EPA Certification Test Report

The following models are EPA certified under the following attached test report:	**i2500**
	Model #
Wood Stoves	N/A
Wood Inserts	i2500
Wood Fireplaces	N/A
Pellet Stoves	N/A
Pellet Inserts	N/A

Full US Environmental Protection Agency ("EPA") certification test reports have been reported to the EPA. Test reports may contain sensitive, confidential business information which has been specifically excluded and/or redacted from this publicly posted test report.

Published February 25, 2022
E&OE

Fireplace Products International, Ltd.

Project # 18-434
Model: I2500
Type: Catalytic Wood-Fired Room Heater
November 19, 2018
Revised Date: August 9, 2021
February 25, 2022

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

Contact: Mr. Dave Lal
6988 Venture Street
Delta, BC VG4 1H4
Canada
dlal@regency-fire.com
(604)-946-5155

Prepared by: Sebastian Button,
Laboratory Supervisor

11785 SE Highway 212 – Suite 305
Clackamas, OR 97015-9050
(503) 650-0088
WWW.PFSTECO.COM

Revision Summary

Date: 11/19/2018 – Original Issue

Date: 8/9/2021 – The following revisions were made per EPA request:

-The manufacturer's written test instructions were added to Appendix A, see page 25 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 22, page 201 of Non-CBI report.

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

Date: 2/25/2022 – The following revisions were made per a request from EPA:

-Sample calculations were added to Appendix A, see page 176 of Non-CBI report.

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

-The Owner's Manual in Appendix B was updated to include information on stack height, see page 220 of Non-CBI report.

Contents

Affidavit

PFS-TECO was contracted by Fireplace Products International Ltd. (FPI) to provide testing services for the I2500 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 10/29/2018 and ending on 10/31/2018. 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. A copy of EPA ALT-125 is included in Appendix A for reference, as required by the approval letter.

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 I2500 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 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: ***I2500***
- Serial Number: ***Un-serialized Prototype – PFS Tracking Number 0014***
- Manufacturer*:* ***FPI-Regency Fireplace Products***
- Catalyst: ***Yes***
- Heat exchange blower: ***Optional***
- Type: ***Wood Stove***
- Style: ***Insert***
- Date Received: ***Thursday, October 25, 2018***
- Wood Heater Aging: ***September 10, 2018 - September 21, 2018***
- Testing Period – Start: ***Monday, October 29, 2018*** Finish: ***Wednesday, October 31, 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: ***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
064	Digital Barometer
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
CC700832	Gas Analyzer Calibration Span Gas
CC170624	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 **76.4%.** The average CO emission rate for the 3 tests was **0.34 g/min.** The FPI I2500 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	10/29/2018	10/30/2018	10/31/2018
Run Number	1	2	3
PM Emission Rate (g/hr)	1.94	0.90	0.62
Burn Rate (kg/hr)	3.01	1.18	1.40
Heat Output (BTU/hr)	42,995	17,178	20,227
HHV Efficiency (%)	73.8	77.2	76.9
LHV Efficiency (%)	78.9	82.6	82.3
CO Emissions (g/MJ output)	0.38	1.70	0.54
CO Emissions (g/kg dry fuel)	5.57	26.25	8.36
CO Emissions (g/min)	0.29	0.51	0.19
First Hour Emission Rate (g/hr)	4.04	4.27	2.01
Weighting Factor (%)	20	40	40
Weighted particulate emission average of 3 test runs: 1.0 grams per hour.			
Weighted average HHV efficiency of 3 test runs: 76.4%.			
Average CO emission rate for 3 test runs: 0.34 grams per minute			

Test Run Narrative

Run 1

Run 1 was performed on 10/29/2018 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 181 minutes, main test fuel load burn time was 143 min. The particulate emissions rate from kindling ignition to test completion was 1.94 g/hr. The burn rate of the test fuel load was 3.01 kg/hr. The main test load portion of the run had an overall HHV efficiency of 73.8%. 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 10/30/2018 as a low fire test run per ASTM E3053. The overall test duration was 499 minutes (8.32 hours). The burn rate for the test run was 1.18 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 0.90 g/hr. The run had an overall HHV efficiency of 77.2%. 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 10/31/2018 as a medium fire test run per ASTM E3053. The overall test duration was 413 minutes. The burn rate for the test run was 1.40 kg/hr, therefore the medium fire category requirements were met, less than the mid-point of the high and low burn rates (2.10 kg/hr). The particulate emissions rate for the test run was 0.62 g/hr. The run had an overall HHV efficiency of 76.9%. 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	63	72	52.1	44.6	30.09	9.9[1]	21.82	21.3	181[2]
2	71	74	44.8	35.3	30.19	21.49	26.56	23.5	499
3	72	70	43.1	53.8	30.04	21.57	25.91	22.5	413

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

[2]Total test time was 181 min, high fire test load burn duration was 143 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 (2.75” 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 (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 (1.156” open from fully closed), blower off for first 20 min, then set to high.

Appliance Description

Model(s): I2500

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 1" C cast 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" 16 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 I2500 is optionally offered with a convection fan that attached to the bottom front on the appliance.

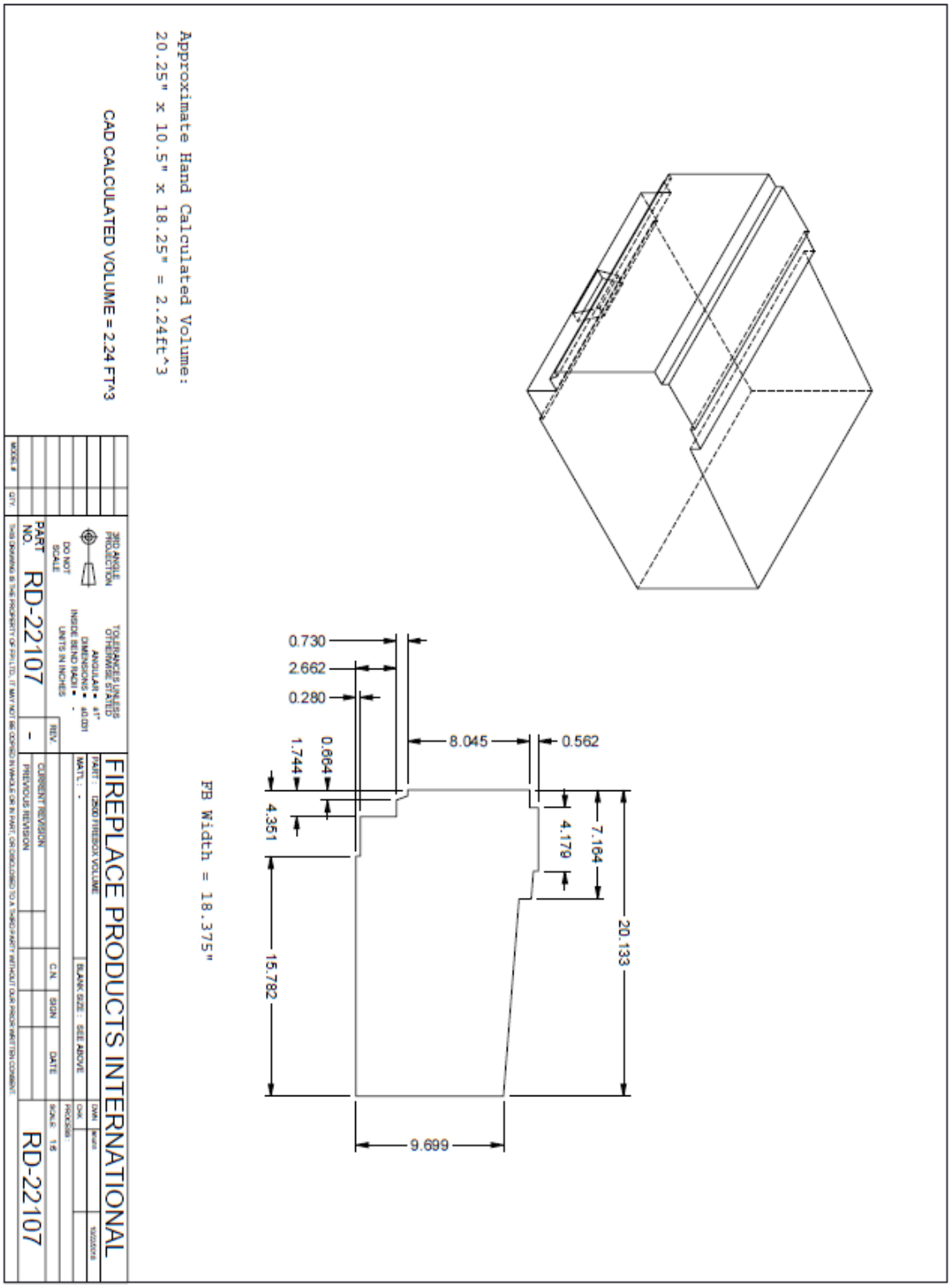
Appliance Dimensions

I2500 Unit Dimensions

Height	Width	Depth	Firebox Volume
20.875"	22.875"	27.9"	2.24 ft^3

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

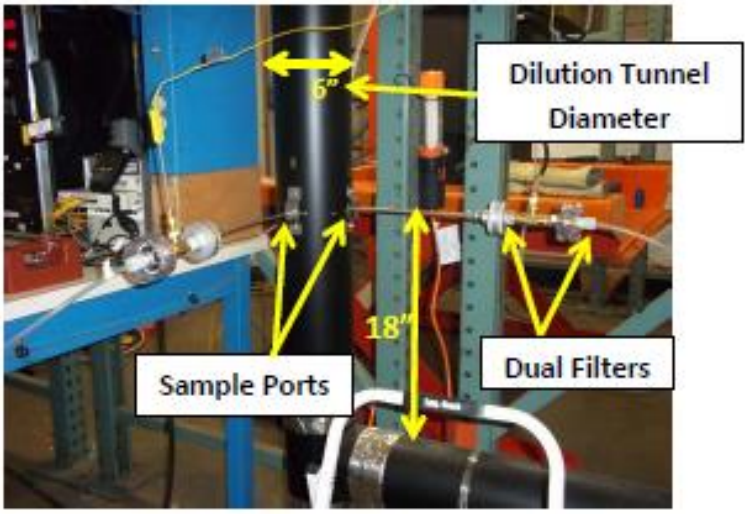
Typical High Fire Load

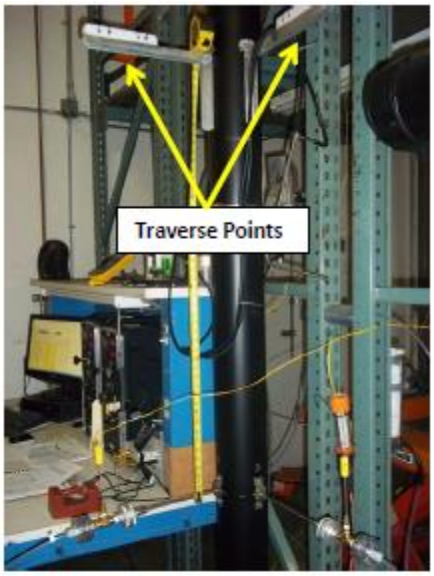
Typical Low Fire Load

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)

WOOD HEATER TESTING SUMMARY

SECTION 1 – Model Identification

Model Name(s)/Number(s)	I2500
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	10/29/2018 - 10/31/2018
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)	I2500			
Usable Firebox Volume - ft^3	2.24			
Convection Air Fan (No, Standard, Optional)	Optional			
Test Run #	1	2	3	
Date Tested	10/29/2018	10/30/2018	10/31/2018	
Test Run Category (L, M, H)	H	L	M	
Average Barometric Pressure - in Hg	30.09	30.19	30.04	
Max. Observed Ambient Temp - °F	63	69	64	
Min. Observed Ambient Temp - °F	72	75	75	
Max. Observed Filter Temp - °F	88	88	88	
Test Run Air Settings				
Primary (measured up from minimum)	Maximum	1.15"	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	4.01	na	na	
Kindling Wt. - As % of Test Fuel Load	18%	na	na	
Kindling Moisture - % DB	10%	na	na	
Kindling - kg DB	1.65	na	na	
SU Fuel - As Fired lb	5.91	na	na	
SU Fuel Wt. - As % of Test Fuel Load	27%	na	na	
SU Fuel Moisture - % DB	21%	na	na	
SU Fuel - kg DB	2.22	na	na	
Test Fuel Load - As Fired lb	21.82	26.56	25.91	
Ave. Test Fuel Load MC % DB	21.3%	23.5%	22.5%	
Test Fuel Load - kg DB	8.18	9.78	9.61	
Test Fuel Loading Density - lb/ft^3	9.74	11.86	11.57	
Residual SU Fuel Wt. - As Fired lb	2.40	na	na	
Residual SU Fuel Wt. - As % of Test Fuel Load	11%	na	na	
Test Run Duration - minutes	181	499	413	
Test Run Duration - h	3.02	8.32	6.88	
Run Duration of High Fire Load Only - minutes	143	na	na	
Run Duration of High Fire Load Only - h	2.38	na	na	
Test Fuel Load Wt. at End of Test - As Fired lb	2.2	0	0	
Total Total Fuel Burned - kg DB	9.96	9.78	9.61	
% Test Fuel Load Wt. at End of Test	10.1%	0.0%	0.0%	

SECTION 3 – Test Run Results Summary

Model Name(s)/Number(s)	I2500			
Usable Firebox Volume - ft^3	2.24			
Convection Air Fan (No, Standard, Optional)	Optional			
Test Run #	1	2	3	
Date Tested	10/29/18	10/30/18	10/31/18	
Test Run Category	H	L	M	
Burn Rate - kg/h DB	3.01	1.18	1.40	
Burn Rate - As % of Low to High Midpoint	na	na	67%	
Burn Duration - h	3.02	8.32	6.88	
Heat Output - Btu/h	42995	17178	20227	
Average Dilution Tunnel Flow Rate - dscfm	181.55	169.02	169.80	
Average Sample Flow Rates - dscfm				
Train 1	0.147	0.146	0.148	
Train 2	0.145	0.146	0.144	
Total PM Emissions - g				
Train 1	6.06	7.44	3.92	
Train 2	5.67	7.47	4.65	
Average	5.865	7.455	4.285	
PM Emission Train Precision - %	3.3%	-0.2%	-8.5%	
PM Emission Train Precision - g/kg	0.04	0.00	-0.08	
PM Emission Rate - g/h	1.94	0.90	0.62	
Total CO Emissions - g	41	256	80	
CO Emissions Rate - g/h	17	31	12	
Overall Efficiency - CSA B415.1-10				
% HHV Basis	73.8	77.2	76.9	
% LHV Basis	78.9	82.6	82.3	

SECTION 4 - Weighted Average Summary

Model Name(s)/Number(s)	I2500		
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	1.18	1.40	3.01
PM Emission Rate - g/h	0.90	0.62	1.94
CO Emissions Rate - g/h	30.8	11.6	17.2
Overall Efficiency - CSA B415.1-10			
% HHV Basis	77.2	76.9	73.8
% LHV Basis	82.6	82.3	78.9
Heat Output - Btu/h	17200	20200	43000
Category Weighting	40%	40%	20%

ASTM E 3053 Weighted Averages			
PM Emission Rate - g/h	1.0		
CO Emissions Rate - g/h	20		
Overall Efficiency - CSA B415.1-10			
% HHV Basis	76		
% LHV Basis	82		
Heat Output Range - Btu/h	17200	to	43000

Conditioning Data

Client:	FPI	Job #:	18-434
Model:	I2500	Tracking #:	0014
Date(s):	9/10/2018 - 9/21/2018	Technician:	SJB

		Average:	352.5	69.3	720
Elapsed Time (hrs)	**Scale Reading (lbs)**	**Weight Change (lbs)**	**Flue (°F)**	**Ambient (°F)**	**Catalyst Exit (°F)**
0	0.9	-	367	67	628
1	3.3	2.4	419	69	824
2	1.0	-2.3	330	70	671
3	3.2	2.2	367	62	632
4	7.7	4.5	411	63	881
5	9.1	1.4	404	63	882
6	8.3	-0.8	373	64	744
7	5.8	-2.5	361	67	738
8	7.2	1.4	331	67	671
9	5.0	-2.2	337	69	694
10	5.7	0.7	303	70	685
11	5.7	0.0	293	72	636
12	18.3	12.6	474	72	982
13	10.0	-8.3	377	75	830
14	5.2	-4.8	291	75	635
15	3.6	-1.6	255	73	565
16	2.5	-1.1	241	72	526
17	1.9	-0.6	234	71	510
18	26.3	24.4	416	73	676
19	18.5	-7.8	438	72	932
20	11.3	-7.2	344	72	675
21	6.7	-4.6	347	72	751
22	4.4	-2.3	322	72	643
23	2.8	-1.6	271	71	530
24	26.1	23.3	406	69	708
25	20.7	-5.4	453	70	1039
26	10.9	-9.8	400	72	821
27	6.0	-4.9	317	72	683
28	3.7	-2.3	283	70	587
29	2.6	-1.1	261	70	541
30	1.5	-1.1	249	69	510
31	7.9	6.4	368	61	675
32	7.3	-0.6	359	65	740
33	3.1	-4.2	315	64	676
34	4.5	1.4	404	67	965
35	6.2	1.7	382	68	777
36	5.4	-0.8	375	69	731
37	4.9	-0.5	347	71	659
38	14.3	9.4	434	71	956
39	6.3	-8.0	327	73	700
40	4.0	-2.3	285	72	658
41	2.8	-1.2	249	71	533
42	1.8	-1.0	240	70	507
43	11.5	9.7	501	66	827
44	9.9	-1.6	468	68	1010
45	2.9	-7.0	323	68	734
46	7.6	4.7	340	70	697
47	5.2	-2.4	305	70	630
48	26.8	21.6	537	67	911
49	21.7	-5.1	405	70	821
50	15.0	-6.7	339	69	671

Signature/Date: 10/29/2018

Emission testing instructions I2500

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 – 4.0lb

Startup fuel – 6.0lb

Procedure

Start with a couple pieces of crumbled paper in between and 2.5 lbs kindling. Adjust the door opening for less smoke and establish a good fire. Keep the door open in that position for 2 – 3 min. Once door is closed and fire is established, close bypass (5 minutes max).

At 0.8lb 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 1.0lb load 2lb 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 2.5lb 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 7lbs adjust the load. Lift the unburned pieces out from the coals and bring unburned pieces to center front to ensure full charcoalization.

Around 4.5 lbs, 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.

Fan on high at 20 min.

WOOD STOVE TEST DATA PACKET
ASTM E3053/E2515

Run 1 Data Summary

Client:	FPI
Model:	I2500
Job #:	18-434
Tracking #:	0014
Test Date:	10/29/2018

Techician Signature

10/31/2018
Date

TEST RESULTS - ASTM E3053 / ASTM E2515

Client: FPI
Model: I2500
Run #: 1

Job #: 18-434
Tracking #: 0014
Technician: SJB
Date: 10/29/2018

Burn Rate (kg/hr):	3.01

	Ambient Sample	Sample Train A	Sample Train B	1st Hour Filter
Total Sample Volume (ft^3)	25.090	26.585	26.205	8.764
Average Gas Velocity in Dilution Tunnel (ft/sec)	16.9			
Average Gas Flow Rate in Dilution Tunnel (dscf/hr)	10893.0			
Average Gas Meter Temperature (°F)	69.0	75.6	87.0	71.9
Total Sample Volume (dscf)	25.149	26.540	25.484	8.810
Average Tunnel Temperature (°F)	109.9			
Total Time of Test (min)	181			
Total Particulate Catch (mg)	0.1	5.0	4.5	3.3
Particulate Concentration, dry-standard (g/dscf)	0.0000040	0.0001884	0.0001766	0.0003746
Total PM Emissions (g)	0.13	6.06	5.67	4.04
Particulate Emission Rate (g/hr)	0.04	2.01	1.88	4.04
Emissions Factor (g/kg)	-	0.55	0.51	-
Difference from Average Total Particulate Emissions (g)	-	0.19	0.19	-
Difference from Average Emissions Factor (g/kg)	-	0.02	0.02	-

Final Average Results	
Total Particulate Emissions (g)	5.87
Particulate Emission Rate (g/hr)	1.94
Emissions Factor (g/kg)	0.53
HHV Efficiency (%)	73.8%
LHV Efficiency (%)	78.9%
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: 88	OK
Face Velocity	< 30 ft/min	8.6	OK
Leakage Rate	Less than 4% of average sample rate	0 cfm	OK
Ambient Temp	55-90 °F	Min: 63 / Max: 72	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:	I2500
Date:	10/29/18
Run:	1
Control #:	18-434
Test Duration:	143
Output Category:	High

Test Results in Accordance with CSA B415.1-09

	HHV Basis	LHV Basis
Overall Efficiency	73.8%	78.9%
Combustion Efficiency	99.5%	99.5%
Heat Transfer Efficiency	74.2%	79.3%

Output Rate (kJ/h)	45,324	42,995	**(Btu/h)**
Burn Rate (kg/h)	3.08	6.78	**(lb/h)**
Input (kJ/h)	61,409	58,253	**(Btu/h)**

Test Load Weight (dry kg)	7.33	16.16	**dry lb**
MC wet (%)	17.55		
MC dry (%)	21.28		
Particulate (g)	5.87		
CO (g)	41		
Test Duration (h)	2.38		

Emissions	**Particulate**	**CO**
g/MJ Output	0.05	0.38
g/kg Dry Fuel	0.80	5.57
g/h	2.46	17.14
g/min	0.04	0.29
lb/MM Btu Output	0.13	0.88

Air/Fuel Ratio (A/F)	10.49

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	4.78	lb	In Range		
	2	3.77	lb	In Range		
	3	3.44	lb	In Range		
Core Load Total. Wt. Actual		11.99	lb	In Range		
	Pc. #					
Remainder Load Piece Wt.	1	6.81	lb	In Range		
(1 to 3 Pcs.)	2	3.02	lb	In Range		
	3		lb	NA		
Remainder Load Tot. Wt. Act		9.83	lb	In Range		
Total Load Wt. Actual		21.82	lb	In Range		
Core % of Total Wt.		55%		In Range		45-65%
Remainder % of Total Wt.		45%		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.)		4.36	lb			
Actual Kindling Wt.		4.01	lb	In Range		18.4%
Maximum Start-up Fuel Wt. (30% of Tot. Load Wt.)		6.55	lb			
Actual Start-up Fuel Wt.		5.91	lb	In Range		27.1%
Allowable Residual Start-up Fuel Wt. Range	2.2	to	4.4	lb		Mid-Point
Actual Residual Start-up Fuel Wt.		2.4	lb	In Range		3.3
Total Wt. All Fuel Added (wet basis)		31.74	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.		2.2	lb	In Range		

Fuel Piece Moisture Reading (%-dry basis)								
1	2	3	Ave.		Pc. Wt. Dry Basis			
20.7	22.8	20.7	21.4	In Range	3.94	lb	1.79	kg
22.8	23.7	20.6	22.4	In Range	3.08	lb	1.40	kg
24.6	20.4	22.3	22.4	In Range	2.81	lb	1.27	kg
20.7	20.6	20	20.4	In Range	5.65	lb	2.56	kg
20.1	19.1	21.9	20.4	In Range	2.51	lb	1.14	kg
			NA	NA	NA	lb	NA	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) →					17.99	lb	8.16	kg
Kindling Moisture (%-dry basis)								
10	10	10	10.0	In Range	3.65	lb	1.65	kg
Start-up Fuel Moisture Readings (%-dry basis)								
22.1	20.4	20.6	21.0	In Range	4.88	lb	2.21	kg
Total Wt. All Fuel Added (dry basis) →					26.52	lb	12.03	kg
Total Wt. All Fuel Burned (dry basis) →					21.9	lb	9.9	kg

DILUTION TUNNEL & MISC. DATA - ASTM E3053 / E2515

Client:	FPI	Job #:	18-434
Model:	I2500	Tracking #:	0014
Run #:	1	Technician:	SJB
Test Start Time:	10:36	Date:	10/29/2018
Test Type:	High Fire		

Recording Interval (min):	1
Total Sampling Time (min):	181
High Fire Test Load Time (min):	38

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

Induced Draft Check (in. H_2O):	0		
Smoke Capture Check (%):	100%		
Date Flue Pipe Last Cleaned:	10/26/2018		

	Pre-Test	Post Test	Avg.
Barometric Pressure (in. Hg)	30.07	30.11	30.09
Relative Humidity (%)	52.1	44.6	
Room Air Velocity (ft/min)	0	0	
Scale Audit (lbs)	10.0	10.0	

Ambient Sample Volume: 25.090 ft^3

Sample Train Post-Test Leak Checks

(A)	0.000	cfm @	-12	in. Hg
(B)	0.000	cfm @	-13	in. Hg
(Ambient)	0.000	cfm @	-14	in. Hg

DILUTION TUNNEL FLOW

Traverse Data

Point	dP (in H_2O)	Temp (°F)
1	0.050	67
2	0.064	67
3	0.066	67
4	0.052	67
5	0.060	67
6	0.068	67
7	0.064	67
8	0.052	67
Center	0.070	67

Static Pressure: -0.230 in. H_2O

Dilution Tunnel H_2O:	2.00	percent
Tunnel Diameter:	6	inches
Pitot Tube Cp:	0.99	[unitless]
Dilution Tunnel MW(dry):	29.00	lb/lb-mole
Dilution Tunnel MW(wet):	28.78	lb/lb-mole
Tunnel Area:	0.1963	ft^2
V_{strav}:	16.24	ft/sec
V_{scent}:	17.48	ft/sec
F_p:	0.929	[ratio]
Initial Tunnel Flow:	187.0	scf/min

TEST FUEL PROPERTIES

Default 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 Used Properties

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

WOODSTOVE PREBURN DATA

Client:	FPI	Job #:	18-434
Model:	I2500	Tracking #:	0014
Run #:	1	Technician:	SJB
		Date:	10/29/2018

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

BOX A TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: I2500
Run #: 1

Job #: 18-434
Tracking #: 0014
Technician: SJB
Date: 10/29/2018

	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		0.070	0.02	70	-0.15		2.3		66	65	83	63
1	0.144	0.144	0.070	2.34	70	-1.51	96	2.1	-0.2	72	133	83	63
2	0.293	0.149	0.070	2.35	70	0	101	1.8	-0.3	90	285	84	63
3	0.438	0.145	0.070	2.27	70	0	100	1.4	-0.4	111	443	86	63
4	0.582	0.144	0.070	2.23	70	-2.38	98	1.1	-0.3	101	458	86	63
5	0.727	0.145	0.070	2.22	70	-1.53	99	0.9	-0.2	99	470	83	64
6	0.871	0.144	0.070	2.24	70	0	98	0.7	-0.2	93	443	82	63
7	1.015	0.144	0.070	2.21	70	0	98	0.5	-0.2	92	427	83	64
8	1.158	0.143	0.070	2.21	70	-0.1	98	8.8	8.3	101	459	85	64
9	1.304	0.146	0.070	2.21	71	-1.71	99	3.2	-5.6	95	450	86	64
10	1.444	0.140	0.070	2.19	70	-2.28	95	3.0	-0.2	96	478	84	64
11	1.590	0.146	0.070	2.18	70	-0.33	99	2.7	-0.3	98	509	83	64
12	1.729	0.139	0.070	2.16	71	-2.38	95	2.6	-0.1	100	535	83	65
13	1.876	0.147	0.070	2.17	70	-0.31	100	2.3	-0.3	101	546	84	65
14	2.016	0.140	0.070	2.18	69	-2.44	96	2.1	-0.2	102	556	86	65
15	2.165	0.149	0.070	2.27	70	0	102	1.9	-0.2	104	573	86	65
16	2.308	0.143	0.070	2.25	71	-2.22	98	1.7	-0.2	105	588	83	65
17	2.456	0.148	0.070	2.25	71	-1.62	101	1.5	-0.2	106	597	83	65
18	2.599	0.143	0.070	2.23	71	-2.71	98	1.3	-0.2	106	599	84	65
19	2.746	0.147	0.070	2.23	71	-2.44	101	1.1	-0.2	106	578	85	65
20	2.889	0.143	0.070	2.24	71	-0.94	98	0.9	-0.2	105	548	87	66
21	3.036	0.147	0.070	2.23	71	-2.29	100	3.0	2.1	104	537	84	65
22	3.180	0.144	0.070	2.22	72	-0.06	98	2.9	-0.1	105	529	83	66
23	3.326	0.146	0.070	2.21	71	-0.61	100	2.7	-0.2	105	532	83	66
24	3.470	0.144	0.070	2.23	72	-2.22	98	2.5	-0.2	106	541	85	66
25	3.614	0.144	0.070	2.21	72	-0.14	98	2.3	-0.2	106	545	87	66
26	3.759	0.145	0.070	2.21	71	-2.28	99	2.1	-0.2	107	549	85	66
27	3.904	0.145	0.070	2.20	72	-0.59	99	2.0	-0.1	106	550	83	66
28	4.049	0.145	0.070	2.19	72	-0.02	99	1.8	-0.2	106	550	82	66
29	4.193	0.144	0.070	2.19	72	0	98	1.7	-0.1	107	546	83	66
30	4.339	0.146	0.070	2.19	72	-2.27	100	1.5	-0.2	106	537	86	67
31	4.483	0.144	0.070	2.20	72	-0.04	99	3.8	2.3	111	575	87	67
32	4.630	0.147	0.070	2.19	72	0	101	3.6	-0.2	110	585	84	66

BOX A TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: I2500
Run #: 1

Job #: 18-434
Tracking #: 0014
Technician: SJB
Date: 10/29/2018

	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	4.773	0.143	0.070	2.17	72	-0.44	98	3.3	-0.3	112	598	83	66
34	4.919	0.146	0.070	2.18	72	-0.04	100	3.1	-0.2	114	616	83	66
35	5.061	0.142	0.070	2.18	72	-1.27	98	2.8	-0.3	113	609	85	67
36	5.208	0.147	0.070	2.17	73	-0.47	101	2.6	-0.2	113	611	86	67
37	5.349	0.141	0.070	2.16	73	-0.25	97	2.4	-0.2	113	611	85	67
38	5.496	0.147	0.070	2.14	73	-0.77	101	21.8	19.4	119	658	83	68
39	5.638	0.142	0.070	2.29	73	-0.32	98	21.3	-0.5	117	636	83	67
40	5.790	0.152	0.070	2.29	72	-0.21	105	21.2	-0.1	117	615	85	67
41	5.935	0.145	0.070	2.28	73	-2.77	100	20.9	-0.3	116	604	87	67
42	6.087	0.152	0.070	2.30	73	-0.97	105	20.7	-0.2	116	599	85	68
43	6.233	0.146	0.070	2.29	73	-2.4	100	20.5	-0.2	115	592	83	67
44	6.385	0.152	0.070	2.30	72	-1.56	105	20.3	-0.2	115	592	83	67
45	6.530	0.145	0.070	2.29	73	-2.55	100	20.1	-0.2	116	588	85	68
46	6.682	0.152	0.070	2.28	73	-0.15	105	19.9	-0.2	116	584	86	68
47	6.828	0.146	0.070	2.29	74	-0.29	100	19.7	-0.2	113	581	85	68
48	6.978	0.150	0.070	2.30	74	-1.84	103	19.5	-0.2	114	582	84	68
49	7.124	0.146	0.070	2.28	73	-2.72	100	19.3	-0.2	115	584	83	68
50	7.275	0.151	0.070	2.29	74	-2.8	103	19.1	-0.2	114	585	84	69
51	7.423	0.148	0.070	2.28	73	-1.11	102	18.9	-0.2	115	584	87	68
52	7.572	0.149	0.070	2.29	74	-2.58	102	18.7	-0.2	115	582	87	68
53	7.721	0.149	0.070	2.27	74	-2.4	102	18.5	-0.2	115	581	84	68
54	7.871	0.150	0.070	2.29	74	-2.58	103	18.3	-0.2	115	582	83	68
55	8.022	0.151	0.070	2.30	74	-0.27	104	18.1	-0.2	116	581	84	68
56	8.169	0.147	0.070	2.29	74	-2.68	101	17.9	-0.2	114	581	86	68
57	8.320	0.151	0.070	2.30	73	-2.08	103	17.5	-0.4	111	580	87	68
58	8.468	0.148	0.070	2.29	74	-0.09	102	17.5	0	115	580	84	69
59	8.618	0.150	0.070	2.29	74	-0.1	103	17.2	-0.3	116	577	83	69
60	8.764	0.146	0.070	2.26	74	-0.41	100	17.1	-0.1	116	571	83	68
61	8.925	0.161	0.070	2.46	74	0	110	16.9	-0.2	115	567	82	69
62	9.074	0.149	0.070	2.26	74	0	102	16.7	-0.2	116	564	86	69
63	9.225	0.151	0.070	2.27	74	0	104	16.5	-0.2	117	561	88	68
64	9.371	0.146	0.070	2.25	75	-0.02	100	16.4	-0.1	116	558	86	68
65	9.521	0.150	0.070	2.27	74	-0.49	103	16.2	-0.2	116	558	84	69

BOX A TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: I2500
Run #: 1

Job #: 18-434
Tracking #: 0014
Technician: SJB
Date: 10/29/2018

	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	9.667	0.146	0.070	2.27	75	-1.13	100	16.0	-0.2	115	557	83	69
67	9.817	0.150	0.070	2.26	75	-2.17	103	15.8	-0.2	116	558	84	69
68	9.963	0.146	0.070	2.25	75	-2.25	100	15.6	-0.2	116	559	86	68
69	10.113	0.150	0.070	2.26	75	-0.78	103	15.3	-0.3	116	560	87	69
70	10.261	0.148	0.070	2.26	75	-1.74	101	15.2	-0.1	115	561	85	69
71	10.409	0.148	0.070	2.27	75	0	101	15.0	-0.2	115	560	84	69
72	10.557	0.148	0.070	2.25	75	-1.24	101	14.8	-0.2	115	559	83	69
73	10.706	0.149	0.070	2.27	75	0	102	14.6	-0.2	115	561	85	69
74	10.855	0.149	0.070	2.25	75	-2.08	102	14.5	-0.1	115	561	87	69
75	11.003	0.148	0.070	2.25	75	-2.51	101	14.3	-0.2	115	562	86	69
76	11.153	0.150	0.070	2.26	75	-2.35	103	14.1	-0.2	115	562	84	69
77	11.299	0.146	0.070	2.25	75	-0.31	100	13.8	-0.3	114	561	83	69
78	11.450	0.151	0.070	2.25	76	-1.28	103	13.7	-0.1	116	562	84	69
79	11.596	0.146	0.070	2.26	76	0	100	13.4	-0.3	116	564	86	69
80	11.746	0.150	0.070	2.24	76	-2.35	103	13.3	-0.1	116	565	87	69
81	11.892	0.146	0.070	2.25	76	-2.48	100	13.1	-0.2	115	566	85	69
82	12.042	0.150	0.070	2.23	76	-1.17	103	12.9	-0.2	115	566	83	69
83	12.187	0.145	0.070	2.24	76	-2.08	99	12.6	-0.3	115	567	83	69
84	12.338	0.151	0.070	2.25	76	-2.46	103	12.6	0	115	569	85	69
85	12.483	0.145	0.070	2.22	76	-2.34	99	12.3	-0.3	116	572	87	69
86	12.633	0.150	0.070	2.22	76	-0.25	103	12.1	-0.2	115	573	86	69
87	12.778	0.145	0.070	2.21	76	-0.17	99	11.9	-0.2	116	574	85	69
88	12.928	0.150	0.070	2.21	76	-0.15	103	11.6	-0.3	116	576	82	69
89	13.073	0.145	0.070	2.19	76	-0.73	99	11.6	0	116	576	83	69
90	13.224	0.151	0.070	2.19	76	-2.18	103	11.4	-0.2	116	575	85	70
91	13.368	0.144	0.070	2.20	76	-2.24	98	11.2	-0.2	116	576	87	70
92	13.519	0.151	0.070	2.20	76	-0.01	103	10.9	-0.3	116	576	85	69
93	13.663	0.144	0.070	2.20	76	-0.26	98	10.8	-0.1	116	574	84	69
94	13.813	0.150	0.070	2.20	76	-1.13	103	10.6	-0.2	116	574	83	70
95	13.957	0.144	0.070	2.19	76	-1.97	98	10.4	-0.2	116	572	84	70
96	14.107	0.150	0.070	2.19	77	-1.89	102	10.2	-0.2	116	572	87	70
97	14.251	0.144	0.070	2.19	76	-2.51	98	10.1	-0.1	116	570	86	70
98	14.401	0.150	0.070	2.17	76	-0.1	103	9.9	-0.2	116	571	84	70

BOX A TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: I2500
Run #: 1

Job #: 18-434
Tracking #: 0014
Technician: SJB
Date: 10/29/2018

	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	14.545	0.144	0.070	2.19	77	-0.16	98	9.7	-0.2	116	569	83	70
100	14.695	0.150	0.070	2.19	77	-0.3	102	9.6	-0.1	116	569	84	70
101	14.839	0.144	0.070	2.18	77	-0.35	98	9.4	-0.2	116	568	85	70
102	14.988	0.149	0.070	2.16	77	-0.82	102	9.2	-0.2	117	566	87	70
103	15.132	0.144	0.070	2.17	77	-1.11	98	9.0	-0.2	116	564	85	70
104	15.281	0.149	0.070	2.17	77	-0.23	102	8.9	-0.1	116	561	83	71
105	15.425	0.144	0.070	2.18	77	0	98	8.7	-0.2	116	560	83	71
106	15.575	0.150	0.070	2.18	77	-0.25	102	8.6	-0.1	115	558	84	71
107	15.718	0.143	0.070	2.16	77	-0.52	98	8.4	-0.2	115	556	86	71
108	15.868	0.150	0.070	2.19	77	-0.42	102	8.3	-0.1	116	553	86	70
109	16.012	0.144	0.070	2.18	77	-1.61	98	8.1	-0.2	115	551	84	70
110	16.162	0.150	0.070	2.18	77	-2.31	102	7.9	-0.2	115	548	83	70
111	16.305	0.143	0.070	2.16	77	0	98	7.8	-0.1	115	547	84	70
112	16.455	0.150	0.070	2.17	77	-1.82	102	7.6	-0.2	114	544	86	70
113	16.600	0.145	0.070	2.16	77	-2.64	99	7.5	-0.1	115	537	87	70
114	16.749	0.149	0.070	2.16	77	-0.25	102	7.4	-0.1	114	535	85	71
115	16.893	0.144	0.070	2.18	78	-1.42	98	7.3	-0.1	114	532	83	70
116	17.043	0.150	0.070	2.18	78	-0.11	102	7.1	-0.2	114	531	84	71
117	17.186	0.143	0.070	2.16	77	-0.02	97	7.0	-0.1	113	530	85	71
118	17.336	0.150	0.070	2.15	77	-0.1	102	6.9	-0.1	114	528	87	71
119	17.480	0.144	0.070	2.15	77	0	98	6.6	-0.3	114	529	86	70
120	17.629	0.149	0.070	2.16	77	-0.91	101	6.6	0	113	528	84	71
121	17.773	0.144	0.070	2.16	78	-1.45	98	6.3	-0.3	113	528	83	72
122	17.922	0.149	0.070	2.16	78	-2.45	101	6.4	0.1	113	526	84	71
123	18.066	0.144	0.070	2.17	78	-0.04	98	6.2	-0.2	113	525	86	71
124	18.215	0.149	0.070	2.17	78	-0.63	101	6.0	-0.2	113	524	86	71
125	18.359	0.144	0.070	2.16	78	0	98	6.0	0	112	523	84	71
126	18.508	0.149	0.070	2.16	78	-1.41	101	5.9	-0.1	112	522	83	71
127	18.652	0.144	0.070	2.16	78	-2.16	98	5.8	-0.1	113	518	84	71
128	18.802	0.150	0.070	2.17	78	-0.12	102	5.7	-0.1	112	515	85	71
129	18.946	0.144	0.070	2.16	78	-1.74	98	5.5	-0.2	112	513	86	71
130	19.095	0.149	0.070	2.15	78	-2.52	101	5.5	0	112	511	85	71
131	19.239	0.144	0.070	2.17	78	-1.65	98	5.4	-0.1	111	508	84	71

BOX A TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: I2500
Run #: 1

Job #: 18-434
Tracking #: 0014
Technician: SJB
Date: 10/29/2018

	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	19.388	0.149	0.070	2.14	78	-2	101	5.3	-0.1	111	508	84	70
133	19.532	0.144	0.070	2.16	78	-0.39	98	5.2	-0.1	111	506	85	70
134	19.682	0.150	0.070	2.16	78	-1.42	102	5.1	-0.1	111	503	87	70
135	19.826	0.144	0.070	2.15	78	-0.01	98	4.9	-0.2	111	501	85	71
136	19.975	0.149	0.070	2.16	78	-2.65	101	4.9	0	110	498	84	71
137	20.119	0.144	0.070	2.14	78	-0.23	98	4.8	-0.1	110	496	84	71
138	20.269	0.150	0.070	2.15	78	-2.47	102	4.7	-0.1	110	493	85	71
139	20.413	0.144	0.070	2.17	78	-1.4	98	4.6	-0.1	110	490	87	72
140	20.563	0.150	0.070	2.17	78	-2.41	102	4.5	-0.1	109	487	86	71
141	20.707	0.144	0.070	2.17	79	-0.14	97	4.4	-0.1	109	485	84	72
142	20.856	0.149	0.070	2.17	79	-2.01	101	4.4	0	109	480	83	71
143	21.000	0.144	0.070	2.18	79	-0.3	97	4.3	-0.1	108	477	84	71
144	21.150	0.150	0.070	2.17	79	-2.27	101	4.2	-0.1	108	473	86	72
145	21.294	0.144	0.070	2.17	79	-0.06	97	4.1	-0.1	108	471	86	71
146	21.444	0.150	0.070	2.17	79	-1.5	101	4.1	0	108	468	85	71
147	21.588	0.144	0.070	2.16	79	0	97	4.0	-0.1	107	465	83	71
148	21.737	0.149	0.070	2.16	79	-1.12	101	3.9	-0.1	107	464	84	71
149	21.882	0.145	0.070	2.17	79	-0.55	98	3.9	0	106	462	86	71
150	22.032	0.150	0.070	2.17	79	-0.43	101	3.8	-0.1	106	457	87	71
151	22.176	0.144	0.070	2.17	79	-2.57	97	3.8	0	106	456	85	71
152	22.326	0.150	0.070	2.19	79	-1.66	101	3.7	-0.1	106	457	83	71
153	22.470	0.144	0.070	2.16	79	-1.55	97	3.6	-0.1	106	456	84	71
154	22.620	0.150	0.070	2.16	79	0	101	3.6	0	105	455	85	71
155	22.764	0.144	0.070	2.14	79	0	97	3.5	-0.1	106	453	87	71
156	22.914	0.150	0.070	2.17	79	0	101	3.5	0	105	450	86	71
157	23.059	0.145	0.070	2.17	79	-2.34	98	3.4	-0.1	106	449	84	71
158	23.208	0.149	0.070	2.16	79	-2.15	100	3.4	0	105	446	83	72
159	23.353	0.145	0.070	2.16	79	0	98	3.3	-0.1	104	444	84	72
160	23.502	0.149	0.070	2.18	79	-2.56	100	3.2	-0.1	105	443	86	71
161	23.646	0.144	0.070	2.18	79	-0.09	97	3.2	0	105	442	87	71
162	23.795	0.149	0.070	2.18	79	-1.91	100	3.1	-0.1	105	441	85	71
163	23.940	0.145	0.070	2.16	79	-1.62	98	3.1	0	104	437	83	71
164	24.089	0.149	0.070	2.17	79	-2.55	100	3.0	-0.1	104	434	84	72

BOX A TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: I2500
Run #: 1

Job #: 18-434
Tracking #: 0014
Technician: SJB
Date: 10/29/2018

	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	24.234	0.145	0.070	2.17	79	0	98	3.0	0	104	434	85	71
166	24.383	0.149	0.070	2.18	79	-1.36	100	2.9	-0.1	104	433	87	71
167	24.528	0.145	0.070	2.17	79	-1.89	98	2.9	0	104	432	85	72
168	24.676	0.148	0.070	2.16	79	0	100	2.9	0	103	431	84	71
169	24.822	0.146	0.070	2.17	79	-2.17	98	2.8	-0.1	104	431	84	72
170	24.970	0.148	0.070	2.17	80	-2.56	99	2.7	-0.1	104	430	85	72
171	25.116	0.146	0.070	2.16	80	-0.49	98	2.7	0	104	430	87	72
172	25.264	0.148	0.070	2.13	80	-2.38	99	2.6	-0.1	103	429	85	72
173	25.410	0.146	0.070	2.13	80	-0.03	98	2.6	0	103	428	84	72
174	25.558	0.148	0.070	2.18	80	-2.08	99	2.6	0	103	426	84	72
175	25.704	0.146	0.070	2.18	80	0	98	2.5	-0.1	103	423	85	72
176	25.852	0.148	0.070	2.17	80	-2.24	99	2.4	-0.1	103	420	87	72
177	25.998	0.146	0.070	2.16	80	-1.18	98	2.4	0	102	418	86	72
178	26.146	0.148	0.070	2.15	80	-1.11	99	2.3	-0.1	102	418	84	72
179	26.292	0.146	0.070	2.17	80	-0.16	98	2.3	0	102	418	84	72
180	26.439	0.147	0.070	2.15	80	-0.11	99	2.3	0	102	418	85	72
181	26.585	0.146	0.070	2.17	80	-0.02	98	2.2	-0.1	102	417	87	72
Avg/Tot	26.585	0.147	0.070	2.19	76	-1.12	100			110	522	85	69.0

BOX B TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: I2500
Run #: 1

Job #: 18-434
Tracking #: 0014
Technician: SJB
Date: 10/29/2018

	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	0.040		0.00	69	-1		85	0.000	0.00	0.00
1	0.190	0.150	2.28	69	-2.14	104	84	-0.040	0.74	0.06
2	0.336	0.146	2.26	69	-1.9	102	84	-0.080	3.78	0.24
3	0.477	0.141	2.22	69	-0.67	101	84	-0.100	7.08	0.25
4	0.621	0.144	2.21	69	-2.66	102	84	-0.080	10.33	0.50
5	0.762	0.141	2.18	69	-2.86	100	84	-0.070	11.21	0.32
6	0.904	0.142	2.19	69	-2.63	100	85	-0.060	11.52	0.21
7	1.044	0.140	2.18	69	-0.68	98	85	-0.080	9.72	0.06
8	1.185	0.141	2.19	69	-1.42	100	85	-0.070	7.30	0.10
9	1.329	0.144	2.18	69	-0.7	102	84	-0.060	9.73	0.14
10	1.467	0.138	2.17	69	-0.77	97	84	-0.080	11.52	0.11
11	1.611	0.144	2.17	70	-0.8	102	84	-0.070	13.76	0.18
12	1.749	0.138	2.17	70	-2.1	98	84	-0.070	14.54	0.14
13	1.892	0.143	2.17	70	-2.77	101	85	-0.070	14.99	0.20
14	2.032	0.140	2.17	70	-0.91	99	85	-0.070	15.73	0.12
15	2.173	0.141	2.19	71	-0.71	100	86	-0.070	16.28	0.23
16	2.315	0.142	2.18	71	-0.7	101	85	-0.090	16.71	1.53
17	2.456	0.141	2.17	71	-2.64	100	84	-0.090	16.68	1.88
18	2.600	0.144	2.17	72	-2.77	102	84	-0.080	16.43	1.24
19	2.739	0.139	2.17	72	-2.62	98	84	-0.070	14.66	0.15
20	2.884	0.145	2.16	72	-2.96	103	85	-0.070	11.34	0.03
21	3.022	0.138	2.17	73	-0.74	97	86	-0.080	9.06	0.09
22	3.166	0.144	2.14	73	-2.18	102	86	-0.070	8.80	0.07
23	3.307	0.141	2.16	74	-2.91	99	85	-0.090	12.47	0.07
24	3.450	0.143	2.16	74	-1.33	101	85	-0.080	13.52	0.06
25	3.591	0.141	2.15	74	-0.99	99	85	-0.080	13.39	0.02
26	3.731	0.140	2.16	74	-1.52	99	85	-0.060	13.91	0.06
27	3.874	0.143	2.14	75	-1.97	101	85	-0.070	14.18	0.04
28	4.015	0.141	2.15	75	-1.53	99	86	-0.070	14.04	0.02
29	4.159	0.144	2.15	76	-0.73	101	87	-0.080	12.78	0.04
30	4.298	0.139	2.15	76	-1.92	98	86	-0.070	12.15	0.01
31	4.441	0.143	2.14	76	-2.66	101	85	-0.060	10.53	0.09

BOX B TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: I2500
Run #: 1

Job #: 18-434
Tracking #: 0014
Technician: SJB
Date: 10/29/2018

	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	4.581	0.140	2.14	76	-0.87	99	84	-0.080	14.91	0.16
33	4.725	0.144	2.14	77	-2.03	102	85	-0.070	16.06	2.81
34	4.865	0.140	2.13	77	-1.93	99	85	-0.080	15.25	1.67
35	5.005	0.140	2.13	78	-2.96	99	86	-0.070	16.13	0.09
36	5.148	0.143	2.12	78	-1.31	101	86	-0.080	17.05	0.54
37	5.288	0.140	2.12	78	-1.34	99	85	-0.070	17.13	2.32
38	5.431	0.143	2.11	78	-2.57	101	85	-0.100	15.30	2.00
39	5.571	0.140	2.20	79	-0.96	99	85	-0.080	12.75	0.63
40	5.717	0.146	2.20	79	-1.91	103	85	-0.080	11.27	0.09
41	5.857	0.140	2.20	80	-1.19	98	86	-0.080	11.93	0.09
42	6.004	0.147	2.19	79	-2.81	104	86	-0.080	11.89	0.12
43	6.146	0.142	2.18	80	-2.29	100	86	-0.080	12.23	0.04
44	6.292	0.146	2.20	80	-2.96	103	86	-0.080	13.19	0.06
45	6.435	0.143	2.18	81	-1.02	100	85	-0.080	12.65	0.05
46	6.581	0.146	2.18	81	-1.63	103	85	-0.080	12.39	0.04
47	6.724	0.143	2.19	81	-2.94	100	86	-0.080	12.13	0.03
48	6.868	0.144	2.19	82	-3.06	101	86	-0.080	13.01	0.04
49	7.012	0.144	2.20	82	-2.24	101	86	-0.080	13.06	0.03
50	7.155	0.143	2.19	82	-1.04	100	86	-0.080	13.25	0.04
51	7.300	0.145	2.19	82	-2.42	102	85	-0.080	13.06	0.04
52	7.444	0.144	2.20	83	-2.77	101	85	-0.080	12.73	0.03
53	7.589	0.145	2.18	83	-0.86	101	85	-0.090	12.66	0.06
54	7.732	0.143	2.19	83	-3.03	100	86	-0.080	12.85	0.02
55	7.879	0.147	2.19	83	-1.25	103	87	-0.080	12.71	0.04
56	8.022	0.143	2.18	84	-0.86	100	86	-0.070	12.71	0.05
57	8.168	0.146	2.19	84	-3	102	86	-0.070	12.62	0.02
58	8.310	0.142	2.19	84	-0.91	99	85	-0.060	12.73	0.07
59	8.457	0.147	2.18	85	-1.01	102	86	-0.070	12.72	0.03
60	8.599	0.142	2.19	85	-0.94	99	85	-0.070	12.47	0.03
61	8.746	0.147	2.17	85	-3.01	102	85	-0.080	12.36	0.05
62	8.888	0.142	2.18	85	-1.74	99	87	-0.080	12.23	0.06
63	9.035	0.147	2.19	86	-0.88	102	87	-0.070	12.45	0.05

BOX B TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: I2500
Run #: 1

Job #: 18-434
Tracking #: 0014
Technician: SJB
Date: 10/29/2018

	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	9.178	0.143	2.20	86	-3	99	85	-0.080	12.45	0.07
65	9.324	0.146	2.19	86	-0.97	102	85	-0.070	12.69	0.06
66	9.468	0.144	2.20	86	-1.08	100	85	-0.080	12.76	0.03
67	9.614	0.146	2.19	86	-2.27	102	86	-0.070	12.71	0.06
68	9.758	0.144	2.20	86	-1.96	100	86	-0.070	13.20	0.03
69	9.904	0.146	2.18	86	-3	102	86	-0.080	13.37	0.07
70	10.048	0.144	2.18	87	-3.03	100	85	-0.080	13.44	0.05
71	10.193	0.145	2.18	87	-2.62	101	85	-0.080	13.56	0.04
72	10.338	0.145	2.18	87	-0.91	101	85	-0.080	13.47	0.05
73	10.482	0.144	2.19	87	-1.12	100	86	-0.080	13.41	0.05
74	10.627	0.145	2.18	88	-1.2	100	86	-0.080	13.52	0.03
75	10.771	0.144	2.18	88	-2.9	100	86	-0.080	13.54	0.05
76	10.917	0.146	2.19	88	-2.95	101	86	-0.090	13.67	0.05
77	11.061	0.144	2.19	88	-2.98	100	85	-0.090	13.63	0.06
78	11.208	0.147	2.19	88	-0.89	102	85	-0.090	13.80	0.04
79	11.350	0.142	2.16	88	-0.94	98	85	-0.080	13.99	0.04
80	11.498	0.148	2.19	89	-2.61	102	86	-0.090	14.06	0.04
81	11.641	0.143	2.18	89	-2.06	99	86	-0.080	14.00	0.07
82	11.789	0.148	2.19	89	-1.66	102	86	-0.080	14.12	0.08
83	11.932	0.143	2.18	89	-0.95	99	85	-0.080	14.46	0.03
84	12.079	0.147	2.17	89	-1.69	102	85	-0.080	14.46	0.04
85	12.221	0.142	2.18	89	-2.23	98	85	-0.080	14.67	0.04
86	12.369	0.148	2.18	89	-1.15	102	86	-0.080	14.64	0.07
87	12.512	0.143	2.19	90	-1	99	86	-0.080	14.62	0.09
88	12.659	0.147	2.18	90	-2.48	102	86	-0.080	14.85	0.04
89	12.802	0.143	2.18	90	-3.06	99	86	-0.080	14.89	0.05
90	12.949	0.147	2.17	90	-2.26	102	85	-0.080	14.80	0.08
91	13.091	0.142	2.17	90	-2.14	98	85	-0.080	14.81	0.07
92	13.239	0.148	2.18	90	-3	102	86	-0.080	14.76	0.05
93	13.382	0.143	2.17	91	-1.49	99	86	-0.080	14.83	0.05
94	13.530	0.148	2.19	91	-1.01	102	86	-0.070	14.66	0.04
95	13.672	0.142	2.16	90	-1	98	86	-0.080	14.55	0.03

BOX B TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: I2500
Run #: 1

Job #: 18-434
Tracking #: 0014
Technician: SJB
Date: 10/29/2018

	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	13.820	0.148	2.17	91	-1.07	102	85	-0.090	14.55	0.04
97	13.964	0.144	2.17	91	-1.54	99	85	-0.080	14.62	0.04
98	14.110	0.146	2.17	91	-3.05	101	85	-0.070	14.60	0.00
99	14.255	0.145	2.18	91	-2.95	100	86	-0.080	14.47	0.01
100	14.401	0.146	2.15	91	-1.87	101	86	-0.080	14.42	0.03
101	14.545	0.144	2.17	91	-3.09	99	87	-0.080	14.28	0.05
102	14.690	0.145	2.16	91	-3.05	100	86	-0.070	14.08	0.05
103	14.835	0.145	2.18	92	-2.82	100	85	-0.080	14.02	0.05
104	14.980	0.145	2.16	92	-1.54	100	85	-0.080	13.99	0.03
105	15.126	0.146	2.18	92	-0.97	100	85	-0.090	13.96	0.03
106	15.270	0.144	2.16	92	-1.06	99	86	-0.080	13.76	0.05
107	15.416	0.146	2.17	92	-1.25	100	86	-0.090	13.63	0.06
108	15.560	0.144	2.16	92	-2.6	99	86	-0.080	13.54	0.03
109	15.707	0.147	2.17	92	-1.3	101	86	-0.070	13.61	0.01
110	15.851	0.144	2.17	92	-0.92	99	85	-0.070	13.52	0.01
111	15.998	0.147	2.17	93	-2.01	101	85	-0.080	13.43	0.00
112	16.141	0.143	2.16	93	-2.99	98	85	-0.090	13.07	0.02
113	16.288	0.147	2.17	92	-3.08	101	86	-0.070	12.53	0.04
114	16.432	0.144	2.17	93	-1.27	99	87	-0.080	12.42	0.02
115	16.580	0.148	2.18	93	-2.01	101	86	-0.090	12.24	0.05
116	16.723	0.143	2.16	93	-1.5	98	85	-0.080	12.36	0.00
117	16.871	0.148	2.19	93	-1.5	101	85	-0.080	12.30	0.00
118	17.014	0.143	2.15	93	-2.38	98	85	-0.080	12.17	0.05
119	17.162	0.148	2.16	93	-1.14	101	86	-0.080	12.25	0.02
120	17.304	0.142	2.16	93	-3.06	97	87	-0.080	12.18	0.01
121	17.452	0.148	2.17	93	-0.94	101	87	-0.090	12.20	0.02
122	17.596	0.144	2.17	93	-1.03	99	86	-0.080	12.12	0.03
123	17.743	0.147	2.15	93	-3.06	101	85	-0.080	12.22	0.02
124	17.886	0.143	2.16	94	-2.42	98	85	-0.080	12.16	0.01
125	18.034	0.148	2.17	94	-3.06	101	86	-0.070	12.04	0.02
126	18.176	0.142	2.15	94	-2.82	97	86	-0.070	11.91	0.04
127	18.324	0.148	2.16	94	-1	101	86	-0.070	11.83	0.00

BOX B TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: I2500
Run #: 1

Job #: 18-434
Tracking #: 0014
Technician: SJB
Date: 10/29/2018

	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	18.467	0.143	2.16	94	-2.63	98	86	-0.070	11.65	0.00
129	18.615	0.148	2.17	94	-0.96	101	85	-0.080	11.53	0.03
130	18.759	0.144	2.16	94	-2.01	98	85	-0.080	11.38	0.01
131	18.907	0.148	2.17	94	-1.18	101	86	-0.080	11.44	0.03
132	19.050	0.143	2.17	94	-3.01	98	86	-0.080	11.31	0.01
133	19.197	0.147	2.15	94	-1.05	100	87	-0.080	11.09	0.03
134	19.341	0.144	2.17	95	-2.08	98	86	-0.060	11.05	0.02
135	19.488	0.147	2.16	95	-1.03	100	85	-0.080	10.97	0.03
136	19.633	0.145	2.17	95	-3.04	99	85	-0.090	10.85	0.02
137	19.780	0.147	2.16	95	-0.93	100	85	-0.070	10.62	0.03
138	19.925	0.145	2.16	95	-3.03	99	86	-0.080	10.55	0.03
139	20.072	0.147	2.17	95	-2.92	100	86	-0.070	10.55	0.01
140	20.216	0.144	2.14	95	-1.39	98	86	-0.060	10.34	0.00
141	20.363	0.147	2.15	95	-2.99	100	86	-0.070	9.88	0.02
142	20.508	0.145	2.17	95	-1.01	99	85	-0.080	9.57	0.01
143	20.654	0.146	2.16	95	-2.82	99	85	-0.070	9.17	0.03
144	20.800	0.146	2.17	95	-1.94	99	86	-0.060	9.21	0.04
145	20.946	0.146	2.16	95	-2.26	99	86	-0.060	8.95	0.02
146	21.092	0.146	2.17	95	-0.97	99	86	-0.060	9.02	0.03
147	21.238	0.146	2.16	95	-1.72	99	86	-0.070	8.97	0.02
148	21.383	0.145	2.15	95	-2.37	98	85	-0.060	8.78	0.03
149	21.529	0.146	2.17	96	-1.59	99	85	-0.070	8.77	0.03
150	21.675	0.146	2.17	96	-1.17	99	86	-0.070	8.88	0.03
151	21.821	0.146	2.17	96	-1.84	99	86	-0.060	8.57	0.02
152	21.968	0.147	2.18	96	-0.97	100	87	-0.070	8.53	0.03
153	22.112	0.144	2.17	96	-1.22	98	86	-0.050	8.49	0.05
154	22.259	0.147	2.16	96	-2.18	99	86	-0.060	8.41	0.06
155	22.404	0.145	2.16	96	-1.43	98	85	-0.060	8.45	0.03
156	22.551	0.147	2.17	96	-1.52	99	85	-0.060	8.33	0.04
157	22.696	0.145	2.16	96	-2.49	98	86	-0.060	8.28	0.04
158	22.843	0.147	2.17	96	-2.99	99	86	-0.050	8.27	0.06
159	22.988	0.145	2.17	96	-2.41	98	86	-0.060	8.37	0.04

