Innovative Hearth Products, LLC

Project # 23-106
Model: S160AGL
AKA: S160TGL, C160AGL, C160TGL, T160GL, WXS2016WS
Type: Wood-Fired Room Heater
June 30, 2023
Revised: September 14, 2023

ASTM E2780 Standard Test Method for Determining Particulate Matter Emissions from Wood Heaters
EPA Test Method 28R for Certification and Auditing of Wood Heaters

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Revision Summary

Date: June 30, 2023 – Original Issue

Date: September 14, 2023 – The following revision was made per a request from EPA:

-A note was added to the appliance description section clarifying that the overall firebox volume is the same as the usable volume.

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Affidavit

PFS-TECO was contracted by Innovative Hearth Products, LLC (IHP) to provide testing services for the S160AGL Catalytic Wood-Fired Room Heater per EPA Method 28R, *Certification and Auditing of Wood Heaters*. All testing and associated procedures were conducted at PFS-TECO's Portland Laboratory beginning on 6/7/2023 and ending on 6/9/2023. PFS-TECO's Portland Laboratory is located at 11785 SE Highway 212 – Suite 305, Clackamas, Oregon 97015. Testing procedures followed EPA Method 28R and ASTM E2780, *Standard Test Method for Determining Particulate Matter Emissions from Wood Heaters*. Particulate sampling was performed per ASTM E2515, *Standard Test Method for Determination of Particulate Matter Emissions Collected by a Dilution Tunnel*.

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 17025:2017 "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.



Aaron Kravitz, Testing Supervisor

Introduction

IHP contracted with PFS-TECO to perform EPA certification testing on the S160AGL Wood-Fired Room Heater. All testing was performed at PFS-TECO's Portland Laboratory. All testing was performed by Aaron Kravitz.

Notes

- Prior to start of testing, 50 hours of conditioning was performed by the manufacturer at a medium burn setting in accordance with ASTM E2780.
- Prior to start of testing, the dilution tunnel was cleaned with a steel brush.
- A separate, independent, third filter train was utilized to determine 1st hour emissions for all test runs.
- A total of 6 test runs were completed. One test run in each of the 4 specified burn rate categories, one additional run at category 2 due to a missed burn rate, as well as a fan confirmation test performed at a category 2 burn rate. All runs have been found to be appropriate, no anomalies occurred. See the Run Narrative section for further detail on each run.

Wood Heater Identification and Testing

- Appliance Tested: ***S160AGL***
- Serial Number: ***PFS Tracking Number 99***
- Manufacturer***: IHP***
- Catalyst: ***No***
- Heat exchange blower: ***Optional***
- Type: ***Wood Stove***
- Style: ***Freestanding***
- Date Received: ***Monday, June 05, 2023***
- Testing Period – Start: ***Wednesday, June 07, 2023***
  Finish: ***Friday, June 09, 2023***
- Test Location: ***PFS TECO***
  11785 SE Hwy 212
  Clackamas, OR 97015
- Elevation: ***~131 Feet above sea level***
- Test Technician(s): ***Aaron Kravitz***
- Observers: ***Matt Romanow of IHP***

Test Procedures and Equipment

All Sampling and analytical procedures were performed by Aaron Kravitz. All procedures used are directly from ASTM E2780 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
50	Digiweigh DWP12i Platform Scale
53	APEX XC-60-ED Digital Emissions Sampling Box A
54	APEX XC-60-ED Digital Emissions Sampling Box B
203	APEX XC-50-DIR Digital Emissions Sampling Box C
55	Apex Ambient Air Sample Box
57	California Analytical ZRE CO2/CO/O2 IR ANALYZER
94	Moisture meter calibration block
95	Anemometer
97	10 lb audit weight
107	Sartorius Analytical Balance
109A/B	Troemner 100mg/200mg Audit Weights
111	Microtector
115	Delmhorst Wood Moisture Meter
189	Mettler 3'x3' floor scale w/digital weight indicator
202	Barometer
207	Dewalt Tape Measure
208	Digital Calipers
215	Temperature Logger
CC121798	Gas Analyzer Calibration Span Gas
CC139173	Gas Analyzer Calibration Mid Gas

Results

A total of 5 test runs where performed on the S160AGL. Run #6, a fan confirmation test, was not used in any weighted average results calculations. The weighted average emissions rate for the 5 run test series was measured to be **1.7 g/hr** with a Higher Heating Value efficiency of **69%.** The average CO emission rate for the 4 tests was **1.8 g/min.** The IHP S160AGL Wood-Fired Room Heater meets the 2020 cribwood PM emission standard of ≤ 2.0 g/hr per CFR 40 part 60, §60.532 (b).

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

Summary Table

	Cat. 2 ≤1.00 kg/hr.	Cat. 2 0.80 - 1.25 kg/hr.	Cat. 2 0.80 - 1.25 kg/hr.	Cat. 3 1.25 - 1.90 kg/hr.	Cat. 4 Max Burn Rate	Fan Confirmation (Cat. 2)*
Date	6/7/2023	6/7/2023	6/8/2023	6/9/2023	6/8/2023	6/9/2023
Run Number	1	2	4	5	3	6
Emission Rate (g/hr)	1.81	1.38	1.55	1.80	1.87	0.90
Burn Rate (kg/hr)	0.95	1.10	1.16	1.75	3.32	1.21
Heat Output (Btu/hr)	12,826	14,331	14,908	22,482	39,447	16,096
Overall Efficiency (% HHV)	72%	70%	69%	69%	64%	71%
CO Emissions (g/MJ Output)	8.22	7.72	7.75	4.55	1.78	5.33
CO Emissions (g/kg Dry Fuel)	117.60	107.52	105.49	62.03	22.45	75.51
CO Emissions (g/min)	1.85	1.94	2.03	1.80	1.23	1.51
Emissions – 1st hr (g/hr)	6.91	2.89	4.15	4.14	2.29	1.56
Weighted particulate emission average of 5 test runs: 1.7 grams per hour.						
Weighted average HHV efficiency of 5 test runs: 69%.						
Average CO Emissions Rate: 1.8 g/min						

*Fan Confirmation test not included in weighted average calculations.

Test Run Narrative

Run 1

Run 1 was performed on 6/7/2023 as a category 2 test, per EPA Method 28R. The total test time was 269 minutes. The particulate emissions rate for the test was 1.81 g/hr, the burn rate was 0.51 kg/hr with an HHV efficiency of 72.2%. All test results were appropriate and valid. There were no anomalies and all test criteria were met. This test meets the burn rate requirements described in EPA Method 28 Section 8.1.1.3.2 as a category 2 test with a burn rate of 1.00 kg/hr or less for wood stoves that cannot be operated at burn rates less than 0.8 kg/hr. This test was performed with the air control set to its lowest setting, it is not possible to operate the stove at a lower air setting. Therefore, this test will be used in lieu of a category 1 test.

Run 2

Run 2 was performed on 6/7/2023 as a category 2 test, per EPA Method 28R. The total test time was 228 minutes. The particulate emissions rate for the test was 1.38 g/hr, the burn rate was 1.10 kg/hr with an HHV efficiency of 70.3%. All test results were appropriate and valid. There were no anomalies and all test criteria were met.

Run 3

Run 3 was performed on 6/8/2023 as a category 4 test, per EPA Method 28R. The total test time was 73 minutes. The particulate emissions rate for the test was 1.87 g/hr, the burn rate was 3.32 kg/hr with an HHV efficiency of 63.8%. All test results were appropriate and valid. There were no anomalies and all test criteria were met.

Run 4

Run 4 was performed on 6/8/2023 as an attempted category 3 test, per EPA Method 28R. The total test time was 219 minutes. The particulate emissions rate for the test was 1.55 g/hr, the burn rate was 1.16 kg/hr with an HHV efficiency of 68.7%. Due to the burn rate of 1.16 kg/hr, the test is considered a category 2. All test results were appropriate and valid. There were no anomalies and all test criteria were met.

Run 5

Run 5 was performed on 6/9/2023 as a category 3 test, per EPA Method 28R. The total test time was 150 minutes. The particulate emissions rate for the test was 1.80 g/hr, the burn rate was 1.75 kg/hr with an HHV efficiency of 68.8%. All test results were appropriate and valid. There were no anomalies and all test criteria were met.

Run 6

Run 5 was performed on 6/9/2023 as a category 2 fan confirmation test, per EPA Method 28R. The total test time was 217 minutes. The particulate emissions rate for the test was 0.90 g/hr with a burn rate of 1.21 kg/hr. All test results were appropriate and valid. There were no anomalies and all test criteria were met. Since the particulate emissions rate is within 1.0 g/hr of the other category 2 tests (run 2, 1.38 g/hr and run 4, 1.55 g/hr) the blower is determined not to have a significant impact on emissions performance and may therefore be approved as an optional accessory. This test run is not included in the weighted average calculations presented in the results summary.

Test Conditions Summary

Testing conditions for all runs fell within allowable specifications of the ASTM 2780 and ASTM E2515. A summary of facility conditions, fuel burned, and run times is listed below.

Run	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	68	72	35.5	32.1	29.74	11.23	11.17	19.6	269
2	74	77.9	31.2	28.2	29.70	13.09	10.93	19.9	228
3	71	70.7	35.5	34.5	29.88	18.51	10.61	19.8	73
4	72	73	24.5	36.2	29.88	13.09	11.15	20.1	219
5	67	70.3	24.5	43.9	29.89	16.82	11.49	19.9	150
6	70	68.6	41.0	44.9	29.90	12.24	11.51	20.2	217

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	Air control fully closed	Air control fully closed, fan on low
Run 2	Air control open 0.53” from fully closed	Air control open 0.53” from fully closed, fan on low
Run 3	Air control fully open	Air control fully open, fan on high
Run 4	Air control open 0.875” from fully closed	Air control open 0.875” from fully closed, fan on low
Run 5	Air control open 1.06” from fully closed	Air control open 1.06” from fully closed, fan on low
Run 6	Air control open 0.53” from fully closed	Air control open 0.53” from fully closed, fan off (fan confirmation)

Appliance Description

Model(s): S160AGL

Appliance Type: Freestanding Wood-Fired Room Heater

Additional Models: Five additional models are available, the S160TGL, C160AGL, C160TGL, T160GL, and WXS2016WS. The S160AGL, S160GL, T160GL and WS2016 are differentiated only by branding and small aesthetic details. The C160A/TGL is a fireplace insert variant, differentiated only by the external support components. All components that may affect emissions performance as specified by 40 CFR § 60.533(k) are identical across the six models.

Overall/Usable Firebox Volume: 1.54 ft^3

Air Introduction System: Primary combustion air enters the appliance through the air control opening located on the bottom front of the stove. Air is routed up the sides of the firebox, then down into the combustion chamber in front of the door glass. Secondary air brought in through a fixed opening on the bottom rear of the appliance and is routed up the back of the firebox and feed into a secondary air tube. Dimensions on all these features can be found in Appendix D.

Baffles: Combustion air is routed to the front of the stove with a steel baffle that sits on top of the secondary air tubes, then back and up through the flue collar.

Catalytic Combustor: None

Refractory Insulation: The firebox is lined with 1.25” thick high-density firebrick.

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

Fan: An optional variable speed convection fan is mounted to the rear of the appliance.

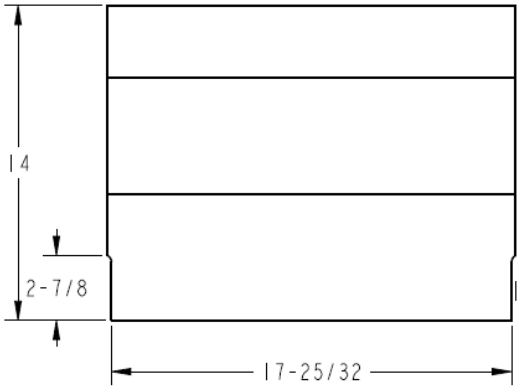
Appliance design drawings can be found in Appendix D submitted with the CBI copy of this report.

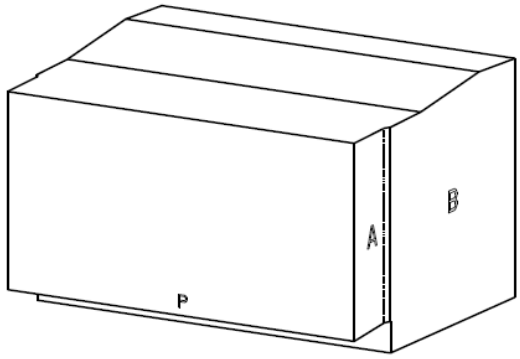
Dimensions & Weights:

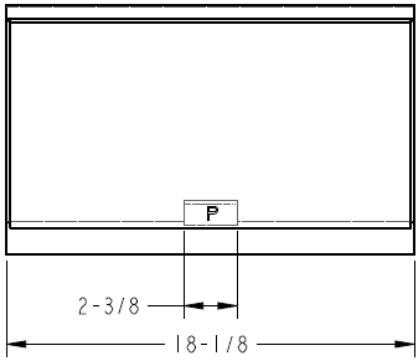
Width	Depth	Height	Steel Mass	Refractory Mass
23”	20”	30”	302.6 lb.	53.7 lb.

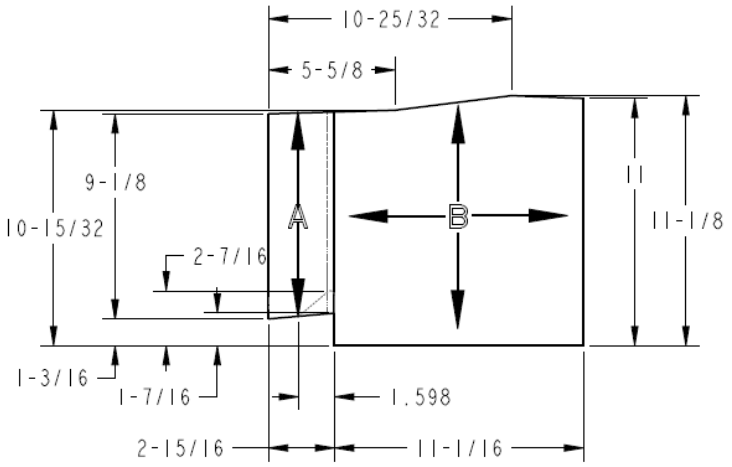
Firebox Volume Dimension

The overall firebox volume for this appliance is the same as the usable firebox volume.









160 Series - Firebox Volume

Box A		(11.125*(11+1/16)-0.5*(5.625-2-15/16)*TAN(ASIN(7/32/5.625))*(5.625-2-15/16)-0.5*(10+25/32-5.625)*(11.125-10-15/32)-0.5*(2+15/16+11+1/16-10-25/32)*(11.125-11))*18.125
	in^3	2193.8
	ft^3	1.27
Box B		((2+15/16)*(10+15/32-1-3/16)-0.5*(10+15/32-9.125-1-7/16)*(2+15/16)*TAN(ASIN(7/32/5.625))-0.5*(2+15/16)*(1+17/16-1-3/16))*(17+25/32)
	in^3	462.0
	ft^3	0.27
Pilot (P)		
	in^3	1.90
	ft^3	0.001
Total ft^3(A+B-P)		1.54

Appliance Front



Appliance Left



Appliance Right



Appliance Rear



Test Fuel Properties

Test fuel used was Douglas Fir dimensional lumber, air-dried to the specified moisture content range. A typical fuel load is pictured below:

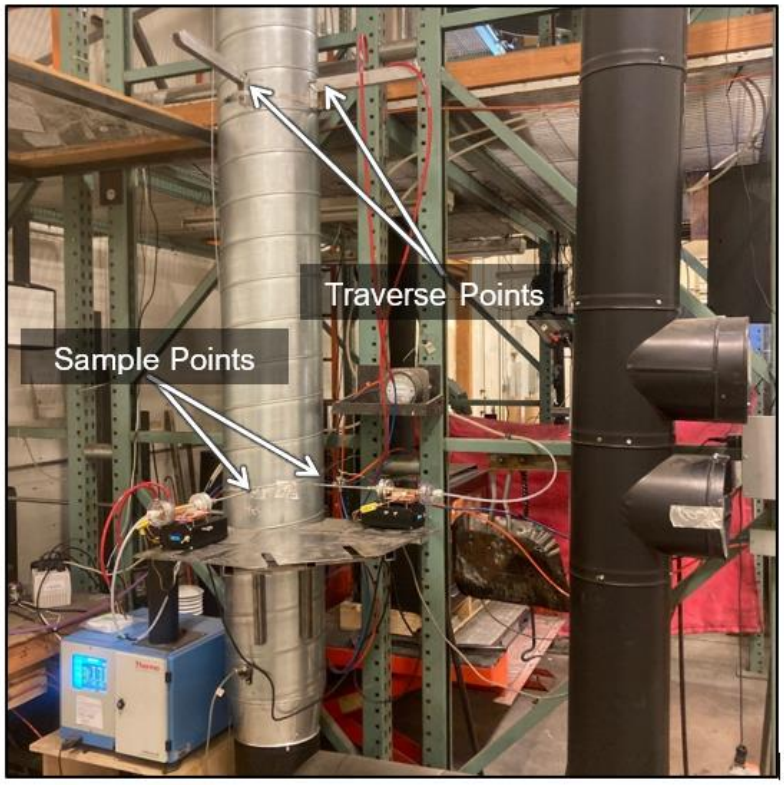
Typical Fuel Load

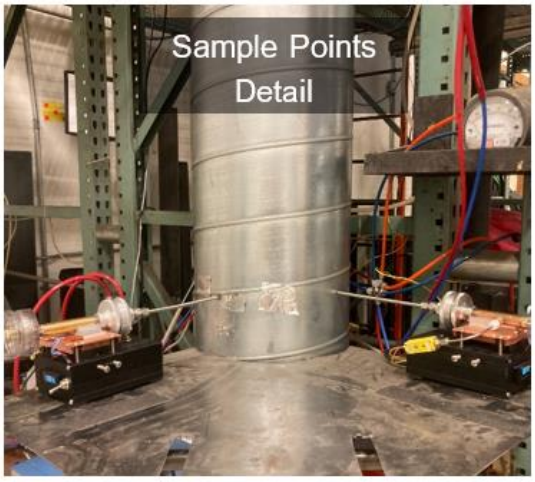




Sampling Locations and Descriptions

Sample ports are located 16.5 feet downstream from any disturbances and 3.5 feet upstream from any disturbances. Flow rate traverse data was collected 8 feet downstream from any disturbances and 4 feet upstream from any disturbances. (See below).







Sampling Methods

ASTM E2515 was used in collecting particulate samples. The dilution tunnel is 12 inches in diameter. All sampling conditions per ASTM E2515 were followed. No alternate procedures were used.

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 and ASTM E2515-11. 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: 1502 14th St. NW, Auburn, WA 98001, 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, and Sample Analysis

Appendix B – Labels and Manuals

Appendix C –Equipment Calibration Records

Appendix D – Design Drawings (CBI Report Only)

Appendix E – Manufacturer QAP (CBI Report Only)

EPA Method 28R Weighted Average Emissions

Client: IHP
Stove Model: S160AGL
Test Dates: 6/7/23 - 6/9/23
Job Number: 23-106

Signature/Date:

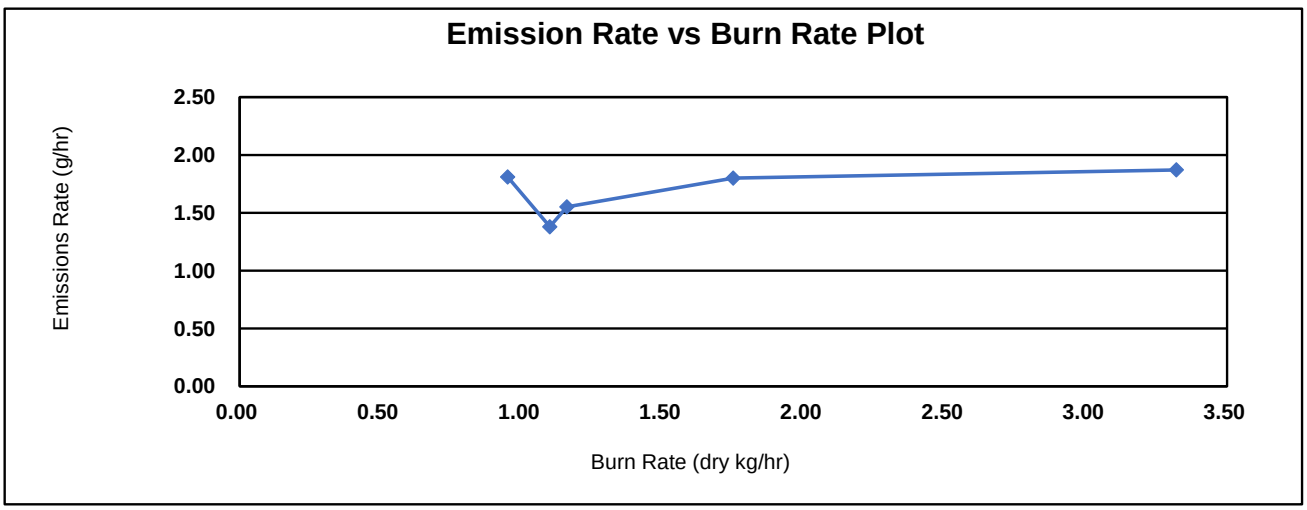
Weighted Average Particulate Emissions (g/hr):	**1.7**
Weighted Average HHV Efficiency (%):	**69.4%**
Weighted Average LHV Efficiency (%):	**75.1%**
Average CO Emissions (g/min):	**1.8**

Individual Run Summaries

Run Number:	1	Run Number:	2
Burn Rate (dry kg/hr):	0.95	Burn Rate (dry kg/hr):	1.10
Emissions Rate (g/hr):	1.81	Emissions Rate (g/hr):	1.38
HHV Efficiency (%):	72.2%	HHV Efficiency (%):	70.3%
LHV Efficiency (%):	78.1%	LHV Efficiency (%):	76.0%
Weighting Percentage (%):	27.70%	Weighting Percentage (%):	10.48%

Run Number:	4	Run Number:	5
Burn Rate (dry kg/hr):	1.16	Burn Rate (dry kg/hr):	1.75
Emissions Rate (g/hr):	1.55	Emissions Rate (g/hr):	1.80
HHV Efficiency (%):	68.7%	HHV Efficiency (%):	68.8%
LHV Efficiency (%):	74.3%	LHV Efficiency (%):	74.3%
Weighting Percentage (%):	23.91%	Weighting Percentage (%):	29.29%

Run Number	3
Burn Rate (dry kg/hr)	3.32
Emissions (g/hr)	1.87
HHV Efficiency (%)	63.8%
LHV Efficiency (%)	68.9%
Weighting Percentage (%):	8.61%



WOOD STOVE TEST DATA PACKET
ASTM E2780/E2515

Run 1 Data Summary

Client:	IHP
Model:	S160AGL
Job #:	23-106
Tracking #:	99
Test Date:	6/7/2023

Technician Signature

6/30/2023
Date

TEST RESULTS - ASTM E2780 / ASTM E2515

Client: IHP
Model: S160AGL
Run #: 1

Job #: 23-106
Tracking #: 99
Technician: AK
Date: 6/7/2023

Burn Rate (kg/hr):	0.95

	Ambient Sample	Sample Train A	Sample Train B	1st Hour Filter
Total Sample Volume (ft^3)	35.510	41.827	39.316	9.503
Average Gas Velocity in Dilution Tunnel (ft/sec)	9.0			
Average Gas Flow Rate in Dilution Tunnel (dscf/hr)	24219.9			
Average Gas Meter Temperature (°F)	70.2	94.2	93.3	80.2
Total Sample Volume (dscf)	35.982	40.222	37.509	9.116
Average Tunnel Temperature (°F)	82.2			
Total Time of Test (min)	269			
Total Particulate Catch (mg)	0.0	3.0	2.8	2.6
Particulate Concentration, dry-standard (g/dscf)	0.0000000	0.0000746	0.0000746	0.0002852
Total PM Emissions (g)	0.00	8.10	8.11	6.91
Particulate Emission Rate (g/hr)	0.00	1.81	1.81	6.91
Emissions Factor (g/kg)	-	1.90	1.90	-
Difference from Average Total Particulate Emissions (g)	-	0.00	0.00	-
Difference from Average Total Particulate Emissions (%)	-	0.0%	0.0%	
Difference from Average Emissions Factor (g/kg)	-	0.00	0.00	-

Final Average Results	
Total Particulate Emissions (g)	8.10
Particulate Emission Rate (g/hr)	1.81
Emissions Factor (g/kg)	1.90
HHV Efficiency (%)	72.2%
LHV Efficiency (%)	78.1%
CO Emissions (g/min)	1.85

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	<90 °F	79.7	OK
Face Velocity	< 30 ft/min	8.7	OK
Leakage Rate	Less than 4% of average sample rate	0.001 cfm	OK
Ambient Temp	55-90 °F	Min:67.8/Max:72.1	OK
Negative Probe Weight Evaluation	<5% of Total Catch	-3.8%	OK
Pro-Rate Variation	90% of readings between 90-110%; none greater than 120% or less than 80%	See Data Tabs	OK
Stove Surface ΔT	<126°F	125.4	OK

B415.1 Efficiency Results

Manufacturer:	IHP
Model:	S160AGL
Date:	06/07/23
Run:	1
Control #:	23-106
Test Duration:	269
Output Category:	2

Test Results in Accordance with CSA B415.1-09

	HHV Basis	LHV Basis
Overall Efficiency	72.2%	78.1%
Combustion Efficiency	91.5%	91.5%
Heat Transfer Efficiency	79.0%	85.4%

Output Rate (kJ/h)	13,520	12,826	**(Btu/h)**
Burn Rate (kg/h)	0.94	2.08	**(lb/h)**
Input (kJ/h)	18,719	17,757	**(Btu/h)**

Test Load Weight (dry kg)	4.24	9.34	**dry lb**
MC wet (%)	16.41		
MC dry (%)	19.63		
Particulate (g)	8.10		
CO (g)	498		
Test Duration (h)	4.48		

Emissions	**Particulate**	**CO**
g/MJ Output	0.13	8.22
g/kg Dry Fuel	1.91	117.60
g/h	1.81	111.12
g/min	0.03	1.85
lb/MM Btu Output	0.31	19.10

Air/Fuel Ratio (A/F)	13.06

VERSION: **2.4** **4/15/2010**

WOODSTOVE FUEL DATA - ASTM E2780

Client: IHP
Model: S160AGL
Run #: 1

Job #: 23-106
Tracking #: 99
Technician: AK
Date: 6/7/2023

Preburn Fuel Information

Size	Length (in)	Moisture Content (% DB)	Size	Length (in)	Moisture Content (% DB)
2x4	9.00	22.0	2x4	13.00	22.3
2x4	13.00	19.3	2x4	13.00	22.0
2x4	13.00	22.7			
2x4	13.00	19.2			
2x4	13.00	19.9			
2x4	13.00	22.1			
2x4	13.00	19.6			
2x4	13.00	19.4			
Total Fuel Weight (lbs):		11.23	Average Moisture (%DB):		20.9

Firebox Volume (ft^3):	1.54
Total 2x4 Crib Weight, with spacers (lbs):	4.28
Total 4x4 Crib Weight, with spacers (lbs):	6.89
Total Wet Fuel Weight, with spacers (lbs):	11.17

Coal Bed Range (20-25%):
Min (lbs): 2.23
Max (lbs): 2.79

Test Fuel Information

Size	Length (in)	Weight (lbs)	Moisture Content (%DB)			Dry Weight (lbs)
2x4	15.00	1.69	18.9	19.4	19.2	1.42
2x4	15.00	1.73	19.2	19.7	18.8	1.45
4x4	15.00	3.44	19.5	20.9	19.7	2.87
4x4	15.00	3.06	19.8	20.8	19.7	2.55
					Total Dry Weight, no spacers (lbs):	8.28
					Total Dry Weight, with spacers (lbs):	9.39

Spacer Moisture Readings (%DB)

8.9	15.4						
9.8	15.1						
11.7	15.9						
10.2	13.4						
13.1	8.5						
13.1	15.0						

Quality Checks	Requirement	Observed	Result
Fuel Density	25 - 36 (lbs/ft^3, DB)	27.3	OK
Loading Density	6.3 - 7.7 (lbs/ft^3, WB)	7.25	OK
2x4 Fuel Mix	35 - 65 % of total weight	38%	OK

DILUTION TUNNEL & MISC. DATA - ASTM E2780 / E2515

Client:	IHP	Job #:	23-106
Model:	S160AGL	Tracking #:	99
Run #:	1	Technician:	AK
Test Start Time:	9:13	Date:	6/7/2023

Total Sampling Time (min):	269
Recording Interval (min):	1

Meter Box γ Factor:	1.010	(A)
Meter Box γ Factor:	1.001	(B)
Meter Box γ Factor:	0.985	(C)
Meter Box γ Factor:	1.024	(Ambient)

Induced Draft Check (in. H_2O):	0
Smoke Capture Check (%):	100%
Date Flue Pipe Last Cleaned:	6/5/2023

	Pre-Test	Post Test	Avg.
Barometric Pressure (in. Hg)	29.75	29.73	29.74
Relative Humidity (%)	35.5	32.1	
Room Air Velocity (ft/min)	0	0.0	
Scale Audit (lbs)	10.0	10.0	
Ambient Sample Volume:		35.510	ft^3

Leak Checks	Pre-Test		Post-Test	
Pitot	0		0	
	cfm	@ in Hg	cfm	@ in Hg
A	0.001	-7	0.000	-7
B	0.000	-7	0.000	-7
C	0.000	-8	0.000	-8
Ambient	0.000	-12	0.000	-12

DILUTION TUNNEL FLOW

Traverse Data

Point	dP (in H_2O)	Temp (°F)
1	0.014	90
2	0.020	90
3	0.020	90
4	0.020	89
5	0.018	89
6	0.014	89
7	0.016	89
8	0.020	89
9	0.022	88
10	0.022	88
11	0.018	88
12	0.010	88
Center	0.024	88

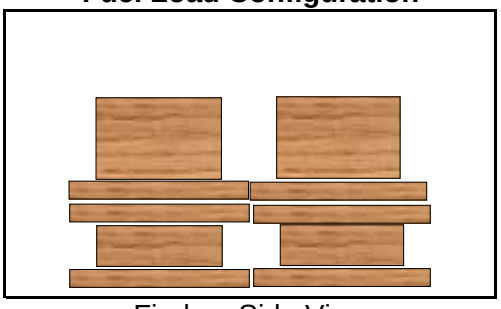
Static Pressure: -0.130 in. H_2O

Dilution Tunnel H_2O:	2.00	percent
Tunnel Diameter:	12	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:	0.7854	ft^2
V_{strav}:	9.00	ft/sec
V_{scent}:	10.49	ft/sec
F_p:	0.858	[ratio]
Initial Tunnel Flow:	397.4	scf/min

TEST FUEL PROPERTIES

Fuel Load Configuration

Firebox Front



Firebox Back

Firebox Side View

Actual Fuel Used Properties

Fuel Type:	D. Fir
HHV (kJ/kg)	19,810
%C	48.73
%H	6.87
%O	43.9
%Ash	0.5
MC (%DB)	19.6

DILUTION TUNNEL & MISC. DATA - ASTM E2780 / E2515

Client:	IHP	Job #:	23-106
Model:	S160AGL	Tracking #:	99
Run #:	1	Technician:	AK
Test Start Time:	9:13	Date:	6/7/2023

Total Sampling Time (min):	269
Recording Interval (min):	1

Meter Box γ Factor:	1.010	(A)
Meter Box γ Factor:	1.001	(B)
Meter Box γ Factor:	0.985	(C)
Meter Box γ Factor:	1.024	(Ambient)

Induced Draft Check (in. H_2O):	0
Smoke Capture Check (%):	100%
Date Flue Pipe Last Cleaned:	6/5/2023

	Pre-Test	Post Test	Avg.
Barometric Pressure (in. Hg)	29.75	29.73	29.74
Relative Humidity (%)	35.5	32.1	
Room Air Velocity (ft/min)	0	0.0	
Scale Audit (lbs)	10.0	10.0	
Ambient Sample Volume:		35.510	ft^3

Leak Checks	Pre-Test		Post-Test	
Pitot	0		0	
	cfm	@ in Hg	cfm	@ in Hg
A	0.001	-7	0.000	-7
B	0.000	-7	0.000	-7

WOODSTOVE PREBURN DATA - ASTM E2780

Client: IHP
Model: S160AGL
Run #: 1

Job #: 23-106
Tracking #: 99
Technician: AK
Date: 6/7/2023

Recording Interval (min): 1
Run Time (min): 60

			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	6.41	-0.116	532	535	333	935	258	518.5	880	71
1	6.22	-0.107	540	542	333	877	275	513.1	675	70
2	6.02	-0.100	542	546	333	826	286	506.3	583	70
3	5.85	-0.098	541	546	333	779	296	498.8	528	70
4	5.70	-0.094	539	545	334	739	305	492.5	495	70
5	5.57	-0.093	538	545	335	711	313	488.3	475	70
6	5.43	-0.090	537	544	335	686	321	484.5	461	70
7	5.30	-0.090	537	543	333	666	328	481.5	451	69
8	5.17	-0.087	537	543	333	650	334	479.3	444	69
9	5.04	-0.087	536	542	330	638	340	477.2	439	69
10	4.91	-0.084	535	541	329	629	345	475.5	435	69
11	4.77	-0.086	535	539	325	621	349	473.8	433	69
12	4.65	-0.086	536	538	323	616	353	473.1	431	69
13	4.52	-0.083	537	537	320	611	357	472.2	428	69
14	4.40	-0.083	539	538	317	608	359	472.2	424	69
15	4.28	-0.083	541	539	314	605	362	472.3	422	68
16	4.16	-0.082	543	540	312	602	364	472.2	419	68
17	4.04	-0.082	546	542	309	598	366	471.9	413	68
18	3.94	-0.080	548	543	307	593	367	471.5	407	68
19	3.84	-0.081	548	544	305	589	368	470.9	402	68
20	3.75	-0.079	548	545	303	586	369	470.1	397	68
21	3.67	-0.079	547	545	301	583	370	469.2	394	68
22	3.57	-0.079	547	544	299	577	370	467.2	391	68
23	3.47	-0.078	546	543	297	572	370	465.7	388	68
24	3.38	-0.076	546	543	294	569	370	464.4	385	68
25	3.31	-0.076	545	542	293	565	370	463.0	380	68
26	3.23	-0.072	545	541	292	553	369	460.0	373	68
27	3.17	-0.072	545	539	291	539	369	456.6	364	68
28	3.11	-0.071	544	538	290	524	369	452.8	355	68
29	3.06	-0.070	544	536	289	509	368	449.2	348	68
30	3.00	-0.069	545	534	288	494	368	446.0	340	68
31	2.95	-0.067	545	532	288	482	367	442.9	333	68
32	2.90	-0.063	544	530	287	469	367	439.5	325	68
33	2.86	-0.062	542	528	286	456	367	435.8	317	68
34	2.82	-0.062	541	525	285	443	367	432.3	309	68
35	2.79	-0.062	540	523	285	432	367	429.5	304	68
36	2.75	-0.060	539	522	284	421	367	426.5	298	68
37	2.71	-0.057	537	520	283	410	367	423.4	292	68
38	2.69	-0.057	535	517	283	401	368	420.9	285	68
39	2.66	-0.056	534	514	284	391	369	418.3	280	68
40	2.63	-0.055	533	511	283	384	370	416.0	275	68
41	2.60	-0.053	532	508	282	375	371	413.5	271	68
42	2.58	-0.053	530	504	283	367	372	411.4	267	68
43	2.55	-0.054	529	501	282	360	373	409.0	262	68
44	2.53	-0.051	527	498	282	353	375	406.8	257	68

