EPA Certification Test Report

The following models are EPA certified under the following attached test report:	**Ci2700**
	Model #
Wood Stoves	N/A
Wood Inserts	Ci2700 Hi500
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 May 4, 2021
E&OE

Fireplace Products International, Ltd.

Project # 18-447
Model: CI2700
AKA: HI500
Type: Catalytic Wood-Fired Fireplace Insert
February 5, 2019
Revised Date: May 4, 2021

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

Contact: Mr. Dave Lal
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Revision Summary

Date: February 5, 2019 – Original Issue

Date: May 4, 2021 – The following revisions were made per request from EPA:

-The “Notes” section was edited to clarify that the pre-test condition burns were at a medium burn setting, see page 5.

-The “Setting & Run Notes” section was edited to clarified air control settings used for each test, see page 9.

-The Firebox volume was added to the Main Body of the test report, to ensure its inclusion in the Non-CBI copy of the test report, see page 11.

-The Owner’s Manual has been updated to include further instruction on fire starting procedures and proper operation at low burn settings, see Appendix B, manual page 30.

-The test burn instructions from the manufacturer to the laboratory were added to Appendix A, see page 25 of Non-CBI Report.

Contents

Affidavit

PFS-TECO was contracted by Fireplace Products International Ltd. (FPI) to provide testing services for the CI2700 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 1/28/2019 and ending on 1/30/2019. 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", and ISO 17025:2005 "Requirements for Testing Laboratories." PFS-TECO is also accredited 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 CI2700 Catalytic Wood-Fired Room Heater. All testing was performed at PFS-TECO's Portland Laboratory. Testing was performed by Mr. Sebastian Button.

Notes

- Prior to start of testing, 50 hours of conditioning was performed by FPI Lab staff at a medium combustion air setting, in accordance with 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: ***CI2700***
- Serial Number: ***Un-serialized Prototype – PFS Tracking Number 0020***
- Manufacturer: ***FPI-Regency Fireplace Products***
- Catalyst: ***Yes***
- Heat exchange blower: ***Optional***
- Type: ***Wood Stove***
- Style: ***Insert***
- Date Received: ***Thursday, January 24, 2019***
- Wood Heater Aging: ***November 12, 2018 - November 20, 2018***
- Testing Period – Start: ***Monday, January 28, 2019*** Finish: ***Wednesday, January 30, 2019***
- 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
115	Delmhorst Wood Moisture Meter
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 **1.34 g/hr** with a Higher Heating Value efficiency of **73.7%.** The average CO emission rate for the 3 tests was **1.19 g/min.** The FPI CI2700 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	1/28/2019	1/29/2019	1/30/2019
Run Number	1	2	3
PM Emission Rate (g/hr)	3.28	0.54	1.17
Burn Rate (kg/hr)	2.17	0.57	1.31
Heat Output (BTU/hr)	29,511	8,292	17,857
HHV Efficiency (%)	70.5	76.9	72.1
LHV Efficiency (%)	75.4	82.3	77.1
CO Emissions (g/MJ output)	1.43	5.82	5.62
CO Emissions (g/kg dry fuel)	20.17	89.31	80.92
CO Emissions (g/min)	0.74	0.85	1.76
First Hour Emission Rate (g/hr)	6.47	4.40	4.27
Weighting Factor (%)	20	40	40
Weighted particulate emission average of 3 test runs: 1.34 grams per hour.			
Weighted average HHV efficiency of 3 test runs: 73.7%.			
Average CO emission rate for 3 test runs: 1.19 grams per minute			

Test Run Narrative

Run 1

Run 1 was performed on 1/28/2019 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 48 minutes into the test. Testing was completed when 90% of the test fuel load was consumed. Total test time was 215 minutes, main test fuel load burn time was 167 min. The particulate emissions rate from kindling ignition to test completion was 3.28 g/hr. The burn rate of the test fuel load was 2.17 kg/hr. The main test load portion of the run had an overall HHV efficiency of 70.5%. 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 1/29/2019 as a low fire test run per ASTM E3053. The overall test duration was 849 minutes. The burn rate for the test run was 0.57 kg/hr. The particulate emissions rate for the test run was 0.54 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 test criteria were met.

Run 3

Run 3 was performed on 1/30/2019 as a medium fire test run per ASTM E3053. The overall test duration was 360 minutes. The burn rate for the test run was 1.31 kg/hr, therefore the medium fire category requirements were met, less than the mid-point of the high and low burn rates (1.37 kg/hr). The particulate emissions rate for the test run was 1.17 g/hr. The run had an overall HHV efficiency of 72.1%. The train A front filter was changed at 1 hr. 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	65	69	24.9	20.6	30.11	8.05[1]	18.63	21.6	215[2]
2	70	65	21.9	19.3	29.95	17.57	21.74	21.5	849
3	70	69	20.7	23.7	29.84	17.68	21.08	22.0	360

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

[2]Total test time was 215 min, high fire test load burn duration was 167 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
Run 1	N/A – Cold Start Ignition	Air control set to high fire test setting (Air control fully open), 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 (Air control 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 (Air control open 0.078” from fully closed), blower off for first 20 min, then set to high.

Appliance Description

Model(s): CI2700

Additional Models Discussion: In addition to the CI2700, the manufacturer also offers the model HI500, which is identical in firebox construction and air intake/control. The difference between the two models is that the CI2700 faceplate is made from steel, while the HI500 face plate is cast-iron, giving the appliance a different aesthetic. The difference between the two models is not expected to cause to appliance to exceed to required emissions limit.

Appliance Type: Catalytic Wood-Fired Fireplace Insert Heater

Firebox Volume: 1.83 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 sides of the appliance and channeled up through a single secondary air tube. Dimensions on all these features can be found in Appendix D.

Bypass: The combustor bypass plate is located at the top/rear of the firebox and is operated via a control arm on the front of the stove above the door. When engaged, flue gases are forced to the front of the firebox and up through the combustor. When open, the flue gases exhaust straight up the flue through a 7.5” x 2.5” opening.

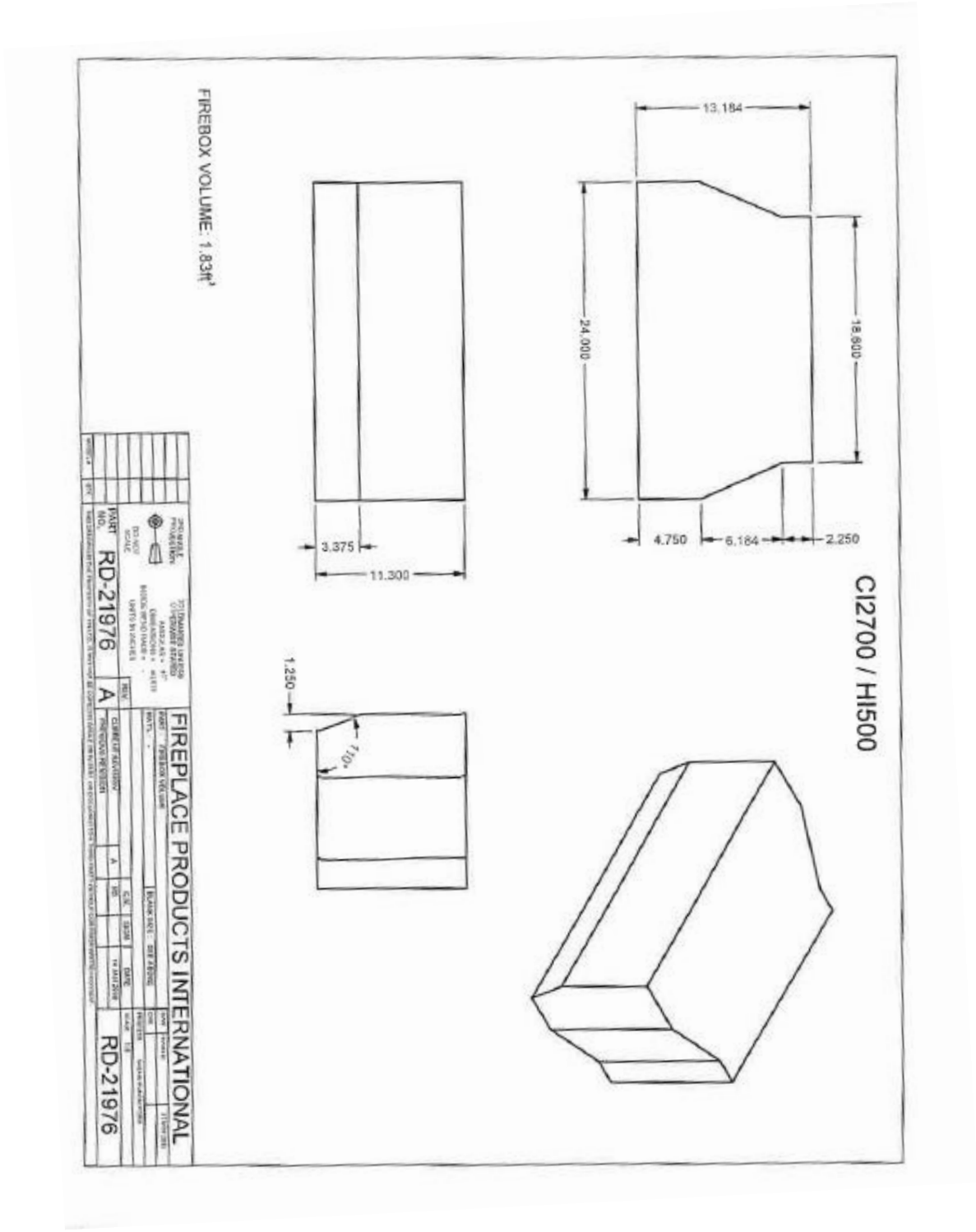
Flue Outlet: 6-inch exhaust outlet located on the top of the appliance.

Catalytic Combustor: 3, 2.28” x 6.030” x 3” 16 cell ceramic substrate Applied Ceramics combustors are located at the top of the firebox, above the secondary tubes. A catalyst temperature probe is provided with the appliance to monitor exit temperatures within 1” of the combustor.

Fan: The CI2700 is optionally offered with a convection fan that attached to the bottom front of the appliance.

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

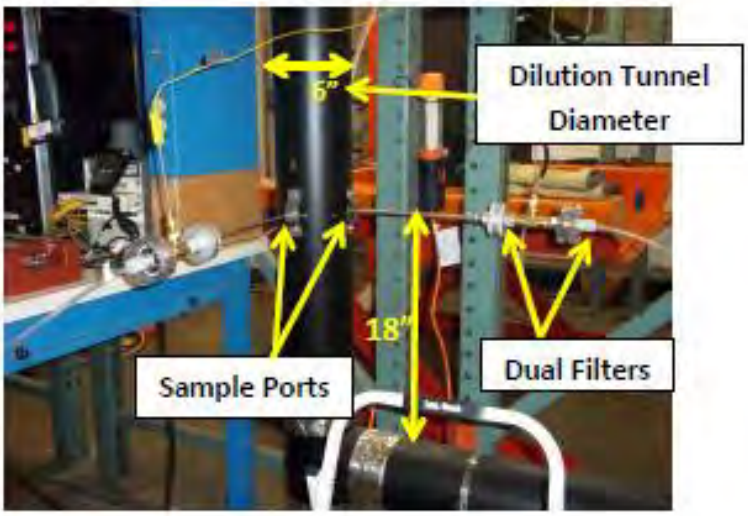
Typical High Fire Load

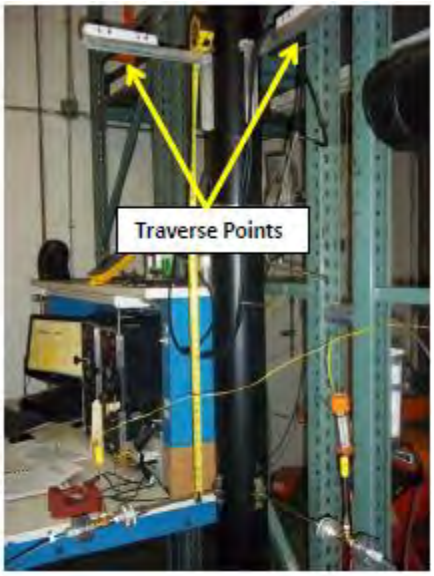
Typical Low Fire Load

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)	CI2700, HI500
Manufacturer	FPI - Regency Fireplaces Products
Address 1	6988 Venture St.
Address 2	Delta, BC V4G 1H4
Appliance Category(s) (Free-standing, Insert, etc.)	Insert
Usable Firebox Volume - ft^3	1.83
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	1/28/2019 - 1/30/2019
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)	CI2700, HI500			
Usable Firebox Volume - ft^3	1.83			
Convection Air Fan (No, Standard, Optional)	Optional			
Test Run #	1	2	3	
Date Tested	1/28/2019	1/29/2019	1/30/2019	
Test Run Category (L, M, H)	H	L	M	
Average Barometric Pressure - in Hg	30.11	29.89	29.84	
Max. Observed Ambient Temp - °F	70	71	72	
Min. Observed Ambient Temp - °F	65	65	66	
Max. Observed Filter Temp - °F	87	87	87	
Test Run Air Settings				
Primary (measured up from minimum)	Maximum	Minimum	0.078"	
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.	17	17	17	
Number of Test Fuel Pieces	5	5	5	
Test Fuel Weight				
Kindling - As Fired lb	3.00	na	na	
Kindling Wt. - As % of Test Fuel Load	16%	na	na	
Kindling Moisture - % DB	10%	na	na	
Kindling - kg DB	1.24	na	na	
SU Fuel - As Fired lb	5.05	na	na	
SU Fuel Wt. - As % of Test Fuel Load	27%	na	na	
SU Fuel Moisture - % DB	21%	na	na	
SU Fuel - kg DB	1.90	na	na	
Test Fuel Load - As Fired lb	18.63	21.74	21.08	
Ave. Test Fuel Load MC % DB	21.6%	21.5%	22.0%	
Test Fuel Load - kg DB	6.95	8.13	7.85	
Test Fuel Loading Density - lb/ft^3	10.18	11.88	11.52	
Residual SU Fuel Wt. - As Fired lb	2.00	na	na	
Residual SU Fuel Wt. - As % of Test Fuel Load	11%	na	na	
Test Run Duration - minutes	215	849	360	
Test Run Duration - h	3.58	14.15	6.00	
Run Duration of High Fire Load Only - minutes	167	na	na	
Run Duration of High Fire Load Only - h	2.78	na	na	
Test Fuel Load Wt. at End of Test - As Fired lb	2	0	0	
Total Total Fuel Burned - kg DB	8.27	8.13	7.85	
% Test Fuel Load Wt. at End of Test	10.7%	0.0%	0.0%	

SECTION 3 – Test Run Results Summary

Model Name(s)/Number(s)	CI2700, HI500			
Usable Firebox Volume - ft^3	1.83			
Convection Air Fan (No, Standard, Optional)	Optional			
Test Run #	1	2	3	
Date Tested	1/28/19	1/29/19	1/30/19	
Test Run Category	H	L	M	
Burn Rate - kg/h DB	2.17	0.57	1.31	
Burn Rate - As % of Low to High Midpoint	na	na	95%	
Burn Duration - h	3.58	14.15	6.00	
Heat Output - Btu/h	29,511	8,292	17,857	
Average Dilution Tunnel Flow Rate - dscfm	180.64	183.25	177.04	
Average Sample Flow Rates - dscfm				
Train 1	0.148	0.149	0.149	
Train 2	0.144	0.148	0.148	
Total PM Emissions - g				
Train 1	11.56	7.56	7.78	
Train 2	11.94	7.61	6.24	
Average	11.750	7.585	7.010	
PM Emission Train Precision - %	-1.6%	-0.3%	11.0%	
PM Emission Train Precision - g/kg	-0.05	-0.01	0.20	
PM Emission Rate - g/h	3.28	0.54	1.17	
Total CO Emissions - g	124	720	635	
CO Emissions Rate - g/h	45	51	106	
Overall Efficiency - CSA B415.1-10				
% HHV Basis	70.5	76.9	72.1	
% LHV Basis	75.4	82.3	77.1	

SECTION 4 - Weighted Average Summary

Model Name(s)/Number(s)	CI2700, HI500		
Usable Firebox Volume - ft_3	1.83		
Convection Air Fan (No, Standard, Optional)	Optional		
Average for Each Test Run Category	L	M	H
Burn Rate - kg/h DB	0.57	1.31	2.17
PM Emission Rate - g/h	0.54	1.17	3.28
CO Emissions Rate - g/h	50.9	105.8	44.6
Overall Efficiency - CSA B415.1-10			
% HHV Basis	76.9	72.1	70.5
% LHV Basis	82.3	77.1	75.4
Heat Output - Btu/h	8300	17900	29500
Category Weighting	40%	40%	20%

ASTM E 3053 Weighted Averages			
PM Emission Rate - g/h	1.3		
CO Emissions Rate - g/h	72		
Overall Efficiency - CSA B415.1-10			
% HHV Basis	74		
% LHV Basis	79		
Heat Output Range - Btu/h	8300	to	29500

Conditioning Data

Client:	FPI	Job #:	18-447
Model:	CI2700	Tracking #:	0020
Date(s):	11/12/2018 - 11/20/2018	Technician:	SJB

		Average:	340.9	69.7	851
Elapsed Time (hrs)	**Scale Reading (lbs)**	**Weight Change (lbs)**	**Flue (°F)**	**Ambient (°F)**	**Catalyst Exit (°F)**
0	2.3	-	347	53	852
1	3.6	1.3	439	55	1143
2	1.8	-1.8	384	55	1008
3	1.6	-0.2	357	55	909
4	0.4	-1.2	284	56	712
5	4.7	4.3	417	60	1005
6	1.9	-2.8	354	61	943
7	2.5	0.6	356	65	921
8	21.7	19.2	439	86	941
9	12.8	-8.9	449	88	1144
10	6.1	-6.7	371	88	929
11	3.2	-2.9	329	89	825
12	2.1	-1.1	257	87	654
13	1.1	-1.0	239	87	610
14	0.2	-0.9	277	85	568
15	21.2	21.0	441	81	963
16	12.5	-8.7	492	80	1276
17	5.1	-7.4	404	84	1040
18	3.3	-1.8	291	83	720
19	2.3	-1.0	255	83	645
20	1.3	-1.0	233	84	581
21	0.5	-0.8	209	83	519
22	21.9	21.4	419	65	853
23	12.7	-9.2	445	65	1138
24	5.4	-7.3	386	67	1042
25	2.9	-2.5	290	67	748
26	1.7	-1.2	246	66	645
27	0.8	-0.9	217	65	587
28	0.0	-0.8	198	65	522
29	21.2	21.2	428	64	941
30	12.4	-8.8	422	64	1124
31	6.7	-5.7	339	65	880
32	3.9	-2.8	305	63	768
33	2.3	-1.6	329	63	629
34	1.5	-0.8	191	62	508
35	1.2	-0.3	393	64	843
36	3.0	1.8	397	65	993
37	3.4	0.4	378	67	988
38	1.2	-2.2	281	66	680
39	14.7	13.5	437	67	1130
40	5.0	-9.7	385	68	1074
41	16.9	11.9	394	67	1095
42	6.8	-10.1	370	67	1095
43	5.0	-1.8	265	70	716
44	4.0	-1.0	344	69	671
45	3.0	-1.0	227	68	630
46	2.1	-0.9	211	68	585
47	1.5	-0.6	190	67	507
48	3.7	2.2	422	63	893
49	4.1	0.4	420	64	1056
50	4.5	0.4	431	66	1136

Signature/Date:

Emission testing instructions CI2700

Volume: 1.83 cu.ft.

Low and Medium

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

Fan on high at 20 min after loading main fuel load

Kindling ~ 3.0lb

Startup fuel ~ 5.0lb

Procedure

Start with a couple pieces of crumbled paper in between and 1.8 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.

At ~0.8lb load the remainder of the kindling fuel and 1 lb of start-up fuel close door soon after loading. Let flame establish for 2-3 minutes then close bypass.

At ~1 lb add 2 lbs of start-up fuel, ensure flame is established prior to closing door (30-60 seconds).

At ~2 lbs load remaining SU fuel, ensure flame is established prior to closing door (30-60 seconds).

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.

Low and Medium test load

Load heavier logs to the bottom/back.

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

Air adjustment

Medium & Low

At 6-7 min set to test setting.

Fan on high at 20 min.

WOOD STOVE TEST DATA PACKET
ASTM E3053/E2515

Run 1 Data Summary

Client: FPI
Model: CI2700
Job #: 18-447
Tracking #: 0020
Test Date: 1/28/2019

2/1/2019

Techician Signature | Date

TEST RESULTS - ASTM E3053 / ASTM E2515

Client: FPI
Model: CI2700
Run #: 1

Job #: 18-447
Tracking #: 0020
Technician: SJB
Date: 1/28/2019

Burn Rate (kg/hr):	2.17

	Ambient Sample	Sample Train A	Sample Train B	1st Hour Filter
Total Sample Volume (ft^3)	25.901	31.851	30.999	8.605
Average Gas Velocity in Dilution Tunnel (ft/sec)	16.65			
Average Gas Flow Rate in Dilution Tunnel (dscf/hr)	10838.3			
Average Gas Meter Temperature (°F)	67.8	76.0	87.8	72.6
Total Sample Volume (dscf)	26.037	31.854	30.206	8.659
Average Tunnel Temperature (°F)	105.2			
Total Time of Test (min)	215			
Total Particulate Catch (mg)	0.1	9.6	9.4	5.2
Particulate Concentration, dry-standard (g/dscf)	0.0000038	0.0003014	0.0003112	0.0006005
Total PM Emissions (g)	0.15	11.56	11.94	6.47
Particulate Emission Rate (g/hr)	0.04	3.22	3.33	6.47
Emissions Factor (g/kg)	-	1.39	1.44	-
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)	11.75
Particulate Emission Rate (g/hr)	3.28
Emissions Factor (g/kg)	1.42
HHV Efficiency (%)	70.5%
LHV Efficiency (%)	75.4%
CO Emissions (g/min)	0.74

Quality Checks	Requirement	Observed	Result
Dual Train Precision	Each train within 7.5% of average emissions (in grams), or emission factors within 0.5 g/kg	See Above	OK
Filter Temps	>80 °F, <90 °F	Min: 80 / Max: 87	OK
Face Velocity	< 30 ft/min	8.4	OK
Leakage Rate	Less than 4% of average sample rate	0 cfm	OK
Ambient Temp	55-90 °F	Min: 65 / Max: 70	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	CHECK 10 MIN. INTERVAL PRO-RATES

B415.1 Efficiency Results

Manufacturer:	FPI
Model:	CI2700
Date:	01/28/19
Run:	1
Control #:	18-447
Test Duration:	167
Output Category:	High

Test Results in Accordance with CSA B415.1-09

	HHV Basis	LHV Basis
Overall Efficiency	70.5%	75.4%
Combustion Efficiency	99.0%	99.0%
Heat Transfer Efficiency	71.2%	76.1%

Output Rate (kJ/h)	31,109	29,511	**(Btu/h)**
Burn Rate (kg/h)	2.21	4.88	**(lb/h)**
Input (kJ/h)	44,158	41,888	**(Btu/h)**

Test Load Weight (dry kg)	6.16	13.57	**dry lb**
MC wet (%)	17.75		
MC dry (%)	21.58		
Particulate (g)	11.75		
CO (g)	124		
Test Duration (h)	2.78		

Emissions	**Particulate**	**CO**
g/MJ Output	0.14	1.43
g/kg Dry Fuel	1.91	20.17
g/h	4.22	44.63
g/min	0.07	0.74
lb/MM Btu Output	0.32	3.33

Air/Fuel Ratio (A/F)	15.21

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

HIGH FIRE FUEL LOAD DATA - ASTM E3053

Client: FPI
Job #: 18-447
Model: CI2700
Tracking #: 0020
Run #: 1
Technician: SJB
Date: 1/28/2019

Nominal Loading Density (lbs/ft^3, wet basis):	10		
Usable Firebox Volume (ft^3):	1.83		
Target Load Weight (lbs):	18.30		
Total Load Weight Range (lbs):	17.40	to	19.20
Core Load Weight Range (lbs):	8.20	to	11.90
Remainder Load Weight Range (lbs):	6.40	to	10.10
Core Load Piece Range (lbs):	2.70	to	4.60
Remainder Load Piece Range (lbs):	1.80	to	10.10
Max Allowable Kindling Weight (lbs):	3.73		
Max Allowable Start-up Fuel Weight (lbs):	5.59		

CORE LOAD DATA

				Fuel Piece Moisture Readings (%DB)					Dry Weight	
Piece #	Length (in)	Weight (lbs)	Within Spec?	1	2	3	Ave.	Within Spec?	lbs	kg
1	17.00	3.22	In Range	22.3	23.7	19.2	21.7	In Range	2.65	1.20
2	17.00	3.88	In Range	20.6	19.4	20.6	20.2	In Range	3.23	1.46
3	17.00	4.45	In Range	21.0	21.4	22.3	21.6	In Range	3.66	1.66
Core Load Wt. (lbs)		11.55	In Range							

REMAINDER LOAD DATA (1 to 3 Pieces)

				Fuel Piece Moisture Readings (%DB)					Dry Weight	
Piece #	Length (in)	Weight (lbs)	Within Spec?	1	2	3	Ave.	Within Spec?	lbs	kg
1	17.00	2.71	In Range	22.3	21.2	21.7	21.7	In Range	2.23	1.01
2	17.00	4.37	In Range	22.0	23.0	22.9	22.6	In Range	3.56	1.62
3			NA				NA	NA	NA	NA
Remainder Load (lbs)		7.08	In Range							

Total Load Weight (lbs):	18.63	In Range	
Core Load % of Total Weight:	62%	In Range	45-65%
Remainder % of Total Weight:	38%	In Range	35-55%
Total Load % of Target Weight:	102%	In Range	95-105%
Actual Fuel Loading Density (lb/ft3):	10.2		
Total Load Average Moisture Conent (%DB):	21.6	In Range	19-25%
Total Load Average Moisture Conent (%WB):	17.7		
Total Test Load Weight (dry basis):	15.32 lbs	6.95 kg	

KINDLING AND START-UP FUEL

		Kindling Moisture Readings (%DB)					Dry Weight	
Kindling Weight (lbs)	Within Spec?	1	2	3	Avg.	Within Spec?	lbs	kg
3.00	In Range	10	10	10	10.0	In Range	2.73	1.24

		Start-up Moisture Readings (%DB)					Dry Weight	
Start-up Fuel Wt. (lb)	Within Spec?	1	2	3	Avg.	Within Spec?	lbs	kg
5.05	In Range	19.3	22.4	20.7	20.8	In Range	4.18	1.90

TEST FUEL LOADING RANGE

Allowable Residual Start-up Fuel Range (lb):	1.9	to	3.7	
Actual Residual Start-up Fuel Weight (lb):		2.0		In Range

TEST END POINT

High Fire Test Run End Point Range:	1.7	to	2.0	lb
Actual Fuel Load Ending Weight (lb):		2.0		In Range

Total Weight All Fuel Added: 26.68 lbs, wet basis
22.23 lbs, dry basis
10.08 kg, dry basis

Total Weight All Fuel Burned (dry basis): 18.23 lbs
8.27 kg

DILUTION TUNNEL & MISC. DATA - ASTM E3053 / E2515

Client:	FPI	Job #:	18-447
Model:	CI2700	Tracking #:	0020
Run #:	1	Technician:	SJB
Test Start Time:	11:17	Date:	1/28/2019
Test Type:	High Fire		

Recording Interval (min):	1
Total Sampling Time (min):	215
High Fire Test Load Time (min):	48

Meter Box γ Factor:	1.004	(A)
Meter Box γ Factor:	1.000	(B)
Meter Box γ Factor:	0.999	(Ambient)

	Pre-Test	Post Test	Avg.
Barometric Pressure (in. Hg)	30.15	30.06	30.11
Relative Humidity (%)	24.9	20.6	
Room Air Velocity (ft/min)	0	0	
Scale Audit (lbs)	10.0	10.0	
Ambient Sample Volume:		25.901	ft^3

Induced Draft Check (in. H_2O):	0
Smoke Capture Check (%):	100%
Date Flue Pipe Last Cleaned:	1/28/2019

Sample Train Post-Test Leak Checks

(A)	0.000	cfm @	-12	in. Hg
(B)	0.000	cfm @	-11	in. Hg
(Ambient)	0.001	cfm @	-14	in. Hg

DILUTION TUNNEL FLOW

Traverse Data

Point	dP (in H_2O)	Temp (°F)
1	0.048	68
2	0.070	68
3	0.066	68
4	0.046	68
5	0.056	68
6	0.068	68
7	0.068	68
8	0.042	68
Center	0.075	68

Static Pressure: -0.200 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}:	16.08	ft/sec
V_{scent}:	18.08	ft/sec
F_p:	0.889	[ratio]
Initial Tunnel Flow:	184.0	scf/min

TEST FUEL PROPERTIES

ASTM 3053-17 - Table A1.1 Fuel Properties by Fuel Species

Select Fuel Type	Species	%C	%H	%O	%Ash	MJ/kg	BTU/lb
	Ash, White	49.70	6.90	43.00	0.30	20.75	8927
	Beech	48.70	5.80	44.70	0.60	18.80	8088
	Birch, Sweet	49.80	6.50	43.40	0.30	20.12	8656
	Birch, Yellow	49.80	6.50	43.40	0.30	20.12	8656
	Doug Fir (Coast, Interior West/North)	48.73	6.87	43.90	0.50	19.81	8522
	Doug Fir (Interioir South)	48.73	6.87	43.90	0.50	19.81	8522
	Elm, Rock	50.40	6.60	42.30	0.70	20.49	8815
	Elm, Soft	50.40	6.60	42.30	0.70	20.49	8815
	Gum, Red	50.88	6.06	41.57	1.28	19.72	8478
	Larch, Western	50.54	6.36	42.40	0.70	17.58	7558
X	Maple, Hard	50.64	6.02	41.74	1.35	19.96	8587
	Maple, Sugar	50.64	6.02	41.74	1.35	19.96	8587
	Oak, Red	49.50	6.62	43.70	0.20	20.20	8690
	Oak, White	50.40	6.59	42.70	0.20	20.50	8819
	Pine, Southern	52.60	7.00	40.10	1.31	22.30	9587
	Pine, Southern Long Leaf	52.60	7.02	40.10	1.30	22.30	9594
	Other						

WOODSTOVE PREBURN DATA

Client:	FPI	Job #:	18-447
Model:	CI2700	Tracking #:	0020
Run #:	1	Technician:	SJB
		Date:	1/28/2019

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

BOX A TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: CI2700
Run #: 1

Job #: 18-447
Tracking #: 0020
Technician: SJB
Date: 1/28/2019

	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		0.075	0.00	71	0.12		1.6		68	66	82	65
1	0.145	0.145	0.075	2.66	71	0.92	96	1.5	-0.1	77	174	83	65
2	0.297	0.152	0.075	2.29	71	0	104	0.6	-0.9	106	377	83	65
3	0.441	0.144	0.075	2.28	71	1.84	97	1.0	0.4	90	307	85	65
4	0.589	0.148	0.075	2.28	71	2.62	99	0.9	-0.1	86	286	85	65
5	0.732	0.143	0.075	2.23	71	0.29	96	0.8	-0.1	83	275	83	65
6	0.880	0.148	0.075	2.25	71	0.14	99	0.7	-0.1	83	276	82	65
7	1.023	0.143	0.075	2.22	71	2.05	96	0.6	-0.1	84	286	82	65
8	1.170	0.147	0.075	2.21	71	2.66	100	2.7	2.1	102	348	83	65
9	1.311	0.141	0.075	2.21	71	1.55	95	2.6	-0.1	94	328	85	65
10	1.459	0.148	0.075	2.20	71	2.39	99	2.5	-0.1	90	295	85	65
11	1.599	0.140	0.075	2.18	71	0.47	94	2.5	0	87	278	84	65
12	1.750	0.151	0.075	2.34	71	2.51	101	2.4	-0.1	86	276	83	65
13	1.896	0.146	0.075	2.34	72	2.67	98	2.3	-0.1	86	282	83	65
14	2.047	0.151	0.075	2.31	71	2.56	101	2.1	-0.2	86	287	83	65
15	2.193	0.146	0.075	2.33	71	2.72	98	2.0	-0.1	86	293	85	65
16	2.344	0.151	0.075	2.30	71	1.59	101	1.9	-0.1	86	299	85	65
17	2.489	0.145	0.075	2.30	72	0.04	97	1.8	-0.1	87	304	84	65
18	2.639	0.150	0.075	2.30	72	1.69	100	1.7	-0.1	87	307	82	65
19	2.784	0.145	0.075	2.27	72	2.75	97	1.7	0	87	309	82	65
20	2.934	0.150	0.075	2.27	72	2.74	100	1.5	-0.2	88	316	83	65
21	3.078	0.144	0.075	2.25	72	2.58	97	1.4	-0.1	89	324	85	65
22	3.227	0.149	0.075	2.24	72	2.84	100	1.3	-0.1	89	332	85	65
23	3.371	0.144	0.075	2.22	72	1.09	97	1.2	-0.1	90	339	84	65
24	3.518	0.147	0.075	2.21	72	0.31	99	1.1	-0.1	90	342	83	65
25	3.661	0.143	0.075	2.20	72	1.32	96	1.0	-0.1	91	343	83	65
26	3.810	0.149	0.075	2.29	73	3.03	100	1.0	0	90	346	83	65
27	3.950	0.140	0.075	1.91	72	1.13	95	2.7	1.7	107	417	85	65
28	4.083	0.133	0.075	1.52	72	3.73	90	2.7	0	101	384	85	65
29	4.195	0.112	0.075	1.08	73	5.68	76	2.5	-0.2	98	374	83	65
30	4.291	0.096	0.075	0.82	73	4.93	65	2.4	-0.1	97	374	83	65
31	4.382	0.091	0.075	0.80	72	6.32	61	2.1	-0.3	97	373	83	65
32	4.477	0.095	0.075	2.69	73	0	64	2.1	0	97	375	82	66

BOX A TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: CI2700
Run #: 1

Job #: 18-447
Tracking #: 0020
Technician: SJB
Date: 1/28/2019

	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	4.634	0.157	0.075	2.26	73	2.65	106	2.0	-0.1	97	377	83	66
34	4.785	0.151	0.075	2.28	73	1.18	102	1.9	-0.1	97	380	85	65
35	4.930	0.145	0.075	2.26	73	0	98	1.9	0	96	388	86	66
36	5.079	0.149	0.075	2.22	73	2.68	101	3.6	1.7	108	440	85	66
37	5.222	0.143	0.075	2.20	73	2.37	97	3.4	-0.2	106	445	83	66
38	5.371	0.149	0.075	2.20	73	0.16	101	3.2	-0.2	106	459	83	66
39	5.514	0.143	0.075	2.21	73	1.15	97	3.1	-0.1	106	462	84	66
40	5.663	0.149	0.075	2.21	73	0.23	101	2.9	-0.2	106	458	84	66
41	5.806	0.143	0.075	2.21	73	0.07	97	2.8	-0.1	106	450	86	66
42	5.954	0.148	0.075	2.19	74	1.48	100	2.9	0.1	106	445	85	66
43	6.097	0.143	0.075	2.18	74	0	97	2.6	-0.3	106	446	83	66
44	6.246	0.149	0.075	2.18	73	2.03	101	2.4	-0.2	107	451	83	66
45	6.388	0.142	0.075	2.19	74	2.26	96	2.2	-0.2	107	461	83	67
46	6.537	0.149	0.075	2.19	74	1.37	101	2.0	-0.2	108	474	85	66
47	6.679	0.142	0.075	2.17	74	2.72	97	1.9	-0.1	109	486	85	66
48	6.827	0.148	0.075	2.15	74	1.78	103	18.5	16.6	131	602	85	67
49	6.969	0.142	0.075	2.15	74	0	98	18.1	-0.4	122	532	83	67
50	7.117	0.148	0.075	2.15	74	2.35	101	18.1	0	117	507	83	67
51	7.262	0.145	0.075	2.27	74	0.18	99	18.1	0	115	501	84	66
52	7.415	0.153	0.075	2.29	74	0.49	104	17.9	-0.2	114	499	85	66
53	7.560	0.145	0.075	2.27	74	2.79	99	17.8	-0.1	113	494	85	67
54	7.712	0.152	0.075	2.27	74	2.48	104	17.7	-0.1	113	492	84	66
55	7.859	0.147	0.075	2.27	74	0.12	100	17.5	-0.2	114	491	83	66
56	8.011	0.152	0.075	2.25	75	2.61	104	17.4	-0.1	113	492	83	66
57	8.157	0.146	0.075	2.26	74	0.68	100	17.3	-0.1	113	496	84	66
58	8.308	0.151	0.075	2.26	75	2.68	103	17.2	-0.1	113	495	85	67
59	8.454	0.146	0.075	2.24	75	0.1	100	17.0	-0.2	114	495	85	66
60	8.605	0.151	0.075	2.26	74	2.49	103	16.9	-0.1	114	494	84	67
61	8.762	0.157	0.075	2.40	75	2.3	107	16.7	-0.2	114	496	80	67
62	8.915	0.153	0.075	2.42	74	1.25	104	16.6	-0.1	114	498	83	67
63	9.071	0.156	0.075	2.40	75	0	106	16.6	0	115	502	84	66
64	9.220	0.149	0.075	2.38	74	0	102	16.3	-0.3	115	506	86	66
65	9.377	0.157	0.075	2.40	75	0	107	16.2	-0.1	116	509	86	67

BOX A TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: CI2700
Run #: 1

Job #: 18-447
Tracking #: 0020
Technician: SJB
Date: 1/28/2019

	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	9.527	0.150	0.075	2.40	75	0	103	16.1	-0.1	117	513	84	67
67	9.682	0.155	0.075	2.39	75	0	106	15.9	-0.2	117	515	83	67
68	9.833	0.151	0.075	2.36	75	0.79	103	15.7	-0.2	118	517	83	66
69	9.986	0.153	0.075	2.38	75	0.56	104	15.5	-0.2	116	509	84	67
70	10.140	0.154	0.075	2.36	75	1.61	105	15.4	-0.1	115	505	87	67
71	10.290	0.150	0.075	2.36	75	2.73	102	15.2	-0.2	114	505	85	67
72	10.444	0.154	0.075	2.36	75	0.02	105	15.1	-0.1	114	502	83	67
73	10.592	0.148	0.075	2.32	75	2.77	101	14.9	-0.2	114	504	83	67
74	10.748	0.156	0.075	2.34	75	0	106	14.7	-0.2	114	506	84	67
75	10.897	0.149	0.075	2.32	76	0.51	101	14.5	-0.2	115	509	85	67
76	11.049	0.152	0.075	2.33	75	2.82	104	14.4	-0.1	115	510	87	67
77	11.199	0.150	0.075	2.33	76	0.11	102	14.2	-0.2	115	510	84	67
78	11.350	0.151	0.075	2.30	76	0.87	103	14.0	-0.2	115	509	83	67
79	11.503	0.153	0.075	2.31	76	2.12	104	13.9	-0.1	115	507	83	67
80	11.652	0.149	0.075	2.31	76	0.01	101	13.7	-0.2	115	505	84	68
81	11.805	0.153	0.075	2.31	75	0	104	13.5	-0.2	115	505	86	67
82	11.953	0.148	0.075	2.30	76	0.03	101	13.4	-0.1	115	506	86	67
83	12.106	0.153	0.075	2.30	76	0.32	104	13.2	-0.2	116	504	84	68
84	12.253	0.147	0.075	2.30	76	2.53	100	13.1	-0.1	116	507	83	67
85	12.407	0.154	0.075	2.30	76	1.47	105	12.9	-0.2	115	504	83	67
86	12.555	0.148	0.075	2.29	76	0.07	101	12.7	-0.2	116	502	84	68
87	12.708	0.153	0.075	2.29	76	2.71	104	12.6	-0.1	116	502	86	67
88	12.856	0.148	0.075	2.29	76	0.37	101	12.3	-0.3	116	505	85	68
89	13.007	0.151	0.075	2.27	76	0.59	103	12.2	-0.1	116	504	84	68
90	13.156	0.149	0.075	2.29	76	0.43	102	12.0	-0.2	116	506	83	68
91	13.306	0.150	0.075	2.27	76	2.57	102	11.8	-0.2	116	505	84	68
92	13.458	0.152	0.075	2.28	76	1.62	103	11.7	-0.1	115	504	85	68
93	13.607	0.149	0.075	2.28	76	1.7	101	11.5	-0.2	115	503	86	68
94	13.759	0.152	0.075	2.27	76	0.01	103	11.5	0	115	500	84	68
95	13.907	0.148	0.075	2.30	76	2.76	101	11.2	-0.3	115	498	83	68
96	14.059	0.152	0.075	2.27	76	0	103	11.1	-0.1	114	495	83	68
97	14.206	0.147	0.075	2.28	76	2.46	100	11.0	-0.1	114	490	84	68
98	14.359	0.153	0.075	2.27	76	0.05	104	10.8	-0.2	113	487	86	68

BOX A TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: CI2700
Run #: 1

Job #: 18-447
Tracking #: 0020
Technician: SJB
Date: 1/28/2019

	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	14.507	0.148	0.075	2.27	76	0.01	101	10.7	-0.1	113	487	86	68
100	14.660	0.153	0.075	2.28	76	0	104	10.7	0	113	484	84	68
101	14.808	0.148	0.075	2.28	77	2.05	100	10.4	-0.3	113	482	83	68
102	14.959	0.151	0.075	2.28	77	2.55	102	10.3	-0.1	113	480	83	68
103	15.108	0.149	0.075	2.26	77	2.8	101	10.2	-0.1	113	479	85	68
104	15.258	0.150	0.075	2.28	77	0.13	102	10.1	-0.1	112	476	87	68
105	15.408	0.150	0.075	2.26	77	2.75	102	10.0	-0.1	112	475	85	68
106	15.559	0.151	0.075	2.27	77	0.6	102	9.9	-0.1	112	472	83	68
107	15.710	0.151	0.075	2.27	77	0.16	102	9.8	-0.1	112	470	83	68
108	15.859	0.149	0.075	2.28	77	0.1	101	9.6	-0.2	111	471	84	68
109	16.010	0.151	0.075	2.27	77	2.64	102	9.5	-0.1	111	469	86	68
110	16.157	0.147	0.075	2.27	77	2.7	100	9.3	-0.2	111	469	86	68
111	16.310	0.153	0.075	2.26	77	2.19	104	9.3	0	111	468	84	69
112	16.457	0.147	0.075	2.25	77	0.19	100	9.2	-0.1	111	467	83	69
113	16.611	0.154	0.075	2.26	77	1.03	104	9.0	-0.2	111	467	84	69
114	16.758	0.147	0.075	2.27	77	0.16	100	9.0	0	111	466	85	68
115	16.911	0.153	0.075	2.25	77	0.27	104	8.6	-0.4	111	467	86	69
116	17.058	0.147	0.075	2.27	77	1.42	100	8.6	0	111	465	84	69
117	17.209	0.151	0.075	2.25	77	0.25	102	8.6	0	111	466	83	69
118	17.358	0.149	0.075	2.25	77	0	101	8.4	-0.2	111	467	83	69
119	17.508	0.150	0.075	2.27	77	0.27	101	8.2	-0.2	110	467	84	69
120	17.659	0.151	0.075	2.26	77	2.22	102	8.1	-0.1	110	467	86	69
121	17.808	0.149	0.075	2.24	77	1.05	101	8.0	-0.1	110	464	85	69
122	17.959	0.151	0.075	2.25	77	0.25	102	7.9	-0.1	110	462	83	68
123	18.108	0.149	0.075	2.25	77	1.77	101	7.7	-0.2	109	461	83	68
124	18.259	0.151	0.075	2.27	77	2.43	102	7.7	0	110	460	84	68
125	18.406	0.147	0.075	2.28	77	2.87	99	7.6	-0.1	110	458	86	69
126	18.558	0.152	0.075	2.26	77	2.41	103	7.5	-0.1	110	458	86	69
127	18.705	0.147	0.075	2.25	77	2.05	99	7.4	-0.1	110	456	84	69
128	18.858	0.153	0.075	2.24	77	0.1	104	7.4	0	110	454	83	70
129	19.006	0.148	0.075	2.26	77	2.75	100	7.2	-0.2	110	452	84	69
130	19.158	0.152	0.075	2.24	77	1.13	103	7.1	-0.1	109	451	85	69
131	19.305	0.147	0.075	2.26	77	2.76	99	7.0	-0.1	109	449	86	69

BOX A TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: CI2700
Run #: 1

Job #: 18-447
Tracking #: 0020
Technician: SJB
Date: 1/28/2019

	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	19.456	0.151	0.075	2.26	77	0.04	102	6.9	-0.1	109	448	85	69
133	19.605	0.149	0.075	2.27	77	2.08	101	6.8	-0.1	108	445	83	69
134	19.755	0.150	0.075	2.26	77	2.63	101	6.8	0	108	441	83	69
135	19.905	0.150	0.075	2.26	77	0.23	101	6.7	-0.1	107	437	84	69
136	20.055	0.150	0.075	2.24	77	0.72	101	6.6	-0.1	107	434	85	69
137	20.206	0.151	0.075	2.24	78	2.69	102	6.5	-0.1	107	432	87	69
138	20.354	0.148	0.075	2.27	77	1.82	100	6.5	0	107	430	85	69
139	20.506	0.152	0.075	2.26	78	2.86	102	6.4	-0.1	106	427	83	70
140	20.652	0.146	0.075	2.23	78	1.19	98	6.3	-0.1	106	425	83	69
141	20.805	0.153	0.075	2.25	78	1.11	103	6.3	0	105	423	84	69
142	20.951	0.146	0.075	2.24	78	1.34	98	6.2	-0.1	105	420	85	69
143	21.105	0.154	0.075	2.26	78	0.14	103	6.1	-0.1	104	416	86	69
144	21.252	0.147	0.075	2.25	78	2.82	99	6.1	0	104	416	84	70
145	21.405	0.153	0.075	2.25	78	2.02	103	6.0	-0.1	104	412	83	70
146	21.552	0.147	0.075	2.25	78	2.67	99	5.9	-0.1	104	410	83	69
147	21.703	0.151	0.075	2.24	78	1	101	5.9	0	104	411	84	69
148	21.852	0.149	0.075	2.25	78	0.14	100	5.8	-0.1	103	409	86	69
149	22.002	0.150	0.075	2.25	78	0.21	101	5.7	-0.1	103	407	86	70
150	22.152	0.150	0.075	2.24	78	0.08	101	5.8	0.1	103	406	84	69
151	22.301	0.149	0.075	2.24	78	2.76	100	5.6	-0.2	103	405	83	69
152	22.453	0.152	0.075	2.26	78	0.01	102	5.5	-0.1	102	403	84	70
153	22.601	0.148	0.075	2.24	78	0.16	99	5.5	0	103	404	85	69
154	22.753	0.152	0.075	2.23	78	2.66	102	5.4	-0.1	103	405	87	69
155	22.899	0.146	0.075	2.25	78	2.83	98	5.4	0	102	405	85	70
156	23.051	0.152	0.075	2.25	78	1.24	102	5.3	-0.1	103	406	83	70
157	23.197	0.146	0.075	2.26	78	1.19	98	5.3	0	103	406	83	69
158	23.351	0.154	0.075	2.24	78	0.04	103	5.1	-0.2	102	406	84	69
159	23.498	0.147	0.075	2.23	78	2.31	99	5.1	0	103	407	85	70
160	23.651	0.153	0.075	2.23	78	0.66	103	5.0	-0.1	102	406	86	69
161	23.798	0.147	0.075	2.24	78	2.99	99	5.0	0	102	405	85	69
162	23.950	0.152	0.075	2.25	78	2.89	102	4.9	-0.1	102	404	83	70
163	24.097	0.147	0.075	2.26	78	2.43	99	4.8	-0.1	102	402	83	69
164	24.248	0.151	0.075	2.25	78	1.22	101	4.8	0	102	401	84	69

BOX A TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: CI2700
Run #: 1

Job #: 18-447
Tracking #: 0020
Technician: SJB
Date: 1/28/2019

	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	24.397	0.149	0.075	2.24	78	1.78	100	4.7	-0.1	102	401	85	69
166	24.547	0.150	0.075	2.24	78	0.38	101	4.7	0	102	402	86	69
167	24.698	0.151	0.075	2.22	78	0.13	101	4.6	-0.1	102	403	85	69
168	24.846	0.148	0.075	2.24	78	0.06	99	4.5	-0.1	102	404	83	69
169	24.998	0.152	0.075	2.23	78	1.19	102	4.5	0	102	403	83	70
170	25.145	0.147	0.075	2.24	78	2.54	99	4.4	-0.1	102	403	84	69
171	25.296	0.151	0.075	2.23	78	0.22	101	4.4	0	102	403	86	69
172	25.443	0.147	0.075	2.24	78	1.9	99	4.3	-0.1	102	404	86	69
173	25.595	0.152	0.075	2.24	78	1.09	102	4.3	0	102	404	84	69
174	25.743	0.148	0.075	2.24	78	0.44	99	4.2	-0.1	102	405	83	69
175	25.896	0.153	0.075	2.22	79	2.93	102	4.1	-0.1	102	407	84	69
176	26.043	0.147	0.075	2.24	78	0.26	99	4.1	0	102	409	85	70
177	26.195	0.152	0.075	2.23	78	0.58	102	4.0	-0.1	102	409	87	70
178	26.342	0.147	0.075	2.22	78	2.83	99	4.0	0	102	411	85	69
179	26.493	0.151	0.075	2.23	79	2.42	101	3.9	-0.1	103	409	83	70
180	26.641	0.148	0.075	2.23	78	0.08	99	3.9	0	102	408	83	69
181	26.791	0.150	0.075	2.24	79	2.05	100	3.8	-0.1	102	406	84	69
182	26.941	0.150	0.075	2.23	79	1.71	100	3.7	-0.1	102	403	86	69
183	27.091	0.150	0.075	2.23	79	1.71	100	3.8	0.1	102	401	86	69
184	27.241	0.150	0.075	2.24	79	0.99	100	3.6	-0.2	102	402	85	69
185	27.390	0.149	0.075	2.21	79	1.94	100	3.6	0	102	402	83	69
186	27.541	0.151	0.075	2.24	78	2.9	101	3.5	-0.1	102	407	84	70
187	27.687	0.146	0.075	2.24	79	2.01	98	3.5	0	102	408	84	69
188	27.840	0.153	0.075	2.24	79	2.77	102	3.4	-0.1	102	405	86	69
189	27.986	0.146	0.075	2.23	79	1.84	98	3.3	-0.1	102	405	86	70
190	28.138	0.152	0.075	2.23	79	1.28	102	3.3	0	102	404	84	69
191	28.285	0.147	0.075	2.23	79	0.12	98	3.2	-0.1	102	404	83	69
192	28.438	0.153	0.075	2.24	79	2.8	102	3.2	0	102	404	84	69
193	28.585	0.147	0.075	2.22	79	2.18	98	3.1	-0.1	102	402	84	69
194	28.737	0.152	0.075	2.23	79	0.32	102	3.2	0.1	102	401	86	70
195	28.884	0.147	0.075	2.23	79	2.58	98	3.0	-0.2	101	400	86	69
196	29.034	0.150	0.075	2.23	79	0.12	100	3.0	0	102	400	85	69
197	29.182	0.148	0.075	2.22	79	0.03	99	2.9	-0.1	102	398	83	69

BOX A TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: CI2700
Run #: 1

Job #: 18-447
Tracking #: 0020
Technician: SJB
Date: 1/28/2019

	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	29.332	0.150	0.075	2.21	79	0.42	100	2.9	0	102	398	84	69
199	29.481	0.149	0.075	2.23	79	2.85	100	2.8	-0.1	101	400	85	69
200	29.631	0.150	0.075	2.21	79	2.9	100	2.8	0	101	402	86	70
201	29.781	0.150	0.075	2.22	79	2.49	100	2.7	-0.1	101	400	85	70
202	29.929	0.148	0.075	2.22	79	0.37	99	2.8	0.1	102	399	83	69
203	30.080	0.151	0.075	2.22	79	1.03	101	2.6	-0.2	102	400	83	69
204	30.227	0.147	0.075	2.22	79	0.46	98	2.6	0	101	402	84	70
205	30.377	0.150	0.075	2.21	79	0.14	100	2.5	-0.1	101	402	85	69
206	30.523	0.146	0.075	2.20	79	2.53	98	2.5	0	102	403	87	69
207	30.675	0.152	0.075	2.20	79	2.84	102	2.4	-0.1	102	404	86	69
208	30.820	0.145	0.075	2.20	79	0.91	97	2.4	0	102	405	84	69
209	30.971	0.151	0.075	2.17	79	0.13	101	2.3	-0.1	102	405	83	70
210	31.116	0.145	0.075	2.17	79	0.31	97	2.4	0.1	102	405	84	69
211	31.268	0.152	0.075	2.17	79	0.27	102	2.3	-0.1	102	407	85	69
212	31.412	0.144	0.075	2.15	79	2.87	96	2.2	-0.1	102	406	86	70
213	31.562	0.150	0.075	2.12	79	2.98	100	2.2	0	103	409	84	69
214	31.704	0.142	0.075	2.09	79	2.55	95	2.1	-0.1	103	410	83	69
215	31.851	0.147	0.075	2.05	79	2.99	98	2.0	-0.1	103	413	83	69
Avg/Tot	31.851	0.148	0.075	2.22	76	1.45	100			105	428	84	67.8

BOX B TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: CI2700
Run #: 1

Job #: 18-447
Tracking #: 0020
Technician: SJB
Date: 1/28/2019

	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	69	1		82	0.000	0.17	0.00
1	0.149	0.149	2.54	68	2.79	105	82	-0.070	0.06	0.00
2	0.297	0.148	2.40	68	0.85	107	83	-0.070	4.84	0.16
3	0.437	0.140	2.39	68	2.63	99	83	-0.050	8.82	0.92
4	0.581	0.144	2.39	69	2.9	102	84	-0.070	7.62	0.24
5	0.720	0.139	2.39	69	2.84	98	84	-0.070	6.72	0.12
6	0.864	0.144	2.37	69	2.54	101	85	-0.050	5.84	0.09
7	1.003	0.139	2.36	69	0.84	98	85	-0.050	6.03	0.08
8	1.146	0.143	2.37	69	0.73	102	85	-0.080	6.60	0.13
9	1.283	0.137	2.35	69	2.23	97	84	-0.050	5.40	0.39
10	1.427	0.144	2.34	69	0.76	102	84	-0.040	7.48	0.31
11	1.563	0.136	2.33	70	1.76	96	84	-0.040	7.00	0.07
12	1.710	0.147	2.33	70	1.55	104	84	-0.050	6.59	0.06
13	1.852	0.142	2.34	70	1.92	100	84	-0.040	6.48	0.02
14	1.999	0.147	2.34	71	2.4	103	85	-0.050	6.95	0.04
15	2.141	0.142	2.33	71	1.17	100	85	-0.050	6.80	0.06
16	2.288	0.147	2.31	71	0.84	103	86	-0.070	6.75	0.04
17	2.429	0.141	2.29	72	2.88	99	86	-0.050	6.87	0.00
18	2.575	0.146	2.29	72	3	103	85	-0.050	7.10	0.00
19	2.716	0.141	2.30	72	2.04	99	84	-0.070	7.40	0.06
20	2.862	0.146	2.28	73	1.13	102	84	-0.050	7.17	0.01
21	3.002	0.140	2.27	73	3.07	98	85	-0.060	7.74	0.05
22	3.147	0.145	2.27	73	3.02	102	85	-0.060	7.77	0.04
23	3.287	0.140	2.25	74	2.07	98	85	-0.070	7.89	0.04
24	3.430	0.143	2.23	74	1.2	100	86	-0.060	7.26	0.03
25	3.569	0.139	2.21	74	1.33	98	85	-0.060	7.00	0.02
26	3.714	0.145	2.20	75	2.42	102	85	-0.060	7.14	0.02
27	3.850	0.136	1.99	75	3.54	97	84	-0.070	6.49	0.02
28	3.979	0.129	1.76	75	2.23	91	85	-0.070	7.13	0.06
29	4.087	0.108	1.38	76	4.51	76	85	-0.070	6.25	0.01
30	4.179	0.092	0.96	76	5.46	65	85	-0.060	6.08	0.02
31	4.266	0.087	0.86	76	6.49	61	85	-0.070	6.22	0.03

BOX B TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: CI2700
Run #: 1

Job #: 18-447
Tracking #: 0020
Technician: SJB
Date: 1/28/2019

	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	4.357	0.091	0.88	77	7.12	64	86	-0.070	7.11	0.05
33	4.510	0.153	0.75	77	6.47	107	86	-0.070	7.79	0.03
34	4.657	0.147	2.83	77	0.73	103	83	-0.070	8.21	0.00
35	4.798	0.141	2.21	78	0.87	99	83	-0.070	8.29	0.04
36	4.943	0.145	2.19	78	2.99	103	84	-0.080	8.55	0.06
37	5.082	0.139	2.18	78	2.94	98	84	-0.080	10.81	0.33
38	5.227	0.145	2.18	79	2.41	102	85	-0.070	12.71	0.40
39	5.366	0.139	2.17	79	3.07	98	85	-0.080	9.29	0.06
40	5.511	0.145	2.18	79	1.19	102	86	-0.070	8.42	0.04
41	5.650	0.139	2.17	80	2.34	98	86	-0.070	8.54	0.04
42	5.794	0.144	2.16	80	3.1	101	85	-0.070	8.03	0.02
43	5.933	0.139	2.16	80	1.16	98	84	-0.080	8.58	0.06
44	6.078	0.145	2.15	81	0.54	102	84	-0.070	10.36	0.04
45	6.216	0.138	2.16	81	0.7	97	85	-0.080	10.97	0.10
46	6.361	0.145	2.15	81	0.69	102	85	-0.080	11.98	0.48
47	6.499	0.138	2.15	81	0.65	97	86	-0.080	12.43	1.06
48	6.643	0.144	2.13	82	3.04	103	86	-0.100	12.07	0.59
49	6.781	0.138	2.12	82	0.67	98	86	-0.080	7.82	0.11
50	6.925	0.144	2.13	82	1.46	102	85	-0.070	7.76	0.15
51	7.066	0.141	2.23	82	1.49	100	85	-0.080	6.45	0.09
52	7.215	0.149	2.24	83	2.17	105	85	-0.070	6.02	0.10
53	7.356	0.141	2.24	83	1.56	99	85	-0.080	5.68	0.12
54	7.504	0.148	2.23	83	1.39	104	86	-0.080	5.42	0.12
55	7.647	0.143	2.23	83	0.72	101	86	-0.080	5.74	0.10
56	7.795	0.148	2.23	83	2.53	104	86	-0.070	6.04	0.14
57	7.937	0.142	2.21	84	1.24	100	86	-0.080	6.46	0.12
58	8.084	0.147	2.21	84	2.78	103	85	-0.090	6.86	0.11
59	8.226	0.142	2.21	85	0.9	100	85	-0.080	7.10	0.13
60	8.373	0.147	2.22	85	3.18	103	85	-0.100	7.22	0.12
61	8.526	0.153	2.20	85	3.27	107	85	-0.090	7.38	0.10
62	8.675	0.149	2.20	85	3.05	105	86	-0.080	7.55	0.11
63	8.827	0.152	2.20	85	1.39	107	86	-0.080	7.70	0.08

