	740
115	400	352	148	487	241	325.6	741
116	399	353	146	487	241	325.2	740
117	400	354	146	484	241	325.0	740
118	399	354	146	483	240	324.4	737
119	399	353	147	479	240	323.6	731
120	398	353	146	476	240	322.6	727
121	398	355	147	474	240	322.8	724
122	397	353	147	471	240	321.6	724
123	397	354	147	469	240	321.4	724
124	396	356	146	468	239	321.0	723
125	397	355	146	466	239	320.6	724
126	396	356	147	463	239	320.2	723
127	396	355	147	463	239	320.0	722
128	395	355	147	462	239	319.6	722
129	395	355	147	460	239	319.2	722
130	394	356	147	460	239	319.2	723
131	394	356	147	459	239	319.0	723
132	395	357	147	459	239	319.4	726
133	395	356	147	458	239	319.0	728
134	394	356	147	457	239	318.6	727
135	395	356	149	457	239	319.2	724
136	394	358	148	456	239	319.0	719
137	395	356	148	455	239	318.6	714
138	395	357	147	453	239	318.2	708
139	395	357	148	451	239	318.0	702
140	395	357	147	449	239	317.4	694
141	395	356	147	447	239	316.8	687
142	395	357	148	445	239	316.8	679
143	394	357	147	442	239	315.8	675

WOODSTOVE SURFACE TEMPERATURE DATA

Client: FPI
Model: F2500
Run #: 2

Job #: 18-414
Tracking #: 003
Technician: SJB
Date: 6/26/2018

	Temperature Data (°F)						
Elapsed Time (min)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
144	394	358	147	440	239	315.6	673
145	393	357	147	438	239	314.8	672
146	393	357	147	434	239	314.0	671
147	392	357	147	432	239	313.4	671
148	392	356	146	428	239	312.2	671
149	391	356	147	427	239	312.0	671
150	390	357	146	425	239	311.4	669
151	390	357	146	423	239	311.0	667
152	389	356	146	421	239	310.2	666
153	389	355	145	420	239	309.6	667
154	388	356	145	419	239	309.4	667
155	388	356	146	417	239	309.2	669
156	388	356	144	416	239	308.6	672
157	387	355	145	414	239	308.0	673
158	387	357	143	412	239	307.6	673
159	387	356	144	412	240	307.8	674
160	386	355	144	410	240	307.0	675
161	386	355	144	409	240	306.8	676
162	385	355	143	409	240	306.4	676
163	385	353	142	408	240	305.6	676
164	385	354	143	407	240	305.8	675
165	385	353	143	407	241	305.8	674
166	385	354	144	406	241	306.0	674
167	385	352	143	405	241	305.2	674
168	385	352	142	404	242	305.0	672
169	385	353	142	402	242	304.8	671
170	386	352	143	401	242	304.8	673
171	386	351	142	399	243	304.2	673
172	386	352	144	398	243	304.6	671
173	386	352	141	396	243	303.6	673
174	386	352	142	395	243	303.6	672
175	387	351	142	393	244	303.4	670
176	386	351	142	392	244	303.0	666
177	386	350	141	389	244	302.0	664
178	386	350	142	387	245	302.0	661
179	386	349	141	384	245	301.0	660
180	386	348	141	381	245	300.2	661
181	386	347	141	379	246	299.8	661
182	385	346	141	375	246	298.6	656
183	385	344	140	372	247	297.6	651
184	385	344	139	370	247	297.0	647
185	384	343	139	366	248	296.0	647
186	384	342	139	362	248	295.0	650
187	383	339	138	359	248	293.4	648
188	382	338	139	356	249	292.8	643
189	380	337	137	353	249	291.2	635
190	378	337	137	351	250	290.6	625
191	377	336	137	347	250	289.4	611

WOODSTOVE SURFACE TEMPERATURE DATA

Client: FPI
Model: F2500
Run #: 2

Job #: 18-414
Tracking #: 003
Technician: SJB
Date: 6/26/2018

	Temperature Data (°F)						
Elapsed Time (min)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
192	375	335	136	345	251	288.4	605
193	373	334	136	342	251	287.2	614
194	373	335	136	340	251	287.0	625
195	371	333	136	337	252	285.8	631
196	370	333	135	335	252	285.0	634
197	369	332	135	332	253	284.2	634
198	368	331	135	329	253	283.2	635
199	367	329	134	327	254	282.2	634
200	365	329	134	324	254	281.2	632
201	364	329	133	322	255	280.6	631
202	363	328	134	320	255	280.0	631
203	362	327	133	317	256	279.0	630
204	360	325	133	315	256	277.8	630
205	359	326	132	313	256	277.2	627
206	358	324	132	311	257	276.4	622
207	357	322	131	308	257	275.0	616
208	356	323	131	306	258	274.8	609
209	355	322	131	303	258	273.8	602
210	354	321	130	302	258	273.0	596
211	352	320	131	300	258	272.2	592
212	351	318	129	298	259	271.0	589
213	351	318	129	297	259	270.8	586
214	349	316	129	294	259	269.4	586
215	348	316	128	292	260	268.8	587
216	347	315	127	291	260	268.0	586
217	346	315	128	289	260	267.6	584
218	345	312	127	287	260	266.2	581
219	344	311	127	286	261	265.8	577
220	343	312	126	284	261	265.2	574
221	342	311	126	282	261	264.4	570
222	341	311	126	281	261	264.0	567
223	340	308	125	279	262	262.8	565
224	339	308	125	277	262	262.2	563
225	338	307	124	276	262	261.4	562
226	338	307	124	275	262	261.2	560
227	337	306	125	273	262	260.6	558
228	336	306	124	272	263	260.2	558
229	335	304	124	270	263	259.2	557
230	335	304	124	268	263	258.8	555
231	334	304	124	268	263	258.6	554
232	333	303	124	266	263	257.8	553
233	332	302	123	265	263	257.0	552
234	332	302	123	264	263	256.8	551
235	331	301	123	263	264	256.4	550
236	331	299	123	263	264	256.0	550
237	330	300	122	262	264	255.6	548
238	329	299	123	261	264	255.2	547
239	328	298	123	260	264	254.6	546

WOODSTOVE SURFACE TEMPERATURE DATA

Client: FPI
Model: F2500
Run #: 2

Job #: 18-414
Tracking #: 003
Technician: SJB
Date: 6/26/2018

	Temperature Data (°F)						
Elapsed Time (min)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
240	328	298	122	259	264	254.2	543
241	327	298	122	258	264	253.8	541
242	327	298	122	257	265	253.8	539
243	326	296	122	257	265	253.2	537
244	326	296	122	256	265	253.0	536
245	326	296	122	255	265	252.8	535
246	325	295	122	254	265	252.2	534
247	325	295	121	253	265	251.8	533
248	324	294	121	253	265	251.4	532
249	323	293	122	252	265	251.0	531
250	323	295	122	252	265	251.4	530
251	322	292	121	251	265	250.2	529
252	322	293	121	250	265	250.2	529
253	322	292	121	250	265	250.0	529
254	321	292	121	249	266	249.8	529
255	321	292	121	249	265	249.6	529
256	320	291	121	249	265	249.2	531
257	320	291	121	248	266	249.2	532
258	320	291	121	247	266	249.0	533
259	319	291	121	247	266	248.8	533
260	319	290	121	246	266	248.4	532
261	319	290	121	246	266	248.4	532
262	319	289	120	245	266	247.8	532
263	318	289	121	245	266	247.8	532
264	318	289	120	244	266	247.4	533
265	318	288	120	244	266	247.2	534
266	318	289	120	244	266	247.4	534
267	317	288	120	243	266	246.8	535
268	317	288	121	243	266	247.0	535
269	317	288	121	242	266	246.8	535
270	316	289	120	242	266	246.6	536
271	316	288	120	242	266	246.4	537
272	316	288	120	242	267	246.6	537
273	315	288	120	242	267	246.4	537
274	315	288	121	242	267	246.6	537
275	315	288	120	242	267	246.4	538
276	315	288	120	242	267	246.4	539
277	315	288	121	242	267	246.6	540
278	315	287	120	242	267	246.2	541
279	315	288	120	241	267	246.2	543
280	315	289	121	241	267	246.6	544
281	315	288	121	241	267	246.4	546
282	315	289	120	241	268	246.6	547
283	314	288	120	241	268	246.2	548
284	315	288	120	240	268	246.2	550
285	315	287	120	241	268	246.2	553
286	315	288	121	240	268	246.4	554
287	314	289	121	240	268	246.4	556

WOODSTOVE SURFACE TEMPERATURE DATA

Client: FPI
Model: F2500
Run #: 2

Job #: 18-414
Tracking #: 003
Technician: SJB
Date: 6/26/2018

	Temperature Data (°F)						
Elapsed Time (min)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
288	314	289	120	240	269	246.4	558
289	315	289	121	240	269	246.8	559
290	315	289	121	240	269	246.8	559
291	315	289	121	241	269	247.0	559
292	315	290	121	241	269	247.2	558
293	315	290	121	241	269	247.2	555
294	315	289	121	240	269	246.8	552
295	315	289	121	241	269	247.0	551
296	315	291	121	241	270	247.6	550
297	315	290	121	241	270	247.4	549
298	315	291	121	241	270	247.6	548
299	315	291	121	241	270	247.6	548
300	315	291	121	241	270	247.6	549
301	316	290	121	241	271	247.8	550
302	316	291	121	241	271	248.0	549
303	316	290	122	242	271	248.2	547
304	316	292	120	242	271	248.2	546
305	317	293	121	242	271	248.8	545
306	316	290	122	241	271	248.0	546
307	317	293	122	242	271	249.0	548
308	317	291	122	242	272	248.8	549
309	317	293	122	242	272	249.2	549
310	318	292	121	242	272	249.0	549
311	318	293	122	242	272	249.4	549
312	318	293	122	242	272	249.4	550
313	317	292	122	242	272	249.0	552
314	318	293	122	242	273	249.6	550
315	318	293	122	242	273	249.6	548
316	318	294	123	242	273	250.0	546
317	319	294	122	242	273	250.0	545
318	319	294	122	242	273	250.0	544
319	319	295	122	242	273	250.2	545
320	319	295	123	242	274	250.6	545
321	319	295	122	243	274	250.6	547
322	319	295	123	243	274	250.8	548
323	320	296	122	243	274	251.0	548
324	320	296	123	243	274	251.2	548
325	319	296	123	244	275	251.4	547
326	319	296	122	244	274	251.0	545
327	320	297	123	244	275	251.8	543
328	320	295	122	244	275	251.2	542
329	320	297	123	244	275	251.8	541
330	320	297	123	245	275	252.0	541
331	320	296	122	244	275	251.4	542
332	322	298	122	244	275	252.2	542
333	321	297	123	245	276	252.4	542
334	321	296	123	245	276	252.2	543
335	321	297	123	244	276	252.2	543

WOODSTOVE SURFACE TEMPERATURE DATA

Client: FPI
Model: F2500
Run #: 2

Job #: 18-414
Tracking #: 003
Technician: SJB
Date: 6/26/2018

	Temperature Data (°F)						
Elapsed Time (min)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
336	321	297	122	245	276	252.2	544
337	322	298	122	245	276	252.6	544
338	322	297	123	245	276	252.6	545
339	321	297	123	245	277	252.6	546
340	322	297	123	245	277	252.8	549
341	322	297	123	245	277	252.8	553
342	323	297	123	245	277	253.0	554
343	323	296	123	246	277	253.0	553
344	323	299	123	245	277	253.4	550
345	324	298	123	245	278	253.6	547
346	324	297	123	245	278	253.4	545
347	325	298	124	246	278	254.2	543
348	325	298	123	245	278	253.8	541
349	325	298	124	245	278	254.0	538
350	325	298	123	245	278	253.8	536
351	326	298	124	245	278	254.2	534
352	326	298	124	245	278	254.2	532
353	327	299	124	245	278	254.6	530
354	327	299	124	245	279	254.8	529
355	327	298	124	244	278	254.2	527
356	327	299	124	244	278	254.4	526
357	327	299	124	244	278	254.4	525
358	328	298	125	243	278	254.4	524
359	328	297	124	243	278	254.0	523
360	328	298	124	243	278	254.2	522
361	328	297	124	242	278	253.8	521
362	328	298	124	243	278	254.2	520
363	328	298	123	242	278	253.8	520
364	328	298	124	242	278	254.0	519
365	328	298	124	241	278	253.8	518
366	328	297	125	241	278	253.8	516
367	328	296	124	241	278	253.4	515
368	328	296	124	241	278	253.4	515
369	328	297	124	241	278	253.6	515
370	328	298	124	240	278	253.6	515
371	328	297	124	240	278	253.4	515
372	327	297	124	240	278	253.2	514
373	327	296	124	240	277	252.8	514
374	327	296	123	239	277	252.4	514
375	327	296	124	239	277	252.6	514
376	327	295	123	239	277	252.2	513
377	327	296	123	239	277	252.4	514
378	327	295	123	238	277	252.0	514
379	327	295	123	238	277	252.0	513
380	327	296	123	238	277	252.2	513
381	327	295	124	238	277	252.2	513
382	326	294	124	237	277	251.6	514
383	327	294	123	237	277	251.6	514

WOODSTOVE SURFACE TEMPERATURE DATA

Client: FPI
Model: F2500
Run #: 2

Job #: 18-414
Tracking #: 003
Technician: SJB
Date: 6/26/2018

	Temperature Data (°F)						
Elapsed Time (min)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
384	327	295	123	237	277	251.8	514
385	327	295	123	237	277	251.8	513
386	327	294	123	237	277	251.6	514
387	326	295	123	237	277	251.6	514
388	327	296	123	236	277	251.8	515
389	326	295	124	236	277	251.6	517
390	326	294	123	236	277	251.2	520
391	326	295	123	236	277	251.4	521
392	326	295	123	236	277	251.4	521
393	326	294	124	236	277	251.4	521
394	325	295	123	236	277	251.2	521
395	325	296	124	236	277	251.6	521
396	326	295	124	236	277	251.6	522
397	326	296	124	235	277	251.6	524
398	326	296	124	236	277	251.8	527
399	326	296	124	236	277	251.8	528
400	325	296	124	236	277	251.6	527
401	326	296	123	236	277	251.6	525
402	325	298	123	236	277	251.8	523
403	325	298	123	236	276	251.6	522
404	325	297	124	237	276	251.8	520
405	325	297	124	236	276	251.6	519
406	325	299	123	236	276	251.8	519
407	325	298	123	236	276	251.6	519
408	325	299	124	237	276	252.2	519
409	325	298	123	236	276	251.6	519
410	325	298	124	236	276	251.8	519
411	325	299	124	236	276	252.0	519
412	324	299	123	236	276	251.6	520
413	325	299	123	236	276	251.8	521
414	325	299	123	236	276	251.8	522
415	324	299	123	236	276	251.6	522
416	325	299	123	236	276	251.8	521
417	325	299	123	236	275	251.6	519
418	325	299	123	235	275	251.4	516
419	325	299	124	235	275	251.6	514
420	325	299	123	235	275	251.4	513
421	325	298	123	235	275	251.2	511
422	325	299	123	235	275	251.4	510
423	325	298	123	235	275	251.2	510
424	325	298	123	235	275	251.2	509
425	325	299	123	235	275	251.4	509
426	325	299	123	235	275	251.4	509
427	325	298	123	235	275	251.2	509
428	325	297	123	235	274	250.8	508
429	325	298	123	234	274	250.8	508
430	325	297	123	234	274	250.6	507
431	325	297	123	234	274	250.6	507

WOODSTOVE SURFACE TEMPERATURE DATA

Client: FPI
Model: F2500
Run #: 2

Job #: 18-414
Tracking #: 003
Technician: SJB
Date: 6/26/2018

	Temperature Data (°F)						
Elapsed Time (min)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
432	325	298	123	234	274	250.8	506
433	325	297	123	233	274	250.4	506
434	325	298	123	233	274	250.6	505
435	325	298	122	233	274	250.4	504
436	325	298	123	233	273	250.4	503
437	325	297	123	233	273	250.2	503
438	325	298	123	232	273	250.2	502
439	325	297	123	232	273	250.0	502
440	325	297	123	232	273	250.0	501
441	324	297	123	232	273	249.8	501
442	325	297	122	231	273	249.6	500
443	325	296	122	232	273	249.6	500
444	324	296	122	231	273	249.2	500
445	324	296	123	231	273	249.4	500
446	324	296	122	231	272	249.0	500
447	324	296	122	231	272	249.0	499
448	325	296	123	230	272	249.2	499
449	325	297	123	230	272	249.4	498
450	325	297	123	230	272	249.4	498
451	324	296	123	230	272	249.0	498
452	324	295	123	230	272	248.8	496
453	325	295	123	229	272	248.8	493
454	325	296	123	229	272	249.0	491
455	324	294	123	229	272	248.4	488
456	325	295	122	228	272	248.4	485
457	324	294	122	227	272	247.8	483
458	325	294	122	227	271	247.8	482
459	324	294	122	226	271	247.4	480
460	324	295	123	225	271	247.6	479
461	324	294	122	225	271	247.2	478
462	323	294	123	225	271	247.2	476
463	323	294	121	225	271	246.8	475
464	323	294	122	224	271	246.8	475
465	323	294	122	224	271	246.8	475
466	322	293	122	223	271	246.2	479
467	322	292	121	223	270	245.6	482
468	321	294	121	222	270	245.6	481
469	320	293	121	222	270	245.2	478
470	320	294	122	222	270	245.6	478
471	319	294	121	221	270	245.0	476
472	319	294	121	221	269	244.8	473
473	319	294	121	221	269	244.8	471
474	318	294	121	220	269	244.4	472
475	317	295	121	220	269	244.4	476
476	317	295	121	219	269	244.2	475
477	317	293	121	219	268	243.6	474
478	317	293	121	219	268	243.6	473
479	316	292	121	218	268	243.0	472

WOODSTOVE SURFACE TEMPERATURE DATA

Client: FPI
Model: F2500
Run #: 2

Job #: 18-414
Tracking #: 003
Technician: SJB
Date: 6/26/2018

	Temperature Data (°F)						
Elapsed Time (min)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
480	316	294	121	218	268	243.4	471
481	315	293	121	217	267	242.6	469
482	315	292	120	217	267	242.2	466
483	314	292	121	217	267	242.2	463
484	314	291	120	216	267	241.6	460
485	314	291	121	216	266	241.6	459
486	313	291	120	215	266	241.0	458
487	313	290	120	215	266	240.8	457
488	313	289	121	214	266	240.6	455
489	313	288	120	214	265	240.0	454
490	312	289	120	214	265	240.0	452
491	312	287	120	213	265	239.4	451
492	312	287	121	212	265	239.4	450
493	311	286	120	212	264	238.6	449
494	311	285	120	212	264	238.4	448
495	311	284	120	211	264	238.0	447
496	311	284	119	211	263	237.6	446
497	310	284	120	210	263	237.4	445
498	310	283	120	209	263	237.0	444
499	310	282	120	209	263	236.8	444
500	310	282	120	209	262	236.6	444
501	309	281	120	209	262	236.2	443
502	309	280	120	208	262	235.8	443
503	309	280	120	208	262	235.8	443
504	308	278	119	207	261	234.6	443
505	308	279	119	207	261	234.8	442
506	308	277	119	207	261	234.4	442
507	308	277	120	207	260	234.4	441
508	308	277	119	206	260	234.0	442
509	307	276	119	206	260	233.6	441
510	307	275	119	206	259	233.2	441
511	307	275	120	205	259	233.2	441
512	307	275	120	205	259	233.2	440
513	306	275	119	204	259	232.6	440
514	306	274	119	204	258	232.2	439
515	306	274	119	204	258	232.2	438
516	305	273	119	203	258	231.6	438
517	305	272	119	203	258	231.4	437
518	305	271	119	203	258	231.2	437
519	305	272	119	203	257	231.2	436
520	305	271	119	202	257	230.8	436
521	305	271	119	202	257	230.8	435
522	304	271	120	202	257	230.8	434
523	304	270	118	201	256	229.8	433
524	304	270	119	201	256	230.0	432
525	303	269	118	200	256	229.2	431
526	303	268	119	200	256	229.2	431
527	303	268	118	200	256	229.0	432

WOODSTOVE SURFACE TEMPERATURE DATA

Client: FPI
Model: F2500
Run #: 2

Job #: 18-414
Tracking #: 003
Technician: SJB
Date: 6/26/2018

	Temperature Data (°F)						
Elapsed Time (min)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
528	303	268	118	200	255	228.8	431
529	303	268	118	200	255	228.8	430
530	302	267	118	200	255	228.4	428
531	303	265	118	199	255	228.0	425
532	303	267	118	199	255	228.4	420
533	302	265	119	198	254	227.6	413
534	302	266	119	198	254	227.8	407
535	302	265	119	198	254	227.6	401
536	301	265	119	198	254	227.4	399
537	302	265	118	198	254	227.4	399
538	301	264	118	197	253	226.6	402
539	301	265	118	197	253	226.8	406
540	301	264	118	197	253	226.6	410
541	301	264	118	196	253	226.4	413
542	300	263	118	196	253	226.0	415
543	300	262	118	196	253	225.8	417
544	300	262	118	196	252	225.6	418
545	300	262	118	195	252	225.4	418
546	299	261	118	195	252	225.0	419
547	299	261	118	195	252	225.0	420
548	299	261	118	195	252	225.0	420
549	299	260	118	195	252	224.8	420
550	299	260	119	195	252	225.0	420
551	298	260	119	195	251	224.6	421
552	298	259	118	194	251	224.0	422
553	298	259	117	194	251	223.8	423
554	298	259	119	194	251	224.2	424
555	298	258	118	193	251	223.6	425
556	298	258	118	193	251	223.6	426
557	297	258	119	194	251	223.8	428
558	297	258	118	193	250	223.2	429
559	297	258	119	193	250	223.4	431
560	296	257	118	193	250	222.8	431
561	296	257	119	193	250	223.0	431
562	296	256	118	193	250	222.6	429
563	296	257	119	193	250	223.0	429
564	296	257	119	193	250	223.0	430
565	295	257	118	193	249	222.4	430
566	295	256	119	193	249	222.4	431
567	295	256	118	193	249	222.2	431
568	295	256	119	193	249	222.4	432
569	295	256	119	193	249	222.4	432
570	295	256	118	193	249	222.2	432
571	295	256	119	193	249	222.4	432
572	295	256	119	193	249	222.4	432
573	294	256	119	192	249	222.0	432
574	294	256	119	193	248	222.0	432
575	294	256	119	193	248	222.0	432

WOODSTOVE SURFACE TEMPERATURE DATA

Client: FPI
Model: F2500
Run #: 2

Job #: 18-414
Tracking #: 003
Technician: SJB
Date: 6/26/2018

	Temperature Data (°F)						
Elapsed Time (min)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
576	294	254	119	193	248	221.6	432
Average	349	316	136	330	268	280	602

LAB SAMPLE DATA - ASTM E2515

Client: FPI
Model: F2500
Run #: 2

Job #: 18-414
Tracking #: 003
Technician: SJB
Date: 6/26/2018

TRAIN A (1st Hour)

Sample Component	Sample Type	Filter, Probe, or O-Ring #	Weights		
			Final, mg	Tare, mg	Particulate, mg
A. Front filter catch	Filter	T007	91.1	86.9	4.2
B. Rear filter catch	Filter				0.0
C. Probe catch*	Probe				0.0
D. O-Ring catch*	O-Ring				0.0

Sub-Total	Total Particulate, mg:	4.2

TRAIN A (Post 1st hour)

Sample Component	Sample Type	Filter, Probe, or O-Ring #	Weights		
			Final, mg	Tare, mg	Particulate, mg
A. Front filter catch	Filter	T008	174.5	87.1	0.9
B. Rear filter catch	Filter	T009		86.5	
C. Probe catch*	Probe	3A	116073.4	116073	0.4
D. O-Ring catch*	O-Ring	3A	3578.5	3577.9	0.6

Sub-Total	Total Particulate, mg:	1.9
Train A Aggregate	Total Particulate, mg:	**6.1**

TRAIN B

Sample Component	Reagent	Filter, Probe, or O-Ring #	Weights		
			Final, mg	Tare, mg	Particulate, mg
A. Front filter catch	Filter	T010	177.1	86.7	4.3
B. Rear filter catch	Filter	T011		86.1	
C. Probe catch*	Probe	3B	116340.8	116340.3	0.5
D. O-Ring catch*	O-Ring	3B	3567.3	3566.2	1.1

Total Particulate, mg:	**5.9**

AMBIENT

Sample Component	Reagent	Filter, Probe, or O-Ring #	Weights		
			Final, mg	Tare, mg	Particulate, mg
A. Filter catch*	Filter	T012	86.7	86.6	0.1

Total Particulate, mg:	**0.1**

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

ASTM E3053 Wood Heater Run Sheets

Client: FPI | Job Number: 18-414 | Tracking #: 003
Model: F2500 | Run Number: 2 | Test Date: 6/26/2018

Wood Heater Run Notes

Pre-Test Notes

Pre-Test Start Time: 8:14
Air Control Setting: High Setting – Fully Open, per ASTM E3053

Time	Notes
0 min	Kindling ignition with propane torch for 30 sec. Door cracked open 3.5", bypass open, blower off.
2 min	Door closed to 1"
3 min	Door engaged/not latched
4 min	Door latched closed
7 min	Catalyst bypass closed
8 min	At 1.1 lbs, added 3.3 lbs of start-up fuel, door closed within 40 seconds
10 min	Door cracked open for 30 seconds
22 min	At 1.4 lbs, added 3.4 lbs of start-up fuel, door closed within 60 seconds
32 min	At 2.6 lbs, leveled coal bed, loaded High Fire Test load, door closed within 40 seconds
52 min	Blower fan turned on to high
90 min	Adjusted fuel load to ensure uniform charcoal bed for beginning of test
117 min	Stirred coal bed
122 min	Zeroed scale; turned off fan to load test fuel

Test Notes

Test Burn Start Time: 10:17
Air Control Setting: Low Setting - Fully Closed

Time	Notes
0 min	Air control opened to fully open, fuel loaded by 50 seconds, door closed by 70 seconds
6 min	Air control set to test setting
20 min	Fan turned on high setting
60 min	Changed 1-hour filter

Test Burn End Time: 19:53

Background Filter Volume (ft^3): 94.733

Filter Data

Train	A	A	A	A	A	B	B	B	B	AMB
Element	Front Filter (First Hour)	Front Filter (Remainder)	Rear Filter	Probe	O-Ring Pair	Front Filter	Rear Filter	Probe	O-Ring Pair	Filter
ID #	T007	T008	T009	3A	3A	T010	T011	3A	3A	T012
Tare (mg)	86.9	87.1	86.5	116073.0	3577.9	86.7	86.1	116340.3	3566.2	86.6
Final Weight (mg)	91.1	174.5		116073.4	3578.5	177.1		116340.8	3567.3	86.7

Sample Train Leak Check: A: 0.001 @ -15 "Hg B: 0.000 @ -15 "Hg

Technician Signature:  Date: 6/29/2018

ASTM E3053 Wood Heater Run Sheets

Client: FPI | Job Number: 18-414 | Tracking #: 003
Model: F2500 | Run Number: 2 | Test Date: 6/26/2018

Flue Gas Concentration Measurement

Calibration Gas Values: Span Gas CO_2 (%): 17.06 CO (%): 4.25
Mid Gas CO_2 (%): 10.02 CO (%): 2.52

Calibration Results:

	Pre Test			Post Test		
	Zero	Mid	Span	Zero	Mid	Span
Time	8:08	8:11	8:16	20:21	20:25	20:30
CO_2	0.00	10.05	17.06	0.22	9.95	17.10
CO	0.000	2.509	4.250	-0.123	2.487	4.300

Flue Gas Probe Leak Check: Initial: No Leakage Final: No Leakage

Dilution Tunnel Flow

Pitot Tube Leak Test: Initial: No Leakage Final: No Leakage

Velocity Traverse Data

	Pt.1	Pt.2	Pt.3	Pt.4	Pt.5	Pt.6	Pt.7	Pt.8	Center
dP (inH_2O):	0.032	0.038	0.046	0.040	0.032	0.038	0.044	0.042	0.045
Temp (°F):	72	72	72	72	72	72	72	72	72

Dilution Tunnel Static Pressure (inH_2O): -0.130

Supplemental Data

Room Air Velocity (ft/min): Initial: <50 Final: <50
Scale Audit (lbs): Initial: 10 Final: 10
Stack Diameter (in): 6
Induced Draft (in H_2O): 0
% Smoke Capture: 100
Flue Pipe Cleaned Prior to First Test in Series: Date: 6/22/2018

	Initial	Middle	Ending
P_b (inHg)	30.06	29.99	29.91
RH (%)	36.1	26.6	25.4

Technician Signature:  Date: 6/29/2018

WOOD STOVE TEST DATA PACKET
ASTM E3053/E2515

Run 3 Data Summary

Client: FPI
Model: F2500
Job #: 18-414
Tracking #: 003
Test Date: 6/27/2018

7/4/2018

Techician Signature Date

TEST RESULTS - ASTM E3053 / ASTM E2515

Client: FPI
Model: F2500
Run #: 3

Job #: 18-414
Tracking #: 003
Technician: SJB
Date: 6/27/2018

Burn Rate (kg/hr):	1.16

	Ambient Sample	Sample Train A	Sample Train B	1st Hour Filter
Total Sample Volume (ft^3)	83.786	73.465	71.507	8.470
Average Gas Velocity in Dilution Tunnel (ft/sec)	13.7			
Average Gas Flow Rate in Dilution Tunnel (dscf/hr)	8883.6			
Average Gas Meter Temperature (°F)	77.5	85.0	99.0	78.0
Total Sample Volume (dscf)	82.089	71.560	67.563	8.358
Average Tunnel Temperature (°F)	102.9			
Total Time of Test (min)	506			
Total Particulate Catch (mg)	0.1	3.8	4.2	1.3
Particulate Concentration, dry-standard (g/dscf)	0.0000012	0.0000531	0.0000622	0.0001555
Total PM Emissions (g)	0.09	3.89	4.57	1.37
Particulate Emission Rate (g/hr)	0.01	0.46	0.54	1.37
Emissions Factor (g/kg)	-	0.40	0.47	-
Difference from Average Total Particulate Emissions (g)	-	0.34	0.34	-
Difference from Average Emissions Factor (g/kg)	-	0.03	0.03	-

Final Average Results	
Total Particulate Emissions (g)	4.23
Particulate Emission Rate (g/hr)	0.50
Emissions Factor (g/kg)	0.43
HHV Efficiency (%)	76.6%
LHV Efficiency (%)	81.9%
CO Emissions (g/min)	0.29

Quality Checks	Requirement	Observed	Result
Dual Train Precision	Each train within 7.5% of average emissions (in grams), or emission factors within 0.5 g/kg	See Above	OK
Filter Temps	>80 °F, <90 °F	Min: 82 / Max: 87	OK
Face Velocity	< 30 ft/min	8.1	OK
Leakage Rate	Less than 4% of average sample rate	0 cfm	OK
Ambient Temp	55-90 °F	Min: 75 / Max: 80	OK
Negative Probe Weight Evaluation	<5% of Total Catch	Probe Catch Not Negative	OK
Pro-Rate Variation	90% of readings between 90-110%; none greater than 120% or less than 80%	See Data Tabs	OK

B415.1 Efficiency Results

Manufacturer:	FPI
Model:	F2500
Date:	06/27/18
Run:	3
Control #:	18-414
Test Duration:	506
Output Category:	Medium

Test Results in Accordance with CSA B415.1-09

	HHV Basis	LHV Basis
Overall Efficiency	76.6%	81.9%
Combustion Efficiency	99.3%	99.3%
Heat Transfer Efficiency	77.2%	82.5%

Output Rate (kJ/h)	17,653	16,746	**(Btu/h)**
Burn Rate (kg/h)	1.15	2.54	**(lb/h)**
Input (kJ/h)	23,042	21,858	**(Btu/h)**

Test Load Weight (dry kg)	9.74	21.46	**dry lb**
MC wet (%)	17.79		
MC dry (%)	21.64		
Particulate (g)	4.23		
CO (g)	147		
Test Duration (h)	8.43		

Emissions	**Particulate**	**CO**
g/MJ Output	0.03	0.99
g/kg Dry Fuel	0.43	15.06
g/h	0.50	17.39
g/min	0.01	0.29
lb/MM Btu Output	0.07	2.29

Air/Fuel Ratio (A/F)	16.62

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

Adjunct to ASTM E 3053 Wood Heater Cordwood Test Method - May 10, 2017 Version

Cordwood Fuel Load Calculators - 10 lb/ft^3 Nominal Load Density

Core 45-65% of Total Load Weight, Remainder 35-55% of Total Load Weight

Values to be input manually

For All Usable Firebox Volumes - High Fire Test Only

Nominal Required Load Density (wet basis)	10	lb/ft^3				
Usable Firebox Volume	2.24	ft^3				
Total Nom. Load Wt. Target	22.40	lb				
Total Load Wt. Allowable Range	21.30	to	23.50	lb		
Core Target Wt. Allowable Range	10.10	to	14.60	lb		
Remainder Load Wt. Allowable Range	7.80	to	12.30	lb		
						Mid-Point
Core Load Pc. Wt. Allowable Range	3.40	to	5.60	lb		4.50
Remainder Load Pc. Wt. Allowable Range	2.20	to	12.30	lb		7.25
	Pc. #					
Core Load Piece Wt. Actual	1	4.21	lb	In Range		
	2	4.03	lb	In Range		
	3	4.72	lb	In Range		
Core Load Total. Wt. Actual		12.96	lb	In Range		
	Pc. #					
Remainder Load Piece Wt.	1	2.76	lb	In Range		
(1 to 3 Pcs.)	2	2.23	lb	In Range		
	3	3.46	lb	In Range		
Remainder Load Tot. Wt. Act		8.45	lb	In Range		
Total Load Wt. Actual		21.41	lb	In Range		
Core % of Total Wt.		61%		In Range		45-65%
Remainder % of Total Wt.		39%		In Range		35-55%
Actual Load % of Nominal Target		96%		In Range		95-105%
Actual Fuel Load Density		9.6	lb/ft^3			
Kindling and Start-up Fuel						
Maximim Kindling Wt. (20% of Tot. Load Wt.)		4.28	lb			
Actual Kindling Wt.		3.81	lb	In Range		17.8%
Maximum Start-up Fuel Wt. (30% of Tot. Load Wt.)		6.42	lb			
Actual Start-up Fuel Wt.		5.78	lb	In Range		27.0%
Allowable Residual Start-up Fuel Wt. Range	2.1	to	4.3	lb		Mid-Point
Actual Residual Start-up Fuel Wt.		2.3	lb	In Range		3.2
Total Wt. All Fuel Added (wet basis)		31.00	lb			
High Fire Test Run End Point Range	Low		High			Mid-Point
Based on Fuel Load Wt. (w/tares)	1.9	to	2.4	lb		2.1
Actual Fuel Load Ending Wt.			lb	Out of Range		

Fuel Piece Moisture Reading (%-dry basis)								
1	2	3	Ave.		Pc. Wt. Dry Basis			
22.3	22.6	20	21.6	In Range	3.46	lb	1.57	kg
23.9	20.7	23	22.5	In Range	3.29	lb	1.49	kg
21.3	21	20.2	20.8	In Range	3.91	lb	1.77	kg
22.3	18.2	19.4	20.0	In Range	2.30	lb	1.04	kg
23	23.6	19.6	22.1	In Range	1.83	lb	0.83	kg
19.3	19.3	22.7	20.4	In Range	2.87	lb	1.30	kg
Total Load Ave. MC (%-dry basis)			21.3	In Range				
Total Load Ave. MC % (wet basis)			17.5					
Total Test Load Weight (dry basis) →					17.66	lb	8.01	kg
Kindling Moisture (%-dry basis)								
10	10	10	10.0	In Range	3.46	lb	1.57	kg
Start-up Fuel Moisture Readings (%-dry basis)								
22.1	19.4	18.7	20.1	In Range	4.81	lb	2.18	kg
Total Wt. All Fuel Added (dry basis) →					25.93	lb	11.76	kg
Total Wt. All Fuel Burned (dry basis) →					23.6	lb	10.7	kg

Adjunct to ASTM E 3053 Wood Heater Cordwood Test Method - May 10, 2017 Version

Cordwood Fuel Load Calculators - 12 lb/ft^3 Nominal Load Density

Core 45-65% of Total Load Weight, Remainder 35-55% of Total Load Weight

Values to be input manually

For Usable Firebox Volumes up to 3.0 ft^3 - Low and Medium Fire						
Nominal Required Load Density (wet basis)	12	lb/ft^3				
Usable Firebox Volume	2.24	ft^3				
Total Nom. Load Wt. Target	26.88	lb				
Total Load Wt. Allowable Range	25.54	to	28.22	lb		
Core Target Wt. Allowable Range	12.096	to	17.47	lb		
Remainder Load Wt. Allowable Range	9.41	to	14.78	lb		
						Mid-Point
Core Load Fuel Pc. Wt. Allowable Range	4.03	to	6.72	lb		5.38
Remainder Load Pc. Wt. Allowable Range	2.69	to	8.06	lb		5.38
	Pc. #					
Core Load Piece Wt. Actual	1	5.78	lb	In Range		
	2	4.76	lb	In Range		
	3	4.92	lb	In Range		
Core Load Total. Wt. Actual		15.46	lb	In Range		
	Pc. #					
Remainder Load Piece Wt.	1	4.12	lb	In Range		
(2 or 3 Pcs.)	2	6.57	lb	In Range		
	3		lb	NA		
Remainder Load Piece Weight Ratio - Small/Large		63%		In Range		≤ 67%
Remainder Load Tot. Wt. Act		10.69	lb	In Range		
Total Load Wt. Actual		26.15	lb	In Range		
Core % of Total Wt.		59%		In Range		45-65%
Remainder % of Total Wt.		41%		In Range		35-55%
Actual Load % of Nominal Target		97%		In Range		95-105%
Actual Fuel Load Density		11.7	lb/ft^3			
Allowable Charcoal Bed Wt. Range (lb)	2.7	to	5.2			Mid-Point
Actual Charcoal Bed Wt.		4.8	lb	In Range		3.9
Actual Fuel Load Ending Wt.		0.0	lb	Valid Test		≥ 90%
Total Wt. of Fuel Burned During Test Run lb.		26.2	lb			

Fuel Piece Moisture Reading (%-dry basis)								
1	2	3	Ave.		Pc. Wt. Dry Basis			
19.6	22.3	21.7	21.2	In Range	4.77	lb	2.16	kg
18.9	18.7	23.1	20.2	In Range	3.96	lb	1.80	kg
19.3	22.1	24.7	22.0	In Range	4.03	lb	1.83	kg
24.2	25.7	23.1	24.3	In Range	3.31	lb	1.50	kg
21.6	23	18.7	21.1	In Range	5.43	lb	2.46	kg
			NA	NA	NA	lb	NA	kg
Total Load Ave. MC % (dry basis)			21.6	In Range				
Total Load Ave. MC % (wet basis)			17.8					
Total Test Load Weight (dry basis) →					21.50	lb	9.75	kg
Total Fuel Weight Burned During Test Run (dry basis)					21.5	lb	9.75	kg

For Usable Firebox Volumes above 3.0 ft^3 - Low and Medium Fire						
Nominal Required Load Density (wet basis)	12	lb/ft^3				
Usable Firebox Volume		ft^3				
Total Nom. Load Wt. Target	0	lb				
Total Load Wt. Allowable Range	0.00	to	0.00	lb		
Core Target Wt. Allowable Range	0.00	to	0.00	lb		
Remainder Load Wt. Allowable Range	0.00	to	0.00	lb		
						Mid-Point
Core Load Fuel Pc. Wt. Allowable Range	0.00	to	0.00	lb		0.00
Remainder Load Pc. Wt. Allowable Range	0.00	to	0.00	lb		0.00
	Pc. #					
Core Load Piece Wt. Actual	1			lb	In Range	
	2			lb	In Range	
	3			lb	In Range	
Core Load Total. Wt. Actual		0.00		lb	In Range	
	Pc. #					
Remainder Load Piece Wt.	1			lb	In Range	
(3 or 4 Pcs.)	2			lb	In Range	
	3			lb	In Range	
	4			lb	NA	
Remainder Load Piece Weight Ratio - Small/Large		#NUM!			#NUM!	≤ 67%
Remainder Load Tot. Wt. Act		0.00		lb	In Range	
Total Load Wt. Actual		0.00		lb	In Range	
Core % of Total Wt.		#DIV/0!			#DIV/0!	45-65%
Remainder % of Total Wt.		#DIV/0!			#DIV/0!	35-55%
Actual Load % of Nominal Target		#DIV/0!			#DIV/0!	95-105%
Actual Fuel Load Density		#DIV/0!		lb/ft^3		
Allowable Charcoal Bed Wt. Range (lb)	0.1	to	-0.1			Mid-Point
Actual Charcoal Bed Wt.				lb	Out of Range	0.0
Actual Fuel Load Ending Wt.				lb	Valid Test	≥ 90%
Total Wt. of Fuel Burned During Test Run lb.		0.0		lb		

Fuel Piece Moisture Reading (%-dry basis)									
1	2	3	Ave.			Pc. Wt. Dry Basis			
			#DIV/0!		#DIV/0!	#DIV/0!	lb	#DIV/0!	kg
			#DIV/0!		#DIV/0!	#DIV/0!	lb	#DIV/0!	kg
			#DIV/0!		#DIV/0!	#DIV/0!	lb	#DIV/0!	kg
			#DIV/0!		#DIV/0!	#DIV/0!	lb	#DIV/0!	kg
			#DIV/0!		#DIV/0!	#DIV/0!	lb	#DIV/0!	kg
			#DIV/0!		#DIV/0!	#DIV/0!	lb	#DIV/0!	kg
			NA	NA		NA	lb	NA	kg
Total Load Ave. MC % (dry basis)			#DIV/0!		#DIV/0!				
Total Load Ave. MC % (wet basis)			#DIV/0!						
Total Test Load Weight (dry basis) →						#DIV/0!	lb	#DIV/0!	kg
Total Fuel Weight Burned During Test Run (dry basis)						#DIV/0!	lb	#DIV/0!	kg

WOODSTOVE PREBURN DATA

Client: FPI
Model: F2500
Run #: 3

Job #: 18-414
Tracking #: 003
Technician: SJB
Date: 6/27/2018

Preburn Start Time: 7:55
Recording Interval (min): 1
Run Time (min): 136

			Temperatures (°F)							
Elapsed Time (min)	**Scale Reading (lbs)**	**Flue Draft (in H_2O)**	**FB Left**	**FB Right**	**FB Back**	**FB Top**	**FB Bottom**	**Stove Surface Average**	**Flue**	**Ambient**
0	3.1	0.015	80	84	81	78	87	82.0	76	66
1	2.9	-0.018	80	84	81	79	87	82.2	115	66
2	2.6	-0.080	81	84	83	86	87	84.2	280	66
3	2.2	-0.077	85	87	88	109	86	91.0	448	66
4	1.9	-0.079	93	92	92	140	86	100.6	538	66
5	5.4	-0.086	104	99	99	178	86	113.2	609	66
6	1.4	-0.069	117	108	108	221	86	128.0	532	66
7	1.3	-0.064	130	119	115	261	86	142.2	505	66
8	1.0	-0.063	143	132	123	299	89	157.2	492	65
9	3.2	-0.068	156	145	130	330	91	170.4	514	65
10	3.0	-0.068	169	158	138	354	94	182.6	486	65
11	2.7	-0.071	181	169	144	382	97	194.6	517	65
12	2.5	-0.073	192	180	150	412	101	207.0	555	64
13	2.3	-0.071	203	191	157	442	106	219.8	571	64
14	2.1	-0.069	215	202	164	470	110	232.2	574	64
15	1.9	-0.067	226	214	171	495	115	244.2	564	64
16	1.7	-0.071	237	224	178	516	120	255.0	555	63
17	1.5	-0.066	247	236	186	533	125	265.4	546	63
18	1.5	-0.063	257	247	194	547	130	275.0	533	63
19	1.3	-0.062	267	258	202	554	135	283.2	515	63
20	1.2	-0.059	276	269	210	557	140	290.4	496	62
21	5.2	-0.077	285	279	219	555	145	296.6	559	62
22	4.8	-0.081	294	288	226	560	151	303.8	632	62
23	4.5	-0.075	302	297	233	575	156	312.6	604	62
24	4.2	-0.070	310	304	240	592	161	321.4	590	62
25	3.9	-0.076	318	311	247	608	167	330.2	585	61
26	3.6	-0.074	325	318	253	623	172	338.2	585	61
27	3.3	-0.077	332	325	258	635	177	345.4	588	61
28	3.0	-0.073	338	332	264	645	181	352.0	590	61
29	2.7	-0.073	345	336	269	655	186	358.2	589	61
30	2.5	-0.070	352	344	275	662	191	364.8	587	61
31	2.3	-0.071	359	349	279	667	195	369.8	586	60
32	25.2	-0.080	364	359	284	673	200	376.0	663	60
33	23.2	-0.074	370	365	290	667	204	379.2	614	60
34	23.0	-0.074	377	371	294	667	209	383.6	586	61
35	22.7	-0.073	380	376	298	671	213	387.6	597	61
36	22.5	-0.076	383	378	301	677	217	391.2	608	60
37	22.4	-0.076	385	381	303	681	221	394.2	612	60
38	22.0	-0.074	386	382	305	685	225	396.6	611	60
39	21.8	-0.075	387	384	306	687	228	398.4	608	60
40	21.6	-0.071	388	384	308	690	231	400.2	607	62
41	21.3	-0.076	389	385	309	693	234	402.0	608	61
42	21.1	-0.071	390	386	310	696	237	403.8	611	61
43	20.8	-0.078	391	387	310	697	239	404.8	616	61

WOODSTOVE PREBURN DATA

Client: FPI
Model: F2500
Run #: 3

Job #: 18-414
Tracking #: 003
Technician: SJB
Date: 6/27/2018

Preburn Start Time: 7:55
Recording Interval (min): 1
Run Time (min): 136

			Temperatures (°F)							
Elapsed Time (min)	**Scale Reading (lbs)**	**Flue Draft (in H_2O)**	**FB Left**	**FB Right**	**FB Back**	**FB Top**	**FB Bottom**	**Stove Surface Average**	**Flue**	**Ambient**
44	20.6	-0.073	392	386	311	699	241	405.8	619	61
45	20.4	-0.077	394	385	310	701	243	406.6	619	60
46	20.1	-0.074	395	385	310	702	245	407.4	619	60
47	19.9	-0.075	396	387	311	703	247	408.8	619	60
48	19.7	-0.072	397	387	311	704	249	409.6	618	60
49	19.4	-0.075	399	386	311	705	250	410.2	618	60
50	19.2	-0.077	400	388	311	707	252	411.6	618	60
51	18.9	-0.074	402	387	311	708	253	412.2	619	60
52	18.7	-0.076	403	388	210	701	255	391.4	617	60
53	18.5	-0.079	405	389	194	695	256	387.8	612	60
54	18.3	-0.082	406	389	183	692	257	385.4	610	60
55	18.0	-0.077	408	389	173	688	258	383.2	608	60
56	17.8	-0.080	410	389	165	689	260	382.6	607	60
57	17.6	-0.076	412	390	160	688	261	382.2	606	60
58	17.3	-0.076	414	391	157	687	262	382.2	606	60
59	17.1	-0.077	416	392	153	687	263	382.2	605	60
60	17.0	-0.080	418	393	152	686	264	382.6	603	60
61	16.7	-0.075	419	393	149	687	265	382.6	602	60
62	16.5	-0.077	422	395	148	686	266	383.4	602	60
63	16.2	-0.076	424	396	147	688	267	384.4	601	60
64	16.0	-0.072	425	397	147	687	269	385.0	599	60
65	15.7	-0.073	427	398	146	685	270	385.2	598	60
66	15.4	-0.077	429	399	145	685	271	385.8	597	60
67	15.2	-0.075	431	400	145	685	272	386.6	595	60
68	15.0	-0.072	433	401	145	685	273	387.4	594	60
69	14.8	-0.072	435	402	145	684	275	388.2	594	60
70	14.6	-0.073	437	403	145	685	276	389.2	592	60
71	14.4	-0.075	439	406	145	685	277	390.4	592	60
72	14.1	-0.077	441	406	145	684	278	390.8	592	60
73	13.9	-0.073	443	407	145	684	280	391.8	592	60
74	13.7	-0.072	445	409	145	687	281	393.4	591	60
75	13.4	-0.073	447	410	146	686	282	394.2	590	60
76	13.2	-0.070	449	412	147	687	284	395.8	589	60
77	12.9	-0.072	451	413	145	689	285	396.6	589	60
78	12.7	-0.074	454	415	147	688	287	398.2	588	60
79	12.5	-0.072	456	416	146	691	288	399.4	588	60
80	12.4	-0.071	458	417	147	689	290	400.2	586	60
81	12.1	-0.073	461	419	147	691	291	401.8	585	60
82	11.9	-0.074	463	420	148	694	293	403.6	584	60
83	11.7	-0.073	465	421	147	694	295	404.4	582	60
84	11.3	-0.079	467	424	148	695	296	406.0	581	60
85	11.3	-0.070	469	426	148	693	298	406.8	582	60
86	11.1	-0.072	471	426	149	692	300	407.6	580	60
87	11.0	-0.074	473	428	149	694	301	409.0	579	60

WOODSTOVE PREBURN DATA

Client: FPI
Model: F2500
Run #: 3

Job #: 18-414
Tracking #: 003
Technician: SJB
Date: 6/27/2018

Preburn Start Time: 7:55
Recording Interval (min): 1
Run Time (min): 136

			Temperatures (°F)							
Elapsed Time (min)	**Scale Reading (lbs)**	**Flue Draft (in H_2O)**	**FB Left**	**FB Right**	**FB Back**	**FB Top**	**FB Bottom**	**Stove Surface Average**	**Flue**	**Ambient**
88	10.8	-0.071	476	430	150	694	303	410.6	578	60
89	10.6	-0.070	478	432	150	694	304	411.6	577	60
90	10.4	-0.070	480	433	150	693	306	412.4	576	60
91	10.2	-0.072	481	435	150	693	308	413.4	576	60
92	10.0	-0.072	483	437	151	692	310	414.6	575	60
93	9.7	-0.071	485	438	152	692	311	415.6	575	60
94	9.7	-0.072	487	440	152	691	313	416.6	575	60
95	9.5	-0.070	488	442	153	693	315	418.2	575	61
96	9.3	-0.073	490	444	153	693	317	419.4	575	61
97	9.1	-0.070	491	446	155	692	318	420.4	574	61
98	8.8	-0.070	492	447	155	692	320	421.2	573	61
99	8.8	-0.074	494	448	155	691	322	422.0	573	61
100	8.6	-0.072	495	450	156	693	324	423.6	572	61
101	8.6	-0.069	497	451	156	695	326	425.0	572	61
102	8.3	-0.069	498	453	157	695	328	426.2	573	61
103	8.1	-0.072	499	455	158	696	330	427.6	572	61
104	7.9	-0.071	501	455	157	698	331	428.4	572	61
105	7.7	-0.071	502	457	158	698	333	429.6	572	61
106	7.6	-0.069	503	458	159	697	336	430.6	571	61
107	7.4	-0.069	505	459	160	697	337	431.6	571	61
108	7.3	-0.070	506	461	159	697	339	432.4	568	61
109	7.2	-0.071	507	462	162	694	342	433.4	564	61
110	7.0	-0.070	509	462	162	694	344	434.2	559	61
111	6.9	-0.069	512	464	162	695	346	435.8	602	61
112	6.7	-0.070	513	466	162	701	350	438.4	576	62
113	6.5	-0.067	515	466	163	703	353	440.0	568	62
114	6.2	-0.070	515	467	164	704	356	441.2	566	61
115	6.2	-0.070	516	468	164	703	359	442.0	563	62
116	6.1	-0.069	516	470	165	699	361	442.2	552	62
117	6.0	-0.067	516	471	164	693	362	441.2	537	62
118	5.9	-0.060	516	473	164	688	363	440.8	525	62
119	5.8	-0.062	516	473	164	683	365	440.2	515	62
120	5.7	-0.065	515	474	164	675	365	438.6	506	62
121	5.5	-0.067	515	476	164	664	366	437.0	496	62
122	5.5	-0.064	514	476	164	652	366	434.4	486	62
123	5.5	-0.061	513	477	164	644	367	433.0	479	62
124	5.3	-0.058	511	478	163	636	367	431.0	473	62
125	5.3	-0.057	510	478	164	628	367	429.4	467	62
126	5.3	-0.056	508	479	163	618	367	427.0	462	62
127	5.2	-0.059	507	478	163	607	367	424.4	458	62
128	5.2	-0.060	505	477	162	599	367	422.0	453	62
129	5.1	-0.057	503	476	162	589	366	419.2	449	62
130	5.1	-0.059	502	476	163	583	366	418.0	446	62
131	5.0	-0.047	500	475	162	575	366	415.6	443	62

WOODSTOVE PREBURN DATA

Client: FPI
Model: F2500
Run #: 3

Job #: 18-414
Tracking #: 003
Technician: SJB
Date: 6/27/2018

Preburn Start Time: 7:55
Recording Interval (min): 1
Run Time (min): 136

			Temperatures (°F)							
Elapsed Time (min)	**Scale Reading (lbs)**	**Flue Draft (in H_2O)**	**FB Left**	**FB Right**	**FB Back**	**FB Top**	**FB Bottom**	**Stove Surface Average**	**Flue**	**Ambient**
132	5.0	-0.054	498	474	161	567	366	413.2	440	62
133	4.9	-0.053	496	472	162	557	365	410.4	436	62
134	4.9	-0.056	494	472	161	549	365	408.2	432	62
135	4.8	-0.054	492	471	161	541	365	406.0	428	62
136	4.8	-0.051	490	470	160	533	364	403.4	426	62

DILUTION TUNNEL & MISC. DATA - ASTM E3053 / E2515

Client:	FPI	Job #:	18-414
Model:	F2500	Tracking #:	003
Run #:	3	Technician:	SJB
Test Start Time:	10:12	Date:	6/27/2018
Test Type:	Medium Fire		

Recording Interval (min):	1
Total Sampling Time (min):	506

	Beginning	Middle	End	Avg.
P_{bar} (in Hg):	29.92	29.86	29.87	29.88

Meter Box γ Factor:	1.002	(A)
Meter Box γ Factor:	0.997	(B)
Meter Box γ Factor:	0.999	(Amb)

Post-Test Leak Check

(A)	0.000	cfm @	-15	in. Hg
(B)	0.000	cfm @	-13	in. Hg
(AMB)	0.000	cfm @	-15	in. Hg