WOODSTOVE PREBURN DATA - ASTM E2780

Client: IHP
Model: S160AGL
Run #: 1

Job #: 23-106
Tracking #: 99
Technician: AK
Date: 6/7/2023

Recording Interval (min): 1
Run Time (min): 60

			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
45	2.51	-0.050	524	495	282	345	377	404.6	253	68
46	2.48	-0.052	522	492	282	339	378	402.5	249	68
47	2.47	-0.049	519	489	282	332	380	400.7	245	67
48	2.45	-0.048	517	487	282	326	382	398.8	242	67
49	2.43	-0.048	514	485	282	322	384	397.1	239	67
50	2.40	-0.047	512	482	282	317	386	395.7	237	68
51	2.38	-0.044	509	481	282	312	388	394.2	234	67
52	2.37	-0.047	507	478	282	307	389	392.6	232	67
53	2.35	-0.047	504	477	281	304	391	391.3	230	67
54	2.34	-0.044	501	474	281	300	393	389.9	228	67
55	2.32	-0.043	498	473	281	294	395	388.1	224	67
56	2.31	-0.043	494	470	281	288	397	385.9	220	68
57	2.29	-0.044	491	467	280	282	399	383.9	217	68
58	2.27	-0.042	488	464	280	277	401	381.9	214	68
59	2.26	-0.041	485	462	279	272	403	380.0	212	68
60	2.25	-0.041	482	458	278	254	405	375.2	209	68

BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: IHP
Model: S160AGL
Run #: 1

Job #: 23-106
Tracking #: 99
Technician: AK
Date: 6/7/2023

	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		0.024	0.55	75	0.6		11.17		87	336	73	68
1	0.136	0.136	0.024	1.93	75	0.9	-	11.85	0.68	97	292	74	68
2	0.276	0.140	0.024	1.96	75	0.9	-	10.85	-1.00	99	368	74	68
3	0.420	0.144	0.023	1.98	75	0.9	-	10.64	-0.21	108	648	75	68
4	0.559	0.139	0.023	2.01	75	0.9	-	10.39	-0.25	118	785	76	69
5	0.703	0.144	0.023	2.02	75	0.9	-	10.01	-0.38	125	847	76	69
6	0.842	0.139	0.024	2.04	75	0.9	-	9.68	-0.33	108	632	76	70
7	0.990	0.148	0.024	2.05	75	0.9	-	9.59	-0.09	100	504	76	70
8	1.132	0.142	0.024	2.07	75	0.9	-	9.52	-0.07	96	431	76	69
9	1.277	0.145	0.025	2.08	75	0.9	-	9.46	-0.06	94	385	76	69
10	1.423	0.146	0.025	2.10	76	0.9	95	9.40	-0.06	92	354	76	69
11	1.567	0.144	0.024	2.11	76	0.9	-	9.32	-0.08	92	334	76	69
12	1.715	0.148	0.025	2.13	76	0.9	-	9.24	-0.08	91	326	76	69
13	1.859	0.144	0.025	2.14	76	0.9	-	9.16	-0.08	91	328	76	69
14	2.008	0.149	0.024	2.14	76	0.9	-	9.05	-0.11	91	331	76	69
15	2.150	0.142	0.024	2.14	77	0.9	-	8.97	-0.08	90	335	76	69
16	2.301	0.151	0.024	2.16	77	0.9	-	8.86	-0.11	90	340	76	69
17	2.445	0.144	0.024	2.17	77	0.9	-	8.77	-0.09	90	350	76	69
18	2.596	0.151	0.024	2.17	77	0.9	-	8.66	-0.11	90	361	77	69
19	2.742	0.146	0.024	2.18	77	0.9	-	8.55	-0.11	90	372	77	69
20	2.893	0.151	0.024	2.18	78	0.9	98	8.44	-0.11	90	383	77	69
21	3.039	0.146	0.024	2.19	78	0.9	-	8.30	-0.14	91	394	77	69
22	3.189	0.150	0.024	2.19	78	0.9	-	8.18	-0.12	91	403	77	69
23	3.336	0.147	0.024	2.20	79	0.9	-	8.03	-0.15	91	409	77	69
24	3.487	0.151	0.024	2.21	79	0.9	-	7.88	-0.15	91	415	77	69
25	3.634	0.147	0.024	2.21	79	0.9	-	7.78	-0.10	91	419	77	69
26	3.785	0.151	0.024	2.22	79	0.9	-	7.65	-0.13	91	423	77	69
27	3.933	0.148	0.024	2.22	80	0.9	-	7.52	-0.13	91	426	77	69
28	4.084	0.151	0.024	2.23	80	0.9	-	7.40	-0.12	92	426	77	69
29	4.232	0.148	0.024	2.23	80	0.9	-	7.29	-0.11	92	427	77	69
30	4.384	0.152	0.025	2.23	81	0.9	99	7.22	-0.07	92	426	77	69
31	4.530	0.146	0.024	2.23	81	0.9	-	7.04	-0.18	89	424	77	69

BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: IHP
Model: S160AGL
Run #: 1

Job #: 23-106
Tracking #: 99
Technician: AK
Date: 6/7/2023

	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
32	4.684	0.154	0.024	2.24	81	0.9	-	6.91	-0.13	89	420	77	69
33	4.833	0.149	0.024	2.25	82	0.9	-	6.78	-0.13	89	417	77	69
34	4.985	0.152	0.024	2.25	82	0.9	-	6.65	-0.13	89	414	77	69
35	5.134	0.149	0.024	2.26	82	0.9	-	6.52	-0.13	89	410	77	69
36	5.287	0.153	0.024	2.25	82	0.9	-	6.39	-0.13	88	406	77	69
37	5.436	0.149	0.024	2.26	83	0.9	-	6.27	-0.12	88	402	77	68
38	5.590	0.154	0.024	2.27	83	0.9	-	6.15	-0.12	88	399	77	68
39	5.738	0.148	0.024	2.27	83	0.9	-	6.03	-0.12	88	396	77	69
40	5.892	0.154	0.024	2.27	84	0.9	100	5.91	-0.12	88	394	77	68
41	6.040	0.148	0.024	2.27	84	1.0	-	5.81	-0.10	88	392	77	69
42	6.195	0.155	0.024	2.27	84	0.9	-	5.70	-0.11	88	392	77	69
43	6.344	0.149	0.023	2.27	85	0.9	-	5.59	-0.11	87	390	77	68
44	6.499	0.155	0.024	2.28	85	0.9	-	5.46	-0.13	87	390	77	69
45	6.647	0.148	0.023	2.28	85	1.0	-	5.36	-0.10	87	391	77	69
46	6.803	0.156	0.024	2.28	85	0.9	-	5.25	-0.11	87	391	77	69
47	6.952	0.149	0.024	2.27	86	0.9	-	5.13	-0.12	87	392	77	69
48	7.105	0.153	0.024	2.29	86	0.9	-	5.01	-0.12	87	391	77	69
49	7.258	0.153	0.024	2.29	86	0.9	-	4.90	-0.11	87	391	77	69
50	7.413	0.155	0.024	2.29	87	0.9	101	4.79	-0.11	87	390	77	69
51	7.563	0.150	0.024	2.30	87	0.9	-	4.70	-0.09	87	388	77	69
52	7.717	0.154	0.024	2.29	87	1.0	-	4.60	-0.10	87	383	77	69
53	7.869	0.152	0.024	2.29	87	0.9	-	4.50	-0.10	87	378	77	69
54	8.022	0.153	0.024	2.28	88	0.9	-	4.40	-0.10	86	372	76	69
55	8.176	0.154	0.024	2.30	88	0.9	-	4.30	-0.10	86	366	76	69
56	8.329	0.153	0.024	2.31	88	1.0	-	4.20	-0.10	86	360	76	69
57	8.484	0.155	0.024	2.30	88	1.0	-	4.11	-0.09	86	354	77	69
58	8.636	0.152	0.024	2.31	89	0.9	-	4.02	-0.09	86	349	76	69
59	8.791	0.155	0.025	2.31	89	0.9	-	3.94	-0.08	86	343	76	69
60	8.942	0.151	0.024	2.32	89	0.9	101	3.87	-0.07	85	340	76	69
61	9.098	0.156	0.024	2.31	89	1.0	-	3.79	-0.08	85	335	76	69
62	9.250	0.152	0.024	2.32	89	0.9	-	3.73	-0.06	85	331	76	69
63	9.407	0.157	0.024	2.32	90	0.9	-	3.67	-0.06	85	327	76	69

BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: IHP
Model: S160AGL
Run #: 1

Job #: 23-106
Tracking #: 99
Technician: AK
Date: 6/7/2023

	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
64	9.559	0.152	0.025	2.32	90	0.9	-	3.61	-0.06	85	321	76	70
65	9.714	0.155	0.024	2.33	90	0.9	-	3.55	-0.06	84	317	76	70
66	9.867	0.153	0.024	2.32	90	1.0	-	3.50	-0.05	84	311	76	70
67	10.021	0.154	0.024	2.32	90	0.9	-	3.45	-0.05	84	306	76	70
68	10.177	0.156	0.024	2.33	91	0.9	-	3.40	-0.05	84	300	76	70
69	10.330	0.153	0.024	2.33	91	1.0	-	3.34	-0.06	83	294	76	70
70	10.488	0.158	0.024	2.33	91	1.0	101	3.29	-0.05	83	289	76	69
71	10.638	0.150	0.024	2.33	91	0.9	-	3.25	-0.04	83	285	76	70
72	10.796	0.158	0.024	2.33	91	0.9	-	3.21	-0.04	83	281	76	69
73	10.948	0.152	0.024	2.32	92	0.9	-	3.16	-0.05	83	278	76	69
74	11.106	0.158	0.024	2.33	92	0.9	-	3.12	-0.04	83	275	76	69
75	11.259	0.153	0.024	2.34	92	1.0	-	3.07	-0.05	82	273	76	69
76	11.415	0.156	0.025	2.34	92	1.0	-	3.03	-0.04	82	271	76	69
77	11.569	0.154	0.024	2.33	92	0.9	-	2.97	-0.06	82	270	76	69
78	11.724	0.155	0.024	2.34	92	0.9	-	2.94	-0.03	82	269	76	69
79	11.881	0.157	0.025	2.34	92	0.9	-	2.89	-0.05	82	267	76	69
80	12.034	0.153	0.024	2.34	93	0.9	101	2.86	-0.03	82	266	76	69
81	12.192	0.158	0.024	2.34	93	1.0	-	2.81	-0.05	82	265	76	69
82	12.343	0.151	0.024	2.33	93	1.0	-	2.77	-0.04	82	266	76	69
83	12.503	0.160	0.024	2.35	93	1.0	-	2.73	-0.04	82	267	76	69
84	12.656	0.153	0.024	2.33	93	1.0	-	2.69	-0.04	82	268	76	69
85	12.812	0.156	0.024	2.34	93	0.9	-	2.65	-0.04	82	271	76	69
86	12.966	0.154	0.024	2.35	94	1.0	-	2.61	-0.04	82	276	76	69
87	13.123	0.157	0.024	2.34	94	0.9	-	2.56	-0.05	82	282	76	69
88	13.280	0.157	0.024	2.34	94	1.0	-	2.52	-0.04	82	287	76	69
89	13.433	0.153	0.024	2.36	94	0.9	-	2.48	-0.04	82	292	76	69
90	13.591	0.158	0.025	2.35	94	1.0	100	2.44	-0.04	82	294	76	69
91	13.743	0.152	0.024	2.35	94	1.0	-	2.39	-0.05	82	293	76	69
92	13.903	0.160	0.024	2.36	94	1.0	-	2.34	-0.05	82	290	76	69
93	14.057	0.154	0.024	2.35	94	0.9	-	2.30	-0.04	82	285	76	70
94	14.211	0.154	0.024	2.35	95	0.9	-	2.27	-0.03	82	274	76	69
95	14.368	0.157	0.024	2.35	95	1.0	-	2.23	-0.04	81	264	76	69

BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: IHP
Model: S160AGL
Run #: 1

Job #: 23-106
Tracking #: 99
Technician: AK
Date: 6/7/2023

	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
96	14.525	0.157	0.024	2.36	95	1.0	-	2.21	-0.02	81	255	76	69
97	14.683	0.158	0.024	2.36	95	0.9	-	2.19	-0.02	81	246	76	69
98	14.835	0.152	0.025	2.35	95	1.0	-	2.17	-0.02	81	240	76	69
99	14.994	0.159	0.024	2.35	95	0.9	-	2.16	-0.01	81	235	76	69
100	15.149	0.155	0.025	2.36	95	1.0	99	2.14	-0.02	81	230	76	69
101	15.308	0.159	0.025	2.36	95	1.0	-	2.13	-0.01	80	226	76	69
102	15.461	0.153	0.025	2.37	95	1.0	-	2.10	-0.03	80	223	75	69
103	15.618	0.157	0.024	2.35	96	0.9	-	2.09	-0.01	80	219	76	69
104	15.776	0.158	0.024	2.37	96	1.0	-	2.07	-0.02	80	216	75	69
105	15.931	0.155	0.024	2.36	96	0.9	-	2.05	-0.02	80	214	76	69
106	16.089	0.158	0.024	2.36	96	1.0	-	2.03	-0.02	80	212	75	69
107	16.242	0.153	0.025	2.36	96	1.0	-	2.02	-0.01	80	210	75	69
108	16.403	0.161	0.025	2.36	96	1.0	-	2.00	-0.02	80	208	75	69
109	16.556	0.153	0.024	2.37	96	1.0	-	1.98	-0.02	80	206	75	69
110	16.714	0.158	0.024	2.37	96	0.9	100	1.97	-0.01	80	204	75	70
111	16.871	0.157	0.025	2.37	96	1.0	-	1.95	-0.02	80	203	75	70
112	17.027	0.156	0.025	2.36	96	1.0	-	1.93	-0.02	80	203	75	70
113	17.185	0.158	0.024	2.37	96	0.9	-	1.91	-0.02	80	202	76	70
114	17.338	0.153	0.025	2.37	96	1.0	-	1.90	-0.01	80	202	75	70
115	17.499	0.161	0.025	2.36	96	1.0	-	1.88	-0.02	80	201	75	70
116	17.653	0.154	0.025	2.37	97	0.9	-	1.87	-0.01	80	201	75	70
117	17.811	0.158	0.025	2.38	97	1.0	-	1.85	-0.02	80	201	75	70
118	17.967	0.156	0.025	2.36	97	1.0	-	1.84	-0.01	80	202	75	70
119	18.124	0.157	0.025	2.37	97	1.0	-	1.81	-0.03	79	203	75	70
120	18.283	0.159	0.025	2.38	97	0.9	100	1.80	-0.01	79	204	75	70
121	18.436	0.153	0.024	2.38	97	1.0	-	1.77	-0.03	79	205	75	70
122	18.597	0.161	0.024	2.36	97	1.0	-	1.76	-0.01	79	205	75	70
123	18.751	0.154	0.024	2.37	97	0.9	-	1.74	-0.02	79	204	75	70
124	18.909	0.158	0.025	2.37	97	0.9	-	1.73	-0.01	79	203	75	70
125	19.065	0.156	0.025	2.36	97	1.0	-	1.71	-0.02	79	203	75	70
126	19.223	0.158	0.024	2.37	97	1.0	-	1.69	-0.02	79	202	75	70
127	19.382	0.159	0.024	2.39	97	0.9	-	1.68	-0.01	79	202	75	70

BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: IHP
Model: S160AGL
Run #: 1

Job #: 23-106
Tracking #: 99
Technician: AK
Date: 6/7/2023

	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
128	19.535	0.153	0.024	2.37	97	0.9	-	1.66	-0.02	79	202	75	70
129	19.696	0.161	0.025	2.37	97	0.9	-	1.64	-0.02	79	201	75	70
130	19.851	0.155	0.024	2.37	98	0.9	100	1.62	-0.02	79	200	75	70
131	20.009	0.158	0.025	2.37	98	1.0	-	1.61	-0.01	79	200	75	70
132	20.166	0.157	0.025	2.38	98	1.0	-	1.60	-0.01	79	199	75	70
133	20.323	0.157	0.025	2.38	98	0.9	-	1.58	-0.02	79	198	75	70
134	20.482	0.159	0.024	2.38	98	1.0	-	1.56	-0.02	79	198	75	70
135	20.636	0.154	0.024	2.37	98	1.0	-	1.54	-0.02	79	196	75	70
136	20.797	0.161	0.024	2.38	98	1.0	-	1.53	-0.01	79	196	75	70
137	20.952	0.155	0.024	2.38	98	0.9	-	1.51	-0.02	79	195	75	70
138	21.110	0.158	0.024	2.38	98	1.0	-	1.49	-0.02	79	195	75	70
139	21.268	0.158	0.025	2.37	98	1.0	-	1.47	-0.02	79	194	75	70
140	21.424	0.156	0.024	2.38	98	0.9	101	1.46	-0.01	79	193	75	70
141	21.583	0.159	0.025	2.37	98	0.9	-	1.45	-0.01	79	192	75	70
142	21.737	0.154	0.024	2.38	98	0.9	-	1.43	-0.02	79	191	75	70
143	21.899	0.162	0.025	2.37	98	1.0	-	1.41	-0.02	79	190	75	70
144	22.053	0.154	0.025	2.37	98	1.0	-	1.40	-0.01	79	189	75	70
145	22.211	0.158	0.024	2.38	98	1.0	-	1.39	-0.01	79	188	75	70
146	22.370	0.159	0.024	2.38	98	0.9	-	1.38	-0.01	79	187	75	70
147	22.526	0.156	0.025	2.38	99	1.0	-	1.37	-0.01	79	186	75	70
148	22.685	0.159	0.025	2.38	98	1.0	-	1.34	-0.03	79	185	75	71
149	22.840	0.155	0.024	2.38	99	1.0	-	1.33	-0.01	79	185	75	71
150	23.001	0.161	0.025	2.38	99	1.0	100	1.31	-0.02	79	184	75	71
151	23.155	0.154	0.025	2.39	99	1.0	-	1.30	-0.01	79	184	75	71
152	23.314	0.159	0.025	2.39	99	0.9	-	1.29	-0.01	79	183	75	71
153	23.473	0.159	0.024	2.39	99	0.9	-	1.28	-0.01	79	182	75	71
154	23.628	0.155	0.024	2.38	99	0.9	-	1.27	-0.01	79	181	75	71
155	23.788	0.160	0.024	2.39	99	1.0	-	1.25	-0.02	79	181	75	71
156	23.944	0.156	0.025	2.39	99	0.9	-	1.24	-0.01	79	180	75	70
157	24.104	0.160	0.025	2.39	99	0.9	-	1.22	-0.02	79	179	75	71
158	24.260	0.156	0.025	2.39	99	0.9	-	1.21	-0.01	79	178	75	71
159	24.418	0.158	0.025	2.38	99	0.9	-	1.20	-0.01	79	178	75	71

BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: IHP
Model: S160AGL
Run #: 1

Job #: 23-106
Tracking #: 99
Technician: AK
Date: 6/7/2023

	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
160	24.578	0.160	0.025	2.39	99	1.0	99	1.19	-0.01	79	177	75	71
161	24.732	0.154	0.025	2.38	99	0.9	-	1.17	-0.02	79	177	75	71
162	24.893	0.161	0.025	2.39	99	1.0	-	1.16	-0.01	79	175	75	71
163	25.049	0.156	0.025	2.39	99	0.9	-	1.15	-0.01	79	176	75	71
164	25.207	0.158	0.025	2.39	99	1.0	-	1.14	-0.01	79	175	75	71
165	25.366	0.159	0.025	2.38	99	1.0	-	1.12	-0.02	79	174	75	71
166	25.523	0.157	0.025	2.39	99	0.9	-	1.11	-0.01	79	174	75	70
167	25.679	0.156	0.025	2.39	99	1.0	-	1.10	-0.01	79	174	75	71
168	25.837	0.158	0.025	2.40	99	0.9	-	1.09	-0.01	79	173	75	70
169	25.998	0.161	0.025	2.39	99	0.9	-	1.08	-0.01	79	172	75	71
170	26.153	0.155	0.024	2.39	99	1.0	100	1.06	-0.02	79	172	75	71
171	26.312	0.159	0.024	2.39	99	1.0	-	1.05	-0.01	79	172	75	71
172	26.472	0.160	0.025	2.38	99	1.0	-	1.04	-0.01	79	172	75	71
173	26.627	0.155	0.025	2.39	99	1.0	-	1.03	-0.01	79	171	75	71
174	26.788	0.161	0.024	2.38	100	1.0	-	1.02	-0.01	79	171	75	71
175	26.944	0.156	0.025	2.38	99	0.9	-	1.00	-0.02	78	170	75	71
176	27.103	0.159	0.025	2.38	100	0.9	-	0.99	-0.01	78	170	75	71
177	27.260	0.157	0.024	2.39	100	1.0	-	0.98	-0.01	78	169	75	71
178	27.418	0.158	0.025	2.38	100	0.9	-	0.96	-0.02	79	169	75	71
179	27.578	0.160	0.025	2.39	100	1.0	-	0.96	0.00	79	169	75	71
180	27.732	0.154	0.025	2.39	100	1.0	100	0.94	-0.02	79	168	75	71
181	27.895	0.163	0.025	2.39	100	1.0	-	0.93	-0.01	79	168	75	71
182	28.050	0.155	0.025	2.40	100	0.9	-	0.92	-0.01	79	168	75	71
183	28.208	0.158	0.025	2.39	100	0.9	-	0.90	-0.02	79	167	75	71
184	28.368	0.160	0.024	2.39	100	1.0	-	0.90	0.00	79	166	75	71
185	28.524	0.156	0.025	2.39	100	1.0	-	0.89	-0.01	79	166	75	71
186	28.684	0.160	0.025	2.39	100	1.0	-	0.87	-0.02	79	166	75	71
187	28.840	0.156	0.024	2.39	100	1.0	-	0.86	-0.01	79	166	76	71
188	29.000	0.160	0.024	2.40	100	0.9	-	0.84	-0.02	79	165	76	71
189	29.156	0.156	0.025	2.38	100	1.0	-	0.84	0.00	78	165	75	71
190	29.315	0.159	0.025	2.39	100	1.0	99	0.82	-0.02	78	165	75	71
191	29.475	0.160	0.025	2.39	100	1.0	-	0.81	-0.01	78	165	75	71

BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: IHP
Model: S160AGL
Run #: 1

Job #: 23-106
Tracking #: 99
Technician: AK
Date: 6/7/2023

	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
192	29.629	0.154	0.024	2.38	100	1.0	-	0.80	-0.01	78	164	75	71
193	29.792	0.163	0.024	2.38	100	1.0	-	0.79	-0.01	78	164	75	71
194	29.947	0.155	0.025	2.39	100	0.9	-	0.78	-0.01	78	163	76	71
195	30.105	0.158	0.024	2.39	100	1.0	-	0.77	-0.01	78	163	76	71
196	30.261	0.156	0.025	2.39	100	0.9	-	0.75	-0.02	78	163	76	71
197	30.419	0.158	0.024	2.38	100	1.0	-	0.74	-0.01	78	162	75	71
198	30.581	0.162	0.025	2.39	100	0.9	-	0.73	-0.01	78	162	76	71
199	30.736	0.155	0.025	2.39	100	1.0	-	0.72	-0.01	78	162	76	71
200	30.895	0.159	0.024	2.39	100	0.9	100	0.71	-0.01	79	162	76	71
201	31.053	0.158	0.025	2.39	100	1.0	-	0.70	-0.01	79	162	76	71
202	31.209	0.156	0.025	2.38	100	1.0	-	0.69	-0.01	79	162	76	71
203	31.372	0.163	0.025	2.39	100	1.0	-	0.67	-0.02	79	162	76	71
204	31.526	0.154	0.025	2.39	100	1.0	-	0.66	-0.01	79	162	76	71
205	31.688	0.162	0.025	2.38	100	0.9	-	0.65	-0.01	79	161	76	71
206	31.844	0.156	0.025	2.38	100	0.9	-	0.64	-0.01	79	161	76	71
207	32.003	0.159	0.025	2.38	100	1.0	-	0.63	-0.01	79	161	76	71
208	32.161	0.158	0.025	2.38	100	1.0	-	0.62	-0.01	79	160	76	71
209	32.319	0.158	0.025	2.38	100	0.9	-	0.60	-0.02	79	160	76	71
210	32.478	0.159	0.025	2.38	100	1.0	100	0.60	0.00	79	159	76	71
211	32.634	0.156	0.025	2.38	101	1.0	-	0.58	-0.02	79	160	76	71
212	32.795	0.161	0.025	2.39	101	1.0	-	0.58	0.00	79	160	76	71
213	32.951	0.156	0.024	2.39	101	1.0	-	0.56	-0.02	79	159	76	71
214	33.110	0.159	0.025	2.40	101	0.9	-	0.55	-0.01	79	159	76	71
215	33.270	0.160	0.025	2.40	101	1.0	-	0.53	-0.02	79	158	76	71
216	33.425	0.155	0.025	2.39	101	1.0	-	0.52	-0.01	79	158	76	71
217	33.587	0.162	0.025	2.39	101	1.0	-	0.51	-0.01	79	158	76	71
218	33.743	0.156	0.025	2.40	101	0.9	-	0.50	-0.01	79	158	76	71
219	33.902	0.159	0.025	2.39	101	1.0	-	0.48	-0.02	79	158	76	71
220	34.061	0.159	0.025	2.38	101	0.9	99	0.46	-0.02	79	158	76	71
221	34.218	0.157	0.025	2.39	101	0.9	-	0.46	0.00	79	158	76	71
222	34.378	0.160	0.024	2.39	101	1.0	-	0.45	-0.01	79	158	76	72
223	34.534	0.156	0.025	2.40	101	1.0	-	0.44	-0.01	79	158	76	71

BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: IHP
Model: S160AGL
Run #: 1

Job #: 23-106
Tracking #: 99
Technician: AK
Date: 6/7/2023

	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
224	34.695	0.161	0.025	2.40	101	0.9	-	0.42	-0.02	79	157	76	71
225	34.851	0.156	0.025	2.39	101	0.9	-	0.42	0.00	79	157	76	72
226	35.010	0.159	0.024	2.39	101	0.9	-	0.41	-0.01	79	156	76	71
227	35.171	0.161	0.024	2.40	101	1.0	-	0.39	-0.02	79	156	76	71
228	35.325	0.154	0.025	2.40	101	1.0	-	0.38	-0.01	79	155	76	72
229	35.488	0.163	0.025	2.41	101	0.9	-	0.37	-0.01	79	155	76	72
230	35.643	0.155	0.025	2.41	101	1.0	99	0.36	-0.01	79	155	76	72
231	35.802	0.159	0.025	2.40	101	1.0	-	0.35	-0.01	79	154	76	72
232	35.962	0.160	0.025	2.40	101	1.0	-	0.34	-0.01	79	154	76	72
233	36.118	0.156	0.025	2.40	101	0.9	-	0.33	-0.01	79	154	76	72
234	36.279	0.161	0.025	2.40	101	1.0	-	0.31	-0.02	79	153	76	72
235	36.435	0.156	0.025	2.40	101	1.0	-	0.30	-0.01	79	153	76	72
236	36.596	0.161	0.025	2.40	101	1.0	-	0.29	-0.01	79	152	76	72
237	36.752	0.156	0.025	2.40	101	1.0	-	0.28	-0.01	79	152	76	72
238	36.909	0.157	0.025	2.39	101	1.0	-	0.27	-0.01	79	152	76	72
239	37.072	0.163	0.025	2.39	101	0.9	-	0.26	-0.01	79	152	76	72
240	37.227	0.155	0.025	2.39	101	1.0	99	0.25	-0.01	79	152	76	72
241	37.387	0.160	0.025	2.38	101	1.0	-	0.24	-0.01	79	152	76	72
242	37.545	0.158	0.025	2.39	101	0.9	-	0.24	0.00	79	151	76	72
243	37.704	0.159	0.025	2.38	101	0.9	-	0.22	-0.02	79	151	76	72
244	37.865	0.161	0.024	2.38	101	1.0	-	0.21	-0.01	79	151	76	72
245	38.020	0.155	0.025	2.39	101	1.0	-	0.20	-0.01	79	151	76	72
246	38.179	0.159	0.024	2.40	101	1.0	-	0.18	-0.02	79	150	76	72
247	38.339	0.160	0.025	2.40	101	1.0	-	0.18	0.00	79	150	76	72
248	38.498	0.159	0.025	2.40	101	1.0	-	0.16	-0.02	79	149	76	72
249	38.658	0.160	0.024	2.40	101	1.0	-	0.16	0.00	79	149	76	72
250	38.815	0.157	0.025	2.39	101	1.0	99	0.15	-0.01	79	149	76	72
251	38.976	0.161	0.024	2.40	101	0.9	-	0.14	-0.01	79	149	76	72
252	39.132	0.156	0.024	2.40	101	1.0	-	0.13	-0.01	79	148	76	72
253	39.293	0.161	0.024	2.40	101	0.9	-	0.12	-0.01	79	148	76	72
254	39.449	0.156	0.024	2.39	101	1.0	-	0.12	0.00	79	147	76	72
255	39.606	0.157	0.024	2.40	101	1.0	-	0.11	-0.01	79	147	76	72

BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: IHP
Model: S160AGL
Run #: 1

Job #: 23-106
Tracking #: 99
Technician: AK
Date: 6/7/2023

	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
256	39.769	0.163	0.025	2.40	101	1.0	-	0.10	-0.01	79	147	76	72
257	39.924	0.155	0.025	2.39	101	1.0	-	0.09	-0.01	79	146	76	72
258	40.087	0.163	0.024	2.39	101	1.0	-	0.08	-0.01	79	145	76	72
259	40.243	0.156	0.024	2.38	101	1.0	-	0.08	0.00	79	145	76	72
260	40.403	0.160	0.024	2.39	101	0.9	100	0.07	-0.01	79	144	76	72
261	40.563	0.160	0.024	2.38	101	1.0	-	0.06	-0.01	79	143	76	72
262	40.718	0.155	0.024	2.39	102	1.0	-	0.06	0.00	80	143	77	72
263	40.881	0.163	0.025	2.38	102	1.0	-	0.05	-0.01	80	143	77	72
264	41.037	0.156	0.025	2.38	102	0.9	-	0.04	-0.01	80	143	77	72
265	41.197	0.160	0.024	2.39	102	1.0	-	0.03	-0.01	80	143	77	72
266	41.352	0.155	0.024	2.39	102	1.0	-	0.02	-0.01	80	143	77	72
267	41.513	0.161	0.024	2.38	102	0.9	-	0.02	0.00	80	142	77	72
268	41.673	0.160	0.024	2.38	102	0.9	-	0.01	-0.01	80	142	77	72
269	41.827	0.154	0.023	2.38	102	1.0	102	0.00	-0.01	80	141	77	72
Avg/Tot	41.827	0.155	0.024	2.33	94.2	0.9	100			82.2	241.4	75.8	70.2

BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: IHP
Model: S160AGL
Run #: 1

Job #: 23-106
Tracking #: 99
Technician: AK
Date: 6/7/2023

	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		0.64	75	1.7		73	-0.077	8.28	0.706
1	0.129	0.129	2.03	75	1.8	-	75	-0.048	1.68	0.304
2	0.272	0.143	2.03	75	1.6	-	76	-0.090	6.12	0.817
3	0.412	0.140	2.03	75	1.9	-	77	-0.112	13.59	0.354
4	0.552	0.140	2.03	75	2.0	-	78	-0.118	15.91	0.116
5	0.693	0.141	2.03	75	1.7	-	80	-0.119	16.92	0.067
6	0.830	0.137	2.03	75	1.7	-	80	-0.091	15.06	1.279
7	0.975	0.145	2.03	75	1.9	-	79	-0.083	6.54	1.088
8	1.114	0.139	2.03	75	1.9	-	79	-0.076	5.06	0.972
9	1.257	0.143	2.04	76	1.7	-	78	-0.074	4.65	0.920
10	1.397	0.140	2.04	76	1.6	99	78	-0.073	4.55	0.905
11	1.536	0.139	2.04	76	1.6	-	78	-0.070	4.91	0.838
12	1.680	0.144	2.04	76	2.0	-	78	-0.070	6.02	0.750
13	1.819	0.139	2.04	76	1.5	-	78	-0.069	8.15	0.843
14	1.962	0.143	2.03	76	1.5	-	78	-0.071	8.91	0.948
15	2.101	0.139	2.04	77	2.0	-	78	-0.071	9.36	0.932
16	2.245	0.144	2.04	77	1.7	-	78	-0.072	9.59	0.919
17	2.386	0.141	2.05	77	1.7	-	78	-0.073	10.31	0.995
18	2.526	0.140	2.05	77	2.0	-	78	-0.075	11.11	0.910
19	2.671	0.145	2.05	78	2.0	-	78	-0.076	11.53	0.818
20	2.810	0.139	2.05	78	1.8	100	78	-0.077	12.16	0.716
21	2.953	0.143	2.04	78	1.6	-	78	-0.078	13.08	0.505
22	3.093	0.140	2.05	78	1.6	-	78	-0.078	13.99	0.387
23	3.238	0.145	2.06	79	1.6	-	78	-0.078	14.23	0.413
24	3.379	0.141	2.06	79	1.6	-	78	-0.082	14.75	0.340
25	3.520	0.141	2.05	79	1.5	-	78	-0.082	14.80	0.493
26	3.664	0.144	2.06	80	1.5	-	78	-0.082	14.71	0.466
27	3.805	0.141	2.06	80	2.0	-	78	-0.082	14.61	0.475
28	3.950	0.145	2.07	80	1.5	-	78	-0.081	14.59	0.409
29	4.090	0.140	2.06	80	1.9	-	78	-0.079	14.44	0.518
30	4.235	0.145	2.06	81	1.6	101	78	-0.081	14.53	0.540
31	4.375	0.140	2.07	81	2.0	-	78	-0.081	14.62	0.614

BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: IHP
Model: S160AGL
Run #: 1

Job #: 23-106
Tracking #: 99
Technician: AK
Date: 6/7/2023

	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	4.521	0.146	2.07	81	1.9	-	78	-0.081	14.55	0.560
33	4.663	0.142	2.06	82	1.8	-	78	-0.080	14.77	0.546
34	4.805	0.142	2.07	82	2.0	-	78	-0.079	14.59	0.614
35	4.951	0.146	2.07	82	1.9	-	78	-0.077	14.56	0.575
36	5.092	0.141	2.07	83	1.7	-	78	-0.078	14.55	0.593
37	5.238	0.146	2.08	83	1.8	-	78	-0.075	14.41	0.491
38	5.379	0.141	2.07	83	2.0	-	78	-0.076	14.22	0.485
39	5.524	0.145	2.08	83	1.7	-	78	-0.077	14.10	0.414
40	5.668	0.144	2.08	84	2.1	101	78	-0.078	14.09	0.346
41	5.812	0.144	2.08	84	2.0	-	78	-0.074	14.19	0.380
42	5.955	0.143	2.08	84	2.0	-	78	-0.075	14.26	0.391
43	6.098	0.143	2.08	85	2.0	-	78	-0.075	14.28	0.356
44	6.243	0.145	2.08	85	1.7	-	78	-0.075	14.36	0.347
45	6.386	0.143	2.08	85	1.8	-	78	-0.076	14.40	0.392
46	6.533	0.147	2.08	85	1.5	-	78	-0.076	14.47	0.585
47	6.674	0.141	2.08	86	1.6	-	78	-0.075	14.69	0.566
48	6.818	0.144	2.08	86	1.6	-	78	-0.076	14.59	0.553
49	6.963	0.145	2.09	86	2.0	-	78	-0.076	14.61	0.433
50	7.109	0.146	2.08	86	1.6	101	78	-0.076	14.52	0.422
51	7.253	0.144	2.09	87	1.9	-	77	-0.074	14.45	0.279
52	7.398	0.145	2.09	87	1.8	-	77	-0.073	14.18	0.275
53	7.543	0.145	2.09	87	1.7	-	77	-0.072	13.73	0.222
54	7.686	0.143	2.08	87	1.6	-	77	-0.073	13.24	0.189
55	7.832	0.146	2.09	88	2.0	-	77	-0.070	12.99	0.256
56	7.976	0.144	2.09	88	2.0	-	77	-0.069	12.80	0.248
57	8.124	0.148	2.10	88	1.7	-	77	-0.070	12.51	0.249
58	8.266	0.142	2.09	88	1.7	-	77	-0.072	12.46	0.241
59	8.414	0.148	2.10	89	1.5	-	77	-0.069	12.20	0.257
60	8.557	0.143	2.10	89	1.6	101	77	-0.067	12.01	0.246
61	8.703	0.146	2.09	89	1.8	-	77	-0.068	11.68	0.253
62	8.847	0.144	2.10	89	1.8	-	77	-0.066	11.49	0.291
63	8.993	0.146	2.10	90	1.7	-	77	-0.064	11.12	0.352

BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: IHP
Model: S160AGL
Run #: 1

Job #: 23-106
Tracking #: 99
Technician: AK
Date: 6/7/2023

	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	9.138	0.145	2.10	90	2.0	-	77	-0.064	10.59	0.428
65	9.284	0.146	2.10	90	1.6	-	77	-0.063	10.21	0.517
66	9.429	0.145	2.10	90	2.0	-	77	-0.062	9.70	0.567
67	9.574	0.145	2.10	90	1.7	-	77	-0.064	9.37	0.655
68	9.719	0.145	2.10	91	1.5	-	77	-0.062	9.06	0.739
69	9.863	0.144	2.10	91	1.8	-	77	-0.060	8.90	0.808
70	10.010	0.147	2.10	91	1.6	101	77	-0.060	8.82	0.892
71	10.155	0.145	2.11	91	2.0	-	77	-0.058	8.73	0.887
72	10.303	0.148	2.11	91	1.6	-	77	-0.057	8.62	0.899
73	10.446	0.143	2.11	91	1.5	-	77	-0.058	8.77	0.886
74	10.594	0.148	2.11	92	2.0	-	77	-0.057	8.68	0.892
75	10.737	0.143	2.11	92	1.5	-	77	-0.052	8.67	0.888
76	10.885	0.148	2.10	92	1.9	-	76	-0.060	8.72	0.856
77	11.029	0.144	2.11	92	1.6	-	76	-0.053	8.73	0.872
78	11.177	0.148	2.11	92	2.0	-	76	-0.056	8.77	0.853
79	11.321	0.144	2.11	92	1.7	-	76	-0.056	8.75	0.843
80	11.469	0.148	2.11	92	1.7	101	76	-0.052	8.80	0.849
81	11.614	0.145	2.11	93	2.0	-	76	-0.055	8.88	0.837
82	11.760	0.146	2.11	93	1.9	-	76	-0.056	8.93	0.802
83	11.906	0.146	2.11	93	1.5	-	76	-0.055	9.06	0.720
84	12.052	0.146	2.11	93	1.8	-	76	-0.054	9.31	0.678
85	12.198	0.146	2.11	93	1.7	-	76	-0.054	9.60	0.598
86	12.343	0.145	2.11	93	1.7	-	76	-0.055	10.18	0.472
87	12.491	0.148	2.12	93	1.6	-	76	-0.056	10.62	0.424
88	12.635	0.144	2.11	94	1.6	-	76	-0.058	10.74	0.386
89	12.784	0.149	2.12	94	1.7	-	76	-0.057	10.99	0.368
90	12.929	0.145	2.11	94	1.5	100	76	-0.058	11.00	0.395
91	13.077	0.148	2.11	94	1.7	-	76	-0.058	10.36	0.388
92	13.221	0.144	2.11	94	1.6	-	76	-0.057	9.75	0.422
93	13.370	0.149	2.11	94	1.8	-	76	-0.056	9.10	0.520
94	13.510	0.140	2.12	94	2.0	-	76	-0.051	7.43	1.153
95	13.662	0.152	2.11	94	1.6	-	76	-0.053	7.15	1.226

BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: IHP
Job #: 23-106
Model: S160AGL
Tracking #: 99
Run #: 1
Technician: AK
Date: 6/7/2023

	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	13.806	0.144	2.11	94	2.0	-	76	-0.049	6.83	1.425
97	13.955	0.149	2.12	94	1.9	-	76	-0.049	6.52	1.662
98	14.100	0.145	2.12	95	1.5	-	76	-0.051	6.62	1.538
99	14.248	0.148	2.12	95	2.0	-	76	-0.045	6.56	1.614
100	14.394	0.146	2.12	95	1.8	99	76	-0.048	6.55	1.638
101	14.542	0.148	2.12	95	1.7	-	76	-0.046	6.47	1.677
102	14.688	0.146	2.12	95	1.8	-	76	-0.045	6.46	1.691
103	14.835	0.147	2.11	95	1.5	-	76	-0.045	6.42	1.764
104	14.981	0.146	2.12	95	1.9	-	76	-0.043	6.41	1.748
105	15.128	0.147	2.12	95	2.0	-	76	-0.044	6.37	1.809
106	15.275	0.147	2.12	95	1.8	-	76	-0.042	6.46	1.746
107	15.420	0.145	2.12	95	2.0	-	76	-0.044	6.52	1.740
108	15.568	0.148	2.12	95	1.5	-	76	-0.042	6.49	1.710
109	15.714	0.146	2.12	95	2.0	-	76	-0.041	6.47	1.751
110	15.862	0.148	2.12	96	1.9	100	76	-0.040	7.26	1.498
111	16.007	0.145	2.12	96	1.7	-	76	-0.043	7.41	1.622
112	16.156	0.149	2.12	96	1.6	-	76	-0.041	7.51	1.594
113	16.302	0.146	2.13	96	1.9	-	76	-0.040	7.51	1.618
114	16.451	0.149	2.12	96	1.5	-	76	-0.038	7.46	1.645
115	16.596	0.145	2.12	96	1.5	-	76	-0.036	7.35	1.698
116	16.745	0.149	2.12	96	1.5	-	76	-0.043	7.38	1.709
117	16.889	0.144	2.12	96	1.7	-	76	-0.039	7.53	1.475
118	17.039	0.150	2.12	96	1.7	-	76	-0.039	7.53	1.507
119	17.183	0.144	2.12	96	1.9	-	76	-0.042	7.51	1.764
120	17.333	0.150	2.12	96	2.0	100	76	-0.039	7.89	1.570
121	17.477	0.144	2.12	96	1.8	-	76	-0.041	7.74	1.559
122	17.626	0.149	2.12	96	2.0	-	76	-0.040	7.64	1.634
123	17.771	0.145	2.12	96	1.7	-	76	-0.041	7.57	1.649
124	17.920	0.149	2.12	96	1.5	-	76	-0.039	7.42	1.741
125	18.066	0.146	2.13	96	1.8	-	76	-0.041	7.35	1.976
126	18.214	0.148	2.12	97	2.0	-	76	-0.041	7.27	1.986
127	18.360	0.146	2.13	97	1.8	-	76	-0.040	7.16	2.097

BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: IHP
Model: S160AGL
Run #: 1

Job #: 23-106
Tracking #: 99
Technician: AK
Date: 6/7/2023

	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	18.509	0.149	2.13	97	1.6	-	76	-0.039	7.03	2.195
129	18.655	0.146	2.13	97	1.7	-	76	-0.038	7.02	2.114
130	18.804	0.149	2.13	97	1.9	100	76	-0.041	6.89	2.298
131	18.950	0.146	2.13	97	1.6	-	76	-0.041	6.78	2.347
132	19.097	0.147	2.12	97	2.0	-	76	-0.039	6.83	2.356
133	19.244	0.147	2.12	97	2.0	-	76	-0.039	6.73	2.357
134	19.392	0.148	2.12	97	2.0	-	76	-0.039	6.74	2.379
135	19.539	0.147	2.12	97	2.0	-	76	-0.039	6.67	2.381
136	19.686	0.147	2.12	97	1.5	-	76	-0.038	6.54	2.491
137	19.833	0.147	2.13	97	1.8	-	76	-0.040	6.54	2.502
138	19.979	0.146	2.12	97	1.5	-	76	-0.039	6.48	2.525
139	20.127	0.148	2.12	97	2.0	-	76	-0.039	6.47	2.489
140	20.274	0.147	2.12	97	1.8	101	76	-0.038	6.32	2.593
141	20.423	0.149	2.13	97	1.5	-	76	-0.035	6.23	2.611
142	20.568	0.145	2.12	97	1.8	-	76	-0.039	6.26	2.628
143	20.717	0.149	2.12	97	1.8	-	76	-0.038	6.15	2.607
144	20.863	0.146	2.12	97	1.6	-	76	-0.038	6.12	2.640
145	21.012	0.149	2.13	97	1.9	-	76	-0.036	5.96	2.722
146	21.158	0.146	2.13	97	1.7	-	76	-0.038	5.93	2.738
147	21.307	0.149	2.13	97	1.7	-	76	-0.038	5.88	2.724
148	21.452	0.145	2.12	97	1.9	-	76	-0.037	5.85	2.734
149	21.601	0.149	2.12	97	1.6	-	76	-0.039	5.84	2.758
150	21.747	0.146	2.13	98	1.5	100	76	-0.036	5.76	2.762
151	21.897	0.150	2.13	98	2.0	-	76	-0.035	5.77	2.782
152	22.041	0.144	2.12	98	1.5	-	76	-0.037	5.74	2.785
153	22.191	0.150	2.13	98	1.6	-	76	-0.038	5.66	2.766
154	22.336	0.145	2.13	98	2.0	-	76	-0.035	5.59	2.754
155	22.485	0.149	2.13	98	1.9	-	76	-0.035	5.58	2.776
156	22.630	0.145	2.12	98	2.0	-	76	-0.036	5.58	2.785
157	22.780	0.150	2.12	98	1.8	-	76	-0.036	5.54	2.780
158	22.926	0.146	2.12	98	1.9	-	76	-0.036	5.49	2.762
159	23.075	0.149	2.13	98	1.5	-	76	-0.036	5.49	2.774

BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: IHP
Model: S160AGL
Run #: 1

Job #: 23-106
Tracking #: 99
Technician: AK
Date: 6/7/2023

	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	23.221	0.146	2.12	98	1.7	99	76	-0.035	5.51	2.760
161	23.370	0.149	2.13	98	1.7	-	76	-0.032	5.46	2.754
162	23.516	0.146	2.13	98	1.9	-	76	-0.033	5.47	2.756
163	23.665	0.149	2.13	98	1.8	-	76	-0.034	5.42	2.731
164	23.812	0.147	2.13	98	1.5	-	76	-0.035	5.44	2.742
165	23.961	0.149	2.13	98	1.9	-	76	-0.033	5.44	2.727
166	24.107	0.146	2.13	98	1.5	-	76	-0.033	5.42	2.699
167	24.253	0.146	2.12	98	1.6	-	76	-0.034	5.37	2.690
168	24.402	0.149	2.13	98	2.0	-	76	-0.030	5.36	2.679
169	24.550	0.148	2.12	98	2.0	-	76	-0.033	5.28	2.718
170	24.697	0.147	2.13	98	1.6	100	76	-0.034	5.17	2.708
171	24.845	0.148	2.12	98	2.0	-	76	-0.033	5.16	2.694
172	24.992	0.147	2.13	98	2.0	-	76	-0.031	5.14	2.689
173	25.140	0.148	2.13	98	1.7	-	76	-0.034	5.12	2.701
174	25.288	0.148	2.12	98	1.5	-	76	-0.032	5.13	2.720
175	25.434	0.146	2.13	98	1.5	-	76	-0.032	5.12	2.725
176	25.582	0.148	2.12	98	2.0	-	76	-0.032	5.11	2.712
177	25.728	0.146	2.12	98	1.5	-	76	-0.033	5.03	2.687
178	25.877	0.149	2.12	98	1.8	-	76	-0.033	5.01	2.679
179	26.024	0.147	2.12	98	1.6	-	76	-0.031	5.03	2.675
180	26.173	0.149	2.12	98	1.9	100	76	-0.032	5.02	2.682
181	26.319	0.146	2.13	98	1.6	-	76	-0.030	4.98	2.665
182	26.468	0.149	2.13	98	2.1	-	76	-0.033	5.01	2.677
183	26.614	0.146	2.12	98	2.1	-	76	-0.033	5.00	2.668
184	26.763	0.149	2.13	98	1.5	-	76	-0.035	4.96	2.662
185	26.909	0.146	2.13	98	1.5	-	76	-0.032	4.96	2.647
186	27.059	0.150	2.13	98	1.5	-	76	-0.030	5.01	2.680
187	27.205	0.146	2.13	98	1.9	-	76	-0.031	5.03	2.690
188	27.355	0.150	2.13	98	1.5	-	76	-0.032	5.01	2.677
189	27.500	0.145	2.12	99	1.7	-	76	-0.034	4.99	2.667
190	27.650	0.150	2.12	98	2.0	99	76	-0.032	5.00	2.673
191	27.795	0.145	2.12	99	1.5	-	76	-0.035	4.99	2.668

BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: IHP
Job #: 23-106
Model: S160AGL
Tracking #: 99
Run #: 1
Technician: AK
Date: 6/7/2023

	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	27.945	0.150	2.12	98	1.7	-	76	-0.031	4.99	2.659
193	28.090	0.145	2.12	99	1.8	-	76	-0.031	4.97	2.644
194	28.239	0.149	2.12	99	2.0	-	76	-0.032	5.01	2.664
195	28.384	0.145	2.12	99	1.6	-	76	-0.034	4.95	2.630
196	28.531	0.147	2.11	99	1.6	-	76	-0.030	4.95	2.608
197	28.676	0.145	2.12	98	1.6	-	76	-0.030	4.98	2.623
198	28.828	0.152	2.12	99	1.7	-	76	-0.030	5.00	2.623
199	28.974	0.146	2.12	99	1.7	-	76	-0.030	5.06	2.660
200	29.121	0.147	2.13	99	1.7	99	76	-0.028	5.12	2.713
201	29.270	0.149	2.12	99	2.0	-	76	-0.027	5.09	2.720
202	29.416	0.146	2.12	99	1.8	-	76	-0.030	5.13	2.735
203	29.564	0.148	2.12	99	1.7	-	76	-0.030	5.14	2.724
204	29.714	0.150	2.12	99	1.6	-	76	-0.028	5.04	2.662
205	29.860	0.146	2.12	99	1.7	-	76	-0.032	4.99	2.639
206	30.009	0.149	2.13	99	1.8	-	76	-0.030	5.00	2.626
207	30.156	0.147	2.13	99	1.9	-	76	-0.028	4.94	2.598
208	30.305	0.149	2.13	99	1.6	-	76	-0.031	4.96	2.596
209	30.451	0.146	2.13	99	1.8	-	76	-0.029	4.94	2.605
210	30.599	0.148	2.12	99	1.6	100	76	-0.030	4.92	2.583
211	30.747	0.148	2.12	99	1.5	-	76	-0.031	4.91	2.598
212	30.894	0.147	2.13	99	1.5	-	76	-0.028	5.11	2.745
213	31.042	0.148	2.13	99	1.9	-	76	-0.028	4.99	2.673
214	31.190	0.148	2.13	99	1.5	-	76	-0.030	4.94	2.662
215	31.338	0.148	2.13	99	2.0	-	76	-0.027	4.94	2.674
216	31.485	0.147	2.13	99	1.5	-	76	-0.029	5.07	2.755
217	31.633	0.148	2.12	99	2.0	-	76	-0.030	5.11	2.881
218	31.780	0.147	2.13	99	1.7	-	76	-0.028	5.03	2.808
219	31.928	0.148	2.13	99	1.7	-	76	-0.030	5.00	2.736
220	32.074	0.146	2.13	99	1.5	98	76	-0.029	4.92	2.684
221	32.223	0.149	2.13	99	1.8	-	76	-0.030	4.87	2.667
222	32.370	0.147	2.13	99	1.5	-	76	-0.027	4.85	2.654
223	32.519	0.149	2.13	99	1.9	-	76	-0.028	4.79	2.637

BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: IHP
Model: S160AGL
Run #: 1

Job #: 23-106
Tracking #: 99
Technician: AK
Date: 6/7/2023

	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	32.666	0.147	2.13	99	1.5	-	76	-0.028	4.79	2.608
225	32.815	0.149	2.13	99	1.9	-	76	-0.027	4.78	2.580
226	32.961	0.146	2.13	99	1.5	-	76	-0.029	4.66	2.540
227	33.110	0.149	2.13	99	1.6	-	76	-0.026	4.66	2.568
228	33.256	0.146	2.13	99	1.6	-	76	-0.031	4.78	2.632
229	33.406	0.150	2.13	99	1.8	-	76	-0.026	4.80	2.637
230	33.552	0.146	2.13	99	1.8	99	76	-0.027	4.76	2.613
231	33.702	0.150	2.13	99	1.5	-	76	-0.027	4.80	2.638
232	33.848	0.146	2.13	99	1.5	-	76	-0.026	4.82	2.648
233	33.998	0.150	2.13	99	2.0	-	76	-0.028	4.82	2.637
234	34.144	0.146	2.13	99	1.8	-	76	-0.026	4.87	2.614
235	34.294	0.150	2.13	99	2.0	-	76	-0.026	4.74	2.554
236	34.439	0.145	2.12	99	1.7	-	76	-0.029	4.70	2.503
237	34.589	0.150	2.13	99	2.0	-	77	-0.028	4.67	2.493
238	34.732	0.143	2.13	99	1.9	-	77	-0.027	4.65	2.476
239	34.885	0.153	2.13	99	2.0	-	77	-0.029	4.58	2.434
240	35.030	0.145	2.13	99	1.5	99	77	-0.029	4.56	2.432
241	35.178	0.148	2.13	99	1.9	-	77	-0.028	4.63	2.466
242	35.326	0.148	2.13	99	2.0	-	77	-0.027	4.67	2.466
243	35.476	0.150	2.13	99	1.8	-	77	-0.025	4.62	2.472
244	35.621	0.145	2.13	99	1.8	-	77	-0.026	4.65	2.474
245	35.771	0.150	2.13	99	1.8	-	77	-0.030	4.66	2.473
246	35.914	0.143	2.12	99	1.9	-	77	-0.025	4.68	2.477
247	36.066	0.152	2.13	99	1.5	-	77	-0.025	4.59	2.426
248	36.212	0.146	2.12	99	1.8	-	77	-0.026	4.62	2.415
249	36.362	0.150	2.12	99	2.0	-	77	-0.024	4.62	2.407
250	36.508	0.146	2.13	99	2.0	99	77	-0.026	4.64	2.401
251	36.658	0.150	2.13	99	1.5	-	77	-0.026	4.63	2.397
252	36.804	0.146	2.13	99	1.8	-	77	-0.027	4.25	2.253
253	36.954	0.150	2.13	99	1.7	-	77	-0.027	4.19	2.206
254	37.100	0.146	2.13	99	1.5	-	77	-0.024	4.16	2.164
255	37.247	0.147	2.13	99	1.5	-	77	-0.027	4.08	2.119

BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: IHP
Model: S160AGL
Run #: 1

Job #: 23-106
Tracking #: 99
Technician: AK
Date: 6/7/2023

	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	37.395	0.148	2.12	99	1.7	-	77	-0.023	4.04	2.097
257	37.545	0.150	2.13	100	1.6	-	77	-0.027	4.00	2.078
258	37.692	0.147	2.13	100	1.5	-	77	-0.024	3.97	2.068
259	37.841	0.149	2.13	100	1.5	-	77	-0.027	3.86	1.992
260	37.988	0.147	2.13	100	1.5	100	77	-0.025	3.90	2.004
261	38.137	0.149	2.13	100	1.5	-	77	-0.023	3.94	2.037
262	38.284	0.147	2.13	100	2.0	-	77	-0.026	3.95	2.025
263	38.433	0.149	2.13	100	1.5	-	77	-0.023	3.95	2.000
264	38.579	0.146	2.12	100	1.7	-	77	-0.023	3.95	2.003
265	38.728	0.149	2.12	100	2.0	-	77	-0.024	4.01	2.040
266	38.873	0.145	2.13	100	2.0	-	77	-0.023	4.00	2.042
267	39.023	0.150	2.12	100	1.5	-	77	-0.023	3.98	2.044
268	39.171	0.148	2.12	100	1.5	-	77	-0.025	3.99	2.053
269	39.316	0.145	2.12	100	1.5	101	77	-0.028	4.02	2.060
Avg/Tot	39.316	0.146	2.10	93.3	1.7	100	76.5	-0.046	7.54	1.751

BOX C TEST DATA - ASTM E2780 / ASTM E2515

Client: IHP
Model: S160AGL
Run #: 1

Job #: 23-106
Tracking #: 99
Technician: AK
Date: 6/7/2023

	Particulate Sampling 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)
0	0.000		0.33	75	1.5		72
1	0.149	0.149	1.04	74	1.7	-	72
2	0.301	0.152	1.04	74	1.8	-	72
3	0.453	0.152	1.04	75	1.7	-	72
4	0.606	0.153	1.05	75	1.7	-	72
5	0.758	0.152	1.05	75	1.9	-	73
6	0.910	0.152	1.06	75	1.8	-	73
7	1.065	0.155	1.06	76	1.7	-	73
8	1.220	0.155	1.07	76	1.7	-	73
9	1.375	0.155	1.07	76	1.8	-	73
10	1.530	0.155	1.08	76	1.9	98	73
11	1.686	0.156	1.08	76	1.8	-	73
12	1.841	0.155	1.09	76	1.8	-	73
13	1.997	0.156	1.09	76	1.7	-	73
14	2.153	0.156	1.09	76	1.7	-	73
15	2.308	0.155	1.09	77	1.8	-	74
16	2.463	0.155	1.09	77	1.9	-	74
17	2.619	0.156	1.08	78	1.7	-	73
18	2.775	0.156	1.08	77	1.8	-	74
19	2.932	0.157	1.09	77	1.9	-	74
20	3.089	0.157	1.10	78	1.8	100	74
21	3.246	0.157	1.10	78	1.8	-	73
22	3.403	0.157	1.10	78	1.9	-	73
23	3.559	0.156	1.10	78	1.9	-	74
24	3.717	0.158	1.10	79	1.8	-	74
25	3.875	0.158	1.11	79	1.8	-	74
26	4.033	0.158	1.12	79	1.7	-	74
27	4.191	0.158	1.12	80	1.8	-	74
28	4.349	0.158	1.11	80	1.7	-	74
29	4.509	0.160	1.12	80	1.9	-	74
30	4.668	0.159	1.12	80	1.9	101	74
31	4.824	0.156	1.13	80	1.7	-	74

BOX C TEST DATA - ASTM E2780 / ASTM E2515

Client: IHP
Model: S160AGL
Run #: 1

Job #: 23-106
Tracking #: 99
Technician: AK
Date: 6/7/2023

	Particulate Sampling 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)
32	4.985	0.161	1.12	81	1.9	-	74
33	5.146	0.161	1.13	81	1.8	-	74
34	5.306	0.160	1.13	81	1.8	-	74
35	5.465	0.159	1.13	82	1.9	-	74
36	5.625	0.160	1.12	82	1.8	-	74
37	5.786	0.161	1.14	82	1.8	-	74
38	5.946	0.160	1.14	82	1.9	-	74
39	6.105	0.159	1.13	82	1.7	-	74
40	6.267	0.162	1.13	83	1.9	101	74
41	6.428	0.161	1.14	83	1.9	-	74
42	6.588	0.160	1.13	83	1.9	-	74
43	6.749	0.161	1.14	83	1.8	-	74
44	6.911	0.162	1.15	84	2.0	-	74
45	7.071	0.160	1.14	84	1.9	-	74
46	7.233	0.162	1.14	84	2.0	-	74
47	7.395	0.162	1.15	84	1.9	-	74
48	7.552	0.157	1.14	84	1.9	-	74
49	7.718	0.166	1.15	85	1.8	-	74
50	7.880	0.162	1.15	84	1.7	103	74
51	8.041	0.161	1.14	85	1.8	-	74
52	8.204	0.163	1.15	85	1.8	-	74
53	8.365	0.161	1.15	85	1.8	-	74
54	8.527	0.162	1.15	85	1.9	-	74
55	8.690	0.163	1.15	85	1.8	-	74
56	8.851	0.161	1.15	86	1.9	-	74
57	9.015	0.164	1.15	85	2.0	-	74
58	9.177	0.162	1.16	85	1.9	-	74
59	9.339	0.162	1.14	86	1.7	-	74
60	9.503	0.164	1.15	86	1.8	103	74
Avg/Tot	9.503	0.158	1.10	80.2	1.8	101	73.5

WOODSTOVE SURFACE TEMPERATURE DATA

Client: IHP
Model: S160AGL
Run #: 1

Job #: 23-106
Tracking #: 99
Technician: AK
Date: 6/7/2023

Stove ΔT: 125

	Temperature Data (°F)						
Elapsed Time (min)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
0	480	456	276	273	392	375.4	69.6
1	479	459	296	291	400	385.1	69.7
2	473	455	308	306	394	387.3	69.7
3	480	460	317	394	391	408.2	69.8
4	490	474	324	506	385	435.7	69.9
5	501	489	329	613	384	463.1	69.9
6	505	496	334	650	395	475.7	70.0
7	499	492	339	632	399	472.2	69.9
8	490	485	344	604	403	465.2	69.9
9	481	477	348	577	406	457.7	69.9
10	473	469	352	552	409	451.0	69.9
11	466	462	355	531	411	444.9	69.9
12	460	455	357	517	413	440.3	69.9
13	459	451	357	512	415	438.7	69.9
14	461	449	358	511	417	439.1	69.9
15	463	447	358	509	418	439.0	70.0
16	466	446	357	511	419	439.6	69.9
17	468	445	356	517	419	441.1	69.9
18	469	446	356	531	419	444.1	70.0
19	471	446	355	546	420	447.5	69.8
20	473	448	354	561	419	451.1	69.7
21	475	450	353	576	419	454.7	69.6
22	479	454	352	591	419	458.7	69.6
23	483	457	352	606	418	463.0	69.7
24	487	460	351	618	417	466.7	69.7
25	491	464	350	630	417	470.5	69.7
26	495	467	351	645	416	474.4	69.8
27	499	469	350	657	415	477.9	69.8
28	501	471	351	669	414	481.2	69.8
29	504	473	350	678	413	483.5	69.9
30	506	475	343	669	412	480.9	69.8
31	508	477	328	643	411	473.2	69.7
32	510	480	316	629	410	468.8	69.9
33	512	482	306	617	409	465.0	69.8
34	513	485	298	607	407	462.2	69.8
35	515	487	291	600	406	459.8	69.8
36	517	489	285	592	405	457.6	69.7
37	518	491	281	583	404	455.4	69.7
38	520	494	276	575	403	453.6	69.7
39	522	496	273	569	401	452.2	69.7
40	523	499	270	563	400	451.0	69.8
41	525	501	268	559	399	450.1	69.9
42	526	503	266	557	397	449.7	69.8
43	528	505	264	554	396	449.3	69.8
44	529	507	263	553	395	449.5	69.8
45	531	509	261	556	393	450.0	69.8
46	532	512	261	559	392	451.0	69.9
47	534	515	260	561	391	452.0	70.1

WOODSTOVE SURFACE TEMPERATURE DATA

Client: IHP
Model: S160AGL
Run #: 1

Job #: 23-106
Tracking #: 99
Technician: AK
Date: 6/7/2023

Stove ΔT: 125

	Temperature Data (°F)						
Elapsed Time (min)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
48	536	517	260	561	389	452.7	69.9
49	539	520	259	564	388	454.0	69.9
50	541	523	259	567	387	455.2	70.0
51	544	526	258	565	385	455.6	70.0
52	547	529	258	558	384	455.1	70.1
53	550	532	258	550	383	454.5	70.1
54	552	533	258	540	382	453.1	70.1
55	554	535	258	530	380	451.5	70.2
56	555	536	259	520	379	449.8	70.2
57	556	536	259	510	378	447.9	70.2
58	556	537	259	501	377	445.8	70.3
59	555	537	260	493	376	444.1	70.4
60	554	538	260	485	375	442.4	70.4
61	553	538	260	477	374	440.6	70.4
62	552	538	261	470	373	439.0	70.4
63	550	539	262	464	373	437.3	70.5
64	547	537	262	456	372	434.9	70.5
65	545	536	263	450	371	432.7	70.5
66	542	534	263	442	370	430.1	70.6
67	538	531	264	435	370	427.7	70.6
68	534	529	265	428	369	425.0	70.5
69	530	526	265	421	368	422.1	70.6
70	526	523	267	414	368	419.4	70.5
71	522	520	268	407	367	416.9	70.6
72	518	518	269	402	366	414.6	70.6
73	515	515	270	395	366	412.0	70.6
74	512	512	270	391	365	410.0	70.6
75	508	509	271	386	365	407.9	70.6
76	506	507	272	381	364	405.9	70.6
77	503	504	273	378	364	404.4	70.5
78	501	501	274	376	363	403.0	70.5
79	498	499	274	374	363	401.5	70.6
80	496	496	274	374	363	400.3	70.5
81	494	494	274	373	362	399.1	70.6
82	491	492	275	372	362	398.3	70.6
83	489	490	275	373	361	397.7	70.6
84	487	489	275	376	361	397.6	70.5
85	485	487	276	381	360	397.8	70.5
86	484	485	276	386	360	398.1	70.5
87	483	484	276	394	360	399.2	70.5
88	482	482	276	402	360	400.3	70.6
89	481	482	276	409	359	401.4	70.7
90	481	481	277	415	359	402.6	70.7
91	480	482	276	419	359	403.1	70.8
92	479	482	276	418	358	402.8	70.7
93	478	483	276	411	358	401.1	70.7
94	476	483	277	396	358	397.9	70.8
95	475	482	276	382	357	394.5	70.8

WOODSTOVE SURFACE TEMPERATURE DATA

Client: IHP
Model: S160AGL
Run #: 1

Job #: 23-106
Tracking #: 99
Technician: AK
Date: 6/7/2023

Stove ΔT: 125

	Temperature Data (°F)						
Elapsed Time (min)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
96	473	481	276	368	357	390.7	70.7
97	471	478	275	353	357	386.7	70.8
98	469	475	274	341	357	383.2	70.8
99	467	472	274	331	356	379.9	70.6
100	465	470	273	321	356	377.0	70.7
101	463	467	272	313	356	374.1	70.6
102	460	464	271	305	356	371.3	70.6
103	458	462	271	298	356	368.8	70.8
104	456	459	270	291	355	366.5	70.7
105	454	457	269	285	355	364.2	70.8
106	452	455	269	280	355	362.1	70.8
107	450	452	269	276	354	360.4	70.9
108	449	450	268	272	354	358.6	70.9
109	447	448	267	268	354	356.7	70.9
110	445	445	266	263	354	354.8	70.9
111	444	443	266	259	354	353.2	71.0
112	444	441	265	257	354	351.9	71.0
113	444	439	264	255	353	350.8	71.1
114	443	437	263	253	354	349.9	71.0
115	443	435	262	252	354	349.0	71.1
116	442	433	262	251	354	348.4	71.0
117	442	432	262	251	354	348.0	71.0
118	441	430	261	251	354	347.3	71.1
119	440	429	260	251	354	346.9	71.1
120	438	427	260	253	355	346.6	71.0
121	437	426	259	254	355	346.1	71.0
122	436	425	258	254	355	345.6	70.9
123	435	424	257	254	355	345.2	70.9
124	434	424	257	254	356	344.9	70.9
125	433	423	256	255	356	344.2	71.0
126	432	421	255	255	356	343.8	70.9
127	431	420	254	254	356	343.0	71.0
128	429	419	252	253	356	342.1	71.1
129	428	418	252	253	357	341.6	71.1
130	427	417	252	253	357	341.0	71.1
131	425	416	250	251	358	340.1	71.3
132	424	415	249	251	358	339.4	71.2
133	423	414	249	250	358	338.7	71.2
134	422	413	248	249	359	338.0	71.3
135	420	412	247	248	359	337.1	71.1
136	419	411	246	246	359	336.2	71.2
137	418	410	245	245	359	335.6	71.4
138	416	409	244	244	360	334.7	71.2
139	415	408	244	243	360	334.0	71.3
140	413	407	243	242	360	333.0	71.1
141	412	406	241	240	360	332.0	71.3
142	411	405	240	239	360	331.1	71.3
143	410	404	239	237	360	330.0	71.4

WOODSTOVE SURFACE TEMPERATURE DATA

Client: IHP
Model: S160AGL
Run #: 1

Job #: 23-106
Tracking #: 99
Technician: AK
Date: 6/7/2023

Stove ΔT: 125

	Temperature Data (°F)						
Elapsed Time (min)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
144	409	403	239	236	360	329.3	71.4
145	407	402	238	235	360	328.6	71.4
146	406	402	238	234	360	327.9	71.4
147	405	400	238	232	360	326.9	71.4
148	404	399	237	231	360	326.0	71.4
149	402	398	236	229	360	325.1	71.5
150	401	397	235	228	360	324.1	71.4
151	400	396	234	226	361	323.1	71.6
152	398	395	232	224	360	321.9	71.4
153	397	394	232	223	360	321.1	71.6
154	396	392	232	222	360	320.3	71.6
155	394	391	231	221	360	319.4	71.5
156	392	390	230	219	360	318.4	71.6
157	391	389	230	218	360	317.6	71.5
158	390	388	228	217	359	316.5	71.6
159	389	387	228	216	359	315.6	71.5
160	387	386	228	215	359	315.0	71.5
161	386	385	228	214	359	314.3	71.6
162	385	384	227	214	358	313.4	71.6
163	383	382	227	213	358	312.8	71.7
164	382	381	227	212	358	311.9	71.8
165	381	380	226	211	358	311.2	71.7
166	380	379	226	210	358	310.3	71.6
167	378	378	225	209	357	309.5	71.6
168	377	377	225	209	357	308.8	71.4
169	376	376	225	208	357	308.1	71.6
170	374	374	225	207	356	307.3	71.6
171	373	373	223	206	356	306.3	71.7
172	372	372	223	206	355	305.5	71.8
173	371	371	223	205	355	304.8	71.8
174	370	370	223	205	354	304.2	71.7
175	368	368	223	204	354	303.6	71.7
176	367	367	222	203	354	302.7	71.9
177	366	366	223	203	354	302.1	71.8
178	365	364	222	202	353	301.4	71.9
179	364	363	222	202	353	300.6	72.0
180	363	362	222	201	352	300.1	71.9
181	362	361	221	201	352	299.3	71.9
182	361	359	221	200	352	298.6	71.8
183	360	358	221	200	351	297.9	71.7
184	359	357	220	199	351	297.1	71.8
185	358	356	220	198	350	296.2	71.9
186	357	355	218	197	350	295.2	71.8
187	356	353	218	197	349	294.5	71.9
188	355	352	218	197	349	294.2	72.0
189	354	351	218	196	349	293.5	71.9
190	353	350	218	196	348	293.0	71.8
191	352	349	218	196	348	292.6	71.9