BOX B TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: I2500
Run #: 1

Job #: 18-434
Tracking #: 0014
Technician: SJB
Date: 10/29/2018

	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	23.136	0.148	2.17	96	-1.25	100	86	-0.060	8.39	0.02
161	23.280	0.144	2.16	96	-2.99	97	85	-0.060	8.17	0.08
162	23.428	0.148	2.17	96	-2.3	100	85	-0.050	8.05	0.07
163	23.573	0.145	2.17	96	-0.91	98	85	-0.060	8.11	0.05
164	23.721	0.148	2.17	96	-2.95	100	86	-0.070	7.61	0.06
165	23.865	0.144	2.18	96	-0.9	97	87	-0.050	7.62	0.06
166	24.013	0.148	2.17	96	-1.02	100	86	-0.070	7.61	0.07
167	24.157	0.144	2.17	96	-2.33	97	86	-0.070	7.51	0.06
168	24.305	0.148	2.16	96	-3	100	85	-0.070	7.47	0.09
169	24.449	0.144	2.16	97	-2.58	97	85	-0.060	7.50	0.08
170	24.597	0.148	2.18	97	-3.01	100	86	-0.070	7.42	0.10
171	24.742	0.145	2.17	97	-2.58	98	86	-0.060	7.50	0.08
172	24.890	0.148	2.17	97	-1.05	100	86	-0.060	7.52	0.08
173	25.034	0.144	2.17	97	-2.93	97	86	-0.060	7.64	0.06
174	25.183	0.149	2.17	97	-0.97	100	85	-0.060	7.77	0.05
175	25.327	0.144	2.18	97	-1.33	97	85	-0.080	7.40	0.04
176	25.475	0.148	2.18	97	-2.81	100	85	-0.060	7.16	0.06
177	25.619	0.144	2.16	97	-2.87	97	86	-0.060	7.01	0.08
178	25.768	0.149	2.16	97	-0.94	100	86	-0.060	7.16	0.05
179	25.912	0.144	2.16	97	-2.74	97	86	-0.060	7.03	0.08
180	26.061	0.149	2.17	97	-1.75	100	86	-0.060	7.15	0.05
181	26.205	0.144	2.17	97	-1.17	97	85	-0.060	6.93	0.04
Avg/Tot	26.205	0.145	2.16	87	-1.90	100			11.75	0.13

WOODSTOVE SURFACE TEMPERATURE DATA

Client: FPI
Model: I2500
Run #: 1

Job #: 18-434
Tracking #: 0014
Technician: SJB
Date: 10/29/2018

	Temperature Data (°F)						
Elapsed Time (min)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
0	65	65	65	66	65	65.2	65
1	65	65	66	66	65	65.4	133
2	66	66	73	66	65	67.2	277
3	69	68	93	68	65	72.6	447
4	74	74	111	73	66	79.6	524
5	82	81	121	81	66	86.2	555
6	91	91	128	91	68	93.8	624
7	100	102	136	103	71	102.4	600
8	110	114	142	115	75	111.2	604
9	120	126	151	127	81	121.0	670
10	130	136	155	140	87	129.6	748
11	140	146	161	156	92	139.0	818
12	150	155	166	174	97	148.4	861
13	160	163	171	194	102	158.0	846
14	170	171	179	214	107	168.2	880
15	179	180	186	237	113	179.0	946
16	188	187	193	259	118	189.0	974
17	197	196	202	282	124	200.2	982
18	208	206	209	306	130	211.8	989
19	219	214	218	327	136	222.8	888
20	229	224	225	346	141	233.0	813
21	239	233	234	362	147	243.0	799
22	249	242	242	375	153	252.2	807
23	257	251	250	385	159	260.4	832
24	265	259	259	393	164	268.0	869
25	272	267	267	401	169	275.2	880
26	280	276	275	409	174	282.8	884
27	287	283	283	418	179	290.0	888
28	294	291	291	428	184	297.6	880
29	302	300	299	436	188	305.0	862
30	310	308	307	445	193	312.6	850
31	316	315	314	449	197	318.2	895
32	323	324	322	457	202	325.6	994
33	330	331	330	462	207	332.0	1010
34	336	337	336	472	212	338.6	1038
35	343	344	341	481	217	345.2	1005
36	349	350	347	490	222	351.6	1052
37	356	357	353	501	226	358.6	1051
38	369	362	360	508	233	366.4	1075
39	378	368	365	517	238	373.2	1056
40	384	373	369	526	244	379.2	993
41	389	378	373	532	248	384.0	978
42	393	380	375	536	253	387.4	967
43	394	384	377	541	258	390.8	959
44	395	386	379	545	262	393.4	968
45	396	384	380	547	266	394.6	957
46	395	385	380	549	269	395.6	945
47	395	386	381	550	272	396.8	944

WOODSTOVE SURFACE TEMPERATURE DATA

Client: FPI
Model: I2500
Run #: 1

Job #: 18-434
Tracking #: 0014
Technician: SJB
Date: 10/29/2018

	Temperature Data (°F)						
Elapsed Time (min)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
48	394	384	380	552	275	397.0	950
49	393	383	380	553	277	397.2	958
50	393	382	379	554	279	397.4	960
51	392	379	378	554	281	396.8	956
52	393	377	377	556	282	397.0	953
53	393	377	376	556	284	397.2	952
54	392	375	375	560	285	397.4	953
55	392	374	375	557	287	397.0	951
56	393	373	373	557	289	397.0	950
57	393	372	373	561	290	397.8	950
58	392	371	372	560	291	397.2	951
59	392	358	369	552	293	392.8	942
60	392	355	364	541	294	389.2	931
61	392	355	358	530	295	386.0	922
62	392	353	352	518	295	382.0	916
63	390	351	348	508	294	378.2	912
64	390	351	343	499	293	375.2	908
65	390	350	340	490	293	372.6	907
66	389	348	337	481	292	369.4	908
67	388	348	334	475	291	367.2	910
68	387	349	331	469	290	365.2	915
69	387	348	329	463	288	363.0	924
70	386	348	327	459	287	361.4	929
71	385	347	326	453	286	359.4	929
72	385	346	324	449	285	357.8	929
73	384	347	323	444	283	356.2	929
74	384	346	322	441	283	355.2	931
75	384	347	322	438	282	354.6	935
76	384	346	321	434	281	353.2	934
77	385	346	320	433	281	353.0	933
78	385	346	320	432	280	352.6	935
79	384	346	320	431	279	352.0	939
80	386	346	320	430	279	352.2	940
81	386	346	320	430	279	352.2	940
82	388	346	320	427	278	351.8	942
83	388	346	320	429	278	352.2	948
84	389	346	320	429	278	352.4	955
85	389	346	321	428	277	352.2	962
86	390	348	321	429	277	353.0	963
87	391	347	322	431	277	353.6	964
88	391	348	322	432	277	354.0	968
89	393	348	323	433	277	354.8	969
90	395	347	324	433	277	355.2	968
91	397	349	324	433	278	356.2	970
92	398	351	326	436	278	357.8	967
93	400	349	326	436	279	358.0	965
94	401	352	327	438	279	359.4	965
95	403	353	328	438	280	360.4	961

WOODSTOVE SURFACE TEMPERATURE DATA

Client: FPI
Model: I2500
Run #: 1

Job #: 18-434
Tracking #: 0014
Technician: SJB
Date: 10/29/2018

	Temperature Data (°F)						
Elapsed Time (min)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
96	405	353	330	439	280	361.4	960
97	407	353	331	440	281	362.4	957
98	409	356	332	441	282	364.0	957
99	412	355	333	442	282	364.8	957
100	413	356	334	442	283	365.6	958
101	414	357	336	441	284	366.4	952
102	417	356	337	441	285	367.2	947
103	419	360	338	441	286	368.8	948
104	420	361	340	440	287	369.6	947
105	423	361	341	440	288	370.6	939
106	425	362	342	439	289	371.4	934
107	427	364	344	438	290	372.6	929
108	428	364	345	436	291	372.8	924
109	429	366	346	434	293	373.6	920
110	430	369	347	433	294	374.6	914
111	434	369	348	432	295	375.6	909
112	433	371	350	429	296	375.8	899
113	434	371	351	428	298	376.4	888
114	435	372	352	426	299	376.8	884
115	437	375	353	423	301	377.8	882
116	438	376	354	421	302	378.2	878
117	439	378	355	418	304	378.8	877
118	440	378	356	417	305	379.2	874
119	442	379	357	414	307	379.8	874
120	443	379	359	412	308	380.2	873
121	444	381	360	410	310	381.0	873
122	444	383	361	408	311	381.4	870
123	445	385	363	408	312	382.6	867
124	446	384	364	405	315	382.8	863
125	447	387	365	405	316	384.0	860
126	448	389	366	402	318	384.6	855
127	450	391	367	401	319	385.6	848
128	451	391	368	400	321	386.2	840
129	451	393	369	400	322	387.0	835
130	453	393	370	398	324	387.6	832
131	453	392	371	396	326	387.6	828
132	455	397	372	394	327	389.0	824
133	455	397	373	393	329	389.4	818
134	455	399	374	391	331	390.0	813
135	455	400	374	389	333	390.2	809
136	457	403	375	387	334	391.2	804
137	456	401	375	384	336	390.4	799
138	457	404	376	382	337	391.2	795
139	458	405	376	380	339	391.6	790
140	458	408	376	378	341	392.2	786
141	457	409	377	375	343	392.2	778
142	456	408	377	372	344	391.4	767
143	457	411	378	368	346	392.0	760

WOODSTOVE SURFACE TEMPERATURE DATA

Client: FPI
Model: I2500
Run #: 1

Job #: 18-434
Tracking #: 0014
Technician: SJB
Date: 10/29/2018

	Temperature Data (°F)						
Elapsed Time (min)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
144	456	411	378	365	348	391.6	756
145	454	413	378	360	349	390.8	751
146	455	411	378	356	351	390.2	746
147	454	414	378	352	353	390.2	741
148	452	414	377	348	354	389.0	738
149	451	414	377	343	356	388.2	734
150	450	414	376	340	358	387.6	730
151	450	415	375	335	360	387.0	728
152	447	414	375	332	361	385.8	729
153	445	415	374	327	363	384.8	728
154	444	414	373	325	365	384.2	722
155	443	414	372	322	366	383.4	719
156	441	414	371	319	368	382.6	715
157	438	415	370	315	369	381.4	712
158	436	413	369	311	370	379.8	709
159	434	413	368	308	372	379.0	705
160	432	414	367	305	373	378.2	703
161	431	412	366	302	374	377.0	703
162	429	412	365	298	376	376.0	699
163	428	412	364	297	377	375.6	690
164	425	410	363	294	378	374.0	685
165	424	411	362	292	379	373.6	684
166	422	408	362	290	380	372.4	684
167	419	408	360	289	381	371.4	683
168	418	409	359	286	381	370.6	682
169	415	407	358	284	382	369.2	680
170	414	408	356	282	382	368.4	679
171	411	407	355	281	383	367.4	679
172	408	407	354	279	383	366.2	678
173	407	408	352	277	383	365.4	675
174	405	407	350	276	383	364.2	674
175	403	406	349	274	384	363.2	664
176	401	407	348	273	384	362.6	657
177	399	407	347	271	384	361.6	657
178	397	407	346	269	384	360.6	658
179	394	406	344	268	384	359.2	658
180	392	406	343	267	383	358.2	657
181	391	407	342	265	383	357.6	654
Average	373	344	325	388	276	341	843

LAB SAMPLE DATA - ASTM E2515

Client: FPI
Job #: 18-434
Model: I2500
Tracking #: 0014
Run #: 1
Technician: SJB
Date: 10/29/2018

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	T019	87.1	83.8	3.3
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:	3.3

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	T020	168.6	83.6	1.1
B. Rear filter catch	Filter	T021		83.9	
C. Probe catch*	Probe	1A	115628.8	115628.6	0.2
D. O-Ring catch*	O-Ring	1A	3566.5	3566.1	0.4

Sub-Total	Total Particulate, mg:	1.7
Train A Aggregate	Total Particulate, mg:	**5.0**

TRAIN B

Sample Component	Reagent	Filter, Probe, or O-Ring #	Weights		
			Final, mg	Tare, mg	Particulate, mg
A. Front filter catch	Filter	T022	169.6	84.0	2.0
B. Rear filter catch	Filter	T023		83.6	
C. Probe catch*	Probe	1B	115903.0	115902.8	0.2
D. O-Ring catch*	O-Ring	1B	3556.7	3554.4	2.3

Total Particulate, mg:	**4.5**

AMBIENT

Sample Component	Reagent	Filter, Probe, or O-Ring #	Weights		
			Final, mg	Tare, mg	Particulate, mg
A. Filter catch*	Filter	T024	83.0	82.9	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: 18-434 | Tracking #: 0014
Model: I2500 | Run Number: 1 | Test Date: 10/29/2018

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: 10:36
Air Control Setting: High Setting - Fully Open

Time	Notes
0 min	Started sampling/kindling ignition with propane torch for 25 seconds. Door cracked open 2.5", bypass open, air control set to test position, blower off. Starting kindling in stove was 2.3 lbs plus a couple sheets of printer paper.
2 min	Door closed to 1"
3 min	Door latched closed
5 min	Catalyst bypass closed
7 min	At 0.6 lbs, added 2.8 lbs of start-up fuel, door closed within 60 seconds
20 min	At 1.0 lbs, added 2.1 lbs of start-up fuel, door closed within 20 seconds
30 min	At 1.5 lbs, added 2.6 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 40 sec from loading
58 min	Blower fan turned on to high
60 min	Changed 1-hour filter

Test Burn End Time: 13:37

Flue Gas Concentration Measurement

Calibration Gas Values: Span Gas CO_2 (%): 16.93 CO (%): 4.330
Mid Gas CO_2 (%): 10.00 CO (%): 2.51

Calibration Results:

	Pre Test			Post Test		
	Zero	Mid	Span	Zero	Mid	Span
Time	8:37	8:42	8:39	14:19	14:22	14:25
CO_2	0.00	10.08	16.93	0.03	10.11	17.00
CO	0.000	2.506	4.330	-0.011	2.483	4.297

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

Technician Signature:  Date: 10/29/2018

ASTM E3053 Wood Heater Run Sheets

Client: FPI | Job Number: 18-434 | Tracking #: 0014
Model: I2500 | Run Number: 1 | Test Date: 10/29/2018

Test Photos

Kindling Fuel Load

Start-up Fuel Load

High Fire Fuel Load

Residual Start-up Fuel Coal Bed

Technician Signature: _____ Date: 10/29/2018

ASTM E3053 Wood Heater Run Sheets

Client: FPI Job Number: 18-434 Tracking #: 0014
Model: I2500 Run Number: 1 Test Date: 10/29/2018

High Fire Fuel Loaded

Residual High Fire Load Coal Bed

N/A – High Fire Test Only

Medium/Low Fire Fuel Load

N/A – High Fire Test Only

Medium/Low Fire Fuel Loaded

Technician Signature: Date: 10/29/2018

WOOD STOVE TEST DATA PACKET
ASTM E3053/E2515

Run 2 Data Summary

Client:	FPI
Model:	I2500
Job #:	18-434
Tracking #:	0014
Test Date:	10/30/2018

Techician Signature

11/2/2018
Date

TEST RESULTS - ASTM E3053 / ASTM E2515

Client: FPI
Model: I2500
Run #: 2

Job #: 18-434
Tracking #: 0014
Technician: SJB
Date: 10/30/2018

Burn Rate (kg/hr):	1.18

	Ambient Sample	Sample Train A	Sample Train B	1st Hour Filter
Total Sample Volume (ft^3)	64.645	73.063	72.908	8.733
Average Gas Velocity in Dilution Tunnel (ft/sec)	15.2			
Average Gas Flow Rate in Dilution Tunnel (dscf/hr)	10141.4			
Average Gas Meter Temperature (°F)	72.4	81.2	96.7	75.4
Total Sample Volume (dscf)	64.597	72.410	69.899	8.750
Average Tunnel Temperature (°F)	92.5			
Total Time of Test (min)	499			
Total Particulate Catch (mg)	0.1	6.5	6.3	3.7
Particulate Concentration, dry-standard (g/dscf)	0.0000015	0.0000898	0.0000901	0.0004228
Total PM Emissions (g)	0.13	7.44	7.47	4.27
Particulate Emission Rate (g/hr)	0.02	0.89	0.90	4.27
Emissions Factor (g/kg)	-	0.76	0.76	-
Difference from Average Total Particulate Emissions (g)	-	0.02	0.02	-
Difference from Average Emissions Factor (g/kg)	-	0.00	0.00	-

Final Average Results	
Total Particulate Emissions (g)	7.46
Particulate Emission Rate (g/hr)	0.90
Emissions Factor (g/kg)	0.76
HHV Efficiency (%)	77.2%
LHV Efficiency (%)	82.6%
CO Emissions (g/min)	0.51

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: 81 / Max: 88	OK
Face Velocity	< 30 ft/min	8.9	OK
Leakage Rate	Less than 4% of average sample rate	0.002 cfm	OK
Ambient Temp	55-90 °F	Min: 69 / Max: 75	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:	I2500
Date:	10/30/18
Run:	2
Control #:	18-434
Test Duration:	499
Output Category:	Low

Test Results in Accordance with CSA B415.1-09

	HHV Basis	LHV Basis
Overall Efficiency	77.2%	82.6%
Combustion Efficiency	98.3%	98.3%
Heat Transfer Efficiency	78.5%	84.0%

Output Rate (kJ/h)	18,109	17,178	**(Btu/h)**
Burn Rate (kg/h)	1.17	2.59	**(lb/h)**
Input (kJ/h)	23,452	22,247	**(Btu/h)**

Test Load Weight (dry kg)	9.77	21.54	**dry lb**
MC wet (%)	19.03		
MC dry (%)	23.51		
Particulate (g)	7.46		
CO (g)	256		
Test Duration (h)	8.32		

Emissions	**Particulate**	**CO**
g/MJ Output	0.05	1.70
g/kg Dry Fuel	0.76	26.25
g/h	0.90	30.84
g/min	0.01	0.51
lb/MM Btu Output	0.12	3.96

Air/Fuel Ratio (A/F)	12.92

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	3.73	lb	In Range		
	2	3.77	lb	In Range		
	3	3.95	lb	In Range		
Core Load Total. Wt. Actual		11.45	lb	In Range		
	Pc. #					
Remainder Load Piece Wt.	1	2.98	lb	In Range		
(1 to 3 Pcs.)	2	3.42	lb	In Range		
	3	3.64	lb	In Range		
Remainder Load Tot. Wt. Act		10.04	lb	In Range		
Total Load Wt. Actual		21.49	lb	In Range		
Core % of Total Wt.		53%		In Range		45-65%
Remainder % of Total Wt.		47%		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.)		4.30	lb			
Actual Kindling Wt.		4.06	lb	In Range		18.9%
Maximum Start-up Fuel Wt. (30% of Tot. Load Wt.)		6.45	lb			
Actual Start-up Fuel Wt.		6.15	lb	In Range		28.6%
Allowable Residual Start-up Fuel Wt. Range	2.1	to	4.3	lb		Mid-Point
Actual Residual Start-up Fuel Wt.		2.5	lb	In Range		3.2
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)	1.9	to	2.4	lb		2.1
Actual Fuel Load Ending Wt.		1.9	lb	Out of Range		

Fuel Piece Moisture Reading (%-dry basis)								
1	2	3	Ave.		Pc. Wt. Dry Basis			
22.3	20.6	23	22.0	In Range	3.06	lb	1.39	kg
23	22.9	24.2	23.4	In Range	3.06	lb	1.39	kg
22.1	25.1	24.7	24.0	In Range	3.19	lb	1.45	kg
20.4	21.6	21.8	21.3	In Range	2.46	lb	1.11	kg
19.6	21.7	20.7	20.7	In Range	2.83	lb	1.29	kg
22.3	22.5	22.6	22.5	In Range	2.97	lb	1.35	kg
Total Load Ave. MC (%-dry basis)			22.3	In Range				
Total Load Ave. MC % (wet basis)			18.3					
Total Test Load Weight (dry basis) →					17.56	lb	7.97	kg
Kindling Moisture (%-dry basis)								
10	10	10	10.0	In Range	3.69	lb	1.67	kg
Start-up Fuel Moisture Readings (%-dry basis)								
21.4	22.6	19.8	21.3	In Range	5.07	lb	2.30	kg
Total Wt. All Fuel Added (dry basis) →					26.33	lb	11.94	kg
Total Wt. All Fuel Burned (dry basis) →					21.9	lb	9.9	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	5.75	lb		In Range	
	2	4.65	lb		In Range	
	3	5.69	lb		In Range	
Core Load Total. Wt. Actual		16.09	lb		In Range	
	Pc. #					
Remainder Load Piece Wt.	1	6.37	lb		In Range	
(2 or 3 Pcs.)	2	4.10	lb		In Range	
	3		lb		NA	
Remainder Load Piece Weight Ratio - Small/Large		64%			In Range	≤ 67%
Remainder Load Tot. Wt. Act		10.47	lb		In Range	
Total Load Wt. Actual		26.56	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		99%			In Range	95-105%
Actual Fuel Load Density		11.9	lb/ft^3			
Allowable Charcoal Bed Wt. Range (lb)	2.7	to	5.3			Mid-Point
Actual Charcoal Bed Wt.		4.4	lb		In Range	4.0
Actual Fuel Load Ending Wt.		0.0	lb		Valid Test	≥ 90%
Total Wt. of Fuel Burned During Test Run lb.		26.6	lb			

Fuel Piece Moisture Reading (%-dry basis)									
1	2	3	Ave.		Pc. Wt. Dry Basis				
22.8	24.1	25.3	24.1	In Range	4.63	lb	2.10	kg	
25	23.1	24.2	24.1	In Range	3.75	lb	1.70	kg	
19.1	24.7	22.6	22.1	In Range	4.66	lb	2.11	kg	
22.9	26.1	23.8	24.3	In Range	5.13	lb	2.33	kg	
23	25	20.5	22.8	In Range	3.34	lb	1.51	kg	
			NA	NA	NA	lb	NA	kg	
Total Load Ave. MC % (dry basis)			23.5	In Range					
Total Load Ave. MC % (wet basis)			19.0						
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

DILUTION TUNNEL & MISC. DATA - ASTM E3053 / E2515

Client:	FPI	Job #:	18-434
Model:	I2500	Tracking #:	0014
Run #:	2	Technician:	SJB
Test Start Time:	10:38	Date:	10/30/2018
Test Type:	Low Fire		

Recording Interval (min):	1
Total Sampling Time (min):	499

	Pre-Test	Post Test	Avg.
Barometric Pressure (in. Hg)	30.24	30.14	30.19
Relative Humidity (%)	44.8	35.3	
Room Air Velocity (ft/min)	0	0	
Scale Audit (lbs)	10.0	10.0	

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

Ambient Sample Volume: 64.645 ft^3

Induced Draft Check (in. H_2O):	0
Smoke Capture Check (%):	100%
Date Flue Pipe Last Cleaned:	10/26/2018

Sample Train Post-Test Leak Checks

(A)	0.000	cfm @	-12	in. Hg
(B)	0.002	cfm @	-12	in. Hg
(Ambient)	0.002	cfm @	-14	in. Hg

DILUTION TUNNEL FLOW

Traverse Data

Point	dP (in H_2O)	Temp (°F)
1	0.040	108
2	0.058	108
3	0.056	108
4	0.042	108
5	0.044	107
6	0.060	107
7	0.062	107
8	0.038	107
Center	0.060	108

Static Pressure: -0.240 in. H_2O

Dilution Tunnel H_2O:	2.00	percent
Tunnel Diameter:	6	inches
Pitot Tube Cp:	0.99	[unitless]
Dilution Tunnel MW(dry):	29.00	lb/lb-mole
Dilution Tunnel MW(wet):	28.78	lb/lb-mole
Tunnel Area:	0.1963	ft^2
V_{strav}:	15.39	ft/sec
V_{scent}:	16.75	ft/sec
F_p:	0.919	[ratio]
Initial Tunnel Flow:	165.1	scf/min

TEST FUEL PROPERTIES

Default 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 Used Properties

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

WOODSTOVE PREBURN DATA

Client: FPI
Model: I2500
Run #: 2

Job #: 18-434
Tracking #: 0014
Technician: SJB
Date: 10/30/2018

Preburn Start Time: 8:00
Recording Interval (min): 1
Run Time (min): 157

			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	2.3	-0.004	66	65	66	66	66	65.8	65	63
1	2.1	-0.019	65	65	66	66	66	65.6	113	63
2	1.9	-0.052	66	66	70	66	66	66.8	178	63
3	1.5	-0.107	67	67	81	67	66	69.6	376	63
4	1.3	-0.056	71	71	96	71	66	75.0	381	63
5	1.1	-0.070	77	76	107	76	66	80.4	399	63
6	1.0	-0.059	86	84	113	84	67	86.8	377	63
7	0.9	-0.053	96	92	119	92	69	93.6	365	63
8	3.4	-0.055	106	101	125	101	71	100.8	392	63
9	2.9	-0.060	115	111	133	109	75	108.6	407	63
10	2.7	-0.077	124	120	140	119	78	116.2	442	63
11	2.4	-0.083	134	128	147	131	82	124.4	494	63
12	2.2	-0.068	144	137	152	147	86	133.2	522	63
13	2.0	-0.077	154	146	158	164	91	142.6	524	63
14	1.8	-0.083	165	154	165	184	96	152.8	523	63
15	1.7	-0.078	176	163	172	206	101	163.6	520	63
16	1.5	-0.064	186	173	179	227	106	174.2	518	64
17	1.2	-0.067	197	182	187	248	112	185.2	517	63
18	1.2	-0.084	207	192	196	267	118	196.0	506	63
19	1.2	-0.070	218	200	204	285	123	206.0	494	64
20	1.0	-0.067	229	209	214	301	129	216.4	486	64
21	3.8	-0.061	238	219	223	314	135	225.8	507	64
22	3.6	-0.068	247	226	233	326	141	234.6	500	64
23	3.4	-0.078	256	235	241	337	147	243.2	516	64
24	3.2	-0.081	264	242	250	349	152	251.4	534	64
25	3.0	-0.068	272	248	258	361	158	259.4	549	64
26	2.7	-0.081	280	254	265	374	163	267.2	565	64
27	2.5	-0.084	287	261	272	389	168	275.4	581	64
28	2.3	-0.091	295	268	279	404	173	283.8	592	64
29	4.6	-0.083	304	276	286	421	179	293.2	618	64
30	4.3	-0.083	312	283	293	437	185	302.0	615	64
31	4.0	-0.091	320	290	300	454	190	310.8	612	64
32	3.7	-0.101	327	297	306	468	194	318.4	605	64
33	3.4	-0.083	335	303	313	482	199	326.4	599	65
34	3.1	-0.072	342	311	319	492	204	333.6	589	65
35	2.8	-0.075	349	317	325	504	209	340.8	583	65
36	2.5	-0.084	357	324	331	512	214	347.6	578	64
37	13.0	-0.092	366	332	338	521	220	355.4	624	64
38	23.3	-0.091	373	337	344	529	225	361.6	627	64
39	23.0	-0.086	380	344	349	534	230	367.4	628	64
40	22.8	-0.085	385	349	353	537	235	371.8	602	64
41	22.5	-0.085	389	354	356	539	239	375.4	608	64
42	22.3	-0.094	393	359	358	539	244	378.6	609	63
43	22.0	-0.091	394	362	360	543	248	381.4	608	63

WOODSTOVE PREBURN DATA

Client: FPI
Model: I2500
Run #: 2

Job #: 18-434
Tracking #: 0014
Technician: SJB
Date: 10/30/2018

Preburn Start Time: 8:00
Recording Interval (min): 1
Run Time (min): 157

			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	21.8	-0.087	396	364	362	545	251	383.6	613	63
45	21.6	-0.091	396	366	363	551	254	386.0	617	63
46	21.3	-0.083	396	367	364	555	257	387.8	614	63
47	21.1	-0.085	396	367	363	561	260	389.4	609	63
48	20.9	-0.080	396	367	363	566	263	391.0	608	63
49	20.7	-0.098	396	367	363	570	265	392.2	613	63
50	20.4	-0.082	396	366	363	572	267	392.8	615	63
51	20.2	-0.085	396	366	364	576	269	394.2	619	62
52	20.0	-0.075	396	366	364	581	271	395.6	623	62
53	19.8	-0.098	395	365	364	582	273	395.8	625	62
54	19.5	-0.079	396	364	364	585	275	396.8	621	62
55	19.3	-0.083	396	364	364	584	277	397.0	613	62
56	19.1	-0.089	396	363	365	589	278	398.2	608	62
57	18.9	-0.077	395	351	363	579	282	394.0	600	62
58	18.6	-0.078	395	351	360	566	284	391.2	588	62
59	18.5	-0.091	395	350	356	556	285	388.4	579	62
60	18.3	-0.087	393	345	352	546	286	384.4	577	62
61	18.1	-0.079	392	342	349	537	286	381.2	575	62
62	17.9	-0.079	390	341	346	529	285	378.2	572	62
63	17.6	-0.068	389	339	342	521	285	375.2	570	62
64	17.5	-0.076	387	339	339	514	284	372.6	568	62
65	17.3	-0.075	386	338	337	507	284	370.4	567	62
66	17.1	-0.079	385	337	334	501	283	368.0	567	62
67	16.9	-0.073	383	335	332	496	283	365.8	567	62
68	16.7	-0.071	382	334	330	492	282	364.0	568	61
69	16.4	-0.083	382	335	328	488	281	362.8	571	61
70	16.2	-0.079	381	333	326	487	281	361.6	572	61
71	16.1	-0.081	379	333	324	482	281	359.8	571	61
72	15.9	-0.078	380	332	323	480	280	359.0	571	61
73	15.7	-0.087	379	332	321	479	280	358.2	569	61
74	15.5	-0.076	379	331	320	477	280	357.4	568	61
75	15.2	-0.076	378	332	319	474	280	356.6	569	61
76	15.1	-0.081	378	330	319	474	280	356.2	569	61
77	14.9	-0.081	378	330	318	473	280	355.8	571	61
78	14.7	-0.081	379	331	317	471	280	355.6	572	61
79	14.5	-0.077	378	330	317	471	280	355.2	572	61
80	14.3	-0.077	377	329	316	471	280	354.6	573	61
81	14.1	-0.079	377	329	316	470	280	354.4	575	61
82	13.9	-0.079	378	329	316	469	280	354.4	577	62
83	13.7	-0.099	378	330	316	469	281	354.8	578	62
84	13.4	-0.081	378	328	317	469	281	354.6	578	62
85	13.3	-0.076	379	329	317	470	281	355.2	578	61
86	13.1	-0.074	379	330	317	473	281	356.0	581	61
87	12.9	-0.091	380	331	318	472	281	356.4	584	61

WOODSTOVE PREBURN DATA

Client: FPI
Model: I2500
Run #: 2

Job #: 18-434
Tracking #: 0014
Technician: SJB
Date: 10/30/2018

Preburn Start Time: 8:00
Recording Interval (min): 1
Run Time (min): 157

			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	12.6	-0.085	381	330	319	474	282	357.2	587	61
89	12.5	-0.075	382	330	320	474	282	357.6	589	61
90	12.3	-0.086	383	332	321	476	283	359.0	592	61
91	12.1	-0.085	384	334	322	477	284	360.2	592	61
92	11.8	-0.085	385	333	324	478	284	360.8	592	61
93	11.6	-0.073	385	336	325	477	285	361.6	589	61
94	11.5	-0.077	388	337	326	476	286	362.6	584	61
95	11.3	-0.068	390	340	328	475	286	363.8	578	61
96	11.2	-0.076	392	341	330	473	287	364.6	573	61
97	10.9	-0.081	393	344	332	471	288	365.6	571	61
98	10.7	-0.077	394	345	333	469	289	366.0	569	61
99	10.6	-0.084	396	346	335	467	290	366.8	565	61
100	10.5	-0.076	399	348	337	463	291	367.6	563	61
101	10.3	-0.077	400	350	339	460	291	368.0	563	61
102	10.1	-0.069	402	352	340	458	293	369.0	562	61
103	10.0	-0.075	404	353	342	455	294	369.6	563	61
104	9.8	-0.076	406	354	344	452	295	370.2	563	61
105	9.7	-0.079	407	354	345	449	296	370.2	562	61
106	9.4	-0.076	408	357	347	446	297	371.0	562	61
107	9.4	-0.080	410	358	348	444	297	371.4	559	61
108	9.2	-0.080	411	359	350	442	299	372.2	555	61
109	9.1	-0.079	413	360	351	439	300	372.6	551	61
110	9.0	-0.077	414	362	353	436	301	373.2	548	61
111	8.8	-0.075	415	362	354	433	302	373.2	547	61
112	8.7	-0.084	416	364	356	431	303	374.0	545	61
113	8.5	-0.075	417	365	357	429	304	374.4	542	61
114	8.4	-0.081	418	365	358	427	306	374.8	541	61
115	8.3	-0.078	420	366	359	425	307	375.4	538	61
116	8.1	-0.079	421	367	361	422	308	375.8	537	61
117	8.0	-0.065	422	369	362	419	309	376.2	535	61
118	7.8	-0.076	422	368	363	417	311	376.2	531	61
119	7.6	-0.067	424	372	364	414	313	377.4	529	61
120	7.6	-0.079	426	372	365	413	314	378.0	528	61
121	7.4	-0.069	426	373	366	411	316	378.4	525	61
122	7.2	-0.062	427	373	367	409	317	378.6	522	61
123	7.2	-0.073	428	377	368	406	319	379.6	521	61
124	7.1	-0.087	429	377	369	405	320	380.0	519	61
125	6.8	-0.083	432	378	370	403	322	381.0	554	61
126	6.6	-0.088	434	379	372	405	327	383.4	564	61
127	6.4	-0.072	434	382	373	411	329	385.8	576	61
128	6.3	-0.079	436	385	375	414	331	388.2	570	61
129	6.2	-0.072	437	385	376	419	333	390.0	556	61
130	6.0	-0.072	437	390	377	424	334	392.4	545	62
131	5.9	-0.085	437	393	378	427	334	393.8	534	61

WOODSTOVE PREBURN DATA

Client: FPI
Model: I2500
Run #: 2

Job #: 18-434
Tracking #: 0014
Technician: SJB
Date: 10/30/2018

Preburn Start Time: 8:00
Recording Interval (min): 1
Run Time (min): 157

			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	5.8	-0.089	436	396	379	429	335	395.0	524	61
133	5.7	-0.074	438	399	381	429	336	396.6	515	61
134	5.7	-0.073	438	401	382	427	336	396.8	507	61
135	5.6	-0.062	437	406	382	423	337	397.0	498	62
136	5.5	-0.066	437	409	383	418	337	396.8	492	62
137	5.3	-0.070	436	411	383	412	337	395.8	485	62
138	5.3	-0.073	435	411	384	407	338	395.0	479	62
139	5.3	-0.070	434	415	384	402	338	394.6	477	62
140	5.2	-0.069	432	416	384	397	338	393.4	473	62
141	5.2	-0.075	430	418	384	393	339	392.8	469	62
142	5.1	-0.050	429	418	384	387	339	391.4	467	62
143	5.0	-0.070	427	418	384	386	339	390.8	464	62
144	5.0	-0.075	426	418	383	380	340	389.4	462	62
145	4.9	-0.071	424	420	383	377	340	388.8	460	62
146	4.9	-0.067	422	418	382	373	340	387.0	459	62
147	4.8	-0.059	422	419	381	369	340	386.2	457	62
148	4.8	-0.066	419	418	380	365	340	384.4	455	62
149	4.7	-0.072	417	417	379	359	341	382.6	453	62
150	4.6	-0.066	417	417	377	356	341	381.6	452	62
151	4.6	-0.056	415	417	376	351	340	379.8	450	62
152	4.6	-0.068	414	416	375	347	340	378.4	449	62
153	4.6	-0.068	411	413	373	343	340	376.0	446	62
154	4.5	-0.065	411	412	371	338	340	374.4	443	62
155	4.5	-0.061	409	412	369	334	340	372.8	441	62
156	4.4	-0.072	408	412	367	329	340	371.2	439	62
157	4.4	-0.066	407	410	366	325	340	369.6	437	62

BOX A TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: I2500
Run #: 2

Job #: 18-434
Tracking #: 0014
Technician: SJB
Date: 10/30/2018

	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		0.060	0.00	73	-0.01		26.6		108	452	84	71
1	0.120	0.120	0.060	2.35	73	-0.3	85	26.4	-0.2	114	457	86	70
2	0.255	0.135	0.060	2.35	74	-0.12	95	26.3	-0.1	109	476	87	70
3	0.404	0.149	0.060	2.31	73	-1.17	105	26.1	-0.2	111	526	84	70
4	0.551	0.147	0.060	2.33	73	-0.21	104	25.9	-0.2	113	542	83	70
5	0.698	0.147	0.060	2.31	73	-2.2	104	25.7	-0.2	114	543	84	70
6	0.844	0.146	0.060	2.29	73	-0.84	103	25.5	-0.2	114	546	85	70
7	0.991	0.147	0.060	2.28	73	-0.54	103	25.4	-0.1	106	481	86	70
8	1.137	0.146	0.060	2.30	74	-2.22	102	25.3	-0.1	103	463	84	70
9	1.284	0.147	0.060	2.26	74	0	103	25.2	-0.1	102	446	83	70
10	1.430	0.146	0.060	2.28	73	-0.75	102	25.2	0	101	436	83	70
11	1.577	0.147	0.060	2.26	74	-0.04	102	25.1	-0.1	100	432	85	70
12	1.723	0.146	0.060	2.27	73	-2.43	102	25.0	-0.1	100	437	86	70
13	1.869	0.146	0.060	2.26	74	-0.97	102	24.9	-0.1	100	451	85	70
14	2.015	0.146	0.060	2.25	74	0	102	24.8	-0.1	99	468	83	70
15	2.161	0.146	0.060	2.25	74	0	102	24.7	-0.1	101	483	83	70
16	2.307	0.146	0.060	2.23	74	-0.31	102	24.5	-0.2	100	495	84	70
17	2.453	0.146	0.060	2.24	74	0	102	24.5	0	101	504	87	70
18	2.600	0.147	0.060	2.23	74	-0.81	103	24.3	-0.2	102	512	86	70
19	2.745	0.145	0.060	2.24	75	-2.51	101	24.2	-0.1	102	521	84	70
20	2.892	0.147	0.060	2.24	74	-1.79	103	24.1	-0.1	103	528	83	70
21	3.037	0.145	0.060	2.24	75	-2.52	101	24.0	-0.1	105	535	84	70
22	3.183	0.146	0.060	2.21	75	-1.32	102	23.9	-0.1	105	532	85	70
23	3.329	0.146	0.060	2.23	75	0	102	23.7	-0.2	106	527	86	70
24	3.476	0.147	0.060	2.24	75	0	103	23.6	-0.1	106	526	85	70
25	3.621	0.145	0.060	2.23	75	-0.06	101	23.5	-0.1	106	530	83	71
26	3.768	0.147	0.060	2.23	75	-0.64	103	23.4	-0.1	107	533	84	71
27	3.913	0.145	0.060	2.23	75	0	101	23.3	-0.1	107	534	85	70
28	4.060	0.147	0.060	2.22	75	0	103	23.1	-0.2	107	537	86	70
29	4.204	0.144	0.060	2.23	75	-2.26	101	23.0	-0.1	107	541	85	70
30	4.353	0.149	0.060	2.21	76	0	104	22.7	-0.3	108	546	83	70
31	4.497	0.144	0.060	2.22	76	0	101	22.7	0	106	539	83	70
32	4.646	0.149	0.060	2.21	76	-1.86	104	22.6	-0.1	107	532	85	70

BOX A TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: I2500
Run #: 2

Job #: 18-434
Tracking #: 0014
Technician: SJB
Date: 10/30/2018

	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	4.789	0.143	0.060	2.21	76	-2.11	100	22.4	-0.2	106	508	87	70
34	4.937	0.148	0.060	2.21	75	-0.78	104	22.2	-0.2	107	487	86	70
35	5.080	0.143	0.060	2.22	76	-0.43	100	22.0	-0.2	107	487	83	70
36	5.229	0.149	0.060	2.21	76	-0.58	104	21.8	-0.2	107	484	84	70
37	5.372	0.143	0.060	2.20	76	-2.47	100	21.6	-0.2	106	477	85	69
38	5.521	0.149	0.060	2.20	76	-1.79	104	21.5	-0.1	105	467	87	71
39	5.664	0.143	0.060	2.20	76	-2.58	100	21.4	-0.1	104	458	85	70
40	5.812	0.148	0.060	2.21	76	-1.58	103	21.2	-0.2	104	481	83	70
41	5.956	0.144	0.060	2.21	77	0	100	21.1	-0.1	105	513	83	70
42	6.105	0.149	0.060	2.22	77	0	104	21.0	-0.1	106	525	85	71
43	6.247	0.142	0.060	2.21	77	-1.56	99	20.9	-0.1	106	502	87	70
44	6.396	0.149	0.060	2.16	77	-2.39	104	20.7	-0.2	105	469	85	70
45	6.539	0.143	0.060	2.17	77	-1.24	99	20.5	-0.2	104	457	83	71
46	6.688	0.149	0.060	2.18	77	-1.2	104	20.3	-0.2	104	456	83	70
47	6.831	0.143	0.060	2.19	76	-0.8	100	20.2	-0.1	104	460	85	70
48	6.980	0.149	0.060	2.21	77	0	104	20.0	-0.2	104	466	87	71
49	7.123	0.143	0.060	2.21	77	-2.28	99	19.8	-0.2	104	470	86	70
50	7.272	0.149	0.060	2.19	77	-2.36	104	19.6	-0.2	104	471	84	71
51	7.415	0.143	0.060	2.19	77	-2.49	100	19.5	-0.1	105	471	83	70
52	7.564	0.149	0.060	2.20	77	-0.21	104	19.3	-0.2	104	471	84	70
53	7.707	0.143	0.060	2.19	77	-0.15	100	19.2	-0.1	105	467	86	70
54	7.857	0.150	0.060	2.18	77	-1.41	104	19.0	-0.2	103	456	86	71
55	8.000	0.143	0.060	2.21	77	0	99	18.9	-0.1	103	453	84	71
56	8.149	0.149	0.060	2.21	78	-1.52	103	18.7	-0.2	103	452	83	71
57	8.292	0.143	0.060	2.19	77	-2.42	99	18.7	0	103	451	84	71
58	8.441	0.149	0.060	2.17	78	-1.99	103	18.4	-0.3	103	455	86	71
59	8.585	0.144	0.060	2.18	78	0	100	18.3	-0.1	103	463	86	71
60	8.733	0.148	0.060	2.18	78	-0.95	103	18.0	-0.3	104	468	84	70
61	8.883	0.150	0.060	2.25	78	-0.45	104	17.9	-0.1	104	475	81	71
62	9.035	0.152	0.060	2.24	78	-2.4	106	17.7	-0.2	105	484	84	71
63	9.181	0.146	0.060	2.25	77	-1.79	102	17.5	-0.2	105	490	86	70
64	9.332	0.151	0.060	2.24	78	-2.49	105	17.3	-0.2	106	498	88	71
65	9.477	0.145	0.060	2.25	78	0	101	17.0	-0.3	106	494	86	71

BOX A TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: I2500
Run #: 2

Job #: 18-434
Tracking #: 0014
Technician: SJB
Date: 10/30/2018

	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	9.628	0.151	0.060	2.25	78	-2.5	105	16.8	-0.2	106	490	83	70
67	9.773	0.145	0.060	2.26	78	-2.32	101	16.6	-0.2	106	490	83	71
68	9.923	0.150	0.060	2.23	78	-0.26	104	16.4	-0.2	107	494	85	71
69	10.068	0.145	0.060	2.24	78	-1.01	101	16.1	-0.3	107	500	87	71
70	10.219	0.151	0.060	2.22	78	-0.3	105	15.9	-0.2	107	507	87	71
71	10.364	0.145	0.060	2.23	78	-0.19	101	15.9	0	107	509	84	71
72	10.514	0.150	0.060	2.23	78	-0.32	104	15.8	-0.1	107	506	83	71
73	10.659	0.145	0.060	2.22	79	0	101	15.5	-0.3	106	502	84	70
74	10.808	0.149	0.060	2.22	79	-0.6	103	15.4	-0.1	106	496	85	70
75	10.954	0.146	0.060	2.22	79	-2.02	101	15.2	-0.2	106	491	87	70
76	11.103	0.149	0.060	2.20	79	-0.65	103	15.0	-0.2	105	487	85	71
77	11.249	0.146	0.060	2.21	79	-2.52	101	14.9	-0.1	105	482	84	71
78	11.398	0.149	0.060	2.23	79	-2.45	103	14.7	-0.2	105	477	83	71
79	11.545	0.147	0.060	2.20	78	-1.58	102	14.6	-0.1	105	474	85	72
80	11.693	0.148	0.060	2.22	79	0	103	14.4	-0.2	105	472	86	71
81	11.840	0.147	0.060	2.22	79	-0.22	102	14.3	-0.1	105	469	85	71
82	11.988	0.148	0.060	2.20	79	0	103	14.1	-0.2	105	468	84	71
83	12.135	0.147	0.060	2.21	79	0	102	14.0	-0.1	105	466	83	71
84	12.282	0.147	0.060	2.21	79	-2.05	102	13.8	-0.2	105	464	85	71
85	12.430	0.148	0.060	2.21	79	-1.81	103	13.7	-0.1	105	464	86	71
86	12.578	0.148	0.060	2.22	79	-1.54	103	13.5	-0.2	104	464	85	70
87	12.725	0.147	0.060	2.19	79	-1.97	102	13.4	-0.1	105	463	84	71
88	12.872	0.147	0.060	2.20	79	-2.39	102	13.1	-0.3	104	462	84	71
89	13.020	0.148	0.060	2.19	79	-2.53	103	13.0	-0.1	105	462	85	71
90	13.166	0.146	0.060	2.20	79	-2.6	101	12.9	-0.1	104	461	86	71
91	13.314	0.148	0.060	2.18	79	0	103	12.8	-0.1	104	457	86	71
92	13.460	0.146	0.060	2.16	79	-2.33	101	12.7	-0.1	104	452	84	71
93	13.609	0.149	0.060	2.18	79	-1.9	103	12.4	-0.3	104	446	83	71
94	13.754	0.145	0.060	2.19	79	-1.51	100	12.4	0	104	442	85	71
95	13.902	0.148	0.060	2.18	79	-0.54	103	12.3	-0.1	104	439	86	71
96	14.048	0.146	0.060	2.16	79	-2.54	101	12.0	-0.3	103	437	86	71
97	14.196	0.148	0.060	2.17	79	-2.47	102	11.9	-0.1	103	433	84	72
98	14.341	0.145	0.060	2.20	79	-0.12	100	11.9	0	103	432	83	71

BOX A TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: I2500
Run #: 2

Job #: 18-434
Tracking #: 0014
Technician: SJB
Date: 10/30/2018

	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	14.490	0.149	0.060	2.17	80	-1.51	103	11.8	-0.1	103	430	84	71
100	14.635	0.145	0.060	2.19	80	0	100	11.7	-0.1	103	426	86	72
101	14.783	0.148	0.060	2.17	79	-2.43	102	11.6	-0.1	102	424	87	71
102	14.928	0.145	0.060	2.18	79	-0.54	100	11.4	-0.2	102	420	85	71
103	15.076	0.148	0.060	2.18	79	0	102	11.3	-0.1	102	419	83	72
104	15.222	0.146	0.060	2.17	80	0	101	11.2	-0.1	101	418	84	72
105	15.370	0.148	0.060	2.17	80	0	102	11.0	-0.2	102	417	86	72
106	15.515	0.145	0.060	2.18	79	0	100	11.0	0	102	416	88	72
107	15.662	0.147	0.060	2.15	80	-0.48	101	10.8	-0.2	102	415	86	71
108	15.808	0.146	0.060	2.18	80	0	101	10.7	-0.1	101	412	84	71
109	15.955	0.147	0.060	2.17	80	-0.8	101	10.6	-0.1	101	409	83	71
110	16.101	0.146	0.060	2.15	80	-0.59	101	10.5	-0.1	101	406	84	71
111	16.248	0.147	0.060	2.16	80	0	101	10.3	-0.2	101	403	86	72
112	16.393	0.145	0.060	2.16	80	-0.25	100	10.3	0	101	397	87	71
113	16.541	0.148	0.060	2.15	80	-0.4	102	10.2	-0.1	99	393	85	72
114	16.686	0.145	0.060	2.14	80	-1.97	100	10.1	-0.1	99	389	83	72
115	16.833	0.147	0.060	2.14	80	-2.42	101	10.1	0	99	386	85	71
116	16.978	0.145	0.060	2.13	80	-2.48	100	10.0	-0.1	99	384	86	72
117	17.125	0.147	0.060	2.15	80	-2.07	101	9.9	-0.1	99	382	87	72
118	17.270	0.145	0.060	2.16	80	-1.36	100	9.8	-0.1	99	379	86	72
119	17.417	0.147	0.060	2.16	80	-1.29	101	9.6	-0.2	98	378	83	71
120	17.562	0.145	0.060	2.14	80	-2.42	100	9.6	0	98	377	84	72
121	17.708	0.146	0.060	2.15	80	-0.01	100	9.5	-0.1	98	374	86	72
122	17.854	0.146	0.060	2.15	80	0	101	9.4	-0.1	99	372	87	72
123	18.000	0.146	0.060	2.12	80	-2.54	101	9.3	-0.1	99	370	85	71
124	18.146	0.146	0.060	2.14	80	-2.49	100	9.2	-0.1	98	370	84	72
125	18.291	0.145	0.060	2.14	80	-2.44	100	9.1	-0.1	98	368	83	71
126	18.438	0.147	0.060	2.13	80	-1.98	101	9.1	0	97	366	85	72
127	18.583	0.145	0.060	2.14	80	0	100	9.0	-0.1	98	365	86	72
128	18.730	0.147	0.060	2.13	81	-2.44	101	8.8	-0.2	97	365	87	72
129	18.875	0.145	0.060	2.14	80	0	100	8.7	-0.1	97	362	85	72
130	19.022	0.147	0.060	2.14	80	-0.4	101	8.7	0	98	362	83	72
131	19.166	0.144	0.060	2.14	81	0	99	8.6	-0.1	97	361	84	72

BOX A TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: I2500
Run #: 2

Job #: 18-434
Tracking #: 0014
Technician: SJB
Date: 10/30/2018

	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	19.313	0.147	0.060	2.10	81	-2.31	101	8.7	0.1	96	361	85	72
133	19.457	0.144	0.060	2.15	80	-1.5	99	8.5	-0.2	97	359	87	72
134	19.605	0.148	0.060	2.13	80	-0.58	102	8.4	-0.1	97	360	86	72
135	19.749	0.144	0.060	2.13	80	-2.64	99	8.3	-0.1	96	360	84	71
136	19.896	0.147	0.060	2.12	80	-1.06	101	8.2	-0.1	96	360	83	72
137	20.040	0.144	0.060	2.14	81	-0.63	99	8.1	-0.1	96	359	84	72
138	20.188	0.148	0.060	2.11	81	-1.69	101	8.0	-0.1	96	359	86	72
139	20.331	0.143	0.060	2.10	81	-2.57	98	8.0	0	96	358	87	72
140	20.479	0.148	0.060	2.12	81	-2.43	101	7.9	-0.1	96	358	85	72
141	20.622	0.143	0.060	2.12	81	-2.65	98	7.8	-0.1	96	358	83	72
142	20.770	0.148	0.060	2.10	81	-2.44	101	7.7	-0.1	96	359	84	72
143	20.913	0.143	0.060	2.10	81	-2.63	98	7.6	-0.1	96	358	85	72
144	21.060	0.147	0.060	2.10	81	0	101	7.5	-0.1	96	359	87	72
145	21.202	0.142	0.060	2.12	81	0	97	7.5	0	96	359	86	72
146	21.351	0.149	0.060	2.09	81	-2.36	102	7.4	-0.1	96	358	84	72
147	21.492	0.141	0.060	2.09	81	-2.06	97	7.3	-0.1	96	357	83	73
148	21.640	0.148	0.060	2.10	81	-1.42	101	7.2	-0.1	96	357	85	72
149	21.783	0.143	0.060	2.17	81	-0.36	98	7.2	0	96	356	87	72
150	21.933	0.150	0.060	2.18	81	0	103	7.1	-0.1	96	356	86	72
151	22.077	0.144	0.060	2.18	81	-2.54	99	7.0	-0.1	96	356	84	72
152	22.227	0.150	0.060	2.18	81	-0.13	103	6.9	-0.1	96	356	83	73
153	22.371	0.144	0.060	2.16	81	-2.5	99	6.9	0	96	356	85	73
154	22.521	0.150	0.060	2.15	81	-0.76	103	6.7	-0.2	95	356	87	73
155	22.665	0.144	0.060	2.16	81	-2.73	99	6.7	0	96	356	87	73
156	22.815	0.150	0.060	2.17	81	-1.21	103	6.7	0	95	356	85	73
157	22.959	0.144	0.060	2.15	81	-1.03	99	6.6	-0.1	95	356	83	73
158	23.109	0.150	0.060	2.15	81	-2.6	103	6.5	-0.1	95	355	85	73
159	23.254	0.145	0.060	2.16	81	-2.34	99	6.5	0	96	355	86	72
160	23.404	0.150	0.060	2.16	81	-2.31	103	6.4	-0.1	95	356	87	72
161	23.547	0.143	0.060	2.15	81	-2.65	98	6.3	-0.1	96	355	85	72
162	23.697	0.150	0.060	2.16	81	-2.65	103	6.3	0	96	355	84	73
163	23.841	0.144	0.060	2.15	81	0	99	6.2	-0.1	96	355	83	73
164	23.990	0.149	0.060	2.14	81	0	102	6.1	-0.1	95	352	85	72

BOX A TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: I2500
Run #: 2

Job #: 18-434
Tracking #: 0014
Technician: SJB
Date: 10/30/2018

	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	24.134	0.144	0.060	2.17	81	-0.32	99	6.1	0	95	351	87	72
166	24.284	0.150	0.060	2.17	81	-1.91	103	6.0	-0.1	95	348	86	72
167	24.427	0.143	0.060	2.16	81	-1.42	98	6.1	0.1	95	346	84	73
168	24.577	0.150	0.060	2.14	81	-2.76	103	5.8	-0.3	95	342	83	73
169	24.721	0.144	0.060	2.14	82	-0.09	98	5.9	0.1	94	339	85	72
170	24.870	0.149	0.060	2.16	82	-2.35	102	5.9	0	94	337	86	72
171	25.014	0.144	0.060	2.14	82	-0.04	98	5.7	-0.2	94	334	87	73
172	25.164	0.150	0.060	2.15	82	-2.3	102	5.8	0.1	94	332	85	72
173	25.307	0.143	0.060	2.15	81	-2.28	98	5.7	-0.1	93	330	83	73
174	25.457	0.150	0.060	2.14	82	0	102	5.7	0	93	327	83	73
175	25.600	0.143	0.060	2.14	82	-0.01	98	5.6	-0.1	93	325	85	73
176	25.750	0.150	0.060	2.13	82	-1.82	102	5.6	0	93	323	87	73
177	25.894	0.144	0.060	2.14	81	-1.57	98	5.6	0	93	320	86	72
178	26.043	0.149	0.060	2.15	82	-1.83	102	5.6	0	93	320	84	73
179	26.187	0.144	0.060	2.15	81	0	98	5.5	-0.1	93	317	84	72
180	26.336	0.149	0.060	2.15	82	-2.71	102	5.4	-0.1	93	317	85	73
181	26.480	0.144	0.060	2.14	82	-1.17	98	5.4	0	93	315	87	72
182	26.629	0.149	0.060	2.14	82	-1.54	102	5.4	0	93	314	86	73
183	26.773	0.144	0.060	2.16	82	-2.36	98	5.3	-0.1	93	314	84	72
184	26.923	0.150	0.060	2.15	82	-1.65	102	5.3	0	93	314	83	73
185	27.066	0.143	0.060	2.15	82	-0.96	97	5.3	0	92	316	84	72
186	27.216	0.150	0.060	2.16	82	-2.09	102	5.3	0	92	317	86	72
187	27.359	0.143	0.060	2.15	82	-0.17	97	5.3	0	92	318	87	73
188	27.509	0.150	0.060	2.15	82	-1.18	102	5.2	-0.1	92	320	85	73
189	27.652	0.143	0.060	2.15	82	-2.35	97	5.2	0	92	322	84	73
190	27.802	0.150	0.060	2.14	82	-1.27	102	5.2	0	92	322	84	73
191	27.946	0.144	0.060	2.14	82	-2.38	98	5.1	-0.1	93	323	85	72
192	28.095	0.149	0.060	2.14	82	-1.27	102	5.1	0	92	322	87	72
193	28.239	0.144	0.060	2.15	82	-2.46	98	5.1	0	92	323	85	72
194	28.388	0.149	0.060	2.15	82	-0.13	101	5.0	-0.1	91	322	83	74
195	28.532	0.144	0.060	2.14	81	-0.69	98	5.1	0.1	92	321	83	72
196	28.681	0.149	0.060	2.14	82	-1.23	101	5.0	-0.1	91	321	85	73
197	28.825	0.144	0.060	2.14	82	-1.92	98	5.0	0	92	320	87	73