BOX B TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: CI2700
Run #: 1

Job #: 18-447
Tracking #: 0020
Technician: SJB
Date: 1/28/2019

	Particulate Sampling Data							Flue Gas Data		
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Filter (°F)	Flue Draft (in H_2O)	CO_2 (%)	CO (%)
64	8.972	0.145	2.20	85	0.98	102	86	-0.090	7.69	0.11
65	9.125	0.153	2.21	86	1.53	107	86	-0.090	7.85	0.09
66	9.271	0.146	2.20	86	3.2	103	85	-0.080	8.17	0.09
67	9.422	0.151	2.18	86	1.74	106	85	-0.080	8.17	0.16
68	9.569	0.147	2.20	86	2.87	103	85	-0.090	8.40	0.18
69	9.718	0.149	2.19	86	1.62	105	85	-0.080	8.40	0.27
70	9.868	0.150	2.18	87	1.76	105	86	-0.080	8.54	0.36
71	10.014	0.146	2.19	87	1.62	102	86	-0.070	8.47	0.30
72	10.164	0.150	2.18	87	1.44	105	86	-0.080	8.40	0.31
73	10.308	0.144	2.18	87	3.18	101	86	-0.100	8.55	0.50
74	10.460	0.152	2.18	87	2.6	106	85	-0.080	8.87	0.55
75	10.605	0.145	2.17	87	1.82	102	85	-0.090	9.07	0.59
76	10.753	0.148	2.18	87	2.87	104	85	-0.080	9.62	0.55
77	10.899	0.146	2.18	87	0.82	102	85	-0.080	9.60	0.67
78	11.046	0.147	2.18	88	3.27	103	86	-0.080	9.47	0.71
79	11.195	0.149	2.19	88	1.14	104	86	-0.090	9.50	0.50
80	11.340	0.145	2.18	88	2.97	101	86	-0.090	9.53	0.47
81	11.489	0.149	2.18	88	2.64	104	86	-0.080	9.76	0.43
82	11.633	0.144	2.17	88	0.88	101	86	-0.090	9.61	0.48
83	11.782	0.149	2.16	88	0.8	104	85	-0.090	9.58	0.45
84	11.925	0.143	2.15	89	3.21	100	85	-0.080	9.46	0.45
85	12.075	0.150	2.15	89	2.24	105	85	-0.090	9.59	0.42
86	12.219	0.144	2.16	89	0.87	101	86	-0.080	10.05	0.32
87	12.368	0.149	2.17	89	3.27	104	86	-0.080	10.41	0.34
88	12.512	0.144	2.17	89	0.97	101	86	-0.080	10.78	0.49
89	12.659	0.147	2.17	89	2.23	103	86	-0.080	11.02	0.66
90	12.804	0.145	2.15	89	2.56	101	86	-0.080	11.34	0.69
91	12.950	0.146	2.17	89	3.27	102	85	-0.080	10.97	0.47
92	13.098	0.148	2.17	90	0.96	103	85	-0.070	10.52	0.23
93	13.243	0.145	2.16	90	0.81	101	85	-0.080	10.18	0.24
94	13.391	0.148	2.17	90	2.9	103	85	-0.080	10.09	0.26
95	13.535	0.144	2.17	90	0.82	100	86	-0.080	9.69	0.17

BOX B TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: CI2700
Run #: 1

Job #: 18-447
Tracking #: 0020
Technician: SJB
Date: 1/28/2019

	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	13.683	0.148	2.17	90	0.86	103	86	-0.090	9.43	0.20
97	13.826	0.143	2.16	90	1.26	100	86	-0.080	9.42	0.20
98	13.975	0.149	2.15	90	2.44	104	86	-0.080	9.36	0.22
99	14.119	0.144	2.16	90	1.02	100	85	-0.070	9.19	0.20
100	14.268	0.149	2.17	91	1.92	103	85	-0.080	9.07	0.13
101	14.412	0.144	2.15	90	1.05	100	85	-0.080	8.98	0.12
102	14.559	0.147	2.16	91	3.34	102	86	-0.080	8.73	0.06
103	14.704	0.145	2.15	91	1.35	101	86	-0.070	8.78	0.04
104	14.850	0.146	2.16	91	2.3	101	86	-0.080	8.72	0.00
105	14.996	0.146	2.17	91	2.22	101	86	-0.070	8.68	0.03
106	15.143	0.147	2.15	91	0.92	102	85	-0.080	8.73	0.03
107	15.290	0.147	2.16	91	3.35	102	85	-0.090	8.90	0.03
108	15.435	0.145	2.15	91	2.18	101	85	-0.080	9.01	0.04
109	15.582	0.147	2.16	91	3.25	102	85	-0.080	9.00	0.04
110	15.725	0.143	2.16	91	2.2	99	86	-0.080	9.01	0.05
111	15.874	0.149	2.14	91	0.97	103	86	-0.070	9.11	0.03
112	16.017	0.143	2.15	92	0.99	99	86	-0.080	8.98	0.05
113	16.167	0.150	2.15	92	2.95	104	86	-0.070	9.09	0.06
114	16.310	0.143	2.16	92	3.23	99	85	-0.070	9.25	0.08
115	16.459	0.149	2.15	92	1.35	103	85	-0.080	9.53	0.11
116	16.602	0.143	2.16	92	2.92	99	85	-0.080	9.67	0.16
117	16.749	0.147	2.14	92	2.6	102	86	-0.080	9.68	0.17
118	16.894	0.145	2.15	92	0.89	100	86	-0.080	10.02	0.19
119	17.040	0.146	2.15	92	1.75	101	86	-0.070	10.12	0.13
120	17.187	0.147	2.15	92	2.85	102	86	-0.070	9.24	0.16
121	17.332	0.145	2.16	92	1.99	100	86	-0.080	9.06	0.11
122	17.479	0.147	2.14	92	1.37	102	85	-0.080	8.91	0.09
123	17.624	0.145	2.16	92	0.82	100	85	-0.070	9.05	0.16
124	17.771	0.147	2.16	92	3.32	102	86	-0.080	9.14	0.10
125	17.914	0.143	2.14	93	1.46	99	86	-0.080	9.22	0.09
126	18.062	0.148	2.17	93	0.89	102	86	-0.080	9.22	0.10
127	18.205	0.143	2.13	93	1.18	99	86	-0.070	9.09	0.10

BOX B TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: CI2700
Run #: 1

Job #: 18-447
Tracking #: 0020
Technician: SJB
Date: 1/28/2019

	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	18.354	0.149	2.15	93	3.2	103	85	-0.080	9.23	0.10
129	18.498	0.144	2.15	93	3.31	99	85	-0.080	9.18	0.12
130	18.646	0.148	2.15	93	2.16	102	85	-0.080	8.81	0.08
131	18.789	0.143	2.14	93	3.41	99	86	-0.080	8.51	0.08
132	18.936	0.147	2.16	93	3.24	101	86	-0.080	8.55	0.00
133	19.081	0.145	2.14	93	3.15	100	86	-0.070	8.52	0.00
134	19.227	0.146	2.14	93	3.22	101	86	-0.090	8.45	0.00
135	19.373	0.146	2.15	93	2.28	100	86	-0.080	8.40	0.00
136	19.519	0.146	2.15	93	1.42	100	85	-0.070	8.24	0.00
137	19.666	0.147	2.16	93	0.78	101	85	-0.080	7.88	0.03
138	19.810	0.144	2.15	94	3.26	99	85	-0.080	7.86	0.01
139	19.958	0.148	2.14	94	1.18	102	85	-0.070	7.74	0.02
140	20.100	0.142	2.16	94	3.36	97	86	-0.070	7.87	0.00
141	20.249	0.149	2.16	94	0.78	102	86	-0.070	7.68	0.04
142	20.391	0.142	2.14	94	1.17	97	86	-0.070	7.55	0.00
143	20.541	0.150	2.15	94	1.57	103	86	-0.070	7.53	0.00
144	20.684	0.143	2.14	94	1.27	98	85	-0.070	7.39	0.01
145	20.833	0.149	2.15	94	3.16	102	85	-0.080	7.40	0.00
146	20.976	0.143	2.14	94	1.48	98	85	-0.070	7.37	0.00
147	21.123	0.147	2.15	94	1.04	101	85	-0.060	7.54	0.00
148	21.268	0.145	2.14	94	2.18	99	86	-0.080	7.55	0.00
149	21.414	0.146	2.14	94	0.87	100	86	-0.060	7.48	0.02
150	21.560	0.146	2.14	94	3	100	86	-0.070	7.53	0.03
151	21.705	0.145	2.13	94	3.3	99	86	-0.060	7.57	0.02
152	21.853	0.148	2.15	94	3.3	101	85	-0.070	7.76	0.02
153	21.997	0.144	2.15	94	0.83	99	85	-0.080	7.63	0.04
154	22.145	0.148	2.14	94	0.94	101	85	-0.070	7.63	0.00
155	22.287	0.142	2.14	94	2.26	97	85	-0.080	7.63	0.00
156	22.435	0.148	2.13	94	0.86	101	86	-0.060	7.47	0.00
157	22.577	0.142	2.14	94	0.83	97	86	-0.070	7.38	0.02
158	22.727	0.150	2.14	94	1.26	103	86	-0.060	7.51	0.00
159	22.870	0.143	2.15	94	0.77	98	86	-0.070	7.43	0.00

BOX B TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: CI2700
Run #: 1

Job #: 18-447
Tracking #: 0020
Technician: SJB
Date: 1/28/2019

	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	23.019	0.149	2.15	94	0.87	102	85	-0.070	7.44	0.01
161	23.162	0.143	2.13	95	0.78	98	85	-0.080	7.23	0.04
162	23.310	0.148	2.14	95	2.25	101	85	-0.060	7.22	0.01
163	23.453	0.143	2.14	95	1.05	98	85	-0.070	7.41	0.00
164	23.600	0.147	2.14	95	2.7	100	86	-0.070	7.22	0.01
165	23.745	0.145	2.14	95	1.91	99	86	-0.070	7.28	0.00
166	23.891	0.146	2.13	95	3.29	100	86	-0.070	7.24	0.00
167	24.038	0.147	2.15	95	2.22	100	86	-0.070	7.26	0.02
168	24.182	0.144	2.12	95	1.13	98	85	-0.070	7.26	0.03
169	24.330	0.148	2.14	95	1.56	101	85	-0.060	7.42	0.03
170	24.473	0.143	2.14	95	1.89	98	85	-0.070	7.31	0.01
171	24.620	0.147	2.15	95	2.92	100	86	-0.070	7.07	0.03
172	24.763	0.143	2.15	95	0.9	98	86	-0.070	7.19	0.01
173	24.911	0.148	2.13	95	1.5	101	86	-0.070	7.09	0.01
174	25.055	0.144	2.15	95	1.39	98	86	-0.070	6.98	0.04
175	25.204	0.149	2.14	95	1.99	102	85	-0.080	7.02	0.02
176	25.347	0.143	2.14	95	0.84	98	85	-0.070	6.98	0.02
177	25.495	0.148	2.14	95	3.06	101	85	-0.060	7.25	0.00
178	25.638	0.143	2.13	95	2.57	98	85	-0.070	6.99	0.02
179	25.785	0.147	2.14	95	0.98	100	85	-0.070	7.08	0.00
180	25.929	0.144	2.13	95	3.25	98	86	-0.080	6.93	0.03
181	26.075	0.146	2.14	95	3.03	100	86	-0.080	6.93	0.02
182	26.221	0.146	2.14	95	0.82	100	86	-0.070	6.95	0.03
183	26.367	0.146	2.14	95	1.6	100	85	-0.060	6.94	0.00
184	26.513	0.146	2.14	95	0.82	100	85	-0.070	6.91	0.03
185	26.658	0.145	2.13	95	2.62	99	85	-0.070	6.97	0.01
186	26.805	0.147	2.13	95	2.23	100	85	-0.070	7.07	0.00
187	26.947	0.142	2.13	96	1.21	97	86	-0.070	7.08	0.00
188	27.096	0.149	2.14	96	1.61	102	86	-0.080	6.91	0.03
189	27.238	0.142	2.14	95	2.03	97	86	-0.080	6.86	0.02
190	27.386	0.148	2.12	96	3.33	101	86	-0.070	6.89	0.03
191	27.529	0.143	2.15	96	3.18	97	85	-0.070	6.89	0.03

BOX B TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: CI2700
Run #: 1

Job #: 18-447
Tracking #: 0020
Technician: SJB
Date: 1/28/2019

	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	27.678	0.149	2.14	96	0.97	102	85	-0.070	6.58	0.01
193	27.821	0.143	2.14	96	3.33	97	85	-0.080	6.41	0.03
194	27.969	0.148	2.13	96	1.32	101	85	-0.070	6.29	0.03
195	28.112	0.143	2.12	96	1.38	97	86	-0.070	6.44	0.00
196	28.258	0.146	2.12	96	1.96	99	86	-0.070	6.21	0.02
197	28.402	0.144	2.13	96	3.37	98	85	-0.080	6.34	0.01
198	28.548	0.146	2.13	96	3.33	99	86	-0.060	6.17	0.02
199	28.693	0.145	2.13	96	1.73	99	85	-0.070	6.16	0.00
200	28.839	0.146	2.12	96	2.44	99	85	-0.080	6.18	0.01
201	28.985	0.146	2.13	96	3.16	99	85	-0.070	6.10	0.01
202	29.129	0.144	2.13	96	0.92	98	86	-0.060	5.89	0.06
203	29.276	0.147	2.13	96	0.82	100	86	-0.080	5.83	0.04
204	29.419	0.143	2.13	96	1.15	97	86	-0.080	5.83	0.03
205	29.565	0.146	2.13	96	2.21	99	86	-0.070	5.79	0.06
206	29.707	0.142	2.12	96	1.18	97	85	-0.080	5.89	0.00
207	29.855	0.148	2.13	96	0.96	101	85	-0.070	5.83	0.02
208	29.996	0.141	2.14	96	1.91	96	85	-0.090	5.81	0.01
209	30.143	0.147	2.13	96	3.2	100	85	-0.060	5.93	0.01
210	30.284	0.141	2.11	96	1.95	96	86	-0.060	5.83	0.05
211	30.432	0.148	2.12	96	3.24	101	86	-0.070	5.82	0.05
212	30.572	0.140	2.10	96	1.15	95	86	-0.080	5.81	0.07
213	30.718	0.146	2.10	96	1.32	100	86	-0.070	5.95	0.05
214	30.856	0.138	2.11	96	2.92	94	85	-0.070	6.01	0.06
215	30.999	0.143	2.10	96	2.92	98	85	-0.070	6.22	0.03
Avg/Tot	30.999	0.144	2.14	88	2.05	100			7.83	0.12

WOODSTOVE SURFACE TEMPERATURE DATA

Client: FPI
Model: CI2700
Run #: 1

Job #: 18-447
Tracking #: 0020
Technician: SJB
Date: 1/28/2019

	Temperature Data (°F)						
Elapsed Time (min)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
0	64	64	64	64	64	64.0	64
1	64	64	66	70	64	65.6	120
2	68	67	85	89	64	74.6	291
3	73	71	105	101	64	82.8	319
4	80	76	115	113	66	90.0	362
5	86	81	122	123	68	96.0	406
6	92	86	129	134	71	102.4	443
7	98	91	135	145	75	108.8	465
8	103	95	141	162	79	116.0	462
9	108	102	149	173	84	123.2	457
10	114	108	156	183	90	130.2	470
11	119	114	163	194	95	137.0	500
12	124	120	169	206	102	144.2	530
13	129	126	175	219	107	151.2	555
14	134	131	181	231	113	158.0	575
15	139	137	187	243	119	165.0	589
16	143	142	193	255	124	171.4	601
17	148	148	199	267	129	178.2	609
18	153	153	206	277	134	184.6	610
19	158	159	213	288	139	191.4	615
20	164	164	221	298	143	198.0	630
21	170	170	228	309	148	205.0	648
22	176	175	237	320	152	212.0	665
23	182	181	244	332	156	219.0	680
24	188	186	251	344	160	225.8	686
25	194	191	258	354	164	232.2	684
26	199	197	263	363	168	238.0	681
27	204	201	264	376	172	243.4	701
28	210	206	267	386	176	249.0	711
29	215	210	270	394	180	253.8	719
30	221	213	273	403	184	258.8	718
31	226	217	276	408	188	263.0	715
32	231	221	279	413	192	267.2	716
33	236	225	284	422	196	272.6	723
34	242	228	289	428	199	277.2	735
35	248	232	294	435	203	282.4	751
36	255	237	308	452	207	291.8	850
37	261	243	315	470	211	300.0	927
38	267	248	318	493	215	308.2	997
39	273	254	321	514	219	316.2	996
40	280	260	324	530	223	323.4	956
41	285	266	327	540	228	329.2	920
42	290	271	330	547	233	334.2	891
43	295	277	333	553	239	339.4	879
44	300	282	336	560	245	344.6	886
45	305	288	337	569	250	349.8	902
46	311	294	338	583	256	356.4	938
47	317	300	338	601	261	363.4	994

WOODSTOVE SURFACE TEMPERATURE DATA

Client: FPI
Model: CI2700
Run #: 1

Job #: 18-447
Tracking #: 0020
Technician: SJB
Date: 1/28/2019

	Temperature Data (°F)						
Elapsed Time (min)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
48	323	306	347	624	266	373.2	1041
49	327	312	350	641	271	380.2	1021
50	330	317	351	650	276	384.8	1011
51	332	322	347	656	280	387.4	989
52	334	326	343	662	284	389.8	976
53	334	328	339	666	288	391.0	961
54	334	329	338	667	292	392.0	949
55	333	331	334	666	296	392.0	960
56	332	331	331	667	300	392.2	976
57	330	332	329	670	303	392.8	987
58	329	333	327	670	307	393.2	985
59	326	333	325	669	311	392.8	978
60	324	333	323	669	314	392.6	973
61	322	333	321	669	318	392.6	972
62	319	334	320	671	321	393.0	973
63	318	333	318	674	324	393.4	974
64	316	334	316	677	328	394.2	978
65	314	334	314	682	331	395.0	983
66	312	333	313	686	334	395.6	990
67	311	334	312	692	337	397.2	999
68	310	334	311	696	340	398.2	1006
69	308	334	286	692	342	392.4	1011
70	306	334	268	692	342	388.4	1019
71	304	334	255	695	340	385.6	1026
72	303	333	244	693	339	382.4	1026
73	301	333	235	695	336	380.0	1033
74	300	334	227	692	334	377.4	1050
75	299	334	222	693	332	376.0	1074
76	298	334	217	694	329	374.4	1090
77	296	335	213	696	327	373.4	1099
78	295	335	210	696	324	372.0	1103
79	294	336	208	695	322	371.0	1096
80	293	337	206	697	320	370.6	1092
81	293	338	204	696	318	369.8	1091
82	292	339	202	695	316	368.8	1095
83	291	340	200	697	314	368.4	1102
84	290	341	199	697	312	367.8	1104
85	290	341	198	697	311	367.4	1099
86	290	343	197	696	310	367.2	1091
87	290	344	196	698	308	367.2	1088
88	289	345	196	699	307	367.2	1090
89	290	346	196	701	306	367.8	1095
90	291	347	196	704	305	368.6	1100
91	292	348	196	708	303	369.4	1101
92	292	350	196	710	302	370.0	1097
93	294	351	196	713	301	371.0	1092
94	294	352	196	714	299	371.0	1086
95	296	353	196	714	298	371.4	1078

WOODSTOVE SURFACE TEMPERATURE DATA

Client: FPI
Model: CI2700
Run #: 1

Job #: 18-447
Tracking #: 0020
Technician: SJB
Date: 1/28/2019

	Temperature Data (°F)						
Elapsed Time (min)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
96	296	354	196	713	297	371.2	1070
97	298	355	196	711	296	371.2	1064
98	300	355	197	707	296	371.0	1058
99	301	356	197	703	295	370.4	1054
100	303	356	198	701	294	370.4	1051
101	305	356	199	698	294	370.4	1048
102	306	356	199	694	293	369.6	1044
103	308	356	199	692	293	369.6	1038
104	309	356	200	689	293	369.4	1032
105	310	356	200	684	293	368.6	1027
106	312	355	200	681	292	368.0	1023
107	314	355	200	678	292	367.8	1022
108	316	355	201	675	292	367.8	1022
109	318	355	201	673	292	367.8	1021
110	319	355	202	671	292	367.8	1018
111	320	355	202	670	292	367.8	1015
112	323	356	203	669	292	368.6	1011
113	324	356	203	667	292	368.4	1005
114	326	356	203	664	292	368.2	1002
115	328	357	203	662	292	368.4	1005
116	330	359	203	662	292	369.2	1010
117	332	361	202	661	292	369.6	1015
118	334	363	202	661	292	370.4	1017
119	336	365	201	663	292	371.4	1013
120	338	367	201	663	292	372.2	1011
121	340	368	201	663	293	373.0	1006
122	342	370	201	661	293	373.4	1002
123	343	372	201	660	293	373.8	999
124	346	374	201	658	294	374.6	999
125	348	375	201	658	294	375.2	1001
126	350	376	202	657	295	376.0	1001
127	352	377	202	655	296	376.4	1000
128	354	379	203	655	296	377.4	996
129	356	380	204	653	297	378.0	991
130	358	381	205	652	298	378.8	984
131	360	382	206	649	298	379.0	975
132	362	383	207	645	299	379.2	966
133	363	384	208	645	300	380.0	956
134	365	385	209	640	300	379.8	944
135	366	386	210	637	301	380.0	933
136	368	387	211	635	301	380.4	924
137	369	388	212	630	302	380.2	915
138	370	389	213	625	302	379.8	906
139	371	390	214	622	303	380.0	899
140	373	391	215	618	304	380.2	892
141	375	391	216	614	304	380.0	886
142	376	392	217	608	305	379.6	881
143	377	393	218	605	305	379.6	877

WOODSTOVE SURFACE TEMPERATURE DATA

Client: FPI
Model: CI2700
Run #: 1

Job #: 18-447
Tracking #: 0020
Technician: SJB
Date: 1/28/2019

	Temperature Data (°F)						
Elapsed Time (min)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
144	378	394	219	600	306	379.4	872
145	379	395	220	596	306	379.2	867
146	379	396	220	591	307	378.6	863
147	380	397	221	588	307	378.6	859
148	380	398	222	585	308	378.6	855
149	381	399	222	580	309	378.2	852
150	381	400	223	576	309	377.8	849
151	381	401	223	573	310	377.6	847
152	382	402	224	570	310	377.6	845
153	382	404	223	568	310	377.4	844
154	382	405	223	566	311	377.4	847
155	383	406	223	564	311	377.4	854
156	383	408	222	563	312	377.6	861
157	383	409	221	562	312	377.4	869
158	385	410	220	563	312	378.0	872
159	385	412	219	561	313	378.0	871
160	385	413	218	561	313	378.0	868
161	386	414	218	560	313	378.2	864
162	387	415	217	558	313	378.0	860
163	387	416	216	556	313	377.6	856
164	388	417	216	556	313	378.0	854
165	388	419	215	554	313	377.8	854
166	388	419	215	553	313	377.6	856
167	388	420	214	553	313	377.6	858
168	389	421	213	552	312	377.4	860
169	389	421	213	552	312	377.4	861
170	389	422	213	552	312	377.6	861
171	389	423	212	551	312	377.4	860
172	389	423	211	551	312	377.2	860
173	389	423	211	552	312	377.4	863
174	389	424	210	551	312	377.2	866
175	389	424	210	552	312	377.4	873
176	389	424	210	553	311	377.4	880
177	389	423	210	556	311	377.8	885
178	388	423	209	558	312	378.0	884
179	388	423	209	557	312	377.8	878
180	388	422	209	557	312	377.6	872
181	387	423	209	557	312	377.6	867
182	386	423	208	556	312	377.0	861
183	386	422	208	554	312	376.4	859
184	385	423	208	552	312	376.0	862
185	385	423	208	552	312	376.0	869
186	385	422	208	553	312	376.0	878
187	384	422	207	554	312	375.8	884
188	383	422	207	554	312	375.6	881
189	383	422	208	553	312	375.6	876
190	383	422	207	552	312	375.2	874
191	382	422	208	552	312	375.2	873

WOODSTOVE SURFACE TEMPERATURE DATA

Client: FPI
Model: CI2700
Run #: 1

Job #: 18-447
Tracking #: 0020
Technician: SJB
Date: 1/28/2019

	Temperature Data (°F)						
Elapsed Time (min)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
192	381	422	208	551	312	374.8	869
193	380	422	208	550	311	374.2	866
194	380	421	208	549	312	374.0	865
195	379	420	207	547	311	372.8	864
196	378	419	207	545	311	372.0	864
197	377	418	207	545	310	371.4	864
198	377	416	206	544	310	370.6	865
199	376	415	206	543	310	370.0	867
200	375	413	205	542	309	368.8	866
201	374	412	204	540	309	367.8	866
202	373	410	203	541	308	367.0	867
203	372	408	203	540	307	366.0	870
204	370	406	202	539	307	364.8	872
205	370	404	202	539	306	364.2	874
206	368	402	201	537	305	362.6	874
207	367	400	201	537	304	361.8	875
208	366	398	200	536	304	360.8	876
209	365	396	200	535	304	360.0	877
210	364	394	199	535	303	359.0	878
211	363	392	199	534	303	358.2	880
212	361	391	199	533	302	357.2	884
213	360	388	198	535	302	356.6	889
214	359	387	198	534	301	355.8	896
215	357	385	197	537	301	355.4	907
Average	312	333	225	558	273	340	885

LAB SAMPLE DATA - ASTM E2515

Client: FPI
Model: CI2700
Run #: 1
Job #: 18-447
Tracking #: 0020
Technician: SJB
Date: 1/28/2019

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	T062, T063	187.6	182.4	5.2
B. Rear filter catch	Filter				0.0
C. Probe catch*	Probe				0.0
D. O-Ring catch*	O-Ring				0.0

Sub-Total	Total Particulate, mg:	5.2

TRAIN A (Post 1st hour)

Sample Component	Sample Type	Filter, Probe, or O-Ring #	Weights		
			Final, mg	Tare, mg	Particulate, mg
A. Front filter catch	Filter	T069	178.4	84.0	3.6
B. Rear filter catch	Filter	T064		90.8	
C. Probe catch*	Probe	1A	115628.5	115627.7	0.8
D. O-Ring catch*	O-Ring	1A	3562.0	3562.0	0.0

Sub-Total	Total Particulate, mg:	4.4
Train A Aggregate	Total Particulate, mg:	**9.6**

TRAIN B

Sample Component	Reagent	Filter, Probe, or O-Ring #	Weights		
			Final, mg	Tare, mg	Particulate, mg
A. Front filter catch	Filter	T065, T068	274.5	174.9	8.8
B. Rear filter catch	Filter	T066		90.8	
C. Probe catch*	Probe	1B	115902.8	115902.3	0.5
D. O-Ring catch*	O-Ring	1B	3550.9	3550.8	0.1

Total Particulate, mg:	**9.4**

AMBIENT

Sample Component	Reagent	Filter, Probe, or O-Ring #	Weights		
			Final, mg	Tare, mg	Particulate, mg
A. Filter catch*	Filter	T067	90.4	90.3	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: 18-447 | Tracking #: 0020
Model: CI2700 | Run Number: 1 | Test Date: 1/28/2019

Wood Heater Run Notes

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

Time	Notes
N/A	High Fire test begins from cold start.

Test Notes
Test Burn Start Time: 11:17
Air Control Setting: Fully Open

Time	Notes
0 min	Starting with 1.8 lbs of kindling and ~6 pieces of printer paper, lit fuel with propane torch for 15 seconds; door cracked 3".
1.5 min	Door closed down to 1"
2 min	Door latched closed
7 min	@ 0.7 lbs, added remaining kindling fuel (1.2 lbs) and a couple pieces of start-up fuel (1.0 lbs); door open 45 seconds
9 min	Bypass closed
26 min	@ 1.0 lbs, added 1.9 lbs of start-up fuel; door open 45 seconds
33 min	Changed both front filters, due to plugging
35 min	@ 1.9 lbs, added remaining start-up fuel pieces (2.1 lbs); door open 30 seconds
47 min	@2.0 lbs, leveled coal bed, zeroed scale and loaded test fuel, door closed 20 seconds after loading completed
60 min	Changed 1-hour filter
68 min	Turned fan on high, per manufacturer's instructions
215 min	End of Test

Test Burn End Time: 14:52

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	10:42	10:48	10:44	15:36	15:30	15:33
CO_2	0.00	10.08	16.93	0.02	10.04	16.86
CO	0.000	2.512	4.330	-0.024	2.472	4.270

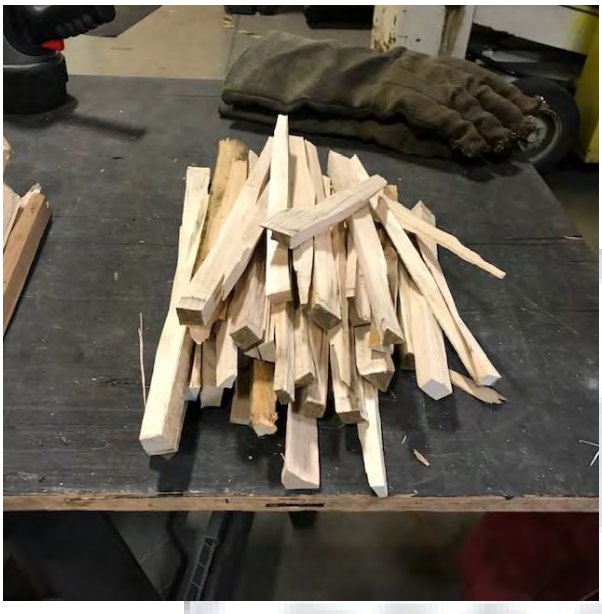
Flue Gas Probe Leak Check: Initial: No Leakage Final: No Leakage

Technician Signature:  Date: 1/28/2019

ASTM E3053 Wood Heater Run Sheets

Client: FPI | Job Number: 18-447 | Tracking #: 0020
Model: CI2700 | Run Number: 1 | Test Date: 1/28/2019

Test Photos



Kindling Fuel Load

Start-up Fuel Load

High Fire Fuel Load

Residual Start-up Fuel Coal Bed

Technician Signature: _____ Date: 1/28/2019

ASTM E3053 Wood Heater Run Sheets

Client: FPI Job Number: 18-447 Tracking #: 0020
Model: CI2700 Run Number: 1 Test Date: 1/28/2019

High Fire Fuel Loaded

Residual High Fire Load Coal Bed

N/A – High Fire Only

Low Fire Fuel Load

N/A – High Fire Only

Low Fire Fuel Loaded

Technician Signature: Date: 1/28/2019

WOOD STOVE TEST DATA PACKET
ASTM E3053/E2515

Run 2 Data Summary

Client: FPI
Model: CI2700
Job #: 18-447
Tracking #: 0020
Test Date: 1/29/2019

Techician Signature

2/4/2019
Date

TEST RESULTS - ASTM E3053 / ASTM E2515

Client: FPI
Model: CI2700
Run #: 2

Job #: 18-447
Tracking #: 0020
Technician: SJB
Date: 1/29/2019

Burn Rate (kg/hr):	0.57

	Ambient Sample	Sample Train A	Sample Train B	1st Hour Filter
Total Sample Volume (ft^3)	102.681	126.801	125.909	8.734
Average Gas Velocity in Dilution Tunnel (ft/sec)	16.18			
Average Gas Flow Rate in Dilution Tunnel (dscf/hr)	10995.2			
Average Gas Meter Temperature (°F)	68.3	78.9	94.2	75.9
Total Sample Volume (dscf)	102.566	125.454	120.656	10.254
Average Tunnel Temperature (°F)	78.6			
Total Time of Test (min)	849			
Total Particulate Catch (mg)	0.0	6.1	5.9	4.1
Particulate Concentration, dry-standard (g/dscf)	0.0000000	0.0000486	0.0000489	0.0003998
Total PM Emissions (g)	0.00	7.56	7.61	4.40
Particulate Emission Rate (g/hr)	0.00	0.53	0.54	4.40
Emissions Factor (g/kg)	-	0.93	0.94	-
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)	7.59
Particulate Emission Rate (g/hr)	0.54
Emissions Factor (g/kg)	0.93
HHV Efficiency (%)	76.9%
LHV Efficiency (%)	82.3%
CO Emissions (g/min)	0.85

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: 87	OK
Face Velocity	< 30 ft/min	8.1	OK
Leakage Rate	Less than 4% of average sample rate	0 cfm	OK
Ambient Temp	55-90 °F	Min: 65 / Max: 71	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:	CI2700
Date:	01/29/19
Run:	2
Control #:	18-447
Test Duration:	850
Output Category:	Low

Test Results in Accordance with CSA B415.1-09

	HHV Basis	LHV Basis
Overall Efficiency	76.9%	82.3%
Combustion Efficiency	96.5%	96.5%
Heat Transfer Efficiency	79.7%	85.2%

Output Rate (kJ/h)	8,741	8,292	**(Btu/h)**
Burn Rate (kg/h)	0.57	1.25	**(lb/h)**
Input (kJ/h)	11,366	10,781	**(Btu/h)**

Test Load Weight (dry kg)	8.07	17.78	**dry lb**
MC wet (%)	17.69		
MC dry (%)	21.49		
Particulate (g)	7.59		
CO (g)	720		
Test Duration (h)	14.17		

Emissions	**Particulate**	**CO**
g/MJ Output	0.06	5.82
g/kg Dry Fuel	0.94	89.31
g/h	0.54	50.85
g/min	0.01	0.85
lb/MM Btu Output	0.14	13.52

Air/Fuel Ratio (A/F)	29.41

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

HIGH FIRE FUEL LOAD DATA - ASTM E3053

Client: FPI | Job #: 18-447
Model: CI2700 | Tracking #: 0020
Run #: 2 | Technician: SJB
Date: 1/29/2019

Nominal Loading Density (lbs/ft^3, wet basis):	10		
Usable Firebox Volume (ft^3):	1.83		
Target Load Weight (lbs):	18.30		
Total Load Weight Range (lbs):	17.40	to	19.20
Core Load Weight Range (lbs):	8.20	to	11.90
Remainder Load Weight Range (lbs):	6.40	to	10.10
Core Load Piece Range (lbs):	2.70	to	4.60
Remainder Load Piece Range (lbs):	1.80	to	10.10
Max Allowable Kindling Weight (lbs):	3.51		
Max Allowable Start-up Fuel Weight (lbs):	5.27		

CORE LOAD DATA

				Fuel Piece Moisture Readings (%DB)					Dry Weight	
Piece #	Length (in)	Weight (lbs)	Within Spec?	1	2	3	Ave.	Within Spec?	lbs	kg
1	17.00	3.88	In Range	22.3	19.8	21.4	21.2	In Range	3.20	1.45
2	17.00	2.82	In Range	24.8	24.2	24.9	24.6	In Range	2.26	1.03
3	17.00	2.91	In Range	20.2	22.8	22.3	21.8	In Range	2.39	1.08
Core Load Wt. (lbs)		9.61	In Range							

REMAINDER LOAD DATA (1 to 3 Pieces)

				Fuel Piece Moisture Readings (%DB)					Dry Weight	
Piece #	Length (in)	Weight (lbs)	Within Spec?	1	2	3	Ave.	Within Spec?	lbs	kg
1	17.00	2.27	In Range	20.6	20.2	19.4	20.1	In Range	1.89	0.86
2	17.00	2.93	In Range	18.7	20.5	19.4	19.5	In Range	2.45	1.11
3	17.00	2.76	In Range	24.3	24.2	24.6	24.4	In Range	2.22	1.01
Remainder Load (lbs)		7.96	In Range							

Total Load Weight (lbs):	17.57	In Range	
Core Load % of Total Weight:	55%	In Range	45-65%
Remainder % of Total Weight:	45%	In Range	35-55%
Total Load % of Target Weight:	96%	In Range	95-105%
Actual Fuel Loading Density (lb/ft3):	9.6		
Total Load Average Moisture Conent (%DB):	21.9	In Range	19-25%
Total Load Average Moisture Conent (%WB):	18.0		
Total Test Load Weight (dry basis):	14.42 lbs	6.54 kg	

KINDLING AND START-UP FUEL

		Kindling Moisture Readings (%DB)					Dry Weight	
Kindling Weight (lbs)	Within Spec?	1	2	3	Avg.	Within Spec?	lbs	kg
2.71	In Range	10	10	10	10.0	In Range	2.46	1.12

		Start-up Moisture Readings (%DB)					Dry Weight	
Start-up Fuel Wt. (lb)	Within Spec?	1	2	3	Avg.	Within Spec?	lbs	kg
4.81	In Range	19.7	22.4	21.7	21.3	In Range	3.97	1.80

TEST FUEL LOADING RANGE

Allowable Residual Start-up Fuel Range (lb):	1.8	to	3.5	
Actual Residual Start-up Fuel Weight (lb):	2.0			In Range

LOW & MEDIUM FIRE FUEL LOAD DATA - ASTM E3053

Client: FPI
Job #: 18-447
Model: CI2700
Tracking #: 0020
Run #: 2
Technician: SJB
Date: 1/29/2019

Nominal Loading Density (lbs/ft^3, wet basis):	12		
Usable Firebox Volume (ft^3):	1.83		
Target Load Weight (lbs):	21.96		
Total Load Weight Range (lbs):	20.86	to	23.06
Core Load Weight Range (lbs):	9.88	to	14.27
Remainder Load Weight Range (lbs):	7.69	to	12.08
Core Load Piece Range (lbs):	3.29	to	5.49
Remainder Load Piece Range (lbs):	2.20	to	6.59

CORE LOAD DATA

				Fuel Piece Moisture Readings (%DB)					Dry Weight	
Piece #	Length (in)	Weight (lbs)	Within Spec?	1	2	3	Ave.	Within Spec?	lbs	kg
1	17.00	4.87	In Range	22.7	23.7	24.6	23.7	In Range	3.94	1.79
2	17.00	3.84	In Range	21.9	20.2	19.9	20.7	In Range	3.18	1.44
3	17.00	3.99	In Range	21.8	22.8	20.9	21.8	In Range	3.27	1.49
Core Load Wt. (lbs)		12.70	In Range							

REMAINDER LOAD DATA (2 to 3 Pieces)

				Fuel Piece Moisture Readings (%DB)					Dry Weight	
Piece #	Length (in)	Weight (lbs)	Within Spec?	1	2	3	Ave.	Within Spec?	lbs	kg
1	17.00	6.53	In Range	21.0	20.6	18.4	20.0	In Range	5.44	2.47
2	17.00	2.51	In Range	19.4	22.5	24.1	22.0	In Range	2.06	0.93
3			NA				NA	NA	NA	NA
Remainder Load (lbs)		9.04	In Range							

Remainder Load Small/Large Piece Weight Ratio:	38%	In Range	≤ 67%
Total Load Weight (lbs):	21.74	In Range	
Core Load % of Total Weight:	58%	In Range	45-65%
Remainder % of Total Weight:	42%	In Range	35-55%
Total Load % of Target Weight:	99%	In Range	95-105%
Actual Fuel Loading Density (lb/ft3):	11.9		
Total Load Average Moisture Conent (%DB):	21.5	In Range	19-25%
Total Load Average Moisture Conent (%WB):	17.7		
Total Test Load Weight (dry basis):	17.89 lbs	8.12 kg	

TEST FUEL LOADING RANGE

Allowable Charcoal Bed Weight Range (lb):	2.2	to	4.3	
Actual Charcoal Bed Wt. (lb):		3.5		In Range

TEST END POINT

Actual Fuel Load Ending Weight (lb):	0.0	Valid Test (≥90%)

Total Fuel Burned During Test Run:	21.7	lbs, wet basis
	17.9	lbs, dry basis
	8.12	kg, dry basis

DILUTION TUNNEL & MISC. DATA - ASTM E3053 / E2515

Client:	FPI	Job #:	18-447
Model:	CI2700	Tracking #:	0020
Run #:	2	Technician:	SJB
Test Start Time:	11:04	Date:	1/29/2019
Test Type:	Low Fire		

Recording Interval (min):	10
Total Sampling Time (min):	849

	Pre-Test	Post Test	Avg.
Barometric Pressure (in. Hg)	30.00	29.89	29.95
Relative Humidity (%)	21.9	19.3	
Room Air Velocity (ft/min)	0	0	
Scale Audit (lbs)	10.0	10.0	

Ambient Sample Volume: 102.681 ft^3

Meter Box γ Factor:	1.004 (A)
Meter Box γ Factor:	1.000 (B)
Meter Box γ Factor:	0.999 (Ambient)

Induced Draft Check (in. H_2O):	0
Smoke Capture Check (%):	100%
Date Flue Pipe Last Cleaned:	1/28/2019

Sample Train Post-Test Leak Checks

(A)	0.000	cfm @	-14	in. Hg
(B)	0.000	cfm @	-12	in. Hg
(Ambient)	0.001	cfm @	-14	in. Hg

DILUTION TUNNEL FLOW

Traverse Data

Point	dP (in H_2O)	Temp (°F)
1	0.046	108
2	0.066	108
3	0.066	108
4	0.048	108
5	0.052	108
6	0.064	108
7	0.070	108
8	0.044	108
Center	0.075	108

Static Pressure: -0.215 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}:	16.61	ft/sec
V_{scent}:	18.80	ft/sec
F_p:	0.883	[ratio]
Initial Tunnel Flow:	175.5	scf/min

TEST FUEL PROPERTIES

ASTM 3053-17 - Table A1.1 Fuel Properties by Fuel Species

Select Fuel Type	Species	%C	%H	%O	%Ash	MJ/kg	BTU/lb
	Ash, White	49.70	6.90	43.00	0.30	20.75	8927
	Beech	48.70	5.80	44.70	0.60	18.80	8088
	Birch, Sweet	49.80	6.50	43.40	0.30	20.12	8656
	Birch, Yellow	49.80	6.50	43.40	0.30	20.12	8656
	Doug Fir (Coast, Interior West/North)	48.73	6.87	43.90	0.50	19.81	8522
	Doug Fir (Interioir South)	48.73	6.87	43.90	0.50	19.81	8522
	Elm, Rock	50.40	6.60	42.30	0.70	20.49	8815
	Elm, Soft	50.40	6.60	42.30	0.70	20.49	8815
	Gum, Red	50.88	6.06	41.57	1.28	19.72	8478
	Larch, Western	50.54	6.36	42.40	0.70	17.58	7558
X	Maple, Hard	50.64	6.02	41.74	1.35	19.96	8587
	Maple, Sugar	50.64	6.02	41.74	1.35	19.96	8587
	Oak, Red	49.50	6.62	43.70	0.20	20.20	8690
	Oak, White	50.40	6.59	42.70	0.20	20.50	8819
	Pine, Southern	52.60	7.00	40.10	1.31	22.30	9587
	Pine, Southern Long Leaf	52.60	7.02	40.10	1.30	22.30	9594
	Other						

WOODSTOVE PREBURN DATA

Client: FPI
Model: CI2700
Run #: 2

Job #: 18-447
Tracking #: 0020
Technician: SJB
Date: 1/29/2019

Recording Interval (min): 1
Run Time (min): 166

			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	1.7	-0.001	66	66	66	66	66	66.0	66	63
1	1.6	-0.030	66	66	68	69	66	67.0	134	63
2	1.4	-0.051	69	69	74	79	66	71.4	245	63
3	0.9	-0.082	74	73	94	97	67	81.0	428	63
4	0.9	-0.046	80	79	110	107	69	89.0	322	63
5	0.8	-0.044	87	85	115	117	73	95.4	278	63
6	0.8	-0.048	93	91	121	126	77	101.6	268	63
7	0.7	-0.056	98	97	125	135	82	107.4	262	63
8	2.9	-0.075	102	101	128	150	87	113.6	342	63
9	2.6	-0.066	108	108	139	168	91	122.8	403	63
10	2.5	-0.058	114	116	148	179	96	130.6	354	63
11	2.3	-0.056	119	123	155	193	100	138.0	352	63
12	2.1	-0.055	125	131	163	209	105	146.6	327	63
13	2.0	-0.062	131	138	169	228	109	155.0	325	63
14	1.9	-0.052	137	145	176	248	114	164.0	330	63
15	1.8	-0.058	143	152	183	267	118	172.6	333	63
16	1.8	-0.075	149	158	189	282	123	180.2	335	63
17	1.6	-0.067	155	165	196	295	128	187.8	332	63
18	1.5	-0.052	161	171	200	308	133	194.6	334	63
19	1.5	-0.075	167	176	204	318	139	200.8	335	63
20	1.5	-0.066	172	182	208	328	144	206.8	334	63
21	1.3	-0.062	177	187	213	336	150	212.6	334	63
22	1.2	-0.055	182	192	221	344	156	219.0	335	63
23	1.1	-0.063	187	197	229	352	162	225.4	338	63
24	1.0	-0.057	193	203	237	361	167	232.2	343	63
25	0.9	-0.067	199	209	244	371	173	239.2	352	63
26	4.0	-0.075	204	214	251	392	178	247.8	447	63
27	3.7	-0.082	211	221	256	411	183	256.4	466	63
28	3.5	-0.079	218	227	261	428	189	264.6	443	63
29	3.3	-0.088	225	233	264	450	194	273.2	451	63
30	3.1	-0.078	231	239	269	477	200	283.2	467	63
31	2.8	-0.080	238	246	274	505	206	293.8	481	63
32	2.7	-0.092	245	253	279	530	212	303.8	484	63
33	2.4	-0.070	252	260	284	553	217	313.2	484	64
34	2.4	-0.080	259	267	291	574	223	322.8	483	64
35	2.1	-0.072	266	274	297	591	228	331.2	483	64
36	1.9	-0.083	273	282	305	606	234	340.0	483	64
37	16.1	-0.102	280	289	312	625	239	349.0	570	64
38	19.0	-0.069	286	295	318	632	245	355.2	541	64
39	18.9	-0.086	291	302	320	628	251	358.4	481	64
40	18.8	-0.080	295	307	319	626	257	360.8	460	64
41	18.7	-0.079	299	312	318	621	262	362.4	449	64
42	18.6	-0.080	302	315	315	616	267	363.0	440	64
43	18.5	-0.075	304	318	313	608	271	362.8	432	64

WOODSTOVE PREBURN DATA

Client: FPI
Model: CI2700
Run #: 2

Job #: 18-447
Tracking #: 0020
Technician: SJB
Date: 1/29/2019

Recording Interval (min): 1
Run Time (min): 166

			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	18.5	-0.073	306	320	311	601	276	362.8	425	65
45	18.4	-0.081	307	320	309	594	280	362.0	418	64
46	18.3	-0.080	307	320	307	586	284	360.8	413	64
47	18.2	-0.074	309	319	305	581	288	360.4	410	64
48	18.1	-0.072	308	318	301	574	292	358.6	408	64
49	18.1	-0.062	308	316	298	568	295	357.0	406	64
50	18.0	-0.074	307	314	296	563	299	355.8	409	64
51	17.9	-0.085	307	313	294	559	302	355.0	412	64
52	17.8	-0.072	307	311	291	559	305	354.6	418	64
53	17.6	-0.071	306	309	290	559	308	354.4	425	64
54	17.6	-0.072	306	308	288	561	311	354.8	433	65
55	17.6	-0.086	306	306	286	566	314	355.6	444	65
56	17.2	-0.088	306	305	285	574	316	357.2	460	65
57	17.2	-0.079	305	303	262	574	317	352.2	456	64
58	17.1	-0.076	304	301	248	581	316	350.0	460	64
59	16.9	-0.091	303	300	236	588	315	348.4	463	64
60	16.8	-0.073	302	298	226	593	313	346.4	467	64
61	16.6	-0.067	301	297	217	599	311	345.0	474	64
62	16.5	-0.072	300	296	210	605	308	343.8	479	64
63	16.3	-0.086	299	295	205	611	306	343.2	487	64
64	16.2	-0.091	298	295	200	619	304	343.2	491	64
65	15.9	-0.085	298	294	197	629	301	343.8	500	64
66	15.7	-0.087	297	294	194	638	299	344.4	504	64
67	15.6	-0.092	296	294	192	649	297	345.6	507	63
68	15.4	-0.094	296	294	190	658	295	346.6	511	63
69	15.2	-0.089	296	294	189	667	294	348.0	511	63
70	15.0	-0.092	296	294	187	674	292	348.6	510	63
71	14.8	-0.081	296	295	186	680	290	349.4	511	63
72	14.6	-0.094	296	296	186	685	288	350.2	512	63
73	14.3	-0.101	297	297	185	689	287	351.0	512	63
74	14.2	-0.079	297	298	185	695	285	352.0	511	63
75	14.0	-0.084	298	300	185	699	284	353.2	510	63
76	13.7	-0.074	299	301	185	701	282	353.6	510	63
77	13.6	-0.089	300	302	185	703	281	354.2	509	63
78	13.5	-0.092	301	304	185	706	279	355.0	509	63
79	13.3	-0.085	302	305	185	709	278	355.8	507	63
80	13.1	-0.087	304	307	185	711	277	356.8	507	62
81	12.9	-0.076	305	308	186	713	275	357.4	507	62
82	12.7	-0.092	306	310	186	716	274	358.4	508	62
83	12.5	-0.084	307	311	187	717	273	359.0	509	62
84	12.3	-0.086	309	313	188	718	272	360.0	508	62
85	12.2	-0.079	311	315	189	721	271	361.4	510	62
86	12.0	-0.086	312	317	189	724	270	362.4	510	62
87	11.8	-0.082	314	318	190	727	269	363.6	510	62

WOODSTOVE PREBURN DATA

Client: FPI
Model: CI2700
Run #: 2

Job #: 18-447
Tracking #: 0020
Technician: SJB
Date: 1/29/2019

Recording Interval (min): 1
Run Time (min): 166

			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	11.6	-0.085	316	320	191	728	268	364.6	512	62
89	11.5	-0.083	318	322	192	731	267	366.0	510	62
90	11.3	-0.080	320	323	193	734	267	367.4	510	62
91	11.1	-0.074	321	325	194	737	266	368.6	506	62
92	11.0	-0.082	323	327	195	737	266	369.6	506	61
93	10.8	-0.084	324	328	196	737	265	370.0	502	61
94	10.7	-0.084	326	330	196	734	265	370.2	498	61
95	10.6	-0.076	327	332	197	732	265	370.6	493	61
96	10.4	-0.080	329	334	198	728	264	370.6	493	61
97	10.3	-0.079	330	335	199	725	264	370.6	487	61
98	10.1	-0.075	331	337	200	721	264	370.6	490	61
99	9.9	-0.079	333	338	201	718	264	370.8	489	61
100	9.8	-0.099	334	340	201	717	264	371.2	487	61
101	9.7	-0.089	335	342	203	716	264	372.0	486	61
102	9.6	-0.080	337	344	204	714	264	372.6	485	61
103	9.4	-0.085	339	345	205	713	264	373.2	483	61
104	9.3	-0.079	340	347	206	712	264	373.8	485	61
105	9.2	-0.085	342	349	207	713	264	375.0	486	61
106	9.0	-0.074	344	351	208	711	264	375.6	484	61
107	8.9	-0.065	346	352	209	711	264	376.4	483	61
108	8.8	-0.081	348	354	210	711	265	377.6	483	61
109	8.6	-0.088	351	356	211	711	265	378.8	483	61
110	8.5	-0.082	353	357	212	709	265	379.2	481	61
111	8.4	-0.075	355	358	213	708	265	379.8	481	61
112	8.3	-0.075	355	360	214	708	265	380.4	480	74
113	8.2	-0.064	359	361	215	707	265	381.4	476	61
114	8.0	-0.075	361	363	216	706	265	382.2	475	61
115	7.9	-0.073	363	364	217	704	266	382.8	472	61
116	7.8	-0.070	365	366	218	702	266	383.4	471	61
117	7.7	-0.081	366	367	220	700	266	383.8	470	61
118	7.6	-0.075	368	369	221	698	267	384.6	469	61
119	7.6	-0.077	370	370	222	696	267	385.0	466	61
120	7.5	-0.083	371	371	223	692	268	385.0	461	61
121	7.4	-0.079	373	373	224	687	268	385.0	457	61
122	7.3	-0.085	375	374	224	681	269	384.6	454	61
123	7.1	-0.073	377	375	225	674	269	384.0	449	61
124	7.2	-0.082	378	376	225	668	270	383.4	446	61
125	7.1	-0.078	380	377	226	661	271	383.0	444	61
126	7.1	-0.078	381	378	227	656	271	382.6	442	61
127	6.9	-0.062	383	380	227	652	272	382.8	440	61
128	6.6	-0.077	386	382	230	655	273	385.2	522	61
129	6.4	-0.091	389	384	233	661	274	388.2	491	61
130	6.2	-0.093	392	386	235	668	275	391.2	488	61
131	6.1	-0.080	395	388	236	679	275	394.6	490	61

WOODSTOVE PREBURN DATA

Client: FPI
Model: CI2700
Run #: 2

Job #: 18-447
Tracking #: 0020
Technician: SJB
Date: 1/29/2019

Recording Interval (min): 1
Run Time (min): 166

			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	6.0	-0.085	398	390	238	688	276	398.0	489	61
133	5.8	-0.083	401	392	239	697	277	401.2	491	61
134	5.6	-0.084	404	393	240	704	277	403.6	490	61
135	5.5	-0.088	407	395	241	711	278	406.4	487	61
136	5.4	-0.100	410	396	242	716	278	408.4	486	61
137	5.3	-0.083	413	397	244	719	279	410.4	485	61
138	5.1	-0.086	415	399	244	720	279	411.4	481	61
139	5.0	-0.081	418	401	243	722	279	412.6	477	61
140	5.0	-0.079	420	402	243	723	280	413.6	474	62
141	4.9	-0.066	422	403	245	723	280	414.6	471	62
142	4.8	-0.085	424	405	245	721	280	415.0	470	62
143	4.6	-0.069	426	407	246	720	280	415.8	466	62
144	4.6	-0.077	427	408	248	717	281	416.2	462	62
145	4.5	-0.088	428	409	249	713	281	416.0	460	62
146	4.5	-0.097	430	411	252	709	282	416.8	458	62
147	4.4	-0.070	430	413	253	704	282	416.4	454	62
148	4.3	-0.076	431	414	255	700	283	416.6	448	62
149	4.3	-0.093	431	416	256	695	283	416.2	446	62
150	4.2	-0.068	433	417	258	687	284	415.8	440	62
151	4.1	-0.059	433	419	260	681	284	415.4	435	62
152	4.1	-0.074	433	421	261	675	285	415.0	433	62
153	4.0	-0.063	434	423	262	668	285	414.4	429	62
154	4.0	-0.069	434	424	263	662	286	413.8	424	62
155	3.9	-0.075	434	426	264	655	286	413.0	423	62
156	4.0	-0.064	435	428	264	650	287	412.8	421	62
157	3.8	-0.067	434	429	265	644	288	412.0	418	62
158	3.8	-0.064	434	431	265	639	288	411.4	417	62
159	3.7	-0.066	434	432	265	633	289	410.6	413	62
160	3.7	-0.059	434	433	266	628	290	410.2	412	62
161	3.7	-0.076	434	434	267	621	290	409.2	408	62
162	3.6	-0.066	433	435	269	614	291	408.4	406	62
163	3.6	-0.064	433	436	272	609	292	408.4	402	62
164	3.5	-0.065	432	437	275	604	293	408.2	401	62
165	3.6	-0.080	432	437	276	599	294	407.6	401	62
166	3.5	-0.058	431	438	277	595	294	407.0	400	62