Dilution Tunnel MW(dry):	29.00	lb/lb-mole
Dilution Tunnel MW(wet):	28.78	lb/lb-mole
Tunnel Area:	0.1963	ft^2
Dilution Tunnel H_2O:	2.00	percent
Tunnel Diameter:	6	inches
Pitot Tube Cp:	0.99	
Dilution Tunnel Static:	-0.130	in H_2O
Ambient Sample Volume (ft^3):	83.786	ft^3

Tunnel Traverse Information

	Pt.1	Pt.2	Pt.3	Pt.4	Pt.5	Pt.6	Pt.7	Pt.8	Center
dP (in H_2O)	0.034	0.042	0.046	0.038	0.032	0.040	0.044	0.040	0.045
Tunnel Temp (°F)	74	74	74	74	74	74	74	74	74

V_{strav}:	13.33	ft/sec	F_p:	0.943	[ratio]
V_{scent}:	14.14	ft/sec	Initial Tunnel Flow:	150.9	scf/min

Default Wood Fuel Values

Fuel Type:	D. Fir	Oak
HHV (kJ/kg)	19,810	19,887
%C	48.73	50
%H	6.87	6.6
%O	43.9	42.9
%Ash	0.5	0.5

Actual

Fuel Type:	Maple
HHV (kJ/kg)	19,960
%C	50.64
%H	6.02
%O	41.74
%Ash	1.35

BOX A TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: F2500
Run #: 3

Job #: 18-414
Tracking #: 003
Technician: SJB
Date: 6/27/2018

	Particulate Sampling Data							Fuel Weight (lb)		Temperature Data (°F)			
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Dilution Tunnel dP (in H_2O)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Scale Reading	Weight Change	Dilution Tunnel	Flue	Filter	Ambient
0	0.207		0.045	0.01	76	-0.11		26.1		121	434	86	76
1	0.341	0.134	0.045	2.08	76	-0.36	97	25.9	-0.2	140	464	85	75
2	0.479	0.138	0.045	2.08	76	-0.4	99	25.8	-0.1	128	442	83	75
3	0.621	0.142	0.045	2.05	76	-1.82	101	25.6	-0.2	126	463	83	76
4	0.758	0.137	0.045	2.02	76	-0.76	98	25.4	-0.2	127	496	84	75
5	0.902	0.144	0.045	2.18	76	-1.57	103	25.2	-0.2	130	530	86	76
6	1.042	0.140	0.045	2.05	76	-1.89	100	24.7	-0.5	131	554	86	75
7	1.181	0.139	0.045	2.04	76	-0.37	99	24.7	0	128	537	85	76
8	1.322	0.141	0.045	2.04	76	-1.22	101	24.6	-0.1	126	525	84	76
9	1.460	0.138	0.045	2.02	76	-1.91	99	24.4	-0.2	125	522	83	76
10	1.602	0.142	0.045	2.03	76	-0.59	101	24.2	-0.2	125	521	84	75
11	1.739	0.137	0.045	2.07	76	-0.79	98	24.0	-0.2	125	517	85	75
12	1.883	0.144	0.045	2.05	76	-0.79	103	23.8	-0.2	125	512	86	75
13	2.021	0.138	0.045	2.04	76	-0.95	98	23.7	-0.1	123	507	85	75
14	2.161	0.140	0.045	2.03	76	-0.84	100	23.5	-0.2	124	503	84	76
15	2.301	0.140	0.045	2.02	77	-1.75	100	23.3	-0.2	124	502	84	76
16	2.441	0.140	0.045	2.03	77	-0.69	100	23.2	-0.1	124	502	83	76
17	2.583	0.142	0.045	2.02	77	-1.89	101	23.1	-0.1	123	500	84	76
18	2.719	0.136	0.045	2.02	77	-0.58	97	22.8	-0.3	123	498	86	76
19	2.862	0.143	0.045	2.03	77	-1.33	102	22.6	-0.2	123	498	86	75
20	3.000	0.138	0.045	2.04	77	-1.61	98	22.5	-0.1	124	499	85	75
21	3.141	0.141	0.045	2.04	77	-1.93	100	22.2	-0.3	123	497	85	76
22	3.281	0.140	0.045	2.02	77	-1.8	100	22.2	0	122	493	84	76
23	3.420	0.139	0.045	2.02	77	-1.98	99	22.0	-0.2	122	489	84	76
24	3.562	0.142	0.045	2.01	77	-1.96	101	21.9	-0.1	122	488	84	76
25	3.698	0.136	0.045	2.02	77	-0.97	97	21.6	-0.3	123	496	86	76
26	3.841	0.143	0.045	2.01	78	-1.06	102	21.4	-0.2	124	502	86	75
27	3.980	0.139	0.045	2.00	78	-0.46	99	21.2	-0.2	124	506	86	76
28	4.121	0.141	0.045	1.98	78	-1.94	100	21.1	-0.1	124	509	85	75
29	4.260	0.139	0.045	2.06	78	-1.6	99	20.9	-0.2	124	511	84	75
30	4.402	0.142	0.045	2.03	78	-1.46	101	20.7	-0.2	124	511	84	76
31	4.546	0.144	0.045	2.05	78	-1.57	102	20.5	-0.2	124	510	83	76
32	4.685	0.139	0.045	2.06	78	-1.88	99	20.3	-0.2	124	509	84	76

BOX A TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: F2500
Run #: 3

Job #: 18-414
Tracking #: 003
Technician: SJB
Date: 6/27/2018

	Particulate Sampling Data							Fuel Weight (lb)		Temperature Data (°F)			
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Dilution Tunnel dP (in H_2O)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Scale Reading	Weight Change	Dilution Tunnel	Flue	Filter	Ambient
33	4.830	0.145	0.045	2.06	79	-1.39	103	20.1	-0.2	124	507	86	76
34	4.968	0.138	0.045	2.04	78	-0.85	98	20.0	-0.1	124	505	86	75
35	5.114	0.146	0.045	2.05	78	-1.8	104	19.8	-0.2	124	503	86	76
36	5.253	0.139	0.045	2.07	79	-1.8	99	19.6	-0.2	123	502	85	75
37	5.399	0.146	0.045	2.05	79	-1.97	103	19.4	-0.2	123	500	84	76
38	5.539	0.140	0.045	2.06	79	-1.52	99	19.4	0	123	498	84	75
39	5.681	0.142	0.045	2.05	79	-0.71	101	19.1	-0.3	123	497	83	75
40	5.823	0.142	0.045	2.06	79	-1.96	101	18.8	-0.3	123	496	85	76
41	5.965	0.142	0.045	2.03	79	-1.21	101	18.8	0	123	495	86	76
42	6.110	0.145	0.045	2.06	79	-1.95	103	18.6	-0.2	123	494	86	76
43	6.250	0.140	0.045	2.07	79	-0.63	99	18.4	-0.2	123	493	85	76
44	6.395	0.145	0.045	2.07	79	-0.53	103	18.3	-0.1	123	493	85	75
45	6.534	0.139	0.045	2.06	79	-1.9	99	18.1	-0.2	123	492	84	76
46	6.679	0.145	0.045	2.05	79	-0.63	103	18.0	-0.1	122	490	83	76
47	6.819	0.140	0.045	2.05	79	-2	99	17.8	-0.2	122	488	84	76
48	6.965	0.146	0.045	2.06	79	-1.62	103	17.6	-0.2	122	484	86	76
49	7.106	0.141	0.045	2.07	80	-1.17	100	17.5	-0.1	122	480	86	76
50	7.250	0.144	0.045	2.05	80	-0.72	102	17.4	-0.1	121	476	85	76
51	7.392	0.142	0.045	2.06	80	-1.74	100	17.1	-0.3	121	473	85	75
52	7.533	0.141	0.045	2.06	80	-1.25	99	17.0	-0.1	120	470	84	76
53	7.678	0.145	0.045	2.08	80	-1.13	102	16.8	-0.2	120	468	84	76
54	7.819	0.141	0.045	2.06	80	-2	99	16.7	-0.1	120	465	83	75
55	7.965	0.146	0.045	2.06	80	-1.76	103	16.5	-0.2	119	464	85	76
56	8.105	0.140	0.045	2.05	80	-1.95	99	16.4	-0.1	119	463	86	76
57	8.251	0.146	0.045	2.04	80	-1.72	103	16.2	-0.2	119	462	86	76
58	8.390	0.139	0.045	2.05	80	-0.79	98	16.1	-0.1	119	459	85	76
59	8.536	0.146	0.045	2.05	80	-1.54	103	16.0	-0.1	119	458	85	77
60	8.677	0.141	0.045	2.04	80	-1.16	99	15.8	-0.2	119	456	84	76
61	8.828	0.151	0.045	2.25	81	-1.03	106	15.7	-0.1	119	454	82	76
62	8.972	0.144	0.045	2.13	81	-1.81	101	15.5	-0.2	118	453	82	76
63	9.121	0.149	0.045	2.13	80	-0.59	105	15.4	-0.1	118	452	85	77
64	9.264	0.143	0.045	2.14	81	-0.31	101	15.2	-0.2	118	452	86	76
65	9.412	0.148	0.045	2.14	81	-0.34	104	15.1	-0.1	118	451	86	76

BOX A TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: F2500
Run #: 3

Job #: 18-414
Tracking #: 003
Technician: SJB
Date: 6/27/2018

	Particulate Sampling Data							Fuel Weight (lb)		Temperature Data (°F)			
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Dilution Tunnel dP (in H_2O)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Scale Reading	Weight Change	Dilution Tunnel	Flue	Filter	Ambient
66	9.555	0.143	0.045	2.14	80	-0.41	101	14.9	-0.2	118	451	85	76
67	9.704	0.149	0.045	2.14	81	-1.81	105	14.8	-0.1	117	450	84	76
68	9.847	0.143	0.045	2.15	81	-1.3	101	14.7	-0.1	118	451	84	76
69	9.995	0.148	0.045	2.15	81	-0.5	104	14.5	-0.2	117	450	84	76
70	10.139	0.144	0.045	2.15	81	-0.46	101	14.4	-0.1	117	450	84	77
71	10.287	0.148	0.045	2.12	81	-1.61	104	14.3	-0.1	117	450	86	76
72	10.431	0.144	0.045	2.15	81	-0.67	101	14.1	-0.2	117	451	86	76
73	10.579	0.148	0.045	2.12	81	-1.76	104	14.0	-0.1	117	451	85	77
74	10.723	0.144	0.045	2.13	82	-1.44	101	13.7	-0.3	117	453	85	77
75	10.870	0.147	0.045	2.13	81	-1.2	103	13.7	0	117	456	84	76
76	11.014	0.144	0.045	2.10	81	-0.83	101	13.6	-0.1	117	460	84	77
77	11.161	0.147	0.045	2.12	81	-0.36	103	13.3	-0.3	118	462	84	77
78	11.306	0.145	0.045	2.12	82	-0.65	102	13.3	0	118	465	86	76
79	11.453	0.147	0.045	2.11	82	-0.86	103	13.0	-0.3	118	467	86	76
80	11.597	0.144	0.045	2.12	82	-1.26	101	13.0	0	119	470	85	76
81	11.743	0.146	0.045	2.12	82	-0.35	102	12.8	-0.2	118	470	84	76
82	11.888	0.145	0.045	2.11	81	-1.41	102	12.6	-0.2	119	470	84	76
83	12.033	0.145	0.045	2.12	82	-0.39	102	12.6	0	119	471	83	76
84	12.178	0.145	0.045	2.11	82	-0.3	102	12.4	-0.2	119	472	84	76
85	12.323	0.145	0.045	2.11	82	-1.75	102	12.2	-0.2	119	474	85	76
86	12.469	0.146	0.045	2.10	82	-1.82	103	12.1	-0.1	119	477	86	76
87	12.614	0.145	0.045	2.12	82	-0.61	102	11.9	-0.2	119	479	86	77
88	12.760	0.146	0.045	2.10	82	-1.79	103	11.8	-0.1	119	482	85	77
89	12.904	0.144	0.045	2.09	82	-0.94	101	11.6	-0.2	120	483	85	77
90	13.050	0.146	0.045	2.10	82	-0.42	103	11.5	-0.1	120	485	84	76
91	13.194	0.144	0.045	2.10	82	-1.16	101	11.4	-0.1	120	487	84	76
92	13.341	0.147	0.045	2.10	82	-1.73	103	11.2	-0.2	121	490	85	77
93	13.484	0.143	0.045	2.08	82	-1.81	101	11.1	-0.1	121	492	86	77
94	13.631	0.147	0.045	2.09	82	-1.82	103	10.9	-0.2	121	492	86	76
95	13.773	0.142	0.045	2.09	82	-0.44	100	10.8	-0.1	121	493	85	77
96	13.921	0.148	0.045	2.10	82	-0.59	104	10.6	-0.2	121	491	84	76
97	14.062	0.141	0.045	2.06	82	-0.84	99	10.5	-0.1	121	490	84	76
98	14.210	0.148	0.045	2.08	82	-1.85	104	10.4	-0.1	121	488	83	77

BOX A TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: F2500
Run #: 3

Job #: 18-414
Tracking #: 003
Technician: SJB
Date: 6/27/2018

	Particulate Sampling Data							Fuel Weight (lb)		Temperature Data (°F)			
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Dilution Tunnel dP (in H_2O)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Scale Reading	Weight Change	Dilution Tunnel	Flue	Filter	Ambient
99	14.351	0.141	0.045	2.06	82	-0.69	99	10.2	-0.2	120	484	83	78
100	14.498	0.147	0.045	2.09	82	-1.65	103	10.1	-0.1	120	478	85	77
101	14.640	0.142	0.045	2.07	82	-1.71	100	10.0	-0.1	119	470	86	76
102	14.788	0.148	0.045	2.10	82	-1.79	104	9.7	-0.3	119	463	86	76
103	14.930	0.142	0.045	2.08	83	-1.23	100	9.8	0.1	119	457	85	77
104	15.077	0.147	0.045	2.08	83	-1.88	103	9.6	-0.2	118	453	85	78
105	15.220	0.143	0.045	2.08	82	-0.7	100	9.5	-0.1	118	449	84	78
106	15.367	0.147	0.045	2.07	83	-1.87	103	9.4	-0.1	117	446	83	76
107	15.510	0.143	0.045	2.08	83	-1.65	100	9.3	-0.1	117	444	84	76
108	15.656	0.146	0.045	2.07	83	-1.13	102	9.2	-0.1	117	441	85	77
109	15.799	0.143	0.045	2.07	83	-0.57	100	9.1	-0.1	115	437	86	77
110	15.944	0.145	0.045	2.08	83	-1.84	101	9.0	-0.1	116	436	86	76
111	16.088	0.144	0.045	2.05	83	-1.31	101	8.8	-0.2	115	434	85	76
112	16.232	0.144	0.045	2.07	83	-1.31	101	8.8	0	116	432	84	76
113	16.377	0.145	0.045	2.07	83	-0.62	101	8.7	-0.1	115	430	84	78
114	16.522	0.145	0.045	2.07	83	-1.12	101	8.5	-0.2	115	429	83	77
115	16.667	0.145	0.045	2.05	83	-0.49	101	8.5	0	115	427	84	76
116	16.811	0.144	0.045	2.07	83	-1.16	101	8.4	-0.1	115	426	86	77
117	16.958	0.147	0.045	2.07	83	-0.8	103	8.2	-0.2	114	424	86	76
118	17.101	0.143	0.045	2.06	83	-1.63	100	8.2	0	114	418	85	77
119	17.248	0.147	0.045	2.07	83	-1.03	103	8.1	-0.1	113	411	85	77
120	17.390	0.142	0.045	2.08	83	-0.75	99	8.0	-0.1	113	404	84	77
121	17.537	0.147	0.045	2.09	83	-1.94	102	8.0	0	112	400	84	77
122	17.679	0.142	0.045	2.08	84	-1.92	99	7.9	-0.1	112	395	84	77
123	17.827	0.148	0.045	2.06	83	-1.73	103	7.8	-0.1	111	391	85	76
124	17.968	0.141	0.045	2.07	83	-0.57	98	7.8	0	111	388	86	76
125	18.116	0.148	0.045	2.06	82	-1.79	103	7.7	-0.1	110	383	85	77
126	18.258	0.142	0.045	2.07	83	-0.66	99	7.6	-0.1	110	381	85	77
127	18.406	0.148	0.045	2.06	83	-1.84	103	7.4	-0.2	110	377	84	77
128	18.547	0.141	0.045	2.05	84	-0.81	98	7.5	0.1	109	375	83	78
129	18.695	0.148	0.045	2.07	83	-1.29	103	7.4	-0.1	109	373	83	78
130	18.838	0.143	0.045	2.06	84	-1.28	99	7.4	0	109	370	84	77
131	18.985	0.147	0.045	2.07	84	-1.34	102	7.3	-0.1	108	368	86	77

BOX A TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: F2500
Run #: 3

Job #: 18-414
Tracking #: 003
Technician: SJB
Date: 6/27/2018

	Particulate Sampling Data							Fuel Weight (lb)		Temperature Data (°F)			
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Dilution Tunnel dP (in H_2O)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Scale Reading	Weight Change	Dilution Tunnel	Flue	Filter	Ambient
132	19.128	0.143	0.045	2.06	83	-0.49	99	7.3	0	108	367	86	77
133	19.274	0.146	0.045	2.07	83	-1.56	101	7.2	-0.1	108	367	85	78
134	19.418	0.144	0.045	2.05	83	-0.61	100	7.2	0	107	365	84	77
135	19.564	0.146	0.045	2.07	84	-0.49	101	7.1	-0.1	107	363	84	78
136	19.708	0.144	0.045	2.08	84	-0.91	100	7.1	0	107	362	84	77
137	19.852	0.144	0.045	2.07	84	-1.74	100	7.0	-0.1	107	361	84	77
138	19.997	0.145	0.045	2.06	84	-2.03	100	7.0	0	107	359	86	77
139	20.141	0.144	0.045	2.07	84	-0.58	100	6.9	-0.1	107	359	86	77
140	20.287	0.146	0.045	2.08	84	-1.33	101	6.8	-0.1	107	359	85	77
141	20.431	0.144	0.045	2.08	84	-1.93	100	6.8	0	107	363	84	78
142	20.577	0.146	0.045	2.06	84	-0.52	101	6.7	-0.1	106	368	84	77
143	20.721	0.144	0.045	2.07	84	-1.98	100	6.7	0	106	369	84	78
144	20.868	0.147	0.045	2.08	84	-1.95	102	6.6	-0.1	107	371	85	77
145	21.012	0.144	0.045	2.09	84	-0.66	100	6.6	0	107	375	86	77
146	21.159	0.147	0.045	2.07	84	-1.6	102	6.5	-0.1	107	376	85	77
147	21.302	0.143	0.045	2.07	84	-0.51	99	6.5	0	107	376	85	77
148	21.449	0.147	0.045	2.08	84	-1.97	102	6.4	-0.1	107	376	84	77
149	21.591	0.142	0.045	2.06	84	-0.87	98	6.4	0	107	374	84	77
150	21.739	0.148	0.045	2.07	84	-0.84	102	6.3	-0.1	107	370	84	77
151	21.881	0.142	0.045	2.08	85	-1.09	98	6.3	0	107	365	85	77
152	22.030	0.149	0.045	2.06	84	-0.64	103	6.2	-0.1	106	359	86	77
153	22.171	0.141	0.045	2.06	84	-0.53	98	6.1	-0.1	106	355	86	78
154	22.319	0.148	0.045	2.06	84	-1.07	102	6.1	0	106	351	85	77
155	22.461	0.142	0.045	2.08	84	-0.6	98	6.0	-0.1	106	348	84	77
156	22.609	0.148	0.045	2.08	84	-0.79	102	5.9	-0.1	105	346	84	77
157	22.752	0.143	0.045	2.08	84	-1.3	99	5.8	-0.1	105	344	84	77
158	22.899	0.147	0.045	2.06	84	-1.42	102	5.8	0	105	343	85	77
159	23.042	0.143	0.045	2.06	84	-1.87	99	5.7	-0.1	105	343	86	77
160	23.190	0.148	0.045	2.06	84	-1.87	102	5.7	0	105	345	86	77
161	23.333	0.143	0.045	2.05	85	-1.41	99	5.6	-0.1	105	348	85	78
162	23.480	0.147	0.045	2.08	85	-1.6	101	5.4	-0.2	105	351	84	77
163	23.623	0.143	0.045	2.06	84	-1.7	99	5.5	0.1	105	352	84	77
164	23.769	0.146	0.045	2.07	85	-1.36	101	5.4	-0.1	105	350	84	78

BOX A TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: F2500
Run #: 3

Job #: 18-414
Tracking #: 003
Technician: SJB
Date: 6/27/2018

	Particulate Sampling Data							Fuel Weight (lb)		Temperature Data (°F)			
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Dilution Tunnel dP (in H_2O)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Scale Reading	Weight Change	Dilution Tunnel	Flue	Filter	Ambient
165	23.913	0.144	0.045	2.06	85	-1.76	99	5.4	0	104	345	85	77
166	24.058	0.145	0.045	2.06	84	-0.99	100	5.4	0	104	338	86	78
167	24.203	0.145	0.045	2.06	84	-1.67	100	5.2	-0.2	103	334	86	77
168	24.347	0.144	0.045	2.06	84	-1.74	99	5.3	0.1	104	333	85	77
169	24.492	0.145	0.045	2.07	85	-0.7	100	5.3	0	103	335	85	78
170	24.637	0.145	0.045	2.07	85	-1.67	100	5.3	0	104	344	84	78
171	24.783	0.146	0.045	2.07	85	-0.63	101	5.2	-0.1	104	353	84	78
172	24.927	0.144	0.045	2.07	85	-1.06	99	5.2	0	104	358	84	78
173	25.073	0.146	0.045	2.05	85	-0.66	101	5.3	0.1	105	360	86	78
174	25.217	0.144	0.045	2.07	85	-1.06	99	5.2	-0.1	105	360	86	78
175	25.364	0.147	0.045	2.06	85	-1.46	101	5.1	-0.1	105	359	86	77
176	25.507	0.143	0.045	2.07	85	-0.5	99	5.1	0	105	357	85	77
177	25.655	0.148	0.045	2.06	85	-1.87	102	5.1	0	105	355	84	78
178	25.797	0.142	0.045	2.07	85	-0.55	98	5.0	-0.1	105	354	84	78
179	25.944	0.147	0.045	2.05	85	-1.83	101	5.0	0	104	352	84	77
180	26.087	0.143	0.045	2.07	85	-1.99	99	5.0	0	104	352	85	77
181	26.235	0.148	0.045	2.07	85	-0.44	102	5.0	0	104	352	86	77
182	26.377	0.142	0.045	2.06	85	-1.88	98	4.9	-0.1	104	350	86	78
183	26.525	0.148	0.045	2.06	85	-1.62	102	4.9	0	104	347	85	78
184	26.666	0.141	0.045	2.06	85	-1.98	97	4.9	0	104	345	85	78
185	26.814	0.148	0.045	2.08	85	-0.62	102	4.9	0	104	343	84	78
186	26.956	0.142	0.045	2.06	85	-0.91	98	4.8	-0.1	104	341	84	78
187	27.104	0.148	0.045	2.08	85	-1.85	102	4.9	0.1	103	340	85	78
188	27.247	0.143	0.045	2.06	85	-0.72	99	4.8	-0.1	103	338	86	78
189	27.394	0.147	0.045	2.06	85	-1.93	101	4.8	0	103	335	86	78
190	27.537	0.143	0.045	2.07	85	-1.85	99	4.8	0	103	332	85	78
191	27.685	0.148	0.045	2.08	85	-1.87	102	4.7	-0.1	103	330	85	78
192	27.828	0.143	0.045	2.06	85	-1.98	98	4.7	0	102	328	84	78
193	27.976	0.148	0.045	2.09	85	-1.84	102	4.7	0	102	326	84	78
194	28.119	0.143	0.045	2.07	85	-0.72	98	4.7	0	102	323	84	78
195	28.265	0.146	0.045	2.05	85	-1.88	100	4.7	0	102	321	86	78
196	28.409	0.144	0.045	2.07	85	-1.63	99	4.6	-0.1	102	319	86	78
197	28.555	0.146	0.045	2.06	85	-1.39	100	4.6	0	102	317	85	78

BOX A TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: F2500
Run #: 3

Job #: 18-414
Tracking #: 003
Technician: SJB
Date: 6/27/2018

	Particulate Sampling Data							Fuel Weight (lb)		Temperature Data (°F)			
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Dilution Tunnel dP (in H_2O)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Scale Reading	Weight Change	Dilution Tunnel	Flue	Filter	Ambient
198	28.699	0.144	0.045	2.06	85	-0.59	99	4.6	0	102	316	85	77
199	28.845	0.146	0.045	2.08	85	-0.59	100	4.6	0	101	314	84	78
200	28.989	0.144	0.045	2.06	85	-1.54	99	4.6	0	101	314	84	77
201	29.134	0.145	0.045	2.06	85	-0.76	100	4.5	-0.1	101	314	84	78
202	29.279	0.145	0.045	2.07	85	-0.49	100	4.5	0	101	313	86	77
203	29.424	0.145	0.045	2.07	86	-1.95	100	4.5	0	101	313	86	78
204	29.570	0.146	0.045	2.07	85	-1.5	100	4.5	0	101	312	85	77
205	29.714	0.144	0.045	2.06	85	-0.63	99	4.5	0	101	311	85	78
206	29.861	0.147	0.045	2.06	86	-0.45	101	4.4	-0.1	101	312	84	77
207	30.004	0.143	0.045	2.07	85	-1.9	98	4.4	0	100	312	84	78
208	30.152	0.148	0.045	2.08	85	-1.41	102	4.4	0	100	310	84	77
209	30.295	0.143	0.045	2.07	85	-1.95	98	4.3	-0.1	100	310	85	77
210	30.443	0.148	0.045	2.07	85	-0.85	102	4.4	0.1	100	308	86	78
211	30.586	0.143	0.045	2.08	86	-1.24	98	4.3	-0.1	100	307	85	78
212	30.733	0.147	0.045	2.06	85	-1.24	101	4.4	0.1	100	307	85	78
213	30.876	0.143	0.045	2.08	86	-1.12	98	4.3	-0.1	100	307	84	78
214	31.024	0.148	0.045	2.06	86	-0.44	101	4.3	0	100	306	84	78
215	31.166	0.142	0.045	2.06	86	-0.72	97	4.3	0	100	306	84	78
216	31.314	0.148	0.045	2.07	86	-1.3	101	4.2	-0.1	100	306	85	78
217	31.455	0.141	0.045	2.07	86	-1.4	97	4.2	0	100	306	86	78
218	31.603	0.148	0.045	2.06	86	-1.2	101	4.2	0	100	306	86	78
219	31.746	0.143	0.045	2.07	86	-0.64	98	4.2	0	100	306	85	78
220	31.894	0.148	0.045	2.08	86	-0.92	101	4.1	-0.1	100	306	84	78
221	32.037	0.143	0.045	2.06	86	-0.54	98	4.1	0	100	306	84	79
222	32.185	0.148	0.045	2.08	86	-1.87	101	4.1	0	100	307	84	78
223	32.327	0.142	0.045	2.04	86	-2.04	97	4.1	0	100	307	85	78
224	32.475	0.148	0.045	2.08	86	-0.65	101	4.1	0	100	307	86	78
225	32.618	0.143	0.045	2.06	86	-1.88	98	4.1	0	100	308	86	79
226	32.766	0.148	0.045	2.06	86	-1.54	101	4.0	-0.1	100	308	85	79
227	32.910	0.144	0.045	2.07	86	-1.82	99	4.0	0	100	309	85	78
228	33.057	0.147	0.045	2.03	86	-0.93	101	4.0	0	100	310	84	78
229	33.200	0.143	0.045	2.07	86	-2.01	98	4.0	0	100	310	84	78
230	33.347	0.147	0.045	2.06	86	-0.77	101	3.9	-0.1	100	311	84	78

BOX A TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: F2500
Run #: 3

Job #: 18-414
Tracking #: 003
Technician: SJB
Date: 6/27/2018

	Particulate Sampling Data							Fuel Weight (lb)		Temperature Data (°F)			
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Dilution Tunnel dP (in H_2O)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Scale Reading	Weight Change	Dilution Tunnel	Flue	Filter	Ambient
231	33.491	0.144	0.045	2.06	86	-1.87	99	3.9	0	100	310	86	78
232	33.637	0.146	0.045	2.06	86	-0.59	100	3.9	0	100	310	86	78
233	33.781	0.144	0.045	2.06	86	-1.05	99	3.9	0	100	310	85	77
234	33.927	0.146	0.045	2.05	86	-1.51	100	3.9	0	100	309	85	77
235	34.072	0.145	0.045	2.06	86	-0.51	99	3.8	-0.1	100	309	84	77
236	34.216	0.144	0.045	2.06	86	-0.76	99	3.8	0	100	308	84	78
237	34.362	0.146	0.045	2.06	86	-0.75	100	3.8	0	100	307	84	78
238	34.507	0.145	0.045	2.07	86	-1.01	99	3.6	-0.2	100	306	86	78
239	34.653	0.146	0.045	2.07	86	-1.78	100	3.8	0.2	100	304	86	78
240	34.798	0.145	0.045	2.06	86	-2.09	99	3.7	-0.1	99	302	86	78
241	34.944	0.146	0.045	2.07	86	-1.99	100	3.7	0	99	301	85	78
242	35.088	0.144	0.045	2.07	86	-1.92	99	3.7	0	99	301	84	78
243	35.235	0.147	0.045	2.09	86	-0.53	101	3.7	0	99	300	84	78
244	35.379	0.144	0.045	2.08	86	-1.24	99	3.6	-0.1	99	300	84	78
245	35.527	0.148	0.045	2.07	86	-0.86	101	3.6	0	99	300	85	78
246	35.670	0.143	0.045	2.07	86	-1.92	98	3.6	0	99	300	86	78
247	35.818	0.148	0.045	2.05	86	-1.7	101	3.6	0	99	300	86	78
248	35.960	0.142	0.045	2.06	86	-1.99	97	3.6	0	99	300	85	78
249	36.108	0.148	0.045	2.07	86	-0.76	101	3.5	-0.1	99	299	85	78
250	36.251	0.143	0.045	2.07	86	-1.44	98	3.5	0	99	299	84	78
251	36.399	0.148	0.045	2.08	86	-1.82	101	3.5	0	99	298	84	77
252	36.541	0.142	0.045	2.05	86	-0.99	97	3.5	0	99	298	84	78
253	36.690	0.149	0.045	2.07	86	-1.89	102	3.4	-0.1	99	298	86	78
254	36.832	0.142	0.045	2.06	86	-0.98	97	3.4	0	99	298	86	78
255	36.980	0.148	0.045	2.06	86	-1.42	101	3.4	0	99	296	85	78
256	37.122	0.142	0.045	2.05	87	-1.68	97	3.4	0	99	294	85	78
257	37.270	0.148	0.045	2.06	86	-1.28	101	3.4	0	99	294	84	78
258	37.413	0.143	0.045	2.06	87	-0.98	98	3.4	0	99	297	84	78
259	37.561	0.148	0.045	2.07	86	-1.18	101	3.2	-0.2	99	300	84	78
260	37.704	0.143	0.045	2.06	87	-1.09	98	3.4	0.2	99	300	86	78
261	37.852	0.148	0.045	2.06	86	-1.07	101	3.3	-0.1	99	301	86	78
262	37.995	0.143	0.045	2.06	87	-0.54	98	3.3	0	99	299	86	78
263	38.143	0.148	0.045	2.07	86	-1.31	101	3.3	0	99	299	85	78

BOX A TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: F2500
Run #: 3

Job #: 18-414
Tracking #: 003
Technician: SJB
Date: 6/27/2018

	Particulate Sampling Data							Fuel Weight (lb)		Temperature Data (°F)			
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Dilution Tunnel dP (in H_2O)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Scale Reading	Weight Change	Dilution Tunnel	Flue	Filter	Ambient
264	38.287	0.144	0.045	2.06	87	-1.69	98	3.2	-0.1	99	297	84	78
265	38.435	0.148	0.045	2.06	87	-1.88	101	3.2	0	99	296	84	78
266	38.578	0.143	0.045	2.06	87	-0.51	98	3.2	0	99	294	84	78
267	38.726	0.148	0.045	2.06	87	-1.22	101	3.2	0	99	293	85	78
268	38.869	0.143	0.045	2.06	87	-0.55	98	3.1	-0.1	98	292	86	78
269	39.016	0.147	0.045	2.07	87	-2.01	100	3.1	0	98	291	86	78
270	39.160	0.144	0.045	2.06	87	-1.3	98	3.1	0	98	291	85	78
271	39.306	0.146	0.045	2.07	87	-1.41	100	3.1	0	98	290	85	78
272	39.451	0.145	0.045	2.07	87	-1.21	99	3.1	0	98	289	84	78
273	39.597	0.146	0.045	2.05	87	-0.98	100	3.1	0	98	288	84	78
274	39.742	0.145	0.045	2.06	87	-0.55	99	3.1	0	98	288	84	78
275	39.887	0.145	0.045	2.05	87	-1.8	99	3.1	0	98	287	86	78
276	40.032	0.145	0.045	2.05	87	-1.2	99	3.0	-0.1	98	287	86	78
277	40.177	0.145	0.045	2.06	87	-1.66	99	3.0	0	98	286	86	79
278	40.323	0.146	0.045	2.05	87	-1.34	100	3.0	0	98	285	85	78
279	40.468	0.145	0.045	2.06	87	-0.98	99	3.0	0	98	285	84	78
280	40.614	0.146	0.045	2.06	87	-0.58	100	3.0	0	98	284	84	78
281	40.759	0.145	0.045	2.07	87	-1.81	99	3.0	0	98	284	84	78
282	40.906	0.147	0.045	2.08	87	-1.88	100	3.0	0	98	283	86	78
283	41.050	0.144	0.045	2.06	87	-0.55	98	2.9	-0.1	98	283	87	78
284	41.197	0.147	0.045	2.07	87	-1.76	100	2.9	0	98	282	86	78
285	41.341	0.144	0.045	2.08	87	-1.82	98	2.9	0	98	282	85	79
286	41.488	0.147	0.045	2.05	87	-2	100	2.9	0	98	282	85	78
287	41.632	0.144	0.045	2.06	87	-1.95	98	3.0	0.1	98	281	84	79
288	41.780	0.148	0.045	2.07	87	-1.85	101	2.9	-0.1	98	281	84	79
289	41.924	0.144	0.045	2.05	87	-0.93	98	2.8	-0.1	98	281	84	78
290	42.071	0.147	0.045	2.06	87	-1.73	100	2.8	0	97	280	86	78
291	42.214	0.143	0.045	2.06	87	-1.38	98	2.7	-0.1	97	280	86	78
292	42.362	0.148	0.045	2.07	87	-0.51	101	2.8	0.1	97	280	85	79
293	42.505	0.143	0.045	2.05	87	-0.84	98	2.8	0	97	281	85	78
294	42.654	0.149	0.045	2.07	87	-1.97	102	2.7	-0.1	97	281	84	79
295	42.796	0.142	0.045	2.06	87	-0.79	97	2.7	0	97	281	84	79
296	42.944	0.148	0.045	2.06	87	-0.71	101	2.7	0	97	282	84	79

BOX A TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: F2500
Run #: 3

Job #: 18-414
Tracking #: 003
Technician: SJB
Date: 6/27/2018

	Particulate Sampling Data							Fuel Weight (lb)		Temperature Data (°F)			
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Dilution Tunnel dP (in H_2O)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Scale Reading	Weight Change	Dilution Tunnel	Flue	Filter	Ambient
297	43.087	0.143	0.045	2.06	87	-1.82	98	2.7	0	98	282	85	79
298	43.235	0.148	0.045	2.05	87	-1.11	101	2.7	0	98	283	86	79
299	43.377	0.142	0.045	2.06	87	-1.41	97	2.6	-0.1	97	284	86	78
300	43.526	0.149	0.045	2.07	87	-1.41	102	2.5	-0.1	98	286	85	78
301	43.668	0.142	0.045	2.05	87	-0.71	97	2.6	0.1	98	287	85	79
302	43.817	0.149	0.045	2.06	87	-1.94	102	2.6	0	98	287	84	79
303	43.960	0.143	0.045	2.08	87	-2.01	98	2.6	0	98	288	84	79
304	44.108	0.148	0.045	2.07	87	-1.57	101	2.5	-0.1	98	288	84	79
305	44.251	0.143	0.045	2.08	87	-0.72	98	2.5	0	98	288	85	79
306	44.399	0.148	0.045	2.05	87	-0.53	101	2.5	0	98	288	86	79
307	44.542	0.143	0.045	2.07	87	-0.58	98	2.5	0	98	288	86	79
308	44.691	0.149	0.045	2.06	87	-1.92	102	2.5	0	98	287	85	79
309	44.834	0.143	0.045	2.07	87	-1.93	98	2.5	0	98	286	84	79
310	44.983	0.149	0.045	2.08	87	-1.24	102	2.4	-0.1	98	285	84	79
311	45.126	0.143	0.045	2.07	87	-1.65	98	2.4	0	98	283	84	79
312	45.274	0.148	0.045	2.07	87	-1.29	101	2.4	0	98	282	85	79
313	45.418	0.144	0.045	2.04	87	-1.38	98	2.4	0	98	281	86	79
314	45.565	0.147	0.045	2.05	87	-0.62	100	2.4	0	98	280	86	79
315	45.709	0.144	0.045	2.06	87	-0.94	98	2.4	0	98	279	85	79
316	45.856	0.147	0.045	2.06	87	-1.99	100	2.3	-0.1	97	278	84	80
317	46.000	0.144	0.045	2.05	87	-1.9	98	2.4	0.1	97	277	84	80
318	46.147	0.147	0.045	2.06	87	-1.85	100	2.3	-0.1	97	276	84	80
319	46.291	0.144	0.045	2.05	87	-0.52	98	2.3	0	97	275	85	80
320	46.437	0.146	0.045	2.04	88	-1.88	99	2.3	0	97	275	87	80
321	46.583	0.146	0.045	2.07	88	-2.04	99	2.2	-0.1	97	275	86	79
322	46.728	0.145	0.045	2.05	87	-1.66	99	2.3	0.1	97	274	86	80
323	46.873	0.145	0.045	2.07	88	-0.64	99	2.3	0	97	274	85	79
324	47.019	0.146	0.045	2.06	88	-0.74	99	2.2	-0.1	97	273	85	79
325	47.164	0.145	0.045	2.07	88	-0.62	99	2.2	0	97	272	84	79
326	47.309	0.145	0.045	2.06	88	-0.5	99	2.2	0	97	272	84	79
327	47.456	0.147	0.045	2.05	88	-0.76	100	2.2	0	97	272	85	79
328	47.601	0.145	0.045	2.07	88	-1.31	99	2.2	0	97	271	86	79
329	47.748	0.147	0.045	2.06	87	-1.67	100	2.2	0	97	270	86	79

BOX A TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: F2500
Run #: 3

Job #: 18-414
Tracking #: 003
Technician: SJB
Date: 6/27/2018

	Particulate Sampling Data							Fuel Weight (lb)		Temperature Data (°F)			
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Dilution Tunnel dP (in H_2O)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Scale Reading	Weight Change	Dilution Tunnel	Flue	Filter	Ambient
330	47.892	0.144	0.045	2.06	88	-1.44	98	2.1	-0.1	97	269	86	79
331	48.039	0.147	0.045	2.04	88	-1.91	100	2.1	0	96	268	85	79
332	48.183	0.144	0.045	2.09	88	-1.07	98	2.1	0	97	267	84	79
333	48.331	0.148	0.045	2.08	88	-1.44	101	2.1	0	96	266	84	79
334	48.475	0.144	0.045	2.07	88	-0.93	98	2.1	0	96	266	84	79
335	48.623	0.148	0.045	2.06	88	-1.9	101	2.1	0	96	265	84	79
336	48.766	0.143	0.045	2.06	88	-1.41	97	2.2	0.1	96	264	86	79
337	48.915	0.149	0.045	2.06	88	-1.9	101	2.0	-0.2	96	263	86	79
338	49.058	0.143	0.045	2.05	88	-1.88	97	2.0	0	96	263	86	79
339	49.206	0.148	0.045	2.06	88	-1.95	101	2.0	0	96	262	85	79
340	49.349	0.143	0.045	2.05	88	-0.64	97	2.0	0	96	261	84	79
341	49.496	0.147	0.045	2.05	88	-1.97	100	2.0	0	96	261	84	79
342	49.638	0.142	0.045	2.06	88	-1.8	97	2.0	0	96	261	84	79
343	49.785	0.147	0.045	2.07	88	-1.7	100	2.0	0	96	260	84	79
344	49.926	0.141	0.045	2.04	88	-0.72	96	2.0	0	96	260	86	79
345	50.073	0.147	0.045	2.05	88	-1.33	100	1.9	-0.1	96	259	86	79
346	50.214	0.141	0.045	2.05	88	-0.96	96	1.9	0	96	259	85	78
347	50.362	0.148	0.045	2.07	88	-1.17	101	1.9	0	96	258	85	79
348	50.504	0.142	0.045	2.06	88	-1.67	97	1.9	0	96	257	84	79
349	50.651	0.147	0.045	2.07	88	-1.42	100	1.9	0	96	257	84	79
350	50.794	0.143	0.045	2.07	88	-0.59	97	1.9	0	96	256	84	79
351	50.942	0.148	0.045	2.07	88	-1.9	101	1.9	0	95	255	85	79
352	51.085	0.143	0.045	2.07	88	-1.3	97	1.8	-0.1	95	254	86	79
353	51.231	0.146	0.045	2.06	88	-1.64	99	1.9	0.1	95	253	86	79
354	51.374	0.143	0.045	2.07	88	-0.55	97	1.8	-0.1	95	252	85	78
355	51.520	0.146	0.045	2.07	88	-1.48	99	1.9	0.1	95	251	84	79
356	51.664	0.144	0.045	2.06	88	-1.95	98	1.8	-0.1	95	250	84	79
357	51.809	0.145	0.045	2.06	88	-0.8	99	1.8	0	95	249	84	79
358	51.953	0.144	0.045	2.06	88	-1.7	98	1.8	0	95	248	84	79
359	52.097	0.144	0.045	2.04	88	-0.81	98	1.8	0	95	248	86	79
360	52.243	0.146	0.045	2.07	88	-1.87	99	1.8	0	95	247	86	78
361	52.386	0.143	0.045	2.03	88	-1.55	97	1.7	-0.1	95	247	86	79
362	52.532	0.146	0.045	2.06	88	-0.54	99	1.7	0	95	246	85	79

BOX A TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: F2500
Run #: 3

Job #: 18-414
Tracking #: 003
Technician: SJB
Date: 6/27/2018

	Particulate Sampling Data							Fuel Weight (lb)		Temperature Data (°F)			
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Dilution Tunnel dP (in H_2O)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Scale Reading	Weight Change	Dilution Tunnel	Flue	Filter	Ambient
363	52.675	0.143	0.045	2.07	88	-1.99	97	1.7	0	94	245	84	78
364	52.822	0.147	0.045	2.06	88	-1.49	100	1.7	0	94	244	84	78
365	52.964	0.142	0.045	2.06	88	-1.32	97	1.7	0	94	243	84	78
366	53.110	0.146	0.045	2.07	88	-1.38	99	1.7	0	94	242	85	78
367	53.251	0.141	0.045	2.07	88	-0.52	96	1.7	0	94	241	86	78
368	53.399	0.148	0.045	2.07	88	-0.73	101	1.7	0	94	240	86	78
369	53.540	0.141	0.045	2.06	88	-1.98	96	1.7	0	94	239	85	78
370	53.687	0.147	0.045	2.06	88	-1.72	100	1.7	0	94	239	85	79
371	53.828	0.141	0.045	2.07	88	-0.62	96	1.6	-0.1	94	238	84	78
372	53.976	0.148	0.045	2.06	88	-0.62	101	1.6	0	94	237	84	78
373	54.118	0.142	0.045	2.10	88	-0.4	97	1.6	0	94	237	85	79
374	54.265	0.147	0.045	2.06	88	-1.12	100	1.6	0	94	236	86	79
375	54.408	0.143	0.045	2.05	88	-0.39	97	1.6	0	94	236	86	79
376	54.554	0.146	0.045	2.07	88	-0.66	99	1.7	0.1	94	235	86	79
377	54.697	0.143	0.045	2.06	88	-0.59	97	1.6	-0.1	94	234	85	79
378	54.842	0.145	0.045	2.06	88	-1.87	98	1.6	0	93	233	84	79
379	54.986	0.144	0.045	2.06	88	-1.25	98	1.6	0	93	232	84	79
380	55.130	0.144	0.045	2.05	88	-0.63	98	1.6	0	93	231	84	79
381	55.275	0.145	0.045	2.07	88	-0.62	98	1.5	-0.1	93	230	86	79
382	55.420	0.145	0.045	2.06	88	-0.68	98	1.5	0	93	228	86	79
383	55.566	0.146	0.045	2.06	88	-1.8	99	1.5	0	93	228	86	79
384	55.708	0.142	0.045	2.04	88	-1.05	96	1.5	0	93	228	85	79
385	55.855	0.147	0.045	2.05	88	-0.65	100	1.5	0	93	228	84	79
386	55.999	0.144	0.045	2.08	88	-0.99	98	1.5	0	93	228	84	79
387	56.146	0.147	0.045	2.06	88	-1.84	100	1.5	0	93	228	84	78
388	56.289	0.143	0.045	2.05	88	-1.99	97	1.4	-0.1	93	228	85	79
389	56.436	0.147	0.045	2.07	88	-1.94	100	1.4	0	93	228	86	78
390	56.578	0.142	0.045	2.08	88	-0.82	96	1.4	0	93	228	86	78
391	56.726	0.148	0.045	2.04	88	-0.84	100	1.4	0	93	228	85	79
392	56.868	0.142	0.045	2.05	88	-0.62	96	1.4	0	93	228	84	79
393	57.015	0.147	0.045	2.07	88	-0.48	100	1.4	0	93	228	84	79
394	57.157	0.142	0.045	2.07	88	-1.48	96	1.4	0	93	228	84	78
395	57.305	0.148	0.045	2.06	88	-0.69	100	1.4	0	93	228	85	78

BOX A TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: F2500
Run #: 3

Job #: 18-414
Tracking #: 003
Technician: SJB
Date: 6/27/2018

	Particulate Sampling Data							Fuel Weight (lb)		Temperature Data (°F)			
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Dilution Tunnel dP (in H_2O)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Scale Reading	Weight Change	Dilution Tunnel	Flue	Filter	Ambient
396	57.447	0.142	0.045	2.07	88	-0.49	96	1.4	0	93	228	86	79
397	57.595	0.148	0.045	2.07	88	-1.85	100	1.4	0	93	227	86	79
398	57.738	0.143	0.045	2.07	88	-1.95	97	1.3	-0.1	92	227	85	79
399	57.885	0.147	0.045	2.04	88	-1.35	100	1.3	0	92	227	85	78
400	58.028	0.143	0.045	2.08	88	-0.69	97	1.3	0	92	227	84	79
401	58.176	0.148	0.045	2.07	88	-1.56	100	1.3	0	92	226	84	79
402	58.319	0.143	0.045	2.09	88	-2.01	97	1.3	0	92	226	84	79
403	58.467	0.148	0.045	2.07	88	-0.89	100	1.3	0	92	225	86	79
404	58.610	0.143	0.045	2.06	88	-0.58	97	1.3	0	92	225	86	79
405	58.757	0.147	0.045	2.07	88	-0.51	100	1.2	-0.1	92	224	86	78
406	58.900	0.143	0.045	2.05	88	-0.88	97	1.3	0.1	92	223	85	78
407	59.047	0.147	0.045	2.06	88	-1.94	100	1.3	0	92	222	84	78
408	59.191	0.144	0.045	2.05	88	-1.92	98	1.1	-0.2	92	222	84	78
409	59.337	0.146	0.045	2.06	88	-1.18	99	1.2	0.1	92	221	84	79
410	59.482	0.145	0.045	2.07	88	-0.8	98	1.2	0	92	221	86	79
411	59.627	0.145	0.045	2.06	88	-1.11	98	1.2	0	92	221	86	78
412	59.772	0.145	0.045	2.06	88	-1.1	98	1.2	0	92	221	86	78
413	59.917	0.145	0.045	2.05	88	-1.08	98	1.2	0	92	221	85	78
414	60.063	0.146	0.045	2.06	88	-0.47	99	1.2	0	92	221	84	78
415	60.208	0.145	0.045	2.06	88	-1.98	98	1.2	0	92	221	84	78
416	60.355	0.147	0.045	2.08	88	-2.05	100	1.2	0	92	221	84	78
417	60.499	0.144	0.045	2.09	88	-0.78	98	1.1	-0.1	92	221	85	78
418	60.646	0.147	0.045	2.06	88	-1.97	100	1.1	0	92	222	86	78
419	60.790	0.144	0.045	2.06	88	-1.91	98	1.1	0	92	222	86	78
420	60.937	0.147	0.045	2.06	88	-0.86	100	1.0	-0.1	92	223	85	78
421	61.081	0.144	0.045	2.07	88	-0.49	98	1.1	0.1	92	223	85	78
422	61.229	0.148	0.045	2.07	88	-1.04	100	1.1	0	92	223	84	78
423	61.373	0.144	0.045	2.07	88	-2.04	98	1.0	-0.1	92	223	84	78
424	61.521	0.148	0.045	2.09	88	-0.55	100	1.1	0.1	92	223	85	78
425	61.664	0.143	0.045	2.07	88	-1.62	97	1.2	0.1	92	223	86	78
426	61.812	0.148	0.045	2.07	88	-0.71	100	1.0	-0.2	92	222	86	78
427	61.955	0.143	0.045	2.08	88	-0.54	97	1.0	0	92	222	85	78
428	62.103	0.148	0.045	2.08	88	-1.66	100	1.0	0	92	222	85	78

BOX A TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: F2500
Run #: 3

Job #: 18-414
Tracking #: 003
Technician: SJB
Date: 6/27/2018

	Particulate Sampling Data							Fuel Weight (lb)		Temperature Data (°F)			
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Dilution Tunnel dP (in H_2O)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Scale Reading	Weight Change	Dilution Tunnel	Flue	Filter	Ambient
429	62.246	0.143	0.045	2.07	88	-0.56	97	1.0	0	92	222	84	78
430	62.395	0.149	0.045	2.07	88	-1.95	101	1.0	0	92	221	84	78
431	62.538	0.143	0.045	2.06	88	-1.77	97	1.0	0	92	221	85	78
432	62.686	0.148	0.045	2.07	88	-1.52	100	1.0	0	92	220	86	78
433	62.828	0.142	0.045	2.07	88	-0.59	96	1.0	0	92	219	86	78
434	62.977	0.149	0.045	2.07	88	-0.55	101	0.9	-0.1	91	217	86	78
435	63.119	0.142	0.045	2.08	88	-1.88	96	0.9	0	91	215	85	78
436	63.268	0.149	0.045	2.06	88	-0.69	101	0.9	0	91	214	84	78
437	63.410	0.142	0.045	2.07	88	-1.55	96	0.9	0	91	213	84	78
438	63.559	0.149	0.045	2.07	88	-1.3	101	0.9	0	91	214	84	78
439	63.702	0.143	0.045	2.08	88	-0.96	97	0.9	0	91	214	86	78
440	63.851	0.149	0.045	2.04	87	-0.46	101	0.9	0	91	214	87	78
441	63.994	0.143	0.045	2.07	88	-0.68	97	0.9	0	91	214	86	78
442	64.142	0.148	0.045	2.07	88	-1.98	100	0.9	0	91	215	85	78
443	64.285	0.143	0.045	2.07	88	-1.02	97	0.9	0	91	216	85	78
444	64.434	0.149	0.045	2.06	87	-1.64	101	0.8	-0.1	91	216	84	78
445	64.577	0.143	0.045	2.07	88	-0.67	97	0.9	0.1	91	217	84	78
446	64.725	0.148	0.045	2.07	88	-1.59	100	0.8	-0.1	91	217	85	78
447	64.869	0.144	0.045	2.09	87	-0.83	98	0.8	0	91	217	86	78
448	65.017	0.148	0.045	2.07	88	-1.94	100	0.8	0	91	217	86	78
449	65.160	0.143	0.045	2.08	88	-1.88	97	0.8	0	91	217	85	78
450	65.309	0.149	0.045	2.05	88	-1.45	101	0.8	0	91	217	84	78
451	65.453	0.144	0.045	2.07	88	-0.94	98	0.8	0	91	217	84	78
452	65.600	0.147	0.045	2.06	88	-1.87	100	0.8	0	91	217	84	78
453	65.744	0.144	0.045	2.05	87	-1.29	98	0.7	-0.1	91	217	85	78
454	65.891	0.147	0.045	2.07	88	-1.99	100	0.8	0.1	91	217	86	78
455	66.035	0.144	0.045	2.06	87	-1.95	98	0.7	-0.1	91	216	86	78
456	66.182	0.147	0.045	2.06	87	-1.02	100	0.6	-0.1	91	216	85	78
457	66.327	0.145	0.045	2.07	87	-1.98	98	0.7	0.1	91	215	85	78
458	66.474	0.147	0.045	2.07	87	-1.17	100	0.7	0	91	215	84	77
459	66.618	0.144	0.045	2.06	87	-1.58	98	0.7	0	91	215	84	77
460	66.764	0.146	0.045	2.07	87	-1.12	99	0.7	0	91	215	86	77
461	66.910	0.146	0.045	2.07	87	-0.54	99	0.6	-0.1	91	215	86	78