BOX A TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: I2500
Run #: 2

Job #: 18-434
Tracking #: 0014
Technician: SJB
Date: 10/30/2018

	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	28.975	0.150	0.060	2.13	82	-1.14	102	5.0	0	92	320	86	72
199	29.118	0.143	0.060	2.15	82	-2.17	97	5.0	0	92	319	84	72
200	29.268	0.150	0.060	2.16	82	-2.56	102	4.9	-0.1	92	319	83	73
201	29.412	0.144	0.060	2.14	82	-1.19	98	4.9	0	92	319	84	72
202	29.561	0.149	0.060	2.13	82	-0.13	102	4.7	-0.2	92	318	86	73
203	29.704	0.143	0.060	2.14	82	-0.71	97	4.8	0.1	92	318	88	73
204	29.854	0.150	0.060	2.14	82	-0.07	102	4.9	0.1	91	316	85	72
205	29.998	0.144	0.060	2.14	82	-2	98	4.8	-0.1	91	316	83	73
206	30.148	0.150	0.060	2.14	82	0	102	4.8	0	91	314	83	72
207	30.291	0.143	0.060	2.13	82	-1.33	97	4.8	0	91	314	84	73
208	30.441	0.150	0.060	2.14	82	-2.05	102	4.8	0	91	312	86	72
209	30.584	0.143	0.060	2.15	82	-2.69	97	4.7	-0.1	91	311	86	72
210	30.734	0.150	0.060	2.15	82	-2.23	102	4.6	-0.1	91	310	85	72
211	30.877	0.143	0.060	2.14	82	-1.71	97	4.7	0.1	91	309	83	72
212	31.027	0.150	0.060	2.14	82	-0.27	102	4.7	0	91	308	84	73
213	31.171	0.144	0.060	2.15	82	-2.67	98	4.6	-0.1	90	308	85	72
214	31.320	0.149	0.060	2.15	82	-0.07	101	4.6	0	91	306	87	72
215	31.464	0.144	0.060	2.15	82	-1.76	98	4.6	0	91	305	85	72
216	31.614	0.150	0.060	2.16	83	-1.53	102	4.6	0	91	305	84	72
217	31.757	0.143	0.060	2.15	82	-2.32	97	4.6	0	90	305	84	73
218	31.907	0.150	0.060	2.15	82	-2.38	102	4.5	-0.1	90	305	85	72
219	32.050	0.143	0.060	2.14	82	-1.62	97	4.5	0	90	304	87	73
220	32.200	0.150	0.060	2.14	82	-1.37	102	4.4	-0.1	90	304	86	72
221	32.344	0.144	0.060	2.15	82	-0.61	98	4.5	0.1	90	304	84	72
222	32.493	0.149	0.060	2.14	82	-2.39	101	4.5	0	90	302	84	73
223	32.637	0.144	0.060	2.14	82	-1.35	98	4.4	-0.1	91	301	84	72
224	32.786	0.149	0.060	2.15	82	-2.51	101	4.4	0	90	300	86	73
225	32.930	0.144	0.060	2.14	82	-2.45	98	4.4	0	90	299	86	72
226	33.080	0.150	0.060	2.14	82	-2.58	102	4.4	0	90	299	84	73
227	33.223	0.143	0.060	2.14	82	-1.34	97	4.4	0	90	297	83	73
228	33.373	0.150	0.060	2.14	82	-1.44	102	4.3	-0.1	90	296	84	73
229	33.516	0.143	0.060	2.14	82	-0.32	97	4.3	0	90	295	86	72
230	33.666	0.150	0.060	2.14	82	-0.19	102	4.3	0	89	294	87	72

BOX A TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: I2500
Run #: 2

Job #: 18-434
Tracking #: 0014
Technician: SJB
Date: 10/30/2018

	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	33.810	0.144	0.060	2.14	83	-2.46	98	4.3	0	90	294	84	72
232	33.959	0.149	0.060	2.14	83	-2.17	101	4.3	0	90	296	83	72
233	34.103	0.144	0.060	2.14	82	-0.07	98	4.2	-0.1	90	296	84	73
234	34.252	0.149	0.060	2.14	83	-2.51	101	4.2	0	89	298	86	72
235	34.396	0.144	0.060	2.15	82	-0.09	98	4.2	0	90	299	87	72
236	34.546	0.150	0.060	2.17	82	-2.82	102	4.2	0	90	299	85	72
237	34.689	0.143	0.060	2.15	83	-2.41	97	4.1	-0.1	90	299	83	72
238	34.839	0.150	0.060	2.14	83	-2.69	102	4.0	-0.1	90	300	83	73
239	34.982	0.143	0.060	2.15	82	-0.09	97	4.1	0.1	90	299	85	72
240	35.132	0.150	0.060	2.13	82	-0.41	102	4.1	0	90	298	87	73
241	35.275	0.143	0.060	2.15	83	-0.44	97	4.1	0	89	297	86	72
242	35.425	0.150	0.060	2.15	83	-2.06	102	4.0	-0.1	90	298	84	72
243	35.569	0.144	0.060	2.13	83	-2.25	98	4.0	0	90	297	83	73
244	35.718	0.149	0.060	2.13	83	-2.43	101	4.0	0	90	297	84	72
245	35.862	0.144	0.060	2.15	82	-0.47	98	4.0	0	90	296	86	73
246	36.011	0.149	0.060	2.14	83	-0.1	101	4.0	0	90	296	87	73
247	36.155	0.144	0.060	2.15	83	-2.68	98	3.9	-0.1	89	296	85	72
248	36.304	0.149	0.060	2.14	83	-0.25	101	3.9	0	90	294	83	72
249	36.448	0.144	0.060	2.14	83	-0.02	98	3.9	0	89	294	84	72
250	36.598	0.150	0.060	2.15	82	-0.19	102	3.9	0	89	293	86	73
251	36.741	0.143	0.060	2.15	83	-1.49	97	3.8	-0.1	90	293	86	73
252	36.890	0.149	0.060	2.13	83	-0.01	101	3.8	0	90	292	85	73
253	37.034	0.144	0.060	2.15	83	-1.94	98	3.8	0	89	291	83	72
254	37.184	0.150	0.060	2.14	83	-0.24	102	3.8	0	89	291	84	73
255	37.327	0.143	0.060	2.14	83	-0.41	97	3.8	0	89	291	85	73
256	37.477	0.150	0.060	2.14	83	-1.29	102	3.7	-0.1	90	290	87	72
257	37.620	0.143	0.060	2.15	83	-1.48	97	3.7	0	89	290	86	73
258	37.770	0.150	0.060	2.15	83	-2.11	102	3.6	-0.1	89	290	84	72
259	37.914	0.144	0.060	2.15	83	-1.94	98	3.7	0.1	89	290	83	72
260	38.063	0.149	0.060	2.13	83	-2.36	101	3.7	0	89	289	84	72
261	38.206	0.143	0.060	2.16	83	-0.18	97	3.5	-0.2	89	289	87	72
262	38.356	0.150	0.060	2.13	83	-1.05	102	3.6	0.1	90	289	86	73
263	38.499	0.143	0.060	2.13	83	-2.02	97	3.6	0	89	287	84	72

BOX A TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: I2500
Run #: 2

Job #: 18-434
Tracking #: 0014
Technician: SJB
Date: 10/30/2018

	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	38.649	0.150	0.060	2.14	82	-2.06	102	3.6	0	89	287	83	72
265	38.793	0.144	0.060	2.13	83	-0.69	98	3.6	0	89	287	84	72
266	38.942	0.149	0.060	2.15	83	-0.68	101	3.5	-0.1	89	287	86	72
267	39.085	0.143	0.060	2.13	83	-2.69	97	3.5	0	89	287	86	73
268	39.235	0.150	0.060	2.12	83	-0.1	102	3.5	0	89	287	84	73
269	39.378	0.143	0.060	2.15	83	-0.28	97	3.5	0	89	288	83	72
270	39.528	0.150	0.060	2.13	83	-1.26	102	3.4	-0.1	89	288	84	73
271	39.671	0.143	0.060	2.12	83	-1.39	97	3.4	0	89	290	85	73
272	39.821	0.150	0.060	2.12	83	-2.26	102	3.4	0	89	289	87	72
273	39.964	0.143	0.060	2.14	83	-0.49	97	3.4	0	89	290	85	73
274	40.114	0.150	0.060	2.15	83	-0.13	102	3.3	-0.1	89	289	83	72
275	40.257	0.143	0.060	2.13	83	-1.76	97	3.4	0.1	89	290	83	73
276	40.406	0.149	0.060	2.14	83	-1.04	101	3.2	-0.2	89	289	86	73
277	40.550	0.144	0.060	2.14	83	-2.68	98	3.3	0.1	89	288	87	72
278	40.699	0.149	0.060	2.12	83	-2.5	101	3.3	0	89	286	85	73
279	40.843	0.144	0.060	2.14	83	-2.63	98	3.3	0	89	285	84	72
280	40.992	0.149	0.060	2.15	83	-0.37	101	3.3	0	89	284	83	72
281	41.136	0.144	0.060	2.13	83	-2.6	98	3.2	-0.1	89	284	85	72
282	41.285	0.149	0.060	2.12	83	-2.59	101	3.2	0	89	284	87	72
283	41.429	0.144	0.060	2.13	83	-0.13	98	3.2	0	89	283	86	72
284	41.578	0.149	0.060	2.13	83	-2.29	101	3.2	0	89	282	84	73
285	41.722	0.144	0.060	2.13	83	-0.4	98	3.2	0	89	280	83	73
286	41.871	0.149	0.060	2.11	83	-1.98	101	3.2	0	88	279	85	73
287	42.015	0.144	0.060	2.14	83	-1.3	98	3.1	-0.1	89	279	86	73
288	42.164	0.149	0.060	2.13	82	-0.91	101	3.1	0	88	278	87	72
289	42.308	0.144	0.060	2.14	83	-2.46	98	3.1	0	89	277	85	73
290	42.457	0.149	0.060	2.14	83	-0.09	101	3.1	0	89	275	83	73
291	42.600	0.143	0.060	2.12	83	-0.14	97	3.0	-0.1	89	274	84	72
292	42.750	0.150	0.060	2.13	83	-1.49	102	3.0	0	88	274	85	73
293	42.893	0.143	0.060	2.12	82	-0.36	97	3.0	0	88	273	87	73
294	43.043	0.150	0.060	2.13	83	-0.82	102	3.0	0	89	272	85	73
295	43.187	0.144	0.060	2.14	83	-2.68	98	3.0	0	88	270	84	73
296	43.336	0.149	0.060	2.13	83	-2.04	101	2.8	-0.2	88	270	84	73

BOX A TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: I2500
Run #: 2

Job #: 18-434
Tracking #: 0014
Technician: SJB
Date: 10/30/2018

	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	43.479	0.143	0.060	2.12	83	-0.45	97	3.0	0.2	88	268	86	73
298	43.629	0.150	0.060	2.15	83	-0.12	102	2.9	-0.1	88	268	87	72
299	43.772	0.143	0.060	2.13	83	-0.8	97	2.9	0	88	267	86	72
300	43.922	0.150	0.060	2.14	83	-1.96	102	2.9	0	88	267	84	73
301	44.066	0.144	0.060	2.12	83	-2.36	98	2.9	0	88	267	83	73
302	44.215	0.149	0.060	2.13	83	-0.18	101	2.9	0	88	266	84	73
303	44.358	0.143	0.060	2.13	83	-0.19	97	2.9	0	88	265	86	73
304	44.508	0.150	0.060	2.14	83	-2.66	102	2.8	-0.1	88	266	87	72
305	44.651	0.143	0.060	2.13	83	-0.89	97	2.8	0	88	266	84	72
306	44.801	0.150	0.060	2.14	83	-0.05	102	2.8	0	88	265	83	73
307	44.944	0.143	0.060	2.14	83	-2.56	97	2.8	0	88	265	84	73
308	45.093	0.149	0.060	2.12	83	-2.47	101	2.8	0	88	264	85	73
309	45.237	0.144	0.060	2.13	83	-1.89	98	2.8	0	88	263	87	73
310	45.386	0.149	0.060	2.12	83	-0.6	101	2.7	-0.1	88	264	85	73
311	45.530	0.144	0.060	2.11	83	-0.88	98	2.7	0	88	264	83	73
312	45.679	0.149	0.060	2.12	83	-2.53	101	2.6	-0.1	88	263	84	72
313	45.823	0.144	0.060	2.15	83	-0.38	98	2.7	0.1	88	262	85	73
314	45.972	0.149	0.060	2.13	83	-2.68	101	2.7	0	87	261	87	73
315	46.116	0.144	0.060	2.13	83	-0.19	98	2.7	0	88	262	86	73
316	46.265	0.149	0.060	2.14	83	-2.52	101	2.6	-0.1	88	262	83	74
317	46.409	0.144	0.060	2.15	83	-2.56	98	2.6	0	87	261	83	73
318	46.558	0.149	0.060	2.14	83	-0.1	101	2.6	0	88	259	84	73
319	46.701	0.143	0.060	2.14	82	-0.06	97	2.6	0	87	259	87	73
320	46.850	0.149	0.060	2.15	83	-0.68	101	2.6	0	88	259	86	73
321	46.994	0.144	0.060	2.14	83	-2.64	98	2.5	-0.1	88	259	84	73
322	47.143	0.149	0.060	2.13	83	-0.21	101	2.5	0	88	259	83	73
323	47.287	0.144	0.060	2.13	83	-0.16	98	2.5	0	87	259	84	74
324	47.436	0.149	0.060	2.11	83	-0.99	101	2.5	0	87	258	87	74
325	47.579	0.143	0.060	2.10	83	-1.19	97	2.5	0	88	258	87	73
326	47.728	0.149	0.060	2.13	84	-2.59	101	2.5	0	87	258	85	73
327	47.872	0.144	0.060	2.12	83	-0.22	98	2.4	-0.1	87	258	83	73
328	48.021	0.149	0.060	2.12	83	-1.91	101	2.4	0	87	258	83	73
329	48.165	0.144	0.060	2.12	83	-0.14	98	2.4	0	88	258	85	73

BOX A TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: I2500
Run #: 2

Job #: 18-434
Tracking #: 0014
Technician: SJB
Date: 10/30/2018

	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	48.314	0.149	0.060	2.15	83	-2.57	101	2.4	0	88	258	87	73
331	48.458	0.144	0.060	2.15	83	-0.48	98	2.4	0	87	258	86	73
332	48.607	0.149	0.060	2.15	83	-1.33	101	2.4	0	87	257	84	73
333	48.751	0.144	0.060	2.14	83	-2.65	98	2.4	0	87	258	83	73
334	48.900	0.149	0.060	2.13	83	-0.3	101	2.3	-0.1	88	257	84	74
335	49.044	0.144	0.060	2.13	83	-2.49	98	2.3	0	87	257	86	73
336	49.193	0.149	0.060	2.14	83	-0.18	101	2.3	0	88	257	86	73
337	49.337	0.144	0.060	2.14	83	-2.63	98	2.3	0	87	257	84	73
338	49.486	0.149	0.060	2.14	83	-1.02	101	2.3	0	87	256	83	73
339	49.630	0.144	0.060	2.14	83	-0.2	98	2.2	-0.1	87	256	84	74
340	49.778	0.148	0.060	2.13	83	-2.51	100	2.3	0.1	87	256	85	73
341	49.923	0.145	0.060	2.13	83	-2.73	98	2.2	-0.1	87	256	87	73
342	50.071	0.148	0.060	2.13	83	-0.52	100	2.2	0	87	256	86	74
343	50.216	0.145	0.060	2.14	84	-0.12	98	2.2	0	88	256	83	73
344	50.364	0.148	0.060	2.13	83	-2.37	100	2.2	0	87	256	84	74
345	50.508	0.144	0.060	2.13	83	-0.18	98	2.1	-0.1	87	256	85	73
346	50.657	0.149	0.060	2.13	83	-2.5	101	2.1	0	86	256	87	73
347	50.801	0.144	0.060	2.12	83	-1.35	98	2.1	0	87	256	86	74
348	50.950	0.149	0.060	2.13	83	-1.42	101	2.1	0	87	256	84	73
349	51.094	0.144	0.060	2.14	83	-0.8	98	2.1	0	87	256	84	74
350	51.243	0.149	0.060	2.13	83	-2.48	101	2.1	0	87	257	85	74
351	51.387	0.144	0.060	2.13	83	-0.19	98	2.0	-0.1	87	255	87	74
352	51.536	0.149	0.060	2.12	83	-2.42	101	2.0	0	87	255	87	74
353	51.680	0.144	0.060	2.10	83	-0.36	98	2.0	0	87	256	84	74
354	51.829	0.149	0.060	2.13	83	-2.56	101	2.0	0	87	255	84	74
355	51.973	0.144	0.060	2.12	83	-0.05	98	2.0	0	87	256	84	73
356	52.122	0.149	0.060	2.13	83	-0.83	101	2.0	0	87	256	85	74
357	52.266	0.144	0.060	2.12	83	-1.7	98	1.9	-0.1	87	256	88	74
358	52.414	0.148	0.060	2.13	83	-0.1	100	1.9	0	87	257	85	74
359	52.559	0.145	0.060	2.13	83	-2.7	98	1.9	0	87	257	84	74
360	52.707	0.148	0.060	2.14	83	-0.64	100	1.9	0	86	257	83	74
361	52.852	0.145	0.060	2.13	83	-1.49	98	1.9	0	87	256	85	74
362	53.000	0.148	0.060	2.11	83	-0.01	100	1.8	-0.1	87	256	87	74

BOX A TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: I2500
Run #: 2

Job #: 18-434
Tracking #: 0014
Technician: SJB
Date: 10/30/2018

	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	53.144	0.144	0.060	2.10	83	-0.62	98	1.8	0	87	257	86	73
364	53.293	0.149	0.060	2.13	83	-2.37	101	1.7	-0.1	87	256	84	73
365	53.437	0.144	0.060	2.11	83	-0.97	98	1.8	0.1	87	257	83	74
366	53.586	0.149	0.060	2.12	83	-2.67	101	1.8	0	87	257	84	75
367	53.730	0.144	0.060	2.11	83	-2.65	97	1.8	0	86	257	87	74
368	53.878	0.148	0.060	2.12	83	-0.2	100	1.8	0	87	257	86	73
369	54.023	0.145	0.060	2.13	83	-2.71	98	1.8	0	87	257	85	73
370	54.171	0.148	0.060	2.14	83	-0.01	100	1.7	-0.1	87	257	83	74
371	54.316	0.145	0.060	2.13	83	-2.26	98	1.7	0	87	258	84	74
372	54.464	0.148	0.060	2.13	83	-2.11	100	1.7	0	87	259	86	74
373	54.609	0.145	0.060	2.14	83	-0.07	98	1.7	0	87	259	87	74
374	54.757	0.148	0.060	2.12	83	-0.02	100	1.7	0	86	258	85	73
375	54.901	0.144	0.060	2.11	83	-0.81	97	1.7	0	86	256	83	72
376	55.049	0.148	0.060	2.12	83	-0.91	100	1.7	0	87	256	84	73
377	55.194	0.145	0.060	2.13	83	-0.42	98	1.6	-0.1	87	256	85	73
378	55.342	0.148	0.060	2.13	83	-1.87	100	1.6	0	86	255	87	73
379	55.487	0.145	0.060	2.12	83	-2.75	98	1.6	0	86	255	86	74
380	55.635	0.148	0.060	2.13	83	-1.82	100	1.6	0	87	254	83	74
381	55.780	0.145	0.060	2.12	83	-2.58	98	1.6	0	87	254	83	74
382	55.928	0.148	0.060	2.12	83	-2.67	100	1.6	0	86	255	85	74
383	56.073	0.145	0.060	2.13	83	-1.33	98	1.5	-0.1	86	254	87	73
384	56.220	0.147	0.060	2.13	83	-0.03	100	1.5	0	87	255	86	74
385	56.366	0.146	0.060	2.12	83	-0.58	99	1.5	0	87	255	84	74
386	56.513	0.147	0.060	2.13	83	-0.34	100	1.5	0	87	255	83	73
387	56.658	0.145	0.060	2.13	83	-2.69	98	1.5	0	86	254	84	73
388	56.806	0.148	0.060	2.13	83	-0.3	100	1.5	0	87	255	86	74
389	56.951	0.145	0.060	2.13	83	-2.17	98	1.5	0	86	254	87	73
390	57.099	0.148	0.060	2.13	83	-0.03	100	1.4	-0.1	86	254	86	74
391	57.244	0.145	0.060	2.12	82	-2.24	98	1.4	0	86	253	83	74
392	57.392	0.148	0.060	2.13	83	-1.52	100	1.4	0	87	253	84	74
393	57.537	0.145	0.060	2.13	83	-1.99	98	1.3	-0.1	86	253	86	74
394	57.684	0.147	0.060	2.12	83	-0.19	99	1.4	0.1	86	252	88	74
395	57.830	0.146	0.060	2.13	83	-2.56	99	1.4	0	86	252	86	74

BOX A TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: I2500
Run #: 2

Job #: 18-434
Tracking #: 0014
Technician: SJB
Date: 10/30/2018

	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	57.977	0.147	0.060	2.11	83	-1.49	99	1.3	-0.1	86	251	83	74
397	58.122	0.145	0.060	2.11	84	-2.35	98	1.3	0	86	250	84	74
398	58.270	0.148	0.060	2.10	83	-0.02	100	1.3	0	86	250	85	73
399	58.415	0.145	0.060	2.11	83	-2.71	98	1.3	0	86	249	87	74
400	58.562	0.147	0.060	2.12	83	-0.9	100	1.3	0	87	249	87	73
401	58.708	0.146	0.060	2.13	83	-1.06	99	1.3	0	86	248	85	73
402	58.855	0.147	0.060	2.12	83	-2.67	99	1.3	0	86	248	84	74
403	59.001	0.146	0.060	2.12	83	-2.67	99	1.2	-0.1	86	248	84	73
404	59.148	0.147	0.060	2.13	83	-1.59	99	1.2	0	86	247	86	73
405	59.294	0.146	0.060	2.12	83	-0.08	99	1.2	0	86	247	87	74
406	59.440	0.146	0.060	2.13	83	-1.1	99	1.2	0	86	247	84	75
407	59.587	0.147	0.060	2.14	83	-0.33	99	1.2	0	86	247	83	73
408	59.733	0.146	0.060	2.13	83	-0.84	99	1.2	0	86	247	84	73
409	59.879	0.146	0.060	2.13	83	-0.26	99	1.2	0	86	247	86	74
410	60.026	0.147	0.060	2.12	83	-1.38	99	1.2	0	86	246	87	74
411	60.172	0.146	0.060	2.12	84	-2.05	99	1.1	-0.1	86	245	85	74
412	60.318	0.146	0.060	2.14	83	-0.7	99	1.1	0	86	244	84	73
413	60.464	0.146	0.060	2.12	84	-2.61	99	1.1	0	85	244	83	73
414	60.610	0.146	0.060	2.12	83	-2.71	99	1.1	0	86	244	85	74
415	60.757	0.147	0.060	2.13	83	-2.45	99	1.1	0	86	243	87	74
416	60.903	0.146	0.060	2.12	83	-1.65	99	1.1	0	86	244	86	73
417	61.050	0.147	0.060	2.12	83	-0.13	99	1.1	0	86	243	84	74
418	61.197	0.147	0.060	2.13	83	-0.06	99	1.0	-0.1	86	242	83	74
419	61.343	0.146	0.060	2.13	83	-0.05	99	1.0	0	86	242	85	74
420	61.489	0.146	0.060	2.11	83	-2.7	99	0.9	-0.1	86	241	86	74
421	61.636	0.147	0.060	2.12	83	-2.68	99	1.0	0.1	86	241	87	73
422	61.782	0.146	0.060	2.11	83	-0.5	99	1.0	0	85	241	85	73
423	61.930	0.148	0.060	2.13	84	-0.63	100	1.0	0	85	241	83	74
424	62.076	0.146	0.060	2.15	84	-2.14	99	1.0	0	85	241	83	74
425	62.222	0.146	0.060	2.13	83	-2.5	99	1.0	0	86	240	85	74
426	62.368	0.146	0.060	2.13	84	-1.13	99	0.9	-0.1	86	240	87	73
427	62.515	0.147	0.060	2.13	83	-2.37	99	0.9	0	85	240	86	73
428	62.661	0.146	0.060	2.10	83	-0.71	99	0.9	0	86	240	84	74

BOX A TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: I2500
Run #: 2

Job #: 18-434
Tracking #: 0014
Technician: SJB
Date: 10/30/2018

	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	62.808	0.147	0.060	2.13	83	-1.6	99	0.9	0	85	240	83	73
430	62.954	0.146	0.060	2.12	83	-1.36	99	0.9	0	86	240	84	74
431	63.101	0.147	0.060	2.12	83	-0.85	99	0.9	0	85	240	86	74
432	63.247	0.146	0.060	2.12	83	-2.69	99	0.9	0	86	240	87	74
433	63.394	0.147	0.060	2.12	83	-2.57	99	0.9	0	85	240	85	72
434	63.540	0.146	0.060	2.13	83	-0.1	99	0.8	-0.1	86	240	83	72
435	63.687	0.147	0.060	2.14	83	-1.53	99	0.8	0	85	240	84	73
436	63.832	0.145	0.060	2.13	83	-2.4	98	0.7	-0.1	85	240	85	73
437	63.980	0.148	0.060	2.11	83	-0.41	100	0.8	0.1	85	240	87	73
438	64.125	0.145	0.060	2.13	83	-0.27	98	0.9	0.1	86	240	86	73
439	64.273	0.148	0.060	2.12	83	-1.31	100	0.9	0	85	239	84	73
440	64.418	0.145	0.060	2.13	83	-0.14	98	0.8	-0.1	85	239	83	73
441	64.566	0.148	0.060	2.13	83	-0.21	100	0.9	0.1	85	239	85	73
442	64.711	0.145	0.060	2.13	83	-0.09	98	0.8	-0.1	85	238	87	74
443	64.859	0.148	0.060	2.12	83	-0.1	100	0.7	-0.1	85	238	86	74
444	65.004	0.145	0.060	2.13	83	-2.74	98	0.7	0	85	238	84	74
445	65.152	0.148	0.060	2.13	84	-2.51	100	0.7	0	85	238	84	74
446	65.297	0.145	0.060	2.14	83	-0.09	98	0.7	0	85	237	85	74
447	65.445	0.148	0.060	2.13	83	-2.5	100	0.8	0.1	85	237	86	74
448	65.590	0.145	0.060	2.11	83	-1.67	98	0.7	-0.1	85	236	87	74
449	65.738	0.148	0.060	2.14	83	-0.12	100	0.7	0	85	236	85	74
450	65.883	0.145	0.060	2.14	83	0	98	0.7	0	85	236	83	73
451	66.031	0.148	0.060	2.12	83	-0.04	100	0.6	-0.1	85	235	84	73
452	66.176	0.145	0.060	2.13	83	-0.14	98	0.6	0	85	235	86	74
453	66.323	0.147	0.060	2.14	83	-0.44	99	0.6	0	85	234	87	74
454	66.469	0.146	0.060	2.12	83	-0.39	99	0.6	0	84	234	85	73
455	66.616	0.147	0.060	2.13	83	-1.52	99	0.6	0	85	233	84	73
456	66.761	0.145	0.060	2.10	83	-2.75	98	0.5	-0.1	84	234	84	74
457	66.909	0.148	0.060	2.11	83	-1.23	100	0.6	0.1	84	234	86	73
458	67.054	0.145	0.060	2.11	83	-0.39	98	0.5	-0.1	85	232	87	74
459	67.202	0.148	0.060	2.11	83	-0.21	100	0.5	0	84	233	86	74
460	67.347	0.145	0.060	2.11	83	-1.98	98	0.5	0	85	232	84	74
461	67.495	0.148	0.060	2.10	83	-2.65	100	0.6	0.1	84	231	84	74

BOX A TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: I2500
Run #: 2

Job #: 18-434
Tracking #: 0014
Technician: SJB
Date: 10/30/2018

	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	67.640	0.145	0.060	2.13	83	-0.82	98	0.5	-0.1	84	231	86	73
463	67.788	0.148	0.060	2.13	83	-2.15	100	0.5	0	85	230	87	73
464	67.932	0.144	0.060	2.12	83	-0.09	97	0.4	-0.1	84	231	86	74
465	68.081	0.149	0.060	2.13	83	-1.04	101	0.4	0	85	230	84	74
466	68.225	0.144	0.060	2.11	83	-0.49	97	0.5	0.1	84	230	83	74
467	68.374	0.149	0.060	2.15	83	-2.58	101	0.4	-0.1	84	230	85	74
468	68.518	0.144	0.060	2.13	83	-0.74	97	0.4	0	84	229	87	74
469	68.666	0.148	0.060	2.11	83	-2.83	100	0.4	0	85	229	87	73
470	68.811	0.145	0.060	2.13	83	-2.46	98	0.4	0	84	229	85	73
471	68.960	0.149	0.060	2.14	83	-0.1	101	0.4	0	84	229	83	75
472	69.104	0.144	0.060	2.16	83	-2.76	97	0.4	0	84	229	84	73
473	69.253	0.149	0.060	2.13	83	-2.37	101	0.3	-0.1	84	228	86	74
474	69.397	0.144	0.060	2.14	83	-0.9	97	0.3	0	84	228	88	73
475	69.546	0.149	0.060	2.13	83	-0.24	101	0.3	0	85	228	86	74
476	69.691	0.145	0.060	2.12	83	-2.76	98	0.3	0	84	227	84	73
477	69.839	0.148	0.060	2.13	83	-1.73	100	0.3	0	84	228	84	74
478	69.984	0.145	0.060	2.14	83	-0.04	98	0.3	0	84	227	86	73
479	70.132	0.148	0.060	2.14	83	-2.76	100	0.3	0	84	228	87	73
480	70.277	0.145	0.060	2.10	83	-0.18	98	0.3	0	84	228	86	74
481	70.425	0.148	0.060	2.13	83	-0.39	100	0.2	-0.1	84	227	84	74
482	70.570	0.145	0.060	2.11	83	-1.86	98	0.2	0	84	226	84	73
483	70.718	0.148	0.060	2.11	83	-2.69	100	0.2	0	84	226	85	74
484	70.863	0.145	0.060	2.14	83	-2.25	98	0.2	0	84	225	87	75
485	71.011	0.148	0.060	2.13	83	-0.44	100	0.2	0	84	225	87	74
486	71.156	0.145	0.060	2.13	83	-2.61	98	0.2	0	84	224	84	73
487	71.304	0.148	0.060	2.14	83	-2.28	100	0.2	0	84	224	84	72
488	71.449	0.145	0.060	2.12	83	-0.03	98	0.2	0	84	224	85	74
489	71.598	0.149	0.060	2.12	83	-0.85	101	0.2	0	84	224	87	74
490	71.742	0.144	0.060	2.13	83	-0.83	97	0.1	-0.1	84	224	87	74
491	71.891	0.149	0.060	2.12	83	-2.63	101	0.1	0	84	224	85	74
492	72.035	0.144	0.060	2.13	83	-2.7	97	0.1	0	84	224	83	73
493	72.184	0.149	0.060	2.13	83	-1.07	101	0.1	0	84	225	84	73
494	72.328	0.144	0.060	2.11	83	-1.3	97	0.1	0	84	224	85	74

BOX A TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: I2500
Run #: 2

Job #: 18-434
Tracking #: 0014
Technician: SJB
Date: 10/30/2018

	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	72.477	0.149	0.060	2.12	83	-0.1	101	0.1	0	84	224	87	74
496	72.621	0.144	0.060	2.13	83	-2.32	97	0.1	0	83	223	86	74
497	72.770	0.149	0.060	2.13	83	-0.87	101	0.1	0	83	224	84	73
498	72.914	0.144	0.060	2.14	83	-2.7	97	0.1	0	83	223	84	74
499	73.063	0.149	0.060	2.13	83	-2.58	101	0.0	-0.1	84	223	85	74
Avg/Tot	73.063	0.146	0.060	2.15	81	-1.31	100			93	325	85	72.4

BOX B TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: I2500
Run #: 2

Job #: 18-434
Tracking #: 0014
Technician: SJB
Date: 10/30/2018

	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	0.001		0.00	72	-1		86	0.000	6.97	0.11
1	0.120	0.119	2.22	72	-1.51	87	85	-0.060	5.97	0.10
2	0.240	0.120	2.21	72	-2.74	87	85	-0.060	6.51	0.23
3	0.381	0.141	2.20	72	-0.47	103	85	-0.080	7.82	0.28
4	0.523	0.142	2.19	72	-0.7	104	85	-0.080	8.89	0.26
5	0.664	0.141	2.18	72	-2.67	103	85	-0.080	11.05	0.17
6	0.805	0.141	2.19	73	-1.95	103	86	-0.070	12.20	0.09
7	0.948	0.143	2.17	73	-2.65	103	86	-0.070	13.36	0.15
8	1.087	0.139	2.18	73	-0.96	100	85	-0.070	7.02	0.14
9	1.232	0.145	2.16	73	-1.68	105	85	-0.060	6.46	0.06
10	1.370	0.138	2.16	74	-0.5	99	85	-0.060	6.52	0.08
11	1.513	0.143	2.15	74	-2.56	103	85	-0.060	6.83	0.10
12	1.654	0.141	2.17	74	-1	101	86	-0.070	7.24	0.15
13	1.796	0.142	2.16	74	-2.39	102	86	-0.070	7.82	0.18
14	1.936	0.140	2.15	74	-1.12	100	85	-0.080	8.83	0.31
15	2.076	0.140	2.15	75	-0.93	100	85	-0.070	9.85	0.42
16	2.220	0.144	2.15	75	-0.85	103	85	-0.090	9.65	0.46
17	2.359	0.139	2.15	76	-2.76	100	85	-0.080	10.07	0.49
18	2.503	0.144	2.15	76	-1.85	103	86	-0.070	10.06	0.51
19	2.641	0.138	2.14	76	-2.28	99	86	-0.060	10.47	0.56
20	2.784	0.143	2.13	77	-2.64	102	86	-0.070	10.77	0.60
21	2.925	0.141	2.15	77	-2.66	101	85	-0.070	10.64	0.57
22	3.067	0.142	2.15	77	-1.94	102	85	-0.070	10.15	0.55
23	3.209	0.142	2.24	77	-1.55	102	85	-0.080	10.53	0.53
24	3.353	0.144	2.24	78	-2.62	103	85	-0.090	10.58	0.53
25	3.498	0.145	2.23	78	-2.68	104	86	-0.070	10.76	0.52
26	3.642	0.144	2.25	79	-2.51	103	86	-0.070	11.03	0.54
27	3.789	0.147	2.24	79	-0.56	105	85	-0.080	10.95	0.57
28	3.932	0.143	2.24	79	-2.3	102	85	-0.080	11.06	0.59
29	4.078	0.146	2.25	80	-0.65	104	85	-0.080	11.27	0.57
30	4.222	0.144	2.25	80	-0.55	103	85	-0.070	11.64	0.59
31	4.369	0.147	2.23	80	-0.8	105	86	-0.080	12.20	0.52

BOX B TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: I2500
Run #: 2

Job #: 18-434
Tracking #: 0014
Technician: SJB
Date: 10/30/2018

	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	4.512	0.143	2.25	80	-0.55	102	86	-0.070	12.45	0.51
33	4.659	0.147	2.24	81	-0.59	105	86	-0.080	13.15	0.33
34	4.802	0.143	2.24	81	-1.19	102	85	-0.080	15.39	0.28
35	4.949	0.147	2.23	82	-2.82	105	85	-0.070	16.98	2.70
36	5.091	0.142	2.22	82	-2.55	101	85	-0.080	17.01	2.66
37	5.239	0.148	2.22	82	-2.86	105	85	-0.070	16.32	0.99
38	5.380	0.141	2.22	82	-2.58	100	86	-0.080	15.57	0.26
39	5.528	0.148	2.20	83	-0.75	105	86	-0.070	13.62	0.09
40	5.670	0.142	2.22	83	-1.92	101	86	-0.080	11.43	0.23
41	5.818	0.148	2.21	84	-2.34	105	85	-0.080	11.15	0.37
42	5.961	0.143	2.22	84	-0.66	101	84	-0.080	11.63	0.46
43	6.108	0.147	2.20	84	-1.68	104	85	-0.070	13.08	0.22
44	6.251	0.143	2.21	84	-2.56	101	86	-0.080	14.44	0.08
45	6.399	0.148	2.23	85	-2.68	105	86	-0.080	15.58	0.17
46	6.543	0.144	2.22	85	-0.68	102	86	-0.070	16.29	0.40
47	6.690	0.147	2.24	85	-1.08	104	86	-0.070	16.59	0.88
48	6.833	0.143	2.20	86	-0.77	101	84	-0.070	16.75	1.13
49	6.979	0.146	2.22	86	-1.63	103	84	-0.080	16.49	0.87
50	7.124	0.145	2.22	86	-0.59	102	85	-0.070	16.64	0.70
51	7.269	0.145	2.21	86	-1.98	102	86	-0.070	16.71	0.47
52	7.415	0.146	2.21	86	-0.72	103	86	-0.070	17.13	0.28
53	7.559	0.144	2.21	87	-1.17	101	86	-0.060	16.84	0.09
54	7.705	0.146	2.21	87	-2.77	103	85	-0.070	16.06	0.03
55	7.849	0.144	2.20	87	-0.95	101	85	-0.070	15.14	0.09
56	7.995	0.146	2.20	87	-0.61	103	85	-0.060	14.96	0.08
57	8.139	0.144	2.20	87	-2.35	101	85	-0.070	15.14	0.11
58	8.286	0.147	2.21	88	-0.65	103	86	-0.070	15.37	0.17
59	8.431	0.145	2.20	88	-1.29	102	86	-0.070	15.60	0.38
60	8.578	0.147	2.21	88	-2.49	103	86	-0.070	16.39	0.53
61	8.721	0.143	2.18	88	-2.83	100	86	-0.080	17.08	0.45
62	8.868	0.147	2.21	89	-1.17	103	85	-0.090	17.81	0.45
63	9.012	0.144	2.20	89	-0.9	101	85	-0.070	17.77	1.10

BOX B TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: I2500
Run #: 2

Job #: 18-434
Tracking #: 0014
Technician: SJB
Date: 10/30/2018

	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	9.160	0.148	2.19	89	-2.71	104	85	-0.070	17.43	3.44
65	9.303	0.143	2.17	89	-1.94	100	86	-0.070	17.09	5.00
66	9.449	0.146	2.15	90	-1.42	102	86	-0.080	17.07	4.72
67	9.591	0.142	2.15	90	-1.51	100	86	-0.070	17.38	3.86
68	9.737	0.146	2.14	90	-0.82	102	86	-0.080	17.66	2.71
69	9.879	0.142	2.15	90	-2.9	100	85	-0.080	18.09	1.44
70	10.024	0.145	2.13	90	-2.24	102	85	-0.070	18.25	0.68
71	10.166	0.142	2.14	90	-2.38	100	85	-0.080	18.02	0.40
72	10.311	0.145	2.13	91	-0.93	102	86	-0.070	17.68	0.32
73	10.453	0.142	2.11	91	-2.85	99	86	-0.080	17.52	0.20
74	10.598	0.145	2.10	91	-1.39	101	86	-0.070	17.51	0.16
75	10.740	0.142	2.10	91	-2.44	99	85	-0.080	17.16	0.20
76	10.882	0.142	2.11	91	-1.02	99	85	-0.070	17.14	0.14
77	11.025	0.143	2.10	91	-2.27	100	85	-0.080	16.73	0.14
78	11.167	0.142	2.10	92	-2	99	86	-0.080	16.64	0.11
79	11.312	0.145	2.09	92	-2.5	101	86	-0.070	16.49	0.11
80	11.452	0.140	2.09	92	-0.91	98	86	-0.070	16.39	0.12
81	11.600	0.148	2.20	92	-2.25	103	85	-0.080	16.26	0.10
82	11.744	0.144	2.20	92	-2.55	101	85	-0.060	16.02	0.12
83	11.892	0.148	2.18	92	-3.15	103	85	-0.080	15.91	0.14
84	12.035	0.143	2.19	92	-2.02	100	85	-0.070	15.89	0.13
85	12.183	0.148	2.17	93	-1.49	103	86	-0.080	15.84	0.09
86	12.325	0.142	2.15	93	-2.48	99	86	-0.080	15.87	0.06
87	12.472	0.147	2.15	93	-1.2	102	86	-0.060	15.95	0.05
88	12.613	0.141	2.12	93	-1.48	98	85	-0.080	15.97	0.07
89	12.758	0.145	2.11	93	-2.21	101	85	-0.070	16.00	0.07
90	12.900	0.142	2.08	93	-2.6	99	85	-0.070	15.90	0.06
91	13.044	0.144	2.08	93	-1.28	100	86	-0.070	15.48	0.06
92	13.186	0.142	2.15	93	-2.51	99	86	-0.070	15.20	0.05
93	13.330	0.144	2.13	93	-1.73	100	86	-0.060	15.09	0.05
94	13.473	0.143	2.11	93	-2.21	100	86	-0.070	14.88	0.07
95	13.615	0.142	2.10	94	-3.44	99	85	-0.080	14.65	0.08

BOX B TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: I2500
Run #: 2

Job #: 18-434
Tracking #: 0014
Technician: SJB
Date: 10/30/2018

	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	13.759	0.144	2.07	94	-2.21	100	85	-0.060	14.59	0.07
97	13.899	0.140	2.06	94	-3.03	97	85	-0.060	14.54	0.06
98	14.044	0.145	2.10	94	-3.42	101	86	-0.070	14.46	0.06
99	14.185	0.141	2.10	94	-1.9	98	86	-0.070	14.61	0.03
100	14.330	0.145	2.08	94	-3.57	101	86	-0.050	14.52	0.01
101	14.469	0.139	2.04	94	-1.9	96	85	-0.070	14.40	0.06
102	14.613	0.144	2.02	94	-3.53	100	85	-0.070	14.58	0.01
103	14.756	0.143	2.14	94	-2	99	85	-0.060	14.38	0.05
104	14.902	0.146	2.12	95	-4.01	101	86	-0.060	14.58	0.03
105	15.043	0.141	2.09	95	-2.32	98	86	-0.050	14.66	0.04
106	15.185	0.142	2.06	95	-2.77	98	86	-0.070	14.74	0.04
107	15.327	0.142	2.03	95	-3.46	98	85	-0.070	14.55	0.03
108	15.466	0.139	2.00	95	-3.38	96	84	-0.070	13.97	0.03
109	15.609	0.143	1.97	95	-2.92	99	85	-0.070	13.98	0.06
110	15.745	0.136	1.95	95	-3.52	94	85	-0.060	13.81	0.05
111	15.887	0.142	2.09	95	-3.44	98	86	-0.070	13.32	0.02
112	16.031	0.144	3.00	95	-0.8	100	84	-0.060	13.05	0.00
113	16.197	0.166	2.09	96	-2.6	114	83	-0.080	12.53	0.04
114	16.337	0.140	2.08	95	-1.02	97	85	-0.070	12.45	0.01
115	16.482	0.145	2.07	96	-0.56	100	86	-0.060	12.43	0.03
116	16.622	0.140	2.07	96	-2.65	97	86	-0.060	12.61	0.01
117	16.767	0.145	2.11	96	-0.49	100	85	-0.060	12.37	0.02
118	16.910	0.143	2.10	95	-0.95	99	85	-0.060	12.33	0.00
119	17.055	0.145	2.12	96	-2.24	100	85	-0.070	12.13	0.02
120	17.199	0.144	2.11	96	-1.41	99	85	-0.080	12.23	0.01
121	17.343	0.144	2.10	96	-2.52	99	86	-0.060	12.19	0.01
122	17.486	0.143	2.11	96	-0.54	99	86	-0.040	12.18	0.00
123	17.631	0.145	2.11	96	-0.98	100	86	-0.060	12.18	0.02
124	17.775	0.144	2.11	96	-2.62	99	85	-0.060	12.28	0.00
125	17.917	0.142	2.11	96	-1.4	98	85	-0.050	12.10	0.04
126	18.062	0.145	2.11	96	-1.5	100	85	-0.060	12.18	0.00
127	18.205	0.143	2.11	96	-2.54	98	85	-0.070	12.08	0.00

BOX B TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: I2500
Run #: 2

Job #: 18-434
Tracking #: 0014
Technician: SJB
Date: 10/30/2018

	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	18.350	0.145	2.12	97	-1.55	100	86	-0.060	12.10	0.04
129	18.493	0.143	2.10	97	-2.44	98	86	-0.050	12.23	0.02
130	18.639	0.146	2.10	97	-0.47	100	86	-0.050	12.14	0.02
131	18.780	0.141	2.11	97	-2.64	97	85	-0.060	12.10	0.03
132	18.927	0.147	2.11	97	-0.49	101	85	-0.070	12.05	0.03
133	19.068	0.141	2.11	97	-1.93	97	85	-0.060	12.16	0.02
134	19.213	0.145	2.11	97	-1.75	100	85	-0.050	12.12	0.01
135	19.355	0.142	2.10	97	-2.03	97	86	-0.060	12.25	0.00
136	19.501	0.146	2.09	97	-2.66	100	86	-0.050	12.23	0.00
137	19.643	0.142	2.11	97	-2.47	97	86	-0.050	12.18	0.02
138	19.789	0.146	2.10	97	-1.64	100	85	-0.060	12.28	0.02
139	19.932	0.143	2.10	97	-0.53	98	85	-0.060	12.20	0.03
140	20.075	0.143	2.10	97	-2.01	98	84	-0.050	12.27	0.03
141	20.219	0.144	2.10	97	-1.24	99	85	-0.060	12.31	0.00
142	20.361	0.142	2.08	97	-0.83	97	85	-0.060	12.31	0.03
143	20.506	0.145	2.10	97	-1.7	100	86	-0.060	12.47	0.00
144	20.648	0.142	2.09	97	-2.66	97	86	-0.060	12.53	0.00
145	20.794	0.146	2.10	98	-0.81	100	85	-0.050	12.37	0.00
146	20.936	0.142	2.10	97	-1.28	97	84	-0.060	12.31	0.01
147	21.081	0.145	2.08	98	-1.7	99	85	-0.060	12.11	0.01
148	21.222	0.141	2.09	97	-2.3	97	85	-0.050	12.00	0.04
149	21.368	0.146	2.17	98	-0.58	100	86	-0.050	11.75	0.04
150	21.514	0.146	2.23	98	-0.61	100	86	-0.070	11.88	0.01
151	21.664	0.150	2.24	98	-2.38	103	86	-0.060	11.90	0.03
152	21.810	0.146	2.23	98	-2.34	100	86	-0.050	11.96	0.02
153	21.960	0.150	2.22	98	-1.31	103	84	-0.050	12.05	0.00
154	22.106	0.146	2.23	98	-1.33	100	85	-0.050	11.90	0.00
155	22.256	0.150	2.22	98	-1.37	103	85	-0.060	11.87	0.04
156	22.402	0.146	2.23	98	-1.74	100	86	-0.050	11.89	0.00
157	22.552	0.150	2.23	98	-0.6	103	87	-0.060	11.62	0.03
158	22.697	0.145	2.22	98	-2.69	99	86	-0.060	11.49	0.02
159	22.847	0.150	2.23	98	-1.87	103	85	-0.060	11.51	0.02

BOX B TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: I2500
Run #: 2

Job #: 18-434
Tracking #: 0014
Technician: SJB
Date: 10/30/2018

	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	22.993	0.146	2.22	98	-2.22	100	85	-0.070	11.60	0.01
161	23.143	0.150	2.22	98	-0.86	103	85	-0.060	11.68	0.00
162	23.289	0.146	2.23	99	-2.39	100	86	-0.050	11.53	0.03
163	23.438	0.149	2.23	99	-0.59	102	86	-0.060	11.53	0.00
164	23.584	0.146	2.22	98	-1.82	100	86	-0.070	11.44	0.02
165	23.733	0.149	2.22	98	-2.68	102	85	-0.060	11.41	0.02
166	23.880	0.147	2.20	99	-2.3	100	85	-0.060	10.93	0.02
167	24.029	0.149	2.21	99	-0.89	102	84	-0.050	10.66	0.00
168	24.176	0.147	2.22	98	-2.79	101	85	-0.050	10.21	0.00
169	24.325	0.149	2.22	98	-1.73	102	85	-0.060	10.13	0.01
170	24.472	0.147	2.22	98	-0.59	101	86	-0.060	10.01	0.03
171	24.620	0.148	2.21	98	-2.71	101	86	-0.050	9.86	0.03
172	24.768	0.148	2.21	99	-1.05	101	86	-0.040	9.75	0.04
173	24.915	0.147	2.20	99	-2.61	100	85	-0.050	9.77	0.03
174	25.063	0.148	2.20	99	-1.65	101	84	-0.050	9.74	0.01
175	25.211	0.148	2.22	99	-2.64	101	85	-0.070	9.83	0.00
176	25.359	0.148	2.19	99	-2.29	101	86	-0.040	9.82	0.01
177	25.506	0.147	2.21	99	-2.71	100	86	-0.050	9.84	0.00
178	25.655	0.149	2.21	99	-2.04	102	86	-0.050	9.65	0.04
179	25.801	0.146	2.21	99	-0.65	100	85	-0.050	9.54	0.00
180	25.950	0.149	2.21	99	-2.47	102	85	-0.060	9.45	0.02
181	26.096	0.146	2.21	99	-2.58	100	85	-0.060	9.46	0.00
182	26.244	0.148	2.21	99	-2.65	101	85	-0.050	9.30	0.01
183	26.390	0.146	2.21	99	-1.87	100	85	-0.050	9.22	0.01
184	26.540	0.150	2.21	99	-1.48	102	86	-0.050	9.03	0.01
185	26.686	0.146	2.21	99	-0.69	99	86	-0.050	8.70	0.01
186	26.835	0.149	2.21	99	-1.27	102	86	-0.050	8.55	0.03
187	26.980	0.145	2.21	99	-1.63	99	85	-0.050	8.46	0.03
188	27.130	0.150	2.21	99	-0.93	102	84	-0.050	8.46	0.05
189	27.275	0.145	2.20	99	-1.56	99	85	-0.030	8.32	0.05
190	27.425	0.150	2.20	99	-0.86	102	86	-0.050	8.48	0.01
191	27.571	0.146	2.20	99	-1.64	100	86	-0.040	8.37	0.05

BOX B TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: I2500
Run #: 2

Job #: 18-434
Tracking #: 0014
Technician: SJB
Date: 10/30/2018

	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	27.721	0.150	2.21	99	-1.17	102	86	-0.050	8.30	0.07
193	27.866	0.145	2.20	99	-1.97	99	85	-0.050	8.40	0.03
194	28.016	0.150	2.21	99	-0.59	102	84	-0.050	8.28	0.01
195	28.161	0.145	2.20	100	-2.24	99	84	-0.040	8.33	0.04
196	28.312	0.151	2.21	100	-1	103	85	-0.060	8.28	0.06
197	28.457	0.145	2.21	99	-1.62	99	85	-0.060	8.10	0.07
198	28.606	0.149	2.21	99	-0.95	102	86	-0.050	8.30	0.04
199	28.752	0.146	2.20	100	-2.52	99	86	-0.050	8.24	0.04
200	28.902	0.150	2.19	99	-2.74	102	85	-0.050	8.25	0.06
201	29.047	0.145	2.20	99	-1.81	99	85	-0.050	8.36	0.01
202	29.197	0.150	2.19	99	-0.67	102	85	-0.060	8.13	0.06
203	29.343	0.146	2.21	100	-1.06	99	85	-0.050	8.37	0.03
204	29.492	0.149	2.20	100	-1.34	101	86	-0.050	8.40	0.03
205	29.637	0.145	2.20	99	-1.82	99	86	-0.050	8.28	0.08
206	29.787	0.150	2.21	99	-0.96	102	85	-0.050	8.38	0.02
207	29.932	0.145	2.21	99	-0.73	99	85	-0.070	8.30	0.04
208	30.081	0.149	2.21	99	-0.65	101	85	-0.050	8.27	0.04
209	30.227	0.146	2.19	100	-1.43	99	85	-0.050	8.20	0.05
210	30.377	0.150	2.20	99	-1.06	102	86	-0.040	8.26	0.02
211	30.523	0.146	2.21	99	-0.65	99	86	-0.070	8.29	0.03
212	30.672	0.149	2.22	99	-2.79	101	86	-0.060	8.32	0.02
213	30.818	0.146	2.19	100	-1.32	99	86	-0.050	8.33	0.04
214	30.966	0.148	2.20	100	-2.13	101	85	-0.050	8.32	0.03
215	31.112	0.146	2.20	99	-0.77	99	85	-0.050	8.17	0.06
216	31.261	0.149	2.20	100	-2.74	101	85	-0.050	8.26	0.02
217	31.408	0.147	2.20	100	-2.75	100	85	-0.050	8.26	0.02
218	31.556	0.148	2.19	100	-1.93	100	86	-0.050	8.22	0.05
219	31.704	0.148	2.21	99	-1.86	101	86	-0.060	8.14	0.03
220	31.852	0.148	2.19	100	-2.03	100	85	-0.050	8.08	0.03
221	31.999	0.147	2.20	100	-1.26	100	85	-0.050	8.11	0.02
222	32.147	0.148	2.20	100	-2.77	100	85	-0.050	8.13	0.04
223	32.294	0.147	2.19	100	-2.81	100	86	-0.050	7.98	0.04

BOX B TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: I2500
Run #: 2

Job #: 18-434
Tracking #: 0014
Technician: SJB
Date: 10/30/2018

	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	32.442	0.148	2.19	100	-2.87	100	86	-0.040	8.19	0.02
225	32.590	0.148	2.21	100	-2.71	100	86	-0.060	8.10	0.02
226	32.737	0.147	2.19	100	-2.49	100	87	-0.040	8.20	0.02
227	32.885	0.148	2.21	100	-0.6	100	85	-0.060	7.98	0.04
228	33.032	0.147	2.19	100	-0.53	100	85	-0.050	8.24	0.02
229	33.180	0.148	2.19	100	-2.64	100	85	-0.040	8.05	0.03
230	33.327	0.147	2.21	100	-1.45	100	85	-0.050	8.15	0.01
231	33.475	0.148	2.20	100	-0.57	100	86	-0.050	8.10	0.03
232	33.621	0.146	2.20	100	-0.67	99	86	-0.050	8.05	0.07
233	33.770	0.149	2.20	100	-2.27	101	86	-0.040	8.14	0.03
234	33.916	0.146	2.20	101	-0.91	99	85	-0.060	8.20	0.04
235	34.065	0.149	2.21	100	-1.83	101	84	-0.050	8.24	0.03
236	34.210	0.145	2.20	100	-2.12	98	85	-0.050	8.35	0.03
237	34.360	0.150	2.20	100	-2.67	102	85	-0.040	8.23	0.07
238	34.506	0.146	2.21	100	-2.19	99	86	-0.050	8.30	0.05
239	34.655	0.149	2.20	100	-1.67	101	86	-0.050	8.20	0.05
240	34.800	0.145	2.20	101	-1.04	98	85	-0.040	8.36	0.03
241	34.949	0.149	2.20	100	-1.07	101	84	-0.030	8.37	0.07
242	35.095	0.146	2.20	100	-2.71	99	85	-0.050	8.42	0.02
243	35.244	0.149	2.20	100	-0.9	101	85	-0.040	8.39	0.04
244	35.389	0.145	2.21	100	-2.66	98	85	-0.050	8.46	0.02
245	35.539	0.150	2.19	100	-0.68	102	86	-0.050	8.40	0.04
246	35.684	0.145	2.19	100	-1.03	98	86	-0.050	8.34	0.03
247	35.834	0.150	2.19	100	-2.77	102	85	-0.050	8.44	0.05
248	35.980	0.146	2.19	100	-0.77	99	84	-0.040	8.43	0.03
249	36.130	0.150	2.19	100	-0.9	102	84	-0.060	8.45	0.04
250	36.275	0.145	2.20	100	-0.74	98	85	-0.050	8.56	0.04
251	36.424	0.149	2.19	101	-2.69	101	85	-0.030	8.40	0.04
252	36.569	0.145	2.20	100	-1.14	98	86	-0.050	8.44	0.04
253	36.719	0.150	2.20	100	-2.62	102	86	-0.040	8.56	0.07
254	36.864	0.145	2.20	100	-0.64	98	85	-0.030	8.48	0.05
255	37.014	0.150	2.19	100	-1.61	102	85	-0.050	8.42	0.04

BOX B TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: I2500
Run #: 2

Job #: 18-434
Tracking #: 0014
Technician: SJB
Date: 10/30/2018

	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	37.159	0.145	2.18	100	-1.91	98	85	-0.050	8.48	0.03
257	37.309	0.150	2.19	100	-1.85	102	85	-0.050	8.41	0.04
258	37.454	0.145	2.19	100	-2.34	98	86	-0.040	8.45	0.02
259	37.604	0.150	2.18	100	-2.68	102	86	-0.040	8.49	0.02
260	37.749	0.145	2.20	100	-2.68	98	86	-0.040	8.56	0.00
261	37.899	0.150	2.19	100	-1.46	102	85	-0.050	8.57	0.02
262	38.044	0.145	2.19	100	-1.19	98	85	-0.050	8.52	0.01
263	38.193	0.149	2.20	100	-2.63	101	85	-0.050	8.49	0.02
264	38.338	0.145	2.20	100	-2.77	98	86	-0.050	8.48	0.04
265	38.488	0.150	2.21	100	-0.59	102	86	-0.050	8.54	0.06
266	38.633	0.145	2.20	100	-2.41	98	87	-0.040	8.48	0.04
267	38.782	0.149	2.19	100	-2.05	101	86	-0.040	8.57	0.02
268	38.927	0.145	2.18	101	-2.31	98	85	-0.050	8.48	0.04
269	39.077	0.150	2.18	101	-2.52	102	84	-0.040	8.53	0.02
270	39.222	0.145	2.20	100	-2.23	98	85	-0.060	8.41	0.06
271	39.371	0.149	2.18	100	-2.56	101	86	-0.050	8.61	0.03
272	39.517	0.146	2.18	100	-0.67	99	86	-0.050	8.48	0.03
273	39.666	0.149	2.18	100	-0.66	101	86	-0.050	8.36	0.05
274	39.812	0.146	2.19	100	-0.77	99	85	-0.050	8.32	0.06
275	39.960	0.148	2.20	100	-2.08	100	85	-0.040	8.50	0.03
276	40.106	0.146	2.18	100	-1.44	99	85	-0.050	8.47	0.02
277	40.255	0.149	2.19	100	-2.42	101	85	-0.050	8.37	0.04
278	40.401	0.146	2.18	100	-1.98	99	86	-0.040	8.39	0.01
279	40.550	0.149	2.18	100	-1.71	101	86	-0.040	8.22	0.03
280	40.697	0.147	2.19	101	-2.82	100	86	-0.050	8.28	0.00
281	40.844	0.147	2.19	101	-1.52	100	86	-0.050	8.33	0.03
282	40.991	0.147	2.18	101	-1.26	100	85	-0.060	8.30	0.00
283	41.139	0.148	2.19	101	-2.8	100	84	-0.050	8.25	0.05
284	41.286	0.147	2.18	100	-0.95	100	85	-0.040	8.25	0.00
285	41.434	0.148	2.19	100	-2.72	100	86	-0.040	8.33	0.02
286	41.581	0.147	2.18	100	-0.83	100	86	-0.040	8.28	0.04
287	41.728	0.147	2.18	101	-1.07	100	86	-0.040	8.28	0.02