BOX A TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: CI2700
Run #: 2

Job #: 18-447
Tracking #: 0020
Technician: SJB
Date: 1/29/2019

	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		0.075	0.00	74	-0.15		21.6		108	434	85	70
10	1.407	0.141	0.075	2.17	74	-2.46	97	20.4	-1.2	101	381	85	69
20	2.858	0.145	0.075	2.16	75	-2.53	100	19.0	-1.4	101	403	84	70
30	4.312	0.145	0.075	2.22	76	-2.07	100	17.4	-1.6	99	386	84	70
40	5.774	0.146	0.075	2.05	77	-2.71	100	15.9	-1.5	99	384	83	70
50	7.258	0.148	0.075	2.22	77	-0.26	102	14.4	-1.5	99	391	86	70
60	8.734	0.148	0.075	2.22	78	0	101	12.9	-1.5	99	392	85	70
70	10.226	0.149	0.075	2.23	78	-0.98	102	11.5	-1.4	99	385	84	70
80	11.711	0.149	0.075	2.21	79	0	101	10.4	-1.1	97	376	86	70
90	13.197	0.149	0.075	2.22	79	0	101	9.4	-1	97	376	86	70
100	14.685	0.149	0.075	2.22	80	0	101	8.4	-1	97	370	84	71
110	16.176	0.149	0.075	2.22	80	-1.07	101	7.6	-0.8	95	353	83	71
120	17.664	0.149	0.075	2.19	81	-0.83	101	7.0	-0.6	94	336	84	70
130	19.152	0.149	0.075	2.20	80	0	101	6.4	-0.6	93	333	87	71
140	20.634	0.148	0.075	2.17	81	0	100	5.9	-0.5	93	336	85	71
150	22.114	0.148	0.075	2.17	81	-1.23	100	5.4	-0.5	92	321	84	71
160	23.589	0.148	0.075	2.15	81	-2.53	100	4.9	-0.5	91	315	83	71
170	25.065	0.148	0.075	2.15	81	-1.14	99	4.5	-0.4	90	300	86	71
180	26.540	0.148	0.075	2.19	81	-0.98	99	4.1	-0.4	90	306	85	71
190	28.028	0.149	0.075	2.19	81	-2.65	100	3.8	-0.3	89	295	84	71
200	29.513	0.149	0.075	2.18	81	0	100	3.7	-0.1	88	269	84	71
210	30.997	0.148	0.075	2.16	81	-2.67	100	3.4	-0.3	87	252	86	71
220	32.483	0.149	0.075	2.17	81	-1.82	100	3.2	-0.2	86	239	85	71
230	33.969	0.149	0.075	2.19	81	-2.02	100	3.1	-0.1	84	226	84	71
240	35.465	0.150	0.075	2.22	81	-0.36	100	2.9	-0.2	84	215	85	71
250	36.965	0.150	0.075	2.21	81	-2.75	100	2.7	-0.2	83	205	86	71
260	38.467	0.150	0.075	2.23	81	0	100	2.7	0	82	194	86	71
270	39.965	0.150	0.075	2.21	81	0	100	2.6	-0.1	81	185	84	71
280	41.465	0.150	0.075	2.22	81	-0.52	100	2.5	-0.1	80	179	84	71
290	42.967	0.150	0.075	2.21	81	-0.39	100	2.4	-0.1	80	172	86	71
300	44.467	0.150	0.075	2.22	81	-2.69	100	2.3	-0.1	79	167	85	70
310	45.967	0.150	0.075	2.21	81	-2.38	100	2.2	-0.1	79	161	84	70
320	47.471	0.150	0.075	2.23	81	-2.08	100	2.1	-0.1	78	158	84	70

BOX A TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: CI2700
Run #: 2

Job #: 18-447
Tracking #: 0020
Technician: SJB
Date: 1/29/2019

	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	48.968	0.150	0.075	2.20	81	-0.59	100	2.0	-0.1	78	155	86	70
340	50.471	0.150	0.075	2.21	81	-2.03	100	2.0	0	78	155	86	70
350	51.972	0.150	0.075	2.21	81	-0.01	100	1.9	-0.1	78	150	83	70
360	53.469	0.150	0.075	2.21	81	0	100	1.8	-0.1	77	146	83	70
370	54.974	0.151	0.075	2.22	81	-2.12	100	1.7	-0.1	77	140	86	70
380	56.473	0.150	0.075	2.24	81	-2.56	100	1.7	0	76	135	86	69
390	57.973	0.150	0.075	2.22	81	0	100	1.6	-0.1	76	131	84	69
400	59.475	0.150	0.075	2.22	81	-2.63	100	1.5	-0.1	75	127	84	69
410	60.976	0.150	0.075	2.22	81	-1.56	100	1.5	0	75	124	86	69
420	62.476	0.150	0.075	2.23	81	-2.51	100	1.4	-0.1	75	121	86	69
430	63.979	0.150	0.075	2.22	80	-2.06	100	1.3	-0.1	74	116	84	69
440	65.478	0.150	0.075	2.22	80	-0.27	100	1.3	0	74	113	84	69
450	66.978	0.150	0.075	2.22	80	-1.77	100	1.3	0	74	108	86	68
460	68.482	0.150	0.075	2.23	80	0	100	1.3	0	73	103	86	68
470	69.980	0.150	0.075	2.21	80	-0.78	100	1.3	0	73	98	84	68
480	71.483	0.150	0.075	2.21	80	-2.02	100	1.2	-0.1	72	93	84	68
490	72.984	0.150	0.075	2.23	80	0	100	1.2	0	72	87	86	68
500	74.481	0.150	0.075	2.21	80	-2.46	99	1.2	0	72	83	86	68
510	75.986	0.151	0.075	2.20	79	-2.27	100	1.2	0	72	80	85	68
520	77.485	0.150	0.075	2.23	79	-2.22	100	1.2	0	71	77	84	67
530	78.984	0.150	0.075	2.23	79	-0.15	100	1.2	0	71	75	84	67
540	80.487	0.150	0.075	2.24	79	-2.72	100	1.2	0	71	74	86	67
550	81.986	0.150	0.075	2.23	79	-0.21	100	1.1	-0.1	70	73	86	67
560	83.485	0.150	0.075	2.22	79	-0.31	100	1.1	0	70	72	85	66
570	84.986	0.150	0.075	2.25	79	-0.04	100	1.1	0	70	71	84	67
580	86.485	0.150	0.075	2.22	79	-1.46	100	1.0	-0.1	70	71	84	67
590	87.983	0.150	0.075	2.25	78	-0.8	100	1.0	0	70	70	86	67
600	89.484	0.150	0.075	2.22	78	0	100	1.0	0	69	70	86	67
610	90.982	0.150	0.075	2.23	78	-0.04	100	0.9	-0.1	69	70	84	66
620	92.481	0.150	0.075	2.24	78	-0.83	100	0.9	0	69	70	84	66
630	93.982	0.150	0.075	2.22	78	-0.51	100	0.9	0	69	70	87	67
640	95.480	0.150	0.075	2.22	78	0	100	0.9	0	69	69	85	66
650	96.978	0.150	0.075	2.24	78	0	100	0.8	-0.1	69	69	83	66

BOX A TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: CI2700
Run #: 2

Job #: 18-447
Tracking #: 0020
Technician: SJB
Date: 1/29/2019

	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
660	98.480	0.150	0.075	2.23	78	-2.09	100	0.8	0	69	69	84	66
670	99.977	0.150	0.075	2.24	77	-0.96	100	0.7	-0.1	68	68	87	66
680	101.475	0.150	0.075	2.23	77	-0.01	100	0.7	0	68	69	84	66
690	102.977	0.150	0.075	2.24	77	-0.41	100	0.7	0	69	68	83	65
700	104.474	0.150	0.075	2.24	77	0	100	0.6	-0.1	68	68	85	65
710	105.972	0.150	0.075	2.23	77	-1.93	100	0.6	0	68	68	86	65
720	107.473	0.150	0.075	2.22	77	-1.69	100	0.6	0	68	68	84	65
730	108.969	0.150	0.075	2.23	77	-1.86	100	0.6	0	68	68	84	65
740	110.468	0.150	0.075	2.24	77	-0.76	100	0.5	-0.1	68	68	85	65
750	111.969	0.150	0.075	2.22	77	0	100	0.6	0.1	68	67	86	65
760	113.465	0.150	0.075	2.25	77	-0.05	100	0.4	-0.2	68	67	85	65
770	114.963	0.150	0.075	2.24	76	0	100	0.4	0	68	67	83	65
780	116.464	0.150	0.075	2.24	76	-2.71	100	0.3	-0.1	68	67	84	65
790	117.960	0.150	0.075	2.24	76	-2.61	100	0.3	0	68	67	87	65
800	119.458	0.150	0.075	2.22	76	0	100	0.2	-0.1	68	67	85	65
810	120.959	0.150	0.075	2.23	76	-1.2	100	0.2	0	68	67	84	65
820	122.455	0.150	0.075	2.22	76	-0.66	100	0.2	0	68	68	84	65
830	123.952	0.150	0.075	2.23	76	-2.48	100	0.1	-0.1	68	67	86	65
840	125.453	0.150	0.075	2.23	76	-0.63	100	0.1	0	69	67	85	65
849	126.801	0.135	0.075	2.22	76	-2.48	90	0.0	-0.1	69	67	84	65
Avg/Tot	126.801	0.149	0.075	2.19	79	-1.12	100			79	168	85	68.3

BOX B TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: CI2700
Run #: 2

Job #: 18-447
Tracking #: 0020
Technician: SJB
Date: 1/29/2019

	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	71	-1		85	0.000	5.70	0.09
10	1.384	0.138	2.15	73	-1.06	99	86	-0.080	9.65	0.40
20	2.813	0.143	2.16	76	-0.64	102	85	-0.070	10.88	1.36
30	4.246	0.143	2.21	80	-0.71	101	85	-0.070	10.43	1.43
40	5.683	0.144	2.04	83	-1.31	101	86	-0.060	10.04	1.72
50	7.150	0.147	2.23	86	-2.11	102	85	-0.070	10.13	2.10
60	8.612	0.146	2.20	88	-0.46	102	85	-0.070	10.41	2.15
70	10.075	0.146	2.20	90	-2.03	101	85	-0.070	10.74	1.33
80	11.541	0.147	2.20	92	-2.97	101	86	-0.060	10.72	0.62
90	13.008	0.147	2.18	93	-1.35	101	85	-0.060	10.30	1.14
100	14.476	0.147	2.19	94	-0.99	101	85	-0.060	10.61	0.74
110	15.944	0.147	2.20	95	-1.08	100	85	-0.070	9.14	0.11
120	17.413	0.147	2.19	95	-2.91	100	86	-0.060	8.31	0.00
130	18.881	0.147	2.19	96	-0.39	100	86	-0.050	9.25	0.20
140	20.348	0.147	2.18	96	-0.55	100	85	-0.060	8.74	0.30
150	21.812	0.146	2.16	97	-0.54	99	85	-0.070	8.38	0.36
160	23.272	0.146	2.15	97	-2.97	99	86	-0.050	8.39	0.05
170	24.728	0.146	2.13	97	-2.55	99	86	-0.060	8.56	0.00
180	26.187	0.146	2.17	97	-2.38	99	85	-0.080	8.74	0.02
190	27.653	0.147	2.17	97	-3	99	85	-0.050	7.13	0.00
200	29.115	0.146	2.14	97	-3.03	99	86	-0.060	6.75	0.01
210	30.575	0.146	2.14	98	-0.73	99	86	-0.060	6.47	0.00
220	32.034	0.146	2.14	98	-2.46	98	85	-0.040	6.18	0.00
230	33.494	0.146	2.14	98	-2.51	98	85	-0.050	6.22	0.00
240	34.985	0.149	2.24	98	-1.6	100	86	-0.050	5.99	0.00
250	36.477	0.149	2.24	98	-3.18	100	86	-0.030	5.79	0.00
260	37.971	0.149	2.25	98	-3.19	100	86	-0.030	5.52	0.00
270	39.466	0.150	2.23	98	-1.56	100	85	-0.030	5.46	0.00
280	40.960	0.149	2.24	98	-3.21	100	85	-0.030	5.34	0.00
290	42.453	0.149	2.25	98	-2.56	100	85	-0.030	5.34	0.00
300	43.950	0.150	2.24	98	-0.8	100	86	-0.030	5.29	0.01
310	45.445	0.150	2.26	98	-2.17	100	86	-0.020	5.34	0.00

BOX B TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: CI2700
Run #: 2

Job #: 18-447
Tracking #: 0020
Technician: SJB
Date: 1/29/2019

	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	46.938	0.149	2.25	98	-0.98	100	86	-0.030	5.51	0.01
330	48.431	0.149	2.24	98	-1.64	100	86	-0.030	5.47	0.00
340	49.926	0.150	2.23	98	-1.99	100	85	-0.030	5.35	0.00
350	51.419	0.149	2.24	98	-3.02	100	84	-0.020	5.24	0.00
360	52.911	0.149	2.24	98	-1.32	100	85	-0.010	4.92	0.00
370	54.406	0.150	2.24	98	-3.22	100	85	-0.030	4.51	0.00
380	55.901	0.150	2.26	98	-1.35	100	86	-0.020	4.53	0.02
390	57.392	0.149	2.25	98	-1.84	100	86	-0.020	4.55	0.01
400	58.885	0.149	2.24	98	-3.21	100	85	-0.020	4.64	0.01
410	60.381	0.150	2.25	97	-0.98	100	84	-0.020	4.41	0.01
420	61.874	0.149	2.25	97	-2.12	100	85	-0.020	4.38	0.00
430	63.367	0.149	2.26	97	-0.78	100	85	-0.020	4.41	0.00
440	64.862	0.150	2.25	97	-1.28	100	86	-0.020	4.41	0.00
450	66.357	0.150	2.25	97	-1.24	100	86	-0.020	4.17	0.01
460	67.850	0.149	2.24	97	-2.97	100	85	-0.010	3.99	0.07
470	69.342	0.149	2.25	96	-3.2	100	85	-0.010	3.58	0.13
480	70.839	0.150	2.25	96	-0.88	100	85	-0.010	2.96	0.20
490	72.332	0.149	2.25	96	-2.35	100	86	-0.010	2.11	0.25
500	73.824	0.149	2.25	96	-3.01	100	86	-0.010	1.29	0.22
510	75.319	0.150	2.24	96	-0.85	100	86	-0.010	0.74	0.11
520	76.815	0.150	2.25	96	-2.8	100	85	-0.010	0.33	0.05
530	78.307	0.149	2.25	96	-0.79	100	85	0.000	0.23	0.01
540	79.800	0.149	2.26	96	-2.81	100	84	-0.010	0.13	0.01
550	81.294	0.149	2.27	95	-1.57	100	84	-0.010	0.23	0.00
560	82.788	0.149	2.26	95	-3.02	100	85	0.000	0.23	0.00
570	84.279	0.149	2.27	95	-2.64	100	85	-0.010	0.12	0.00
580	85.772	0.149	2.24	95	-3.26	100	85	-0.010	0.13	0.00
590	87.269	0.150	2.26	95	-1.01	100	86	-0.010	0.04	0.03
600	88.761	0.149	2.26	95	-1	100	86	0.000	0.10	0.02
610	90.252	0.149	2.24	95	-0.94	99	86	-0.010	0.13	0.02
620	91.747	0.150	2.24	95	-3.1	100	85	-0.010	0.00	0.03
630	93.241	0.149	2.26	94	-2.65	100	85	0.010	0.15	0.02

BOX B TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: CI2700
Run #: 2

Job #: 18-447
Tracking #: 0020
Technician: SJB
Date: 1/29/2019

	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 (%)
640	94.731	0.149	2.26	94	-0.86	100	85	0.000	0.20	0.00
650	96.223	0.149	2.26	94	-0.83	100	84	0.010	0.09	0.02
660	97.718	0.150	2.25	94	-3.07	100	84	-0.010	0.12	0.01
670	99.210	0.149	2.27	94	-3.08	100	85	-0.010	0.16	0.02
680	100.700	0.149	2.26	94	-1.14	100	84	-0.020	0.24	0.00
690	102.193	0.149	2.26	93	-0.7	100	84	-0.010	0.00	0.02
700	103.687	0.149	2.25	93	-0.71	100	85	-0.010	0.21	0.00
710	105.179	0.149	2.26	93	-2.98	100	85	0.010	0.11	0.03
720	106.669	0.149	2.26	93	-3.21	100	85	-0.010	0.12	0.00
730	108.162	0.149	2.26	93	-0.74	100	85	0.000	0.14	0.02
740	109.655	0.149	2.27	93	-3.16	100	85	0.000	0.09	0.02
750	111.146	0.149	2.26	93	-1.12	100	85	0.000	0.19	0.00
760	112.636	0.149	2.26	93	-0.67	100	86	0.010	0.12	0.03
770	114.130	0.149	2.27	93	-2.19	100	86	0.000	0.11	0.04
780	115.622	0.149	2.27	93	-2.74	100	85	-0.010	0.05	0.03
790	117.111	0.149	2.25	93	-0.81	100	85	0.000	0.24	0.00
800	118.602	0.149	2.25	92	-0.58	100	86	0.000	0.11	0.04
810	120.095	0.149	2.25	93	-3.08	100	86	0.000	0.17	0.03
820	121.587	0.149	2.27	93	-1.8	100	86	0.000	0.22	0.01
830	123.076	0.149	2.27	92	-1.06	100	85	0.010	0.28	0.01
840	124.566	0.149	2.26	93	-3.11	100	85	0.000	0.18	0.02
849	125.909	0.134	2.27	92	-2.96	90	85	0.000	0.23	0.00
Avg/Tot	125.909	0.148	2.20	94	-1.89	100			3.98	0.18

WOODSTOVE SURFACE TEMPERATURE DATA

Client: FPI
Model: CI2700
Run #: 2

Job #: 18-447
Tracking #: 0020
Technician: SJB
Date: 1/29/2019

	Temperature Data (°F)						
Elapsed Time (min)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
0	430	440	286	593	297	409.2	832
10	412	420	337	620	339	425.6	983
20	378	384	329	723	367	436.2	1088
30	346	357	232	713	336	396.8	1073
40	322	333	204	700	308	373.4	1060
50	306	310	192	699	292	359.8	1108
60	299	295	186	702	282	352.8	1099
70	299	288	184	700	273	348.8	1085
80	304	289	183	703	265	348.8	1085
90	308	291	187	706	258	350.0	1078
100	314	294	190	697	255	350.0	1054
110	328	299	192	681	253	350.6	1042
120	340	300	193	632	251	343.2	960
130	344	301	197	602	251	339.0	962
140	347	303	202	612	250	342.8	1014
150	353	308	208	581	249	339.8	900
160	356	309	211	566	250	338.4	898
170	358	311	224	536	250	335.8	823
180	359	314	226	533	248	336.0	889
190	359	318	219	528	247	334.2	829
200	353	319	214	485	250	324.2	745
210	348	315	208	452	252	315.0	710
220	341	311	207	425	251	307.0	675
230	335	306	205	401	248	299.0	640
240	328	301	202	381	246	291.6	620
250	320	295	200	363	244	284.4	590
260	313	289	197	344	237	276.0	556
270	304	281	194	327	230	267.2	530
280	296	275	191	313	225	260.0	509
290	288	268	187	300	220	252.6	493
300	279	263	182	291	217	246.4	484
310	272	259	178	283	213	241.0	467
320	264	255	175	275	211	236.0	462
330	256	251	173	273	215	233.6	470
340	249	246	170	270	216	230.2	469
350	242	243	166	264	213	225.6	453
360	236	241	163	256	209	221.0	434
370	231	237	159	247	203	215.4	415
380	224	233	156	238	198	209.8	400
390	218	229	154	231	193	205.0	388
400	212	226	151	224	189	200.4	378
410	207	224	148	218	185	196.4	367
420	201	220	144	212	182	191.8	355
430	197	213	141	206	180	187.4	342
440	193	206	139	199	178	183.0	328
450	189	200	137	192	176	178.8	315
460	183	195	135	186	174	174.6	299
470	177	189	132	178	171	169.4	282

WOODSTOVE SURFACE TEMPERATURE DATA

Client: FPI
Model: CI2700
Run #: 2

Job #: 18-447
Tracking #: 0020
Technician: SJB
Date: 1/29/2019

	Temperature Data (°F)						
Elapsed Time (min)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
480	169	183	129	170	168	163.8	262
490	162	175	125	161	164	157.4	240
500	155	168	123	151	161	151.6	212
510	148	162	121	142	158	146.2	187
520	143	156	120	135	154	141.6	168
530	138	152	120	128	152	138.0	154
540	134	148	120	123	149	134.8	144
550	131	146	119	120	146	132.4	137
560	129	145	118	117	145	130.8	131
570	128	145	117	115	143	129.6	127
580	128	145	117	113	142	129.0	124
590	128	146	117	112	142	129.0	123
600	129	146	117	112	141	129.0	122
610	131	146	117	111	141	129.2	121
620	135	145	115	111	141	129.4	122
630	139	146	113	111	141	130.0	122
640	141	147	111	111	141	130.2	123
650	142	146	109	111	141	129.8	123
660	143	142	107	111	140	128.6	122
670	144	139	106	110	139	127.6	122
680	145	135	106	110	139	127.0	121
690	147	134	105	109	138	126.6	122
700	147	133	105	109	138	126.4	121
710	145	134	105	109	138	126.2	121
720	142	137	105	108	138	126.0	121
730	138	139	106	108	138	125.8	120
740	135	141	106	108	138	125.6	119
750	132	143	107	108	137	125.4	119
760	129	144	108	107	137	125.0	118
770	127	145	109	107	137	125.0	117
780	125	146	110	108	137	125.2	117
790	123	147	111	108	138	125.4	116
800	121	149	112	109	139	126.0	117
810	120	149	114	110	139	126.4	118
820	120	148	115	110	138	126.2	119
830	120	148	115	111	139	126.6	119
840	119	146	114	111	139	125.8	119
849	118	145	112	111	140	125.2	119
Average	224	223	157	294	196	219	444

LAB SAMPLE DATA - ASTM E2515

Client: FPI
Model: CI2700
Run #: 2

Job #: 18-447
Tracking #: 0020
Technician: SJB
Date: 1/29/2019

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	T070, T071	171.8	167.7	4.1
B. Rear filter catch	Filter				0.0
C. Probe catch*	Probe				0.0
D. O-Ring catch*	O-Ring				0.0

Sub-Total	Total Particulate, mg:	4.1

TRAIN A (Post 1st hour)

Sample Component	Sample Type	Filter, Probe, or O-Ring #	Weights		
			Final, mg	Tare, mg	Particulate, mg
A. Front filter catch	Filter	T077	167.2	82.0	1.4
B. Rear filter catch	Filter	T072		83.8	
C. Probe catch*	Probe	2A	116239.9	116239.6	0.3
D. O-Ring catch*	O-Ring	2A	3548.2	3547.9	0.3

Sub-Total	Total Particulate, mg:	2.0
Train A Aggregate	Total Particulate, mg:	**6.1**

TRAIN B

Sample Component	Reagent	Filter, Probe, or O-Ring #	Weights		
			Final, mg	Tare, mg	Particulate, mg
A. Front filter catch	Filter	T073, T076	253.1	165.5	5.2
B. Rear filter catch	Filter	T074		82.4	
C. Probe catch*	Probe	2B	116330.0	116329.4	0.6
D. O-Ring catch*	O-Ring	2B	3566.6	3566.5	0.1

Total Particulate, mg:	**5.9**

AMBIENT

Sample Component	Reagent	Filter, Probe, or O-Ring #	Weights		
			Final, mg	Tare, mg	Particulate, mg
A. Filter catch*	Filter	T075	82.4	82.4	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: 18-447 | Tracking #: 0020
Model: CI2700 | Run Number: 2 | Test Date: 1/29/2019

Wood Heater Run Notes

Pre-Test Notes
Pre-Test Start Time: 8:16
Air Control Setting: Full Open

Time	Notes
0 min	Starting with 1.9 lbs of kindling and ~6 pieces of printer paper, lit fuel with propane torch for 15 seconds; door cracked 3".
1.5 min	Door closed down to 1"
3 min	Door latched closed
7 min	@ 0.8 lbs, added remaining kindling fuel (0.8 lbs) and a couple pieces of start-up fuel (1.5 lbs); door open 60 seconds
11 min	Bypass closed
25 min	@ 0.9 lbs, added remaining start-up fuel pieces (3.3 lbs); door open 120 seconds
36 min	@2.0 lbs, leveled coal bed, loaded High Fire fuel load, door closed 20 seconds after loading completed.
56 min	Turned fan on high, per manufacturer's instructions
127 min	@ 7.0 lbs, adjusted fuel load to bring unburnt pieces forward, in order to achieve uniform charcoalization
166 min	@ 3.5 lbs, leveled coal bed, turned fan off, zeroed scale in preparation of Low Fire fuel loading

Test Notes
Test Burn Start Time: 11:04
Air Control Setting: Fully Closed

Time	Notes
0 min	Fuel loading done in 40 seconds, door closed at 80 seconds, air fully open
6 min	Set air to test setting
20 min	Turned fan on high, per manufacturer's instructions
42 min	Changed front filter on both trains due to plugging
60 min	Changed 1-hour filter
849 min	End of Test

Test Burn End Time: 1/30/2019 - 1:13

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	9:01	9:07	9:04	9:14	9:10	9:16
CO_2	0.00	10.09	16.93	0.10	10.11	16.88
CO	0.000	2.510	4.330	0.023	2.510	4.303

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

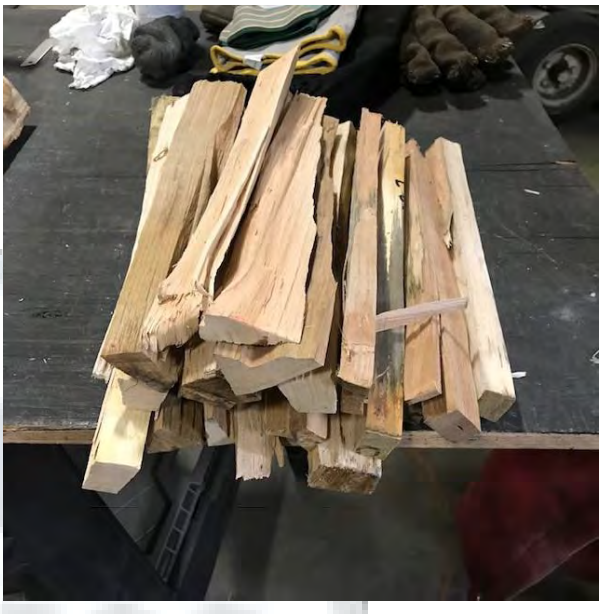
Technician Signature: Date: 1/30/2019

ASTM E3053 Wood Heater Run Sheets

Client: FPI | Job Number: 18-447 | Tracking #: 0020
Model: CI2700 | Run Number: 2 | Test Date: 1/29/2019

Test Photos

Kindling Fuel Load



Start-up Fuel Load

High Fire Fuel Load

Residual Start-up Fuel Coal Bed

Technician Signature: _____ Date: 1/30/2019

ASTM E3053 Wood Heater Run Sheets

Client: FPI Job Number: 18-447 Tracking #: 0020
Model: CI2700 Run Number: 2 Test Date: 1/29/2019

High Fire Fuel Loaded

Residual High Fire Load Coal Bed

Low Fire Fuel Load

Low Fire Fuel Loaded

Technician Signature: Date: 1/30/2019

WOOD STOVE TEST DATA PACKET
ASTM E3053/E2515

Run 3 Data Summary

Client: FPI
Model: CI2700
Job #: 18-447
Tracking #: 0020
Test Date: 1/30/2019

Techician Signature

2/4/2019
Date

TEST RESULTS - ASTM E3053 / ASTM E2515

Client: FPI
Model: CI2700
Run #: 3

Job #: 18-447
Tracking #: 0020
Technician: SJB
Date: 1/30/2019

Burn Rate (kg/hr):	1.31

	Ambient Sample	Sample Train A	Sample Train B	1st Hour Filter
Total Sample Volume (ft^3)	43.452	53.872	53.184	8.721
Average Gas Velocity in Dilution Tunnel (ft/sec)	16.10			
Average Gas Flow Rate in Dilution Tunnel (dscf/hr)	10622.6			
Average Gas Meter Temperature (°F)	70.1	79.2	93.1	74.7
Total Sample Volume (dscf)	43.097	53.076	50.877	8.664
Average Tunnel Temperature (°F)	92.6			
Total Time of Test (min)	360			
Total Particulate Catch (mg)	0.1	6.6	5.1	3.5
Particulate Concentration, dry-standard (g/dscf)	0.0000023	0.0001243	0.0001002	0.0004040
Total PM Emissions (g)	0.15	7.78	6.24	4.27
Particulate Emission Rate (g/hr)	0.02	1.30	1.04	4.27
Emissions Factor (g/kg)	-	0.99	0.79	-
Difference from Average Total Particulate Emissions (g)	-	0.77	0.77	-
Difference from Average Emissions Factor (g/kg)	-	0.10	0.10	-

Final Average Results	
Total Particulate Emissions (g)	7.01
Particulate Emission Rate (g/hr)	1.17
Emissions Factor (g/kg)	0.89
HHV Efficiency (%)	72.1%
LHV Efficiency (%)	77.1%
CO Emissions (g/min)	1.76

Quality Checks	Requirement	Observed	Result
Dual Train Precision	Each train within 7.5% of average emissions (in grams), or emission factors within 0.5 g/kg	See Above	OK
Filter Temps	>80 °F, <90 °F	Min: 82 / Max: 87	OK
Face Velocity	< 30 ft/min	9.0	OK
Leakage Rate	Less than 4% of average sample rate	0 cfm	OK
Ambient Temp	55-90 °F	Min: 66 / 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	CHECK 10 MIN. INTERVAL PRO-RATES

B415.1 Efficiency Results

Manufacturer:	FPI
Model:	CI2700
Date:	01/30/19
Run:	3
Control #:	18-447
Test Duration:	360
Output Category:	Medium

Test Results in Accordance with CSA B415.1-09

	HHV Basis	LHV Basis
Overall Efficiency	72.1%	77.1%
Combustion Efficiency	94.5%	94.5%
Heat Transfer Efficiency	76.3%	81.6%

Output Rate (kJ/h)	18,825	17,857	**(Btu/h)**
Burn Rate (kg/h)	1.31	2.88	**(lb/h)**
Input (kJ/h)	26,102	24,761	**(Btu/h)**

Test Load Weight (dry kg)	7.85	17.29	**dry lb**
MC wet (%)	18.04		
MC dry (%)	22.01		
Particulate (g)	7.01		
CO (g)	635		
Test Duration (h)	6.00		

Emissions	**Particulate**	**CO**
g/MJ Output	0.06	5.62
g/kg Dry Fuel	0.89	80.92
g/h	1.17	105.82
g/min	0.02	1.76
lb/MM Btu Output	0.14	13.06

Air/Fuel Ratio (A/F)	15.78

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

HIGH FIRE FUEL LOAD DATA - ASTM E3053

Client: FPI | Job #: 18-447
Model: CI2700 | Tracking #: 0020
Run #: 3 | Technician: SJB
Date: 1/30/2019

Nominal Loading Density (lbs/ft^3, wet basis):	10		
Usable Firebox Volume (ft^3):	1.83		
Target Load Weight (lbs):	18.30		
Total Load Weight Range (lbs):	17.40	to	19.20
Core Load Weight Range (lbs):	8.20	to	11.90
Remainder Load Weight Range (lbs):	6.40	to	10.10
Core Load Piece Range (lbs):	2.70	to	4.60
Remainder Load Piece Range (lbs):	1.80	to	10.10
Max Allowable Kindling Weight (lbs):	3.54		
Max Allowable Start-up Fuel Weight (lbs):	5.30		

CORE LOAD DATA

				Fuel Piece Moisture Readings (%DB)					Dry Weight	
Piece #	Length (in)	Weight (lbs)	Within Spec?	1	2	3	Ave.	Within Spec?	lbs	kg
1	17.00	3.15	In Range	19.0	18.4	19.9	19.1	In Range	2.64	1.20
2	17.00	3.44	In Range	21.9	19.5	20.5	20.6	In Range	2.85	1.29
3	17.00	3.95	In Range	23.1	24.2	21.7	23.0	In Range	3.21	1.46
Core Load Wt. (lbs)		10.54	In Range							

REMAINDER LOAD DATA (1 to 3 Pieces)

				Fuel Piece Moisture Readings (%DB)					Dry Weight	
Piece #	Length (in)	Weight (lbs)	Within Spec?	1	2	3	Ave.	Within Spec?	lbs	kg
1	17.00	1.81	In Range	23.0	20.4	19.8	21.1	In Range	1.50	0.68
2	17.00	2.60	In Range	25.0	25.3	22.9	24.4	In Range	2.09	0.95
3	17.00	2.73	In Range	19.2	22.3	21.5	21.0	In Range	2.26	1.02
Remainder Load (lbs)		7.14	In Range							

Total Load Weight (lbs):	17.68	In Range	
Core Load % of Total Weight:	60%	In Range	45-65%
Remainder % of Total Weight:	40%	In Range	35-55%
Total Load % of Target Weight:	97%	In Range	95-105%
Actual Fuel Loading Density (lb/ft3):	9.7		
Total Load Average Moisture Conent (%DB):	21.5	In Range	19-25%
Total Load Average Moisture Conent (%WB):	17.7		
Total Test Load Weight (dry basis):	14.55 lbs	6.60 kg	

KINDLING AND START-UP FUEL

		Kindling Moisture Readings (%DB)					Dry Weight	
Kindling Weight (lbs)	Within Spec?	1	2	3	Avg.	Within Spec?	lbs	kg
2.93	In Range	10	10	10	10.0	In Range	2.66	1.21

		Start-up Moisture Readings (%DB)					Dry Weight	
Start-up Fuel Wt. (lb)	Within Spec?	1	2	3	Avg.	Within Spec?	lbs	kg
4.96	In Range	23.1	19.8	20.4	21.1	In Range	4.10	1.86

TEST FUEL LOADING RANGE

Allowable Residual Start-up Fuel Range (lb):	1.8	to	3.5	
Actual Residual Start-up Fuel Weight (lb):		1.9		In Range

LOW & MEDIUM FIRE FUEL LOAD DATA - ASTM E3053

Client: FPI
Job #: 18-447
Model: CI2700
Tracking #: 0020
Run #: 3
Technician: SJB
Date: 1/30/2019

Nominal Loading Density (lbs/ft^3, wet basis):	12		
Usable Firebox Volume (ft^3):	1.83		
Target Load Weight (lbs):	21.96		
Total Load Weight Range (lbs):	20.86	to	23.06
Core Load Weight Range (lbs):	9.88	to	14.27
Remainder Load Weight Range (lbs):	7.69	to	12.08
Core Load Piece Range (lbs):	3.29	to	5.49
Remainder Load Piece Range (lbs):	2.20	to	6.59

CORE LOAD DATA

				Fuel Piece Moisture Readings (%DB)					Dry Weight	
Piece #	Length (in)	Weight (lbs)	Within Spec?	1	2	3	Ave.	Within Spec?	lbs	kg
1	17.00	4.41	In Range	22.8	24.6	20.8	22.7	In Range	3.59	1.63
2	17.00	4.81	In Range	20.6	20.2	24.7	21.8	In Range	3.95	1.79
3	17.00	4.01	In Range	19.5	19.1	20.6	19.7	In Range	3.35	1.52
Core Load Wt. (lbs)		13.23	In Range							

REMAINDER LOAD DATA (2 to 3 Pieces)

				Fuel Piece Moisture Readings (%DB)					Dry Weight	
Piece #	Length (in)	Weight (lbs)	Within Spec?	1	2	3	Ave.	Within Spec?	lbs	kg
1	17.00	4.87	In Range	25.3	23.7	22.9	24.0	In Range	3.93	1.78
2	17.00	2.98	In Range	21.0	21.0	21.7	21.2	In Range	2.46	1.11
3			NA				NA	NA	NA	NA
Remainder Load (lbs)		7.85	In Range							

Remainder Load Small/Large Piece Weight Ratio:	61%	In Range	≤ 67%
Total Load Weight (lbs):	21.08	In Range	
Core Load % of Total Weight:	63%	In Range	45-65%
Remainder % of Total Weight:	37%	In Range	35-55%
Total Load % of Target Weight:	96%	In Range	95-105%
Actual Fuel Loading Density (lb/ft3):	11.5		
Total Load Average Moisture Conent (%DB):	22.0	In Range	19-25%
Total Load Average Moisture Conent (%WB):	18.0		
Total Test Load Weight (dry basis):	17.28 lbs	7.84 kg	

TEST FUEL LOADING RANGE

Allowable Charcoal Bed Weight Range (lb):	2.2	to	4.2	
Actual Charcoal Bed Wt. (lb):		3.7		In Range

TEST END POINT

Actual Fuel Load Ending Weight (lb): 0.0 Valid Test (≥90%)

Total Fuel Burned During Test Run: 21.1 lbs, wet basis
17.3 lbs, dry basis
7.84 kg, dry basis

DILUTION TUNNEL & MISC. DATA - ASTM E3053 / E2515

Client:	FPI	Job #:	18-447
Model:	CI2700	Tracking #:	0020
Run #:	3	Technician:	SJB
Test Start Time:	12:48	Date:	1/30/2019
Test Type:	Medium Fire		

Recording Interval (min):	1
Total Sampling Time (min):	360

Meter Box γ Factor:	1.004	(A)
Meter Box γ Factor:	1.000	(B)
Meter Box γ Factor:	0.999	(Ambient)

	Pre-Test	Post Test	Avg.
Barometric Pressure (in. Hg)	29.84	29.83	29.84
Relative Humidity (%)	20.7	23.7	
Room Air Velocity (ft/min)	0	0	
Scale Audit (lbs)	10.0	10.0	

Ambient Sample Volume: 43.452 ft^3

Induced Draft Check (in. H_2O):	0
Smoke Capture Check (%):	100%
Date Flue Pipe Last Cleaned:	1/28/2019

Sample Train Post-Test Leak Checks

(A)	0.000	cfm @	-11	in. Hg
(B)	0.000	cfm @	-12	in. Hg
(Ambient)	0.001	cfm @	-14	in. Hg

DILUTION TUNNEL FLOW

Traverse Data

Point	dP (in H_2O)	Temp (°F)
1	0.040	106
2	0.072	106
3	0.062	106
4	0.044	106
5	0.044	106
6	0.062	106
7	0.070	106
8	0.044	106
Center	0.075	106

Static Pressure: -0.210 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}:	16.30	ft/sec
V_{scent}:	18.82	ft/sec
F_p:	0.866	[ratio]
Initial Tunnel Flow:	171.6	scf/min

TEST FUEL PROPERTIES

ASTM 3053-17 - Table A1.1 Fuel Properties by Fuel Species

Select Fuel Type	Species	%C	%H	%O	%Ash	MJ/kg	BTU/lb
	Ash, White	49.70	6.90	43.00	0.30	20.75	8927
	Beech	48.70	5.80	44.70	0.60	18.80	8088
	Birch, Sweet	49.80	6.50	43.40	0.30	20.12	8656
	Birch, Yellow	49.80	6.50	43.40	0.30	20.12	8656
	Doug Fir (Coast, Interior West/North)	48.73	6.87	43.90	0.50	19.81	8522
	Doug Fir (Interioir South)	48.73	6.87	43.90	0.50	19.81	8522
	Elm, Rock	50.40	6.60	42.30	0.70	20.49	8815
	Elm, Soft	50.40	6.60	42.30	0.70	20.49	8815
	Gum, Red	50.88	6.06	41.57	1.28	19.72	8478
	Larch, Western	50.54	6.36	42.40	0.70	17.58	7558
X	Maple, Hard	50.64	6.02	41.74	1.35	19.96	8587
	Maple, Sugar	50.64	6.02	41.74	1.35	19.96	8587
	Oak, Red	49.50	6.62	43.70	0.20	20.20	8690
	Oak, White	50.40	6.59	42.70	0.20	20.50	8819
	Pine, Southern	52.60	7.00	40.10	1.31	22.30	9587
	Pine, Southern Long Leaf	52.60	7.02	40.10	1.30	22.30	9594
	Other						

WOODSTOVE PREBURN DATA

Client: FPI
Model: CI2700
Run #: 3

Job #: 18-447
Tracking #: 0020
Technician: SJB
Date: 1/30/2019

Recording Interval (min): 1
Run Time (min): 153

			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	1.8	0.007	77	77	80	79	80	78.6	75	62
1	1.5	-0.041	78	78	81	84	80	80.2	155	62
2	1.1	-0.083	81	80	90	105	80	87.2	361	62
3	0.6	-0.095	88	86	110	130	81	99.0	540	62
4	0.6	-0.074	96	93	125	154	83	110.2	421	62
5	0.4	-0.056	104	100	135	175	86	120.0	390	62
6	0.3	-0.059	112	107	145	196	91	130.2	345	62
7	3.1	-0.055	119	114	152	219	97	140.2	370	62
8	3.0	-0.057	128	122	158	236	103	149.4	347	62
9	2.8	-0.061	135	129	164	251	110	157.8	340	62
10	2.7	-0.068	141	136	170	268	117	166.4	346	62
11	2.7	-0.068	146	143	175	282	124	174.0	351	62
12	2.5	-0.064	151	151	181	297	130	182.0	348	62
13	2.4	-0.058	155	158	187	306	137	188.6	343	62
14	2.3	-0.068	159	165	193	316	143	195.2	341	62
15	2.2	-0.066	163	171	198	325	149	201.2	341	62
16	2.1	-0.060	167	177	202	333	155	206.8	342	62
17	2.0	-0.060	171	182	208	341	161	212.6	342	62
18	2.0	-0.052	175	188	213	349	166	218.2	343	62
19	1.8	-0.065	179	193	220	356	171	223.8	344	62
20	1.7	-0.054	185	199	227	364	176	230.2	344	62
21	1.6	-0.059	190	204	234	371	181	236.0	346	62
22	1.5	-0.070	197	208	241	377	186	241.8	348	62
23	1.5	-0.060	203	213	247	384	190	247.4	351	62
24	4.4	-0.077	211	217	254	399	194	255.0	419	62
25	4.1	-0.081	218	222	259	416	198	262.6	419	62
26	3.9	-0.083	226	226	262	442	203	271.8	441	62
27	3.6	-0.081	234	230	263	469	207	280.6	466	62
28	3.4	-0.071	243	234	266	499	211	290.6	483	63
29	3.2	-0.084	251	238	266	530	216	300.2	491	63
30	3.0	-0.096	260	242	267	555	220	308.8	495	63
31	2.8	-0.067	269	247	266	575	224	316.2	495	63
32	2.7	-0.073	277	252	269	592	229	323.8	494	63
33	2.5	-0.078	285	257	275	607	233	331.4	492	63
34	2.4	-0.086	293	262	275	617	238	337.0	486	63
35	2.3	-0.082	300	268	279	623	242	342.4	478	63
36	2.1	-0.076	308	274	286	629	247	348.8	471	63
37	2.0	-0.079	315	279	292	631	251	353.6	465	63
38	1.9	-0.074	321	285	300	632	255	358.6	462	63
39	1.7	-0.070	328	292	308	636	260	364.8	491	63
40	19.2	-0.091	333	298	337	643	264	375.0	556	63
41	19.0	-0.085	337	305	341	653	268	380.8	514	63
42	18.8	-0.083	341	312	343	668	272	387.2	520	63
43	18.6	-0.086	344	319	344	691	276	394.8	538	63

WOODSTOVE PREBURN DATA

Client: FPI
Model: CI2700
Run #: 3

Job #: 18-447
Tracking #: 0020
Technician: SJB
Date: 1/30/2019

Recording Interval (min): 1
Run Time (min): 153

			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	18.4	-0.080	345	325	344	714	280	401.6	549	63
45	18.2	-0.097	347	330	345	734	283	407.8	564	63
46	18.0	-0.098	349	335	345	751	287	413.4	570	63
47	17.7	-0.086	350	338	344	768	290	418.0	576	63
48	17.5	-0.085	352	341	343	784	294	422.8	575	63
49	17.4	-0.097	355	343	342	797	298	427.0	574	63
50	17.2	-0.095	357	345	341	809	302	430.8	575	63
51	17.0	-0.085	361	346	341	816	305	433.8	573	63
52	16.8	-0.094	363	347	340	823	309	436.4	569	63
53	16.6	-0.093	365	347	339	827	312	438.0	565	63
54	16.4	-0.095	368	348	338	830	316	440.0	563	63
55	16.1	-0.093	371	348	338	832	320	441.8	563	63
56	16.0	-0.093	373	349	338	832	323	443.0	562	63
57	15.7	-0.087	375	349	338	835	327	444.8	560	63
58	15.6	-0.087	377	350	338	837	330	446.4	558	63
59	15.4	-0.089	379	351	339	840	334	448.6	558	64
60	15.3	-0.090	380	351	312	827	335	441.0	543	64
61	15.1	-0.093	381	351	293	824	335	436.8	540	64
62	14.9	-0.080	381	351	280	823	335	434.0	543	64
63	14.7	-0.081	381	351	270	824	333	431.8	546	64
64	14.5	-0.075	382	352	262	828	331	431.0	549	64
65	14.4	-0.095	383	352	256	830	329	430.0	546	64
66	14.2	-0.086	383	352	252	830	327	428.8	545	64
67	13.9	-0.073	384	352	249	829	326	428.0	545	64
68	13.8	-0.100	384	352	247	829	324	427.2	543	64
69	13.7	-0.082	384	353	244	821	322	424.8	535	64
70	13.6	-0.089	384	352	241	811	321	421.8	526	63
71	13.3	-0.070	384	352	238	801	319	418.8	521	63
72	13.2	-0.089	384	352	234	790	318	415.6	515	63
73	13.0	-0.083	384	352	231	782	317	413.2	512	63
74	12.7	-0.084	383	352	229	774	315	410.6	509	63
75	12.7	-0.077	383	351	227	768	314	408.6	508	63
76	12.5	-0.078	382	351	223	759	313	405.6	507	63
77	12.3	-0.081	383	350	220	753	313	403.8	503	63
78	12.2	-0.080	382	350	219	749	312	402.4	502	63
79	12.0	-0.091	383	349	218	744	311	401.0	501	63
80	11.8	-0.079	382	349	217	739	310	399.4	499	63
81	11.7	-0.083	382	349	217	737	309	398.8	496	63
82	11.5	-0.085	382	348	216	732	309	397.4	489	63
83	11.4	-0.081	382	348	216	730	308	396.8	486	63
84	11.2	-0.072	382	348	215	727	308	396.0	487	63
85	11.0	-0.072	382	348	215	727	307	395.8	485	63
86	10.8	-0.082	382	348	214	726	307	395.4	484	63
87	10.6	-0.071	382	349	214	724	306	395.0	483	62

WOODSTOVE PREBURN DATA

Client: FPI
Model: CI2700
Run #: 3

Job #: 18-447
Tracking #: 0020
Technician: SJB
Date: 1/30/2019

Recording Interval (min): 1
Run Time (min): 153

			Temperatures (°F)							
Elapsed Time (min)	**Scale Reading (lbs)**	**Flue Draft (in H_2O)**	**FB Left**	**FB Right**	**FB Back**	**FB Top**	**FB Bottom**	**Stove Surface Average**	**Flue**	**Ambient**
88	10.6	-0.075	382	349	214	725	306	395.2	483	62
89	10.4	-0.081	382	350	214	725	305	395.2	483	62
90	10.2	-0.074	381	350	215	723	305	394.8	482	62
91	10.1	-0.074	382	351	215	724	304	395.2	480	62
92	9.8	-0.080	382	352	215	722	303	394.8	479	62
93	9.8	-0.073	382	353	215	721	303	394.8	481	62
94	9.6	-0.081	382	354	215	722	302	395.0	481	62
95	9.5	-0.085	381	355	215	721	302	394.8	479	62
96	9.2	-0.078	382	356	215	719	302	394.8	477	62
97	9.2	-0.085	382	357	216	719	301	395.0	477	62
98	9.0	-0.095	382	358	216	719	301	395.2	476	62
99	8.9	-0.085	382	359	216	718	301	395.2	474	62
100	8.8	-0.084	382	360	216	718	300	395.2	474	62
101	8.6	-0.080	382	361	216	716	300	395.0	473	62
102	8.5	-0.077	382	363	216	715	299	395.0	471	62
103	8.5	-0.074	382	364	216	715	299	395.2	468	62
104	8.3	-0.073	382	366	216	712	298	394.8	468	62
105	8.1	-0.063	382	367	216	711	298	394.8	466	62
106	8.1	-0.078	382	368	216	711	297	394.8	466	62
107	7.8	-0.081	381	370	217	709	297	394.8	465	62
108	7.7	-0.079	383	371	216	708	296	394.8	462	62
109	7.7	-0.093	383	372	216	707	296	394.8	462	62
110	7.5	-0.076	383	374	216	706	295	394.8	459	62
111	7.4	-0.074	384	375	217	705	295	395.2	457	62
112	7.3	-0.075	384	376	217	702	294	394.6	455	62
113	7.2	-0.072	384	377	218	702	294	395.0	452	62
114	7.1	-0.077	385	378	219	700	294	395.2	449	62
115	7.0	-0.077	385	379	220	697	294	395.0	447	62
116	6.9	-0.076	387	380	220	694	294	395.0	445	62
117	6.6	-0.065	389	381	226	698	294	397.6	516	62
118	6.4	-0.076	391	384	226	701	295	399.4	492	62
119	6.2	-0.084	393	386	226	705	295	401.0	486	62
120	6.0	-0.068	395	389	228	711	296	403.8	485	62
121	5.8	-0.069	398	393	230	716	296	406.6	485	62
122	5.7	-0.070	400	397	232	722	297	409.6	483	62
123	5.6	-0.081	403	401	234	731	297	413.2	481	62
124	5.4	-0.083	406	405	235	737	298	416.2	479	62
125	5.3	-0.069	408	408	237	740	299	418.4	478	62
126	5.2	-0.072	410	411	240	743	299	420.6	472	62
127	5.2	-0.093	412	414	243	744	300	422.6	469	62
128	5.1	-0.079	414	417	244	744	301	424.0	466	62
129	5.0	-0.076	416	420	245	742	302	425.0	463	62
130	4.9	-0.094	418	423	247	741	302	426.2	460	62
131	4.8	-0.083	420	425	249	737	304	427.0	456	62

WOODSTOVE PREBURN DATA

Client: FPI
Model: CI2700
Run #: 3

Job #: 18-447
Tracking #: 0020
Technician: SJB
Date: 1/30/2019

Recording Interval (min): 1
Run Time (min): 153

			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	4.8	-0.078	421	427	250	735	305	427.6	454	62
133	4.7	-0.081	423	429	251	733	306	428.4	451	62
134	4.6	-0.068	424	432	253	728	307	428.8	447	62
135	4.6	-0.070	426	433	254	724	308	429.0	446	62
136	4.6	-0.081	427	435	256	719	309	429.2	442	62
137	4.4	-0.081	428	436	257	714	309	428.8	438	62
138	4.5	-0.077	429	438	259	707	310	428.6	436	62
139	4.3	-0.069	430	439	260	705	310	428.8	433	62
140	4.2	-0.063	431	440	262	698	311	428.4	431	62
141	4.2	-0.072	431	441	263	693	311	427.8	428	62
142	4.2	-0.072	433	442	265	686	312	427.6	423	62
143	4.1	-0.078	432	442	266	679	312	426.2	422	62
144	4.2	-0.072	434	443	267	671	313	425.6	417	62
145	4.0	-0.089	435	443	268	664	313	424.6	414	62
146	4.0	-0.066	436	443	269	655	313	423.2	411	62
147	4.0	-0.075	437	443	269	648	314	422.2	407	62
148	3.9	-0.071	437	442	270	640	314	420.6	404	62
149	3.9	-0.075	437	442	270	633	314	419.2	402	62
150	3.8	-0.070	438	442	271	625	315	418.2	399	62
151	3.8	-0.063	438	441	271	619	315	416.8	398	63
152	3.7	-0.068	438	441	270	612	315	415.2	395	63
153	3.7	-0.076	438	440	270	606	316	414.0	395	63

BOX A TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: CI2700
Run #: 3

Job #: 18-447
Tracking #: 0020
Technician: SJB
Date: 1/30/2019

	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	0.315		0.075	0.00	73	-0.12		21.1		110	428	84	70
1	0.417	0.102	0.075	2.25	73	-0.79	71	20.9	-0.2	124	459	86	70
2	0.562	0.145	0.075	2.24	73	0	100	20.7	-0.2	119	411	85	69
3	0.708	0.146	0.075	2.20	73	0	100	20.5	-0.2	112	393	84	69
4	0.852	0.144	0.075	2.19	73	-1.95	99	20.5	0	110	404	82	69
5	1.000	0.148	0.075	2.27	73	0	102	20.3	-0.2	109	423	83	69
6	1.145	0.145	0.075	2.26	73	-2.15	100	20.6	0.3	110	439	84	70
7	1.293	0.148	0.075	2.25	73	-2.63	101	20.0	-0.6	107	415	85	70
8	1.438	0.145	0.075	2.23	73	-1.57	99	19.9	-0.1	106	411	85	70
9	1.585	0.147	0.075	2.23	73	-1.55	101	19.8	-0.1	106	412	83	69
10	1.730	0.145	0.075	2.21	73	0	99	19.6	-0.2	105	415	83	70
11	1.877	0.147	0.075	2.22	73	0	100	19.5	-0.1	105	417	84	69
12	2.021	0.144	0.075	2.21	73	-2.19	98	19.2	-0.3	105	420	85	69
13	2.168	0.147	0.075	2.18	73	-0.37	100	19.2	0	105	424	85	69
14	2.311	0.143	0.075	2.19	73	-1.62	98	19.0	-0.2	105	428	84	69
15	2.459	0.148	0.075	2.19	74	0	101	18.8	-0.2	106	430	82	69
16	2.601	0.142	0.075	2.18	74	0	97	18.7	-0.1	106	432	83	69
17	2.749	0.148	0.075	2.18	74	-0.61	101	18.5	-0.2	106	434	84	70
18	2.890	0.141	0.075	2.18	74	0	96	18.3	-0.2	106	436	86	69
19	3.038	0.148	0.075	2.17	74	0	101	18.2	-0.1	107	439	84	70
20	3.179	0.141	0.075	2.16	74	-1.78	96	18.1	-0.1	107	443	83	70
21	3.327	0.148	0.075	2.17	74	-2.68	101	17.9	-0.2	106	434	83	70
22	3.469	0.142	0.075	2.15	74	-1.87	97	17.7	-0.2	105	431	84	69
23	3.617	0.148	0.075	2.13	75	0	101	17.5	-0.2	105	430	85	69
24	3.759	0.142	0.075	2.15	74	-2.24	97	17.4	-0.1	105	429	85	69
25	3.907	0.148	0.075	2.15	74	-1.84	101	17.2	-0.2	105	429	83	70
26	4.050	0.143	0.075	2.17	75	-0.09	97	17.1	-0.1	105	431	83	70
27	4.199	0.149	0.075	2.24	75	0	101	16.9	-0.2	105	430	84	67
28	4.344	0.145	0.075	2.24	75	-1.51	99	16.8	-0.1	104	430	86	66
29	4.494	0.150	0.075	2.24	75	-2.23	102	16.5	-0.3	104	430	85	66
30	4.638	0.144	0.075	2.24	75	-2.76	98	16.4	-0.1	104	430	84	67
31	4.789	0.151	0.075	2.22	75	0	103	16.3	-0.1	103	429	83	66
32	4.933	0.144	0.075	2.21	75	-2.69	98	16.2	-0.1	104	429	84	66

BOX A TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: CI2700
Run #: 3

Job #: 18-447
Tracking #: 0020
Technician: SJB
Date: 1/30/2019

	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	5.083	0.150	0.075	2.19	75	-1.81	102	16.0	-0.2	104	428	85	67
34	5.227	0.144	0.075	2.19	75	-1.15	98	15.9	-0.1	104	427	87	67
35	5.376	0.149	0.075	2.18	75	-2.01	101	15.7	-0.2	104	427	86	67
36	5.520	0.144	0.075	2.17	75	-0.15	98	15.5	-0.2	104	426	84	68
37	5.668	0.148	0.075	2.16	75	-1.07	101	15.4	-0.1	104	426	83	68
38	5.812	0.144	0.075	2.17	75	-1.19	98	15.3	-0.1	105	428	84	68
39	5.962	0.150	0.075	2.23	75	-0.26	102	15.1	-0.2	104	427	85	68
40	6.107	0.145	0.075	2.23	75	-0.25	99	14.9	-0.2	105	427	87	69
41	6.256	0.149	0.075	2.19	75	-1.67	101	14.8	-0.1	104	426	85	69
42	6.400	0.144	0.075	2.17	75	-2.46	98	14.8	0	104	426	84	69
43	6.549	0.149	0.075	2.14	76	-2.83	101	14.5	-0.3	105	428	83	69
44	6.692	0.143	0.075	2.11	76	-0.27	97	14.4	-0.1	105	427	84	69
45	6.838	0.146	0.075	2.08	76	-3.02	99	14.2	-0.2	105	427	85	69
46	6.978	0.140	0.075	2.02	76	-3.04	95	14.1	-0.1	105	427	86	69
47	7.119	0.141	0.075	1.96	76	-1.09	96	14.0	-0.1	105	426	84	69
48	7.262	0.143	0.075	2.42	76	-0.86	97	13.8	-0.2	104	425	83	69
49	7.411	0.149	0.075	2.19	76	-0.4	101	13.7	-0.1	105	425	83	69
50	7.558	0.147	0.075	2.19	76	0	100	13.5	-0.2	105	425	84	69
51	7.707	0.149	0.075	2.19	76	0	101	13.4	-0.1	105	425	86	70
52	7.854	0.147	0.075	2.19	76	-2.24	100	13.3	-0.1	104	423	86	70
53	8.002	0.148	0.075	2.19	76	-2.07	101	13.2	-0.1	104	423	84	70
54	8.149	0.147	0.075	2.18	76	-1.72	100	13.0	-0.2	104	422	83	69
55	8.298	0.149	0.075	2.22	77	-2.45	101	12.9	-0.1	104	421	84	69
56	8.444	0.146	0.075	2.19	76	-0.92	99	12.7	-0.2	104	420	85	70
57	8.594	0.150	0.075	2.20	77	-1.33	102	12.7	0	104	419	86	70
58	8.740	0.146	0.075	2.20	77	0	99	12.5	-0.2	104	420	85	70
59	8.890	0.150	0.075	2.19	77	0	102	12.4	-0.1	104	418	83	70
60	9.036	0.146	0.075	2.20	77	-1.27	99	12.3	-0.1	104	418	83	70
61	9.192	0.156	0.075	2.37	77	0	106	12.1	-0.2	104	417	83	70
62	9.337	0.145	0.075	2.22	77	-2.53	98	12.0	-0.1	104	416	85	70
63	9.489	0.152	0.075	2.22	77	-0.3	103	11.9	-0.1	104	415	87	70
64	9.634	0.145	0.075	2.22	77	0	98	11.7	-0.2	104	414	86	70
65	9.786	0.152	0.075	2.22	77	-2.42	103	11.6	-0.1	104	416	84	70