BOX A TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: F2500
Run #: 3

Job #: 18-414
Tracking #: 003
Technician: SJB
Date: 6/27/2018

	Particulate Sampling Data							Fuel Weight (lb)		Temperature Data (°F)			
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Dilution Tunnel dP (in H_2O)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Scale Reading	Weight Change	Dilution Tunnel	Flue	Filter	Ambient
462	67.056	0.146	0.045	2.07	87	-1.91	99	0.7	0.1	91	215	86	77
463	67.201	0.145	0.045	2.08	87	-0.73	98	0.8	0.1	91	215	85	77
464	67.346	0.145	0.045	2.06	87	-1.94	98	0.6	-0.2	91	215	84	77
465	67.492	0.146	0.045	2.06	87	-1.34	99	0.6	0	90	216	84	77
466	67.637	0.145	0.045	2.08	87	-0.75	98	0.6	0	90	217	84	77
467	67.784	0.147	0.045	2.07	87	-0.99	100	0.6	0	91	218	85	77
468	67.929	0.145	0.045	2.08	87	-0.63	98	0.6	0	90	218	87	77
469	68.075	0.146	0.045	2.09	87	-0.64	99	0.6	0	90	219	86	77
470	68.220	0.145	0.045	2.06	87	-1.39	98	0.6	0	91	220	85	77
471	68.367	0.147	0.045	2.08	87	-2.03	100	0.6	0	91	221	85	77
472	68.512	0.145	0.045	2.06	87	-2	98	0.5	-0.1	91	222	84	77
473	68.659	0.147	0.045	2.07	87	-0.69	100	0.5	0	91	223	84	77
474	68.803	0.144	0.045	2.08	87	-1.18	98	0.5	0	91	224	85	77
475	68.951	0.148	0.045	2.10	87	-1.55	100	0.6	0.1	91	224	86	77
476	69.095	0.144	0.045	2.07	87	-1.13	98	0.5	-0.1	91	225	86	77
477	69.243	0.148	0.045	2.07	87	-1.89	100	0.5	0	91	225	86	77
478	69.387	0.144	0.045	2.06	87	-0.69	98	0.5	0	91	226	85	77
479	69.535	0.148	0.045	2.08	87	-0.83	100	0.5	0	91	227	84	77
480	69.678	0.143	0.045	2.07	87	-0.68	97	0.5	0	91	227	84	77
481	69.826	0.148	0.045	2.07	87	-1.9	100	0.5	0	91	227	84	77
482	69.969	0.143	0.045	2.06	87	-0.69	97	0.4	-0.1	91	228	86	76
483	70.117	0.148	0.045	2.06	87	-0.9	100	0.4	0	91	228	86	76
484	70.260	0.143	0.045	2.08	87	-0.55	97	0.5	0.1	91	229	86	76
485	70.409	0.149	0.045	2.06	87	-1.65	101	0.4	-0.1	91	229	85	76
486	70.552	0.143	0.045	2.06	87	-1.67	97	0.4	0	91	230	84	76
487	70.700	0.148	0.045	2.07	87	-1.29	100	0.4	0	91	230	84	76
488	70.843	0.143	0.045	2.05	87	-1.88	97	0.4	0	91	231	84	76
489	70.992	0.149	0.045	2.07	87	-1.91	101	0.3	-0.1	91	231	86	76
490	71.134	0.142	0.045	2.08	87	-0.71	96	0.3	0	91	231	86	76
491	71.282	0.148	0.045	2.06	87	-0.62	100	0.3	0	91	232	86	76
492	71.425	0.143	0.045	2.06	87	-0.92	97	0.3	0	91	232	85	77
493	71.573	0.148	0.045	2.06	87	-1.79	100	0.3	0	91	232	84	76
494	71.716	0.143	0.045	2.06	87	-1.66	97	0.3	0	91	232	84	76

BOX A TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: F2500
Run #: 3

Job #: 18-414
Tracking #: 003
Technician: SJB
Date: 6/27/2018

	Particulate Sampling Data							Fuel Weight (lb)		Temperature Data (°F)			
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Dilution Tunnel dP (in H_2O)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Scale Reading	Weight Change	Dilution Tunnel	Flue	Filter	Ambient
495	71.865	0.149	0.045	2.07	87	-1.95	101	0.3	0	91	233	84	76
496	72.008	0.143	0.045	2.07	87	-1.61	97	0.2	-0.1	91	233	86	76
497	72.156	0.148	0.045	2.08	87	-2.01	100	0.2	0	91	233	86	76
498	72.299	0.143	0.045	2.08	87	-1.33	97	0.2	0	91	234	85	76
499	72.448	0.149	0.045	2.07	87	-1.79	101	0.2	0	91	234	85	76
500	72.590	0.142	0.045	2.07	87	-0.71	96	0.2	0	91	233	84	76
501	72.739	0.149	0.045	2.08	87	-0.81	101	0.2	0	91	234	84	76
502	72.882	0.143	0.045	2.08	87	-0.51	97	0.2	0	91	234	85	76
503	73.030	0.148	0.045	2.09	86	-0.49	101	0.2	0	91	234	86	76
504	73.174	0.144	0.045	2.09	87	-1.55	98	0.1	-0.1	91	234	86	76
505	73.322	0.148	0.045	2.08	86	-1.53	101	0.2	0.1	91	234	85	76
506	73.465	0.143	0.045	2.06	86	-1.85	97	0.0	-0.2	91	235	84	76
Avg/Tot	73.465	0.145	0.045	2.06	85	-1.26	100			103	325	85	77.5

BOX B TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: F2500
Run #: 3

Job #: 18-414
Tracking #: 003
Technician: SJB
Date: 6/27/2018

	Particulate Sampling Data							Flue Gas Data		
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Filter (°F)	Flue Draft (in H_2O)	CO_2 (%)	CO (%)
0	0.004		0.00	74	1		85	0.000	6.44	0.07
1	0.134	0.130	2.05	74	0.63	99	84	-0.060	3.95	0.14
2	0.271	0.137	2.04	74	1.63	104	83	-0.050	7.77	0.11
3	0.411	0.140	2.02	74	0.97	106	83	-0.060	10.91	0.07
4	0.546	0.135	2.00	74	1.76	102	84	-0.070	14.37	0.10
5	0.683	0.137	1.99	74	2.66	104	86	-0.070	15.54	0.11
6	0.820	0.137	2.02	74	1.81	104	86	-0.070	16.54	0.36
7	0.957	0.137	2.02	75	2.42	104	85	-0.060	15.92	1.45
8	1.097	0.140	2.02	75	0.74	106	83	-0.070	14.63	0.58
9	1.231	0.134	2.01	75	1.61	101	83	-0.070	14.84	0.42
10	1.370	0.139	1.98	75	1.81	105	84	-0.070	15.12	0.65
11	1.508	0.138	2.06	75	2.65	104	86	-0.070	14.40	0.48
12	1.645	0.137	2.06	76	1.46	103	86	-0.060	13.99	0.21
13	1.787	0.142	2.06	76	2.18	107	85	-0.060	13.68	0.12
14	1.922	0.135	2.04	76	2.41	101	84	-0.060	13.42	0.14
15	2.064	0.142	2.05	77	2.64	107	83	-0.060	13.53	0.16
16	2.202	0.138	2.04	77	0.91	104	84	-0.060	13.62	0.09
17	2.340	0.138	2.04	77	2.24	103	85	-0.060	13.55	0.05
18	2.479	0.139	2.03	78	1.51	104	86	-0.060	13.57	0.09
19	2.617	0.138	2.05	78	2.76	103	86	-0.060	13.65	0.07
20	2.758	0.141	2.04	78	2.06	106	84	-0.060	13.67	0.13
21	2.893	0.135	2.03	79	1.44	101	83	-0.070	13.47	0.15
22	3.035	0.142	2.05	79	1.81	106	83	-0.060	13.40	0.06
23	3.173	0.138	2.04	79	0.82	103	85	-0.070	13.34	0.10
24	3.310	0.137	2.02	80	1.98	102	86	-0.060	13.53	0.11
25	3.451	0.141	2.04	80	2.59	105	86	-0.070	15.09	0.94
26	3.588	0.137	2.03	80	0.83	102	85	-0.060	15.34	1.14
27	3.728	0.140	2.01	81	2.53	104	84	-0.060	15.40	0.91
28	3.866	0.138	2.01	81	0.82	103	83	-0.070	15.39	0.72
29	4.006	0.140	2.03	81	0.86	104	85	-0.070	15.32	0.66
30	4.143	0.137	2.01	82	1.77	102	86	-0.060	15.30	0.59
31	4.281	0.138	2.02	82	0.91	103	86	-0.070	15.15	0.54

BOX B TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: F2500
Run #: 3

Job #: 18-414
Tracking #: 003
Technician: SJB
Date: 6/27/2018

	Particulate Sampling Data							Flue Gas Data		
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Filter (°F)	Flue Draft (in H_2O)	CO_2 (%)	CO (%)
32	4.422	0.141	2.01	82	0.9	105	85	-0.060	15.03	0.45
33	4.558	0.136	2.00	83	0.82	101	83	-0.060	14.91	0.41
34	4.699	0.141	2.02	83	1.38	105	83	-0.060	14.84	0.31
35	4.837	0.138	2.02	83	2.57	102	84	-0.060	14.70	0.25
36	4.974	0.137	2.00	84	1.38	101	86	-0.070	14.59	0.19
37	5.115	0.141	2.01	84	1.76	104	86	-0.060	14.43	0.14
38	5.252	0.137	2.01	84	1.63	101	85	-0.070	14.34	0.09
39	5.392	0.140	2.00	85	2.81	103	84	-0.060	14.31	0.10
40	5.529	0.137	1.99	85	2.18	101	83	-0.060	14.24	0.10
41	5.670	0.141	2.00	85	1.47	104	84	-0.060	14.24	0.06
42	5.808	0.138	1.99	86	2.87	102	86	-0.060	14.24	0.08
43	5.945	0.137	1.99	86	1.74	101	86	-0.070	14.19	0.12
44	6.087	0.142	1.98	86	1.57	105	85	-0.060	14.22	0.09
45	6.223	0.136	2.00	87	2.64	100	84	-0.060	14.12	0.07
46	6.364	0.141	2.00	87	0.96	104	83	-0.070	14.05	0.06
47	6.502	0.138	2.01	87	2.36	101	84	-0.060	13.91	0.06
48	6.641	0.139	2.00	87	0.77	102	86	-0.060	13.72	0.05
49	6.780	0.139	1.99	87	1.73	102	86	-0.060	13.54	0.05
50	6.918	0.138	1.99	88	0.85	101	85	-0.060	13.45	0.04
51	7.060	0.142	1.99	88	2.81	104	84	-0.060	13.35	0.05
52	7.195	0.135	1.99	88	2.2	99	83	-0.060	13.34	0.04
53	7.337	0.142	2.00	88	0.89	104	84	-0.060	13.29	0.04
54	7.475	0.138	1.99	89	1.61	101	85	-0.060	13.18	0.04
55	7.613	0.138	1.98	89	1.87	101	86	-0.060	13.27	0.04
56	7.754	0.141	1.99	89	2.59	103	85	-0.060	13.09	0.04
57	7.892	0.138	2.00	89	0.88	101	84	-0.060	12.97	0.05
58	8.034	0.142	2.06	90	0.94	104	83	-0.060	12.83	0.04
59	8.172	0.138	2.06	90	1.64	101	84	-0.060	12.67	0.06
60	8.316	0.144	2.06	90	0.97	105	85	-0.060	12.61	0.05
61	8.457	0.141	2.07	90	1.69	103	86	-0.060	12.48	0.04
62	8.599	0.142	2.05	90	2.37	103	86	-0.060	12.49	0.04
63	8.740	0.141	2.05	91	1.66	103	85	-0.050	12.51	0.06

BOX B TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: F2500
Run #: 3

Job #: 18-414
Tracking #: 003
Technician: SJB
Date: 6/27/2018

	Particulate Sampling Data							Flue Gas Data		
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Filter (°F)	Flue Draft (in H_2O)	CO_2 (%)	CO (%)
64	8.880	0.140	2.05	91	1.15	102	83	-0.060	12.59	0.05
65	9.024	0.144	2.06	91	2.77	105	83	-0.060	12.62	0.05
66	9.164	0.140	2.03	91	1.28	102	84	-0.060	12.74	0.04
67	9.308	0.144	2.05	91	1.39	105	86	-0.060	12.65	0.05
68	9.446	0.138	2.05	92	1.61	100	86	-0.060	12.65	0.04
69	9.591	0.145	2.05	92	2.62	105	85	-0.060	12.61	0.05
70	9.731	0.140	2.06	92	0.84	102	84	-0.070	12.69	0.06
71	9.874	0.143	2.04	92	0.89	104	83	-0.060	12.81	0.04
72	10.015	0.141	2.05	92	2.84	102	84	-0.060	12.83	0.04
73	10.156	0.141	2.04	92	2.83	102	85	-0.060	12.97	0.05
74	10.299	0.143	2.05	93	2.56	104	86	-0.060	13.12	0.06
75	10.439	0.140	2.05	93	0.92	101	86	-0.060	13.31	0.05
76	10.584	0.145	2.04	93	2.17	105	85	-0.060	13.51	0.05
77	10.723	0.139	2.04	93	1.34	101	84	-0.060	13.70	0.06
78	10.866	0.143	2.04	93	2.54	104	83	-0.060	13.77	0.05
79	11.006	0.140	2.06	93	2.74	101	84	-0.060	13.88	0.06
80	11.150	0.144	2.05	94	1.59	104	86	-0.060	13.91	0.08
81	11.292	0.142	2.05	93	1.08	103	86	-0.060	13.93	0.07
82	11.433	0.141	2.04	94	2.83	102	86	-0.060	13.87	0.07
83	11.575	0.142	2.04	94	2.07	103	84	-0.060	13.99	0.08
84	11.716	0.141	2.04	94	2.45	102	83	-0.060	14.03	0.11
85	11.859	0.143	2.05	94	2.11	104	83	-0.060	14.09	0.16
86	12.000	0.141	2.06	95	1.71	102	85	-0.060	14.25	0.18
87	12.144	0.144	2.06	94	0.9	104	86	-0.060	14.32	0.22
88	12.283	0.139	2.04	95	2.86	100	86	-0.060	14.42	0.26
89	12.426	0.143	2.04	95	1.01	103	85	-0.060	14.49	0.25
90	12.566	0.140	2.04	95	2.67	101	83	-0.060	14.61	0.28
91	12.710	0.144	2.05	95	1	104	83	-0.060	14.82	0.28
92	12.851	0.141	2.04	95	2.68	102	84	-0.060	14.91	0.38
93	12.991	0.140	2.03	95	1	101	86	-0.060	14.94	0.40
94	13.134	0.143	2.02	95	2.93	104	86	-0.060	14.89	0.47
95	13.274	0.140	2.03	96	2.89	101	85	-0.070	14.80	0.42

BOX B TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: F2500
Run #: 3

Job #: 18-414
Tracking #: 003
Technician: SJB
Date: 6/27/2018

	Particulate Sampling Data							Flue Gas Data		
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Filter (°F)	Flue Draft (in H_2O)	CO_2 (%)	CO (%)
96	13.418	0.144	2.00	96	1.01	104	84	-0.060	14.79	0.31
97	13.557	0.139	2.02	96	2.33	100	83	-0.060	14.71	0.22
98	13.699	0.142	2.01	96	2.88	103	84	-0.060	14.57	0.12
99	13.839	0.140	2.02	96	2.83	101	86	-0.060	14.39	0.06
100	13.983	0.144	2.02	96	2.57	104	86	-0.060	14.02	0.04
101	14.123	0.140	2.01	96	1.06	101	85	-0.060	13.47	0.02
102	14.263	0.140	2.02	96	2.61	101	84	-0.060	13.11	0.03
103	14.405	0.142	2.02	96	2.08	102	83	-0.060	12.93	0.01
104	14.545	0.140	2.01	96	2.91	101	84	-0.060	12.72	0.02
105	14.689	0.144	1.99	96	2.15	104	85	-0.060	12.51	0.02
106	14.828	0.139	2.01	97	2.16	100	86	-0.060	12.37	0.02
107	14.970	0.142	2.01	97	2.5	102	86	-0.060	12.16	0.03
108	15.110	0.140	2.01	96	0.98	101	84	-0.050	12.01	0.03
109	15.253	0.143	2.01	97	2.07	103	83	-0.060	11.93	0.02
110	15.393	0.140	2.01	97	2.48	101	84	-0.060	11.76	0.03
111	15.534	0.141	2.01	97	2.74	101	85	-0.060	11.66	0.03
112	15.676	0.142	2.01	97	1.21	102	86	-0.060	11.62	0.02
113	15.815	0.139	2.01	97	1.01	100	86	-0.060	11.56	0.03
114	15.959	0.144	2.00	97	2.06	103	84	-0.060	11.42	0.03
115	16.098	0.139	1.99	97	1.64	100	83	-0.060	11.35	0.04
116	16.240	0.142	1.99	97	2.91	102	84	-0.060	11.39	0.03
117	16.380	0.140	2.00	97	2.88	100	85	-0.060	11.31	0.03
118	16.523	0.143	2.01	97	2.99	103	86	-0.060	10.67	0.02
119	16.663	0.140	2.00	97	2.92	100	86	-0.050	10.04	0.02
120	16.804	0.141	2.01	98	1.78	101	85	-0.050	9.79	0.02
121	16.946	0.142	2.01	98	1.33	101	84	-0.050	9.54	0.02
122	17.086	0.140	2.01	98	2.72	100	83	-0.050	9.36	0.02
123	17.230	0.144	2.01	98	2.12	103	84	-0.050	9.28	0.01
124	17.368	0.138	2.00	98	1.34	99	86	-0.050	9.08	0.04
125	17.511	0.143	1.99	98	1.78	102	86	-0.050	8.87	0.03
126	17.650	0.139	1.99	98	2.94	99	85	-0.050	8.38	0.03
127	17.794	0.144	2.00	98	2.88	103	84	-0.050	8.24	0.04

BOX B TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: F2500
Run #: 3

Job #: 18-414
Tracking #: 003
Technician: SJB
Date: 6/27/2018

	Particulate Sampling Data							Flue Gas Data		
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Filter (°F)	Flue Draft (in H_2O)	CO_2 (%)	CO (%)
128	17.934	0.140	2.01	98	2.27	100	83	-0.050	8.12	0.05
129	18.075	0.141	2.00	98	2.68	100	84	-0.050	8.02	0.04
130	18.217	0.142	2.00	98	2.93	101	85	-0.040	7.94	0.05
131	18.357	0.140	2.00	98	2.88	100	86	-0.050	7.85	0.06
132	18.501	0.144	2.00	98	2.41	103	86	-0.050	7.80	0.05
133	18.639	0.138	2.01	98	2.87	98	85	-0.050	7.79	0.05
134	18.782	0.143	1.99	98	2.77	102	84	-0.050	7.71	0.04
135	18.922	0.140	2.00	98	2.01	100	83	-0.050	7.69	0.05
136	19.066	0.144	2.00	98	0.97	102	85	-0.050	7.63	0.05
137	19.206	0.140	2.00	98	2.33	100	86	-0.040	7.57	0.06
138	19.347	0.141	2.01	99	2.92	100	86	-0.050	7.70	0.05
139	19.488	0.141	1.99	99	2.84	100	85	-0.050	7.63	0.06
140	19.628	0.140	2.01	99	1.81	99	84	-0.040	7.54	0.06
141	19.773	0.145	1.99	99	1.13	103	83	-0.040	7.46	0.06
142	19.911	0.138	2.00	99	1.07	98	84	-0.050	7.44	0.06
143	20.055	0.144	2.00	99	1.43	102	85	-0.050	7.47	0.06
144	20.194	0.139	2.00	99	2.84	99	86	-0.050	7.46	0.06
145	20.338	0.144	2.00	99	1.94	102	86	-0.050	7.57	0.07
146	20.478	0.140	2.00	99	2.92	99	85	-0.050	7.57	0.07
147	20.620	0.142	1.99	99	1.11	101	84	-0.050	7.55	0.08
148	20.761	0.141	2.00	99	1.21	100	83	-0.050	7.71	0.06
149	20.901	0.140	2.02	99	1.51	99	84	-0.050	7.65	0.07
150	21.046	0.145	2.00	99	2.9	103	86	-0.050	7.65	0.05
151	21.185	0.139	2.00	99	2.92	99	86	-0.040	7.75	0.05
152	21.328	0.143	2.00	99	2.04	101	85	-0.050	7.87	0.05
153	21.467	0.139	2.01	99	2.85	99	84	-0.050	8.09	0.04
154	21.610	0.143	2.01	99	1.43	101	83	-0.050	8.20	0.04
155	21.752	0.142	2.00	99	1.64	101	84	-0.040	8.40	0.04
156	21.893	0.141	1.99	99	2.17	100	85	-0.050	8.42	0.04
157	22.034	0.141	2.02	99	2.01	100	86	-0.040	8.62	0.02
158	22.174	0.140	2.00	99	2.63	99	86	-0.050	8.75	0.04
159	22.318	0.144	2.01	99	1.61	102	85	-0.040	9.08	0.04

BOX B TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: F2500
Run #: 3

Job #: 18-414
Tracking #: 003
Technician: SJB
Date: 6/27/2018

	Particulate Sampling Data							Flue Gas Data		
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Filter (°F)	Flue Draft (in H_2O)	CO_2 (%)	CO (%)
160	22.457	0.139	2.01	99	1.99	99	84	-0.040	9.35	0.05
161	22.600	0.143	2.00	99	1.57	101	83	-0.050	9.63	0.03
162	22.739	0.139	1.99	100	1.98	98	84	-0.050	9.77	0.03
163	22.882	0.143	2.00	100	2.81	101	86	-0.040	9.33	0.04
164	23.023	0.141	1.99	100	1.17	100	86	-0.050	8.51	0.03
165	23.164	0.141	1.99	100	2.84	100	86	-0.040	7.74	0.02
166	23.306	0.142	2.00	100	1.44	100	84	-0.040	7.06	0.02
167	23.445	0.139	2.00	100	1.03	98	83	-0.040	6.63	0.04
168	23.589	0.144	2.00	100	2.1	102	83	-0.040	6.51	0.05
169	23.729	0.140	1.98	100	2.88	99	84	-0.040	6.36	0.06
170	23.873	0.144	2.00	100	1.16	102	86	-0.050	6.26	0.08
171	24.011	0.138	2.00	100	1.27	98	86	-0.040	6.26	0.09
172	24.154	0.143	2.02	100	3.01	101	85	-0.050	6.22	0.08
173	24.295	0.141	2.00	100	1.89	100	84	-0.050	6.01	0.08
174	24.437	0.142	1.99	100	1.99	100	83	-0.050	6.02	0.09
175	24.578	0.141	2.00	100	1.63	100	84	-0.040	6.06	0.07
176	24.718	0.140	2.00	100	2.25	99	85	-0.050	6.03	0.08
177	24.861	0.143	1.99	100	2.34	101	86	-0.040	5.98	0.08
178	25.001	0.140	2.01	100	2.89	99	86	-0.040	6.03	0.07
179	25.145	0.144	2.00	100	2.56	102	85	-0.050	5.99	0.09
180	25.283	0.138	1.99	100	1.1	98	83	-0.050	6.02	0.08
181	25.427	0.144	2.00	100	1.45	102	83	-0.040	5.99	0.09
182	25.566	0.139	2.02	100	2.68	98	85	-0.050	5.93	0.09
183	25.710	0.144	1.98	100	0.99	102	86	-0.040	5.98	0.09
184	25.850	0.140	1.99	100	2.88	99	86	-0.040	5.96	0.09
185	25.990	0.140	1.99	100	2.93	99	85	-0.040	6.04	0.08
186	26.133	0.143	2.00	100	1.39	101	84	-0.050	5.99	0.09
187	26.273	0.140	2.00	101	1.61	99	83	-0.040	5.99	0.08
188	26.417	0.144	1.99	100	2.32	102	84	-0.040	5.96	0.07
189	26.556	0.139	1.99	101	2.05	98	85	-0.040	5.93	0.07
190	26.699	0.143	2.00	101	1.02	101	86	-0.040	5.91	0.08
191	26.839	0.140	1.99	101	2.86	99	86	-0.040	5.92	0.08

BOX B TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: F2500
Run #: 3

Job #: 18-414
Tracking #: 003
Technician: SJB
Date: 6/27/2018

	Particulate Sampling Data							Flue Gas Data		
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Filter (°F)	Flue Draft (in H_2O)	CO_2 (%)	CO (%)
192	26.983	0.144	2.00	101	2.96	101	85	-0.040	5.99	0.08
193	27.123	0.140	2.00	100	1.8	99	84	-0.040	5.98	0.08
194	27.264	0.141	2.00	101	1.56	99	83	-0.040	6.04	0.07
195	27.406	0.142	1.99	101	1.34	100	84	-0.040	5.99	0.07
196	27.546	0.140	2.01	101	0.98	99	85	-0.040	6.04	0.07
197	27.691	0.145	1.99	101	1.21	102	86	-0.040	6.01	0.06
198	27.829	0.138	2.00	101	1.54	97	85	-0.040	6.00	0.07
199	27.972	0.143	1.99	101	0.98	101	84	-0.040	6.01	0.07
200	28.112	0.140	2.01	101	1.08	99	83	-0.040	5.96	0.07
201	28.255	0.143	2.00	101	2.1	101	84	-0.040	5.95	0.09
202	28.396	0.141	1.99	101	1.34	99	85	-0.040	5.95	0.07
203	28.538	0.142	2.00	101	2.92	100	86	-0.040	6.02	0.06
204	28.679	0.141	1.99	101	2.89	99	86	-0.040	6.00	0.07
205	28.820	0.141	2.00	101	2.5	99	84	-0.040	5.98	0.08
206	28.964	0.144	2.00	101	2.75	101	84	-0.040	5.92	0.08
207	29.103	0.139	2.00	101	2.39	98	83	-0.040	6.01	0.07
208	29.247	0.144	2.00	101	2.88	101	85	-0.040	5.94	0.06
209	29.385	0.138	1.99	101	2.87	97	86	-0.040	5.98	0.07
210	29.529	0.144	1.99	101	1.94	101	86	-0.040	6.06	0.07
211	29.670	0.141	2.00	101	2.81	99	85	-0.040	6.02	0.07
212	29.812	0.142	2.01	101	2.79	100	84	-0.050	6.02	0.06
213	29.953	0.141	2.00	101	2.5	99	83	-0.040	6.00	0.07
214	30.093	0.140	2.00	101	1.02	98	84	-0.040	5.96	0.07
215	30.237	0.144	2.00	101	1.04	101	86	-0.040	5.98	0.07
216	30.377	0.140	2.00	101	2.92	98	86	-0.040	5.99	0.06
217	30.521	0.144	1.99	101	2.44	101	85	-0.040	6.07	0.07
218	30.659	0.138	1.99	101	2.37	97	84	-0.040	6.03	0.07
219	30.803	0.144	2.00	101	2.18	101	83	-0.040	6.05	0.08
220	30.943	0.140	2.01	101	0.97	98	83	-0.040	6.08	0.07
221	31.086	0.143	1.98	101	1.02	101	84	-0.040	6.10	0.08
222	31.227	0.141	2.01	101	2.92	99	86	-0.040	6.17	0.07
223	31.367	0.140	1.99	101	2.51	98	86	-0.030	6.11	0.08

BOX B TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: F2500
Run #: 3

Job #: 18-414
Tracking #: 003
Technician: SJB
Date: 6/27/2018

	Particulate Sampling Data							Flue Gas Data		
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Filter (°F)	Flue Draft (in H_2O)	CO_2 (%)	CO (%)
224	31.510	0.143	2.00	101	1.62	101	85	-0.040	6.14	0.08
225	31.650	0.140	2.00	101	1.66	98	84	-0.040	6.16	0.07
226	31.794	0.144	2.00	102	1.08	101	83	-0.040	6.11	0.07
227	31.933	0.139	1.99	102	1.49	98	84	-0.040	6.24	0.08
228	32.076	0.143	1.99	102	2.8	100	85	-0.040	6.27	0.08
229	32.217	0.141	2.00	102	1.06	99	86	-0.040	6.22	0.08
230	32.360	0.143	2.00	102	2.94	100	86	-0.040	6.26	0.07
231	32.501	0.141	1.99	102	2.66	99	85	-0.040	6.20	0.08
232	32.642	0.141	1.99	102	1.43	99	84	-0.040	6.25	0.07
233	32.783	0.141	2.01	102	2.86	99	83	-0.040	6.25	0.07
234	32.924	0.141	1.99	102	2.83	99	83	-0.040	6.20	0.09
235	33.069	0.145	2.00	102	2.28	102	85	-0.040	6.28	0.06
236	33.208	0.139	1.99	102	1.16	98	86	-0.040	6.29	0.07
237	33.352	0.144	2.00	102	2.77	101	86	-0.040	6.31	0.06
238	33.490	0.138	1.99	102	3.04	97	86	-0.040	6.38	0.06
239	33.634	0.144	1.99	102	2.17	101	84	-0.040	6.39	0.05
240	33.775	0.141	2.00	102	1.39	99	84	-0.040	6.43	0.06
241	33.917	0.142	1.99	102	1.41	100	83	-0.040	6.41	0.06
242	34.059	0.142	1.99	102	1.42	100	85	-0.040	6.41	0.06
243	34.199	0.140	1.99	102	2.92	98	86	-0.040	6.42	0.06
244	34.342	0.143	2.00	102	2.44	100	86	-0.040	6.53	0.06
245	34.483	0.141	2.00	102	2.93	99	85	-0.040	6.48	0.05
246	34.627	0.144	1.99	102	1.05	101	84	-0.030	6.49	0.05
247	34.766	0.139	2.00	102	0.97	97	83	-0.040	6.46	0.06
248	34.909	0.143	1.99	102	1.68	100	84	-0.040	6.47	0.06
249	35.049	0.140	2.00	102	1.86	98	85	-0.040	6.54	0.04
250	35.193	0.144	1.98	102	2.61	101	86	-0.040	6.55	0.04
251	35.333	0.140	2.00	102	1.94	98	86	-0.040	6.53	0.05
252	35.474	0.141	1.99	102	2	99	85	-0.040	6.49	0.05
253	35.617	0.143	1.99	102	2.82	100	84	-0.040	6.56	0.05
254	35.757	0.140	2.01	102	1.24	98	83	-0.030	6.57	0.05
255	35.901	0.144	1.97	102	1.2	101	84	-0.040	6.21	0.03

BOX B TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: F2500
Run #: 3

Job #: 18-414
Tracking #: 003
Technician: SJB
Date: 6/27/2018

	Particulate Sampling Data							Flue Gas Data		
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Filter (°F)	Flue Draft (in H_2O)	CO_2 (%)	CO (%)
256	36.041	0.140	2.00	102	1.06	98	86	-0.040	5.99	0.04
257	36.184	0.143	1.98	102	1.31	100	86	-0.040	5.93	0.06
258	36.323	0.139	1.99	103	2.42	97	86	-0.030	5.89	0.05
259	36.467	0.144	2.00	103	2.27	101	84	-0.040	5.83	0.06
260	36.608	0.141	1.99	103	2.58	99	84	-0.040	5.77	0.05
261	36.750	0.142	1.99	103	2.74	99	83	-0.040	5.76	0.05
262	36.891	0.141	2.00	103	2.24	99	84	-0.040	5.75	0.05
263	37.032	0.141	1.99	103	1.55	99	86	-0.040	5.65	0.05
264	37.176	0.144	2.01	103	2.26	101	86	-0.040	5.69	0.06
265	37.315	0.139	1.99	103	1.85	97	85	-0.040	5.71	0.05
266	37.459	0.144	1.99	103	2.33	101	84	-0.030	5.68	0.04
267	37.598	0.139	1.99	103	1.46	97	83	-0.040	5.66	0.05
268	37.742	0.144	2.00	103	2.8	101	83	-0.030	5.62	0.04
269	37.882	0.140	2.00	103	1.38	98	84	-0.030	5.56	0.05
270	38.025	0.143	2.00	103	2.91	100	86	-0.040	5.50	0.05
271	38.166	0.141	1.99	103	2.89	99	86	-0.040	5.49	0.05
272	38.306	0.140	1.99	103	2.91	98	86	-0.040	5.47	0.04
273	38.450	0.144	2.00	103	2.73	101	84	-0.040	5.44	0.04
274	38.590	0.140	2.00	103	1.57	98	84	-0.030	5.39	0.04
275	38.734	0.144	2.00	103	3.01	101	84	-0.030	5.53	0.05
276	38.873	0.139	1.99	103	1.84	97	85	-0.030	5.54	0.05
277	39.017	0.144	1.99	103	2.04	101	86	-0.030	5.48	0.05
278	39.157	0.140	2.00	103	2.86	98	86	-0.030	5.44	0.05
279	39.301	0.144	1.99	103	2.91	101	85	-0.040	5.54	0.05
280	39.441	0.140	1.98	103	2.87	98	84	-0.030	5.47	0.05
281	39.583	0.142	1.99	103	1.17	99	83	-0.030	5.48	0.05
282	39.724	0.141	1.98	103	1.02	99	83	-0.030	5.52	0.05
283	39.865	0.141	1.99	103	1.73	99	85	-0.040	5.61	0.05
284	40.010	0.145	2.00	103	2.79	101	86	-0.030	5.55	0.06
285	40.149	0.139	1.99	103	1.39	97	86	-0.030	5.60	0.05
286	40.293	0.144	1.99	103	2.38	101	86	-0.030	5.62	0.05
287	40.431	0.138	1.99	103	2.86	97	85	-0.040	5.70	0.05

BOX B TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: F2500
Run #: 3

Job #: 18-414
Tracking #: 003
Technician: SJB
Date: 6/27/2018

	Particulate Sampling Data							Flue Gas Data		
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Filter (°F)	Flue Draft (in H_2O)	CO_2 (%)	CO (%)
288	40.575	0.144	1.98	103	1.93	101	84	-0.030	5.64	0.06
289	40.716	0.141	2.00	103	1.24	99	83	-0.030	5.70	0.04
290	40.859	0.143	2.01	103	1.81	100	84	-0.030	5.70	0.04
291	41.000	0.141	2.01	103	2.47	99	86	-0.030	5.82	0.05
292	41.140	0.140	1.99	103	1.78	98	86	-0.030	5.79	0.05
293	41.284	0.144	1.99	103	1.66	101	86	-0.030	5.79	0.05
294	41.424	0.140	2.00	103	2.94	98	85	-0.040	5.84	0.05
295	41.568	0.144	1.99	103	1.23	101	84	-0.030	5.81	0.05
296	41.707	0.139	2.00	103	2.82	97	83	-0.030	5.92	0.04
297	41.850	0.143	1.99	103	1.78	100	84	-0.030	5.92	0.06
298	41.991	0.141	1.97	103	2.81	99	85	-0.030	5.92	0.06
299	42.135	0.144	1.98	103	2.22	101	86	-0.030	5.93	0.06
300	42.275	0.140	2.00	103	1.43	98	86	-0.040	6.00	0.06
301	42.417	0.142	1.99	103	2	99	85	-0.030	6.00	0.06
302	42.559	0.142	2.00	103	0.97	99	84	-0.040	5.97	0.05
303	42.699	0.140	2.00	103	2.17	98	84	-0.040	5.98	0.04
304	42.844	0.145	1.99	103	2.59	101	83	-0.030	5.94	0.05
305	42.983	0.139	1.99	103	1.47	97	85	-0.040	5.93	0.05
306	43.127	0.144	2.00	103	2.98	101	86	-0.030	5.86	0.06
307	43.266	0.139	1.99	103	2.02	97	86	-0.040	5.55	0.06
308	43.409	0.143	1.98	103	2.54	100	85	-0.030	5.52	0.04
309	43.551	0.142	2.00	103	2.78	99	84	-0.040	5.54	0.05
310	43.693	0.142	1.99	103	1.58	99	84	-0.030	5.49	0.05
311	43.835	0.142	1.99	103	1.37	99	83	-0.030	5.50	0.04
312	43.974	0.139	1.98	103	2.9	97	84	-0.030	5.46	0.04
313	44.118	0.144	1.98	103	2.92	101	86	-0.030	5.47	0.03
314	44.259	0.141	1.98	103	1.53	99	86	-0.030	5.39	0.05
315	44.402	0.143	1.99	103	1.31	100	86	-0.030	5.42	0.04
316	44.542	0.140	2.00	103	2.79	98	85	-0.030	5.39	0.04
317	44.685	0.143	1.99	103	2.66	100	84	-0.030	5.42	0.04
318	44.825	0.140	1.99	103	2.9	98	83	-0.030	5.42	0.03
319	44.969	0.144	1.99	103	1.56	101	84	-0.030	5.32	0.04

BOX B TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: F2500
Run #: 3

Job #: 18-414
Tracking #: 003
Technician: SJB
Date: 6/27/2018

	Particulate Sampling Data							Flue Gas Data		
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Filter (°F)	Flue Draft (in H_2O)	CO_2 (%)	CO (%)
320	45.110	0.141	1.99	103	2.85	99	85	-0.030	5.18	0.04
321	45.251	0.141	2.01	103	1.75	99	86	-0.030	5.21	0.04
322	45.393	0.142	1.99	103	0.87	99	86	-0.030	5.14	0.05
323	45.533	0.140	2.00	103	2.47	98	85	-0.030	5.08	0.04
324	45.678	0.145	2.00	104	2.06	101	84	-0.030	5.15	0.04
325	45.817	0.139	1.99	104	1.89	97	84	-0.030	4.98	0.04
326	45.961	0.144	2.00	104	1.38	100	83	-0.030	4.96	0.04
327	46.100	0.139	1.99	104	0.98	97	85	-0.030	5.02	0.04
328	46.244	0.144	2.01	104	1.21	100	86	-0.030	4.96	0.04
329	46.385	0.141	2.00	104	2.42	98	86	-0.030	4.85	0.04
330	46.527	0.142	1.99	104	2.33	99	85	-0.040	4.92	0.05
331	46.669	0.142	2.01	104	2.42	99	84	-0.030	4.87	0.04
332	46.809	0.140	2.00	104	1.23	98	84	-0.030	4.86	0.04
333	46.952	0.143	1.99	104	2.47	100	83	-0.030	4.88	0.03
334	47.093	0.141	2.00	104	0.96	98	84	-0.030	4.86	0.03
335	47.237	0.144	1.99	104	2.53	100	86	-0.030	4.86	0.05
336	47.376	0.139	2.00	104	1.03	97	86	-0.030	4.85	0.04
337	47.520	0.144	1.99	104	1.37	100	86	-0.030	4.82	0.04
338	47.660	0.140	1.98	104	2.35	98	85	-0.030	4.86	0.04
339	47.804	0.144	1.99	104	1.13	100	84	-0.030	4.79	0.04
340	47.945	0.141	1.99	104	2.86	98	83	-0.030	4.87	0.04
341	48.086	0.141	2.00	104	1.18	98	84	-0.030	4.84	0.05
342	48.228	0.142	1.99	104	1.02	99	86	-0.030	4.84	0.03
343	48.368	0.140	1.99	104	0.91	98	86	-0.030	4.82	0.04
344	48.513	0.145	1.99	104	1.1	101	86	-0.030	4.57	0.04
345	48.652	0.139	1.99	104	2.53	97	85	-0.030	4.47	0.04
346	48.797	0.145	1.99	104	1.44	101	84	-0.020	4.45	0.04
347	48.936	0.139	1.99	104	1.15	97	83	-0.030	4.40	0.04
348	49.080	0.144	1.98	104	1.3	100	84	-0.030	4.41	0.03
349	49.221	0.141	2.00	104	2.71	98	85	-0.030	4.40	0.04
350	49.363	0.142	1.99	104	2.81	99	86	-0.030	4.35	0.05
351	49.505	0.142	1.99	104	1.1	99	86	-0.030	4.38	0.04

BOX B TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: F2500
Run #: 3

Job #: 18-414
Tracking #: 003
Technician: SJB
Date: 6/27/2018

	Particulate Sampling Data							Flue Gas Data		
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Filter (°F)	Flue Draft (in H_2O)	CO_2 (%)	CO (%)
352	49.645	0.140	2.00	104	1.15	97	85	-0.030	4.31	0.05
353	49.789	0.144	1.99	104	2.93	100	84	-0.030	4.36	0.04
354	49.929	0.140	2.00	104	0.99	97	83	-0.030	4.28	0.03
355	50.074	0.145	1.99	104	1.7	101	83	-0.030	4.20	0.05
356	50.213	0.139	1.99	104	2.39	97	84	-0.030	4.20	0.05
357	50.357	0.144	1.99	104	1.04	100	86	-0.030	4.20	0.04
358	50.497	0.140	1.99	104	2.31	97	86	-0.030	4.25	0.04
359	50.641	0.144	2.01	104	2.91	100	86	-0.030	4.18	0.04
360	50.782	0.141	1.99	104	1.02	98	85	-0.030	4.20	0.05
361	50.924	0.142	1.99	104	2.94	99	84	-0.030	4.11	0.05
362	51.065	0.141	1.99	104	0.96	98	83	-0.030	4.11	0.05
363	51.206	0.141	2.00	104	2.61	98	84	-0.020	4.10	0.05
364	51.350	0.144	2.00	104	0.96	100	85	-0.030	4.10	0.05
365	51.491	0.141	1.98	104	2.09	98	86	-0.030	4.05	0.06
366	51.635	0.144	1.99	104	2.59	100	86	-0.030	4.01	0.07
367	51.774	0.139	1.99	104	2.09	97	85	-0.020	4.04	0.05
368	51.918	0.144	1.99	104	1.32	100	84	-0.030	4.03	0.06
369	52.058	0.140	1.99	104	2.8	97	83	-0.030	4.03	0.07
370	52.202	0.144	1.99	104	2.79	100	83	-0.020	4.05	0.06
371	52.343	0.141	1.99	104	2.81	98	85	-0.030	4.04	0.06
372	52.484	0.141	1.99	104	2.16	98	86	-0.030	3.97	0.07
373	52.627	0.143	2.00	104	0.97	99	86	-0.030	4.03	0.06
374	52.767	0.140	1.98	104	1.43	97	85	-0.030	4.01	0.07
375	52.912	0.145	2.00	104	1.64	101	84	-0.030	3.95	0.08
376	53.051	0.139	1.99	104	0.99	97	84	-0.030	3.94	0.08
377	53.195	0.144	2.00	104	2.85	100	83	-0.020	3.95	0.10
378	53.334	0.139	1.99	104	2.39	97	84	-0.030	3.95	0.10
379	53.479	0.145	1.99	104	0.96	101	86	-0.030	3.95	0.11
380	53.620	0.141	1.99	104	1.98	98	86	-0.020	3.93	0.12
381	53.762	0.142	1.99	104	1.1	99	86	-0.020	3.91	0.13
382	53.904	0.142	1.99	104	2.45	99	84	-0.020	3.93	0.12
383	54.044	0.140	2.00	104	1.65	97	84	-0.020	3.95	0.11

BOX B TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: F2500
Run #: 3

Job #: 18-414
Tracking #: 003
Technician: SJB
Date: 6/27/2018

	Particulate Sampling Data							Flue Gas Data		
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Filter (°F)	Flue Draft (in H_2O)	CO_2 (%)	CO (%)
384	54.188	0.144	2.00	104	1.94	100	83	-0.020	3.97	0.11
385	54.328	0.140	1.99	104	2.71	97	84	-0.020	3.99	0.10
386	54.473	0.145	2.00	104	2.91	101	86	-0.030	3.97	0.10
387	54.613	0.140	1.99	104	2.86	97	86	-0.020	3.98	0.08
388	54.756	0.143	1.98	104	2.91	99	86	-0.020	4.02	0.08
389	54.896	0.140	1.99	104	1.21	97	85	-0.020	4.05	0.07
390	55.040	0.144	2.00	104	2.93	100	84	-0.030	4.01	0.08
391	55.181	0.141	1.98	104	1.82	98	83	-0.030	4.01	0.08
392	55.323	0.142	2.00	104	1.18	99	84	-0.030	3.98	0.08
393	55.465	0.142	1.99	104	2.84	99	85	-0.020	4.01	0.08
394	55.606	0.141	2.01	104	1.06	98	86	-0.020	4.07	0.07
395	55.749	0.143	2.00	104	2.08	99	86	-0.020	4.02	0.08
396	55.890	0.141	2.00	104	2.85	98	85	-0.030	4.05	0.08
397	56.034	0.144	1.99	104	1.52	100	84	-0.020	4.04	0.08
398	56.174	0.140	2.00	104	2.65	97	83	-0.030	4.05	0.08
399	56.317	0.143	2.00	104	2.39	99	84	-0.020	4.04	0.08
400	56.457	0.140	1.99	104	1.72	97	85	-0.020	4.04	0.09
401	56.601	0.144	1.99	104	1.35	100	86	-0.020	3.97	0.10
402	56.742	0.141	1.99	104	1.28	98	86	-0.030	3.96	0.11
403	56.884	0.142	2.00	104	2.61	99	85	-0.020	4.01	0.13
404	57.026	0.142	1.99	104	1.01	99	84	-0.020	3.94	0.15
405	57.167	0.141	1.98	104	1	98	83	-0.030	3.99	0.15
406	57.312	0.145	2.00	104	1.05	101	83	-0.020	4.01	0.16
407	57.451	0.139	1.99	104	1.22	97	84	-0.020	3.98	0.16
408	57.595	0.144	1.99	104	1.2	100	86	-0.030	3.97	0.16
409	57.734	0.139	1.99	104	1.28	97	86	-0.020	3.95	0.18
410	57.879	0.145	2.00	104	2.41	101	86	-0.020	3.99	0.16
411	58.019	0.140	2.01	104	1.77	97	84	-0.020	4.04	0.15
412	58.162	0.143	1.98	104	2.94	99	84	-0.020	3.96	0.16
413	58.304	0.142	1.99	104	1.92	99	83	-0.030	4.02	0.14
414	58.444	0.140	1.99	104	2.31	97	84	-0.020	4.00	0.13
415	58.588	0.144	2.00	104	1	100	86	-0.020	4.02	0.13

BOX B TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: F2500
Run #: 3

Job #: 18-414
Tracking #: 003
Technician: SJB
Date: 6/27/2018

	Particulate Sampling Data							Flue Gas Data		
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Filter (°F)	Flue Draft (in H_2O)	CO_2 (%)	CO (%)
416	58.728	0.140	2.01	104	2.37	97	86	-0.020	4.04	0.12
417	58.873	0.145	1.98	104	1.05	101	86	-0.020	3.98	0.13
418	59.012	0.139	2.00	104	1.22	97	85	-0.020	4.07	0.12
419	59.156	0.144	2.00	104	1.42	100	84	-0.020	4.04	0.12
420	59.296	0.140	1.99	104	1.21	97	83	-0.020	4.03	0.12
421	59.440	0.144	2.00	104	2.3	100	84	-0.030	4.02	0.11
422	59.582	0.142	2.00	104	2.47	99	85	-0.020	4.02	0.12
423	59.724	0.142	2.01	104	1.87	99	86	-0.020	4.00	0.11
424	59.866	0.142	2.00	104	1.02	99	86	-0.030	4.02	0.12
425	60.006	0.140	2.00	104	2.92	97	85	-0.020	3.98	0.12
426	60.150	0.144	1.99	104	2.44	100	84	-0.030	4.02	0.12
427	60.291	0.141	1.99	104	2.16	98	83	-0.020	3.99	0.13
428	60.434	0.143	1.99	104	2.5	99	84	-0.030	4.02	0.13
429	60.574	0.140	2.00	104	2.03	97	85	-0.020	3.95	0.14
430	60.717	0.143	2.00	104	0.96	99	86	-0.020	3.92	0.15
431	60.858	0.141	2.00	104	1.16	98	86	-0.020	3.94	0.16
432	61.002	0.144	2.00	104	2.05	100	85	-0.020	3.89	0.19
433	61.143	0.141	2.00	104	2.73	98	84	-0.020	3.88	0.19
434	61.285	0.142	1.98	104	2.21	99	83	-0.020	3.82	0.21
435	61.427	0.142	1.99	104	2.56	99	83	-0.020	3.78	0.23
436	61.568	0.141	2.00	104	1.47	98	85	-0.020	3.82	0.22
437	61.711	0.143	2.01	104	1.39	99	86	-0.020	3.82	0.20
438	61.852	0.141	1.98	104	2.91	98	86	-0.020	3.74	0.21
439	61.996	0.144	1.99	104	2.06	100	85	-0.020	3.82	0.19
440	62.135	0.139	2.00	104	0.99	96	84	-0.020	3.82	0.20
441	62.279	0.144	1.99	104	2.05	100	84	-0.020	3.83	0.18
442	62.420	0.141	2.00	104	1.43	98	83	-0.020	3.86	0.17
443	62.564	0.144	2.00	104	2.89	100	84	-0.020	3.85	0.16
444	62.705	0.141	1.99	104	2.26	98	86	-0.020	3.83	0.17
445	62.846	0.141	2.00	104	2.87	98	86	-0.020	3.89	0.15
446	62.988	0.142	2.00	104	1.2	99	86	-0.020	3.84	0.15
447	63.129	0.141	1.99	104	1.59	98	84	-0.020	3.84	0.16

BOX B TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: F2500
Run #: 3

Job #: 18-414
Tracking #: 003
Technician: SJB
Date: 6/27/2018

	Particulate Sampling Data							Flue Gas Data		
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Filter (°F)	Flue Draft (in H_2O)	CO_2 (%)	CO (%)
448	63.274	0.145	1.99	104	2.03	101	84	-0.020	3.86	0.14
449	63.413	0.139	2.00	104	1.15	96	83	-0.020	3.88	0.14
450	63.557	0.144	2.00	104	2.73	100	84	-0.030	3.86	0.14
451	63.696	0.139	1.99	104	2.19	96	86	-0.020	3.89	0.14
452	63.841	0.145	2.00	104	2.71	101	86	-0.020	3.86	0.14
453	63.982	0.141	1.99	104	2.83	98	86	-0.020	3.83	0.16
454	64.124	0.142	1.99	104	1.24	99	85	-0.030	3.82	0.17
455	64.266	0.142	2.00	104	1.05	99	84	-0.020	3.84	0.17
456	64.406	0.140	2.00	104	1.73	97	83	-0.020	3.85	0.18
457	64.550	0.144	2.00	104	2.57	100	84	-0.020	3.90	0.17
458	64.690	0.140	2.00	104	2.41	97	85	-0.030	3.90	0.17
459	64.835	0.145	1.99	104	1	101	86	-0.020	3.85	0.17
460	64.974	0.139	2.00	104	1.06	96	86	-0.020	3.89	0.14
461	65.118	0.144	1.99	104	2.18	100	85	-0.020	3.89	0.14
462	65.258	0.140	1.98	104	1.17	97	84	-0.020	3.89	0.14
463	65.402	0.144	2.01	104	2.3	100	83	-0.020	3.97	0.13
464	65.544	0.142	1.99	103	2.75	99	84	-0.020	4.03	0.13
465	65.686	0.142	2.00	103	1.05	99	85	-0.030	3.99	0.13
466	65.828	0.142	2.01	103	2.84	99	86	-0.030	4.03	0.12
467	65.968	0.140	2.00	103	1.05	97	86	-0.030	4.10	0.11
468	66.112	0.144	2.00	103	1.32	100	85	-0.030	4.07	0.11
469	66.253	0.141	2.01	103	1.28	98	84	-0.020	4.06	0.10
470	66.397	0.144	2.00	103	1.02	100	83	-0.020	4.06	0.10
471	66.536	0.139	2.00	103	1.79	97	84	-0.030	4.11	0.08
472	66.680	0.144	2.00	103	1.36	100	86	-0.030	4.14	0.08
473	66.820	0.140	2.01	103	1.19	97	86	-0.020	4.18	0.07
474	66.964	0.144	2.01	103	2.22	100	85	-0.030	4.19	0.07
475	67.105	0.141	2.00	103	2.17	98	84	-0.020	4.19	0.07
476	67.247	0.142	2.00	103	1.25	99	83	-0.030	4.18	0.07
477	67.389	0.142	2.00	103	1.33	99	84	-0.030	4.18	0.06
478	67.530	0.141	2.01	103	1.92	98	85	-0.030	4.21	0.06
479	67.674	0.144	2.01	103	1.35	100	86	-0.030	4.20	0.07

BOX B TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: F2500
Run #: 3

Job #: 18-414
Tracking #: 003
Technician: SJB
Date: 6/27/2018

	Particulate Sampling Data							Flue Gas Data		
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Filter (°F)	Flue Draft (in H_2O)	CO_2 (%)	CO (%)
480	67.814	0.140	1.97	103	2.44	97	86	-0.030	4.21	0.07
481	67.959	0.145	2.00	103	1.99	101	85	-0.020	4.20	0.06
482	68.097	0.138	1.98	103	1.73	96	84	-0.020	4.26	0.05
483	68.242	0.145	2.00	103	1.38	101	83	-0.020	4.20	0.06
484	68.382	0.140	2.01	103	1.17	97	84	-0.030	4.14	0.06
485	68.526	0.144	2.00	103	1.41	100	85	-0.020	4.26	0.04
486	68.667	0.141	2.01	103	1.98	98	86	-0.030	4.27	0.05
487	68.809	0.142	2.00	103	1.39	99	86	-0.020	4.29	0.04
488	68.951	0.142	2.00	103	2.2	99	85	-0.030	4.28	0.04
489	69.091	0.140	2.00	103	2.84	97	83	-0.020	4.21	0.05
490	69.236	0.145	1.99	103	2.83	101	83	-0.030	4.28	0.04
491	69.376	0.140	2.00	103	2.07	97	85	-0.030	4.23	0.05
492	69.520	0.144	2.00	103	1.17	100	86	-0.020	4.24	0.04
493	69.659	0.139	2.00	103	1.28	97	86	-0.020	4.24	0.05
494	69.803	0.144	2.00	103	2.77	100	85	-0.030	4.22	0.05
495	69.945	0.142	2.01	103	1.83	99	84	-0.030	4.24	0.05
496	70.087	0.142	1.99	103	2.75	99	83	-0.030	4.21	0.05
497	70.229	0.142	2.00	103	1.49	99	84	-0.030	4.30	0.04
498	70.369	0.140	1.98	103	1.46	97	86	-0.030	4.28	0.04
499	70.513	0.144	2.00	103	1.17	100	86	-0.030	4.27	0.04
500	70.654	0.141	2.00	103	1.54	98	85	-0.030	4.30	0.04
501	70.798	0.144	1.98	103	1.68	100	84	-0.030	4.30	0.04
502	70.938	0.140	2.01	103	2.07	97	83	-0.030	4.33	0.03
503	71.082	0.144	2.00	103	2.94	100	84	-0.030	4.31	0.05
504	71.221	0.139	1.99	103	0.97	97	86	-0.020	4.31	0.04
505	71.365	0.144	2.01	103	2.87	100	86	-0.030	4.34	0.04
506	71.507	0.142	2.01	103	2.03	99	85	-0.030	4.32	0.04
Avg/Tot	71.507	0.141	2.00	99	1.95	100			7.27	0.10