BOX B TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: I2500
Run #: 2

Job #: 18-434
Tracking #: 0014
Technician: SJB
Date: 10/30/2018

	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	41.875	0.147	2.20	101	-1.08	99	86	-0.040	7.85	0.00
289	42.023	0.148	2.18	100	-0.97	100	86	-0.040	7.68	0.04
290	42.170	0.147	2.19	101	-0.87	100	85	-0.040	7.79	0.00
291	42.317	0.147	2.18	101	-1.16	100	86	-0.040	7.72	0.00
292	42.465	0.148	2.18	100	-2.1	100	85	-0.060	7.63	0.03
293	42.612	0.147	2.18	100	-1.12	100	86	-0.030	7.81	0.00
294	42.760	0.148	2.20	100	-2.35	100	86	-0.040	7.69	0.04
295	42.906	0.146	2.19	101	-1.89	99	86	-0.030	7.75	0.02
296	43.055	0.149	2.19	101	-2.81	101	85	-0.040	7.66	0.02
297	43.201	0.146	2.18	100	-2.61	99	85	-0.050	7.75	0.01
298	43.349	0.148	2.18	100	-2.68	100	85	-0.040	7.66	0.06
299	43.495	0.146	2.19	100	-0.69	99	85	-0.040	7.69	0.00
300	43.643	0.148	2.18	101	-2.15	100	86	-0.050	7.62	0.03
301	43.789	0.146	2.19	101	-1.52	99	86	-0.050	7.78	0.00
302	43.937	0.148	2.19	101	-2.42	100	86	-0.040	7.67	0.02
303	44.083	0.146	2.19	101	-2.82	99	85	-0.040	7.58	0.01
304	44.232	0.149	2.17	100	-1.05	101	85	-0.060	7.59	0.04
305	44.378	0.146	2.18	100	-1.96	99	85	-0.040	7.84	0.00
306	44.527	0.149	2.19	100	-2.72	101	85	-0.050	7.79	0.02
307	44.672	0.145	2.19	101	-1.06	98	86	-0.030	7.78	0.00
308	44.821	0.149	2.20	100	-0.83	101	86	-0.040	7.64	0.03
309	44.966	0.145	2.19	101	-1.55	98	85	-0.040	7.60	0.00
310	45.115	0.149	2.19	101	-2.33	101	85	-0.040	7.73	0.00
311	45.260	0.145	2.18	100	-2.02	98	85	-0.040	7.70	0.01
312	45.410	0.150	2.20	100	-0.95	102	85	-0.050	7.53	0.02
313	45.555	0.145	2.18	100	-2.68	98	86	-0.050	7.45	0.03
314	45.704	0.149	2.20	100	-0.79	101	86	-0.050	7.65	0.01
315	45.849	0.145	2.18	101	-2.71	98	86	-0.040	7.55	0.04
316	45.999	0.150	2.17	100	-0.89	102	86	-0.040	7.56	0.00
317	46.144	0.145	2.18	101	-0.9	98	85	-0.060	7.64	0.00
318	46.293	0.149	2.18	101	-2.79	101	84	-0.030	7.57	0.04
319	46.439	0.146	2.19	101	-1.84	99	85	-0.040	7.56	0.04

BOX B TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: I2500
Run #: 2

Job #: 18-434
Tracking #: 0014
Technician: SJB
Date: 10/30/2018

	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	46.588	0.149	2.18	101	-2.81	101	85	-0.040	7.66	0.00
321	46.733	0.145	2.18	101	-2.02	98	86	-0.050	7.58	0.00
322	46.883	0.150	2.19	101	-0.69	101	86	-0.040	7.53	0.03
323	47.028	0.145	2.18	101	-1.56	98	85	-0.040	7.70	0.00
324	47.178	0.150	2.18	101	-0.72	101	85	-0.040	7.65	0.01
325	47.322	0.144	2.19	101	-2.78	97	85	-0.040	7.56	0.02
326	47.472	0.150	2.19	101	-0.78	101	85	-0.040	7.49	0.06
327	47.617	0.145	2.18	100	-1.89	98	85	-0.030	7.78	0.00
328	47.766	0.149	2.18	100	-0.73	101	86	-0.050	7.64	0.03
329	47.911	0.145	2.19	100	-0.74	98	86	-0.040	7.70	0.00
330	48.061	0.150	2.18	100	-2.76	102	86	-0.040	7.71	0.01
331	48.206	0.145	2.18	101	-0.8	98	85	-0.030	7.71	0.02
332	48.355	0.149	2.19	101	-0.65	101	84	-0.050	7.60	0.02
333	48.500	0.145	2.17	101	-0.59	98	85	-0.040	7.53	0.04
334	48.650	0.150	2.17	101	-2.73	101	86	-0.030	7.56	0.02
335	48.795	0.145	2.19	100	-1.54	98	86	-0.050	7.61	0.00
336	48.945	0.150	2.20	101	-1.02	101	86	-0.050	7.51	0.03
337	49.089	0.144	2.18	100	-2.35	97	86	-0.030	7.57	0.01
338	49.239	0.150	2.18	100	-2.77	102	86	-0.040	7.52	0.02
339	49.383	0.144	2.19	101	-2.78	97	86	-0.050	7.58	0.01
340	49.532	0.149	2.18	101	-0.74	101	85	-0.040	7.56	0.01
341	49.677	0.145	2.19	101	-0.98	98	85	-0.040	7.61	0.00
342	49.826	0.149	2.19	101	-0.95	101	87	-0.030	7.64	0.00
343	49.971	0.145	2.18	101	-0.99	98	87	-0.040	7.38	0.03
344	50.121	0.150	2.18	101	-2.72	101	86	-0.040	7.50	0.00
345	50.266	0.145	2.19	101	-0.69	98	85	-0.030	7.55	0.00
346	50.415	0.149	2.17	101	-2.74	101	85	-0.040	7.47	0.02
347	50.560	0.145	2.17	101	-0.72	98	85	-0.050	7.50	0.00
348	50.709	0.149	2.19	101	-0.74	101	85	-0.040	7.57	0.00
349	50.855	0.146	2.20	101	-2.75	99	87	-0.040	7.47	0.04
350	51.003	0.148	2.18	101	-0.64	100	87	-0.040	7.41	0.02
351	51.149	0.146	2.18	101	-2.64	99	86	-0.040	7.38	0.02

BOX B TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: I2500
Run #: 2

Job #: 18-434
Tracking #: 0014
Technician: SJB
Date: 10/30/2018

	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	51.297	0.148	2.19	101	-1.26	100	85	-0.040	7.39	0.02
353	51.443	0.146	2.18	101	-1.43	99	85	-0.040	7.46	0.00
354	51.591	0.148	2.18	101	-0.75	100	85	-0.040	7.43	0.02
355	51.737	0.146	2.18	101	-1.8	99	85	-0.040	7.33	0.02
356	51.885	0.148	2.19	101	-0.82	100	86	-0.060	7.44	0.00
357	52.031	0.146	2.18	101	-1.9	99	86	-0.060	7.33	0.04
358	52.179	0.148	2.18	101	-1.32	100	85	-0.050	7.29	0.04
359	52.325	0.146	2.18	101	-2.23	99	85	-0.040	7.44	0.00
360	52.474	0.149	2.18	101	-1.63	101	85	-0.040	7.30	0.04
361	52.620	0.146	2.18	101	-0.95	99	85	-0.030	7.36	0.02
362	52.768	0.148	2.17	101	-1.12	100	85	-0.040	7.30	0.00
363	52.914	0.146	2.18	101	-1.45	99	86	-0.040	7.36	0.00
364	53.063	0.149	2.18	101	-2.48	101	87	-0.040	7.33	0.01
365	53.209	0.146	2.19	101	-1.19	99	86	-0.050	7.22	0.02
366	53.357	0.148	2.19	101	-2.65	100	85	-0.040	7.20	0.04
367	53.503	0.146	2.18	101	-1.53	99	85	-0.030	7.19	0.03
368	53.651	0.148	2.18	101	-2.79	100	85	-0.050	7.18	0.03
369	53.798	0.147	2.18	101	-0.7	99	85	-0.040	7.32	0.02
370	53.945	0.147	2.17	101	-1.92	99	86	-0.050	7.15	0.00
371	54.092	0.147	2.19	101	-2.73	99	86	-0.040	6.90	0.04
372	54.239	0.147	2.18	101	-2.49	99	86	-0.040	6.90	0.01
373	54.387	0.148	2.19	101	-1.43	100	85	-0.040	6.90	0.01
374	54.534	0.147	2.19	101	-1.55	99	84	-0.040	6.72	0.01
375	54.681	0.147	2.18	101	-1.36	99	85	-0.050	6.70	0.01
376	54.828	0.147	2.18	101	-1.7	99	85	-0.040	6.82	0.04
377	54.975	0.147	2.18	101	-1.45	99	86	-0.050	6.93	0.01
378	55.122	0.147	2.18	101	-0.68	99	86	-0.040	6.80	0.01
379	55.269	0.147	2.17	101	-2.14	99	86	-0.040	6.78	0.03
380	55.416	0.147	2.18	101	-1.36	99	86	-0.050	7.01	0.02
381	55.563	0.147	2.18	101	-2.74	99	85	-0.050	6.96	0.03
382	55.710	0.147	2.17	101	-2.79	99	85	-0.050	7.02	0.00
383	55.857	0.147	2.18	101	-1.2	99	85	-0.040	6.97	0.05

BOX B TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: I2500
Run #: 2

Job #: 18-434
Tracking #: 0014
Technician: SJB
Date: 10/30/2018

	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	56.004	0.147	2.18	101	-1.65	99	85	-0.040	6.99	0.04
385	56.152	0.148	2.17	101	-2.7	100	86	-0.030	7.09	0.01
386	56.298	0.146	2.19	101	-2.08	99	86	-0.040	6.61	0.04
387	56.446	0.148	2.19	101	-1.2	100	85	-0.050	6.62	0.03
388	56.592	0.146	2.17	101	-0.7	99	85	-0.040	6.61	0.03
389	56.740	0.148	2.20	101	-1.93	100	85	-0.040	6.59	0.04
390	56.886	0.146	2.17	101	-1.61	99	85	-0.040	6.58	0.02
391	57.034	0.148	2.18	101	-1.75	100	86	-0.050	6.44	0.03
392	57.180	0.146	2.19	101	-1.24	99	86	-0.040	6.61	0.03
393	57.328	0.148	2.18	101	-0.66	100	86	-0.040	6.70	0.01
394	57.473	0.145	2.18	101	-0.81	98	85	-0.050	6.53	0.01
395	57.622	0.149	2.19	101	-2.79	101	85	-0.050	6.41	0.03
396	57.767	0.145	2.18	101	-2.57	98	84	-0.050	6.53	0.00
397	57.915	0.148	2.17	101	-0.79	100	85	-0.050	6.47	0.02
398	58.061	0.146	2.18	101	-1.52	99	86	-0.030	6.53	0.01
399	58.209	0.148	2.18	101	-2.85	100	86	-0.040	6.36	0.04
400	58.355	0.146	2.19	101	-0.81	99	86	-0.040	6.38	0.06
401	58.503	0.148	2.17	101	-2.85	100	85	-0.030	6.51	0.02
402	58.649	0.146	2.17	101	-0.71	99	85	-0.040	6.39	0.03
403	58.797	0.148	2.17	101	-2.02	100	85	-0.050	6.43	0.04
404	58.943	0.146	2.17	101	-1.77	99	85	-0.040	6.54	0.02
405	59.091	0.148	2.18	101	-2.72	100	86	-0.040	6.73	0.00
406	59.237	0.146	2.18	101	-1.53	99	87	-0.040	6.56	0.02
407	59.386	0.149	2.18	101	-1.09	101	86	-0.040	6.45	0.03
408	59.531	0.145	2.18	101	-1.42	98	85	-0.030	6.44	0.04
409	59.680	0.149	2.18	101	-0.71	101	84	-0.050	6.56	0.00
410	59.824	0.144	2.18	101	-1.88	97	85	-0.040	6.48	0.02
411	59.973	0.149	2.18	101	-2.81	101	86	-0.030	6.41	0.02
412	60.118	0.145	2.18	101	-0.81	98	86	-0.050	6.32	0.04
413	60.267	0.149	2.17	101	-0.85	101	86	-0.040	6.55	0.01
414	60.412	0.145	2.19	101	-1.56	98	86	-0.040	6.27	0.03
415	60.561	0.149	2.17	101	-2.83	101	85	-0.040	6.42	0.03

BOX B TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: I2500
Run #: 2

Job #: 18-434
Tracking #: 0014
Technician: SJB
Date: 10/30/2018

	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	60.706	0.145	2.18	101	-0.72	98	85	-0.030	6.39	0.00
417	60.855	0.149	2.18	101	-1.2	101	85	-0.040	6.44	0.00
418	61.000	0.145	2.17	101	-0.71	98	86	-0.040	6.26	0.04
419	61.149	0.149	2.17	101	-2.13	101	86	-0.030	6.34	0.03
420	61.294	0.145	2.18	101	-0.7	98	86	-0.050	6.30	0.05
421	61.443	0.149	2.17	101	-0.82	101	86	-0.040	6.31	0.01
422	61.588	0.145	2.17	101	-2.82	98	85	-0.040	6.21	0.02
423	61.737	0.149	2.16	101	-0.79	101	85	-0.040	6.16	0.05
424	61.881	0.144	2.17	101	-1.84	97	85	-0.030	6.23	0.01
425	62.031	0.150	2.17	101	-2.26	101	86	-0.050	6.25	0.00
426	62.176	0.145	2.18	101	-0.67	98	86	-0.040	6.21	0.04
427	62.325	0.149	2.19	101	-0.66	101	86	-0.040	6.18	0.02
428	62.470	0.145	2.18	101	-2.7	98	86	-0.040	6.21	0.01
429	62.619	0.149	2.18	101	-2.69	101	85	-0.030	6.33	0.01
430	62.764	0.145	2.19	101	-2.59	98	85	-0.040	6.33	0.02
431	62.913	0.149	2.18	101	-0.85	101	85	-0.040	6.15	0.04
432	63.058	0.145	2.17	101	-0.71	98	86	-0.040	6.31	0.03
433	63.207	0.149	2.17	101	-2.67	101	86	-0.040	6.31	0.03
434	63.352	0.145	2.18	101	-0.77	98	86	-0.030	6.28	0.05
435	63.501	0.149	2.18	101	-0.65	101	85	-0.040	6.05	0.02
436	63.646	0.145	2.19	101	-0.6	98	85	-0.040	5.94	0.00
437	63.795	0.149	2.18	101	-1.14	101	86	-0.040	5.84	0.04
438	63.940	0.145	2.18	101	-0.75	98	85	-0.040	5.88	0.00
439	64.089	0.149	2.18	101	-1.84	101	86	-0.040	5.80	0.00
440	64.233	0.144	2.18	101	-1.35	97	87	-0.040	5.82	0.02
441	64.383	0.150	2.17	101	-0.81	101	86	-0.040	5.81	0.01
442	64.527	0.144	2.18	102	-2.37	97	85	-0.050	5.71	0.02
443	64.677	0.150	2.18	101	-2.8	101	85	-0.040	5.88	0.01
444	64.821	0.144	2.17	101	-2.19	97	85	-0.040	5.74	0.03
445	64.971	0.150	2.18	101	-2.71	101	85	-0.040	5.79	0.02
446	65.115	0.144	2.18	101	-2.34	97	86	-0.020	5.73	0.04
447	65.264	0.149	2.17	101	-0.89	101	86	-0.030	5.92	0.00

BOX B TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: I2500
Run #: 2

Job #: 18-434
Tracking #: 0014
Technician: SJB
Date: 10/30/2018

	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	65.409	0.145	2.19	101	-0.67	98	86	-0.040	5.65	0.04
449	65.559	0.150	2.18	101	-0.69	101	85	-0.040	5.74	0.03
450	65.703	0.144	2.18	101	-2.36	97	85	-0.030	5.72	0.02
451	65.853	0.150	2.17	101	-1.8	101	85	-0.040	5.90	0.00
452	65.997	0.144	2.18	101	-0.97	97	85	-0.040	5.83	0.00
453	66.147	0.150	2.16	101	-1.44	101	86	-0.030	5.81	0.00
454	66.291	0.144	2.17	101	-1.56	97	86	-0.030	5.86	0.01
455	66.441	0.150	2.18	101	-2.41	101	85	-0.040	5.76	0.04
456	66.586	0.145	2.19	101	-1.78	98	85	-0.040	5.88	0.01
457	66.735	0.149	2.19	101	-2.27	100	85	-0.030	5.89	0.01
458	66.880	0.145	2.19	101	-0.74	98	85	-0.030	5.72	0.08
459	67.029	0.149	2.18	101	-1.44	100	85	-0.040	5.72	0.02
460	67.173	0.144	2.17	101	-2.59	97	86	-0.040	5.68	0.03
461	67.323	0.150	2.18	101	-0.76	101	86	-0.030	5.74	0.04
462	67.467	0.144	2.18	101	-0.76	97	86	-0.050	5.72	0.01
463	67.616	0.149	2.18	101	-2.36	101	85	-0.040	5.96	0.03
464	67.761	0.145	2.19	101	-0.83	98	85	-0.040	5.72	0.06
465	67.910	0.149	2.19	101	-1.83	101	86	-0.050	5.60	0.05
466	68.055	0.145	2.18	101	-2.66	98	86	-0.030	5.75	0.02
467	68.204	0.149	2.19	101	-2.8	100	86	-0.040	5.71	0.07
468	68.349	0.145	2.18	101	-2.76	98	87	-0.040	5.78	0.02
469	68.498	0.149	2.18	101	-0.99	101	85	-0.030	5.86	0.03
470	68.643	0.145	2.19	101	-1.12	98	85	-0.030	5.82	0.02
471	68.792	0.149	2.18	101	-1.31	100	85	-0.040	5.74	0.01
472	68.937	0.145	2.17	101	-2.82	98	85	-0.030	5.72	0.00
473	69.086	0.149	2.16	101	-2.76	100	86	-0.040	5.79	0.01
474	69.232	0.146	2.18	101	-1.9	98	86	-0.040	5.85	0.02
475	69.380	0.148	2.18	101	-2.78	100	86	-0.040	5.75	0.02
476	69.526	0.146	2.19	101	-2.59	98	86	-0.040	5.67	0.05
477	69.674	0.148	2.18	101	-1.72	100	85	-0.040	5.75	0.04
478	69.820	0.146	2.19	101	-1.94	98	85	-0.040	5.60	0.02
479	69.968	0.148	2.18	101	-1.04	100	85	-0.040	5.60	0.06

BOX B TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: I2500
Run #: 2

Job #: 18-434
Tracking #: 0014
Technician: SJB
Date: 10/30/2018

	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	70.114	0.146	2.19	101	-2.52	98	85	-0.040	5.58	0.05
481	70.262	0.148	2.18	101	-0.77	100	86	-0.060	5.59	0.07
482	70.408	0.146	2.18	101	-2.27	98	86	-0.040	5.57	0.05
483	70.556	0.148	2.18	101	-2.7	100	85	-0.050	5.58	0.06
484	70.701	0.145	2.19	101	-2.57	98	85	-0.040	5.71	0.07
485	70.850	0.149	2.18	101	-2.23	100	85	-0.040	5.59	0.08
486	70.995	0.145	2.18	101	-1.44	98	85	-0.040	5.61	0.05
487	71.143	0.148	2.18	101	-1.9	100	86	-0.030	5.72	0.06
488	71.289	0.146	2.19	101	-0.66	98	86	-0.030	5.73	0.06
489	71.437	0.148	2.18	101	-0.84	100	86	-0.030	5.65	0.04
490	71.583	0.146	2.17	101	-1.88	98	86	-0.030	5.79	0.02
491	71.731	0.148	2.17	101	-0.83	100	84	-0.030	5.64	0.05
492	71.877	0.146	2.17	101	-2.17	98	85	-0.040	5.60	0.05
493	72.025	0.148	2.17	101	-2.52	100	85	-0.030	5.68	0.03
494	72.171	0.146	2.17	101	-1.95	98	86	-0.040	5.67	0.04
495	72.319	0.148	2.17	101	-0.75	100	86	-0.040	5.65	0.02
496	72.465	0.146	2.18	101	-0.68	98	86	-0.040	5.58	0.06
497	72.613	0.148	2.17	101	-2.71	100	85	-0.040	5.52	0.07
498	72.760	0.147	2.18	101	-2.45	99	86	-0.040	5.49	0.08
499	72.908	0.148	2.19	101	-2.75	100	85	-0.020	5.67	0.06
Avg/Tot	72.908	0.146	2.17	97	-1.74	100			9.34	0.13

WOODSTOVE SURFACE TEMPERATURE DATA

Client: FPI
Model: I2500
Run #: 2

Job #: 18-434
Tracking #: 0014
Technician: SJB
Date: 10/30/2018

	Temperature Data (°F)						
Elapsed Time (min)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
0	404	414	367	320	336	368.2	684
1	402	417	371	318	337	369.0	630
2	402	416	376	315	337	369.2	818
3	401	414	378	314	337	368.8	940
4	400	411	380	314	338	368.6	932
5	398	409	380	317	338	368.4	908
6	395	406	379	323	340	368.6	904
7	392	402	377	331	344	369.2	940
8	389	399	375	339	347	369.8	936
9	385	394	373	343	349	368.8	883
10	381	389	370	344	352	367.2	865
11	376	385	366	342	354	364.6	879
12	373	379	363	339	356	362.0	917
13	369	375	359	336	358	359.4	974
14	364	370	355	332	360	356.2	1034
15	359	365	351	328	362	353.0	1067
16	355	360	347	325	364	350.2	1089
17	351	356	343	322	365	347.4	1097
18	346	352	339	319	366	344.4	1110
19	342	348	336	317	367	342.0	1136
20	338	344	332	315	368	339.4	1149
21	331	326	326	312	363	331.6	1128
22	326	321	318	309	359	326.6	1096
23	321	315	311	303	354	320.8	1080
24	317	311	303	297	350	315.6	1091
25	312	305	296	291	346	310.0	1110
26	307	301	289	285	342	304.8	1120
27	304	298	283	279	339	300.6	1132
28	300	293	278	274	336	296.2	1133
29	296	290	272	269	332	291.8	1141
30	292	286	267	265	329	287.8	1144
31	288	282	262	260	325	283.4	1104
32	286	278	258	257	322	280.2	1070
33	282	276	254	256	319	277.4	947
34	278	273	250	256	316	274.6	894
35	275	270	247	259	313	272.8	966
36	273	268	244	263	310	271.6	971
37	272	266	241	270	308	271.4	948
38	271	265	239	277	305	271.4	903
39	272	264	237	284	302	271.8	915
40	272	263	235	289	300	271.8	1068
41	271	262	233	292	298	271.2	1153
42	272	261	231	294	296	270.8	1115
43	271	260	230	293	293	269.4	940
44	270	258	228	292	291	267.8	837
45	269	258	227	295	290	267.8	840
46	267	256	225	299	288	267.0	881
47	265	256	224	304	286	267.0	916

WOODSTOVE SURFACE TEMPERATURE DATA

Client: FPI
Model: I2500
Run #: 2

Job #: 18-434
Tracking #: 0014
Technician: SJB
Date: 10/30/2018

	Temperature Data (°F)						
Elapsed Time (min)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
48	265	256	223	310	284	267.6	926
49	265	256	222	316	282	268.2	923
50	264	257	222	321	281	269.0	913
51	264	257	222	326	279	269.6	897
52	265	258	221	331	278	270.6	923
53	267	259	222	335	277	272.0	917
54	268	260	222	340	276	273.2	880
55	270	260	222	343	274	273.8	882
56	270	261	222	346	273	274.4	887
57	273	262	222	349	272	275.6	892
58	274	262	223	352	271	276.4	915
59	276	263	223	353	269	276.8	956
60	277	263	224	355	269	277.6	960
61	278	263	224	355	268	277.6	990
62	279	265	225	358	267	278.8	1021
63	281	266	226	360	266	279.8	1020
64	283	267	227	363	265	281.0	980
65	285	269	229	366	264	282.6	940
66	287	270	230	368	263	283.6	950
67	289	272	232	370	262	285.0	977
68	291	273	235	372	261	286.4	1014
69	294	275	237	375	260	288.2	1058
70	296	276	239	377	260	289.6	1101
71	297	278	242	380	258	291.0	1099
72	300	279	244	381	258	292.4	1073
73	302	281	245	385	257	294.0	1044
74	303	282	247	387	256	295.0	1017
75	305	283	249	388	256	296.2	1001
76	306	284	250	390	255	297.0	989
77	309	285	252	390	254	298.0	977
78	309	286	253	391	253	298.4	965
79	312	286	254	392	252	299.2	959
80	312	288	256	392	252	300.0	957
81	314	288	257	393	251	300.6	953
82	315	288	258	392	251	300.8	950
83	316	288	260	392	250	301.2	946
84	318	289	261	393	249	302.0	947
85	318	289	262	393	249	302.2	958
86	320	289	264	393	248	302.8	966
87	321	290	264	393	248	303.2	967
88	321	290	266	393	247	303.4	968
89	322	290	266	392	247	303.4	966
90	323	290	268	392	247	304.0	961
91	324	290	269	392	246	304.2	945
92	323	291	270	392	245	304.2	926
93	326	290	270	390	245	304.2	910
94	326	291	271	389	245	304.4	899
95	327	290	272	388	244	304.2	891

WOODSTOVE SURFACE TEMPERATURE DATA

Client: FPI
Model: I2500
Run #: 2

Job #: 18-434
Tracking #: 0014
Technician: SJB
Date: 10/30/2018

	Temperature Data (°F)						
Elapsed Time (min)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
96	327	291	272	387	244	304.2	886
97	327	291	273	386	244	304.2	882
98	328	290	273	385	243	303.8	876
99	327	290	274	383	243	303.4	868
100	327	290	274	382	243	303.2	858
101	327	290	275	381	242	303.0	849
102	327	290	275	379	242	302.6	842
103	328	290	275	378	242	302.6	839
104	327	290	275	378	242	302.4	836
105	327	290	276	377	241	302.2	834
106	326	290	276	377	241	302.0	834
107	326	291	276	378	241	302.4	832
108	326	291	276	377	241	302.2	817
109	326	291	277	377	241	302.4	807
110	326	291	278	376	241	302.4	801
111	325	291	278	377	241	302.4	789
112	326	291	278	375	240	302.0	775
113	325	293	279	374	240	302.2	763
114	326	292	279	371	239	301.4	755
115	326	292	280	368	240	301.2	752
116	325	292	281	366	239	300.6	750
117	324	292	281	362	239	299.6	748
118	324	292	282	358	239	299.0	744
119	325	292	282	355	239	298.6	741
120	324	293	283	351	239	298.0	737
121	324	293	283	348	239	297.4	734
122	322	293	283	345	239	296.4	729
123	324	292	284	343	239	296.4	724
124	323	293	284	340	239	295.8	720
125	322	293	284	338	239	295.2	718
126	321	293	285	335	239	294.6	714
127	321	293	285	332	239	294.0	712
128	322	294	285	330	239	294.0	711
129	321	294	286	329	239	293.8	710
130	322	293	286	327	239	293.4	708
131	322	294	287	326	239	293.6	708
132	321	294	286	324	239	292.8	708
133	320	294	286	322	239	292.2	708
134	319	296	287	321	240	292.6	708
135	320	295	288	320	239	292.4	708
136	320	295	288	319	239	292.2	707
137	319	296	288	317	240	292.0	707
138	319	296	288	316	240	291.8	707
139	320	296	289	315	240	292.0	708
140	320	296	289	315	240	292.0	709
141	320	296	290	313	240	291.8	710
142	319	297	290	313	240	291.8	713
143	318	297	290	313	241	291.8	715

WOODSTOVE SURFACE TEMPERATURE DATA

Client: FPI
Model: I2500
Run #: 2

Job #: 18-434
Tracking #: 0014
Technician: SJB
Date: 10/30/2018

	Temperature Data (°F)						
Elapsed Time (min)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
144	319	297	291	313	241	292.2	715
145	319	297	292	311	241	292.0	716
146	319	297	292	312	241	292.2	714
147	320	298	292	312	241	292.6	710
148	319	298	293	311	241	292.4	710
149	319	298	294	311	241	292.6	711
150	319	299	295	309	241	292.6	712
151	320	298	295	309	242	292.8	714
152	320	298	296	308	242	292.8	715
153	320	298	296	307	242	292.6	717
154	321	298	297	305	242	292.6	720
155	321	299	298	305	242	293.0	722
156	320	299	298	304	242	292.6	723
157	321	298	299	302	243	292.6	726
158	322	299	299	300	243	292.6	727
159	320	300	300	299	243	292.4	730
160	322	300	301	299	244	293.2	732
161	321	300	302	298	244	293.0	731
162	323	300	302	297	244	293.2	729
163	325	300	302	296	244	293.4	726
164	324	301	303	295	244	293.4	723
165	323	301	303	295	244	293.2	719
166	324	300	304	293	244	293.0	709
167	325	300	304	291	245	293.0	699
168	325	300	305	290	245	293.0	688
169	325	301	305	289	245	293.0	680
170	325	301	305	288	245	292.8	675
171	325	301	306	286	246	292.8	670
172	323	301	306	285	247	292.4	665
173	322	302	306	284	246	292.0	659
174	323	301	307	281	247	291.8	653
175	323	302	306	279	247	291.4	646
176	322	301	307	278	248	291.2	641
177	319	302	308	275	248	290.4	638
178	318	302	307	274	249	290.0	635
179	319	301	307	272	249	289.6	632
180	317	302	307	271	249	289.2	631
181	318	302	307	269	249	289.0	631
182	317	302	307	267	250	288.6	631
183	317	302	308	265	250	288.4	632
184	315	302	308	263	251	287.8	636
185	316	302	307	261	251	287.4	641
186	314	302	307	258	252	286.6	645
187	315	301	307	256	252	286.2	650
188	314	302	306	253	253	285.6	657
189	313	301	306	250	253	284.6	657
190	312	300	306	247	254	283.8	654
191	311	299	305	245	254	282.8	653

WOODSTOVE SURFACE TEMPERATURE DATA

Client: FPI
Model: I2500
Run #: 2

Job #: 18-434
Tracking #: 0014
Technician: SJB
Date: 10/30/2018

	Temperature Data (°F)						
Elapsed Time (min)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
192	312	299	304	242	255	282.4	652
193	311	298	303	240	255	281.4	651
194	312	297	303	237	256	281.0	647
195	311	297	303	235	256	280.4	647
196	311	295	301	233	256	279.2	648
197	310	295	301	231	257	278.8	646
198	309	296	300	229	258	278.4	645
199	309	294	299	227	258	277.4	643
200	309	293	298	224	258	276.4	642
201	308	292	298	223	259	276.0	641
202	308	292	297	221	259	275.4	639
203	308	291	296	220	260	275.0	637
204	307	291	295	218	260	274.2	636
205	307	290	295	216	261	273.8	634
206	308	289	294	214	262	273.4	632
207	306	289	294	213	262	272.8	630
208	307	288	294	212	262	272.6	629
209	305	288	294	211	263	272.2	627
210	305	289	293	210	263	272.0	624
211	305	288	293	209	264	271.8	620
212	305	287	293	208	264	271.4	618
213	305	287	292	207	264	271.0	616
214	304	287	292	206	265	270.8	614
215	304	287	291	204	265	270.2	615
216	304	286	291	203	265	269.8	614
217	305	286	291	203	266	270.2	613
218	304	286	290	202	266	269.6	612
219	303	286	289	201	267	269.2	612
220	304	286	289	201	267	269.4	611
221	303	285	289	201	267	269.0	608
222	304	285	288	199	267	268.6	605
223	302	285	288	199	268	268.4	602
224	302	285	288	198	268	268.2	598
225	301	285	287	198	268	267.8	596
226	302	284	286	197	268	267.4	593
227	302	284	286	197	269	267.6	591
228	302	283	286	197	269	267.4	588
229	301	283	285	196	269	266.8	586
230	302	284	284	196	269	267.0	586
231	300	284	284	195	270	266.6	592
232	300	283	284	194	270	266.2	597
233	301	283	284	194	270	266.4	601
234	301	283	283	194	271	266.4	603
235	300	283	282	193	270	265.6	603
236	300	282	282	192	271	265.4	603
237	299	282	281	192	271	265.0	603
238	300	282	281	192	272	265.4	602
239	300	282	281	192	271	265.2	601

WOODSTOVE SURFACE TEMPERATURE DATA

Client: FPI
Model: I2500
Run #: 2

Job #: 18-434
Tracking #: 0014
Technician: SJB
Date: 10/30/2018

	Temperature Data (°F)						
Elapsed Time (min)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
240	298	283	281	192	272	265.2	601
241	298	283	280	191	273	265.0	600
242	299	282	280	191	272	264.8	599
243	298	283	280	191	272	264.8	598
244	299	282	280	191	273	265.0	597
245	299	282	279	191	273	264.8	596
246	298	283	279	191	273	264.8	595
247	297	283	279	191	274	264.8	594
248	298	282	279	191	275	265.0	593
249	297	282	279	191	275	264.8	592
250	298	282	278	191	275	264.8	590
251	298	283	278	191	275	265.0	588
252	297	282	278	191	276	264.8	586
253	298	282	278	191	276	265.0	585
254	298	282	279	191	277	265.4	585
255	298	284	278	191	277	265.6	584
256	298	283	278	192	277	265.6	583
257	299	283	278	191	278	265.8	582
258	299	282	279	191	278	265.8	582
259	299	283	279	191	278	266.0	582
260	299	283	279	191	279	266.2	581
261	300	283	279	191	279	266.4	580
262	298	283	279	191	279	266.0	579
263	299	283	279	192	279	266.4	578
264	299	283	279	192	280	266.6	578
265	299	283	280	191	280	266.6	579
266	298	282	280	191	281	266.4	579
267	298	282	280	192	281	266.6	580
268	299	283	281	191	281	267.0	580
269	299	283	280	191	282	267.0	582
270	299	283	281	191	281	267.0	584
271	300	283	281	191	282	267.4	584
272	299	283	282	191	283	267.6	584
273	300	283	282	191	282	267.6	583
274	299	282	282	191	283	267.4	582
275	299	282	282	191	283	267.4	582
276	299	282	283	191	283	267.6	580
277	299	282	283	191	283	267.6	577
278	299	282	283	191	284	267.8	574
279	300	282	283	191	284	268.0	571
280	300	282	283	191	284	268.0	569
281	300	283	284	191	284	268.4	567
282	299	283	283	191	285	268.2	565
283	300	282	284	191	285	268.4	563
284	300	282	284	191	284	268.2	560
285	299	282	284	191	284	268.0	557
286	299	283	285	190	285	268.4	555
287	300	282	284	191	285	268.4	554

WOODSTOVE SURFACE TEMPERATURE DATA

Client: FPI
Model: I2500
Run #: 2

Job #: 18-434
Tracking #: 0014
Technician: SJB
Date: 10/30/2018

	Temperature Data (°F)						
Elapsed Time (min)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
288	299	282	284	190	285	268.0	552
289	299	282	284	190	285	268.0	550
290	300	282	285	190	285	268.4	547
291	299	281	284	190	285	267.8	545
292	300	281	284	190	285	268.0	541
293	298	281	285	189	285	267.6	537
294	299	281	284	189	286	267.8	536
295	298	281	284	188	285	267.2	533
296	298	280	284	188	286	267.2	531
297	298	282	284	188	286	267.6	529
298	298	281	284	188	285	267.2	528
299	298	279	284	187	285	266.6	527
300	297	280	284	187	285	266.6	527
301	297	280	284	186	285	266.4	527
302	297	279	284	186	284	266.0	526
303	297	280	284	186	285	266.4	525
304	296	279	284	186	284	265.8	524
305	296	278	284	185	284	265.4	524
306	296	278	283	185	285	265.4	523
307	296	278	284	185	283	265.2	522
308	295	278	283	184	283	264.6	521
309	296	278	283	185	283	265.0	521
310	295	277	283	184	283	264.4	520
311	295	277	283	184	283	264.4	519
312	295	276	283	184	283	264.2	518
313	294	276	283	183	283	263.8	517
314	294	276	283	183	283	263.8	515
315	295	276	283	183	282	263.8	515
316	292	276	283	183	282	263.2	515
317	292	276	282	183	281	262.8	514
318	292	275	283	182	282	262.8	513
319	292	275	283	182	280	262.4	512
320	294	275	283	181	281	262.8	512
321	293	275	282	181	280	262.2	512
322	292	275	282	181	280	262.0	511
323	293	274	282	181	280	262.0	510
324	292	274	282	180	280	261.6	509
325	290	274	282	181	280	261.4	510
326	291	273	282	181	279	261.2	509
327	292	273	281	181	279	261.2	509
328	291	273	281	181	279	261.0	509
329	290	274	281	180	279	260.8	509
330	289	273	280	180	278	260.0	509
331	290	272	280	180	278	260.0	509
332	290	273	280	179	278	260.0	509
333	289	273	280	180	278	260.0	509
334	289	273	280	179	277	259.6	508
335	289	273	279	179	277	259.4	507

WOODSTOVE SURFACE TEMPERATURE DATA

Client: FPI
Model: I2500
Run #: 2

Job #: 18-434
Tracking #: 0014
Technician: SJB
Date: 10/30/2018

	Temperature Data (°F)						
Elapsed Time (min)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
336	288	272	279	180	277	259.2	507
337	289	272	279	178	278	259.2	505
338	288	271	279	178	277	258.6	505
339	287	271	279	178	276	258.2	504
340	288	271	279	178	276	258.4	504
341	287	271	279	178	276	258.2	503
342	286	271	279	178	277	258.2	503
343	287	271	279	177	276	258.0	503
344	286	272	278	178	276	258.0	504
345	287	271	278	177	275	257.6	504
346	286	271	278	177	276	257.6	504
347	285	271	278	177	276	257.4	504
348	285	271	278	177	275	257.2	503
349	285	271	279	177	275	257.4	503
350	284	271	278	177	275	257.0	504
351	284	271	278	176	275	256.8	504
352	284	270	278	176	275	256.6	504
353	284	270	277	176	275	256.4	504
354	284	270	277	176	274	256.2	504
355	283	270	277	176	274	256.0	504
356	283	270	277	176	274	256.0	504
357	283	270	277	176	274	256.0	504
358	283	270	276	176	274	255.8	504
359	282	269	276	176	274	255.4	504
360	281	270	276	176	273	255.2	505
361	280	270	276	175	273	254.8	506
362	280	269	276	175	273	254.6	506
363	280	269	276	175	273	254.6	505
364	281	269	275	175	273	254.6	505
365	280	269	275	175	273	254.4	505
366	279	270	275	174	273	254.2	504
367	279	269	275	174	272	253.8	504
368	279	269	274	174	272	253.6	504
369	278	269	274	174	272	253.4	504
370	277	268	274	174	272	253.0	505
371	277	268	273	174	272	252.8	510
372	277	268	273	173	272	252.6	511
373	277	269	272	174	271	252.6	508
374	277	269	272	173	271	252.4	504
375	277	268	271	173	271	252.0	500
376	277	268	271	173	271	252.0	499
377	276	268	270	173	271	251.6	499
378	275	268	270	173	271	251.4	498
379	275	268	269	172	271	251.0	498
380	275	268	268	172	270	250.6	500
381	274	268	268	172	270	250.4	501
382	274	269	267	172	271	250.6	501
383	274	268	266	172	270	250.0	501

WOODSTOVE SURFACE TEMPERATURE DATA

Client: FPI
Model: I2500
Run #: 2

Job #: 18-434
Tracking #: 0014
Technician: SJB
Date: 10/30/2018

	Temperature Data (°F)						
Elapsed Time (min)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
384	274	268	266	172	270	250.0	501
385	273	267	265	172	271	249.6	500
386	272	267	265	172	270	249.2	499
387	272	267	264	171	270	248.8	498
388	273	268	263	171	270	249.0	497
389	272	267	263	171	270	248.6	497
390	272	267	262	171	270	248.4	495
391	271	267	262	170	269	247.8	494
392	271	266	261	170	269	247.4	493
393	271	267	261	170	269	247.6	491
394	270	266	260	170	269	247.0	490
395	270	265	259	169	269	246.4	488
396	271	265	259	169	268	246.4	487
397	269	265	258	169	268	245.8	484
398	269	265	257	169	267	245.4	482
399	268	264	257	169	268	245.2	481
400	268	264	256	168	267	244.6	481
401	268	264	256	168	267	244.6	480
402	267	264	255	168	266	244.0	480
403	266	263	254	167	266	243.2	480
404	267	263	253	167	265	243.0	480
405	266	263	253	167	264	242.6	479
406	266	262	253	166	264	242.2	479
407	266	262	252	166	265	242.2	477
408	265	261	251	166	264	241.4	477
409	264	262	250	166	263	241.0	476
410	263	261	250	166	263	240.6	475
411	263	261	249	165	263	240.2	474
412	263	260	249	165	262	239.8	473
413	263	260	248	164	262	239.4	472
414	261	260	248	164	261	238.8	471
415	262	260	247	164	261	238.8	471
416	262	260	247	164	261	238.8	470
417	261	260	246	164	260	238.2	469
418	261	260	246	163	260	238.0	468
419	261	260	245	163	260	237.8	468
420	260	260	245	163	259	237.4	467
421	260	259	245	162	259	237.0	466
422	259	259	244	162	258	236.4	465
423	259	259	243	162	259	236.4	464
424	258	258	243	162	258	235.8	464
425	259	258	243	161	257	235.6	463
426	258	258	242	161	257	235.2	463
427	257	258	242	161	257	235.0	462
428	257	258	241	161	257	234.8	462
429	256	258	241	160	256	234.2	462
430	256	257	241	160	256	234.0	462
431	256	258	240	160	255	233.8	462

WOODSTOVE SURFACE TEMPERATURE DATA

Client: FPI
Model: I2500
Run #: 2

Job #: 18-434
Tracking #: 0014
Technician: SJB
Date: 10/30/2018

	Temperature Data (°F)						
Elapsed Time (min)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
432	255	257	240	160	255	233.4	462
433	255	256	240	160	256	233.4	462
434	255	256	240	159	255	233.0	462
435	254	256	240	159	255	232.8	462
436	254	256	239	159	254	232.4	462
437	254	255	239	159	254	232.2	462
438	253	255	238	158	254	231.6	460
439	253	254	238	158	254	231.4	459
440	253	255	238	158	254	231.6	459
441	253	255	238	158	254	231.6	458
442	253	254	237	157	254	231.0	457
443	251	253	237	157	253	230.2	457
444	251	254	236	157	253	230.2	457
445	252	253	236	156	252	229.8	455
446	251	252	236	156	252	229.4	454
447	251	252	236	156	251	229.2	453
448	251	251	235	156	251	228.8	451
449	250	251	235	155	250	228.2	450
450	250	250	235	155	250	228.0	449
451	248	250	234	154	249	227.0	448
452	249	250	234	154	248	227.0	447
453	248	249	234	154	247	226.4	446
454	248	248	233	154	247	226.0	446
455	248	249	233	154	247	226.2	446
456	248	248	233	154	246	225.8	445
457	248	248	232	153	245	225.2	444
458	247	248	232	153	245	225.0	443
459	247	247	232	153	244	224.6	442
460	246	247	232	153	244	224.4	441
461	246	246	232	152	244	224.0	440
462	246	246	232	152	243	223.8	440
463	245	246	232	151	243	223.4	438
464	245	245	232	152	243	223.4	438
465	246	245	231	151	242	223.0	438
466	244	245	231	151	242	222.6	437
467	244	245	231	150	241	222.2	437
468	244	245	231	150	241	222.2	437
469	244	244	230	151	241	222.0	438
470	244	244	230	151	240	221.8	437
471	243	243	230	150	240	221.2	437
472	244	243	230	149	240	221.2	436
473	243	242	230	149	240	220.8	436
474	243	243	230	149	239	220.8	435
475	243	242	230	149	239	220.6	434
476	242	241	230	149	239	220.2	434
477	243	241	229	148	239	220.0	432
478	243	241	229	149	238	220.0	432
479	241	240	229	149	238	219.4	431

WOODSTOVE SURFACE TEMPERATURE DATA

Client: FPI
Model: I2500
Run #: 2

Job #: 18-434
Tracking #: 0014
Technician: SJB
Date: 10/30/2018

	Temperature Data (°F)						
Elapsed Time (min)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
480	243	241	229	149	238	220.0	431
481	241	240	229	148	237	219.0	430
482	241	240	229	148	238	219.2	428
483	242	239	229	148	237	219.0	426
484	241	239	228	148	237	218.6	423
485	240	239	229	147	237	218.4	419
486	240	238	228	147	236	217.8	416
487	240	238	228	147	236	217.8	416
488	240	238	228	147	236	217.8	419
489	240	238	228	147	236	217.8	421
490	240	237	229	147	236	217.8	423
491	239	237	227	147	236	217.2	425
492	240	236	228	146	236	217.2	426
493	241	237	228	146	235	217.4	426
494	239	235	228	146	235	216.6	425
495	240	235	227	146	235	216.6	425
496	239	235	228	146	235	216.6	424
497	240	235	228	146	235	216.8	423
498	239	234	227	146	235	216.2	423
499	238	235	227	146	234	216.0	422
Average	294	281	273	235	268	270	645

LAB SAMPLE DATA - ASTM E2515

Client: FPI
Job #: 18-434
Model: I2500
Tracking #: 0014
Run #: 2
Technician: SJB
Date: 10/30/2018

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	T025	86.1	82.4	3.7
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:	3.7

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	T026	167.3	82.8	2.2
B. Rear filter catch	Filter	T027		82.3	
C. Probe catch*	Probe	2A	116240.5	116240.2	0.3
D. O-Ring catch*	O-Ring	2A	3552.9	3552.6	0.3

Sub-Total	Total Particulate, mg:	2.8

Train A Aggregate	Total Particulate, mg:	**6.5**

TRAIN B

Sample Component	Reagent	Filter, Probe, or O-Ring #	Weights		
			Final, mg	Tare, mg	Particulate, mg
A. Front filter catch	Filter	T028, T031	254.0	166.3	5.7
B. Rear filter catch	Filter	T029		82.0	
C. Probe catch*	Probe	2B	116330.7	116330.3	0.4
D. O-Ring catch*	O-Ring	2B	3571.0	3570.8	0.2

Total Particulate, mg:	**6.3**

AMBIENT

Sample Component	Reagent	Filter, Probe, or O-Ring #	Weights		
			Final, mg	Tare, mg	Particulate, mg
A. Filter catch*	Filter	T030	81.9	81.8	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: 18-434 | Tracking #: 0014
Model: I2500 | Run Number: 2 | Test Date: 10/30/2018

Wood Heater Run Notes

Pre-Test Notes

Pre-Test Start Time: 8:00
Air Control Setting: High Setting - Fully Open

Time	Notes
0 min	Started sampling/kindling ignition with propane torch for 25 seconds. Door cracked open 2.5", bypass open, air control set to high air setting, blower off. Starting kindling in stove was 2.3 lbs plus a couple sheets of printer paper.
2 min	Door closed to 3/4"
3 min	Door latched closed
5 min	Catalyst bypass closed
7 min	At 0.9 lbs, added 2.4 lbs of start-up fuel, door closed within 60 seconds
20 min	At 1.0 lbs, added 2.9 lbs of start-up fuel, door closed within 35 seconds
28 min	At 2.3 lbs, added 2.4 lbs of start-up fuel, door closed within 30 seconds
36 min	At 2.5 lbs, leveled coal bed, loaded high fire fuel, done in 30 seconds, door closed at 40 sec from loading
56 min	Blower fan turned on to high setting.
124 min	At 7.0 lbs stirred fuel forward to ensure uniform charcoalization.
157 min	At 4.4 lbs, leveled coal bed, turned off fan, zeroed scale in preparation of fuel loading.

Test Notes

Test Burn Start Time: 10:38
Air Control Setting: Low Setting - Fully Closed

Time	Notes
0 min	Loaded test load, fuel in and door closed in 50 seconds, fan off, air on high setting, bypass closed throughout fuel loading
6 min	Set air to test setting, fully closed.
20 min	Blower fan turned on to high
60 min	Changed 1-hour filter
112 min	Changed Train B front filter due to plugging

Test Burn End Time: 18:57

Flue Gas Concentration Measurement

Calibration Gas Values: Span Gas CO_2 (%): 16.93 CO (%): 4.330
Mid Gas CO_2 (%): 10.00 CO (%): 2.51

Calibration Results:

	Pre Test			Post Test		
	Zero	Mid	Span	Zero	Mid	Span
Time	8:23	8:30	8:26	19:15	19:18	19:23
CO_2	0.00	10.13	16.93	-0.01	9.99	16.86
CO	0.000	2.512	4.330	-0.013	2.474	4.311

Technician Signature:  Date: 11/1/2018

ASTM E3053 Wood Heater Run Sheets

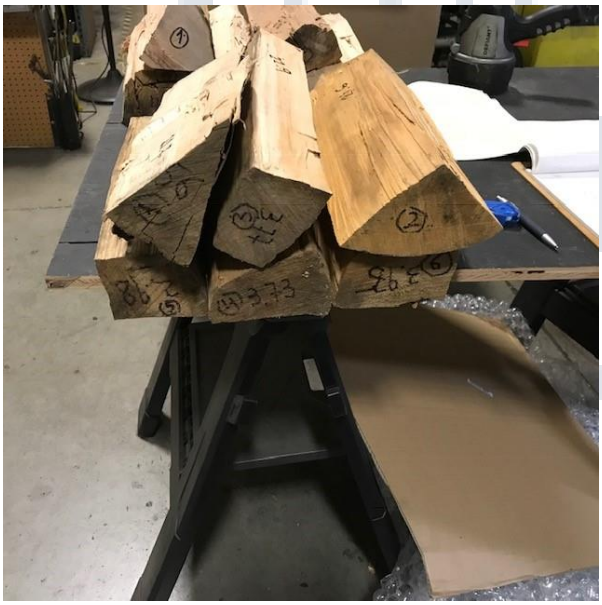
Client: FPI | Job Number: 18-434 | Tracking #: 0014
Model: I2500 | Run Number: 2 | Test Date: 10/30/2018

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

Test Photos

Kindling Fuel Load

Start-up Fuel Load



High Fire Fuel Load

Residual Start-up Fuel Coal Bed

Technician Signature: Date: 11/1/2018

ASTM E3053 Wood Heater Run Sheets

Client: FPI Job Number: 18-434 Tracking #: 0014
Model: I2500 Run Number: 2 Test Date: 10/30/2018

High Fire Fuel Loaded

Residual High Fire Load Coal Bed

Low Fire Fuel Load

Low Fire Fuel Loaded

Technician Signature: Date: 11/1/2018

WOOD STOVE TEST DATA PACKET
ASTM E3053/E2515

Run 3 Data Summary

Client:	FPI
Model:	I2500
Job #:	18-434
Tracking #:	0014
Test Date:	10/31/2018

11/2/2018

Techician Signature — Date

TEST RESULTS - ASTM E3053 / ASTM E2515

Client: FPI
Model: I2500
Run #: 3

Job #: 18-434
Tracking #: 0014
Technician: SJB
Date: 10/31/2018

Burn Rate (kg/hr):	1.40

	Ambient Sample	Sample Train A	Sample Train B	1st Hour Filter
Total Sample Volume (ft^3)	52.648	61.372	59.624	8.658
Average Gas Velocity in Dilution Tunnel (ft/sec)	15.4			
Average Gas Flow Rate in Dilution Tunnel (dscf/hr)	10188.0			
Average Gas Meter Temperature (°F)	69.1	78.2	92.7	76.7
Total Sample Volume (dscf)	52.666	60.863	57.281	8.609
Average Tunnel Temperature (°F)	93.5			
Total Time of Test (min)	413			
Total Particulate Catch (mg)	0.0	3.4	3.8	1.7
Particulate Concentration, dry-standard (g/dscf)	0.0000000	0.0000559	0.0000663	0.0001975
Total PM Emissions (g)	0.00	3.92	4.65	2.01
Particulate Emission Rate (g/hr)	0.00	0.57	0.68	2.01
Emissions Factor (g/kg)	-	0.41	0.48	-
Difference from Average Total Particulate Emissions (g)	-	0.37	0.37	-
Difference from Average Emissions Factor (g/kg)	-	0.04	0.04	-

Final Average Results	
Total Particulate Emissions (g)	4.28
Particulate Emission Rate (g/hr)	0.62
Emissions Factor (g/kg)	0.45
HHV Efficiency (%)	76.9%
LHV Efficiency (%)	82.3%
CO Emissions (g/min)	0.19

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: 83 / Max: 88	OK
Face Velocity	< 30 ft/min	8.4	OK
Leakage Rate	Less than 4% of average sample rate	0.002 cfm	OK
Ambient Temp	55-90 °F	Min: 64 / Max: 75	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:	I2500
Date:	10/31/18
Run:	3
Control #:	18-434
Test Duration:	413
Output Category:	Medium

Test Results in Accordance with CSA B415.1-09

	HHV Basis	LHV Basis
Overall Efficiency	76.9%	82.3%
Combustion Efficiency	99.5%	99.5%
Heat Transfer Efficiency	77.3%	82.7%

Output Rate (kJ/h)	21,323	20,227	**(Btu/h)**
Burn Rate (kg/h)	1.39	3.06	**(lb/h)**
Input (kJ/h)	27,710	26,286	**(Btu/h)**

Test Load Weight (dry kg)	9.56	21.06	**dry lb**
MC wet (%)	18.37		
MC dry (%)	22.50		
Particulate (g)	4.28		
CO (g)	80		
Test Duration (h)	6.88		

Emissions	**Particulate**	**CO**
g/MJ Output	0.03	0.54
g/kg Dry Fuel	0.45	8.36
g/h	0.62	11.61
g/min	0.01	0.19
lb/MM Btu Output	0.07	1.27

Air/Fuel Ratio (A/F)	13.41

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	4.96	lb	In Range		
	2	3.95	lb	In Range		
	3	3.42	lb	In Range		
Core Load Total. Wt. Actual		12.33	lb	In Range		
	Pc. #					
Remainder Load Piece Wt.	1	3.11	lb	In Range		
(1 to 3 Pcs.)	2	2.82	lb	In Range		
	3	3.31	lb	In Range		
Remainder Load Tot. Wt. Act		9.24	lb	In Range		
Total Load Wt. Actual		21.57	lb	In Range		
Core % of Total Wt.		57%		In Range		45-65%
Remainder % of Total Wt.		43%		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.)		4.31	lb			
Actual Kindling Wt.		4.06	lb	In Range		18.8%
Maximum Start-up Fuel Wt. (30% of Tot. Load Wt.)		6.47	lb			
Actual Start-up Fuel Wt.		5.86	lb	In Range		27.2%
Allowable Residual Start-up Fuel Wt. Range	2.2	to	4.3	lb		Mid-Point
Actual Residual Start-up Fuel Wt.		2.2	lb	In Range		3.2
Total Wt. All Fuel Added (wet basis)		31.49	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		2.2
Actual Fuel Load Ending Wt.		2.3	lb	In Range		

Fuel Piece Moisture Reading (%-dry basis)								
1	2	3	Ave.		Pc. Wt. Dry Basis			
22	23.4	23.1	22.8	In Range	4.04	lb	1.83	kg
20	20.7	24.8	21.8	In Range	3.24	lb	1.47	kg
22.6	23.1	20.8	22.2	In Range	2.80	lb	1.27	kg
25	18.6	19.7	21.1	In Range	2.57	lb	1.16	kg
21.3	22.1	21.9	21.8	In Range	2.32	lb	1.05	kg
21.6	20.4	19.6	20.5	In Range	2.75	lb	1.25	kg
Total Load Ave. MC (%-dry basis)			21.8	In Range				
Total Load Ave. MC % (wet basis)			17.9					
Total Test Load Weight (dry basis) →					17.71	lb	8.03	kg
Kindling Moisture (%-dry basis)								
10	10	10	10.0	In Range	3.69	lb	1.67	kg
Start-up Fuel Moisture Readings (%-dry basis)								
23.1	22.8	22.8	22.9	In Range	4.77	lb	2.16	kg
Total Wt. All Fuel Added (dry basis) →					26.17	lb	11.87	kg
Total Wt. All Fuel Burned (dry basis) →					21.7	lb	9.8	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	5.14	lb	In Range		
	2	5.75	lb	In Range		
	3	4.50	lb	In Range		
Core Load Total. Wt. Actual		15.39	lb	In Range		
	Pc. #					
Remainder Load Piece Wt.	1	6.46	lb	In Range		
(2 or 3 Pcs.)	2	4.06	lb	In Range		
	3		lb	NA		
Remainder Load Piece Weight Ratio - Small/Large		63%		In Range		≤ 67%
Remainder Load Tot. Wt. Act		10.52	lb	In Range		
Total Load Wt. Actual		25.91	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		96%		In Range		95-105%
Actual Fuel Load Density		11.6	lb/ft^3			
Allowable Charcoal Bed Wt. Range (lb)	2.6	to	5.1			Mid-Point
Actual Charcoal Bed Wt.		4.5	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.		25.9	lb			

Fuel Piece Moisture Reading (%-dry basis)									
1	2	3	Ave.		Pc. Wt. Dry Basis				
23.6	22.7	25.7	24.0	In Range	4.15	lb	1.88	kg	
22.7	22.5	18.7	21.3	In Range	4.74	lb	2.15	kg	
19.3	22.3	24.8	22.1	In Range	3.68	lb	1.67	kg	
24.2	21.8	19.4	21.8	In Range	5.30	lb	2.41	kg	
22.1	25.3	24.2	23.9	In Range	3.28	lb	1.49	kg	
			NA	NA	NA	lb	NA	kg	
Total Load Ave. MC % (dry basis)			22.5	In Range					
Total Load Ave. MC % (wet basis)			18.4						
Total Test Load Weight (dry basis) →					21.15	lb	9.59	kg	
Total Fuel Weight Burned During Test Run (dry basis)					21.2	lb	9.59	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

DILUTION TUNNEL & MISC. DATA - ASTM E3053 / E2515

Client:	FPI	Job #:	18-434
Model:	I2500	Tracking #:	0014
Run #:	3	Technician:	SJB
Test Start Time:	9:27	Date:	10/31/2018
Test Type:	Medium Fire		

Recording Interval (min):	1
Total Sampling Time (min):	413

	Pre-Test	Post Test	Avg.
Barometric Pressure (in. Hg)	30.04	30.03	30.04
Relative Humidity (%)	43.1	53.8	
Room Air Velocity (ft/min)	0	0	
Scale Audit (lbs)	10.0	10.0	

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

Ambient Sample Volume: 52.648 ft^3

Induced Draft Check (in. H_2O):	0
Smoke Capture Check (%):	100%
Date Flue Pipe Last Cleaned:	10/26/2018

Sample Train Post-Test Leak Checks

(A)	0.002	cfm @	-12	in. Hg
(B)	0.000	cfm @	-12	in. Hg
(Ambient)	0.002	cfm @	-14	in. Hg

DILUTION TUNNEL FLOW

Traverse Data

Point	dP (in H_2O)	Temp (°F)
1	0.040	115
2	0.058	115
3	0.058	115
4	0.046	115
5	0.044	114
6	0.060	114
7	0.060	114
8	0.040	114
Center	0.060	114

Static Pressure: -0.190 in. H_2O

Dilution Tunnel H_2O:	2.00	percent
Tunnel Diameter:	6	inches
Pitot Tube Cp:	0.99	[unitless]
Dilution Tunnel MW(dry):	29.00	lb/lb-mole
Dilution Tunnel MW(wet):	28.78	lb/lb-mole
Tunnel Area:	0.1963	ft^2
V_{strav}:	15.65	ft/sec
V_{scent}:	16.90	ft/sec
F_p:	0.926	[ratio]
Initial Tunnel Flow:	165.0	scf/min