BOX A TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: CI2700
Run #: 3

Job #: 18-447
Tracking #: 0020
Technician: SJB
Date: 1/30/2019

	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	9.932	0.146	0.075	2.19	77	-2.38	99	11.5	-0.1	103	416	83	70
67	10.084	0.152	0.075	2.20	77	-0.89	103	11.4	-0.1	103	415	84	70
68	10.230	0.146	0.075	2.22	77	-2.15	99	11.3	-0.1	104	416	85	70
69	10.381	0.151	0.075	2.20	77	-1.54	102	11.2	-0.1	103	415	86	70
70	10.527	0.146	0.075	2.21	77	-0.94	99	11.1	-0.1	103	414	85	70
71	10.677	0.150	0.075	2.21	77	-2.51	102	10.9	-0.2	103	414	83	70
72	10.823	0.146	0.075	2.22	77	-1.72	99	10.9	0	103	414	83	70
73	10.973	0.150	0.075	2.21	78	-0.91	101	10.7	-0.2	103	413	84	70
74	11.121	0.148	0.075	2.20	77	-0.7	100	10.6	-0.1	103	411	85	70
75	11.270	0.149	0.075	2.20	78	0	101	10.5	-0.1	103	411	86	70
76	11.418	0.148	0.075	2.20	77	-2.39	100	10.4	-0.1	102	410	84	70
77	11.567	0.149	0.075	2.20	78	-1.46	101	10.3	-0.1	102	406	83	70
78	11.716	0.149	0.075	2.21	78	-2.3	101	10.1	-0.2	102	406	84	70
79	11.864	0.148	0.075	2.19	78	-1.35	100	9.9	-0.2	103	406	84	70
80	12.014	0.150	0.075	2.20	78	-1.63	101	9.9	0	102	404	86	70
81	12.161	0.147	0.075	2.21	78	-0.89	99	9.7	-0.2	102	402	86	70
82	12.312	0.151	0.075	2.20	78	-1.32	102	9.7	0	102	401	84	71
83	12.458	0.146	0.075	2.20	78	-0.68	99	9.6	-0.1	102	400	84	70
84	12.609	0.151	0.075	2.19	78	-2.51	102	9.5	-0.1	102	400	84	70
85	12.754	0.145	0.075	2.18	78	-0.75	98	9.4	-0.1	102	399	85	70
86	12.906	0.152	0.075	2.20	78	0	103	9.3	-0.1	102	399	87	70
87	13.051	0.145	0.075	2.18	78	0	98	9.1	-0.2	102	400	86	70
88	13.202	0.151	0.075	2.20	78	-1.88	102	9.0	-0.1	102	397	84	70
89	13.347	0.145	0.075	2.19	78	0	98	8.9	-0.1	102	397	84	70
90	13.499	0.152	0.075	2.19	78	0	103	8.8	-0.1	101	396	84	71
91	13.645	0.146	0.075	2.18	78	-1	99	8.7	-0.1	101	395	85	71
92	13.796	0.151	0.075	2.21	79	-0.78	102	8.6	-0.1	101	393	87	71
93	13.942	0.146	0.075	2.17	78	-1.41	99	8.5	-0.1	101	394	85	71
94	14.093	0.151	0.075	2.19	79	-2.15	102	8.4	-0.1	101	394	84	70
95	14.239	0.146	0.075	2.17	78	-0.73	99	8.3	-0.1	101	393	83	71
96	14.390	0.151	0.075	2.19	79	-2.55	102	8.2	-0.1	100	392	84	71
97	14.535	0.145	0.075	2.19	78	0	98	8.1	-0.1	101	393	86	70
98	14.685	0.150	0.075	2.20	79	-0.64	101	8.0	-0.1	101	394	87	70

BOX A TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: CI2700
Run #: 3

Job #: 18-447
Tracking #: 0020
Technician: SJB
Date: 1/30/2019

	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	14.831	0.146	0.075	2.18	79	-0.21	98	7.9	-0.1	101	391	85	71
100	14.981	0.150	0.075	2.18	79	-2.5	101	7.8	-0.1	101	392	84	70
101	15.128	0.147	0.075	2.19	79	-2.55	99	7.7	-0.1	101	390	83	71
102	15.277	0.149	0.075	2.19	79	-2.57	100	7.6	-0.1	100	390	84	71
103	15.425	0.148	0.075	2.17	79	0	100	7.5	-0.1	101	391	85	71
104	15.574	0.149	0.075	2.18	79	-2.46	100	7.3	-0.2	101	391	87	71
105	15.723	0.149	0.075	2.17	79	-1.51	100	7.2	-0.1	101	391	85	71
106	15.871	0.148	0.075	2.18	79	-1.32	100	7.3	0.1	101	389	84	71
107	16.020	0.149	0.075	2.18	79	-2.12	100	7.1	-0.2	101	390	84	71
108	16.167	0.147	0.075	2.20	79	0	99	6.9	-0.2	100	390	85	71
109	16.317	0.150	0.075	2.17	79	-2.53	101	6.8	-0.1	100	390	86	71
110	16.464	0.147	0.075	2.20	79	0	99	6.8	0	100	392	86	71
111	16.614	0.150	0.075	2.18	79	-0.57	101	6.6	-0.2	100	392	84	71
112	16.759	0.145	0.075	2.18	79	-2.46	98	6.5	-0.1	100	390	83	71
113	16.909	0.150	0.075	2.18	79	-2.57	101	6.4	-0.1	100	390	84	71
114	17.055	0.146	0.075	2.18	79	-2.53	98	6.3	-0.1	100	389	85	71
115	17.206	0.151	0.075	2.18	79	-2.59	102	6.2	-0.1	100	388	86	72
116	17.351	0.145	0.075	2.17	79	0	98	6.2	0	100	388	84	71
117	17.501	0.150	0.075	2.18	80	0	101	6.1	-0.1	101	388	83	71
118	17.646	0.145	0.075	2.16	80	0	97	6.0	-0.1	100	386	84	70
119	17.797	0.151	0.075	2.17	80	-0.44	101	5.9	-0.1	99	386	85	67
120	17.943	0.146	0.075	2.17	79	-1.01	98	5.8	-0.1	99	384	87	68
121	18.094	0.151	0.075	2.17	80	0	101	5.7	-0.1	98	384	86	67
122	18.239	0.145	0.075	2.14	79	-1.9	97	5.6	-0.1	98	385	84	66
123	18.390	0.151	0.075	2.16	79	-2	101	5.5	-0.1	98	385	83	67
124	18.534	0.144	0.075	2.16	79	-1.2	97	5.4	-0.1	98	385	85	67
125	18.684	0.150	0.075	2.14	79	-1.5	101	5.3	-0.1	99	385	86	68
126	18.829	0.145	0.075	2.14	79	-0.18	97	5.2	-0.1	98	387	87	69
127	18.978	0.149	0.075	2.12	79	0	100	5.1	-0.1	99	388	86	68
128	19.122	0.144	0.075	2.13	79	-0.35	97	5.0	-0.1	99	388	84	69
129	19.271	0.149	0.075	2.10	79	-2.61	100	5.0	0	99	387	83	69
130	19.415	0.144	0.075	2.11	79	0	97	4.8	-0.2	99	387	84	69
131	19.563	0.148	0.075	2.09	79	-1.99	100	4.7	-0.1	99	388	86	69

BOX A TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: CI2700
Run #: 3

Job #: 18-447
Tracking #: 0020
Technician: SJB
Date: 1/30/2019

	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	19.706	0.143	0.075	2.07	79	-2.28	96	4.6	-0.1	99	388	87	70
133	19.854	0.148	0.075	2.07	79	-0.15	100	4.6	0	100	387	85	70
134	19.996	0.142	0.075	2.07	79	-2.18	95	4.3	-0.3	99	385	83	70
135	20.144	0.148	0.075	2.09	79	-0.83	100	4.3	0	99	384	84	70
136	20.290	0.146	0.075	2.19	79	-2.3	98	4.3	0	99	382	85	70
137	20.443	0.153	0.075	2.22	79	-0.56	103	4.2	-0.1	99	378	87	70
138	20.591	0.148	0.075	2.22	80	-2.06	99	4.1	-0.1	99	377	86	70
139	20.743	0.152	0.075	2.22	79	-1.38	102	4.1	0	99	374	84	71
140	20.890	0.147	0.075	2.21	79	-1.97	99	4.0	-0.1	99	373	83	71
141	21.041	0.151	0.075	2.23	80	-2.65	101	3.9	-0.1	98	369	84	70
142	21.190	0.149	0.075	2.22	79	-2.64	100	3.9	0	98	369	85	71
143	21.341	0.151	0.075	2.22	80	-0.74	101	3.9	0	98	366	87	71
144	21.492	0.151	0.075	2.22	79	-2.76	101	3.8	-0.1	98	366	86	70
145	21.640	0.148	0.075	2.22	80	-2.15	99	3.8	0	97	362	84	70
146	21.792	0.152	0.075	2.21	80	-2.44	102	3.7	-0.1	97	361	84	70
147	21.938	0.146	0.075	2.22	80	-0.02	98	3.7	0	97	359	85	70
148	22.091	0.153	0.075	2.22	80	-0.48	102	3.6	-0.1	97	357	86	71
149	22.237	0.146	0.075	2.22	80	-2.08	98	3.6	0	97	355	87	70
150	22.390	0.153	0.075	2.22	80	-2.47	102	3.5	-0.1	97	354	85	71
151	22.537	0.147	0.075	2.22	80	-0.09	98	3.5	0	97	352	84	70
152	22.690	0.153	0.075	2.20	80	-2.62	102	3.5	0	96	352	84	71
153	22.837	0.147	0.075	2.22	80	-2.79	98	3.4	-0.1	96	348	85	71
154	22.990	0.153	0.075	2.21	80	-0.08	102	3.4	0	96	349	87	71
155	23.136	0.146	0.075	2.21	80	-2.56	98	3.3	-0.1	96	346	86	70
156	23.287	0.151	0.075	2.23	80	-2.68	101	3.3	0	96	345	85	71
157	23.436	0.149	0.075	2.22	80	0	100	3.3	0	95	342	83	71
158	23.586	0.150	0.075	2.21	80	0	100	3.3	0	95	339	84	71
159	23.737	0.151	0.075	2.22	80	-0.24	101	3.2	-0.1	95	337	85	71
160	23.886	0.149	0.075	2.21	80	0	100	3.2	0	95	336	86	71
161	24.037	0.151	0.075	2.21	80	0	101	3.2	0	95	332	86	71
162	24.185	0.148	0.075	2.22	80	-2.8	99	3.1	-0.1	94	330	85	70
163	24.336	0.151	0.075	2.22	80	-2.25	101	3.2	0.1	94	327	83	71
164	24.483	0.147	0.075	2.23	80	-2.32	98	3.1	-0.1	94	324	84	71

BOX A TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: CI2700
Run #: 3

Job #: 18-447
Tracking #: 0020
Technician: SJB
Date: 1/30/2019

	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	24.635	0.152	0.075	2.22	80	-0.06	102	3.1	0	94	322	85	70
166	24.782	0.147	0.075	2.22	80	-1.79	98	3.0	-0.1	93	321	87	71
167	24.935	0.153	0.075	2.21	80	-2.22	102	3.0	0	93	319	86	71
168	25.083	0.148	0.075	2.22	80	-1.53	99	3.0	0	93	317	84	71
169	25.235	0.152	0.075	2.20	80	-0.56	101	3.0	0	93	315	84	71
170	25.382	0.147	0.075	2.22	80	-2.83	98	3.0	0	93	313	84	71
171	25.533	0.151	0.075	2.23	80	-2.72	101	2.9	-0.1	93	312	85	71
172	25.682	0.149	0.075	2.21	80	-2.23	99	2.9	0	93	313	87	71
173	25.831	0.149	0.075	2.23	80	0	99	2.9	0	92	310	86	71
174	25.982	0.151	0.075	2.20	80	-1.99	101	2.9	0	92	308	84	71
175	26.131	0.149	0.075	2.22	80	-2.69	99	2.9	0	92	308	84	71
176	26.283	0.152	0.075	2.21	80	-2.85	101	2.8	-0.1	92	305	84	71
177	26.431	0.148	0.075	2.22	80	-0.34	99	2.8	0	92	303	85	71
178	26.582	0.151	0.075	2.22	80	-0.03	101	2.8	0	92	303	87	71
179	26.729	0.147	0.075	2.21	80	-2.8	98	2.7	-0.1	91	301	85	71
180	26.881	0.152	0.075	2.23	80	-2.22	101	2.7	0	91	300	84	71
181	27.028	0.147	0.075	2.22	80	-0.03	98	2.7	0	91	298	84	71
182	27.181	0.153	0.075	2.22	80	-0.2	102	2.7	0	91	296	84	71
183	27.328	0.147	0.075	2.22	80	-1.3	98	2.7	0	91	296	86	71
184	27.481	0.153	0.075	2.23	80	-1.73	102	2.6	-0.1	91	295	87	71
185	27.629	0.148	0.075	2.23	80	-2.64	99	2.7	0.1	91	294	86	71
186	27.780	0.151	0.075	2.22	80	-0.1	101	2.6	-0.1	91	292	84	71
187	27.927	0.147	0.075	2.20	80	-0.11	98	2.6	0	91	291	84	71
188	28.078	0.151	0.075	2.21	80	-1.49	101	2.7	0.1	90	291	84	71
189	28.227	0.149	0.075	2.22	81	0	99	2.5	-0.2	90	290	86	71
190	28.378	0.151	0.075	2.22	80	-0.06	101	2.4	-0.1	90	289	87	71
191	28.528	0.150	0.075	2.21	80	0	100	2.6	0.2	90	287	85	71
192	28.677	0.149	0.075	2.21	80	-0.3	99	2.5	-0.1	90	285	83	71
193	28.829	0.152	0.075	2.22	80	0	101	2.5	0	90	285	84	71
194	28.975	0.146	0.075	2.23	81	0	97	2.5	0	90	284	85	71
195	29.128	0.153	0.075	2.22	81	-1.38	102	2.4	-0.1	90	283	86	71
196	29.274	0.146	0.075	2.21	81	-2.65	97	2.4	0	89	282	86	71
197	29.427	0.153	0.075	2.21	81	-0.02	102	2.4	0	89	281	84	71

BOX A TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: CI2700
Run #: 3

Job #: 18-447
Tracking #: 0020
Technician: SJB
Date: 1/30/2019

	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	29.575	0.148	0.075	2.21	81	-2.67	98	2.4	0	89	280	83	71
199	29.727	0.152	0.075	2.21	81	-2.18	101	2.4	0	89	278	84	71
200	29.875	0.148	0.075	2.17	81	-2.74	98	2.3	-0.1	89	278	85	71
201	30.027	0.152	0.075	2.21	81	-1.04	101	2.3	0	89	276	86	71
202	30.174	0.147	0.075	2.22	81	-0.37	98	2.3	0	89	275	85	71
203	30.325	0.151	0.075	2.22	80	-1.73	100	2.3	0	89	273	83	71
204	30.474	0.149	0.075	2.21	81	-0.63	99	2.2	-0.1	89	272	83	71
205	30.625	0.151	0.075	2.21	80	-0.22	100	2.2	0	89	272	84	71
206	30.776	0.151	0.075	2.21	81	-0.22	100	2.2	0	88	271	86	72
207	30.924	0.148	0.075	2.21	81	-2.75	98	2.2	0	89	270	86	71
208	31.076	0.152	0.075	2.20	81	-1.71	101	2.1	-0.1	88	270	85	71
209	31.223	0.147	0.075	2.22	81	-0.54	97	2.2	0.1	88	270	83	71
210	31.375	0.152	0.075	2.21	81	-1.74	101	2.1	-0.1	88	268	84	71
211	31.522	0.147	0.075	2.20	81	-2.8	97	2.1	0	88	267	85	71
212	31.675	0.153	0.075	2.20	81	-2.62	101	2.1	0	88	266	86	71
213	31.822	0.147	0.075	2.19	81	-2.41	97	2.0	-0.1	88	265	85	71
214	31.975	0.153	0.075	2.23	80	-0.02	102	2.1	0.1	88	264	84	71
215	32.122	0.147	0.075	2.18	81	-1.17	97	2.1	0	88	263	83	71
216	32.274	0.152	0.075	2.22	81	-2.18	101	2.1	0	88	262	84	71
217	32.421	0.147	0.075	2.21	81	-1.88	97	2.1	0	87	260	85	71
218	32.573	0.152	0.075	2.23	81	-0.72	101	2.0	-0.1	87	259	87	71
219	32.722	0.149	0.075	2.21	81	-0.85	99	2.0	0	87	257	85	71
220	32.872	0.150	0.075	2.24	81	-1.34	99	2.1	0.1	87	257	84	71
221	33.023	0.151	0.075	2.20	81	-1.25	100	2.0	-0.1	87	256	83	71
222	33.172	0.149	0.075	2.22	81	-1.27	99	2.0	0	87	254	84	71
223	33.324	0.152	0.075	2.21	81	-0.23	101	2.0	0	87	252	85	71
224	33.471	0.147	0.075	2.21	81	-1.78	97	1.9	-0.1	87	251	87	71
225	33.623	0.152	0.075	2.21	81	-1.39	101	1.9	0	87	250	86	71
226	33.770	0.147	0.075	2.23	81	-2.51	97	1.9	0	87	250	84	71
227	33.923	0.153	0.075	2.20	81	-2.16	101	1.9	0	87	248	84	71
228	34.070	0.147	0.075	2.20	81	0	97	1.9	0	86	248	84	71
229	34.223	0.153	0.075	2.22	81	-1.19	101	1.9	0	86	247	85	71
230	34.371	0.148	0.075	2.19	81	-2.68	98	1.8	-0.1	86	245	87	71

BOX A TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: CI2700
Run #: 3

Job #: 18-447
Tracking #: 0020
Technician: SJB
Date: 1/30/2019

	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	34.522	0.151	0.075	2.22	81	-0.01	100	1.9	0.1	86	245	86	71
232	34.670	0.148	0.075	2.20	81	-2.17	98	1.8	-0.1	86	244	84	71
233	34.821	0.151	0.075	2.21	81	-0.53	100	1.8	0	86	243	84	71
234	34.970	0.149	0.075	2.19	81	-2.71	99	1.8	0	86	242	84	71
235	35.121	0.151	0.075	2.21	81	-0.48	100	1.8	0	86	241	85	71
236	35.272	0.151	0.075	2.21	81	-1.93	100	1.8	0	85	240	86	71
237	35.420	0.148	0.075	2.21	81	-0.05	98	1.6	-0.2	85	238	85	71
238	35.573	0.153	0.075	2.22	81	-2.63	101	1.7	0.1	85	238	84	71
239	35.719	0.146	0.075	2.24	81	-2.62	97	1.7	0	85	237	83	71
240	35.872	0.153	0.075	2.22	81	-2.28	101	1.7	0	86	235	84	71
241	36.018	0.146	0.075	2.20	81	-0.12	97	1.7	0	85	234	86	71
242	36.172	0.154	0.075	2.23	81	-0.97	102	1.7	0	85	233	86	71
243	36.320	0.148	0.075	2.21	81	-2.39	98	1.7	0	85	233	85	71
244	36.473	0.153	0.075	2.19	81	-0.22	101	1.6	-0.1	85	232	84	71
245	36.621	0.148	0.075	2.21	81	-2.28	98	1.6	0	85	230	83	71
246	36.771	0.150	0.075	2.21	81	-2.71	99	1.6	0	85	229	84	70
247	36.920	0.149	0.075	2.23	81	-1.65	99	1.6	0	85	230	85	71
248	37.070	0.150	0.075	2.22	81	-0.4	99	1.6	0	85	229	86	71
249	37.221	0.151	0.075	2.21	81	-2.65	100	1.7	0.1	85	228	85	71
250	37.371	0.150	0.075	2.21	81	-2.57	99	1.7	0	85	227	83	71
251	37.523	0.152	0.075	2.22	81	-1.59	101	1.5	-0.2	85	226	83	71
252	37.671	0.148	0.075	2.21	81	-0.06	98	1.5	0	85	226	84	71
253	37.822	0.151	0.075	2.21	81	-0.37	100	1.5	0	84	225	85	71
254	37.969	0.147	0.075	2.22	81	-0.38	97	1.5	0	85	224	86	70
255	38.122	0.153	0.075	2.21	81	0	101	1.5	0	84	224	84	71
256	38.270	0.148	0.075	2.22	81	-2.59	98	1.5	0	84	222	83	71
257	38.423	0.153	0.075	2.21	81	-2.8	101	1.5	0	84	222	83	71
258	38.571	0.148	0.075	2.20	81	-1.25	98	1.5	0	84	221	84	71
259	38.723	0.152	0.075	2.23	81	-2.18	100	1.4	-0.1	84	220	86	71
260	38.870	0.147	0.075	2.20	81	-1.07	97	1.4	0	84	220	86	71
261	39.022	0.152	0.075	2.22	81	0	100	1.4	0	84	221	85	70
262	39.170	0.148	0.075	2.21	81	0	98	1.4	0	84	220	83	71
263	39.321	0.151	0.075	2.21	81	-0.11	100	1.4	0	84	220	83	70

BOX A TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: CI2700
Run #: 3

Job #: 18-447
Tracking #: 0020
Technician: SJB
Date: 1/30/2019

	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	39.473	0.152	0.075	2.20	81	-2.52	100	1.4	0	83	219	84	71
265	39.622	0.149	0.075	2.21	81	0	98	1.4	0	84	218	86	71
266	39.774	0.152	0.075	2.21	81	-2.13	100	1.3	-0.1	84	216	86	70
267	39.921	0.147	0.075	2.20	81	-0.71	97	1.3	0	84	216	85	70
268	40.073	0.152	0.075	2.23	81	0	100	1.3	0	83	216	83	71
269	40.220	0.147	0.075	2.21	81	-2.58	97	1.3	0	83	215	83	71
270	40.373	0.153	0.075	2.21	81	-2.63	101	1.3	0	83	214	84	71
271	40.521	0.148	0.075	2.21	81	0	98	1.3	0	83	214	85	71
272	40.674	0.153	0.075	2.21	81	0	101	1.3	0	83	214	86	70
273	40.822	0.148	0.075	2.22	81	0	98	1.3	0	83	214	84	70
274	40.973	0.151	0.075	2.21	81	-0.5	100	1.3	0	83	213	83	70
275	41.121	0.148	0.075	2.23	81	0	98	1.2	-0.1	83	212	84	70
276	41.272	0.151	0.075	2.22	81	-2.77	100	1.3	0.1	83	211	85	71
277	41.422	0.150	0.075	2.21	81	-2.72	99	1.2	-0.1	83	212	86	70
278	41.572	0.150	0.075	2.19	81	-0.04	99	1.2	0	83	211	85	71
279	41.724	0.152	0.075	2.22	81	0	100	1.2	0	82	210	84	71
280	41.873	0.149	0.075	2.22	81	-0.09	98	1.2	0	82	211	83	70
281	42.024	0.151	0.075	2.21	81	-0.4	100	1.2	0	83	210	84	71
282	42.171	0.147	0.075	2.20	81	-2.6	97	1.1	-0.1	83	209	85	70
283	42.324	0.153	0.075	2.22	81	-2.58	101	1.1	0	82	209	86	70
284	42.471	0.147	0.075	2.19	81	-0.71	97	1.1	0	82	208	85	70
285	42.624	0.153	0.075	2.20	81	0	101	1.1	0	82	208	84	70
286	42.772	0.148	0.075	2.22	81	-1.43	98	1.1	0	82	208	84	70
287	42.925	0.153	0.075	2.22	81	-0.01	101	1.0	-0.1	82	207	84	70
288	43.072	0.147	0.075	2.21	81	-2.6	97	1.1	0.1	82	208	85	70
289	43.223	0.151	0.075	2.23	81	-1.15	100	1.1	0	82	207	86	70
290	43.372	0.149	0.075	2.22	81	-0.01	98	1.1	0	82	207	85	70
291	43.523	0.151	0.075	2.22	81	-2.02	100	1.0	-0.1	82	207	83	70
292	43.674	0.151	0.075	2.22	81	-2.34	100	1.0	0	82	206	83	70
293	43.823	0.149	0.075	2.21	81	-0.04	98	1.0	0	82	205	84	70
294	43.975	0.152	0.075	2.20	81	-1.49	100	1.0	0	82	206	85	70
295	44.122	0.147	0.075	2.23	81	-2.39	97	1.0	0	82	206	86	70
296	44.275	0.153	0.075	2.20	81	0	101	0.9	-0.1	82	206	85	70

BOX A TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: CI2700
Run #: 3

Job #: 18-447
Tracking #: 0020
Technician: SJB
Date: 1/30/2019

	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	44.421	0.146	0.075	2.22	81	-2.79	96	0.8	-0.1	82	207	84	70
298	44.575	0.154	0.075	2.20	81	-2.02	102	1.0	0.2	82	206	83	70
299	44.722	0.147	0.075	2.21	81	-0.57	97	0.8	-0.2	82	207	84	70
300	44.875	0.153	0.075	2.21	81	-2.51	101	0.9	0.1	82	208	85	70
301	45.023	0.148	0.075	2.19	81	-0.06	98	0.9	0	82	209	86	70
302	45.174	0.151	0.075	2.21	81	-2.64	100	0.8	-0.1	81	208	84	70
303	45.322	0.148	0.075	2.20	81	-0.37	98	0.8	0	82	208	83	70
304	45.473	0.151	0.075	2.22	81	-1.26	100	0.8	0	82	208	83	70
305	45.623	0.150	0.075	2.21	81	-1.15	99	0.8	0	81	207	84	70
306	45.773	0.150	0.075	2.23	81	0	99	0.9	0.1	81	207	86	70
307	45.925	0.152	0.075	2.22	81	0	100	0.8	-0.1	81	207	86	70
308	46.073	0.148	0.075	2.20	81	-0.24	98	0.8	0	81	207	84	70
309	46.225	0.152	0.075	2.22	81	-0.05	100	0.8	0	81	208	83	70
310	46.372	0.147	0.075	2.23	81	-0.43	97	0.7	-0.1	82	208	83	70
311	46.524	0.152	0.075	2.23	81	-2.13	100	0.7	0	82	208	84	70
312	46.671	0.147	0.075	2.21	81	-1.38	97	0.7	0	81	208	86	70
313	46.825	0.154	0.075	2.22	81	-0.05	101	0.7	0	81	207	85	70
314	46.972	0.147	0.075	2.21	81	0	97	0.8	0.1	81	208	84	70
315	47.125	0.153	0.075	2.22	81	0	101	0.7	-0.1	81	208	83	70
316	47.273	0.148	0.075	2.21	81	-0.31	98	0.6	-0.1	81	207	84	70
317	47.424	0.151	0.075	2.21	81	-1	100	0.6	0	81	208	85	70
318	47.572	0.148	0.075	2.20	81	-1.67	98	0.6	0	81	208	86	70
319	47.722	0.150	0.075	2.21	81	-0.85	99	0.6	0	81	208	84	70
320	47.873	0.151	0.075	2.21	81	0	100	0.6	0	81	208	83	70
321	48.023	0.150	0.075	2.22	81	0	99	0.6	0	81	207	83	70
322	48.174	0.151	0.075	2.21	81	-2.84	100	0.6	0	81	207	84	70
323	48.323	0.149	0.075	2.23	81	-2.74	98	0.7	0.1	81	207	86	70
324	48.474	0.151	0.075	2.21	81	-1.36	100	0.5	-0.2	81	207	86	70
325	48.621	0.147	0.075	2.23	81	-2.7	97	0.5	0	81	207	84	70
326	48.774	0.153	0.075	2.22	81	-1.7	101	0.5	0	81	207	83	69
327	48.921	0.147	0.075	2.21	81	-0.19	97	0.5	0	81	206	83	70
328	49.074	0.153	0.075	2.18	81	-2.25	101	0.5	0	80	206	84	70
329	49.222	0.148	0.075	2.22	81	-2.76	98	0.5	0	81	205	86	70

BOX A TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: CI2700
Run #: 3

Job #: 18-447
Tracking #: 0020
Technician: SJB
Date: 1/30/2019

	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	49.375	0.153	0.075	2.21	81	-2.68	101	0.6	0.1	81	205	86	70
331	49.522	0.147	0.075	2.22	81	-0.22	97	0.5	-0.1	81	204	84	70
332	49.673	0.151	0.075	2.21	81	-0.88	100	0.4	-0.1	81	205	83	70
333	49.822	0.149	0.075	2.23	81	-2.79	98	0.4	0	80	204	83	70
334	49.972	0.150	0.075	2.20	81	-0.83	99	0.4	0	81	204	85	69
335	50.123	0.151	0.075	2.21	81	0	99	0.4	0	80	203	86	70
336	50.272	0.149	0.075	2.21	81	-0.58	98	0.4	0	80	203	85	69
337	50.424	0.152	0.075	2.21	81	-2.81	100	0.4	0	81	204	84	69
338	50.572	0.148	0.075	2.23	81	-2.78	97	0.3	-0.1	80	204	83	70
339	50.723	0.151	0.075	2.23	81	-0.54	99	0.4	0.1	80	204	84	69
340	50.871	0.148	0.075	2.22	81	0	98	0.3	-0.1	81	205	85	70
341	51.023	0.152	0.075	2.21	81	-2.12	100	0.3	0	80	205	86	69
342	51.171	0.148	0.075	2.22	81	-2.68	98	0.3	0	81	204	85	70
343	51.324	0.153	0.075	2.20	81	-2.81	101	0.3	0	80	205	84	70
344	51.471	0.147	0.075	2.22	81	-2.48	97	0.3	0	81	205	83	69
345	51.624	0.153	0.075	2.23	81	-0.54	101	0.2	-0.1	80	206	84	69
346	51.771	0.147	0.075	2.22	81	-0.42	97	0.2	0	80	205	85	70
347	51.922	0.151	0.075	2.22	81	-1.14	99	0.2	0	80	205	86	70
348	52.071	0.149	0.075	2.22	81	-2.56	98	0.3	0.1	80	205	85	69
349	52.221	0.150	0.075	2.21	81	0	99	0.2	-0.1	80	205	83	69
350	52.373	0.152	0.075	2.21	81	-2.2	100	0.2	0	80	203	83	69
351	52.521	0.148	0.075	2.20	81	-1.45	97	0.2	0	80	204	84	69
352	52.673	0.152	0.075	2.21	81	-2.16	100	0.3	0.1	80	204	85	69
353	52.820	0.147	0.075	2.23	81	-0.42	97	0.1	-0.2	80	203	86	69
354	52.972	0.152	0.075	2.19	81	-0.12	100	0.1	0	80	204	84	69
355	53.119	0.147	0.075	2.22	81	0	97	0.1	0	80	203	83	69
356	53.272	0.153	0.075	2.20	81	-1.23	101	0.1	0	80	202	83	69
357	53.419	0.147	0.075	2.22	81	-2.77	97	0.2	0.1	80	202	84	69
358	53.572	0.153	0.075	2.22	81	-2.69	101	0.1	-0.1	80	201	86	69
359	53.720	0.148	0.075	2.20	81	-0.96	97	0.1	0	80	201	85	70
360	53.872	0.152	0.075	2.21	81	-0.3	100	0.0	-0.1	80	201	84	69
Avg/Tot	53.872	0.149	0.075	2.20	79	-1.27	99			93	311	85	70.1

BOX B TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: CI2700
Run #: 3

Job #: 18-447
Tracking #: 0020
Technician: SJB
Date: 1/30/2019

	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	0.013		0.00	71	-1		86	0.000	6.12	0.07
1	0.112	0.099	2.21	70	-0.33	72	85	-0.070	5.05	0.08
2	0.252	0.140	2.19	71	-0.38	101	85	-0.060	2.74	0.09
3	0.398	0.146	2.19	71	-2.66	105	85	-0.070	5.59	0.05
4	0.538	0.140	2.17	71	-2.52	100	85	-0.070	6.40	0.03
5	0.681	0.143	2.15	71	-0.34	102	85	-0.080	8.81	0.17
6	0.823	0.142	2.20	71	-2.74	102	85	-0.070	8.38	0.06
7	0.966	0.143	2.18	71	-2.01	102	86	-0.060	8.99	0.51
8	1.109	0.143	2.17	71	-2.57	102	86	-0.070	8.87	0.97
9	1.250	0.141	2.15	72	-0.79	100	85	-0.070	9.01	0.95
10	1.396	0.146	2.17	72	-1.25	104	85	-0.100	9.00	0.78
11	1.535	0.139	2.16	72	-1.4	99	85	-0.080	9.51	0.79
12	1.680	0.145	2.15	72	-2.05	103	85	-0.070	9.79	0.88
13	1.819	0.139	2.13	73	-0.61	99	85	-0.070	10.07	0.87
14	1.964	0.145	2.14	73	-1.91	103	85	-0.080	10.28	1.08
15	2.104	0.140	2.14	73	-1.52	100	86	-0.070	10.06	1.08
16	2.251	0.147	2.26	74	-2.72	104	86	-0.070	10.20	1.09
17	2.395	0.144	2.27	74	-2.37	102	85	-0.070	10.20	1.12
18	2.542	0.147	2.24	74	-0.7	104	85	-0.070	10.29	1.24
19	2.686	0.144	2.26	75	-2.44	102	85	-0.070	10.32	1.24
20	2.832	0.146	2.25	75	-1.48	103	85	-0.070	10.24	1.26
21	2.977	0.145	2.24	75	-0.6	103	85	-0.080	10.12	1.30
22	3.123	0.146	2.24	76	-3.1	103	86	-0.080	10.01	1.35
23	3.268	0.145	2.24	76	-0.54	102	86	-0.080	9.94	1.33
24	3.413	0.145	2.23	77	-2.26	102	86	-0.070	10.02	1.26
25	3.559	0.146	2.24	77	-3.02	103	85	-0.090	9.96	1.26
26	3.703	0.144	2.22	77	-1.6	102	85	-0.070	10.02	1.36
27	3.849	0.146	2.21	78	-1.38	103	85	-0.080	9.95	1.31
28	3.993	0.144	2.22	78	-0.68	101	85	-0.080	9.99	1.31
29	4.140	0.147	2.22	79	-1.96	103	85	-0.070	10.03	1.30
30	4.284	0.144	2.22	79	-0.64	101	85	-0.080	9.85	1.38
31	4.431	0.147	2.20	79	-2.68	103	86	-0.080	9.94	1.36

BOX B TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: CI2700
Run #: 3

Job #: 18-447
Tracking #: 0020
Technician: SJB
Date: 1/30/2019

	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	4.574	0.143	2.20	80	-1.67	100	86	-0.070	10.07	1.42
33	4.721	0.147	2.21	80	-2.83	103	86	-0.080	9.86	1.56
34	4.865	0.144	2.20	80	-2.42	101	85	-0.070	9.87	1.58
35	5.012	0.147	2.19	81	-2.83	103	85	-0.070	9.79	1.53
36	5.154	0.142	2.17	81	-2.79	99	85	-0.070	9.88	1.48
37	5.301	0.147	2.17	81	-3.18	103	85	-0.080	9.94	1.52
38	5.443	0.142	2.17	81	-2.44	99	86	-0.070	9.90	1.51
39	5.591	0.148	2.23	81	-1.46	103	86	-0.080	9.97	1.53
40	5.734	0.143	2.21	82	-3.2	100	86	-0.080	9.94	1.48
41	5.882	0.148	2.20	82	-3.21	103	85	-0.080	10.05	1.44
42	6.025	0.143	2.19	82	-1.49	100	85	-0.060	10.08	1.42
43	6.172	0.147	2.16	83	-1.3	102	85	-0.080	10.11	1.45
44	6.313	0.141	2.14	83	-0.99	98	85	-0.070	10.19	1.34
45	6.460	0.147	2.14	83	-2.26	102	85	-0.070	10.05	1.34
46	6.601	0.141	2.11	83	-1.03	98	86	-0.080	10.26	1.27
47	6.745	0.144	2.06	84	-3.02	100	86	-0.070	10.01	1.26
48	6.885	0.140	2.05	84	-1.91	97	85	-0.080	10.21	1.15
49	7.032	0.147	2.39	84	-3.42	102	85	-0.070	10.17	1.16
50	7.182	0.150	2.25	85	-1.67	104	85	-0.070	10.11	1.09
51	7.329	0.147	2.18	85	-3.52	102	85	-0.080	10.11	1.14
52	7.472	0.143	2.27	85	-3.41	99	85	-0.060	10.00	1.21
53	7.640	0.168	2.83	85	-0.96	117	82	-0.080	10.12	1.06
54	7.792	0.152	2.27	86	-0.91	105	85	-0.080	9.77	1.01
55	7.942	0.150	2.24	86	-0.55	104	86	-0.070	9.89	1.03
56	8.088	0.146	2.27	86	-1.63	101	86	-0.070	9.89	1.10
57	8.238	0.150	2.27	86	-1.51	104	86	-0.080	9.78	1.09
58	8.384	0.146	2.27	87	-2.27	101	85	-0.080	9.90	1.09
59	8.534	0.150	2.27	87	-2.92	104	85	-0.060	9.92	1.13
60	8.680	0.146	2.25	87	-1.47	101	85	-0.070	9.77	1.11
61	8.830	0.150	2.26	87	-2.48	104	85	-0.070	9.93	0.99
62	8.977	0.147	2.26	87	-1.2	102	85	-0.070	9.68	1.04
63	9.126	0.149	2.26	88	-1.58	103	86	-0.070	9.68	0.98

BOX B TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: CI2700
Run #: 3

Job #: 18-447
Tracking #: 0020
Technician: SJB
Date: 1/30/2019

	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	9.273	0.147	2.26	88	-2.87	101	86	-0.090	9.62	0.94
65	9.423	0.150	2.27	88	-1.19	104	86	-0.060	9.61	0.93
66	9.571	0.148	2.25	88	-2.51	102	85	-0.080	9.74	0.90
67	9.720	0.149	2.25	89	-2.33	103	85	-0.080	9.77	0.92
68	9.868	0.148	2.26	89	-2.24	102	85	-0.070	9.77	0.92
69	10.016	0.148	2.25	89	-3.1	102	85	-0.080	9.89	0.90
70	10.165	0.149	2.25	89	-2.89	103	85	-0.080	9.86	0.87
71	10.313	0.148	2.27	89	-0.57	102	86	-0.060	9.88	0.88
72	10.462	0.149	2.26	89	-2.29	103	86	-0.060	9.72	0.93
73	10.608	0.146	2.26	90	-2.85	100	86	-0.090	9.69	0.90
74	10.758	0.150	2.26	90	-2.01	103	85	-0.070	9.75	0.86
75	10.904	0.146	2.26	90	-1.81	100	85	-0.090	9.72	0.85
76	11.055	0.151	2.25	90	-0.63	104	85	-0.070	9.79	0.76
77	11.201	0.146	2.25	90	-2.83	100	85	-0.080	9.95	0.74
78	11.351	0.150	2.25	90	-2.77	103	86	-0.070	9.66	0.78
79	11.497	0.146	2.24	91	-2.71	100	86	-0.070	9.88	0.72
80	11.649	0.152	2.25	91	-2.47	104	86	-0.070	9.80	0.73
81	11.794	0.145	2.24	91	-1.88	99	86	-0.060	9.75	0.74
82	11.945	0.151	2.25	91	-0.57	103	85	-0.070	9.87	0.69
83	12.091	0.146	2.25	91	-2.89	100	85	-0.090	9.85	0.74
84	12.242	0.151	2.25	91	-2.81	103	85	-0.080	9.77	0.81
85	12.389	0.147	2.24	91	-2.58	101	85	-0.060	9.69	0.89
86	12.539	0.150	2.24	91	-0.82	103	86	-0.070	9.85	0.88
87	12.684	0.145	2.24	92	-2.52	99	86	-0.080	9.68	0.90
88	12.834	0.150	2.25	92	-0.53	103	86	-0.080	9.79	0.81
89	12.980	0.146	2.21	92	-1.84	100	85	-0.070	9.69	0.84
90	13.131	0.151	2.24	92	-3.01	103	84	-0.070	9.65	0.92
91	13.277	0.146	2.24	92	-2.24	100	85	-0.070	9.56	0.98
92	13.426	0.149	2.24	92	-0.65	102	84	-0.060	9.68	0.94
93	13.573	0.147	2.24	93	-0.55	100	85	-0.080	9.57	0.96
94	13.723	0.150	2.23	93	-1.33	102	85	-0.080	9.79	0.96
95	13.871	0.148	2.23	93	-0.99	101	86	-0.070	9.74	0.96

BOX B TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: CI2700
Run #: 3

Job #: 18-447
Tracking #: 0020
Technician: SJB
Date: 1/30/2019

	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	14.020	0.149	2.23	93	-1.86	102	86	-0.060	9.76	0.99
97	14.168	0.148	2.24	93	-2.43	101	85	-0.070	9.73	1.07
98	14.316	0.148	2.24	93	-2.48	101	86	-0.070	10.06	1.13
99	14.465	0.149	2.23	93	-1.21	102	85	-0.070	9.61	1.09
100	14.613	0.148	2.23	93	-2.78	101	85	-0.080	9.56	1.00
101	14.762	0.149	2.22	93	-1.59	102	85	-0.070	9.66	0.96
102	14.908	0.146	2.23	94	-1.95	99	85	-0.080	9.57	0.95
103	15.058	0.150	2.23	94	-1.52	102	86	-0.070	9.74	0.96
104	15.204	0.146	2.22	94	-0.46	99	86	-0.070	9.89	0.93
105	15.355	0.151	2.22	94	-2.4	103	86	-0.070	9.91	0.95
106	15.500	0.145	2.23	94	-1.24	99	85	-0.070	10.10	0.94
107	15.651	0.151	2.23	94	-1.8	103	85	-0.080	10.03	0.75
108	15.796	0.145	2.22	94	-1.33	99	84	-0.080	10.11	0.78
109	15.947	0.151	2.22	94	-1.15	103	85	-0.070	10.09	0.82
110	16.093	0.146	2.22	94	-1.6	99	86	-0.070	10.11	0.88
111	16.244	0.151	2.22	94	-0.86	103	86	-0.070	10.17	0.97
112	16.390	0.146	2.22	94	-2.47	99	86	-0.070	10.04	1.01
113	16.540	0.150	2.22	94	-0.64	102	85	-0.080	10.22	0.84
114	16.686	0.146	2.22	95	-1.7	99	85	-0.060	9.81	0.67
115	16.837	0.151	2.22	95	-2.69	103	85	-0.080	9.81	0.69
116	16.983	0.146	2.21	95	-2.98	99	85	-0.060	9.87	0.68
117	17.133	0.150	2.21	95	-1.48	102	85	-0.070	9.68	0.76
118	17.278	0.145	2.22	95	-0.65	98	85	-0.080	9.69	0.74
119	17.428	0.150	2.21	95	-2.42	102	86	-0.070	9.66	0.71
120	17.573	0.145	2.22	95	-1.03	98	86	-0.060	9.70	0.76
121	17.723	0.150	2.20	95	-1.38	102	85	-0.070	9.69	0.78
122	17.869	0.146	2.21	95	-0.67	99	85	-0.070	9.64	0.80
123	18.019	0.150	2.20	95	-3.04	102	85	-0.070	9.57	0.92
124	18.165	0.146	2.21	95	-0.71	99	85	-0.090	9.73	0.92
125	18.313	0.148	2.19	96	-2.08	100	85	-0.070	10.09	0.96
126	18.459	0.146	2.18	95	-1.49	99	86	-0.080	9.90	1.00
127	18.607	0.148	2.18	95	-1.57	100	86	-0.070	10.11	1.01

BOX B TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: CI2700
Run #: 3

Job #: 18-447
Tracking #: 0020
Technician: SJB
Date: 1/30/2019

	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	18.753	0.146	2.17	95	-2.78	99	86	-0.070	10.14	1.00
129	18.901	0.148	2.17	95	-0.65	100	85	-0.060	10.19	0.91
130	19.046	0.145	2.16	95	-0.61	98	85	-0.070	10.26	0.95
131	19.194	0.148	2.15	95	-1.65	100	85	-0.070	10.37	0.89
132	19.338	0.144	2.15	95	-1.54	98	85	-0.070	10.11	0.73
133	19.486	0.148	2.14	95	-3.01	101	85	-0.070	9.97	0.68
134	19.630	0.144	2.14	95	-3.03	98	86	-0.070	9.91	0.61
135	19.778	0.148	2.14	95	-0.67	100	86	-0.060	9.65	0.52
136	19.922	0.144	2.22	95	-0.76	98	86	-0.070	9.47	0.43
137	20.072	0.150	2.23	95	-2.9	102	85	-0.080	9.53	0.19
138	20.219	0.147	2.22	95	-3.07	100	85	-0.060	9.33	0.07
139	20.368	0.149	2.21	95	-3.19	101	85	-0.070	9.11	0.05
140	20.516	0.148	2.21	95	-3.13	100	85	-0.070	9.04	0.00
141	20.665	0.149	2.21	95	-1.25	101	85	-0.070	8.89	0.00
142	20.814	0.149	2.21	95	-1.41	101	86	-0.060	8.72	0.00
143	20.962	0.148	2.21	95	-3.21	100	86	-0.070	8.52	0.00
144	21.111	0.149	2.23	95	-1.81	101	86	-0.070	8.35	0.00
145	21.258	0.147	2.21	95	-0.66	100	85	-0.060	8.25	0.00
146	21.408	0.150	2.22	96	-2.84	101	85	-0.060	8.17	0.00
147	21.555	0.147	2.22	96	-2.7	99	85	-0.070	8.12	0.00
148	21.704	0.149	2.22	96	-2.75	101	85	-0.070	8.06	0.00
149	21.850	0.146	2.23	96	-2.37	99	86	-0.080	7.91	0.00
150	22.001	0.151	2.22	96	-1.65	102	86	-0.060	8.04	0.00
151	22.147	0.146	2.22	96	-3.13	99	86	-0.070	8.04	0.00
152	22.297	0.150	2.21	96	-3.01	101	86	-0.060	8.07	0.00
153	22.443	0.146	2.22	96	-0.74	99	85	-0.070	7.97	0.02
154	22.594	0.151	2.20	96	-1.73	102	85	-0.050	7.91	0.00
155	22.740	0.146	2.21	96	-1.85	99	85	-0.070	7.96	0.00
156	22.891	0.151	2.21	96	-2.75	102	85	-0.060	7.74	0.00
157	23.037	0.146	2.22	96	-2.5	99	85	-0.060	7.45	0.00
158	23.187	0.150	2.22	96	-1.22	101	86	-0.070	7.20	0.00
159	23.333	0.146	2.21	96	-3.13	99	86	-0.060	7.03	0.00

BOX B TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: CI2700
Run #: 3

Job #: 18-447
Tracking #: 0020
Technician: SJB
Date: 1/30/2019

	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	23.484	0.151	2.21	96	-0.81	102	86	-0.060	7.11	0.00
161	23.630	0.146	2.22	96	-3	99	85	-0.060	7.01	0.00
162	23.780	0.150	2.22	96	-3.13	101	85	-0.050	6.96	0.00
163	23.926	0.146	2.21	96	-1.46	98	85	-0.060	6.98	0.00
164	24.076	0.150	2.22	96	-3.17	101	85	-0.050	7.00	0.00
165	24.222	0.146	2.22	96	-1.97	98	85	-0.060	6.84	0.01
166	24.372	0.150	2.21	96	-0.9	101	86	-0.060	6.78	0.00
167	24.519	0.147	2.21	96	-2.99	99	86	-0.060	6.92	0.00
168	24.668	0.149	2.21	96	-3.17	100	86	-0.060	7.01	0.00
169	24.816	0.148	2.20	96	-3.09	100	85	-0.060	6.82	0.00
170	24.965	0.149	2.22	96	-1.41	100	85	-0.060	6.93	0.00
171	25.113	0.148	2.21	97	-2.93	100	85	-0.060	6.70	0.00
172	25.262	0.149	2.21	97	-0.74	100	85	-0.060	6.70	0.00
173	25.410	0.148	2.21	97	-0.72	99	85	-0.050	6.73	0.00
174	25.558	0.148	2.21	97	-0.88	99	86	-0.050	6.55	0.00
175	25.708	0.150	2.20	97	-1.49	101	86	-0.050	6.69	0.00
176	25.855	0.147	2.21	97	-1.76	99	86	-0.060	6.62	0.01
177	26.004	0.149	2.22	97	-3.17	100	85	-0.060	6.48	0.00
178	26.150	0.146	2.21	97	-0.85	98	85	-0.050	6.43	0.00
179	26.300	0.150	2.20	97	-1.34	101	85	-0.060	6.60	0.00
180	26.447	0.147	2.21	97	-3.1	99	85	-0.040	6.55	0.00
181	26.597	0.150	2.20	97	-2.69	101	85	-0.050	6.60	0.00
182	26.743	0.146	2.20	97	-0.98	98	86	-0.050	6.45	0.01
183	26.894	0.151	2.20	97	-3.17	101	86	-0.050	6.52	0.00
184	27.040	0.146	2.21	97	-0.76	98	86	-0.050	6.51	0.00
185	27.191	0.151	2.20	97	-1.49	101	85	-0.070	6.54	0.00
186	27.337	0.146	2.21	97	-1.19	98	85	-0.050	6.48	0.00
187	27.488	0.151	2.21	97	-2.69	101	85	-0.050	6.45	0.00
188	27.634	0.146	2.21	97	-3.11	98	85	-0.040	6.51	0.00
189	27.785	0.151	2.20	97	-0.76	101	85	-0.050	6.60	0.00
190	27.931	0.146	2.22	97	-1.8	98	86	-0.050	6.33	0.00
191	28.081	0.150	2.22	97	-0.72	101	86	-0.050	6.52	0.00

BOX B TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: CI2700
Run #: 3

Job #: 18-447
Tracking #: 0020
Technician: SJB
Date: 1/30/2019

	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	28.227	0.146	2.22	97	-1.36	98	85	-0.060	6.33	0.00
193	28.377	0.150	2.21	97	-0.81	101	85	-0.050	6.33	0.01
194	28.524	0.147	2.22	97	-0.86	99	85	-0.050	6.40	0.00
195	28.674	0.150	2.21	97	-0.73	101	85	-0.050	6.28	0.00
196	28.821	0.147	2.20	97	-0.76	98	86	-0.060	6.41	0.00
197	28.970	0.149	2.21	97	-1.4	100	86	-0.060	6.33	0.00
198	29.119	0.149	2.21	97	-2.98	100	86	-0.060	6.31	0.00
199	29.267	0.148	2.22	97	-0.75	99	86	-0.050	6.27	0.00
200	29.416	0.149	2.21	98	-1.52	100	85	-0.050	6.45	0.00
201	29.564	0.148	2.20	97	-1.72	99	85	-0.060	6.30	0.00
202	29.713	0.149	2.21	97	-1.45	100	85	-0.050	6.32	0.00
203	29.861	0.148	2.19	97	-0.71	99	85	-0.050	6.31	0.00
204	30.011	0.150	2.21	97	-0.9	101	85	-0.050	6.17	0.00
205	30.157	0.146	2.20	97	-2.91	98	86	-0.050	6.21	0.00
206	30.307	0.150	2.22	97	-0.76	100	86	-0.050	6.13	0.00
207	30.454	0.147	2.21	97	-1.22	98	86	-0.050	6.09	0.00
208	30.604	0.150	2.21	97	-3.05	100	85	-0.040	6.18	0.00
209	30.750	0.146	2.21	97	-1.84	98	85	-0.050	6.13	0.00
210	30.901	0.151	2.21	97	-3.11	101	84	-0.040	6.14	0.00
211	31.047	0.146	2.21	97	-0.9	98	84	-0.060	5.81	0.01
212	31.198	0.151	2.21	98	-3.22	101	85	-0.050	5.82	0.01
213	31.345	0.147	2.20	97	-1.41	98	86	-0.050	5.85	0.00
214	31.496	0.151	2.22	98	-0.72	101	86	-0.050	5.88	0.00
215	31.641	0.145	2.22	98	-2.2	97	86	-0.060	5.74	0.00
216	31.793	0.152	2.19	98	-1.43	102	85	-0.050	5.87	0.00
217	31.939	0.146	2.22	97	-0.62	98	85	-0.040	5.83	0.00
218	32.089	0.150	2.21	98	-2.88	100	85	-0.050	5.68	0.00
219	32.235	0.146	2.22	98	-3.14	97	85	-0.040	5.82	0.00
220	32.385	0.150	2.19	98	-0.9	100	85	-0.050	5.76	0.00
221	32.532	0.147	2.20	98	-0.65	98	86	-0.050	5.60	0.00
222	32.682	0.150	2.21	97	-0.81	100	86	-0.050	5.61	0.00
223	32.829	0.147	2.21	98	-0.72	98	86	-0.060	5.55	0.00

BOX B TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: CI2700
Run #: 3

Job #: 18-447
Tracking #: 0020
Technician: SJB
Date: 1/30/2019

	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	32.979	0.150	2.20	98	-0.97	100	85	-0.040	5.57	0.00
225	33.127	0.148	2.21	98	-1.92	99	85	-0.040	5.47	0.00
226	33.276	0.149	2.21	98	-0.75	99	85	-0.040	5.57	0.00
227	33.425	0.149	2.20	98	-2.48	99	85	-0.040	5.52	0.00
228	33.573	0.148	2.21	98	-3.01	99	85	-0.040	5.60	0.00
229	33.722	0.149	2.20	98	-0.82	99	85	-0.050	5.54	0.00
230	33.870	0.148	2.21	98	-1.53	99	86	-0.050	5.36	0.00
231	34.019	0.149	2.21	98	-0.94	99	86	-0.050	5.48	0.00
232	34.166	0.147	2.21	98	-0.73	98	86	-0.050	5.45	0.00
233	34.316	0.150	2.20	98	-0.79	100	85	-0.050	5.40	0.00
234	34.463	0.147	2.21	98	-1.15	98	85	-0.040	5.32	0.00
235	34.613	0.150	2.21	98	-0.78	100	85	-0.040	5.49	0.00
236	34.759	0.146	2.21	98	-3.11	97	85	-0.040	5.40	0.00
237	34.910	0.151	2.20	98	-2.51	101	85	-0.030	5.25	0.00
238	35.056	0.146	2.20	98	-2.02	97	86	-0.040	5.25	0.00
239	35.208	0.152	2.21	98	-2.14	101	86	-0.040	5.23	0.00
240	35.354	0.146	2.22	98	-1.57	97	85	-0.040	5.21	0.00
241	35.505	0.151	2.21	98	-0.84	101	85	-0.030	5.31	0.00
242	35.651	0.146	2.21	98	-3.13	97	84	-0.040	5.21	0.00
243	35.802	0.151	2.21	98	-2.67	101	84	-0.050	5.21	0.00
244	35.948	0.146	2.22	98	-0.88	97	85	-0.050	5.16	0.00
245	36.098	0.150	2.21	98	-2.92	100	85	-0.050	5.12	0.00
246	36.245	0.147	2.20	98	-1.86	98	86	-0.050	5.16	0.00
247	36.395	0.150	2.20	98	-3.22	100	86	-0.040	5.20	0.00
248	36.542	0.147	2.22	98	-3.07	98	86	-0.040	5.27	0.00
249	36.691	0.149	2.21	98	-3.02	99	85	-0.040	5.48	0.00
250	36.839	0.148	2.21	98	-0.82	99	85	-0.040	5.33	0.00
251	36.989	0.150	2.21	98	-0.91	100	85	-0.050	5.28	0.00
252	37.138	0.149	2.21	98	-2.8	99	85	-0.040	5.27	0.00
253	37.286	0.148	2.21	98	-0.83	99	85	-0.030	5.25	0.00
254	37.435	0.149	2.21	98	-2.7	99	85	-0.040	5.31	0.00
255	37.583	0.148	2.21	98	-1.53	99	86	-0.050	5.15	0.00

BOX B TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: CI2700
Run #: 3

Job #: 18-447
Tracking #: 0020
Technician: SJB
Date: 1/30/2019

	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	37.733	0.150	2.22	98	-1.82	100	86	-0.040	5.14	0.00
257	37.879	0.146	2.22	98	-0.68	97	86	-0.040	5.34	0.00
258	38.029	0.150	2.21	98	-2.1	100	85	-0.040	5.31	0.00
259	38.176	0.147	2.21	98	-1.55	98	85	-0.050	5.22	0.00
260	38.327	0.151	2.22	98	-2.74	101	85	-0.040	5.28	0.00
261	38.473	0.146	2.22	98	-2.8	97	85	-0.040	5.33	0.00
262	38.624	0.151	2.20	98	-0.88	101	85	-0.030	5.26	0.00
263	38.771	0.147	2.21	98	-2.67	98	86	-0.040	5.43	0.00
264	38.922	0.151	2.20	98	-3.08	100	86	-0.040	5.41	0.00
265	39.068	0.146	2.21	98	-3.23	97	86	-0.040	5.29	0.00
266	39.219	0.151	2.21	98	-2.77	101	85	-0.040	5.15	0.00
267	39.365	0.146	2.21	98	-2.72	97	85	-0.040	5.27	0.00
268	39.516	0.151	2.22	98	-0.9	100	85	-0.040	5.21	0.00
269	39.662	0.146	2.21	98	-1.72	97	85	-0.030	5.26	0.00
270	39.812	0.150	2.22	98	-2.96	100	85	-0.030	5.35	0.00
271	39.959	0.147	2.21	98	-2.92	98	86	-0.050	5.31	0.00
272	40.109	0.150	2.20	98	-1.51	100	86	-0.030	5.40	0.00
273	40.256	0.147	2.22	98	-2.41	98	86	-0.030	5.31	0.00
274	40.406	0.150	2.21	98	-3.04	100	85	-0.040	5.34	0.00
275	40.554	0.148	2.21	98	-2.07	98	85	-0.040	5.34	0.00
276	40.704	0.150	2.21	98	-1.6	100	84	-0.040	5.31	0.00
277	40.852	0.148	2.21	98	-2.47	98	85	-0.050	5.21	0.00
278	41.001	0.149	2.20	98	-1.33	99	86	-0.030	5.41	0.00
279	41.150	0.149	2.21	98	-2.02	99	85	-0.030	5.17	0.00
280	41.298	0.148	2.22	98	-1.04	98	86	-0.040	5.23	0.00
281	41.447	0.149	2.21	98	-3.16	99	86	-0.040	5.25	0.00
282	41.594	0.147	2.22	98	-2.11	98	85	-0.030	5.28	0.00
283	41.744	0.150	2.19	98	-1.76	100	84	-0.050	5.23	0.00
284	41.891	0.147	2.22	98	-0.71	98	85	-0.050	5.20	0.00
285	42.041	0.150	2.22	98	-0.96	100	85	-0.050	5.28	0.00
286	42.187	0.146	2.22	98	-2.23	97	85	-0.030	5.38	0.00
287	42.339	0.152	2.21	98	-1.12	101	86	-0.030	5.31	0.00