WOODSTOVE SURFACE TEMPERATURE DATA

Client: FPI
Model: F2500
Run #: 3

Job #: 18-414
Tracking #: 003
Technician: SJB
Date: 6/27/2018

	Temperature Data (°F)						
Elapsed Time (min)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
0	486	469	215	531	364	413.0	710
1	484	468	236	526	364	415.6	648
2	482	466	253	518	365	416.8	715
3	479	463	265	518	365	418.0	791
4	474	460	273	531	365	420.6	873
5	469	455	281	553	365	424.6	943
6	463	450	285	574	365	427.4	1008
7	457	444	292	595	365	430.6	1006
8	452	440	295	610	365	432.4	970
9	447	435	298	624	365	433.8	959
10	443	430	297	637	364	434.2	960
11	440	425	300	647	364	435.2	940
12	437	421	300	655	363	435.2	915
13	435	417	300	661	363	435.2	899
14	432	413	300	667	362	434.8	893
15	430	409	299	670	361	433.8	895
16	428	404	300	673	361	433.2	892
17	425	402	298	677	360	432.4	882
18	424	397	296	678	359	430.8	879
19	422	394	295	679	358	429.6	885
20	420	391	293	680	357	428.2	893
21	419	387	202	669	357	406.8	890
22	418	384	185	665	355	401.4	883
23	417	382	173	661	354	397.4	878
24	416	380	164	657	353	394.0	880
25	415	379	157	655	352	391.6	925
26	415	377	153	656	351	390.4	940
27	414	376	150	658	349	389.4	951
28	413	374	146	657	347	387.4	961
29	413	375	145	658	346	387.4	971
30	413	373	143	659	345	386.6	975
31	414	373	143	657	343	386.0	976
32	414	373	142	657	342	385.6	972
33	414	372	141	657	340	384.8	965
34	415	374	141	656	338	384.8	957
35	415	374	141	653	337	384.0	951
36	415	373	140	651	335	382.8	942
37	415	373	140	650	334	382.4	934
38	415	373	140	647	332	381.4	928
39	415	373	140	647	331	381.2	926
40	415	373	141	645	329	380.6	922
41	415	373	139	644	327	379.6	919
42	415	373	139	642	326	379.0	919
43	415	373	138	641	324	378.2	919
44	415	373	139	641	322	378.0	914
45	415	373	139	639	321	377.4	907
46	415	373	139	639	319	377.0	902
47	415	373	138	639	318	376.6	895

WOODSTOVE SURFACE TEMPERATURE DATA

Client: FPI
Model: F2500
Run #: 3

Job #: 18-414
Tracking #: 003
Technician: SJB
Date: 6/27/2018

	Temperature Data (°F)						
Elapsed Time (min)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
48	415	372	138	636	316	375.4	884
49	415	372	139	635	315	375.2	876
50	415	372	139	632	313	374.2	868
51	415	372	139	630	312	373.6	863
52	415	372	138	627	311	372.6	859
53	415	373	139	622	309	371.6	859
54	415	372	139	619	308	370.6	861
55	415	371	138	617	306	369.4	863
56	414	372	138	613	305	368.4	863
57	415	371	138	609	304	367.4	856
58	415	371	139	607	302	366.8	848
59	415	371	139	604	301	366.0	848
60	415	371	138	601	300	365.0	842
61	415	372	139	598	299	364.6	840
62	415	372	138	596	297	363.6	840
63	415	370	139	593	296	362.6	839
64	415	370	139	590	295	361.8	838
65	415	371	139	589	294	361.6	839
66	415	370	139	587	293	360.8	839
67	415	370	139	585	292	360.2	842
68	414	370	139	583	291	359.4	843
69	415	370	139	580	290	358.8	843
70	414	370	140	578	289	358.2	842
71	414	370	139	577	288	357.6	847
72	415	371	140	576	286	357.6	845
73	415	370	140	577	286	357.6	846
74	415	370	141	577	285	357.6	855
75	415	370	141	579	284	357.8	864
76	416	370	140	580	283	357.8	872
77	416	371	141	581	282	358.2	877
78	417	371	142	583	281	358.8	882
79	417	371	141	584	280	358.6	889
80	418	373	142	586	280	359.8	895
81	419	372	143	587	279	360.0	894
82	420	372	144	588	278	360.4	889
83	420	373	143	592	277	361.0	888
84	422	373	144	593	277	361.8	894
85	423	374	145	595	276	362.6	902
86	424	374	145	597	275	363.0	913
87	424	374	144	598	275	363.0	923
88	426	375	145	604	274	364.8	932
89	427	377	145	604	273	365.2	936
90	428	377	145	608	272	366.0	946
91	429	377	145	612	272	367.0	957
92	430	378	145	615	272	368.0	963
93	431	379	146	617	271	368.8	966
94	432	379	146	622	271	370.0	965
95	434	381	147	623	270	371.0	964

WOODSTOVE SURFACE TEMPERATURE DATA

Client: FPI
Model: F2500
Run #: 3

Job #: 18-414
Tracking #: 003
Technician: SJB
Date: 6/27/2018

	Temperature Data (°F)						
Elapsed Time (min)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
96	435	382	147	626	270	372.0	962
97	436	383	148	628	270	373.0	955
98	438	384	149	629	269	373.8	942
99	439	385	148	631	269	374.4	925
100	440	385	150	632	269	375.2	907
101	441	387	149	630	268	375.0	886
102	442	389	149	628	268	375.2	873
103	443	388	150	625	268	374.8	863
104	443	391	150	621	267	374.4	856
105	445	391	150	616	267	373.8	849
106	445	391	151	612	268	373.4	843
107	446	391	152	608	267	372.8	838
108	447	392	153	603	267	372.4	833
109	447	392	152	597	267	371.0	830
110	447	391	152	594	267	370.2	827
111	448	392	153	590	267	370.0	826
112	448	392	153	584	267	368.8	823
113	449	392	153	582	267	368.6	821
114	449	391	154	578	267	367.8	818
115	450	392	154	574	267	367.4	817
116	450	392	154	570	267	366.6	815
117	450	391	154	566	267	365.6	811
118	450	392	154	561	268	365.0	792
119	450	392	155	556	268	364.2	769
120	450	393	155	548	268	362.8	754
121	450	391	155	543	269	361.6	745
122	449	392	155	538	269	360.6	738
123	449	391	155	531	269	359.0	733
124	448	390	156	523	269	357.2	729
125	447	391	156	516	269	355.8	726
126	446	389	155	509	270	353.8	720
127	444	388	156	501	270	351.8	714
128	443	387	155	493	270	349.6	710
129	441	387	154	486	270	347.6	707
130	440	386	154	479	270	345.8	703
131	438	383	153	472	271	343.4	701
132	436	383	153	464	270	341.2	702
133	435	382	152	459	271	339.8	702
134	434	381	151	453	271	338.0	695
135	431	379	151	448	271	336.0	690
136	429	377	150	442	271	333.8	691
137	428	376	149	436	271	332.0	690
138	426	375	148	432	272	330.6	688
139	424	373	149	426	272	328.8	688
140	422	371	147	421	272	326.6	690
141	420	369	146	417	272	324.8	710
142	418	369	146	413	272	323.6	723
143	416	367	145	408	272	321.6	721

WOODSTOVE SURFACE TEMPERATURE DATA

Client: FPI
Model: F2500
Run #: 3

Job #: 18-414
Tracking #: 003
Technician: SJB
Date: 6/27/2018

	Temperature Data (°F)						
Elapsed Time (min)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
144	413	365	145	403	272	319.6	733
145	411	364	144	398	271	317.6	758
146	409	362	144	394	271	316.0	763
147	407	361	142	391	271	314.4	761
148	406	358	142	388	271	313.0	757
149	404	357	142	385	271	311.8	740
150	403	355	142	382	271	310.6	714
151	402	354	141	380	271	309.6	688
152	401	354	141	378	271	309.0	672
153	400	352	141	376	271	308.0	662
154	400	352	140	376	270	307.6	657
155	399	350	141	376	271	307.4	652
156	400	351	141	376	271	307.8	648
157	399	349	141	376	270	307.0	644
158	400	351	142	376	270	307.8	645
159	400	351	142	376	270	307.8	653
160	400	351	142	377	270	308.0	665
161	400	353	142	378	271	308.8	677
162	401	355	143	382	271	310.4	688
163	401	354	144	385	271	311.0	690
164	401	357	144	386	271	311.8	678
165	400	358	144	386	271	311.8	657
166	399	359	144	385	271	311.6	640
167	398	360	145	382	271	311.2	639
168	397	361	144	380	271	310.6	642
169	395	361	144	376	271	309.4	655
170	394	359	143	372	271	307.8	701
171	391	359	142	367	271	306.0	733
172	389	358	142	363	271	304.6	742
173	387	357	142	358	271	303.0	739
174	386	356	140	354	271	301.4	732
175	384	352	139	350	271	299.2	724
176	382	350	139	346	271	297.6	717
177	380	349	138	342	272	296.2	711
178	378	346	138	339	272	294.6	707
179	377	346	137	336	272	293.6	705
180	375	343	136	332	272	291.6	708
181	373	342	135	329	272	290.2	704
182	372	339	135	326	272	288.8	698
183	371	337	134	324	272	287.6	691
184	370	337	134	321	272	286.8	685
185	369	335	134	318	273	285.8	680
186	368	334	133	316	273	284.8	677
187	367	332	132	314	273	283.6	675
188	366	331	132	311	273	282.6	669
189	365	329	132	309	273	281.6	661
190	364	327	132	307	274	280.8	655
191	363	328	131	305	274	280.2	648

WOODSTOVE SURFACE TEMPERATURE DATA

Client: FPI
Model: F2500
Run #: 3

Job #: 18-414
Tracking #: 003
Technician: SJB
Date: 6/27/2018

	Temperature Data (°F)						
Elapsed Time (min)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
192	362	327	131	303	274	279.4	642
193	362	326	131	302	274	279.0	637
194	362	325	130	300	275	278.4	631
195	361	323	130	298	275	277.4	625
196	360	323	130	296	275	276.8	620
197	359	323	130	295	275	276.4	615
198	359	323	130	294	276	276.4	613
199	359	321	130	292	276	275.6	612
200	358	320	130	291	276	275.0	612
201	357	320	129	291	276	274.6	612
202	357	320	129	289	277	274.4	611
203	356	319	129	288	277	273.8	610
204	356	319	129	286	277	273.4	609
205	355	317	129	285	278	272.8	608
206	355	317	129	284	278	272.6	609
207	355	316	129	283	278	272.2	609
208	354	318	129	282	279	272.4	605
209	354	317	128	281	278	271.6	602
210	353	317	129	280	279	271.6	599
211	353	317	130	280	279	271.8	598
212	352	315	129	279	279	270.8	599
213	353	316	129	278	280	271.2	598
214	352	316	129	278	280	271.0	597
215	352	315	130	277	281	271.0	596
216	351	316	130	276	281	270.8	595
217	351	316	129	276	281	270.6	599
218	351	316	130	275	281	270.6	600
219	351	314	130	275	282	270.4	600
220	351	315	130	275	282	270.6	600
221	350	315	130	275	282	270.4	602
222	351	315	130	275	282	270.6	603
223	351	315	130	275	283	270.8	604
224	350	315	130	274	283	270.4	604
225	350	315	130	274	284	270.6	605
226	350	315	130	274	284	270.6	605
227	350	316	131	274	284	271.0	610
228	350	315	130	274	284	270.6	615
229	350	315	131	275	285	271.2	616
230	350	314	131	275	285	271.0	614
231	350	315	130	274	285	270.8	613
232	350	315	130	275	286	271.2	612
233	350	315	130	274	286	271.0	610
234	350	315	131	274	286	271.2	609
235	350	317	130	274	287	271.6	607
236	350	315	131	274	287	271.4	606
237	350	316	131	274	287	271.6	602
238	350	316	131	274	288	271.8	595
239	350	317	132	276	288	272.6	589

WOODSTOVE SURFACE TEMPERATURE DATA

Client: FPI
Model: F2500
Run #: 3

Job #: 18-414
Tracking #: 003
Technician: SJB
Date: 6/27/2018

	Temperature Data (°F)						
Elapsed Time (min)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
240	351	318	131	275	288	272.6	585
241	350	318	132	276	289	273.0	585
242	351	317	132	276	289	273.0	585
243	351	318	132	277	289	273.4	585
244	351	320	132	277	290	274.0	584
245	352	321	133	277	290	274.6	585
246	352	320	133	278	290	274.6	585
247	352	321	132	279	291	275.0	586
248	353	322	134	279	291	275.8	585
249	353	320	133	280	291	275.4	584
250	353	322	133	280	292	276.0	584
251	354	323	133	280	292	276.4	583
252	353	324	133	280	293	276.6	583
253	354	323	134	281	293	277.0	582
254	355	324	133	281	293	277.2	582
255	355	324	135	282	294	278.0	575
256	356	325	134	282	294	278.2	566
257	356	326	134	282	295	278.6	572
258	356	326	135	282	295	278.8	586
259	356	327	135	282	295	279.0	592
260	356	326	135	282	295	278.8	592
261	355	329	135	281	295	279.0	587
262	355	328	135	281	296	279.0	583
263	354	329	135	281	296	279.0	579
264	354	329	136	280	296	279.0	575
265	353	330	136	280	296	279.0	571
266	353	329	135	280	297	278.8	569
267	353	329	135	279	297	278.6	566
268	351	329	136	278	297	278.2	564
269	351	329	135	277	297	277.8	562
270	350	330	135	276	297	277.6	561
271	349	329	135	276	297	277.2	558
272	349	330	135	275	298	277.4	556
273	348	329	134	275	298	276.8	554
274	347	330	134	274	298	276.6	553
275	347	329	135	273	298	276.4	553
276	346	328	134	272	297	275.4	552
277	345	328	134	271	297	275.0	550
278	345	328	134	270	298	275.0	548
279	343	328	134	269	297	274.2	547
280	343	326	134	270	297	274.0	546
281	342	327	133	269	297	273.6	545
282	342	327	133	268	297	273.4	545
283	341	327	132	268	297	273.0	545
284	340	327	133	267	297	272.8	543
285	340	327	132	266	297	272.4	542
286	339	327	132	266	297	272.2	541
287	338	326	133	265	297	271.8	541

WOODSTOVE SURFACE TEMPERATURE DATA

Client: FPI
Model: F2500
Run #: 3

Job #: 18-414
Tracking #: 003
Technician: SJB
Date: 6/27/2018

	Temperature Data (°F)						
Elapsed Time (min)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
288	337	327	133	266	297	272.0	540
289	337	325	133	265	297	271.4	539
290	336	326	132	265	296	271.0	538
291	336	325	132	264	296	270.6	539
292	336	325	132	264	296	270.6	540
293	335	324	132	264	296	270.2	542
294	335	325	132	263	296	270.2	543
295	335	324	132	263	296	270.0	543
296	334	324	131	262	296	269.4	544
297	334	324	131	262	296	269.4	546
298	334	324	132	262	296	269.6	548
299	334	323	132	262	296	269.4	551
300	334	324	131	262	296	269.4	554
301	334	324	132	262	296	269.6	558
302	334	324	131	262	296	269.4	560
303	334	324	131	263	296	269.6	561
304	334	325	131	262	296	269.6	561
305	334	324	131	262	295	269.2	560
306	334	324	132	263	296	269.8	560
307	335	324	132	263	296	270.0	558
308	335	323	132	263	296	269.8	556
309	334	324	132	263	296	269.8	553
310	335	324	132	262	296	269.8	549
311	334	324	132	262	296	269.6	545
312	335	325	132	261	296	269.8	542
313	335	325	132	262	296	270.0	539
314	335	324	133	261	296	269.8	536
315	334	324	132	261	296	269.4	534
316	335	323	133	261	296	269.6	532
317	334	322	132	261	296	269.0	530
318	334	322	133	260	296	269.0	528
319	334	322	133	259	295	268.6	527
320	334	322	133	259	295	268.6	527
321	334	320	132	259	295	268.0	527
322	333	320	132	259	295	267.8	527
323	333	320	132	258	295	267.6	525
324	333	321	132	257	295	267.6	523
325	333	319	132	257	295	267.2	522
326	333	318	132	257	295	267.0	521
327	332	319	133	256	295	267.0	520
328	332	318	132	256	295	266.6	518
329	332	318	132	255	294	266.2	516
330	331	317	131	254	294	265.4	514
331	331	316	130	253	294	264.8	512
332	331	316	130	253	294	264.8	509
333	330	315	130	252	294	264.2	507
334	330	315	131	251	293	264.0	506
335	330	314	130	250	293	263.4	504

WOODSTOVE SURFACE TEMPERATURE DATA

Client: FPI
Model: F2500
Run #: 3

Job #: 18-414
Tracking #: 003
Technician: SJB
Date: 6/27/2018

	Temperature Data (°F)						
Elapsed Time (min)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
336	330	313	130	250	293	263.2	503
337	329	313	130	249	293	262.8	502
338	329	311	129	248	292	261.8	501
339	328	312	129	247	292	261.6	499
340	328	310	129	247	292	261.2	499
341	328	310	129	245	292	260.8	499
342	327	310	129	245	291	260.4	497
343	327	310	130	245	291	260.6	497
344	327	309	129	245	290	260.0	496
345	326	307	129	243	290	259.0	495
346	326	307	129	243	290	259.0	494
347	325	306	128	242	289	258.0	493
348	325	307	128	241	289	258.0	490
349	324	305	129	240	289	257.4	489
350	324	306	128	239	288	257.0	487
351	323	305	127	239	288	256.4	485
352	323	304	127	238	288	256.0	483
353	323	303	127	237	287	255.4	481
354	322	304	127	236	287	255.2	479
355	321	304	127	235	287	254.8	476
356	321	303	127	235	286	254.4	474
357	321	302	127	233	286	253.8	472
358	320	302	126	233	285	253.2	471
359	319	301	126	232	285	252.6	470
360	319	300	125	231	285	252.0	468
361	318	300	125	230	284	251.4	466
362	317	299	125	229	284	250.8	464
363	317	300	125	228	284	250.8	461
364	316	298	125	228	283	250.0	458
365	316	298	124	227	283	249.6	456
366	315	298	124	227	282	249.2	454
367	315	297	124	226	282	248.8	452
368	314	297	123	225	281	248.0	451
369	313	297	124	224	281	247.8	450
370	313	296	123	224	280	247.2	450
371	313	296	123	223	280	247.0	448
372	312	295	123	222	279	246.2	447
373	311	295	122	221	279	245.6	446
374	311	294	122	221	279	245.4	445
375	310	294	122	220	278	244.8	443
376	310	293	122	220	278	244.6	442
377	310	293	122	219	277	244.2	440
378	309	292	121	218	277	243.4	439
379	309	291	122	218	276	243.2	437
380	308	290	121	217	276	242.4	434
381	308	290	121	216	275	242.0	433
382	307	289	121	216	275	241.6	432
383	307	289	121	215	275	241.4	432

WOODSTOVE SURFACE TEMPERATURE DATA

Client: FPI
Model: F2500
Run #: 3

Job #: 18-414
Tracking #: 003
Technician: SJB
Date: 6/27/2018

	Temperature Data (°F)						
Elapsed Time (min)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
384	306	287	120	214	274	240.2	432
385	306	287	120	214	274	240.2	432
386	305	287	121	213	273	239.8	432
387	305	286	120	213	273	239.4	431
388	304	286	121	212	272	239.0	431
389	304	285	120	211	272	238.4	431
390	303	286	120	211	271	238.2	431
391	304	284	119	211	271	237.8	430
392	303	283	119	210	271	237.2	430
393	303	283	120	209	270	237.0	429
394	302	283	119	209	270	236.6	429
395	302	283	119	209	269	236.4	429
396	301	282	119	208	269	235.8	429
397	301	282	119	208	268	235.6	428
398	300	281	119	208	268	235.2	428
399	301	280	119	208	267	235.0	428
400	300	281	119	207	267	234.8	427
401	299	280	119	207	267	234.4	425
402	300	280	119	207	266	234.4	423
403	299	280	118	206	266	233.8	421
404	299	279	118	206	265	233.4	421
405	299	279	118	206	265	233.4	421
406	299	280	118	205	265	233.4	421
407	298	278	119	205	264	232.8	421
408	299	278	118	205	264	232.8	422
409	299	279	118	204	264	232.8	422
410	299	278	119	204	263	232.6	422
411	299	278	118	204	263	232.4	422
412	298	277	118	204	262	231.8	422
413	298	277	118	203	262	231.6	422
414	298	277	118	203	262	231.6	421
415	298	277	118	203	261	231.4	422
416	298	276	118	203	261	231.2	422
417	298	276	117	202	261	230.8	422
418	298	275	118	202	260	230.6	423
419	298	276	118	202	260	230.8	423
420	298	275	118	202	260	230.6	423
421	297	275	118	202	259	230.2	422
422	297	274	118	202	259	230.0	422
423	298	275	117	201	259	230.0	422
424	297	274	118	202	258	229.8	422
425	297	274	118	202	258	229.8	421
426	297	273	117	201	258	229.2	420
427	297	274	117	201	257	229.2	420
428	297	274	118	201	257	229.4	419
429	297	272	118	201	257	229.0	418
430	297	271	117	201	257	228.6	417
431	297	273	118	200	256	228.8	414

WOODSTOVE SURFACE TEMPERATURE DATA

Client: FPI
Model: F2500
Run #: 3

Job #: 18-414
Tracking #: 003
Technician: SJB
Date: 6/27/2018

	Temperature Data (°F)						
Elapsed Time (min)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
432	297	271	118	200	256	228.4	407
433	297	272	118	200	256	228.6	397
434	297	271	118	200	255	228.2	391
435	297	271	117	200	255	228.0	389
436	297	271	117	200	255	228.0	392
437	297	270	117	200	254	227.6	396
438	296	269	117	200	254	227.2	401
439	296	270	118	199	254	227.4	405
440	297	269	117	200	254	227.4	408
441	297	269	117	199	254	227.2	412
442	296	269	117	199	253	226.8	414
443	296	268	117	198	253	226.4	415
444	296	269	117	198	253	226.6	415
445	296	268	117	197	253	226.2	415
446	296	267	117	198	253	226.2	415
447	295	267	117	197	252	225.6	415
448	296	266	117	197	252	225.6	415
449	296	266	117	197	252	225.6	415
450	295	266	117	196	252	225.2	415
451	295	266	116	196	252	225.0	414
452	295	265	116	196	251	224.6	414
453	295	265	117	196	251	224.8	414
454	295	264	117	196	251	224.6	414
455	294	264	117	195	251	224.2	413
456	295	263	116	195	251	224.0	413
457	295	263	116	195	251	224.0	412
458	294	262	116	195	250	223.4	412
459	294	263	116	195	250	223.6	412
460	294	261	117	194	250	223.2	412
461	294	262	116	194	250	223.2	412
462	294	262	116	194	250	223.2	412
463	294	262	116	194	250	223.2	412
464	294	262	116	194	250	223.2	413
465	293	262	116	193	249	222.6	415
466	293	262	116	194	249	222.8	417
467	293	261	116	193	249	222.4	419
468	292	260	116	194	249	222.2	421
469	293	262	116	193	249	222.6	423
470	293	261	116	193	249	222.4	425
471	293	262	116	193	249	222.6	427
472	292	261	116	193	249	222.2	428
473	292	261	116	193	249	222.2	430
474	292	261	117	193	249	222.4	431
475	292	261	116	193	248	222.0	432
476	292	261	117	194	248	222.4	432
477	292	262	117	193	248	222.4	433
478	292	262	117	194	248	222.6	433
479	292	262	117	194	248	222.6	434

WOODSTOVE SURFACE TEMPERATURE DATA

Client: FPI
Model: F2500
Run #: 3

Job #: 18-414
Tracking #: 003
Technician: SJB
Date: 6/27/2018

	Temperature Data (°F)						
Elapsed Time (min)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
480	292	261	117	194	248	222.4	435
481	292	261	117	194	248	222.4	436
482	292	262	117	194	248	222.6	436
483	292	263	117	194	248	222.8	436
484	292	262	117	195	248	222.8	436
485	292	262	117	195	248	222.8	437
486	293	262	117	195	248	223.0	439
487	293	262	118	195	247	223.0	441
488	293	264	118	195	247	223.4	443
489	293	263	117	195	247	223.0	443
490	293	263	118	195	247	223.2	444
491	294	262	117	195	247	223.0	444
492	294	263	118	195	247	223.4	444
493	295	264	118	195	247	223.8	444
494	295	265	117	196	247	224.0	445
495	295	264	118	196	247	224.0	445
496	295	264	117	196	247	223.8	446
497	296	264	118	197	247	224.4	447
498	296	265	119	197	247	224.8	447
499	296	265	119	197	247	224.8	447
500	296	267	118	197	247	225.0	447
501	296	267	118	197	247	225.0	448
502	297	266	119	197	247	225.2	448
503	297	267	119	198	247	225.6	448
504	297	266	119	197	247	225.2	448
505	297	267	119	198	247	225.6	449
506	297	268	118	198	247	225.6	449
Average	359	328	138	350	283	292	618

LAB SAMPLE DATA - ASTM E2515

Client: FPI
Model: F2500
Run #: 3

Job #: 18-414
Tracking #: 003
Technician: SJB
Date: 6/27/2018

TRAIN A (1st Hour)

Sample Component	Sample Type	Filter, Probe, or O-Ring #	Weights		
			Final, mg	Tare, mg	Particulate, mg
A. Front filter catch	Filter	T013	87.9	86.6	1.3
B. Rear filter catch	Filter				0.0
C. Probe catch*	Probe				0.0
D. O-Ring catch*	O-Ring				0.0

Sub-Total	Total Particulate, mg:	1.3

TRAIN A (Post 1st hour)

Sample Component	Sample Type	Filter, Probe, or O-Ring #	Weights		
			Final, mg	Tare, mg	Particulate, mg
A. Front filter catch	Filter	T014	172.3	84.6	1.9
B. Rear filter catch	Filter	T015		85.8	
C. Probe catch*	Probe	4A	116183.3	116183.1	0.2
D. O-Ring catch*	O-Ring	4A	3591.8	3591.4	0.4

Sub-Total	Total Particulate, mg:	2.5
Train A Aggregate	Total Particulate, mg:	**3.8**

TRAIN B

Sample Component	Reagent	Filter, Probe, or O-Ring #	Weights		
			Final, mg	Tare, mg	Particulate, mg
A. Front filter catch	Filter	T016	172.1	84.9	3.4
B. Rear filter catch	Filter	T017		83.8	
C. Probe catch*	Probe	4B	116366.0	116365.8	0.2
D. O-Ring catch*	O-Ring	4B	3580.1	3579.5	0.6

Total Particulate, mg:	**4.2**

AMBIENT

Sample Component	Reagent	Filter, Probe, or O-Ring #	Weights		
			Final, mg	Tare, mg	Particulate, mg
A. Filter catch*	Filter	T018	84.2	84.1	0.1

Total Particulate, mg:	**0.1**

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

ASTM E3053 Wood Heater Run Sheets

Client: FPI | Job Number: 18-414 | Tracking #: 003
Model: F2500 | Run Number: 3 | Test Date: 6/27/2018

Wood Heater Run Notes

Pre-Test Notes

Pre-Test Start Time: 7:55
Air Control Setting: High Setting – Fully Open, per ASTM E3053

Time	Notes
0 min	Kindling ignition with propane torch for 20 sec. Door cracked open 3.5", bypass open, blower off.
2 min	Door engaged/not latched
5 min	Door latched closed
7 min	Catalyst bypass closed
8 min	At 1.0 lbs, added 3.2 lbs of start-up fuel, door closed within 40 seconds
20 min	At 1.2 lbs, added 3.8 lbs of start-up fuel, door closed within 60 seconds
31 min	At 2.3 lbs, leveled coal bed, loaded High Fire Test load, door closed within 90 seconds
51 min	Blower fan turned on to high
110 min	Adjusted fuel load to ensure uniform charcoal bed for beginning of test, door closed within 30 seconds
136 min	Stirred coal bed, zeroed scale; turned off fan to load test fuel

Test Notes

Test Burn Start Time: 10:12
Air Control Setting: Medium Setting – See appliance description in report

Time	Notes
0 min	Air control opened to fully open, fuel loaded by 40 seconds, door closed by 60 seconds
6 min	Air control set to test setting
20 min	Fan turned on high setting
60 min	Changed 1-hour filter

Test Burn End Time: 19:18

Background Filter Volume (ft^3): 83.786

Filter Data

Train	A	A	A	A	A	B	B	B	B	AMB
Element	Front Filter (First Hour)	Front Filter (Remainder)	Rear Filter	Probe	O-Ring Pair	Front Filter	Rear Filter	Probe	O-Ring Pair	Filter
ID #	T013	T014	T015	4A	4A	T016	T017	4B	4B	T018
Tare (mg)	86.6	84.6	85.8	116183.1	3591.4	84.9	83.8	116365.8	3579.5	84.1
Final Weight (mg)	87.9	172.3		116183.3	3591.8	172.1		116366.0	3580.1	84.2

Sample Train Leak Check: A: 0.000 @ -15 "Hg B: 0.000 @ -13 "Hg

Technician Signature:  Date: 7/4/2018

ASTM E3053 Wood Heater Run Sheets

Client: FPI | Job Number: 18-414 | Tracking #: 003
Model: F2500 | Run Number: 3 | Test Date: 6/27/2018

Flue Gas Concentration Measurement

Calibration Gas Values: Span Gas CO_2 (%): 17.06 CO (%): 4.25
Mid Gas CO_2 (%): 10.02 CO (%): 2.52

Calibration Results:

	Pre Test			Post Test		
	Zero	Mid	Span	Zero	Mid	Span
Time	7:40	7:45	7:48	19:40	19:42	19:50
CO_2	0.00	10.08	17.06	0.18	10.16	17.24
CO	0.000	2.515	4.250	0.031	2.520	4.319

Flue Gas Probe Leak Check: Initial: No Leakage Final: No Leakage

Dilution Tunnel Flow

Pitot Tube Leak Test: Initial: No Leakage Final: No Leakage

Velocity Traverse Data

	Pt.1	Pt.2	Pt.3	Pt.4	Pt.5	Pt.6	Pt.7	Pt.8	Center
dP (inH_2O):	0.034	0.042	0.046	0.038	0.032	0.040	0.044	0.040	0.045
Temp (°F):	74	74	74	74	74	74	74	74	74

Dilution Tunnel Static Pressure (inH_2O): -0.130

Supplemental Data

Room Air Velocity (ft/min): Initial: <50 Final: <50
Scale Audit (lbs): Initial: 10 Final: 10
Stack Diameter (in): 6
Induced Draft (in H_2O): 0
% Smoke Capture: 100
Flue Pipe Cleaned Prior to First Test in Series: Date: 6/22/2018

	Initial	Middle	Ending
P_b (inHg)	29.92	29.86	29.87
RH (%)	36.8	26.9	26.4

Technician Signature:  Date: 7/4/2018

Sample Pre-Test Tare Sheet: ☐ Probes ☒ TX40 Filters ☐ O-Rings

Date/Time In Desiccator: 6/13/13 10:00 Balance ID#: 107 Audit Weight ID# / Weight(mg): 100-A / 100 mg

Sample ID	Date/Time	Weight (mg)	Date/Time	Weight (mg)	Date/Time	Weight (mg)	Date/Time	Weight (mg)	Tech. Initials	Project/Run #
T001	6/20/13 - 11:00	85.9	6/22/13 - 12:00	86.0					SB	13-414 #1
T002		85.9		86.0					SB	
T003		85.2		85.3					SB	
T004		87.1		87.1					SB	
T005		87.6		87.6					SB	
T006		87.8		87.8					SB	
T007		87.0		86.9					SB	13-414 #2
T008		87.2		87.1					SB	
T009		86.7		86.5					SB	
T010		86.7		86.7					SB	
T011		86.2		86.1					SB	
T012		86.7		86.6					SB	
T013		86.6		86.6					SB	13-414 #3
T014		84.5		84.6					SB	
T015		85.7		85.6					SB	
T016		85.1		84.9					SB	
T017		83.8		83.8					SB	
T018		84.0		84.1					SB	
T019		84.1								
T020		83.9								
T021		84.2								
T022		84.4								
T023		83.8								
T024		83.0								
T025		82.5								
T026		82.7								
T027		82.4								
T028		82.3								
T029		82.1								
T030		81.7								

Sample Post-Test Analysis Sheet: ☐ Probes ☒ TX40 Filters ☐ O-Rings

Balance ID#: 107 Audit Weight ID# / Weight (mg): 109-A / 100 mg

Sample ID	Tare (mg)	Date/ Time in Desiccator	Date/ Time	Weight (mg)	Date/ Time	Weight (mg)	Date/ Time	Weight (mg)	Date/ Time	Weight (mg)	Tech. Initials
T001	86.0	6/25 - 11:30	6/26 - 13:00	91.1	6/27 - 10:00	91.1	–	–	–	–	SB
T002	86.0	↓	↓	→ 172.6	↓	→ 172.5	–	–	–	–	SB
T003	85.3	↓	↓	→ 181.4	↓	→ 181.2	–	–	–	–	SB
T004	87.1	↓	↓	87.9	↓	87.9	–	–	–	–	SB
T005	87.6	↓	↓	91.0	6/29/18-6:30	91.1	–	–	–	–	SB
T006	87.8	↓	↓	→ 174.5	↓	→ 174.5	–	–	–	–	SB
T007	86.9	6/26 - 20:00	6/28 - 7:00	→ 177.0	↓	→ 177.1	–	–	–	–	SB
T008	87.1	↓	↓	86.6	↓	86.7	–	–	–	–	SB
T009	86.5	↓	↓	87.9	6/29 - 16:00	87.9	–	–	–	–	SB
T010	86.7	↓	↓	→ 172.2	↓	→ 172.3	–	–	–	–	SB
T011	86.1	↓	↓	→ 172.3	↓	→ 172.1	–	–	–	–	SB
T012	86.6	↓	↓	84.3	↓	84.2	–	–	–	–	SB
T013	86.6	6/27 - 19:00	6/29 - 6:30								
T014	84.6	↓	↓								
T015	85.8	↓	↓								
T016	84.9	↓	↓								
T017	83.8	↓	↓								
T018	84.1	↓	↓								
T019											
T020											
T021											
T022											
T023											
T024											
T025											
T026											
T027											
T028											
T029											
T030											

Sample Pre-Test Tare Sheet: ☒ Probes ☐ Filters ☐ O-Rings

Date/Time In Desiccator: 4/2/18 - 10:00 Balance ID#: 107 Audit Weight ID# / Weight(mg): 109-A / 100 mg

Sample ID	Date/Time	Weight (mg)	Date/Time	Weight (mg)	Date/Time	Weight (mg)	Date/Time	Weight (mg)	Tech. Initials	Project/Run #
1A	4/17-14:00	115626.8	4/23-9:45	115626.7					SB	18-409 #1
1B	↓	115901.3	↓	115901.4					SB	↓
2A		116237.4	6/22/18-12:3	116237.5	-	-	-	-	SB	18-414 #1
2B		116328.3		116328.5	-	-	-	-	SB	↓
3A		116072.5		116073.2	6/23/18-7:30	116073.0	-	-	SB	18-414 #2
3B		116340.1		116340.5	↓	116340.3	-		SB	↓
4A		116182.5		116183.2		116183.1	-	-	SB	18-414 #3
4B		116365.1	↓	116365.9	↓	116365.8	-	-	SB	↓
5A		116789.6								
5B		SB ~~116565.0~~ 116880.2								
6A		116565.0								
6B		116117.2								
7A		116739.9								
7B		117304.5								
8A		116829.6								
8B		116825.2								
9A		116720.6								
9B		117135.4								
10A		116826.4								
10B		117167.5								
11A		117034.8								
11B	↓	116674.0								
12A										
12B										
13A										
13B										
14A										
14B										

Sample Post-Test Analysis Sheet: ☒ Probes ☐ Filters ☐ O-Rings

Balance ID#: 107 Audit Weight ID# / Weight (mg): _____

Sample ID	Tare (mg)	Date/ Time in Desiccator	Date/ Time	Weight (mg)	Date/ Time	Weight (mg)	Date/ Time	Weight (mg)	Date/ Time	Weight (mg)	Tech. Initials
1A	115626.7	4/23 - 16:45	4/25 - 8:45	115626.6	4/27 - 9:00	115626.7	—	—	—	—	SB
1B	115901.4	⚓	⚓	115901.6	4/27 - 9:00	115901.6	—				SB
2A	116237.5	6/25 - 11:30	6/26 - 13:00	116238.5	6/27 - 10:00	116238.0	6/28 - 7:00	116237.9	—	—	SB
2B	116328.5	6/25 - 11:30	6/26 - 13:00	116329.8	6/27 - 10:00	116329.1	6/28 - 7:00	116328.9	—	—	SB
3A	116073.0	6/26 - 20:00	6/28 - 7:00	116073.3	6/29 - 6:30	116073.4	—	—	—	—	SB
3B	116340.3	6/26 - 20:00	6/28 - 7:00	116341.0	6/29 - 6:30	116340.8	—	—	—		SB
4A	116183.1	6/27 - 19:00	6/29 - 6:30	116183.2	6/29 - 16:00	116183.3	—	—	—	—	SB
4B	116365.8	6/27 - 19:00	6/29 - 6:30	116365.9	6/29 - 16:00	116366.0	—	—	—	—	SB
5A											
5B											
6A											
6B											
7A											
7B											
8A											
8B											
9A											
9B											
10A											
10B											
11A											
11B											
12A											
12B											
13A											
13B											
14A											
14B											

Sample Pre-Test Tare Sheet: ☐ Probes ☐ Filters ☒ O-Rings

Date/Time In Desiccator: 4/2/18 - 12:00 Balance ID#: 107 Audit Weight ID# / Weight(mg): 109B / 200 mg

Sample ID	Date/Time	Weight (mg)	Date/Time	Weight (mg)	Date/Time	Weight (mg)	Date/Time	Weight (mg)	Tech. Initials	Project/Run #
1A	4/17/18-14:0	3550.0	4/23/ 9:5	3550.1	~	~	~	~	SB	18-409 #1
1B	↓	3561.0	↓	3561.2	~	~	~	~	SB	↓
2A		3547.2	6/20/18-11:15	3550.6	6/22/18-12:10	3550.5	~	~	SB	18-414 #1
2B		3565.8		3569.2	↓	3569.2	~	~	SB	↓
3A		3574.7		3578.0		3577.9	~	~	SB	18-414 #2
3B		3563.0		3566.3		3566.2	~	~	SB	↓
4A		3587.9		3591.4		3591.4	~	~	SB	18-414 #3
4B		3576.4		3579.5	↓	3579.5	~	~	SB	↓
5A		3525.8		3528.9						
5B		3529.4		3532.7						
6A		3442.3		3455.9						
6B		3549.1		3552.2						
7A		3569.6		3572.5						
7B	↓	3516.8	↓	3520.0						
8A										
8B										
9A										
9B										
10A										
10B										
11A										
11B										
12A										
12B										
13A										
13B										
14A										
14B										

Sample Post-Test Analysis Sheet: ☐ Probes ☐ Filters ☒ O-Rings

Balance ID#: 107 Audit Weight ID# / Weight (mg):_____

Sample ID	Tare (mg)	Date/ Time in Desiccator	Date/ Time	Weight (mg)	Date/ Time	Weight (mg)	Date/ Time	Weight (mg)	Date/ Time	Weight (mg)	Tech. Initials
1A	3550.1	4/23- 16:45	4/25-8:45	3550.8	4/27-9:00	3550.6					JB
1B	3561.2	↓	↓	3562.1	↓	3562.1					JB
2A	3550.5	6/25-11:30	6/26-13:00	3552.1	6/27-10:00	3551.5	6/28-7:00	3551.6	–	–	JB
2B	3569.2	6/25-11:30	6/26-13:00	3570.0	6/27-10:00	3569.7	6/28-7:00	3569.6	–	–	JB
3A	3577.9	6/26-20:00	6/28-7:00	3578.4	6/29-6:30	3578.5	–	–	–	–	JB
3B	3566.2	6/26-20:00	6/28-7:00	3567.3	6/29-6:30	3567.3	–	–	–	–	JB
4A	3591.4	6/27-19:00	6/29-6:30	3591.7	6/29-16:00	3591.8	–	–	–	–	JB
4B	3579.5	6/27-19:00	6/29-6:30	3580.0	6/29-16:00	3580.1	–	–	–	–	JB
5A											
5B											
6A											
6B											
7A											
7B											
8A											
8B											
9A											
9B											
10A											
10B											
11A											
11B											
12A											
12B											
13A											
13B											
14A											
14B											

Sample Calculations – ASTM E3053 & E2515

Client: FPI
Model: F2500
Run: 1

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_{Fldb} – Weight of test fuel load, dry basis, lb (kg)

M_{SUdb} – Weight of start-up fuel, dry basis, lb (kg)

M_{Kdb} - Weight of kindling, dry basis, lb (kg)

M_{FREHdb} - Total weight of all remaining fuel at end of high fire test run, lb (kg)

M_{TFBHdb} - Total weight of all fuel burned during high fire test run, lb (kg), dry basis

BR_H – Dry burn rate for high fire test run, from time when test fuel load is added to end of test run, lb/h (kg/h)

M_{TFBdb} - Total weight of fuel burned during low or medium fire test run, lb (kg), dry basis

BR - Dry burn rate for low and medium fire test runs, lb/h (kg/h)

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 STP, g/dscf

E_T – Total particulate emissions, g

PR - Proportional rate variation

PM_{RH} - Particulate emission rate for high fire test run, g/hr

PM_{FH} - Particulate emission factor for high fire test run, g/dry kg of fuel burned

PM_R – Particulate emission rate for low or medium fire test run, g/hr

PM_F – Particulate emission factor for low or medium fire test run, g/dry kg of fuel burned

M_{Fldb} – Weight of test fuel load, dry basis, lb (kg)
ASTM E3053 equation (1)

$$M_{Fldb} = \Sigma((M_{FLnwb})(100/(100 + MC_{FLn})))$$

Where,

M_{FLnwb} = Weight of each test fuel piece, n, in test fuel load per 8.4.1, wet basis, lb (kg)
MC_{FLn} = Average fuel moisture of test fuel piece, n, in test fuel load, % dry basis
n = individual test fuel pieces that comprise the test fuel load, as applicable.

Sample Calculation:

n	M_{FLnwb}	MC_{FLn}	$(M_{FLnwb})(100/(100 + MC_{FLn}))$	
1	4.83	21.2	4.83 (100) / (100+ 21.2)) =	3.99
2	3.81	19.2	3.81 (100) / (100+ 19.2)) =	3.20
3	4.10	21.5	4.1 (100) / (100+ 21.5)) =	3.38
4	3.42	19.3	3.42 (100) / (100+ 19.3)) =	2.87
5	5.80	19.7	5.8 (100) / (100+ 19.7)) =	4.84
6	0.00	NA		
7	N/A	N/A	N/A	-
			SUM	18.27 lbs

M_{Fldb} = **18.27** lbs
M_{Fldb} = **8.29** kg

M_{SUdb} – Weight of start-up fuel, dry basis, lb (kg)
ASTM E3053 equation (2)

$$M_{SUdb} = (M_{SUwb})(100/(100 + MC_{SU}))$$

Where,

M_{SUwb} = Total weight of start-up fuel pieces, wet basis, lb (kg)

MC_{SU} = Average fuel moisture of the piece(s) from which start-up fuel was split, % dry basis

Sample Calculation:

M_{SUwb} = 5.82

MC_{SU} = 20.9

M_{SUdb} = 5.8 (100/(100+ 20.9)

M_{SUdb} = **4.82** lbs

= **2.18** kg

M_{Kdb} - Weight of kindling, dry basis, lb (kg)
ASTM E3053 equation (3)

$$M_{Kdb} = (M_{Kwb})(100/(100 + MC_K))$$

Where,

M_{Kwb} = Weight of kindling per 8.5.6, wet basis, lb (kg);

MC_K = Average moisture of kindling (may be assumed 10%), % dry basis.

Sample calculation:

M_{Kwb} = 3.92

MC_K = 10.0

M_{Kdb} = 3.92 (100/(100+ 10.0)

M_{Kdb} = **3.56** lbs

= **1.62** kgs

M_{FREHdb} - Total weight of all remaining fuel at end of high fire test run, lb (kg)
ASTM E3053 equation (4)

$$M_{FREHdb} = M_{RSUBdb} + M_{FLEHdb}$$

Where,

M_{RSUBdb} = Weight of residual start-up fuel bed when high fire test load added, lb (kg)

M_{FLEHdb} = Weight of unburned portion of test fuel load at the end of the high fire test run, lb (kg)

Sample calculation:

M_{RSUBdb} = 2.3

M_{FLEHdb} = 2.1

M_{FREHdb} = 2.30 + 2.1

M_{FREHdb} = **4.40** lbs

= **2.00** kg

M_{TFBHdb} - Total weight of all fuel burned during high fire test run, lb (kg), dry basis

ASTM E3053 equation (5)

$$M_{TFBHdb} = M_{Kdb} + M_{SUdb} + M_{FLdb} - M_{FREHdb}$$

Sample Calculation:

M_{Kdb} = 3.56

M_{SUdb} = 4.82

M_{FLdb} = 18.27

M_{FREHdb} = 4.40

M_{TFBHdb} = 3.56 + 4.82 + 18.27 - 4.40

= **22.25** lbs

= **10.09** kg

BR_H – Dry burn rate for high fire test run, from time when test fuel load is added to end of test run, lb/h (kg/h)

ASTM E3053 equation (6)

$$BR_H = 60 (M_{FLdb} - M_{FLEHdb})/\theta_{H1}$$

Where,

θ_{H1} = Total duration of high fire test run, from time when test fuel load is added to end of test run, min.

Sample calculation:

M_{FLdb} = 18.27

M_{FLEHdb} = 2.10

θ_{H1} = 126

$$BR_H = \frac{60 (18.27 - 2.10)}{126}$$

BR_H = **7.70** lb/hr

= **3.50** kg/hr

M_{TFBdb} - Total weight of fuel burned during low or medium fire test run, lb (kg), dry basis
ASTM E3053 equation (7)

$$M_{TFBdb} = M_{FLdb} - M_{FREdb}$$

Where,

M_{FLdb} = Total weight of fuel burned during low or medium fire test run, lb (kg), dry basis

M_{FREdb} = Weight of remaining fuel at end of low or medium fire test run, lb (kg)

Sample Calculation:

M_{FLdb} = N/A - Applicable to Low/Medium Fire Tests Only

M_{FREdb} = N/A - Applicable to Low/Medium Fire Tests Only

M_{TFBdb} = N/A - N/A

= **N/A** lbs

= **N/A** kg

BR - Dry burn rate for low and medium fire test runs, lb/h (kg/h)
ASTM E3053 equation (8)

$$BR = \frac{60\ M_{TFBdb}}{\theta}$$

Where,

θ = Total test run duration for low or medium fire test run, min.

Sample Calculation:

M_{TFBdb} = N/A - Applicable to Low/Medium Fire Tests Only
θ = N/A - Applicable to Low/Medium Fire Tests Only

$$BR = \frac{60 \text{ x } \text{N/A}}{\text{N/A}}$$

BR = **N/A** lb/hr
= **N/A** kg/hr

V_s – Average gas velocity in the dilution tunnel, ft/sec
ASTM E2515 equation (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 pitot tube center point reading = $\frac{V_{strav}}{V_{scent}}$, 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:

$$Fp = \frac{12.98}{14.15} = 0.917$$

$$V_s = 0.917 \times 85.49 \times 0.99 \times 0.212 \times \left(\frac{131.0 + 460}{\left(29.94 + \frac{-0.13}{13.6}\right) \times 28.78} \right)^{1/2}$$

V_s = **13.64** 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:

$$Q_{sd} = 3600 \times (1 - 0.02) \times 13.64 \times 0.1963 \times \frac{528}{131.0 + 460} \times \frac{29.94 + \frac{-0.13}{13.6}}{29.92}$$

Q_{sd} = **8446.9** dscf/hr

$V_{m(std)}$ – Volume of Gas Sampled Corrected to Dry Standard Conditions, dscf
ASTM E2515 equation (6)

$$V_{m(std)} = K_1 V_m Y \frac{P_{bar} + \frac{\Delta H}{13.6}}{T_m}$$

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:

$$V_{m(std)} = 17.64 \times 23.318 \times 1.002 \times \frac{\left(29.94 + \frac{2.02}{13.6}\right)}{(81.4 + 460)}$$

$V_{m(std)}$ = **22.904** dscf

Using equation for Train 2:

$$V_{m(std)} = 17.64 \times 22.713 \times 0.997 \times \frac{\left(29.94 + \frac{1.97}{13.6}\right)}{(91.4 + 460)}$$

$V_{m(std)}$ = **21.795** dscf

Using equation for ambient train:

$$V_{m(std)} = 17.64 \times 26.64 \times 0.999 \times \frac{\left(\underline{29.94} + \frac{0.00}{13.6}\right)}{(76.3 + 460)}$$

$V_{m(std)}$ = **26.212** 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 A (first hour):

m_n = 0.0 + 5.1 + 0.0

m_n = 5.1 mg

Using equation for Train A (post-first hour):

m_n = 0.4 + 1.2 + 1.1

m_n = 2.7 mg

Train A aggregate:

m_n = 5.1 + 2.7
m_n = **7.8** mg

Using equation for Train B:

m_n = 0.4 + 6.5 + 0.4

m_n = **7.3** mg

C_s - Concentration of particulate matter in tunnel gas, dry basis, corrected to STP, g/dscf
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:

$$C_s = 0.001 \times \frac{7.8}{22.90}$$

C_s = **0.00034** g/dscf

For Train 2

$$C_s = 0.001 \times \frac{7.3}{21.79}$$

C_s = **0.00033** g/dscf

For Ambient Train

$$C_r = 0.001 \times \frac{0.1}{26.21}$$

C_r = **0.000004** 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 = (0.000341 - 0.000004) x 8446.9 x 164 /60

E_T = **7.77** g

For Train 2

E_T = (0.000335 - 0.000004) x 8446.9 x 164 /60

E_T = **7.65** g

Average

E = **7.71** g

Total emission values shall not differ by more than 7.5% from the total average emissions

7.5% of the average =	0.58
Train 1 difference =	0.06
Train 2 difference =	0.06

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):

$$PR = \left(\frac{164 \times 0.136 \times 13.64 \times (79.0 + 460) \times (81.4 + 460)}{1 \times 23.318 \times 13.03 \times (131.0 + 460) \times (78.0 + 460)} \right) \times 100$$

PR = **92** %

PM_{RH} - Particulate emission rate for high fire test run, g/hr;
ASTM E3053 equation (9)

$$PM_{RH} = 60(E_{TH}/\theta_{H2})$$

Where,

E_{TH} = Total particulate emissions for high fire test run including kindling and start-up, g

θ_{H2} = Total duration of high fire test run, from ignition of kindling to end of test run, min.

Sample Calculation:

E_{TH} = 7.71

θ_{H2} = 164

PM_{RH} = 60(7.71 / 164)

PM_{RH} = **2.82** g/hr

PM_{FH} - Particulate emission factor for high fire test run, g/dry kg of fuel burned.

ASTM E3053 equation (10)

$$PM_{FH} = E_{TH}/M_{TFBHdb}$$

Sample Calculation:

E_{TH} = 7.71

M_{TFBHdb} = 10.09

PM_{FH} = 7.71 / 10.09

= **0.76** g/kg

PM_R - Particulate emission rate for low or medium fire test runs, g/hr
ASTM E3053 equation (12)

$$PM_R = 60(E_T/\theta)$$

Where,

E_T = Total particulate emissions for low or medium fire test runs from Test Method E2515, g

Sample Calculation:

E_T = N/A - Applicable to Low/Medium Fire Tests Only
θ = N/A - Applicable to Low/Medium Fire Tests Only

PM_R = 60(N/A / N/A)

PM_{RH} = **N/A** g/hr

PM_{FH} - Particulate emission factor for high fire test run, g/dry kg of fuel burned.

ASTM E3053 equation (13)

$$PM_F = E_T/M_{TFBdb}$$

Sample Calculation:

E_T = N/A - Applicable to Low/Medium Fire Tests Only
M_{TFBdb} = N/A - Applicable to Low/Medium Fire Tests Only

PM_{FH} = N/A / N/A
= **N/A** g/kg

Sample Calculations – ASTM E3053 & E2515

Client: FPI
Model: F2500
Run: 2

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_{Fldb} – Weight of test fuel load, dry basis, lb (kg)

M_{SUdb} – Weight of start-up fuel, dry basis, lb (kg)

M_{Kdb} - Weight of kindling, dry basis, lb (kg)

M_{FREHdb} - Total weight of all remaining fuel at end of high fire test run, lb (kg)

M_{TFBHdb} - Total weight of all fuel burned during high fire test run, lb (kg), dry basis

BR_H – Dry burn rate for high fire test run, from time when test fuel load is added to end of test run, lb/h (kg/h)

M_{TFBdb} - Total weight of fuel burned during low or medium fire test run, lb (kg), dry basis

BR - Dry burn rate for low and medium fire test runs, lb/h (kg/h)

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 STP, g/dscf

E_T – Total particulate emissions, g

PR - Proportional rate variation

PM_{RH} - Particulate emission rate for high fire test run, g/hr

PM_{FH} - Particulate emission factor for high fire test run, g/dry kg of fuel burned

PM_R – Particulate emission rate for low or medium fire test run, g/hr

PM_F – Particulate emission factor for low or medium fire test run, g/dry kg of fuel burned

M_{Fldb} – Weight of test fuel load, dry basis, lb (kg)
ASTM E3053 equation (1)

$$M_{Fldb} = \Sigma((M_{FLnwb})(100/(100 + MC_{FLn})))$$

Where,

M_{FLnwb} = Weight of each test fuel piece, n, in test fuel load per 8.4.1, wet basis, lb (kg)
MC_{FLn} = Average fuel moisture of test fuel piece, n, in test fuel load, % dry basis
n = individual test fuel pieces that comprise the test fuel load, as applicable.

Sample Calculation:

n	M_{FLnwb}	MC_{FLn}	$(M_{FLnwb})(100/(100 + MC_{FLn}))$		
1	4.70	19.3	4.7 (100) / (100+ 19.3)) =	3.94	
2	6.68	21.4	6.68 (100) / (100+ 21.4)) =	5.50	
3	5.38	20.8	5.38 (100) / (100+ 20.8)) =	4.45	
4	5.84	19.4	5.84 (100) / (100+ 19.4)) =	4.89	
5	3.68	19.3	3.68 (100) / (100+ 19.3)) =	3.09	
6	0.00	NA			
7			N/A	-	
			SUM	21.87	lbs

M_{Fldb} = **21.87** lbs
M_{Fldb} = **9.92** kg

M_{SUdb} – Weight of start-up fuel, dry basis, lb (kg)
ASTM E3053 equation (2)

$$M_{SUdb} = (M_{SUwb})(100/(100 + MC_{SU}))$$

Where,

M_{SUwb} = Total weight of start-up fuel pieces, wet basis, lb (kg)

MC_{SU} = Average fuel moisture of the piece(s) from which start-up fuel was split, % dry basis

Sample Calculation:

M_{SUwb} = N/A - Applicable to High Fire Tests Only

MC_{SU} = N/A - Applicable to High Fire Tests Only

M_{SUdb} = N/A (100/(100+ N/A)

M_{SUdb} = **N/A** lbs

= **N/A** kg

M_{Kdb} - Weight of kindling, dry basis, lb (kg)
ASTM E3053 equation (3)

$$M_{Kdb} = (M_{Kwb})(100/(100 + MC_K))$$

Where,

M_{Kwb} = Weight of kindling per 8.5.6, wet basis, lb (kg);

MC_K = Average moisture of kindling (may be assumed 10%), % dry basis.