TEST FUEL PROPERTIES

Default 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 Used Properties

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

WOODSTOVE PREBURN DATA

Client: FPI
Model: I2500
Run #: 3

Job #: 18-434
Tracking #: 0014
Technician: SJB
Date: 10/31/2018

Preburn Start Time: 7:00
Recording Interval (min): 1
Run Time (min): 146

			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	2.3	-0.004	67	66	67	67	67	66.8	67	62
1	2.1	-0.039	67	66	67	67	67	66.8	118	63
2	1.8	-0.088	67	67	70	67	67	67.6	264	63
3	1.3	-0.109	69	70	81	69	67	71.2	461	63
4	1.1	-0.077	73	77	92	74	67	76.6	449	63
5	0.8	-0.067	80	87	102	83	67	83.8	457	64
6	0.7	-0.060	89	98	109	94	69	91.8	439	63
7	0.5	-0.059	99	109	116	107	71	100.4	429	63
8	0.3	-0.071	111	121	122	121	74	109.8	418	63
9	3.7	-0.083	123	132	129	136	78	119.6	433	63
10	3.5	-0.074	134	143	137	150	83	129.4	434	63
11	3.3	-0.070	145	152	143	164	87	138.2	483	63
12	3.1	-0.079	155	161	149	179	92	147.2	526	63
13	2.8	-0.089	164	169	155	198	97	156.6	550	63
14	2.6	-0.066	173	177	161	219	102	166.4	560	63
15	2.2	-0.085	182	184	168	240	107	176.2	567	63
16	2.1	-0.075	191	192	176	264	112	187.0	567	63
17	1.8	-0.082	201	200	184	286	117	197.6	568	63
18	1.6	-0.083	211	209	192	310	122	208.8	576	63
19	1.4	-0.083	221	219	201	332	128	220.2	584	63
20	1.2	-0.072	232	228	210	354	133	231.4	590	63
21	1.0	-0.080	243	238	219	376	138	242.8	590	63
22	0.9	-0.081	254	248	228	394	143	253.4	562	63
23	2.9	-0.078	265	258	237	407	149	263.2	543	64
24	2.6	-0.070	275	267	246	419	154	272.2	528	64
25	2.6	-0.070	286	277	254	428	158	280.6	531	64
26	2.3	-0.083	295	285	262	437	163	288.4	541	64
27	2.1	-0.068	303	293	270	447	168	296.2	552	64
28	2.0	-0.072	312	301	278	453	173	303.4	562	64
29	3.8	-0.083	321	310	286	462	178	311.4	587	64
30	3.5	-0.089	329	317	293	471	183	318.6	577	64
31	3.3	-0.070	336	325	300	479	187	325.4	586	64
32	3.0	-0.091	343	332	308	488	192	332.6	588	64
33	2.8	-0.089	349	340	315	499	196	339.8	587	64
34	2.4	-0.083	356	348	322	509	200	347.0	587	64
35	2.2	-0.090	363	355	328	519	205	354.0	600	64
36	23.5	-0.085	369	363	335	530	210	361.4	616	64
37	23.3	-0.080	375	370	342	537	214	367.6	592	64
38	23.1	-0.074	381	377	347	541	218	372.8	582	64
39	22.7	-0.089	385	382	351	541	222	376.2	580	64
40	22.6	-0.084	387	385	355	542	226	379.0	583	64
41	22.4	-0.093	388	389	358	543	229	381.4	593	64
42	22.1	-0.098	389	390	360	546	233	383.6	601	64
43	21.9	-0.085	388	392	361	546	236	384.6	601	64

WOODSTOVE PREBURN DATA

Client: FPI
Model: I2500
Run #: 3

Job #: 18-434
Tracking #: 0014
Technician: SJB
Date: 10/31/2018

Preburn Start Time: 7:00
Recording Interval (min): 1
Run Time (min): 146

			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	21.7	-0.082	387	392	362	550	239	386.0	600	64
45	21.4	-0.084	386	392	363	550	243	386.8	601	65
46	21.2	-0.077	387	392	364	550	246	387.8	603	65
47	20.9	-0.078	385	392	364	554	248	388.6	604	65
48	20.7	-0.088	385	393	364	554	251	389.4	603	65
49	20.4	-0.086	383	391	364	558	253	389.8	603	65
50	20.2	-0.075	383	391	365	558	255	390.4	603	65
51	20.1	-0.087	382	391	366	562	257	391.6	604	65
52	19.7	-0.076	383	391	366	562	259	392.2	605	65
53	19.5	-0.072	382	391	366	561	261	392.2	604	65
54	19.3	-0.079	381	392	367	564	263	393.4	605	65
55	19.0	-0.085	381	391	368	566	265	394.2	607	65
56	18.8	-0.079	381	382	366	556	267	390.4	604	65
57	18.6	-0.078	380	380	363	545	268	387.2	599	65
58	18.3	-0.073	378	379	358	534	268	383.4	594	66
59	18.1	-0.086	378	377	354	524	268	380.2	593	66
60	17.9	-0.064	378	377	351	516	268	378.0	593	67
61	17.7	-0.074	376	377	348	508	268	375.4	591	67
62	17.5	-0.069	374	376	345	500	267	372.4	593	67
63	17.2	-0.083	375	376	342	495	266	370.8	593	67
64	17.0	-0.073	373	375	340	490	265	368.6	596	67
65	16.8	-0.085	373	375	338	487	264	367.4	600	67
66	16.5	-0.087	371	374	336	484	263	365.6	599	67
67	16.3	-0.068	370	375	334	480	262	364.2	603	66
68	16.0	-0.072	369	375	332	478	261	363.0	607	66
69	15.8	-0.086	368	376	331	476	260	362.2	611	65
70	15.6	-0.077	368	376	330	475	259	361.6	613	65
71	15.3	-0.094	367	377	329	475	258	361.2	615	65
72	15.1	-0.081	366	378	328	474	257	360.6	618	64
73	14.8	-0.086	366	379	327	474	256	360.4	618	64
74	14.6	-0.095	366	381	327	474	255	360.6	618	64
75	14.3	-0.086	367	382	326	475	255	361.0	615	63
76	14.1	-0.081	367	384	326	475	254	361.2	612	63
77	13.9	-0.098	368	385	326	476	253	361.6	608	63
78	13.7	-0.081	368	386	326	477	252	361.8	608	63
79	13.5	-0.087	368	388	325	479	252	362.4	611	62
80	13.2	-0.092	369	389	326	480	251	363.0	612	62
81	13.0	-0.079	369	391	326	481	251	363.6	612	62
82	12.8	-0.079	370	392	326	482	251	364.2	611	62
83	12.6	-0.070	371	394	327	483	251	365.2	611	62
84	12.3	-0.084	373	396	327	485	250	366.2	612	62
85	12.1	-0.083	373	397	328	486	250	366.8	614	62
86	11.8	-0.087	374	399	329	487	250	367.8	611	62
87	11.6	-0.091	375	402	330	488	250	369.0	605	62

WOODSTOVE PREBURN DATA

Client: FPI
Model: I2500
Run #: 3

Job #: 18-434
Tracking #: 0014
Technician: SJB
Date: 10/31/2018

Preburn Start Time: 7:00
Recording Interval (min): 1
Run Time (min): 146

			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	11.5	-0.098	377	403	330	488	250	369.6	599	61
89	11.2	-0.093	377	405	332	488	250	370.4	596	61
90	11.1	-0.070	379	407	333	488	251	371.6	594	61
91	10.9	-0.099	379	408	334	488	251	372.0	592	61
92	10.5	-0.078	382	409	335	486	251	372.6	592	61
93	10.4	-0.088	382	411	336	485	251	373.0	595	61
94	10.3	-0.069	384	412	338	486	251	374.2	600	61
95	10.2	-0.072	385	414	339	486	252	375.2	601	61
96	10.0	-0.085	386	415	341	486	252	376.0	600	61
97	9.9	-0.073	387	417	342	487	253	377.2	596	61
98	9.6	-0.077	388	418	344	487	253	378.0	592	61
99	9.4	-0.087	390	420	346	485	253	378.8	586	61
100	9.3	-0.070	391	420	347	482	254	378.8	580	61
101	9.1	-0.072	392	423	349	479	255	379.6	572	61
102	9.0	-0.070	393	423	351	477	255	379.8	568	61
103	8.7	-0.066	395	424	352	474	256	380.2	562	61
104	8.6	-0.082	395	426	354	470	256	380.2	558	61
105	8.5	-0.085	398	427	355	467	257	380.8	554	60
106	8.3	-0.073	399	429	357	466	258	381.8	548	60
107	8.1	-0.066	400	430	359	462	259	382.0	542	60
108	8.1	-0.072	401	430	360	458	259	381.6	535	60
109	8.0	-0.077	402	433	362	455	260	382.4	531	60
110	7.8	-0.074	404	434	363	451	261	382.6	527	60
111	7.7	-0.075	404	435	364	449	262	382.8	524	60
112	7.6	-0.081	404	437	366	445	263	383.0	522	60
113	7.5	-0.076	406	437	367	442	264	383.2	520	60
114	7.5	-0.082	406	438	368	439	266	383.4	518	60
115	7.2	-0.081	408	440	369	437	267	384.2	515	60
116	7.1	-0.062	407	441	371	435	268	384.4	513	61
117	7.0	-0.078	408	443	371	430	269	384.2	508	61
118	6.7	-0.073	408	440	372	427	269	383.2	547	61
119	6.6	-0.073	408	445	373	427	271	384.8	549	61
120	6.5	-0.084	410	447	374	428	273	386.4	562	60
121	6.0	-0.082	411	446	375	432	274	387.6	573	60
122	6.1	-0.081	413	449	376	436	275	389.8	568	61
123	6.0	-0.081	413	450	377	438	277	391.0	554	61
124	5.8	-0.081	414	449	377	438	278	391.2	537	61
125	5.9	-0.078	416	450	377	439	278	392.0	523	60
126	5.7	-0.070	416	450	378	437	279	392.0	513	60
127	5.6	-0.080	418	449	378	433	280	391.6	507	60
128	5.5	-0.068	418	448	378	431	281	391.2	500	60
129	5.4	-0.060	420	447	378	427	281	390.6	497	60
130	5.3	-0.056	421	445	377	423	282	389.6	492	61
131	5.3	-0.083	423	445	377	419	282	389.2	488	61

WOODSTOVE PREBURN DATA

Client: FPI
Model: I2500
Run #: 3

Job #: 18-434
Tracking #: 0014
Technician: SJB
Date: 10/31/2018

Preburn Start Time: 7:00
Recording Interval (min): 1
Run Time (min): 146

			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	5.2	-0.069	423	443	377	414	283	388.0	486	61
133	5.1	-0.068	426	441	376	410	283	387.2	482	61
134	5.1	-0.070	425	439	376	405	284	385.8	479	61
135	5.0	-0.058	427	437	375	402	284	385.0	477	61
136	4.9	-0.062	428	436	375	397	285	384.2	472	61
137	4.9	-0.072	431	434	374	393	286	383.6	468	61
138	4.8	-0.078	431	432	374	389	287	382.6	464	61
139	4.8	-0.052	432	431	373	383	287	381.2	461	61
140	4.7	-0.063	433	428	373	379	288	380.2	457	61
141	4.7	-0.070	434	427	372	373	289	379.0	454	61
142	4.6	-0.068	433	426	371	368	289	377.4	452	61
143	4.5	-0.059	433	422	369	364	290	375.6	450	61
144	4.6	-0.068	432	421	368	357	291	373.8	448	61
145	4.6	-0.060	430	419	367	353	291	372.0	448	61
146	4.5	-0.066	430	416	365	345	292	369.6	445	61

BOX A TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: I2500
Run #: 3

Job #: 18-434
Tracking #: 0014
Technician: SJB
Date: 10/31/2018

	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	0.394		0.060	0.01	74	-0.1		25.8		111	456	87	72
1	0.521	0.127	0.060	2.30	74	-1.99	88	25.8	0	118	457	86	72
2	0.652	0.131	0.060	2.29	74	-0.62	90	25.7	-0.1	111	438	84	72
3	0.801	0.149	0.060	2.25	75	-2.59	102	25.6	-0.1	111	456	83	72
4	0.945	0.144	0.060	2.26	74	-1.74	99	25.4	-0.2	112	475	85	72
5	1.093	0.148	0.060	2.24	74	-2.54	102	25.3	-0.1	113	491	87	72
6	1.236	0.143	0.060	2.23	74	-2.45	99	24.8	-0.5	114	507	85	72
7	1.384	0.148	0.060	2.24	75	-1.93	101	24.8	0	108	474	83	72
8	1.527	0.143	0.060	2.22	74	0	98	24.7	-0.1	107	455	83	72
9	1.674	0.147	0.060	2.20	75	-0.79	101	24.7	0	106	443	85	72
10	1.816	0.142	0.060	2.20	75	-2.15	97	24.6	-0.1	105	436	86	71
11	1.964	0.148	0.060	2.21	75	-2.32	101	24.4	-0.2	105	432	85	72
12	2.105	0.141	0.060	2.19	75	0	96	24.3	-0.1	104	429	83	72
13	2.253	0.148	0.060	2.19	75	-0.03	101	24.2	-0.1	103	427	83	71
14	2.395	0.142	0.060	2.19	75	-2.38	97	24.1	-0.1	104	425	84	72
15	2.543	0.148	0.060	2.16	75	-2.24	101	24.0	-0.1	103	425	86	72
16	2.685	0.142	0.060	2.19	75	0	97	23.9	-0.1	103	425	86	72
17	2.833	0.148	0.060	2.17	76	-1.99	101	23.8	-0.1	101	426	84	72
18	2.976	0.143	0.060	2.20	75	-2.61	98	23.6	-0.2	102	428	83	71
19	3.122	0.146	0.060	2.18	75	-0.34	100	23.5	-0.1	103	431	84	72
20	3.265	0.143	0.060	2.18	76	-1.95	97	23.4	-0.1	103	434	86	72
21	3.411	0.146	0.060	2.15	76	0	99	23.2	-0.2	103	444	86	72
22	3.553	0.142	0.060	2.13	76	-0.54	97	23.1	-0.1	105	458	84	72
23	3.696	0.143	0.060	2.13	76	-2.58	98	22.9	-0.2	106	470	83	71
24	3.839	0.143	0.060	2.08	76	-1.97	98	22.7	-0.2	106	478	84	72
25	3.981	0.142	0.060	2.12	76	-2.54	97	22.5	-0.2	107	482	86	72
26	4.127	0.146	0.060	2.11	76	-2.04	100	22.3	-0.2	107	481	87	72
27	4.267	0.140	0.060	2.09	76	0	96	22.2	-0.1	107	481	84	72
28	4.412	0.145	0.060	2.09	77	-0.16	99	22.0	-0.2	107	480	83	72
29	4.551	0.139	0.060	2.09	77	-0.09	95	21.9	-0.1	107	477	84	72
30	4.697	0.146	0.060	2.10	77	-1.92	100	21.7	-0.2	108	475	85	72
31	4.836	0.139	0.060	2.08	77	0	95	21.5	-0.2	108	473	86	72
32	4.983	0.147	0.060	2.17	77	-0.13	100	21.4	-0.1	107	469	84	72

BOX A TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: I2500
Run #: 3

Job #: 18-434
Tracking #: 0014
Technician: SJB
Date: 10/31/2018

	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	5.126	0.143	0.060	2.17	77	0	98	21.2	-0.2	107	465	83	72
34	5.273	0.147	0.060	2.15	77	-0.25	100	21.1	-0.1	106	460	84	72
35	5.416	0.143	0.060	2.16	77	-2.51	98	20.9	-0.2	106	455	86	73
36	5.563	0.147	0.060	2.16	77	-0.43	100	20.7	-0.2	106	451	86	72
37	5.707	0.144	0.060	2.16	77	-0.03	98	20.7	0	107	447	85	72
38	5.853	0.146	0.060	2.15	78	-2.67	99	20.5	-0.2	106	445	83	72
39	5.997	0.144	0.060	2.16	78	-0.6	98	20.3	-0.2	106	442	84	72
40	6.144	0.147	0.060	2.15	78	-1.12	100	20.2	-0.1	105	440	86	72
41	6.288	0.144	0.060	2.15	78	-2.35	98	20.2	0	105	438	87	72
42	6.433	0.145	0.060	2.15	78	-2.5	99	19.8	-0.4	105	436	85	72
43	6.579	0.146	0.060	2.15	78	-2.65	99	19.8	0	105	435	84	72
44	6.724	0.145	0.060	2.16	78	-1.77	99	19.6	-0.2	105	431	84	72
45	6.870	0.146	0.060	2.16	78	-0.04	99	19.4	-0.2	104	430	86	72
46	7.014	0.144	0.060	2.18	78	-0.43	98	19.4	0	105	429	87	72
47	7.161	0.147	0.060	2.13	78	-2.07	100	19.3	-0.1	104	428	85	73
48	7.305	0.144	0.060	2.15	79	-2.48	98	19.1	-0.2	104	427	84	73
49	7.452	0.147	0.060	2.14	79	-0.91	100	19.0	-0.1	104	428	84	72
50	7.596	0.144	0.060	2.17	78	-0.65	98	18.9	-0.1	104	428	86	73
51	7.744	0.148	0.060	2.13	79	-2.65	100	18.7	-0.2	104	427	87	73
52	7.888	0.144	0.060	2.15	79	-1.19	98	18.5	-0.2	104	427	85	73
53	8.036	0.148	0.060	2.16	79	-0.18	100	18.4	-0.1	104	427	84	73
54	8.179	0.143	0.060	2.14	79	-0.28	97	18.4	0	104	427	84	72
55	8.327	0.148	0.060	2.11	79	-1.25	100	18.2	-0.2	104	426	86	72
56	8.470	0.143	0.060	2.14	79	-1.99	97	18.1	-0.1	104	427	87	72
57	8.618	0.148	0.060	2.13	79	-1.5	100	18.0	-0.1	104	427	85	73
58	8.761	0.143	0.060	2.15	79	-2.64	97	17.8	-0.2	104	425	84	73
59	8.909	0.148	0.060	2.15	79	-2.25	100	17.7	-0.1	104	425	84	73
60	9.052	0.143	0.060	2.14	79	-2.54	97	17.5	-0.2	103	426	85	73
61	9.209	0.157	0.060	2.39	79	-1.01	106	17.5	0	103	426	85	73
62	9.356	0.147	0.060	2.28	80	-1.23	100	17.4	-0.1	104	426	85	73
63	9.508	0.152	0.060	2.27	79	0	103	17.3	-0.1	103	426	84	73
64	9.657	0.149	0.060	2.27	80	-1.88	101	17.0	-0.3	104	428	84	73
65	9.807	0.150	0.060	2.28	79	-0.59	102	17.0	0	103	427	85	73

BOX A TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: I2500
Run #: 3

Job #: 18-434
Tracking #: 0014
Technician: SJB
Date: 10/31/2018

	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	9.958	0.151	0.060	2.25	80	-2.07	102	16.9	-0.1	104	427	87	73
67	10.107	0.149	0.060	2.25	80	-1.96	101	16.8	-0.1	104	428	86	73
68	10.260	0.153	0.060	2.29	80	-1.57	104	16.6	-0.2	104	427	84	73
69	10.406	0.146	0.060	2.28	80	-2.44	99	16.5	-0.1	103	427	84	72
70	10.559	0.153	0.060	2.26	80	0	104	16.3	-0.2	104	426	85	73
71	10.705	0.146	0.060	2.27	80	-1.09	99	16.3	0	103	426	87	72
72	10.859	0.154	0.060	2.26	80	-0.7	104	16.2	-0.1	104	426	86	73
73	11.007	0.148	0.060	2.26	80	0	100	16.0	-0.2	104	426	85	72
74	11.160	0.153	0.060	2.26	80	-1.11	104	15.9	-0.1	104	425	83	73
75	11.308	0.148	0.060	2.26	80	-2.44	100	15.8	-0.1	104	425	84	73
76	11.459	0.151	0.060	2.26	80	-1.44	102	15.7	-0.1	103	426	86	73
77	11.608	0.149	0.060	2.27	80	-2.37	101	15.6	-0.1	104	424	87	72
78	11.758	0.150	0.060	2.26	80	0	101	15.5	-0.1	103	424	85	73
79	11.909	0.151	0.060	2.26	80	-0.45	102	15.2	-0.3	103	422	83	73
80	12.059	0.150	0.060	2.26	80	-1.56	101	15.2	0	103	421	83	73
81	12.211	0.152	0.060	2.26	81	-0.85	103	15.1	-0.1	103	421	85	73
82	12.359	0.148	0.060	2.27	80	-0.84	100	14.9	-0.2	103	420	86	73
83	12.511	0.152	0.060	2.27	80	0	103	14.9	0	103	420	86	73
84	12.658	0.147	0.060	2.28	81	0	99	14.8	-0.1	102	419	84	73
85	12.811	0.153	0.060	2.26	81	0	103	14.6	-0.2	103	419	83	73
86	12.959	0.148	0.060	2.26	81	-2.06	100	14.5	-0.1	103	418	84	73
87	13.112	0.153	0.060	2.27	81	-1.27	103	14.4	-0.1	103	418	86	73
88	13.260	0.148	0.060	2.26	80	0	100	14.3	-0.1	102	418	87	73
89	13.412	0.152	0.060	2.26	81	-0.98	103	14.2	-0.1	102	418	85	73
90	13.560	0.148	0.060	2.25	81	-2.35	100	14.0	-0.2	103	419	83	73
91	13.711	0.151	0.060	2.24	81	-2.58	102	13.9	-0.1	102	419	84	73
92	13.860	0.149	0.060	2.24	81	-2.39	101	13.8	-0.1	102	420	86	73
93	14.011	0.151	0.060	2.25	81	-0.02	102	13.7	-0.1	103	420	87	73
94	14.162	0.151	0.060	2.26	81	-0.9	102	13.5	-0.2	103	420	85	73
95	14.311	0.149	0.060	2.28	81	-1.99	101	13.4	-0.1	103	420	84	73
96	14.464	0.153	0.060	2.25	81	-2.16	103	13.3	-0.1	103	420	84	73
97	14.611	0.147	0.060	2.24	81	-2.36	99	13.2	-0.1	103	420	85	73
98	14.763	0.152	0.060	2.25	80	0	103	13.1	-0.1	103	421	87	73

BOX A TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: I2500
Run #: 3

Job #: 18-434
Tracking #: 0014
Technician: SJB
Date: 10/31/2018

	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	14.910	0.147	0.060	2.25	81	0	99	12.8	-0.3	103	421	85	73
100	15.064	0.154	0.060	2.25	81	-2.24	104	12.8	0	103	421	84	73
101	15.212	0.148	0.060	2.25	81	-2.02	100	12.7	-0.1	103	422	84	73
102	15.364	0.152	0.060	2.24	81	-2.35	103	12.5	-0.2	103	422	85	73
103	15.512	0.148	0.060	2.26	82	-2.38	100	12.4	-0.1	103	421	87	73
104	15.663	0.151	0.060	2.24	81	0	102	12.3	-0.1	103	420	86	74
105	15.811	0.148	0.060	2.26	82	0	100	12.2	-0.1	103	420	84	74
106	15.962	0.151	0.060	2.24	81	-1.59	102	12.1	-0.1	103	419	83	73
107	16.112	0.150	0.060	2.24	82	0	101	12.0	-0.1	102	417	84	74
108	16.262	0.150	0.060	2.22	81	0	101	11.9	-0.1	103	415	87	74
109	16.413	0.151	0.060	2.23	82	-2.35	102	11.8	-0.1	102	414	87	73
110	16.562	0.149	0.060	2.24	82	-0.15	100	11.6	-0.2	102	412	85	74
111	16.713	0.151	0.060	2.24	82	-2.29	102	11.4	-0.2	102	411	83	74
112	16.860	0.147	0.060	2.20	82	-2.41	99	11.4	0	103	410	84	74
113	17.012	0.152	0.060	2.22	82	-1.01	102	11.3	-0.1	102	410	85	73
114	17.159	0.147	0.060	2.23	82	-0.06	99	11.2	-0.1	102	408	87	73
115	17.312	0.153	0.060	2.22	82	-2.05	103	11.2	0	102	408	85	73
116	17.460	0.148	0.060	2.24	82	0	100	11.0	-0.2	102	408	84	74
117	17.612	0.152	0.060	2.22	82	-1.03	102	10.9	-0.1	102	406	84	73
118	17.759	0.147	0.060	2.22	82	-1.51	99	10.9	0	102	405	85	74
119	17.910	0.151	0.060	2.22	82	-0.72	102	10.8	-0.1	101	404	87	73
120	18.058	0.148	0.060	2.22	82	-2.3	100	10.7	-0.1	102	404	86	74
121	18.208	0.150	0.060	2.22	82	0	101	10.5	-0.2	102	403	84	74
122	18.357	0.149	0.060	2.21	82	-1.16	100	10.5	0	101	402	83	74
123	18.508	0.151	0.060	2.22	82	-2.05	102	10.4	-0.1	101	400	84	74
124	18.658	0.150	0.060	2.22	82	-0.91	101	10.3	-0.1	101	399	86	74
125	18.807	0.149	0.060	2.21	82	-0.03	100	10.2	-0.1	101	398	87	74
126	18.958	0.151	0.060	2.22	82	-0.5	102	10.0	-0.2	101	399	85	74
127	19.105	0.147	0.060	2.22	82	-0.33	99	10.0	0	101	399	84	74
128	19.256	0.151	0.060	2.24	82	-0.47	102	9.8	-0.2	101	400	84	74
129	19.403	0.147	0.060	2.22	82	0	99	9.8	0	101	401	86	74
130	19.555	0.152	0.060	2.22	82	-0.17	102	9.8	0	101	401	87	73
131	19.701	0.146	0.060	2.20	83	-2.4	98	9.6	-0.2	101	402	85	74

BOX A TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: I2500
Run #: 3

Job #: 18-434
Tracking #: 0014
Technician: SJB
Date: 10/31/2018

	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	19.854	0.153	0.060	2.21	82	-1.68	103	9.6	0	100	401	84	74
133	20.001	0.147	0.060	2.23	83	-0.65	99	9.5	-0.1	100	401	84	74
134	20.153	0.152	0.060	2.21	83	-0.05	102	9.4	-0.1	100	401	85	74
135	20.300	0.147	0.060	2.21	83	0	99	9.3	-0.1	101	401	87	74
136	20.451	0.151	0.060	2.21	82	-2.15	102	9.2	-0.1	101	400	86	74
137	20.597	0.146	0.060	2.21	83	-2.57	98	9.1	-0.1	100	399	84	74
138	20.748	0.151	0.060	2.22	83	0	101	8.9	-0.2	100	399	84	74
139	20.895	0.147	0.060	2.18	83	-2.4	99	8.8	-0.1	100	399	85	74
140	21.045	0.150	0.060	2.19	83	-1.93	101	8.9	0.1	100	400	86	74
141	21.195	0.150	0.060	2.20	83	0	101	8.6	-0.3	100	401	86	74
142	21.343	0.148	0.060	2.18	83	-0.9	99	8.7	0.1	100	401	85	74
143	21.493	0.150	0.060	2.19	83	-1.62	101	8.6	-0.1	100	402	84	74
144	21.641	0.148	0.060	2.19	83	-2.53	99	8.5	-0.1	100	400	84	75
145	21.792	0.151	0.060	2.19	83	0	101	8.4	-0.1	100	398	86	74
146	21.938	0.146	0.060	2.20	83	-0.13	98	8.4	0	100	397	87	74
147	22.089	0.151	0.060	2.22	83	-1.15	101	8.3	-0.1	100	396	85	74
148	22.235	0.146	0.060	2.18	83	-2.5	98	8.2	-0.1	100	395	83	74
149	22.386	0.151	0.060	2.19	83	0	101	8.1	-0.1	100	394	84	74
150	22.532	0.146	0.060	2.20	83	0	98	8.1	0	99	394	86	74
151	22.684	0.152	0.060	2.21	83	-2.54	102	8.0	-0.1	100	394	87	74
152	22.830	0.146	0.060	2.20	83	0	98	7.9	-0.1	100	394	85	74
153	22.982	0.152	0.060	2.18	83	-2.09	102	7.8	-0.1	100	393	84	73
154	23.128	0.146	0.060	2.19	83	0	98	7.8	0	99	393	84	71
155	23.279	0.151	0.060	2.19	83	-0.03	101	7.7	-0.1	99	392	86	71
156	23.426	0.147	0.060	2.17	83	-1.1	98	7.6	-0.1	98	392	87	71
157	23.577	0.151	0.060	2.20	83	-1.64	101	7.5	-0.1	97	392	85	71
158	23.723	0.146	0.060	2.20	83	0	98	7.4	-0.1	97	392	84	69
159	23.873	0.150	0.060	2.19	83	-1.21	100	7.4	0	96	391	83	69
160	24.021	0.148	0.060	2.20	83	-0.02	99	7.2	-0.2	96	392	85	69
161	24.170	0.149	0.060	2.18	83	-0.04	100	7.2	0	96	390	86	70
162	24.319	0.149	0.060	2.19	82	-0.52	100	7.2	0	95	388	87	69
163	24.468	0.149	0.060	2.20	82	-1.25	100	7.1	-0.1	95	386	84	70
164	24.618	0.150	0.060	2.19	82	-2.71	100	7.0	-0.1	95	384	83	69

BOX A TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: I2500
Run #: 3

Job #: 18-434
Tracking #: 0014
Technician: SJB
Date: 10/31/2018

	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	24.766	0.148	0.060	2.19	82	0	99	7.0	0	95	383	84	69
166	24.916	0.150	0.060	2.18	82	-2.31	100	6.9	-0.1	95	381	85	68
167	25.064	0.148	0.060	2.19	82	-2.55	99	6.8	-0.1	94	380	87	69
168	25.214	0.150	0.060	2.21	82	-2.66	100	6.6	-0.2	94	380	85	68
169	25.360	0.146	0.060	2.21	82	-1.6	98	6.8	0.2	94	379	83	67
170	25.511	0.151	0.060	2.20	82	-0.09	101	6.5	-0.3	94	378	84	68
171	25.657	0.146	0.060	2.20	82	-2.58	98	6.5	0	94	376	85	68
172	25.808	0.151	0.060	2.22	81	0	101	6.4	-0.1	94	374	88	67
173	25.954	0.146	0.060	2.20	81	-0.17	98	6.4	0	93	371	86	68
174	26.107	0.153	0.060	2.19	81	-0.79	102	6.3	-0.1	93	368	84	68
175	26.253	0.146	0.060	2.18	81	0	98	6.3	0	93	366	84	68
176	26.404	0.151	0.060	2.18	81	-0.31	101	6.3	0	93	364	85	67
177	26.550	0.146	0.060	2.18	81	-0.62	98	6.2	-0.1	93	363	87	67
178	26.702	0.152	0.060	2.18	81	-2.61	102	6.1	-0.1	92	362	87	67
179	26.848	0.146	0.060	2.19	81	-1.17	98	6.1	0	92	361	84	67
180	26.998	0.150	0.060	2.21	81	-1.38	100	6.1	0	92	360	83	67
181	27.145	0.147	0.060	2.20	80	-0.59	98	6.0	-0.1	92	360	84	67
182	27.295	0.150	0.060	2.20	81	-0.65	100	6.0	0	92	358	86	67
183	27.442	0.147	0.060	2.19	81	-2.38	98	5.8	-0.2	92	357	88	67
184	27.592	0.150	0.060	2.19	80	-0.35	100	5.9	0.1	92	356	86	67
185	27.740	0.148	0.060	2.18	80	-2.38	99	5.9	0	91	354	84	67
186	27.889	0.149	0.060	2.21	80	-2.33	100	5.8	-0.1	91	353	84	66
187	28.039	0.150	0.060	2.17	80	-0.59	100	5.8	0	91	352	85	67
188	28.187	0.148	0.060	2.20	80	-0.47	99	5.7	-0.1	90	350	87	67
189	28.337	0.150	0.060	2.18	80	0	100	5.7	0	90	350	86	67
190	28.484	0.147	0.060	2.18	80	-2.59	98	5.7	0	90	349	84	67
191	28.634	0.150	0.060	2.19	80	-2.04	100	5.6	-0.1	90	348	83	67
192	28.780	0.146	0.060	2.19	80	-0.44	98	5.6	0	90	347	84	67
193	28.931	0.151	0.060	2.19	80	-1.69	101	5.5	-0.1	90	344	87	67
194	29.077	0.146	0.060	2.19	80	-0.02	98	5.5	0	90	344	87	68
195	29.228	0.151	0.060	2.20	80	-2.58	101	5.4	-0.1	91	343	84	68
196	29.373	0.145	0.060	2.19	80	-2.51	97	5.4	0	91	342	83	68
197	29.524	0.151	0.060	2.20	80	-1.26	101	5.4	0	91	342	84	69

BOX A TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: I2500
Run #: 3

Job #: 18-434
Tracking #: 0014
Technician: SJB
Date: 10/31/2018

	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	29.670	0.146	0.060	2.18	80	-1.58	98	5.3	-0.1	92	341	86	69
199	29.822	0.152	0.060	2.17	80	0	102	5.3	0	92	340	88	69
200	29.968	0.146	0.060	2.16	79	-0.22	98	5.2	-0.1	92	340	86	69
201	30.119	0.151	0.060	2.18	80	-0.02	101	5.1	-0.1	92	340	84	69
202	30.264	0.145	0.060	2.17	80	-0.41	97	5.2	0.1	92	340	84	69
203	30.415	0.151	0.060	2.18	79	-2.51	101	5.1	-0.1	92	339	85	69
204	30.561	0.146	0.060	2.19	80	-2.46	98	5.1	0	92	340	87	70
205	30.711	0.150	0.060	2.18	80	-1.26	100	5.0	-0.1	92	341	86	69
206	30.857	0.146	0.060	2.19	80	0	98	4.9	-0.1	91	342	85	68
207	31.007	0.150	0.060	2.20	80	-2.02	100	5.0	0.1	91	343	83	67
208	31.153	0.146	0.060	2.17	80	0	98	4.9	-0.1	90	344	84	68
209	31.303	0.150	0.060	2.21	80	0	100	4.9	0	90	345	86	68
210	31.450	0.147	0.060	2.20	80	0	98	4.8	-0.1	90	345	87	68
211	31.598	0.148	0.060	2.19	79	-1.68	99	4.8	0	89	345	84	67
212	31.746	0.148	0.060	2.18	79	-2.24	99	4.6	-0.2	89	345	83	67
213	31.895	0.149	0.060	2.20	79	-2.5	100	4.7	0.1	89	344	84	67
214	32.044	0.149	0.060	2.18	79	-0.47	100	4.7	0	89	344	86	67
215	32.191	0.147	0.060	2.18	79	-0.09	98	4.6	-0.1	89	343	87	67
216	32.341	0.150	0.060	2.19	79	-2.46	100	4.6	0	89	342	85	67
217	32.488	0.147	0.060	2.17	79	-1.27	98	4.5	-0.1	89	343	83	66
218	32.637	0.149	0.060	2.18	79	-0.7	100	4.5	0	89	342	83	67
219	32.784	0.147	0.060	2.17	79	-2.54	98	4.4	-0.1	88	342	85	67
220	32.934	0.150	0.060	2.18	79	-0.33	100	4.4	0	88	342	87	67
221	33.080	0.146	0.060	2.18	79	-0.94	98	4.4	0	89	342	86	66
222	33.229	0.149	0.060	2.18	79	0	100	4.4	0	88	346	84	67
223	33.375	0.146	0.060	2.20	79	-0.58	98	4.3	-0.1	88	356	83	66
224	33.525	0.150	0.060	2.17	79	-2.37	100	4.3	0	89	360	84	66
225	33.671	0.146	0.060	2.21	79	-2.67	98	4.4	0.1	89	364	86	66
226	33.821	0.150	0.060	2.18	79	-1.1	100	4.2	-0.2	89	366	87	66
227	33.966	0.145	0.060	2.20	78	0	97	4.2	0	89	367	85	66
228	34.117	0.151	0.060	2.18	78	-0.87	101	4.2	0	90	367	83	66
229	34.262	0.145	0.060	2.18	78	-1.56	97	4.2	0	89	367	84	66
230	34.414	0.152	0.060	2.18	78	-2.64	102	4.1	-0.1	90	367	85	66

BOX A TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: I2500
Run #: 3

Job #: 18-434
Tracking #: 0014
Technician: SJB
Date: 10/31/2018

	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	34.559	0.145	0.060	2.18	78	-0.21	97	4.1	0	89	364	88	66
232	34.711	0.152	0.060	2.17	78	-1.57	102	4.1	0	89	358	86	66
233	34.856	0.145	0.060	2.19	78	-2.23	97	4.1	0	89	354	84	66
234	35.006	0.150	0.060	2.18	78	-2.27	101	4.1	0	89	351	83	66
235	35.152	0.146	0.060	2.19	78	-2.66	98	4.0	-0.1	89	350	85	66
236	35.303	0.151	0.060	2.18	78	-0.26	101	4.0	0	88	349	87	66
237	35.448	0.145	0.060	2.19	78	-0.91	97	4.0	0	89	348	88	66
238	35.598	0.150	0.060	2.19	78	-2.11	100	3.9	-0.1	88	345	85	66
239	35.744	0.146	0.060	2.19	78	-2.51	98	3.9	0	88	342	84	66
240	35.893	0.149	0.060	2.20	77	-0.2	100	3.9	0	88	339	84	65
241	36.040	0.147	0.060	2.17	77	0	99	3.9	0	88	337	85	66
242	36.189	0.149	0.060	2.19	77	-2.54	100	3.8	-0.1	88	339	88	66
243	36.336	0.147	0.060	2.19	77	-0.14	99	3.8	0	88	340	86	66
244	36.484	0.148	0.060	2.20	77	0	99	3.8	0	88	340	84	66
245	36.632	0.148	0.060	2.18	77	-2.13	99	3.8	0	88	342	84	66
246	36.780	0.148	0.060	2.19	77	-2.25	99	3.7	-0.1	88	342	84	66
247	36.928	0.148	0.060	2.19	77	-0.82	99	3.6	-0.1	88	341	86	66
248	37.077	0.149	0.060	2.19	77	-1.09	100	3.7	0.1	88	340	88	66
249	37.225	0.148	0.060	2.19	77	-0.52	99	3.7	0	87	339	85	66
250	37.373	0.148	0.060	2.18	77	-1.77	99	3.6	-0.1	87	339	84	65
251	37.522	0.149	0.060	2.18	77	0	100	3.5	-0.1	87	337	84	65
252	37.668	0.146	0.060	2.19	77	-0.84	98	3.6	0.1	87	335	85	66
253	37.817	0.149	0.060	2.17	77	-1.92	100	3.6	0	87	335	87	65
254	37.964	0.147	0.060	2.18	77	0	99	3.4	-0.2	87	334	86	66
255	38.114	0.150	0.060	2.20	77	-0.04	100	3.5	0.1	86	332	84	66
256	38.259	0.145	0.060	2.18	77	-0.34	97	3.5	0	87	331	83	65
257	38.409	0.150	0.060	2.19	77	-1.69	101	3.4	-0.1	87	331	84	66
258	38.554	0.145	0.060	2.19	77	-1.39	97	3.4	0	86	330	86	66
259	38.704	0.150	0.060	2.18	77	-2.58	100	3.4	0	86	330	87	66
260	38.849	0.145	0.060	2.17	76	-0.78	97	3.4	0	86	329	84	66
261	39.000	0.151	0.060	2.19	77	0	101	3.4	0	87	328	83	66
262	39.144	0.144	0.060	2.19	77	-0.33	96	3.3	-0.1	86	328	84	66
263	39.295	0.151	0.060	2.18	76	-2.19	101	3.3	0	86	328	85	66

BOX A TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: I2500
Run #: 3

Job #: 18-434
Tracking #: 0014
Technician: SJB
Date: 10/31/2018

	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	39.439	0.144	0.060	2.19	76	-2.62	97	3.2	-0.1	86	328	87	66
265	39.590	0.151	0.060	2.17	76	-0.03	101	3.3	0.1	86	328	85	66
266	39.735	0.145	0.060	2.19	76	-0.29	97	3.2	-0.1	86	328	83	66
267	39.886	0.151	0.060	2.18	77	-0.94	101	3.2	0	86	329	83	66
268	40.031	0.145	0.060	2.18	76	-2.43	97	3.2	0	86	329	84	66
269	40.182	0.151	0.060	2.18	76	-2.4	101	3.1	-0.1	86	330	86	66
270	40.327	0.145	0.060	2.17	76	-0.25	97	3.0	-0.1	86	330	87	66
271	40.478	0.151	0.060	2.17	76	-2.26	101	3.1	0.1	86	331	84	66
272	40.622	0.144	0.060	2.18	76	-1.74	97	3.1	0	86	332	83	66
273	40.773	0.151	0.060	2.18	76	-2	101	3.0	-0.1	86	332	84	66
274	40.918	0.145	0.060	2.18	76	-1.39	97	3.0	0	86	334	85	66
275	41.068	0.150	0.060	2.18	76	0	101	3.0	0	86	335	87	66
276	41.214	0.146	0.060	2.18	76	-2.43	98	3.0	0	86	335	85	65
277	41.363	0.149	0.060	2.19	76	-1.69	100	2.9	-0.1	86	336	83	65
278	41.508	0.145	0.060	2.18	76	0	97	2.9	0	86	337	83	66
279	41.658	0.150	0.060	2.19	76	-2.46	101	2.9	0	86	338	84	66
280	41.803	0.145	0.060	2.19	76	-0.44	97	2.9	0	86	340	87	65
281	41.952	0.149	0.060	2.19	76	-1.62	100	2.9	0	86	340	86	65
282	42.098	0.146	0.060	2.19	76	-1.91	98	2.8	-0.1	86	340	84	65
283	42.247	0.149	0.060	2.17	76	-1.31	100	2.7	-0.1	86	340	83	65
284	42.394	0.147	0.060	2.18	76	-0.7	99	2.8	0.1	86	340	84	65
285	42.542	0.148	0.060	2.18	76	-0.04	99	2.8	0	86	340	86	65
286	42.689	0.147	0.060	2.18	76	-1.56	99	2.7	-0.1	86	340	87	66
287	42.837	0.148	0.060	2.20	76	0	99	2.7	0	86	340	84	65
288	42.984	0.147	0.060	2.20	76	-1.37	99	2.7	0	86	341	83	65
289	43.132	0.148	0.060	2.17	76	-0.38	99	2.6	-0.1	86	340	84	65
290	43.280	0.148	0.060	2.18	76	-0.52	99	2.6	0	86	340	85	65
291	43.428	0.148	0.060	2.19	76	0	99	2.6	0	86	336	87	65
292	43.576	0.148	0.060	2.18	76	-1.72	99	2.6	0	85	329	85	65
293	43.723	0.147	0.060	2.19	75	0	99	2.6	0	85	325	83	65
294	43.872	0.149	0.060	2.17	76	-2.15	100	2.5	-0.1	85	322	83	65
295	44.019	0.147	0.060	2.19	76	-2.36	99	2.5	0	85	321	84	65
296	44.168	0.149	0.060	2.18	76	-2.22	100	2.5	0	85	321	87	65

BOX A TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: I2500
Run #: 3

Job #: 18-434
Tracking #: 0014
Technician: SJB
Date: 10/31/2018

	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	44.314	0.146	0.060	2.20	75	-0.89	98	2.5	0	85	321	86	65
298	44.463	0.149	0.060	2.18	76	-2.66	100	2.5	0	85	321	84	65
299	44.609	0.146	0.060	2.17	76	-2.57	98	2.4	-0.1	85	321	83	65
300	44.758	0.149	0.060	2.18	76	-0.16	100	2.3	-0.1	85	321	84	65
301	44.904	0.146	0.060	2.15	75	0	98	2.4	0.1	86	321	85	65
302	45.054	0.150	0.060	2.18	76	-0.23	101	2.4	0	85	323	87	65
303	45.199	0.145	0.060	2.17	76	-0.73	97	2.4	0	85	323	85	65
304	45.348	0.149	0.060	2.18	75	0	100	2.3	-0.1	85	324	83	65
305	45.493	0.145	0.060	2.19	75	0	97	2.3	0	85	324	83	65
306	45.643	0.150	0.060	2.18	75	-0.47	101	2.2	-0.1	85	325	85	65
307	45.788	0.145	0.060	2.20	75	0	97	2.3	0.1	85	325	87	65
308	45.938	0.150	0.060	2.19	75	-1.69	101	2.2	-0.1	85	324	85	65
309	46.082	0.144	0.060	2.18	75	-0.09	97	2.2	0	85	324	83	65
310	46.233	0.151	0.060	2.18	76	-0.65	101	2.2	0	86	323	83	65
311	46.378	0.145	0.060	2.19	75	-2.6	97	2.2	0	85	322	84	65
312	46.528	0.150	0.060	2.20	75	-0.81	101	2.2	0	85	321	86	65
313	46.673	0.145	0.060	2.17	76	-1.35	97	2.1	-0.1	85	320	87	65
314	46.823	0.150	0.060	2.18	75	-1.26	101	2.1	0	84	320	84	65
315	46.967	0.144	0.060	2.18	76	-1.18	96	2.1	0	84	318	83	64
316	47.118	0.151	0.060	2.17	75	-0.91	101	2.1	0	84	318	84	64
317	47.263	0.145	0.060	2.17	75	-1.27	97	2.1	0	84	317	85	64
318	47.413	0.150	0.060	2.18	75	-0.25	101	2.0	-0.1	84	316	87	64
319	47.557	0.144	0.060	2.18	75	-0.77	97	2.0	0	84	316	85	65
320	47.709	0.152	0.060	2.19	75	-0.09	102	2.0	0	84	315	83	64
321	47.853	0.144	0.060	2.18	75	0	97	2.0	0	84	315	83	65
322	48.003	0.150	0.060	2.20	75	0	101	2.0	0	84	314	84	65
323	48.148	0.145	0.060	2.19	75	-2.61	97	1.9	-0.1	84	314	87	65
324	48.298	0.150	0.060	2.17	75	-2.64	101	1.9	0	84	313	86	64
325	48.443	0.145	0.060	2.17	75	-0.29	97	1.9	0	84	313	83	64
326	48.593	0.150	0.060	2.18	75	-2.62	101	1.9	0	84	313	83	65
327	48.737	0.144	0.060	2.18	75	-0.44	97	1.9	0	84	311	84	65
328	48.887	0.150	0.060	2.18	75	-1	101	1.8	-0.1	84	312	86	65
329	49.032	0.145	0.060	2.18	75	-0.45	97	1.8	0	84	311	87	65

BOX A TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: I2500
Run #: 3

Job #: 18-434
Tracking #: 0014
Technician: SJB
Date: 10/31/2018

	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	49.182	0.150	0.060	2.18	75	0	101	1.8	0	84	311	84	65
331	49.327	0.145	0.060	2.17	75	-0.53	97	1.8	0	84	310	83	65
332	49.477	0.150	0.060	2.16	75	-1.1	101	1.8	0	84	310	83	65
333	49.622	0.145	0.060	2.19	75	-2.34	97	1.7	-0.1	83	310	84	64
334	49.771	0.149	0.060	2.17	75	-0.11	100	1.7	0	83	310	87	65
335	49.916	0.145	0.060	2.18	75	-2.58	97	1.7	0	83	310	85	64
336	50.065	0.149	0.060	2.18	75	-2.63	100	1.7	0	83	309	83	64
337	50.211	0.146	0.060	2.19	75	-0.54	98	1.6	-0.1	83	309	83	64
338	50.359	0.148	0.060	2.18	75	-0.84	99	1.6	0	84	307	84	65
339	50.505	0.146	0.060	2.18	75	-0.92	98	1.6	0	83	305	86	64
340	50.654	0.149	0.060	2.18	75	-2.48	100	1.6	0	83	304	87	65
341	50.799	0.145	0.060	2.17	75	0	97	1.6	0	83	303	84	64
342	50.948	0.149	0.060	2.16	75	-2.61	100	1.6	0	83	302	83	65
343	51.093	0.145	0.060	2.15	75	0	97	1.6	0	83	301	84	65
344	51.241	0.148	0.060	2.18	75	-1.89	100	1.5	-0.1	88	330	85	66
345	51.387	0.146	0.060	2.19	75	-0.9	98	1.4	-0.1	85	314	87	66
346	51.535	0.148	0.060	2.17	75	-1.3	99	1.4	0	85	313	86	66
347	51.681	0.146	0.060	2.19	75	-1.57	98	1.4	0	85	312	83	66
348	51.829	0.148	0.060	2.19	75	0	99	1.4	0	85	314	83	66
349	51.975	0.146	0.060	2.18	75	-2.58	98	1.3	-0.1	85	314	84	66
350	52.123	0.148	0.060	2.16	74	-0.02	100	1.3	0	86	315	86	66
351	52.269	0.146	0.060	2.18	75	-0.41	98	1.3	0	85	314	88	67
352	52.417	0.148	0.060	2.17	75	-2.26	100	1.3	0	86	314	85	66
353	52.563	0.146	0.060	2.18	75	-0.03	98	1.2	-0.1	86	314	83	67
354	52.710	0.147	0.060	2.18	75	-2.52	99	1.2	0	86	314	84	67
355	52.856	0.146	0.060	2.17	75	-2.58	98	1.2	0	86	313	85	67
356	53.003	0.147	0.060	2.16	75	-0.53	99	1.2	0	86	312	87	67
357	53.150	0.147	0.060	2.18	75	-1.38	99	1.1	-0.1	86	312	87	67
358	53.297	0.147	0.060	2.19	75	-2.39	99	1.1	0	86	311	84	68
359	53.443	0.146	0.060	2.16	75	-1.9	98	1.0	-0.1	86	311	83	67
360	53.590	0.147	0.060	2.16	75	0	99	1.1	0.1	85	311	84	68
361	53.736	0.146	0.060	2.16	76	-0.41	98	1.1	0	86	310	86	68
362	53.884	0.148	0.060	2.17	75	-2.61	100	1.0	-0.1	86	310	88	68

BOX A TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: I2500
Run #: 3

Job #: 18-434
Tracking #: 0014
Technician: SJB
Date: 10/31/2018

	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	54.030	0.146	0.060	2.15	75	-0.73	98	1.0	0	86	310	85	68
364	54.177	0.147	0.060	2.16	76	-2.12	99	0.9	-0.1	86	310	83	68
365	54.323	0.146	0.060	2.17	76	-2.45	98	1.0	0.1	86	311	84	68
366	54.470	0.147	0.060	2.16	76	-0.06	99	1.0	0	86	311	85	68
367	54.617	0.147	0.060	2.16	76	-2.56	99	1.0	0	86	312	87	68
368	54.764	0.147	0.060	2.17	76	-2.58	99	0.9	-0.1	86	311	86	68
369	54.910	0.146	0.060	2.17	75	0	98	0.9	0	86	312	84	69
370	55.057	0.147	0.060	2.17	76	-0.9	99	0.8	-0.1	86	313	83	69
371	55.203	0.146	0.060	2.16	76	-1.86	98	0.8	0	86	312	84	68
372	55.351	0.148	0.060	2.15	76	-2.53	99	0.8	0	86	311	86	69
373	55.497	0.146	0.060	2.15	76	-2.12	98	0.8	0	86	312	87	69
374	55.644	0.147	0.060	2.16	76	-0.28	99	0.8	0	86	311	85	68
375	55.790	0.146	0.060	2.17	77	-2.64	98	0.7	-0.1	86	311	83	68
376	55.937	0.147	0.060	2.17	76	-0.22	99	0.8	0.1	87	310	83	69
377	56.084	0.147	0.060	2.17	76	-0.06	99	0.7	-0.1	86	310	85	69
378	56.231	0.147	0.060	2.17	76	-2.62	99	0.7	0	86	309	87	68
379	56.377	0.146	0.060	2.16	76	-2.04	98	0.7	0	86	310	87	69
380	56.524	0.147	0.060	2.17	76	-1.2	99	0.7	0	87	311	84	69
381	56.671	0.147	0.060	2.16	76	-2.5	99	0.7	0	87	310	83	69
382	56.818	0.147	0.060	2.15	77	-1.88	99	0.6	-0.1	87	309	84	69
383	56.964	0.146	0.060	2.16	77	-2.2	98	0.7	0.1	87	309	86	69
384	57.111	0.147	0.060	2.16	77	-0.52	99	0.6	-0.1	87	308	87	69
385	57.258	0.147	0.060	2.15	77	0	98	0.5	-0.1	86	307	85	69
386	57.405	0.147	0.060	2.16	77	-0.54	98	0.5	0	86	308	83	69
387	57.551	0.146	0.060	2.16	77	-1.32	98	0.6	0.1	86	308	83	69
388	57.698	0.147	0.060	2.15	77	-1.71	98	0.5	-0.1	86	309	84	69
389	57.845	0.147	0.060	2.15	77	-0.07	98	0.5	0	86	309	87	69
390	57.992	0.147	0.060	2.16	77	-1.71	98	0.5	0	86	309	86	69
391	58.139	0.147	0.060	2.16	77	-2.31	98	0.4	-0.1	86	310	84	70
392	58.286	0.147	0.060	2.17	77	-0.05	98	0.4	0	86	309	83	69
393	58.433	0.147	0.060	2.16	77	-2.43	98	0.4	0	86	309	83	69
394	58.580	0.147	0.060	2.17	77	-0.31	99	0.5	0.1	87	308	86	69
395	58.727	0.147	0.060	2.16	77	-2.47	98	0.4	-0.1	86	308	87	69

BOX A TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: I2500
Run #: 3

Job #: 18-434
Tracking #: 0014
Technician: SJB
Date: 10/31/2018

	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	58.873	0.146	0.060	2.17	77	-1.21	98	0.3	-0.1	86	307	85	69
397	59.021	0.148	0.060	2.17	77	-2.66	99	0.3	0	87	307	83	70
398	59.167	0.146	0.060	2.16	77	-2.49	98	0.2	-0.1	87	306	83	69
399	59.315	0.148	0.060	2.15	77	-0.07	99	0.3	0.1	86	307	84	69
400	59.461	0.146	0.060	2.15	77	-0.53	98	0.3	0	86	307	87	70
401	59.609	0.148	0.060	2.16	77	-0.18	99	0.3	0	86	308	86	70
402	59.755	0.146	0.060	2.15	77	-2.55	98	0.1	-0.2	87	308	84	69
403	59.903	0.148	0.060	2.17	77	-2.64	99	0.2	0.1	87	308	83	69
404	60.049	0.146	0.060	2.15	76	-2.56	98	0.2	0	87	307	84	70
405	60.197	0.148	0.060	2.18	78	0	99	0.1	-0.1	87	307	86	70
406	60.343	0.146	0.060	2.15	77	-0.55	98	0.2	0.1	87	308	87	69
407	60.491	0.148	0.060	2.16	78	-2.39	99	0.2	0	86	308	85	70
408	60.636	0.145	0.060	2.15	77	-2.56	97	0.1	-0.1	87	308	83	70
409	60.784	0.148	0.060	2.16	77	0	99	0.1	0	86	309	83	70
410	60.930	0.146	0.060	2.15	77	-2.53	98	0.1	0	87	309	84	70
411	61.078	0.148	0.060	2.16	78	-1.3	99	0.1	0	86	307	86	70
412	61.224	0.146	0.060	2.15	78	0	98	0.1	0	87	307	86	70
413	61.372	0.148	0.060	2.16	78	-0.68	99	0.0	-0.1	87	306	84	70
Avg/Tot	61.372	0.148	0.060	2.18	78	-1.20	99			94	367	85	69.1

BOX B TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: I2500
Run #: 3

Job #: 18-434
Tracking #: 0014
Technician: SJB
Date: 10/31/2018

	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	72	-1		86	0.000	5.99	0.18
1	0.120	0.120	2.30	72	-2.53	88	86	-0.060	5.90	0.14
2	0.255	0.135	2.30	72	-2.63	99	85	-0.050	4.24	0.18
3	0.399	0.144	2.30	72	-2.71	105	84	-0.070	5.34	0.14
4	0.546	0.147	2.28	72	-2.67	108	85	-0.060	5.76	0.17
5	0.690	0.144	2.28	73	-2.33	105	85	-0.080	8.73	0.14
6	0.835	0.145	2.27	73	-0.96	106	86	-0.080	10.72	0.14
7	0.979	0.144	2.25	73	-1.95	105	86	-0.080	13.23	0.24
8	1.122	0.143	2.24	73	-1.42	104	85	-0.070	9.73	0.03
9	1.268	0.146	2.24	74	-1.49	106	85	-0.080	8.90	0.07
10	1.411	0.143	2.24	74	-0.76	104	85	-0.070	9.44	0.09
11	1.557	0.146	2.24	74	-0.63	106	85	-0.060	9.51	0.08
12	1.700	0.143	2.24	74	-0.6	103	86	-0.090	9.49	0.09
13	1.847	0.147	2.25	75	-0.62	106	86	-0.050	9.71	0.07
14	1.988	0.141	2.23	75	-2.17	102	86	-0.060	9.76	0.03
15	2.135	0.147	2.23	75	-0.66	106	85	-0.070	10.13	0.03
16	2.276	0.141	2.23	76	-2.74	102	85	-0.070	10.14	0.04
17	2.423	0.147	2.21	76	-0.77	106	85	-0.060	10.38	0.02
18	2.564	0.141	2.21	76	-2.36	101	86	-0.070	10.22	0.05
19	2.710	0.146	2.21	77	-2.56	105	86	-0.060	10.67	0.03
20	2.853	0.143	2.22	77	-0.63	103	85	-0.080	10.66	0.05
21	2.999	0.146	2.19	78	-2.82	105	85	-0.080	11.83	0.04
22	3.141	0.142	2.19	78	-0.7	102	85	-0.070	14.40	0.56
23	3.284	0.143	2.16	78	-2.74	103	85	-0.080	14.84	0.80
24	3.426	0.142	2.14	79	-2.92	102	85	-0.080	15.76	0.35
25	3.567	0.141	2.13	79	-2.71	101	86	-0.070	15.86	0.12
26	3.711	0.144	2.13	80	-0.9	103	86	-0.070	15.90	0.07
27	3.852	0.141	2.13	80	-2.86	101	85	-0.080	15.60	0.06
28	3.997	0.145	2.14	80	-0.92	104	85	-0.080	15.17	0.07
29	4.136	0.139	2.12	80	-2.75	100	85	-0.080	14.87	0.07
30	4.281	0.145	2.14	81	-0.94	104	85	-0.070	14.76	0.08
31	4.419	0.138	2.11	81	-2.55	99	86	-0.070	14.56	0.04

BOX B TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: I2500
Run #: 3

Job #: 18-434
Tracking #: 0014
Technician: SJB
Date: 10/31/2018

	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	4.564	0.145	2.12	82	-1.77	104	86	-0.080	14.34	0.06
33	4.705	0.141	2.12	82	-1.94	101	85	-0.070	14.24	0.03
34	4.848	0.143	2.13	82	-1.8	102	85	-0.070	14.06	0.03
35	4.989	0.141	2.11	83	-2.55	101	85	-0.070	13.69	0.06
36	5.130	0.141	2.09	83	-2.45	101	85	-0.070	13.42	0.03
37	5.274	0.144	2.11	83	-2.28	103	86	-0.060	13.32	0.01
38	5.415	0.141	2.11	84	-0.91	100	86	-0.070	13.14	0.03
39	5.559	0.144	2.12	84	-2.86	102	85	-0.060	12.82	0.03
40	5.699	0.140	2.12	84	-0.82	100	85	-0.070	12.61	0.02
41	5.843	0.144	2.10	85	-2.63	102	85	-0.070	12.48	0.01
42	5.983	0.140	2.11	85	-1	99	85	-0.070	12.35	0.04
43	6.127	0.144	2.11	85	-0.8	102	86	-0.060	12.36	0.01
44	6.269	0.142	2.11	85	-0.88	101	86	-0.070	12.17	0.05
45	6.412	0.143	2.10	86	-0.95	101	86	-0.070	12.38	0.00
46	6.554	0.142	2.10	86	-2.38	101	85	-0.060	12.36	0.04
47	6.694	0.140	2.10	87	-1.7	99	84	-0.060	12.36	0.02
48	6.839	0.145	2.11	87	-2.49	102	85	-0.060	12.37	0.02
49	6.979	0.140	2.10	87	-1.36	99	85	-0.070	12.34	0.02
50	7.125	0.146	2.10	87	-2.67	103	86	-0.060	12.28	0.02
51	7.265	0.140	2.10	88	-3.03	99	86	-0.060	12.30	0.02
52	7.410	0.145	2.08	88	-1.35	102	86	-0.070	12.20	0.02
53	7.549	0.139	2.10	88	-1.33	98	85	-0.070	12.08	0.04
54	7.697	0.148	2.19	88	-2.13	104	85	-0.060	12.12	0.03
55	7.840	0.143	2.18	89	-2.91	101	85	-0.070	12.12	0.01
56	7.988	0.148	2.19	89	-1.27	104	86	-0.070	11.78	0.05
57	8.132	0.144	2.20	89	-1.06	101	86	-0.070	11.80	0.02
58	8.279	0.147	2.18	90	-1.59	103	86	-0.070	11.72	0.03
59	8.423	0.144	2.19	90	-2.74	101	85	-0.070	11.55	0.04
60	8.570	0.147	2.19	90	-1.64	103	84	-0.080	11.44	0.06
61	8.715	0.145	2.19	90	-0.93	102	85	-0.060	11.46	0.06
62	8.862	0.147	2.18	90	-2.76	103	85	-0.070	11.47	0.06
63	9.006	0.144	2.19	91	-2.95	101	86	-0.060	11.51	0.04