BOX B TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: CI2700
Run #: 3

Job #: 18-447
Tracking #: 0020
Technician: SJB
Date: 1/30/2019

	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	42.485	0.146	2.23	98	-0.71	97	86	-0.050	5.30	0.00
289	42.637	0.152	2.21	98	-1.33	101	86	-0.040	5.30	0.00
290	42.783	0.146	2.21	98	-2.59	97	85	-0.030	5.22	0.00
291	42.934	0.151	2.22	98	-3.05	100	85	-0.040	5.22	0.00
292	43.080	0.146	2.20	98	-3.08	97	84	-0.030	5.29	0.00
293	43.231	0.151	2.23	98	-2.24	100	85	-0.040	5.19	0.00
294	43.377	0.146	2.20	98	-1.5	97	85	-0.030	5.16	0.00
295	43.527	0.150	2.23	98	-1.05	100	86	-0.030	6.16	0.00
296	43.674	0.147	2.22	98	-0.74	98	86	-0.040	5.99	0.00
297	43.824	0.150	2.22	98	-0.78	100	86	-0.040	5.81	0.00
298	43.971	0.147	2.20	98	-3.18	98	85	-0.040	5.84	0.00
299	44.121	0.150	2.21	98	-0.74	100	85	-0.040	5.84	0.00
300	44.269	0.148	2.22	98	-0.66	98	85	-0.050	5.94	0.00
301	44.418	0.149	2.21	98	-0.69	99	85	-0.030	6.00	0.00
302	44.567	0.149	2.22	98	-0.65	99	85	-0.040	5.61	0.00
303	44.715	0.148	2.21	98	-1.35	98	86	-0.040	5.62	0.00
304	44.865	0.150	2.20	98	-0.92	100	86	-0.040	5.62	0.00
305	45.013	0.148	2.22	98	-3.15	98	86	-0.040	5.68	0.00
306	45.162	0.149	2.22	98	-2.01	99	86	-0.040	5.81	0.00
307	45.309	0.147	2.22	98	-2.16	98	85	-0.040	5.71	0.00
308	45.459	0.150	2.20	98	-0.91	100	85	-0.030	5.72	0.00
309	45.606	0.147	2.22	98	-2.85	98	85	-0.040	5.65	0.00
310	45.756	0.150	2.21	98	-2.07	100	85	-0.040	5.65	0.00
311	45.903	0.147	2.21	98	-0.81	98	85	-0.040	5.77	0.00
312	46.054	0.151	2.21	98	-0.81	100	86	-0.030	5.87	0.00
313	46.200	0.146	2.22	98	-1.41	97	86	-0.040	5.86	0.00
314	46.352	0.152	2.21	98	-2.65	101	86	-0.030	5.87	0.00
315	46.498	0.146	2.21	98	-1.1	97	85	-0.040	5.69	0.00
316	46.649	0.151	2.21	98	-3.16	100	85	-0.040	5.62	0.00
317	46.796	0.147	2.22	98	-2.94	98	85	-0.040	5.59	0.00
318	46.946	0.150	2.21	98	-2.74	100	85	-0.040	5.48	0.00
319	47.092	0.146	2.22	98	-0.71	97	85	-0.030	5.56	0.00

BOX B TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: CI2700
Run #: 3

Job #: 18-447
Tracking #: 0020
Technician: SJB
Date: 1/30/2019

	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	47.242	0.150	2.21	98	-3.14	100	85	-0.040	5.52	0.00
321	47.389	0.147	2.22	98	-0.76	98	86	-0.030	5.42	0.00
322	47.539	0.150	2.22	97	-0.62	100	86	-0.040	5.41	0.00
323	47.686	0.147	2.20	98	-3.01	98	86	-0.040	5.55	0.00
324	47.836	0.150	2.20	98	-2.11	100	85	-0.040	5.40	0.00
325	47.984	0.148	2.22	97	-3.04	98	85	-0.040	5.34	0.00
326	48.133	0.149	2.20	98	-0.85	99	85	-0.030	5.54	0.00
327	48.282	0.149	2.20	98	-1.39	99	85	-0.040	5.39	0.00
328	48.430	0.148	2.21	98	-0.74	98	85	-0.050	5.29	0.00
329	48.580	0.150	2.20	98	-2.86	100	86	-0.040	5.39	0.00
330	48.727	0.147	2.21	98	-0.77	98	86	-0.040	5.37	0.00
331	48.877	0.150	2.21	98	-1.43	100	86	-0.040	5.50	0.00
332	49.023	0.146	2.22	98	-0.9	97	85	-0.040	5.47	0.01
333	49.174	0.151	2.21	98	-1.33	100	85	-0.040	5.51	0.00
334	49.320	0.146	2.22	97	-3.08	97	85	-0.040	5.54	0.00
335	49.471	0.151	2.21	98	-1.95	100	85	-0.040	5.42	0.00
336	49.617	0.146	2.22	97	-0.73	97	85	-0.040	5.53	0.00
337	49.768	0.151	2.21	98	-1.38	100	85	-0.040	5.67	0.00
338	49.914	0.146	2.21	97	-3.14	97	86	-0.050	5.59	0.00
339	50.066	0.152	2.21	97	-2.6	101	86	-0.030	5.53	0.00
340	50.212	0.146	2.21	97	-0.63	97	85	-0.030	5.60	0.00
341	50.363	0.151	2.21	97	-1.41	100	85	-0.030	5.69	0.00
342	50.509	0.146	2.20	97	-3.18	97	85	-0.030	5.64	0.00
343	50.660	0.151	2.20	97	-1.08	100	85	-0.040	5.48	0.00
344	50.806	0.146	2.22	97	-1.76	97	85	-0.040	5.46	0.00
345	50.956	0.150	2.21	97	-0.82	100	85	-0.040	5.42	0.00
346	51.103	0.147	2.21	98	-0.88	98	86	-0.040	5.43	0.00
347	51.253	0.150	2.22	97	-0.73	100	86	-0.030	5.35	0.00
348	51.399	0.146	2.21	97	-1.94	97	86	-0.050	5.28	0.00
349	51.549	0.150	2.21	97	-0.73	100	85	-0.040	5.31	0.00
350	51.697	0.148	2.21	97	-1.53	98	84	-0.030	5.38	0.00
351	51.847	0.150	2.20	97	-1.61	100	85	-0.030	5.28	0.00

BOX B TEST DATA - ASTM E3053 / ASTM E2515

Client: FPI
Model: CI2700
Run #: 3

Job #: 18-447
Tracking #: 0020
Technician: SJB
Date: 1/30/2019

	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	51.995	0.148	2.22	97	-1.44	98	85	-0.030	5.18	0.00
353	52.144	0.149	2.21	97	-0.75	99	85	-0.040	5.23	0.00
354	52.293	0.149	2.22	97	-1.16	99	86	-0.030	5.16	0.00
355	52.441	0.148	2.22	97	-2.78	98	86	-0.040	5.16	0.00
356	52.590	0.149	2.21	97	-2.62	99	86	-0.040	5.26	0.00
357	52.737	0.147	2.22	97	-0.72	98	85	-0.050	5.05	0.00
358	52.887	0.150	2.21	97	-3.14	100	85	-0.040	4.92	0.00
359	53.034	0.147	2.21	97	-2.4	98	85	-0.020	5.02	0.00
360	53.184	0.150	2.22	97	-0.69	100	85	-0.040	5.15	0.00
Avg/Tot	53.184	0.148	2.21	93	-1.83	100			7.38	0.37

WOODSTOVE SURFACE TEMPERATURE DATA

Client: FPI
Model: CI2700
Run #: 3

Job #: 18-447
Tracking #: 0020
Technician: SJB
Date: 1/30/2019

	Temperature Data (°F)						
Elapsed Time (min)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
0	439	442	291	608	317	419.4	855
1	442	444	311	603	319	423.8	729
2	442	443	313	591	323	422.4	673
3	443	442	315	582	327	421.8	696
4	443	441	318	578	331	422.2	762
5	442	438	321	581	335	423.4	841
6	440	436	322	589	339	425.2	904
7	438	433	324	598	343	427.2	932
8	436	430	327	609	347	429.8	962
9	433	426	328	622	350	431.8	989
10	430	423	329	636	353	434.2	1012
11	427	420	332	650	356	437.0	1038
12	423	417	332	664	359	439.0	1063
13	420	414	331	679	362	441.2	1085
14	417	411	330	693	364	443.0	1101
15	414	409	329	705	366	444.6	1112
16	411	406	328	718	368	446.2	1123
17	409	404	327	729	369	447.6	1134
18	406	401	327	740	371	449.0	1141
19	404	399	326	749	372	450.0	1149
20	402	397	324	758	373	450.8	1158
21	398	393	304	752	372	443.8	1161
22	395	390	287	757	370	439.8	1160
23	392	386	271	760	366	435.0	1161
24	390	383	258	761	362	430.8	1162
25	387	380	249	762	357	427.0	1162
26	384	377	241	764	353	423.8	1162
27	381	373	235	765	348	420.4	1161
28	379	370	229	765	344	417.4	1160
29	376	367	224	763	339	413.8	1160
30	373	364	220	763	335	411.0	1160
31	371	360	216	763	331	408.2	1162
32	369	357	212	763	327	405.6	1163
33	367	354	209	762	323	403.0	1165
34	366	351	206	761	320	400.8	1166
35	364	348	205	760	317	398.8	1166
36	362	345	203	759	314	396.6	1165
37	361	343	201	759	311	395.0	1165
38	359	340	200	758	308	393.0	1165
39	358	338	198	757	306	391.4	1165
40	357	335	197	756	303	389.6	1166
41	356	333	196	756	301	388.4	1166
42	355	331	195	755	299	387.0	1167
43	355	329	194	755	297	386.0	1167
44	354	326	193	756	296	385.0	1168
45	354	324	192	755	294	383.8	1167
46	354	323	191	755	292	383.0	1168
47	353	321	191	755	291	382.2	1167

WOODSTOVE SURFACE TEMPERATURE DATA

Client: FPI
Model: CI2700
Run #: 3

Job #: 18-447
Tracking #: 0020
Technician: SJB
Date: 1/30/2019

	Temperature Data (°F)						
Elapsed Time (min)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
48	353	319	190	753	289	380.8	1168
49	352	317	189	755	288	380.2	1169
50	352	316	188	753	287	379.2	1171
51	352	315	187	753	286	378.6	1173
52	352	313	186	754	284	377.8	1173
53	351	312	185	754	283	377.0	1171
54	352	311	185	753	282	376.6	1168
55	352	310	185	752	281	376.0	1165
56	352	309	185	751	280	375.4	1161
57	353	308	185	749	280	375.0	1160
58	352	307	184	749	279	374.2	1158
59	353	306	185	747	278	373.8	1156
60	353	306	185	746	277	373.4	1154
61	353	305	185	745	277	373.0	1151
62	354	305	186	743	276	372.8	1150
63	355	304	186	742	275	372.4	1149
64	356	304	186	739	274	371.8	1149
65	356	303	187	737	274	371.4	1150
66	357	303	187	736	273	371.2	1149
67	358	303	187	734	273	371.0	1147
68	358	303	187	731	272	370.2	1143
69	359	303	188	729	272	370.2	1139
70	359	302	188	728	271	369.6	1136
71	359	302	188	725	270	368.8	1132
72	360	302	188	725	270	369.0	1127
73	359	302	189	722	269	368.2	1122
74	361	303	190	719	269	368.4	1115
75	361	303	190	718	268	368.0	1107
76	361	303	191	715	268	367.6	1098
77	362	303	191	714	267	367.4	1090
78	363	303	191	712	267	367.2	1084
79	363	304	192	711	267	367.4	1079
80	364	304	192	709	266	367.0	1075
81	364	304	193	707	265	366.6	1072
82	365	305	193	707	265	367.0	1069
83	366	305	194	705	265	367.0	1067
84	367	306	194	704	264	367.0	1065
85	367	306	195	704	264	367.2	1063
86	368	307	195	703	263	367.2	1060
87	369	308	196	702	263	367.6	1057
88	370	308	196	700	262	367.2	1053
89	371	309	197	699	262	367.6	1049
90	372	310	197	699	261	367.8	1045
91	373	310	197	699	261	368.0	1041
92	374	310	198	697	260	367.8	1037
93	375	311	199	695	260	368.0	1033
94	376	312	199	694	260	368.2	1030
95	377	312	200	692	259	368.0	1028

WOODSTOVE SURFACE TEMPERATURE DATA

Client: FPI
Model: CI2700
Run #: 3

Job #: 18-447
Tracking #: 0020
Technician: SJB
Date: 1/30/2019

	Temperature Data (°F)						
Elapsed Time (min)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
96	377	313	201	691	259	368.2	1027
97	379	314	201	690	259	368.6	1028
98	380	314	202	690	258	368.8	1030
99	380	315	202	690	258	369.0	1031
100	381	316	202	688	258	369.0	1033
101	383	316	203	687	257	369.2	1033
102	383	317	203	687	257	369.4	1031
103	384	318	204	687	257	370.0	1030
104	385	319	204	685	257	370.0	1029
105	386	319	204	685	257	370.2	1030
106	386	320	205	684	256	370.2	1030
107	388	321	205	684	257	371.0	1030
108	388	322	206	684	256	371.2	1029
109	389	323	207	684	257	372.0	1029
110	389	324	208	684	256	372.2	1031
111	390	326	208	685	256	373.0	1034
112	390	327	209	685	256	373.4	1036
113	391	328	210	686	256	374.2	1038
114	391	329	211	686	256	374.6	1036
115	392	331	212	686	255	375.2	1032
116	392	332	213	685	256	375.6	1027
117	391	333	213	683	255	375.0	1023
118	392	335	215	682	255	375.8	1020
119	392	336	215	682	255	376.0	1018
120	393	338	216	682	256	377.0	1016
121	392	339	217	682	255	377.0	1016
122	393	340	217	682	255	377.4	1017
123	393	341	218	681	255	377.6	1018
124	392	342	219	681	255	377.8	1019
125	394	344	220	681	254	378.6	1021
126	394	345	222	681	255	379.4	1022
127	393	346	223	680	255	379.4	1023
128	394	347	225	681	255	380.4	1022
129	395	347	226	681	255	380.8	1022
130	395	349	228	681	255	381.6	1022
131	395	350	228	682	255	382.0	1022
132	396	351	231	682	255	383.0	1020
133	396	352	232	681	255	383.2	1016
134	397	352	234	681	255	383.8	1009
135	397	353	234	679	255	383.6	1004
136	397	354	236	680	255	384.4	999
137	397	355	236	678	255	384.2	994
138	397	356	236	677	255	384.2	989
139	397	357	236	673	255	383.6	982
140	398	358	236	671	255	383.6	975
141	398	359	236	669	255	383.4	967
142	399	360	236	664	255	382.8	959
143	398	361	236	662	256	382.6	950

WOODSTOVE SURFACE TEMPERATURE DATA

Client: FPI
Model: CI2700
Run #: 3

Job #: 18-447
Tracking #: 0020
Technician: SJB
Date: 1/30/2019

	Temperature Data (°F)						
Elapsed Time (min)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
144	398	362	236	658	256	382.0	942
145	398	363	236	652	256	381.0	935
146	398	364	236	649	256	380.6	927
147	397	365	236	644	256	379.6	919
148	397	366	236	640	257	379.2	912
149	397	367	236	634	257	378.2	905
150	396	368	236	630	257	377.4	900
151	395	369	237	626	257	376.8	895
152	395	370	237	623	258	376.6	891
153	394	371	237	619	258	375.8	888
154	394	372	237	615	258	375.2	885
155	393	372	237	612	258	374.4	883
156	392	373	237	609	259	374.0	879
157	392	374	237	605	259	373.4	875
158	391	375	237	601	259	372.6	868
159	390	376	236	597	259	371.6	859
160	389	376	236	592	260	370.6	850
161	388	377	236	587	260	369.6	842
162	388	378	236	581	260	368.6	836
163	387	378	236	577	260	367.6	830
164	386	378	236	571	260	366.2	825
165	386	378	236	567	261	365.6	820
166	385	379	236	561	261	364.4	815
167	385	379	235	557	261	363.4	811
168	384	379	235	552	261	362.2	807
169	383	379	235	548	261	361.2	803
170	382	379	235	544	261	360.2	800
171	381	378	235	540	262	359.2	797
172	381	378	236	536	262	358.6	794
173	380	378	236	533	262	357.8	791
174	379	377	235	529	262	356.4	788
175	378	377	235	525	262	355.4	785
176	377	376	235	521	262	354.2	783
177	376	376	235	518	262	353.4	781
178	376	375	235	516	262	352.8	779
179	375	374	235	512	262	351.6	776
180	374	374	235	510	262	351.0	774
181	373	373	235	507	262	350.0	772
182	372	372	235	504	262	349.0	770
183	372	371	235	501	262	348.2	767
184	371	371	235	499	262	347.6	765
185	370	370	236	496	262	346.8	763
186	369	369	235	494	262	345.8	760
187	369	369	235	491	262	345.2	758
188	368	368	235	489	262	344.4	755
189	367	367	234	486	262	343.2	753
190	366	366	233	484	261	342.0	750
191	365	365	234	482	261	341.4	748

WOODSTOVE SURFACE TEMPERATURE DATA

Client: FPI
Model: CI2700
Run #: 3

Job #: 18-447
Tracking #: 0020
Technician: SJB
Date: 1/30/2019

	Temperature Data (°F)						
Elapsed Time (min)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
192	365	365	233	479	261	340.6	745
193	364	364	233	477	261	339.8	742
194	363	363	233	475	261	339.0	739
195	362	363	233	473	260	338.2	736
196	362	362	233	471	260	337.6	733
197	361	361	233	468	260	336.6	730
198	360	360	233	466	260	335.8	727
199	359	360	232	464	259	334.8	724
200	358	359	232	461	259	333.8	721
201	356	359	232	459	259	333.0	718
202	356	358	231	457	259	332.2	715
203	356	357	231	455	258	331.4	713
204	354	356	231	453	258	330.4	710
205	353	356	231	451	258	329.8	708
206	353	355	231	449	257	329.0	706
207	351	355	231	446	257	328.0	705
208	350	354	231	445	257	327.4	704
209	349	353	231	443	257	326.6	703
210	348	353	230	441	257	325.8	700
211	347	352	229	440	256	324.8	698
212	346	351	230	437	256	324.0	695
213	345	351	230	435	256	323.4	692
214	344	350	229	433	256	322.4	688
215	343	349	230	430	256	321.6	685
216	342	348	231	429	255	321.0	681
217	340	347	231	426	255	319.8	677
218	339	347	231	424	255	319.2	673
219	339	346	230	422	255	318.4	669
220	337	345	230	420	254	317.2	665
221	336	344	229	418	254	316.2	662
222	335	343	228	416	254	315.2	659
223	334	343	227	414	254	314.4	655
224	333	342	227	411	253	313.2	652
225	331	341	226	410	253	312.2	650
226	330	340	225	407	253	311.0	647
227	329	339	224	406	252	310.0	644
228	328	338	224	404	252	309.2	642
229	327	338	223	402	252	308.4	639
230	326	337	222	400	252	307.4	637
231	325	336	221	398	251	306.2	635
232	324	336	222	396	251	305.8	632
233	323	335	221	394	251	304.8	630
234	322	334	221	393	250	304.0	628
235	321	334	220	391	250	303.2	625
236	320	333	220	389	249	302.2	623
237	319	332	219	387	249	301.2	620
238	318	331	219	386	248	300.4	618
239	317	330	218	384	248	299.4	615

WOODSTOVE SURFACE TEMPERATURE DATA

Client: FPI
Model: CI2700
Run #: 3

Job #: 18-447
Tracking #: 0020
Technician: SJB
Date: 1/30/2019

	Temperature Data (°F)						
Elapsed Time (min)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
240	316	329	218	383	247	298.6	613
241	315	329	218	381	246	297.8	610
242	314	328	217	379	246	296.8	608
243	313	327	217	377	246	296.0	605
244	312	326	217	376	245	295.2	603
245	311	326	217	374	244	294.4	601
246	310	325	215	372	244	293.2	599
247	309	324	217	371	243	292.8	597
248	309	323	216	369	243	292.0	595
249	308	323	215	368	243	291.4	593
250	307	322	215	366	242	290.4	591
251	306	321	214	365	241	289.4	590
252	304	320	214	364	241	288.6	588
253	303	320	213	362	241	287.8	586
254	303	319	213	361	240	287.2	585
255	302	318	213	359	240	286.4	583
256	301	317	212	358	239	285.4	582
257	300	317	212	357	239	285.0	580
258	300	316	212	355	239	284.4	579
259	299	315	211	354	238	283.4	577
260	297	315	211	353	238	282.8	576
261	296	314	211	352	237	282.0	574
262	296	313	210	351	237	281.4	573
263	295	313	210	350	237	281.0	572
264	294	312	209	348	236	279.8	570
265	293	311	209	347	236	279.2	570
266	293	311	209	346	236	279.0	568
267	292	310	208	345	235	278.0	567
268	291	310	208	344	235	277.6	566
269	290	309	208	343	235	277.0	566
270	290	309	208	342	234	276.6	564
271	289	308	207	342	234	276.0	564
272	288	308	208	340	233	275.4	563
273	287	307	207	340	233	274.8	563
274	286	307	207	339	233	274.4	561
275	286	307	207	338	232	274.0	561
276	285	306	206	337	232	273.2	560
277	284	305	206	336	232	272.6	559
278	284	305	206	335	231	272.2	558
279	283	305	206	335	231	272.0	557
280	282	304	205	334	231	271.2	556
281	282	304	205	333	230	270.8	555
282	281	304	205	332	230	270.4	554
283	281	303	204	331	230	269.8	553
284	280	303	203	331	229	269.2	552
285	280	302	203	330	229	268.8	551
286	279	302	203	329	229	268.4	550
287	278	302	203	328	229	268.0	549

WOODSTOVE SURFACE TEMPERATURE DATA

Client: FPI
Model: CI2700
Run #: 3

Job #: 18-447
Tracking #: 0020
Technician: SJB
Date: 1/30/2019

	Temperature Data (°F)						
Elapsed Time (min)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
288	277	301	202	328	228	267.2	549
289	277	301	202	327	228	267.0	548
290	276	301	201	326	228	266.4	547
291	276	300	201	326	227	266.0	547
292	275	300	200	325	227	265.4	546
293	274	300	200	325	227	265.2	546
294	273	299	200	324	227	264.6	546
295	273	299	200	324	226	264.4	547
296	273	299	199	324	226	264.2	550
297	272	299	200	324	226	264.2	553
298	272	298	199	324	226	263.8	557
299	272	298	199	325	226	264.0	559
300	272	298	199	325	226	264.0	562
301	272	298	199	326	226	264.2	563
302	271	298	199	326	226	264.0	564
303	271	298	199	327	227	264.4	564
304	271	297	199	327	227	264.2	563
305	271	297	199	327	228	264.4	562
306	271	297	199	327	228	264.4	561
307	270	296	198	326	229	263.8	560
308	270	296	199	326	230	264.2	560
309	270	295	198	326	231	264.0	560
310	270	295	198	326	232	264.2	561
311	270	294	198	326	233	264.2	562
312	269	294	197	326	234	264.0	563
313	269	293	197	326	234	263.8	563
314	269	293	197	326	235	264.0	563
315	269	293	197	326	235	264.0	563
316	269	292	196	326	236	263.8	563
317	269	292	196	326	236	263.8	563
318	268	292	196	326	237	263.8	563
319	269	291	196	326	237	263.8	562
320	268	291	195	326	237	263.4	562
321	268	291	195	326	237	263.4	561
322	268	290	195	326	237	263.2	560
323	268	290	194	325	236	262.6	559
324	267	290	194	325	236	262.4	558
325	267	290	194	325	236	262.4	557
326	267	290	194	324	236	262.2	556
327	267	289	194	324	235	261.8	554
328	267	289	193	324	235	261.6	553
329	267	289	193	323	235	261.4	552
330	267	288	193	323	235	261.2	550
331	266	289	193	322	234	260.8	550
332	266	288	192	322	234	260.4	550
333	266	288	192	322	234	260.4	550
334	266	288	192	321	234	260.2	552
335	265	288	192	322	234	260.2	554

WOODSTOVE SURFACE TEMPERATURE DATA

Client: FPI
Model: CI2700
Run #: 3

Job #: 18-447
Tracking #: 0020
Technician: SJB
Date: 1/30/2019

	Temperature Data (°F)						
Elapsed Time (min)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
336	265	288	192	322	234	260.2	556
337	265	287	191	321	233	259.4	558
338	265	287	191	321	233	259.4	559
339	265	287	191	322	233	259.6	560
340	264	287	191	322	233	259.4	561
341	264	287	191	322	233	259.4	562
342	264	286	191	322	233	259.2	563
343	264	286	191	322	232	259.0	563
344	264	286	191	322	232	259.0	563
345	264	286	191	322	232	259.0	563
346	264	286	190	322	231	258.6	562
347	264	286	190	322	231	258.6	562
348	263	285	190	322	231	258.2	560
349	264	286	190	322	231	258.6	559
350	264	285	190	321	230	258.0	558
351	263	285	189	321	230	257.6	557
352	263	285	189	321	230	257.6	555
353	263	285	189	320	229	257.2	553
354	263	285	189	319	229	257.0	551
355	263	285	189	319	229	257.0	549
356	262	285	189	319	228	256.6	547
357	263	285	188	319	228	256.6	545
358	263	285	188	317	228	256.2	543
359	262	285	188	317	227	255.8	542
360	262	284	188	316	227	255.4	540
Average	342	333	218	526	262	336	816

LAB SAMPLE DATA - ASTM E2515

Client: FPI
Model: CI2700
Run #: 3
Job #: 18-447
Tracking #: 0020
Technician: SJB
Date: 1/30/2019

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	T078, T079	167.7	164.2	3.5
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:	3.5

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	T085	165.5	81.5	1.9
B. Rear filter catch	Filter	T080		82.1	
C. Probe catch*	Probe	3A	116073.5	116072.9	0.6
D. O-Ring catch*	O-Ring	3A	3575.8	3575.2	0.6

Sub-Total	Total Particulate, mg:	3.1
Train A Aggregate	Total Particulate, mg:	**6.6**

TRAIN B

Sample Component	Reagent	Filter, Probe, or O-Ring #	Weights		
			Final, mg	Tare, mg	Particulate, mg
A. Front filter catch	Filter	T081, T084	251.0	164.5	4.7
B. Rear filter catch	Filter	T082		81.8	
C. Probe catch*	Probe	3B	116340.1	116339.7	0.4
D. O-Ring catch*	O-Ring	3B	3563.8	3563.8	0.0

Total Particulate, mg:	**5.1**

AMBIENT

Sample Component	Reagent	Filter, Probe, or O-Ring #	Weights		
			Final, mg	Tare, mg	Particulate, mg
A. Filter catch*	Filter	T083	82.5	82.4	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: 18-447 | Tracking #: 0020
Model: CI2700 | Run Number: 3 | Test Date: 1/30/2019

Wood Heater Run Notes

Pre-Test Notes
Pre-Test Start Time: 10:14
Air Control Setting: Full Open

Time	Notes
0 min	Starting with 1.9 lbs of kindling and ~6 pieces of printer paper, lit fuel with propane torch for 15 seconds; door cracked 3".
1.5 min	Door closed down to 1"
3 min	Door latched closed
5 min	Bypass closed
6 min	@ 0.3 lbs, added remaining kindling fuel (1.0 lbs) and a couple pieces of start-up fuel (1.8 lbs); door open 75 seconds
23 min	@ 1.5 lbs, added remaining start-up fuel pieces (3.2 lbs); door open 40 seconds
38 min	@1.9 lbs, leveled coal bed, loaded High Fire fuel load, door closed 20 seconds after loading completed.
59 min	Turned fan on high, per manufacturer's instructions
116 min	@ 7.0 lbs, adjusted fuel load to bring unburnt pieces forward, in order to achieve uniform charcoalization
153 min	@ 3.7 lbs, leveled coal bed, turned fan off, zeroed scale in preparation of Med. Fire fuel loading

Test Notes
Test Burn Start Time: 12:48
Air Control Setting: Medium Air Setting – See Photos in Test Folder

Time	Notes
0 min	Fuel loading done in 40 seconds, door closed at 80 seconds, air fully open
6 min	Set air to test setting
20 min	Turned fan on high, per manufacturer's instructions
47 min	Changed front filter on Train A due to plugging
52 min	Changed front filter on Train B due to plugging
60 min	Changed 1-hour filter
360 min	End of Test

Test Burn End Time: 18:48

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	9:25	9:29	9:27	7:40	7:38	7:42
CO_2	0.00	10.08	16.93	0.02	10.03	16.87
CO	0.000	2.501	4.330	-0.003	2.490	4.309

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

Technician Signature:  Date: 1/31/2019

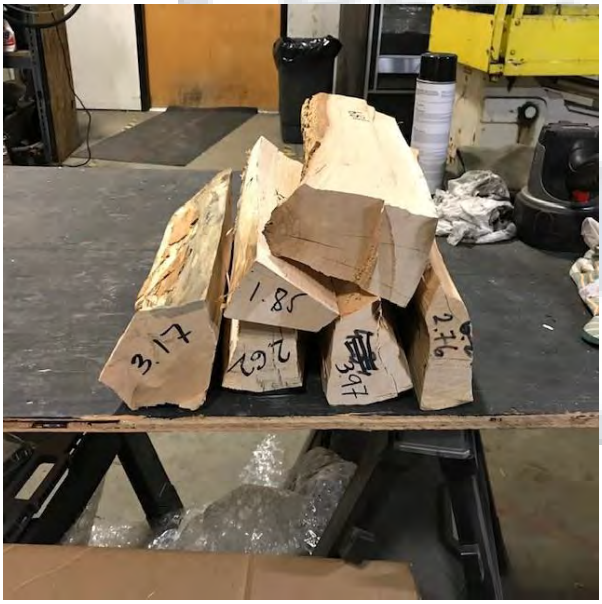
ASTM E3053 Wood Heater Run Sheets

Client: FPI | Job Number: 18-447 | Tracking #: 0020
Model: CI2700 | Run Number: 3 | Test Date: 1/30/2019

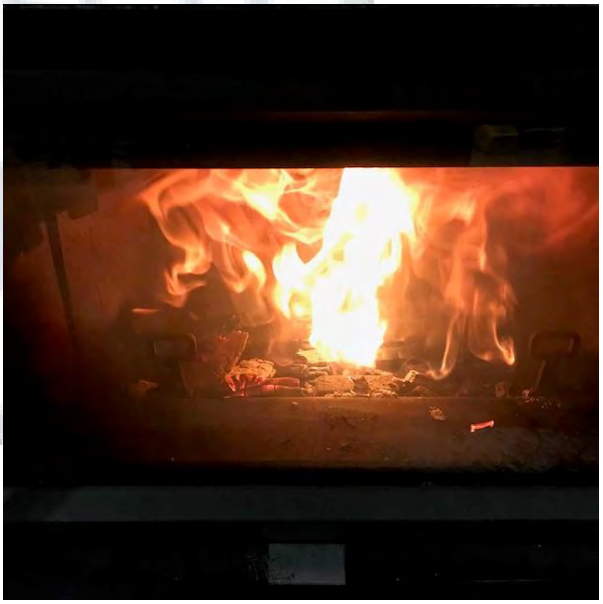
Test Photos

Kindling Fuel Load

Start-up Fuel Load



High Fire Fuel Load



Residual Start-up Fuel Coal Bed

Technician Signature: _____ Date: 1/31/2019

ASTM E3053 Wood Heater Run Sheets

Client: FPI | Job Number: 18-447 | Tracking #: 0020
Model: CI2700 | Run Number: 3 | Test Date: 1/30/2019

High Fire Fuel Loaded

Residual High Fire Load Coal Bed

Medium Fire Fuel Load

Medium Fire Fuel Loaded

Technician Signature: _____ Date: 1/31/2019

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

Date/Time In Desiccator: 12/7 - 11:00 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 #
T061	12/11-13:00	90.8	12/12 - 9:00	90.7	–	–	~	~	SB	18-446 #3
T062	1/24 -10:00	~~91.4~~ 91.2	1/24- 10:00	91.2	–	–	–	–	SB	18-447 #1
T063	↓	91.2	↓	91.2	–	–	–	–	SB	↓
T064		90.7		90.8	–	–	–	–	SB	
T065		90.9		91.1	–	–	–	–	SB	
T066		90.9		90.8	–	–	–	–	SB	
T067		90.3		90.3	–	–	–	–	SB	
T068		83.9		83.8	–	–	–	–	SB	
T069		83.9		84.0	–	–	–	–	SB	↓
T070		83.8		83.8	–	–	–	–	SB	18-447 #2
T071		83.9		83.9	–	–	–	–	SB	
T072		83.8		83.8	–	–	–	–	SB	
T073		83.0		83.0	–	–	–	–	SB	
T074		82.6		82.4	–	–	–	–	SB	
T075		82.3		82.4	–	–	–	–	SB	↓
T076		82.6		82.5	–	–	–	–	SB	
T077		82.0		82.0	–	–	–	–	SB	↓
T078		82.0		82.1	–	–	–	–	SB	18-447 #3
T079		81.9		82.2	1/29 - 7:00	82.1	–	–	SB	↓
T080		82.1		82.1	–	–	–	–	SB	
T081		81.6		81.9	1/29 - 7:00	81.8	–	–	SB	
T082		81.8		81.8	–	–	–	–	SB	
T083		82.6		82.4	–	–	–	–	SB	↓
T084		82.6		82.7	–	–	–	–	SB	
T085		81.4		81.5	–	–	–	–	SB	↓
T086		82.3		82.3	–	–	–	–	SB	
T087		82.4		82.3	–	–	–	–	SB	
T088		82.3		82.4	–	–	–	–	SB	
T089		81.9		81.9	–	–	–	–	SB	
T090	↓	81.5	↓	81.3	–	–	–	–	SB	

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

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

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
T061	90.7	12/13 - 8:30	12/14-9:45	90.6	12/17-8:40	90.7	-	-	-	-	SB
T062	91.2	12/28 - 15:10	1/30 - 7:30	> 188.0	1/31 - 8:00	> 187.6	2/1 - 8:45	> 187.6	-	-	SB
T063	91.2	↓	↓	↓	↓	↓	↓	↓	-	-	SB
T064	90.8			178.7		178.4	↓	178.4	-	-	SB
T065	91.1			> 274.5		> 274.5	-	-	-	-	SB
T066	90.8			↓		↓	-	-	-	-	SB
T067	90.3			90.5	↓	90.4	-	-	-	-	SB
T068	83.8			* weighed as a set with T065 + T066							SB
T069	84.0	↓	↓	* weighed as a pair with T064 *							SB
T070	83.8	1/30 - 8:00	1/31 - 8:00	> 171.9	2/1 - 8:45	> 171.8	-	-	-	-	SB
T071	83.9	↓	↓	↓	↓	↓	-	-	-	-	SB
T072	83.8			167.1		167.2	-	-	-	-	SB
T073	83.0			> 253.1		> 253.1	-	-	-	-	SB
T074	82.4			↓		↓	-	-	-	-	SB
T075	82.4			82.5	↓	82.4	-	-	-	-	SB
T076	82.5			* weighed as a set with T073 + T074							SB
T077	82.0	↓	↓	* weighed as a pair with T072 *							SB
T078	82.1	1/31 - 8:30	2/1 - 8:45	> 167.7	2/2 - 7:30	> 167.7	-	-	-	-	SB
T079	82.1	↓	↓	↓	↓	↓	-	-	-	-	SB
T080	82.1			165.4		165.5	-	-	-	-	SB
T081	81.8			> 250.9		> 251.0	-	-	-	-	SB
T082	81.8			↓		↓	-	-	-	-	SB
T083	82.4			82.5	↓	82.5	-	-	-	-	SB
T084	82.7			* weighed as a set with T081 + T082 *							SB
T085	81.5	↓	↓	* weighed as a pair with T080 *							SB
T086											
T087											
T088											
T089											
T090											

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

Date/Time In Desiccator: 1/17/19 - 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	1/24 - 10:00	115627.8	1/24 - 8:00	115627.7	–	–	–	–	JD	18-447 #1
1B		115902.3		115902.3	–	–	–	–	SD	18-447 #1
2A		116239.5		116239.6	–	–	–	–	SB	18-447 #2
2B		116329.5		116329.4	–	–	–	–	SB	18-447 #2
3A		116072.9		116072.9	–	–	–	–	SB	18-447 #3
3B		116339.8		116339.7	–	–	–	–	SB	18-447 #3
4A		116182.2	2/1/19-8:45	116182.3	–	–	–	–	SB	18-439 #1
4B		116365.2	2/1 - 8:45	116365.3	–	–	–	–	SB	18-439 #1
5A										
5B										
6A										
6B										
7A										
7B										
8A										
8B										
9A										
9B										
10A										
10B										
11A										
11B										
12A										
12B										
13A										
13B										
14A										
14B										
15A										
15B										

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	115627.7	1/28 - 15:10	1/30 - 7:30	115628.7	1/31 - 8:00	115628.5	-	-	-	-	SB
1B	115902.3	1/28 - 15:10	1/30 - 7:30	115903.0	1/31 - 8:00	115902.8	-	-	-	-	SB
2A	116239.6	1/30 - 8:00	1/31 - 8:00	116239.8	2/1 - 8:45	116239.9	-	-	-	-	SB
2B	116329.4	1/30 - 8:00	1/31 - 8:00	116329.9	2/1 - 8:45	116330.0	-	-	-	-	SB
3A	116072.9	1/31 - 8:30	2/1 - 8:45	116073.4	2/2 - 7:30	116073.5	-	-	-	-	SB
3B	116339.7	1/31 - 8:30	2/1 - 8:45	116340.1	2/2 - 7:30	116340.1	-	-	-	-	SB
4A	116182.3										
4B	116365.3										
5A											
5B											
6A											
6B											
7A											
7B											
8A											
8B											
9A											
9B											
10A											
10B											
11A											
11B											
12A											
12B											
13A											
13B											
14A											
14B											
15A											
15B											

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

Date/Time In Desiccator: 1/17/2019 - 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	1/24 - 10:00	3562.0	1/24 - 16:30	3562.0	-	-	-	-	SB	18-447 #1
1B		3550.9		3550.8	-	-	-	-	SB	18- 447 #1
2A		3548.0		3547.9	-	-	-	-	SB	18- 447 #2
2B		3566.4		3566.5	-	-	-	-	SB	18- 447 #2
3A		3575.4		3575.2	-	-	-	-	SB	18- 447 #3
3B		3563.8		3563.8	-	-	-	-	SB	18- 447 #3
4A		3588.8	2/1 - 8:45	3588.4	2/2 - 7:30	3588.3	-	-	SB	18-459 #1
4B		3576.4	2/1 - 8:45	3575.7	2/2 - 7:30	3575.7	-	-	SB	18- 439 #1
5A										
5B										
6A										
6B										
7A										
7B										
8A					-					
8B										
9A										
9B										
10A										
10B										
11A										
11B										
12A										
12B										
13A										
13B										
14A										
14B										
15A										
15B										

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

Balance ID#: 107 Audit Weight ID# / Weight (mg): 109B-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	3562.0	1/28 - 15:10	1/30 - 7:30	3562.3	1/31 - 8:00	3562.0	2/1 - 8:45	3562.0	-	-	SB
1B	3550.8	1/28 - 15:10	1/30 - 7:30	3551.1	1/31 - 8:00	3550.9	-	-	-	-	SB
2A	3547.9	1/30 - 8:00	1/31 - 8:00	3548.5	2/1 - 8:45	3548.2	2/2 - 7:30	3548.2	-	-	SB
2B	3566.5	1/30 - 8:00	1/31 - 8:00	3566.8	2/1 - 8:45	3566.6	-	-	-	-	SB
3A	3575.2	1/31 - 8:30	2/1 - 8:45	3575.9	2/2 - 7:30	3575.8	-	-	-	-	SB
3B	3563.8	1/31 - 8:30	2/1 - 8:45	3564.0	2/2 - 7:30	3563.8	-	-	-	-	SB
4A	3588.3										
4B	3575.7										
5A											
5B											
6A											
6B											
7A											
7B											
8A											
8B											
9A											
9B											
10A											
10B											
11A											
11B											
12A											
12B											
13A											
13B											
14A											
14B											
15A											
15B											

Sample Calculations – ASTM E3053 & E2515

Client: FPI
Model: CI2700
Run: 2

Equations used to calculate the parameters listed below are described in this appendix. Sample calculations are provided for each equation. The raw data and printout results from a sample run are also provided for comparison to the sample calculations.

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

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

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

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

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

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

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

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

V_s – Average gas velocity in the dilution tunnel, ft/sec

Q_{sd} – Average gas flow rate in dilution tunnel, dscf/hr

$V_{m(std)}$ – Volume of gas sampled, corrected to dry standard conditions, dscf

m_n – Total particulate matter collected, mg

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

E_T – Total particulate emissions, g

PR - Proportional rate variation

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

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

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

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

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

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

Where,

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

Sample Calculation:

n	M_{FLnwb}	MC_{FLn}	$(M_{FLnwb})(100/(100 + MC_{FLn}))$		
1	4.87	23.7	4.87 (100) / (100+ 23.7)) =	3.94	
2	3.84	20.7	3.84 (100) / (100+ 20.7)) =	3.18	
3	3.99	21.8	3.99 (100) / (100+ 21.8)) =	3.27	
4	6.53	20.0	6.53 (100) / (100+ 20)) =	5.44	
5	2.51	22.0	2.51 (100) / (100+ 22)) =	2.06	
6	0.00	NA	N/A	-	
7	0.00		N/A	-	
			SUM	17.89	lbs

M_{Fldb} = **17.89** lbs
M_{Fldb} = **8.12** 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

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

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} = 17.89

M_{FREdb} = 0.00

M_{TFBdb} = 17.89 - 0.00

= **17.89** lbs

= **8.12** 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} = 17.89

θ = 849

$$BR = \frac{60 \times 17.89}{849}$$

BR = **1.26** lb/hr

= **0.57** 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:

$$Fp = \frac{16.61}{18.80} = 0.883$$

$$V_s = 0.883 \times 85.49 \times 0.99 \times 0.274 \times \left(\frac{78.6 + 460}{\left(29.95 + \frac{-0.22}{13.6}\right) \times 28.78} \right)^{1/2}$$

V_s = **16.18** 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:

$$Q_{sd} = 3600 \times (1 - 0.02) \times 16.18 \times 0.1963 \times \frac{528}{78.6 + 460} \times \frac{29.95 + \frac{-0.22}{13.6}}{29.92}$$

Q_{sd} = **10995.2** 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:

$$V_{m(std)} = 17.64 \times 126.801 \times 1.004 \times \frac{\left(29.95 + \frac{2.19}{13.6}\right)}{(78.9 + 460)}$$

$V_{m(std)}$ = **125.454** dscf

Using equation for Train 2:

$$V_{m(std)} = 17.64 \times 125.909 \times 1 \times \frac{\left(29.95 + \frac{2.20}{13.6}\right)}{(94.2 + 460)}$$

$V_{m(std)}$ = **120.656** dscf

Using equation for ambient train:

$$V_{m(std)} = 17.64 \times 102.68 \times 0.999 \times \frac{\left(\underline{29.95} + \frac{0.00}{13.6}\right)}{(68.3 + 460)}$$

$V_{m(std)}$ = **102.566** dscf

m_n – Total Particulate Matter Collected, mg
ASTM E2515 Equation (12)

$$m_n = m_p + m_f + m_g$$

Where:

m_p = mass of particulate matter from probe, mg
m_f = mass of particulate matter from filters, mg
m_g = mass of particulate matter from filter seals, mg

Sample Calculation:

Using equation for Train A (first hour):

m_n = 0.0 + 4.1 + 0.0

m_n = 4.1 mg

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

m_n = 0.3 + 1.4 + 0.3

m_n = 2.0 mg

Train A aggregate:

m_n = 4.1 + 2.0
m_n = **6.1** mg

Using equation for Train B:

m_n = 0.6 + 5.2 + 0.1

m_n = **5.9** mg

C_s - Concentration of particulate matter in tunnel gas, dry basis, corrected to STP, g/dscf
ASTM E2515 equation (13)

$$C_s = K_2 \times \frac{m_n}{V_{m(std)}}$$

Where:

K_2	=	Constant, 0.001 g/mg
m_n	=	Total mass of particulate matter collected in the sampling train, mg
$V_{m(std)}$	=	Volume of gas sampled corrected to dry standard conditions, dscf

Sample calculation:

For Train 1:

$$C_s = 0.001 \times \frac{6.1}{125.45}$$

C_s = **0.00005** g/dscf

For Train 2

$$C_s = 0.001 \times \frac{5.9}{120.66}$$

C_s = **0.00005** g/dscf

For Ambient Train

$$C_r = 0.001 \times \frac{0.0}{102.57}$$

C_r = **0.000000** 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 = (0.000049 - 0.000000) x 10995.2 x 849 /60

E_T = **7.56** g

For Train 2

E_T = (0.000049 - 0.000000) x 10995.2 x 849 /60

E_T = **7.61** g

Average

E = **7.59** g

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

7.5% of the average =	0.57
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):

$$PR = \left(\frac{849 \times 1.407 \times 16.18 \times (101.0 + 460) \times (78.9 + 460)}{10 \times 126.8 \times 16.52 \times (78.6 + 460) \times (74.0 + 460)} \right) \times 100$$

PR = **97** %

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 = 7.59
θ = 849

PM_R = 60(7.59 / 849)

PM_{RH} = **0.54** 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 = 7.59
M_{TFBdb} = 8.12

PM_{FH} = 7.59 / 8.12
= **0.93** g/kg

Sample Calculations – ASTM E3053 & E2515

Client: FPI
Model: CI2700
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	3.22	21.7	3.22 (100) / (100+ 21.7)) =	2.65	
2	3.88	20.2	3.88 (100) / (100+ 20.2)) =	3.23	
3	4.45	21.6	4.45 (100) / (100+ 21.6)) =	3.66	
4	2.71	21.7	2.71 (100) / (100+ 21.7)) =	2.23	
5	4.37	22.6	4.37 (100) / (100+ 22.6)) =	3.56	
6	0.00	NA	N/A	-	
7	N/A	N/A	N/A	-	
			SUM	15.32	lbs

M_{Fldb} = **15.32** lbs
M_{Fldb} = **6.95** 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} = 5.05

MC_{SU} = 20.8

M_{SUdb} = 5.1 (100/(100+ 20.8)

M_{SUdb} = **4.18** lbs

= **1.90** kg

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

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

Where,

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

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

Sample calculation:

M_{Kwb} = 3

MC_K = 10.0

M_{Kdb} = 3.00 (100/(100+ 10.0)

M_{Kdb} = **2.73** lbs

= **1.24** 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

M_{FLEHdb} = 2

M_{FREHdb} = 2.00 + 2

M_{FREHdb} = **4.00** lbs

= **1.81** 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} = 2.73

M_{SUdb} = 4.18

M_{FLdb} = 15.32

M_{FREHdb} = 4.00

M_{TFBHdb} = 2.73 + 4.18 + 15.32 - 4.00

= **18.23** lbs

= **8.27** 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} = 15.32

M_{FLEHdb} = 2.00

θ_{H1} = 167

$$BR_H = \frac{60\ (\ 15.32\ -\ 2.00\ )}{167}$$

BR_H = **4.79** lb/hr

= **2.17** 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

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

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:

$$Fp = \frac{16.08}{18.08} = 0.889$$

$$V_s = 0.889 \times 85.49 \times 0.99 \times 0.274 \times \left(\frac{105.2 + 460}{\left(30.11 + \frac{-0.20}{13.6}\right) \times 28.78} \right)^{1/2}$$

V_s = **16.65** 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:

$$Q_{sd} = 3600 \times (1 - 0.02) \times 16.65 \times 0.1963 \times \frac{528}{105.2 + 460} \times \frac{30.11 + \frac{-0.20}{13.6}}{29.92}$$

Q_{sd} = **10838.3** dscf/hr

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

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

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:

$$V_{m(std)} = 17.64 \times 31.851 \times 1.004 \times \frac{\left(30.11 + \frac{2.22}{13.6}\right)}{(76.0 + 460)}$$

$V_{m(std)}$ = **31.854** dscf

Using equation for Train 2:

$$V_{m(std)} = 17.64 \times 30.999 \times 1 \times \frac{\left(30.11 + \frac{2.14}{13.6}\right)}{(87.8 + 460)}$$

$V_{m(std)}$ = **30.206** dscf

Using equation for ambient train:

$$V_{m(std)} = 17.64 \times 25.90 \times 0.999 \times \frac{\left(\underline{30.11} + \frac{0.00}{13.6}\right)}{(67.8 + 460)}$$

$V_{m(std)}$ = **26.037** dscf

m_n – Total Particulate Matter Collected, mg
ASTM E2515 Equation (12)

$$m_n = m_p + m_f + m_g$$

Where:

m_p = mass of particulate matter from probe, mg
m_f = mass of particulate matter from filters, mg
m_g = mass of particulate matter from filter seals, mg

Sample Calculation:

Using equation for Train A (first hour):

m_n = 0.0 + 5.2 + 0.0

m_n = 5.2 mg

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

m_n = 0.8 + 3.6 + 0.0

m_n = 4.4 mg

Train A aggregate:

m_n = 5.2 + 4.4
m_n = **9.6** mg

Using equation for Train B:

m_n = 0.5 + 8.8 + 0.1

m_n = **9.4** 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:

$$C_s = 0.001 \times \frac{9.6}{31.85}$$

C_s = **0.00030** g/dscf

For Train 2

$$C_s = 0.001 \times \frac{9.4}{30.21}$$

C_s = **0.00031** g/dscf

For Ambient Train

$$C_r = 0.001 \times \frac{0.1}{26.04}$$

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 = (0.000301 - 0.000004) x 10838.3 x 215 /60

E_T = **11.56** g

For Train 2

E_T = (0.000311 - 0.000004) x 10838.3 x 215 /60

E_T = **11.94** g

Average

E = **11.75** g

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

7.5% of the average =	0.88
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):

$$PR = \left(\frac{215 \times 0.145 \times 16.65 \times (77.0 + 460) \times (76.0 + 460)}{1 \times 31.851 \times 16.23 \times (105.2 + 460) \times (71.0 + 460)} \right) \times 100$$

PR = **96** %

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} = 11.75

θ_{H2} = 215

PM_{RH} = 60(11.75 / 215)

PM_{RH} = **3.28** 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} = 11.75

M_{TFBHdb} = 8.27

PM_{FH} = 11.75 / 8.27

= **1.42** 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

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

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NE PAS ENLEVER CETTE ETQUETTE

U.S. ENVIRONMENTAL PROTECTION AGENCY CERTIFIED TO COMPLY WITH 2020 PARTICULATE EMISSION STANDARDS USING CORD WOOD." TESTED TO ASTM E3053. MODEL REGENCY CI2700/HI500 – 1.3G /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.
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UN MINIMUM DE DÉGAGEMENT DE MATÉRIAUX COMBUSTIBLES (MESURÉE À PARTIR DU HAUT/PORTE LATÉRALE)

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MANTLE / MANTEAU B) 21-5/8 in / 549 mm
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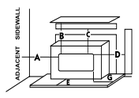

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COMPONENTS REQUIRED FOR INSTALLATION: 6" (152mm) STAINLESS STEEL LINER - LISTED TO: UL1777, ULCS635 OR ULCS640. OPTIONAL COMPONENT: FAN (PART# 106-917), ELECTRICAL RATING: VOLTS 115, 60 HZ, 0.6 AMPS, CONTEMPORARY FACEPLATE, CONTOUR FACEPLATE, CAST FACEPLATE, OFFSET FLUE COLLAR, OR BACKER PLATE.
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920-048

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Manufactured By:
FIREPLACE PRODUCTS INTERNATIONAL LTD.
6988 VENTURE ST., DELTA, BC V4G 1H4

Serial No./ No de série
516

SIGNATURE

DATE OF MANUFACTURE

2023	2022	2021	2020	2019
☐	☐	☐	☐	☐

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

(Duplicate Serial #) 516

Part #: 920-048

Size: 5.4" H x 10.9" W (file at 100%)

Colour: Black on grey, except for what is indicated as being printed red on grey.
White out signature box.
Material: 2 ml silver matt polyester (DPM SMS)

Jan. 24/19: created draft

REGENCY®
FIREPLACE PRODUCTS

Pro Series Wood Fireplace Insert

Owners & Installation Manual

www.regency-fire.com

MODEL: CI2700/HI500

Report #0219WN017S

***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.
Keep those **REGENCY FIRES** burning.

“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 fuelling areas.

“U.S. ENVIRONMENTAL PROTECTION AGENCY Certified to comply with 2020 particulate emission standards using cordwood.” Model Regency CI2700 and HI500 – 1.3g/hr."

SAFETY NOTE: If this wood stove is not properly installed, a house fire may result. For your safety, follow the installation instructions, contact local building, fire officials, or authority having jurisdiction about restrictions and installation inspection requirements in your area.

The following statements are required by the Environmental Protection Agency:

“This manual describes the installation and operation of the Regency CI2700 and HI500 catalytic equipped wood heater. This heater meets the 2020 U.S. Environmental Protection Agency’s crib wood emission limits for wood heaters. Under specific test conditions this heater has been shown to deliver heat at rates ranging from 8,292 BTU/hr to 29,511 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 and fully lined."

“This wood heater contains a catalytic combustor, which needs periodic inspection and replacement for proper operation. It is against federal regulations to operate this wood heater in a manner inconsistent with operating instructions in this manual, or if the catalytic element is deactivated or removed.”

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

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

DO NOT BURN:

- Treated wood
- Coal
- Garbage
- Cardboard
- Solvents
- Colored Paper
- Trash
- Lawn clippings or yard waste
- Materials containing rubber including tires
- Materials containing plastic
- Waste petroleum products , paints or paint thinners or asphalt products
- Materials containing asbestos
- Construction or demolition debris
- Railroad ties
- Manure or animal remains
- Saltwater driftwood or other previously salt water saturated materials
- Unseasoned wood
- Paper products, cardboard, plywood or particle board. The prohibition against burning these materials does not prohibit the use of fire starters made from paper, cardboard, saw dust, wax and similar substances for the purpose of starting a fire in a wood heater

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

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

This unit must be connected to either a listed factory built chimney suitable for use with solid fuels and conforming to, UL1777,ULCS635 and ULCS640, or code approved masonry chimney with flue liner.
CI2700/HI500 is tested and certified to UL-1482 (R2015), and ULC-S628 (R1997).

SAVE THESE INSTRUCTIONS

NATIONAL FIREPLACE INSTITUTE NFI CERTIFIED

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

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

SAFETY LABEL FOR CI2700

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.