WOODSTOVE SURFACE TEMPERATURE DATA

Client: IHP
Model: S160AGL
Run #: 1

Job #: 23-106
Tracking #: 99
Technician: AK
Date: 6/7/2023

Stove ΔT: 125

	Temperature Data (°F)						
Elapsed Time (min)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
192	351	348	218	196	348	292.1	72.0
193	350	347	218	195	348	291.6	71.9
194	349	347	218	194	348	291.1	72.0
195	349	346	217	194	347	290.6	72.1
196	348	345	217	194	347	290.0	72.1
197	347	344	217	193	346	289.3	71.9
198	346	343	216	193	346	288.7	71.9
199	345	343	216	192	346	288.2	72.0
200	344	342	215	192	345	287.6	72.1
201	343	342	214	191	345	286.9	72.0
202	342	341	214	191	345	286.5	72.1
203	342	341	214	191	344	286.3	72.1
204	341	340	214	190	344	285.9	72.2
205	340	340	214	190	344	285.3	72.3
206	339	339	213	189	344	285.0	72.2
207	338	339	212	189	344	284.2	72.2
208	337	339	213	188	343	283.9	72.2
209	336	338	212	188	343	283.2	72.2
210	335	338	212	187	343	282.8	72.1
211	333	337	211	186	343	282.3	72.2
212	332	337	211	186	343	281.8	72.3
213	331	336	210	186	343	281.1	72.3
214	330	336	209	185	342	280.6	72.2
215	329	335	209	185	342	280.0	72.1
216	328	335	208	184	342	279.4	72.2
217	327	334	208	185	342	279.1	72.2
218	326	334	207	185	341	278.6	72.1
219	325	333	207	184	341	278.1	72.1
220	325	333	206	184	341	277.6	72.2
221	324	332	206	183	341	277.1	72.3
222	323	331	206	183	341	276.7	72.4
223	322	330	205	183	341	276.2	72.5
224	321	330	205	182	341	275.5	72.4
225	320	329	204	181	340	275.0	72.4
226	319	329	204	181	340	274.4	72.4
227	318	328	203	180	339	273.8	72.5
228	317	328	202	180	339	273.2	72.2
229	316	327	202	180	339	272.6	72.3
230	316	327	201	179	338	272.2	72.3
231	315	326	201	179	338	271.8	72.3
232	314	326	200	179	338	271.3	72.3
233	313	325	200	178	337	270.7	72.4
234	312	325	199	178	337	270.1	72.4
235	311	324	198	177	337	269.5	72.2
236	310	324	198	177	336	268.9	72.3
237	310	324	197	176	336	268.3	72.4
238	309	324	196	176	335	267.8	72.3
239	308	323	196	175	335	267.4	72.3

WOODSTOVE SURFACE TEMPERATURE DATA

Client: IHP
Model: S160AGL
Run #: 1

Job #: 23-106
Tracking #: 99
Technician: AK
Date: 6/7/2023

Stove ΔT: 125

	Temperature Data (°F)						
Elapsed Time (min)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
240	307	323	195	175	334	266.8	72.3
241	306	322	195	174	334	266.2	72.4
242	305	322	194	174	334	265.8	72.4
243	304	321	194	173	334	265.3	72.4
244	304	320	194	173	333	264.8	72.4
245	303	320	193	172	333	264.2	72.5
246	302	319	192	172	333	263.7	72.5
247	301	319	191	172	332	263.0	72.5
248	301	318	191	171	332	262.5	72.4
249	300	317	190	171	332	262.0	72.4
250	299	317	190	171	331	261.5	72.5
251	298	317	189	170	331	261.0	72.5
252	297	316	189	170	331	260.5	72.4
253	296	315	189	169	330	259.9	72.5
254	295	314	188	169	330	259.3	72.5
255	294	314	188	168	329	258.7	72.4
256	293	313	188	168	329	258.0	72.5
257	292	312	187	167	329	257.3	72.5
258	291	311	187	166	328	256.7	72.4
259	290	310	186	166	328	256.0	72.4
260	289	309	185	165	328	255.3	72.6
261	288	308	185	165	327	254.7	72.5
262	287	307	185	164	327	254.2	72.6
263	286	307	185	164	327	253.6	72.6
264	286	306	185	163	326	252.9	72.7
265	285	305	184	163	326	252.4	72.8
266	284	304	184	162	325	251.9	72.8
267	283	303	184	162	325	251.2	72.8
268	282	302	183	161	324	250.6	72.7
269	281	301	183	161	324	250.1	72.7
Average	416.7	413.8	248.8	314.5	361.8	351.1	71.2

LAB SAMPLE DATA - ASTM E2515

Client: IHP
Model: S160AGL
Run #: 1

Job #: 23-106
Tracking #: 99
Technician: AK
Date: 6/7/2023

		Sample ID	Tare, mg	Final, mg	Catch, mg
Filters	**A**	G00546	241.6	244.1	2.5
	B	G00547	242.8	245.1	2.3
	C - 1st Hour	G00548	243.2	245.2	2.0
	Amb	G00549	242.9	242.9	0.0
Probes	**A**	12A	116704.9	116705.0	0.1
	B	12B	117770.6	117770.9	0.3
	C - 1st Hour	12C	117170.6	117170.5	0.0*
O-rings	**A**	12A	3586.2	3586.6	0.4
	B	12B	3550.7	3550.9	0.2
	C - 1st Hour	12C	3616.3	3616.9	0.6

**Negative value corrected to zero*

Placed in Dessicator on:	6/7/2023

Filters	**A**	244.0	6/9 14:06	244.1	6/12 10:15				
	B	245.1	6/9 14:08	245.1	6/12 10:15				
	C - 1st Hour	245.2	6/9 14:06	245.2	6/12 10:16				
	Amb	242.9	6/9 14:08	242.9	6/12 10:16				
Probes	**A**	116704.9	6/9 14:07	116705.0	6/12 10:16				
	B	117770.9	6/9 14:07	117770.9	6/12 10:16				
	C - 1st Hour	117170.7	6/9 14:07	117170.5	6/12 10:16				
O-Rings	**A**	3586.5	6/9 14:07	3586.6	6/12 10:16				
	B	3550.9	6/9 14:07	3550.9	6/12 10:16				
	C - 1st Hour	3617.0	6/9 14:08	3616.9	6/12 10:17				

Train A Aggregate, mg:	**3.0**
Train B Aggregate, mg:	**2.8**
Train C Aggregate, mg:	**2.6**
Ambient, mg:	**0.0**

ASTM E2780 Wood Heater Run Sheets

Client: IHP Job Number: 23-106 Tracking #: 99
Model: S160AGL Run Number: 1 Test Date: 6/7/23

Wood Heater Run Notes

Test Control Settings

Primary Air Setting(s): Fully Closed
Targeted Burn Category: I

Preburn Notes

Time	Notes
60:00	End PB

Test Notes

Test Burn Start Time: 9:13 Test Fuel Loaded by: 35 seconds
Door Closed: 60 seconds Air Control Set at: 300 seconds
Other Loading Notes: Fan on low @ 30 min

Time	Notes
	-None-

Test Burn End Time: 13:42

Flue Gas Concentration Measurement

Calibration Gas Values: Span Gas CO_2 (%): 17.01 CO (%): 4.306
Mid Gas CO_2 (%): 10.09 CO (%): 2.53

Calibration Results:

	Pre Test			Post Test		
	Zero	Span	Mid	Zero	Span	Mid
Time	08:32	08:33	08:34	4/18 10:42	4/18 10:43	4/18 10:44
CO_2	0.00	17.01	10.13	-0.08	17.07	9.98
CO	0.000	4.306	2.515	-0.001	4.318	4.486

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

Technician Signature: Date: 6/26/23

ASTM E2780 Wood Heater Run Sheets

Client: IHP Job Number: 23-106 Tracking #: 99
Model: S160AGL Run Number: 1 Test Date: 6/7/23



Test Fuel Side View



Test Fuel Iso View



Test Fuel Loaded in Stove



Air Setting

Technician Signature: Date: 6/26/23

ASTM E2780 Wood Heater Run Sheets

Client: IHP Job Number: 23-106 Tracking #: 99
Model: S160AGL Run Number: 1 Test Date: 6/7/23

REVISION HISTORY

Version Number	Issue Date	Summary of Changes
Version 1.0	20-Sep-22	Initial release into the BMS

DOCUMENT APPROVAL

Version Number	Approval Date	Approved by
Version 1.0	20-Sep-22	John Steinert

Technician Signature: Date: 6/26/23

WOOD STOVE TEST DATA PACKET
ASTM E2780/E2515

Run 2 Data Summary

Client:	IHP
Model:	S160AGL
Job #:	23-106
Tracking #:	99
Test Date:	6/7/2023

Techician Signature

6/30/2023
Date

TEST RESULTS - ASTM E2780 / ASTM E2515

Client: IHP
Model: S160AGL
Run #: 2

Job #: 23-106
Tracking #: 99
Technician: AK
Date: 6/7/2023

Burn Rate (kg/hr):	1.10

	Ambient Sample	Sample Train A	Sample Train B	1st Hour Filter
Total Sample Volume (ft^3)	30.797	35.941	33.489	9.591
Average Gas Velocity in Dilution Tunnel (ft/sec)	9.1			
Average Gas Flow Rate in Dilution Tunnel (dscf/hr)	23887.0			
Average Gas Meter Temperature (°F)	76.0	99.8	98.6	84.9
Total Sample Volume (dscf)	30.818	34.166	31.599	9.107
Average Tunnel Temperature (°F)	91.7			
Total Time of Test (min)	228			
Total Particulate Catch (mg)	0.0	2.0	1.8	1.1
Particulate Concentration, dry-standard (g/dscf)	0.0000000	0.0000585	0.0000570	0.0001208
Total PM Emissions (g)	0.00	5.31	5.17	2.89
Particulate Emission Rate (g/hr)	0.00	1.40	1.36	2.89
Emissions Factor (g/kg)	-	1.27	1.24	-
Difference from Average Total Particulate Emissions (g)	-	0.07	0.07	-
Difference from Average Total Particulate Emissions (%)	-	1.4%	1.4%	
Difference from Average Emissions Factor (g/kg)	-	0.02	0.02	-

Final Average Results	
Total Particulate Emissions (g)	5.24
Particulate Emission Rate (g/hr)	1.38
Emissions Factor (g/kg)	1.26
HHV Efficiency (%)	70.3%
LHV Efficiency (%)	76.0%
CO Emissions (g/min)	1.94

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	<90 °F		86.8	OK
Face Velocity	< 30 ft/min		8.9	OK
Leakage Rate	Less than 4% of average sample rate		0.001 cfm	OK
Ambient Temp	55-90 °F		Min:74.1/Max:77.9	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
Stove Surface ΔT	<126°F --OR--		158.6	OK
	DQH < 0.085(QFC)	DQH=	6500	
		.085(QFC)=	6684	

B415.1 Efficiency Results

Manufacturer:	IHP
Model:	S160AGL
Date:	06/07/23
Run:	2
Control #:	23-106
Test Duration:	228
Output Category:	2

Test Results in Accordance with CSA B415.1-09

	HHV Basis	LHV Basis
Overall Efficiency	70.3%	76.0%
Combustion Efficiency	92.3%	92.3%
Heat Transfer Efficiency	76.2%	82.4%

Output Rate (kJ/h)	15,107	14,331	**(Btu/h)**
Burn Rate (kg/h)	1.08	2.39	**(lb/h)**
Input (kJ/h)	21,485	20,381	**(Btu/h)**

Test Load Weight (dry kg)	4.12	9.08	**dry lb**
MC wet (%)	16.59		
MC dry (%)	19.89		
Particulate (g)	5.24		
CO (g)	443		
Test Duration (h)	3.80		

Emissions	**Particulate**	**CO**
g/MJ Output	0.09	7.72
g/kg Dry Fuel	1.27	107.52
g/h	1.38	116.60
g/min	0.02	1.94
lb/MM Btu Output	0.21	17.94

Air/Fuel Ratio (A/F)	14.29

VERSION: **2.4** **4/15/2010**

WOODSTOVE FUEL DATA - ASTM E2780

Client: IHP
Model: S160AGL
Run #: 2

Job #: 23-106
Tracking #: 99
Technician: AK
Date: 6/7/2023

Preburn Fuel Information

Size	Length (in)	Moisture Content (% DB)	Size	Length (in)	Moisture Content (% DB)
2x4	9.00	19.7	2x4	13.00	22.1
2x4	13.00	20.6	2x4	13.00	22.7
2x4	13.00	21.3			
2x4	13.00	24.6			
2x4	13.00	19.5			
2x4	13.00	23.8			
2x4	13.00	19.0			
2x4	13.00	19.6			

Total Fuel Weight (lbs): 13.09
Average Moisture (%DB): 21.3

Firebox Volume (ft^3): 1.54
Total 2x4 Crib Weight, with spacers (lbs): 4.03
Total 4x4 Crib Weight, with spacers (lbs): 6.90
Total Wet Fuel Weight, with spacers (lbs): 10.93

Coal Bed Range (20-25%):
Min (lbs): 2.19
Max (lbs): 2.73

Test Fuel Information

Size	Length (in)	Weight (lbs)	Moisture Content (%DB)			Dry Weight (lbs)
2x4	15.00	1.65	20.6	20.2	19.2	1.38
2x4	15.00	1.55	19.4	20.1	21.0	1.29
4x4	15.00	3.46	19.8	20.8	19.7	2.88
4x4	15.00	3.07	19.1	19.3	19.5	2.57

Total Dry Weight, no spacers (lbs): 8.12
Total Dry Weight, with spacers (lbs): 9.19

Spacer Moisture Readings (%DB)

11.6	8.6						
12.6	9.6						
8.0	12.5						
8.6	13.2						
15.8	14.6						
11.3	12.1						

Quality Checks	Requirement	Observed	Result
Fuel Density	25 - 36 (lbs/ft^3, DB)	26.7	OK
Loading Density	6.3 - 7.7 (lbs/ft^3, WB)	7.10	OK
2x4 Fuel Mix	35 - 65 % of total weight	37%	OK

DILUTION TUNNEL & MISC. DATA - ASTM E2780 / E2515

Client:	IHP	Job #:	23-106
Model:	S160AGL	Tracking #:	99
Run #:	2	Technician:	AK
Test Start Time:	15:44	Date:	6/7/2023

Total Sampling Time (min):	228	
Recording Interval (min):	1	
Meter Box γ Factor:	1.010	(A)
Meter Box γ Factor:	1.001	(B)
Meter Box γ Factor:	0.985	(C)
Meter Box γ Factor:	1.024	(Ambient)
Induced Draft Check (in. H_2O):	0	
Smoke Capture Check (%):	100%	
Date Flue Pipe Last Cleaned:		
Stove Metal Mass :	302.6	lb
Stove Refractory Mass:	53.65	lb

	Pre-Test	Post Test	Avg.
Barometric Pressure (in. Hg)	29.71	29.68	29.70
Relative Humidity (%)	31.2	28.2	
Room Air Velocity (ft/min)	0	0.0	
Scale Audit (lbs)	10.0	10.0	
Ambient Sample Volume:		30.797	ft^3

Leak Checks	Pre-Test		Post-Test	
Pitot	0		0	
	cfm	@ in Hg	cfm	@ in Hg
A	0.001	-7	0.000	-7
B	0.000	-7	0.000	-7
C	0.000	-8	0.000	-8
Ambient	0.000	-12	0.000	-12

DILUTION TUNNEL FLOW

Traverse Data

Point	dP (in H_2O)	Temp (°F)
1	0.014	90
2	0.020	90
3	0.020	90
4	0.020	89
5	0.018	89
6	0.014	89
7	0.016	89
8	0.020	89
9	0.022	88
10	0.022	88
11	0.018	88
12	0.010	88
Center	0.024	88

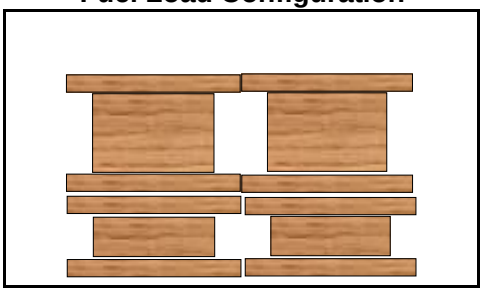
Static Pressure: -0.130 in. H_2O

Dilution Tunnel H_2O:	2.00	percent
Tunnel Diameter:	12	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:	0.7854	ft^2
V_{strav}:	9.01	ft/sec
V_{scent}:	10.50	ft/sec
F_p:	0.858	[ratio]
Initial Tunnel Flow:	397.1	scf/min

TEST FUEL PROPERTIES

Fuel Load Configuration

Firebox Front



Firebox Back

Firebox Side View

Actual Fuel Used Properties	
Fuel Type:	D. Fir
HHV (kJ/kg)	19,810
%C	48.73
%H	6.87
%O	43.9
%Ash	0.5
MC (%DB)	19.9

WOODSTOVE PREBURN DATA - ASTM E2780

Client: IHP
Model: S160AGL
Run #: 2

Job #: 23-106
Tracking #: 99
Technician: AK
Date: 6/7/2023

Recording Interval (min): 1
Run Time (min): 68

			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	6.96	-0.115	557	552	363	929	329	545.9	817	76
1	6.74	-0.108	565	560	361	865	342	538.2	672	76
2	6.52	-0.104	570	564	358	819	350	532.3	607	76
3	6.33	-0.101	576	568	359	784	358	529.1	568	76
4	6.17	-0.099	582	570	358	754	365	525.7	546	76
5	5.98	-0.096	586	573	357	728	372	523.2	531	76
6	5.81	-0.096	590	575	356	710	377	521.7	523	76
7	5.65	-0.096	593	577	355	697	383	520.7	515	75
8	5.47	-0.092	595	577	352	686	387	519.4	508	75
9	5.27	-0.092	596	577	351	674	392	517.9	502	76
10	5.11	-0.093	598	577	349	665	396	516.9	497	75
11	4.94	-0.093	599	578	347	657	399	515.9	492	75
12	4.77	-0.091	601	579	344	649	402	515.0	487	75
13	4.62	-0.090	602	581	342	642	405	514.6	481	76
14	4.50	-0.087	604	583	340	635	407	513.9	474	75
15	4.38	-0.087	606	585	338	629	409	513.4	469	75
16	4.25	-0.084	606	586	336	625	411	512.9	462	75
17	4.14	-0.085	607	587	335	619	413	512.0	454	75
18	4.03	-0.085	607	589	333	611	414	510.6	446	75
19	3.92	-0.084	608	589	332	601	415	508.9	439	75
20	3.82	-0.083	608	590	330	589	416	506.6	432	75
21	3.73	-0.079	609	589	329	576	418	504.1	424	75
22	3.65	-0.081	609	588	328	564	418	501.5	417	75
23	3.57	-0.079	608	587	327	552	419	498.9	409	75
24	3.49	-0.076	607	587	327	541	420	496.4	403	75
25	3.43	-0.077	605	587	327	532	421	494.3	398	75
26	3.36	-0.076	604	586	326	524	422	492.4	392	75
27	3.28	-0.076	602	586	327	515	423	490.3	387	75
28	3.22	-0.074	600	586	327	506	424	488.5	382	75
29	3.15	-0.076	598	586	326	497	424	486.3	376	75
30	3.10	-0.072	596	585	327	487	425	483.9	370	75
31	3.04	-0.072	594	584	328	478	426	481.8	364	75
32	2.99	-0.072	590	583	327	471	427	479.6	358	75
33	3.98	-0.082	589	582	329	468	428	479.1	407	75
34	3.86	-0.082	588	582	331	485	429	482.9	417	75
35	3.74	-0.082	588	581	331	502	429	486.1	422	75
36	3.64	-0.080	587	581	331	515	430	488.6	424	75
37	3.53	-0.081	586	579	331	523	431	489.9	420	75
38	3.42	-0.078	585	578	331	526	432	490.2	413	75
39	3.32	-0.078	584	577	330	526	433	489.8	408	75
40	3.24	-0.078	583	576	330	525	433	489.3	404	75
41	3.15	-0.077	582	575	329	525	434	489.0	402	75
42	3.08	-0.075	581	575	328	524	435	488.5	399	74
43	3.00	-0.076	581	575	328	522	435	488.2	396	74
44	2.92	-0.073	581	575	326	518	436	487.1	388	74

WOODSTOVE PREBURN DATA - ASTM E2780

Client: IHP
Model: S160AGL
Run #: 2

Job #: 23-106
Tracking #: 99
Technician: AK
Date: 6/7/2023

Recording Interval (min): 1
Run Time (min): 68

			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
45	2.86	-0.069	581	575	326	509	437	485.3	379	75
46	2.80	-0.070	579	573	325	497	437	482.2	368	75
47	2.76	-0.067	576	572	324	484	438	478.9	356	75
48	2.72	-0.067	574	570	324	470	438	475.0	345	75
49	2.68	-0.065	571	566	322	456	439	471.0	337	75
50	2.64	-0.064	568	564	322	444	440	467.6	331	75
51	2.61	-0.063	565	561	321	433	442	464.4	326	74
52	2.58	-0.061	562	559	321	423	442	461.2	317	75
53	2.56	-0.062	560	556	319	411	443	457.8	310	75
54	2.53	-0.059	558	554	319	400	444	455.0	305	75
55	2.50	-0.057	555	551	319	391	445	452.2	301	74
56	2.48	-0.057	553	549	318	382	446	449.4	297	74
57	2.45	-0.058	551	547	317	373	447	447.0	293	74
58	2.45	-0.055	549	544	316	366	448	444.6	290	74
59	2.41	-0.056	547	542	312	356	449	441.2	287	74
60	2.39	-0.055	545	540	311	348	450	438.5	284	74
61	2.37	-0.054	543	537	308	341	451	436.1	282	74
62	2.34	-0.054	542	534	307	335	452	433.9	279	74
63	2.32	-0.053	541	531	305	330	453	431.9	277	74
64	2.31	-0.053	539	529	304	325	453	429.9	275	74
65	2.27	-0.054	537	526	303	321	454	428.3	272	74
66	2.25	-0.051	537	524	302	317	455	426.8	271	74
67	2.23	-0.052	535	521	301	313	456	425.2	269	74
68	2.22	-0.050	534	518	300	310	456	423.6	268	74

BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: IHP
Model: S160AGL
Run #: 2

Job #: 23-106
Tracking #: 99
Technician: AK
Date: 6/7/2023

	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		0.024	0.14	85	0.3		10.89		92	338	78	74
1	0.141	0.141	0.023	2.08	85	0.9	-	10.95	0.06	103	297	79	75
2	0.283	0.142	0.024	2.08	85	0.9	-	10.65	-0.30	109	558	79	75
3	0.434	0.151	0.023	2.10	85	0.9	-	10.27	-0.38	122	787	80	75
4	0.578	0.144	0.023	2.12	85	0.9	-	9.88	-0.39	132	901	81	75
5	0.729	0.151	0.023	2.13	85	0.9	-	9.47	-0.41	139	948	82	76
6	0.873	0.144	0.023	2.15	84	1.0	-	9.19	-0.28	121	714	82	76
7	1.024	0.151	0.023	2.16	84	0.9	-	9.02	-0.17	114	615	82	76
8	1.170	0.146	0.023	2.18	85	0.9	-	8.87	-0.15	111	570	82	76
9	1.323	0.153	0.024	2.19	85	0.9	-	8.72	-0.15	109	549	82	75
10	1.469	0.146	0.024	2.20	85	0.9	97	8.57	-0.15	108	538	82	75
11	1.623	0.154	0.024	2.21	85	0.9	-	8.42	-0.15	108	532	83	75
12	1.770	0.147	0.024	2.21	85	0.9	-	8.27	-0.15	108	529	83	75
13	1.922	0.152	0.024	2.22	85	1.0	-	8.07	-0.20	108	528	83	76
14	2.072	0.150	0.024	2.22	85	0.9	-	7.91	-0.16	107	529	83	75
15	2.226	0.154	0.024	2.24	85	0.9	-	7.75	-0.16	108	528	83	76
16	2.375	0.149	0.024	2.26	85	0.9	-	7.56	-0.19	107	527	83	75
17	2.529	0.154	0.024	2.25	86	0.9	-	7.42	-0.14	107	525	83	75
18	2.678	0.149	0.023	2.26	86	0.9	-	7.23	-0.19	107	525	83	75
19	2.833	0.155	0.024	2.28	86	0.9	-	7.07	-0.16	107	525	83	76
20	2.983	0.150	0.023	2.26	86	1.0	102	6.92	-0.15	107	524	83	76
21	3.137	0.154	0.024	2.27	86	1.0	-	6.75	-0.17	107	522	83	76
22	3.286	0.149	0.023	2.27	86	1.0	-	6.60	-0.15	107	521	83	75
23	3.440	0.154	0.024	2.27	87	0.9	-	6.42	-0.18	107	518	83	75
24	3.591	0.151	0.023	2.27	87	0.9	-	6.24	-0.18	106	511	83	75
25	3.744	0.153	0.024	2.28	87	0.9	-	6.09	-0.15	106	509	83	76
26	3.897	0.153	0.024	2.27	87	1.0	-	5.92	-0.17	106	509	83	75
27	4.050	0.153	0.024	2.29	88	0.9	-	5.77	-0.15	106	507	83	75
28	4.204	0.154	0.024	2.29	88	0.9	-	5.61	-0.16	106	505	83	76
29	4.355	0.151	0.024	2.29	88	0.9	-	5.48	-0.13	106	501	83	75
30	4.511	0.156	0.024	2.29	88	0.9	102	5.32	-0.16	106	500	83	76
31	4.665	0.154	0.024	2.30	89	1.0	-	5.21	-0.11	102	498	83	76

BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: IHP
Model: S160AGL
Run #: 2

Job #: 23-106
Tracking #: 99
Technician: AK
Date: 6/7/2023

	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
32	4.821	0.156	0.024	2.30	89	0.9	-	5.07	-0.14	101	492	83	75
33	4.971	0.150	0.024	2.29	89	1.0	-	4.93	-0.14	100	488	83	75
34	5.128	0.157	0.024	2.30	89	1.0	-	4.77	-0.16	100	485	83	76
35	5.279	0.151	0.024	2.31	90	1.0	-	4.62	-0.15	100	481	83	76
36	5.436	0.157	0.024	2.31	90	0.9	-	4.48	-0.14	99	476	83	75
37	5.588	0.152	0.024	2.31	90	0.9	-	4.35	-0.13	99	473	83	75
38	5.742	0.154	0.024	2.31	90	0.9	-	4.21	-0.14	99	468	83	75
39	5.896	0.154	0.024	2.32	91	1.0	-	4.08	-0.13	98	462	82	75
40	6.050	0.154	0.024	2.31	91	1.0	101	3.96	-0.12	98	454	82	75
41	6.207	0.157	0.024	2.32	91	1.0	-	3.84	-0.12	98	444	83	75
42	6.360	0.153	0.024	2.33	91	0.9	-	3.72	-0.12	97	433	82	75
43	6.516	0.156	0.024	2.33	92	1.0	-	3.62	-0.10	97	424	83	75
44	6.667	0.151	0.024	2.32	92	0.9	-	3.54	-0.08	97	417	83	76
45	6.825	0.158	0.024	2.32	92	1.0	-	3.46	-0.08	96	409	83	76
46	6.978	0.153	0.024	2.32	93	1.0	-	3.38	-0.08	96	400	83	76
47	7.136	0.158	0.024	2.33	93	0.9	-	3.32	-0.06	95	391	82	76
48	7.288	0.152	0.024	2.33	93	1.0	-	3.25	-0.07	95	383	82	76
49	7.445	0.157	0.024	2.33	93	0.9	-	3.19	-0.06	94	374	82	75
50	7.600	0.155	0.024	2.34	93	1.0	100	3.14	-0.05	94	369	82	76
51	7.755	0.155	0.024	2.34	94	1.0	-	3.07	-0.07	93	363	82	75
52	7.913	0.158	0.024	2.34	94	1.0	-	3.01	-0.06	93	358	82	75
53	8.065	0.152	0.024	2.34	94	1.0	-	2.96	-0.05	93	354	82	75
54	8.223	0.158	0.024	2.33	94	1.0	-	2.91	-0.05	93	346	82	75
55	8.377	0.154	0.023	2.33	94	0.9	-	2.87	-0.04	92	338	82	75
56	8.536	0.159	0.024	2.34	95	0.9	-	2.83	-0.04	92	331	82	75
57	8.689	0.153	0.024	2.34	95	1.0	-	2.78	-0.05	92	327	82	75
58	8.846	0.157	0.023	2.34	95	1.0	-	2.74	-0.04	92	321	82	75
59	9.003	0.157	0.024	2.34	95	1.0	-	2.71	-0.03	91	316	82	75
60	9.159	0.156	0.023	2.34	96	0.9	101	2.68	-0.03	91	309	81	75
61	9.316	0.157	0.024	2.35	96	1.0	-	2.64	-0.04	91	303	81	75
62	9.469	0.153	0.024	2.35	96	1.0	-	2.60	-0.04	91	298	82	75
63	9.630	0.161	0.024	2.36	96	1.0	-	2.58	-0.02	90	294	81	75

BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: IHP
Model: S160AGL
Run #: 2

Job #: 23-106
Tracking #: 99
Technician: AK
Date: 6/7/2023

	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
64	9.784	0.154	0.024	2.36	96	1.0	-	2.55	-0.03	90	290	81	75
65	9.939	0.155	0.024	2.35	97	0.9	-	2.50	-0.05	90	286	81	75
66	10.095	0.156	0.023	2.35	97	1.0	-	2.48	-0.02	90	284	81	75
67	10.255	0.160	0.024	2.36	97	1.0	-	2.44	-0.04	90	282	81	75
68	10.414	0.159	0.024	2.37	97	1.0	-	2.40	-0.04	90	280	81	75
69	10.567	0.153	0.024	2.37	97	0.9	-	2.36	-0.04	89	280	81	75
70	10.729	0.162	0.024	2.38	97	0.9	102	2.33	-0.03	89	280	81	75
71	10.884	0.155	0.024	2.37	98	0.9	-	2.29	-0.04	90	281	81	75
72	11.042	0.158	0.023	2.37	98	1.0	-	2.26	-0.03	89	281	81	75
73	11.200	0.158	0.024	2.37	98	0.9	-	2.22	-0.04	90	281	81	75
74	11.356	0.156	0.024	2.38	98	0.9	-	2.19	-0.03	89	283	81	75
75	11.515	0.159	0.024	2.38	98	1.0	-	2.16	-0.03	89	283	81	75
76	11.670	0.155	0.024	2.38	98	1.0	-	2.13	-0.03	89	285	81	75
77	11.831	0.161	0.024	2.37	99	1.0	-	2.09	-0.04	89	288	81	75
78	11.986	0.155	0.024	2.38	99	1.0	-	2.06	-0.03	89	291	81	75
79	12.144	0.158	0.024	2.38	99	0.9	-	2.02	-0.04	90	293	81	75
80	12.304	0.160	0.024	2.40	99	0.9	100	1.99	-0.03	90	291	81	75
81	12.459	0.155	0.024	2.39	99	1.0	-	1.95	-0.04	90	291	82	75
82	12.620	0.161	0.024	2.38	99	0.9	-	1.92	-0.03	90	288	82	75
83	12.776	0.156	0.024	2.38	99	1.0	-	1.90	-0.02	90	282	82	75
84	12.936	0.160	0.024	2.39	100	0.9	-	1.87	-0.03	89	276	82	75
85	13.092	0.156	0.024	2.38	100	0.9	-	1.86	-0.01	89	270	82	75
86	13.251	0.159	0.024	2.39	100	1.0	-	1.83	-0.03	89	264	82	75
87	13.411	0.160	0.024	2.40	100	1.0	-	1.81	-0.02	89	259	82	75
88	13.563	0.152	0.024	2.39	100	0.9	-	1.80	-0.01	89	254	82	76
89	13.725	0.162	0.024	2.38	100	0.9	-	1.78	-0.02	89	251	82	76
90	13.883	0.158	0.025	2.39	100	0.9	99	1.77	-0.01	89	247	82	76
91	14.042	0.159	0.024	2.38	100	1.0	-	1.74	-0.03	89	245	82	75
92	14.202	0.160	0.025	2.41	100	1.0	-	1.74	0.00	89	242	82	75
93	14.358	0.156	0.024	2.39	101	1.0	-	1.72	-0.02	88	240	82	76
94	14.519	0.161	0.025	2.39	101	0.9	-	1.70	-0.02	88	238	82	76
95	14.675	0.156	0.024	2.38	101	1.0	-	1.68	-0.02	88	236	82	76

BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: IHP
Model: S160AGL
Run #: 2

Job #: 23-106
Tracking #: 99
Technician: AK
Date: 6/7/2023

	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
96	14.835	0.160	0.024	2.39	101	1.0	-	1.66	-0.02	88	234	82	76
97	14.993	0.158	0.025	2.40	101	0.9	-	1.64	-0.02	88	233	82	76
98	15.152	0.159	0.025	2.39	101	0.9	-	1.63	-0.01	88	232	82	76
99	15.310	0.158	0.024	2.39	101	1.0	-	1.61	-0.02	88	231	82	76
100	15.464	0.154	0.024	2.37	101	1.0	99	1.59	-0.02	88	230	82	76
101	15.624	0.160	0.024	2.38	101	1.0	-	1.58	-0.01	88	229	82	76
102	15.783	0.159	0.024	2.37	102	1.0	-	1.57	-0.01	88	228	82	76
103	15.945	0.162	0.024	2.36	102	1.0	-	1.56	-0.01	88	226	82	76
104	16.106	0.161	0.024	2.37	102	1.0	-	1.53	-0.03	88	225	82	76
105	16.261	0.155	0.024	2.39	102	1.0	-	1.52	-0.01	88	224	82	76
106	16.424	0.163	0.024	2.40	102	0.9	-	1.50	-0.02	88	223	82	76
107	16.580	0.156	0.024	2.39	102	0.9	-	1.49	-0.01	88	221	82	76
108	16.739	0.159	0.024	2.38	102	0.9	-	1.48	-0.01	88	220	82	76
109	16.900	0.161	0.024	2.39	102	1.0	-	1.46	-0.02	88	219	82	76
110	17.056	0.156	0.024	2.39	102	1.0	101	1.45	-0.01	88	218	82	76
111	17.217	0.161	0.025	2.39	102	1.0	-	1.43	-0.02	88	217	82	76
112	17.375	0.158	0.025	2.37	102	1.0	-	1.42	-0.01	87	216	82	76
113	17.535	0.160	0.024	2.38	103	0.9	-	1.40	-0.02	87	215	82	76
114	17.694	0.159	0.025	2.38	103	1.0	-	1.38	-0.02	87	215	82	76
115	17.852	0.158	0.024	2.36	103	1.0	-	1.37	-0.01	87	214	82	76
116	18.013	0.161	0.024	2.36	103	1.0	-	1.36	-0.01	87	214	82	76
117	18.170	0.157	0.024	2.38	103	0.9	-	1.34	-0.02	87	213	82	76
118	18.331	0.161	0.024	2.39	103	1.0	-	1.33	-0.01	87	212	82	76
119	18.488	0.157	0.024	2.40	103	0.9	-	1.31	-0.02	87	212	82	76
120	18.648	0.160	0.024	2.40	103	1.0	101	1.30	-0.01	87	211	82	76
121	18.809	0.161	0.024	2.40	103	1.0	-	1.29	-0.01	87	211	82	76
122	18.965	0.156	0.025	2.40	103	0.9	-	1.27	-0.02	87	210	82	76
123	19.129	0.164	0.024	2.38	103	0.9	-	1.25	-0.02	87	210	82	76
124	19.285	0.156	0.024	2.37	103	1.0	-	1.25	0.00	87	209	82	76
125	19.445	0.160	0.024	2.39	103	0.9	-	1.23	-0.02	87	209	82	76
126	19.606	0.161	0.024	2.39	104	1.0	-	1.21	-0.02	87	208	82	76
127	19.762	0.156	0.024	2.37	104	0.9	-	1.20	-0.01	87	207	82	76

BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: IHP
Model: S160AGL
Run #: 2