BOX B TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: I2500
Run #: 3

Job #: 18-434
Tracking #: 0014
Technician: SJB
Date: 10/31/2018

	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	9.153	0.147	2.19	91	-2.67	103	86	-0.070	11.49	0.05
65	9.298	0.145	2.16	91	-2.94	102	86	-0.070	11.60	0.04
66	9.444	0.146	2.17	91	-1.82	102	85	-0.060	11.81	0.00
67	9.589	0.145	2.18	91	-2.95	102	85	-0.080	11.72	0.02
68	9.735	0.146	2.17	92	-2.94	102	85	-0.070	11.66	0.05
69	9.880	0.145	2.17	92	-2.26	101	86	-0.060	11.61	0.05
70	10.026	0.146	2.17	92	-2.51	102	86	-0.050	11.74	0.05
71	10.171	0.145	2.16	92	-2.06	101	86	-0.070	11.70	0.05
72	10.316	0.145	2.16	93	-1.41	101	85	-0.060	12.13	0.04
73	10.462	0.146	2.17	93	-1.37	102	84	-0.060	11.98	0.03
74	10.607	0.145	2.16	93	-1.74	101	85	-0.070	12.06	0.00
75	10.753	0.146	2.15	93	-2.86	102	85	-0.060	11.89	0.05
76	10.897	0.144	2.16	93	-0.98	101	86	-0.070	12.01	0.01
77	11.044	0.147	2.17	93	-1.01	103	86	-0.070	11.90	0.03
78	11.189	0.145	2.17	94	-2.6	101	85	-0.070	11.96	0.02
79	11.336	0.147	2.16	94	-0.93	102	85	-0.050	11.78	0.05
80	11.480	0.144	2.17	94	-2.01	100	85	-0.060	11.88	0.02
81	11.628	0.148	2.16	94	-2.89	103	86	-0.070	11.95	0.01
82	11.771	0.143	2.15	94	-2.94	100	86	-0.060	11.84	0.03
83	11.919	0.148	2.15	94	-2.63	103	86	-0.060	11.86	0.04
84	12.063	0.144	2.16	95	-3	100	86	-0.070	12.08	0.01
85	12.211	0.148	2.16	95	-1.79	103	85	-0.080	12.02	0.05
86	12.354	0.143	2.16	95	-1.47	99	85	-0.070	12.30	0.00
87	12.502	0.148	2.17	95	-1.52	103	85	-0.060	12.28	0.03
88	12.646	0.144	2.18	95	-2.97	100	85	-0.070	12.26	0.03
89	12.794	0.148	2.14	95	-1.32	103	86	-0.070	12.46	0.02
90	12.937	0.143	2.16	95	-2.99	99	86	-0.070	12.89	0.02
91	13.085	0.148	2.15	95	-1.59	103	86	-0.070	13.01	0.00
92	13.228	0.143	2.15	95	-2.18	99	85	-0.070	13.08	0.01
93	13.376	0.148	2.15	96	-1.58	103	85	-0.070	12.94	0.03
94	13.520	0.144	2.15	96	-1.06	100	85	-0.070	13.09	0.00
95	13.668	0.148	2.14	96	-2.86	103	86	-0.080	12.99	0.03

BOX B TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: I2500
Run #: 3

Job #: 18-434
Tracking #: 0014
Technician: SJB
Date: 10/31/2018

	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	13.811	0.143	2.15	96	-2.98	99	86	-0.060	13.31	0.00
97	13.959	0.148	2.16	96	-1.36	103	86	-0.060	13.19	0.00
98	14.102	0.143	2.16	96	-1.11	99	85	-0.060	13.38	0.00
99	14.249	0.147	2.14	96	-2.87	102	85	-0.070	13.23	0.02
100	14.393	0.144	2.15	96	-1.18	100	85	-0.060	13.21	0.02
101	14.540	0.147	2.16	96	-3.02	102	86	-0.070	13.16	0.03
102	14.684	0.144	2.15	96	-1.25	100	86	-0.070	13.08	0.04
103	14.832	0.148	2.14	97	-3	103	86	-0.060	13.17	0.00
104	14.976	0.144	2.15	97	-3.02	100	85	-0.070	12.90	0.01
105	15.124	0.148	2.15	97	-2.05	103	85	-0.060	12.62	0.04
106	15.267	0.143	2.15	97	-1.35	99	85	-0.080	12.44	0.02
107	15.414	0.147	2.13	97	-2.55	102	86	-0.060	12.25	0.01
108	15.559	0.145	2.15	97	-1.31	101	86	-0.060	12.06	0.01
109	15.706	0.147	2.15	97	-1.17	102	86	-0.060	11.80	0.01
110	15.850	0.144	2.15	97	-2.95	100	85	-0.060	11.42	0.05
111	15.997	0.147	2.14	97	-1.97	102	85	-0.060	11.29	0.07
112	16.142	0.145	2.14	97	-1.04	101	85	-0.070	11.13	0.02
113	16.289	0.147	2.15	98	-1.53	102	86	-0.070	10.97	0.02
114	16.433	0.144	2.12	98	-2.92	100	86	-0.060	10.96	0.02
115	16.579	0.146	2.13	98	-2.32	101	86	-0.070	10.81	0.05
116	16.724	0.145	2.13	98	-2.98	100	86	-0.060	10.77	0.06
117	16.870	0.146	2.13	98	-2.36	101	85	-0.050	10.68	0.03
118	17.016	0.146	2.14	98	-1.26	101	85	-0.060	10.79	0.02
119	17.161	0.145	2.12	98	-1.64	100	85	-0.050	10.71	0.02
120	17.306	0.145	2.14	98	-1.34	100	86	-0.060	10.54	0.04
121	17.451	0.145	2.15	98	-0.95	100	86	-0.080	10.55	0.04
122	17.597	0.146	2.13	98	-2.8	101	86	-0.060	10.52	0.03
123	17.741	0.144	2.12	98	-3.04	99	85	-0.070	10.51	0.07
124	17.888	0.147	2.13	98	-3.07	102	85	-0.050	10.69	0.06
125	18.032	0.144	2.13	98	-2.98	99	85	-0.060	11.15	0.07
126	18.179	0.147	2.14	99	-2.21	101	86	-0.050	11.29	0.03
127	18.323	0.144	2.13	99	-2.8	99	86	-0.060	11.22	0.04

BOX B TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: I2500
Run #: 3

Job #: 18-434
Tracking #: 0014
Technician: SJB
Date: 10/31/2018

	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	18.470	0.147	2.13	99	-2.2	101	86	-0.060	11.40	0.01
129	18.614	0.144	2.12	99	-3.02	99	85	-0.060	11.28	0.03
130	18.761	0.147	2.14	99	-1.3	101	85	-0.070	11.20	0.03
131	18.905	0.144	2.14	99	-1.42	99	85	-0.060	11.11	0.06
132	19.053	0.148	2.14	99	-1.76	102	85	-0.060	11.08	0.04
133	19.196	0.143	2.13	99	-1.37	99	86	-0.070	10.94	0.04
134	19.344	0.148	2.12	99	-2.75	102	86	-0.060	10.97	0.05
135	19.486	0.142	2.12	99	-2.53	98	86	-0.070	10.88	0.05
136	19.634	0.148	2.13	99	-2.83	102	85	-0.070	11.19	0.05
137	19.777	0.143	2.12	99	-2.82	99	85	-0.060	11.02	0.03
138	19.925	0.148	2.12	99	-2.84	102	85	-0.070	10.80	0.04
139	20.067	0.142	2.11	99	-3.1	98	86	-0.070	10.60	0.06
140	20.215	0.148	2.13	99	-1.04	102	86	-0.060	10.90	0.03
141	20.357	0.142	2.11	99	-2.49	98	86	-0.070	10.54	0.05
142	20.504	0.147	2.10	99	-2.21	101	86	-0.060	10.57	0.04
143	20.647	0.143	2.11	100	-1.48	98	85	-0.060	10.57	0.03
144	20.795	0.148	2.11	99	-2.14	102	85	-0.070	10.34	0.05
145	20.938	0.143	2.13	100	-1.15	98	85	-0.060	10.30	0.07
146	21.085	0.147	2.12	100	-3.02	101	86	-0.060	10.43	0.04
147	21.228	0.143	2.13	100	-1.12	98	86	-0.060	10.32	0.05
148	21.375	0.147	2.12	100	-2.38	101	86	-0.040	10.35	0.06
149	21.519	0.144	2.11	100	-3.09	99	86	-0.060	10.27	0.05
150	21.666	0.147	2.12	100	-1.78	101	85	-0.070	9.88	0.04
151	21.810	0.144	2.09	100	-3.04	99	85	-0.060	9.88	0.05
152	21.956	0.146	2.11	100	-2.63	100	85	-0.070	9.66	0.07
153	22.100	0.144	2.11	100	-1.21	99	86	-0.060	9.80	0.05
154	22.246	0.146	2.11	100	-1.09	100	86	-0.060	9.84	0.02
155	22.391	0.145	2.12	100	-1.62	100	86	-0.070	9.67	0.08
156	22.535	0.144	2.11	100	-2.25	99	85	-0.060	9.81	0.05
157	22.681	0.146	2.12	100	-3.03	100	85	-0.060	9.80	0.05
158	22.825	0.144	2.11	100	-0.94	99	85	-0.060	9.94	0.02
159	22.971	0.146	2.12	100	-3.08	100	86	-0.070	9.85	0.07

BOX B TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: I2500
Run #: 3

Job #: 18-434
Tracking #: 0014
Technician: SJB
Date: 10/31/2018

	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	23.115	0.144	2.11	100	-3.11	99	86	-0.060	9.98	0.03
161	23.262	0.147	2.12	100	-1.7	101	86	-0.070	10.00	0.01
162	23.406	0.144	2.12	100	-3.1	99	86	-0.060	10.01	0.01
163	23.552	0.146	2.10	100	-2.49	100	86	-0.060	10.06	0.01
164	23.696	0.144	2.12	100	-3.01	99	85	-0.060	9.98	0.05
165	23.843	0.147	2.12	100	-2	101	85	-0.060	10.00	0.05
166	23.987	0.144	2.12	100	-1.42	99	85	-0.070	10.03	0.04
167	24.135	0.148	2.13	100	-2.94	101	86	-0.070	10.14	0.00
168	24.277	0.142	2.09	100	-2.32	97	86	-0.060	10.14	0.05
169	24.425	0.148	2.12	100	-2.98	101	87	-0.060	10.38	0.00
170	24.567	0.142	2.12	100	-1.88	97	86	-0.050	10.36	0.02
171	24.715	0.148	2.12	100	-1.03	101	86	-0.060	10.47	0.00
172	24.858	0.143	2.10	100	-1.62	98	85	-0.060	10.09	0.02
173	25.005	0.147	2.12	99	-1.36	101	85	-0.070	9.38	0.03
174	25.148	0.143	2.14	99	-3.02	98	85	-0.060	9.11	0.01
175	25.295	0.147	2.12	99	-1.19	101	86	-0.060	8.91	0.01
176	25.438	0.143	2.12	99	-1.99	98	86	-0.070	8.72	0.00
177	25.585	0.147	2.13	99	-1.18	101	86	-0.060	8.49	0.04
178	25.729	0.144	2.13	99	-1.84	98	86	-0.060	8.56	0.01
179	25.876	0.147	2.14	99	-1.07	101	85	-0.060	8.56	0.04
180	26.019	0.143	2.13	99	-1	98	85	-0.060	8.66	0.04
181	26.166	0.147	2.14	99	-1.17	101	85	-0.060	8.50	0.05
182	26.310	0.144	2.12	98	-2.67	99	85	-0.060	8.68	0.00
183	26.457	0.147	2.13	98	-1.08	101	86	-0.050	8.50	0.04
184	26.601	0.144	2.14	98	-1.04	99	86	-0.050	8.48	0.05
185	26.747	0.146	2.11	98	-2.91	100	86	-0.050	8.43	0.04
186	26.891	0.144	2.13	98	-2.72	99	85	-0.060	8.46	0.00
187	27.037	0.146	2.12	98	-2.47	100	85	-0.070	8.39	0.03
188	27.182	0.145	2.13	98	-2.27	99	85	-0.060	8.30	0.03
189	27.327	0.145	2.11	98	-1.04	99	85	-0.060	8.40	0.05
190	27.472	0.145	2.12	98	-1.51	99	86	-0.050	8.49	0.02
191	27.616	0.144	2.12	97	-2.92	99	86	-0.060	8.56	0.00

BOX B TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: I2500
Run #: 3

Job #: 18-434
Tracking #: 0014
Technician: SJB
Date: 10/31/2018

	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	27.762	0.146	2.12	97	-1.06	100	86	-0.060	8.55	0.00
193	27.905	0.143	2.13	97	-1.69	98	86	-0.060	8.39	0.04
194	28.052	0.147	2.12	97	-2.11	101	85	-0.060	8.47	0.01
195	28.196	0.144	2.13	97	-2.57	99	85	-0.060	8.34	0.02
196	28.342	0.146	2.12	97	-1.07	100	85	-0.060	8.43	0.04
197	28.485	0.143	2.13	97	-3.1	98	86	-0.060	8.47	0.03
198	28.633	0.148	2.12	97	-2.86	102	86	-0.040	8.43	0.03
199	28.776	0.143	2.12	96	-2.95	98	86	-0.060	8.23	0.05
200	28.923	0.147	2.10	96	-1.55	101	85	-0.060	8.31	0.04
201	29.065	0.142	2.12	96	-1.1	98	85	-0.060	8.37	0.04
202	29.212	0.147	2.12	96	-1.44	101	85	-0.050	8.37	0.03
203	29.354	0.142	2.11	96	-1.1	98	85	-0.050	8.32	0.06
204	29.501	0.147	2.13	96	-2.48	101	86	-0.050	8.25	0.05
205	29.643	0.142	2.12	96	-2.77	98	86	-0.060	8.16	0.06
206	29.790	0.147	2.11	96	-3	101	86	-0.050	8.26	0.02
207	29.933	0.143	2.12	96	-1.04	98	85	-0.050	8.16	0.04
208	30.080	0.147	2.13	96	-1.08	101	85	-0.050	7.99	0.04
209	30.222	0.142	2.11	96	-2.65	97	85	-0.050	7.94	0.09
210	30.369	0.147	2.12	96	-2.3	101	85	-0.050	8.03	0.04
211	30.513	0.144	2.12	96	-3.04	99	86	-0.070	7.94	0.06
212	30.659	0.146	2.12	96	-2.24	100	86	-0.070	7.90	0.11
213	30.802	0.143	2.11	96	-2.33	98	87	-0.060	8.09	0.05
214	30.947	0.145	2.10	96	-2.28	99	86	-0.050	8.02	0.06
215	31.092	0.145	2.12	96	-1.4	99	85	-0.060	7.98	0.06
216	31.236	0.144	2.12	96	-3.1	99	85	-0.060	7.96	0.07
217	31.381	0.145	2.12	96	-2.75	99	85	-0.060	7.86	0.06
218	31.524	0.143	2.11	96	-3.15	98	85	-0.060	7.88	0.07
219	31.670	0.146	2.12	96	-2.99	100	86	-0.060	7.84	0.10
220	31.814	0.144	2.12	96	-1.12	99	86	-0.060	7.75	0.06
221	31.960	0.146	2.12	96	-1.51	100	86	-0.050	7.60	0.06
222	32.102	0.142	2.11	95	-2.38	97	86	-0.060	7.28	0.11
223	32.250	0.148	2.12	95	-1.06	102	85	-0.050	7.46	0.11

BOX B TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: I2500
Run #: 3

Job #: 18-434
Tracking #: 0014
Technician: SJB
Date: 10/31/2018

	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	32.393	0.143	2.13	95	-3.13	98	85	-0.070	7.33	0.08
225	32.539	0.146	2.11	95	-1.46	100	85	-0.060	7.35	0.12
226	32.681	0.142	2.11	95	-2.61	98	86	-0.060	7.31	0.10
227	32.829	0.148	2.11	95	-2.72	102	86	-0.060	7.22	0.11
228	32.970	0.141	2.12	95	-3.05	97	86	-0.060	7.23	0.10
229	33.117	0.147	2.13	95	-2.36	101	86	-0.070	7.33	0.09
230	33.259	0.142	2.11	95	-2.08	98	85	-0.060	7.37	0.09
231	33.406	0.147	2.12	95	-1.98	101	85	-0.070	7.34	0.12
232	33.548	0.142	2.12	95	-2.04	98	85	-0.070	7.18	0.12
233	33.695	0.147	2.12	95	-1.05	101	85	-0.060	7.29	0.08
234	33.838	0.143	2.13	95	-3	98	86	-0.040	7.24	0.12
235	33.984	0.146	2.12	95	-3.09	100	86	-0.060	7.11	0.11
236	34.128	0.144	2.13	95	-2.03	99	86	-0.050	7.30	0.08
237	34.273	0.145	2.12	95	-1.19	100	85	-0.040	7.14	0.13
238	34.417	0.144	2.13	95	-3.13	99	85	-0.060	7.34	0.08
239	34.561	0.144	2.12	94	-1.29	99	85	-0.060	7.37	0.08
240	34.706	0.145	2.12	94	-3.22	100	85	-0.060	7.43	0.07
241	34.849	0.143	2.11	94	-3.08	98	86	-0.050	7.49	0.06
242	34.994	0.145	2.13	94	-1	100	86	-0.060	7.30	0.11
243	35.138	0.144	2.12	94	-3.15	99	86	-0.060	7.40	0.07
244	35.284	0.146	2.13	94	-2.95	100	85	-0.050	7.34	0.08
245	35.426	0.142	2.13	94	-1.04	98	85	-0.060	7.33	0.09
246	35.573	0.147	2.13	94	-1.05	101	85	-0.060	7.51	0.06
247	35.716	0.143	2.14	94	-1.17	98	85	-0.060	7.41	0.11
248	35.863	0.147	2.11	94	-3.12	101	86	-0.060	7.40	0.11
249	36.005	0.142	2.12	94	-1.07	98	86	-0.060	7.41	0.11
250	36.152	0.147	2.12	94	-1.16	101	86	-0.060	7.55	0.09
251	36.293	0.141	2.11	94	-1.57	97	86	-0.060	7.52	0.09
252	36.440	0.147	2.11	94	-1.1	101	85	-0.060	7.56	0.10
253	36.581	0.141	2.11	94	-3.03	97	85	-0.060	7.49	0.13
254	36.728	0.147	2.12	94	-1.27	101	85	-0.060	7.54	0.12
255	36.871	0.143	2.13	94	-1.53	98	85	-0.060	7.48	0.06

BOX B TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: I2500
Run #: 3

Job #: 18-434
Tracking #: 0014
Technician: SJB
Date: 10/31/2018

	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	37.017	0.146	2.11	94	-1.72	100	86	-0.060	7.65	0.06
257	37.160	0.143	2.12	93	-2.34	98	86	-0.050	7.61	0.07
258	37.306	0.146	2.13	93	-1.56	100	86	-0.060	7.56	0.09
259	37.449	0.143	2.12	93	-2.88	98	86	-0.050	7.67	0.08
260	37.594	0.145	2.12	93	-3.07	100	85	-0.050	7.67	0.06
261	37.738	0.144	2.12	93	-1.98	99	85	-0.060	7.65	0.08
262	37.882	0.144	2.12	93	-3.07	99	85	-0.050	7.65	0.10
263	38.026	0.144	2.11	93	-1.4	99	85	-0.050	7.71	0.07
264	38.169	0.143	2.12	93	-1.33	98	86	-0.060	7.52	0.11
265	38.315	0.146	2.13	93	-2.87	100	86	-0.060	7.52	0.09
266	38.458	0.143	2.11	93	-1.24	98	86	-0.050	7.62	0.11
267	38.604	0.146	2.13	93	-1.15	100	85	-0.070	7.59	0.11
268	38.747	0.143	2.13	93	-3.09	98	85	-0.050	7.66	0.09
269	38.894	0.147	2.11	93	-3.1	101	85	-0.050	7.75	0.09
270	39.035	0.141	2.12	93	-1.26	97	85	-0.060	7.63	0.12
271	39.182	0.147	2.12	93	-2.22	101	85	-0.060	7.73	0.08
272	39.324	0.142	2.12	93	-1.38	98	86	-0.060	7.65	0.09
273	39.470	0.146	2.12	93	-1	100	86	-0.060	7.71	0.10
274	39.611	0.141	2.14	93	-3.13	97	86	-0.060	7.80	0.09
275	39.758	0.147	2.12	93	-1.07	101	85	-0.060	7.73	0.09
276	39.901	0.143	2.12	93	-3.04	98	85	-0.060	7.67	0.11
277	40.046	0.145	2.13	93	-3.07	100	85	-0.050	7.74	0.14
278	40.190	0.144	2.12	93	-1.65	99	85	-0.050	7.80	0.08
279	40.336	0.146	2.12	93	-1.13	100	86	-0.060	7.61	0.13
280	40.478	0.142	2.12	92	-3.17	98	86	-0.070	7.61	0.11
281	40.623	0.145	2.12	92	-2.19	100	86	-0.060	7.67	0.10
282	40.767	0.144	2.12	93	-1.09	99	85	-0.050	7.55	0.14
283	40.910	0.143	2.12	93	-3.11	98	85	-0.040	7.74	0.11
284	41.055	0.145	2.14	92	-2.8	100	85	-0.050	7.69	0.12
285	41.198	0.143	2.13	92	-1.05	98	85	-0.050	7.66	0.11
286	41.344	0.146	2.11	92	-2.26	101	85	-0.050	7.66	0.11
287	41.486	0.142	2.13	92	-1.23	98	86	-0.060	7.71	0.11

BOX B TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: I2500
Run #: 3

Job #: 18-434
Tracking #: 0014
Technician: SJB
Date: 10/31/2018

	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	41.633	0.147	2.13	92	-2.99	101	86	-0.050	7.64	0.09
289	41.775	0.142	2.10	92	-3.11	98	86	-0.060	7.60	0.14
290	41.921	0.146	2.11	92	-2.32	101	85	-0.060	7.56	0.12
291	42.063	0.142	2.12	92	-3.05	98	85	-0.050	7.48	0.09
292	42.209	0.146	2.12	92	-1.2	100	85	-0.070	7.23	0.08
293	42.350	0.141	2.12	92	-0.96	97	85	-0.050	7.17	0.07
294	42.497	0.147	2.11	92	-3	101	85	-0.060	7.03	0.08
295	42.639	0.142	2.11	92	-3.15	98	86	-0.060	6.97	0.11
296	42.785	0.146	2.11	92	-1.15	100	86	-0.050	7.00	0.09
297	42.928	0.143	2.12	92	-2.62	98	86	-0.050	6.97	0.10
298	43.074	0.146	2.12	92	-1.23	100	85	-0.070	6.84	0.11
299	43.217	0.143	2.11	92	-2.34	98	85	-0.050	6.87	0.09
300	43.361	0.144	2.12	92	-1.56	99	85	-0.050	6.93	0.09
301	43.505	0.144	2.11	92	-1.21	99	85	-0.060	7.02	0.08
302	43.649	0.144	2.12	92	-2.81	99	86	-0.050	7.05	0.10
303	43.792	0.143	2.12	92	-3.14	98	86	-0.060	7.02	0.09
304	43.936	0.144	2.12	92	-3.15	99	86	-0.050	6.99	0.10
305	44.082	0.146	2.13	92	-3.06	100	85	-0.060	7.17	0.10
306	44.224	0.142	2.12	92	-1.22	98	85	-0.060	6.72	0.09
307	44.371	0.147	2.12	92	-1.47	101	85	-0.050	6.78	0.10
308	44.513	0.142	2.12	92	-2.97	98	85	-0.060	6.69	0.10
309	44.659	0.146	2.12	92	-1.04	100	85	-0.050	6.71	0.11
310	44.800	0.141	2.12	92	-2.43	97	86	-0.050	6.59	0.14
311	44.947	0.147	2.12	92	-2.1	101	86	-0.060	6.69	0.11
312	45.087	0.140	2.11	91	-2.92	97	85	-0.050	6.68	0.13
313	45.234	0.147	2.13	92	-2.03	101	85	-0.060	6.81	0.10
314	45.376	0.142	2.12	92	-1.14	98	85	-0.060	6.82	0.11
315	45.522	0.146	2.12	91	-1.12	101	85	-0.050	6.72	0.11
316	45.665	0.143	2.13	92	-1.63	98	85	-0.060	6.71	0.11
317	45.811	0.146	2.15	92	-1.09	100	85	-0.050	6.85	0.10
318	45.953	0.142	2.11	92	-1.51	98	86	-0.050	6.71	0.12
319	46.098	0.145	2.12	92	-1.89	100	86	-0.060	6.70	0.14

BOX B TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: I2500
Run #: 3

Job #: 18-434
Tracking #: 0014
Technician: SJB
Date: 10/31/2018

	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	46.242	0.144	2.12	92	-3.07	99	85	-0.060	6.67	0.14
321	46.385	0.143	2.12	92	-2.71	98	85	-0.050	6.80	0.12
322	46.529	0.144	2.12	92	-1.11	99	84	-0.050	6.92	0.08
323	46.672	0.143	2.12	92	-3.16	98	85	-0.050	6.81	0.13
324	46.818	0.146	2.12	91	-3.06	101	85	-0.060	6.86	0.11
325	46.960	0.142	2.13	91	-1.3	98	85	-0.050	6.83	0.09
326	47.107	0.147	2.13	91	-1	101	86	-0.070	6.88	0.12
327	47.249	0.142	2.11	91	-2.83	98	86	-0.050	6.76	0.15
328	47.395	0.146	2.12	92	-3.01	100	85	-0.050	6.82	0.11
329	47.536	0.141	2.13	91	-0.99	97	85	-0.060	6.88	0.11
330	47.683	0.147	2.13	91	-1	101	85	-0.050	6.96	0.09
331	47.824	0.141	2.11	91	-1.63	97	85	-0.060	6.68	0.15
332	47.970	0.146	2.12	91	-2.97	101	85	-0.050	6.78	0.11
333	48.112	0.142	2.14	91	-0.98	98	85	-0.060	6.60	0.14
334	48.258	0.146	2.13	91	-2.57	100	86	-0.050	6.77	0.07
335	48.401	0.143	2.12	91	-1.75	98	86	-0.050	6.76	0.10
336	48.546	0.145	2.10	91	-1.86	100	85	-0.050	6.68	0.12
337	48.689	0.143	2.12	91	-2.42	98	85	-0.050	6.74	0.11
338	48.834	0.145	2.12	91	-2.44	100	85	-0.050	6.54	0.11
339	48.977	0.143	2.13	91	-2.99	98	85	-0.050	6.63	0.10
340	49.120	0.143	2.11	91	-1.37	98	86	-0.050	6.59	0.14
341	49.265	0.145	2.13	91	-3.09	100	86	-0.070	6.68	0.09
342	49.408	0.143	2.13	91	-1.51	98	86	-0.050	6.58	0.12
343	49.554	0.146	2.13	92	-1.04	100	86	-0.060	6.73	0.09
344	49.696	0.142	2.12	91	-1.95	98	85	-0.040	6.77	0.10
345	49.843	0.147	2.11	91	-1.05	101	84	-0.050	7.21	0.15
346	49.984	0.141	2.12	91	-1.16	97	85	-0.030	7.22	0.11
347	50.130	0.146	2.11	91	-1.36	101	85	-0.050	7.20	0.11
348	50.271	0.141	2.10	91	-3.13	97	85	-0.050	7.12	0.14
349	50.417	0.146	2.10	91	-1.14	101	86	-0.060	7.17	0.09
350	50.559	0.142	2.12	91	-3.17	98	86	-0.050	7.10	0.11
351	50.705	0.146	2.12	91	-3.08	101	85	-0.050	7.19	0.13

BOX B TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: I2500
Run #: 3

Job #: 18-434
Tracking #: 0014
Technician: SJB
Date: 10/31/2018

	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	50.847	0.142	2.13	91	-2.37	98	85	-0.050	7.28	0.09
353	50.993	0.146	2.12	91	-2.39	101	85	-0.050	7.38	0.08
354	51.136	0.143	2.09	91	-1.95	99	85	-0.050	7.26	0.10
355	51.280	0.144	2.11	91	-1.85	99	85	-0.050	7.40	0.12
356	51.423	0.143	2.10	91	-3.18	99	86	-0.060	7.46	0.07
357	51.566	0.143	2.13	91	-3.04	99	86	-0.070	7.29	0.13
358	51.710	0.144	2.11	92	-2.09	99	85	-0.060	7.38	0.10
359	51.853	0.143	2.11	92	-1.1	98	85	-0.060	7.27	0.10
360	51.998	0.145	2.09	92	-3.06	100	84	-0.060	7.25	0.13
361	52.140	0.142	2.12	92	-2.35	98	85	-0.060	7.21	0.09
362	52.287	0.147	2.12	92	-1.11	101	86	-0.060	7.18	0.12
363	52.428	0.141	2.11	92	-1.36	97	86	-0.050	7.35	0.07
364	52.575	0.147	2.11	92	-3.11	101	86	-0.050	7.20	0.12
365	52.716	0.141	2.11	92	-2.4	97	85	-0.050	7.19	0.12
366	52.861	0.145	2.11	92	-1.02	100	85	-0.050	7.39	0.09
367	53.003	0.142	2.10	92	-3.19	98	85	-0.050	7.28	0.07
368	53.149	0.146	2.11	92	-2.31	101	85	-0.040	7.28	0.09
369	53.291	0.142	2.11	92	-2.41	98	86	-0.050	7.30	0.11
370	53.437	0.146	2.12	92	-2.49	101	86	-0.060	7.22	0.09
371	53.580	0.143	2.11	92	-2.77	98	86	-0.060	7.29	0.11
372	53.724	0.144	2.10	92	-3.02	99	85	-0.060	7.02	0.12
373	53.867	0.143	2.10	92	-2.6	98	85	-0.050	7.12	0.12
374	54.011	0.144	2.12	93	-2.78	99	85	-0.050	6.82	0.12
375	54.154	0.143	2.10	93	-1.08	98	85	-0.050	6.95	0.11
376	54.297	0.143	2.10	93	-1.83	98	86	-0.050	7.05	0.08
377	54.443	0.146	2.10	93	-1.15	100	86	-0.040	6.99	0.11
378	54.585	0.142	2.11	93	-3.19	98	86	-0.050	6.97	0.07
379	54.731	0.146	2.11	93	-2.87	100	85	-0.050	6.99	0.07
380	54.873	0.142	2.10	93	-1.96	98	85	-0.050	7.03	0.10
381	55.019	0.146	2.11	93	-1.99	100	85	-0.040	6.94	0.11
382	55.160	0.141	2.10	93	-1.77	97	85	-0.070	7.06	0.09
383	55.306	0.146	2.10	93	-3.18	100	86	-0.050	6.97	0.09

BOX B TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: I2500
Run #: 3

Job #: 18-434
Tracking #: 0014
Technician: SJB
Date: 10/31/2018

	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	55.447	0.141	2.09	94	-1.48	97	86	-0.050	7.01	0.10
385	55.594	0.147	2.11	94	-3.08	101	85	-0.040	6.79	0.10
386	55.735	0.141	2.10	94	-1.05	97	85	-0.040	6.79	0.10
387	55.881	0.146	2.11	93	-1.45	100	85	-0.060	6.87	0.08
388	56.025	0.144	2.11	94	-2.13	99	85	-0.050	6.91	0.08
389	56.169	0.144	2.09	94	-2.97	99	85	-0.050	6.74	0.12
390	56.312	0.143	2.11	94	-2.48	98	86	-0.040	6.86	0.10
391	56.456	0.144	2.11	94	-1.31	99	86	-0.060	6.68	0.10
392	56.600	0.144	2.09	94	-2.34	99	85	-0.050	6.59	0.11
393	56.742	0.142	2.10	94	-3.07	97	85	-0.050	6.54	0.12
394	56.888	0.146	2.11	94	-1.22	100	85	-0.060	6.60	0.08
395	57.030	0.142	2.10	94	-1.28	97	85	-0.050	6.64	0.11
396	57.177	0.147	2.11	94	-2.87	101	86	-0.050	6.69	0.09
397	57.319	0.142	2.11	94	-2.03	98	86	-0.050	6.65	0.12
398	57.465	0.146	2.11	95	-1.32	100	86	-0.050	6.44	0.11
399	57.606	0.141	2.11	95	-1.05	97	85	-0.050	6.22	0.13
400	57.753	0.147	2.10	95	-1.05	101	85	-0.050	6.25	0.11
401	57.894	0.141	2.10	95	-3.11	97	85	-0.060	6.22	0.10
402	58.040	0.146	2.10	95	-3.04	100	85	-0.050	6.15	0.13
403	58.182	0.142	2.10	95	-1.61	97	85	-0.050	6.23	0.12
404	58.328	0.146	2.08	95	-2.19	100	86	-0.050	6.17	0.11
405	58.471	0.143	2.11	95	-1.56	98	86	-0.050	6.22	0.09
406	58.617	0.146	2.11	95	-3.01	100	86	-0.060	6.09	0.10
407	58.759	0.142	2.09	95	-3.08	97	85	-0.050	6.20	0.13
408	58.904	0.145	2.10	95	-1.05	99	84	-0.050	6.04	0.10
409	59.047	0.143	2.09	95	-1.15	98	85	-0.060	6.16	0.13
410	59.191	0.144	2.11	95	-1.59	99	85	-0.050	6.03	0.10
411	59.335	0.144	2.10	95	-2.69	99	86	-0.050	6.02	0.11
412	59.478	0.143	2.10	95	-2.96	98	86	-0.070	6.04	0.09
413	59.624	0.146	2.12	96	-2.89	100	86	-0.050	6.17	0.10
Avg/Tot	59.624	0.144	2.13	93	-2.06	100			9.06	0.07

WOODSTOVE SURFACE TEMPERATURE DATA

Client: FPI
Model: I2500
Run #: 3

Job #: 18-434
Tracking #: 0014
Technician: SJB
Date: 10/31/2018

	Temperature Data (°F)						
Elapsed Time (min)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
0	430	415	366	340	289	368.0	691
1	429	413	370	337	291	368.0	616
2	428	412	373	333	292	367.6	672
3	427	411	375	330	293	367.2	756
4	425	409	376	327	295	366.4	799
5	422	407	376	325	296	365.2	805
6	418	403	375	329	298	364.6	842
7	413	398	373	335	302	364.2	844
8	408	394	371	344	305	364.4	812
9	403	390	368	353	307	364.2	789
10	398	385	365	361	309	363.6	784
11	393	380	362	369	311	363.0	782
12	389	376	359	377	313	362.8	780
13	384	372	356	383	315	362.0	775
14	380	367	353	389	317	361.2	774
15	376	363	350	393	319	360.2	778
16	372	359	348	398	320	359.4	785
17	368	355	345	402	321	358.2	788
18	364	351	342	407	323	357.4	794
19	361	348	340	412	323	356.8	803
20	358	344	338	416	324	356.0	809
21	353	327	333	418	320	350.2	842
22	350	323	327	421	316	347.4	914
23	345	319	320	420	313	343.4	936
24	341	315	314	420	309	339.8	945
25	338	312	309	421	305	337.0	935
26	334	310	305	420	302	334.2	924
27	332	308	302	421	299	332.4	921
28	330	307	299	421	295	330.4	915
29	328	306	297	420	292	328.6	907
30	328	305	295	418	289	327.0	904
31	327	305	293	418	285	325.6	893
32	326	304	291	416	282	323.8	873
33	326	304	290	414	279	322.6	857
34	325	303	289	412	276	321.0	841
35	325	303	287	409	273	319.4	828
36	324	303	286	409	270	318.4	818
37	323	303	285	406	267	316.8	808
38	323	303	284	405	264	315.8	801
39	324	302	283	402	262	314.6	795
40	322	302	281	400	260	313.0	790
41	322	301	280	398	258	311.8	784
42	322	301	279	396	255	310.6	782
43	321	301	278	393	253	309.2	776
44	321	299	277	391	251	307.8	771
45	321	299	276	389	249	306.8	766
46	320	298	274	388	247	305.4	764
47	320	297	273	386	245	304.2	762

WOODSTOVE SURFACE TEMPERATURE DATA

Client: FPI
Model: I2500
Run #: 3

Job #: 18-434
Tracking #: 0014
Technician: SJB
Date: 10/31/2018

	Temperature Data (°F)						
Elapsed Time (min)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
48	319	296	271	385	244	303.0	761
49	319	295	270	384	242	302.0	761
50	318	294	269	382	241	300.8	762
51	318	293	267	382	239	299.8	761
52	318	292	266	381	237	298.8	761
53	317	291	264	381	236	297.8	761
54	317	290	263	380	235	297.0	762
55	316	289	262	379	234	296.0	762
56	316	288	261	379	232	295.2	765
57	315	288	259	378	231	294.2	766
58	315	287	258	377	229	293.2	763
59	314	286	257	376	228	292.2	765
60	314	285	256	375	227	291.4	771
61	313	284	255	374	226	290.4	770
62	312	283	253	373	225	289.2	767
63	311	282	252	371	224	288.0	770
64	310	281	251	370	223	287.0	773
65	310	280	250	369	222	286.2	771
66	308	279	249	369	221	285.2	770
67	307	279	247	369	220	284.4	766
68	307	278	247	368	219	283.8	765
69	305	277	246	369	219	283.2	766
70	305	277	245	369	218	282.8	761
71	303	277	244	370	217	282.2	756
72	303	276	244	371	217	282.2	753
73	301	275	242	372	216	281.2	752
74	300	275	242	372	216	281.0	751
75	300	275	241	372	215	280.6	752
76	300	275	241	372	215	280.6	753
77	299	275	240	372	214	280.0	752
78	298	274	240	374	213	279.8	749
79	298	274	240	374	213	279.8	749
80	298	274	240	373	213	279.6	748
81	298	274	239	372	212	279.0	746
82	298	273	239	372	212	278.8	745
83	298	274	239	371	211	278.6	744
84	298	273	239	368	211	277.8	745
85	298	274	239	368	210	277.8	744
86	298	274	239	367	210	277.6	744
87	298	274	239	367	210	277.6	744
88	299	274	240	366	209	277.6	745
89	300	274	240	366	209	277.8	745
90	301	274	240	367	209	278.2	745
91	301	274	241	367	209	278.4	747
92	302	275	241	367	208	278.6	749
93	302	276	242	368	208	279.2	749
94	304	276	242	369	208	279.8	748
95	305	276	243	370	208	280.4	749

WOODSTOVE SURFACE TEMPERATURE DATA

Client: FPI
Model: I2500
Run #: 3

Job #: 18-434
Tracking #: 0014
Technician: SJB
Date: 10/31/2018

	Temperature Data (°F)						
Elapsed Time (min)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
96	306	277	244	372	207	281.2	749
97	308	277	245	373	207	282.0	751
98	308	278	245	373	207	282.2	751
99	309	278	246	374	206	282.6	753
100	310	280	247	376	207	284.0	755
101	312	280	247	377	206	284.4	759
102	313	281	249	377	207	285.4	760
103	313	282	250	377	206	285.6	757
104	314	283	250	379	206	286.4	756
105	315	284	252	378	206	287.0	755
106	317	285	252	378	206	287.6	752
107	317	286	254	377	206	288.0	751
108	318	287	254	377	206	288.4	749
109	319	288	255	375	206	288.6	745
110	319	290	257	372	206	288.8	742
111	319	291	258	369	206	288.6	740
112	319	291	259	366	206	288.2	740
113	319	292	260	364	206	288.2	742
114	320	292	261	361	206	288.0	743
115	319	293	262	358	206	287.6	744
116	319	294	263	354	206	287.2	744
117	318	294	264	351	206	286.6	741
118	318	295	265	348	206	286.4	737
119	319	297	265	345	206	286.4	736
120	317	298	266	342	206	285.8	736
121	318	298	267	340	206	285.8	733
122	316	299	267	337	206	285.0	727
123	316	299	268	333	206	284.4	721
124	316	299	268	331	206	284.0	719
125	315	299	269	330	206	283.8	723
126	314	299	269	328	206	283.2	723
127	314	299	270	327	205	283.0	724
128	314	299	270	326	205	282.8	727
129	314	300	271	326	205	283.2	729
130	314	300	271	326	205	283.2	730
131	313	301	272	326	205	283.4	732
132	315	302	273	326	205	284.2	731
133	313	301	273	326	205	283.6	731
134	314	302	274	325	205	284.0	731
135	313	302	275	325	205	284.0	729
136	313	302	276	325	205	284.2	726
137	314	302	277	324	205	284.4	727
138	313	302	278	324	205	284.4	729
139	314	302	278	324	205	284.6	732
140	313	302	279	323	205	284.4	736
141	313	302	280	322	205	284.4	740
142	314	301	281	322	205	284.6	745
143	314	301	281	322	205	284.6	737

WOODSTOVE SURFACE TEMPERATURE DATA

Client: FPI
Model: I2500
Run #: 3

Job #: 18-434
Tracking #: 0014
Technician: SJB
Date: 10/31/2018

	Temperature Data (°F)						
Elapsed Time (min)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
144	314	300	282	321	204	284.2	732
145	314	300	283	321	205	284.6	728
146	314	300	283	320	204	284.2	726
147	314	299	284	319	204	284.0	725
148	313	300	285	319	204	284.2	724
149	313	299	285	317	204	283.6	723
150	313	299	286	316	203	283.4	725
151	312	299	286	315	203	283.0	725
152	312	298	287	314	203	282.8	727
153	312	298	287	312	203	282.4	723
154	312	298	287	309	203	281.8	720
155	311	298	287	307	203	281.2	717
156	310	298	287	305	202	280.4	716
157	309	299	287	303	202	280.0	720
158	309	298	286	301	202	279.2	720
159	309	299	286	299	202	279.0	717
160	309	300	286	297	201	278.6	714
161	308	300	286	296	201	278.2	711
162	306	300	286	295	201	277.6	706
163	307	300	286	294	201	277.6	702
164	307	301	286	294	200	277.6	698
165	307	301	286	293	200	277.4	694
166	306	301	286	293	200	277.2	690
167	306	301	286	293	200	277.2	687
168	305	301	286	293	200	277.0	685
169	305	302	286	293	199	277.0	681
170	304	302	287	294	199	277.2	678
171	306	303	287	294	199	277.8	673
172	306	302	287	295	199	277.8	667
173	306	304	287	294	199	278.0	661
174	305	303	287	295	199	277.8	656
175	306	304	287	294	199	278.0	652
176	306	303	286	293	199	277.4	652
177	306	304	285	292	199	277.2	651
178	307	303	284	290	199	276.6	649
179	306	303	283	289	199	276.0	649
180	306	303	282	287	199	275.4	647
181	306	303	281	285	199	274.8	644
182	304	302	280	284	199	273.8	641
183	305	302	279	283	199	273.6	638
184	305	302	278	282	199	273.2	635
185	304	302	277	280	199	272.4	632
186	304	301	276	278	199	271.6	629
187	305	301	275	277	199	271.4	626
188	303	301	274	276	200	270.8	624
189	302	301	273	275	200	270.2	623
190	302	300	272	273	200	269.4	620
191	302	300	272	272	201	269.4	618

WOODSTOVE SURFACE TEMPERATURE DATA

Client: FPI
Model: I2500
Run #: 3

Job #: 18-434
Tracking #: 0014
Technician: SJB
Date: 10/31/2018

	Temperature Data (°F)						
Elapsed Time (min)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
192	303	300	271	271	201	269.2	617
193	303	300	270	269	201	268.6	614
194	303	300	270	268	201	268.4	613
195	302	300	270	267	202	268.2	612
196	303	300	269	266	202	268.0	611
197	302	300	269	265	203	267.8	610
198	302	300	269	264	203	267.6	609
199	303	300	269	263	204	267.8	608
200	303	300	269	262	205	267.8	609
201	302	300	269	261	205	267.4	609
202	302	300	269	260	206	267.4	609
203	302	300	269	259	206	267.2	609
204	303	300	269	258	207	267.4	611
205	302	300	270	257	207	267.2	613
206	303	300	270	256	208	267.4	614
207	302	299	270	254	209	266.8	617
208	302	299	270	252	209	266.4	620
209	302	299	270	252	210	266.6	622
210	303	299	270	250	210	266.4	622
211	302	299	270	249	210	266.0	622
212	302	299	270	248	211	266.0	622
213	302	298	270	247	211	265.6	621
214	302	298	270	245	212	265.4	618
215	302	298	270	244	212	265.2	617
216	302	298	270	243	212	265.0	617
217	302	298	270	242	213	265.0	617
218	302	298	270	241	213	264.8	618
219	302	298	270	241	213	264.8	618
220	301	298	270	240	213	264.4	618
221	301	298	269	239	214	264.2	623
222	302	297	269	237	214	263.8	647
223	301	298	269	236	214	263.6	669
224	301	298	268	235	214	263.2	675
225	300	298	267	234	215	262.8	675
226	299	298	266	232	215	262.0	677
227	299	298	265	230	215	261.4	679
228	298	298	264	228	216	260.8	678
229	298	298	263	226	216	260.2	677
230	298	298	262	224	216	259.6	674
231	297	299	261	223	217	259.4	658
232	297	299	260	222	217	259.0	642
233	295	300	259	219	217	258.0	635
234	295	300	259	219	218	258.2	634
235	295	301	258	217	218	257.8	635
236	296	301	257	216	218	257.6	634
237	294	301	257	215	218	257.0	631
238	296	302	256	215	219	257.6	618
239	295	301	256	214	219	257.0	608

WOODSTOVE SURFACE TEMPERATURE DATA

Client: FPI
Model: I2500
Run #: 3

Job #: 18-434
Tracking #: 0014
Technician: SJB
Date: 10/31/2018

	Temperature Data (°F)						
Elapsed Time (min)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
240	296	301	255	213	219	256.8	606
241	295	301	255	213	220	256.8	608
242	294	302	255	213	220	256.8	618
243	294	301	254	212	220	256.2	619
244	296	301	254	212	220	256.6	622
245	296	300	254	211	220	256.2	623
246	296	300	254	212	220	256.4	619
247	296	300	254	212	221	256.6	615
248	296	299	254	211	221	256.2	612
249	296	299	254	211	221	256.2	610
250	297	299	254	210	222	256.4	607
251	297	299	254	210	222	256.4	603
252	296	299	254	210	222	256.2	603
253	296	298	254	210	222	256.0	603
254	297	298	254	210	223	256.4	600
255	297	298	254	209	223	256.2	597
256	297	298	255	209	223	256.4	595
257	298	298	255	209	223	256.6	593
258	298	298	255	208	224	256.6	591
259	298	299	255	208	224	256.8	591
260	298	300	256	208	224	257.2	590
261	299	300	256	208	224	257.4	588
262	298	300	256	207	224	257.0	588
263	299	300	256	207	224	257.2	588
264	298	301	257	207	224	257.4	588
265	300	301	257	207	224	257.8	588
266	300	302	258	207	225	258.4	590
267	300	303	258	207	225	258.6	593
268	300	304	259	206	225	258.8	594
269	299	305	259	206	225	258.8	594
270	300	305	260	206	225	259.2	595
271	301	305	260	206	226	259.6	596
272	301	306	260	206	226	259.8	598
273	301	307	260	206	226	260.0	603
274	301	307	261	206	227	260.4	606
275	301	308	261	206	227	260.6	605
276	302	308	262	206	227	261.0	606
277	303	308	262	206	227	261.2	609
278	303	309	262	206	227	261.4	613
279	302	310	262	206	228	261.6	617
280	303	310	263	206	228	262.0	618
281	304	311	263	205	228	262.2	616
282	303	312	263	206	228	262.4	615
283	304	312	264	206	229	263.0	615
284	304	313	264	205	229	263.0	616
285	304	312	264	205	229	262.8	617
286	304	313	265	205	230	263.4	618
287	305	313	265	205	230	263.6	619

WOODSTOVE SURFACE TEMPERATURE DATA

Client: FPI
Model: I2500
Run #: 3

Job #: 18-434
Tracking #: 0014
Technician: SJB
Date: 10/31/2018

	Temperature Data (°F)						
Elapsed Time (min)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
288	306	314	265	205	230	264.0	619
289	306	314	266	205	231	264.4	618
290	306	315	266	204	231	264.4	617
291	305	315	266	204	231	264.2	597
292	306	315	267	204	232	264.8	575
293	306	315	267	204	232	264.8	569
294	307	315	267	204	232	265.0	570
295	306	315	267	204	232	264.8	572
296	306	316	268	204	233	265.4	573
297	308	315	268	203	232	265.2	575
298	308	315	268	203	233	265.4	576
299	307	315	268	203	233	265.2	577
300	308	315	268	202	233	265.2	579
301	309	314	268	202	234	265.4	582
302	307	314	268	202	234	265.0	584
303	308	314	268	201	234	265.0	586
304	307	314	268	201	234	264.8	588
305	308	313	268	200	234	264.6	588
306	308	313	268	199	234	264.4	587
307	308	313	268	199	234	264.4	588
308	307	313	268	198	235	264.2	586
309	308	312	267	198	235	264.0	584
310	308	311	267	197	235	263.6	582
311	306	312	267	197	235	263.4	581
312	307	311	266	196	235	263.0	578
313	307	311	266	196	235	263.0	576
314	307	311	266	195	235	262.8	574
315	305	310	265	194	236	262.0	572
316	305	310	264	194	236	261.8	569
317	305	311	264	193	235	261.6	568
318	305	310	264	192	235	261.2	567
319	304	310	263	192	235	260.8	566
320	303	310	263	192	235	260.6	565
321	303	310	262	191	235	260.2	565
322	303	310	262	191	235	260.2	563
323	303	310	262	190	235	260.0	562
324	303	309	261	190	235	259.6	561
325	302	309	261	190	235	259.4	560
326	301	309	261	189	235	259.0	560
327	302	310	260	188	235	259.0	558
328	301	309	260	188	235	258.6	556
329	301	309	260	188	235	258.6	555
330	299	309	260	188	236	258.4	554
331	300	309	260	188	235	258.4	555
332	298	309	260	188	235	258.0	556
333	300	309	260	187	235	258.2	556
334	299	309	260	187	235	258.0	556
335	299	308	260	187	235	257.8	554

WOODSTOVE SURFACE TEMPERATURE DATA

Client: FPI
Model: I2500
Run #: 3

Job #: 18-434
Tracking #: 0014
Technician: SJB
Date: 10/31/2018

	Temperature Data (°F)						
Elapsed Time (min)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
336	298	309	260	187	235	257.8	552
337	299	308	260	186	235	257.6	550
338	298	308	260	186	235	257.4	546
339	297	308	260	186	235	257.2	540
340	298	307	260	185	235	257.0	537
341	297	307	260	185	235	256.8	536
342	297	307	260	185	234	256.6	535
343	296	307	260	185	235	256.6	534
344	297	311	261	185	235	257.8	531
345	298	311	261	185	234	257.8	548
346	300	312	261	185	235	258.6	564
347	299	311	262	185	235	258.4	569
348	299	311	262	186	235	258.6	570
349	300	312	262	186	235	259.0	570
350	300	312	262	187	235	259.2	570
351	300	312	262	187	235	259.2	569
352	300	312	262	187	235	259.2	568
353	301	312	262	189	236	260.0	567
354	301	311	262	189	236	259.8	565
355	300	311	262	190	236	259.8	561
356	302	311	261	190	236	260.0	559
357	301	311	262	190	236	260.0	558
358	302	311	261	191	236	260.2	559
359	303	310	260	191	236	260.0	558
360	302	310	260	192	236	260.0	558
361	303	310	260	192	237	260.4	558
362	303	310	259	192	237	260.2	558
363	304	310	259	193	237	260.6	558
364	303	309	259	193	237	260.2	560
365	305	309	258	193	237	260.4	561
366	304	308	258	193	237	260.0	563
367	305	308	257	193	237	260.0	562
368	305	308	257	194	237	260.2	562
369	305	307	257	194	237	260.0	562
370	305	307	256	193	237	259.6	562
371	304	306	256	193	237	259.2	563
372	306	307	256	194	237	260.0	563
373	306	306	256	194	236	259.6	562
374	305	306	255	194	236	259.2	560
375	306	305	255	194	237	259.4	558
376	306	304	254	194	236	258.8	555
377	306	304	254	194	236	258.8	554
378	306	304	254	194	236	258.8	558
379	306	304	254	194	236	258.8	561
380	305	303	253	194	236	258.2	561
381	305	303	253	194	236	258.2	558
382	305	302	252	193	236	257.6	555
383	305	302	252	193	235	257.4	553

WOODSTOVE SURFACE TEMPERATURE DATA

Client: FPI
Model: I2500
Run #: 3

Job #: 18-434
Tracking #: 0014
Technician: SJB
Date: 10/31/2018

	Temperature Data (°F)						
Elapsed Time (min)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
384	305	301	252	193	235	257.2	552
385	305	301	252	193	235	257.2	552
386	305	300	251	193	234	256.6	555
387	304	300	250	192	234	256.0	557
388	305	299	251	192	234	256.2	558
389	304	299	250	192	234	255.8	559
390	304	298	250	192	234	255.6	560
391	303	298	250	192	233	255.2	559
392	304	297	249	191	234	255.0	558
393	303	297	249	191	233	254.6	556
394	303	297	249	190	233	254.4	554
395	303	296	248	190	233	254.0	553
396	303	296	248	190	233	254.0	551
397	302	295	247	190	233	253.4	551
398	301	294	247	189	232	252.6	549
399	302	294	247	189	232	252.8	551
400	301	293	246	189	232	252.2	551
401	301	293	246	189	232	252.2	552
402	300	292	245	189	232	251.6	552
403	299	292	246	188	232	251.4	551
404	299	291	245	188	232	251.0	550
405	299	290	244	188	232	250.6	551
406	299	289	244	187	232	250.2	552
407	299	289	243	187	232	250.0	552
408	297	288	243	186	231	249.0	551
409	297	287	242	186	231	248.6	553
410	297	286	242	185	231	248.2	552
411	296	286	242	185	231	248.0	550
412	295	285	241	185	231	247.4	548
413	294	284	240	184	231	246.6	548
Average	311	304	269	274	228	277	661

LAB SAMPLE DATA - ASTM E2515

Client: FPI
Job #: 18-434
Model: I2500
Tracking #: 0014
Run #: 3
Technician: SJB
Date: 10/31/2018

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	T032	85.9	84.2	1.7
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:	1.7

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	T033	169.8	84.4	1.1
B. Rear filter catch	Filter	T034		84.3	
C. Probe catch*	Probe	3A	116073.9	116073.6	0.3
D. O-Ring catch*	O-Ring	3A	3580.0	3579.7	0.3

Sub-Total	Total Particulate, mg:	1.7
Train A Aggregate	Total Particulate, mg:	**3.4**

TRAIN B

Sample Component	Reagent	Filter, Probe, or O-Ring #	Weights		
			Final, mg	Tare, mg	Particulate, mg
A. Front filter catch	Filter	T035	173.8	85.1	3.0
B. Rear filter catch	Filter	T036		85.7	
C. Probe catch*	Probe	3B	116340.6	116340.3	0.3
D. O-Ring catch*	O-Ring	3B	3568.3	3567.8	0.5

Total Particulate, mg:	**3.8**

AMBIENT

Sample Component	Reagent	Filter, Probe, or O-Ring #	Weights		
			Final, mg	Tare, mg	Particulate, mg
A. Filter catch*	Filter	T037	86.0	86.0	0.0

Total Particulate, mg:	**0.0**

*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: 18-434 | Tracking #: 0014
Model: I2500 | Run Number: 3 | Test Date: 10/31/2018

Wood Heater Run Notes

Pre-Test Notes
Pre-Test Start Time: 7:00
Air Control Setting: High Setting - Fully Open

Time	Notes
0 min	Started sampling/kindling ignition with propane torch for 20 seconds. Door cracked open 2.5", bypass open, air control set to high air setting, blower off. Starting kindling in stove was 2.3 lbs plus a couple sheets of printer paper.
2 min	Door closed to 3/4"
3 min	Door latched closed
5 min	Catalyst bypass closed
8 min	At 0.3 lbs, added 3.3 lbs of start-up fuel, door closed within 60 seconds
22 min	At 0.9 lbs, added 2.1 lbs of start-up fuel, door closed within 35 seconds
28 min	At 2.0 lbs, added 2.0 lbs of start-up fuel, door closed within 30 seconds
35 min	At 2.2 lbs, leveled coal bed, loaded high fire fuel, done in 30 seconds, door closed at 40 sec from loading
55 min	Blower fan turned on to high setting.
117 min	At 7.0 lbs stirred fuel forward to ensure uniform charcoalization.
146 min	At 4.5 lbs, leveled coal bed, turned off fan, zeroed scale in preparation of fuel loading.

Test Notes
Test Burn Start Time: 9:27
Air Control Setting: Medium Setting – Position 17 on control indicator (see photos).

Time	Notes
0 min	Loaded test load, fuel in and door closed in 50 seconds, fan off, air on high setting, bypass closed throughout fuel loading
6 min	Set air to test setting.
20 min	Blower fan turned on to high
60 min	Changed 1-hour filter
343 min	At 1.6 lbs, after 10 minutes with less than 0.26 lb weight loss (1% of fuel load), adjusted fuel load (see pictures in test folder) door was open for approximately 20 seconds.