Report #0219WN017S

LISTED FACTORY BUILT FIREPLACE INSERT
CONSTRUITS EN USINE CHEMINÉE INSERT
CERTIFIED FOR USE IN CANADA AND U.S.A
CERTIFIÉE POUR: CANADA AND U.S.A.
MODEL/ MODÈLE: CI2700/HI500
TESTED TO: UL-1482 (R2015), and ULC-S628 (R1997)

REGENCY® FIREPLACE PRODUCTS
MADE IN CANADA

DO NOT REMOVE THIS LABEL
NE PAS ENLEVER CETTE ETQUETTE

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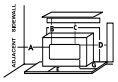

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920-048

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Manufactured By:
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Serial No./ No de série
516

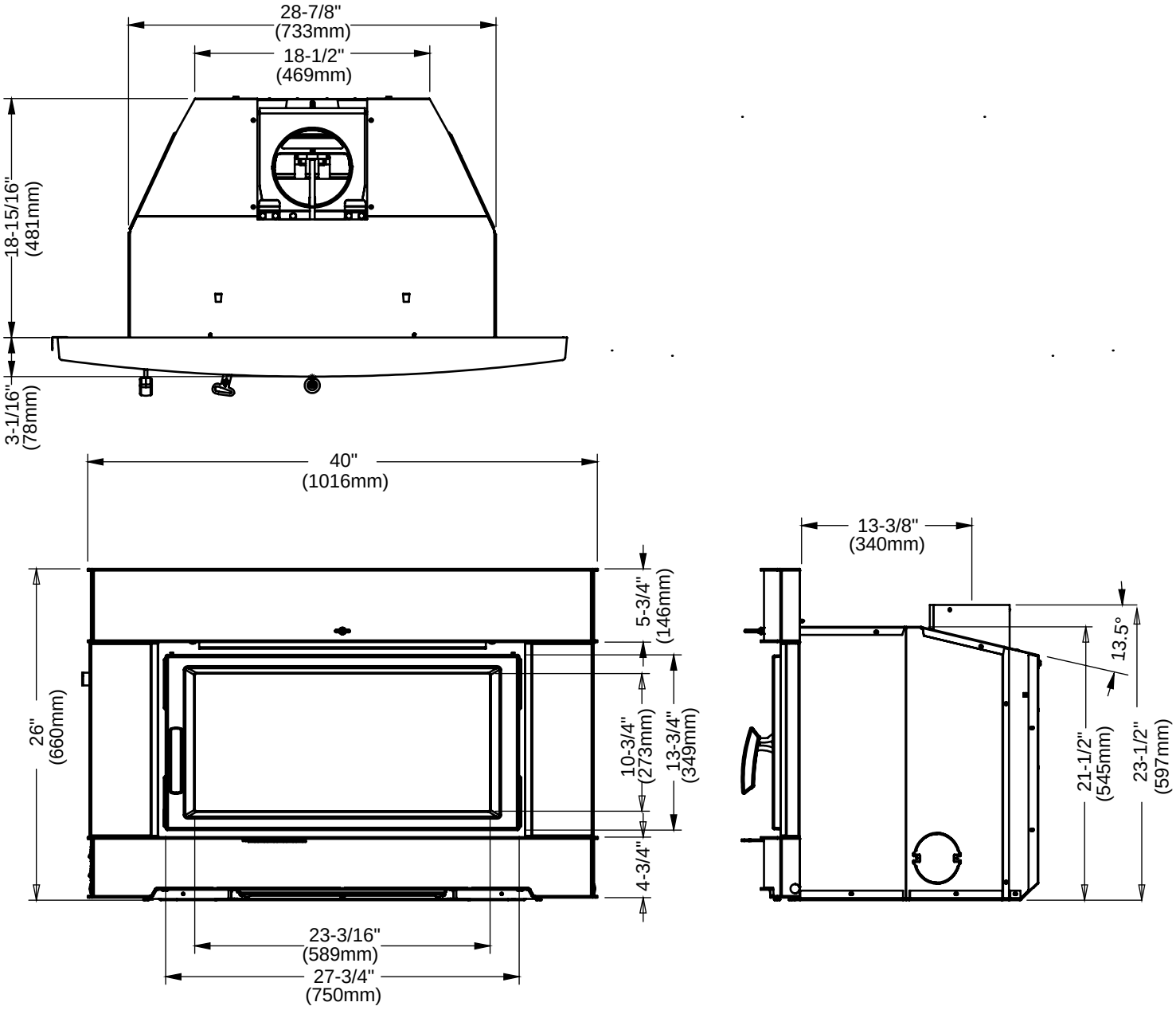
(Duplicate Serial #) 516

DATE OF MANUFACTURE

2025	2024	2023	2022	2021
☐	☐	☐	☐	☐

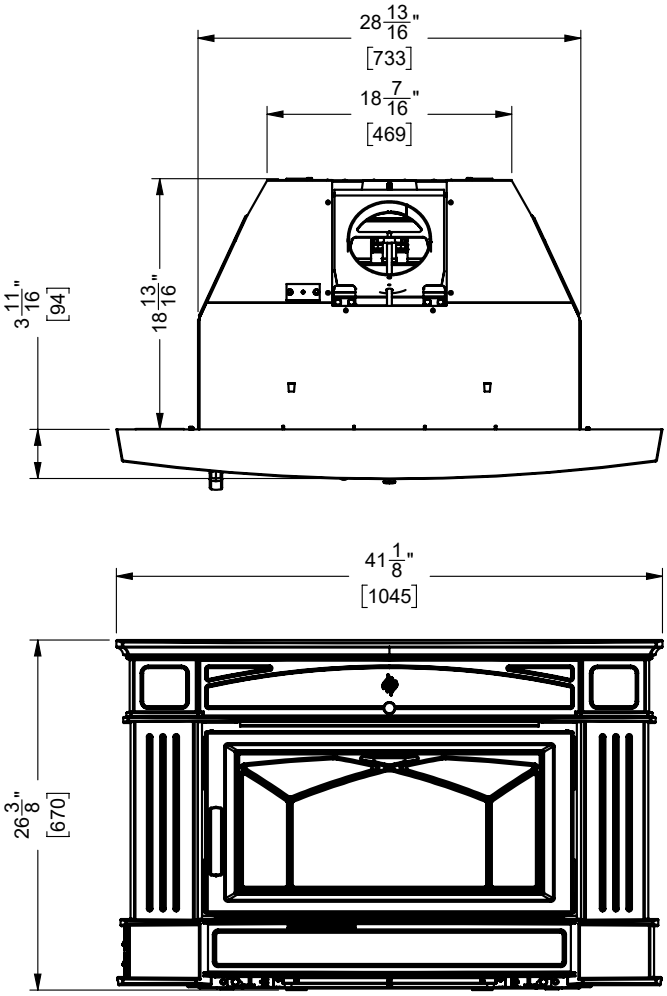
Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

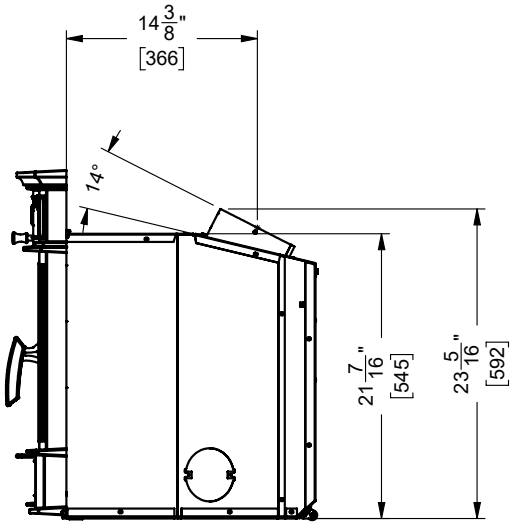
DIMENSIONS - CONTEMPORARY FACEPLATE



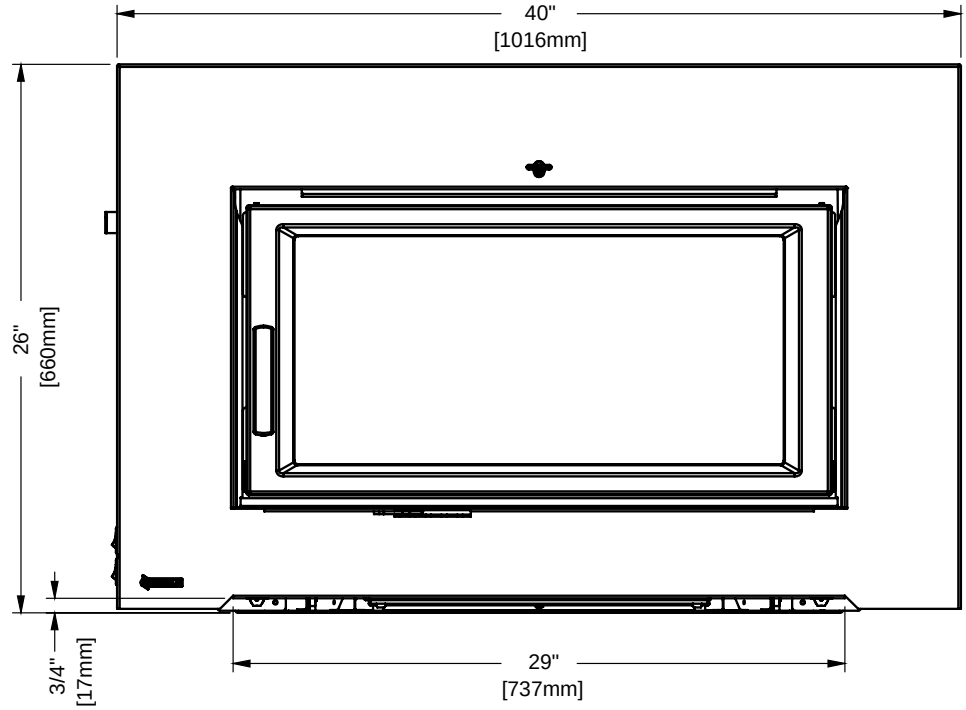
ALL PICTURES / DIAGRAMS SHOWN THROUGHOUT THIS MANUAL ARE FOR ILLUSTRATION PURPOSES ONLY. ACTUAL PRODUCT MAY VARY DUE TO PRODUCT ENHANCEMENTS.

DIMENSIONS - CAST FACEPLATE AND OFFSET FLUE COLLAR

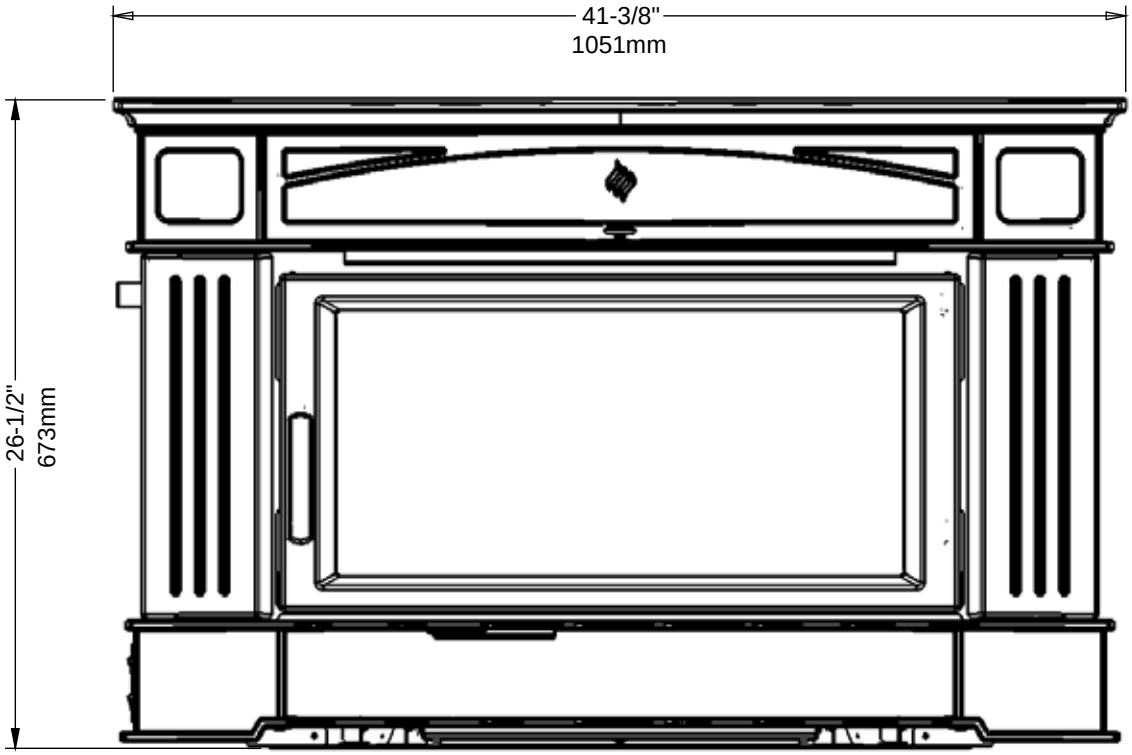




DIMENSIONS - LOW PROFILE FACEPLATE

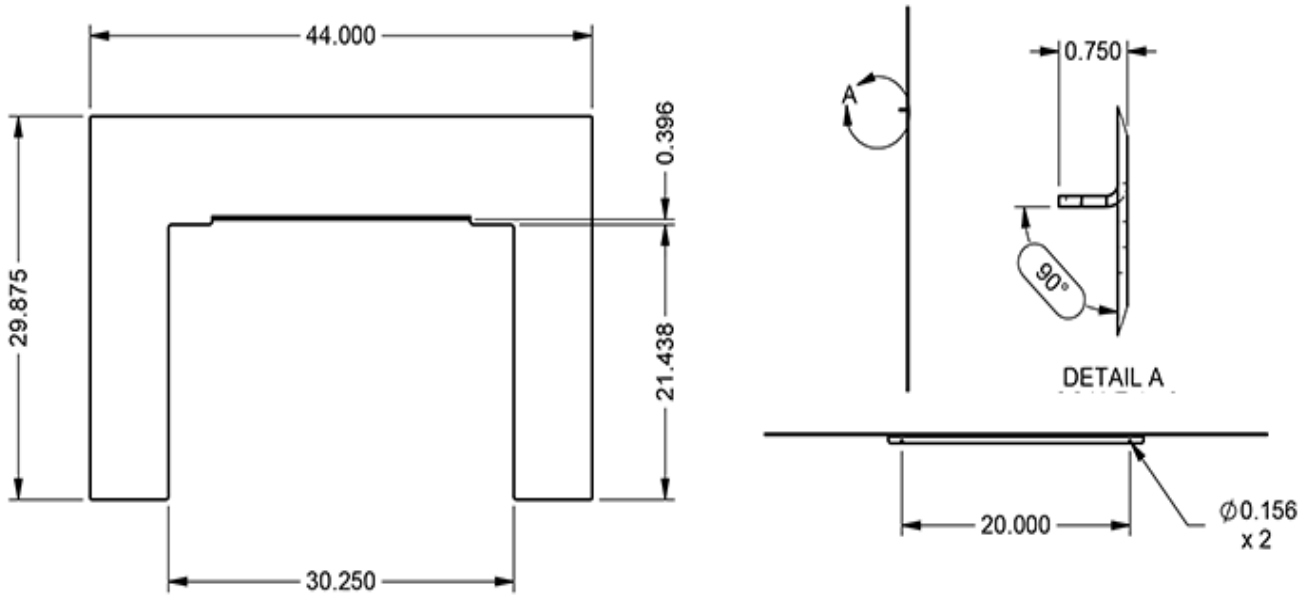


DIMENSIONS - CAST FACEPLATE

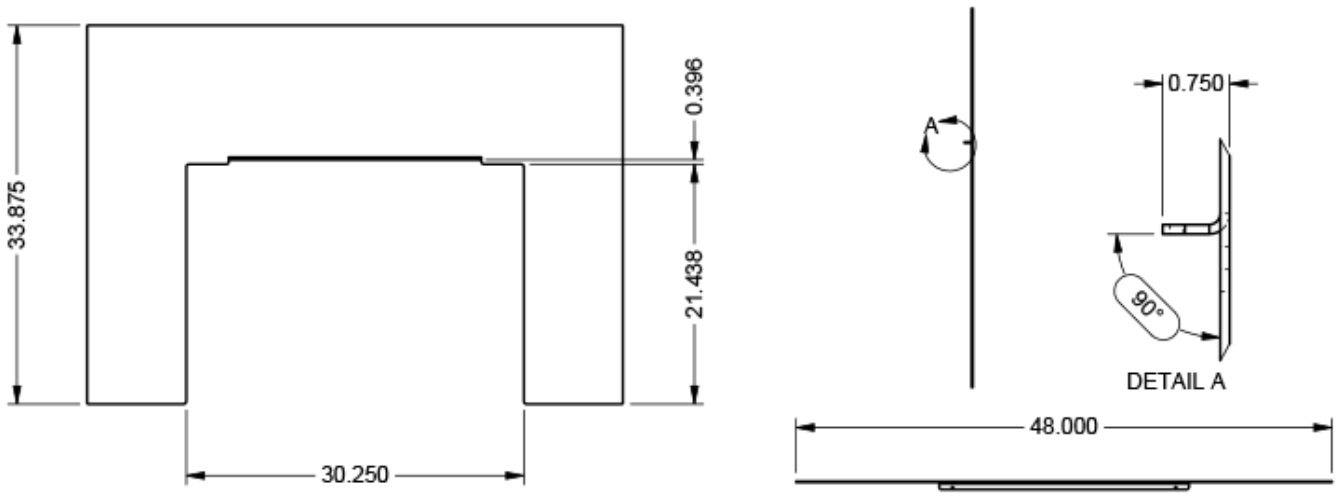


Standard Cast Faceplate shown above
Oversized Cast Faceplate Dimensions: 44" W x 31" H

DIMENSIONS - STANDARD BACKING PLATE



DIMENSIONS - OVERSIZED BACKING PLATE



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	Adjacent Side Wall (to Side of Door) A	Mantle ** (to Top of Door) B	Top Facing (to Top of Door C	Side Facing (to Side of Door) D	Minimum Hearth Extension* E	Minimum Hearth Side Extension* F	To Top of Door G
CI2700/ HI500	12-3/16"	21-5/8"	14"	7-3/8"	US 16" Canada 18"	8"	19-1/4"
Measurements A,B,C,D are from top/side of door							

Side and Top facing is a maximum of 1.5" thick.

*** Side hearth extension for Canada measured from side of appliance.**

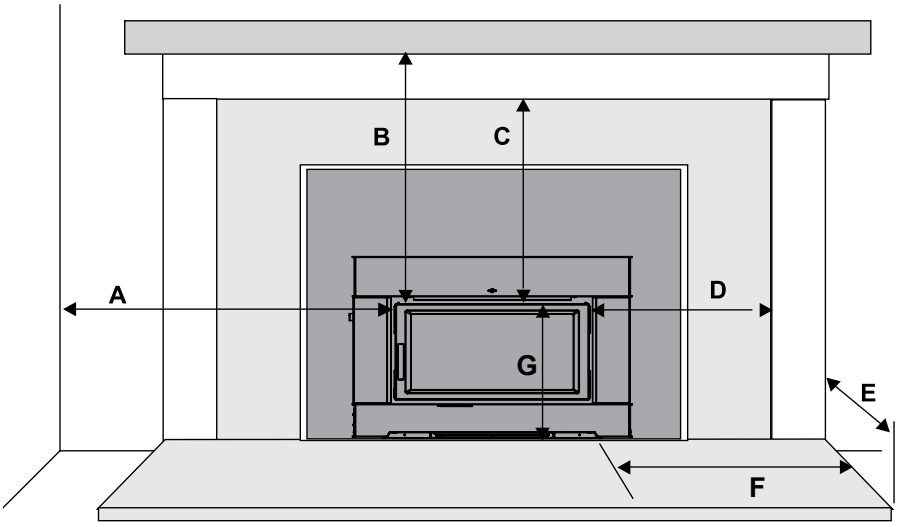
*** Hearth extension to have minimum: R value of 2.13 or greater.**

**** A non-combustible mantel may be installed at a lower height if the framing is made of metal studs covered with a non-combustible board.**

**** Max. mantle depth is 10" (254mm).**

Thermal floor protection is not required if the unit is raised 6.5" minimum (measured from the bottom of the stove). However, standard ember floor protection is required. It will need to be a non-combustible material that covers 16" (406 mm) in the US and 18" (450 mm) in Canada to the front of the unit and 8" (200 mm) to the sides.

All floor protection must be non-combustible (i.e., metals, brick, stone, mineral fiber boards, etc.) Any organic materials (i.e. plastics, wood paper products, etc.) are combustible and must not be used. The floor protection specified includes some form of thermal designation similar to R-value (thermal resistance) or k-factor (thermal conductivity). Floor protector listed to UL1618.



Clearance diagram for Installations

Minimum Hearth Extension for the front (E) and sides (F) are measured from the fuel door opening.

HOW TO DETERMINE IF ALTERNATE FLOOR PROTECTION MATERIALS ARE ACCEPTABLE

The specified floor protector should be 3/8" (18mm) thick material with a K - factor of 0.84.

The proposed alternative is 4" (100mm) brick with a C-factor of 1.25 over 1/8" (3mm) mineral board with a K-factor of 0.29.

Step (a):
Use formula above to convert specification to R-value.
R = 1/k x T = 1/0.84 x .75 = 0.893.

Step (b):
Calculate R of proposed system.
4" brick of C = 1.25, therefore
Rbrick = 1/C = 1/1.25 = 0.80
1/8" mineral board of k = 0.29, therefore
Rmin.bd. = 1/0.29 x 0.125 = 0.431
Total R = Rbrick + Rmineral board =
0.8 + 0.431 = 1.231.

Step (c):
Compare proposed system R of 1.231 to specified R of 0.893. Since proposed system R is greater than required, the system is acceptable.

DEFINITIONS

Thermal Conductance:

$$C = \frac{Btu}{(hr)(ft^2)(^oF)} = \frac{W}{(m^{2)})(K)}$$

Thermal Conductivity:

$$k = \frac{(Btu)(inch)}{(hr)(ft^3)(^oF)} = \frac{W}{(m)(K)} = \frac{Btu}{(hr)(ft)(^oF)}$$

Thermal Resistance:

$$R = \frac{(ft^2)(hr)(^oF)}{Btu} = \frac{(m^2)(K)}{W}$$

WOOD INSERT SPECIFICATIONS

Your fireplace opening requires the following minimum sizes:

Height: 21-3/4" (552 mm)
Width: 29" (737 mm)
Depth: 19" (483 mm)

INSTALLATION INTO A MASONRY FIREPLACE

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

It is important that you read this manual thoroughly and fully understand the safe installation and operating procedures. 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. Please read this entire manual before you install and use your new wood insert. Failure to follow instructions may result in property damage, bodily injury or even death. 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 or hearth heater.

4. Your fireplace insert is heavy and requires two or more people to move it safely. The insert 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 system 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.

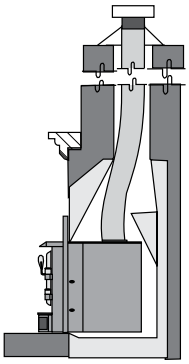
The appliance, when installed, must be electrically grounded in accordance with local codes or, in the absence of local codes, with the National Electrical Code, ANSI/NFPA 70, or the Canadian Electrical code, CSA C22.1.

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

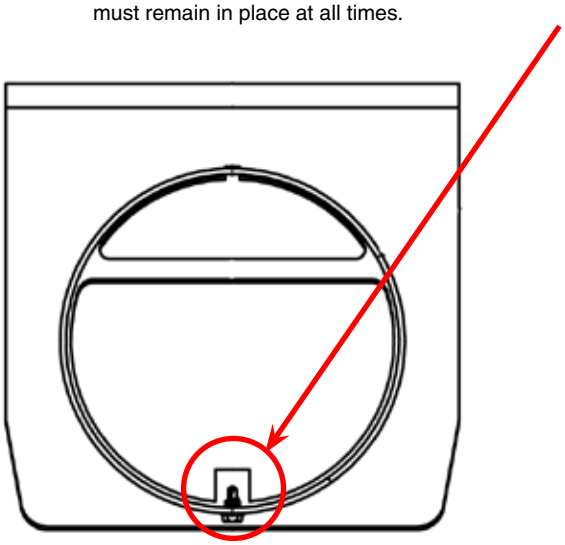
In Canada this fireplace insert must be installed with a continuous chimney liner of 5.5" (140 mm) or 6" (152 mm) diameter extending from the fireplace insert to the top of the chimney. The chimney liner must conform to the Class 3 requirements of CAN/ULC-S635 or CAN/ULC-S640, Standard for Lining Systems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

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.



Note: On this appliance, there is a screw directly above the bypass rod located on the flue collar as shown below. This screw is located in its position to prevent the liner/adaptor from coming into contact with the bypass rod. Please do not remove. This must remain in place at all times.



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

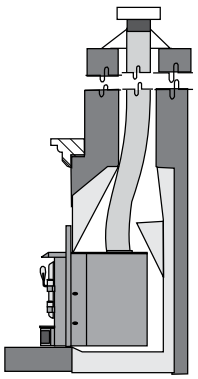
ALTERING THE FIREPLACE

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.

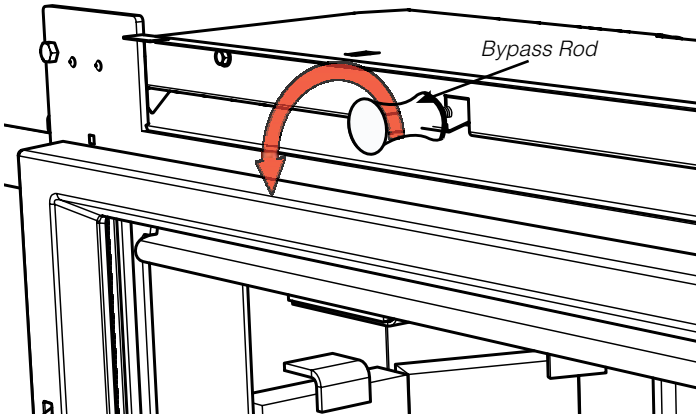
INSTALLING YOUR INSERT

Your insert is very heavy and will require two or three people to move it into position. The insert can be made 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. Evaluate your minimum cavity opening. If the cavity height lends itself to conduct the install without removing the flue collar, then just slide the unit into place and position the liner within the flue collar and secure.

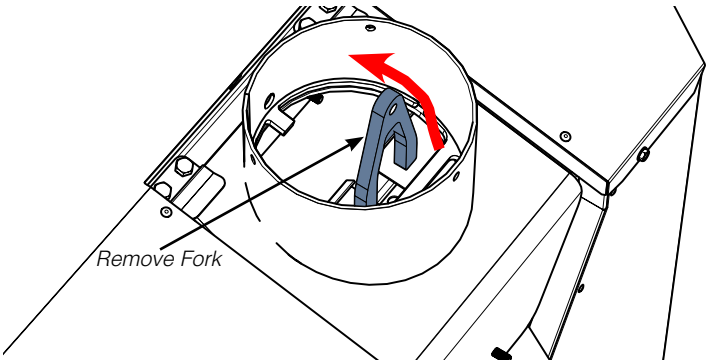
If the cavity dictates the flue collar needs to be removed or the optional offset flue adaptor is required, please follow the steps below.

1. Remove door, manual package, and bricks - see instructions in manual.

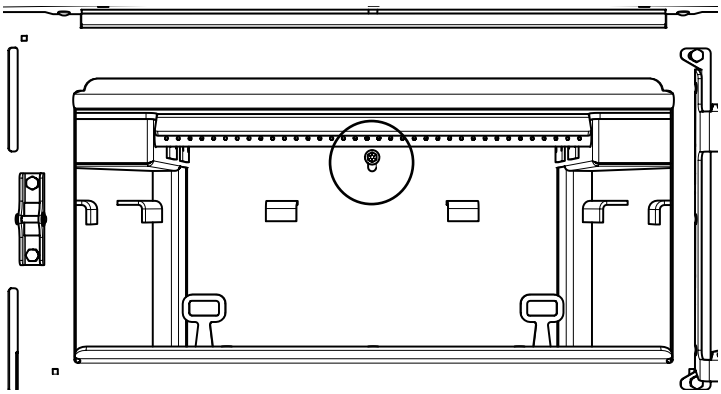
2. Remove bypass rod - turn counter clockwise.



3. The bypass rod was threaded through a "fork" - access fork through the flue and remove by bringing it through the front of the unit.



4. From inside the firebox - remove 7/16" bolt at back of firebox to remove the flue collar.

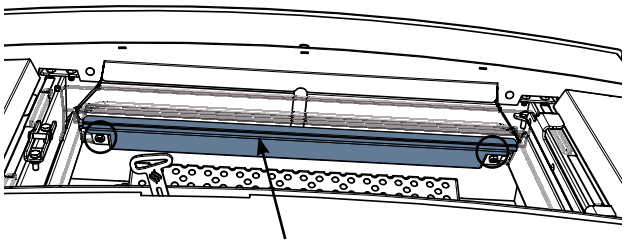


5. Install chimney liner, attach connector from flex kit with band and screws (ensure tabs on connector are positioned so they won't get in the way of the bypass rod - or remove them) attach flue collar with 2 or more screws, to the liner within fireplace cavity.
Ensure to position at the proper height and angle to be able to attach the unit.

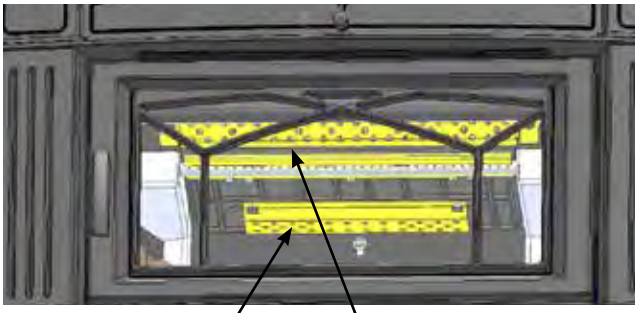
6. Before sliding the unit into place and attaching the collar - the following parts must be removed to allow access and a positive connection.

a) Primary Air Shield
b) Combustor Flame Shield
c) Combustor
d) Upper Shield - accessed through combustor opening
e) Bottom Shield

7. Slide unit into position- ensure to centre with flue collar.

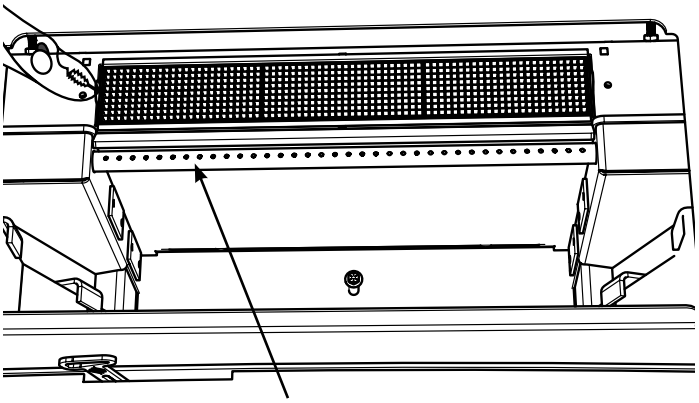


A- *Primary Air Shield - loosen 2 x 7/16" bolts - slide forward to remove.*

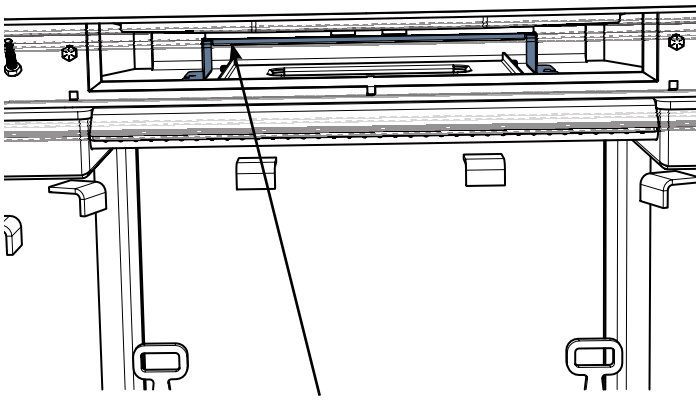


B- *Combustor Flame Shield - loosen 2 x 7/16" bolts to remove.*

E- *Bottom Shield*



C- *Combustor- remove with pliers*
Tilt down and forward to ease removal.

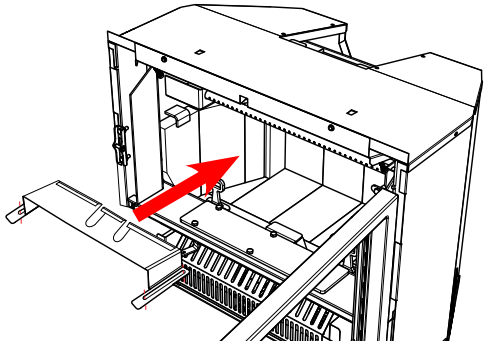


D- *Upper Shield - slide forward and lift up to remove.*

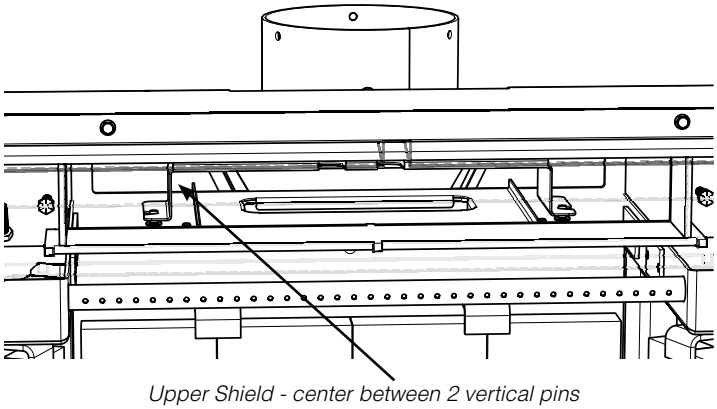
8. From inside the unit - grab the collar by accessing through the bypass opening.
Pull the collar down and forward - use hook tool (provided with the unit) to assist removal.
Secure with 7/16" bolt (removed in Step 4) while pulling collar down - to ensure positive connection.
Ensure bolt is tightly secured and centred.

9. Reinstall the upper shield removed in Step 6e.
Ensure upper shield is centered in between 2 (two) vertical pins from front to back.
When positioning the upper shield locate the vertical pins by feel.
When the shield parts are in place - slide to the back.

10. Reinstall "Fork" (removed in Step 4) on the bypass plate. **Ensure the letter "F" stamped into the Fork is facing towards the front of the unit.**



E- *Upper Shield - orientation for reinstall*



Upper Shield - center between 2 vertical pins

Access through the combustor opening from inside the firebox to reinstall. Bypass plate may need centering before proceeding to next step.

11. Reinstall bypass rod through flue collar and into "Fork". Ensure bypass rod is screwed in tightly. Test bypass rod to ensure positive connection and review bypass opening.

12. Reinstall Combustor/Flame Combustor Shield / Primary Air Shield /Liner Shield.

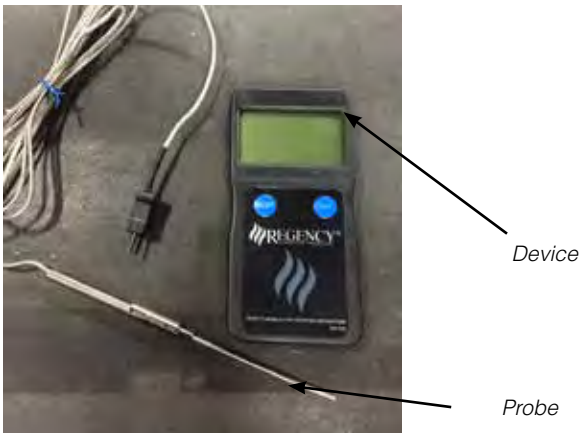
13. Reinstall brick liners and door - (see detailed instructions in manual).

14. Center unit and install faceplate (see instructions in manual).

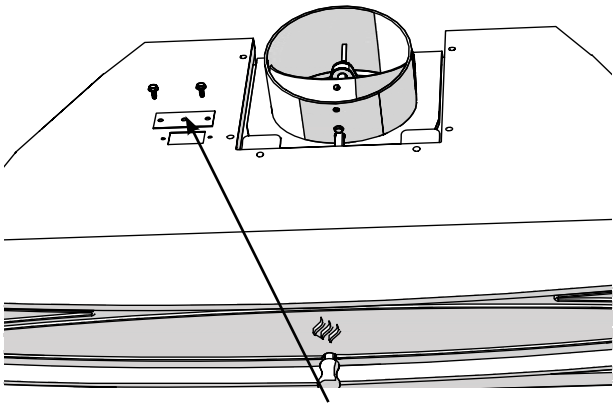
15. Install bypass knob onto bypass rod.

DIGITAL CATALYTIC COMBUSTOR MONITOR

The CI2700/HI500 is equipped with a provision to accept a catalytic temperature monitoring device. Please follow instructions below for the installation of the probe. Follow the user instructions of the catalytic monitoring device for product set up and details.

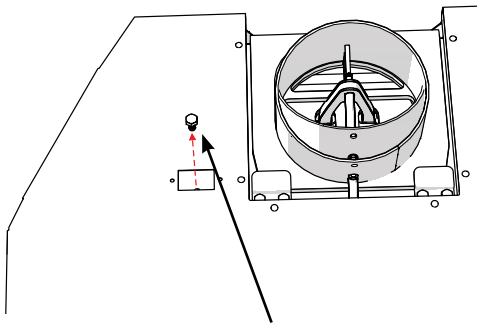


1. Remove two (2) bolts from the top of the unit to remove plate as shown below.



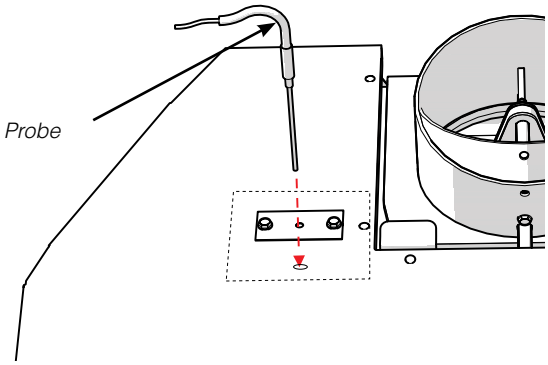
Remove 2 bolts to remove plate

2. Locate the 7/16" bolt below the metal and remove.



Remove bolt and recycle

3. Reinstall the plate removed in Step 1 and insert the temperature probe through the plate and into the hole created by removing the bolt in Step 2.



Install temperature probe

4. Complete the installation of the CI2700/HI500. Ensure temperature probe wire is routed behind the faceplate and to the left side of the unit. Plug in the monitoring device.

5. Monitoring device can be attached to the unit (with supplied velcro) on the hanger or the hearth beside the fireplace.

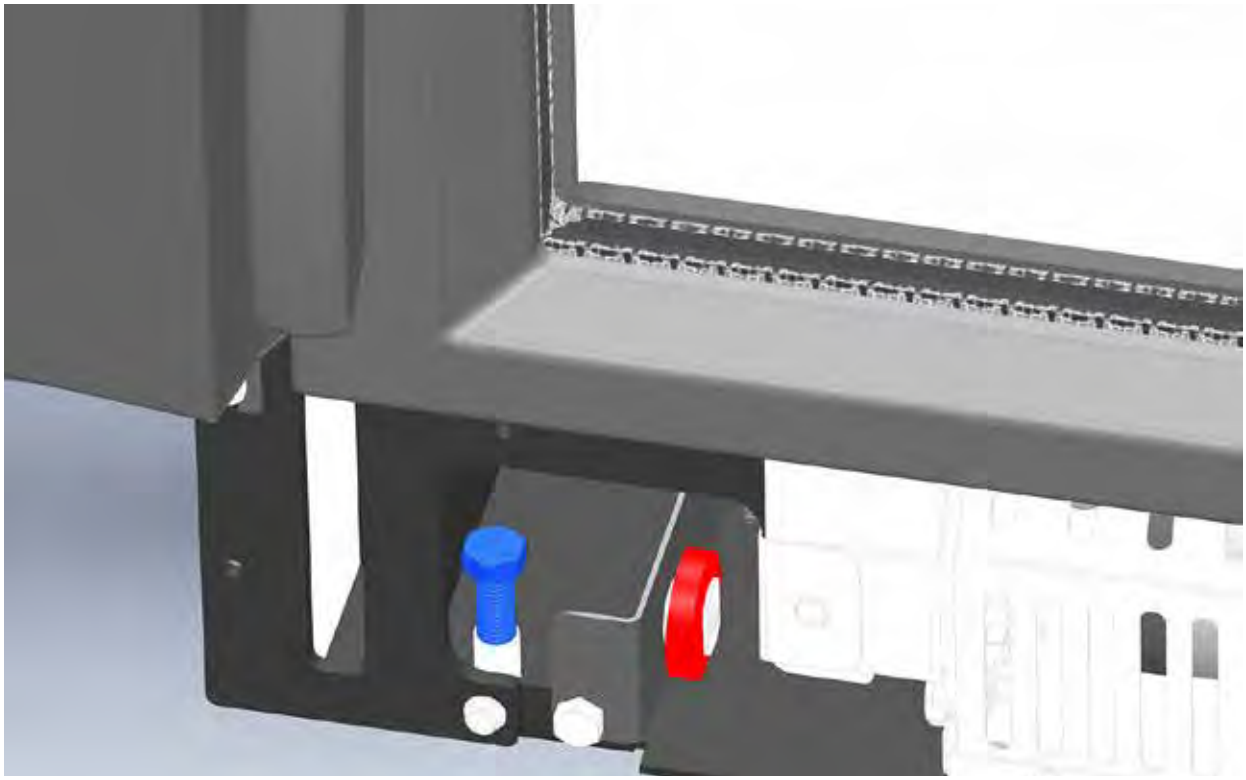
Monitor on hanger

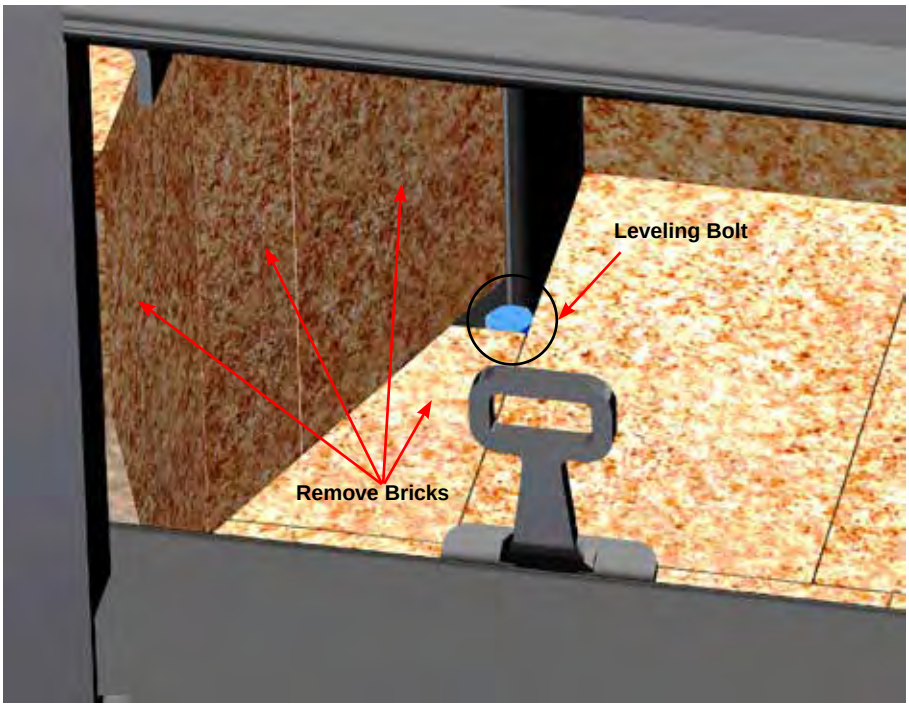
Monitor on hearth

Important: The catalytic monitor probe which is supplied with this appliance must be installed prior to sliding the unit into final position in the masonry or factory built fireplace.

LEVELLING BOLTS

1. Use a 9/16" wrench to adjust the front leveling bolts located on the right and the left side of the firebox.



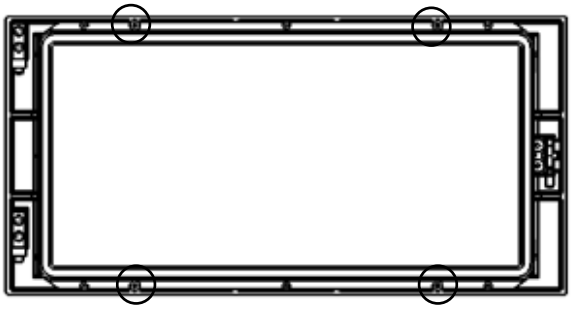


2. Remove the three side bricks on each side then remove the corner bottom/side cut brick to gain access to the rear leveling bolts. You can adjust using a 9/16" wrench or socket.

OPTIONAL CAST GRILL INSTALLATION

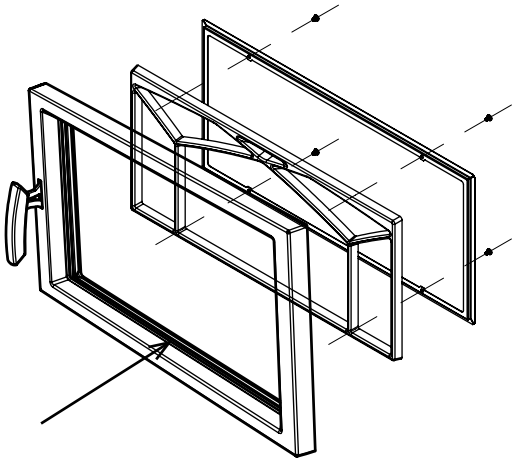
GLASS REMOVAL TO INSTALL OPTIONAL DOOR CAST GRILL

1. To remove the glass, remove the 4 retainer bolts (2 top and 2 bottom) highlighted in the diagram.
2. Carefully remove the glass and the gasket frame assembly. (Gasket frame assembly shown)
3. Place the grill in the door.
4. Carefully install the glass into place and re-install the gasket frame assembly.
5. Re-install the 4 retainer bolts removed in Step 1. Do not over tighten.



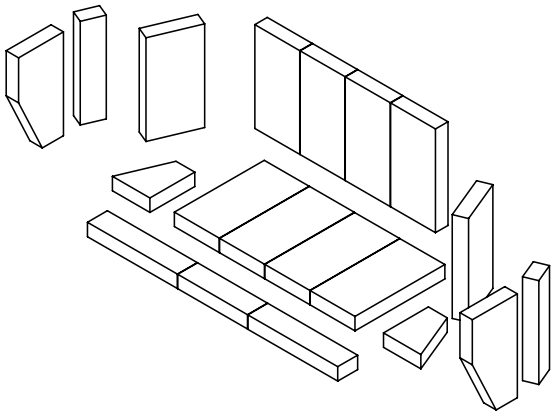
Remove 4 Bolts

Avoid impact on glass doors such as striking or slamming shut.



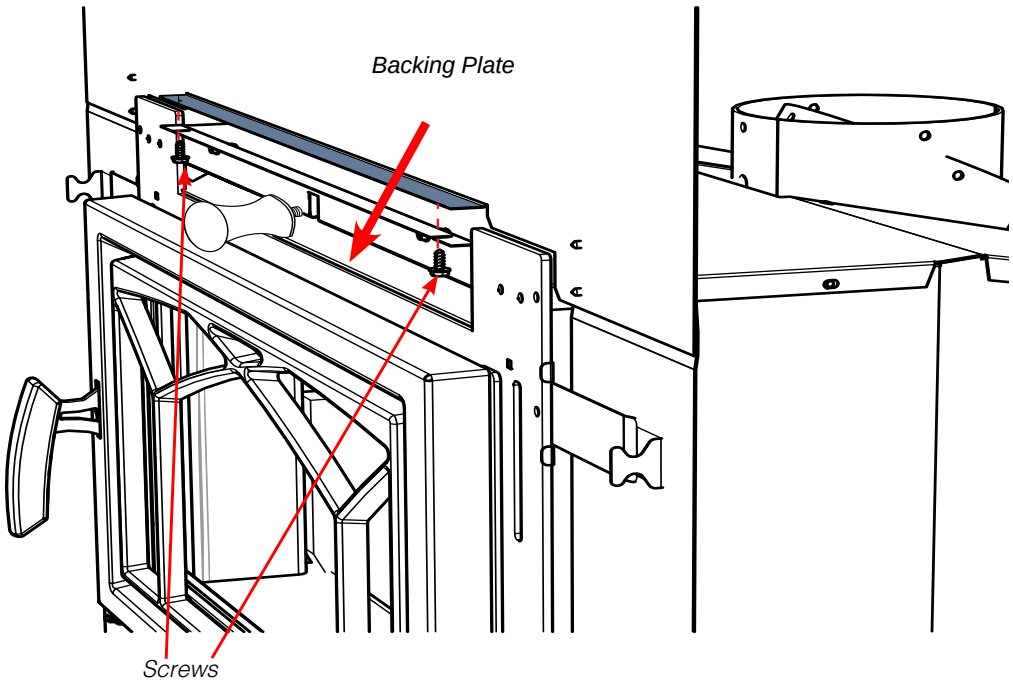
FIREBRICK ASSEMBLY

Firebrick is included to extend the life of your insert and radiate heat more evenly.
Check to see that all firebricks are in their correct positions and have not become misaligned during shipping.



OPTIONAL BACKING PLATE INSTALLATION

1. Slide the backing plate over unit. Line up flange on backing plate with flange on unit and secure with 2 screws from the underside as shown below.
   Proceed with Faceplate install.



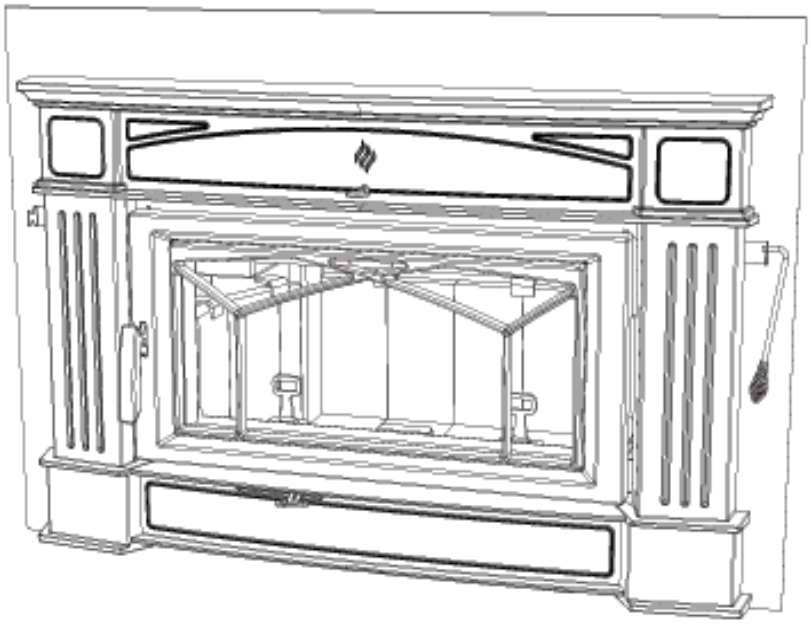
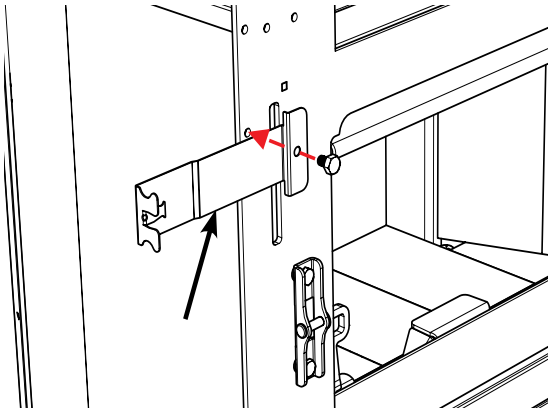


Diagram 4

CONTEMPORARY FACEPLATE INSTALLATION

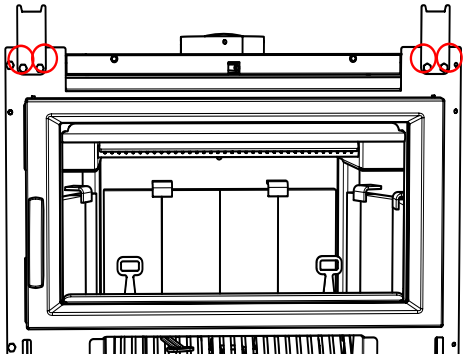
Remove unit door prior to installation of faceplate.
Remove all contents from the package and lay out.
NOTE: Bolts may be pre-installed on unit and will need to be removed prior to each step of the noted instructions. As a result, there may be spare bolts.

1. Install tool and handle holder to the left side of the unit with on - 7/16" bolt as shown below. (Note: part is packed with the manual package).



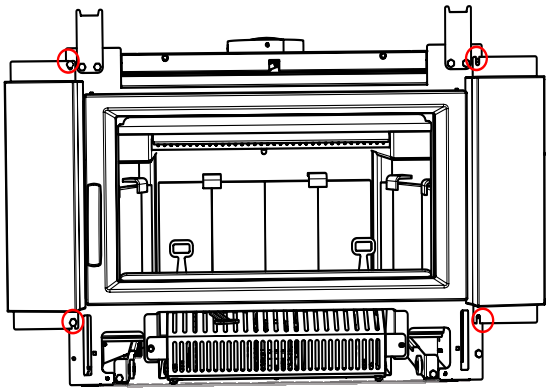
Handle / Tool holder

2. Install the upper left and right brackets using the four 7/16" bolts.



Brackets with Bolts

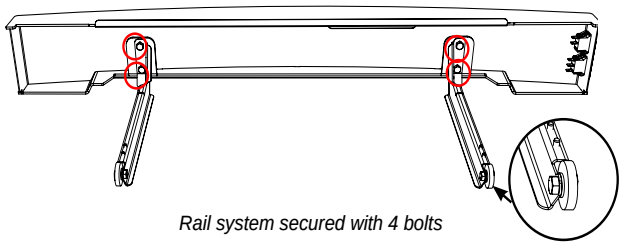
3. Install the left and right of the fascia panels using four 7/16" bolts.



Fascia side panels installed with Bolts

4. Attach the left and right side rails to the back of the bottom fascia panel using four 7/16" bolts, push each rail upwards before tightening.

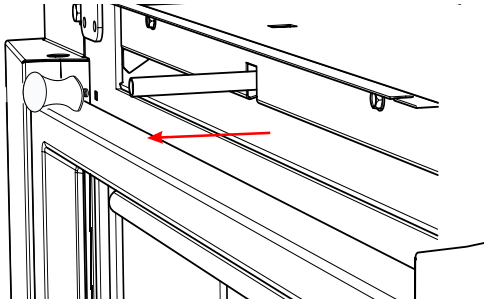
NOTE: Wheels should be facing outward when completed.



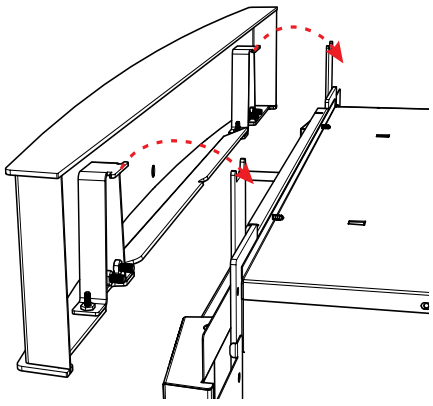
Rail system secured with 4 bolts

NOTE: Fan cassette must be installed prior to this step. See fan install instructions.

5. Remove the bypass knob on the bypass rod by turning counter clockwise and pull bypass rod forward to the open position. Then take the top fascia panel and gently slide the bypass rod through the hole in the fascia panel. Lift the fascia panel up slightly - push back to engage the brackets installed on step 1.

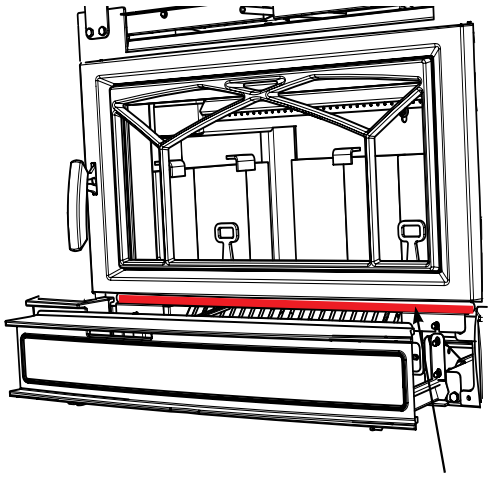


Remove Bypass Knob from Bypass Rod



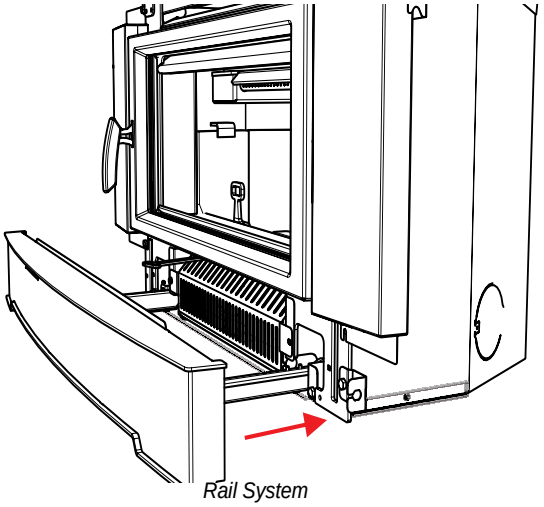
Back view of Top Fascia Panel lining up with the brackets installed in Step 1

6. Apply the flat self adhesive gasket to the face of the unit just above the fan opening. Install the seal/cushion to line up with the top of the slide out door.



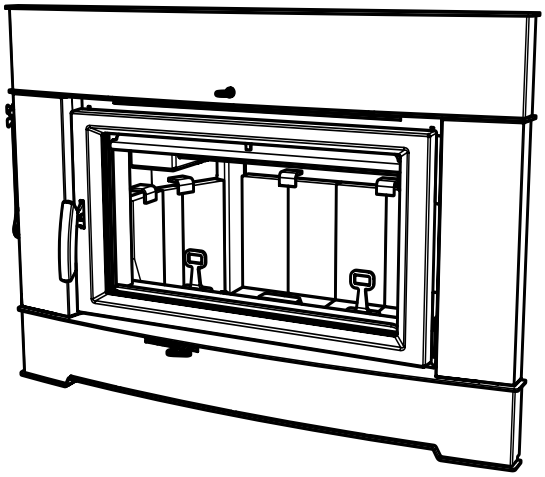
Gasket

7. With door in closed position, take the bottom fascia and line up the wheels and rails with the rails on the unit. Once lined up lift up and into the rail system and slide into position.



Rail System

8. Re-install bypass knob and door.



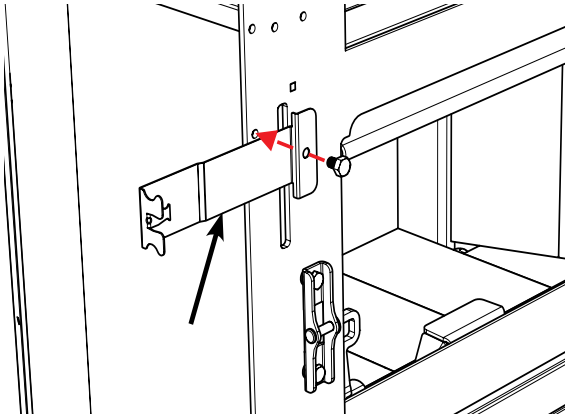
Final Install

LOW PROFILE FACEPLATE INSTALLATION

Remove unit door prior to installation of faceplate.
Remove all contents from the package and lay out.

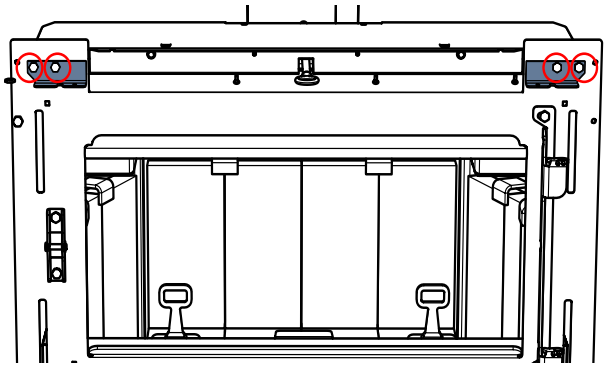
NOTE: Bolts may be pre-installed on unit and will need to be removed prior to each step of the noted instructions. As a result, there may be spare bolts.