Sample calculation:

M_{Kwb} = N/A - Applicable to High Fire Tests Only

MC_K = N/A - Applicable to High Fire Tests Only

M_{Kdb} = N/A (100/(100+ N/A)

M_{Kdb} = **N/A** lbs

= **N/A** kgs

M_{FREHdb} - Total weight of all remaining fuel at end of high fire test run, lb (kg)
ASTM E3053 equation (4)

$$M_{FREHdb} = M_{RSUBdb} + M_{FLEHdb}$$

Where,

M_{RSUBdb} = Weight of residual start-up fuel bed when high fire test load added, lb (kg)

M_{FLEHdb} = Weight of unburned portion of test fuel load at the end of the high fire test run, lb (kg)

Sample calculation:

M_{RSUBdb} = N/A - Applicable to High Fire Tests Only

M_{FLEHdb} = N/A - Applicable to High Fire Tests Only

M_{FREHdb} = N/A + N/A

M_{FREHdb} = **N/A** lbs

= **N/A** kg

M_{TFBHdb} - Total weight of all fuel burned during high fire test run, lb (kg), dry basis

ASTM E3053 equation (5)

$$M_{TFBHdb} = M_{Kdb} + M_{SUdb} + M_{FLdb} - M_{FREHdb}$$

Sample Calculation:

M_{Kdb} = N/A

M_{SUdb} = N/A

M_{FLdb} = N/A

M_{FREHdb} = N/A

M_{TFBHdb} = N/A + N/A + N/A - N/A

= **N/A** lbs

= **N/A** kg

BR_H – Dry burn rate for high fire test run, from time when test fuel load is added to end of test run, lb/h (kg/h)

ASTM E3053 equation (6)

$$BR_H = 60 (M_{FLdb} - M_{FLEHdb})/\theta_{H1}$$

Where,

θ_{H1} = Total duration of high fire test run, from time when test fuel load is added to end of test run, min.

Sample calculation:

M_{FLdb} = N/A - Applicable to High Fire Tests Only

M_{FLEHdb} = N/A - Applicable to High Fire Tests Only

θ_{H1} = N/A - Applicable to High Fire Tests Only

$$BR_H = \frac{60 (\text{N/A} - \text{N/A})}{\text{N/A}}$$

BR_H = **N/A** lb/hr

= **N/A** kg/hr

M_{TFBdb} - Total weight of fuel burned during low or medium fire test run, lb (kg), dry basis
ASTM E3053 equation (7)

$$M_{TFBdb} = M_{FLdb} - M_{FREdb}$$

Where,

M_{FLdb} = Total weight of fuel burned during low or medium fire test run, lb (kg), dry basis

M_{FREdb} = Weight of remaining fuel at end of low or medium fire test run, lb (kg)

Sample Calculation:

M_{FLdb} = 21.87

M_{FREdb} = 0.00

M_{TFBdb} = 21.87 - 0.00

= **21.87** lbs

= **9.92** kg

BR - Dry burn rate for low and medium fire test runs, lb/h (kg/h)
ASTM E3053 equation (8)

$$BR = \frac{60\ M_{TFBdb}}{\theta}$$

Where,

θ = Total test run duration for low or medium fire test run, min.

Sample Calculation:

M_{TFBdb} = 21.87
θ = 576

$$BR = \frac{60 \times 21.87}{576}$$

BR = **2.28** lb/hr
= **1.04** kg/hr

V_s – Average gas velocity in the dilution tunnel, ft/sec
ASTM E2515 equation (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 pitot tube center point reading = $\frac{V_{strav}}{V_{scent}}$, 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:

$$Fp = \frac{13.19}{14.08} = 0.937$$

$$V_s = 0.937 \times 85.49 \times 0.99 \times 0.212 \times \left(\frac{97.7 + 460}{\left(29.99 + \frac{-0.13}{13.6}\right) \times 28.78} \right)^{1/2}$$

V_s = **13.53** 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:

$$Q_{sd} = 3600 \times (1 - 0.02) \times 13.53 \times 0.1963 \times \frac{528}{97.7 + 460} \times \frac{29.99 + \frac{-0.13}{13.6}}{29.92}$$

Q_{sd} = **8887.5** dscf/hr

$V_{m(std)}$ – Volume of Gas Sampled Corrected to Dry Standard Conditions, dscf
ASTM E2515 equation (6)

$$V_{m(std)} = K_1 V_m Y \frac{P_{bar} + \frac{\Delta H}{13.6}}{T_m}$$

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:

$$V_{m(std)} = 17.64 \times 81.316 \times 1.002 \times \frac{\left(29.99 + \frac{1.96}{13.6}\right)}{(84.3 + 460)}$$

$V_{m(std)}$ = **79.570** dscf

Using equation for Train 2:

$$V_{m(std)} = 17.64 \times 82.217 \times 0.997 \times \frac{\left(29.99 + \frac{2.05}{13.6}\right)}{(98.5 + 460)}$$

$V_{m(std)}$ = **78.021** dscf

Using equation for ambient train:

$$V_{m(std)} = 17.64 \times 94.73 \times 0.999 \times \frac{\left(\underline{29.99} + \frac{0.00}{13.6}\right)}{(76.7 + 460)}$$

$V_{m(std)}$ = **93.281** 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 A (first hour):

m_n = 0.0 + 4.2 + 0.0

m_n = 4.2 mg

Using equation for Train A (post-first hour):

m_n = 0.4 + 0.9 + 0.6

m_n = 1.9 mg

Train A aggregate:

m_n = 4.2 + 1.9
m_n = **6.1** mg

Using equation for Train B:

m_n = 0.5 + 4.3 + 1.1

m_n = **5.9** mg

C_s - Concentration of particulate matter in tunnel gas, dry basis, corrected to STP, g/dscf
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:

$$C_s = 0.001 \times \frac{6.1}{79.57}$$

C_s = **0.00008** g/dscf

For Train 2

$$C_s = 0.001 \times \frac{5.9}{78.02}$$

C_s = **0.00008** g/dscf

For Ambient Train

$$C_r = 0.001 \times \frac{0.1}{93.28}$$

C_r = **0.000001** 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 = (0.000077 - 0.000001) x 8887.5 x 576 /60

E_T = **6.45** g

For Train 2

E_T = (0.000076 - 0.000001) x 8887.5 x 576 /60

E_T = **6.36** g

Average

E = **6.40** g

Total emission values shall not differ by more than 7.5% from the total average emissions

7.5% of the average =	0.48
Train 1 difference =	0.04
Train 2 difference =	0.04

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):

$$PR = \left(\frac{576 \times 0.125 \times 13.53 \times (138.0 + 460) \times (84.3 + 460)}{1 \times 81.118 \times 14.01 \times (97.7 + 460) \times (76.0 + 460)} \right) \times 100$$

PR = **93** %

PM_{RH} - Particulate emission rate for high fire test run, g/hr;
ASTM E3053 equation (9)

$$PM_{RH} = 60(E_{TH}/\theta_{H2})$$

Where,

E_{TH} = Total particulate emissions for high fire test run including kindling and start-up, g

θ_{H2} = Total duration of high fire test run, from ignition of kindling to end of test run, min.

Sample Calculation:

E_{TH} = N/A - Applicable to High Fire Tests Only

θ_{H2} = N/A - Applicable to High Fire Tests Only

PM_{RH} = 60(N/A / N/A)

PM_{RH} = **N/A** g/hr

PM_{FH} - Particulate emission factor for high fire test run, g/dry kg of fuel burned.

ASTM E3053 equation (10)

$$PM_{FH} = E_{TH}/M_{TFBHdb}$$

Sample Calculation:

E_{TH} = N/A - Applicable to High Fire Tests Only

M_{TFBHdb} = N/A - Applicable to High Fire Tests Only

PM_{FH} = N/A / N/A

= **N/A** g/kg

PM_R - Particulate emission rate for low or medium fire test runs, g/hr
ASTM E3053 equation (12)

$$PM_R = 60(E_T/\theta)$$

Where,

E_T = Total particulate emissions for low or medium fire test runs from Test Method E2515, g

Sample Calculation:

E_T = 6.40
θ = 576

PM_R = 60(6.40 / 576)

PM_{RH} = **0.67** g/hr

PM_{FH} - Particulate emission factor for high fire test run, g/dry kg of fuel burned.

ASTM E3053 equation (13)

$$PM_F = E_T/M_{TFBdb}$$

Sample Calculation:

E_T = 6.40
M_{TFBdb} = 9.92

PM_{FH} = 6.40 / 9.92
= **0.64** g/kg

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
RESEARCH TRIANGLE PARK, NC 27711

FEB 2 8 2018

OFFICE OF
AIR QUALITY PLANNING
AND STANDARDS

Mr. Justin White
Hearthstone QHPP, Inc.
#17 Stafford Ave.
Morrisville, VT 05661

Dear Mr. White,

I am writing in response to your letter dated January 12, 2018, regarding wood heaters manufactured by Hearthstone QHPP, Inc. (Hearthstone). This response, dated February 28, 2018, supercedes our previous response (dated February 26, 2018) to correct an inaccuracy regarding required changes to ASTM E3053-17.

You are requesting to use an alternative test method, using cord wood, as referenced in section 60.532(c) of 40 CFR part 60, Subpart AAA, Standards of Performance for New Residential Wood Heaters (Subpart AAA) to meet the 2020 cord wood alternative compliance option. The 2020 cord wood alternative compliance option states that each affected wood heater manufactured or sold at retail for use in the United States on or after May 15, 2020, must not discharge into the atmosphere any gases that contain particulate matter in excess of 2.5 g/hr. Compliance must be determined by a cord wood test method approved by the Administrator along with the procedures in 40 CFR 60.534. You have requested approval to use the procedures and specifications found in ASTM Method E3053-17, a cord wood test method titled, "Standard Test Method for Determining Particulate Matter Emissions from Wood Heaters using Cordwood Test Fuel," in conjunction with ASTM E2515-11 and Canadian Standards Administration (CSA) Method CSA-B415.1-10, which are specified in 40 CFR 60.534.

We understand that Hearthstone is also requesting that the alternative method proposed above be approved to apply broadly to all wood heaters manufactured by Hearthstone meeting the requirements of Subpart AAA, from the approval date of this request until such time that Subpart AAA is revised or replaced to require a different cord wood certification method, providing all requirements of section 60.533 of Subpart AAA are met.

With the caveats set forth below, we approve your alternative test method request for certifying wood heaters using ASTM E3053-17 in conjunction with section 60.534 of Subpart AAA to meet the 2020 cord wood compliance option until such time that Subpart AAA is revised or replaced to require a different cord wood certification method. We also approve application of this alternative method to all wood heaters manufactured by Hearthstone meeting the requirements of Subpart AAA.

As required in Subpart AAA, section 60.354(d), you or your approved test laboratory must also measure the first hour of particulate matter emissions for each test run using a separate filter in one of the two parallel sampling trains. These results must be reported separately and also included in the total particulate matter emissions per run. Also, as required by Subpart AAA, section 60.534(e), you must have your approved laboratory measure the efficiency, heat output, and carbon monoxide emissions of the tested wood heater using CSA-B415.1-10. For measurement of particulate matter emission concentrations, ASTM 2515-11 must be used.

The following change to ASTM E3053-17 must be followed:

1. Coal bed conditions prior to loading test fuel. The coal bed shall be a level plane without valleys or ridges for all test runs in the high, low, and medium burn rate categories.

The following changes to ASTM E2515-11 must be followed:

1. The filter temperature must be maintained between 80 and 90 degrees F during testing.

2. Filters must be weighed in pairs to reduce weighing error propagation; see ASTM 2515-11, Section 10.2.1 Analytical Procedure.

3. Sample filters must be Pall TX-40 or equivalent Teflon-coated glass fiber, and of 47 mm, 90 mm, 100 mm, or 110 mm in diameter.

4. Only one point is allowed outside the +/- 10 percent proportionality range per test run.

A copy of this letter must be included in each certification test report where this alternative test method is utilized.

It is reasonable that this alternative test method approval be broadly applicable to all wood heaters subject to the requirements of 40 CFR part 60, Subpart AAA. For this reason, we will post this letter as ALT-125 on our website at *http://www3.epa.gov/ttn/emc/approalt.html* for use by other interested parties. As noted earlier in this letter, this alternative method approval is valid until such time that Subpart AAA is revised or replaced to require a different cord wood certification method, and at such time, this alternative will be reconsidered and possibly withdrawn.

If you have additional questions regarding this approval, please contact Michael Toney of my staff at 919-541-5247 or toney.mike@epa.gov.

Sincerely,

Steffan M. Johnson, Group Leader
Measurement Technology Group

cc: Amanda Aldridge, EPA/OAQPS/OID
Adam Baumgart-Getz, EPA/OAQPS/OID
Rafael Sanchez, EPA/OECA
Michael Toney, EPA/OAQPS/AQAD

duplicate serial number **439**

Tested & Listed By OMNI-Test Laboratories, Inc. Portland Oregon USA

0219WS021S

LISTED SPACE HEATER, SOLID FUEL TYPE, ALSO SUITABLE FOR MOBILE HOME INSTALLATION / APPAREIL DE CHAUFFAGE AMBIANT HOMOLOGUÉ À COMBUSTIBLE SOLIDE, CONVENANT AUSSI POUR INSTALLATION DANS UNE MAISON MOBILE

DO NOT REMOVE THIS LABEL/
NE RETIREZ PAS CETTE ÉTIQUETTE

439

MODEL: REGENCY SMALL FREESTANDING STOVE - F2500
TESTED TO: ULC S627-00 / UL 1482-2011 (R2015)

U.S. ENVIRONMENTAL PROTECTION AGENCY Certified to comply with 2020 particulate emission standards using cord wood." Tested to ASTM E3053. Model Regency F2500 – 1.0g /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.
Certifié conforme aux normes 2020 du U.S. ENVIRONMENTAL PROTECTION AGENCY en matière d'émission de particules de bois avec du bois de corde". Approuvé ASTM E3053. Modèle Regency F2500 – 1,0 g /h. Cet appareil de chauffage au bois doit être inspecté périodiquement et réparé pour fonctionner correctement. Consulter le manuel d'installation pour plus d'information. La réglementation fédérale interdit de faire fonctionner un tel appareil si les consignes d'utilisation contenues dans le présent manuel ne sont pas respectées.

INSTALL AND USE ONLY IN ACCORDANCE WITH THE MANUFACTURER'S INSTALLATION AND OPERATING INSTRUCTIONS. CONTACT LOCAL BUILDING OR FIRE OFFICIALS ABOUT RESTRICTIONS AND INSTALLATION INSPECTION IN YOUR AREA. USE 150 MM (6 IN.) DIAMETER MINIMUM 24 MSG BLACK OR 26 MSG BLUED STEEL CONNECTOR WITH LISTED UL103 HT FACTORY-BUILT CHIMNEY SUITABLE FOR USE WITH SOLID FUELS OR MASONRY CHIMNEY.
SEE LOCAL BUILDING CODE AND MANUFACTURER'S INSTRUCTIONS FOR PRECAUTIONS REQUIRED FOR PASSING A CHIMNEY THROUGH A COMBUSTIBLE WALL OR CEILING. DO NOT PASS CHIMNEY CONNECTOR THROUGH COMBUSTIBLE WALL OR CEILING. DO NOT CONNECT THIS UNIT TO A CHIMNEY FLUE SERVING ANOTHER APPLIANCE.

INSTALLER ET UTILISER SEULEMENT SELON LES INSTRUCTIONS D'INSTALLATION ET D'UTILISATION DU FABRICANT. CONTACTER LES RESPONSABLES DU BÂTIMENT OU DU SERVICE-INCENDIE DE VOTRE RÉGION POUR CONNAÎTRE LES RESTRICTIONS ET EXIGENCES D'INSPECTION DANS VOTRE RÉGION. UTILISER UN CONNECTEUR D'UN DIAMÈTRE MINIMAL DE 150 MM (6 PO) 24 MSG EN ACIER NOIR OU 26 MSG EN ACIER BRONZÉ AVEC CHEMINÉE PRÉFABRIQUÉE HOMOLOGUÉE UL103 HT CONÇUE POUR UTILISATION AVEC COMBUSTIBLES SOLIDES OU UNE CHEMINÉE DE MAÇONNERIE.
VOIR LE CODE DU BÂTIMENT LOCAL ET LES INSTRUCTIONS DU FABRICANT CONCERNANT LES PRÉCAUTIONS EXIGÉES POUR INSTALLER UNE CHEMINÉE TRAVERSANT UN MUR OU PLAFOND EN MATÉRIAUX COMBUSTIBLES. NE FAITES PAS TRAVERSER LE CONNECTEUR DE CHEMINÉE DANS UN MUR OU PLAFOND EN MATÉRIAUX COMBUSTIBLES. NE RACCORDEZ PAS CE POÊLE À BOIS À UN CONDUIT DE CHEMINÉE DESSERVANT UN AUTRE APPAREIL.

MINIMUM ALCOVE CEILING HEIGHT: 2109 MM / 83" MAXIMUM ALCOVE DEPTH 915 MM / 36 IN.
MINIMUM CLEARANCES FOR HORIZONTAL CONNECTOR TO CEILING: 455 MM / 18"
THE SPACE BENEATH THE HEATER MUST NOT BE OBSTRUCTED. OPERATE ONLY WITH FIREBRICKS IN PLACE.

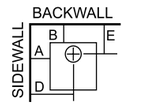
FOR USE WITH SOLID WOOD FUEL ONLY. USE OF OTHER FUELS MAY DAMAGE HEATER AND CREATE A HAZARDOUS CONDITION. DO NOT OBSTRUCT COMBUSTION AIR OPENINGS. OPERATE ONLY WITH FIREBRICKS IN PLACE. RISK OF SMOKE AND FLAME SPILLAGE, OPERATE ONLY WITH DOORS FULLY CLOSED. IF INSTALLED IN A MOBILE HOME OPERATE ONLY WITH DOORS FULLY CLOSED - OPEN FEED DOOR TO FEED FIRE ONLY. DO NOT USE GRATE OR ELEVATE FIRE. BUILD WOOD FIRE DIRECTLY ON HEARTH. DO NOT OVERFIRE - IF HEATER OR CHIMNEY CONNECTOR GLOWS YOU ARE OVERFIRING. INSPECT AND CLEAN CHIMNEY AND CONNECTOR FREQUENTLY. UNDER CERTAIN CONDITIONS OF USE CREOSOTE BUILDUP MAY OCCUR RAPIDLY. KEEP FURNISHINGS AND OTHER COMBUSTIBLE MATERIAL AWAY FROM HEATER. REPLACE GLASS ONLY WITH NEOCERAM GLASS. COMBUSTIBLE FLOOR MUST BE PROTECTED BY NON-COMBUSTIBLE MATERIAL EXTENDING BENEATH THE HEATER AND TO THE FRONT AND SIDES AS INDICATED OR TO THE NEAREST PERMITTED COMBUSTIBLE MATERIAL.
OPTIONAL COMPONENT: FAN PART #075-917, ELECTRICAL RATING: VOLTS 115, 60 HZ, 2 AMPS
DANGER: RISK OF ELECTRIC SHOCK. DISCONNECT POWER BEFORE SERVICING UNIT. DO NOT ROUTE POWER CORD UNDER OR IN FRONT OF APPLIANCE.
COMPONENTS REQUIRED FOR MOBILE HOME INSTALLATION: OUTSIDE AIR KIT
IN CANADA: LISTED ULCS 629 CHIMNEY. USE CHIMNEY COMPONENTS AS SPECIFIED IN INSTALLATION/INSTRUCTIONS
IN USA: LISTED UL 103 HT CHIMNEY
WARNING: ONLY USE LISTED REGENCY OPTIONS SUCH AS LEGS, AIRMATE, FAN AS SHOWN IN THE INSTALLATION MANUAL.
CAUTION: BURNING OF MATERIALS OTHER THAN THE SPECIFIED FUEL MAY MAKE THE CATALYST IN THE COMBUSTOR INACTIVE.
CAUTION: THE COMBUSTOR IS FRAGILE, HANDLE CAREFULLY.
COMBUSTOR: PART #000-000
CAUTION: MOVING PARTS MAY CAUSE INJURY.
CAUTION: BURNING OF MATERIAL OTHER THAN THE SPECIFIED FUELS MAY TAKE THE CATALYST IN THE COMBUSTOR INACTIVE. THE COMBUSTOR IS FRAGILE, HANDLE CAREFULLY, THE PERFORMANCE OF THE CATALYTIC DEVISE OR ITS DURABILITY HAS NOT BEEN EVALUATED AS PART OF THE CERTIFICATION.
HAUTEUR MINIMALE DU PLAFOND DE L'ALCÔVE : 2108 MM / 83 PO PROFONDEUR MAXIMALE DE L'ALCÔVE : 915 MM / 36 PO
DÉGAGEMENT MINIMAL DU PLAFOND POUR UN CONNECTEUR HORIZONTAL : 455 MM / 18 PO.
L'ESPACE AU-DESSOUS DU POÊLE NE DOIT PAS ÊTRE OBSTRUÉ. UTILISER SEULEMENT AVEC LES BRIQUES RÉFRACTAIRES EN PLACE.
POUR UTILISATION AVEC BOIS SOLIDE SEULEMENT. L'UTILISATION D'AUTRES COMBUSTIBLES PEUT ENDOMMAGER LE POÊLE ET CRÉER UNE CONDITION DANGEREUSE. NE PAS OBSTRUER LES OUVERTURES D'AIR DE COMBUSTION. UTILISER SEULEMENT AVEC LA PORTE FERMÉE – OUVRIR LA PORTE DE CHARGEMENT POUR ALIMENTER LE FEU SEULEMENT. NE PAS UTILISER DE GRILLE À BÛCHES NI SURÉLEVER LE FEU. MONTER LE FEU DE BOIS DIRECTEMENT SUR L'ÂTRE. NE PAS SURCHAUFFER – SI LE POÊLE OU LE CONNECTEUR DE CHEMINÉE SE MET À ROUGIR, VOUS SURCHAUFFEZ. INSPECTEZ ET NETTOYEZ FRÉQUEMMENT LA CHEMINÉE ET LE CONNECTEUREN CERTAINES CONDITIONS D'UTILISATION, UN DÉPÔT DE CRÉOSOTE PEUT SE FORMER RAPIDEMENT. GARDEZ LES MEUBLES ET AUTRES MATÉRIAUX COMBUSTIBLES ÉLOIGNÉS DU POÊLE. REMPLACEZ LA VITRE SEULEMENT PAR DU VERRE EN NEOCERAM. LE PLANCHER COMBUSTIBLE DOIT ÊTRE PROTÉGÉ PAR DES MATÉRIAUX NON COMBUSTIBLES DÉPASSANT DU DESSOUS, DU DEVANT ET DES CÔTÉS DU POÊLE, TEL QU'INDIQUÉ, OU JUSQU'AU MATÉRIAU COMBUSTIBLE LE PLUS PRÈS PERMIS.
COMPOSANTS EN OPTION : VENTILATEUR, ALIMENTATION ÉLECTRIQUE : 115 VOLTS, 60 HZ, 2 AMP.
DANGER : RISQUE D'ÉLECTROCUTION. DÉCONNECTER L'ALIMENTATION ÉLECTRIQUE AVANT DE FAIRE L'ENTRETIEN DU POÊLE. NE PAS INSTALLER LE CORDON ÉLECTRIQUE SOUS OU DEVANT L'APPAREIL.
COMPOSANTS EXIGÉS POUR INSTALLATION DANS UNE MAISON MOBILE : KIT DE PRISE D'AIR EXTÉRIEUR.
AU CANADA : CHEMINÉE HOMOLOGUÉE ULCS 629. UTILISER LES PIÈCES DE LA CHEMINÉE TEL QUE SPÉCIFIÉ DANS LES CONSIGNES D'INSTALLATION.
AUX ÉTATS-UNIS : CHEMINÉE HOMOLOGUÉE UL103HT.

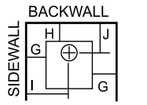
MANUFACTURED BY/ FABRIQUÉ PAR :
FPI FIREPLACE PRODUCTS INTERNATIONAL LTD.
6988 VENTURE ST.
DELTA, BC V4G 1H4

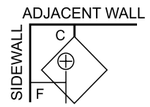
REGENCY FIREPLACE PRODUCTS

MINIMUM CLEARANCES TO COMBUSTIBLE MATERIALS
DÉGAGEMENTS MINIMUMS AUX MATÉRIAUX COMBUSTIBLES

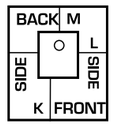
F2500M WITH AIRMATE SHIELD			F2500M WITH REAR DEFLECTOR		
MEASURE FROM	HEATER	FLUE CENTER-LINE	MEASURE FROM	HEATER	FLUE CENTER-LINE
RESIDENTIAL INSTALLATION USING SINGLE WALL CONNECTOR			**RESIDENTIAL INSTALLATION USING SINGLE WALL CONNECTOR**		
SIDEWALL	A 381 mm / 15 in	D 686 mm / 27 in	SIDEWALL	A 457 mm / 18 in	D 696 mm / 27 in
BACKWALL	B 241 mm / 9.5 in	E 470 mm / 18.5 in	BACKWALL	B 305 mm / 12 in	E 470 mm / 18.5 in
CORNER	C 127 mm / 5 in	F 432 mm / 17 in	CORNER	C 127 mm / 5 in	F 432 mm / 17 in
INSTALLATION USING LISTED DOUBLE WALL CONNECTOR - MOBILE HOME			**INSTALLATION USING LISTED DOUBLE WALL CONNECTOR - MOBILE HOME**		
SIDEWALL	A 381 mm / 15 in	D 685 mm / 27 in	SIDEWALL	A 380 mm / 15 in	D 685 mm / 27 in
BACKWALL	B 178 mm / 7 in	E 406 mm / 16 in	BACKWALL	B 241 mm / 9.5 in	E 406 mm / 16 in
CORNER	C 127 mm / 5 in	F 432 mm / 17 in	CORNER	C 127 mm / 5 in	F 432 mm / 17 in
INSTALLATION USING LISTED DOUBLE WALL CONNECTOR - RESIDENTIAL CLOSE CLEARANCE			**INSTALLATION USING LISTED DOUBLE WALL CONNECTOR - RESIDENTIAL CLOSE CLEARANCE**		
SIDEWALL	A 380 mm / 15 in	D 685 mm / 27 in	SIDEWALL	A 380 mm / 15 in	D 685 mm / 27 in
BACKWALL	B 178 mm / 7 in	E 406 mm / 16 in	BACKWALL	B 241 mm / 9.5in	E 406 mm / 16 in
CORNER	C 127 mm / 5 in	F 432 mm / 17 in	CORNER	C 127 mm / 5 in	F 432 mm / 17 in
INSTALLATION USING LISTED DOUBLE WALL CONNECTOR - ALCOVE			**INSTALLATION USING LISTED DOUBLE WALL CONNECTOR - ALCOVE**		
SIDEWALL	G 380 mm / 15 in	I 685 mm / 27 in	SIDEWALL	G 380 mm / 15 in	I 685 mm / 27 in
BACKWALL	H 241 mm / 9.5in	J 406 mm / 16 in	BACKWALL	H 241 mm / 9.5 in	J 406 mm / 16 in







FLOOR PROTECTION*
PROTECTION DE PLANCHER*



K 405 mm / 16 in
L 200 mm / 8 in
M 200 mm / 8 in

* In Canada, floor protection must extend 18" (450mm) to the front and 8" (200mm) to each side and back of the stove.

* Au Canada, la protection de plancher doit dépasser de 18 po (457 mm) à l'avant et de 8 po (200 mm) de chaque côté du poêle et derrière le poêle.

CAUTION

HOT WHILE IN OPERATION DO NOT TOUCH. KEEP CHILDREN, CLOTHING AND FURNITURE AWAY. CONTACT MAY CAUSE SKIN BURNS. READ NAMEPLATE AND INSTRUCTIONS.

ATTENTION

CHAUD DURANT LE FONCTIONNEMENT. NE TOUCHEZ PAS. ÉLOIGNEZ LES ENFANTS, LES VÊTEMENTS ET LES MEUBLES. LE CONTACT PEUT CAUSER DES BRÛLURES DE LA PEAU. LISEZ LA PLAQUE SIGNALÉTIQUE ET LES INSTRUCTIONS

MADE IN CANADA / FABRIQUÉ AU CANADA

919-413

DATE OF MANUFACTURE
JAN ☐ FEB ☐ MAR ☐ APR ☐ MAY ☐ JUN ☐ JUL ☐ AUG ☐ SEPT ☐ OCT ☐ NOV ☐ DEC ☐
2018 ○ 2019 ○ 2020 ○ 2021 ○ 2022 ○

Part #: 919-413

Size: 6.53" H x 10.8" W (File at 100%)
Color: black on grey except for the items indicated as being printed in red.

Mar. 16/17: Created decal
June 06/18: Updated decal
July16/18: Updated decal w/EPA info

REGENCY®
FIREPLACE PRODUCTS

Cascades™ Series Freestanding Woodstove

Owners & Installation Manual

MODEL: F2500

Tested by:

0219WS024S

Installer: **Please complete the details on the back cover and leave this manual with the homeowner.**
Homeowner: **Please keep these instructions for future reference.**

FPI FIREPLACE PRODUCTS INTERNATIONAL LTD. 6988 Venture St., Delta, BC Canada, V4G 1H4

Thank-you for purchasing a
REGENCY FIREPLACE PRODUCT.

The pride of workmanship that goes into each of our products will give you years of trouble-free enjoyment. Should you have any questions about your product that are not covered in this manual, please contact the **REGENCY DEALER** in your area.

"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." Failure to follow the manual details can lead to smoke and CO emissions spilling into the home. It is recommended to have monitors in areas that are expected to generate CO such as heater fueling areas.

"U.S. ENVIRONMENTAL PROTECTION AGENCY Certified to comply with 2020 particulate emission standards using cord wood." Tested to ASTM E3053. Model Regency F2500 – 1.0g/hr.

"This manual describes the installation and operation of the Regency F2500 catalytic equipped wood heater. This heater meets the 2020 U.S. Environmental Protection Agency's cord wood emission limits for wood heaters. Under specific test conditions this heater has been shown to deliver heat at rates ranging from 14,746 BTU/hr. to 50,349 BTU/hr." Efficiency is determined using the B415 method resulting in lower and higher heat values. This heater generates the best efficiency when operated using well-seasoned wood and installed in the main living areas where the majority of the chimney is within the building envelope. "This wood heater contains a catalytic combustor, which needs periodic inspection and replacement for proper operation.

It is against federal regulation to operate this wood heater in a manner inconsistent with operating instructions in this manual, or if the catalytic element is deactivated or removed."

CAUTION: BURN UNTREATED WOOD ONLY. OTHER MATERIALS SUCH AS WOOD PRESERVATIVES, METAL FOILS, COAL, PLASTIC,GARBAGE, SULPHUR OR OIL MAY DAMAGE THE CATALYST

"This heater is designed to burn natural wood only. Higher efficiencies and lower emissions generally result when burning air dried seasoned hardwoods, as compared to softwoods or to green or freshly cut hardwoods."

DO NOT BURN:

- Treated wood
- Coal
- Garbage
- Cardboard
- Solvents
- Colored Paper
- Trash
- **Lawn clippings or yard waste**
- **Materials containing rubber including tires**
- **Materials containing plastic**
- **Waste petroleum products , paints or paint thinners or asphalt products**
- **Materials containing asbestos**
- **Construction or demolition debris**
- **Railroad ties**
- **Manure or animal remains**
- **Saltwater driftwood or other previously salt water saturated materials**
- **Unseasoned wood**
- **Paper products, cardboard, plywood or particle board. 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 a wood heater.**

Burning these materials may result in release of toxic fumes or render the heater ineffective and cause smoke.

The authority having jurisdiction (such as Municipal Building Department, Fire Department, Fire Prevention Bureau, etc.) should be consulted before installation to determine the need to obtain a permit.

This unit must be connected to either a listed factory built chimney suitable for use with solid fuels and conforming to, ULC629 in Canada or UL-103HT in the United States of America. or code approved masonry chimney with flue liner.

F2500 is tested and certified to ULC-S627-00 and UL1482-2011 (R2015).

SAVE THESE INSTRUCTIONS

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) or in Canada by Wood Energy Technical Training (WETT).

Wood Energy Technical Training

WARNING: Cancer and Reproductive Harm
www.P65Warnings.ca.gov
919-874

table of contents

CAUTION: To avoid burns or wood splinters, when opening/closing the fuel door or adding wood to the fire, You should always wear appropriate protective gloves to protect your hands from the heat being emitted from this fireplace.

safety decal

This is a copy of the label that accompanies each Regency Freestanding Woodstove (F2500). We have printed a copy of the contents here for your review.

NOTE: Regency units are constantly being improved. Check the label on the unit and if there is a difference, the label on the unit is the correct one.

Safety Label for F2500

duplicate serial number **439**

0219WS024S

LISTED SPACE HEATER, SOLID FUEL TYPE, ALSO SUITABLE FOR MOBILE HOME INSTALLATION / APPAREIL DE CHAUFFAGE AMBIANT HOMOLOGUÉ À COMBUSTIBLE SOLIDE, CONVENANT AUSSI POUR INSTALLATION DANS UNE MAISON MOBILE

MODEL: REGENCY MEDIUM FREESTANDING STOVE - F2500

TESTED TO: ULC S627-00 / UL 1482-2011 (R2015)

This appliance is not approved for mobile home installations in Canada (USA only)

Cet appareil n'est pas homologué pour être installé dans une maison mobile au Canada (États-Unis seulement)

DO NOT REMOVE THIS LABEL/
NE RETIREZ PAS CETTE ÉTIQUETTE

439

U.S. ENVIRONMENTAL PROTECTION AGENCY Certified to comply with 2020 particulate emission standards using cord wood." Tested to ASTM E3053. Model Regency F2500 – 1.0g /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.

Certifié conforme aux normes 2020 du U.S. ENVIRONMENTAL PROTECTION AGENCY en matière d'émission de particules de bois avec du bois de corde". Approuvé ASTM E3053. Modèle Regency F2500 – 1,0 g /h. Cet appareil de chauffage au bois doit être inspecté périodiquement et réparé pour fonctionner correctement. Consulter le manuel d'installation pour plus d'information. La réglementation fédérale interdit de faire fonctionner un tel appareil si les consignes d'utilisation contenues dans le présent manuel ne sont pas respectées.

INSTALL AND USE ONLY IN ACCORDANCE WITH THE MANUFACTURER'S INSTALLATION AND OPERATING INSTRUCTIONS. CONTACT LOCAL BUILDING OR FIRE OFFICIALS ABOUT RESTRICTIONS AND INSTALLATION INSPECTION IN YOUR AREA. USE 150 MM (6 IN.) DIAMETER MINIMUM 24 MSG BLACK OR 26 MSG BLUED STEEL CONNECTOR WITH LISTED UL103 HT FACTORY-BUILT CHIMNEY SUITABLE FOR USE WITH SOLID FUELS OR MASONRY CHIMNEY.

SEE LOCAL BUILDING CODE AND MANUFACTURER'S INSTRUCTIONS FOR PRECAUTIONS REQUIRED FOR PASSING A CHIMNEY THROUGH A COMBUSTIBLE WALL OR CEILING. DO NOT PASS CHIMNEY CONNECTOR THROUGH COMBUSTIBLE WALL OR CEILING. DO NOT CONNECT THIS UNIT TO A CHIMNEY FLUE SERVING ANOTHER APPLIANCE.

INSTALLER ET UTILISER SEULEMENT SELON LES CONSIGNES D'INSTALLATION ET D'UTILISATION DU FABRICANT. CONTACTER LES RESPONSABLES DU BÂTIMENT OU DU SERVICE-INCENDIE DE VOTRE RÉGION POUR CONNAÎTRE LES RESTRICTIONS ET EXIGENCES D'INSPECTION DANS VOTRE RÉGION. UTILISER UN CONNECTEUR D'UN DIAMÈTRE MINIMAL DE 150 MM (6 PO) 24 MSG EN ACIER NOIR OU 26 MSG EN ACIER BRONZÉ AVEC CHEMINÉE PRÉFABRIQUÉE HOMOLOGUÉE UL103 HT CONÇUE POUR ÊTRE UTILISÉE AVEC DES COMBUSTIBLES SOLIDES OU UNE CHEMINÉE EN MAÇONNERIE.

VOIR LE CODE DU BÂTIMENT LOCAL ET LES INSTRUCTIONS DU FABRICANT CONCERNANT LES PRÉCAUTIONS D'INSTALLATION D'UNE CHEMINÉE TRAVERSANT UN MUR OU UN PLAFOND EN MATÉRIAUX COMBUSTIBLES. NE PAS FAIRE TRAVERSER LE CONNECTEUR DE CHEMINÉE DANS UN MUR OU PLAFOND EN MATÉRIAUX COMBUSTIBLES. NE PAS RACCORDER CE POÊLE À BOIS À UN CONDUIT DE CHEMINÉE DESSERVANT UN AUTRE APPAREIL.

MINIMUM ALCOVE CEILING HEIGHT: 2109 MM / 83" MAXIMUM ALCOVE DEPTH 1219 MM / 48".
MINIMUM CLEARANCES FOR HORIZONTAL CONNECTOR TO CEILING: 405 MM / 16"
THE SPACE BENEATH THE HEATER MUST NOT BE OBSTRUCTED. OPERATE ONLY WITH FIREBRICKS IN PLACE.

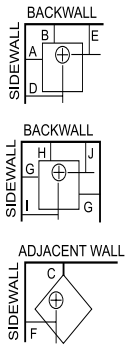
FOR USE WITH SOLID WOOD FUEL ONLY. USE OF OTHER FUELS MAY DAMAGE HEATER AND CREATE A HAZARDOUS CONDITION. DO NOT OBSTRUCT COMBUSTION AIR OPENINGS. OPERATE ONLY WITH FIREBRICKS IN PLACE. RISK OF SMOKE AND FLAME SPILLAGE, OPERATE ONLY WITH DOORS FULLY CLOSED. IF INSTALLED IN A MOBILE HOME OPERATE ONLY WITH DOORS FULLY CLOSED - OPEN FEED DOOR TO FEED FIRE ONLY. DO NOT USE GRATE OR ELEVATE FIRE. BUILD WOOD FIRE DIRECTLY ON HEARTH. DO NOT OVERFIRE - IF HEATER OR CHIMNEY CONNECTOR GLOWS YOU ARE OVERFIRING. INSPECT AND CLEAN CHIMNEY AND CONNECTOR FREQUENTLY. UNDER CERTAIN CONDITIONS OF USE CREOSOTE BUILDUP MAY OCCUR RAPIDLY. KEEP FURNISHINGS AND OTHER COMBUSTIBLE MATERIAL AWAY FROM HEATER. REPLACE GLASS ONLY WITH NEOCERAM GLASS. COMBUSTIBLE FLOOR MUST BE PROTECTED BY NON-COMBUSTIBLE MATERIAL EXTENDING BENEATH THE HEATER AND TO THE FRONT AND SIDES AS INDICATED OR TO THE NEAREST PERMITTED COMBUSTIBLE MATERIAL.
OPTIONAL COMPONENT: FAN PART #075-917, ELECTRICAL RATING: VOLTS 115, 60 HZ, 2 AMPS
DANGER: RISK OF ELECTRIC SHOCK. DISCONNECT POWER BEFORE SERVICING UNIT. DO NOT ROUTE POWER CORD UNDER OR IN FRONT OF APPLIANCE.
COMPONENTS REQUIRED FOR MOBILE HOME INSTALLATION: OUTSIDE AIR KIT
IN CANADA: LISTED ULCS 629 CHIMNEY. USE CHIMNEY COMPONENTS AS SPECIFIED IN INSTALLATION/INSTRUCTIONS
IN USA: LISTED UL 103 HT CHIMNEY
WARNING: ONLY USE LISTED REGENCY OPTIONS SUCH AS LEGS, AIRMATE, FAN AS SHOWN IN THE INSTALLATION MANUAL.
CAUTION: BURNING OF MATERIALS OTHER THAN THE SPECIFIED FUEL MAY MAKE THE CATALYST IN THE COMBUSTOR INACTIVE.
CAUTION: THE COMBUSTOR IS FRAGILE, HANDLE CAREFULLY.
COMBUSTOR: PART #021-531
CAUTION: MOVING PARTS MAY CAUSE INJURY.
CAUTION: BURNING OF MATERIAL OTHER THAN THE SPECIFIED FUELS MAY TAKE THE CATALYST IN THE COMBUSTOR INACTIVE. THE COMBUSTOR IS FRAGILE, HANDLE CAREFULLY, THE PERFORMANCE OF THE CATALYTIC DEVISE OR ITS DURABILITY HAS NOT BEEN EVALUATED AS PART OF THE CERTIFICATION.
HAUTEUR MINIMALE DU PLAFOND DE L'ALCÔVE : 2109 MM / 83 PO PROFONDEUR MAXIMALE DE L'ALCÔVE : 1219 MM / 48 PO
DÉGAGEMENT MINIMAL DU PLAFOND POUR UN CONNECTEUR HORIZONTAL : 405 MM / 16 PO.
L'ESPACE SOUS LE POÊLE NE DOIT PAS ÊTRE OBSTRUÉ. UTILISER SEULEMENT AVEC LES BRIQUES RÉFRACTAIRES EN PLACE.
À UTILISER AVEC DU BOIS SOLIDE SEULEMENT. L'UTILISATION D'AUTRES COMBUSTIBLES PEUT ENDOMMAGER LE POÊLE ET CRÉER UNE CONDITION DANGEREUSE. NE PAS OBSTRUER LES OUVERTURES D'AIR DE COMBUSTION. UTILISER SEULEMENT AVEC LA PORTE FERMÉE – OUVRIR SEULEMENT LA PORTE DE CHARGEMENT POUR ALIMENTER LE FEU. NE PAS UTILISER DE GRILLE À BÛCHES NI SURÉLEVER LE FEU. MONTER LE FEU DE BOIS DIRECTEMENT SUR L'ÂTRE. NE PAS SURCHAUFFER – SI LE POÊLE OU LE CONNECTEUR DE CHEMINÉE SE MET À ROUGIR, RISQUE DE SURCHAUFFAGE. INSPECTER ET NETTOYER FRÉQUEMMENT LA CHEMINÉE ET LE CONNECTEUR. DANS CERTAINES CONDITIONS D'UTILISATION, UN DÉPÔT DE CRÉOSOTE PEUT SE FORMER RAPIDEMENT. GARDER LES MEUBLES ET AUTRES MATÉRIAUX COMBUSTIBLES ÉLOIGNÉS DU POÊLE. REMPLACER LA VITRE SEULEMENT PAR DU VERRE EN NEOCERAM. LE PLANCHER COMBUSTIBLE DOIT ÊTRE PROTÉGÉ PAR DES MATÉRIAUX NON COMBUSTIBLES DÉPASSANT SUR LE DESSOUS, LE DEVANT ET LES CÔTÉS DU POÊLE, TEL QU'INDIQUÉ, OU JUSQU'AU MATÉRIAU COMBUSTIBLE LE PLUS PRÈS PERMIS.
COMPOSANTS EN OPTION : VENTILATEUR, ALIMENTATION ÉLECTRIQUE : 115 VOLTS, 60 HZ, 2 AMP.
DANGER: RISQUE D'ÉLECTROCUTION. DÉCONNECTER L'ALIMENTATION ÉLECTRIQUE AVANT D'EFFECTUER L'ENTRETIEN DU POÊLE. NE PAS INSTALLER LE CORDON ÉLECTRIQUE SOUS OU DEVANT L'APPAREIL.
COMPOSANTS EXIGÉS POUR INSTALLATION DANS UNE MAISON MOBILE : KIT DE PRISE D'AIR EXTÉRIEUR.
AU CANADA : CHEMINÉE HOMOLOGUÉE ULCS 629. UTILISER LES PIÈCES DE LA CHEMINÉE TEL QUE SPÉCIFIÉ DANS LES CONSIGNES D'INSTALLATION.
AUX ÉTATS-UNIS : CHEMINÉE HOMOLOGUÉE UL103HT.

MANUFACTURED BY/ FABRIQUÉ PAR :
FPI FIREPLACE PRODUCTS INTERNATIONAL LTD.
6988 VENTURE ST.
DELTA, BC V4G 1H4

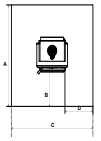
REGENCY® FIREPLACE PRODUCTS

MINIMUM CLEARANCES TO COMBUSTIBLE MATERIALS
DÉGAGEMENTS MINIMAUX PAR RAPPORT AUX MATÉRIAUX COMBUSTIBLES

F2500M WITH AIRMATE SHIELD			F2500M WITH REAR DEFLECTOR		
MEASURE FROM	HEATER	FLUE CENTER-LINE	MEASURE FROM	HEATER	FLUE CENTER-LINE
RESIDENTIAL INSTALLATION USING SINGLE WALL CONNECTOR			RESIDENTIAL INSTALLATION USING SINGLE WALL CONNECTOR		
SIDEWALL	A 406 mm / 16 in	D 711 mm / 28 in	SIDEWALL	A 406 mm / 16 in	D 711 mm / 28 in
BACKWALL	B 216 mm / 8.5 in	E 381 mm / 15 in	BACKWALL	B 267 mm / 10.5 in	E 432 mm / 17 in
CORNER	C 178 mm / 7 in	F 483 mm / 19 in	CORNER	C 178 mm / 7 in	F 483 mm / 19 in
INSTALLATION USING LISTED DOUBLE WALL CONNECTOR - MOBILE HOME			INSTALLATION USING LISTED DOUBLE WALL CONNECTOR - MOBILE HOME		
SIDEWALL	A 381 mm / 15 in	D 686 mm / 27 in	SIDEWALL	A 381 mm / 15 in	D 686 mm / 27 in
BACKWALL	B 178 mm / 7 in	E 343 mm / 13.5 in	BACKWALL	B 229 mm / 9 in	E 394 mm / 15.5 in
CORNER	C 127 mm / 5 in	F 432 mm / 17 in	CORNER	C 127 mm / 5 in	F 432 mm / 17 in
INSTALLATION USING LISTED DOUBLE WALL CONNECTOR - RESIDENTIAL CLOSE CLEARANCE			INSTALLATION USING LISTED DOUBLE WALL CONNECTOR - RESIDENTIAL CLOSE CLEARANCE		
SIDEWALL	A 381 mm / 15 in	D 686 mm / 27 in	SIDEWALL	A 381 mm / 15 in	D 686 mm / 27 in
BACKWALL	B 178 mm / 7 in	E 343 mm / 13.5 in	BACKWALL	B 229 mm / 9 in	E 394 mm / 15.5 in
CORNER	C 127 mm / 5 in	F 432 mm / 17 in	CORNER	C 127 mm / 5 in	F 432 mm / 17 in
INSTALLATION USING LISTED DOUBLE WALL CONNECTOR - ALCOVE			INSTALLATION USING LISTED DOUBLE WALL CONNECTOR - ALCOVE		
SIDEWALL	G 380 mm / 15 in	I 686 mm / 27 in	SIDEWALL	G 380 mm / 15 in	I 686 mm / 27 in
BACKWALL	H 178 mm / 7 in	J 343 mm / 13.5 in	BACKWALL	H 229 mm / 9 in	J 394 mm / 15.5 in



FLOOR PROTECTION*
PROTECTION DE PLANCHER*



A 1245 mm / 49 in (Canada)
A 1194mm / 47 in (USA)
B 457 mm / 18 in*
C 855 mm / 33-11/16 in
D 200 mm / 8 in

* In Canada, floor protection must extend 18" (457mm) to the front (16" for USA) and 8" (200mm) to each side and back of the stove.

* Au Canada, la protection de plancher doit dépasser de 18 po (457 mm) à l'avant (16 po aux États-Unis) et de 8 po (200 mm) de chaque côté du poêle et derrière le poêle.

CAUTION

HOT WHILE IN OPERATION DO NOT TOUCH. KEEP CHILDREN, CLOTHING AND FURNITURE AWAY. CONTACT MAY CAUSE SKIN BURNS. READ NAMEPLATE AND INSTRUCTIONS.

ATTENTION

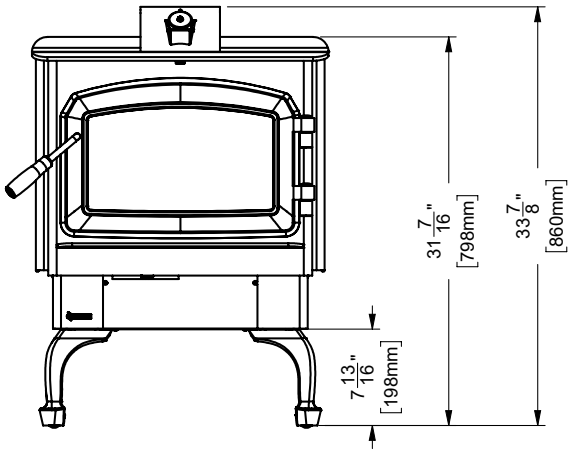
CHAUD DURANT LE FONCTIONNEMENT. NE TOUCHEZ PAS. ÉLOIGNEZ LES ENFANTS, LES VÊTEMENTS ET LES MEUBLES. LE CONTACT PEUT CAUSER DES BRÛLURES. LISEZ LA PLAQUE SIGNALÉTIQUE ET LES INSTRUCTIONS

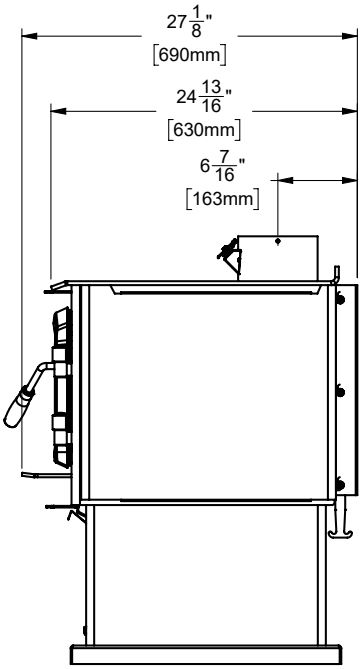
MADE IN CANADA / FABRIQUÉ AU CANADA

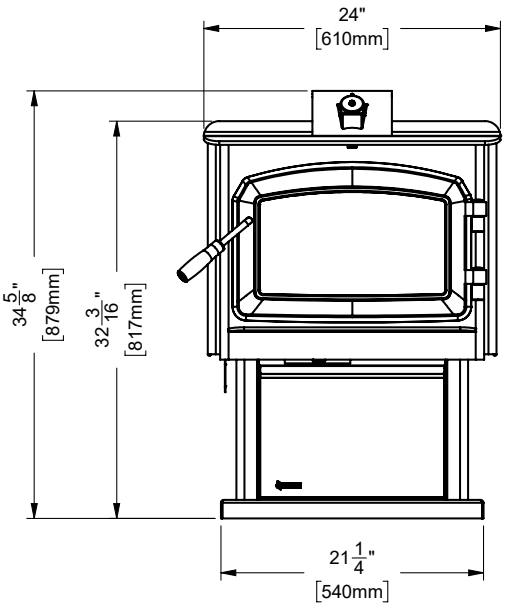
919-413b

DATE OF MANUFACTURE
2021 2022 2023 2024 2025
JAN FEB MAR APR MAY JUN JUL AUG SEPT OCT NOV DEC

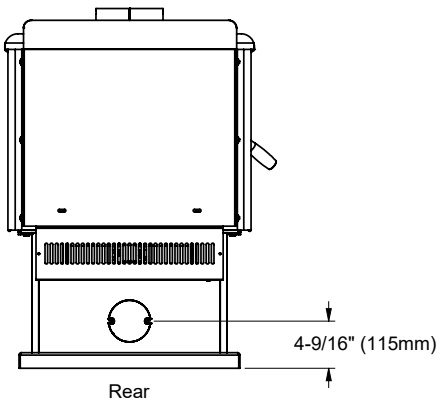
Unit Dimensions

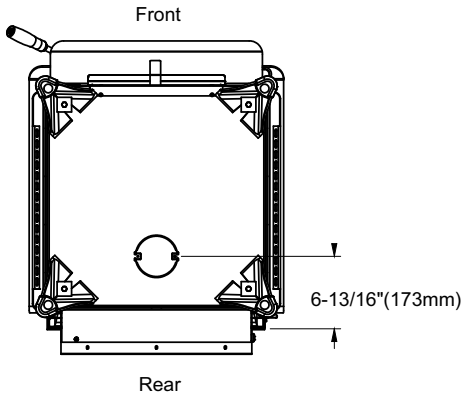






Outside Air Dimensions





installation

1. Please read this entire manual before you install and use your new woodstove. Failure to follow instructions may result in property damage, bodily injury or even death. Be aware that local Codes and Regulations may override some items in this manual. Check with your local inspector.

2. Select a position for your Regency Stove. Consult the minimum clearance chart for your model and set the stove in place. For installation use listed double wall connector systems only.

3. To insure vertical alignment, suspend a plumb bob from the ceiling over the exact center of your stove flue and mark a spot on the ceiling to indicate the center of the chimney.

4. Check that the area above the ceiling is clear for cutting. Re-confirm the clearance from the stove to combustibles to ensure that they are within the prescribed limits.

5. This woodstove must be connected to a UL 103 HT (ULC S629) listed chimney or a code approved masonry chimney with a flue liner.

   Space heater is to be connected to a factory built chimney conforming to CAN/ULC-5629 standard for 650C factory built chimneys. The chimney requirement is 6", refer to appropriate sections in this manual for specifics.

6. Install chimney according to chimney manufacturers instructions. The performance of your woodstove is governed to a very large part by the chimney system. Too short a chimney can cause difficult start-up, dirty glass, back smoking when door is open, and even reduced heat output.

   Too tall a chimney may prompt excessive draft which can result in very short burn times and excessive heat output. The use of an inexpensive flue pipe damper may be helpful in reducing excessive draft.

   CAUTION: The chimney should be the same size as the 6" flue outlet on the stove. The chimney must be listed as suitable for use with solid fuels. For other types of chimneys check with your local building code officials. Do not confuse a chimney with a type "B" Venting System used for gas appliances as suitable for a wood burning appliance. For Mobile Home installations refer to that section within this manual.

7. Mark the location of the pedestal base or legs on the floor, then move the stove aside and mark the position of the floor protector.