Test Burn End Time: 16:20

Flue Gas Concentration Measurement

Calibration Gas Values: Span Gas CO_2 (%): 16.93 CO (%): 4.330
Mid Gas CO_2 (%): 10.00 CO (%): 2.51

Calibration Results:

	Pre Test			Post Test		
	Zero	Mid	Span	Zero	Mid	Span
Time	8:00	8:06	8:02	16:43	16:45	16:50
CO_2	0.00	10.00	16.93	-0.06	9.98	16.90
CO	0.000	2.512	4.330	-0.012	2.297	4.499

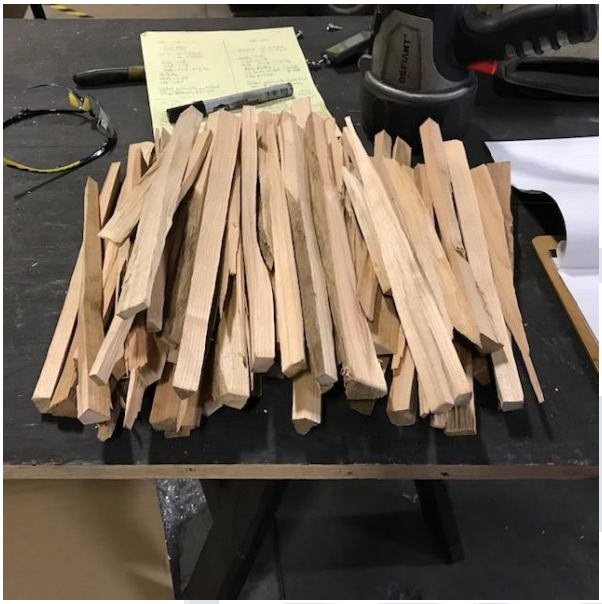
Flue Gas Probe Leak Check: Initial: No Leakage Final: No Leakage

Technician Signature:  Date: 11/1/2018

ASTM E3053 Wood Heater Run Sheets

Client: FPI | Job Number: 18-434 | Tracking #: 0014
Model: I2500 | Run Number: 3 | Test Date: 10/31/2018

Test Photos



Kindling Fuel Load

Start-up Fuel Load

High Fire Fuel Load

Residual Start-up Fuel Coal Bed

Technician Signature: _____ Date: 11/1/2018

ASTM E3053 Wood Heater Run Sheets

Client: FPI | Job Number: 18-434 | Tracking #: 0014
Model: I2500 | Run Number: 3 | Test Date: 10/31/2018

High Fire Fuel Loaded

Residual High Fire Load Coal Bed

Medium Fire Fuel Load

Medium Fire Fuel Loaded

Technician Signature: _____ Date: 11/1/2018

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

Date/Time In Desiccator: 6/13/18 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	6/20/18 - 11:00	85.9	6/22/18 - 12:00	86.0					SB	18-414 #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	18-414 #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	18-414 #3
T014		84.5		84.6					SB	
T015		85.7		85.8					SB	
T016		85.1		84.9					SB	
T017		83.8		85.8					SB	
T018		84.0		84.1					SB	
T019		84.1	10/25 - 8:00	83.7	10/26 - 8:30	83.8	-	-	SB	18-434 #1
T020		83.9		83.6		83.6	-	-	SB	
T021		84.2		83.9		83.9	-	-	SB	
T022		84.4		84.0		84.0	-	-	SB	
T023		83.8		~~83.9~~ 83.5		83.6	-	-	SB	
T024		83.0		82.9	—	-	-	-	SB	
T025		82.5		82.4	—	-	-	-	SB	18-434#2
T026		82.7		82.8	—	-	-	-	SB	
T027		82.4		82.3	—	-	-	-	SB	
T028		82.3		82.2	—	-	-	-	SB	
T029		82.1		82.0	—	-	-	-	SB	
T030		81.7		81.8	—	-	-	-	SB	

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	–	–	–	–	JB
T002	86.0	"	"	> 172.6	"	> 172.5	–	–	–	–	JB
T003	85.3	"	"	"	"	"	–	–	–	–	JB
T004	87.1	"	"	> 181.4	"	> 181.2	–	–	–	–	JB
T005	87.6	"	"	"	"	"	–	–	–	–	JB
T006	87.8	"	"	87.9	"	87.9	–	–	–	–	JB
T007	86.9	6/26 - 20:00	6/28 - 7:00	91.0	6/29/18-6:30	91.1	–	–	–	–	JB
T008	87.1	"	"	"	"	"	–	–	–	–	JB
T009	86.5	"	"	> 174.5	"	> 174.5	–	–	–	–	JB
T010	86.7	"	"	"	"	"	–	–	–	–	JB
T011	86.1	"	"	> 177.0	"	> 177.1	–	–	–	–	JB
T012	86.6	"	"	86.6	"	86.7	–	–	–	–	JB
T013	86.6	6/27 - 19:00	6/29 - 6:30	87.9	6/29 - 16:00	87.9	–	–	–	–	JB
T014	84.6	"	"	> 172.2	"	> 172.3	–	–	–	–	JB
T015	85.8	"	"	"	"	"	–	–	–	–	JB
T016	84.9	"	"	> 172.3	"	> 172.1	–	–	–	–	JB
T017	83.8	"	"	"	"	"	–	–	–	–	JB
T018	84.1	"	"	84.3	"	84.2	–	–	–	–	JB
T019	83.3	10/29 - 13:50	10/30 - 8:00	87.2	10/31 - 6:00	87.1	–	–	–	–	JB
T020	83.6	"	"	> 168.5	"	> 168.6	–	–	–	–	JB
T021	83.9	"	"	"	"	"	–	–	–	–	JB
T022	84.0	"	"	> 169.6	"	> 169.6	–	–	–	–	JB
T023	83.6	"	"	"	"	"	–	–	–	–	JB
T024	82.9	"	"	83.1	"	83.0	–	–	–	–	JB
T025	82.4	10/30 - 19:10	11/1 - 8:00	86.1	11/2 - 7:30	86.1	–	–	–	–	JB
T026	82.8	"	"	> 167.2	"	> 167.3	–	–	–	–	JB
T027	82.3	"	"	"	"	"	–	–	–	–	JB
T028	82.2	"	"	> 254.4	"	> 254.2	–	–	–	–	JB
T029	82.6	"	"	"	"	"	–	–	–	–	JB
T030	81.8	"	"	82.0	"	81.9	–	–	–	–	JB

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

Date/Time In Desiccator: 6/22/2018 - 12:00 Balance ID#: 107 Audit Weight ID# / Weight(mg): 109A - 100mg

Sample ID	Date/Time	Weight (mg)	Date/Time	Weight (mg)	Date/Time	Weight (mg)	Date/Time	Weight (mg)	Tech. Initials	Project/Run #
T031	6/25 - 8:00	84.3	6/26 - 8:30	84.1	–	–	–	–	SB	18-434 #2
T032	↓	84.2	↓	84.2	–	–	–	–	SB	18-434 #3
T033		84.4		84.4	–	–	–	–	SB	↓
T034		84.2		84.3	–	–	–	–	SB	
T035		85.1		85.1	–	–	–	–	SB	
T036		85.5		85.7	–	–	–	–	SB	
T037		86.1		86.0	–	–	–	–	SB	↓
T038		85.8		85.8	–	–	–	–	SB	
T039		86.6		86.6	–	–	–	–	SB	
T040	↓	86.6	↓	86.6	–	–	–	–	SB	
T041										
T042										
T043										
T044										
T045										
T046										
T047										
T048										
T049										
T050										
T051										
T052										
T053										
T054										
T055										
T056										
T057										
T058										
T059										
T060										

Sample Post-Test Analysis Sheet: ☐ Probes ☒ TX40 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
T031	84.1	10/30 - 19:10	~~5~~	THIS FILTER WAS WEIGHED AS A PAIR WITH T028 + T029							SB
T032	84.2	10/31 - 16:30	11/2 - 8:00	85.9	11/2 - 15:30	85.9	–	–	–	–	SB
T033	84.4	↓	↓	> 169.8	↓	> 169.8	–	–	–	–	SB
T034	84.3						–	–	–	–	SB
T035	85.1			> 173.9		> 173.8	–	–	–	–	SB
T036	85.7						–	–	–	–	SB
T037	86.0	↓	↓	85.9	↓	86.0	–	–	–	–	SB
T038											
T039											
T040											
T041											
T042											
T043											
T044											
T045											
T046											
T047											
T048											
T049											
T050											
T051											
T052											
T053											
T054											
T055											
T056											
T057											
T058											
T059											
T060											

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

Date/Time In Desiccator: 10/22/2018 - 8:00 Balance ID#: 107 Audit Weight ID# / Weight(mg): 109A/B – 100/200mg

Sample ID	Date/Time	Weight (mg)	Date/Time	Weight (mg)	Date/Time	Weight (mg)	Date/Time	Weight (mg)	Tech. Initials	Project/Run #
1A	10/25 - 8:00	115028.5	10/26 - 8:30	115028.6	-	-	-	-	SB	18-434 #1
1B	↓	115902.7	↓	115902.8	-	-	-	-	SB	18-434 #1
2A		116240.2		116240.2	-	-	-	-	SB	18-434 #2
2B		116330.3		116330.3	-	-	-	-	SB	18-434 #2
3A		116073.5		116073.6	-	-	-	-	SB	18-434 #3
3B	↓	116340.3	↓	116340.3	-	-	-	-	SB	18-434 #3
4A										
4B										
5A										
5B										
6A										
6B										
7A										
7B										
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): 109A/B / 100/200mg

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	115628.6	10/29-13:50	10/30-18:00	115628.7	10/31-6:00	115628.8	-	-	-	-	SD
1B	115902.8	10/29-17:50	10/30-18:00	115903.0	10/31-6:00	115903.0	-	-	-	-	SB
2A	116240.2	10/30-19:10	11/1-8:00	116240.5	11/2-7:30	116240.5	-	-	-	-	SD
2B	116330.3	10/30-19:10	11/1-8:00	116330.7	11/2-7:30	116330.7	-	-	-	-	SB
3A	116073.6	10/31-16:30	11/2-7:30	116073.9	11/2-15:30	116073.9	-	-	-	-	SB
3B	116340.3	10/31-16:30	11/2-7:30	116340.7	11/2-15:30	116340.6	-	-	-	-	SB
4A											
4B											
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: 10/22/2018 - 8:00 Balance ID#: 107 Audit Weight ID# / Weight(mg): 109B-200mg

Sample ID	Date/Time	Weight (mg)	Date/Time	Weight (mg)	Date/Time	Weight (mg)	Date/Time	Weight (mg)	Tech. Initials	Project/Run #
1A	10/25 - 8:00	3566.2	10/26 - 8:50	3566.1	–	–	–	–	SB	18-434 #1
1B		3554.5		3554.4	–	–	–	–	SB	18-434 #1
2A		3552.4		3552.6	–	–	–	–	SB	18-434 #2
2B		3570.8		3570.8	–	–	–	–	SB	18-434 #2
3A		3579.6		3579.7	–	–	–	–	SB	18-434 #3
3B	↓	3567.8	↓	3567.8	–	–	–	–	SB	18-434 #3
4A										
4B										
5A										
5B										
6A										
6B										
7A										
7B										
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): 109B- 200 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	3566.1	10/29-13:50	10/30-18:00	3566.4	10/31-6:00	3566.5	-	-	-	-	SB
1B	3554.4	10/29-13:50	10/30-13:00	3556.6	10/31-6:00	3556.7	-	-	-	-	SB
2A	3552.6	10/30-19:10	10/1-8:00	3552.8	11/2-7:30	3552.9	-	-	-	-	SB
2B	3570.8	10/30-19:10	11/1-8:00	3570.9	11/2-7:30	3571.0	-	-	-	-	SB
3A	3579.7	10/31-16:30	11/2-7:30	3579.9	11/2-15:30	3580.0	-	-	-	-	SB
3B	3567.3	10/31-16:30	11/2-7:30	3568.4	11/2-15:30	3568.3	-	-	-	-	SB
4A											
4B											
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: I2500
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	4.78	21.4	4.78 (100) / (100+ 21.4)) =	3.94	
2	3.77	22.4	3.77 (100) / (100+ 22.4)) =	3.08	
3	3.44	22.4	3.44 (100) / (100+ 22.4)) =	2.81	
4	6.81	20.4	6.81 (100) / (100+ 20.4)) =	5.65	
5	3.02	20.4	3.02 (100) / (100+ 20.4)) =	2.51	
6	0.00	NA	N/A	-	
7	N/A	N/A	N/A	-	
			SUM	17.99	lbs

M_{Fldb} = **17.99** lbs
M_{Fldb} = **8.16** 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} = 5.91

MC_{SU} = 21.0

M_{SUdb} = 5.9 (100/(100+ 21.0)

M_{SUdb} = **4.88** lbs

= **2.21** 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} = 4.01

MC_K = 10.0

M_{Kdb} = 4.01 (100/(100+ 10.0)

M_{Kdb} = **3.65** lbs

= **1.65** 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} = 2.4

M_{FLEHdb} = 2.2

M_{FREHdb} = 2.40 + 2.2

M_{FREHdb} = **4.60** lbs

= **2.09** 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} = 3.65

M_{SUdb} = 4.88

M_{FLdb} = 17.99

M_{FREHdb} = 4.60

M_{TFBHdb} = 3.65 + 4.88 + 17.99 - 4.60

= **21.92** lbs

= **9.94** 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} = 17.99

M_{FLEHdb} = 2.20

θ_{H1} = 143

$$BR_H = \frac{60 (17.99 - 2.20)}{143}$$

BR_H = **6.63** lb/hr

= **3.01** 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:

$$Fp = \frac{16.24}{17.48} = 0.929$$

$$V_s = 0.929 \times 85.49 \times 0.99 \times 0.265 \times \left(\frac{109.9 + 460}{\left(30.09 + \frac{-0.23}{13.6} \right) \times 28.78} \right)^{1/2}$$

V_s = **16.89** 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:

$$Q_{sd} = 3600 \times (1 - 0.02) \times 16.89 \times 0.1963 \times \frac{528}{109.9 + 460} \times \frac{30.09 + \frac{-0.23}{13.6}}{29.92}$$

Q_{sd} = **10893.0** 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:

$$V_{m(std)} = 17.64 \times 26.585 \times 1.002 \times \frac{\left(30.09 + \frac{2.19}{13.6}\right)}{(75.6 + 460)}$$

$V_{m(std)}$ = **26.540** dscf

Using equation for Train 2:

$$V_{m(std)} = 17.64 \times 26.205 \times 0.997 \times \frac{\left(30.09 + \frac{2.16}{13.6}\right)}{(87.0 + 460)}$$

$V_{m(std)}$ = **25.484** dscf

Using equation for ambient train:

$$V_{m(std)} = 17.64 \times 25.09 \times 0.999 \times \frac{\left(\underline{30.09} + \frac{0.00}{13.6}\right)}{(69.0 + 460)}$$

$V_{m(std)}$ = **25.149** 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 + 3.3 + 0.0

m_n = 3.3 mg

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

m_n = 0.2 + 1.1 + 0.4

m_n = 1.7 mg

Train A aggregate:

m_n = 3.3 + 1.7
m_n = **5.0** mg

Using equation for Train B:

m_n = 0.2 + 2 + 2.3

m_n = **4.5** 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:

$$C_s = 0.001 \times \frac{5.0}{26.54}$$

C_s = **0.00019** g/dscf

For Train 2

$$C_s = 0.001 \times \frac{4.5}{25.48}$$

C_s = **0.00018** g/dscf

For Ambient Train

$$C_r = 0.001 \times \frac{0.1}{25.15}$$

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 = (0.000188 - 0.000004) x 10893.0 x 181 /60

E_T = **6.06** g

For Train 2

E_T = (0.000177 - 0.000004) x 10893.0 x 181 /60

E_T = **5.67** g

Average

E = **5.87** g

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

7.5% of the average =	0.44
Train 1 difference =	0.19
Train 2 difference =	0.19

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):

$$PR = \left(\frac{181 \times 0.144 \times 16.72 \times (72.0 + 460) \times (75.6 + 460)}{1 \times 26.585 \times 16.31 \times (109.9 + 460) \times (70.0 + 460)} \right) \times 100$$

PR = **95** %

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} = 5.87

θ_{H2} = 181

PM_{RH} = 60(5.87 / 181)

PM_{RH} = **1.94** 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} = 5.87

M_{TFBHdb} = 9.94

PM_{FH} = 5.87 / 9.94

= **0.59** 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: I2500
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	5.75	24.1	5.75 (100) / (100+ 24.1)) =	4.63	
2	4.65	24.1	4.65 (100) / (100+ 24.1)) =	3.75	
3	5.69	22.1	5.69 (100) / (100+ 22.1)) =	4.66	
4	6.37	24.3	6.37 (100) / (100+ 24.3)) =	5.13	
5	4.10	22.8	4.1 (100) / (100+ 22.8)) =	3.34	
6	0.00	NA	N/A	-	
7			N/A	-	
			SUM	21.50	lbs

M_{Fldb} = **21.50** lbs
M_{Fldb} = **9.75** 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} = 21.50

M_{FREdb} = 0.00

M_{TFBdb} = 21.50 - 0.00

= **21.50** lbs

= **9.75** 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} = 21.50
θ = 499

$$BR = \frac{60 \times 21.50}{499}$$

BR = **2.59** lb/hr
= **1.18** 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:

$$Fp = \frac{15.39}{16.75} = 0.919$$

$$V_s = 0.919 \times 85.49 \times 0.99 \times 0.245 \times \left(\frac{92.5 + 460}{\left(30.19 + \frac{-0.24}{13.6}\right) \times 28.78} \right)^{1/2}$$

V_s = **15.19** 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:

$$Q_{sd} = 3600 \times (1 - 0.02) \times 15.19 \times 0.1963 \times \frac{528}{92.5 + 460} \times \frac{30.19 + \frac{-0.24}{13.6}}{29.92}$$

Q_{sd} = **10141.4** 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:

$$V_{m(std)} = 17.64 \times 73.063 \times 1.002 \times \frac{\left(30.19 + \frac{2.15}{13.6}\right)}{(81.2 + 460)}$$

$V_{m(std)}$ = **72.410** dscf

Using equation for Train 2:

$$V_{m(std)} = 17.64 \times 72.908 \times 0.997 \times \frac{\left(30.19 + \frac{2.17}{13.6}\right)}{(96.7 + 460)}$$

$V_{m(std)}$ = **69.899** dscf

Using equation for ambient train:

$$V_{m(std)} = 17.64 \times 64.65 \times 0.999 \times \frac{\left(\underline{30.19} + \frac{0.00}{13.6}\right)}{(72.4 + 460)}$$

$V_{m(std)}$ = **64.597** 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 + 3.7 + 0.0

m_n = 3.7 mg

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

m_n = 0.3 + 2.2 + 0.3

m_n = 2.8 mg

Train A aggregate:

m_n = 3.7 + 2.8
m_n = **6.5** mg

Using equation for Train B:

m_n = 0.4 + 5.7 + 0.2

m_n = **6.3** 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:

$$C_s = 0.001 \times \frac{6.5}{72.41}$$

C_s = **0.00009** g/dscf

For Train 2

$$C_s = 0.001 \times \frac{6.3}{69.90}$$

C_s = **0.00009** g/dscf

For Ambient Train

$$C_r = 0.001 \times \frac{0.1}{64.60}$$

C_r = **0.000002** 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 = (0.000090 - 0.000002) x 10141.4 x 499 /60

E_T = **7.44** g

For Train 2

E_T = (0.000090 - 0.000002) x 10141.4 x 499 /60

E_T = **7.47** g

Average

E = **7.46** g

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

7.5% of the average =	0.56
Train 1 difference =	0.02
Train 2 difference =	0.02

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):

$$PR = \left(\frac{499 \times 0.12 \times 15.02 \times (114.0 + 460) \times (81.2 + 460)}{1 \times 73.063 \times 15.48 \times (92.5 + 460) \times (73.0 + 460)} \right) \times 100$$

PR = **84** %

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 = 7.46
θ = 499

PM_R = 60(7.46 / 499)

PM_{RH} = **0.90** 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 = 7.46
M_{TFBdb} = 9.75

PM_{FH} = 7.46 / 9.75
= **0.76** 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

Tested and listed to:

c ETL us

0219WN025S

LISTED FACTORY BUILT FIREPLACE INSERT
CERTIFIED FOR USE IN CANADA AND U.S.A.
MODEL/MODÈLE : I2500M
TESTED & LISTED TO /TESTÉ & APPROUVÉ : ULC-S628-93 (R1997) / UL-1482

DO NOT REMOVE THIS LABEL/NE PAS RETIRER CETTE ÉTIQUETTE

REGENCY® FIREPLACE PRODUCTS

U.S. ENVIRONMENTAL PROTECTION AGENCY CERTIFIED TO COMPLY WITH 2020 PARTICULATE EMISSION STANDARDS USING CORD WOOD." TESTED & LISTED TO ASTM E3053. MODEL REGENCY I2500 – 1.0 G /HR. THIS WOOD HEATER NEEDS PERIODIC INSPECTION AND REPAIR FOR PROPER OPERATION. CONSULT THE OWNER'S MANUAL FOR FURTHER INFORMATION. IT IS AGAINST FEDERAL REGULATIONS TO OPERATE THIS WOOD HEATER IN A MANNER INCONSISTENT WITH THE OPERATING INSTRUCTIONS IN THE OWNER'S MANUAL. **COMPONENTS REQUIRED FOR INSTALLATION: 5.5" (140mm) or 6" (152mm) STAINLESS STEEL LINER.**
CERTIFIÉ CONFORME AUX NORMES 2020 DU U.S. ENVIRONMENTAL PROTECTION AGENCY EN MATIÈRE D'ÉMISSION DE PARTICULES DE BOIS AVEC DU BOIS DE CORDE". TESTÉ & APPROUVÉ ASTM E3053. MODÈLE REGENCY I2500 – 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.

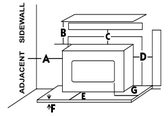
PIÈCES REQUISES POUR L'INSTALLATION : DOUBLURE EN ACIER INOXYDABLE DE 5,5 PO (140 mm) OU 6 PO (152 mm)

INSTALL AND USE ONLY IN ACCORDANCE WITH THE MANUFACTURER'S INSTALLATION AND OPERATING INSTRUCTIONS. INSTALL AND USE ONLY IN MASONRY FIREPLACE OR FACTORY BUILT FIREPLACE. CONTACT LOCAL BUILDING OR FIRE OFFICIALS ABOUT RESTRICTIONS AND INSTALLATION INSPECTION IN YOUR AREA.
INSTALLER ET UTILISER SELON LES INSTRUCTIONS DU FABRICANT. INSTALLER ET UTILISER DANS UN FOYER DE MAÇONNERIE OU PRÉFABRIQUÉ.
APPELER UN INSPECTEUR EN BÂTIMENT OU LE DÉPARTEMENT INCENDIE LOCAL POUR CONNAÎTRE LES RESTRICTIONS ET LESCONDITIONS D'INSPECTION À L'INSTALLATION DANS VOTRE SECTEUR.
FLOOR THERMAL INSULATION/PROTECTION WITH A R VALUE OF 2.8 IS REQUIRED IF THE UNIT IS RAISED 0 - 3" (76MM) (MEASURED FROM THE BOTTOM OF THE APPLIANCE).
THERMAL FLOOR PROTECTION IS NOT REQUIRED WHEN UNIT IS RAISER GREATER THAN 3" (76MM) (MEASURED FROM THE BOTTOM OF THE APPLIANCE).
INSTALLER OBLIGATOIREMENT UNE ISOLATION/PROTECTION THERMIQUE D'UNE VALEUR R DE 2,8 SI L'APPAREIL EST INSTALLÉ À UNE DISTANCE INFÉRIEURE À 3 PO (76 MM) DU SOCLE (MESURE PRISE À PARTIR DU BAS DE L'APPAREIL).
LA PROTECTION THERMIQUE N'EST PAS REQUISE SI L'APPAREIL SE TROUVE À PLUS DE 3 PO (76 MM) DU SOCLE (MESURE PRISE À PARTIR DU BAS DE L'APPAREIL).

919-907

MINIMUM CLEARANCES TO COMBUSTIBLE MATERIALS (MEASURED FROM INSERT BODY)

ADJACENT SIDEWALL MANTEL	A)12 in / 305 mm B)17-1/4 in / 438 mm (3" MANTEL) B)22-1/2 in / 572 mm (12" MANTEL)
TOP FACING	C)16 in / 406 mm
SIDE FACING	D)0.5 in / 13 mm (TO SIDE SURROUND)



Serial No./ No de série

473

OPTIONAL COMPONENT: FAN (142-917), ELECTRICAL RATING: VOLTS 115, 60 HZ, 0.6 AMPS
DANGER: RISK OF ELECTRIC SHOCK. DISCONNECT POWER BEFORE SERVICING UNIT. DO NOT ROUTE POWER CORD UNDER OR IN FRONT OF APPLIANCE. DO NOT CONNECT THIS UNIT TO A CHIMNEY FLUE SERVICING ANOTHER APPLIANCE. DO NOT REMOVE BRICKS OR MORTAR IN MASONRY FIREPLACE. FOR USE WITH SOLID WOOD FUEL ONLY. DO NOT USE GRATE OR ELEVATE FIRE. BUILD WOOD FIRE DIRECTLY ON HEARTH. RISK OF SMOKE AND FLAME SPILLAGE, OPERATE ONLY WITH DOORS FULLY OPEN OR FULLY CLOSED. OPEN FEED DOOR TO FEED FIRE ONLY. REPLACE GLASS ONLY WITH CERAMIC GLASS (5MM). INSPECT AND CLEAN CHIMNEY FREQUENTLY. UNDER CERTAIN CONDITIONS OF USE CREOSOTE BUILDUP MAY OCCUR RAPIDLY. DO NOT OVERFIRE, IF INSERT GLOWS YOU ARE OVER-FIRING. CATALYTIC COMBUSTOR PART#075-531

PIÈCE FACULTATIVE : VENTILATEUR (142-917); PUISSANCE ÉLECTRIQUE : 115 VOLTS, 60 HZ, 0,6 A
DANGER : RISQUE D'ÉLECTROCUTION. DÉBRANCHER L'APPAREIL AVANT TOUTE RÉPARATION. NE PAS FAIRE PASSER LE FIL ÉLECTRIQUE DEVANT L'APPAREIL NI EN DESSOUS. NE PAS RELIER CET APPAREIL À UNE CHEMINÉE DESTINÉE À L'ÉVACUATION D'UN AUTRE APPAREIL. NE PAS ENLEVER DE BRIQUES NI DE MORTIER D'UNE CHEMINÉE DE MAÇONNERIE. N'UTILISER QUE DU COMBUSTIBLE DE BOIS SOLIDE. NE PAS SURÉLEVER LES BÛCHES NI LES PLACER SUR DES GRILLES, MAIS LES DÉPOSER DIRECTEMENT SUR L'ÂTRE. RISQUE DE DÉGAGEMENT DE FUMÉE OU DE FLAMMES : TOUJOURS GARDER LES PORTES COMPLÈTEMENT OUVERTES OU FERMÉES LORSQUE L'APPAREIL FONCTIONNE. DANS UNE MAISON MOBILE, TOUJOURS GARDER LES PORTES BIEN FERMÉES LORSQUE L'APPAREIL FONCTIONNE. OUVRIR LA PORTE UNIQUEMENT POUR ALIMENTER LE FEU. SI LES PORTES DU POÊLE RESTENT OUVERTES, TOUJOURS UTILISER LE PARE-ÉTINCELLES FOURNI PAR LE FABRICANT. REMPLACER LA VITRE UNIQUEMENT PAR UNE VITRE EN VITROCÉRAMIQUE (5 MM). INSPECTER ET NETTOYER FRÉQUEMMENT LA CHEMINÉE. SELON LE TYPE D'USAGE, DE LA CRÉOSOTE PEUT S'ACCUMULER RAPIDEMENT. NE PAS SURCHAUFFER; SI L'ENCASTRABLE SE MET À ROUGIR, IL SURCHAUFFE. CATALYSEUR DE POSTCOMBUSTION PIÈCE N°075-531

CAUTION / ATTENTION

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

SURFACES CHAUDES LORS DE FONCTIONNEMENT. NE PAS TOUCHER. ÉLOIGNER LES ENFANTS, LES VÊTEMENTS ET LES MEUBLES. TOUT CONTACT AVEC LA PEAU PEUT OCCASIONNER DES BRÛLURES. LIRE LES CONSIGNES DE CET APPAREIL.

Manufactured By:
FIREPLACE PRODUCTS INTERNATIONAL LTD.
6988 VENTURE ST. DELTA, BC V4G 1H4
MADE IN CANADA
918-176a

SIGNATURE

DATE OF MANUFACTURE

Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ June ☐
July ☐ Aug ☐ Sept ☐ Oct ☐ Nov ☐ Dec ☐

2018 ☐
2019 ☐
2020 ☐
2021 ☐
2022 ☐

(Duplicate Serial #) 473

Part #: **919-907**

Size: **3" H x 20-1/2" W (file at 100%)**

Colour: **Black on grey, except for what is indicated as being printed red on grey.**

Sept.17/18: Created decal
Sept.26/18: Modified French text
Oct. 31/18:Updated clearances + added EPA info
Nov. 1/18: Updated the decal as per Dave L
Nov. 13/18: updated the G/hr

REGENCY
FIREPLACE PRODUCTS

Cascades™ I2500 Wood Fireplace Insert

Owners & Installation Manual

www.regency-fire.com
French Manual: https://bit.ly/2YuraWc
Manuel en français : https://bit.ly/2YuraWc

MODEL: I2500

Tested & listed by:
O-TL
0219WN025S

***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 & listed to ASTM E3053. Model Regency I2500 – 1.0g/hr.

"This manual describes the installation and operation of the Regency I2500 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 17,178 Btu/hr. to 42,995 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

CAUTION: CATALYTIC COMBUSTOR IS FRAGILE--HANDLE WITH CARE.

The performance of the catalytic device or its durability has not been evaluated as part to this certification.

"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.

I2500 is tested and certified to ULC-S628-93 (R1997) 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

safety label

unit dimensions

installation

operating instructions

maintenance

parts

warranty

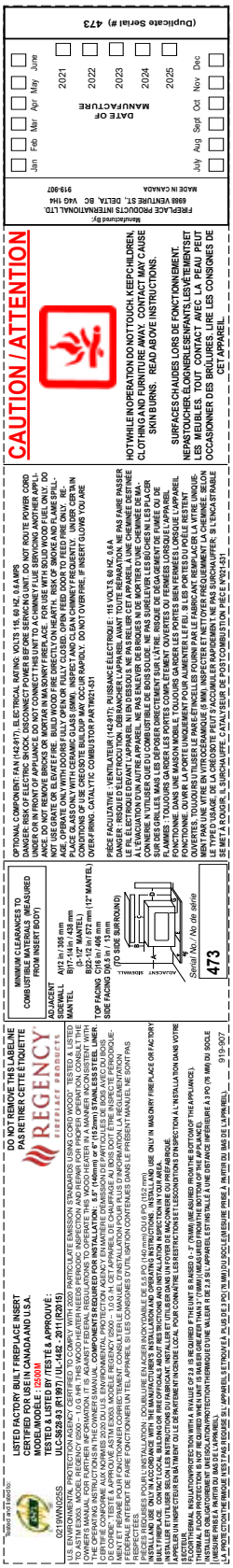
CAUTION: To avoid burns or wood splinters, when opening/closing the fuel door or adding wood to the fire, You should always wear appropriate protective gloves to protect your hands from the heat being emitted from this fireplace.

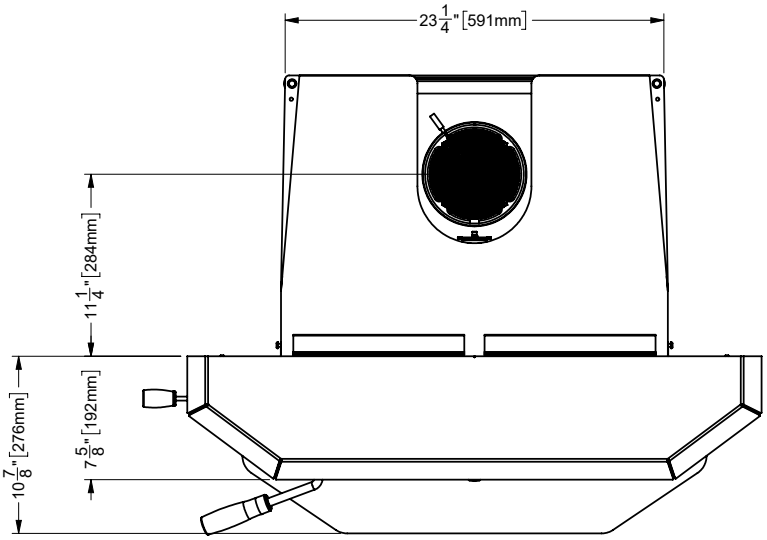
ALL PICTURES / DIAGRAMS SHOWN THROUGHOUT THIS MANUAL ARE FOR ILLUSTRATION PURPOSES ONLY. ACTUAL PRODUCT MAY VARY DUE TO PRODUCT ENHANCEMENTS.

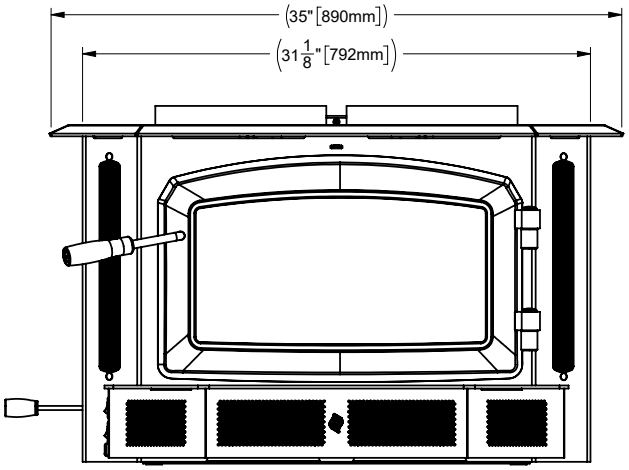
SAFETY LABEL FOR I2500

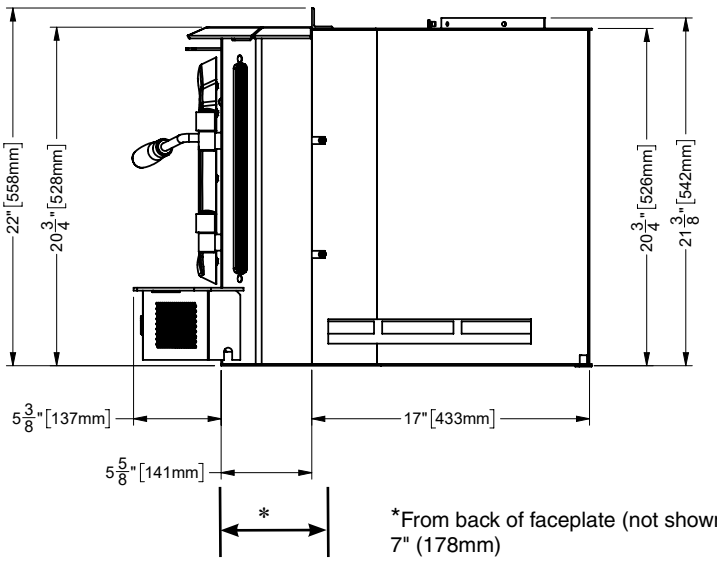
This is a copy of the label that accompanies your **Regency Insert**. We have printed a copy of the contents here for your review.

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.









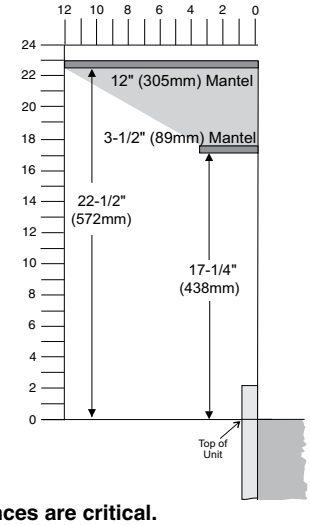
*From back of faceplate (not shown) to fuel door opening 7" (178mm)

MASONRY AND FACTORY BUILT FIREPLACE CLEARANCES

The minimum required clearances to combustible materials when installed into a masonry or factory built fireplace are listed below.

Unit I2500	Adjacent Side Wall (to Side) A	Mantle ** (to Top of Unit) B	Top Facing (to Top of Unit) C	Side Facing D	Minimum Hearth Extension* E	Minimum Hearth Side Extension* F	To Top of Unit G
	12" (305mm)	17-1/4"(438mm) for 3-1/2" (89mm) mantel	16" (406mm)	1/2"(13mm) to side surround	16" (406mm) USA	8" (203mm)	20" (508mm)
		22-1/2"(572mm) for 12" (305mm) mantel			18"(457mm) Canada		

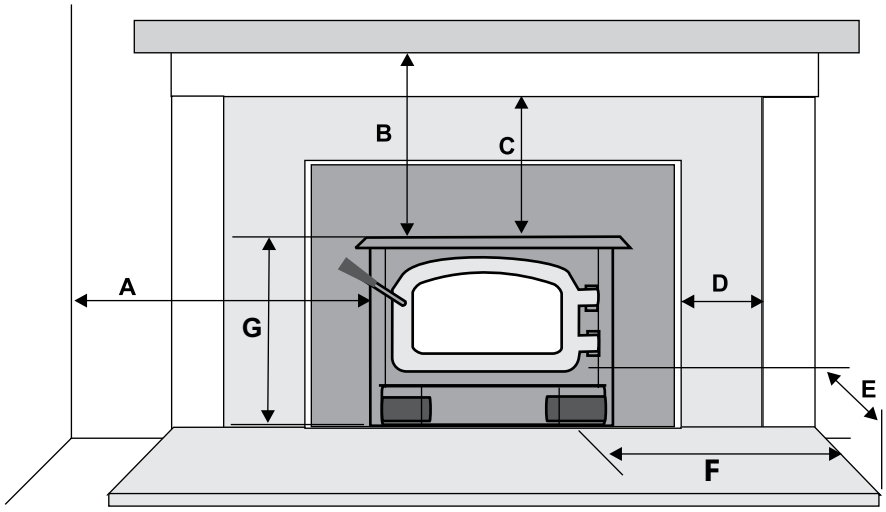
Side and Top facing is a maximum of 1-1/2" (38mm) thick.



Clearances are critical.

**Mantel can be installed anywhere in shaded area or higher using the above scale.

Note: Ensure the paint that is used on the mantel and the facing is "heat resistant" or the paint may discolour.



Clearance diagram for installations

*Floor Protection

Floor thermal insulation/protection with a R value of 2.8 is required if the unit is raised 0 - 3" (0-76mm) (measured from the bottom of the appliance).

Thermal floor protection is not required when unit is raiser greater than 3" (76mm) (measured from the bottom of the appliance).

Please check to ensure that your floor protection and hearth will meet the standards for clearance to combustibles. Your hearth extension must be made from a non-combustible material. Extending 16" for US and 18" for Canada—measured from the fuel loading door opening.

WOOD INSERT SPECIFICATIONS

Your fireplace opening requires the following minimum sizes:

Height: 21.5"
Width: 25"
Depth: 17"

Two faceplates are available to seal the fireplace opening:

Standard	Oversize
40" W x 30" H	48" W x 33" H

INSTALLATION INTO A MASONRY FIREPLACE

Regency inserts are constructed with the highest quality materials and assembled under strict quality control procedures that ensure years of trouble free and reliable performance.

It is important that you read this manual thoroughly and fully understand the installation and operating procedures. Failure to follow instructions may result in property damage, bodily injury or even death. The more you understand the way your Regency Insert operates, the more enjoyment you will experience from knowing that your unit is operating at peak performance.

BEFORE INSTALLING YOUR INSERT

1. Read all instructions before installing and using your fireplace insert. Install and use only in accordance with manufacturer's installation and operating instructions.

2. Check your local building codes - Building Inspection Department. You may require a **permit before installing your insert. Be aware that local codes and regulations may override some items in the manual.**

   WARNING: Careless installation is the major cause of safety hazard. Check all local building and safety codes before installation of unit.

3. Notify your home insurance company that you plan to install a fireplace insert.

4. Your fireplace insert is heavy and requires two or more people to move it safely. The insert and surrounding structure can be badly damaged by mishandling.

5. If your existing fireplace damper control will become inaccessible once you have installed your Regency Insert, you should either remove or secure it in the open position.

6. Inspect your fireplace and chimney prior to installing your insert to determine that it is free from cracks, loose mortar or other signs of damage. If repairs are required, they should be completed before installing your insert. Do not remove bricks or mortar from your masonry fireplace.

7. Do not connect the insert to a chimney flue servicing another appliance or an air distribution duct.

When referencing installation or connection to masonry fireplaces or chimneys, the masonry construction must or shall be code complying.

CHIMNEY SPECIFICATIONS

Before installing, check and clean your chimney system thoroughly. If in doubt about its condition, seek professional advice. Your Regency Insert is designed for installation into a masonry fireplace that is constructed in accordance with the requirements of "The Standard for Chimneys, Fireplaces, Vents, and Solid Fuel Burning Appliance", N.F.P.A. 211, the National Building Code of Canada, or the applicable local code requirements.

The appliance, when installed, must be electrically grounded in accordance with local codes or, in the absence of local codes, with the National Electrical Code, ANSI/NFPA 70, or the Canadian Electrical code, CSA C22.1.

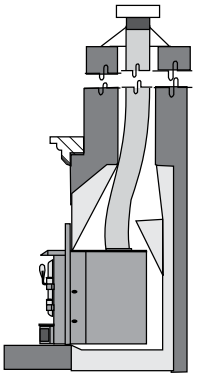
Regency Inserts are designed to use either a 5.5" (140 mm) or 6" (152 mm) flue.

In Canada this fireplace insert must be installed with a continuous chimney liner of 5.5" (140mm) or 6" (152mm) diameter extending from the fireplace insert to the top of the chimney. The chimney liner must conform to the Class 3 requirements of CAN/ULC-S635 or CAN/ULC-S640, Standard for Lining Systems for New Masonry Chimneys.

In the U.S.A., a 5.5 inch (140 mm) or 6 inch (152 mm) diameter, stainless steel, full height chimney liner that meets type HT (2100^0 F) requirements per UL 1777 must be installed. The full liner must be attached to the insert flue collar and to the top of the existing masonry chimney.

Recommended chimney height
from top of flue collar:
Minimum 15 feet (4.6 meters)

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.



IMPORTANT:
Smoke and CO Detectors:
Make sure your home has a working smoke and CO detector, especially near any bedrooms. We recommend having a smoke and CO detector in the same room as the wood appliance for additional safety. Location of both detectors should be chosen wisely to avoid false alarms when reloading the appliance.

Fire Extinguisher:
A fire extinguisher should be installed in the home. The location of the fire extinguisher should be known by all family members.

INSTALLATION INTO A FACTORY BUILT FIREPLACE

Regency inserts are constructed with the highest quality materials and assembled under strict quality control procedures that ensure years of trouble free and reliable performance.

It is important that you read this manual thoroughly and fully understand the installation and operating procedures. Failure to follow instructions may result in property damage, bodily injury or even death. The more you understand the way your Regency Insert operates, the more enjoyment you will experience from knowing that your unit is operating at peak performance.

Requirements for Installing Solid-fuel Inserts in Factory-built Fireplaces

1. A permit may be required for installations, final approval is contingent of the authority having local jurisdiction. Consult insurance carrier, local building, fire officials or authorities having jurisdiction about restrictions, installation inspection, and permits.
2. Inspect the existing fireplace and chimney for any damage or flaws such as burnouts, metal or refectory warping.
3. Inspection to a minimum of NFPA 211 Level II is recommended. All repairs must be made prior to installing an insert. The fireplace must be structurally sound and be able to support the weight of the solid-fuel insert.
4. The factory-built chimney must be listed per UL 127 or ULC 610-M87 for all installations. Install thermal protection as per this appliance listing requirements.
5. A full height 5.5 inch (140 mm) or 6 inch (152 mm) diameter stainless steel full height listed chimney liner must be installed meeting type HT (2100°F) requirements per UL 1777 (USA) or ULC S635 with "0" clearance to masonry (Canada). The full liner must be attached to the insert flue collar and to the top of the existing chimney.
6. The flue liner top support attachment must not reduce the air flow for the existing air-cooled chimney system. Reinstall original factory-built chimney cap only.
7. To prevent room air passage to the chimney cavity of the fireplace, seal either the damper area around the chimney liner or the insert surround. Circulating air chamber (i.e. in a steel fireplace liner or metal hearth circulatory) may not be blocked. The air flow within and around the fireplace shall not be altered, blocked by the installation of the insert (i.e. not louvers or cooling air inlet or outlet ports may be blocked by the insert or the insert surround).
8. Means must be provided for removal of the insert to clean the chimney flue.
9. Inserts that project in front of the fireplace must be supplied with appropriate supporting means.
10. Installer must mechanically attach the supplied label to the inside of the firebox of the fireplace into which the insert is installed.

⚠ WARNING

Fire Risk.
When lining air-cooled factory-built chimneys:
- Run chimney liner approved to **UL 1777 Type HT requirements (2100°F)**
- Reinstall original factory-built chimney cap ONLY
- DO NOT block cooling air openings in chimney
- Blocking cooling air will overheat the chimney

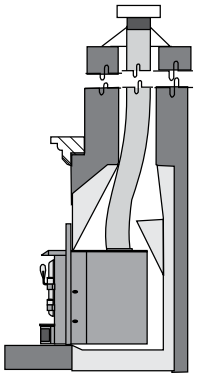
ALTERING THE FIREPLACE

The following modifications of factory-built fireplaces are permissible:

The following parts may be removed:	
Damper	Smoke Shelf or Baffle
Ember Catches	Fire Grate
Viewing Screen/ Curtain	Doors

- The fireplace must be altered. Cutting any sheet metal parts of the fireplace in which the fireplace insert is to be installed is prohibited, except that the damper may be removed to accomodate a direct-connect starter pipe or chimney liner.
- External trim pieces which do not affect the operation of the fireplace may be removed providing they can be stored on or within the fireplace for reassembly if the insert is removed.
- The permanent metal warning label provided in the component pack must be attached to the back of the fireplace, with screws or nails, stating that the fireplace may have been altered to accomodate the insert, and must be returned to original condition for use as a conventional fireplace.
- If the hearth extension is lower than the fireplace opening, the portion of the insert extending onto the hearth must be supported.
- Manufacturer designed adjustable support kit can be ordered from your dealer.
- Final approval of this installation type is contingent upon the authority having jurisdiction.

WARNING: This fireplace may have been altered to accommodate an insert. It must be returned to its original condition before use as a solid fuel burning fireplace.



1. When installed in a factory built fireplace, a full stainless steel rigid or flexible flue liner is mandatory, for both safety and performance purposes. When a flue or liner is in use, the insert is able to breathe better by allowing a greater draft to be created. The greater draft can decrease problems such as, difficult start-ups, smoking out the door, and dirty glass.
2. In order to position the flue liner, the existing rain cap must be removed from your chimney system. In most cases the flue damper should also be removed to allow passage of the liner.
3. In most cases opening the existing spark screens fully should give enough room for the insert installation. If it does not, remove and store.
4. If the floor of your fireplace is below the level of the fireplace opening, adjust the insert's levelling bolts to accommodate the difference. When additional shimming is required, use non-combustible masonry or steel shims.
5. Measure approximately the alignment of the flue liner with the position of the smoke outlet hole on the insert to check for possible offset. If an offset is required, use the appropriate offset adaptor in your installation.

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 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.

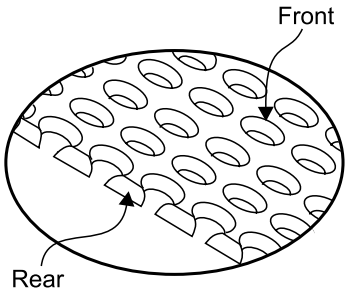
INSTALLING YOUR INSERT

Your insert is very heavy and will require two or three people to move it into position. The insert can be made a little lighter by removing the cast iron door by opening it and lifting it off its hinges. Be sure to protect your hearth extension with a heavy blanket or carpet scrap during the installation.

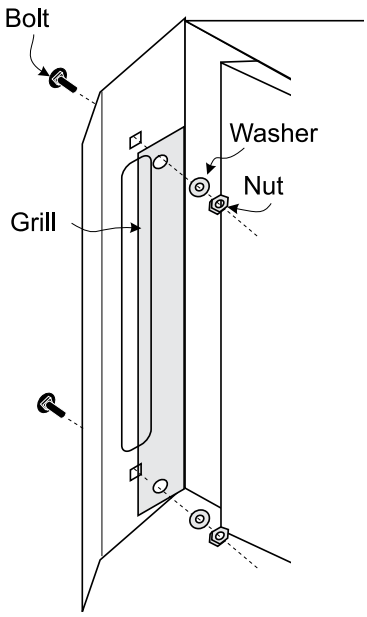
Convection Grills

The black convection grills are pre-installed on this appliance.

If the optional nickel grills are being used, remove the black grills and position the nickel grill on the inside body face side and fasten using the bolts, washers and nuts provided (2 per side) as shown in the diagrams.



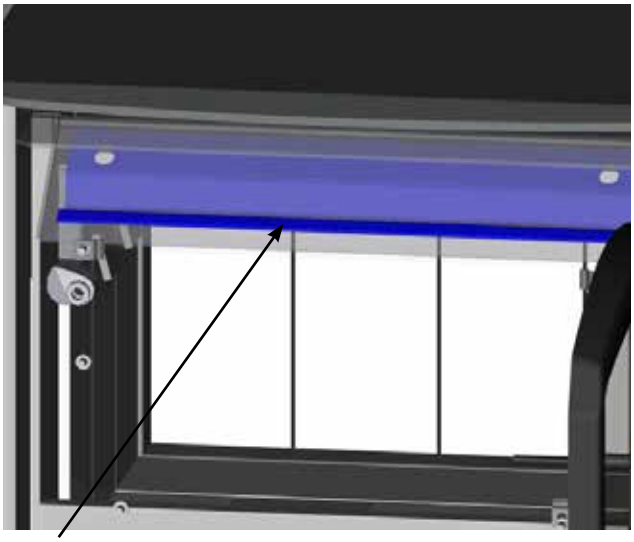
Note: The grill has a front and rear, the holes on the front side have rounded edges and the rear holes have flat edges.



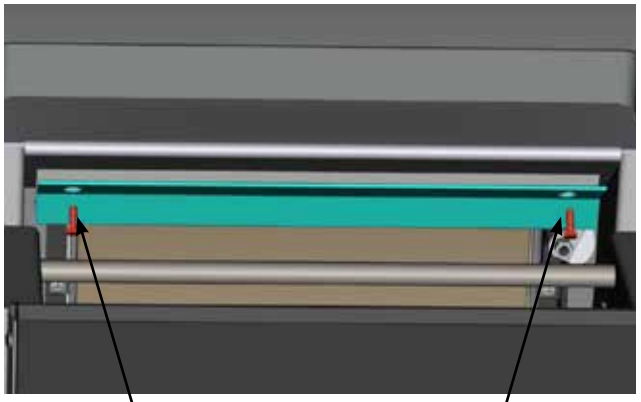
View from Rear of Insert

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.

FACEPLATE AND TRIM INSTALLATION

Your Faceplate kit contains:

1 Set Faceplate panel (top, left & right)
1 Set Trim (top, left, right)
2 pcs. insulation
4 spring nuts
4 1" screws
8 washers
2 screws - black
2 corner trim clips

Note: The Digital Monitor Operating Door tool Bracket and tool holder are supplied with the insert.

Prior to sliding your insert into its final position and attaching the connector or liner pipe, the faceplate must be installed as follows:

1) Slide the spring nuts (supplied) over the slots in the insert's side convection panels (the spring nuts may need to be squeezed with a pair of pliers first, to help them stay in position).

2) Screw the side faceplate panels, (item A in the diagram) one to each side. See diagram 1.

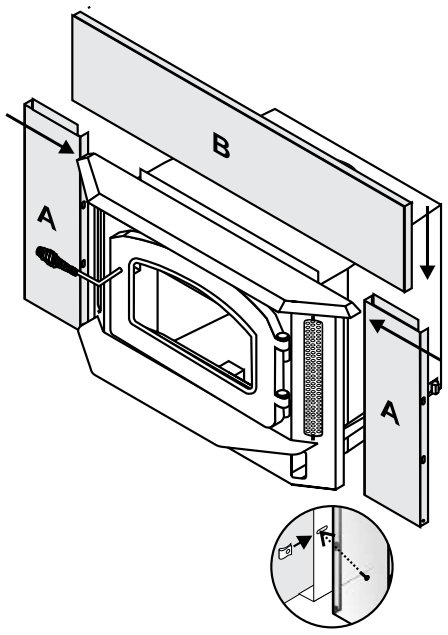


Diagram 1

3) Slide the digital monitor operating tool bracket lining up the slots on the bracket to the 2 loose screws on item A on left hand side Once slid into position tighten screws on both left and right side (item A) See diagram 2.

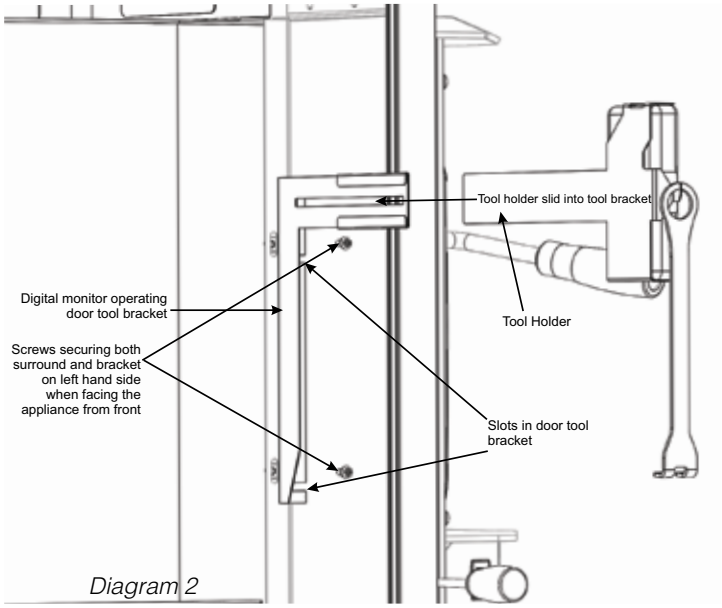


Diagram 2

4) Using the top panel (item B - see diagram 1) as a gauge, check that the side panels are within approximately 1/4" of the overall width. If the difference is greater than this, use the supplied washers to attain the required width.

5) The unit may now be slid into final position and attached to the connection system.

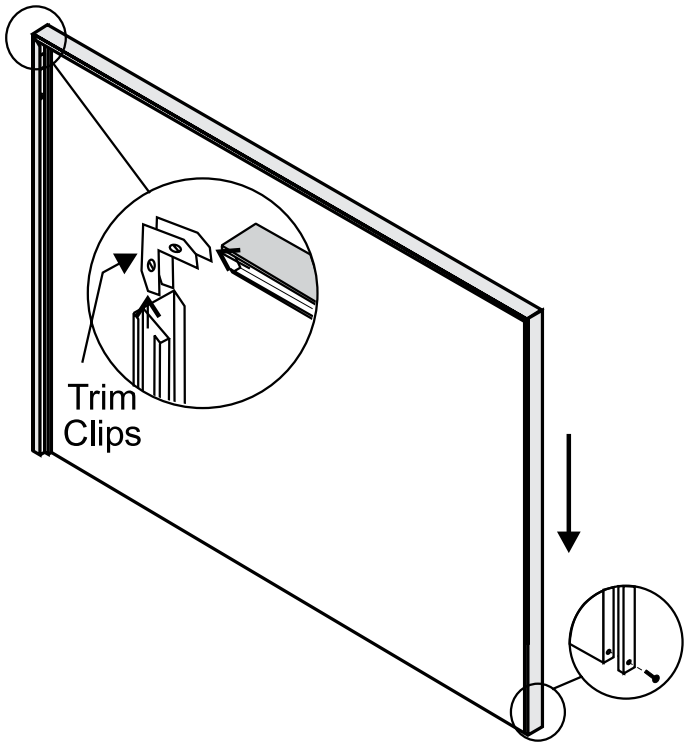
6) Once connection is made, the insulation strips should be installed between the insert faceplates and the fireplace face.

7) The faceplate top may now be installed (with insulation strip behind) by aligning its brackets with the top flange on the side shields and the angle iron bar on the insert top.

8) The faceplate trim may be installed to the edge of the faceplate at this time. To permanently mount the trim, drill two 5/32" diameter holes through the trim and side panels and screw the trim to the panels using the gold plated screws provided.

Note: It may be easier to install the insulation, faceplate top and faceplate trim with the unit pulled slightly away from the fireplace face. If this is done, be very careful not to disturb the connector when shifting the unit to its final position.

9) Now that your insert is installed, check once more that all the clearances from the unit to any combustible materials are correct as listed earlier.



FLUE COLLAR REMOVAL AND INSTALLATION & DEFLECTOR REPLACEMENT

List of Tools required:
- Tin snips
- Pull rod (supplied with unit)
- 1/2" socket / ratchet
- 3/8" open face wrench
- 7/16" socket / ratchet

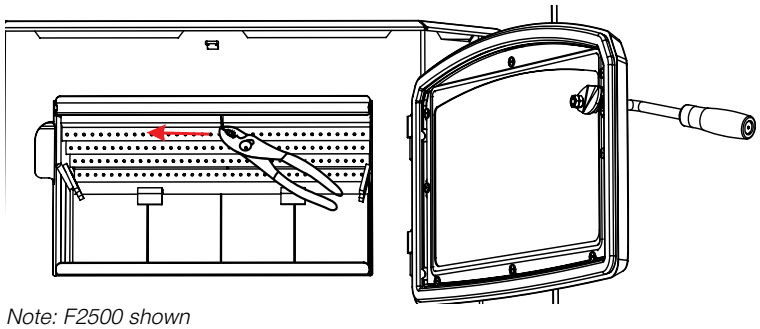
NOTE: The removable flue collar is attached to the unit. If you need to remove the collar for ease of installation, please follow the below steps.

Note: unit in images may not be identical to the I2500—but they depict the process.

SAFETY NOTE: The insert is very heavy and will require two people to move it into position. The door and bricks can be removed to help. Be sure to protect your hearth extension with a heavy blanket or cardboard during the installation.

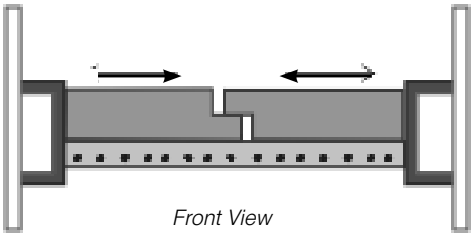
If the combustor must be examined or replaced, follow this procedure:

1. Remove the front 3 secondary air tubes with pliers as shown below.



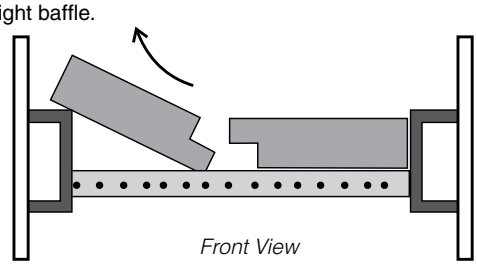
Note: F2500 shown

2. Remove baffles - push the baffles together and away from the side walls. Note: If baffles are not installed, proceed to step 5.