1. Install tool and handle holder to the left side of the unit with an 7/16" bolt as shown below. (Note: part is packed with the manual package).

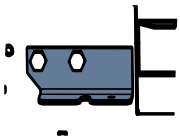


Handle / Tool holder

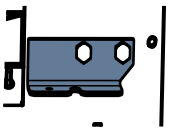
2. Install the upper left and right brackets using the four 7/16" bolts. Identify proper orientation below before installing.



Brackets with Bolts

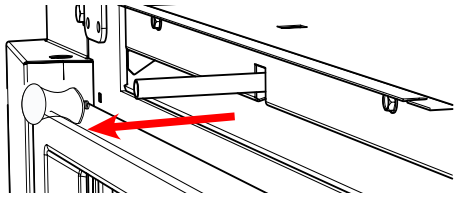


Left Bracket



Right Bracket

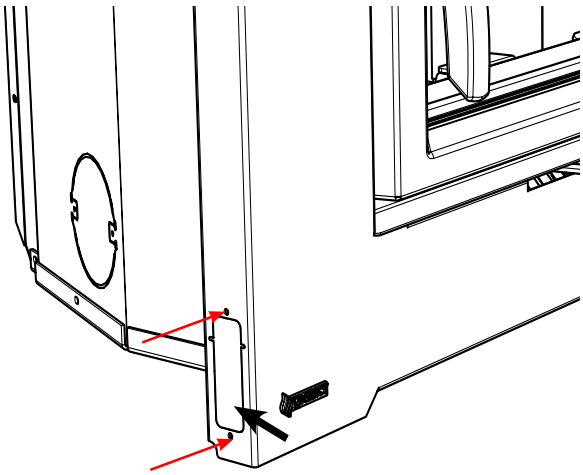
3. Remove the bypass knob on the bypass rod by turning counter clock-wise - pull bypass rod forward to the open position.



Remove bypass knob from the bypass rod

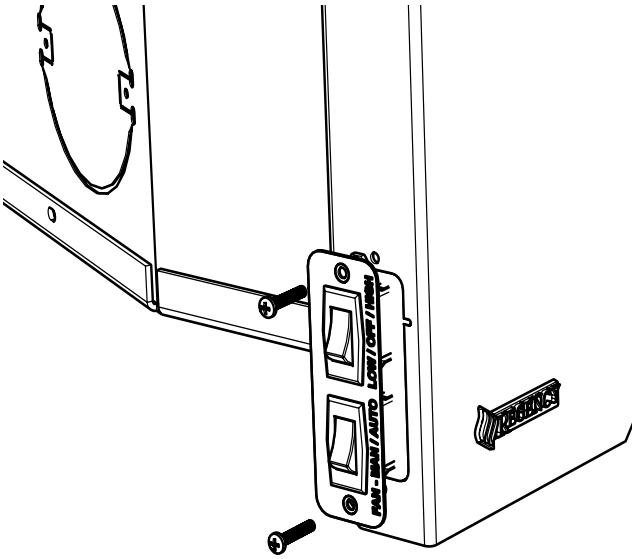
NOTE: If installing blower, optional Fan cassette must be installed prior at this point. See fan installation instructions for details.
If not installing blower—proceed to Step 6.

4. Remove dummy plate from left side of faceplate by removing 2 screws. Set screws aside, use to secure the fan switch assembly in Step 5.



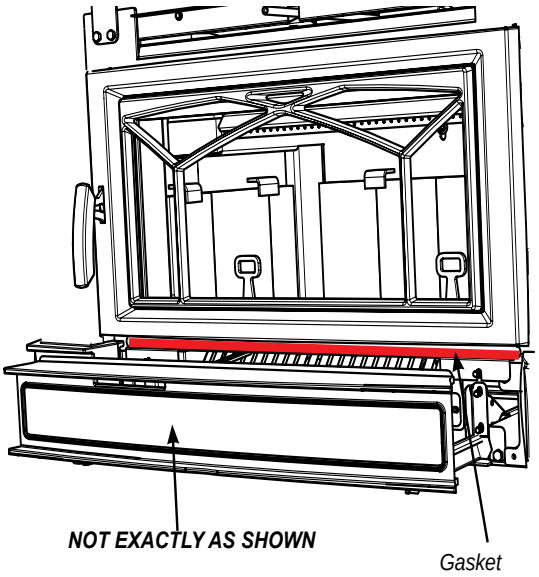
Dummy Plate

5. With fan cassette in position—take the fan switch assembly (attached to the fan cassette wiring harness) and install into opening created by dummy plate removal. Ensure fan switch assembly is fully seated onto faceplate and secure with 2 screws from Step 4.

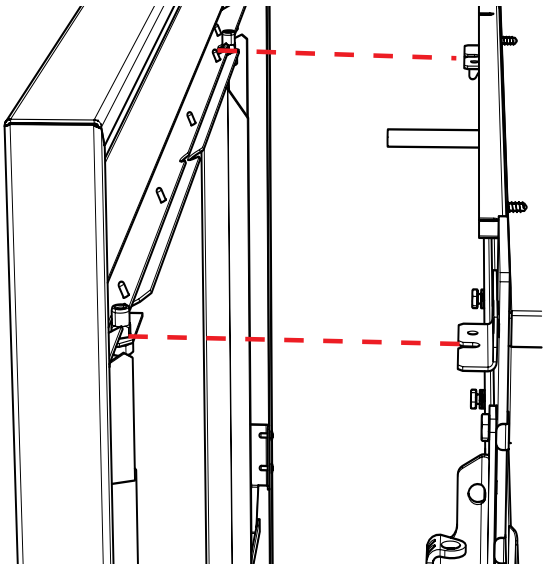


Install fan switch assembly

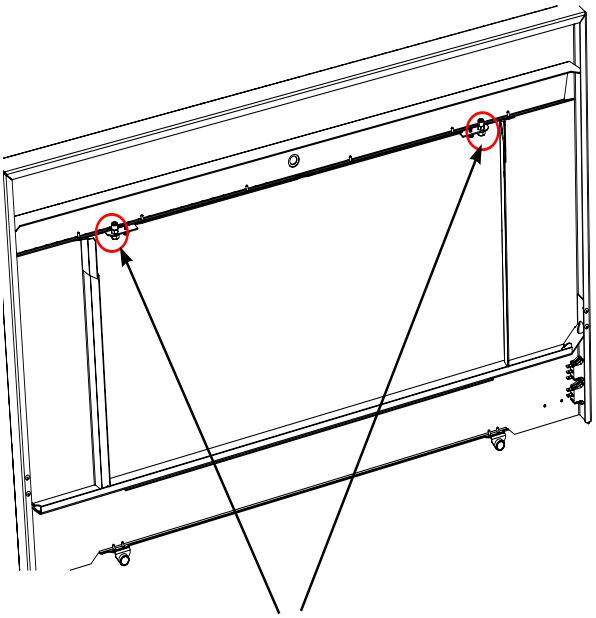
6. Apply the flat self adhesive to the face of the unit just above the fan opening. Install the seal /cushion to line up with the top of the bottom of the low profile faceplate.



7. Gently slide the bypass rod through the center hole within the fascia and also guide the primary air control through the slot in the bottom of the fascia. Push the faceplate towards the unit, ensuring the bolts in Step 2 slide into the brackets installed in Step 1.



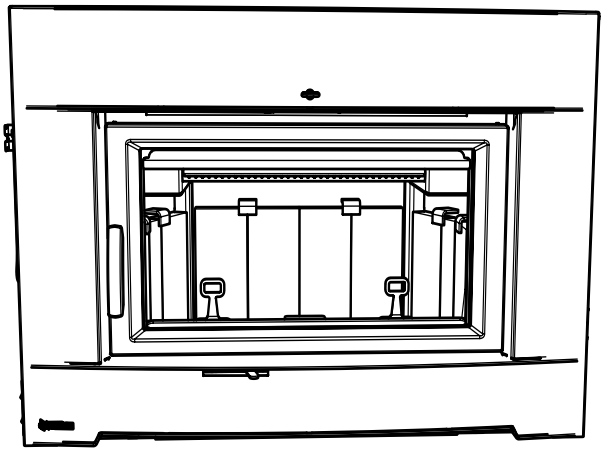
8. Ensure the left and right side bolts on the top of the Low Profile Faceplate are spaced evenly. The spacing of these bolts is critical to ensure the faceplate slides into the brackets installed in Step 1.



7/16" bolts on back of Faceplate

9. Tighten the 7/16" bolts on the back of the Flat Faceplate

10. Re-install bypass knob and door.

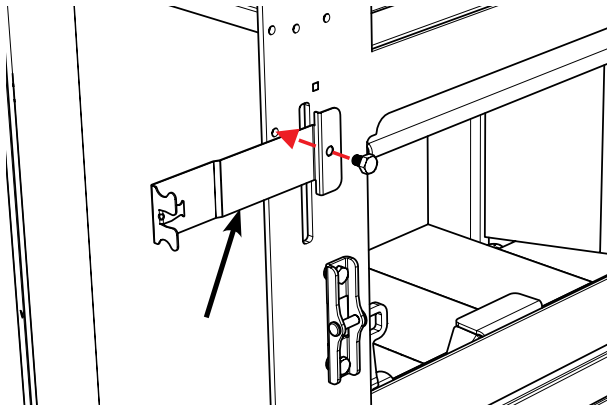


Final Install

CAST FACEPLATE INSTALLATION

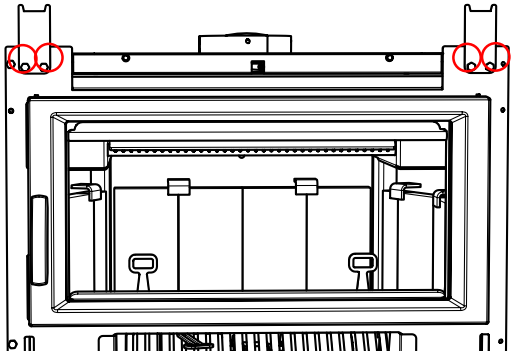
Remove unit door prior to installation of faceplate.
Remove and lay out all contents from the faceplate package.

1. Install tool and handle holder to the left side of the unit with on - 7/16" bolt as shown below. (Note: part is packed with the manual package).



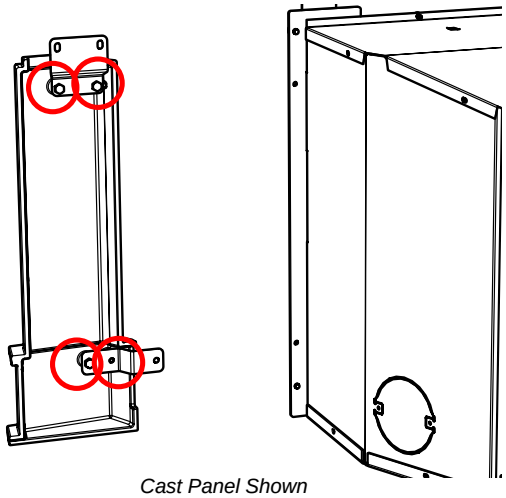
Handle / Tool holder

2. Install the upper left and right brackets using the four 7/16" bolts–as shown below.



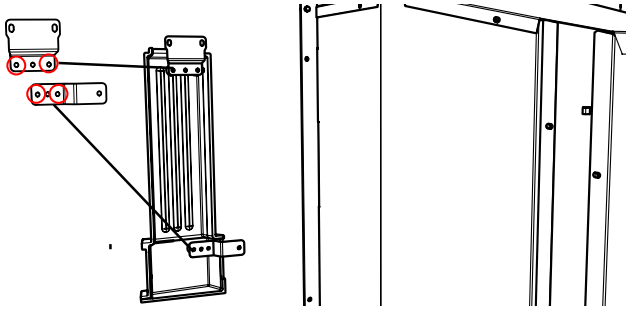
Brackets with Bolts

3. See Step 4 if installing the Enamel Faceplate. Install two brackets (supplied with faceplate) to the back of each side panel with four 7/16" bolts.



Cast Panel Shown

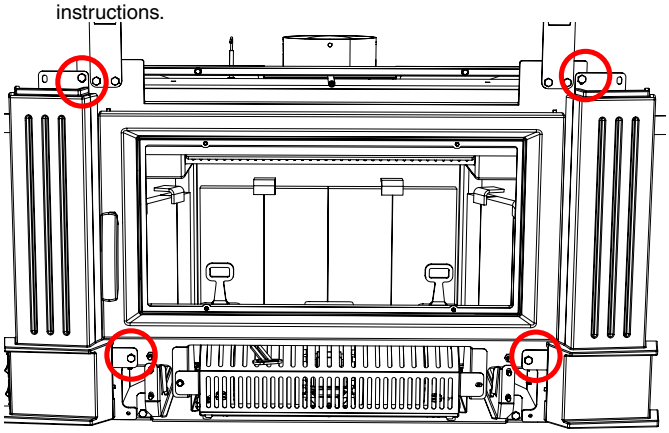
4. Install two brackets (supplied with Faceplate) to the back of each side panel with four 7/16" bolts. The supplied brackets have three holes, use only the two outside holes for installation as shown in close up.



Enamel Panel Brackets

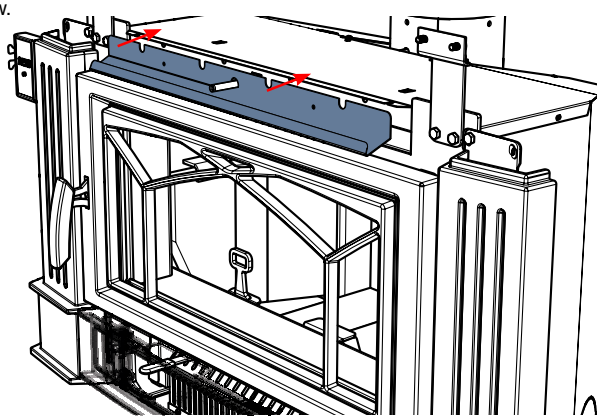
5. Remove 4-7/16" bolts in locations shown below and Install the left and right of the fascia panels using four 7/16" bolts.

NOTE: Fan cassette must be installed prior to this step. See fan install instructions.



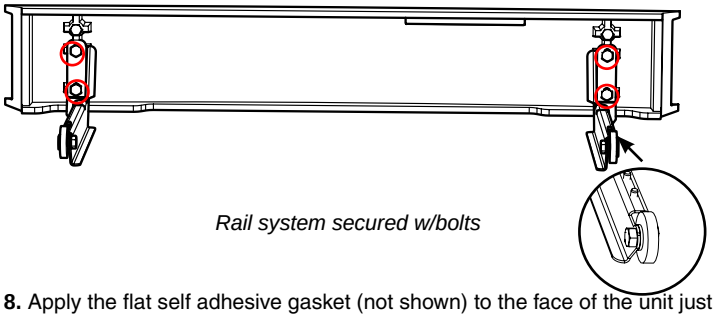
Fascia side panels installed with bolts

6. Pull the bypass knobforward to the open position then remove the bypass knob by turning it counter clockwise**.** Install fan deflector on unit. If screw holes not present on unit, place deflector through bypass rod and ensure deflector is level. Secure with 2 supplied screws in locations shown below.
If screw holes already present on unit, line up deflector with corresponding screw holes and secure with 2 screws on locations shown below.



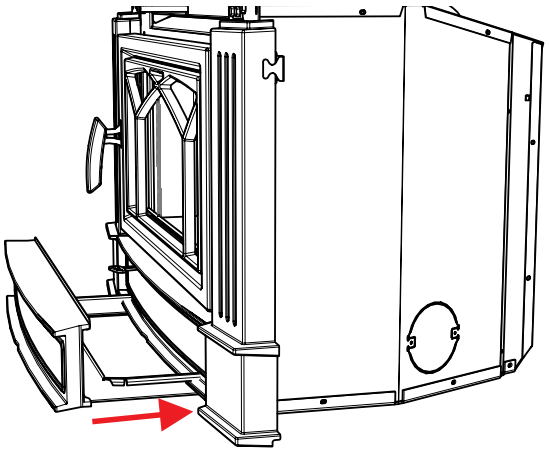
Fan deflector screw locations

7. Reinstall unit door (removed in Step 1), attach the left and right side rails to the back of the bottom fascia panel using four 7/16" bolts, slide each rail upward before tightening. (Rails may need to be bent slightly outward to get a good fit).



Rail system secured w/bolts

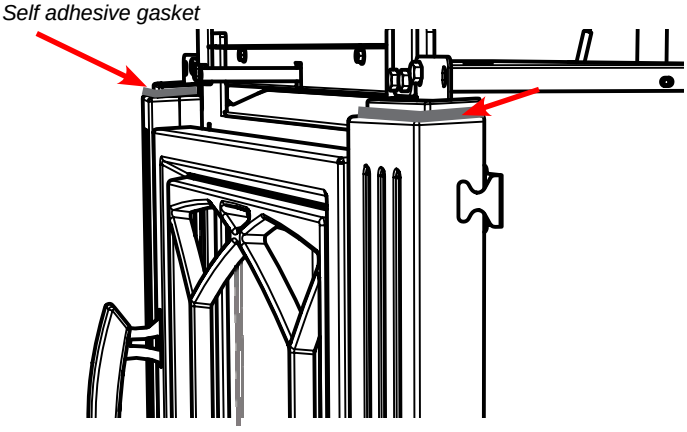
8. Apply the flat self adhesive gasket (not shown) to the face of the unit just above the fan opening. Install the seal/cushion to line up with the top of the slide out door. With the door in closed position,take the bottom fascia and line up the wheels and rails with the rails on the unit. When lined up, lift up and into the rail system and slide into position.

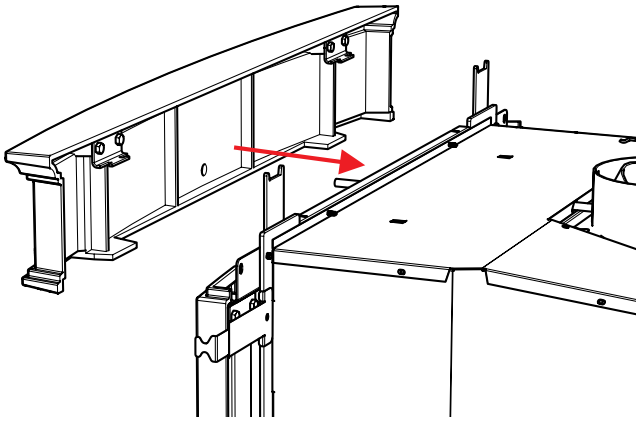


Rail System

9. Apply self adhesive gasket to protect enamel surfaces from chipping. Take the top fascia panel and gently slide the bypass rod through the hole in the fascia panel, use caution to avoid chipping enamel. Lift the fascia panel up slightly - push back to engage the brackets installed on Step 1.

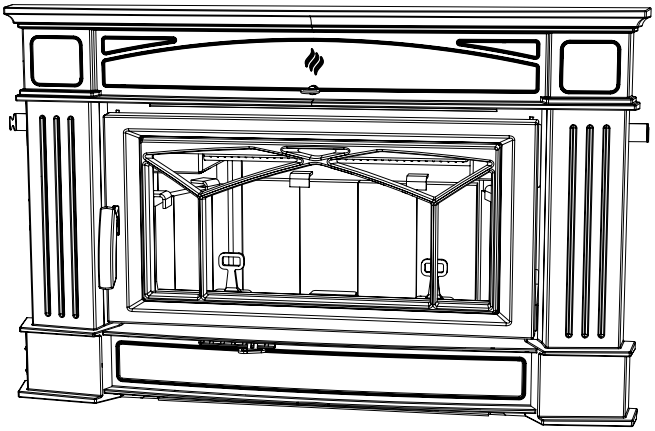
Self adhesive gasket





Back view of Top Fascia Panel lining up with the brackets installed in Step 1

10. Re-install bypass knob and door.

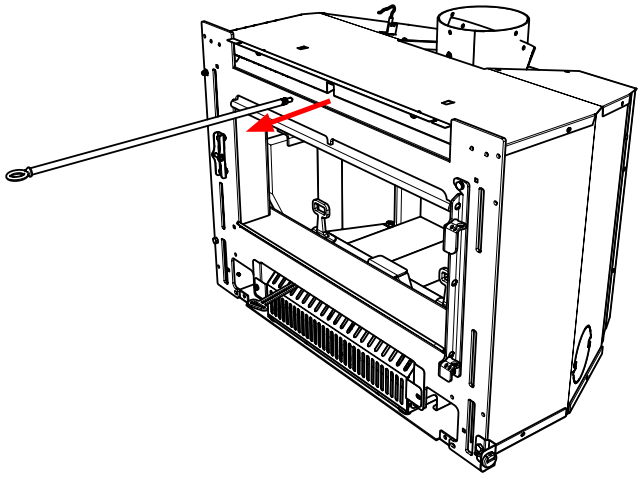


Completed Optional Hampton Cast Faceplate

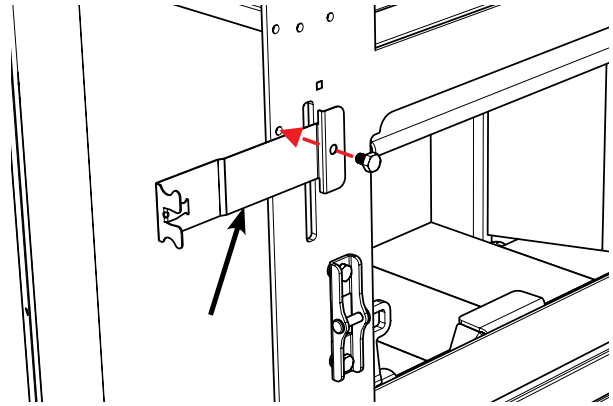
Note: If installing optional cast grill - follow installation instructions in this manual.

OVERSIZE CAST FACEPLATE INSTALLATION

Remove unit door prior to installation of faceplate.
Remove and lay out all contents from the faceplate package.
1. Remove bypass ring and rod by turning counter clockwise - set aside.

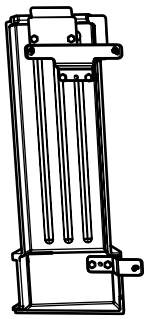


2. Install tool and handle holder (use part packed with Faceplate - not part from Manual pack) to the left side of the unit with one - 7/16" bolt as shown below. (Note: part is packed with the Oversized Faceplate package).

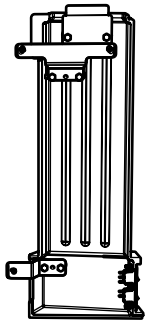


Handle / Tool holder

3. Identify left and right side panels

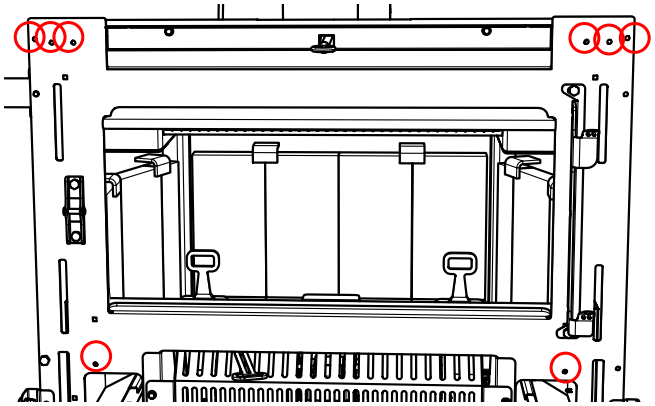


Right Panel/ Back Side

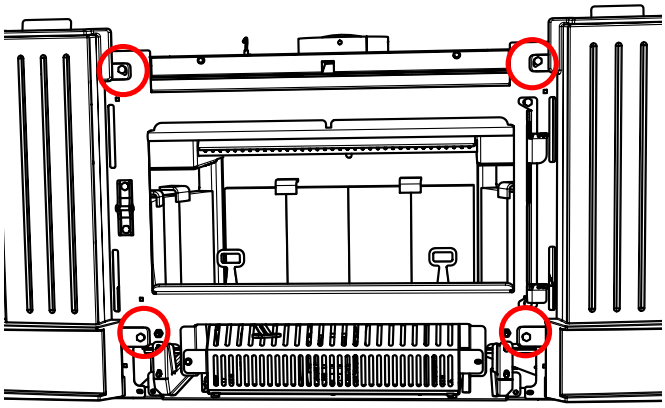


Left Panel/ Back Side

4. Remove 8-7/16" bolts in locations shown below and Install the left and right of the fascia panels using four 7/16" bolts.

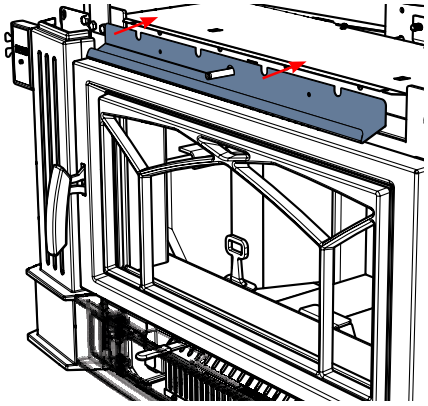


NOTE: Fan cassette must be installed prior to this step. See fan install instructions.



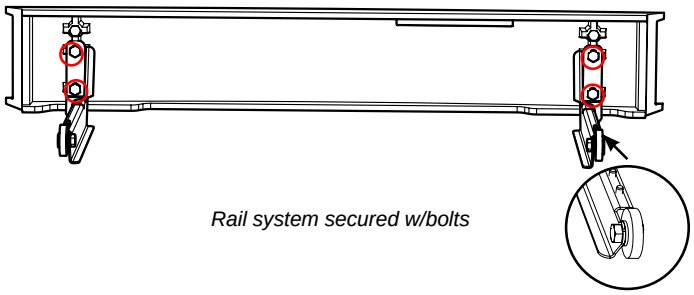
Fascia side panels installed with Bolts

5. Install fan deflector on unit. If screw holes not present on unit, lineup deflector with bypass rod opening and ensure deflector is level. Secure with 2 supplied screws in locations shown below.
If screw holes already present on unit, line up deflector with corresponding screw holes and secure with 2 screws on locations shown below.



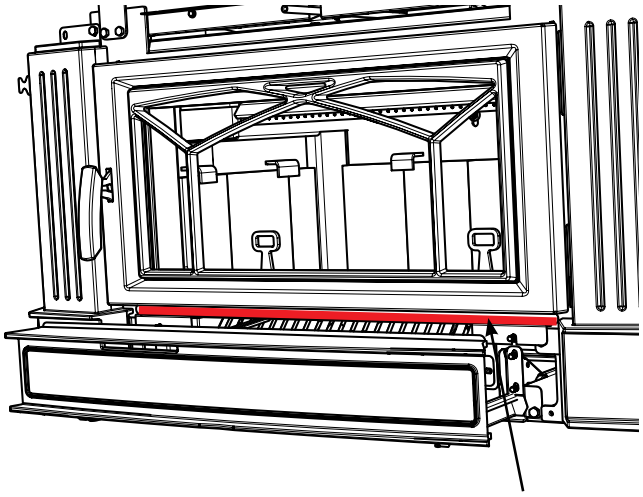
Fan deflector screw locations

5. Reinstall unit door (removed in Step 1), attach the left and right side rails to the back of the bottom fascia panel using four 7/16" bolts, slide each rail upward before tightening. (Rails may need to be bent slightly outward to get a good fit).

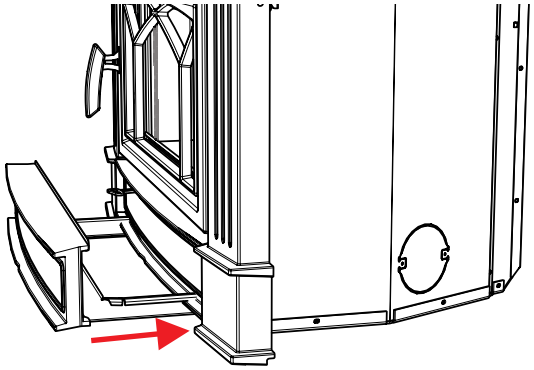


Rail system secured w/bolts

6. Apply the flat self adhesive gasket (not shown) to the face of the unit just above the fan opening. Install the seal/cushion to line up with the top of the slide out door. With the door in closed position,take the bottom fascia and line up the wheels and rails with the rails on the unit. When lined up, lift up and into the rail system and slide into position.

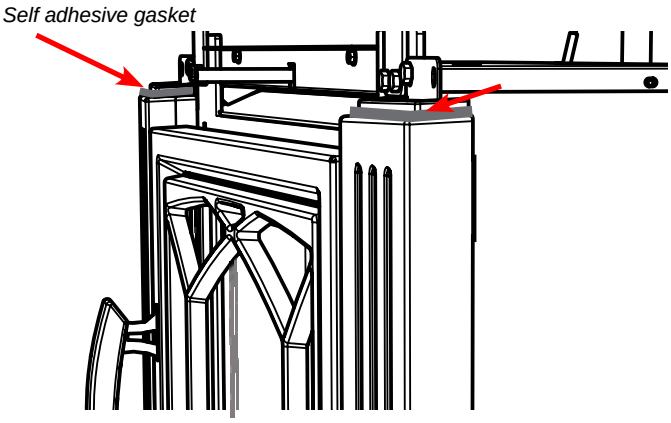


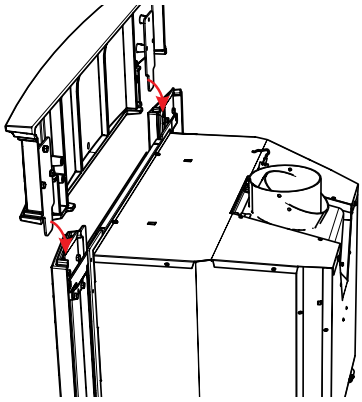
Gasket



Rail System

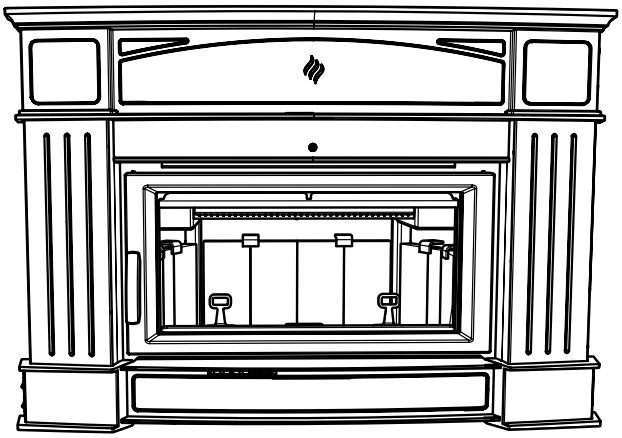
7. Apply self adhesive gasket to protect enamel surfaces from chipping. Lift the top fascia panel up (use care as it is heavy) and slide down into the brackets installed on Step 1.





Back view of Top Fascia Panel lining up with the brackets on Side Panels

8. Re-install bypass rod and bypass knob.



Completed Optional Hampton Oversize Cast Faceplate

Note: If installing optional cast grill - follow installation instructions in the manual.

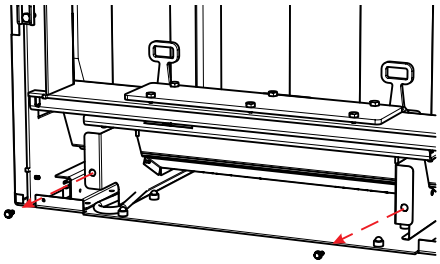
OPTIONAL FAN/BLOWER INSTALLATION

Installer: Please record unit serial number here before installing blower—serial number will not be visible after blower is installed.

Serial No._____

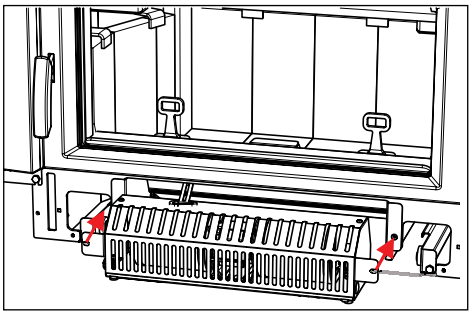
The fan should only be installed once the unit is in place in order to prevent any damage to the fan.

1. Remove 2- 5/16" screws from locations shown below—set aside for installation.



Remove 2 screws from locations shown

2. Slide the fan cassette fully into position.



Line up fan cassette with screw holes.

3. Align screw holes on fan harness bracket with holes in fan cassette mounting bracket on right and left sides.

4. Secure using the two (2) 5/16" screws removed from Step 1.

Secure fan with 2 screws removed in Step 1

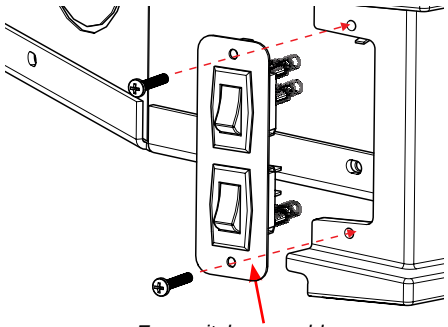
5. Remove 7/16" bolts from position shown below.

**See specific faceplate installation instructions for detailed instructions of fan switch assembly.

6. Align preset strain relief bracket to bottom right corner of the faceplate, secure with 7/16" bolt removed in Step 5.

Secure preset strain relief

7. Remove the dummy plug from the faceplate being installed, by removing the 2 screws along with washers and nuts. Discard dummy plug, but keep hardware. Install fan switch assembly with 2 screws, or use washers and nuts for Cast Faceplate to lower fascia before sliding faceplate into position.



Fan switch assembly

NOTE: Avoid disconnecting wires from switch during installation.

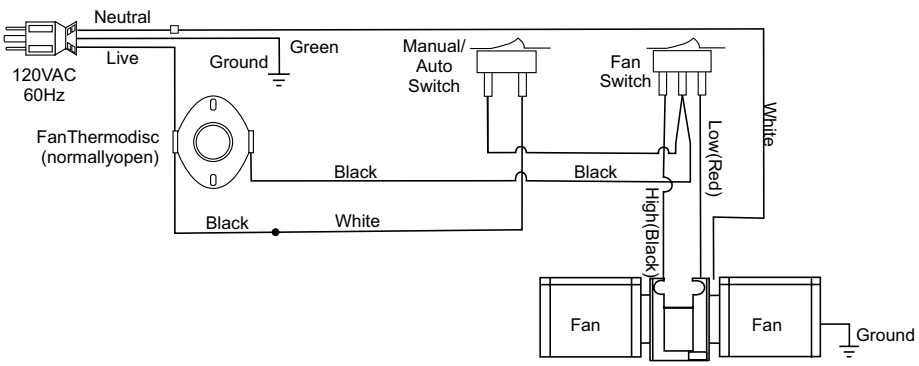
8. Tuck Power Cord to the bottom right hand side of the faceplate as shown.

Tuck cord to right side of faceplate

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

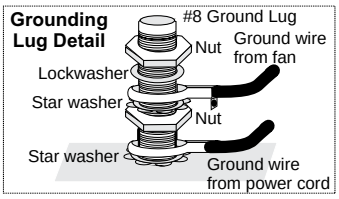
Important:

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.



Blower/Fan Wiring Diagram

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



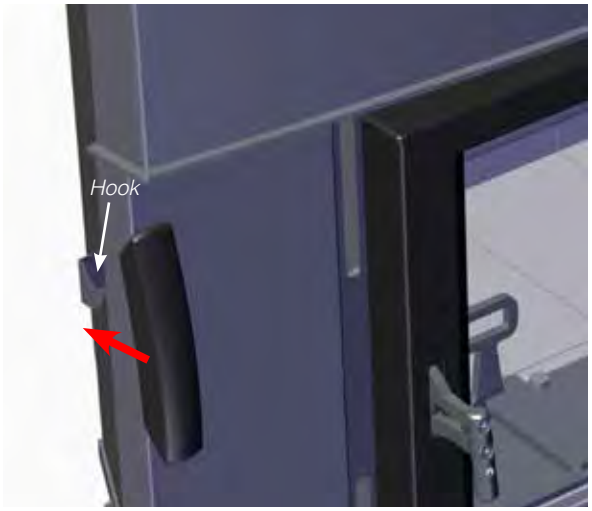
WARNING:
Electrical Grounding Instructions

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.

REMOVABLE DOOR HANDLE

The CI2700/HI500 has a removable door handle that can be stored when not in use. All the faceplates have a storage hook on the left side that accommodates the handle.

The cool to touch door handle is designed to be inserted from the bottom up and slide off when not held in place. Once in position, the door can be opened. After use, store the door handle on the storage hook located on the left side of the faceplate



WARNING: FAILURE TO USE REMOVABLE HANDLE AS PER INSTRUCTIONS MAY CAUSE SERIOUS BURNS.

BYPASS HANDLE

The CI2700/HI500 is supplied with a bypass operating handle.
The handle is used to open or close the bypass when re-loading

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.

OPERATING INSTRUCTIONS

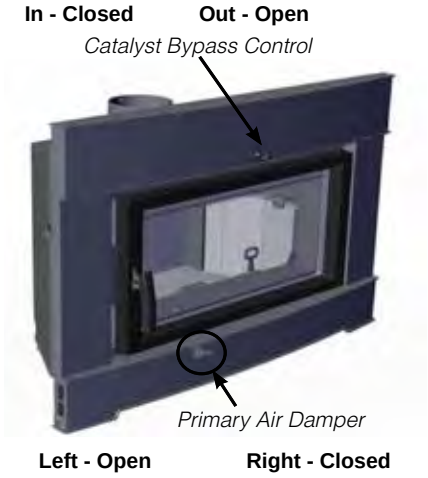
With your unit now correctly installed and safety inspected by your local authority, you are now ready to start a fire. Before establishing your first fire, it is important that you fully understand the operation of your Catalytic combustor and draft control.

WARNING
Fireplace Inserts 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 insert opening, creating risks from both fire and smoke.

DRAFT CONTROL

Both the primary and air wash drafts are controlled by the control slide located on the front left side of the unit (when facing the unit). To increase your draft - slide to the left to open, and to decrease - slide to the right to close. The CI2700/HI500 Wood Insert has a secondary draft system that continually allows combustion air to the induction ports at the top of the firebox, just in front of the catalytic combustor.

Draft is the force which moves air from the appliance up through the chimney. The amount of draft in your chimney depends on the length of the chimney, local geography, nearby obstructions and other factors. Too much draft may cause excessive temperatures in the appliance and may damage the catalytic combustor. Inadequate draft may cause back puffing into the room and plugging of the chimney or catalyst.



WARNING: To build a fire in ignorance or to disregard the information contained in this section can cause serious permanent damage to the unit and void your warranty!!

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). Crumble 2-5 pieces of newspaper and add approx. 1.8lbs of 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 the newspaper and adjust the door if it is slightly ajar for less smoke roll out. Keep the door in that position for 2-3 minutes to establish a good fire.
4. Add additional 0.8lbs of kindling along with 1lb of start up cord wood (startup cordwood is slightly larger than kindling but not full pieces of cordwood). Close the door and establish flame for 2-3 minutes.
   CAUTION: Never leave unit unattended if door is left open. This procedure is for fire start-up only, as unit may overheat if door is left open for too long.
5. Once flame has been established, open the door and add another 2lbs of start up cordwood. Hold door slightly ajar for 30-60 sec to establish flame, and then close the door and bypass.
6. After 5-7 minutes, go ahead and add another 2lbs of startup fuel and establish flame and close the door.
   NOTE: These steps are crucial to ensure proper charcoalization and coal bed prior to loading High, Med and Low fire loads.
7. Once this has burned down, open the door and the bypass, and rake the coals to create a uniform charcoal bed. Load 5 pcs of 17" long cordwood, East-West orientation, with the heaviest pieces at the back of the firebox, and ensure all pieces are behind the log retainers. Once loaded, close the door right away and bypass. Burn on high setting (air control to the far left when facing the unit) for 10-15 minutes. After the 10-15 minutes, adjust the air control to your desired position.
   High Fire: Air control to far left.
   Low Fire: Air control to far right.
   Med Fire: Air control slightly left of low fire setting.
8. IMPORTANT: The temperature in the wood insert and the gases entering the combustor must reach between 500°F - 700°F 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 600°F 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.

14. Green or wet wood is not recommended for your unit. If you must add wet or green fuel, open the draft control fully until all moisture has been dispersed by the intense fire. Once all moisture has been removed, the draft control may be adjusted to maintain the fire.

15. If you have been burning your stove on a low draft, use caution when opening the door. After opening the damper, open the door a crack, and allow the fire to adjust before fully opening the door.
16. The controls of your unit or the air supply passages should not be altered to increase firing for any reason.
17. If you burn the unit too slowly or at too low a setting your unit will not be operating as efficiently as it can. An easy rule of thumb says that if your glass is clean, catalytic thermostat is active, then your flue is clean and your exhaust is clean. Burn the stove hot enough to keep your glass clean and catalytic combustor ,you won't need to clean your flue as often.

HOT WHILE IN OPERATION. KEEP CHILDREN, CLOTHING AND FURNITURE AWAY. CONTACT MAY CAUSE SKIN BURNS.

ASH DISPOSAL

During constant use, ashes should be removed every few days. Please take care to prevent the build-up of ash around the start-up air housing located inside the firebox, under the loading door lip.

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. Always leave 1 to 2 inches of ash in the bottom of the firebox. This helps in easier starting and a more uniform burn of your fire.

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. Other waste should not be placed in the ash container.

FAN OPERATION

The fan unit must not be turned on until a fire has been burning for at least 30 minutes and the unit is hot enough. As well, after each fuel loading the fan must be shut off until 30 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.

To achieve maximum efficiency and performance, operate the fan in the low speed when the air control is not more than ¼" open from its lowest setting. See draft control instructions for operation of air control. When the appliance is cool it is important to clean in and around the fan. Always ensure areas on the hearth are clean and ashes, debris etc. are not pushed towards the bottom of the fascia. Always brush and clean debris away from the unit, not towards.

CREOSOTE

When wood is burned slowly, it produces tar and other organic vapors, which form creosote when combined with moisture. The creosote vapors 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 make an extremely hot fire.

For wood-burning heaters, reference to the formation and removal of creosote buildup in the chimney connector and chimney as follows (the inspection frequency "once every two months' stated below may be a shorter time period at the manufacturer's or private labeler's options):

"Creosote - Formation and Need for Removal

The chimney connector and chimney should be inspected at least once every two months during the heating season to determine if a creosote buildup has occurred.
If creosote has accumulated it should be removed to reduce the risk of chimney fire.

REMOVAL FOR CLEANING

Removal of your insert for cleaning purposes is usually not required if a proper installation has been done. In the event that removal is required, be sure not to damage any parts needed for re-installation. In most cases removal and replacement of the baffle system should allow full access for cleaning.

WARNING: In case of chimney fire:

1. **Close draft control**
2. **Call the Fire Department**

WAYS TO PREVENT AND KEEP UNIT FREE OF CREOSOTE

1. Burn insert with draft control wide open for about 45 minutes every morning during burning season. This helps to prevent creosote deposits within the heating system.
2. Burn insert with draft control wide open for about 10 - 15 minutes every time you add fresh wood. This allows the wood to achieve the charcoal stage faster and burns up any wood vapors which might otherwise be deposited within the system.
3. **Only burn seasoned wood!** Do not burn wet or green wood. Seasoned wood that has been dried at least one year must be used.
4. A small hot fire is preferable to a large smouldering one that can deposit creosote within the system.
5. Check the chimney at least twice a month during the burning season for creosote build-up.
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 (3mm / 1/8" or more) it should be removed to reduce the risk of a chimney fire.**

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.

SAFETY GUIDELINES & WARNINGS

DO NOT USE CHEMICALS FOR FLUIDS TO START FIRE.

CAUTION

1. 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, andirons or other methods for supporting fuel. Burn directly on the bricks.

SAFETY GUIDELINES & WARNINGS

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 hard-woods, as compared to softwoods or to green or freshly cut hardwoods.

14. 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.

15. 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.

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.

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.

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.

CATALYTIC COMBUSTOR (PART # 106-534)

ACHIEVING AND MAINTAINING CATALYST LIGHT-OFF:

There are some obvious signs of trouble that your inspection may reveal. The temperature in the stove and the gases entering the combustor must be raised to between 500F to 700F for catalytic activity to be initiated. During the start up of a cold stove a medium to high firing rate must be maintained for about 30 minutes. This ensures that the stove, catalyst and fuel are all stabilized at proper operating temperatures. Even though it is possible to have temperatures at 600F within minutes after a fire has been started, if the fire is allowed to die down immediately it may go out or the combustor may stop working. Once the combustor starts working, heat generated in it by burning the smoke will keep it working. During re-fueling and rekindling of the cool fire, or a fire that has burned down to the charcoal phase, operate the stove at a medium to high firing rate for about 10 minutes to ensure that 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.

- 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.

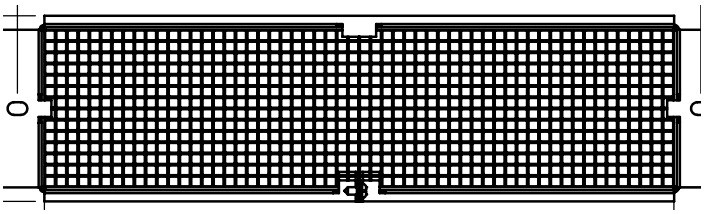
Step 2: With smoke routed through the catalyst (by-pass closed) go outside and observe the emissions leaving the chimney.

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 paintbrush 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.

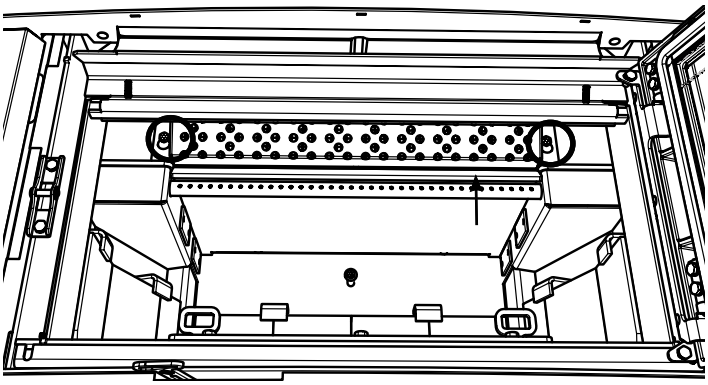


COMBUSTOR ASSEMBLY REMOVAL / REPLACEMENT:

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

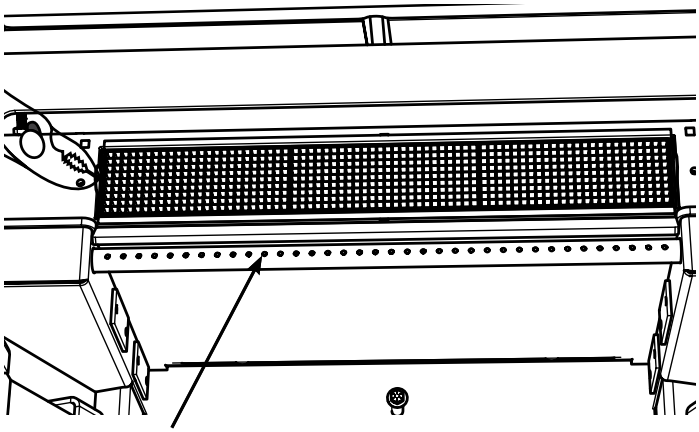
1. Allow the stove to burn out and cool down.

2. Open the door and loosen the two 7/16" bolts -see locations below.



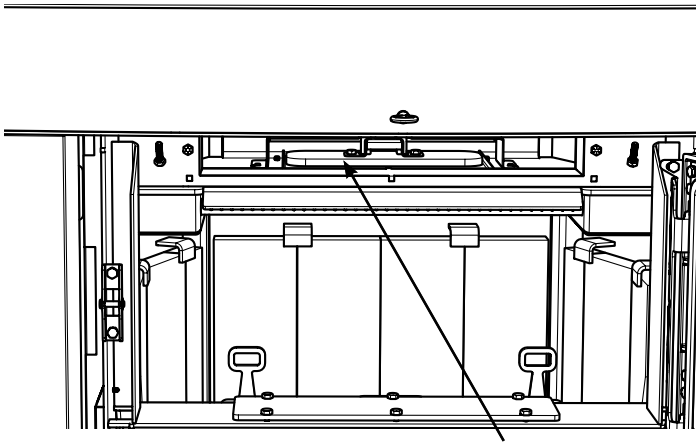
3. Lift flame shield slightly upwards in keyhole slot and pull it forward and down.

4. Use a pair of pliers and gently slide out the band at each end. The assembly will loosen enough that it can be pulled forward, lowered, and pulled out through the door.



CI2700/HI500 Airtube

NOTE: If also replacing the gasket in the bypass door (see next page), remove the lid of the bypass door while it is accessible and complete steps in Bypass Door Gasket Replacement.



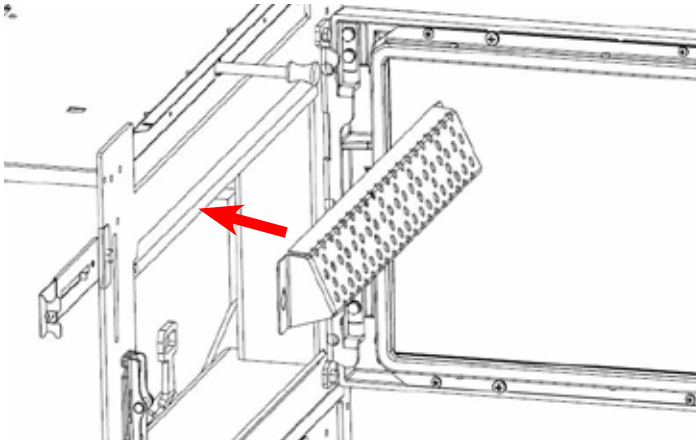
Lid for Bypass Door

TO REPLACE THE COMBUSTOR:

First clean the combustor area and the area around the by-pass,use a vacuum cleaner.

Lift the new combustor into position, with the stainless flanges on each end facing forward.
The combustor should slide easily into position, you may need to pinch down the top center with your finger to start, gently push as far to the back of the stove as possible.

Replace the flame shield in the orientation shown below.



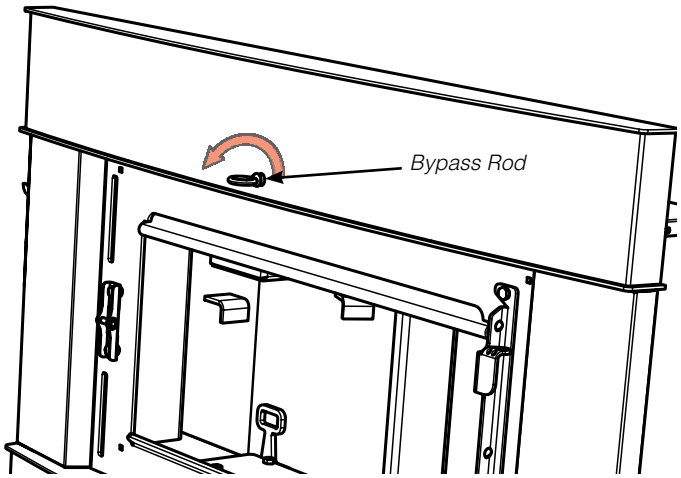
Lift it into position, place the key slot opening over the bolt and push the flame shield down to seat. Tighten the bolt till its SNUG only, do not over tighten. The flame shield should rest at an angle (about 45 degrees) with the thin end at the bottom and the thick end near the top of the stove.

NOTE: Replacement combustors can be retrieved from Applied Ceramics or Contact your local Regency Dealer for details.

DO NOT OPERATE THE APPLIANCE IF COMBUSTOR BECOMES INACTIVE - DO NOT OPERATE WITHOUT COMBUSTOR.

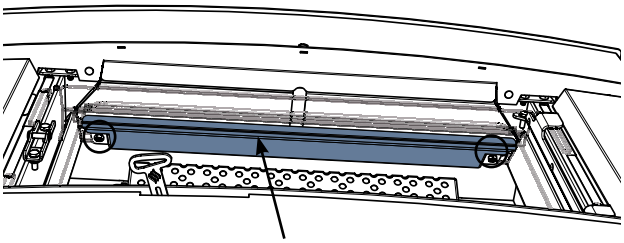
BYPASS DOOR GASKET REPLACEMENT

1. Remove bypass rod - turn counter clockwise.

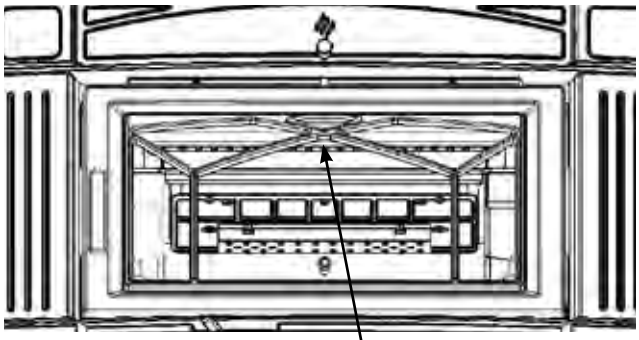


2. The following parts must be removed to allow access and a positive connection.

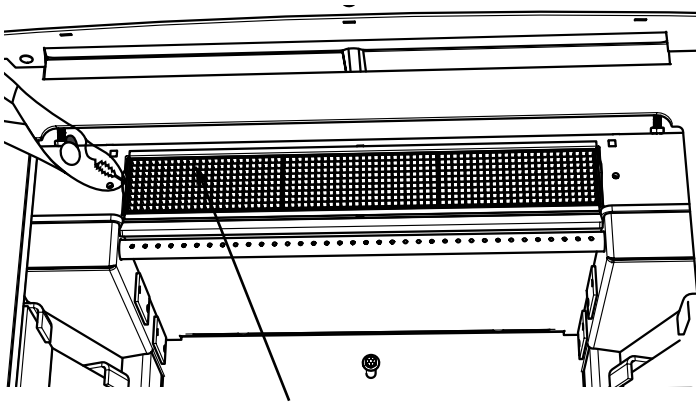
a) Primary Air Shield
b) Combustor Flame Shield
c) Combustor
d) Upper shield



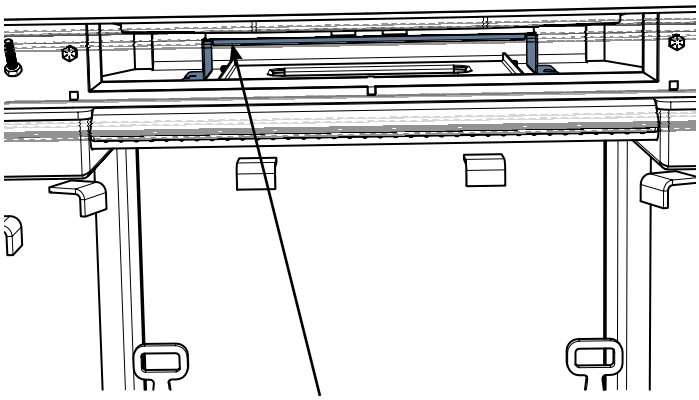
A- *Primary Air Shield - loosen 2 x 7/16" bolts - slide forward to remove.*



B- *Combustor Flame Shield - loosen 2 x 7/16" bolts to remove.*

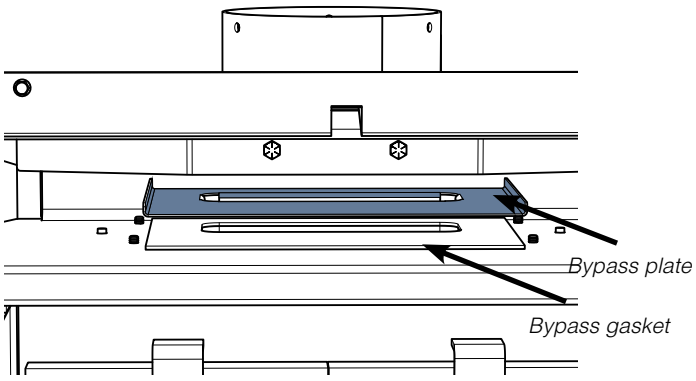


D- *Combustor- remove with pliers Tilt down and forward to ease removal.*



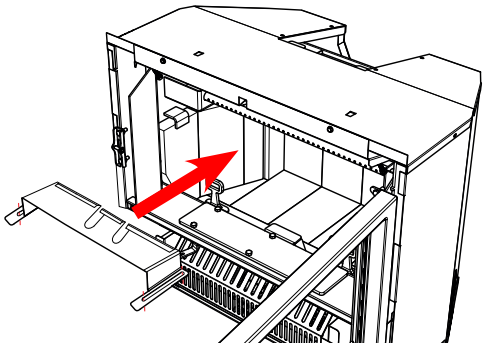
E- *Upper Shield - slide forward and lift up to remove.*

3. Lift off bypass plate, remove bypass gasket and replace with a new one.

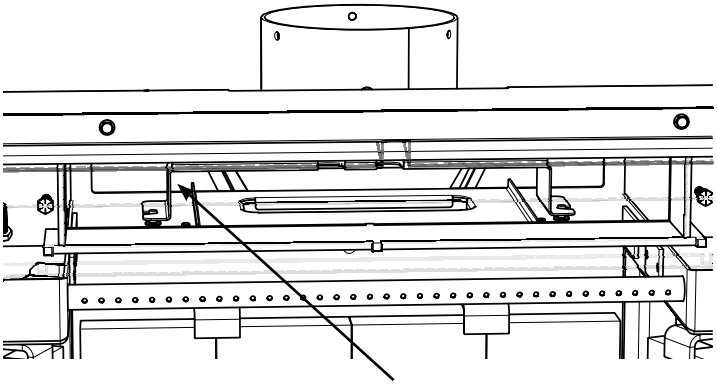


4. Reinstall bypass plate.

5. Reinstall the Upper Shield removed in Step 2d.
Ensure Upper Shield is centered in between 2 (two) vertical pins from front to back.
When positioning the upper shield locate the vertical pins by feel.
When the shield parts are in place - slide to the back.