Job #: 23-106
Tracking #: 99
Technician: AK
Date: 6/7/2023

	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
128	19.925	0.163	0.024	2.37	104	1.0	-	1.18	-0.02	87	207	82	76
129	20.082	0.157	0.024	2.37	104	1.0	-	1.17	-0.01	87	207	82	76
130	20.242	0.160	0.024	2.37	104	0.9	100	1.16	-0.01	87	206	82	76
131	20.404	0.162	0.024	2.37	104	1.0	-	1.15	-0.01	87	206	82	76
132	20.559	0.155	0.024	2.38	104	1.0	-	1.13	-0.02	87	205	82	77
133	20.723	0.164	0.024	2.41	104	1.0	-	1.12	-0.01	87	205	82	76
134	20.879	0.156	0.024	2.41	104	0.9	-	1.10	-0.02	87	205	82	76
135	21.040	0.161	0.024	2.41	104	0.9	-	1.09	-0.01	87	204	82	76
136	21.201	0.161	0.024	2.41	104	0.9	-	1.08	-0.01	87	204	82	76
137	21.358	0.157	0.025	2.41	104	0.9	-	1.06	-0.02	87	203	82	76
138	21.521	0.163	0.025	2.41	104	1.0	-	1.05	-0.01	87	203	82	76
139	21.677	0.156	0.024	2.41	104	1.0	-	1.04	-0.01	87	203	82	76
140	21.838	0.161	0.024	2.39	104	1.0	100	1.03	-0.01	87	202	82	76
141	22.000	0.162	0.024	2.40	104	1.0	-	1.01	-0.02	87	202	82	76
142	22.156	0.156	0.024	2.41	105	0.9	-	1.00	-0.01	87	202	83	76
143	22.319	0.163	0.025	2.42	105	1.0	-	0.99	-0.01	87	201	83	76
144	22.476	0.157	0.024	2.43	105	1.0	-	0.97	-0.02	87	201	82	76
145	22.636	0.160	0.024	2.42	105	0.9	-	0.96	-0.01	87	201	82	76
146	22.798	0.162	0.024	2.41	105	0.9	-	0.94	-0.02	87	201	82	76
147	22.954	0.156	0.025	2.41	105	1.0	-	0.93	-0.01	87	201	82	76
148	23.118	0.164	0.025	2.39	105	1.0	-	0.91	-0.02	87	201	82	76
149	23.275	0.157	0.024	2.38	105	0.9	-	0.90	-0.01	87	200	83	77
150	23.435	0.160	0.025	2.41	105	1.0	99	0.88	-0.02	87	201	83	76
151	23.597	0.162	0.025	2.40	105	1.0	-	0.87	-0.01	87	200	83	77
152	23.754	0.157	0.024	2.42	105	0.9	-	0.86	-0.01	87	200	83	77
153	23.917	0.163	0.024	2.40	105	0.9	-	0.85	-0.01	87	200	83	77
154	24.074	0.157	0.025	2.40	105	0.9	-	0.83	-0.02	87	200	83	76
155	24.235	0.161	0.024	2.39	105	1.0	-	0.82	-0.01	87	201	83	77
156	24.397	0.162	0.025	2.41	105	0.9	-	0.80	-0.02	87	200	83	76
157	24.553	0.156	0.024	2.41	105	1.0	-	0.79	-0.01	87	200	83	77
158	24.717	0.164	0.024	2.41	105	1.0	-	0.78	-0.01	87	200	83	77
159	24.874	0.157	0.025	2.41	105	1.0	-	0.76	-0.02	87	200	83	77

BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: IHP
Model: S160AGL
Run #: 2

Job #: 23-106
Tracking #: 99
Technician: AK
Date: 6/7/2023

	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
160	25.035	0.161	0.024	2.40	106	1.0	100	0.75	-0.01	87	200	83	77
161	25.197	0.162	0.024	2.40	106	1.0	-	0.73	-0.02	87	200	83	76
162	25.353	0.156	0.025	2.41	106	1.0	-	0.72	-0.01	87	200	83	76
163	25.517	0.164	0.024	2.41	106	1.0	-	0.70	-0.02	87	199	83	77
164	25.674	0.157	0.024	2.41	106	0.9	-	0.69	-0.01	87	199	83	76
165	25.834	0.160	0.024	2.39	106	1.0	-	0.68	-0.01	87	199	83	76
166	25.997	0.163	0.024	2.40	106	1.0	-	0.66	-0.02	87	198	83	77
167	26.154	0.157	0.025	2.41	106	1.0	-	0.65	-0.01	87	198	83	76
168	26.317	0.163	0.025	2.42	106	0.9	-	0.64	-0.01	87	198	83	76
169	26.475	0.158	0.024	2.42	106	1.0	-	0.63	-0.01	87	198	83	76
170	26.636	0.161	0.024	2.41	106	1.0	101	0.62	-0.01	87	197	83	76
171	26.798	0.162	0.025	2.42	106	0.9	-	0.60	-0.02	87	196	83	77
172	26.954	0.156	0.025	2.42	106	1.0	-	0.59	-0.01	87	196	83	77
173	27.119	0.165	0.025	2.42	106	1.0	-	0.58	-0.01	87	196	83	77
174	27.275	0.156	0.025	2.42	106	1.0	-	0.57	-0.01	87	195	83	77
175	27.437	0.162	0.025	2.41	106	1.0	-	0.56	-0.01	87	194	83	77
176	27.600	0.163	0.025	2.42	106	1.0	-	0.55	-0.01	87	193	83	77
177	27.755	0.155	0.024	2.42	106	1.0	-	0.54	-0.01	87	192	83	77
178	27.920	0.165	0.024	2.42	106	0.9	-	0.53	-0.01	87	192	83	77
179	28.074	0.154	0.024	2.41	106	1.0	-	0.51	-0.02	87	192	83	77
180	28.238	0.164	0.024	2.43	106	1.0	101	0.49	-0.02	87	191	83	76
181	28.400	0.162	0.024	2.42	106	1.0	-	0.49	0.00	87	190	83	77
182	28.554	0.154	0.024	2.42	106	1.0	-	0.47	-0.02	87	189	83	77
183	28.718	0.164	0.024	2.42	106	1.0	-	0.47	0.00	87	189	83	77
184	28.875	0.157	0.024	2.42	106	1.0	-	0.47	0.00	87	188	83	77
185	29.040	0.165	0.024	2.42	106	1.0	-	0.45	-0.02	87	188	83	77
186	29.199	0.159	0.024	2.40	106	1.0	-	0.44	-0.01	87	188	83	77
187	29.359	0.160	0.024	2.40	107	1.0	-	0.44	0.00	87	187	83	77
188	29.523	0.164	0.024	2.39	107	1.0	-	0.42	-0.02	87	187	83	77
189	29.678	0.155	0.025	2.40	107	1.0	-	0.41	-0.01	87	186	83	77
190	29.839	0.161	0.025	2.40	107	1.0	99	0.39	-0.02	87	186	83	77
191	30.000	0.161	0.025	2.40	107	1.0	-	0.39	0.00	87	185	83	77

BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: IHP
Model: S160AGL
Run #: 2

Job #: 23-106
Tracking #: 99
Technician: AK
Date: 6/7/2023

	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
192	30.159	0.159	0.025	2.39	107	1.0	-	0.37	-0.02	87	185	83	77
193	30.324	0.165	0.025	2.39	107	0.9	-	0.36	-0.01	87	184	83	77
194	30.479	0.155	0.025	2.38	107	1.0	-	0.35	-0.01	87	185	83	77
195	30.641	0.162	0.025	2.39	107	1.0	-	0.34	-0.01	87	184	83	77
196	30.803	0.162	0.025	2.39	107	1.0	-	0.33	-0.01	87	183	83	77
197	30.963	0.160	0.025	2.38	107	1.0	-	0.32	-0.01	87	183	83	77
198	31.122	0.159	0.025	2.37	107	1.0	-	0.31	-0.01	87	183	83	77
199	31.282	0.160	0.025	2.36	107	1.0	-	0.30	-0.01	87	183	83	77
200	31.440	0.158	0.024	2.37	107	0.9	99	0.29	-0.01	87	182	83	77
201	31.605	0.165	0.025	2.38	107	1.0	-	0.27	-0.02	87	181	83	77
202	31.763	0.158	0.025	2.39	107	1.0	-	0.26	-0.01	87	181	83	77
203	31.925	0.162	0.025	2.40	107	1.0	-	0.25	-0.01	87	181	83	77
204	32.089	0.164	0.025	2.40	107	0.9	-	0.24	-0.01	87	181	83	77
205	32.245	0.156	0.025	2.43	107	0.9	-	0.23	-0.01	87	180	83	77
206	32.407	0.162	0.025	2.41	107	0.9	-	0.22	-0.01	87	180	83	77
207	32.569	0.162	0.024	2.42	107	1.0	-	0.21	-0.01	87	180	83	77
208	32.727	0.158	0.025	2.44	107	1.0	-	0.20	-0.01	87	180	83	77
209	32.889	0.162	0.025	2.44	107	1.0	-	0.19	-0.01	87	179	83	77
210	33.047	0.158	0.025	2.43	107	1.0	100	0.17	-0.02	87	179	83	77
211	33.211	0.164	0.025	2.42	107	1.0	-	0.16	-0.01	87	179	83	77
212	33.369	0.158	0.025	2.43	107	1.0	-	0.15	-0.01	87	179	83	77
213	33.530	0.161	0.025	2.42	107	1.0	-	0.14	-0.01	87	179	83	77
214	33.696	0.166	0.025	2.41	107	1.0	-	0.13	-0.01	87	177	83	77
215	33.850	0.154	0.025	2.42	107	1.0	-	0.12	-0.01	87	176	83	77
216	34.014	0.164	0.025	2.40	107	0.9	-	0.12	0.00	87	175	83	77
217	34.171	0.157	0.025	2.40	107	1.0	-	0.11	-0.01	87	175	83	77
218	34.334	0.163	0.025	2.40	108	1.0	-	0.10	-0.01	87	174	83	78
219	34.496	0.162	0.024	2.41	108	1.0	-	0.09	-0.01	87	173	83	78
220	34.653	0.157	0.025	2.41	108	1.0	98	0.08	-0.01	87	172	83	78
221	34.820	0.167	0.025	2.43	108	1.0	-	0.07	-0.01	87	172	83	78
222	34.975	0.155	0.025	2.42	108	1.0	-	0.06	-0.01	87	171	83	78
223	35.137	0.162	0.025	2.41	108	1.0	-	0.05	-0.01	87	170	83	78

BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: IHP
Model: S160AGL
Run #: 2

Job #: 23-106
Tracking #: 99
Technician: AK
Date: 6/7/2023

	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
224	35.299	0.162	0.024	2.41	108	1.0	-	0.05	0.00	87	169	83	78
225	35.457	0.158	0.025	2.39	108	1.0	-	0.04	-0.01	87	169	83	78
226	35.620	0.163	0.025	2.41	108	0.9	-	0.03	-0.01	87	168	83	78
227	35.783	0.163	0.025	2.39	108	1.0	-	0.02	-0.01	87	168	83	78
228	35.941	0.158	0.024	2.39	108	1.0	99	0.00	-0.02	87	167	83	78
Avg/Tot	35.941	0.158	0.024	2.35	99.8	0.9	100			91.7	284.7	82.3	76.0

BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: IHP
Model: S160AGL
Run #: 2

Job #: 23-106
Tracking #: 99
Technician: AK
Date: 6/7/2023

	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		0.16	84	1.1		79	-0.077	8.59	1.041
1	0.121	0.121	2.07	84	1.8	-	81	-0.050	1.61	0.214
2	0.255	0.134	2.07	84	1.6	-	82	-0.109	10.68	0.407
3	0.402	0.147	2.06	84	2.0	-	84	-0.120	15.84	0.101
4	0.544	0.142	2.06	84	1.6	-	86	-0.123	17.86	0.038
5	0.690	0.146	2.05	84	1.6	-	87	-0.124	18.29	0.027
6	0.830	0.140	2.05	84	1.8	-	87	-0.102	15.91	3.134
7	0.975	0.145	2.05	84	2.0	-	86	-0.097	15.24	0.441
8	1.116	0.141	2.05	84	1.6	-	85	-0.096	14.91	0.423
9	1.262	0.146	2.06	84	1.7	-	85	-0.094	15.00	0.449
10	1.404	0.142	2.06	84	1.5	99	85	-0.094	15.26	0.449
11	1.546	0.142	2.06	84	1.7	-	85	-0.093	15.36	0.453
12	1.690	0.144	2.06	84	2.0	-	85	-0.093	15.46	0.492
13	1.831	0.141	2.06	84	1.7	-	85	-0.093	15.70	0.534
14	1.979	0.148	2.06	84	1.8	-	85	-0.093	15.75	0.469
15	2.120	0.141	2.07	85	1.5	-	85	-0.092	15.76	0.412
16	2.265	0.145	2.06	85	1.9	-	85	-0.094	15.83	0.435
17	2.407	0.142	2.06	85	1.9	-	85	-0.091	15.91	0.495
18	2.553	0.146	2.07	85	1.5	-	85	-0.092	15.92	0.550
19	2.696	0.143	2.07	85	1.9	-	85	-0.091	15.99	0.636
20	2.840	0.144	2.07	86	1.5	103	85	-0.091	16.04	0.699
21	2.983	0.143	2.07	86	1.9	-	85	-0.091	16.02	0.838
22	3.126	0.143	2.06	86	2.0	-	85	-0.091	15.94	0.942
23	3.272	0.146	2.07	86	1.8	-	85	-0.090	16.04	1.247
24	3.415	0.143	2.07	86	2.0	-	85	-0.089	15.95	1.374
25	3.561	0.146	2.06	87	2.1	-	85	-0.089	15.78	1.131
26	3.702	0.141	2.07	87	2.0	-	85	-0.089	15.57	0.775
27	3.848	0.146	2.06	87	2.0	-	85	-0.089	15.51	0.616
28	3.990	0.142	2.06	88	1.8	-	85	-0.090	15.34	0.498
29	4.137	0.147	2.07	88	1.6	-	85	-0.088	15.31	0.478
30	4.280	0.143	2.06	88	1.5	103	85	-0.089	15.36	0.493
31	4.424	0.144	2.06	88	2.1	-	85	-0.090	15.47	0.607

BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: IHP
Model: S160AGL
Run #: 2

Job #: 23-106
Tracking #: 99
Technician: AK
Date: 6/7/2023

	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	4.568	0.144	2.06	89	1.6	-	85	-0.088	15.49	0.671
33	4.712	0.144	2.07	89	2.0	-	84	-0.088	15.34	0.683
34	4.858	0.146	2.07	89	1.5	-	84	-0.087	15.55	0.741
35	5.002	0.144	2.07	89	1.9	-	84	-0.087	15.61	0.809
36	5.148	0.146	2.07	90	2.0	-	84	-0.088	15.45	0.736
37	5.290	0.142	2.07	90	1.6	-	84	-0.087	15.24	0.575
38	5.437	0.147	2.06	90	1.7	-	84	-0.086	15.22	0.471
39	5.580	0.143	2.07	90	1.9	-	84	-0.085	14.89	0.330
40	5.727	0.147	2.07	91	1.5	102	84	-0.084	14.37	0.246
41	5.871	0.144	2.07	91	1.5	-	84	-0.082	13.77	0.101
42	6.017	0.146	2.07	91	1.7	-	84	-0.080	13.16	0.071
43	6.162	0.145	2.08	91	1.6	-	84	-0.080	12.68	0.069
44	6.306	0.144	2.08	92	1.7	-	84	-0.080	12.34	0.081
45	6.451	0.145	2.07	92	2.0	-	84	-0.078	11.85	0.067
46	6.596	0.145	2.08	92	1.5	-	84	-0.075	11.56	0.104
47	6.743	0.147	2.08	92	1.6	-	83	-0.072	11.00	0.199
48	6.887	0.144	2.08	92	1.5	-	83	-0.072	10.31	0.328
49	7.035	0.148	2.08	93	1.8	-	83	-0.071	9.83	0.355
50	7.178	0.143	2.08	93	1.5	101	83	-0.072	9.70	0.406
51	7.326	0.148	2.08	93	2.0	-	83	-0.073	9.56	0.401
52	7.469	0.143	2.08	93	1.6	-	83	-0.070	9.45	0.415
53	7.617	0.148	2.07	94	1.7	-	83	-0.070	9.49	0.343
54	7.761	0.144	2.08	94	1.6	-	83	-0.066	8.30	0.231
55	7.908	0.147	2.08	94	1.7	-	83	-0.066	7.89	0.325
56	8.053	0.145	2.09	94	1.6	-	83	-0.066	7.25	0.569
57	8.201	0.148	2.09	94	1.7	-	83	-0.064	7.10	0.538
58	8.346	0.145	2.08	95	1.6	-	82	-0.060	6.85	0.673
59	8.492	0.146	2.09	95	1.8	-	82	-0.064	6.59	0.740
60	8.638	0.146	2.09	95	2.0	102	82	-0.059	5.92	1.120
61	8.783	0.145	2.09	95	1.7	-	82	-0.060	6.11	1.145
62	8.930	0.147	2.09	95	2.0	-	82	-0.058	5.61	1.374
63	9.075	0.145	2.09	96	1.6	-	82	-0.055	5.51	1.395

BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: IHP
Model: S160AGL
Run #: 2

Job #: 23-106
Tracking #: 99
Technician: AK
Date: 6/7/2023

	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	9.223	0.148	2.09	96	2.0	-	82	-0.057	5.52	1.423
65	9.366	0.143	2.10	96	2.1	-	82	-0.059	5.61	1.432
66	9.515	0.149	2.10	96	1.7	-	82	-0.051	5.63	1.475
67	9.661	0.146	2.10	96	1.7	-	82	-0.058	5.66	1.457
68	9.809	0.148	2.10	96	2.0	-	82	-0.057	5.85	1.454
69	9.953	0.144	2.10	97	1.9	-	82	-0.054	5.98	1.434
70	10.102	0.149	2.10	97	1.8	102	82	-0.054	6.20	1.402
71	10.247	0.145	2.10	97	1.8	-	82	-0.056	6.26	1.372
72	10.395	0.148	2.10	97	1.5	-	82	-0.055	6.73	0.967
73	10.539	0.144	2.09	97	1.5	-	82	-0.057	6.43	1.164
74	10.688	0.149	2.10	97	1.9	-	81	-0.057	6.46	1.182
75	10.834	0.146	2.10	97	1.5	-	81	-0.057	6.42	1.167
76	10.982	0.148	2.11	98	1.7	-	81	-0.057	6.66	1.077
77	11.128	0.146	2.10	98	1.9	-	81	-0.058	6.90	1.028
78	11.276	0.148	2.11	98	2.0	-	81	-0.060	7.39	0.843
79	11.423	0.147	2.11	98	2.0	-	81	-0.053	7.58	0.822
80	11.571	0.148	2.11	98	2.0	100	81	-0.059	7.30	0.840
81	11.717	0.146	2.10	98	1.7	-	82	-0.058	7.51	0.806
82	11.864	0.147	2.10	98	2.0	-	82	-0.059	7.25	0.747
83	12.011	0.147	2.11	98	2.0	-	82	-0.056	6.38	1.113
84	12.157	0.146	2.11	99	2.0	-	82	-0.049	5.93	1.248
85	12.304	0.147	2.11	99	1.9	-	82	-0.052	5.65	1.328
86	12.451	0.147	2.11	99	1.5	-	82	-0.051	5.62	1.491
87	12.599	0.148	2.10	99	2.0	-	82	-0.051	5.45	1.594
88	12.742	0.143	2.11	99	1.5	-	82	-0.048	5.56	1.625
89	12.891	0.149	2.11	99	1.5	-	82	-0.048	5.66	1.509
90	13.039	0.148	2.10	99	1.5	99	82	-0.047	5.56	1.556
91	13.188	0.149	2.11	99	1.6	-	82	-0.046	5.56	1.611
92	13.333	0.145	2.11	100	1.9	-	82	-0.047	5.54	1.613
93	13.483	0.150	2.10	100	1.9	-	82	-0.049	5.57	1.647
94	13.629	0.146	2.11	100	1.6	-	82	-0.045	5.46	1.704
95	13.778	0.149	2.11	100	1.9	-	82	-0.044	5.39	1.794

BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: IHP
Model: S160AGL
Run #: 2

Job #: 23-106
Tracking #: 99
Technician: AK
Date: 6/7/2023

	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	13.924	0.146	2.11	100	1.5	-	82	-0.043	5.30	1.860
97	14.073	0.149	2.11	100	2.0	-	82	-0.047	5.38	1.842
98	14.218	0.145	2.11	100	2.0	-	82	-0.045	5.42	1.836
99	14.366	0.148	2.11	100	1.6	-	82	-0.045	5.45	1.838
100	14.510	0.144	2.11	100	2.0	99	82	-0.044	5.47	1.863
101	14.657	0.147	2.11	100	2.0	-	82	-0.042	5.33	1.872
102	14.806	0.149	2.11	101	2.0	-	82	-0.044	5.39	1.924
103	14.958	0.152	2.11	101	1.5	-	82	-0.043	5.03	2.204
104	15.103	0.145	2.11	101	1.5	-	82	-0.041	4.97	2.231
105	15.252	0.149	2.11	101	1.8	-	82	-0.043	4.96	2.228
106	15.397	0.145	2.10	101	1.8	-	82	-0.041	4.94	2.218
107	15.547	0.150	2.10	101	1.6	-	82	-0.043	4.96	2.221
108	15.693	0.146	2.10	101	1.6	-	82	-0.043	4.95	2.217
109	15.843	0.150	2.11	101	2.0	-	82	-0.042	4.86	2.159
110	15.989	0.146	2.11	101	1.9	100	82	-0.041	4.83	2.165
111	16.138	0.149	2.11	101	1.5	-	82	-0.040	4.78	2.134
112	16.284	0.146	2.12	101	2.0	-	82	-0.043	4.77	2.147
113	16.433	0.149	2.11	101	1.7	-	82	-0.041	4.78	2.134
114	16.579	0.146	2.10	101	1.9	-	82	-0.041	4.82	2.142
115	16.729	0.150	2.11	102	1.6	-	82	-0.040	4.83	2.220
116	16.876	0.147	2.11	102	1.5	-	82	-0.039	4.79	2.226
117	17.025	0.149	2.11	102	2.0	-	82	-0.039	4.86	2.234
118	17.172	0.147	2.11	102	2.0	-	82	-0.041	4.85	2.248
119	17.321	0.149	2.11	102	1.5	-	82	-0.043	4.83	2.232
120	17.467	0.146	2.11	102	1.5	100	82	-0.041	4.83	2.214
121	17.616	0.149	2.11	102	1.6	-	82	-0.039	4.84	2.215
122	17.763	0.147	2.11	102	1.8	-	82	-0.040	4.83	2.211
123	17.911	0.148	2.11	102	1.7	-	82	-0.041	4.81	2.207
124	18.059	0.148	2.11	102	1.6	-	82	-0.039	4.85	2.215
125	18.207	0.148	2.11	102	1.6	-	82	-0.040	5.09	1.947
126	18.355	0.148	2.11	102	1.5	-	82	-0.039	5.01	1.931
127	18.503	0.148	2.11	102	1.8	-	82	-0.040	5.00	1.922

BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: IHP
Model: S160AGL
Run #: 2

Job #: 23-106
Tracking #: 99
Technician: AK
Date: 6/7/2023

	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	18.651	0.148	2.11	102	1.8	-	82	-0.042	5.01	1.924
129	18.798	0.147	2.11	102	1.5	-	82	-0.038	5.01	1.913
130	18.947	0.149	2.11	102	1.5	100	82	-0.040	5.00	1.915
131	19.094	0.147	2.11	102	1.7	-	82	-0.037	4.97	1.913
132	19.242	0.148	2.12	103	1.9	-	82	-0.038	4.96	1.909
133	19.389	0.147	2.11	103	1.5	-	82	-0.039	4.87	1.852
134	19.538	0.149	2.11	103	2.0	-	82	-0.039	4.85	1.851
135	19.685	0.147	2.10	103	1.7	-	82	-0.040	4.90	1.864
136	19.834	0.149	2.11	103	1.5	-	82	-0.038	4.86	1.864
137	19.981	0.147	2.11	103	2.0	-	82	-0.040	4.89	1.867
138	20.131	0.150	2.11	103	1.6	-	82	-0.040	4.85	1.855
139	20.277	0.146	2.11	103	1.6	-	82	-0.038	4.85	1.858
140	20.427	0.150	2.11	103	1.5	100	82	-0.041	4.77	1.862
141	20.574	0.147	2.11	103	1.5	-	82	-0.040	4.79	1.856
142	20.724	0.150	2.11	103	1.8	-	82	-0.036	4.82	1.848
143	20.870	0.146	2.11	103	1.8	-	82	-0.035	4.82	1.863
144	21.020	0.150	2.12	103	1.6	-	82	-0.040	4.85	1.885
145	21.166	0.146	2.12	103	1.6	-	82	-0.036	4.91	1.882
146	21.316	0.150	2.11	103	2.0	-	82	-0.035	4.93	1.877
147	21.462	0.146	2.11	103	1.5	-	82	-0.038	4.93	1.854
148	21.613	0.151	2.12	103	1.5	-	82	-0.041	4.95	1.852
149	21.759	0.146	2.11	103	1.6	-	82	-0.039	4.92	1.851
150	21.909	0.150	2.12	103	1.7	99	82	-0.034	4.98	1.864
151	22.056	0.147	2.12	103	1.7	-	82	-0.038	4.93	1.865
152	22.206	0.150	2.12	103	1.9	-	82	-0.035	4.89	1.844
153	22.353	0.147	2.12	104	2.0	-	82	-0.040	4.86	1.922
154	22.503	0.150	2.12	104	1.5	-	82	-0.038	4.95	1.891
155	22.649	0.146	2.12	104	1.9	-	82	-0.039	4.95	1.887
156	22.800	0.151	2.12	104	1.7	-	82	-0.032	4.94	1.876
157	22.946	0.146	2.12	104	1.5	-	82	-0.039	5.02	1.797
158	23.097	0.151	2.11	104	1.6	-	82	-0.039	5.03	1.777
159	23.243	0.146	2.12	104	2.0	-	82	-0.036	5.00	1.740

BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: IHP
Job #: 23-106
Model: S160AGL
Tracking #: 99
Run #: 2
Technician: AK
Date: 6/7/2023

	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	23.393	0.150	2.12	104	1.9	99	82	-0.036	5.00	1.681
161	23.539	0.146	2.12	104	1.9	-	82	-0.033	4.99	1.661
162	23.690	0.151	2.11	104	1.5	-	82	-0.033	4.98	1.684
163	23.836	0.146	2.11	104	1.7	-	82	-0.038	4.98	1.666
164	23.986	0.150	2.11	104	1.5	-	82	-0.037	4.92	1.651
165	24.132	0.146	2.11	104	2.0	-	82	-0.036	4.88	1.664
166	24.283	0.151	2.11	104	1.5	-	83	-0.037	4.84	1.638
167	24.429	0.146	2.11	104	1.7	-	83	-0.037	4.76	1.659
168	24.579	0.150	2.12	104	1.6	-	83	-0.034	4.69	1.660
169	24.726	0.147	2.12	104	1.6	-	83	-0.038	4.66	1.621
170	24.876	0.150	2.12	104	1.7	100	83	-0.037	4.58	1.704
171	25.022	0.146	2.12	104	1.6	-	83	-0.039	4.57	1.717
172	25.173	0.151	2.11	104	2.1	-	82	-0.034	4.57	1.729
173	25.319	0.146	2.11	104	1.7	-	82	-0.038	4.50	1.726
174	25.470	0.151	2.12	104	1.6	-	82	-0.036	4.10	1.917
175	25.616	0.146	2.12	104	1.6	-	82	-0.039	4.03	1.912
176	25.767	0.151	2.12	104	1.5	-	83	-0.038	4.01	1.898
177	25.913	0.146	2.12	104	1.9	-	83	-0.038	4.00	1.896
178	26.064	0.151	2.12	104	1.8	-	83	-0.036	3.97	1.884
179	26.207	0.143	2.11	104	1.7	-	83	-0.030	3.97	1.882
180	26.361	0.154	2.11	104	1.9	100	83	-0.034	3.94	1.882
181	26.507	0.146	2.12	105	2.0	-	83	-0.035	3.91	1.865
182	26.655	0.148	2.12	105	1.5	-	83	-0.036	3.93	1.867
183	26.801	0.146	2.12	105	1.9	-	83	-0.037	3.88	1.854
184	26.951	0.150	2.12	105	1.6	-	83	-0.038	3.94	1.895
185	27.100	0.149	2.11	105	2.0	-	83	-0.035	3.97	1.899
186	27.248	0.148	2.12	105	1.5	-	83	-0.033	3.95	1.883
187	27.397	0.149	2.11	105	1.7	-	83	-0.038	3.94	1.879
188	27.548	0.151	2.12	105	2.0	-	83	-0.035	3.88	1.843
189	27.691	0.143	2.11	105	1.5	-	83	-0.035	3.88	1.836
190	27.842	0.151	2.11	105	1.5	99	83	-0.035	3.92	1.845
191	27.988	0.146	2.12	105	1.5	-	83	-0.033	3.88	1.814

BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: IHP
Job #: 23-106
Model: S160AGL
Tracking #: 99
Run #: 2
Technician: AK
Date: 6/7/2023

	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	28.139	0.151	2.11	105	1.6	-	83	-0.036	3.87	1.808
193	28.288	0.149	2.12	105	1.5	-	83	-0.032	3.81	1.779
194	28.436	0.148	2.11	105	1.9	-	83	-0.038	3.81	1.776
195	28.582	0.146	2.11	105	1.7	-	83	-0.037	3.81	1.770
196	28.733	0.151	2.11	105	1.5	-	83	-0.035	3.80	1.767
197	28.882	0.149	2.11	105	1.8	-	83	-0.034	3.79	1.769
198	29.028	0.146	2.12	105	1.6	-	83	-0.032	3.82	1.768
199	29.176	0.148	2.11	105	1.6	-	83	-0.035	3.86	1.799
200	29.325	0.149	2.12	105	1.8	99	83	-0.034	3.98	1.841
201	29.473	0.148	2.11	105	2.0	-	83	-0.032	4.01	1.835
202	29.624	0.151	2.12	105	1.7	-	83	-0.032	4.06	1.834
203	29.771	0.147	2.11	105	1.6	-	83	-0.032	4.06	1.840
204	29.924	0.153	2.11	105	1.8	-	83	-0.033	4.02	1.830
205	30.068	0.144	2.12	105	1.9	-	83	-0.034	4.07	1.846
206	30.218	0.150	2.12	105	1.5	-	83	-0.032	4.07	1.834
207	30.367	0.149	2.11	105	1.9	-	83	-0.033	4.05	1.833
208	30.516	0.149	2.12	105	1.8	-	83	-0.032	4.03	1.814
209	30.662	0.146	2.12	105	1.8	-	83	-0.034	4.01	1.813
210	30.813	0.151	2.12	105	1.8	99	83	-0.033	4.02	1.821
211	30.960	0.147	2.12	105	1.7	-	83	-0.033	4.09	1.850
212	31.110	0.150	2.12	105	2.0	-	83	-0.031	4.04	1.830
213	31.257	0.147	2.12	105	1.6	-	83	-0.031	4.02	1.845
214	31.410	0.153	2.11	105	2.0	-	83	-0.032	3.81	1.748
215	31.554	0.144	2.11	105	1.6	-	83	-0.033	3.73	1.707
216	31.705	0.151	2.12	105	1.6	-	83	-0.032	3.70	1.680
217	31.851	0.146	2.11	105	1.9	-	83	-0.030	3.68	1.673
218	32.002	0.151	2.12	105	2.0	-	83	-0.032	3.62	1.647
219	32.149	0.147	2.12	105	1.6	-	83	-0.030	3.61	1.640
220	32.299	0.150	2.12	105	1.8	98	83	-0.030	3.61	1.644
221	32.448	0.149	2.11	105	1.5	-	83	-0.029	3.54	1.611
222	32.596	0.148	2.12	105	1.5	-	83	-0.027	3.55	1.615
223	32.743	0.147	2.12	105	1.5	-	83	-0.033	3.48	1.594

BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: IHP
Model: S160AGL
Run #: 2

Job #: 23-106
Tracking #: 99
Technician: AK
Date: 6/7/2023

	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	32.894	0.151	2.12	106	1.8	-	83	-0.029	3.53	1.619
225	33.041	0.147	2.12	106	1.7	-	83	-0.030	3.54	1.637
226	33.191	0.150	2.12	106	1.9	-	83	-0.029	3.59	1.661
227	33.340	0.149	2.11	106	1.5	-	83	-0.034	3.59	1.666
228	33.489	0.149	2.12	106	1.8	99	83	-0.030	3.59	1.677
Avg/Tot	33.489	0.147	2.09	98.6	1.7	100	82.7	-0.052	7.08	1.432

BOX C TEST DATA - ASTM E2780 / ASTM E2515

Client: IHP
Model: S160AGL
Run #: 2

Job #: 23-106
Tracking #: 99
Technician: AK
Date: 6/7/2023

	Particulate Sampling 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)
0	0.000		0.09	80	0.8		77
1	0.155	0.155	1.06	79	1.7	-	77
2	0.306	0.151	1.06	79	1.7	-	77
3	0.463	0.157	1.06	79	1.8	-	78
4	0.617	0.154	1.06	79	1.8	-	78
5	0.772	0.155	1.07	79	1.9	-	79
6	0.927	0.155	1.08	80	1.7	-	79
7	1.083	0.156	1.09	80	1.8	-	79
8	1.239	0.156	1.09	80	1.7	-	79
9	1.396	0.157	1.09	80	1.9	-	80
10	1.551	0.155	1.09	80	1.9	99	80
11	1.708	0.157	1.08	81	1.9	-	80
12	1.865	0.157	1.09	81	1.9	-	80
13	2.019	0.154	1.10	81	1.8	-	80
14	2.179	0.160	1.10	81	1.8	-	80
15	2.337	0.158	1.11	81	1.7	-	80
16	2.493	0.156	1.10	82	1.9	-	80
17	2.651	0.158	1.10	82	1.7	-	81
18	2.809	0.158	1.11	82	1.8	-	81
19	2.968	0.159	1.12	82	1.9	-	81
20	3.126	0.158	1.12	82	1.8	102	81
21	3.284	0.158	1.11	83	1.9	-	81
22	3.444	0.160	1.12	83	1.9	-	81
23	3.603	0.159	1.12	83	1.8	-	81
24	3.763	0.160	1.13	83	2.0	-	81
25	3.921	0.158	1.12	84	1.7	-	81
26	4.082	0.161	1.12	84	1.9	-	81
27	4.242	0.160	1.13	84	2.0	-	81
28	4.401	0.159	1.13	85	1.9	-	81
29	4.562	0.161	1.13	85	1.7	-	81
30	4.723	0.161	1.14	85	1.8	103	81
31	4.883	0.160	1.14	85	1.7	-	81

BOX C TEST DATA - ASTM E2780 / ASTM E2515

Client: IHP
Model: S160AGL
Run #: 2

Job #: 23-106
Tracking #: 99
Technician: AK
Date: 6/7/2023

	Particulate Sampling 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)
32	5.043	0.160	1.13	85	1.9	-	81
33	5.205	0.162	1.14	86	1.9	-	81
34	5.366	0.161	1.14	86	1.9	-	81
35	5.526	0.160	1.13	86	1.7	-	81
36	5.689	0.163	1.14	86	1.9	-	81
37	5.850	0.161	1.15	87	2.0	-	81
38	6.011	0.161	1.14	87	1.7	-	81
39	6.173	0.162	1.15	87	2.0	-	81
40	6.334	0.161	1.14	87	1.9	102	81
41	6.497	0.163	1.14	88	1.9	-	81
42	6.659	0.162	1.15	88	1.8	-	81
43	6.820	0.161	1.14	88	1.9	-	81
44	6.983	0.163	1.15	88	1.9	-	81
45	7.146	0.163	1.15	89	1.8	-	81
46	7.307	0.161	1.14	89	1.9	-	81
47	7.471	0.164	1.15	89	1.9	-	81
48	7.632	0.161	1.15	89	1.8	-	81
49	7.796	0.164	1.14	89	2.0	-	81
50	7.959	0.163	1.16	90	1.9	102	81
51	8.121	0.162	1.14	90	1.9	-	81
52	8.285	0.164	1.16	90	1.8	-	80
53	8.447	0.162	1.15	90	1.9	-	80
54	8.611	0.164	1.15	90	1.9	-	80
55	8.775	0.164	1.16	90	1.9	-	80
56	8.937	0.162	1.15	90	1.9	-	80
57	9.101	0.164	1.16	90	1.9	-	80
58	9.264	0.163	1.15	90	1.8	-	80
59	9.429	0.165	1.16	90	1.9	-	80
60	9.591	0.162	1.16	90	1.9	103	80
Avg/Tot	9.591	0.160	1.11	84.9	1.8	102	80.2