8. The floor protector must be of non-combustible material and must extend 16" (406mm) (USA)in front of the door opening and 8" (203mm) to the sides and rear of the unit. Some areas may require a larger size floor protector. See your local inspector. For outside air installation refer to Mobile Home installation instructions within this manual.

   NOTE: In Canada, floor protection must extend 18" (450mm) to the front and 8" (203mm) to each side and back of the stove.

9. When the floor protection is complete, position the stove with the flue collar centered under the installed chimney.

10. In areas with frequent seismic activity, Regency recommends that your unit is secured to the floor by using the bolt down holes inside the pedestal (the same ones used in Mobile Home installations).

11. For residential installations 6" (single wall OK) double wall chimney, the chimney connector must be at least 24 gauge steel. Do not use galvanized pipe. For Mobile Home installation refer to the Mobile Home installation instructions within this manual.

12. **DO NOT CONNECT THIS UNIT TO A CHIMNEY SERVING ANOTHER APPLIANCE.**

13. A chimney connector cannot pass through an attic or roof space, closet or similar concealed space, or a floor, ceiling, wall or partition of combustible construction. In Canada, if passage through a wall, or partition of combustible construction is desired, the installation shall conform to CAN/CSA-B365, Installation Code for Solid-Fuel-Burning Appliances and Equipment.

14. Your Regency Woodstove is not to be connected to any air distribution duct.

    CAUTION:
    Do not alter or makeshift chimney or install. Install as per Manual.

WHEN THIS ROOM HEATER IS NOT PROPERLY INSTALLED, 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.

Modular Installation Options

WARNING: ONLY USE SPECIFIED COMPONENTS.
The following items are required when assembling your Regency Stove. F2500 unit - the Rear Heat Deflector is supplied with the stove, but if you choose not to use it you must use the Airmate instead

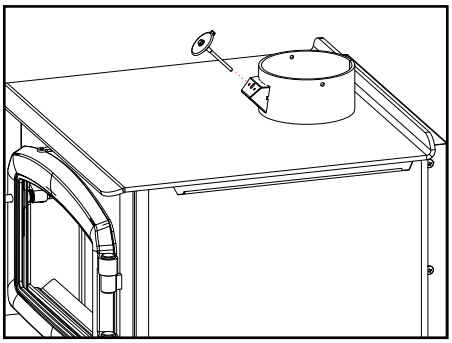
Modular Part	See the Minimum Clearance to Combustible Materials chart in the Installation section of this manual
F2500 Airmate OR Rear Heat Deflector	Convection heat with Airmate vs. Radiant Heat with Rear Heat Deflector. The Airmate pushes heat forward out into the room, the Rear Heat Deflector deflects the heat upward. Refer to the Installation sections within this manual.
OPTIONS :	
Blower/ Fan	Adding the blower will increase the area heated by the stove, it can move warm air beyond the room where the stove
Ash Drawer Kit	Adding the Ash Drawer Kit makes cleaning ashes out of the stove easier and cleaner (refer to Bottom Shield Ash Drawer Kit, Installation section)
Outside Air Kit	Allows outside combustion air to enter firebox
Bottom heat shield + legs	Used instead of pedestal
Pedestal	Used instead of heat shield and legs

Stove Assembly Prior to Installation

The F2500 unit requires the pedestal (or heat shield and legs) to be attached to the base. The F2500 stove requires either the Airmate or Rear Heat Deflector on top of the stove. Clearances to combustible materials vary depending on whether the airmate or rear heat deflector is installed, so be sure to check the Minimum Clearances, Installation section.

Thermometer Installation F2500

Install the supplied thermometer by inserting it into the bracket located at the front of the flue collar as shown below.



Airmate Assembly for F2500

1. The airmate sits on top of the stove with the slots in the sides fitting over the curved deflector on the rear stove top. See diagram 1. Discard the Rear Heat Deflector that is supplied with the unit, it is not required if the airmate is installed.

2. Center the airmate and push it forward to the front of the stove. The back of the airmate should be level with the back and sides of the rear heat shield. See Diagrams 2 & 3.

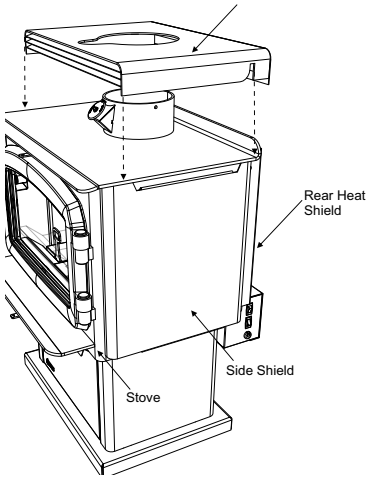


Diagram 1

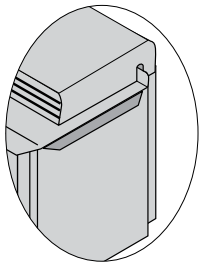


Diagram 2

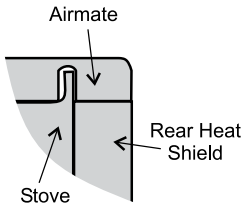


Diagram 3

Rear Heat Deflector Assembly for F2500

The rear heat deflector is supplied with the stove and must be installed unless the optional airmate has been selected. It stops the heat radiated from the flue collar from overheating the rear wall. The rear heat deflector is installed on top of the rear heat shield, as shown in Diagram 4.

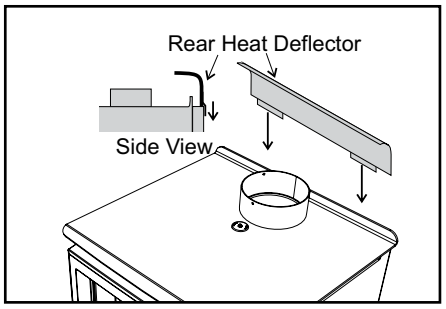


Diagram 4

Side Shield Adjustment

The left and right side shields are lowered for shipping and handling. It allows for a handhold on the top of the stove. Before placing the stove in its final position, the side shields must be raised.

Loosen the screws on the rear on the stove (3 per side), slide the side panel up as far as possible and then secure by tightening the screws.

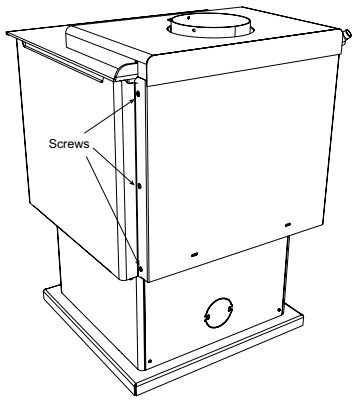


Diagram 5

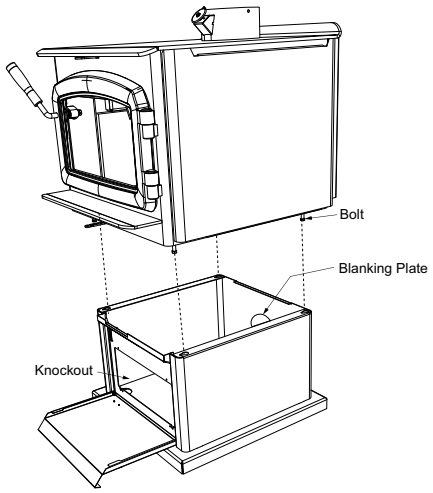
Pedestal Assembly Installation

1. For easier assembly, tip the stove on its back (onto a soft surface to prevent scratching) and remove the front cover.

   Hint: If you have chosen the Ash Drawer option, remove the ash dump cover plates before attaching the pedestal (refer to the Ash drawer Kit Installation section).

2. Important: Remove the blanking plate if:
   a) you are not installing outside combustion air or
   b) outside air is to be brought in from the rear of the stove (see below).

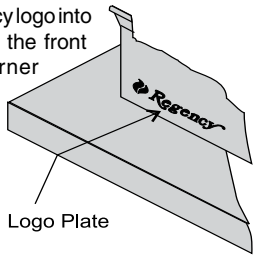
3. Using the 4 supplied 5/16" bolts in the underside of the stove, insert the bolts loosely onto the threads located at all 4 corners at the base of the unit. Align the holes in the corners of the pedestal top with the corresponding bolts in the base of the stove. Tighten each bolt from inside the pedestal.



Shown with Classic door

Logo Installation

1. Push the Regency logo into the two holes in the front bottom left corner of the pedestal cover plate.



Note: Any paint touch up should be done prior to placing logo on pedestal.

2. If not using ash drawer, then the front cover must remain in place. If using ash drawer, then remove the front cover.

Bottom Heat Shield and Legs Installation

The instructions below apply to the painted cast leg. It will be easier to attach the legs to the stove if the stove is tipped on its back (preferably on a soft surface to prevent scratching). Ensure to be extremely careful when tipping stove.

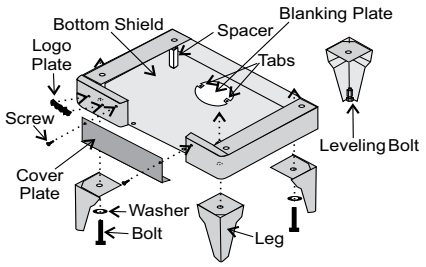
Important: Prior to installing the bottom heat shield, remove the 4 inch blanking plate. See below.
This must be removed for combustion air to enter the appliance.

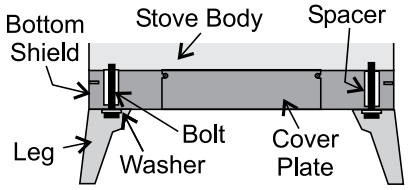
1. Remove the bolts from underside of the base of the pedestal (if installed) and discard. Also remove cover plate and put to the side.

2. Line up the heat shield with the bottom of the unit.

3. Start threading the bolt and washer (washers may be square/round) (supplied with the bottom shield) for about 1/4 of the way through the leg with the washers being underneath the legs. Ensure that the legs are properly aligned with heat shield and tighten the bolts.

4. Level the stove by adjusting the levelling bolts in the bottom of each leg.





5. Reinstall cover plate if not using ash drawer option.

6. Install logo plate onto heat shield by placing in 2 holes as shown in diagram.

If you are installing outside combustion air, bend the tabs out 90 degrees. Pipe fresh air into the bottom shield by using a minimum 4" duct pipe with a mesh grill at the outside termination. Attach the pipe to the 2 tabs with screws.

Room Air Important

For installation using room air for combustion, remove knockout from the pedestal, and/or from the bottom if using a heat shield.

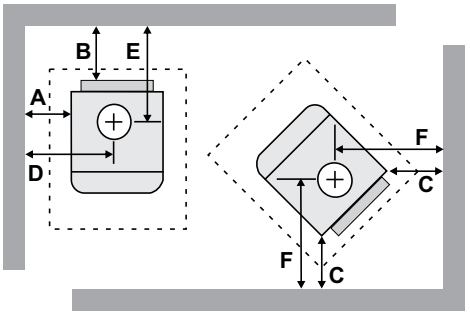
Mobile home installations require the use of outside air.

On pedestal units there are two locations where outside air may be adapted to the unit. If using the bottom of the pedestal, do not remove knock-out from the rear of the pedestal. Only remove rear knockout if outside air will be brought in from the rear.

On leg units outside air can only be brought in from the bottom of the heat shield.

Note: Once the knockout is removed there are two tabs remaining. Bend both tabs out for ease of installation when attaching outside air.

Minimum Clearance To Combustible Materials



Please read the section below carefully as clearances depend on whether the airmate or the rear heat deflector is installed on the stove.

Measurements "From Unit" are from the top plate of the stove to a side wall or to a corner, and from the rear heat shield to a back wall.

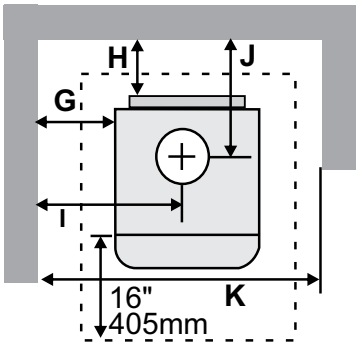
Clearances may only be reduced by means approved by the regulatory authority.
Minimum ceiling height - 83" (2108mm)

NOTE: This clearance is also required for air space between the appliance and wall/ceiling.

NOTE: Be aware that local Codes and Regulations may override some clearances listed in this manual. Check with your local inspector.

Residential Installation "C" Vent (Single Wall)						
Unit	**From Unit**		**From Corner**		**From Flue Center-Line**	
	A	**B**	**C**	**D**	**E**	**F**
Medium F2500M with Airmate	16" (406mm)	8.5" (216mm)	7" (178mm)	28" (711mm)	15" (381mm)	19" (483mm)
with Rear Deflector	16" (406mm)	10.5" (267mm)	7" (178mm)	28" (711mm)	17" (432mm)	19" (483mm)
Residential Close Clearance (To be installed with required pipe components) When the stove is installed as a close clearance residential unit, a listed double wall connector is required from the stove collar to the ceiling level.						
Unit	**From Unit**		**From Corner**		**From Flue Center-Line**	
	A	**B**	**C**	**D**	**E**	**F**
Medium F2500M with Airmate	15" (381mm)	7" (178mm)	5" (127mm)	27" (686mm)	13.5" (343mm)	17" (432mm)
with Rear Deflector	15" (381mm)	9" (229mm)	5" (127mm)	27" (686mm)	15.5" (394mm)	17" (432mm)
Mobile Home Close Clearance (To be installed with required pipe components) "C" Vent single wall pipe is not approved for Mobile Home installations. (Refer to Mobile Home Instructions.)						
Unit	**From Unit**		**From Corner**		**From Flue Center-Line**	
	A	B	C	D	E	F
Medium F2500M with Airmate	15" (381mm)	7" (178mm)	5" (127mm)	27" (686mm)	13.5" (343mm)	17" (432mm)
with Rear Deflector	15" (381mm)	9" (229mm)	5" (127mm)	27" (686mm)	15.5" (394mm)	17" (432mm)

Minimum Alcove Clearance and Clearance to Combustible Materials



The Regency Freestanding models have been alcove approved and must be installed with a listed double wall connector to the ceiling level.

Note: Minimum alcove ceiling height - 83"
Maximum depth of alcove - 48"

NOTE: This clearance is also required for air space between the appliance and wall/ceiling. Where the appliance is installed less than 8" from a rear wall, the ember pad only needs to extend to the base of the wall based on the clearances noted in this manual.

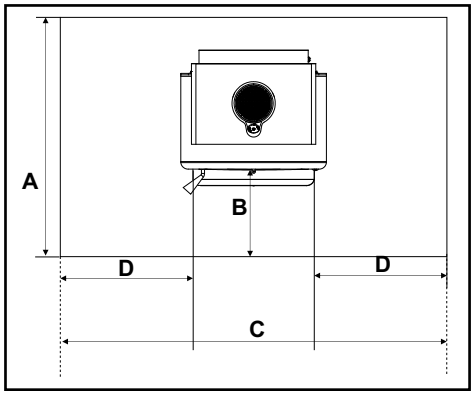
Unit	From Unit		From Flue Center-Line		From Wall
	G	H	I	J	K
Medium F2500M with Airmate	15" (381mm)	7" (178mm)	27" (686mm)	13.5"(343mm)	54" (1372mm)
with Rear Deflector	15" (381mm)	9" (229mm)	27" (686mm)	15.5"(394mm)	54" (1372mm)

Floor Protection
(Ember Protection only required)

A combustible floor must be protected by a non-combustible material (like tile, concrete board, or certified to UL-1618 Type 1 (or as defined by local codes).

Canada: Beneath the heater and extending to at least 18" on the fuel loading side and at least 8" on the sides and back.

USA: Beneath the heater and extending to at least 16" beyond the fuel loading side and ash removal opening and at least 8" on the sides and back and under the chimney connector extending 2" beyond each side for horizontal applications.



Minimum Overall Depth (Y) of Floor Protector					
		Edge of Fuel door opening to edge of hearth		Edge of Fuel Door Opening (Both Sides)	
Unit		A	B	C	D
F2500	Canada	49" (1245mm)	18" (457mm)	33 11/16" (856 mm)	8" (203mm)
	USA	47" (1194mm)	16" (406mm)	33 11/16" (856 mm)	8" (203mm)

Minimum Overall Depth (Y) of Floor Protector					
Reference only when hearth pad is installed to rear wall at minimum pipe clearances.		Hearth Depth	Edge of Fuel door opening to edge of hearth	Hearth Width	Edge of Fuel Door Opening (Both Sides)
Residential Installation "C" Vent (Single Wall)					
Unit		A	B	C	D
F2500 with Airmate	Canada	49-1/2" (1257mm)	18" (457mm)	33-11/16" (856mm)	8" (203mm)
	USA	47-1/2" (1207mm)	16" (406mm)	33-11/16" (856mm)	8" (203mm)
F2500 with Rear Deflector	Canada	51-1/2" (1308mm)	18" (457mm)	33-11/16" (856mm)	8" (203mm)
	USA	49-1/2" (1257mm)	16" (406mm)	33-11/16" (856mm)	8" (203mm)
Residential Close Clearance (To be installed with required pipe components)					
Unit		A	B	C	D
F2500 with Airmate	Canada	48" (1219mm)	18" (457mm)	33-11/16" (856mm)	8" (203mm)
	USA	46" (1168mm)	16" (406mm)	33-11/16" (856mm)	8" (203mm)
F2500 with Rear Deflector	Canada	50" (1270mm)	18" (457mm)	33-11/16" (856mm)	8" (203mm)
	USA	48" (1219mm)	16" (406mm)	33-11/16" (856mm)	8" (203mm)

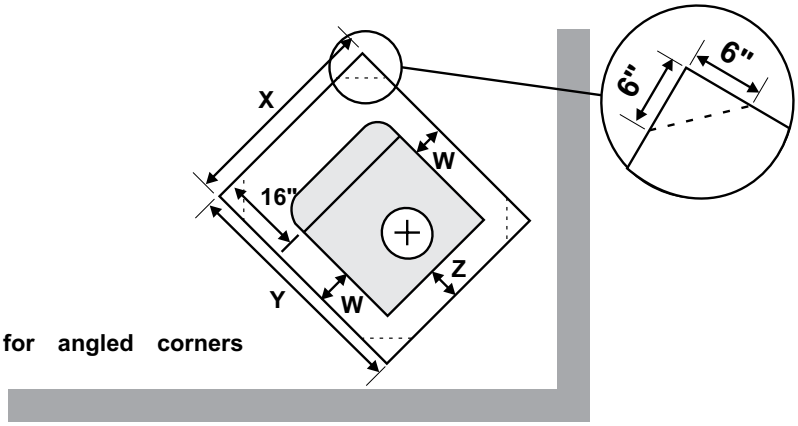
Floor Protection (Corner Installation)

A combustible floor must be protected by non-combustible material (like tile, concrete board, or certified to UL-1618 or as defined by local codes) extending beneath the heater and a minimum of 8" (203mm) from each side and minimum 16" (406mm)** from the front face of the stove and minimum 6" (152mm)** (or the rear clearance to combustibles whichever is smaller) from the rear of the stove.

When installed with horizontal venting, non-combustible floor protection must beneath the flue pipe and extend 2" (51mm) beyond each side.

Minimum Overall Width (X) of Floor Protector for all installations:

Stove	F2500M	33-11/16"(856mm)

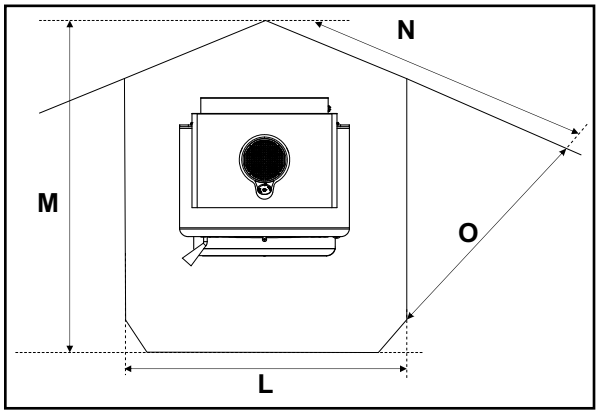


for angled corners

****NOTE: In Canada, floor protection must extend 18" (450mm) to the front and 8" (203mm) to back of the stove.**

Minimum Overall Depth (Y) of Floor Protector			
Unit	**Residential "C" Vent**		**From Edge of Fuel Door Opening**
	Y	**Z**	**W**
Medium F2500M	Canada - 49" (1245mm) USA - 47" (1194mm)	**6" (152mm)	8" (203mm)

Minimum Overall Depth (Y) of Floor Protector - Corner Hearth Reference only when hearth pad is installed to rear wall at minimum pipe clearances.				
	Hearth Depth			
F2500	**L**	**M**	**N**	**O**
Residential Installation "C" Vent (Single Wall)				
Canada	33-11/16" (856mm)	61-7/16" (1561mm)	51-1/8" (1299mm)	27-5/16" (694mm)
USA	33-11/16" (856mm)	59-7/16" (1510mm)	49-3/4" (1264mm)	25-7/8" (657mm)
Residential Close Clearance (To be installed with required pipe components)				
Canada	33-11/16" (856mm)	57-15/16" (1472mm)	48-5/8" (1235mm)	24-13/16" (630mm)
USA	33-11/16" (856mm)	55-15/16" (1421mm)	47-1/4" (1200mm)	23-7/16" (595mm)



This stove may be connected to a lined masonry chimney or a listed factory built chimney suitable for use with solid fuels and conforming to ULC629 in Canada or UL-103HT in the USA. Do not connect it to a chimney serving another appliance. To do so will affect the safe operation of both appliances, and will void the stove warranty. You must comply with the local authority having jurisdiction and/or in Canada, CSA installation standard B365-M87.

The chimney connector must be 6" diameter, 24 MSG Black/Blue steel. Do not use aluminum or galvanized steel, they cannot properly withstand the extreme temperatures of a wood fire. The chimney connector between the stove and the chimney should be as short and direct as possible.

The chimney connector must be attached to either an approved masonry chimney or one of the listed factory built chimneys suitable for use with solid wood fuel. All joints must be tight and fastened with sheet metal screws.

⚠ WARNING

THE CHIMNEY CONNECTOR IS TO BE USED ONLY WITHIN THE ROOM, BETWEEN THE STOVE AND CEILING/ WALL. NEVER USE A CHIMNEY CONNECTOR TO PASS THROUGH AN ATTIC OR ROOF SPACE, CLOSET OR SIMILAR CONCEALED SPACE, OR A FLOOR, OR CEILING. AN EFFECTIVE VAPOR BARRIER MUST BE MAINTAINED AT THE LOCATION WHERE THE CHIMNEY OR COMPONENT PENETRATES TO THE EXTERIOR OF THE STRUCTURE. ALWAYS MAINTAIN THE MINIMUM CLEARANCES TO COMBUSTIBLES AS REQUIRED BY THE APPLICABLE BUILDING CODES.

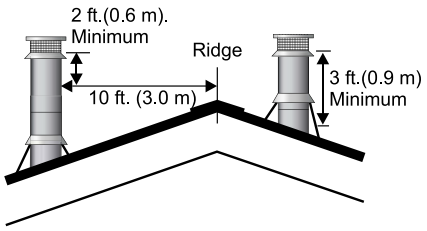
Step-By-Step Chimney And Connector Installation

Note: These are a generic set of chimney installation instructions. Always follow the manufacturers own instructions explicitly. Check the Minimum Recommended Flue Heights section (Table 1).

1. With your location already established, cut and frame the roof hole. It is recommended that no ceiling support member be cut for chimney and support box installation. If it is necessary to cut them, the members must be made structurally sound.

2. Install radiant shield and support from above.

3. Stack the insulated pipe onto your finish support to a minimum height of 3 feet above the roof penetration, or 2 feet above any point within 10 feet measured horizontally. There must be at least 3 feet of chimney above the roof level.



Note: Increasing the chimney height above this minimum level will sometimes help your unit to "breathe" better by allowing a greater draft to be created. This greater draft can decrease problems such as, difficult start-ups, back-smoking when door is open, and dirty glass. It might be sufficient to initially try with the minimum required height, and then if problems do arise add additional height at a later date.

4. Slide the roof flashing over your chimney and seal the flashing to the roof with roofing compound. Secure the flashing to your roof with nails or screws.

5. Place the storm collar over the flashing, sealing the joints with a silicone caulking.

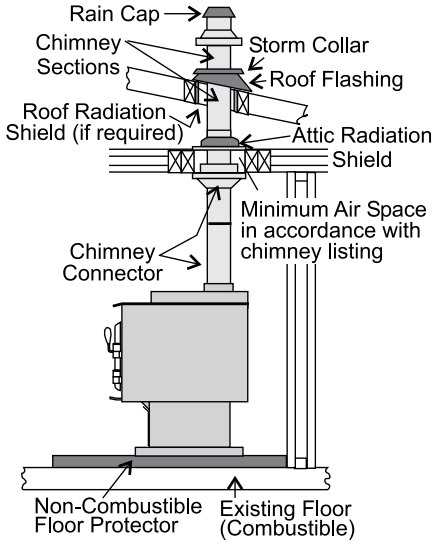
6. Fasten the raincap with spark screens (if required) to the top of your chimney.

7. To complete your chimney installation, install the double wall connector pipe from the stove's flue collar to the chimney support device.

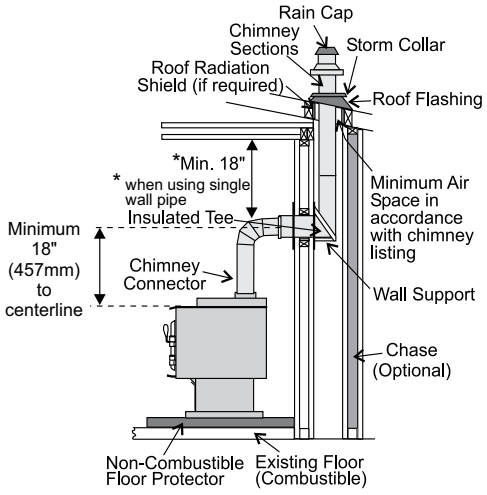
8. If you are using a horizontal connector, the chimney connector should be as high as possible while still maintaining the 18" (457mm) minimum distance from the horizontal connector to the ceiling.

NOTE: Residential Close Clearance and Alcove installations require a listed double wall connector from the stove collar to the ceiling level.

The diagrams below illustrate one way to install your unit into a standard ceiling or with a horizontal connector. Check with your dealer or installer for information on other options available to you.



Standard Ceiling Installation



Horizontal Installation

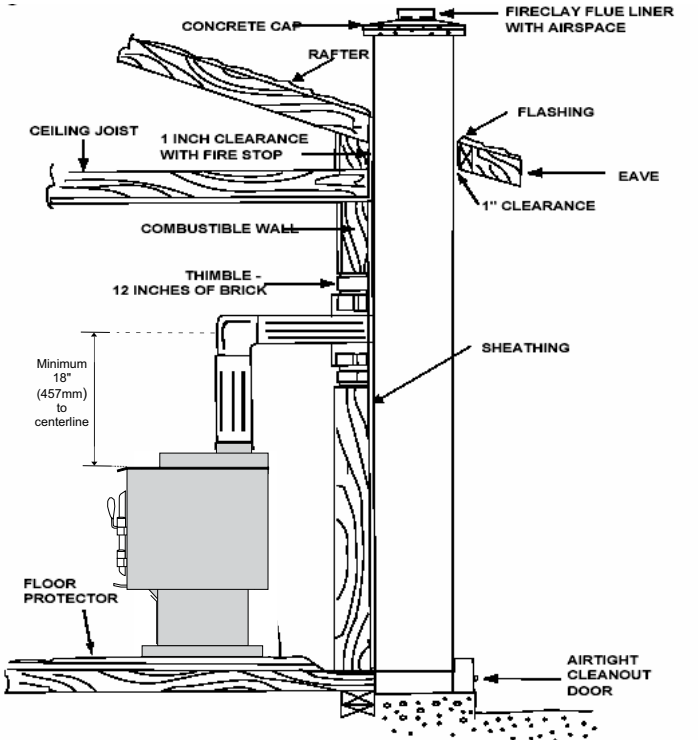
Masonry Chimney

Ensure that a masonry chimney meets the minimum standards of the National Fire Protection Association (NFPA) by having it inspected by a professional. Make sure there are no cracks, loose mortar or other signs of deterioration and blockage. Have the chimney cleaned before the stove is installed and operated. When connecting the stove through a combustible wall to a masonry chimney, special methods are needed.

Ensure that an effective vapour barrier at the location where the chimney or other component penetrates to the exterior of the structure.

When referencing installation or connection to masonry fireplaces or chimneys, the masonry construction must or shall be code complying.

This unit is designed to use either a 5.5" (140mm) or 6" (152mm) flue liner only in the confines of the masonry chimney.



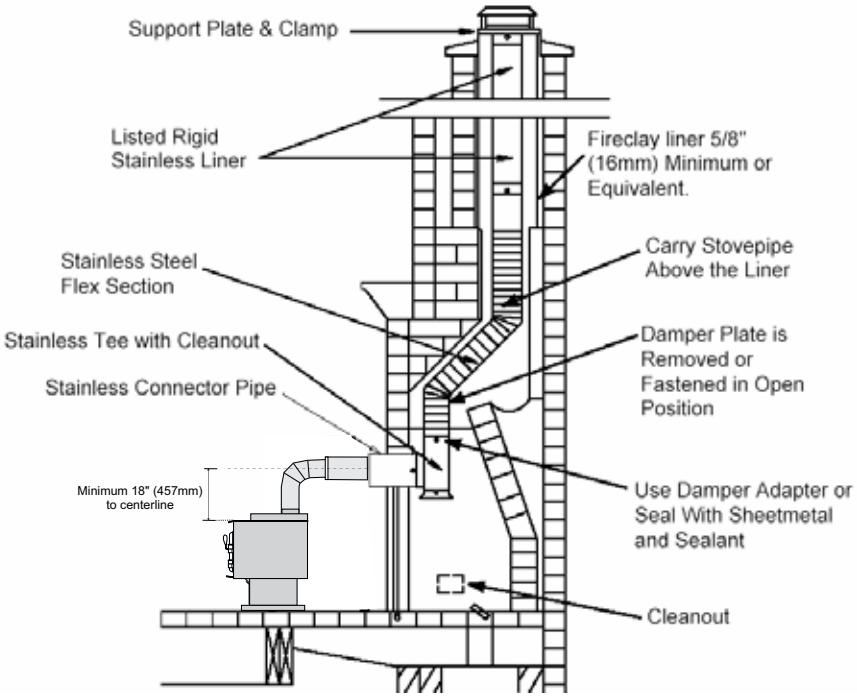
Masonry Fireplace

There are listed kits available to connect a stove to a masonry fireplace. The kit is an adapter that is installed at the location of the fireplace damper. The existing damper may have to be removed to allow installation.

Ensure that an effective vapour barrier at the location where the chimney or other component penetrates to the exterior of the structure.

This unit is designed to use either a 5.5" (140mm) or 6" (152mm) flue liner only in the confines of the masonry chimney as shown.

When referencing installation or connection to masonry fireplaces or chimneys, the masonry construction must or shall be code complying.



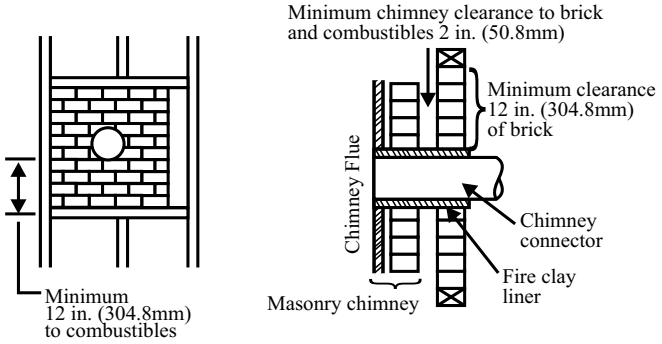
Factory Built Chimney

When a metal prefabricated chimney is used, the manufacturer's installation instructions must be followed. You must also purchase and install the ceiling support package or wall pass-through and "T" section package, firestops (where needed), insulation shield, roof flashing, chimney cap, etc. Maintain proper clearance to the structure as recommended by the manufacturer. The chimney must be the required height above the roof or other obstructions for safety and proper draft operation. The space heater is to be connected to a factory-built chimney conforming to CAN/ULC-S629, Standard for 650^{0}C Factory-Built Chimneys.

Combustible Wall Chimney Connector Pass-throughs

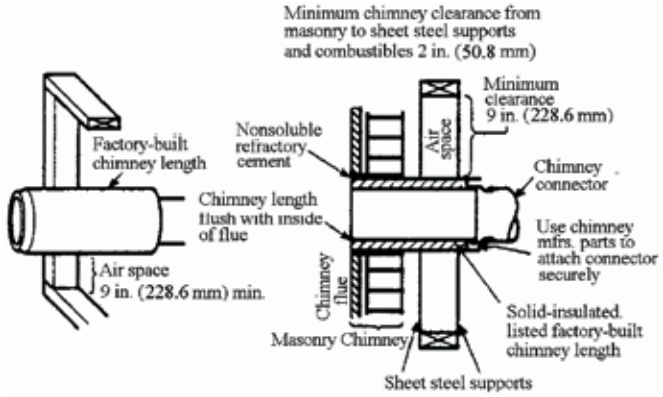
Method A: 12" (304.8 mm) Clearance to Combustible Wall Member:

Using a minimum thickness 3.5" (89 mm) brick and a 5/8" (15.9 mm) minimum wall thickness clay liner, construct a wall pass-through. The clay liner must conform to ASTM C315 (Standard Specification for Clay Fire Linings) or its equivalent. Keep a minimum of 12" (304.8 mm) of brick masonry between the clay liner and wall combustibles. The clay liner shall run from the brick masonry outer surface to the inner surface of the chimney flue liner but not past the inner surface. Firmly grout or cement the clay liner in place to the chimney flue liner.



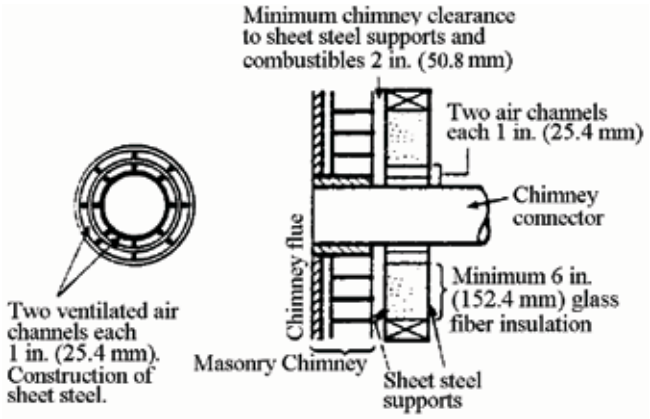
Method B: 9" (228.6 mm) Clearance to Combustible Wall Member:

Using a 6" (152.4 mm) inside diameter, listed, factory-built Solid-Pak chimney section with insulation of 1" (25.4 mm) or more, build a wall pass-through with a minimum 9" (228.6 mm) air space between the outer wall of the chimney length and wall combustibles. Use sheet metal supports fastened securely to wall surfaces on all sides, to maintain the 9" (228.6 mm) air space. When fastening supports to chimney length, do not penetrate the chimney liner (the inside wall of the Solid-Pak chimney). The inner end of the Solid-Pak chimney section shall be flush with the inside of the masonry chimney flue, and sealed with a non-water soluble refractory cement. Use this cement to also seal to the brick masonry penetration.



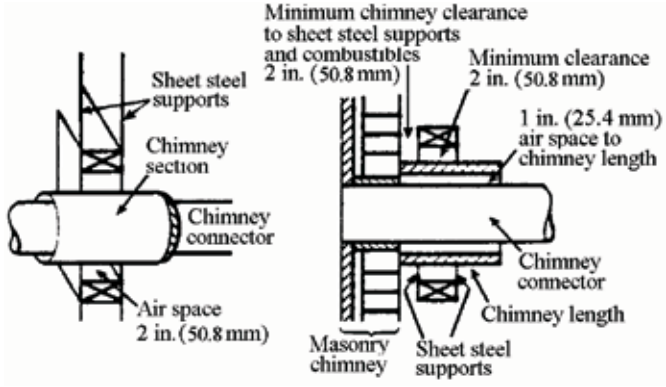
Method C: 6" (152.4 mm) Clearance to Combustible Wall Member:

Starting with a minimum 24 gage (.024" [.61 mm]) 6" (152.4 mm) metal chimney connector, and a minimum 24 gage ventilated wall thimble which has two air channels of 1" (25.4 mm) each, construct a wall pass-through. There shall be a minimum 6" (152.4 mm) separation area containing fiberglass insulation, from the outer surface of the wall thimble to wall combustibles. Support the wall thimble, and cover its opening with a 24-gage minimum sheet metal support. Maintain the 6" (152.4 mm) space. There should also be a support sized to fit and hold the metal chimney connector. See that the supports are fastened securely to wall surfaces on all sides. Make sure fasteners used to secure the metal chimney connector do not penetrate chimney flue liner.



Method D: 2" (50.8 mm) Clearance to Combustible Wall Member:

Start with a solid-pak listed factory built chimney section at least 12" (304 mm) long, with insulation of 1" (25.4 mm) or more, and an inside diameter of 6" (2 inches [51 mm] larger than the 6" [152.4 mm] chimney connector). Use this as a pass-through for a minimum 24-gage single wall steel chimney connector. Keep solid-pak section concentric with and spaced 1" (25.4 mm) off the chimney connector by way of sheet metal support plates at both ends of chimney section. Cover opening with and support chimney section on both sides with 24 gage minimum sheet metal supports. See that the supports are fastened securely to wall surfaces on all sides. Make sure fasteners used to secure the metal chimney connector do not penetrate chimney flue liner.



Mobile Home Installation (USA only)

This appliance is not approved for mobile home installations in Canada (USA only) .

For USA Installations : see Outside Air Kit - Part # 846-502.
There are further requirements when installing this unit into a mobile home in the US Only.

Once you have properly marked the position of your unit and the floor protection as outlined in the Residential Installation items #1 through #8, a supply of fresh air has to be supplied to your unit.

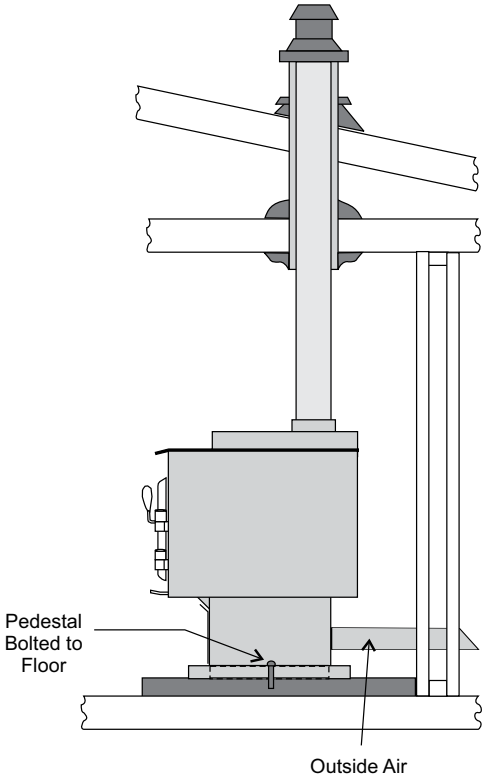
See Optional Outside Air Kit instructions in this manual.

Place your unit in position and secure it to the floor using two lag bolts 3/8" (10mm) x 3-1/2" (89mm) through the two holes inside the pedestal base. It is important to maintain the structural integrity of the Mobile Home floor, walls and roof when installing your unit.

For Mobile Home units installed in the U.S. the unit must be grounded using a #8 ground wire with approved termination and star washer.

CAUTION: At no time use unlabelled parts, or substitute parts made for another chimney system.

Install as per chimney manufacturer's installation instructions.



WARNING: Operate only with door fully closed - open feed door to feed fire only.

1. Identify the position of the outside air damper by the orientation of the metal handle that rests outside the galvanized pipe. The metal handle and the damper disc are in line with each other. This means that if the metal handle is in a horizontal position, the damper is flat and fully open.

2. Open the damper fully whenever you start a fire. This will allow the outside air to be drawn in the pedestal base eliminating any potential smoke escaping the stove and entering the room. (Negative air pressure)

In addition to standard installation instructions the following requirements are mandatory for installation in a mobile home.

1. **The stove must be permanently bolted to the floor of the Mobile Home using the floor screws provided.**

2. The stove must have a permanent outside air source for combustion.

3. The stove must be electrically grounded to the steel chassis of the Mobile Home.

4. A listed double-wall connector chimney system, roof thimble, spark arrestor and roof flashing kit suitable for use in Mobile Homes must be used.

5. If the chimney exits the Mobile Home at a location other than through the roof, and exits at a point 7ft. (2130mm) or less above the ground level on which the Mobile Home is positioned a guard or method of enclosing the chimney shall be fitted at the point of exit for a height up to 7ft. (2130mm).

6. The chimney shall be attached directly to the room heater and shall extend at least 3 ft. (914mm) above the part of the roof through which it passes. The top of the chimney should project at least 2ft. (610mm) above the highest elevation of any part of the Mobile Home within 10 ft. (3048mm) of the chimney.

7. The chimney system shall comply with Local Requirements.

8. Any openings in a chimney guard where required must not permit the entrance of 3/4" (19mm) diameter rod.

9. **CAUTION: THE STRUCTURAL INTEGRITY OF THE MOBILE HOME ROOF, FLOOR, WALLS AND CEILING MUST BE MAINTAINED.**

10. Check any other local building code as other local codes may apply.

11. **WARNING: DO NOT INSTALL IN A SLEEPING ROOM OF A MOBILE HOME.**

12. Use silicone to create an effective vapour barrier at the location where the chimney or other component penetrates to the exterior of the structure.

TABLE 1

MINIMUM RECOMMENDED FLUE HEIGHTS IN FEET
(Measured from the top of the unit)

ELEVATION (FT) ABOVE SEA LEVEL	# OF ELBOWS						
	0	2 x 15°	4 x 15°	2 x 30°	4 x 30°	2 x 45°	4 x 45°
0-1000	12.0	13.0	14.0	15.0	18.0	16.0	20.0
1000-2000	12.5	13.5	14.5	15.5	19.0	16.5	21.0
2000-3000	13.0	14.0	15.0	16.0	19.5	17.0	21.5
3000-4000	13.5	14.5	15.5	17.0	20.0	18.0	22.5
4000-5000	14.0	15.0	16.0	17.5	21.0	18.5	23.0
5000-6000	14.5	15.5	17.0	18.0	21.5	19.0	24.0
6000-7000	15.0	16.0	17.5	18.5	22.5	20.0	25.0
7000-8000	15.5	16.5	18.0	19.0	23.0	20.5	25.5
8000-9000	16.0	17.0	18.5	20.0	24.0	21.0	26.5
9000-10000	16.5	17.5	19.0	20.5	24.5	22.0	27.0

NOTE: No more than two offsets (four elbows) allowed. Two 45° elbows equal one 90° elbow.

Recommended Heights For Woodstove Flue

Simple rules on draft. See Table 1.

1) At sea level minimum height is 12' straight.

2) Add the following vertical height to compensate for:
45 deg. elbow = 1 ft.
90 deg. elbow = 2 ft.
"T" = 3 ft.
Each foot of horizontal run = 2 ft.

3) Add 4% overall for each 1000' above sea level.

Example: a)
1-1/2 ft. of horizontal run = 3 ft.
one "T" = 3 ft.
Total Addition (at sea level) = 6 ft.

Example: b)
One 90 deg. elbow = 2 ft.
2 ft. of horizontal run = 4 ft.
one "T" = 3 ft.
Total Addition (at sea level) = 9 ft.

	Recommended Flue Height	
Elevation	**Example a)**	**Example b)**
0'	18'	21'
1000'	18.72'	21.84'
2000'	19.44'	22.68'
5000'	21.60'	25.20'
8000'	23.76'	27.72'

Draft is the force which moves air from the appliance up through the chimney. The amount of draft in your chimney depends on the length of the chimney, local geography, nearby obstructions and other factors. Too much draft may cause excessive temperatures in the appliance and may cause damage. An uncontrollable burn or excessive temperature indicates excessive draft. Inadequate draft may cause back puffing into the room and plugging of the chimney. Inadequate draft will cause the appliance to leak smoke into the room through appliance and chimney connector joints. Ensure the heater is installed in areas that are not too close to neighbors or in valleys that would cause unhealthy air quality or nuisance conditions.

WARNING:
DO NOT INSTALL IN SLEEPING ROOM

CAUTION: The structural integrity of the mobile home floor, wall and ceiling/roof must be maintained.

Optional Outside Air Kit

The Outside Air Kit is an option for Freestanding Stoves. Outside air for combustion can be brought in either through the bottom of the pedestal or through the rear plate of the pedestal.

For both bottom and rear outside air the Pedestal Cover Plate must be installed. Loosen the 4 screws on the rear of the pedestal and slide the cover plate over them. Slide the plate to the left to center it and tighten down the 4 screws.

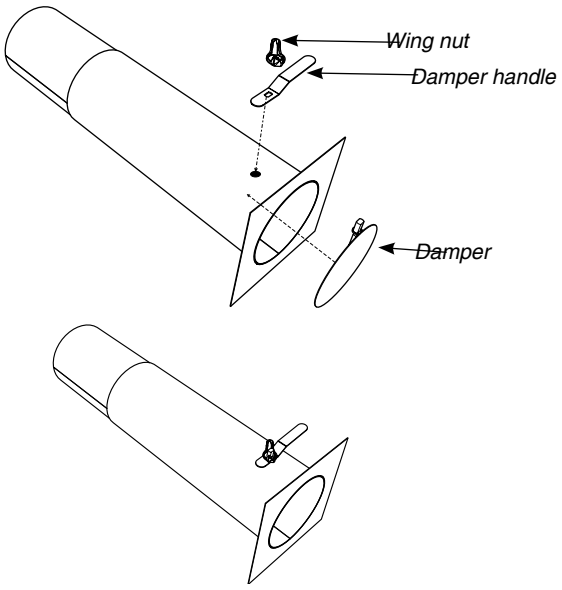
Damper Installation

NOTE: The damper cannot be installed if attaching outside air to the bottom of the appliance.

Supplied damper allows the combustion air to be closed off when unit is not in operation.

Install the damper within the round pipe in an easily accessible location.

1. Drill a 5/16" hole in the desired location.
2. Insert damper with threaded section out.
3. Install damper handle and secure with wing nut.

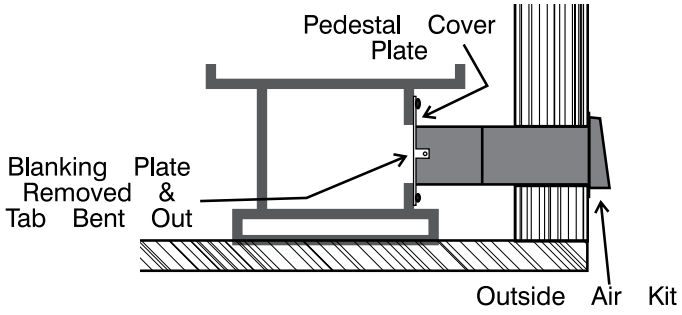


Completed Install

Outside Air Through Pedestal Rear

Remove the blanking plate from the rear of the pedestal and bend the two tabs out 90 degrees. Pipe fresh air into the pedestal area by using a minimum 4" metallic duct pipe with a mesh grill at the outside termination.

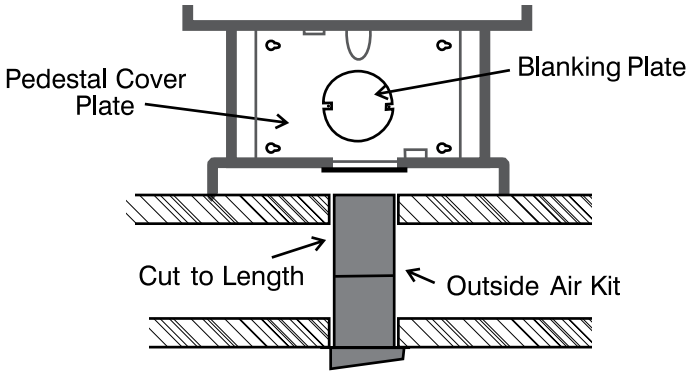
Fasten the pipe to the cover plate using the tabs and 2 screws.



Side View

Outside Air Through Pedestal Bottom

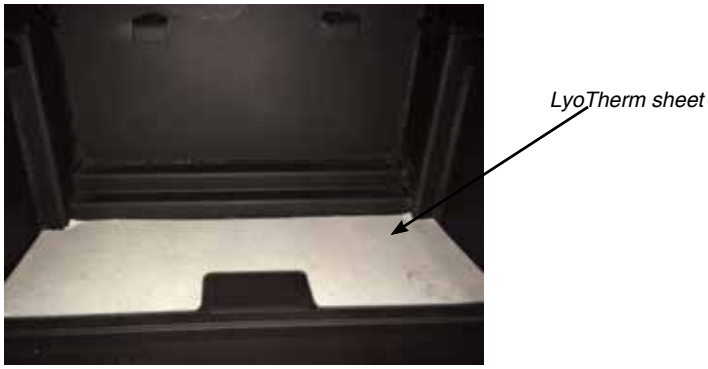
Mark the position of your unit as outlined in the "General Information" and "Clearances to Combustibles" section of the manual. Pipe fresh air into the pedestal area by using a minimum 4" duct pipe with a mesh grill at the outside termination.



Rear View

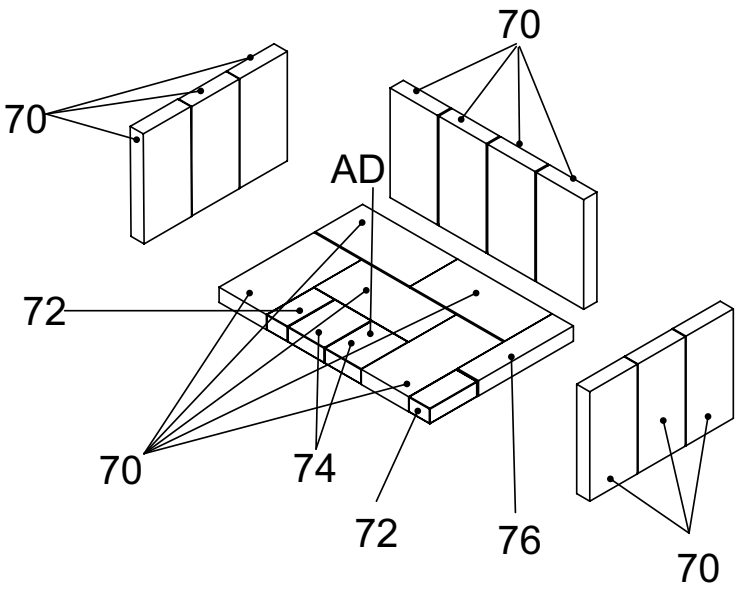
Brick Installation

Firebrick is included to extend the life of your stove and radiate heat more evenly. Check to see that all firebricks are in their correct positions and have not become misaligned during shipping. Install all firebricks (if bricks were removed at install) per the diagram below and place in their correct positions.
Do not use a grate.



Order of firebrick install:

a) Rear Firebrick
b) Firebox floor - install brick over LyoTherm Sheet
c) Right and left side Firebricks



020-960 Brick Kit Complete	
70)	Brick - Regular Full Size: 1-1/4" x 4-1/2" x 9"
72)	Brick Partial: 1-1/4" x 2" x 4-1/2"
74)	Brick Partial: 1-1/4" x 4-1/2" x 3-1/2"
76)	Brick Partial: 1-1/4" x 2" x 9"
NOTE: This kit contains one spare brick in case of breakage.	

NOTE: The "AD" brick covers the Ash Dump hole that is used when the Ash Drawer Kit is installed.

Brick Installation

Firebrick is included to extend the life of your stove and radiate heat more evenly. Check to see that all firebricks are in their correct positions and have not become misaligned during shipping.

The "AD" brick in the drawings above is the brick covering the Ash Dump hole that is used when the Ash Drawer Kit is installed (refer to the Listed Components for Mobile Home Installation section).

Removing Wooden Handle

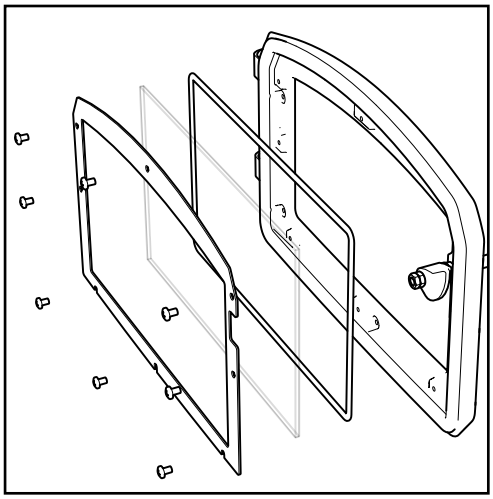
1. To remove the wooden door handle from unit, firstly locate 7/64" Allen key hole at the bottom of wooden handle.

2. Unscrew 7/64" Allen Key screw counterclockwise. Once the screw is completely loose, remove and drop the handle down off the door handle shaft and replace with new handle.

Glass Installation

Your Regency stove is supplied with 5 mm Neoceram ceramic glass that will withstand the highest heat that your unit will produce. In the event that you break your glass by impact, purchase your replacement from an authorized Regency dealer only.

Remove the door from the stove and remove the screws securing the glass retainer. Position the glass in the door, make sure that the glass gasketing will properly seal your unit, and replace the retainer, it should rest on the gasket not the glass. Tighten securely, but do not wrench down on the glass as this may cause the glass to break.



Wood Handle & Door Assembly

1. In preparation of installing the door handle, the nuts, cam, washers and spacer must be removed as shown in Diagram 1.

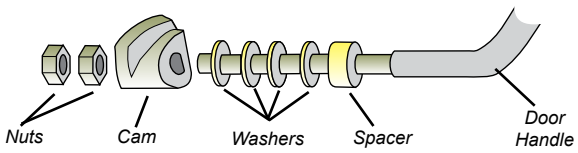


Diagram 1

LATCH ADJUSTMENT

The door latch may require adjustment as the door gasket material compresses over time. Removal of 1 or 2 washers will allow the latch to move closer to the door frame, causing a tighter seal. (Refer to Diagram 1)

2. Place the door onto the hinges and then place the door handle through the opening on the door, as shown in Diagram 2.

   Re-assemble and secure the door handle components in reverse order as removed in step 1, refer to Diagram 1.