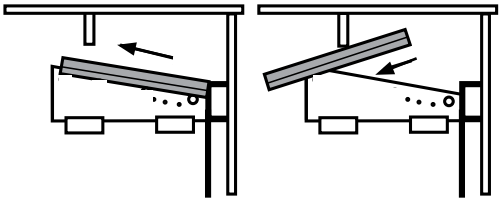
Front View

3. Lift the left baffle out from underneath the right baffle - then lift out. Remove the right baffle.



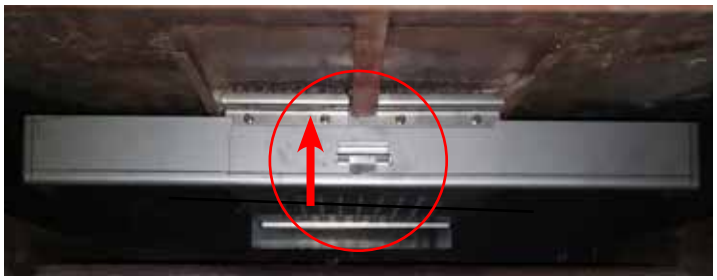
Front View

4. Manoeuver the baffle above the air tube and slide out.

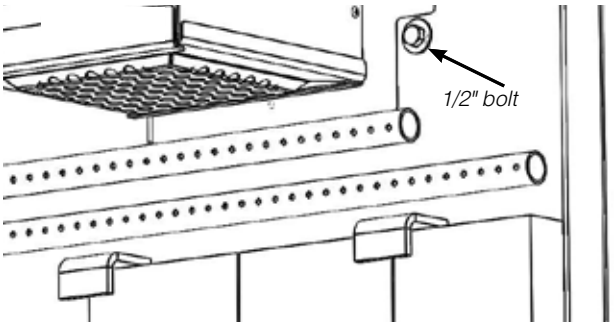


Side View

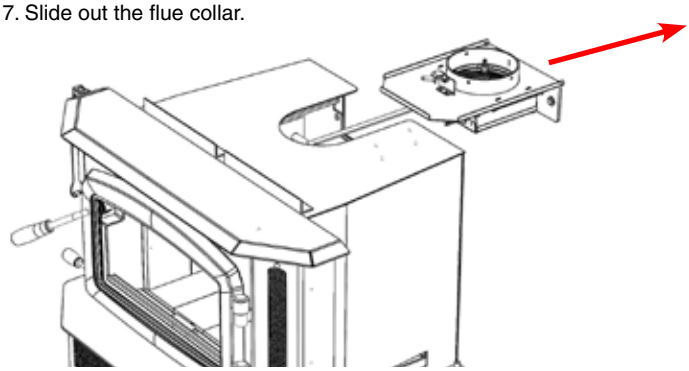
5. Remove locking clip from the front face of the Catalyst assembly by sliding up and out.



6. Take a 1/2" ratchet and remove the two bolts at back inside of the firebox. These bolts are used to secure the flue collar. Keep these and washers for reinstall.



7. Slide out the flue collar.



8. Install flex liner into existing chimney as per liner manufacturer's specifications. Ensure that the notch on the adapter cut in the previous step is pointed forward at about the 6 o'clock position. See Diagram 1.

Diagram 1

9. Secure the adaptor to the flex liner with three screws. Ensure the adapter is level and aligned correctly. See Diagrams 2 & 2A.

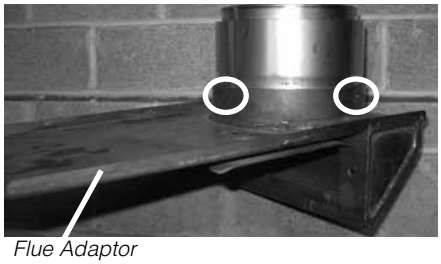


Diagram 2

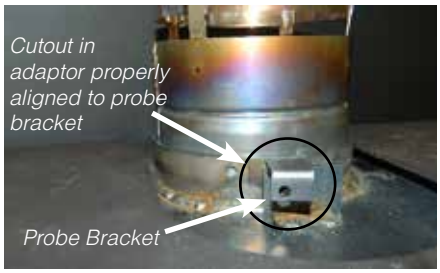


Diagram 2A

10. Fully insert the probe into the probe bracket as shown. See diagram 3.

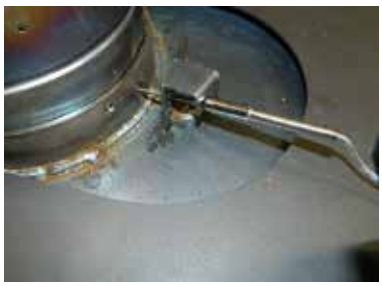


Diagram 3

11. Install the unit by first setting the rear of the unit into the fireplace. See Diagram 4. Ensure that the unit is centered in the existing fireplace and lined up with the flue adaptor.

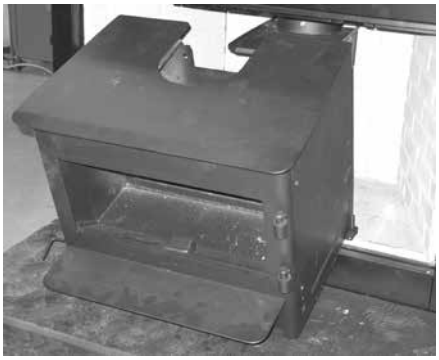


Diagram 4

12. Slide the unit back until the flue adaptor is slightly engaged. At this point it is recommended to level the unit. This will keep the adaptor from binding.

13. Insert the provided pull rod through the hole in the top center of the unit. Secure the threaded end into the flue adaptor as shown in diagram 5. While sliding the unit into place pull on the rod to ensure that the flue adaptor is properly engaged. See Diagram 6. Double check the adaptor is seated properly and the pull rod in the firebox, locate the two holes lined up to the two holes on the adaptor.

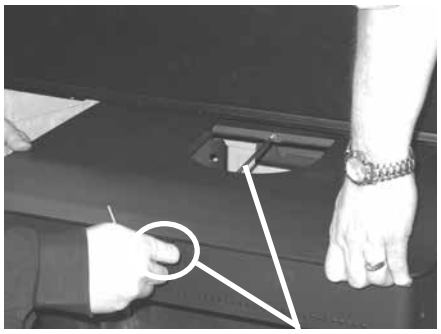
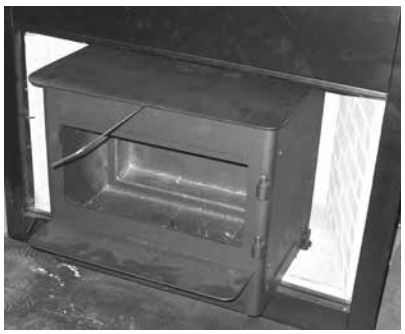


Diagram 5 Pull Rod



Pull Rod in place

Diagram 6

14. To complete the install, use the two bolts, washers and lock washers removed in step 6 and install them, tighten down using the 1/2" socket to ensure the adapter is positively secured to the unit. Once completed remove pull rod and place away for future re-install.

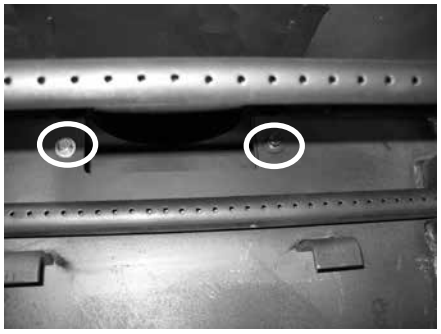


Diagram 7

15. When re-installing flue collar after it has been attached to the flex, be careful to guide the bypass arm through front above the door. This can only be guided through firebox opening.

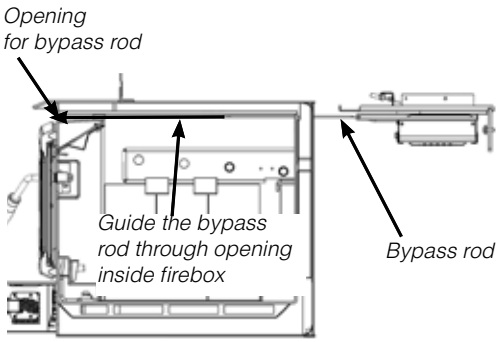


Diagram 8

16. Repeat steps 5-1 to complete install.

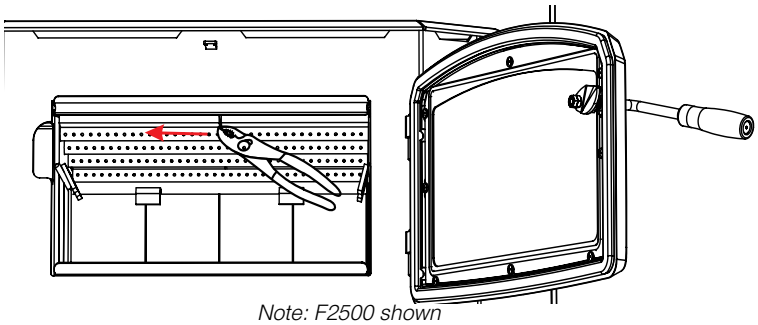
CATALYST COMBUSTOR REMOVAL AND REPLACEMENT

List of Tools required:
- 7/16" socket / ratchet
- Hammer
- Vice Grip

1. Allow the stove to burn out and cool down.

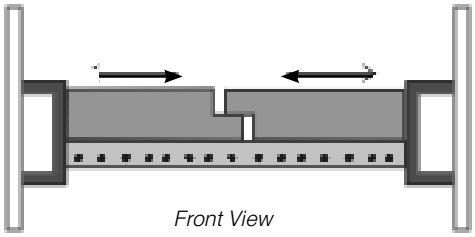
2. Remove stainless steel smoke deflector - See instructions in this manual.

3. Remove the front 3 secondary air tubes with pliers as shown below.



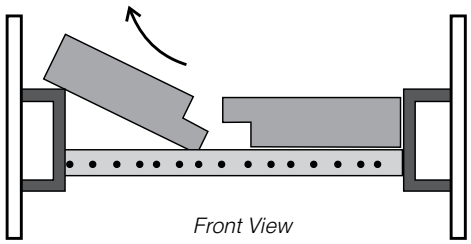
Note: F2500 shown

4. Remove baffles - push the baffles together and away from the side walls.



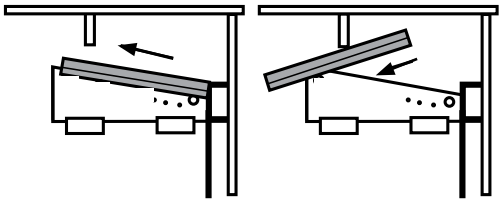
Front View

5. Lift the left baffle out from underneath the right baffle - then lift out. Remove the right baffle.



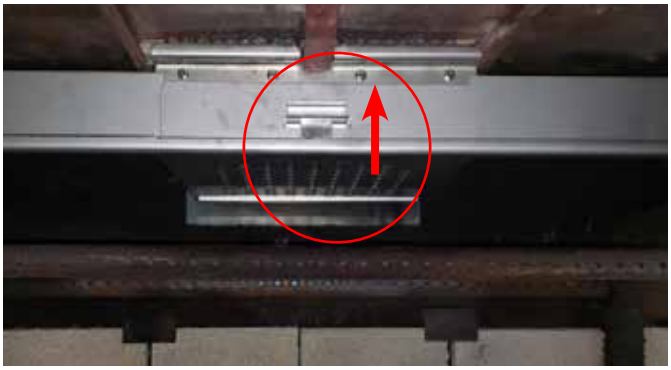
Front View

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.



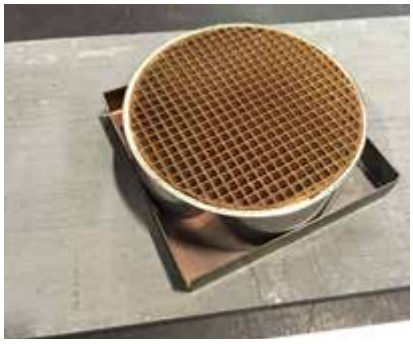
8. Pull the flame shield forward and tilt down, be prepared to support catalyst assembly.

9. Slide the catalyst retainer to the right to remove.

10. Pull down catalyst assembly to remove.

11. If the bypass rod/clip requires replacement also reach up into the catalyst cartridge and remove bypass rod clip. Slide out bypass rod from the front of the insert.

12. Take your new or cleaned out round catalyst and install it into the square support. Then take the catalyst and square support and insert it into the cartridge in the unit. Take the flame shield and slide back end into the opening. After sliding flame shield into position—secure in place by sliding the clip down (reverse Step 7). The install of the catalyst, bypass rod, and flue adaptor is now complete.



Catalyst in square support

13. Repeat steps 10-1.

NOTE: when cleaning chimney, remove tubes, baffles, retainer, flame shield and catalyst. After sweeping, re-install.

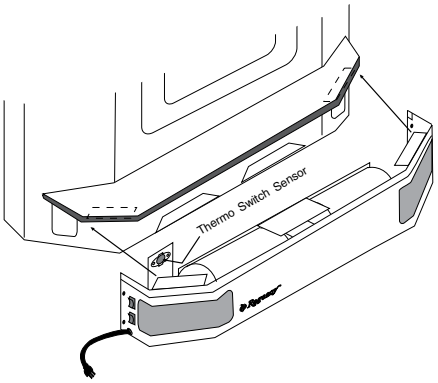
FAN INSTALLATION

Installer: Please record unit serial number here before installing blower.

Serial No._____

1. Align the fan support with the offset clip on the bottom of the ashlip.
2. Slide the supports into the clips. The tension holding the clips in place may be adjusted by increasing or decreasing the offset spacing of the clips.
3. Ensure that the power cord is not in contact with any hot stove surfaces.

   NOTE: DO NOT ROUTE POWER CORD UNDER OR IN FRONT OF UNIT.



4. Push the Regency logo plate into the two holes in the front bottom left corner of the fan.

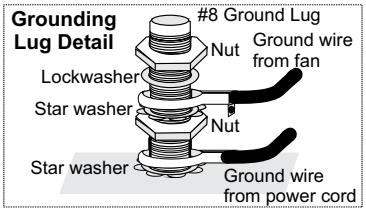
Do not turn fan ON until your insert has reached operating temperature or at least 30 minutes after starting fire.

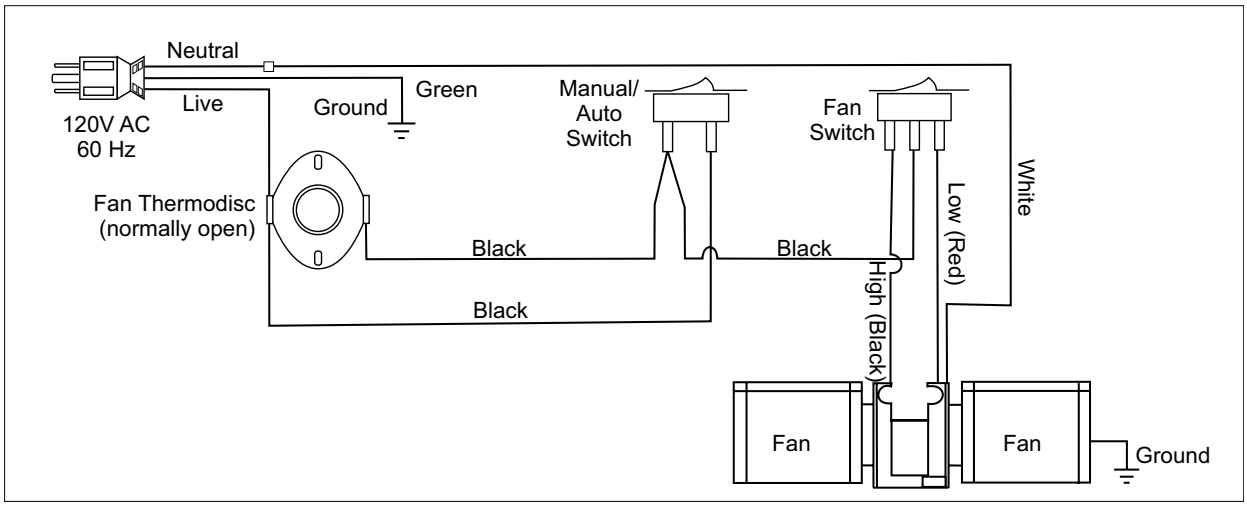
Important:

The blower to this appliance must be turned off anytime the fuel door is opened. Prior to turning the blower back on, ensure there are no embers near the blower which may have fallen onto the hearth when the fuel door was opened. Once the fuel door is closed, the blower may be turned back on.

CAUTION: Label all wires prior to disconnection when servicing controls. Wiring errors can cause improper and dangerous operation.

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.





Blower/Fan Wiring Diagram

FLOOR PROTECTION

Please check to ensure that your floor protection and hearth will meet the standards for clearance to combustibles. Your hearth extension must be made from a non-combustible material.

FLUE BAFFLE & SECONDARY AIR TUBE INSTALLATION

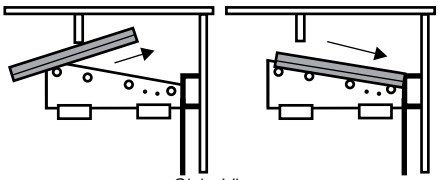
The flue baffle system located in the upper area of the firebox is removable to make cleaning your chimney system easier. The baffles must be installed prior to your first fire. **Smoke spillage and draft problems may occur if the baffles are improperly positioned.** Check the position of the baffles on a regular basis as they can be dislodged if too much fuel is forced into the firebox.

The unit arrives with the 2 baffle plates on the floor of the firebox.

1) If all 4 air tubes are installed continue on to Step 2), if not, follow the instructions below. Install the air tube into the holes in the side channels. The notch goes on the right hand side with the air holes facing toward the door. Slide the tube into the left hand side, as far as possible and then bring it back into the hole on the right hand side. Use a pair of vise grips or pliers and tap it into place with a hammer. A tighter fit will ensure the tube will not move when the unit is burning. Though there are four air tubes in the medium units.

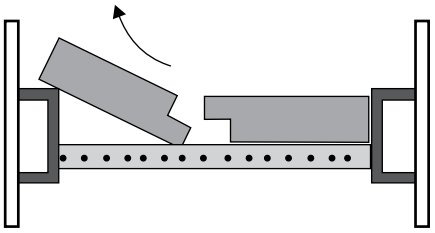
2) Slide the left baffle over the air tubes from the front and then push it to the back.

3) 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.

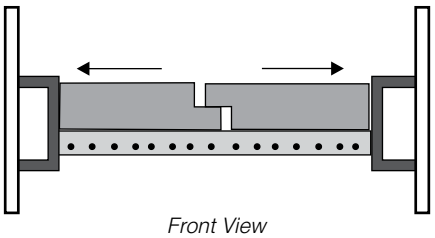


Side View

4) Important: push both baffles so they are tight against the side walls.



Front View

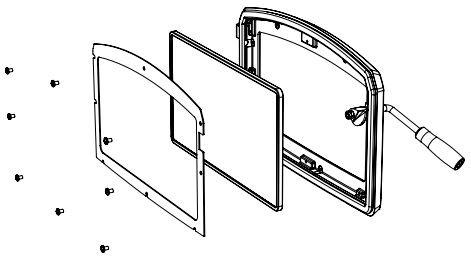


Front View

GLASS REPLACEMENT

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.



Shown with classic door

WOOD DOOR & HANDLE ASSEMBLY

1. In preparation of installing the door handle, the nuts, cam, washers and spacer must be removed as shown in Diagram 1.

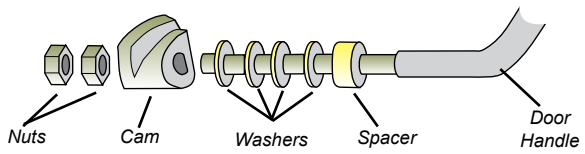


Diagram 1

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 removed. Recheck door to ensure there is still a tight seal. The handle should be approximately in the 8 o'clock position when door is fully closed. (Diagram 3)

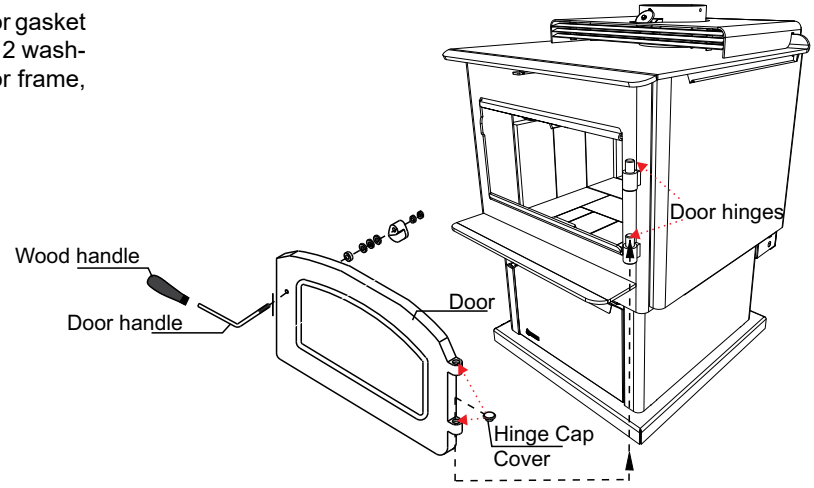


Diagram 2

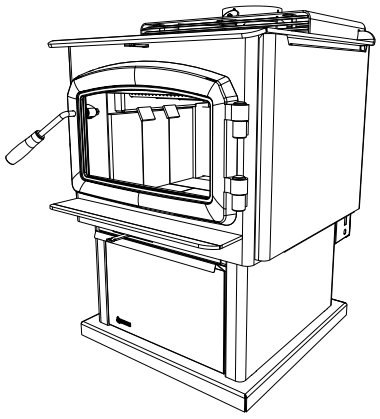
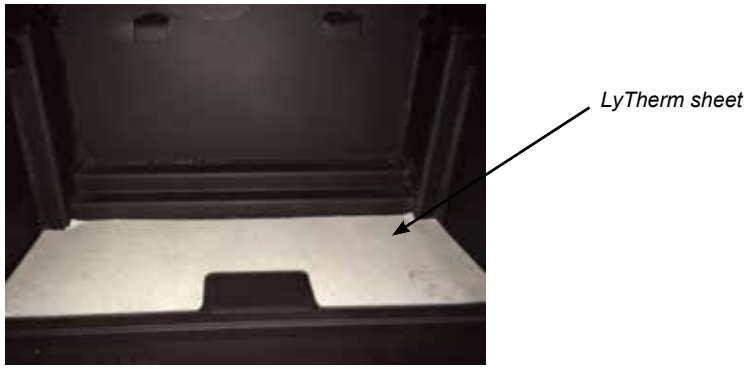


Diagram 3

BRICK INSTALLATION

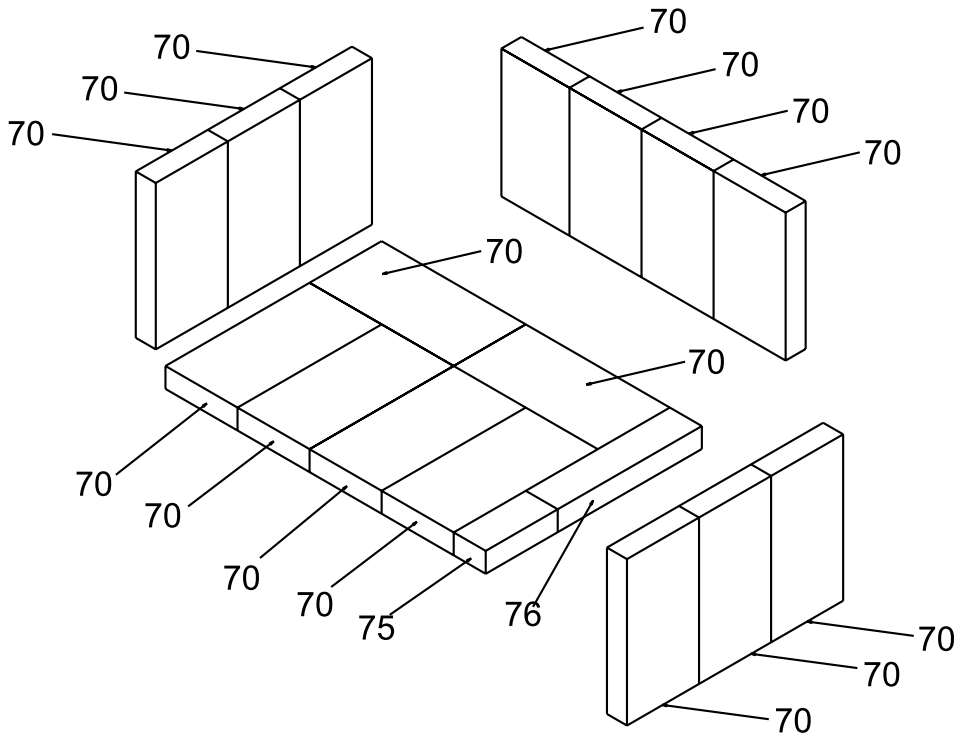
Firebrick is included to extend the life of your stove and radiate heat more evenly. Check to see that all firebricks are in their correct positions and have not become misaligned during shipping. Install all firebricks (if bricks were removed at install) per the diagram below and place in their correct positions.
Do not use a grate.



Order of firebrick install:

a) Rear Firebrick
b) Firebox floor - install brick over LyTherm Sheet
c) Right and left side Firebricks

70) Brick Regular Full Size: 1-1/4" x 4-1/2" x 9"
75) Brick Partial: 1-1/4 x 4-1/2" x 2"
76) Brick Partial: 1-1/4" x 2" x 9"



SEASONED WOOD

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.

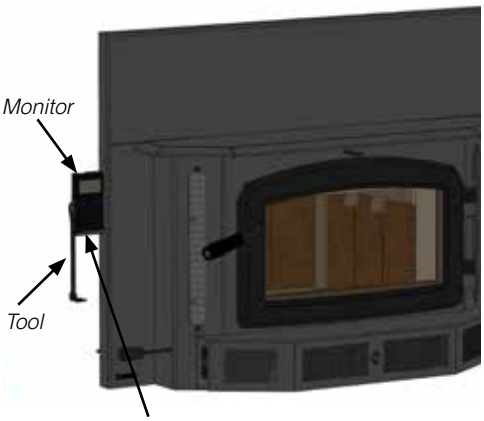
Softer woods like pine, spruce and poplar/aspen that is cut, split and stacked properly in the early spring maybe be ready for burning in the fall. Extremely hard woods like oak and maple, and large pieces of firewood, may take a minimum of a full year to dry enough. Drying may also take longer in damp 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.

BYPASS OPERATING HANDLE

The I2500 is supplied with an air and bypass operating handle. The handle is used to open and close the by-pass and hung on the bracket as shown below. This bracket can also be used for the digital catalytic monitor.
Diagrams below show catalyst monitor and bracket already installed.



Air and Bypass operating handle storage

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.

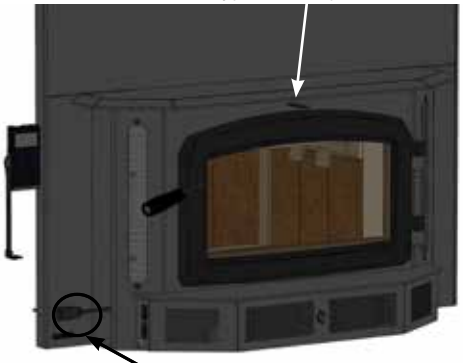
DRAFT CONTROL

Both the primary and air wash drafts are controlled by the control slide located on the left side of the unit (when facing the unit). To increase your draft - slide to the left to open, and to decrease - slide to the right to close. The I2500 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.

Outward - Open **Inward - Closed**

Bypass Damper



Side Draft Control

Left - Open **Right - Closed**

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!

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 insert 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 insert 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 insert at its maximum setting, and only after the metal has been warmed.
2. Do not place anything on the wood insert 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. 4 lb kindling and 6 lb start up fuel, wood split larger than kindling, approx. 2 inches thick. Start with few pieces of crumpled paper and half of the kindling, stacked in a manner that allows air flow on the firebrick hearth (Teepee 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. 3 minutes to establish a good fire. Once the door is closed, close the bypass (after approx.5 minutes).
4. Once most of the kindling has burned down add the remaining of the kindling and 4 - 5 pieces of start up wood, more to the back. 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. Load in centre and more to the back. Keep bigger pieces for the next load.
6. While there are still good flames, level the burning wood and 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 charcoaling and coal bed prior to loading the main load of bigger logs.
7. 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 pulled out to the far left) for at least 10 -15 minutes.
   After a strong fire is established you can adjust the air control to your desired position.
   High Fire: Air control pulled out to far left.
   Low Fire: Air control pushed in 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.
   After 20 minutes the fan can be set on high setting.
8. IMPORTANT: The temperature in the wood insert and the gases entering the combustor must reach between 500ºF - 700ºF for catalytic activity to start. From the start up of a cold wood insert, a medium to high firing rate must be maintained for 30 min. This ensures that the wood insert, 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 insert 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 insert. Always warm your wood insert 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 insert causing a draft down your chimney. If this occurs, slightly open a window near your unit.

CAUTION: If the body of your wood insert, 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.

How to Light & Maintain a Wood Stove Fire

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.

NOTE: You can stir and level the coals before reloading to ensure proper charcoaling and a good start up of the load.

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.

Ashes should be placed in a metal container with a tight-fitting lid. The closed container of ashes should be placed on a noncombustible floor or on the ground, 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.

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.

SAFETY GUIDELINES AND WARNINGS

CAUTION: DO NOT USE CHEMICALS AS 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. If you have smoke detectors, prevent smoke spillage as this may set off a false alarm.
5. 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.
6. 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.
7. 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.
8. The stove consumes air while operating, provide adequate ventilation with an air duct or open a window while the stove is in use.
9. Do not connect this unit to a chimney flue serving another appliance.
10. Do not use grates or andirons or other methods for supporting fuel. Burn directly on the bricks.
11. Open the draft control fully for 10 to 15 seconds prior to slowly opening the door when refuelling the fire.
12. Do not connect your unit to any air distribution duct.
13. 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.
14. In the event of component failure, replace parts with only Regency listed parts.
15. Warning: do not abuse glass door such as striking or slamming shut.
16. 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.
17. **WARNING: Do not operate without either the Ash Plug properly seated or the Ash Dump Plates screwed in place, excessive temperatures will result.**
18. **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: HOT WHILE IN OPERATION. KEEP CHILDREN, CLOTHING AND FURNITURE AWAY. CONTACT MAY CAUSE SKIN BURNS.

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.

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 kiln dried, 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) 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.

6) **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, use 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 gasket compresses after a few fires. The door latch compression may require adjustment to renew seal. Removal of a shim, (see section in this manual), will allow the latch to be moved closer to the door frame, causing a tighter seal.

GLASS MAINTENANCE

Your Regency stove is supplied with 5mm Neoceram ceramic glass (Part #846-308) 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).

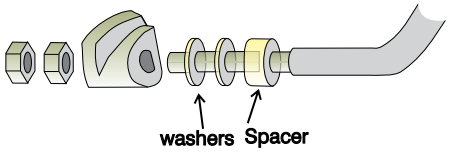
Allow the stove to cool down before cleaning the glass. Cleaning the glass will prevent build up of carbon and allow full view of the fire.
WARNING: Do not clean the glass when it is hot.
WARNING: Do not use abrasive cleaners, a damp cloth and glass cleaner is effective.

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.

LATCH ADJUSTMENT

The door latch may require adjustment as the door gasket material compresses after a few fires. Removal of the spacer washer, shown in the diagram below, will allow the latch to be moved closer to the door frame, causing a tighter seal. Remove and replace the nuts, washer and spacer as shown.



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.

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 hit 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 he 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.

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.

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 is 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 and partially 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.

Cleaning & Maintaining Your Wood Stove

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 above the insert must be cleaned at least once a year. Use 220 sand paper to clean probe. Access to the probe can be done in 2 ways. - by removing the catalyst as this will be exposed once the catalyst is removed. - by removing the faceplate. However, there must be clearance above the insert to be able to remove the probe from the top of the insert. See specific details in this manual.

NOTE:

Chimney Cleaning

When cleaning the chimney system the air tubes, baffles should be removed for ease of cleaning. See manual for details on removal.
The bypass should be moved all the way outward so any creosote will fall onto the firebox floor when being cleaned.
Alternatively, the catalyst may be removed so this can also be cleaned at the same time following the guide lines found in this manual.
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.

IMPORTANT

Before attempting to loosen or remove any bolt from the interior of a wood stove, insert or factory built fireplace, we highly recommend to liberally spray the bolt with a good-quality penetrating oil, one that does not have flammable properties contained within the penetrating oil being used. Allow it to set, then tap or vibrate the bolt to help loosen it before attempting to remove it. For best results, follow the instructions that are provided with the penetrating oil.

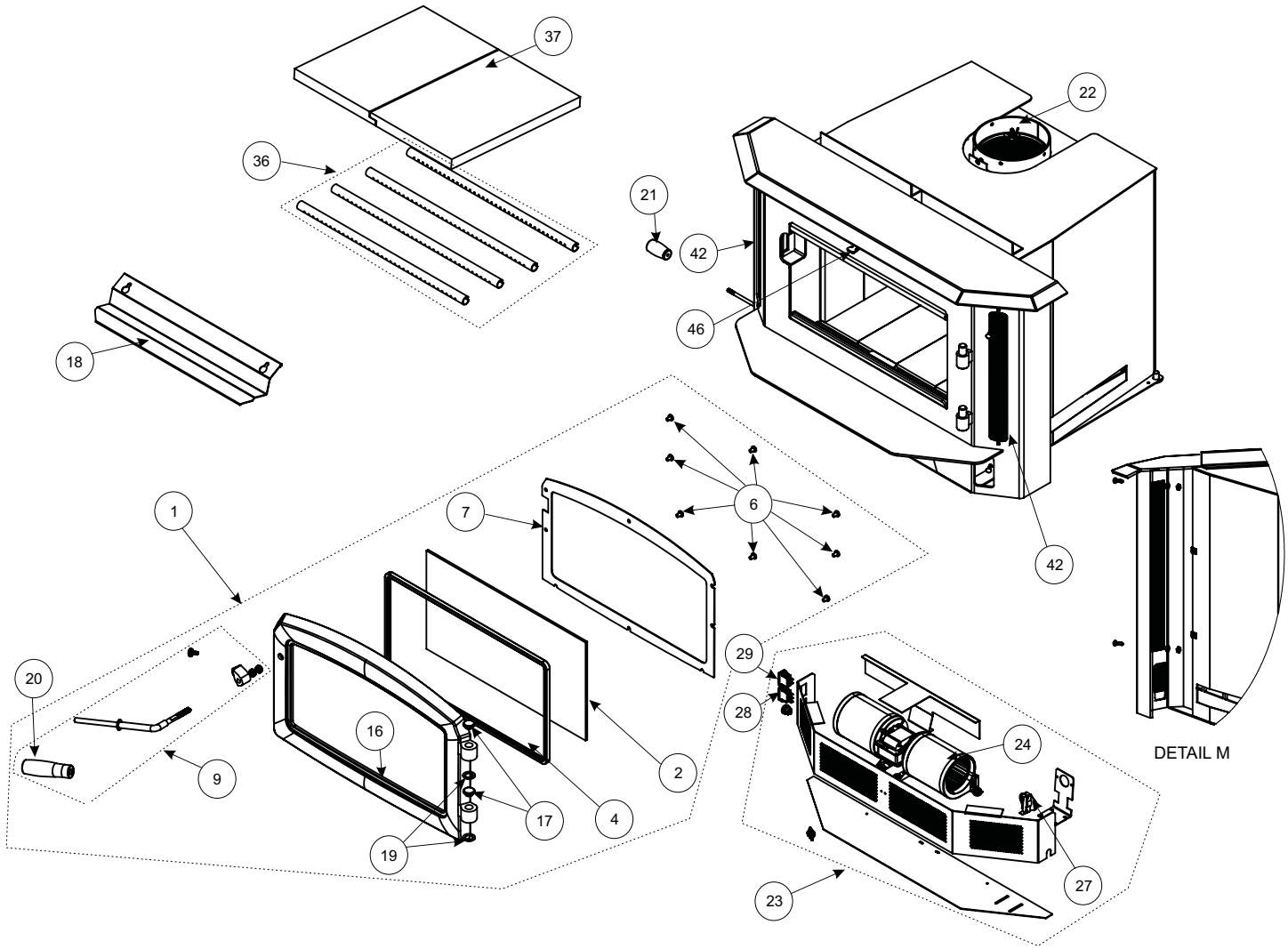
MAIN ASSEMBLY & OPTIONS - I2500

	Part #	Description
1)	850-251	Door Assy - Large Black
	850-253	Door Assy - Large Nickel Accent
2)	846-308	Glass - Replacement
4)	936-241	7/8" Adhesive Tape Gasket
6)	904-115*	Screw 1/4-20 x 3/8"
7)	181-034F	Glass Retainer - Large
9)	021-973	Door Handle Assembly
16)	846-570	Door Gasket Kit
17)	948-079BN	Hinge Caps - Nickel (each)
17)	846-918	Hinge Caps Black Oxide (Set of 2)
18)	021-018	Smoke Detector
19)	650-084	Door Spacer
20)	948-146	Wood Handle
21)	181-039	Draft Control Handle
22)	181-532	Flue Adaptor

	Part #	Description
23)	142-917	Fan Assembly
24)	910-157/P	Fan Motor 120 Volts
*	910-678	Power Cord 120 Volts
27)	910-142	Fan Thermodisc
28)	910-140	Fan Speed Hi / OFF / Low Switch (3-way)
29)	910-138	Auto / Manual On / OFF Switch
30)	*	Grommet Strain Relief
36)	033-953	Air Tube 3/4" (Qty:4) (each)
37)	020-957	Baffle (2/set)

	Part #	Description
42)	163-931	Convection Grill - Nickel (Opt)
	163-930	Convection Grill - Blk
43)	*	Hex Nut 10-24 Zinc Coated
44)	*	Washer #10 Flat
45)	*	Bolt, 10-24 x 3/4" Blk Carriage
46)	181-038	Bypass Rod
	911-185	Monitor
	911-186	Probe
	948-223	Regency Logo - Nickel
	919-908	Manual

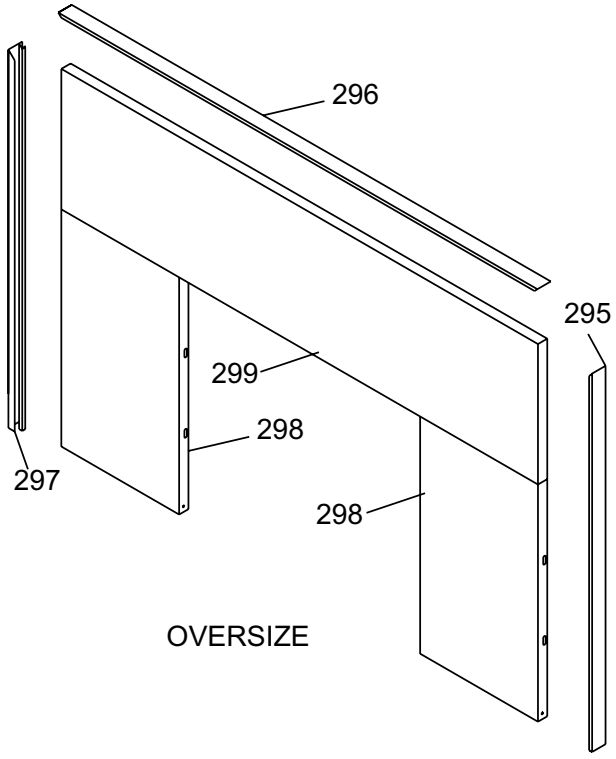
*Not available as a replacement part.

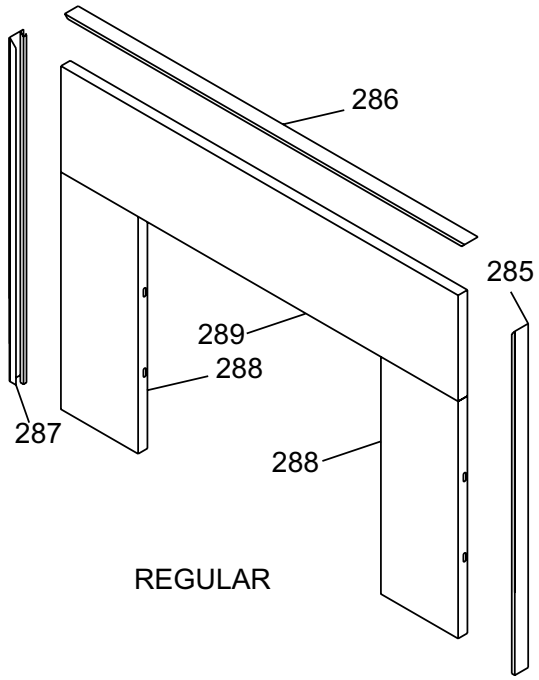


FACEPLATES - I2500

	Part #	Description
	140-911	Faceplate & Trim Set - Regular
	180-570	Black Trim Regular (set of 3)
285)	*	Trim Right Regular
286)	*	Trim Top Regular
287)	*	Trim Left Regular
288)	*	Faceplate Side Regular
289)	*	Faceplate Top Regular
	140-913	Faceplate & Trim Set - Oversize
	180-572	Black Trim Oversize (set of 3)
295)	*	Trim Right Oversize
296)	*	Trim Top Oversize
297)	*	Trim Left Oversize
298)	*	Faceplate Side Oversize
299)	*	Faceplate Top Oversize

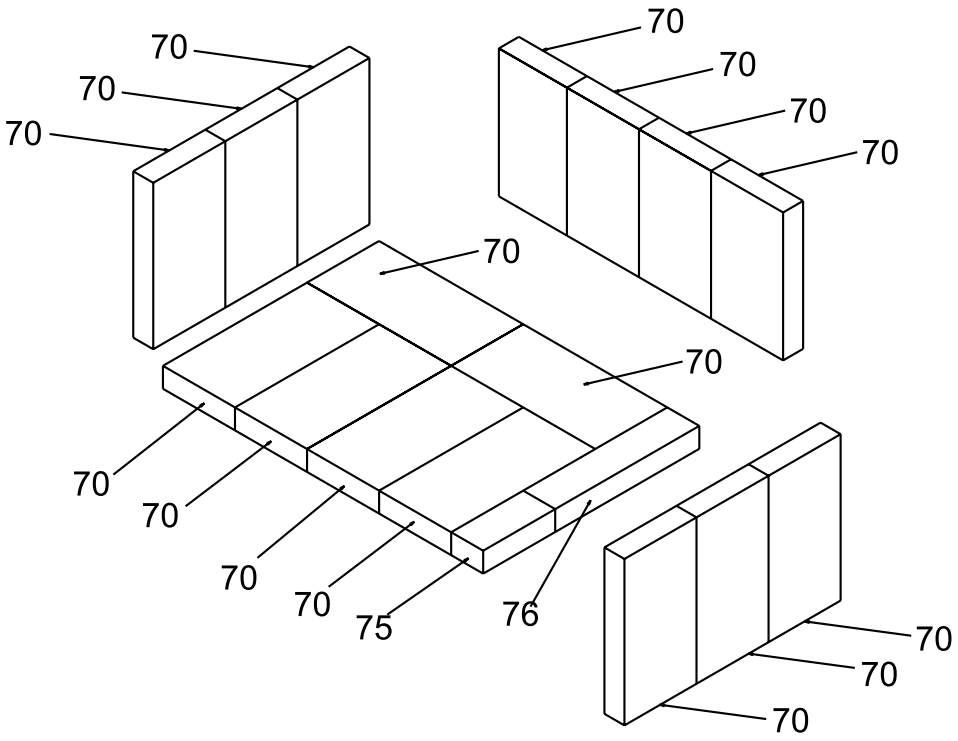
*Not available as a replacement part.





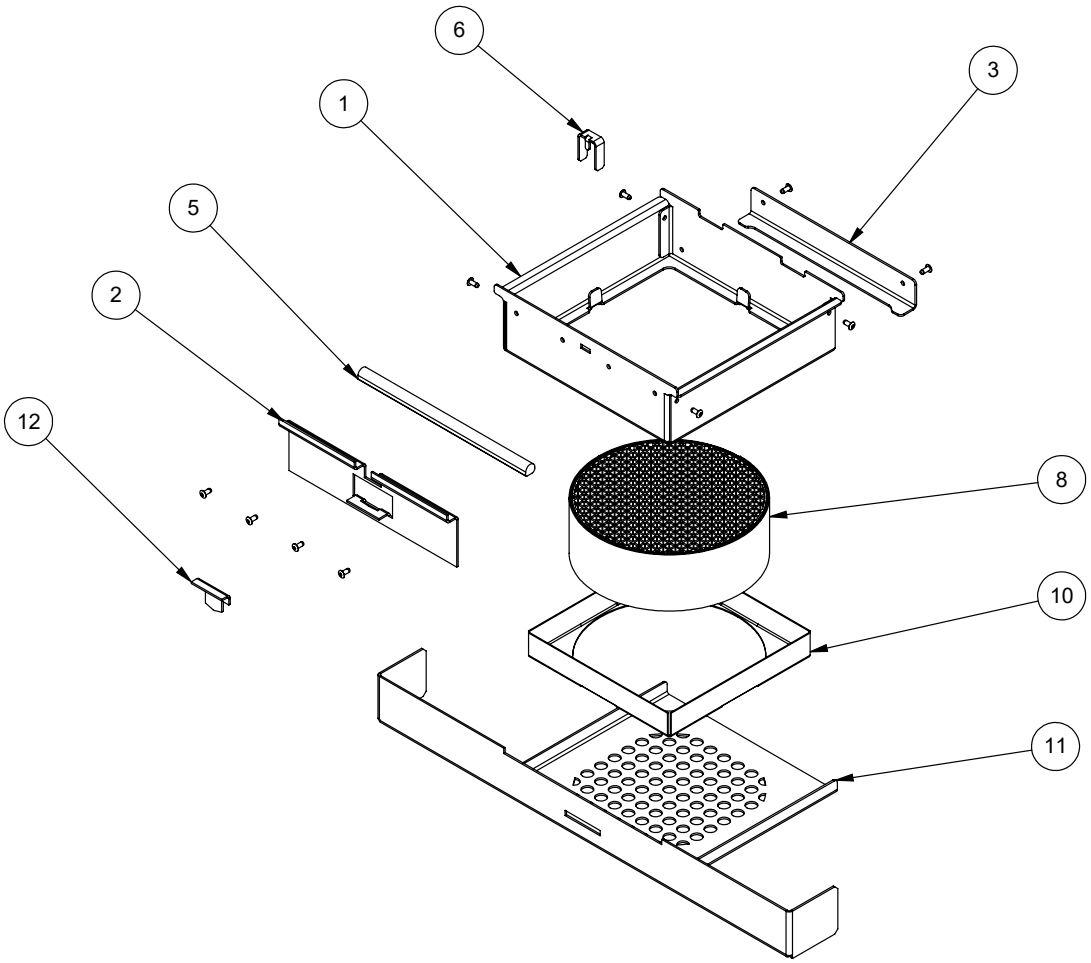
BRICK PANELS - I2500

	Part #	Description
	180-960	Firebrick - Complete Set
70)	902-111	Brick Regular Full Size: 1-1/4" x 4-1/2" x 9"
75)	*	Brick Partial: 1-1/4 x 4-1/2" x 2"
76)	*	Brick Partial: 1-1/4" x 2" x 9"



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	075-531	5.83 diameter combustor assembly
10	075-044	Cat cradle
11	181-053	Vertical 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.

REGENCY
FIREPLACE PRODUCTS

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.

Installer: Please complete the following information

Dealer Name & Address:_____

_____

Installer: _____

Phone #: _____

Date Installed: _____

Serial #:_____

Printed in Canada

Established 1974

QUALITY CONTROL SERVICES

LABORATORY EQUIPMENT • SALES • SERVICE • CALIBRATION • REPAIRS
2340 SE 11TH Ave. Portland, Oregon 97214 • Box 14831 Portland, Oregon 97293
(503) 236-2712 • FAX (503) 235-2535 • www.qc-services.com

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.

Established 1974

QUALITY CONTROL SERVICES

LABORATORY EQUIPMENT • SALES • SERVICE • CALIBRATION • REPAIRS
2340 SE 11TH Ave. Portland, Oregon 97214 • Box 14831 Portland, Oregon 97293
(503) 236-2712 • FAX (503) 235-2535 • www.qc-services.com

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%.

Established 1974

QUALITY CONTROL SERVICES

LABORATORY EQUIPMENT • SALES • SERVICE • CALIBRATION • REPAIRS

2340 SE 11TH Ave. Portland, Oregon 97214 • Box 14831 Portland, Oregon 97293

(503) 236-2712 • FAX (503) 235-2535 • www.qc-services.com

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

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

QUALITY CONTROL SERVICES

LABORATORY EQUIPMENT • SALES • SERVICE • CALIBRATION • REPAIRS

2340 SE 11TH Ave. Portland, Oregon 97214 • Box 14831 Portland, Oregon 97293

(503) 236-2712 • FAX (503) 235-2535 • www.qc-services.com

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

QUALITY CONTROL SERVICES

LABORATORY EQUIPMENT • SALES • SERVICE • CALIBRATION • REPAIRS
2340 SE 11TH Ave. Portland, Oregon 97214 • Box 14831 Portland, Oregon 97293
(503) 236-2712 • FAX (503) 235-2535 • www.qc-services.com

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

QUALITY CONTROL SERVICES

LABORATORY EQUIPMENT • SALES • SERVICE • CALIBRATION • REPAIRS
2340 SE 11TH Ave. Portland, Oregon 97214 • Box 14831 Portland, Oregon 97293
(503) 236-2712 • FAX (503) 235-2535 • www.qc-services.com

A2LA ACCREDITED
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®
INNOVATIVE CALIBRATION SOLUTIONS
625 East Bunker Court
Vernon Hills, Illinois 60061
PH: 866-466-6225
Fax: 847-327-2993
www.innocalsolutions.com

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: 000113537

CERTIFICATE OF ANALYSIS / EPA PROTOCOL GAS

Customer & Order Information:

PXPKG TUALATIN OR H
10450 SW TUALATIN SHERWOOD
TUALATIN OR 97062

Praxair Order Number: 70337802
Customer P. O. Number:
Customer Reference Number:

Fill Date: 8/7/2017
Part Number: NI CD17CO8E-AS
Lot Number: 70086721903
Cylinder Style & Outlet: AS CGA 590
Cylinder Pressure & Volume: 1290 psig 99 cu. ft.

Certified Concentration:

Expiration Date: 8/11/2025
Cylinder Number: CC700832

			NIST Traceable Analytical Uncertainty:
4.33	%	CARBON MONOXIDE	± 0.5 %
16.93	%	CARBON DIOXIDE	± 0.3 %
16.99	%	OXYGEN	± 0.3 %
Balance		NITROGEN	± 0.2 %

Certifcation Information: *Certification Date:* 8/11/2017 *Term:* 96 Months *Expiration Date:* 8/11/2025
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 IR boardening effect. O2 responses have been corrected for CO2 interference.

Analytical Data: *(R=Reference Standard, Z=Zero Gas, C=Gas Candidate)*

1. Component: CARBON MONOXIDE

Requested Concentration: 4.25 %
Certified Concentration: 4.33 %
Instrument Used: Horiba VIA-510 S/N UB9UCSYX
Analytical Method: NDIR
Last Multipoint Calibration: 7/23/2017

First Analysis Data: Date: 8/11/2017

Z:	0	R:	5	C:	4.33	Conc: 4.333
R:	4.99	Z:	0	C:	4.33	Conc: 4.333
Z:	0	C:	4.32	R:	5	Conc: 4.323

UOM: % Mean Test Assay: 4.33 %

Reference Standard Type: GMIS
Ref. Std. Cylinder # : CC242633
Ref. Std. Conc: 5.00%
Ref. Std. Traceable to SRM # : 2642a
SRM Sample # : 51-D-23
SRM Cylinder # : FF23106

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 DIOXIDE

Requested Concentration: 17 %
Certified Concentration: 16.93 %
Instrument Used: Horiba VIA-510 S/N 20C194WK
Analytical Method: NDIR
Last Multipoint Calibration: 7/20/2017

First Analysis Data: Date: 8/11/2017

Z:	0	R:	20.08	C:	16.99	Conc: 16.936
R:	20.08	Z:	0	C:	16.99	Conc: 16.936
Z:	0	C:	16.98	R:	20.09	Conc: 16.926

UOM: % Mean Test Assay: 16.933 %

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 %

PRAXAIR
Making our planet more productive

DocNumber: 223791

Praxair Distribution, Inc.
5700 S. Alameda Street
Los Angeles CA 90058
Tel: 323-585-2154
Fax: 714-542-6689
PGVP ID: F22018

CERTIFICATE OF ANALYSIS / EPA PROTOCOL GAS

Customer & Order Information

PXPKG TUALATIN OR H
10450 SW TUALATIN SHERWOOD ROAD
TUALATIN OR 97062

Certificate Modification Date: 09/05/2018
Praxair Order Number: 70716136
Part Number: NI CD10CO33E-AS

Fill Date: 08/31/2018
Lot Number: 70086824308
Cylinder Style & Outlet: AS CGA 590
Cylinder Pressure and Volume: 2000 psig 140 ft3

Certified Concentration

ProSpec EZ Cert

Expiration Date:	09/05/2026	NIST Traceable
Cylinder Number:	CC170624	Expanded Uncertainty
10.00 %	Carbon dioxide	± 0.3 %
2.51 %	Carbon monoxide	± 0.7 %
10.50 %	Oxygen	± 0.6 %
Balance	Nitrogen	

Certification Information:

Certification Date: 09/05/2018 *Term:* 96 Months *Expiration Date:* 09/05/2026

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.

CO responses have been corrected for CO2 interference. CO2 responses have been corrected for Oxygen IR Broadening effect. O2 responses have been corrected for CO2 interference.

Analytical Data:

(R=Reference Standard, Z=Zero Gas, C=Gas Candidate)

1. ***Component:*** **Carbon dioxide**

Requested Concentration: 10 %
Certified Concentration: 10.00 %
Instrument Used: Horiba VIA-510 S/N 20C194WK
Analytical Method: NDIR
Last Multipoint Calibration: 08/20/2018

First Analysis Data: **Date** 09/05/2018

Z:	0	R:	14.02	C:	10	Conc:	10
R:	14.02	Z:	0	C:	10	Conc:	10
Z:	0	C:	10	R:	14.02	Conc:	10

UOM: % **Mean Test Assay:** 10 %

Reference Standard: Type / Cylinder #: GMIS / CC141375
Concentration / Uncertainty: 14.02 % ±0.3%
Expiration Date: 06/11/2026
Traceable to: SRM # / Sample # / Cylinder #: SRM 1675b / 6-F-51 / CAL014538
SRM Concentration / Uncertainty: 13.963% / ±0.034%
SRM Expiration Date: 05/16/2022

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:** %

2. ***Component:*** **Carbon monoxide**

Requested Concentration: 2.5 %
Certified Concentration: 2.51 %
Instrument Used: Horiba VIA-510 S/N UB9UCSYX
Analytical Method: NDIR
Last Multipoint Calibration: 08/20/2018

First Analysis Data: **Date** 09/05/2018

Z:	0	R:	2.48	C:	2.51	Conc:	2.51
R:	2.48	Z:	0	C:	2.51	Conc:	2.51
Z:	0	C:	2.51	R:	2.48	Conc:	2.51

UOM: % **Mean Test Assay:** 2.51 %

Reference Standard: Type / Cylinder #: GMIS / CC102045
Concentration / Uncertainty: 2.48 % ±0.448%
Expiration Date: 04/03/2025
Traceable to: SRM # / Sample # / Cylinder #: SRM 2641a / 52-D-30 / CAL017193
SRM Concentration / Uncertainty: 4.009% / ±0.017%
SRM Expiration Date: 07/15/2019

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:** %

3. ***Component:*** **Oxygen**

Requested Concentration: 10.5 %
Certified Concentration: 10.50 %
Instrument Used: OXYMAT 5E
Analytical Method: Paramagnetic
Last Multipoint Calibration: 09/04/2018

First Analysis Data: **Date** 09/05/2018

Z:	0	R:	9.88	C:	10.49	Conc:	10.49
R:	9.88	Z:	0	C:	10.5	Conc:	10.5
Z:	0	C:	10.5	R:	9.88	Conc:	10.5

UOM: % **Mean Test Assay:** 10.5 %

Reference Standard: Type / Cylinder #: NTRM / DT0010402
Concentration / Uncertainty: 9.88 % ±0.4%
Expiration Date: 11/18/2022
Traceable to: SRM # / Sample # / Cylinder #: NTRM #170701 / N/A / NTRM #DT0010402
SRM Concentration / Uncertainty: 9.875% / ±0.040%
SRM Expiration Date: 11/18/2022

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:** %

Analyzed By: Danielle Burns

Certified By: Jose Vasquez

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 #:	2260-28789-46	**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.
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:	NICOLAS ILLA	**Date:**	January 23, 2018
Technical Manager:	MARSHALL DOYLE	**Signature:**	MDoyle

J-2000

owner's manual

DELMHORST®
INSTRUMENT CO.

WHEN ACCURACY IS THE POINT.™

ACCREDITED
A2LA Certificate No. 1750.01
Calibration

Calibration complies with ISO/IEC 17025, ANSI/NCSL Z540-1, and 9001

Cert. No.: 4198-9765787

Traceable® Certificate of Calibration for Hand Held Barometer

Customer :PFS TECO Suite 305 ,11785 SE Highway 212 ,Clackamas ,OR-97015 ,U.S.A.

Instrument Identification:

Model: 4198, S/N: 80531676 Manufacturer: Control Company

Standards/Equipment:

Description	Serial Number	Due Date	NIST Traceable Reference
Digital Barometer	D4540001	09 Oct 2018	1000415948
Digital Thermometer	111879345	09 Apr 2019	4000-9377595

Certificate Information:

Technician: 57 Procedure: CAL-32 Cal Date: 29 Aug 2018 Cal Due Date: 29 Aug 2019

Test Conditions: 62.73%RH 23.92°C 1018mBar

Calibration Data:

Unit(s)	Nominal	As Found	In Tol	Nominal	As Left	In Tol	Min	Max	±U	TUR
°C	24.10	24.1	Y	23.51	23.9	Y	22.01	25.01	0.05	>4:1
mb/hPa	551.55	552	Y	551.62	546	Y	544	560	0.62	>4:1
mb/hPa	751.22	744	Y	748.87	746	Y	741	757	0.62	>4:1
mb/hPa	1015.90	1011	Y	1018.22	1017	Y	1010	1026	0.62	>4:1

This certificate indicates Traceability to standards provided by (NIST) National Institute of Standards and Technology and/or a National Standards Laboratory.

A Test Uncertainty Ratio of at least 4:1 is maintained unless otherwise stated and is calculated using the expanded measurement uncertainty. Uncertainty evaluation includes the instrument under test and is calculated in accordance with the ISO "Guide to the Expression of Uncertainty in Measurement : (GUM). The uncertainty represents an expanded uncertainty using a coverage factor k=2 to approximate a 95% confidence level. In tolerance conditions are based on test results falling within specified limits with no reduction by the uncertainty of the measurement. The results contained herein relate only to the item calibrated. This certificate shall not be reproduced except in full, without written approval of Control Company.

Nominal=Standard's Reading; As Left=Instrument's Reading; In Tol=In Tolerance; Min/Max=Acceptance Range; ± U=Expanded Measurement Uncertainty; TUR=Test Uncertainty Ratio; Accuracy=±(Max-Min)/2; Min=As Left Nominal(Rounded) – Tolerance; Max= As Left Nominal(Rounded) + Tolerance;

Nicol Rodriguez

Nicol Rodriguez, Quality Manager

Aaron Judice

Aaron Judice. Technical Manager

Note :

Maintaining Accuracy:

In our opinion once calibrated your Hand Held Barometer should maintain its accuracy. There is no exact way to determine how long calibration will be maintained. Hand Held Barometer change little, if any at all, but can be affected by aging, temperature, shock, and contamination.

Recalibration:

For factory calibration and re-certification traceable to National Institute of Standards and Technology contact Control Company.

CONTROL COMPANY 12554 Galveston RD Suite B230 Webster TX USA 77598
Phone 281 482-1714 Fax 281 482-9448 sales@control3.com www.control3.com

Control Company is an ISO/IEC 17025:2005 Calibration Laboratory Accredited by (A2LA) American Association for Laboratory Accreditation, Certificate No. 1750.01.
Control Company is ISO 9001:2008 Quality Certified by DNV GL, Certificate No. CERT-01805-2006-AQ-HOU-RvA.
International Laboratory Accreditation Cooperation (ILAC) - Multilateral Recognition Arrangement (MRA).