E- *Upper Shield - orientation for reinstall*



Upper Shield - center between 2 vertical pins

6. Reinstall Combustor/Flame Combustor Shield / Primary Air Shield and Bypass Rod.

DOOR GASKET

If the door gasket requires replacement, 5/8" diameter material must be used. A proper high temperature gasket adhesive is required. A gasket repair kit, Part # 846-530 is available from your local Regency dealer.

Cleaning & Maintaining Your Wood Stove

GLASS CLEANING

Only clean your glass window when it is cool. Your local retailer can supply you with special glass cleaner if plain water and a soft cloth does not remove all deposits. Regular cleaning will prevent the build up of carbon and allow full view of fire.

CAUTION: Do not build fire too close to glass window.
WARNING: Do not use abrasive cleaners.
WARNING: Do not clean glass when hot.
WARNING: Do not operate unit with broken glass

GLASS REPLACEMENT

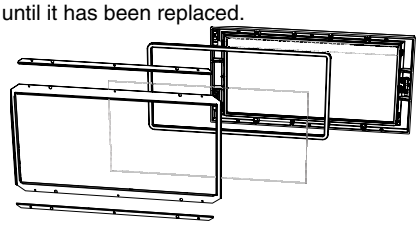
Your Regency Insert is supplied with 5mm Neoceram ceramic glass (Part #940-420/P) that will withstand the highest heat that your unit will produce. In the event that you break your glass by impact - purchase your replacement from an authorized Regency dealer only, and follow our step-by-step instructions.

WARNING: Do not use substitute materials.

GLASS REMOVAL

Allow the stove to cool before removing or replacing glass. Remove the door from the insert and remove the glass retainer. Use caution when removing broken glass to prevent injury.

When placing the replacement glass in the door, make sure the glass gasket will properly seal your unit. Replace the retainer and tighten securely, but do not wrench down on the glass as this may cause breakage. Do not substitute materials. If your glass door does break, do not continue to use your unit until it has been replaced.



WARNING: Avoid impact on glass doors such as striking or slamming shut.

Annual Maintenance	
Completely clean out entire unit	Annually
Inspect air tubes, baffles and bricks	Replace any damaged parts.
Adjust door catch / latch	If unable to obtain a tight seal on the door - replace door gasket seal. Readjust latch after new gasket installed.
Inspect condition and seal of: Glass Gasket Door Gasket Bypass Door Gasket	Perform paper test - replace gasket if required
Paper Test	Test the seal on the loading door and bypass door with a paper bill. Place a paper bill in the gasketed 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 (loading door only). If that doesn't solve the problem, replace the door gasket, bypass gasket, or both.
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.

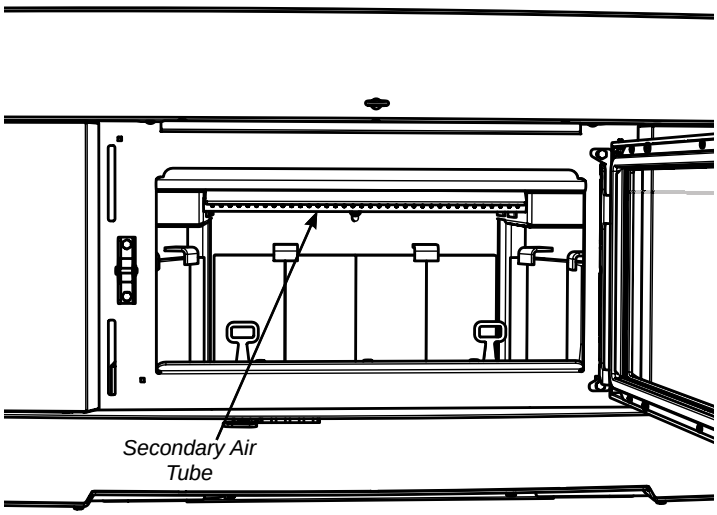
NOTE: Chimney Cleaning

When cleaning the chimney system the bottom stainless steel shield underneath the bypass door should be removed for ease of cleaning. The catalytic combustor should also be removed so this can also be cleaned at the same time following the guide lines found in this manual. The bypass should be moved all the way outward so any creosote will fall onto the firebox floor when being cleaned.
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.

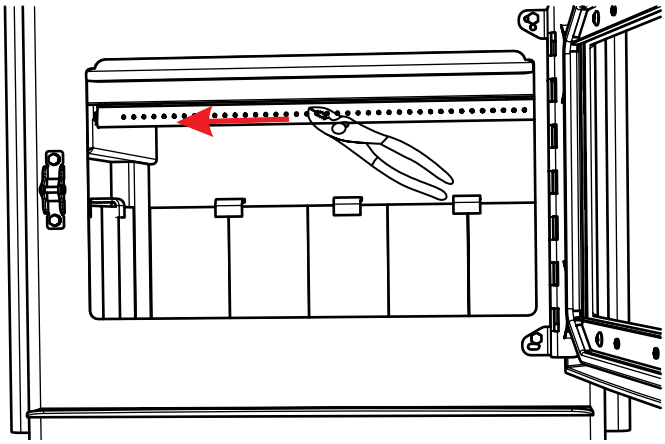
SECONDARY AIR TUBE REMOVAL / INSTALLATION

1. Allow the stove to burn out and cool down, until cool to touch.

2. Open stove door to access secondary air tube.



3. Grasp secondary air tube firmly with vise grips, using a hammer tap vise grips from right to left until air tube is released from grip.

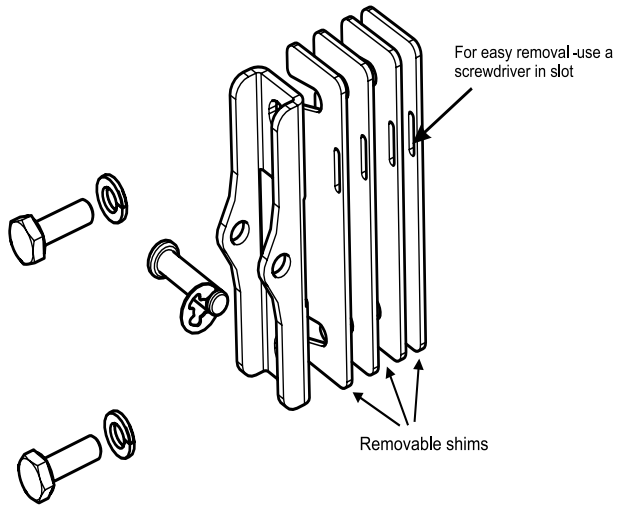


4. To reinstall or replace, first slide left side of tube into hole on left side air channel. Align tab on right side air channel with notch on right hand end of air tube. Firmly grip center of air tube with vise grips, use hammer to tap vise grips from left to right until the tube bottoms out into the air channel on right.

DOOR CATCH ADJUSTMENT

After a few fires, the door catch may require adjustment to renew a tight seal, as the door gasket will compress. Removal of a shim, shown in the diagram below, will allow the catch to be moved closer to the door frame, creating a tighter seal.

To remove a shim, loosen the 2 bolts to create clearance behind catch. Place a screwdriver in the slot of the shim and slide out. Retighten bolts.
Note: Keep the shims - they may be required in the future when the gasket is replaced.



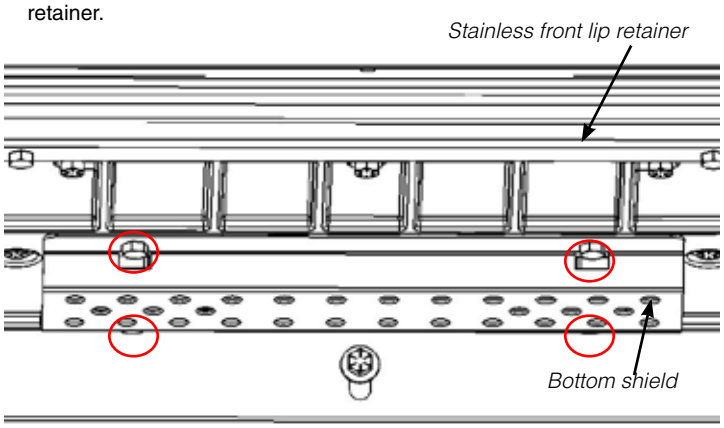
CAST BYPASS TOP PLATE REMOVAL / INSTALLATION

1. Allow the stove to burn out and cool down, until cool to touch.

2. Open stove door to access secondary air tube.

3. Remove secondary air tube–(see previous page).

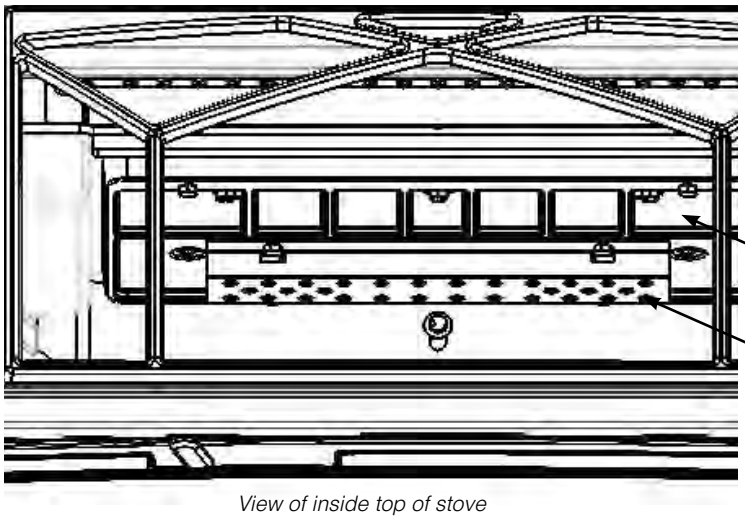
4. Remove 2 bolts in locations shown and remove stainless steel front lip retainer.



View of inside top of stove

5. Loosen the 4 bolts holding the bottom shield. Slide shield towards door opening to remove.

6. 8 bolts secure the cast bypass top plate to the roof of the stove. Before removing the bolts securing the cast bypass - support the cast up with 2 X 12-1/4" 2 x 4 's. The cast bypass opening weighs 30lbs - **DO NOT REMOVE** the bolts on the cast bypass prior to supporting the weight to avoid damage and injury.



View of inside top of stove

7. Remove the cast bypass opening top plate and replace.

8. Reverse steps to reinstall.

FAN OPERATION INTO AUTO MODE

If fan will not come on in auto mode see the following possible causes and solutions:

Possible causes:
- Bypass damper is open
- Brand new unit or first burn of the season
- No ember bed established (embers or coals, not to be mistaken with ashes)
- Primary damper is set to low (all the way to the right)
- There are only a couple small logs on fire or fire is almost out
- Mechanical issues or defects

Solutions:
- Close bypass once unit is at optimum temperature
- Establish a couple inch ember bed
- Set damper between medium to high (middle or all the way to the left)
- Add a few more logs onto the fire
- See your authorized dealer

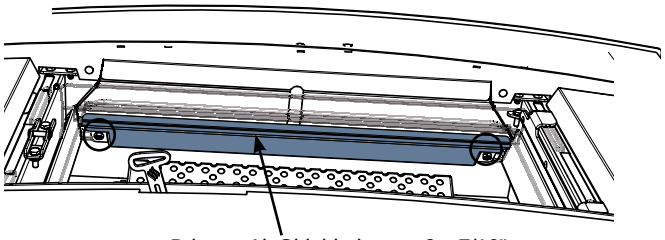
NOTE: The temperature displayed on the catalyst monitor has nothing to do with the activation temperature in auto for the fan.

The automatic sensor for this appliance is located at the firebox base. If the temperature at this location is not met, the fan will not come on. It is crucial on this appliance to get this up to operating temperature so that the catalyst is activated and bypass may be closed to retain heat within the firebox.

SWEEPING THE FLUE FROM THE TOP DOWN

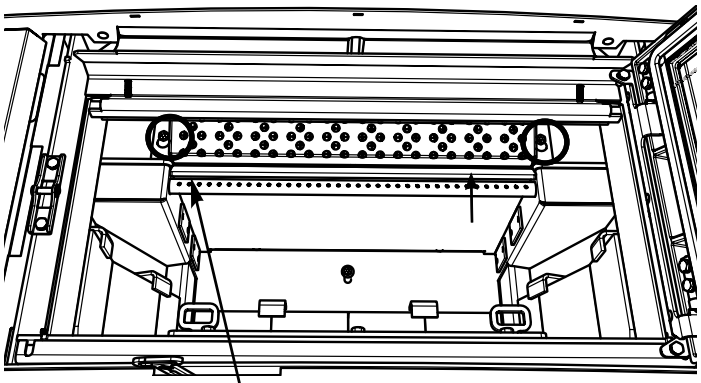
Note: The chimney system on this appliance cannot be cleaned from below.
IMPORTANT: It is imperative that the area around the exterior of the fireplace insert is protected with blankets, drop clothes to prevent any creosote, ash from falling on the finished floor.

1.Remove the primary air shield



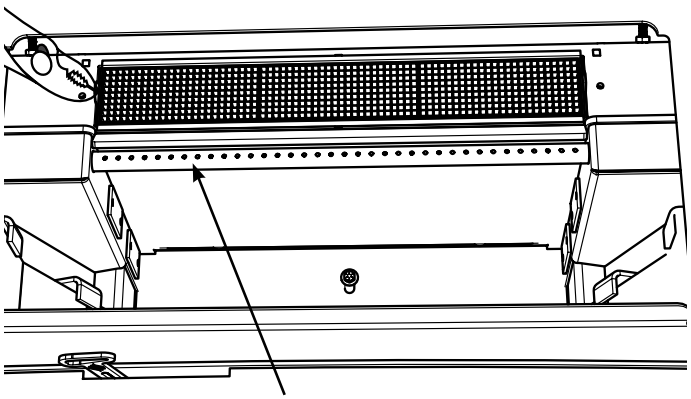
Primary Air Shield - loosen 2 x 7/16" bolts - slide forward to remove.

2. Remove the combustor flame shield.



Combustor Flame Shield - loosen 2 x 7/16" bolts to remove.

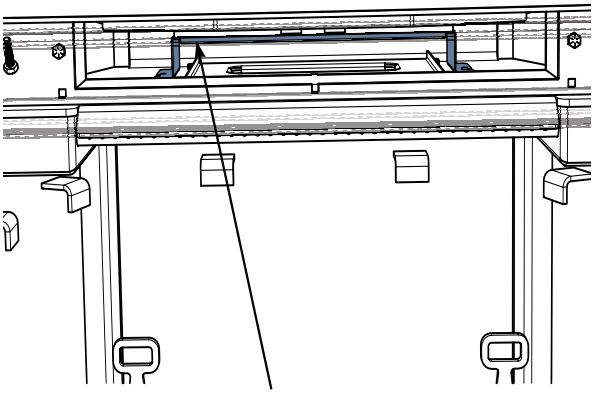
3. Remove the catalyst combustor



Combustor- remove with pliers Tilt down and forward to ease removal.

4. Close the door of the insert and the bypass rod and sweep the flue from the top of the chimney down into the bypass area.

5. After allowing the debris to settle slowly open the door to prevent spillage. Using an ash vac and extensions clean the area behind the catalyst combustor and bypass area.



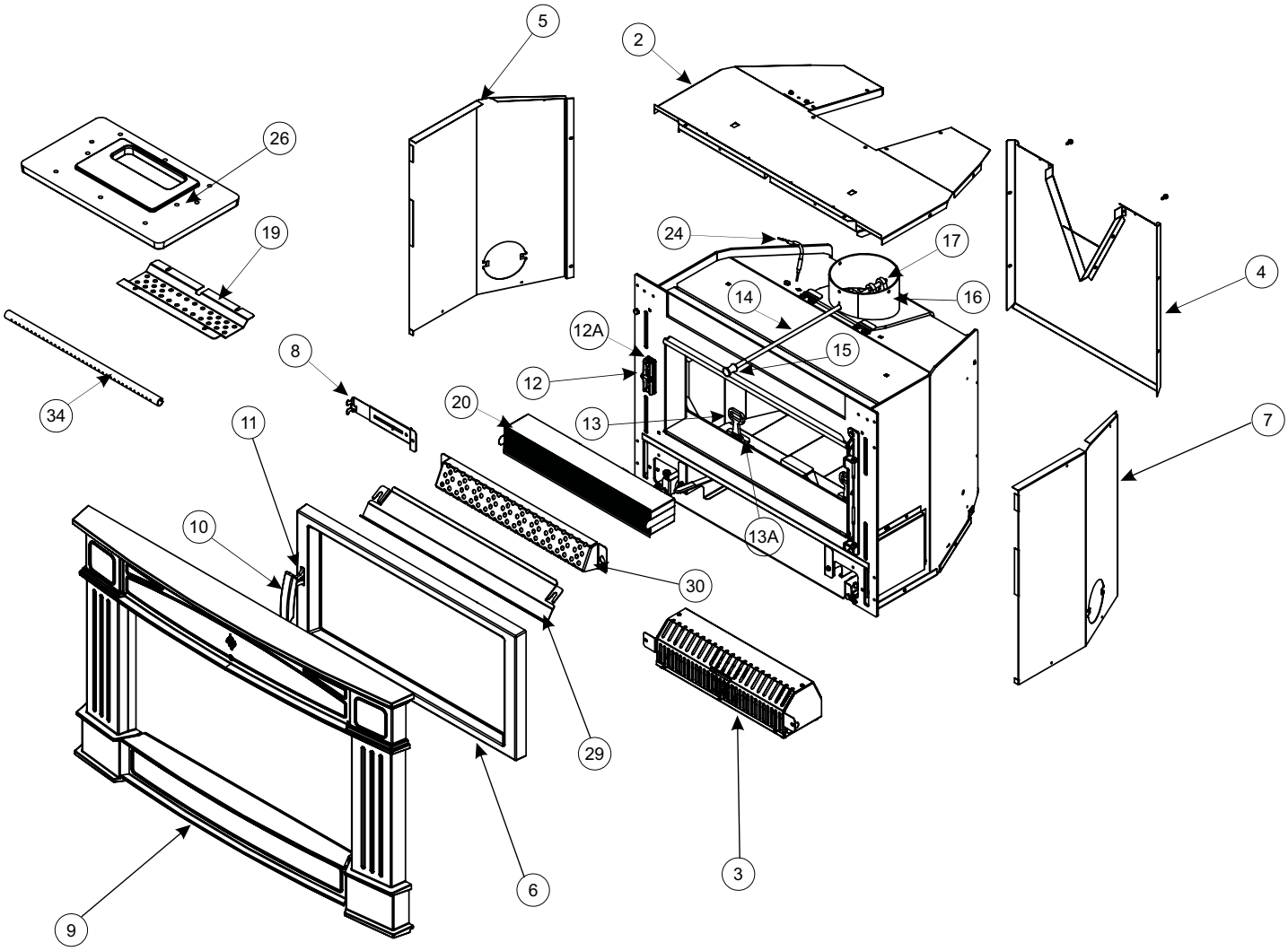
6. Check that the bypass is moving freely after cleaning the area. Do additional cleaning and make adjustments as needed.

7. Reverse steps 1-3 to reinstall the combustor, combustor flame shield and primary air shield.

MAIN ASSEMBLY

	Part #	Description
2	106-517	Stove Top Assembly
3	106-917	Fan Assembly
4	106-525	Rear Panel Assembly
5	106-038	Outer Shield L
6	106-520	Black cast door Assembly
*	106-565	Timberline Brown cast door Assembly
7	106-039	Outer Shield R
8	106-518	Handle/Tool Holder Assembly Regular
*	106-542	Handle/Tool Holder Assembly Oversize
9	106-912	Contemporary Faceplate
*	106-910	Low Profile Faceplate
*	106-921	Cast Faceplate Regular - Black
*	106-925	Cast Faceplate Regular -Timberline Brown
*	106-941	Cast Faceplate - Oversize Black
*	106-945	Cast Faceplate - Oversize Timberline Brown
*	106-931	Cast Grill - Black
*	106-935	Cast Grill - Timberline Brown
*	106-956	Standard Backing Plate
*	106-958	Oversize Backing Plate
10	156-241	Cast Handle
11	156-514	Handle Assembly
*	106-541/P	Aligner Assembly (For Back Side of Door Latch)
12	106-561	Catch Assembly
*	106-131F	106-131F Door Catch Shims (Each)
13	106-043	Andirons (ea)
13A	106-042	Andiron Bracket (Each)
14	106-016	Bypass rod
15	106-122B	Bypass knob (Matt Black)
	106-122MJE	Bypass knob (Timberline brown)
19	106-143	Bottom shield

	Part #	Description
16	106-516	Flue Collar Assembly
17	106-062F	Fork
20	106-534	Catalytic Combustor
*	106-546	Contemporary Rail Assembly Left
*	106-547	Contemporary Rail Assembly Right
*	911-185	Digital Catalytic Combustor Monitor
24	911-186	Digital Catalytic Monitor Probe
*	106-955	Offset Flue Adapter
26	106-351	Cast Bypass Top Plate
27	106-018	Bypass Top Gasket
*	910-138	Auto/manual switch
*	910-140	Fan Hi/Off/Low switch
	106-536	Fan Swith Assembly Complete
*	910-142	Fan Thermodisc
*	910-157/P	Fan motor only
*	940-420/P	Replacement Glass
*	106-003	Stainless steel baffle
29	106-095	Primary Air Shield
30	106-144	Combustor Flame Shield
*	106-060	Upper Shield
*	106-129	Bypass Damper Tool
34	033-953	Secondary Air Tube
	920-047	Manual
* Part not Shown		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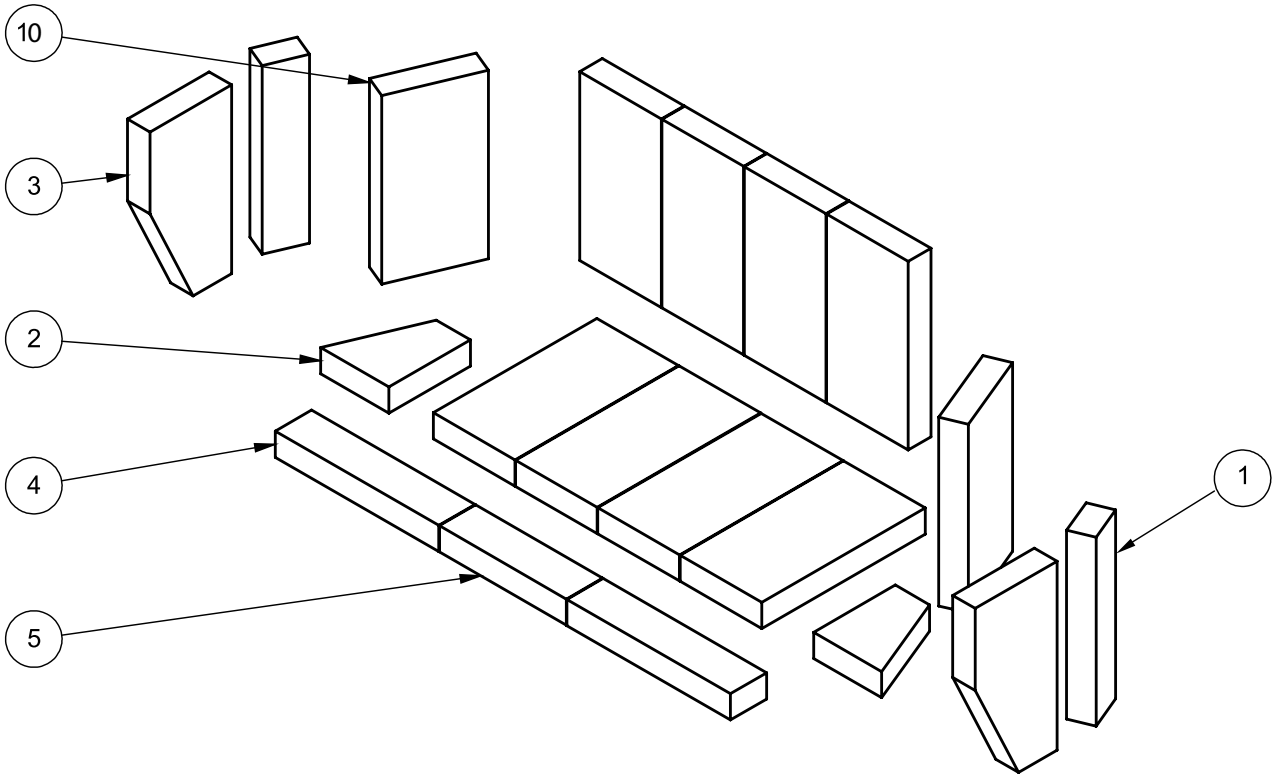
BRICK LAYOUT

106-960 Brick Set - Complete

1	2 x 7 BRICK
4	2 x 9 BRICK
2	FIRE BRICK
2	FIRE BRICK
10	9 x 4.5 STANDARD BRICK



Limited Lifetime Warranty

FPI Fireplace Products International Ltd. (for Canadian customers) and Fireplace Products U.S., Inc. (for U.S. customers) (collectively referred to herein as "FPI") extends this Limited Lifetime Warranty to the original purchaser of this appliance provided the product remains in the original place of installation. The items covered by this limited warranty and the period of such coverage is set forth in the table below.

Some conditions apply (see below).

The policy is not transferable, amendable, or negotiable under any circumstances.

Wood Products	Component Coverage					Labor Coverage
Components Covered	Limited Lifetime	5 years	2 years	1 year	Warranty	(Years)
Welded Firebox Steel	✓					5
All Stainless Steel Components, Smoke Deflectors, Heat Shields etc.	✓					3
Air Tubes	✓					3
Airmate	✓					3
Door handle and latch assembly, all hardware	✓					3
Glass Thermal Breakage Only	✓					3
Steel Faceplates, Accessory Housings	✓					3
All Plating	✓					3
Ash Drawer, Heatshields, Pedestal	✓					
All Baffles, Steel, Ceramic, Vermiculite C-Baffles	✓					
All castings, firebox, surrounds, doors, panels etc.		✓				3
All Electrical, Blower, wiring, switches etc.			✓			2
Glass - Crazing				✓		1
Catalyst Combustor					*10 Years Prorated	
Venting/Chimney				✓		1
Screens				✓		1

*See specific warranty details in regards to the catalyst combustor in unit manual.

Conditions:

Warranty protects against defect in manufacture or FPI factory assembled components only, unless herein specified otherwise.

Any part(s) found to be defective during the warranty period as outlined above will be repaired or replaced at FPI's option through an accredited distributor, dealer or pre-approved and assigned agent provided that the defective part is returned to the distributor, dealer or agent for inspection if requested by FPI. Alternatively, FPI may at its own discretion fully discharge all of its obligations under the warranty by refunding the verified purchase price of the product to the original purchaser. The purchase price must be confirmed by the original Bill of Sale.

The authorized selling dealer, or an alternative authorized FPI dealer if pre-approved by FPI, is responsible for all in-field diagnosis and service work related to all warranty claims. FPI is not responsible for results or costs of workmanship of unauthorized FPI dealers or agents in the negligence of their service work.

At all times FPI reserves the right to inspect reported complaints on location in the field claimed to be defective prior to processing or authorizing of any claim. Failure to allow this upon request will void the warranty.

All warranty claims must be submitted by the dealer servicing the claim, including a copy of the Bill of Sale (proof of purchase by you). All claims must be complete and provide full details as requested by FPI to receive consideration for evaluation. Incomplete claims may be rejected.

Replacement units are limited to one per warranty term. Airtube and baffle replacements are limited to one replacement per term.

Unit must be installed according to all manufacturers' instructions as per the manual.

All Local and National required codes must be met.

The installer is responsible to ensure the unit is operating as designed at the time of installation.

The original purchaser is responsible for annual maintenance of the unit, as outlined in the owner's manual. As outlined below, the warranty may be voided due to problems caused by lack of maintenance.

Repair/replacement parts purchased by the consumer from FPI after the original coverage has expired on the unit will carry a 90 day warranty, valid with a receipt only. Any item shown to be defective will be repaired or replaced at our discretion. No labor coverage is included with these parts.

Exclusions:
This Limited Lifetime Warranty does not extend to rust or corrosion of any kind due to: a lack of maintenance or improper venting, lack of combustion air provision, or exposure to corrosive chemicals (i.e. chlorine, salt, air, etc.).

This Limited Lifetime Warranty also does not extend to: paint, firebricks (rear, sides, or bottom), door gasketing, glass gasketing (or any other additional factory fitted gasketing), vermiculite floor bricks, andiron assemblies, and flue damper rods.

Malfunction, damage or performance based issues as a result of environmental conditions, location, chemical damages, downdrafts, installation error, installation by an unqualified installer, incorrect chimney components (including but not limited to cap size or type), operator error, abuse, misuse, use of improper fuels (such as unseasoned cordwood, mill-ends, construction lumber or debris, off-cuts, treated or painted lumber, metal or foil, plastics, garbage, solvents, cardboard, coal or coal products, oil based products, waxed cartons, compressed pre-manufactured logs, kiln dried wood), lack of regular maintenance and upkeep, acts of God, weather related problems from hurricanes, tornados, earthquakes, floods, lightning strikes/bolts or acts of terrorism or war, which result in malfunction of the appliance are not covered under the terms of this Limited Lifetime Warranty.

FPI has no obligation to enhance or modify any unit once manufactured (i.e. as products evolve, field modifications or upgrades will not be performed on existing appliances).

This warranty does not cover dealer travel costs for diagnostic or service work. All labor rates paid to authorized dealers are subsidized, pre-determined rates. Dealers may charge homeowner for travel and additional time beyond their subsidy.

Any unit showing signs of neglect or misuse will not be covered under the terms of this warranty policy and may void this warranty. This includes units with rusted or corroded fireboxes which have not been reported as rusted or corroded within three (3) months of installation/purchase.

Units which show evidence of being operated while damaged, or with problems known to the purchaser and causing further damages will void this warranty.

Units where the serial no. has been altered, deleted, removed or made illegible will void this warranty.

Minor movement, expansion and contraction of the steel is normal and is not covered under the terms of this warranty.

FPI is not liable for the removal or replacement of facings or finishing in order to repair or replace any appliance in the field.

Freight damages for products or parts are not covered under the terms of the warranty.

Products made or provided by other manufacturers and used in conjunction with the FPI appliance without prior authorization from FPI may void this warranty.

Limitations of Liability:
The original purchaser's exclusive remedy under this warranty, and FPI's sole obligation under this warranty, express or implied, in contract or in tort, shall be limited to replacement, repair, or refund, as outlined above. IN NO EVENT WILL FPI BE LIABLE UNDER THIS WARRANTY FOR ANY INCIDENTAL OR CONSEQUENTIAL COMMERCIAL DAMAGES OR DAMAGES TO PROPERTY. TO THE EXTENT PERMITTED BY APPLICABLE LAW, FPI MAKES NO EXPRESS WARRANTIES OTHER THAN THE WARRANTY SPECIFIED HEREIN. THE DURATION OF ANY IMPLIED WARRANTY IS LIMITED TO DURATION OF THE EXPRESSED WARRANTY SPECIFIED ABOVE. IF IMPLIED WARRANTIES CANNOT BE DISCLAIMED, THEN SUCH WARRANTIES ARE LIMITED IN DURATION TO THE DURATION OF THIS WARRANTY.

Some U.S. states do not allow limitations on how long an implied warranty lasts, or allow exclusion or limitation of incidental or consequential damages, so the above limitations or exclusions may not apply to you.

Customers located outside the U.S. should consult their local, provincial or national legal codes for additional terms which may be applicable to this warranty.

How to Obtain Warranty Service:
Customers should contact the authorized selling dealer to obtain all warranty and service. In the event the authorized selling dealer is unable to provide warranty / service, please contact FPI by mail at the address listed on the next page. Please include a brief description of the problem and your address, email and telephone contact information. A representative will contact you to make arrangements for an inspection and/or warranty service, by an alternative dealer.

Product Registration and Customer Support:
Thank you for choosing a Regency Fireplace. Regency strives to be a world leader in the design, manufacture, and marketing of hearth products. To provide the best support for your product, we request that you complete a product registration form at http://www.regency-fire.com/Customer-Care/Warranty-Registration.aspx within ninety (90) days of purchase.

Product Registration and Customer Support:

Thank you for choosing a Regency Fireplace. Regency strives to be a world leader in the design, manufacture, and marketing of hearth products. To provide the best support for your product, we request that you complete a product registration form found on our Web Site under Customer Care within ninety (90) days of purchase.

For purchases made in **CANADA or the UNITED STATES**:
http://www.regency-fire.com/Customer-Care/Warranty-Registration.aspx

For purchases made in AUSTRALIA:
http://www.regency-fire.com.au/Customer-Care/Warranty-Registration.aspx

You may also complete the warranty registration form below to register your Regency Fireplace Product and mail and/or fax it back to us, and we will register the warranty for you. It is important you provide us with all the information below in order for us to serve you better.

Warranty Registration Form (or Register online immediately at the above Web Site):

Warranty Details	
Serial Number (required):	
Purchase Date (required) (mm/dd/yyyy):	
Product Details	
Product Model (required):	
Dealer Details	
Dealer Name (required):	
Dealer Address:	
Dealer Phone #:	
Installer:	
Date Installed (mm/dd/yyyy):	
Your Contact Details (required)	
Name:	
Address:	
Phone:	
Email:	

For purchases made in CANADA:

FPI Fireplace Products International Ltd.
6988 Venture St.
Delta, British Columbia
Canada, V4G 1H4

Phone: 604-946-5155
Fax: 1-866-393-2806

For purchases made in the UNITED STATES:

Fireplace Products US, Inc.
PO Box 2189 PMB 125
Blaine, WA
United States, 98231

Phone: 604-946-5155
Fax: 1-866-393-2806

For purchases made in AUSTRALIA:

Fireplace Products Australia Pty Ltd
1- 3 Conquest Way
Hallam, VIC
Australia, 3803

Phone: +61 3 9799 7277
Fax: +61 3 9799 7822

For fireplace care and tips and answers to most common questions please visit our Customer Care section on our Web Site. Please feel free to contact your selling dealer if you have any questions about your Regency product.

CATALYTIC COMBUSTOR WARRANTY COVERAGE

IMPORTANT WARRANTY INFORMATION FOR CATALYTIC COMBUSTOR
Effective March 1 2019

Any and all claims for catalytic combustor must be filed **by the consumer** directly with their authorized Regency Dealer. FPI/Regency does not handle these claims directly with consumers.

Please follow the instructions below for your catalytic combustor under warranty. To learn more about the care and maintenance or the catalytic combustor, please visit our website: www.firecatcombustors.com.

Any warranty coverage before this date will be covered by the original warranty when the appliance was purchased.

(1) **10-year** coverage from Regency – not the supplier of the catalytic combustor.

(2) All claims must be made through the dealer where the appliance had been purchased.

(3) One no-charge replacement at any time within the **ten (10) year** period.

(4) Second replacement at 50% off retail* within the original **ten (10) years**.

(5) Subsequent replacements or if **ten (10)-year** coverage has expired at full retail* price.

(6) The catalytic combustor must not have been mechanically abused, nor must the wrong fuels have been used in the appliance.

(7) All claims must be accompanied by clear photos of the catalytic combustor showing all damage and also showing existing internal venting from the stove.

The consumer will be responsible for removal, any servicing. This warranty is REGENCY® exclusive warranty and REGENCY® disclaims any other express or implied warranty for the catalytic combustor, including any warranty or merchantability of fitness for a particular use.
NO LABOR WILL APPLY.

All warranty claims must be sent to: Regency Fireplace Products
By Authorized Regency Dealer

* Prices subject to change.
Regency reserves the right to reject any claim if it is determined the damage is a result of misuse, abuse or improper cleaning/handling.

Installer: Please complete the following information

Dealer Name & Address:_____

_____

Installer: _____

Phone #: _____

Date Installed: _____

Serial #:_____

Printed in Canada

Established 1974

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A2LA ACCREDITED
CERTIFICATE #1550.01

PFS Teco
11785 SE Hwy 212 STE#305
Clackamas, OR 97015

Report Number: DIRI01A05026181218

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	#041	Lab
Units	**Readability**	**SOP**	**Cal Date**	**Last Cal Date**	**Cal Due Date**
lbs	0.1	QC033	12/18/18	6/13/18	12/2019

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: 16.9°C
As-Left: Pass:☑ Fail:☐	As-Left: Pass:☑ Fail:☐	As-Left: Pass:☑ Fail:☐	

CALIBRATION DATA

Standard	As-Found	As-Left	Expanded Uncertainty
1000	999.3	1000.2	0.12
700	699.7	700.1	0.12
500	499.7	500.1	0.08
300	299.8	300.1	0.08
100	99.9	100.0	0.05
50	50.0	50.0	0.05

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:
12 month calibration cycle. 2000lb platform.

Comments/Information Concerning this Calibration
12/18 - RH = 67%. Adjusted span.

Report prepared/reviewed by: ServiceTechDC **Date:** 12/28/18 **Technician:** R.Kauble **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.

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A2LA ACCREDITED
CERTIFICATE #1550.01

PFS Teco
11785 SE Hwy 212 STE#305
Clackamas, OR 97015

Report Number: DIRI0182484A0912013i181218

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	12/18/18	6/13/18	12/2019

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:☐	
As-Left: Pass:☑ Fail:☐	As-Left: Pass:☑ Fail:☐	As-Left: Pass:☑ Fail:☐	Temperature: 16.4°C

CALIBRATION DATA

Standard	As-Found	As-Left	Expanded Uncertainty
400	399.99	399.99	0.058
300	300.00	300.00	0.058
200	200.03	200.03	0.058
100	100.01	100.01	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

Permanent Information Concerning this Equipment:
12 month calibration cycle.

Comments/Information Concerning this Calibration
12/18 - RH = 64%. Adjusted span.

Report prepared/reviewed by: ServiceTechSC **Date:** 12/28/18 **Technician:** R.Kauble
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.

y Gas Meter Calibrati)

Meter Manufacturer:	Apex
Model:	XC-60-ED
Lab ID #:	53
Serial #:	1902130
Calibration Date:	12/17/2018
Calibration Expiration:	6/17/2019
Barometric Pressure:	29.87 in. Hg

PFS·TECO

Reference Standard DGM	
Manufacturer:	Apex
Model:	SK25DA
Lab ID#:	47
Serial #:	1101001
Calibration Expiration Date:	3/5/2019
Calibration γ Factor:	0.998

Unit Under Test Previous Calibration	
Date	12/13/2018
γ Factor:	1.002
Allowable Deviation (±5%):	0.0501
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)	166.180	147.027	169.354
Standard DGM Temperature (°F)	71.7	72.5	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)	5.950	5.296	6.132
DGM Temperature (°F)	83.0	91.0	93.0
DGM Pressure (in H_2O)	2.60	2.00	1.5
Time (min)	37.0	37.0	49.0
Net Volume for Standard DGM (ft^3)	5.869	5.192	5.981
Net Volume for DGM (ft^3)	5.950	5.296	6.132
Dry Gas Meter γ Factor	0.999	1.007	1.006
γ Factor Deviation From Average	0.999	1.007	1.006

Average Gas Meter γ Factor: 1.004

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%.

Technician _____ 12/17/2018

Dry Gas Meter Calibration

Meter Manufacturer:	Apex
Model:	XC-60-ED
Lab ID #:	54
Serial #:	1902133
Calibration Date:	12/17/2018
Calibration Expiration:	6/17/2019
Barometric Pressure:	29.87 in. Hg

Reference Standard DGM	
Manufacturer:	Apex
Model:	SK25DA
Lab ID#:	47
Serial #:	1101001
Calibration Expiration Date:	3/5/2019
Calibration γ Factor:	0.998

Unit Under Test Previous Calibration	
Date	12/13/2018
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)	153.596	138.287	193.022
Standard DGM Temperature (°F)	73.0	73.0	74.0
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)	5.594	5.047	7.058
DGM Temperature (°F)	94.5	95.0	96.0
DGM Pressure (in H_2O)	2.60	2.00	1.5
Time (min)	35.0	36.0	57.0
Net Volume for Standard DGM (ft^3)	5.424	4.884	6.816
Net Volume for DGM (ft^3)	5.594	5.047	7.058
Dry Gas Meter γ Factor	1.000	1.001	1.000
γ Factor Deviation From Average	1.000	1.001	1.000

Average Gas Meter γ Factor: 1.000

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%.

Technician: 12/17/2018

Dry Gas Meter Calibration

Meter Manufacturer:	Apex
Model:	Apex-AK-600
Lab ID #:	055
Serial #:	810016
Calibration Date:	6/15/2018
Calibration Expiration:	6/15/2019
Barometric Pressure:	29.83 in. Hg

Reference Standard DGM	
Manufacturer:	Apex
Model:	SK25DA
Lab ID#:	047
Serial #:	1101001
Calibration Expiration Date:	3/5/2019
Calibration γ Factor:	0.998

Unit Under Test Previous Calibration	
Date	1/18/2017
γ Factor:	0.997
Allowable Deviation (±5%):	0.04985
Actual Deviation:	0.00
Result:	PASS

Calibration Data	Run 1	Run 2	Run 3
Standard DGM Initial Volume (L)	0.000	0.000	0.000
Standard DGM Final Volume (L)	145.479	148.058	143.802
Standard DGM Temperature (°F)	71.0	71.0	71.0
Standard DGM Pressure (in H_2O)	0.00	0.00	0.0
DGM Initial Volume (ft^3)	0.000	0.000	0.000
DGM Final Volume (ft^3)	5.146	5.254	5.114
DGM Temperature (°F)	75.0	76.5	77.5
DGM Pressure (in H_2O)	1.80	1.80	1.8
Time (min)			
Net Volume for Standard DGM (ft^3)	5.138	5.229	5.078
Net Volume for DGM (ft^3)	5.146	5.254	5.114

Dry Gas Meter γ Factor	0.999	0.999	0.999
γ Factor Deviation From Average	0.999	0.999	0.999

Average Gas Meter γ Factor: 0.999

Calculations:

1. Deviation = |Average value for all runs - current run value|
2. $\gamma = [V_{std} \times (\gamma_{Std}) \times (P_{bar}+P_{std}/13.6) \times (T_{DGM} + 460)] / [V_{DGM} \times (T_{std} + 460) \times (P_{bar} + P_{DGM}/ 13.6)]$

Standard Reference Meter is calibrated to NIST traceable standards. Uncertainty of measurement is ±0.5%.

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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

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ACCREDITED

Calibration Services

Certificate Number: 1550.01

Laboratory code: 115953

Report of Calibration

Firm: Dirigo Laboratories
Address: 11785 SE Hwy 212, Ste 305
City/State/Zip: Clackamas, OR 97015

Test Completed: 03/21/17
Submitted By: John Steiner
Traceable Number: 20170468

Test Item: 200mg and 100mg Individual Weights
Serial No.: Listed in Table

Manufacturer: Troemner

Laboratory Environment at time of test

Temperature °C	Pressure mmHg	Humidity %RH
21.967	753.44	49.44

Conventional Mass Value

Nominal Value	As Found grams	As Found Correction* (mg)	Uncertainty (mg)	Tolerance (mg)
200mg SN 1000101395	0.2000061	0.0061	0.0026	0.01
100mg SN 1000126267	0.1000046	0.0046	0.0028	0.01

*Correction is the difference between the conventional mass value of a weight and its nominal value.

Comments: These weights were new from the manufacturer and were within ASTM Class 1 tolerances As Found. No adjustments or changes were made so As Found values should be considered to be As Left values.

Accredited by the American Association for Laboratory Accreditation (A2LA) under Calibration Laboratory Code 115953 and Certificate Number 1550.01. This laboratory meets the requirements of ISO/IEC 17025:2005 *General Requirements for the Competence of Testing and Calibration Laboratories.* This laboratory also meets the requirements of ANSI/NCSL Z540-1-1994 and any additional program requirements in the field of calibration.

Quality Control Services, Inc.
Metrology Laboratory Manager
E-mail dthompson@qc-services.com

Date: 03/21/17

Signature David S. Thompson

Established 1974

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ACCREDITED
Calibration Services
Certificate Number: 1550.01
Laboratory code: 115953

Report of Calibration

Firm: Dirigo Laboratories
Address: 11785 SE Hwy 212, Ste 305
City/State/Zip: Clackamas, OR 97015

Test Completed: 01/15/16
Purchase Order: 1001
Traceable Number: 20152489

Test Item: 20lb and 10lb Individual Grip Handle Weights
Serial No.: Listed in Table

Manufacturer: Unknown

Laboratory Environment at time of test

Temperature °C	Pressure mmHg	Humidity %RH
21.448	760.64	44.58

Conventional Mass Value

Nominal Value	As Found pounds	As Found Correction* (mg)	Uncertainty (mg)	Tolerance (mg)
20lb #098	19.9995450	-206.4	6.4	910
10lb #097	10.0006510	295.3	5.1	450
10lb #051	10.0003421	155.2	5.1	450

*Correction is the difference between the conventional mass value of a weight and its nominal value.

Comments: These weights were received in good condition and were within NIST Handbook 105-1 Class F tolerances As Found. No adjustments or changes were made so As Found values should be considered to be As Left values.

Accredited by the American Association for Laboratory Accreditation (A2LA) under Calibration Laboratory Code 115953 and Certificate Number 1550.01. This laboratory meets the requirements of ISO/IEC 17025:2005 *General Requirements for the Competence of Testing and Calibration Laboratories*. This laboratory also meets the requirements of ANSI/NCSL Z540-1-1994 and any additional program requirements in the field of calibration.

Quality Control Services, Inc.
Metrology Laboratory Manager
E-mail dthompson@qc-services.com

Date: 01/15/16

Signature David S. Thompson

Established 1974

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ACCREDITED
CERTIFICATE #1550.01

PFS Teco
11785 SE Hwy 212 STE#305
Clackamas, OR 97015

Report Number: DIRI0134307497181218

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	12/18/18	6/13/18	12/2019

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. 100.0001	5. 100.0002	9. 100.0001
2. 100.0001	6. 100.0001	10. 100.0001
3. 100.0001	7. 100.0001	Result
4. 100.0001	8. 100.0002	0.00004

ENVIRONMENTAL CONDITIONS
☐ Good ☑ Fair ☐ Poor
Temperature: 21.3°C

A2LA ACCREDITED SECTION OF REPORT

Standard	As-Found	As-Left	Expanded Uncertainty
200	200.0002	200.0001	0.00014
100	100.0001	100.0001	0.00014
50	50.0003	50.0001	0.00014
20	20.0001	20.0001	0.00014
1	1.0001	1.0000	0.00014
0.1	0.1000	0.1000	0.00014

CALIBRATION STANDARDS

Item	Make	Model	Serial Number	Cal Date	Cal Due Date	NIST ID
Weight Set	R.L./Troemner	10kg to 1mg	G782	1/3/18	1/2019	20172421

Permanent Information Concerning this Equipment:
12 month calibration cycle.

Comments/Info Concerning this Calibration:
12/18 - RH = 56%. Adjusted span.

Report prepared/reviewed by: ServiceTech JC **Date:** 12/28/18 **Technician:** R.Kauble
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.

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NIST Traceable
Calibration Report

REPORT NUMBER
1375092

Reference Number: **1200788**
PO Number: **JSTEINERT013118**

PFS-TECO
11785 SE Highway 212
Suite 305
Clackamas, OR 97015 United States

Manufacturer:	Dwyer Instruments Inc.	**Calibration Date:**	02/14/2018
Model Number:	471	**Calibration Due Date:**	02/14/2019
Description:	Air Velocity, Digital Thermo Anemometer	**Condition As Found:**	Limited In Tol See Comments
Asset Number:	#095	**Condition As Left:**	Limited See Comments
Serial Number:	#095		
Procedure:	DS Universal Speed/Time/Temperature		

Remarks:
NIST-traceable calibration performed on the unit referenced above in accordance with customer requirements, published specifications and the lab's standard operating procedures. No adjustments were made to the unit.

This calibration is considered limited due to the requested test range.

Standards Utilized

Asset No.	Manufacturer	Model No.	Description	Cal. Date	Due Date
CP105979	Kanomax	X5602	Air Velocity, Wind Tunnel, Open Jet	01/06/2018	01/31/2019
CP144554	Fluke Corporation	1551A EX	Temperature, Stik Thermometer	01/08/2018	01/31/2019

Calibration Data

FUNCTION TESTED	Nominal Value	As Found	Out of Tol	As Left	Out of Tol	CALIBRATION TOLERANCE
Speed Accuracy Air Velocity	50 ft/min	43		Same		35 to 65 ft/min [EMU 1.3 ft/min][TUR 12:1]
Speed Accuracy Air Velocity	100 ft/min	90		Same		85 to 115 ft/min [EMU 1.5 ft/min][TUR 9.8:1]
Speed Accuracy Air Velocity	150 ft/min	140		Same		135 to 165 ft/min [EMU 1.8 ft/min][TUR 8.3:1]
Speed Accuracy Air Velocity	200 ft/min	192		Same		185 to 215 ft/min [EMU 2.1 ft/min][TUR 7.1:1]
Speed Accuracy Air Velocity	250 ft/min	240		Same		235 to 265 ft/min [EMU 2.4 ft/min][TUR 6.2:1]
Speed Accuracy Air Velocity	300 ft/min	288		Same		285 to 315 ft/min [EMU 2.7 ft/min][TUR 5.6:1]
Speed Accuracy Air Velocity	400 ft/min	395		Same		385 to 415 ft/min [EMU 3.3 ft/min][TUR 4.5:1]
Speed Accuracy Air Velocity	500 ft/min	485		Same		485 to 515 ft/min [EMU 3.9 ft/min][TUR 3.8:1]
Temperature Accuracy	72.0 °F	71.9		Same		70.0 to 74.0 °F [EMU 0.11 °F][TUR 18:1]

Temperature: 23° C
Humidity: 20% RH
Rpt. No.: 1375092

Calibration Performed By:				Quality Reviewer:	
Mathews, Rich	314	Metrologist	847-327-5314	Szplit, Tony	02/14/2018
Name	ID #	Title	Phone	Name	Date

Model 1430 Microtector® Electronic Point Gage

Installation and Operating Instructions

Model 1430 Microtector® Portable Electronic Point Gage combines modern, solid-state integrated circuit electronics with a time-proven point gage manometer to provide fast, accurate pressure measurements.

SPECIFICATIONS AND FEATURES

- Accurate and repeatable to ± .00025 inches water column
- Pressure range: 0 - 2″ w.c., positive, negative, or differential pressures
- Non-toxic and inexpensive gage fluid consists of distilled water mixed with a small amount of fluorescein green color concentrate
- Convenient, portable, lightweight and self-contained, the unit requires no external power connections and is operated by a 1.5 volt penlight cell
- A.C. detector current eliminates point plating, fouling and erosion
- Micrometers are manufactured in accordance with ASME B89.1.13-2001, and are traceable to a standard at the National Institute of Standards and Technology
- Three-point mounting, dual leveling adjustment, and circular level vial assure rapid setup
- Durablock® precision-machined acrylic plastic gage body
- Sensitive 0 - 50 microamp D.C. meter acts as a detector and also indicates battery and probe condition
- Heavy 2″ thick steel base plate provides steady mounting
- Top-quality glass epoxy circuit board and solid-state, integrated circuit electronics
- Electronic enclosure of tough, molded styrene acrylonitrile provides maximum protection to components yet allows easy access to battery compartment
- Rugged sheet steel cover and carrying case protects the entire unit when not in use
- Accessories included are (2) 3-foot lengths Tygon® tubing, (2) 1/8″ pipe thread adapters and 3/4 oz. bottle of fluorescein green color concentrate with wetting agent

Maximum pressure: 100 psig with optional pipe thread connections.

Tygon® is a registered trademark of Saint-Gobain Corporation

DWYER INSTRUMENTS, INC.
P.O. BOX 373
MICHIGAN CITY, INDIANA 46361,U.S.A
Phone: 219/879-8000
Fax: 219/872-9057
www.dwyer-inst.com
e-mail: info@dwyer-inst.com

PRAXAIR

Praxair
5700 South Alameda Street
Los Angeles, CA 90058
Tel: (323) 585-2154 Fax:(714) 542-6689
PGVPID: F22017

DocNumber: 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	± 0.2 %
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

Verification of Standardization

of

Tape Measure

by

Advanced Calibration Technologies
28111 S.E. Wally Road
Boring, OR 97009
1-800-259-5058

ACCREDITED
Calibration
Cert# 1342.01

Customer:	PFS Teco, Inc	Street:	11785 Southeast Highway 212 Suite 305
City:	Clackamas State: OR	Zip:	97015 Location: In House
Machine Manufacturer:	Dewalt	Model:	16' Tape Measure
Capacity:	0.000 - 192.000 inches 0.125 Divisions	Serial #:	090
Calibration Cycle:	12 Months	Lab ID#:	#090
Previous Calibration Date:	January 2019	Calibration Procedure:	Ad-Tek SR
Equipment Used:	Gauge Blocks S/N: ADGB002	Action Recommended:	
If Other, Explain:			

Verification Data

Purpose:

This method provides instructions for checking the critical dimensions of the equipment.

Tolerance:

Equipment shall meet the dimensional tolerances specified in the applicable test method.

Procedure:

Verified using manufacturer's procedures.

Actual Dimensions (inches)	Unit Under Test As Found (inches)	Unit Under Test As Left (inches)	Difference (inches)
0.0000	0.000	0.000	0.000
0.1250	0.050	0.050	-0.075
0.2500	0.250	0.250	0.000
0.5000	0.500	0.500	0.000
0.7500	0.750	0.750	0.000
1.0000	1.000	1.000	0.000
3.0000	3.000	3.000	0.000
5.0000	5.000	5.000	0.000
7.0000	7.000	7.000	0.000
9.0000	9.000	9.000	0.000
12.0000	12.000	12.000	0.000

The overall condition of the device as found:	Within Specification
The overall condition of the device as left:	Within Specification
The measurement of uncertainty (MU) was calculated to be:	0.00060

File No: PFS-101666-0119D0120-AH-SR-090

Temperature: 72.1°F Humidity: 41.1%

The equipment used in the verification of this instrument has been calibrated and is NIST traceable.
The uncertainty of calibration was estimated at the 95% confidence level, coverage factor (k=2).

Remarks:

This certificate of verification is issued as a statement of fact that on the date of verification the above instrument had an accuracy as indicated and was calibrated to meet the requirements of the manufacturer's specifications. This certificate should not be construed or regarded as a guarantee or warranty of any kind that the instrument will retain the same percentage of accuracy as determined on the date when the verification was performed and reported. Ad-Tek, Inc. hereby expressly disclaims any and all liability for damage or loss by all parties arising or resulting from deterioration, obsolescence, malfunction, subsequent calibration performed by another agency or substandard performance of said instrument.

Service Technician: Alisa Houser Date of Service: January 16, 2019

Technical Manager: Nicole Ostrowski Date Next Due: January 2020

We sincerely appreciate your business and thank you for selecting Advanced Calibration Technologies, Inc. for servicing your equipment.
To reschedule, please call (800) 259-5058. Thank You.

Verification of Standardization

of

Calipers

by

Advanced Calibration Technologies
28111 S.E. Wally Road
Boring, OR 97009
1-800-259-5058

ACCREDITED
Calibration
Cert# 1342.01

Customer:	PFS Teco, Inc	Street:	11785 Southeast Highway 212 Suite 305
City:	Clackamas State: OR	Zip:	97015 Location: In House
Machine Manufacturer:	General	Model:	6" Digital Caliper
Capacity:	0.0000 - 6.0000 inches 0.0005 Divisions	Serial #:	092
Calibration Cycle:	12 Months	Lab ID#:	092
Previous Calibration Date:	January 2018	Calibration Procedure:	Ad-Tek DC
Equipment Used:	Gauge Blocks S/N: ADGB002	Action Recommended:	
If Other, Explain:			

Verification Data

Purpose:

This method provides instructions for checking the critical dimensions of the inside diameter of the equipment.

Tolerance:

Equipment shall meet the dimensional tolerances specified by the manufacturer for the inside diameter.

Procedure:

Verified using the procedure to meet manufacturer's tolerance for inside diameter.

Actual Dimensions (inches)	Unit Under Test As Found (inches)	Unit Under Test As Left (inches)	Difference (inches)
0.0000	0.0000	0.0000	0.0000
0.0500	0.0500	0.0500	0.0000
0.1000	0.1000	0.1000	0.0000
0.1010	0.1010	0.1010	0.0000
0.1050	0.1050	0.1050	0.0000
0.1100	0.1100	0.1100	0.0000
0.1500	0.1500	0.1500	0.0000
0.5000	0.5000	0.5000	0.0000
1.0000	1.0000	1.0000	0.0000
3.0000	2.9995	2.9995	-0.0005
5.0000	4.9990	4.9990	-0.0010

The overall condition of the device as found:	Within Specification
The overall condition of the device as left:	Within Specification
The measurement of uncertainty (MU) was calculated to be:	0.00062

This certificate does not reflect meausrements for inside jaws, step height, or depth.

File No: PFS-101666-0119D0120-AH-DC-092

Temperature: 68.2°F Humidity: 41.6%

The equipment used in the verification of this instrument has been calibrated and is NIST traceable.
The uncertainty of calibration was estimated at the 95% confidence level, coverage factor (k=2).

Remarks:

This certificate of verification is issued as a statement of fact that on the date of verification the above instrument had an accuracy as indicated and was calibrated to meet the requirements of the manufacturer's specifications. This certificate should not be construed or regarded as a guarantee or warranty of any kind that the instrument will retain the same percentage of accuracy as determined on the date when the verification was performed and reported. Ad-Tek, Inc. hereby expressly disclaims any and all liability for damage or loss by all parties arising or resulting from deterioration, obsolescence, malfunction, subsequent calibration performed by another agency or substandard performance of said instrument.

Service Technician: Alisa Houser Date of Service: January 15, 2019

Technical Manager: Nicole Ostrowski Date Next Due: January 2020

We sincerely appreciate your business and thank you for selecting Advanced Calibration Technologies, Inc. for servicing your equipment.
To reschedule, please call (800) 259-5058. Thank You.

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).