3. Put the hinge cover caps on top of hinges to complete the door installation.

Note: The bottom of the door may scrape the ashlip. In this case place the spacers provided on the door hinges of the unit before placing the door.

4. Close door and ensure there is a tight seal. If door is too tight, a washer can be added. If the door is not creating a tight seal, a washer can be removed. Recheck door to ensure there is still a tight seal. Repeat steps if door seal is still not tight until a tight seal has been achieved. The handle should be approximately in the 8 o'clock position when door is fully closed.(Diagram 3)

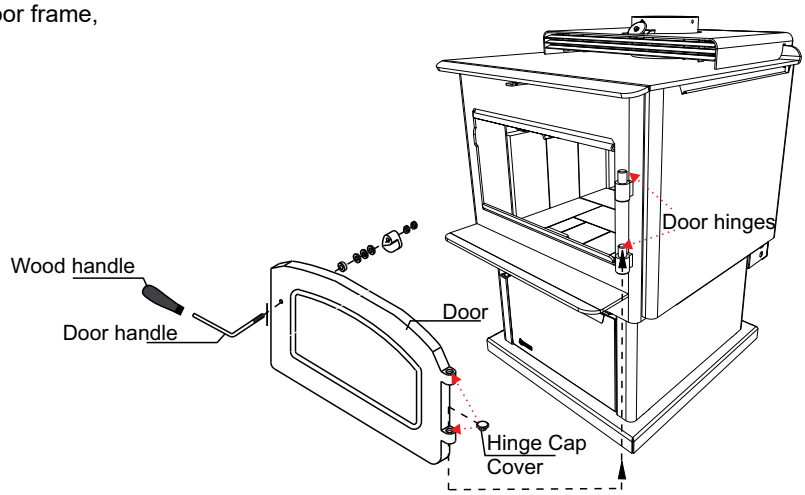


Diagram 2

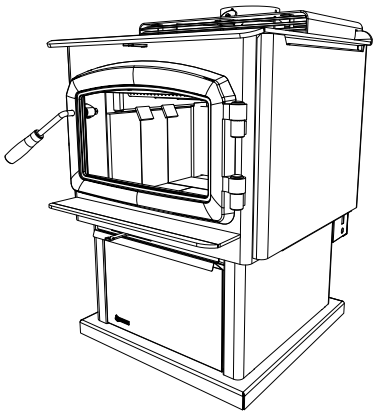


Diagram 3

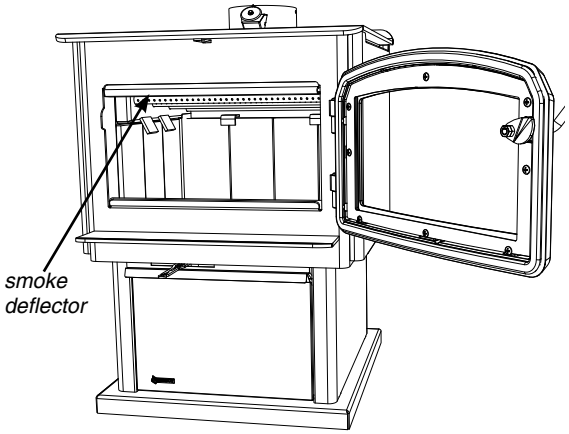
Flue Baffle & Secondary Air Tube Installation

The flue baffle system located in the upper area of the firebox is removable to make cleaning your chimney system easier. The baffles must be installed prior to your first fire. **Smoke spillage and draft problems may occur if the baffles are improperly positioned.** Check the position of the baffles on a regular basis as they can be dislodged if too much fuel is forced into the firebox.

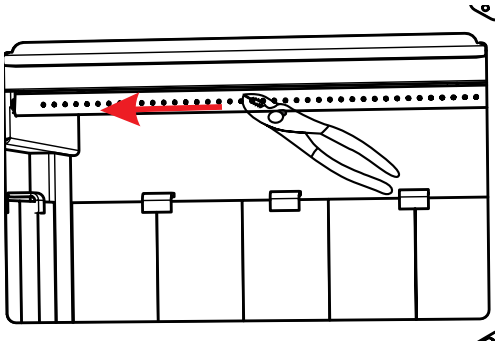
Freestanding Stove F2500

The unit arrives with the 2 baffles on the floor of the firebox.

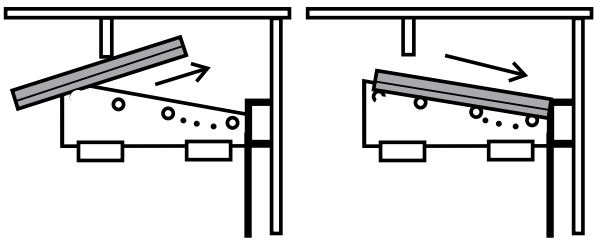
1. Open the door and Remove stainless steel smoke deflector - See smoke deflector instructions in this manual.



2. Remove the front secondary air tube with pliers as shown below.

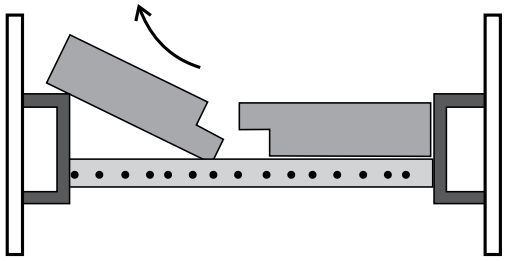


3. Slide the left baffle over the three remaining air tubes from the front and then push it to the back.



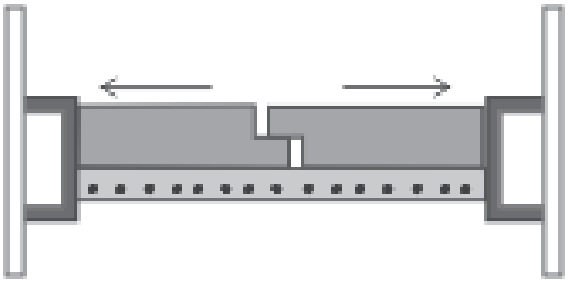
Side View

4. Tilt the left baffle up on top of the side channel and it will leave enough room to position the right baffle in the same manner as Step 1) above. Then reposition the left baffle flat on the air tubes.



Front View

Important: push both baffles so they are tight against the side walls.



Front View

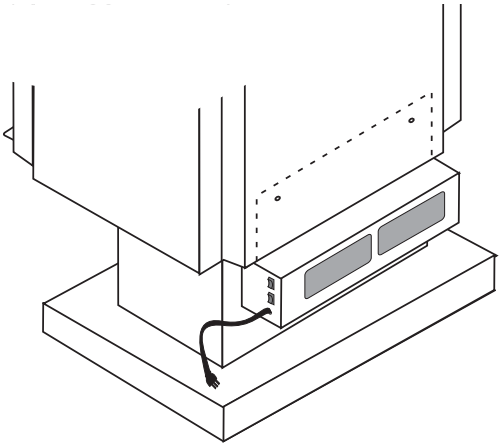
5. Reverse Steps 1 and 2.

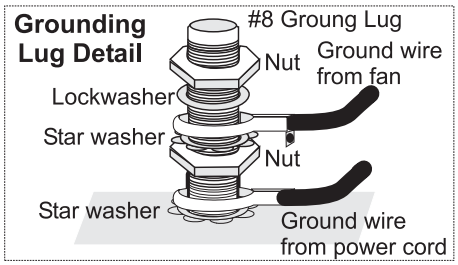
Fan Installation

1. Remove the two screws from the top of the fan housing.
2. Slide the fan up into the rear heat shield.
3. After aligning holes, secure the fan to the rear heat shield using the two screws removed earlier.

Note: The connection cord should not be in contact with any hot surfaces.

WARNING: FAN ASSEMBLY MUST BE DISCONNECTED FROM THE SOURCE OF ELECTRICAL SUPPLY BEFORE ATTEMPTING THE INSTALLATION.





AUTOMATIC

To operate the fan automatically, push the bottom switch on the side of the fan housing to "AUTO" and the top switch to either "HIGH" or "LOW" for fan speed.

This will allow the fan to turn on as the stove has come up to operating temperature. It will also shut the fan system off after the fire has gone out and the unit cooled to below a useful heat output range.

If the fan cycles on and off continuously the thermo switch sensor is not making contact with the stove body. Remove the fan, bend the bracket closer to the stove and re-install the fan.

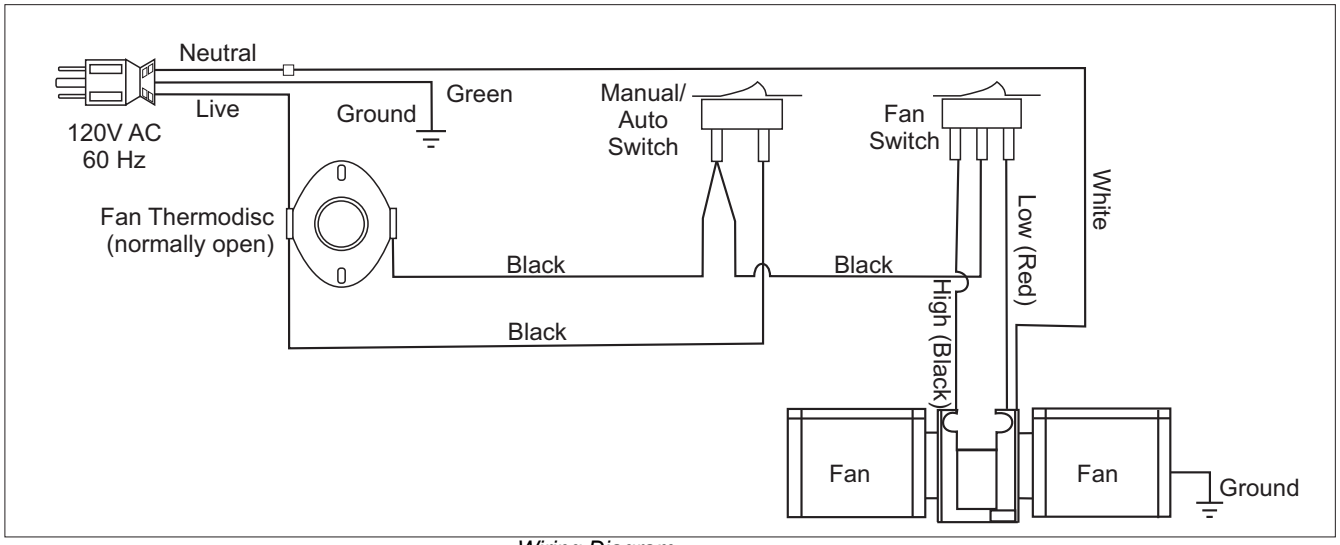
MANUAL

To manually operate the fan system push the bottom switch to "MAN" and the top switch to either "HIGH" or "LOW". This will bypass the sensing device and allow full control of the fan.

Switching from "AUTO" to "MAN" or "HIGH" to "LOW" may be done anytime.

WARNING: Electrical Grounding Instructions
This appliance is equipped with a three pronged (grounding) plug for your protection against shock hazard and should be plugged directly into a properly grounded three-prong receptacle. Do not cut or remove the grounding prong from this plug.

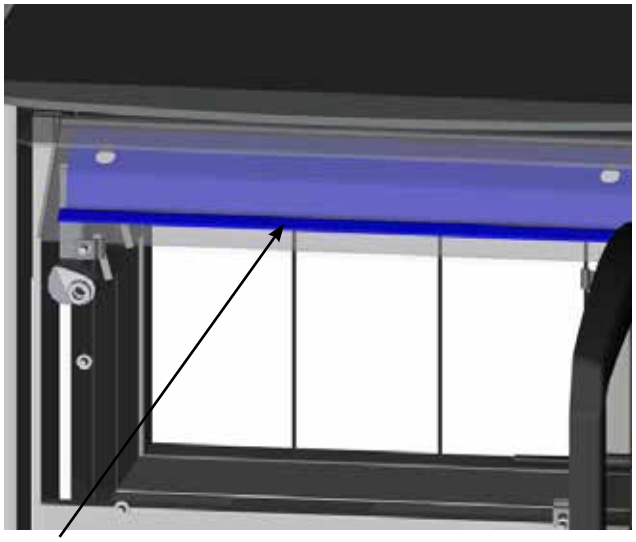
CAUTION: Label all wires prior to disconnection when servicing controls. Wiring errors can cause improper and dangerous operation.



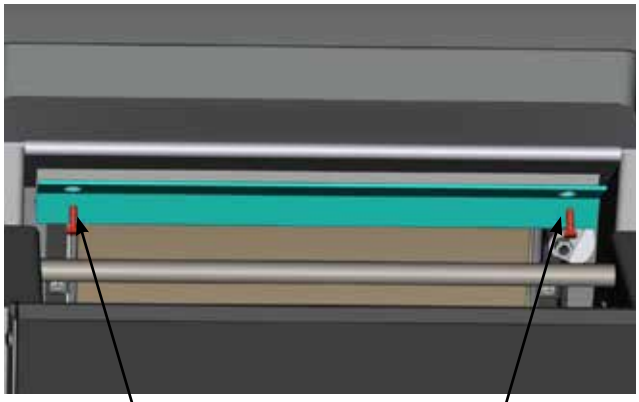
Wiring Diagram

Stainless Steel Smoke Deflector Installation

The stainless smoke deflector is located in the upper front area of the firebox. The deflector is held in place with 2 bolts Prior to the first fire, ensure deflector is seated properly and secured with 2 hand tightened bolts.



Smoke deflector *Smoke deflector is installed through the door opening in location shown in diagram*



Smoke deflector installed with 2 bolts.

Note: *This is a view from the back of the unit through the top.*

To replace the deflector, loosen off both bolts and slide deflector upward and out. Install new deflector and hand tighten bolts. Ensure positive location of the deflector prior to hand tightening.

WARNING: Operation of the unit with out proper installation of smoke deflector will void warranty.

Ensure deflector is seated so bolts are situated at the top of the keyhole before tightening.

Seasoned Firewood

Whether you burn wood in a fireplace, stove or insert, good quality firewood is the key to convenience, efficiency and safety. Wet wood and pieces that are not the right size and shape for your wood burner can be frustrating, burn inefficiently and deposit creosote that can fuel a dangerous chimney fire. Good planning, seasoning and storage of the firewood supply are essential to successful wood burning.

- Stack the wood in separate rows in an open location where the summer sun can warm it and breezes can carry away the moisture. Do not stack unseasoned wood tightly in an unvented storage area.
- Do not allow firewood to lie on the ground for more than a couple of days before stacking. Mould and rot can set in quickly.
- Stack the wood up off the ground on poles, lumber rails or pallets.
- The top of the pile can be covered to keep off rain, but do not cover the sides.

Softer woods like pine, spruce and poplar/aspen that is cut, split and stacked properly in the early spring maybe be ready for burning in the fall. Extremely hard woods like oak and maple, and large pieces of firewood, may take a minimum of a full year to dry enough. Drying may also take longer in damp climates.

There are a few ways to tell if wood is dry enough to burn efficiently. Use as many indicators as possible to judge the dryness of the firewood your are considering. Here are ways to judge firewood moisture.

- Using a moisture meter, select the species of fuel and then penetrate the pins into a split piece. Ideal moisture and seasoned firewood should be less than 20% moisture content.
- Checks or cracks in the end grain can be an indication of dryness, but may not be a reliable indicator. Some wet wood has checks and some dry wood has no checks.
- The wood tends to darken from white or cream colour to grey or yellow as it dries.
- Two dry pieces banged together sound hollow; wet pieces sound solid and dull.
- Dry wood weighs much less than wet wood.
- Split a piece of wood. If the exposed surface feels damp, the wood is too wet to burn.

Operating Instructions

With your unit now correctly installed and safety inspected by your local authority, you are now ready to start a fire. Before establishing your first fire, it is important that you fully understand the operation of your Catalytic combustor and draft control.

WARNING
Fireplace stoves equipped with doors should be operated only with doors fully closed. If doors are left partly open, gas and flame may be drawn out of the fireplace stove opening, creating risks from both fire and smoke.

Draft Control

Both the primary and air wash drafts are controlled by the control slide located on the front left side of the unit, below the ashlip (when facing the unit). To increase your draft - slide to the left to open, and to decrease - slide to the right to close. The F2500 unit has a secondary draft system that continually allows combustion air to the induction ports at the top of the firebox (see catalytic combustor instructions in this manual).

Draft is the force which moves air from the appliance up through the chimney. The amount of draft in your chimney depends on the length of the chimney, local geography, nearby obstructions and other factors. Too much draft may cause excessive temperatures in the appliance and may damage the catalytic combustor. Inadequate draft may cause back puffing into the room and plugging of the chimney or catalyst.

WARNING: To build a fire in ignorance or to disregard the information contained in this section can cause serious permanent damage to the unit and void your warranty!!

Bypass Operating Handle

The F2500 is supplied with an air and bypass operating handle. The handle is used to open and close the by-pass and to adjust the air control for the desired heat output.

Install the operating handle storage bracket on the bottom right or left side screw that secures the side shield.

Loosen screw and insert storage bracket.

Hang operating handle after use

Using the operating handle:

Bypass located above door

Air control for heat output located below ashlip

First Fire

When your installation is completed and inspected you are ready for your first fire.

THIS UNIT IS DESIGNED TO BURN SEASONED CORDWOOD ONLY. COAL, BRIQUETTES AND ALL OTHERS LISTED ON PAGE 2 ARE NOT APPROVED. SEASONED CORDWOOD SHOULD BE LESS THAN 20% MOISTURE CONTENT.

START UP AND OPERATING PROCEDURES:

1. For the first few days, the wood stove will give off an odour from the paint. This is to be expected as the high temperature paint becomes seasoned. Windows and/or doors should be left open to provide adequate ventilation while this temporary condition exists. Burning the wood stove at a very high temperature the first few times may damage the paint. During the first few fires, keep the combustion rate at a moderate level and avoid a large fire. Only after 5 or 6 such fires can you operate the wood stove at its maximum setting, and only after the metal has been warmed.
2. Do not place anything on the wood stove top during the curing process. This may result in damage to your paint finish.
3. When starting the fire, ensure the bypass is in the fully open position (pulled out) and air control is in the fully open position (far left).
   To start a good and clean fire you will need approx. 3.7 lb kindling and 6 lb start up fuel, wood split slightly larger than kindling, approx. 2 inches thick.
   Load 3 pieces of start up wood on the bottom 6 pieces of crumpled paper in between and half of the kindling on top, stacked in a manner that allows air flow on the firebrick hearth (Tee pee style or other). DO NOT USE A GRATE TO ELEVATE THE FIRE.
   Light crumpled newspaper and adjust the door to establish fire and for less smoke roll out. Keep the door in that position for approx. 4 minutes to establish a good fire. Once the door is closed, close the bypass.
4. Once most of the kindling has burned down add the remaining of the kindling and 4 more pieces of start up wood. Close the door soon after loading to keep the catalyst from cooling down.
5. When a good fire is established add few more pieces of start up fuel. Keep few more pieces for the next load.
6. While there are still flames add the remainder of the start up fuel more to the back of the firebox. Close the door right away after loading.
   NOTE: These steps are crucial to ensure proper charcoalization and coal bed prior to loading High, Med and Low fire loads.
7. Once a nice coal bed is established and there are still good sized flames, open the door and the bypass, and rake the coals to create a uniform charcoal bed. Load 5 pieces of 16" long cord wood, front to back, North/South orientation Once loaded, and strong flames are established close the door and the bypass. Burn on high setting (air control to the far left when facing the unit) for 10-15 minutes.
   After the 10-15 minutes, adjust the air control to your desired position.
   After 20 minutes the fan can be set on high setting.
   High Fire: Air control to far left.
   Low Fire: Air control to far right.
   Med Fire: Air control slightly left of low fire setting.
   For low and medium fire, adjust the air gradually from high to the desired position.
8. IMPORTANT: The temperature in the wood stove and the gases entering the combustor must reach between 500ºF - 700ºF for catalytic activity to start. From the start up of a cold wood stove, a medium to high firing rate must be maintained for 30 min. This ensures that the wood stove, catalyst and fuel are all stabilized at proper operating temperatures. Even though it is possible to have temperatures at 600ºF within minutes after a fire has been started, if the fire is allowed to die down immediately it may go out or the combustor may stop working. Once the combustor starts working, heat generated in it by burning the smoke will keep it working. During re-fueling and rekindling of the cool fire, or a fire that has burned down to the charcoal phase, operate the wood stove at a medium to high firing rate for about 10 minutes to ensure that the catalyst reaches operating temperatures.
   WARNING: Never build a roaring fire in a cold wood stove. Always warm your wood stove up slowly!
9. When re-fueling, always open by-pass control, and primary air damper, load fuel, then wait for at least 10-15 minutes before closing the by-pass. Reason for the 10-15 min. is the fresh fuel and the opening of the door will cause the catalyst to drop in temperature as well as the moisture within the wood which is the first thing to be released. This will also minimize any smoking (spilling) back into the room.
10. During the first few days it may be more difficult to start the fire. As you dry out your firebrick and your masonry flue, your draft will increase.
11. For those units installed at higher elevations or into sub-standard masonry fireplaces, drafting problems may occur. Consult an experienced dealer or mason on methods of increasing your draft.
12. Some cracking and popping noises may be experienced during the heating up process. These noises will be minimal when your unit reaches temperature.
13. All fuel burning appliances consume oxygen during operation. It is important that you supply a source of fresh air to your unit while burning. A slightly opened window is sufficient for the purpose. If you also have another fireplace in your home, a downdraft may be created by your Regency wood stove causing a draft down your chimney. If this occurs, slightly open a window near your unit.

CAUTION: If the body of your wood stove, or any part of the chimney connector starts to glow, you are over firing. Stop loading fuel immediately and close the draft control until the glow has completely subsided.

14. Green or wet wood is not recommended for your unit. If you must add wet or green fuel, open the draft control fully until all moisture has been dispersed by the intense fire. Once all moisture has been removed, the draft control may be adjusted to maintain the fire.
15. If you have been burning your stove on a low draft, use caution when opening the door. After opening the damper, open the door a crack, and allow the fire to adjust before fully opening the door.
16. The controls of your unit or the air supply passages should not be altered to increase firing for any reason.
17. If you burn the unit too slowly or at too low a setting your unit will not be operating as efficiently as it can. An easy rule of thumb says that if your glass is clean, catalytic thermostat is active, then your flue is clean and your exhaust is clean. Burn the stove hot enough to keep your glass clean and catalytic combustor, you won't need to clean your flue as often.

HOT WHILE IN OPERATION. KEEP CHILDREN, CLOTHING AND FURNITURE AWAY. CONTACT MAY CAUSE SKIN BURNS.

NOTE: Always stir the coal approximately half way through a burn cycle to ensure proper charcoaling.

How to Light and Maintain a Wood Stove Fire

Fan Operation

The fan unit must not be turned on until a fire has been burning for at least 20 minutes and the unit is hot enough. As well, after each fuel loading the fan must be shut off until 20 minutes has elapsed. To operate fan automatically, push switch on side of fan housing to "Auto" and second switch to either "High" or "Low" for fan speed. The automatic temperature sensor will engage the blower when the unit is at temperature and will shut off the blower once the fire has gone out and the unit has cooled to below a useful heat output range.
To manually operate the fan system, push the first switch to "Man" and second switch to either "high" or "Low". This will bypass the sensing device and allow full control of the fan. Switching from "Auto" to "Manual" or "High" to "Low" may be done at any time.

Ash Disposal

During constant use, ashes should be removed every few days. The Ash Drawer option features a convenient ash dump for easy removal of ash, refer to Modular Installation Options section.

Safety Precautions

1. Do not allow ashes to build up to the loading doors! Only remove ashes when the fire has died down. Even then, expect to find a few hot embers.

2. Please take care to prevent the build-up of ash around the start-up air housing located inside the stove box, under the loading door lip.

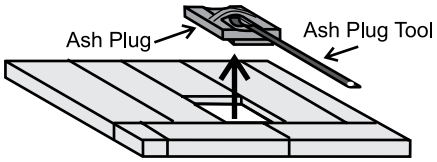
3. Never start a fire if the ash plug and ash drawer are not in place. This will cause over firing which can cause excessive warping of the stove. Evidence of over firing can void the warranty on your stove.

4. The firebricks are brittle and can be damaged if the plug is replaced carelessly or pieces that are too large are forced through the hole.

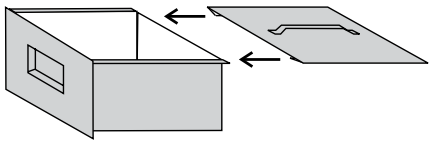
Ash Drawer Operating Guidelines

1. Only clean ashes out of the stove when the unit has cooled down. Remove the plug by lifting on the handle using the tool provided. The plug may still be warm, use caution. Push the ashes down the hole into the ash drawer, the large pieces can be left in the firebox and burned during the next fire or removed through the door opening.

2. Always leave 1/2 to 1 inch of ash in the bottom of the firebox. This helps in easier starting and a more uniform burn of your fire. Replace ash plug when ashes have been removed.



3. **Pedestal Units:**
To remove the drawer, lift slightly and slide it out. When the drawer is completely out, slide the cover plate over the ash drawer and carry away.



CAUTION: HOT WHILE IN OPERATION. KEEP CHILDREN, CLOTHING AND FURNITURE AWAY. CONTACT MAY CAUSE SKIN BURNS.

4. When emptying the ash drawer, make sure the ashes are cold. Ashes should be placed in a metal container with a tight fitting lid. The closed container of ashes should be placed on a non-combustible floor or on the ground, 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 should not be placed in the ash container.

5. Before putting the ash drawer back into place, make sure the ash plug is back in place.

   Pedestal Units: make sure the cover lid is off.

Safety Guidelines and Warnings

CAUTION: do not use chemicals or fluids to start fire.

1. **CAUTION:** Never use gasoline, gasoline type lantern fuels, kerosene, charcoal lighter fuel, or similar liquids to start or 'freshen up' a fire in your heater. Keep all such liquids well away from the heater while it is in use.

2. Keep the door closed during operation and maintain all seals in good condition.

3. Do not burn any quantities of paper, garbage, and never burn flammable fluids such as gasoline, naptha or engine oil in your stove.

4. Do not store solid fuels by the appliance.

5. If you have smoke detectors, prevent smoke spillage as this may set off a false alarm.

6. Do not overfire heater. If the chimney connector, flue baffle or the stove top begin to glow, you are over firing. Stop adding fuel and close the draft control. Over firing can cause extensive damage to your stove including warping and premature steel corrosion. Over firing will void your warranty.

7. Do not permit creosote or soot build-up in the chimney system. Check and clean chimney at regular intervals. Failure to do so can result in a serious chimney fire.

8. Your Regency stove can be very hot. You may be seriously burned if you touch the stove while it is operating, keep children, clothing and furniture away. Warn children of the burn hazard.

9. The stove consumes air while operating, provide adequate ventilation with an air duct or open a window while the stove is in use.

10. Do not connect this unit to a chimney flue serving another appliance.

11. Do not use grates or andirons or other methods for supporting fuel. Burn directly on the bricks.

12. Open the draft control fully for 10 to 15 seconds prior to slowly opening the door when refuelling the fire.

13. Do not connect your unit to any air distribution duct.

14. This heater is designed to burn natural wood only. Higher efficiencies and lower emissions generally result when burning air dried seasoned hardwoods, as compared to softwoods or to green or freshly cut hardwoods.

DO NOT BURN:

- Treated wood
- Coal
- Garbage
- Cardboard
- Solvents
- Colored Paper
- Trash
- Salt drift wood
- Cut lumber, plywood, mill ends.

Burning treated wood, garbage, solvents, colored paper or trash may result in release of toxic fumes and may poison or render ineffective the catalytic combustor. Burning coal, cardboard, or loose paper can produce soot, or large flakes of char or fly ash that can coat the combustor, causing smoke spillage into the room, and rendering the combustor ineffective.

15. Do not store any fuel closer than 2 feet from your unit. Do not place wood, paper, furniture, drapes or other combustibles near the appliance.

16. **WARNING: Do not operate without either the Ash Plug properly seated or the Ash Dump Plates screwed in place, excessive temperatures will result.**

17. **CAUTION: Do not operate with cracked/ broken, plugged, or glazing catalyst.**

IMPORTANT: It is against federal regulation to operate this wood heater in a manner inconsistent with operating instructions in this manual, or if the catalytic element is deactivated or removed.

CAUTION: DO NOT BURN GARBAGE OR FLAMMABLE LIQUIDS SUCH AS GASOLINE, NAPTHA OR ENGINE OIL. SOME FUELS COULD GENERATE CARBON MONOXIDE AND ARE VERY DANGEROUS.

CAUTION: DO NOT CONNECT TO, OR USE IN CONJUNCTION WITH ANY AIR DISTRIBUTION DUCT WORK UNLESS SPECIFICALLY APPROVED FOR SUCH INSTALLATION.

Troubleshooting Guide

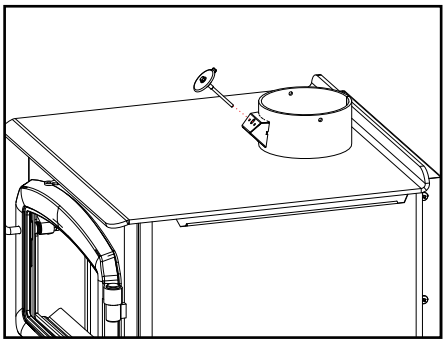
PROBLEM	POSSIBLE CAUSE	SOLUTION
Crumbling Substrate	Extreme Thermal Shock Refueling with Wet Wood High Draft	Bypass combustor when the stove is running Use seasoned, dried wood. Do not exceed .06" of water draft. Install a manual damper and draft gauge or a barometric damper.
Fly-Ash Build-up **Fly-Ash Masking** **Fly-ash Plugging**	Combustor has not maintained light-off temperature. Combustor has not maintained light-off temperature. **Burning materials that produce a lot of char and fly-ash.** **Closing the bypass too soon**	Brush cold combustor with a soft bristled brush or vacuum lightly. Brush cold combustor with a soft bristled brush or vacuum lightly. Do not burn cardboard, gift wrap or garbage. Follow instructions for proper light-off.
Thermal Cracking	Uneven temperatures, flame impingement and heat spikes.	If cracking causes large pieces to fall out, replace combustor.
Mechanical Cracks	Combustor mishandled or abused. Distortion of combustor holder.	Handle combustor with care. Replace if necessary. Replace combustor if large pieces are missing, replace any warped stove parts as well.
Plugging (Creosote)	Burning wet, pitchy woods or burning large loads of small diameter wood with the combustor in the operating position without light-off ever occurring.	Burn dried seasoned wood. Make sure combustor has light-off before closing the bypass damper. It may be possible to burn off the soot or creosote accumulation by putting the combustor in a partially open and partially closed position after a hot fire has been started.
Masking (Soot)	Combustor has not maintained a light-off. Burning coal will cause a sulfur-based compound to coat the catalyst.	Place combustor in a partially open position after a hot fire has been started to burn off the soot accumulation. Revert to burning wood and fire the combustor to elevated temperatures for one hour.

Maintenance

It is very important to carefully maintain your fireplace stove, including burning seasoned wood and maintaining a clean stove and chimney system. Have the chimney cleaned before the burning season and as necessary during the season, as creosote deposits may build up rapidly. Moving parts of your stove require no lubrication.

Thermometer

The catalyst thermometer is only an indication of the flue gas temperature as they pass through the catalyst. The thermostat probe that is inserted into the opening in front of the flue collar, must be cleaned at least once a year. Use 220 sand paper to clean probe.



Creosote

When wood is burned slowly, it produces tar and other organic vapours combine with moisture to form creosote. The creosote vapours condense in the relatively cool chimney flue of a slow burning fire. As a result, creosote residue accumulates on the flue lining. When ignited, this creosote can result in an extremely hot fire.

The chimney connector and chimney should be inspected at least once every two months during the heating season to determine if creosote build up has occurred. If creosote has accumulated it should be removed to reduce the risk of chimney fire.

CAUTION: Things to remember in case of a chimney fire:

1. Close all draft and damper controls.

2. CALL THE FIRE DEPARTMENT.

Ways to Prevent and Keep Unit Free of Creosote

1. Burn stove with the draft control wide open for about 10-15 minutes every morning during burning season.

2. Burn stove with draft control wide open for about 10 - 15 minutes every time you apply fresh wood. This allows the wood to achieve the charcoal stage faster and burns up any unburned gas vapours which might otherwise be deposited within the system.

3. Only burn seasoned wood! Avoid burning wet or green wood. Seasoned wood has been dried at least one year.

4. A small hot fire is preferable to a large smouldering one that can deposit creosote within the system.

5. Establish a routine for the fuel, wood burner and firing technique. Check daily for creosote buildup.

6. The chimney and chimney connector should be inspected at least once every two months during the heating season to determine is a creosote buildup has occurred.

7. **Have chimney system and unit cleaned by competent chimney sweeps twice a year during the first year of use and at least once a year thereafter or when a significant layer of creosote has accumulated (3 mm/1/8" or more) it should be removed to reduce the risk of a chimney fire.**

Door Gasket

If the door gasket requires replacement 7/8" diameter material must be used. Regency uses a 7/8" gasket rope (Part #846-570). A proper high temperature gasket adhesive is required. See your Regency Dealer.

The door catch may require adjustment as the door g

Glass Maintenance

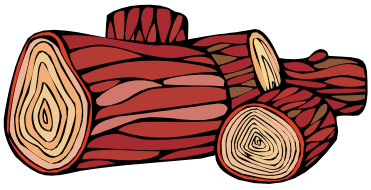
Your Regency stove is supplied with 5mm Neoceram ceramic glass (Part #846-306) that will withstand the highest heat that your unit will produce. In the event that you break your glass by impact, purchase your replacement from an authorized Regency dealer only, and follow our step-by-step instructions for replacement (refer to Glass Replacement section).

Allow the stove to cool down before cleaning the glass. Cleaning the glass will prevent build up of carbon and allow full view of the fire.

WARNING: Do not clean the glass when it is hot.
WARNING: Do not use abrasive cleaners, a damp cloth and glass cleaner is effective.
WARNING: Do not use substitute materials.
WARNING: Do not abuse the glass door, such as striking of slamming shut.
WARNING: Do not operate with broken glass.

Wood Storage

Store wood under cover, such as in a shed, or covered with a tarp, plastic, tar paper, sheets of scrap plywood, etc., as uncovered wood can absorb water from rain or snow, delaying the seasoning process.



Catalytic Combustor Part# 021-531

ACHIEVING AND MAINTAINING CATALYST LIGHT-OFF:

The temperature in the stove and the gases entering the combustor must be raised to between 500F to 700F for catalytic activity to be initiated. During the start up of a cold stove a medium to high firing rate must be maintained for about 30 minutes. This ensures that the stove, catalyst and fuel are all stabilized at proper operating temperatures. Even though it is possible to have temperatures at 600F within minutes after a fire has been started, if the fire is allowed to die down immediately it may go out or the combustor may stop working. Once the combustor starts working, heat generated in it by burning the smoke will keep it working. During re-fueling and rekindling of the cool fire, or a fire that has burned down to the charcoal phase, operate the stove at a medium to high firing rate for about 10 minutes to ensure that the catalyst reaches operating temperatures.

CATALYST MONITORING: It is important to periodically monitor the operation of the catalytic combustor to ensure that it is functioning properly and to determine when it needs to be replaced. 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. If any of these conditions exist, refer to Catalyst trouble shooting section of this owner's manual.
- A good combustor is designed to withstand approximately 12,000 hours of continuous use. This will translate into five to ten years of use, depending on the length of your heating season and how often you use your stove. Proper maintenance will increase the combustor's effectiveness and prevent many problems. Inspect your combustor before each heating season, and during the season if your stove's performance seems to change.
- This catalytic heater is equipped with a temperature probe to monitor catalyst operation. Properly functioning combustors typically maintain temperatures in excess of 500F and often reach temperatures in excess of 1000F. If catalyst temperatures are not in within, refer to Catalyst trouble shooting section of this manual.
- 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 the smoke is not routed (by-pass open) through the combustor.

Step 1: Light the stove in accordance with instructions within this manual.

Step 2: With smoke routed through the catalyst (by-pass closed) go outside and observe the emissions leaving the chimney.

Step 3: Engage the bypass mechanism and move to by-pass open position. And again observe the emission leaving the chimney. Significantly more smoke should be seen when the smoke is not routed through the combustor (by-pass open). Be careful not to confuse smoke with steam.

ACHIEVING PROPER DRAFT: Draft is the force which moves air from the appliance up through the chimney. The amount of draft in your chimney depends on the length of the chimney, local geography, nearby obstructions and other factors. Too much draft may cause excessive temperatures in the appliance and may damage the catalytic combustor. Inadequate draft may cause back puffing into the room and plugging of the chimney or catalyst.

CATALYTIC COMBUSTOR CLEANING:

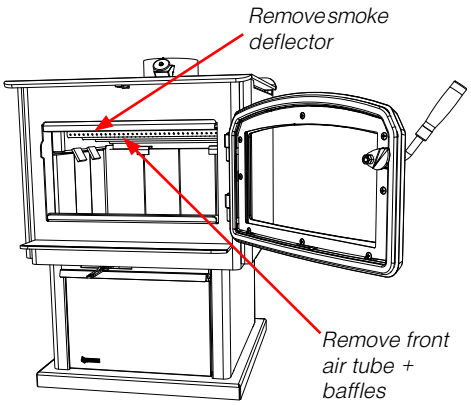
Method #1
A vacuum cleaner may be used, but **never use high pressured air** to blow the cells free of any build-up. This can damage the cell walls. Any cell blockage can be removed with the use of a pipe cleaner or a cotton swab as well.
Method #2
Should the combustor's cells become covered with fly-ash, use a paint-brush or soft-bristled brush and dust the combustor gently. Never use anything abrasive to clean the combustor.
Method #3
Normally the catalytic combustor requires little or no maintenance, it generates such high temperatures and therefore is basically self-cleaning. However, should the combustor become covered with soot or creosote, it is possible to burn the accumulation off by opening the bypass and building a hot fire. Once the hot fire is created, close the bypass halfway and burn for 30 to 60 minutes with the bypass left in this position. **Never use cleaning solvents to clean it.** Check and clean the combustor, if necessary, before each burning season and inspect the flue system for any signs of creosote buildup. A clean flue helps prevent chimney flue fires.

Bypass Rod Replacement

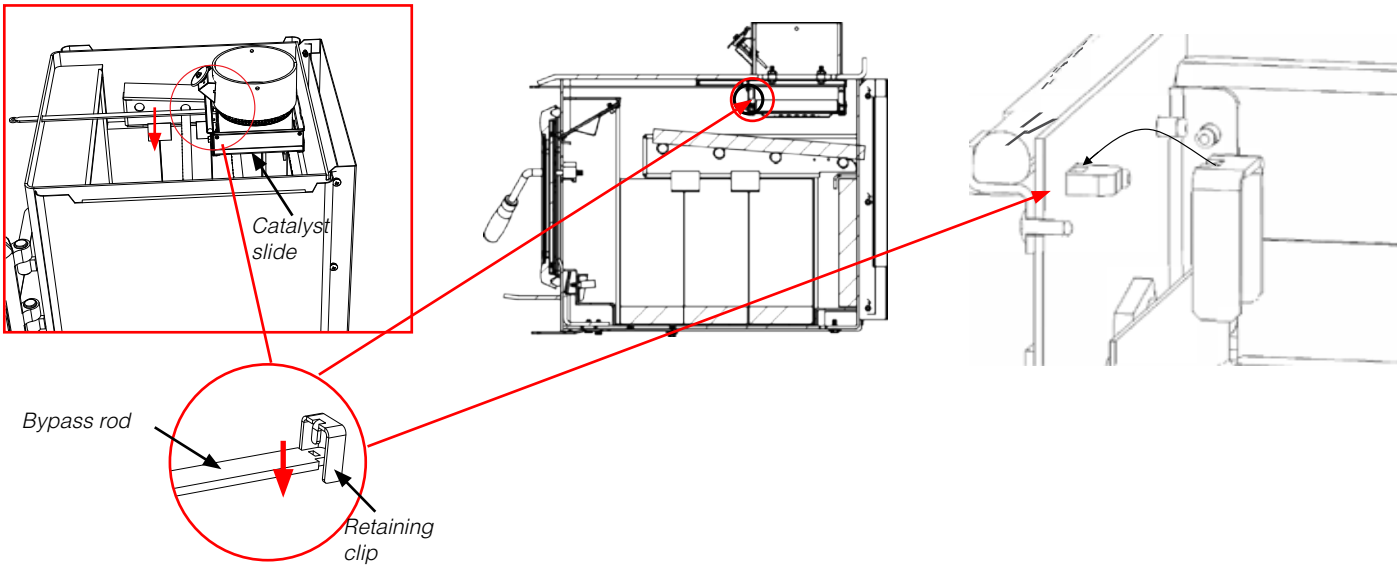
If the bypass rod becomes damaged it will need to be replaced.

1. Allow the stove to burn out and cool down, until cool to touch.

2. Open the door and remove the following from inside the unit, smoke deflector, front air tube, baffles and catalyst. See sections in this manual for details.



3. From inside the unit, manoeuver and slightly pull down on the bypass rod to release it from its retaining clip. This could also be removed by hand if reaching up into the catalyst slide and lifting up on the retaining clip.



4. Slide bypass rod out.

5. Replace with a new bypass rod.

6. Reverse Steps 3 and 2.

Combustor Assembly Removal/Replacement

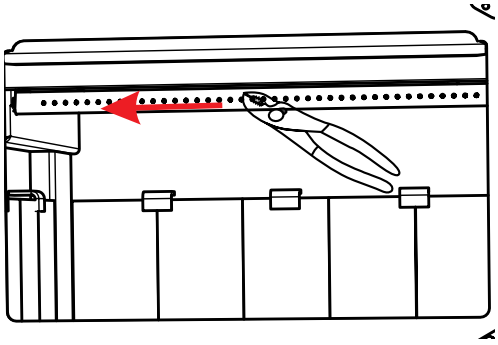
The catalytic thermometer on top of the stove should read in the active zone after the stove has been in operation for several hours. If the thermometer's indicator needle does not stay in the active zone, even with a hot fire, over a period of regular use, the catalyst may need to be cleaned. If this persists it may be necessary to replace it.

If the combustor must be examined or replaced, follow this procedure:

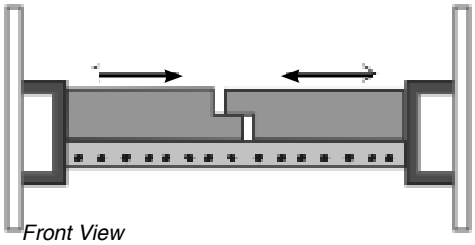
1. Allow the stove to burn out and cool down.

2. Remove stainless steel smoke deflector - See instructions in this manual.

3. Remove the front secondary air tube with pliers as shown below.

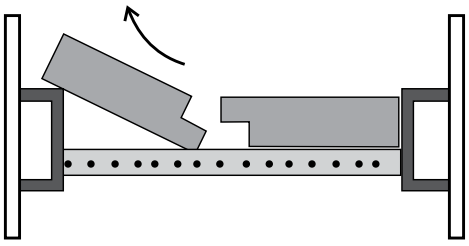


4. Remove baffles - push the baffles together and away from the side walls.



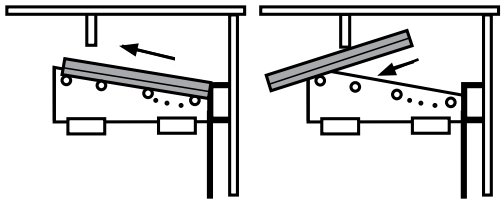
Front View

5. Lift the left baffle out from underneath the right baffle - then lift out. Remove the right baffle.



Front View

6. Manoeuver the baffle above the air tube and slide out.



Side View

7. Remove locking clip from the front face of the Catalyst assembly by sliding up and out.

8. Pull the flame shield forward and tilt down, be prepared to support catalyst assembly.

9. Loosen bolts on catalyst retainer, slide the catalyst retainer to the right to remove.

10. Pull down catalyst assembly to remove.

11. Reverse steps to reinstall catalyst.

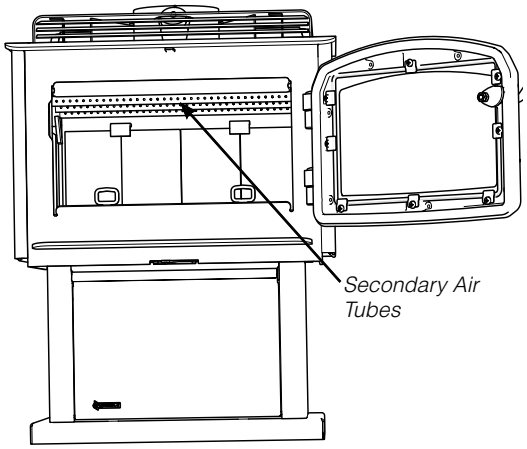
NOTE: Replacement combustors can be retrieved from Applied Ceramics or contact your local Regency Dealer—see warranty information at the back of this manual for details.

DO NOT OPERATE THE APPLIANCE IF COMBUSTOR BECOMES INACTIVE - DO NOT OPERATE WITHOUT COMBUSTOR.

Secondary Air Tube Removal/Installation

1. Allow the stove to burn out and cool down, until cool to touch.

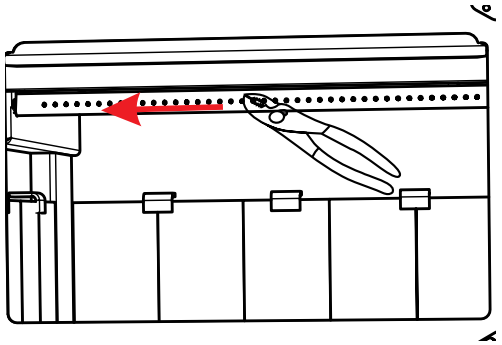
2. Open stove door to access secondary air tubes.



Secondary Air Tubes

3. Grasp secondary air tube firmly with vise grips, using a hammer tap vise grips from right to left until air tube is released from grip. Remove.

4. Remove top left and right metal retainers, followed by the fragile three piece C-Cast Baffles (see catalyst removal instructions for details), then remove the remaining 2 tubes.



5. To reinstall or replace, first slide left side of tube into hole on left side air channel. Align tab on right side air channel with notch on right hand end of air tube. Firmly grip center of air tube with vise grips, use hammer to tap vise grips from left to right until the tube bottoms out into the air channel on right.

Annual Maintenance	
Completely clean out entire unit	Annually
Inspect air tube, Catalytic Combustor and bricks	Replace any damaged parts.
Adjust door catch assembly	If unable to obtain a tight seal on the door - replace door gasket seal. Readjust door catch after new gasket installed.
Inspect condition and seal of: Glass Gasket Door Gasket	 Perform paper test - replace gasket if required
Paper Test	Test the seal on the loading door with a paper bill. Place a paper bill in the gasket area of the door on a cold stove. Close the door. Try to remove the paper by pulling. The paper should not pull out easily, if it does, try adjusting the door latch, if that doesn't solve the problem replace the door gasket.
Check and lubricate door hinge + latch	Use only high temperature anti seize lube. (ie. never seize)
Check glass for cracks	Replace if required.
Clean blower motor	Disconnect power supply. Remove and clean blower. ***DO NOT LUBRICATE***
Inspect and clean chimney	Annual professional chimney cleaning recommended.
Thermostat Probe	The thermostat probe that is inserted into the opening, must be cleaned at least once a year. Use 220 sand paper to clean probe.

NOTE:

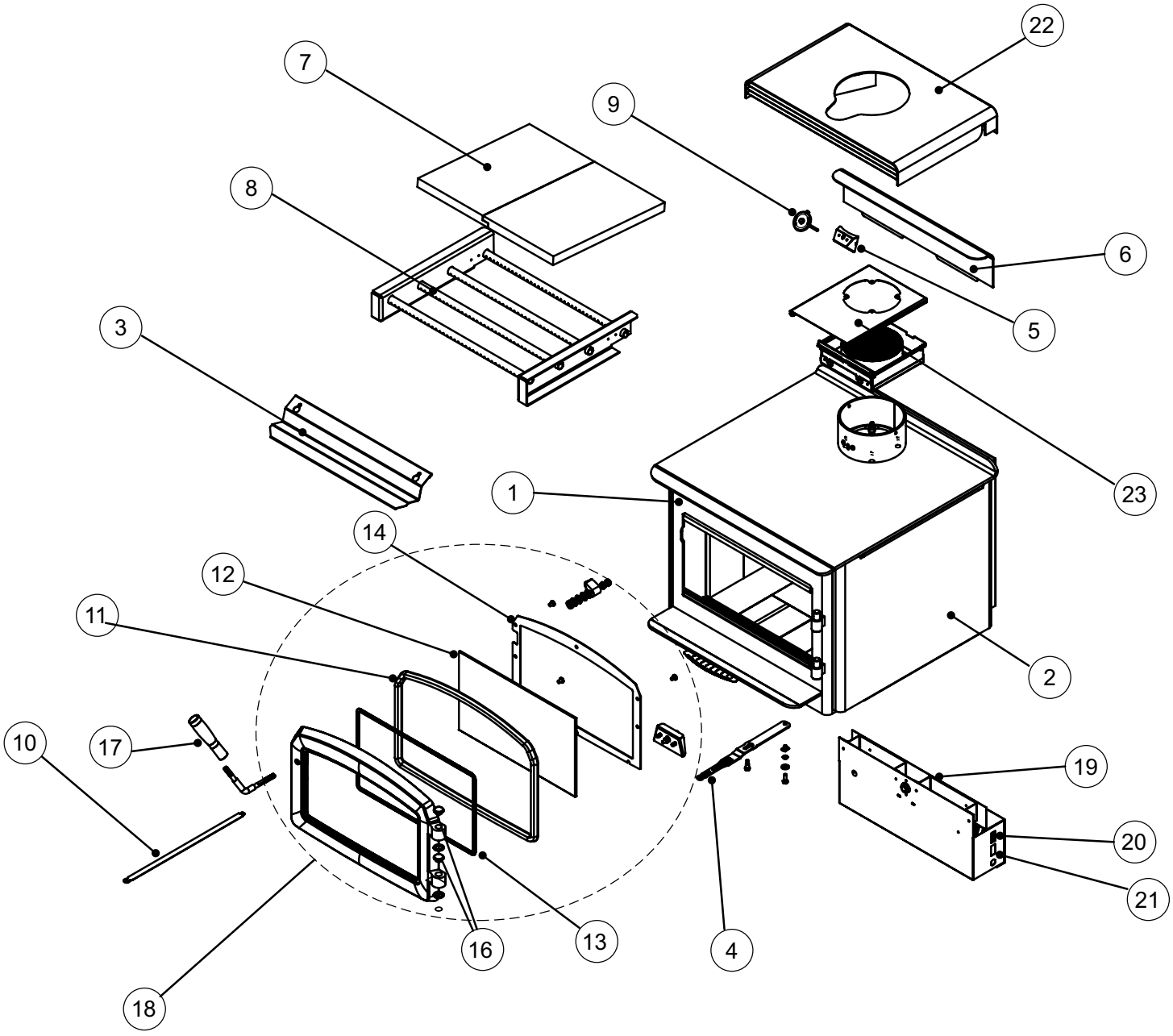
Chimney Cleaning

When cleaning the chimney system the catalyst should be removed so this can also be cleaned at the same time following the guide lines found in this manual. The bypass should be open so any creosote will fall onto the firebox floor when being cleaned and door closed. The monitor should also be removed when cleaning is being done to prevent damage to the monitor.

We highly recommend that the chimney cleaning be done by a professional as they will have the necessary tools such as a proper sized brush and special vacuum cleaner designed to deal with fine particles.

Main Assembly

	Part #	Description
1	021-006	Left Side Heat Shield
2	021-007	Right Side Heat Shield
3	021-018	SS Smoke Deflector
4	021-020	Draft Control Lever
5	075-052	Bracket Probe
6	815-557	Rear Air Deflector
7	020-957	Baffle Bricks Complete (Set Of 2)
8	033-953	3/4 OD x 19-1/4 Air tube 4 Per Unit (Each)
9	075-028	Thermometer
10	021-028	Bypass Rod
11	846-570	7/8" Door Gasket Repair Kit
12	846-306	Replacement Glass - Small (Size :9 1/8" X 15 5/8")
13	936-241	Tape 7/8 Window Adhesive Sold per foot (4 Feet required)
14	075-077F	Glass Retainer
15	021-973	Door Handle Assembly Complete
16	948-079BN	Hinge Cap Brush Nickel (Each)
17	948-146	Long Black Handle
18	850-241	Black Door - Complete
18	850-243	Black with Nickel Accent Door - Complete
19	846-515	Fan Assembly Complete
20	910-138	2 Way Switch
21	910-140	3 way Switch
22	075-912	Airmate
23	075-051	SS Slide Holder
8	075-073F	Tool Hanger
N/S	948-223	Regency Logo Plate
N/S	910-157/P	Fan Motor Only With Squirrel cage
N/S	910-142	Fan Thermodisc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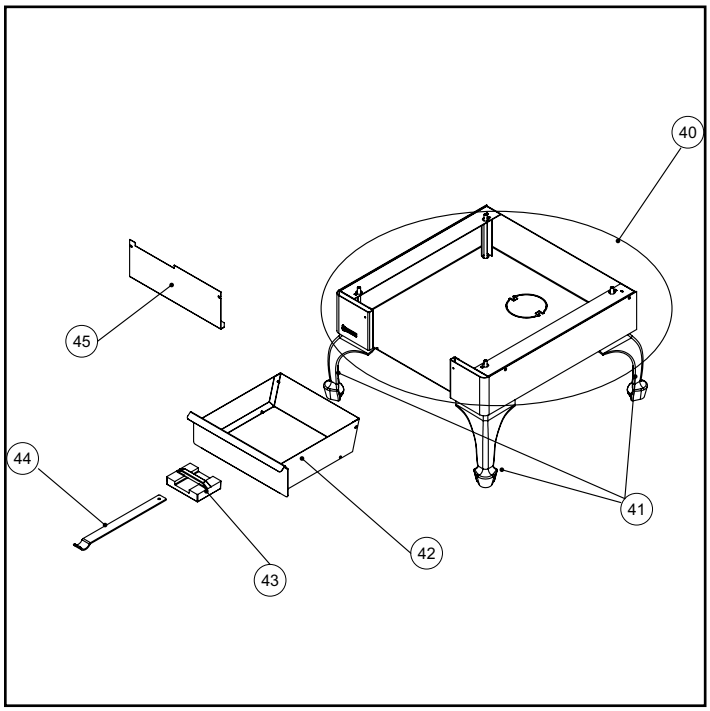
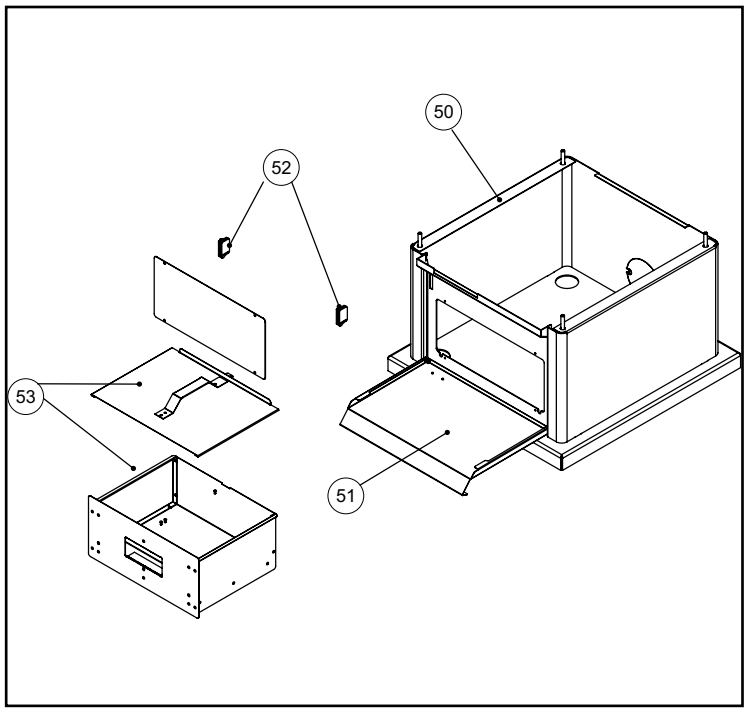
Bases

	Part #	Description
40	021-911	Bottom heat Shield
41	850-126	Black Cast legs (Set Of 4)
41	850-128	Nickel Cast legs (Set Of 4)
42	075-914	Ashdrawer Bottom Heat Shield
43	942-110	Ashplug
44	820-249	Ashplug Tool
45	021-024	Blanking Plate
N/S	904-100	5/16" x 5 1/2 " Long Hex Head Bolt (Each)
N/S	820-468F	Metal Washer
N/S	820-456	Metal Spacer/Support Bracket (Each)

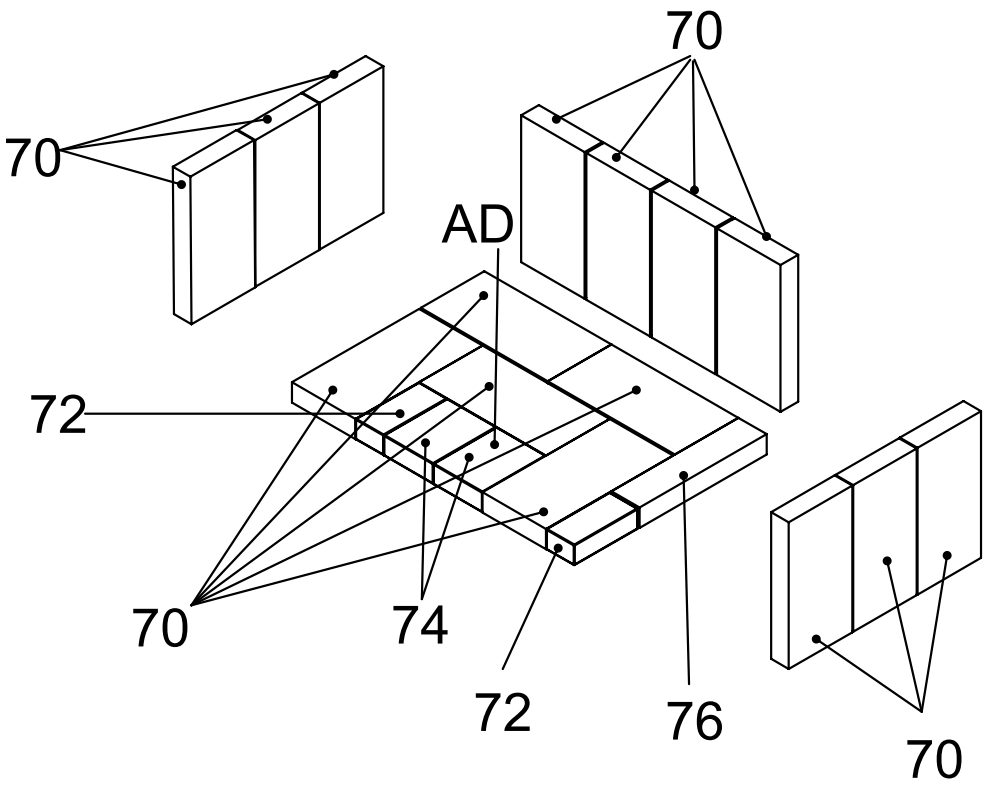


	Part #	Description
50	021-915	Pedestal Complete
51	075-069	Pedestal Door
52	904-257	Magnetic Catch (Each)
53	075-910	Ashdrawer
N/S	904-023	5/16 x 1-1/2 Hex Head Bolt (Each)



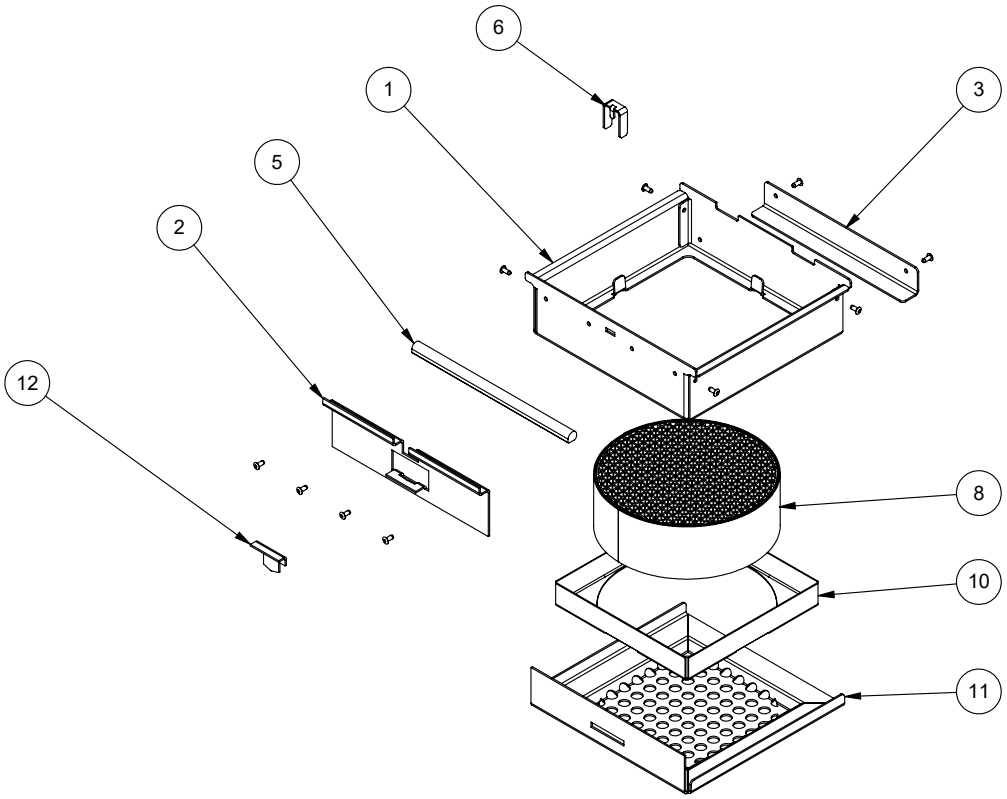
parts list

020-960 Brick Kit Complete	
70)	Brick - Regular Full Size: 1-1/4" x 4-1/2" x 9"
72)	Brick Partial: 1-1/4" x 2" x 4-1/2"
74)	Brick Partial: 1-1/4" x 4-1/2" x 3-1/2"
76)	Brick Partial: 1-1/4" x 2" x 9"
NOTE: This kit contains one spare brick in case of breakage.	



Catalytic Combustor

	Part #	Description
1	075-101	Catalyst slide
2	075-102	Gasket bracket
3	075-104	Long shield bracket
5	936-236	Rope gasket 1/2" diameter
6	075-043	Rod lock
8	021-531	5.83 diameter combustor assembly
10	075-044	Cat cradle
11	021-035	Offset flame shield
12	075-103	Rod clip lock



Limited Lifetime Warranty

FPI Fireplace Products International Ltd. (for Canadian customers) and Fireplace Products U.S., Inc. (for U.S. customers) (collectively referred to herein as "FPI") extends this Limited Lifetime Warranty to the original purchaser of this appliance provided the product remains in the original place of installation. The items covered by this limited warranty and the period of such coverage is set forth in the table below.

Some conditions apply (see below).

The policy is not transferable, amendable, or negotiable under any circumstances.

Wood Products	Component Coverage					Labor Coverage
Components Covered	Limited Lifetime	5 years	2 years	1 year	Warranty	(Years)
Welded Firebox Steel	✓					5
All Stainless Steel Components, Smoke Deflectors, Heat Shields etc.	✓					3
Air Tubes	✓					3
Airmate	✓					3
Door handle and latch assembly, all hardware	✓					3
Glass Thermal Breakage Only	✓					3
Steel Faceplates, Accessory Housings	✓					3
All Plating	✓					3
Ash Drawer, Heatshields, Pedestal	✓					
All Baffles, Steel, Ceramic, Vermiculite C-Baffles	✓					
All castings, firebox, surrounds, doors, panels etc.		✓				3
All Electrical, Blower, wiring, switches etc.			✓			2
Glass - Crazing				✓		1
Catalyst Combustor					*10 Years Prorated	
Venting/Chimney				✓		1
Screens				✓		1

*See specific warranty details in regards to the catalyst combustor in unit manual.

Conditions:

Warranty protects against defect in manufacture or FPI factory assembled components only, unless herein specified otherwise.

Any part(s) found to be defective during the warranty period as outlined above will be repaired or replaced at FPI's option through an accredited distributor, dealer or pre-approved and assigned agent provided that the defective part is returned to the distributor, dealer or agent for inspection if requested by FPI. Alternatively, FPI may at its own discretion fully discharge all of its obligations under the warranty by refunding the verified purchase price of the product to the original purchaser. The purchase price must be confirmed by the original Bill of Sale.

The authorized selling dealer, or an alternative authorized FPI dealer if pre-approved by FPI, is responsible for all in-field diagnosis and service work related to all warranty claims. FPI is not responsible for results or costs of workmanship of unauthorized FPI dealers or agents in the negligence of their service work.
At all times FPI reserves the right to inspect reported complaints on location in the field claimed to be defective prior to processing or authorizing of any claim. Failure to allow this upon request will void the warranty.

All warranty claims must be submitted by the dealer servicing the claim, including a copy of the Bill of Sale (proof of purchase by you). All claims must be complete and provide full details as requested by FPI to receive consideration for evaluation. Incomplete claims may be rejected.

Replacement units are limited to one per warranty term. Airtube and baffle replacements are limited to one replacement per term.

Unit must be installed according to all manufacturers' instructions as per the manual.

All Local and National required codes must be met.

The installer is responsible to ensure the unit is operating as designed at the time of installation.

The original purchaser is responsible for annual maintenance of the unit, as outlined in the owner's manual. As outlined below, the warranty may be voided due to problems caused by lack of maintenance.

Repair/replacement parts purchased by the consumer from FPI after the original coverage has expired on the unit will carry a 90 day warranty, valid with a receipt only. Any item shown to be defective will be repaired or replaced at our discretion. No labor coverage is included with these parts.

Exclusions:
This Limited Lifetime Warranty does not extend to rust or corrosion of any kind due to: a lack of maintenance or improper venting, lack of combustion air provision, or exposure to corrosive chemicals (i.e. chlorine, salt, air, etc.).

This Limited Lifetime Warranty also does not extend to: paint, firebricks (rear, sides, or bottom), door gasketing, glass gasketing (or any other additional factory fitted gasketing), vermiculite floor bricks, andiron assemblies, and flue damper rods.

Malfunction, damage or performance based issues as a result of environmental conditions, location, chemical damages, downdrafts, installation error, installation by an unqualified installer, incorrect chimney components (including but not limited to cap size or type), operator error, abuse, misuse, use of improper fuels (such as unseasoned cordwood, mill-ends, construction lumber or debris, off-cuts, treated or painted lumber, metal or foil, plastics, garbage, solvents, cardboard, coal or coal products, oil based products, waxed cartons, compressed pre-manufactured logs, kiln dried wood), lack of regular maintenance and upkeep, acts of God, weather related problems from hurricanes, tornados, earthquakes, floods, lightning strikes/bolts or acts of terrorism or war, which result in malfunction of the appliance are not covered under the terms of this Limited Lifetime Warranty.

FPI has no obligation to enhance or modify any unit once manufactured (i.e. as products evolve, field modifications or upgrades will not be performed on existing appliances).

This warranty does not cover dealer travel costs for diagnostic or service work. All labor rates paid to authorized dealers are subsidized, pre-determined rates. Dealers may charge homeowner for travel and additional time beyond their subsidy.

Any unit showing signs of neglect or misuse will not be covered under the terms of this warranty policy and may void this warranty. This includes units with rusted or corroded fireboxes which have not been reported as rusted or corroded within three (3) months of installation/purchase.

Units which show evidence of being operated while damaged, or with problems known to the purchaser and causing further damages will void this warranty.

Units where the serial no. has been altered, deleted, removed or made illegible will void this warranty.

Minor movement, expansion and contraction of the steel is normal and is not covered under the terms of this warranty.

FPI is not liable for the removal or replacement of facings or finishing in order to repair or replace any appliance in the field.

Freight damages for products or parts are not covered under the terms of the warranty.

Products made or provided by other manufacturers and used in conjunction with the FPI appliance without prior authorization from FPI may void this warranty.

Limitations of Liability:
The original purchaser's exclusive remedy under this warranty, and FPI's sole obligation under this warranty, express or implied, in contract or in tort, shall be limited to replacement, repair, or refund, as outlined above. IN NO EVENT WILL FPI BE LIABLE UNDER THIS WARRANTY FOR ANY INCIDENTAL OR CONSEQUENTIAL COMMERCIAL DAMAGES OR DAMAGES TO PROPERTY. TO THE EXTENT PERMITTED BY APPLICABLE LAW, FPI MAKES NO EXPRESS WARRANTIES OTHER THAN THE WARRANTY SPECIFIED HEREIN. THE DURATION OF ANY IMPLIED WARRANTY IS LIMITED TO DURATION OF THE EXPRESSED WARRANTY SPECIFIED ABOVE. IF IMPLIED WARRANTIES CANNOT BE DISCLAIMED, THEN SUCH WARRANTIES ARE LIMITED IN DURATION TO THE DURATION OF THIS WARRANTY.

Some U.S. states do not allow limitations on how long an implied warranty lasts, or allow exclusion or limitation of incidental or consequential damages, so the above limitations or exclusions may not apply to you.

Customers located outside the U.S. should consult their local, provincial or national legal codes for additional terms which may be applicable to this warranty.

How to Obtain Warranty Service:
Customers should contact the authorized selling dealer to obtain all warranty and service. In the event the authorized selling dealer is unable to provide warranty / service, please contact FPI by mail at the address listed on the next page. Please include a brief description of the problem and your address, email and telephone contact information. A representative will contact you to make arrangements for an inspection and/or warranty service, by an alternative dealer.

Product Registration and Customer Support:
Thank you for choosing a Regency Fireplace. Regency strives to be a world leader in the design, manufacture, and marketing of hearth products. To provide the best support for your product, we request that you complete a product registration form at http://www.regency-fire.com/Customer-Care/Warranty-Registration.aspx within ninety (90) days of purchase.

Product Registration and Customer Support:

Thank you for choosing a Regency Fireplace. Regency strives to be a world leader in the design, manufacture, and marketing of hearth products. To provide the best support for your product, we request that you complete a product registration form found on our Web Site under Customer Care within ninety (90) days of purchase.

For purchases made in **CANADA or the UNITED STATES**:
http://www.regency-fire.com/Customer-Care/Warranty-Registration.aspx

For purchases made in AUSTRALIA:
http://www.regency-fire.com.au/Customer-Care/Warranty-Registration.aspx

You may also complete the warranty registration form below to register your Regency Fireplace Product and mail and/or fax it back to us, and we will register the warranty for you. It is important you provide us with all the information below in order for us to serve you better.

Warranty Registration Form (or Register online immediately at the above Web Site):

Warranty Details	
Serial Number (required):	
Purchase Date (required) (mm/dd/yyyy):	
Product Details	
Product Model (required):	
Dealer Details	
Dealer Name (required):	
Dealer Address:	
Dealer Phone #:	
Installer:	
Date Installed (mm/dd/yyyy):	
Your Contact Details (required)	
Name:	
Address:	
Phone:	
Email:	

For purchases made in CANADA:

FPI Fireplace Products International Ltd.
6988 Venture St.
Delta, British Columbia
Canada, V4G 1H4

Phone: 604-946-5155
Fax: 1-866-393-2806

For purchases made in the UNITED STATES:

Fireplace Products US, Inc.
PO Box 2189 PMB 125
Blaine, WA
United States, 98231

Phone: 604-946-5155
Fax: 1-866-393-2806

For purchases made in AUSTRALIA:

Fireplace Products Australia Pty Ltd
1- 3 Conquest Way
Hallam, VIC
Australia, 3803

Phone: +61 3 9799 7277
Fax: +61 3 9799 7822

For fireplace care and tips and answers to most common questions please visit our Customer Care section on our Web Site. Please feel free to contact your selling dealer if you have any questions about your Regency product.

CATALYTIC COMBUSTOR WARRANTY COVERAGE

IMPORTANT WARRANTY INFORMATION FOR CATALYTIC COMBUSTOR
Effective March 1 2019

Any and all claims for catalytic combustor must be filed **by the consumer** directly with their authorized Regency Dealer. FPI/Regency does not handle these claims directly with consumers.

Please follow the instructions below for your catalytic combustor under warranty. To learn more about the care and maintenance or the catalytic combustor, please visit our website: www.firecatcombustors.com.

Any warranty coverage before this date will be covered by the original warranty when the appliance was purchased.

(1) **10-year** coverage from Regency – not the supplier of the catalytic combustor.

(2) All claims must be made through the dealer where the appliance had been purchased.

(3) One no-charge replacement at any time within the **ten (10) year** period.

(4) Second replacement at 50% off retail* within the original **ten (10) years**.

(5) Subsequent replacements or if **ten (10)-year** coverage has expired at full retail* price.

(6) The catalytic combustor must not have been mechanically abused, nor must the wrong fuels have been used in the appliance.

(7) All claims must be accompanied by clear photos of the catalytic combustor showing all damage and also showing existing internal venting from the stove.

The consumer will be responsible for removal, any servicing. This warranty is REGENCY® exclusive warranty and REGENCY® disclaims any other express or implied warranty for the catalytic combustor, including any warranty or merchantability of fitness for a particular use.
NO LABOR WILL APPLY.

All warranty claims must be sent to: Regency Fireplace Products
By Authorized Regency Dealer

* Prices subject to change.
Regency reserves the right to reject any claim if it is determined the damage is a result of misuse, abuse or improper cleaning/ handling.

notes

Installer: Please complete the following information

Dealer Name & Address:_____

_____

Installer: _____

Phone #: _____

Date Installed: _____

Serial #:_____

Printed in Canada

Established 1974

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A2LA ACCREDITED
CERTIFICATE #1550.01

PFS Teco
11785 SE Hwy 212 STE#305
Clackamas, OR 97015

Report Number: DIRI01A05026180111

A2LA ACCREDITED
CERTIFICATE OF CALIBRATION WITH DATA

INSTRUMENT INFORMATION

Item	Make	Model	Serial Number	Customer ID	Location
Scale	Rice Lake	IQ+355E-2A x 100(	A05026	N/A	Lab
Units	**Readability**	**SOP**	**Cal Date**	**Last Cal Date**	**Cal Due Date**
lbs	1	QC033	1/11/18	6/27/17	6/2018

FUNCTIONAL CHECKS

SHIFT TEST	LINEARITY	REPEATABILITY	ENVIRONMENTAL CONDITIONS
Test Wt: 250 Tol: 1	Test Wt: HB44 Tol: HB44	Test Wt: 100 Tol: 1	☐ Good ☑ Fair ☐ Poor
As-Found: Pass:☑ Fail:☐	As-Found: Pass:☑ Fail:☐	As-Found: Pass:☑ Fail:☐	Temperature: 17.7°C
As-Left: Pass:☑ Fail:☐	As-Left: Pass:☑ Fail:☐	As-Left: Pass:☑ Fail:☐	

CALIBRATION DATA

Standard	As-Found	As-Left	Expanded Uncertainty
1000	1000.1	1000.1	0.5
700	700.3	700.3	0.5
500	499.8	499.8	0.5
300	300.0	300.0	0.5
100	100.0	100.0	0.5
50	50.0	50.0	0.5

CALIBRATION STANDARDS

Item	Make	Model	Serial Number	Cal Date	Cal Due Date	NIST ID
Avoirdupois Cast W	Rice Lake	25 and 50lb	PWO990-CA	11/24/17	11/2019	20172265

Permanent Information Concerning this Equipment:
2000lbs platform. Has a custom pan.

Comments/Information Concerning this Calibration
1/18 RH = 58.5

Report prepared/reviewed by: _____ **Date:** 1-11-18

Technician: D. Oudeans
Signature: D-Oud

The uncertainty is calculated according to the ISO Guide to the Expression of Uncertainty in Measurement and includes the uncertainty of standards used combined with the observed standard deviation of the unit under test. The uncertainty is expanded with a k factor of 2 for an approximate 95% level of confidence. Instruments listed above were calibrated using standards traceable to the National Institute of Standards and Technology (NIST). Calibration data reflect results at the time and location of calibration. Calibration data should be reviewed to insure that the instrument is performing to its required accuracy.

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A2LA ACCREDITED
CERTIFICATE #1550.01

PFS Teco
11785 SE Hwy 212 STE#305
Clackamas, OR 97015

Report Number: DIRI0182484A0912013i180613

A2LA ACCREDITED
CERTIFICATE OF CALIBRATION WITH DATA

INSTRUMENT INFORMATION

Item	Make	Model	Serial Number	Customer ID	Location
Scale	Digiweigh	DWP12i 400x.01	82484A0912013i	#050	Lab
Units	**Readability**	**SOP**	**Cal Date**	**Last Cal Date**	**Cal Due Date**
lbs	0.01	QC033	6/13/18	1/11/18	12/2018

FUNCTIONAL CHECKS

SHIFT TEST	LINEARITY	REPEATABILITY	ENVIRONMENTAL CONDITIONS
Test Wt: 50 Tol: 0.05	Test Wt: HB44 Tol: HB44	Test Wt: 50 Tol: 0.01	☐ Good ☑ Fair ☐ Poor
As-Found: Pass:☑ Fail:☐	As-Found: Pass:☑ Fail:☐	As-Found: Pass:☑ Fail:☐	Temperature: 22.2°C
As-Left: Pass:☑ Fail:☐	As-Left: Pass:☑ Fail:☐	As-Left: Pass:☑ Fail:☐	

CALIBRATION DATA

Standard	As-Found	As-Left	Expanded Uncertainty
400	399.98	399.98	0.058
300	300.00	300.00	0.058
200	200.00	200.00	0.058
100	100.00	100.00	0.012
50	50.00	50.00	0.012
20	20.00	20.00	0.012

CALIBRATION STANDARDS

Item	Make	Model	Serial Number	Cal Date	Cal Due Date	NIST ID
Avoirdupois Cast W	Rice Lake	25 and 50lb	PWO990-CA	11/24/17	11/2019	20172265
Weight Set	Rice Lake	.001 to 10lb	PW0990	9/23/16	9/2018	20161896

Permanent Information Concerning this Equipment:

6 month calibration cycle. Relative humidity= 56%.

Comments/Information Concerning this Calibration

Report prepared/reviewed by: Jake C **Date:** 6/13/18

Technician: J. Colacchio
Signature:

The uncertainty is calculated according to the ISO Guide to the Expression of Uncertainty in Measurement and includes the uncertainty of standards used combined with the observed standard deviation of the unit under test. The uncertainty is expanded with a k factor of 2 for an approximate 95% level of confidence. Instruments listed above were calibrated using standards traceable to the National Institute of Standards and Technology (NIST). Calibration data reflect results at the time and location of calibration. Calibration data should be reviewed to insure that the instrument is performing to its required accuracy.

Dry Gas Meter Calibration

Meter Manufacturer:	Apex
Model:	XC-60-ED
Lab ID #:	053
Serial #:	1902130
Calibration Date:	6/13/2018
Calibration Expiration:	12/13/2018
Barometric Pressure:	29.84 in. Hg

Reference Standard DGM	
Manufacturer:	Apex
Model:	SK25DA
Lab ID#:	047
Serial #:	1101001
Calibration Expiration Date:	3/5/2019
Calibration γ Factor:	0.998

Unit Under Test Previous Calibration	
Date	1/10/2018
γ Factor:	0.995
Allowable Deviation (±5%):	0.04975
Actual Deviation:	0.01
Result:	PASS

Calibration Data	Run 1	Run 2	Run 3
Standard DGM Initial Volume (L)	0.000	0.000	0.000
Standard DGM Final Volume (L)	144.977	146.222	201.016
Standard DGM Temperature (°F)	73.2	73.0	72.0
Standard DGM Pressure (in H_2O)	0.00	0.00	0.0
DGM Initial Volume (ft^3)	0.000	0.000	0.000
DGM Final Volume (ft^3)	5.194	5.278	7.307
DGM Temperature (°F)	84.0	90.0	94.0
DGM Pressure (in H_2O)	2.10	2.58	1.4
Time (min)	36.0	32.0	60.0
Net Volume for Standard DGM (ft^3)	5.120	5.164	7.099
Net Volume for DGM (ft^3)	5.194	5.278	7.307

Dry Gas Meter γ Factor	0.999	1.001	1.006
γ Factor Deviation From Average	0.999	1.001	1.006

Average Gas Meter γ Factor: 1.002

Calculations:

1. Deviation = |Average value for all runs - current run value|
2. $\gamma = [V_{std} \times (\gamma_{Std}) \times (P_{bar}+P_{std}/13.6) \times (T_{DGM} + 460)] / [V_{DGM} \times (T_{std} + 460) \times (P_{bar} + P_{DGM}/ 13.6)]$

Standard Reference Meter is calibrated to NIST traceable standards. Uncertainty of measurement is ±0.5%.

Dry Gas Meter Calibration

Meter Manufacturer:	Apex
Model:	XC-60-ED
Lab ID #:	054
Serial #:	1902133
Calibration Date:	6/13/2018
Calibration Expiration:	12/13/2018
Barometric Pressure:	29.84 in. Hg

Reference Standard DGM	
Manufacturer:	Apex
Model:	SK25DA
Lab ID#:	047
Serial #:	1101001
Calibration Expiration Date:	3/5/2019
Calibration γ Factor:	0.998

Unit Under Test Previous Calibration	
Date	1/11/2018
γ Factor:	1.000
Allowable Deviation (±5%):	0.05
Actual Deviation:	0.00
Result:	PASS

Calibration Data	Run 1	Run 2	Run 3
Standard DGM Initial Volume (L)	0.000	0.000	0.000
Standard DGM Final Volume (L)	158.715	148.505	236.136
Standard DGM Temperature (°F)	72.5	73.2	73.0
Standard DGM Pressure (in H_2O)	0.00	0.00	0.0
DGM Initial Volume (ft^3)	0.000	0.000	0.000
DGM Final Volume (ft^3)	5.777	5.426	8.616
DGM Temperature (°F)	93.5	94.0	90.0
DGM Pressure (in H_2O)	2.50	2.00	1.5
Time (min)	37.0	38.5	71.5
Net Volume for Standard DGM (ft^3)	5.605	5.244	8.339
Net Volume for DGM (ft^3)	5.777	5.426	8.616

Dry Gas Meter γ Factor	1.000	0.997	0.993
γ Factor Deviation From Average	1.000	0.997	0.993

Average Gas Meter γ Factor: 0.997

Calculations:

1. Deviation = |Average value for all runs - current run value|
2. $\gamma = [V_{std} \times (\gamma_{Std}) \times (P_{bar}+P_{std}/13.6) \times (T_{DGM} + 460)] / [V_{DGM} \times (T_{std} + 460) \times (P_{bar} + P_{DGM}/ 13.6)]$

Standard Reference Meter is calibrated to NIST traceable standards. Uncertainty of measurement is ±0.5%.

Dry Gas Meter Calibration

Meter Manufacturer:	Apex
Model:	Apex-AK-600
Lab ID #:	055
Serial #:	810016
Calibration Date:	6/15/2018
Calibration Expiration:	6/15/2019
Barometric Pressure:	29.83 in. Hg

Reference Standard DGM	
Manufacturer:	Apex
Model:	SK25DA
Lab ID#:	047
Serial #:	1101001
Calibration Expiration Date:	3/5/2019
Calibration γ Factor:	0.998

Unit Under Test Previous Calibration	
Date	1/18/2017
γ Factor:	0.997
Allowable Deviation (±5%):	0.04985
Actual Deviation:	0.00
Result:	PASS

Calibration Data	Run 1	Run 2	Run 3
Standard DGM Initial Volume (L)	0.000	0.000	0.000
Standard DGM Final Volume (L)	145.479	148.058	143.802
Standard DGM Temperature (°F)	71.0	71.0	71.0
Standard DGM Pressure (in H_2O)	0.00	0.00	0.0
DGM Initial Volume (ft^3)	0.000	0.000	0.000
DGM Final Volume (ft^3)	5.146	5.254	5.114
DGM Temperature (°F)	75.0	76.5	77.5
DGM Pressure (in H_2O)	1.80	1.80	1.8
Time (min)			
Net Volume for Standard DGM (ft^3)	5.138	5.229	5.078
Net Volume for DGM (ft^3)	5.146	5.254	5.114

Dry Gas Meter γ Factor	0.999	0.999	0.999
γ Factor Deviation From Average	0.999	0.999	0.999

Average Gas Meter γ Factor: 0.999

Calculations:

1. Deviation = |Average value for all runs - current run value|
2. $\gamma = [V_{std} \times (\gamma_{Std}) \times (P_{bar}+P_{std}/13.6) \times (T_{DGM} + 460)] / [V_{DGM} \times (T_{std} + 460) \times (P_{bar} + P_{DGM}/ 13.6)]$

Standard Reference Meter is calibrated to NIST traceable standards. Uncertainty of measurement is ±0.5%.

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Calibration Services

Certificate Number: 1550.01

Laboratory code: 115953

Report of Calibration

Firm: Dirigo Laboratories
Address: 11785 SE Hwy 212, Ste 305
City/State/Zip: Clackamas, OR 97015

Test Completed: 03/21/17
Submitted By: John Steiner
Traceable Number: 20170468

Test Item: 200mg and 100mg Individual Weights
Serial No.: Listed in Table

Manufacturer: Troemner

Material	Assumed Density	Range	Tolerance Class
Stainless Steel	7.95 g/cm^3	200mg & 100mg	ASTM Class 1

Method and Traceability
The procedure used for this calibration is NIST IR 6969 SOP 4 Double Substitution Weighing Design. Standards used for comparison are traceable to the National Institute of Standards and Technology (reports on file) and are part of a comprehensive measurement assurance program for ensuring continued accuracy and traceability within the level of uncertainty reported. The Traceable Number listed above is Traceable to National Standards through an unbroken chain of comparison each having stated uncertainties.

Standards Used:
100g to 1mg Working Standards Were Calibrated: 03/03/17 Due: 03/31/18 Standards ID: 723318
Mass Comparators Used: MET-05 **Tested by:** D. Thompson

Conventional Mass: "The conventional value of the result of weighing a body in air is equal to the mass of a standard, of conventionally chosen density, at a conventionally chosen temperature, which balances this body at this reference temperature in air of conventionally chosen density. International Recommendation 33 (OIML IR 33 1973, 1979). "Conventional Value of the Result of Weighing in Air" **(Previously known as "Apparent Mass vs. 8.0g/cm^3).**

Uncertainty Statement: The uncertainty conforms to the ISO Guide to the Expressions of Uncertainty in Measurement. Uncertainty as reported is based on a coverage factor k=2 for an approximate 95 percent level of uncertainty. Uncertainty components include the standard deviation of the process, the uncertainty of the standard used, an uncertainty component associated with the potential drift of the standard used, and the estimated uncertainty related to measuring and determining the air buoyancy effect.

Conventional Mass Values are listed on page 2 of this report.

Quality Control Services, Inc.
Metrology Laboratory Manager
E-mail dthompson@qc-services.com

Date: 03/21/17

Signature David S. Thompson

Established 1974

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ACCREDITED

Calibration Services

Certificate Number: 1550.01

Laboratory code: 115953

Report of Calibration

Firm: Dirigo Laboratories
Address: 11785 SE Hwy 212, Ste 305
City/State/Zip: Clackamas, OR 97015

Test Completed: 03/21/17
Submitted By: John Steiner
Traceable Number: 20170468

Test Item: 200mg and 100mg Individual Weights
Serial No.: Listed in Table

Manufacturer: Troemner

Laboratory Environment at time of test

Temperature °C	Pressure mmHg	Humidity %RH
21.967	753.44	49.44

Conventional Mass Value

Nominal Value	As Found grams	As Found Correction* (mg)	Uncertainty (mg)	Tolerance (mg)
200mg SN 1000101395	0.2000061	0.0061	0.0026	0.01
100mg SN 1000126267	0.1000046	0.0046	0.0028	0.01

*Correction is the difference between the conventional mass value of a weight and its nominal value.

Comments: These weights were new from the manufacturer and were within ASTM Class 1 tolerances As Found. No adjustments or changes were made so As Found values should be considered to be As Left values.

Accredited by the American Association for Laboratory Accreditation (A2LA) under Calibration Laboratory Code 115953 and Certificate Number 1550.01. This laboratory meets the requirements of ISO/IEC 17025:2005 *General Requirements for the Competence of Testing and Calibration Laboratories.* This laboratory also meets the requirements of ANSI/NCSL Z540-1-1994 and any additional program requirements in the field of calibration.

Quality Control Services, Inc.
Metrology Laboratory Manager
E-mail dthompson@qc-services.com

Date: 03/21/17

Signature David S. Thompson

Established 1974

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ACCREDITED
Calibration Services
Certificate Number: 1550.01
Laboratory code: 115953

Report of Calibration

Firm: Dirigo Laboratories
Address: 11785 SE Hwy 212, Ste 305
City/State/Zip: Clackamas, OR 97015

Test Completed: 01/15/16
Purchase Order: 1001
Traceable Number: 20152489

Test Item: 20lb and 10lb Individual Grip Handle Weights
Serial No.: Listed in Table

Manufacturer: Unknown

Laboratory Environment at time of test

Temperature °C	Pressure mmHg	Humidity %RH
21.448	760.64	44.58

Conventional Mass Value

Nominal Value	As Found pounds	As Found Correction* (mg)	Uncertainty (mg)	Tolerance (mg)
20lb #098	19.9995450	-206.4	6.4	910
10lb #097	10.0006510	295.3	5.1	450
10lb #051	10.0003421	155.2	5.1	450

*Correction is the difference between the conventional mass value of a weight and its nominal value.

Comments: These weights were received in good condition and were within NIST Handbook 105-1 Class F tolerances As Found. No adjustments or changes were made so As Found values should be considered to be As Left values.

Accredited by the American Association for Laboratory Accreditation (A2LA) under Calibration Laboratory Code 115953 and Certificate Number 1550.01. This laboratory meets the requirements of ISO/IEC 17025:2005 *General Requirements for the Competence of Testing and Calibration Laboratories*. This laboratory also meets the requirements of ANSI/NCSL Z540-1-1994 and any additional program requirements in the field of calibration.

Quality Control Services, Inc.
Metrology Laboratory Manager
E-mail dthompson@qc-services.com

Date: 01/15/16

Signature David S. Thompson

Established 1974

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CERTIFICATE #1550.01

PFS Teco
11785 SE Hwy 212 STE#305
Clackamas, OR 97015

Report Number: DIRI0134307497180613

A2LA ACCREDITED
CERTIFICATE OF CALIBRATION WITH DATA

INSTRUMENT INFORMATION

Item	Make	Model	Serial Number	Customer ID	Location
Balance	Sartorius	ENTRIS224-1S	34307497	#107	Lab

Units	Readability	SOP	Cal Date	Last Cal Date	Cal Due Date
g	0.0001	QC012	6/13/18	1/11/18	12/2018

FUNCTIONAL CHECKS

ECCENTRICITY
Test Wt: 100 Tol: 0.0003
As-Found: Pass: ☑ Fail: ☐
As-Left: Pass: ☑ Fail: ☐

LINEARITY
Test Wt: 50 x 4 Tol: 0.0002
As-Found: Pass: ☑ Fail: ☐
As-Left: Pass: ☑ Fail: ☐

STANDARD DEVIATION
Test Wt: 100 Tol: 0.0001

1. 100.0000	5. 100.0001	9. 100.0001
2. 100.0000	6. 100.0001	10. 100.0001
3. 100.0000	7. 100.0001	Result
4. 100.0000	8. 100.0001	0.00005

ENVIRONMENTAL CONDITIONS
☐ Good ☑ Fair ☐ Poor
Temperature: 22.8°C

A2LA ACCREDITED SECTION OF REPORT

Standard	As-Found	As-Left	Expanded Uncertainty
200	199.9980	200.0000	0.00015
100	99.9991	100.0000	0.00015
50	49.9995	50.0001	0.00015
20	19.9998	20.0000	0.00015
1	1.0000	1.0000	0.00015
0.1	0.1000	0.1000	0.00015

CALIBRATION STANDARDS

Item	Make	Model	Serial Number	Cal Date	Cal Due Date	NIST ID
Weight Set	Rice Lake	20 kg to 1mg	2831W	1/3/18	1/2019	20152429

Permanent Information Concerning this Equipment:
6 month calibration cycle. Relative humidity= 47%

Comments/Info Concerning this Calibration:
6/13/18: Adjusted span.

Report prepared/reviewed by: Jake C **Date:** 6/13/18

Technician: J. Colacchio
Signature:

The uncertainty is calculated according to the ISO Guide to the Expression of Uncertainty in Measurement and includes the uncertainty of standards used combined with the observed standard deviation and readability of the unit under test. The uncertainty is expanded with a k factor of 2 for an approximate 95% level of confidence. Instruments listed above were calibrated using standards traceable to the National Institute of Standards and Technology (NIST). Calibration data reflect results at the time and location of calibration. Calibration data should be reviewed to insure that the instrument is performing to its required accuracy. Calibrations comply with ISO/IEC 17025 and ANSI/Z540-1-1994 quality standards.

INNOCAL®
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625 East Bunker Court
Vernon Hills, Illinois 60061
PH: 866-466-6225
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NIST Traceable
Calibration Report

REPORT NUMBER
1375092

Reference Number: 1200788
PO Number: JSTEINERT013118

PFS-TECO
11785 SE Highway 212
Suite 305
Clackamas, OR 97015 United States

Manufacturer:	Dwyer Instruments Inc.	**Calibration Date:**	02/14/2018
Model Number:	471	**Calibration Due Date:**	02/14/2019
Description:	Air Velocity, Digital Thermo Anemometer	**Condition As Found:**	Limited In Tol See Comments
Asset Number:	#095	**Condition As Left:**	Limited See Comments
Serial Number:	#095		
Procedure:	DS Universal Speed/Time/Temperature		

Remarks:

NIST-traceable calibration performed on the unit referenced above in accordance with customer requirements, published specifications and the lab's standard operating procedures. No adjustments were made to the unit.

This calibration is considered limited due to the requested test range.

Standards Utilized

Asset No.	Manufacturer	Model No.	Description	Cal. Date	Due Date
CP105979	Kanomax	X5602	Air Velocity, Wind Tunnel, Open Jet	01/06/2018	01/31/2019
CP144554	Fluke Corporation	1551A EX	Temperature, Stik Thermometer	01/08/2018	01/31/2019

Calibration Data

FUNCTION TESTED	Nominal Value	As Found	Out of Tol	As Left	Out of Tol	CALIBRATION TOLERANCE
Speed Accuracy Air Velocity	50 ft/min	43		Same		35 to 65 ft/min [EMU 1.3 ft/min][TUR 12:1]
Speed Accuracy Air Velocity	100 ft/min	90		Same		85 to 115 ft/min [EMU 1.5 ft/min][TUR 9.8:1]
Speed Accuracy Air Velocity	150 ft/min	140		Same		135 to 165 ft/min [EMU 1.8 ft/min][TUR 8.3:1]
Speed Accuracy Air Velocity	200 ft/min	192		Same		185 to 215 ft/min [EMU 2.1 ft/min][TUR 7.1:1]
Speed Accuracy Air Velocity	250 ft/min	240		Same		235 to 265 ft/min [EMU 2.4 ft/min][TUR 6.2:1]
Speed Accuracy Air Velocity	300 ft/min	288		Same		285 to 315 ft/min [EMU 2.7 ft/min][TUR 5.6:1]
Speed Accuracy Air Velocity	400 ft/min	395		Same		385 to 415 ft/min [EMU 3.3 ft/min][TUR 4.5:1]
Speed Accuracy Air Velocity	500 ft/min	485		Same		485 to 515 ft/min [EMU 3.9 ft/min][TUR 3.8:1]
Temperature Accuracy	72.0 °F	71.9		Same		70.0 to 74.0 °F [EMU 0.11 °F][TUR 18:1]

Temperature: 23° C
Humidity: 20% RH
Rpt. No.: 1375092

Calibration Performed By:				Quality Reviewer:	
Mathews, Rich	314	Metrologist	847-327-5314	Szplit, Tony	02/14/2018
Name	ID #	Title	Phone	Name	Date

Model 1430 Microtector® Electronic Point Gage

Installation and Operating Instructions

Model 1430 Microtector® Portable Electronic Point Gage combines modern, solid-state integrated circuit electronics with a time-proven point gage manometer to provide fast, accurate pressure measurements.

SPECIFICATIONS AND FEATURES

- Accurate and repeatable to ± .00025 inches water column
- Pressure range: 0 - 2″ w.c., positive, negative, or differential pressures
- Non-toxic and inexpensive gage fluid consists of distilled water mixed with a small amount of fluorescein green color concentrate
- Convenient, portable, lightweight and self-contained, the unit requires no external power connections and is operated by a 1.5 volt penlight cell
- A.C. detector current eliminates point plating, fouling and erosion
- Micrometers are manufactured in accordance with ASME B89.1.13-2001, and are traceable to a standard at the National Institute of Standards and Technology
- Three-point mounting, dual leveling adjustment, and circular level vial assure rapid setup
- Durablock® precision-machined acrylic plastic gage body
- Sensitive 0 - 50 microamp D.C. meter acts as a detector and also indicates battery and probe condition
- Heavy 2″ thick steel base plate provides steady mounting
- Top-quality glass epoxy circuit board and solid-state, integrated circuit electronics
- Electronic enclosure of tough, molded styrene acrylonitrile provides maximum protection to components yet allows easy access to battery compartment
- Rugged sheet steel cover and carrying case protects the entire unit when not in use
- Accessories included are (2) 3-foot lengths Tygon® tubing, (2) 1/8″ pipe thread adapters and 3/4 oz. bottle of fluorescein green color concentrate with wetting agent

Maximum pressure: 100 psig with optional pipe thread connections.

Tygon® is a registered trademark of Saint-Gobain Corporation

DWYER INSTRUMENTS, INC.
P.O. BOX 373
MICHIGAN CITY, INDIANA 46361,U.S.A
Phone: 219/879-8000
Fax: 219/872-9057
www.dwyer-inst.com
e-mail: info@dwyer-inst.com

PRAXAIR

Praxair
5700 South Alameda Street
Los Angeles, CA 90058
Tel: (323) 585-2154 Fax:(714) 542-6689
PGVPID: F22017

DocNumber: 000104677

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: 109702413
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:	CC144992	Analytical Uncertainty:
17.06 %	CARBON DIOXIDE	± 0.3 %
4.25 %	CARBON MONOXIDE	± 0.6 %
17.02 %	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 06 %
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: 17 04	Conc:	17 049	
R: 20 01	Z: 0	C: 17 05	Conc:	17 059	
Z: 0	C: 17 05	R: 20 01	Conc:	17 059	

UOM: % Mean Test Assay: 17 055 %

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 25 %
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 3	Conc:	4 253	
R: 4	Z: 0	C: 4 3	Conc:	4 253	
Z: 0	C: 4 3	R: 4 01	Conc:	4 253	

UOM: % Mean Test Assay: 4 253 %

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: 000104677

CERTIFICATE OF ANALYSIS / EPA PROTOCOL GAS

3. Component: **OXYGEN**

Requested Concentration	17 %
Certified Concentration	17 02 %
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:	17 01	Conc:	17 016
Z:	0	C:	17 03	R:	19 74	Conc:	17 036
UOM:	%			**Mean Test Assay:**			17 022 %

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

PRAXAIR

Praxair
5700 South Alameda Street
Los Angeles, CA 90058
Tel: (323) 585-2154 Fax:(714) 542-6689
PGVPID: F22016

DocNumber: 000101815

CERTIFICATE OF ANALYSIS / EPA PROTOCOL GAS

Customer & Order Information:

PRAXAIR PKG VANCOUVER WA
603 SE VICTORY AVE BLDG 46 S
VANCOUVER WA 98661

Praxair Order Number: 70157889
Customer P. O. Number:
Customer Reference Number:

Fill Date: 11/28/2016
Part Number: NI CD10CO33E-AS
Lot Number: 109633301
Cylinder Style & Outlet: AS CGA 590
Cylinder Pressure & Volume: 2000 psig 140 cu ft

Certified Concentration:

Expiration Date:	12/15/2024	NIST Traceable
Cylinder Number:	CC332147	Analytical Uncertainty:
10.02 %	CARBON DIOXIDE	± 0.4 %
2.52 %	CARBON MONOXIDE	± 0.5 %
10.51 %	OXYGEN	± 0.2 %
Balance	NITROGEN	

Certifcation Information: *Certification Date:* 12/15/2016 *Term:* 96 Months *Expiration Date:* 12/15/2024

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.

O2 responses have been corrected for CO2 interference. CO2 responses have been corrected for O2 effect.

Analytical Data: *(R=Reference Standard, Z=Zero Gas, C=Gas Candidate)*

1. Component: CARBON DIOXIDE

Requested Concentration: 10 %
Certified Concentration: 10.02 %
Instrument Used: Horiba VIA-510 S/N 20C194WK
Analytical Method: NDIR
Last Multipoint Calibration: 12/12/2016

First Analysis Data:						Date:	12/15/2016
Z:	0	R:	13.98	C:	10.01	Conc:	10.017
R:	13.99	Z:	0	C:	10.01	Conc:	10.017
Z:	0	C:	10.01	R:	13.97	Conc:	10.017
UOM:	%			Mean Test Assay:			10.017 %

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: 11/18/2016

First Analysis Data:						Date:	11/15/2016
Z:	0	R:	3.97	C:	2.52	Conc:	2.516
R:	3.96	Z:	0	C:	2.53	Conc:	2.526
Z:	0	C:	2.52	R:	3.97	Conc:	2.516
UOM:	%			Mean Test Assay:			2.519 %

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 %

Report and Certificate of Calibration

CAL-CERT
CALIBRATION CERTIFICATION

6709 SE Lake Road
Milwaukie, OR 97222
1-800-356-4662
CL-108

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"Measure The Difference"

14 Inverness Drive East, Ste B-128
Englewood, CO 80112
1-800-983-7832
CL-157

ACCREDITED
Calibration Laboratory

Report #:	2260-28789-46	**Customer PO#:**	
Customer Name:	PFS TECO		
Customer Address:	11785 Southeast Highway 212		
City:	Clackamas	**State:** OR	**Zip:** 97015
Contact:	John Steinert		
Service Address:	6709 Southeast Lake Road	Milwaukie, OR 97222	

Calibration Standards

10-RH/00192 Comark Thermohygrometer S/N: 6217150049 Cal Date: 11/17/17 Due Date: 11/30/18 Vendor: Cal-Cert REPORT # 1573-C-01
10-SR1/00515 SPI Steel Rule S/N: 00515 Cal Date: 3/21/17 Due Date: 3/21/18 Vendor: Cal-Cert REPORT# 59499-C-07

Instrument Data

Calibration Date:	January 25, 2018	**Reference:**	Manufacturer's Spec
Calibration Due Date:	January 25, 2019	**Cal-Cert Procedure:**	CP-115
Calibration Frequency:	12 Months	**Indicating System:**	Scaling
Manufacturer:	Dewalt	**Temperature:**	71 °F
Type:	Tape Measure	**Humidity:**	29% RH
Model Number:	DWHT33372	**Asset #:**	#090
Serial #:	#1 TAPE	**Service Location:**	Cal-Cert Lab
Capacity:	192 Inches	**As Found:**	Pass
		As Left:	Pass

Instrument Range: 192.000 Inches **Range Resolution:** 0.0625 Inches

Calibration Standard	As Found Reading	Verification Reading #1	Verification Reading #2
0.000	0.000	0.000	0.000
0.063	0.063	0.063	0.063
1.000	1.000	1.000	1.000
12.000	12.000	12.000	12.000
48.000	48.000	48.000	48.000
96.000	96.000	96.000	96.000
192.000	192.000	192.000	192.000

Expanded Uncertainty ± 0.07217 Inches

Remarks:

We sincerely thank you for your business. Please call us at 1-800-356-4662 for all your sales and calibration needs.
Cleaning and preventative maintenance were performed as part of this service.

Cal-Cert is accredited by the International Accreditation Service, Inc. (IAS) under Calibration Laboratory Code CL-108 & CL-157.
IAS is recognized under the ILAC mutual recognition agreement (MRA).

This certificate is hereby issued that the above instrument was tested for accuracy with calibrated standards traceable to the National Institute of Standards and Technology (NIST). The information provided on this form complies with the data gathering and reporting requirements of ISO/IEC 17025 and ANSI/NCSL Z540.3, and meets the requirements of all applicable references and Cal-Cert procedures listed above.
Any stated measurement uncertainty includes the uncertainty of the Calibration standards used, combined with the uncertainty of the measurement process using the RSS method with a k=2 for an approximate 95% level of confidence. The calibration process meets or exceeds a ratio of 4:1 unless otherwise stated.
All tolerances were derived from the applicable standards and pass/fail determination is based on those tolerances. The customer determined any recommended due dates indicated on the certificate.

Service Engineer:	TYSON MORAN	**Date:**	January 25, 2018
Technical Manager:	MARSHALL DOYLE	**Signature:**	MDoyle

Report and Certificate of Calibration

CAL-CERT CALIBRATION CERTIFICATION
6709 SE Lake Road
Milwaukie, OR 97222
1-800-356-4662
CL-108

www.Cal-Cert.com
"Measure The Difference"

14 Inverness Drive East, Ste B-128
Englewood, CO 80112
1-800-983-7832
CL-157

ACCREDITED
Calibration Laboratory

Report #:	2260-28781-66	**Customer PO#:**	
Customer Name:	PFS TECO		
Customer Address:	11785 SE Highway 212		
City:	Clackamas	**State:** OR	**Zip:** 97015
Contact:	John Steinert		
Service Address:	6709 SE Lake Road, Milwaukie, OR 97222		

Calibration Standards

10-RH/00192 Comark Thermohygrometer S/N: 6217150049 Cal Date: 11/17/17 Due Date: 11/30/18 Vendor: CC REPORT # 1573-C-01
L-GB-0/00397 Mitutoyo 83 Piece Gage Block Set S/N: 0509020 Cal Date: 9/8/16 Due Date: 9/30/18 Vendor: American Gage REPORT#: 83181-2-354224

Instrument Data

Calibration Date:	January 23, 2018	**Reference:**	NAVAIR 17-20MD-07
Calibration Due Date:	January 23, 2019	**Cal-Cert Procedure:**	CP-008
Calibration Frequency:	12 Months	**Indicating System:**	Digital
Manufacturer:	General	**Temperature:**	72 °F
Type:	Digital Caliper	**Humidity:**	31% RH
Model Number:	147	**Asset #:**	#092
Serial #:	#092	**Service Location:**	Cal-Cert Lab
Capacity:	6 Inches	**As Found:**	PASS
Resolution:	0.0005 Inches	**As Left:**	PASS

Instrument Range: 6 Inches **Range Resolution:** 0.0005 Inches

Outside Jaws / Linearity

Calibration Standard Inches	As Found Inches	As Left Reading 1 Inches	As Left Reading 2 Inches	Tolerance ± Inches
0.0000	0.0000	0.0000	0.0000	0.0000
0.0500	0.0500	0.0500	0.0500	0.0010
0.3000	0.3000	0.3000	0.3005	0.0010
0.6000	0.6000	0.6000	0.6000	0.0010
1.2000	1.2005	1.2005	1.2000	0.0010
2.4000	2.4000	2.4000	2.4005	0.0010
3.5000	3.5000	3.5000	3.5000	0.0010
5.0000	5.0000	5.0000	5.0000	0.0010
6.0000	6.0000	6.0000	6.0000	0.0010

Expanded Uncertainty ± 0.00129 Inches

Verifications (for information only)

	Target	Measured	Tolerance ±
Resolution Check	0.10050	0.10050	N/A
Depth	1.000	1.00000	N/A
Step	1.000	1.00000	N/A
Inside Jaws	1.000	1.00000	N/A

Inspections

Jaws Parallel	Acceptable

Remarks:

We sincerely thank you for your business. Please call us at 1-800-356-4662 for all your sales and calibration needs.
Cleaning and preventative maintenance were performed as part of this service.

Cal-Cert is accredited by the International Accreditation Service, Inc. (IAS) under Calibration Laboratory Code CL-108 & CL-157.
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This certificate is hereby issued that the above instrument was tested for accuracy with calibrated standards traceable to the National Institute of Standards and Technology (NIST). The information provided on this form complies with the data gathering and reporting requirements of ISO/IEC 17025 and ANSI/NCSL Z540.3, and meets the requirements of all applicable references and Cal-Cert procedures listed above.

Any stated measurement uncertainty includes the uncertainty of the Calibration standards used, combined with the uncertainty of the measurement process using the RSS method with a k=2 for an approximate 95% level of confidence. The calibration process meets or exceeds a ratio of 4:1 unless otherwise stated.

All tolerances were derived from the applicable standards and pass/fail determination is based on those tolerances. The customer determined any recommended due dates indicated on the certificate.

Service Engineer:	NICOLAS ILLA	**Date:**	January 23, 2018
Technical Manager:	MARSHALL DOYLE	**Signature:**	MDoyle