WOODSTOVE SURFACE TEMPERATURE DATA

Client: IHP
Model: S160AGL
Run #: 2

Job #: 23-106
Tracking #: 99
Technician: AK
Date: 6/7/2023

Stove ΔT: **159**

	Temperature Data (°F)						
Elapsed Time (min)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
0	534	516	299	312	444	420.8	73.9
1	530	511	303	298	453	419.1	73.9
2	527	508	327	380	440	436.3	73.9
3	533	515	339	499	434	463.8	73.9
4	540	525	347	609	431	490.4	73.9
5	550	537	354	701	427	513.9	74.0
6	555	545	360	731	441	526.3	73.9
7	559	548	367	738	446	531.4	74.0
8	562	551	372	742	449	535.0	74.0
9	565	553	377	746	452	538.5	74.0
10	568	555	381	752	454	541.7	74.0
11	570	556	384	758	456	544.8	74.1
12	573	558	386	764	457	547.5	74.1
13	575	559	388	770	458	550.0	74.0
14	578	561	389	778	458	552.9	74.1
15	580	563	391	783	459	555.1	74.1
16	582	565	392	788	459	557.2	74.0
17	585	567	393	793	459	559.3	74.0
18	588	569	394	796	459	561.1	74.0
19	590	571	394	800	459	562.8	74.0
20	593	573	395	804	459	564.8	74.0
21	595	576	395	810	458	566.8	74.0
22	598	578	396	813	458	568.6	74.1
23	601	580	397	815	457	569.9	74.0
24	603	582	397	815	457	570.6	74.0
25	606	584	398	816	456	572.0	74.0
26	609	586	398	816	456	573.1	74.0
27	613	589	399	812	455	573.6	74.1
28	616	592	399	808	454	573.9	74.1
29	619	594	400	801	453	573.5	74.1
30	622	596	400	799	453	574.0	74.0
31	625	598	378	751	452	560.5	74.1
32	628	600	366	729	450	554.5	74.1
33	630	601	355	711	449	549.3	74.0
34	633	603	345	697	448	545.2	74.0
35	636	605	337	686	447	542.3	74.1
36	639	607	331	677	446	540.0	74.0
37	642	609	327	667	445	537.9	74.0
38	644	611	322	658	444	535.7	74.0
39	647	612	318	648	443	533.5	74.0
40	648	614	316	635	441	530.8	74.0
41	649	615	313	621	440	527.5	74.1
42	650	615	310	605	439	523.8	74.1
43	650	614	310	590	438	520.3	74.2
44	650	613	309	575	437	516.8	74.3
45	650	611	309	561	435	513.2	74.3
46	649	609	308	546	434	509.1	74.2
47	647	606	308	531	433	504.9	74.2

WOODSTOVE SURFACE TEMPERATURE DATA

Client: IHP
Model: S160AGL
Run #: 2

Job #: 23-106
Tracking #: 99
Technician: AK
Date: 6/7/2023

Stove ΔT: 159

	Temperature Data (°F)						
Elapsed Time (min)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
48	644	603	308	516	432	500.5	74.3
49	640	601	308	501	431	495.9	74.3
50	635	597	309	489	429	491.7	74.3
51	631	593	310	478	428	487.9	74.2
52	627	589	311	468	427	484.2	74.3
53	622	585	312	459	426	480.8	74.3
54	617	581	312	449	426	476.8	74.3
55	611	577	314	439	425	473.0	74.3
56	604	572	315	429	424	468.8	74.3
57	597	568	315	421	423	464.7	74.4
58	590	563	315	411	422	460.2	74.4
59	583	559	314	401	421	455.5	74.3
60	576	555	312	390	420	450.7	74.3
61	569	551	310	380	420	446.1	74.3
62	562	548	309	370	419	441.6	74.4
63	556	543	308	362	417	437.3	74.3
64	549	538	307	354	416	432.8	74.4
65	544	533	304	347	415	428.6	74.4
66	538	528	303	340	414	424.4	74.4
67	532	523	300	335	413	420.4	74.5
68	527	518	298	329	411	416.5	74.2
69	522	513	295	326	409	413.2	74.3
70	517	509	293	322	408	410.1	74.4
71	513	505	291	320	407	407.3	74.5
72	509	502	289	318	406	404.8	74.5
73	505	499	287	317	405	402.3	74.5
74	501	496	285	317	403	400.1	74.4
75	497	492	281	315	401	397.3	74.3
76	493	490	279	315	400	395.3	74.4
77	490	487	277	316	398	393.6	74.3
78	487	485	275	318	397	392.4	74.3
79	485	483	273	321	395	391.5	74.5
80	483	481	270	321	394	389.8	74.5
81	481	480	269	322	393	388.6	74.6
82	478	479	267	320	391	387.1	74.4
83	475	478	265	315	390	384.7	74.6
84	473	476	264	311	389	382.6	74.6
85	470	475	262	305	388	379.9	74.5
86	467	473	261	301	387	377.5	74.6
87	464	471	259	295	386	375.0	74.5
88	462	470	258	289	386	372.9	74.5
89	459	469	257	286	385	371.2	74.5
90	456	467	256	281	384	368.8	74.5
91	453	466	255	277	383	366.7	74.5
92	451	464	255	273	382	364.7	74.6
93	448	462	254	270	382	362.9	74.4
94	446	459	253	267	381	361.1	74.5
95	443	457	252	263	380	359.1	74.5

WOODSTOVE SURFACE TEMPERATURE DATA

Client: IHP
Model: S160AGL
Run #: 2

Job #: 23-106
Tracking #: 99
Technician: AK
Date: 6/7/2023

Stove ΔT: 159

	Temperature Data (°F)						
Elapsed Time (min)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
96	441	454	251	260	380	357.2	74.6
97	438	452	250	257	379	355.3	74.6
98	436	449	249	255	379	353.8	74.7
99	434	447	248	253	379	352.1	74.5
100	432	445	247	251	378	350.6	74.5
101	431	442	249	251	378	350.2	74.7
102	428	440	250	249	378	349.1	74.7
103	426	438	248	247	377	347.1	74.7
104	424	435	248	245	377	346.0	74.7
105	422	433	248	244	377	344.8	74.5
106	421	431	248	242	376	343.5	74.6
107	419	429	249	240	376	342.5	74.5
108	418	427	250	240	375	341.8	74.6
109	416	425	249	238	375	340.6	74.5
110	414	423	248	237	375	339.5	74.6
111	413	421	247	236	375	338.2	74.5
112	411	419	245	235	374	336.7	74.5
113	409	417	243	234	374	335.4	74.6
114	408	416	244	233	374	334.8	74.6
115	407	414	243	232	373	333.6	74.6
116	405	412	242	231	373	332.7	74.6
117	404	410	241	230	373	331.5	74.6
118	402	409	240	229	372	330.6	74.6
119	401	408	239	229	372	329.7	74.5
120	400	406	238	227	372	328.5	74.6
121	399	405	237	227	371	327.7	74.5
122	398	403	236	226	371	326.6	74.7
123	397	402	235	225	371	325.9	74.6
124	396	401	235	224	370	325.2	74.5
125	394	400	234	224	370	324.3	74.6
126	393	399	233	223	370	323.6	74.6
127	392	399	233	223	369	323.1	74.6
128	391	398	231	222	369	322.2	74.7
129	390	397	231	221	369	321.5	74.5
130	389	397	230	220	368	320.8	74.6
131	388	396	230	220	368	320.4	74.7
132	387	395	229	219	368	319.5	74.6
133	386	395	229	218	367	318.9	74.6
134	385	394	229	218	367	318.5	74.7
135	384	393	228	217	367	317.7	74.6
136	382	392	226	217	367	316.8	74.6
137	381	392	227	216	366	316.4	74.7
138	380	391	226	216	366	315.7	74.8
139	379	390	226	215	365	315.0	74.7
140	378	389	225	215	365	314.5	74.6
141	377	388	224	214	365	313.6	74.8
142	376	387	224	214	364	313.1	74.7
143	375	387	224	213	364	312.6	74.7

WOODSTOVE SURFACE TEMPERATURE DATA

Client: IHP
Model: S160AGL
Run #: 2

Job #: 23-106
Tracking #: 99
Technician: AK
Date: 6/7/2023

Stove ΔT: 159

	Temperature Data (°F)						
Elapsed Time (min)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
144	374	386	224	213	364	312.0	74.7
145	373	385	223	213	363	311.5	74.8
146	372	384	223	213	363	310.9	74.8
147	371	384	223	213	362	310.5	74.7
148	370	384	222	213	362	310.1	74.7
149	369	383	221	213	362	309.5	74.8
150	368	382	221	212	361	308.9	74.8
151	367	382	221	213	361	308.7	74.7
152	366	381	220	212	360	308.0	74.7
153	365	381	220	212	360	307.6	74.8
154	364	380	220	212	360	307.1	74.9
155	363	380	220	212	359	306.8	74.8
156	362	380	219	211	359	306.1	74.7
157	362	379	219	211	359	305.9	74.7
158	361	378	219	211	358	305.4	74.8
159	360	378	218	211	358	305.0	74.9
160	360	377	218	211	357	304.5	74.9
161	359	376	219	211	357	304.5	74.9
162	358	375	218	211	357	303.7	74.8
163	357	375	218	211	356	303.3	74.8
164	357	374	218	210	356	302.9	74.9
165	356	374	218	210	355	302.4	74.9
166	355	373	218	210	355	302.2	74.9
167	354	373	217	210	354	301.7	74.8
168	354	372	218	209	354	301.3	74.8
169	353	372	218	209	354	300.9	74.9
170	352	371	217	208	353	300.3	74.8
171	351	370	218	208	353	300.0	74.8
172	350	369	218	208	352	299.5	74.8
173	350	368	219	207	352	299.0	74.9
174	349	367	218	206	351	298.3	74.8
175	348	366	218	206	351	297.6	74.8
176	347	365	219	205	350	297.1	74.9
177	346	364	219	204	350	296.3	74.9
178	345	363	219	203	349	295.7	74.9
179	344	362	220	202	349	295.1	74.9
180	343	360	218	201	348	293.9	74.9
181	342	359	217	200	347	292.9	75.0
182	341	358	217	199	347	292.2	74.9
183	340	357	217	198	346	291.4	74.9
184	339	355	217	197	345	290.6	75.1
185	338	354	217	197	344	290.1	75.0
186	337	354	217	196	344	289.5	75.0
187	336	352	217	195	343	288.7	75.1
188	335	351	217	195	342	288.1	75.0
189	334	350	217	194	342	287.4	75.0
190	333	349	216	193	341	286.6	75.0
191	332	348	216	193	340	285.9	74.9

WOODSTOVE SURFACE TEMPERATURE DATA

Client: IHP
Model: S160AGL
Run #: 2

Job #: 23-106
Tracking #: 99
Technician: AK
Date: 6/7/2023

Stove ΔT: 159

	Temperature Data (°F)						
Elapsed Time (min)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
192	331	347	216	192	340	285.0	75.0
193	330	346	216	191	339	284.3	75.1
194	329	345	215	190	338	283.4	75.0
195	328	345	215	190	338	283.0	75.1
196	327	344	215	189	337	282.0	75.2
197	326	343	214	189	336	281.4	75.1
198	324	342	214	188	335	280.7	75.1
199	324	341	214	188	334	280.1	75.1
200	323	340	214	187	334	279.4	75.1
201	322	340	213	187	333	278.7	75.0
202	321	339	213	186	332	278.2	75.1
203	320	339	212	186	332	277.6	75.2
204	319	338	212	185	331	276.9	75.0
205	318	337	212	185	330	276.5	75.0
206	318	337	211	185	329	275.8	75.1
207	317	336	211	184	329	275.2	75.0
208	316	336	210	184	328	274.7	75.0
209	315	335	210	184	327	274.2	75.1
210	314	334	209	184	326	273.5	75.2
211	314	333	210	183	326	273.1	75.2
212	313	333	210	183	325	272.7	75.1
213	313	332	209	182	324	272.1	75.1
214	312	332	209	182	323	271.6	75.2
215	311	331	209	181	323	270.9	75.0
216	310	331	208	181	322	270.2	75.2
217	309	330	209	179	321	269.7	75.3
218	308	330	209	178	321	269.1	75.3
219	307	329	209	178	320	268.5	75.2
220	306	328	208	178	319	267.8	75.3
221	305	327	208	177	319	267.0	75.2
222	304	326	208	176	318	266.3	75.3
223	303	325	208	175	317	265.5	75.4
224	302	325	207	175	317	264.9	75.2
225	301	324	207	174	316	264.2	75.3
226	300	323	207	173	315	263.5	75.4
227	299	322	206	173	315	262.9	75.3
228	298	321	206	173	314	262.2	75.3
Average	445.7	447.3	265.4	340.3	383.8	376.5	74.6

LAB SAMPLE DATA - ASTM E2515

Client: IHP
Model: S160AGL
Run #: 2

Job #: 23-106
Tracking #: 99
Technician: AK
Date: 6/7/2023

		Sample ID	Tare, mg	Final, mg	Catch, mg
Filters	**A**	G00550	243.7	245.3	1.6
	B	G00551	243.9	245.3	1.4
	C - 1st Hour	G00552	241.7	242.2	0.5
	Amb	G00553	241.8	241.8	0.0
Probes	**A**	13A	117313.8	117313.8	0.0
	B	13B	116941.0	116941.0	0.0
	C - 1st Hour	13C	115649.6	115649.6	0.0
O-rings	**A**	13A	3595.7	3596.1	0.4
	B	13B	3641.9	3642.3	0.4
	C - 1st Hour	13C	4408.9	4409.5	0.6

Placed in Dessicator on:	6/7/2023

Filters	**A**	245.3	6/9 14:02					
	B	245.3	6/9 14:02					
	C - 1st Hour	242.2	6/9 14:02					
	Amb	241.8	6/9 14:02					
Probes	**A**	117313.8	6/9 14:02					
	B	116941.0	6/9 14:02					
	C - 1st Hour	115649.6	6/9 14:02					
O-Rings	**A**	3596.1	6/9 14:02					
	B	3642.3	6/9 14:03					
	C - 1st Hour	4409.5	6/9 14:03					

Train A Aggregate, mg:	**2.0**
Train B Aggregate, mg:	**1.8**
Train C Aggregate, mg:	**1.1**
Ambient, mg:	**0.0**

ASTM E2780 Wood Heater Run Sheets

Client: IHP Job Number: 23-106 Tracking #: 99
Model: S160AGL Run Number: 2 Test Date: 6/7/23

Wood Heater Run Notes

Test Control Settings

Primary Air Setting(s): Open 0.53" from fully closed
Targeted Burn Category: II

Preburn Notes

Time	Notes
32:00 68:00	Added 1.05lb, door open 15 sec End PB

Test Notes

Test Burn Start Time: 15:44 Test Fuel Loaded by: 45 seconds
Door Closed: 65 seconds Air Control Set at: 300 seconds
Other Loading Notes: Fan on low @ 30 min

Time	Notes
	-None-

Test Burn End Time: 21:32

Flue Gas Concentration Measurement

Calibration Gas Values: Span Gas CO_2 (%): 17.01 CO (%): 4.306
Mid Gas CO_2 (%): 10.09 CO (%): 2.53

Calibration Results:

	Pre Test			Post Test		
	Zero	Span	Mid	Zero	Span	Mid
Time	08:32	08:33	08:34	20:06	20:07	20:09
CO_2	0.00	17.01	10.13	-0.04	16.99	10.06
CO	0.000	4.306	2.515	-0.037	4.243	2.459

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

Technician Signature:  Date: 6/26/23

ASTM E2780 Wood Heater Run Sheets

Client: IHP Job Number: 23-106 Tracking #: 99
Model: S160AGL Run Number: 2 Test Date: 6/7/23



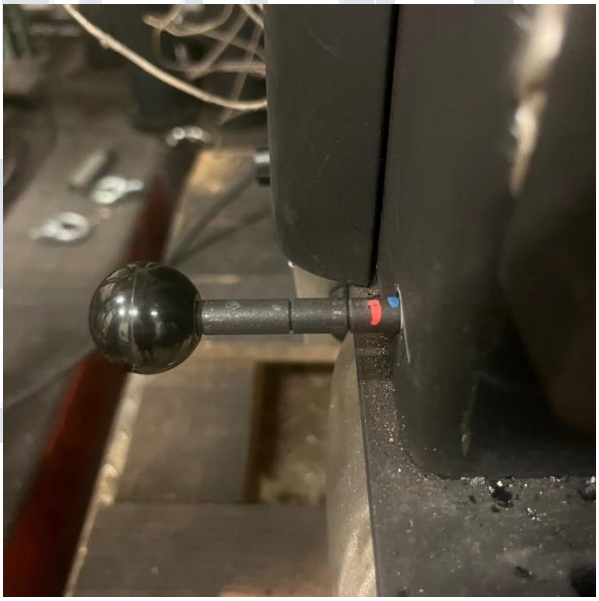
Test Fuel Side View



Test Fuel Iso View



Test Fuel Loaded in Stove



Air Setting

Technician Signature: Date: 6/26/23

WOOD STOVE TEST DATA PACKET
ASTM E2780/E2515

Run 3 Data Summary

Client:	IHP
Model:	S160AGL
Job #:	23-106
Tracking #:	99
Test Date:	6/8/2023

Technician Signature

6/30/2023
Date

TEST RESULTS - ASTM E2780 / ASTM E2515

Client: IHP
Model: S160AGL
Run #: 3

Job #: 23-106
Tracking #: 99
Technician: AK
Date: 6/8/2023

Burn Rate (kg/hr):	3.32

	Ambient Sample	Sample Train A	Sample Train B	1st Hour Filter
Total Sample Volume (ft^3)	8.506	10.834	10.400	9.408
Average Gas Velocity in Dilution Tunnel (ft/sec)	9.1			
Average Gas Flow Rate in Dilution Tunnel (dscf/hr)	23031.3			
Average Gas Meter Temperature (°F)	71.3	82.3	82.1	80.7
Total Sample Volume (dscf)	8.641	10.691	10.174	9.058
Average Tunnel Temperature (°F)	118.8			
Total Time of Test (min)	73			
Total Particulate Catch (mg)	0.0	0.9	0.8	0.9
Particulate Concentration, dry-standard (g/dscf)	0.0000000	0.0000842	0.0000786	0.0000994
Total PM Emissions (g)	0.00	2.36	2.20	2.29
Particulate Emission Rate (g/hr)	0.00	1.94	1.81	2.29
Emissions Factor (g/kg)	-	0.58	0.54	-
Difference from Average Total Particulate Emissions (g)	-	0.08	0.08	-
Difference from Average Total Particulate Emissions (%)	-	3.4%	3.4%	
Difference from Average Emissions Factor (g/kg)	-	0.02	0.02	-

Final Average Results	
Total Particulate Emissions (g)	2.28
Particulate Emission Rate (g/hr)	1.87
Emissions Factor (g/kg)	0.56
HHV Efficiency (%)	63.8%
LHV Efficiency (%)	68.9%
CO Emissions (g/min)	1.23

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	<90 °F	85.8	OK
Face Velocity	< 30 ft/min	8.5	OK
Leakage Rate	Less than 4% of average sample rate	0.001 cfm	OK
Ambient Temp	55-90 °F	Min:70.4/Max:72.5	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
Stove Surface ΔT	<126°F	76.0	OK

B415.1 Efficiency Results

Manufacturer:	IHP
Model:	S160AGL
Date:	06/08/23
Run:	3
Control #:	23-106
Test Duration:	73
Output Category:	4

Test Results in Accordance with CSA B415.1-09

	HHV Basis	LHV Basis
Overall Efficiency	63.8%	68.9%
Combustion Efficiency	98.6%	98.6%
Heat Transfer Efficiency	64.7%	69.9%

Output Rate (kJ/h)	41,585	39,447	**(Btu/h)**
Burn Rate (kg/h)	3.29	7.25	**(lb/h)**
Input (kJ/h)	65,199	61,848	**(Btu/h)**

Test Load Weight (dry kg)	4.00	8.83	**dry lb**
MC wet (%)	16.50		
MC dry (%)	19.77		
Particulate (g)	2.28		
CO (g)	90		
Test Duration (h)	1.22		

Emissions	**Particulate**	**CO**
g/MJ Output	0.05	1.78
g/kg Dry Fuel	0.57	22.45
g/h	1.87	73.88
g/min	0.03	1.23
lb/MM Btu Output	0.10	4.13

Air/Fuel Ratio (A/F)	12.16

VERSION: **2.4** **4/15/2010**

WOODSTOVE FUEL DATA - ASTM E2780

Client: IHP
Model: S160AGL
Run #: 3

Job #: 23-106
Tracking #: 99
Technician: AK
Date: 6/8/2023

Preburn Fuel Information

Size	Length (in)	Moisture Content (% DB)	Size	Length (in)	Moisture Content (% DB)
2x4	9.00	19.4	2x4	13.00	24.4
2x4	13.00	21.9	2x4	13.00	24.5
2x4	13.00	21.9	2x4	13.00	20.9
2x4	13.00	19.5	2x4	13.00	19.4
2x4	13.00	24.9			
2x4	13.00	22.4			
2x4	13.00	24.7			
2x4	13.00	19.8			
Total Fuel Weight (lbs):		18.51	Average Moisture (%DB):		22.0

Firebox Volume (ft^3):	1.54
Total 2x4 Crib Weight, with spacers (lbs):	4.12
Total 4x4 Crib Weight, with spacers (lbs):	6.49
Total Wet Fuel Weight, with spacers (lbs):	10.61

Coal Bed Range (20-25%):
Min (lbs): 2.12
Max (lbs): 2.65

Test Fuel Information

Size	Length (in)	Weight (lbs)	Moisture Content (%DB)			Dry Weight (lbs)
2x4	15.00	1.64	19.5	19.5	19.2	1.37
2x4	15.00	1.64	19.4	19.9	19.7	1.37
4x4	15.00	2.94	19.0	21.0	19.6	2.45
4x4	15.00	3.15	19.9	20.3	20.2	2.62
				Total Dry Weight, no spacers (lbs):		7.82
				Total Dry Weight, with spacers (lbs):		8.92

Spacer Moisture Readings (%DB)

12.7	14.9						
11.8	10.3						
9.3	15.4						
12.8	15.6						
12.6	14.4						
15.4	8.0						

Quality Checks	Requirement	Observed	Result
Fuel Density	25 - 36 (lbs/ft^3, DB)	25.7	OK
Loading Density	6.3 - 7.7 (lbs/ft^3, WB)	6.89	OK
2x4 Fuel Mix	35 - 65 % of total weight	39%	OK

DILUTION TUNNEL & MISC. DATA - ASTM E2780 / E2515

Client:	IHP	Job #:	23-106
Model:	S160AGL	Tracking #:	99
Run #:	3	Technician:	AK
Test Start Time:	11:06	Date:	6/8/2023

Total Sampling Time (min):	73
Recording Interval (min):	1

Meter Box γ Factor:	1.010	(A)
Meter Box γ Factor:	1.001	(B)
Meter Box γ Factor:	0.985	(C)
Meter Box γ Factor:	1.024	(Ambient)

Induced Draft Check (in. H_2O):	0
Smoke Capture Check (%):	100%
Date Flue Pipe Last Cleaned:	6/5/2023

	Pre-Test	Post Test	Avg.
Barometric Pressure (in. Hg)	29.89	29.87	29.88
Relative Humidity (%)	35.5	34.5	
Room Air Velocity (ft/min)	0	0.0	
Scale Audit (lbs)	10.0	10.0	
Ambient Sample Volume:		8.506	ft^3

Leak Checks	Pre-Test		Post-Test	
Pitot	0		0	
	cfm	@ in Hg	cfm	@ in Hg
A	0.001	-7	0.000	-7
B	0.000	-7	0.000	-7
C	0.000	-8	0.000	-8
Ambient	0.000	-12	0.000	-12

DILUTION TUNNEL FLOW

Traverse Data

Point	dP (in H_2O)	Temp (°F)
1	0.012	110
2	0.018	110
3	0.020	109
4	0.020	109
5	0.018	109
6	0.012	109
7	0.014	109
8	0.020	109
9	0.022	108
10	0.022	108
11	0.016	108
12	0.012	108
Center	0.023	108

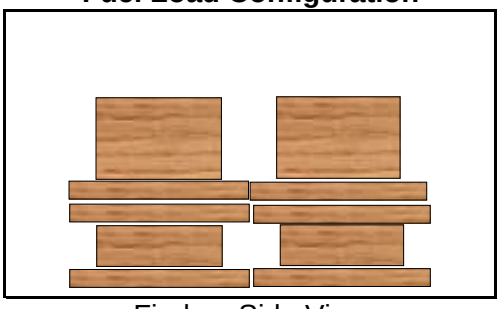
Static Pressure: -0.130 in. H_2O

Dilution Tunnel H_2O:	2.00	percent
Tunnel Diameter:	12	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:	0.7854	ft^2
V_{strav}:	8.96	ft/sec
V_{scent}:	10.43	ft/sec
F_p:	0.859	[ratio]
Initial Tunnel Flow:	383.7	scf/min

TEST FUEL PROPERTIES

Fuel Load Configuration

Firebox Front



Firebox Back

Firebox Side View

Actual Fuel Used Properties

Fuel Type:	D. Fir
HHV (kJ/kg)	19,810
%C	48.73
%H	6.87
%O	43.9
%Ash	0.5
MC (%DB)	19.8

WOODSTOVE PREBURN DATA - ASTM E2780

Client: IHP
Model: S160AGL
Run #: 3

Job #: 23-106
Tracking #: 99
Technician: AK
Date: 6/8/2023

Recording Interval (min): 1
Run Time (min): 61

			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	19.73	-0.075	468	464	276	475	237	383.8	334	69
1	19.60	-0.073	458	452	264	418	245	367.1	380	69
2	19.39	-0.090	447	441	255	387	253	356.7	442	69
3	19.07	-0.115	438	433	248	404	259	356.4	748	69
4	18.65	-0.126	428	427	242	456	266	363.8	945	69
5	18.16	-0.128	419	423	237	530	272	376.2	1044	69
6	17.71	-0.131	410	420	234	580	278	384.4	1101	69
7	17.20	-0.131	404	421	231	625	283	392.8	1169	70
8	16.69	-0.130	397	426	230	657	288	399.7	1164	71
9	16.22	-0.133	391	432	230	679	293	405.0	1172	71
10	15.68	-0.130	386	437	231	698	297	409.8	1159	71
11	15.13	-0.130	385	443	232	718	302	416.0	1117	71
12	14.61	-0.131	384	451	235	736	307	422.4	1136	71
13	14.06	-0.131	383	459	237	748	311	427.6	1127	71
14	13.54	-0.130	383	467	239	760	316	432.9	1116	71
15	13.02	-0.127	384	476	242	769	320	438.1	1100	71
16	12.49	-0.127	386	486	247	778	325	444.2	1063	71
17	11.95	-0.124	392	496	251	784	329	450.6	1014	72
18	11.43	-0.125	402	507	255	788	334	457.2	993	72
19	10.93	-0.126	413	518	259	791	339	463.9	979	72
20	10.41	-0.123	424	530	262	792	344	470.3	971	72
21	9.94	-0.123	436	542	266	795	349	477.4	960	72
22	9.48	-0.123	448	554	269	795	353	483.8	951	72
23	9.03	-0.122	460	567	273	796	358	490.7	935	72
24	8.60	-0.119	472	581	277	796	363	497.5	911	72
25	8.18	-0.120	484	595	280	795	368	504.3	893	72
26	7.77	-0.119	496	610	283	797	372	511.3	880	72
27	7.39	-0.118	507	625	285	798	376	518.3	865	73
28	7.03	-0.117	518	639	289	795	384	525.0	860	72
29	6.68	-0.117	528	651	294	796	388	531.3	865	73
30	6.34	-0.120	539	662	297	802	395	538.8	879	73
31	6.02	-0.120	547	672	300	802	401	544.5	886	72
32	5.72	-0.120	555	684	304	803	408	550.8	917	73
33	5.36	-0.120	567	696	308	805	414	558.2	921	73
34	5.10	-0.118	580	706	311	800	426	564.4	905	72
35	4.84	-0.117	592	714	315	790	432	568.4	875	73
36	4.61	-0.114	603	721	319	777	439	571.6	848	73
37	4.39	-0.114	617	728	322	762	450	575.9	832	73
38	4.19	-0.114	630	735	326	747	458	579.3	820	72
39	3.98	-0.113	640	740	332	735	461	581.5	808	73
40	3.83	-0.111	652	743	335	728	469	585.3	793	72
41	3.66	-0.109	661	745	338	715	475	587.0	771	71
42	3.51	-0.108	666	747	344	693	477	585.3	744	72
43	3.39	-0.107	670	748	348	664	481	582.2	726	72
44	3.27	-0.105	673	748	352	638	485	579.4	705	73

WOODSTOVE PREBURN DATA - ASTM E2780

Client: IHP
Model: S160AGL
Run #: 3

Job #: 23-106
Tracking #: 99
Technician: AK
Date: 6/8/2023

Recording Interval (min): 1
Run Time (min): 61

			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
45	3.15	-0.103	676	749	355	616	494	577.7	686	72
46	3.05	-0.102	676	748	358	591	496	573.7	669	73
47	2.96	-0.100	679	745	360	577	501	572.5	663	73
48	2.87	-0.100	682	743	360	562	510	571.4	656	72
49	2.80	-0.100	685	741	362	544	516	569.7	640	72
50	2.72	-0.099	685	738	362	523	520	565.6	627	72
51	2.64	-0.097	686	735	363	506	522	562.4	615	72
52	2.59	-0.097	687	732	361	491	530	560.3	600	72
53	2.54	-0.093	687	728	362	474	537	557.5	588	71
54	2.48	-0.091	684	724	360	460	542	554.1	573	71
55	2.42	-0.090	681	720	359	447	547	550.7	561	71
56	2.37	-0.092	677	716	356	433	550	546.4	557	71
57	2.31	-0.092	674	712	355	421	551	542.6	554	71
58	2.27	-0.092	671	707	354	414	555	540.3	555	71
59	2.22	-0.091	668	704	352	405	558	537.2	552	71
60	2.16	-0.089	664	700	351	397	558	534.2	545	71
61	2.13	-0.088	661	697	350	389	559	531.2	534	71

BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: IHP
Model: S160AGL
Run #: 3

Job #: 23-106
Tracking #: 99
Technician: AK
Date: 6/8/2023

	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		0.024	0.14	74	0.3		10.57		112	462	73	71
1	0.134	0.134	0.024	1.90	74	0.9	-	10.47	-0.10	110	435	75	72
2	0.272	0.138	0.023	1.92	74	0.9	-	10.19	-0.28	116	716	76	71
3	0.413	0.141	0.023	1.94	74	0.9	-	9.87	-0.32	122	830	77	71
4	0.555	0.142	0.023	1.97	74	0.9	-	9.53	-0.34	130	922	78	72
5	0.694	0.139	0.022	1.99	74	0.9	-	9.18	-0.35	133	925	78	72
6	0.838	0.144	0.023	2.01	74	0.9	-	8.86	-0.32	135	919	79	72
7	0.978	0.140	0.024	2.02	74	0.9	-	8.55	-0.31	138	924	79	71
8	1.120	0.142	0.023	2.03	75	0.9	-	8.22	-0.33	139	920	80	72
9	1.266	0.146	0.023	2.05	75	0.9	-	7.90	-0.32	139	917	81	72
10	1.406	0.140	0.023	2.08	75	1.0	97	7.58	-0.32	140	930	81	71
11	1.553	0.147	0.023	2.08	75	0.9	-	7.27	-0.31	141	919	81	72
12	1.694	0.141	0.023	2.09	75	1.0	-	6.96	-0.31	141	921	82	72
13	1.843	0.149	0.023	2.11	75	0.9	-	6.65	-0.31	141	920	82	72
14	1.986	0.143	0.023	2.12	76	0.9	-	6.35	-0.30	142	918	83	72
15	2.132	0.146	0.024	2.12	76	0.9	-	6.07	-0.28	141	918	83	72
16	2.276	0.144	0.023	2.12	76	1.0	-	5.75	-0.32	142	929	84	72
17	2.421	0.145	0.023	2.13	76	1.0	-	5.45	-0.30	143	933	84	72
18	2.569	0.148	0.023	2.15	77	0.9	-	5.14	-0.31	143	929	84	72
19	2.714	0.145	0.023	2.14	77	0.9	-	4.87	-0.27	142	898	84	72
20	2.862	0.148	0.023	2.15	77	1.0	102	4.63	-0.24	140	876	84	72
21	3.006	0.144	0.023	2.16	78	1.0	-	4.38	-0.25	139	859	85	73
22	3.155	0.149	0.023	2.17	78	1.0	-	4.14	-0.24	138	854	85	72
23	3.298	0.143	0.023	2.16	78	1.0	-	3.89	-0.25	138	865	85	72
24	3.449	0.151	0.023	2.17	78	1.0	-	3.69	-0.20	136	814	85	72
25	3.593	0.144	0.024	2.16	79	1.0	-	3.51	-0.18	133	775	85	72
26	3.744	0.151	0.023	2.18	79	1.0	-	3.34	-0.17	131	750	85	72
27	3.889	0.145	0.023	2.19	79	1.0	-	3.20	-0.14	129	728	85	72
28	4.039	0.150	0.023	2.19	80	1.0	-	3.06	-0.14	127	709	85	72
29	4.185	0.146	0.023	2.20	80	1.0	-	2.94	-0.12	125	685	84	72
30	4.335	0.150	0.024	2.20	80	1.0	101	2.81	-0.13	124	669	84	72
31	4.482	0.147	0.024	2.21	81	1.0	-	2.71	-0.10	122	649	84	72

BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: IHP
Model: S160AGL
Run #: 3

Job #: 23-106
Tracking #: 99
Technician: AK
Date: 6/8/2023

	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
32	4.631	0.149	0.024	2.21	81	1.0	-	2.60	-0.11	120	632	84	72
33	4.779	0.148	0.023	2.21	81	1.0	-	2.50	-0.10	118	618	84	72
34	4.928	0.149	0.023	2.21	82	1.0	-	2.41	-0.09	117	608	84	72
35	5.077	0.149	0.023	2.21	82	1.0	-	2.31	-0.10	116	601	84	72
36	5.226	0.149	0.023	2.22	82	1.0	-	2.21	-0.10	116	595	84	72
37	5.375	0.149	0.024	2.22	83	1.0	-	2.13	-0.08	115	590	83	71
38	5.525	0.150	0.023	2.22	83	1.0	-	2.05	-0.08	114	580	83	71
39	5.672	0.147	0.023	2.23	83	1.0	-	1.96	-0.09	113	577	83	71
40	5.821	0.149	0.023	2.22	84	1.0	100	1.88	-0.08	113	573	83	71
41	5.972	0.151	0.023	2.23	84	1.0	-	1.80	-0.08	112	573	83	71
42	6.122	0.150	0.024	2.23	84	1.0	-	1.70	-0.10	111	569	83	71
43	6.275	0.153	0.023	2.24	84	1.0	-	1.62	-0.08	111	565	83	71
44	6.422	0.147	0.024	2.24	85	1.0	-	1.54	-0.08	110	562	82	71
45	6.573	0.151	0.023	2.24	85	1.0	-	1.47	-0.07	110	557	82	71
46	6.723	0.150	0.024	2.23	85	1.0	-	1.40	-0.07	110	556	82	71
47	6.874	0.151	0.023	2.25	86	1.0	-	1.33	-0.07	109	553	82	71
48	7.029	0.155	0.024	2.25	86	1.0	-	1.25	-0.08	108	545	82	71
49	7.177	0.148	0.023	2.26	86	1.0	-	1.19	-0.06	108	532	82	71
50	7.329	0.152	0.024	2.25	87	1.0	100	1.14	-0.05	107	522	82	71
51	7.479	0.150	0.024	2.26	87	1.0	-	1.09	-0.05	106	516	82	71
52	7.632	0.153	0.024	2.26	87	1.0	-	1.02	-0.07	106	513	82	71
53	7.782	0.150	0.023	2.26	87	1.0	-	0.95	-0.07	105	511	81	71
54	7.939	0.157	0.024	2.27	88	1.0	-	0.91	-0.04	105	512	81	71
55	8.087	0.148	0.024	2.27	88	1.0	-	0.86	-0.05	105	517	81	71
56	8.239	0.152	0.024	2.28	88	1.0	-	0.80	-0.06	105	520	81	71
57	8.388	0.149	0.024	2.27	88	1.0	-	0.74	-0.06	105	524	81	71
58	8.545	0.157	0.024	2.27	89	1.0	-	0.68	-0.06	105	522	81	70
59	8.691	0.146	0.024	2.29	89	1.0	-	0.62	-0.06	104	522	81	71
60	8.846	0.155	0.024	2.28	89	1.0	99	0.58	-0.04	104	522	81	71
61	8.995	0.149	0.023	2.27	89	1.0	-	0.51	-0.07	104	523	81	71
62	9.154	0.159	0.023	2.28	89	1.0	-	0.46	-0.05	104	521	80	71
63	9.301	0.147	0.024	2.29	90	1.0	-	0.40	-0.06	104	516	80	71

BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: IHP
Model: S160AGL
Run #: 3

Job #: 23-106
Tracking #: 99
Technician: AK
Date: 6/8/2023

	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
64	9.457	0.156	0.024	2.29	90	1.0	-	0.35	-0.05	103	512	80	71
65	9.607	0.150	0.024	2.29	90	1.0	-	0.29	-0.06	103	510	80	71
66	9.764	0.157	0.024	2.30	90	1.0	-	0.25	-0.04	103	508	80	71
67	9.912	0.148	0.023	2.30	90	1.0	-	0.20	-0.05	102	503	80	71
68	10.067	0.155	0.023	2.31	91	1.0	-	0.15	-0.05	102	502	80	71
69	10.218	0.151	0.023	2.29	91	1.0	-	0.10	-0.05	102	497	80	71
70	10.372	0.154	0.024	2.29	91	1.0	99	0.06	-0.04	101	494	80	71
71	10.527	0.155	0.024	2.29	91	1.0	-	0.01	-0.05	101	491	80	71
72	10.681	0.154	0.024	2.30	91	1.0	-	0.00	-0.01	101	484	80	71
73	10.834	0.153	0.023	2.30	92	1.0	100	0.00	0.00	101	477	80	71
Avg/Tot	10.834	0.148	0.023	2.16	82.3	1.0	100			118.8	662.7	81.7	71.3

BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: IHP
Model: S160AGL
Run #: 3

Job #: 23-106
Tracking #: 99
Technician: AK
Date: 6/8/2023

	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		0.18	74	0.9		74	-0.086	2.35	0.250
1	0.118	0.118	2.04	74	1.6	-	77	-0.094	1.28	0.287
2	0.257	0.139	2.04	74	2.0	-	78	-0.113	12.96	0.182
3	0.404	0.147	2.04	74	1.9	-	79	-0.115	14.96	0.423
4	0.541	0.137	2.04	74	1.9	-	80	-0.121	16.86	0.183
5	0.683	0.142	2.04	74	1.5	-	81	-0.120	17.02	0.131
6	0.823	0.140	2.04	74	1.9	-	82	-0.121	16.34	0.121
7	0.963	0.140	2.05	74	1.5	-	82	-0.120	16.27	0.132
8	1.104	0.141	2.04	74	1.6	-	83	-0.118	16.36	0.113
9	1.244	0.140	2.05	74	1.6	-	83	-0.121	16.23	0.132
10	1.386	0.142	2.05	75	2.0	99	84	-0.121	16.43	0.106
11	1.525	0.139	2.05	75	2.0	-	84	-0.119	16.24	0.094
12	1.668	0.143	2.05	75	2.0	-	84	-0.120	16.09	0.088
13	1.808	0.140	2.05	75	2.0	-	85	-0.118	16.18	0.075
14	1.947	0.139	2.04	75	2.0	-	85	-0.117	16.09	0.073
15	2.091	0.144	2.05	76	1.6	-	85	-0.118	16.28	0.073
16	2.229	0.138	2.05	76	1.5	-	85	-0.119	16.91	0.059
17	2.372	0.143	2.04	76	2.1	-	86	-0.119	17.16	0.056
18	2.511	0.139	2.05	76	2.0	-	86	-0.120	16.99	0.060
19	2.654	0.143	2.05	77	2.0	-	86	-0.118	16.31	0.061
20	2.794	0.140	2.05	77	2.0	103	86	-0.116	15.38	0.043
21	2.934	0.140	2.04	77	1.5	-	86	-0.116	14.93	0.054
22	3.078	0.144	2.04	78	1.6	-	86	-0.116	15.21	0.050
23	3.217	0.139	2.04	78	1.6	-	86	-0.115	15.68	0.092
24	3.360	0.143	2.04	78	1.5	-	86	-0.110	13.06	0.050
25	3.501	0.141	2.05	79	1.6	-	85	-0.107	11.73	0.024
26	3.643	0.142	2.05	79	1.5	-	85	-0.106	11.30	0.024
27	3.784	0.141	2.04	79	2.0	-	85	-0.106	10.75	0.024
28	3.925	0.141	2.05	80	1.8	-	85	-0.102	10.23	0.026
29	4.069	0.144	2.05	80	1.8	-	84	-0.100	9.78	0.032
30	4.209	0.140	2.06	80	1.8	101	84	-0.100	9.65	0.049
31	4.353	0.144	2.05	80	1.9	-	84	-0.099	8.68	0.081

BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: IHP
Job #: 23-106
Model: S160AGL
Tracking #: 99
Run #: 3
Technician: AK
Date: 6/8/2023

	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	4.494	0.141	2.06	81	2.0	-	83	-0.097	8.35	0.116
33	4.638	0.144	2.05	81	1.7	-	83	-0.096	8.03	0.151
34	4.780	0.142	2.06	82	1.6	-	83	-0.096	7.97	0.178
35	4.921	0.141	2.06	82	1.7	-	83	-0.096	7.83	0.185
36	5.066	0.145	2.07	82	2.0	-	83	-0.095	7.77	0.172
37	5.207	0.141	2.07	82	2.0	-	82	-0.095	7.80	0.179
38	5.352	0.145	2.07	83	1.9	-	82	-0.092	7.69	0.211
39	5.490	0.138	2.07	83	1.6	-	82	-0.093	7.64	0.201
40	5.636	0.146	2.08	83	2.0	100	82	-0.093	7.64	0.210
41	5.778	0.142	2.07	84	1.9	-	82	-0.092	7.64	0.232
42	5.921	0.143	2.07	84	2.0	-	81	-0.091	7.56	0.206
43	6.067	0.146	2.08	84	2.1	-	81	-0.089	7.42	0.215
44	6.207	0.140	2.07	84	1.5	-	81	-0.090	7.35	0.206
45	6.353	0.146	2.08	85	2.1	-	81	-0.089	7.31	0.212
46	6.495	0.142	2.08	85	1.5	-	81	-0.089	7.18	0.207
47	6.641	0.146	2.08	85	1.7	-	81	-0.088	7.10	0.208
48	6.784	0.143	2.09	86	1.5	-	80	-0.086	6.95	0.208
49	6.928	0.144	2.09	86	2.0	-	80	-0.088	6.44	0.288
50	7.071	0.143	2.08	86	2.1	99	80	-0.088	6.18	0.371
51	7.216	0.145	2.08	86	2.1	-	80	-0.085	6.23	0.401
52	7.360	0.144	2.09	87	1.6	-	80	-0.089	6.21	0.441
53	7.503	0.143	2.09	87	1.6	-	80	-0.085	6.33	0.385
54	7.650	0.147	2.08	87	1.6	-	80	-0.083	6.47	0.371
55	7.794	0.144	2.09	88	1.6	-	80	-0.086	6.63	0.358
56	7.939	0.145	2.09	88	2.0	-	80	-0.087	6.72	0.344
57	8.081	0.142	2.08	88	2.0	-	79	-0.087	6.77	0.321
58	8.230	0.149	2.09	88	1.5	-	79	-0.086	6.71	0.322
59	8.370	0.140	2.09	88	1.5	-	79	-0.087	6.50	0.351
60	8.517	0.147	2.09	89	1.7	98	79	-0.085	6.55	0.362
61	8.659	0.142	2.09	89	1.5	-	79	-0.085	6.74	0.337
62	8.808	0.149	2.10	89	1.5	-	79	-0.086	6.69	0.335
63	8.950	0.142	2.09	89	1.5	-	79	-0.086	6.47	0.378

BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: IHP
Model: S160AGL
Run #: 3

Job #: 23-106
Tracking #: 99
Technician: AK
Date: 6/8/2023

	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	9.095	0.145	2.10	89	2.0	-	79	-0.082	6.24	0.425
65	9.239	0.144	2.10	90	1.9	-	79	-0.089	6.20	0.451
66	9.385	0.146	2.10	90	1.8	-	79	-0.084	6.27	0.450
67	9.529	0.144	2.10	90	1.7	-	79	-0.085	6.00	0.496
68	9.673	0.144	2.10	90	1.6	-	79	-0.084	5.93	0.503
69	9.821	0.148	2.11	91	1.7	-	79	-0.079	5.90	0.535
70	9.963	0.142	2.10	91	1.8	97	79	-0.084	5.83	0.563
71	10.110	0.147	2.10	91	2.0	-	79	-0.082	5.70	0.574
72	10.256	0.146	2.10	91	1.5	-	79	-0.082	5.51	0.612
73	10.400	0.144	2.10	91	1.5	99	79	-0.079	5.29	0.629
Avg/Tot	10.400	0.142	2.04	82.1	1.8	99	81.6	-0.099	9.83	0.232

BOX C TEST DATA - ASTM E2780 / ASTM E2515

Client: IHP
Model: S160AGL
Run #: 3

Job #: 23-106
Tracking #: 99
Technician: AK
Date: 6/8/2023

	Particulate Sampling 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)
0	0.000		0.10	75	0.9		73
1	0.149	0.149	1.04	75	1.7	-	73
2	0.300	0.151	1.04	75	1.7	-	73
3	0.454	0.154	1.05	75	1.7	-	74
4	0.606	0.152	1.05	75	1.9	-	74
5	0.759	0.153	1.05	75	1.7	-	74
6	0.911	0.152	1.06	75	1.9	-	75
7	1.064	0.153	1.06	75	1.7	-	75
8	1.217	0.153	1.07	75	1.7	-	75
9	1.371	0.154	1.07	76	1.9	-	76
10	1.525	0.154	1.07	76	1.9	99	76
11	1.679	0.154	1.07	76	1.9	-	77
12	1.833	0.154	1.07	77	1.9	-	77
13	1.987	0.154	1.08	77	1.7	-	77
14	2.142	0.155	1.08	77	1.9	-	78
15	2.297	0.155	1.08	77	1.9	-	78
16	2.451	0.154	1.08	78	1.7	-	78
17	2.605	0.154	1.09	78	1.9	-	79
18	2.760	0.155	1.08	78	1.9	-	79
19	2.914	0.154	1.08	79	1.8	-	79
20	3.069	0.155	1.09	79	1.8	102	80
21	3.223	0.154	1.09	79	1.9	-	80
22	3.378	0.155	1.09	79	1.9	-	80
23	3.532	0.154	1.08	79	1.8	-	80
24	3.687	0.155	1.08	79	1.9	-	80
25	3.843	0.156	1.08	80	1.8	-	80
26	3.999	0.156	1.09	80	1.9	-	80
27	4.155	0.156	1.10	81	1.9	-	80
28	4.311	0.156	1.11	81	1.8	-	80
29	4.468	0.157	1.11	81	1.9	-	80
30	4.624	0.156	1.11	81	1.8	100	80
31	4.781	0.157	1.10	81	1.8	-	80

BOX C TEST DATA - ASTM E2780 / ASTM E2515

Client: IHP
Model: S160AGL
Run #: 3

Job #: 23-106
Tracking #: 99
Technician: AK
Date: 6/8/2023

	Particulate Sampling 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)
32	4.939	0.158	1.11	81	2.0	-	80
33	5.097	0.158	1.11	81	1.9	-	80
34	5.255	0.158	1.12	82	1.8	-	80
35	5.413	0.158	1.12	82	1.8	-	79
36	5.571	0.158	1.11	82	1.9	-	79
37	5.730	0.159	1.12	82	2.0	-	79
38	5.889	0.159	1.12	82	1.8	-	79
39	6.045	0.156	1.13	83	2.0	-	79
40	6.203	0.158	1.12	83	2.0	100	79
41	6.362	0.159	1.12	83	1.8	-	79
42	6.522	0.160	1.13	84	2.0	-	79
43	6.684	0.162	1.13	84	2.0	-	79
44	6.840	0.156	1.13	84	1.9	-	78
45	7.000	0.160	1.13	84	1.9	-	78
46	7.161	0.161	1.13	84	1.9	-	78
47	7.320	0.159	1.14	85	1.9	-	78
48	7.482	0.162	1.13	85	1.9	-	78
49	7.640	0.158	1.13	85	1.8	-	78
50	7.801	0.161	1.14	85	1.8	100	77
51	7.960	0.159	1.13	85	1.8	-	77
52	8.122	0.162	1.13	85	1.8	-	77
53	8.282	0.160	1.14	86	1.8	-	77
54	8.445	0.163	1.13	86	1.8	-	77
55	8.606	0.161	1.14	87	1.8	-	77
56	8.765	0.159	1.14	86	1.9	-	77
57	8.925	0.160	1.14	86	2.0	-	77
58	9.089	0.164	1.14	86	1.9	-	76
59	9.248	0.159	1.15	86	1.9	-	76
60	9.408	0.160	1.14	86	1.8	99	76
Avg/Tot	9.408	0.157	1.09	80.7	1.8	100	77.7

WOODSTOVE SURFACE TEMPERATURE DATA

Client: IHP
Model: S160AGL
Run #: 3

Job #: 23-106
Tracking #: 99
Technician: AK
Date: 6/8/2023

Stove ΔT: 76

	Temperature Data (°F)						
Elapsed Time (min)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
0	655	690	350	363	569	525.3	70.4
1	644	680	347	344	574	517.8	70.4
2	638	669	338	395	573	522.5	70.3
3	634	666	330	464	568	532.3	70.3
4	632	667	325	525	562	542.2	70.6
5	634	669	321	575	559	551.5	70.8
6	638	672	316	608	562	558.8	70.7
7	642	678	312	637	565	566.8	70.5
8	646	684	308	661	560	571.7	70.6
9	652	690	304	680	562	577.4	70.5
10	657	696	301	693	561	581.6	70.4
11	662	703	298	703	554	583.7	70.4
12	668	709	294	711	556	587.4	70.2
13	674	714	291	718	552	589.5	70.3
14	682	717	289	724	552	592.6	70.3
15	690	721	287	732	550	596.1	70.5
16	697	726	285	748	546	600.4	70.6
17	704	730	283	764	544	604.9	70.5
18	710	736	282	781	543	610.3	70.4
19	716	741	282	788	541	613.5	70.5
20	723	746	281	782	539	614.3	70.6
21	728	751	282	773	533	613.5	70.5
22	733	755	283	769	533	614.5	70.4
23	738	760	285	768	530	616.1	70.4
24	746	762	284	766	530	617.7	70.4
25	750	761	284	739	529	612.5	70.5
26	750	758	286	710	527	606.2	70.5
27	750	754	287	679	525	599.1	70.5
28	749	749	288	647	519	590.4	70.6
29	745	743	289	616	516	581.9	70.7
30	742	737	291	588	519	575.3	70.7
31	738	732	292	565	516	568.7	70.7
32	732	727	293	544	514	561.9	70.7
33	725	723	293	524	510	554.9	70.8
34	719	718	294	504	511	549.2	70.8
35	713	713	295	488	512	544.2	70.8
36	706	709	295	475	506	538.2	70.9
37	701	704	294	464	508	534.3	70.9
38	695	700	295	453	501	528.8	71.0
39	690	696	294	444	504	525.5	71.0
40	685	692	295	435	504	522.1	71.1
41	680	689	295	427	502	518.3	71.1
42	675	686	295	422	503	516.1	70.9
43	670	682	294	415	496	511.6	70.8
44	667	679	294	408	498	509.2	70.7
45	663	676	294	402	498	506.7	70.8
46	660	673	294	398	497	504.4	70.9
47	656	670	294	395	495	501.9	70.8

WOODSTOVE SURFACE TEMPERATURE DATA

Client: IHP
Model: S160AGL
Run #: 3

Job #: 23-106
Tracking #: 99
Technician: AK
Date: 6/8/2023

Stove ΔT: 76

	Temperature Data (°F)						
Elapsed Time (min)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
48	653	666	293	390	493	499.0	70.7
49	650	664	293	382	491	496.0	70.9
50	646	660	293	373	490	492.3	70.9
51	641	656	293	365	488	488.6	70.9
52	637	652	292	358	487	485.4	70.8
53	633	649	292	351	483	481.6	70.9
54	630	645	293	346	483	479.3	71.0
55	627	642	293	342	480	476.8	71.1
56	625	639	293	341	481	475.8	71.0
57	623	636	294	340	479	474.4	70.9
58	621	634	294	339	477	473.1	70.7
59	619	632	293	337	474	471.1	70.8
60	617	630	294	339	473	470.6	71.0
61	616	628	295	336	473	469.6	71.1
62	614	626	295	334	466	467.0	71.2
63	614	623	295	332	470	466.6	71.1
64	613	621	296	330	469	465.6	71.2
65	612	619	298	328	467	464.5	71.1
66	609	616	299	327	462	462.3	70.9
67	606	613	300	325	458	460.3	71.1
68	604	611	301	323	455	458.7	71.4
69	602	608	302	322	452	457.2	71.4
70	600	605	303	319	450	455.4	71.5
71	598	602	303	316	449	453.4	71.5
72	595	598	303	313	447	451.4	71.5
73	593	595	304	309	446	449.3	71.4
Average	666.2	682.0	297.1	500.4	510.4	531.2	70.8

LAB SAMPLE DATA - ASTM E2515

Client: IHP
Model: S160AGL
Run #: 3

Job #: 23-106
Tracking #: 99
Technician: AK
Date: 6/8/2023

		Sample ID	Tare, mg	Final, mg	Catch, mg
Filters	**A**	G00554	244.2	244.9	0.7
	B	G00555	243.6	244.1	0.5
	C - 1st Hour	G00556	242.5	243.2	0.7
	Amb	G00557	242.7	242.7	0.0
Probes	**A**	14A	116632.7	116632.7	0.0
	B	14B	116618.4	116618.4	0.0
	C - 1st Hour	14C	116530.1	116530.2	0.1
O-rings	**A**	14A	3366.4	3366.6	0.2
	B	14B	3341.3	3341.6	0.3
	C - 1st Hour	14C	3445.2	3445.3	0.1

Placed in Dessicator on:	

Filters	**A**	244.9	6/9 14:05	244.9	6/12 10:17				
	B	244.3	6/9 14:05	244.1	6/12 10:17				
	C - 1st Hour	243.3	6/9 14:03	243.2	6/12 10:17				
	Amb	242.8	6/9 14:07	242.7	6/12 10:17				
Probes	**A**	116632.7	6/9 14:04	116632.7	6/12 10:17				
	B	116618.4	6/9 14:04	116618.4	6/12 10:17				
	C - 1st Hour	116530.2	6/9 14:04	116530.2	6/12 10:18				
O-Rings	**A**	3366.6	6/9 14:04	3366.6	6/12 10:18				
	B	3341.7	6/9 14:04	3341.6	6/12 10:18				
	C - 1st Hour	3445.3	6/9 14:04	3445.3	6/12 10:18				

Train A Aggregate, mg:	**0.9**
Train B Aggregate, mg:	**0.8**
Train C Aggregate, mg:	**0.9**
Ambient, mg:	**0.0**

ASTM E2780 Wood Heater Run Sheets

Client: IHP Job Number: 23-106 Tracking #: 99
Model: S160AGL Run Number: 3 Test Date: 6/8/23

Wood Heater Run Notes

Test Control Settings

Primary Air Setting(s): Fully Open
Targeted Burn Category: IV

Preburn Notes

Time	Notes
60:00	End PB

Test Notes

Test Burn Start Time: 11:06 Test Fuel Loaded by: 35 seconds
Door Closed: 35 seconds Air Control Set at: 0 seconds
Other Loading Notes: Fan on high @ 0 min

Time	Notes
	-None-

Test Burn End Time: 12:19

Flue Gas Concentration Measurement

Calibration Gas Values: Span Gas CO_2 (%): 17.01 CO (%): 4.306
Mid Gas CO_2 (%): 10.09 CO (%): 2.530

Calibration Results:

	Pre Test			Post Test		
	Zero	Span	Mid	Zero	Span	Mid
Time	10:31	10:33	10:34	6/9 08:43	6/9 08:46	6/9 08:50
CO_2	0.00	17.01	10.15	0.07	16.95	10.07
CO	0.000	4.305	2.520	0.010	4.290	2.471

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

Technician Signature:  Date: 6/26/23

ASTM E2780 Wood Heater Run Sheets

Client: IHP Job Number: 23-106 Tracking #: 99
Model: S160AGL Run Number: 3 Test Date: 6/8/23



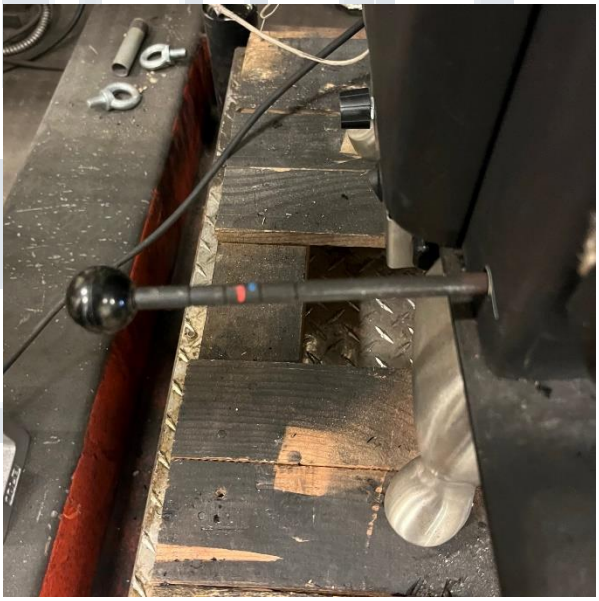
Test Fuel Side View



Test Fuel Iso View



Test Fuel Loaded in Stove



Air Setting

Technician Signature: _____ Date: 6/26/23

WOOD STOVE TEST DATA PACKET
ASTM E2780/E2515



Run 4 Data Summary

Client:	IHP
Model:	S160AGL
Job #:	23-106
Tracking #:	99
Test Date:	6/8/2023

Technician Signature

6/30/2023
Date

TEST RESULTS - ASTM E2780 / ASTM E2515

Client: IHP
Model: S160AGL
Run #: 4

Job #: 23-106
Tracking #: 99
Technician: AK
Date: 6/8/2023

Burn Rate (kg/hr):	1.16

	Ambient Sample	Sample Train A	Sample Train B	1st Hour Filter
Total Sample Volume (ft^3)	137.228	34.017	32.327	9.649
Average Gas Velocity in Dilution Tunnel (ft/sec)	9.0			
Average Gas Flow Rate in Dilution Tunnel (dscf/hr)	23993.9			
Average Gas Meter Temperature (°F)	73.4	96.0	94.9	83.5
Total Sample Volume (dscf)	138.836	32.754	30.892	9.242
Average Tunnel Temperature (°F)	88.9			
Total Time of Test (min)	219			
Total Particulate Catch (mg)	0.0	2.1	2.0	1.6
Particulate Concentration, dry-standard (g/dscf)	0.0000000	0.0000641	0.0000647	0.0001731
Total PM Emissions (g)	0.00	5.62	5.67	4.15
Particulate Emission Rate (g/hr)	0.00	1.54	1.55	4.15
Emissions Factor (g/kg)	-	1.32	1.34	-
Difference from Average Total Particulate Emissions (g)	-	0.03	0.03	-
Difference from Average Total Particulate Emissions (%)	-	0.5%	0.5%	
Difference from Average Emissions Factor (g/kg)	-	0.01	0.01	-

Final Average Results	
Total Particulate Emissions (g)	5.64
Particulate Emission Rate (g/hr)	1.55
Emissions Factor (g/kg)	1.33
HHV Efficiency (%)	68.7%
LHV Efficiency (%)	74.3%
CO Emissions (g/min)	2.03

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	<90 °F	81.8	OK
Face Velocity	< 30 ft/min	8.9	OK
Leakage Rate	Less than 4% of average sample rate	0.001 cfm	OK
Ambient Temp	55-90 °F	Min:72.3/Max:74.3	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
Stove Surface ΔT	<126°F --OR--	151.4	OK
	DQH < 0.085(QFC) DQH=	6204	
	.085(QFC)=	6799	

B415.1 Efficiency Results

Manufacturer:	IHP
Model:	S160AGL
Date:	06/08/23
Run:	4
Control #:	23-106
Test Duration:	219
Output Category:	2

Test Results in Accordance with CSA B415.1-09

	HHV Basis	LHV Basis
Overall Efficiency	68.7%	74.3%
Combustion Efficiency	92.5%	92.5%
Heat Transfer Efficiency	74.3%	80.3%

Output Rate (kJ/h)	15,716	14,908	**(Btu/h)**
Burn Rate (kg/h)	1.15	2.54	**(lb/h)**
Input (kJ/h)	22,868	21,693	**(Btu/h)**

Test Load Weight (dry kg)	4.21	9.29	**dry lb**
MC wet (%)	16.71		
MC dry (%)	20.07		
Particulate (g)	5.64		
CO (g)	444		
Test Duration (h)	3.65		

Emissions	**Particulate**	**CO**
g/MJ Output	0.10	7.75
g/kg Dry Fuel	1.34	105.49
g/h	1.55	121.77
g/min	0.03	2.03
lb/MM Btu Output	0.23	18.01

Air/Fuel Ratio (A/F)	15.49

VERSION: **2.4** **4/15/2010**

WOODSTOVE FUEL DATA - ASTM E2780

Client: IHP
Model: S160AGL
Run #: 4

Job #: 23-106
Tracking #: 99
Technician: AK
Date: 6/8/2023

Preburn Fuel Information

Size	Length (in)	Moisture Content (% DB)	Size	Length (in)	Moisture Content (% DB)
2x4	9.00	21.2	2x4	13.00	19.5
2x4	13.00	22.0	2x4	13.00	25.3
2x4	13.00	22.0	2x4	13.00	21.4
2x4	13.00	19.2	2x4	13.00	20.2
2x4	13.00	22.1			
2x4	13.00	20.9			
2x4	13.00	23.8			
2x4	13.00	22.8			
Total Fuel Weight (lbs):		13.09	Average Moisture (%DB):		21.7

Firebox Volume (ft^3):	1.54
Total 2x4 Crib Weight, with spacers (lbs):	4.04
Total 4x4 Crib Weight, with spacers (lbs):	7.11
Total Wet Fuel Weight, with spacers (lbs):	11.15

Coal Bed Range (20-25%):
Min (lbs): 2.23
Max (lbs): 2.79

Test Fuel Information

Size	Length (in)	Weight (lbs)	Moisture Content (%DB)			Dry Weight (lbs)
2x4	15.00	1.63	19.7	19.6	21.8	1.35
2x4	15.00	1.60	20.0	19.7	20.1	1.33
4x4	15.00	3.42	19.9	19.7	19.4	2.86
4x4	15.00	3.29	20.4	21.2	19.3	2.73
2x4						
				Total Dry Weight, no spacers (lbs):		8.28
				Total Dry Weight, with spacers (lbs):		9.35

Spacer Moisture Readings (%DB)

10.9	15.3						
14.9	11.1						
12.3	15.0						
9.4	15.0						
9.6	14.5						
14.8	12.3						

Quality Checks	Requirement	Observed	Result
Fuel Density	25 - 36 (lbs/ft^3, DB)	27.3	OK
Loading Density	6.3 - 7.7 (lbs/ft^3, WB)	7.24	OK
2x4 Fuel Mix	35 - 65 % of total weight	36%	OK

DILUTION TUNNEL & MISC. DATA - ASTM E2780 / E2515

Client:	IHP	Job #:	23-106
Model:	S160AGL	Tracking #:	99
Run #:	4	Technician:	AK
Test Start Time:	15:20	Date:	6/8/2023

Total Sampling Time (min):	219
Recording Interval (min):	1
Meter Box γ Factor:	1.010 (A)
Meter Box γ Factor:	1.001 (B)
Meter Box γ Factor:	0.985 (C)
Meter Box γ Factor:	1.024 (Ambient)
Induced Draft Check (in. H_2O):	0
Smoke Capture Check (%):	100%
Date Flue Pipe Last Cleaned:	6/5/2023
Stove Metal Mass :	302.6 lb
Stove Refractory Mass:	53.65 lb

	Pre-Test	Post Test	Avg.
Barometric Pressure (in. Hg)	29.86	29.89	29.88
Relative Humidity (%)	24.5	36.2	
Room Air Velocity (ft/min)	0	0.0	
Scale Audit (lbs)	10.0	10.0	
Ambient Sample Volume:		137.228	ft^3

Leak Checks	Pre-Test		Post-Test	
Pitot	0		0	
	cfm	@ in Hg	cfm	@ in Hg
A	0.001	-7	0.000	-7
B	0.000	-7	0.000	-7
C	0.000	-8	0.000	-8
Ambient	0.000	-12	0.000	-12

DILUTION TUNNEL FLOW

Traverse Data

Point	dP (in H_2O)	Temp (°F)
1	0.012	110
2	0.018	110
3	0.020	109
4	0.020	109
5	0.018	109
6	0.012	109
7	0.014	109
8	0.020	109
9	0.022	108
10	0.022	108
11	0.016	108
12	0.012	108
Center	0.023	108

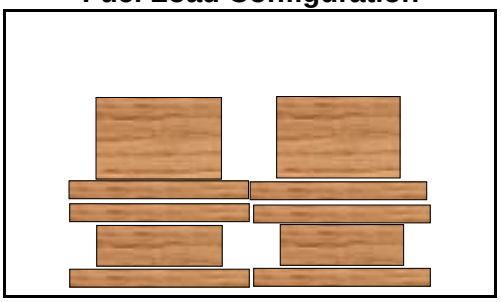
Static Pressure: -0.130 in. H_2O

Dilution Tunnel H_2O:	2.00	percent
Tunnel Diameter:	12	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:	0.7854	ft^2
V_{strav}:	8.97	ft/sec
V_{scent}:	10.44	ft/sec
F_p:	0.859	[ratio]
Initial Tunnel Flow:	383.6	scf/min

TEST FUEL PROPERTIES

Fuel Load Configuration

Firebox Front



Firebox Back

Firebox Side View

Actual Fuel Used Properties

Fuel Type:	D. Fir
HHV (kJ/kg)	19,810
%C	48.73
%H	6.87
%O	43.9
%Ash	0.5
MC (%DB)	20.1

WOODSTOVE PREBURN DATA - ASTM E2780

Client: IHP
Model: S160AGL
Run #: 4

Job #: 23-106
Tracking #: 99
Technician: AK
Date: 6/8/2023

Recording Interval (min): 1
Run Time (min): 73

			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	7.17	-0.113	610	671	433	1007	397	623.7	796	75
1	7.96	-0.102	613	676	443	975	408	622.8	738	74
2	7.88	-0.107	613	676	429	889	413	604.1	659	74
3	7.60	-0.106	612	676	422	843	418	594.1	630	74
4	7.33	-0.103	614	675	415	811	422	587.3	609	74
5	7.07	-0.101	616	676	409	787	426	582.5	592	74
6	6.85	-0.100	617	676	403	767	429	578.4	583	74
7	6.64	-0.100	619	675	398	751	432	574.8	576	74
8	6.43	-0.099	619	672	392	740	435	571.7	573	73
9	6.24	-0.097	619	671	387	732	438	569.3	572	74
10	6.03	-0.096	620	669	382	726	440	567.3	569	73
11	5.84	-0.097	621	668	377	720	442	565.6	566	73
12	5.66	-0.095	622	669	373	715	443	564.3	565	73
13	5.50	-0.095	624	669	368	708	445	562.7	559	73
14	5.34	-0.095	625	669	365	702	446	561.3	554	73
15	5.18	-0.093	626	670	361	696	448	560.1	546	73
16	5.04	-0.093	628	670	358	688	449	558.7	539	73
17	4.91	-0.092	630	671	356	681	450	557.4	532	73
18	4.77	-0.092	631	671	354	674	451	556.1	527	73
19	4.65	-0.090	632	671	351	667	452	554.7	524	73
20	4.54	-0.089	634	670	349	660	452	553.2	520	73
21	4.43	-0.089	639	669	347	657	453	552.9	517	73
22	4.33	-0.089	644	668	346	653	453	552.5	512	73
23	4.24	-0.088	647	666	344	643	454	550.8	502	73
24	4.15	-0.085	650	664	343	630	454	548.3	492	74
25	4.08	-0.083	651	662	342	617	454	545.3	480	73
26	4.01	-0.082	651	659	341	601	455	541.3	469	73
27	3.94	-0.080	651	656	340	580	456	536.4	453	73
28	3.89	-0.078	650	652	339	559	456	531.0	439	72
29	3.83	-0.079	649	648	338	540	457	526.2	428	73
30	3.78	-0.079	647	643	337	523	458	521.4	422	73
31	3.73	-0.076	645	637	337	509	458	517.0	416	73
32	3.68	-0.075	644	631	335	495	459	512.8	411	73
33	3.64	-0.075	643	626	335	484	460	509.3	406	72
34	3.59	-0.073	642	621	335	474	461	506.4	400	72
35	3.53	-0.073	642	617	335	463	461	503.4	395	72
36	3.49	-0.072	641	613	333	455	462	500.8	392	72
37	3.44	-0.072	639	609	333	448	463	498.5	389	72
38	3.39	-0.071	637	605	334	441	464	496.2	386	72
39	3.34	-0.070	636	602	335	434	465	494.1	381	72
40	3.30	-0.069	634	599	335	428	466	492.2	378	73
41	3.25	-0.070	633	595	335	421	467	490.3	375	72
42	3.20	-0.069	631	592	337	416	468	488.7	370	73
43	3.17	-0.068	629	589	338	410	469	486.8	368	73
44	3.12	-0.068	627	586	339	404	469	485.1	367	73

WOODSTOVE PREBURN DATA - ASTM E2780

Client: IHP
Model: S160AGL
Run #: 4

Job #: 23-106
Tracking #: 99
Technician: AK
Date: 6/8/2023

Recording Interval (min): 1
Run Time (min): 73

			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
45	3.08	-0.067	626	583	339	400	470	483.8	364	72
46	3.04	-0.068	625	580	341	396	471	482.6	362	72
47	3.01	-0.065	624	577	342	391	472	481.3	359	72
48	2.97	-0.066	622	575	343	387	473	479.9	356	72
49	2.93	-0.065	618	573	343	382	475	478.1	352	72
50	2.91	-0.065	614	570	342	377	475	475.7	346	73
51	2.88	-0.063	609	568	343	371	476	473.3	341	72
52	2.86	-0.063	604	565	343	366	477	470.9	338	72
53	2.83	-0.063	598	562	342	361	478	468.2	335	73
54	2.82	-0.061	593	560	341	356	479	465.6	330	73
55	2.79	-0.061	587	557	340	351	479	462.7	327	73
56	2.77	-0.061	582	554	340	346	480	460.5	326	73
57	2.74	-0.059	577	552	338	342	481	458.2	323	73
58	2.72	-0.060	573	549	337	339	482	455.8	322	73
59	2.70	-0.060	568	547	336	336	482	453.7	320	73
60	2.67	-0.060	564	544	334	333	483	451.5	318	72
61	2.65	-0.057	560	542	333	329	483	449.5	315	72
62	2.63	-0.058	557	540	331	327	484	447.5	314	72
63	2.60	-0.058	553	537	330	324	484	445.5	312	73
64	2.58	-0.057	549	535	328	320	484	443.2	310	72
65	2.56	-0.058	546	532	327	317	485	441.2	308	72
66	2.54	-0.058	542	530	326	313	485	439.2	305	72
67	2.51	-0.056	539	527	323	311	485	437.0	303	72
68	2.50	-0.057	535	524	321	307	486	434.7	301	72
69	2.48	-0.058	531	522	320	305	486	432.7	301	72
70	2.45	-0.054	528	518	319	302	486	430.5	300	72
71	2.44	-0.055	525	516	316	299	487	428.3	298	72
72	2.43	-0.055	521	513	315	297	487	426.4	297	73
73	2.40	-0.054	518	510	313	295	487	424.5	296	73

BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: IHP
Model: S160AGL
Run #: 4

Job #: 23-106
Tracking #: 99
Technician: AK
Date: 6/8/2023

	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		0.024	0.69	79	0.7		11.15		90	367	77	72
1	0.137	0.137	0.023	1.99	79	0.9	-	11.14	-0.01	100	290	78	73
2	0.279	0.142	0.024	2.00	79	0.9	-	10.93	-0.21	99	360	78	73
3	0.421	0.142	0.023	2.02	79	0.9	-	10.74	-0.19	105	485	79	73
4	0.568	0.147	0.023	2.04	79	0.9	-	10.45	-0.29	112	729	79	73
5	0.709	0.141	0.023	2.05	79	0.9	-	10.15	-0.30	121	821	80	73
6	0.852	0.143	0.024	2.06	79	0.9	-	9.93	-0.22	110	631	80	73
7	0.998	0.146	0.024	2.07	79	1.0	-	9.78	-0.15	105	570	80	73
8	1.142	0.144	0.024	2.11	79	0.9	-	9.63	-0.15	103	548	80	73
9	1.290	0.148	0.024	2.12	79	0.9	-	9.46	-0.17	103	543	80	73
10	1.434	0.144	0.024	2.13	79	1.0	96	9.29	-0.17	103	547	80	73
11	1.583	0.149	0.024	2.14	79	0.9	-	9.11	-0.18	102	555	80	73
12	1.725	0.142	0.024	2.14	80	1.0	-	8.93	-0.18	103	563	80	73
13	1.874	0.149	0.024	2.16	80	0.9	-	8.74	-0.19	104	568	81	73
14	2.018	0.144	0.024	2.16	80	0.9	-	8.55	-0.19	104	572	81	73
15	2.169	0.151	0.024	2.17	80	1.0	-	8.36	-0.19	104	576	81	73
16	2.315	0.146	0.023	2.18	80	0.9	-	8.19	-0.17	102	572	81	73
17	2.468	0.153	0.024	2.19	80	1.0	-	8.01	-0.18	101	565	81	73
18	2.612	0.144	0.024	2.20	81	0.9	-	7.84	-0.17	101	562	81	73
19	2.766	0.154	0.023	2.20	81	1.0	-	7.67	-0.17	101	558	81	73
20	2.910	0.144	0.024	2.21	81	0.9	99	7.48	-0.19	100	555	81	74
21	3.061	0.151	0.024	2.21	81	0.9	-	7.31	-0.17	100	556	81	73
22	3.211	0.150	0.024	2.22	82	1.0	-	7.13	-0.18	100	557	81	73
23	3.363	0.152	0.024	2.22	82	0.9	-	6.95	-0.18	100	553	81	73
24	3.511	0.148	0.024	2.23	82	0.9	-	6.76	-0.19	101	550	81	73
25	3.660	0.149	0.024	2.23	83	1.0	-	6.58	-0.18	100	545	81	73
26	3.811	0.151	0.023	2.24	83	1.0	-	6.39	-0.19	100	536	82	73
27	3.960	0.149	0.023	2.24	83	0.9	-	6.22	-0.17	100	533	82	73
28	4.111	0.151	0.024	2.24	83	1.0	-	6.05	-0.17	100	539	82	73
29	4.261	0.150	0.024	2.24	84	1.0	-	5.90	-0.15	100	546	82	74
30	4.410	0.149	0.023	2.25	84	1.0	101	5.73	-0.17	100	549	82	74
31	4.565	0.155	0.023	2.24	84	1.0	-	5.58	-0.15	100	539	82	74

BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: IHP
Model: S160AGL
Run #: 4

Job #: 23-106
Tracking #: 99
Technician: AK
Date: 6/8/2023

	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
32	4.713	0.148	0.024	2.24	85	1.0	-	5.47	-0.11	99	522	82	74
33	4.867	0.154	0.024	2.25	85	1.0	-	5.35	-0.12	99	507	82	74
34	5.015	0.148	0.024	2.26	85	1.0	-	5.23	-0.12	99	496	82	74
35	5.168	0.153	0.024	2.26	86	1.0	-	5.12	-0.11	98	484	82	74
36	5.316	0.148	0.024	2.26	86	1.0	-	5.02	-0.10	97	474	82	74
37	5.471	0.155	0.024	2.27	86	1.0	-	4.92	-0.10	97	469	81	74
38	5.617	0.146	0.024	2.27	86	1.0	-	4.82	-0.10	97	463	81	73
39	5.772	0.155	0.024	2.27	87	0.9	-	4.73	-0.09	96	458	81	73
40	5.923	0.151	0.024	2.27	87	1.0	101	4.63	-0.10	96	454	81	74
41	6.079	0.156	0.024	2.29	87	1.0	-	4.52	-0.11	96	453	81	73
42	6.228	0.149	0.024	2.28	88	1.0	-	4.44	-0.08	96	450	81	73
43	6.384	0.156	0.023	2.29	88	1.0	-	4.34	-0.10	95	447	81	74
44	6.534	0.150	0.024	2.28	88	0.9	-	4.24	-0.10	95	443	81	74
45	6.686	0.152	0.023	2.29	89	1.0	-	4.15	-0.09	95	441	81	74
46	6.839	0.153	0.024	2.29	89	1.0	-	4.06	-0.09	95	437	81	74
47	6.992	0.153	0.023	2.29	89	1.0	-	3.97	-0.09	95	437	81	74
48	7.144	0.152	0.024	2.30	89	1.0	-	3.88	-0.09	94	437	81	74
49	7.297	0.153	0.024	2.29	90	1.0	-	3.79	-0.09	94	436	81	74
50	7.451	0.154	0.024	2.30	90	1.0	100	3.71	-0.08	94	433	81	73
51	7.604	0.153	0.024	2.30	90	1.0	-	3.62	-0.09	94	430	81	73
52	7.756	0.152	0.023	2.29	90	1.0	-	3.56	-0.06	94	423	81	73
53	7.910	0.154	0.024	2.31	91	1.0	-	3.49	-0.07	94	414	81	73
54	8.065	0.155	0.024	2.31	91	1.0	-	3.43	-0.06	93	405	81	73
55	8.213	0.148	0.024	2.31	91	1.0	-	3.37	-0.06	93	396	81	74
56	8.372	0.159	0.024	2.31	91	1.0	-	3.32	-0.05	93	389	81	74
57	8.523	0.151	0.024	2.31	92	1.0	-	3.27	-0.05	92	383	81	74
58	8.681	0.158	0.024	2.31	92	1.0	-	3.22	-0.05	92	375	81	74
59	8.832	0.151	0.024	2.30	92	1.0	-	3.17	-0.05	92	370	81	74
60	8.988	0.156	0.024	2.32	92	1.0	100	3.12	-0.05	91	365	81	74
61	9.139	0.151	0.024	2.31	93	1.0	-	3.08	-0.04	91	362	81	74
62	9.293	0.154	0.024	2.31	93	1.0	-	3.03	-0.05	91	359	81	74
63	9.446	0.153	0.025	2.31	93	1.0	-	2.99	-0.04	91	356	81	74

BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: IHP
Model: S160AGL
Run #: 4

Job #: 23-106
Tracking #: 99
Technician: AK
Date: 6/8/2023

	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
64	9.601	0.155	0.024	2.32	93	1.0	-	2.94	-0.05	91	352	81	74
65	9.761	0.160	0.024	2.33	93	1.0	-	2.91	-0.03	91	350	81	74
66	9.912	0.151	0.024	2.33	94	1.0	-	2.86	-0.05	90	348	81	74
67	10.069	0.157	0.024	2.33	94	1.0	-	2.81	-0.05	90	346	80	74
68	10.218	0.149	0.024	2.31	94	1.0	-	2.76	-0.05	90	345	80	74
69	10.382	0.164	0.024	2.33	94	1.0	-	2.72	-0.04	90	344	80	74
70	10.532	0.150	0.024	2.32	94	1.0	100	2.68	-0.04	90	344	81	74
71	10.688	0.156	0.024	2.33	95	1.0	-	2.65	-0.03	90	345	80	74
72	10.842	0.154	0.024	2.33	95	1.0	-	2.60	-0.05	90	345	80	74
73	10.995	0.153	0.024	2.32	95	1.0	-	2.56	-0.04	89	343	80	74
74	11.154	0.159	0.024	2.34	95	1.0	-	2.52	-0.04	89	342	80	74
75	11.308	0.154	0.024	2.33	95	1.0	-	2.48	-0.04	89	342	80	74
76	11.465	0.157	0.023	2.33	95	1.0	-	2.44	-0.04	89	343	80	74
77	11.615	0.150	0.024	2.34	96	1.0	-	2.41	-0.03	89	337	80	74
78	11.780	0.165	0.024	2.34	96	1.0	-	2.36	-0.05	89	327	80	74
79	11.930	0.150	0.024	2.34	96	1.0	-	2.33	-0.03	88	321	80	74
80	12.086	0.156	0.024	2.34	96	1.0	100	2.30	-0.03	88	310	80	74
81	12.238	0.152	0.024	2.35	96	1.0	-	2.27	-0.03	88	304	80	74
82	12.398	0.160	0.024	2.35	96	0.9	-	2.24	-0.03	88	299	80	74
83	12.553	0.155	0.024	2.34	96	1.0	-	2.22	-0.02	88	296	80	74
84	12.709	0.156	0.024	2.34	97	1.0	-	2.19	-0.03	87	294	80	74
85	12.867	0.158	0.024	2.35	97	1.0	-	2.15	-0.04	87	291	80	73
86	13.017	0.150	0.024	2.34	97	1.0	-	2.13	-0.02	87	289	80	73
87	13.180	0.163	0.023	2.36	97	1.0	-	2.10	-0.03	87	288	80	73
88	13.333	0.153	0.024	2.35	97	1.0	-	2.07	-0.03	87	286	80	73
89	13.488	0.155	0.024	2.35	97	1.0	-	2.03	-0.04	87	286	80	73
90	13.643	0.155	0.024	2.34	97	1.0	100	2.00	-0.03	87	285	80	73
91	13.803	0.160	0.024	2.35	97	1.0	-	1.97	-0.03	87	284	80	73
92	13.959	0.156	0.024	2.37	98	1.0	-	1.95	-0.02	87	285	79	74
93	14.114	0.155	0.024	2.36	98	1.0	-	1.91	-0.04	87	286	79	74
94	14.274	0.160	0.024	2.36	98	1.0	-	1.89	-0.02	86	287	79	74
95	14.427	0.153	0.024	2.36	98	1.0	-	1.85	-0.04	86	288	79	74

BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: IHP
Model: S160AGL
Run #: 4

Job #: 23-106
Tracking #: 99
Technician: AK
Date: 6/8/2023

	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
96	14.586	0.159	0.024	2.37	98	1.0	-	1.82	-0.03	86	288	79	74
97	14.740	0.154	0.025	2.36	98	1.0	-	1.79	-0.03	86	289	79	73
98	14.895	0.155	0.024	2.35	98	1.0	-	1.76	-0.03	86	289	79	74
99	15.056	0.161	0.024	2.36	98	1.0	-	1.72	-0.04	86	290	79	74
100	15.210	0.154	0.025	2.37	98	1.0	99	1.70	-0.02	86	290	79	74
101	15.369	0.159	0.025	2.36	98	1.0	-	1.67	-0.03	86	290	79	73
102	15.521	0.152	0.024	2.36	99	1.0	-	1.64	-0.03	86	287	79	74
103	15.681	0.160	0.023	2.37	99	1.0	-	1.62	-0.02	86	285	79	73
104	15.838	0.157	0.024	2.37	99	1.0	-	1.59	-0.03	86	282	79	74
105	15.995	0.157	0.024	2.36	99	1.0	-	1.58	-0.01	86	280	79	73
106	16.154	0.159	0.024	2.36	99	1.0	-	1.56	-0.02	86	277	79	73
107	16.306	0.152	0.024	2.38	99	1.0	-	1.54	-0.02	86	273	79	73
108	16.465	0.159	0.024	2.37	99	1.0	-	1.52	-0.02	86	270	79	73
109	16.619	0.154	0.024	2.36	99	1.0	-	1.51	-0.01	86	267	79	73
110	16.779	0.160	0.025	2.37	99	1.0	98	1.49	-0.02	85	264	79	73
111	16.933	0.154	0.024	2.36	99	1.0	-	1.48	-0.01	85	262	79	73
112	17.091	0.158	0.024	2.37	99	1.0	-	1.46	-0.02	85	260	79	73
113	17.250	0.159	0.025	2.37	99	0.9	-	1.44	-0.02	85	258	79	73
114	17.405	0.155	0.024	2.38	99	1.0	-	1.42	-0.02	85	256	79	73
115	17.566	0.161	0.024	2.37	100	1.0	-	1.42	0.00	85	255	79	73
116	17.718	0.152	0.023	2.37	100	1.0	-	1.40	-0.02	85	253	79	73
117	17.881	0.163	0.024	2.37	100	1.0	-	1.39	-0.01	85	252	79	73
118	18.036	0.155	0.025	2.38	100	0.9	-	1.38	-0.01	85	250	79	73
119	18.191	0.155	0.024	2.37	100	1.0	-	1.37	-0.01	85	248	79	73
120	18.353	0.162	0.025	2.37	100	1.0	98	1.35	-0.02	85	247	79	73
121	18.507	0.154	0.024	2.37	100	1.0	-	1.33	-0.02	85	245	79	73
122	18.667	0.160	0.024	2.38	100	1.0	-	1.32	-0.01	85	243	79	73
123	18.822	0.155	0.024	2.37	100	1.0	-	1.31	-0.01	85	241	79	73
124	18.982	0.160	0.025	2.38	100	1.0	-	1.30	-0.01	85	240	79	74
125	19.134	0.152	0.024	2.37	100	1.0	-	1.29	-0.01	85	239	79	73
126	19.292	0.158	0.025	2.36	100	1.0	-	1.27	-0.02	85	239	79	74
127	19.455	0.163	0.024	2.38	100	1.0	-	1.25	-0.02	85	238	79	74

BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: IHP
Model: S160AGL
Run #: 4

Job #: 23-106
Tracking #: 99
Technician: AK
Date: 6/8/2023

	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
128	19.609	0.154	0.024	2.37	100	1.0	-	1.24	-0.01	85	237	79	73
129	19.770	0.161	0.025	2.38	100	1.0	-	1.22	-0.02	85	237	79	74
130	19.922	0.152	0.025	2.37	101	1.0	98	1.20	-0.02	85	236	79	74
131	20.081	0.159	0.024	2.40	101	1.0	-	1.18	-0.02	85	236	79	74
132	20.240	0.159	0.024	2.38	101	1.0	-	1.17	-0.01	85	235	79	74
133	20.396	0.156	0.024	2.39	101	1.0	-	1.16	-0.01	85	234	79	74
134	20.557	0.161	0.024	2.39	101	1.0	-	1.14	-0.02	85	234	79	74
135	20.709	0.152	0.024	2.38	101	1.0	-	1.13	-0.01	85	234	79	74
136	20.873	0.164	0.025	2.37	101	1.0	-	1.11	-0.02	85	233	79	73
137	21.026	0.153	0.025	2.37	101	1.0	-	1.10	-0.01	85	233	79	74
138	21.187	0.161	0.025	2.37	101	1.0	-	1.08	-0.02	85	232	79	73
139	21.346	0.159	0.025	2.38	101	1.0	-	1.07	-0.01	85	232	80	73
140	21.502	0.156	0.024	2.38	101	1.0	100	1.06	-0.01	85	231	79	73
141	21.659	0.157	0.024	2.39	101	1.0	-	1.05	-0.01	85	230	80	74
142	21.817	0.158	0.024	2.38	101	1.0	-	1.03	-0.02	85	230	80	74
143	21.975	0.158	0.024	2.38	101	1.0	-	1.02	-0.01	85	228	80	74
144	22.133	0.158	0.025	2.38	101	1.0	-	1.00	-0.02	84	227	80	74
145	22.292	0.159	0.024	2.37	101	1.0	-	0.99	-0.01	84	226	80	74
146	22.449	0.157	0.025	2.35	101	1.0	-	0.98	-0.01	84	224	80	73
147	22.604	0.155	0.024	2.37	102	1.0	-	0.97	-0.01	85	223	80	73
148	22.768	0.164	0.025	2.37	102	1.0	-	0.95	-0.02	84	223	80	73
149	22.924	0.156	0.024	2.36	102	1.0	-	0.94	-0.01	84	222	80	74
150	23.083	0.159	0.024	2.38	102	0.9	101	0.93	-0.01	84	221	80	74
151	23.237	0.154	0.024	2.36	102	1.0	-	0.91	-0.02	84	221	80	74
152	23.396	0.159	0.024	2.37	102	1.0	-	0.90	-0.01	84	220	80	74
153	23.558	0.162	0.024	2.36	102	1.0	-	0.89	-0.01	84	219	80	74
154	23.710	0.152	0.024	2.36	102	1.0	-	0.87	-0.02	84	219	80	74
155	23.875	0.165	0.025	2.37	102	1.0	-	0.86	-0.01	84	218	80	74
156	24.028	0.153	0.024	2.37	102	1.0	-	0.85	-0.01	84	218	80	74
157	24.186	0.158	0.024	2.38	102	1.0	-	0.83	-0.02	84	218	80	74
158	24.347	0.161	0.025	2.38	102	1.0	-	0.82	-0.01	84	217	80	74
159	24.505	0.158	0.025	2.40	102	1.0	-	0.81	-0.01	84	216	80	73

BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: IHP
Model: S160AGL
Run #: 4

Job #: 23-106
Tracking #: 99
Technician: AK
Date: 6/8/2023

	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
160	24.666	0.161	0.024	2.38	102	1.0	101	0.80	-0.01	84	216	80	73
161	24.819	0.153	0.024	2.38	102	1.0	-	0.79	-0.01	84	215	80	73
162	24.981	0.162	0.025	2.38	102	1.0	-	0.77	-0.02	84	215	80	73
163	25.136	0.155	0.025	2.38	102	1.0	-	0.76	-0.01	84	215	80	73
164	25.295	0.159	0.024	2.38	102	1.0	-	0.75	-0.01	84	214	80	73
165	25.458	0.163	0.024	2.39	103	1.0	-	0.74	-0.01	84	213	80	73
166	25.613	0.155	0.025	2.39	103	1.0	-	0.73	-0.01	84	213	80	74
167	25.775	0.162	0.025	2.38	103	1.0	-	0.71	-0.02	84	212	80	73
168	25.931	0.156	0.024	2.38	103	1.0	-	0.70	-0.01	84	211	80	74
169	26.090	0.159	0.024	2.38	103	1.0	-	0.69	-0.01	84	211	80	74
170	26.248	0.158	0.024	2.37	103	1.0	100	0.68	-0.01	84	210	80	74
171	26.403	0.155	0.025	2.38	103	1.0	-	0.68	0.00	84	210	80	74
172	26.568	0.165	0.024	2.36	103	1.0	-	0.65	-0.03	84	208	80	73
173	26.724	0.156	0.024	2.36	103	1.0	-	0.64	-0.01	84	207	80	73
174	26.881	0.157	0.024	2.35	103	1.0	-	0.63	-0.01	83	206	80	73
175	27.043	0.162	0.025	2.35	103	1.0	-	0.62	-0.01	84	205	80	73
176	27.197	0.154	0.024	2.37	103	1.0	-	0.61	-0.01	83	204	80	73
177	27.359	0.162	0.024	2.36	103	1.0	-	0.60	-0.01	83	204	80	73
178	27.516	0.157	0.024	2.37	103	1.0	-	0.59	-0.01	83	203	80	73
179	27.675	0.159	0.024	2.39	103	1.0	-	0.58	-0.01	83	203	80	73
180	27.831	0.156	0.024	2.38	103	1.0	100	0.56	-0.02	83	203	80	73
181	27.993	0.162	0.024	2.40	103	1.0	-	0.55	-0.01	83	203	80	73
182	28.153	0.160	0.025	2.40	103	1.0	-	0.54	-0.01	83	203	80	73
183	28.306	0.153	0.024	2.39	103	1.0	-	0.53	-0.01	83	203	80	73
184	28.471	0.165	0.024	2.40	103	1.0	-	0.51	-0.02	83	203	80	73
185	28.624	0.153	0.025	2.39	103	1.0	-	0.50	-0.01	83	203	80	73
186	28.783	0.159	0.025	2.38	103	1.0	-	0.49	-0.01	83	204	80	73
187	28.947	0.164	0.025	2.37	103	1.0	-	0.47	-0.02	83	203	80	73
188	29.102	0.155	0.025	2.36	103	1.0	-	0.46	-0.01	83	203	80	73
189	29.264	0.162	0.024	2.37	104	1.0	-	0.45	-0.01	83	203	80	73
190	29.417	0.153	0.024	2.38	104	1.0	100	0.44	-0.01	83	203	80	73
191	29.579	0.162	0.024	2.39	104	1.0	-	0.42	-0.02	83	203	80	73

BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: IHP
Model: S160AGL
Run #: 4

Job #: 23-106
Tracking #: 99
Technician: AK
Date: 6/8/2023

	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
192	29.734	0.155	0.024	2.37	104	1.0	-	0.40	-0.02	83	203	80	73
193	29.893	0.159	0.025	2.37	104	1.0	-	0.39	-0.01	83	204	80	73
194	30.052	0.159	0.024	2.37	104	1.0	-	0.38	-0.01	83	204	80	73
195	30.211	0.159	0.024	2.36	104	1.0	-	0.37	-0.01	83	204	80	73
196	30.373	0.162	0.024	2.37	104	0.9	-	0.35	-0.02	83	204	80	73
197	30.526	0.153	0.024	2.36	104	1.0	-	0.34	-0.01	83	204	80	73
198	30.686	0.160	0.025	2.36	104	1.0	-	0.32	-0.02	83	204	80	73
199	30.849	0.163	0.024	2.36	104	1.0	-	0.31	-0.01	83	204	80	73
200	31.001	0.152	0.024	2.36	104	1.0	100	0.30	-0.01	83	204	80	73
201	31.166	0.165	0.024	2.36	104	1.0	-	0.29	-0.01	83	205	80	73
202	31.322	0.156	0.024	2.36	104	1.0	-	0.27	-0.02	83	204	80	73
203	31.479	0.157	0.024	2.36	104	1.0	-	0.25	-0.02	83	205	80	73
204	31.641	0.162	0.024	2.37	104	1.0	-	0.24	-0.01	83	205	80	73
205	31.795	0.154	0.024	2.37	104	1.0	-	0.23	-0.01	83	205	80	73
206	31.956	0.161	0.024	2.37	104	1.0	-	0.21	-0.02	83	205	80	73
207	32.112	0.156	0.024	2.36	104	1.0	-	0.20	-0.01	83	205	80	73
208	32.275	0.163	0.024	2.37	104	1.0	-	0.18	-0.02	83	206	80	73
209	32.433	0.158	0.024	2.37	104	1.0	-	0.17	-0.01	83	206	80	73
210	32.592	0.159	0.024	2.37	104	1.0	101	0.15	-0.02	83	207	80	73
211	32.752	0.160	0.024	2.39	104	1.0	-	0.14	-0.01	83	208	80	73
212	32.904	0.152	0.024	2.38	104	1.0	-	0.12	-0.02	83	208	80	73
213	33.070	0.166	0.024	2.38	104	1.0	-	0.10	-0.02	83	209	80	73
214	33.226	0.156	0.024	2.39	104	1.0	-	0.09	-0.01	83	209	80	73
215	33.382	0.156	0.024	2.39	104	1.0	-	0.07	-0.02	83	210	80	73
216	33.543	0.161	0.024	2.39	104	1.0	-	0.05	-0.02	83	211	80	73
217	33.699	0.156	0.024	2.40	104	1.0	-	0.04	-0.01	83	211	80	73
218	33.861	0.162	0.024	2.39	104	1.0	-	0.02	-0.02	83	211	80	73
219	34.017	0.156	0.025	2.40	104	1.0	99	0.00	-0.02	83	212	80	73
Avg/Tot	34.017	0.155	0.024	2.32	96.0	1.0	100			88.9	316.2	79.9	73.4

BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: IHP
Model: S160AGL
Run #: 4

Job #: 23-106
Tracking #: 99
Technician: AK
Date: 6/8/2023

	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		0.82	79	1.8		76	-0.073	6.82	0.830
1	0.142	0.142	2.11	79	1.7	-	77	-0.045	1.69	0.323
2	0.283	0.141	2.10	79	1.6	-	78	-0.074	5.25	0.657
3	0.428	0.145	2.10	79	1.6	-	79	-0.098	3.17	0.262
4	0.573	0.145	2.10	79	1.7	-	79	-0.110	13.40	0.101
5	0.715	0.142	2.10	79	1.9	-	80	-0.115	14.90	0.068
6	0.861	0.146	2.10	79	1.6	-	81	-0.094	14.50	0.657
7	1.001	0.140	2.10	79	1.5	-	80	-0.092	12.23	0.459
8	1.147	0.146	2.10	79	1.6	-	80	-0.092	12.35	0.455
9	1.289	0.142	2.10	79	1.6	-	80	-0.091	13.00	0.443
10	1.434	0.145	2.10	79	1.5	101	80	-0.093	13.89	0.236
11	1.577	0.143	2.10	79	2.0	-	81	-0.094	14.62	0.357
12	1.719	0.142	2.10	80	1.5	-	81	-0.095	15.37	0.448
13	1.862	0.143	2.11	80	1.7	-	81	-0.094	15.39	0.502
14	2.004	0.142	2.10	80	1.7	-	81	-0.094	15.58	0.498
15	2.150	0.146	2.10	80	1.7	-	81	-0.094	15.69	0.495
16	2.290	0.140	2.10	80	1.8	-	81	-0.094	15.75	0.454
17	2.439	0.149	2.10	81	1.8	-	81	-0.096	15.81	0.427
18	2.579	0.140	2.11	81	1.7	-	81	-0.093	15.71	0.483
19	2.728	0.149	2.11	81	1.8	-	81	-0.094	15.82	0.453
20	2.868	0.140	2.11	81	1.5	101	81	-0.094	15.85	0.478
21	3.011	0.143	2.11	82	1.7	-	81	-0.092	16.01	0.611
22	3.158	0.147	2.10	82	2.0	-	81	-0.092	16.20	0.657
23	3.302	0.144	2.11	82	2.1	-	81	-0.094	16.26	0.778
24	3.448	0.146	2.11	82	1.5	-	81	-0.094	16.31	0.982
25	3.588	0.140	2.11	83	1.8	-	81	-0.090	16.30	1.238
26	3.737	0.149	2.11	83	1.7	-	81	-0.089	16.17	1.474
27	3.876	0.139	2.10	83	1.7	-	81	-0.091	15.96	1.344
28	4.025	0.149	2.10	84	2.0	-	81	-0.093	15.88	1.002
29	4.165	0.140	2.11	84	1.7	-	81	-0.093	16.01	0.633
30	4.312	0.147	2.11	84	1.5	102	81	-0.091	15.61	0.385
31	4.458	0.146	2.11	85	2.0	-	81	-0.090	14.24	0.156

BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: IHP
Model: S160AGL
Run #: 4

Job #: 23-106
Tracking #: 99
Technician: AK
Date: 6/8/2023

	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	4.603	0.145	2.11	85	1.9	-	81	-0.090	13.39	0.063
33	4.747	0.144	2.11	85	1.8	-	81	-0.088	12.62	0.049
34	4.891	0.144	2.11	85	1.6	-	81	-0.086	12.08	0.051
35	5.037	0.146	2.11	86	2.0	-	81	-0.084	11.77	0.049
36	5.181	0.144	2.12	86	1.6	-	81	-0.083	11.48	0.069
37	5.329	0.148	2.12	86	1.6	-	81	-0.086	11.33	0.081
38	5.469	0.140	2.12	87	1.5	-	81	-0.081	11.32	0.079
39	5.617	0.148	2.12	87	1.6	-	81	-0.082	11.21	0.089
40	5.761	0.144	2.12	87	1.5	102	81	-0.080	11.25	0.074
41	5.909	0.148	2.12	87	1.6	-	81	-0.080	11.30	0.077
42	6.053	0.144	2.13	88	1.4	-	81	-0.081	11.28	0.073
43	6.200	0.147	2.12	88	1.9	-	81	-0.081	11.17	0.080
44	6.345	0.145	2.13	88	1.8	-	81	-0.081	11.22	0.081
45	6.489	0.144	2.13	89	1.9	-	81	-0.081	11.18	0.086
46	6.637	0.148	2.13	89	1.6	-	81	-0.079	11.15	0.089
47	6.783	0.146	2.12	89	1.9	-	81	-0.083	11.19	0.087
48	6.929	0.146	2.12	89	1.8	-	80	-0.082	11.34	0.096
49	7.074	0.145	2.13	89	1.5	-	80	-0.075	11.42	0.104
50	7.221	0.147	2.12	90	1.6	101	80	-0.079	10.99	0.093
51	7.366	0.145	2.13	90	1.5	-	80	-0.079	10.91	0.072
52	7.512	0.146	2.14	90	1.9	-	80	-0.076	10.15	0.065
53	7.659	0.147	2.14	90	1.5	-	80	-0.076	9.50	0.101
54	7.808	0.149	2.13	91	1.8	-	80	-0.076	8.84	0.200
55	7.949	0.141	2.13	91	1.6	-	80	-0.074	8.30	0.316
56	8.101	0.152	2.13	91	2.0	-	80	-0.071	7.97	0.414
57	8.245	0.144	2.13	92	1.6	-	80	-0.070	7.71	0.519
58	8.394	0.149	2.13	92	1.9	-	80	-0.074	7.44	0.651
59	8.539	0.145	2.13	92	1.9	-	80	-0.067	7.20	0.770
60	8.687	0.148	2.13	92	1.6	101	80	-0.069	7.09	0.801
61	8.831	0.144	2.13	92	1.6	-	80	-0.069	7.06	0.810
62	8.978	0.147	2.14	93	1.9	-	80	-0.067	6.99	0.838
63	9.123	0.145	2.14	93	1.7	-	80	-0.067	6.97	0.878

BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: IHP
Model: S160AGL
Run #: 4

Job #: 23-106
Tracking #: 99
Technician: AK
Date: 6/8/2023

	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	9.272	0.149	2.14	93	1.7	-	80	-0.069	6.96	0.883
65	9.420	0.148	2.14	93	2.0	-	80	-0.068	6.84	0.935
66	9.569	0.149	2.15	93	2.0	-	80	-0.068	6.59	0.843
67	9.715	0.146	2.15	94	1.8	-	80	-0.067	6.43	0.893
68	9.860	0.145	2.13	94	1.5	-	80	-0.067	6.15	1.043
69	10.012	0.152	2.14	94	2.0	-	80	-0.067	6.07	1.057
70	10.157	0.145	2.14	94	1.6	100	80	-0.066	6.12	1.040
71	10.304	0.147	2.15	94	1.6	-	80	-0.066	6.10	1.105
72	10.451	0.147	2.14	94	1.9	-	80	-0.064	6.46	0.899
73	10.596	0.145	2.14	95	2.0	-	80	-0.065	6.41	0.909
74	10.746	0.150	2.14	95	1.6	-	80	-0.064	6.51	0.909
75	10.893	0.147	2.15	95	1.9	-	80	-0.065	6.65	0.920
76	11.039	0.146	2.14	95	2.0	-	80	-0.063	6.71	0.829
77	11.186	0.147	2.15	95	1.7	-	80	-0.061	6.74	0.839
78	11.337	0.151	2.14	96	1.6	-	80	-0.062	6.15	1.031
79	11.484	0.147	2.15	96	1.9	-	79	-0.058	6.03	1.131
80	11.627	0.143	2.14	96	1.7	100	79	-0.061	5.02	1.439
81	11.777	0.150	2.14	96	1.5	-	79	-0.058	4.96	1.503
82	11.925	0.148	2.15	96	1.9	-	79	-0.057	5.05	1.480
83	12.073	0.148	2.16	96	2.0	-	79	-0.058	5.24	1.399
84	12.221	0.148	2.15	96	2.0	-	79	-0.058	5.27	1.412
85	12.371	0.150	2.15	96	1.9	-	79	-0.058	5.31	1.397
86	12.515	0.144	2.15	96	1.7	-	79	-0.058	5.35	1.376
87	12.667	0.152	2.16	96	1.5	-	79	-0.058	5.43	1.417
88	12.813	0.146	2.16	97	2.0	-	79	-0.056	5.45	1.471
89	12.961	0.148	2.15	97	1.9	-	79	-0.056	5.50	1.429
90	13.107	0.146	2.15	97	1.9	100	79	-0.054	5.56	1.412
91	13.260	0.153	2.16	97	1.6	-	79	-0.054	5.58	1.403
92	13.403	0.143	2.15	97	1.7	-	79	-0.057	5.73	1.367
93	13.556	0.153	2.15	97	1.5	-	79	-0.058	5.80	1.345
94	13.702	0.146	2.15	97	1.5	-	79	-0.056	5.88	1.330
95	13.853	0.151	2.15	97	1.8	-	79	-0.054	5.93	1.282

BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: IHP
Model: S160AGL
Run #: 4

Job #: 23-106
Tracking #: 99
Technician: AK
Date: 6/8/2023

	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	13.999	0.146	2.15	97	2.0	-	79	-0.057	6.01	1.300
97	14.149	0.150	2.16	97	1.5	-	79	-0.058	6.08	1.294
98	14.293	0.144	2.16	98	1.9	-	79	-0.056	6.14	1.268
99	14.446	0.153	2.16	98	1.9	-	79	-0.053	6.15	1.261
100	14.592	0.146	2.16	98	1.5	99	79	-0.054	6.21	1.188
101	14.743	0.151	2.16	98	1.6	-	79	-0.056	5.97	1.229
102	14.886	0.143	2.16	98	2.0	-	79	-0.056	5.59	1.360
103	15.037	0.151	2.16	98	2.0	-	79	-0.052	5.54	1.382
104	15.186	0.149	2.16	98	1.5	-	79	-0.054	5.17	1.557
105	15.337	0.151	2.16	98	1.5	-	79	-0.052	4.97	1.692
106	15.483	0.146	2.16	98	1.8	-	79	-0.055	4.69	1.865
107	15.631	0.148	2.16	98	1.8	-	79	-0.053	4.53	1.957
108	15.777	0.146	2.16	98	2.0	-	79	-0.055	4.10	2.227
109	15.928	0.151	2.16	98	1.5	-	79	-0.048	4.17	2.127
110	16.074	0.146	2.16	98	2.0	98	78	-0.054	3.96	2.232
111	16.225	0.151	2.16	98	1.5	-	78	-0.051	3.99	2.154
112	16.372	0.147	2.16	99	1.5	-	79	-0.052	4.34	1.887
113	16.523	0.151	2.16	99	1.5	-	78	-0.050	4.29	1.901
114	16.669	0.146	2.16	99	1.5	-	79	-0.050	4.29	1.939
115	16.823	0.154	2.16	99	1.5	-	78	-0.052	4.22	1.984
116	16.966	0.143	2.16	99	2.0	-	78	-0.048	4.17	1.979
117	17.120	0.154	2.16	99	1.5	-	78	-0.047	4.08	1.974
118	17.266	0.146	2.16	99	2.0	-	78	-0.051	4.05	1.975
119	17.414	0.148	2.16	99	2.0	-	78	-0.046	4.04	1.979
120	17.563	0.149	2.16	99	1.6	98	79	-0.046	3.72	2.265
121	17.714	0.151	2.16	99	1.8	-	79	-0.050	3.67	2.267
122	17.861	0.147	2.16	99	1.7	-	78	-0.049	3.67	2.265
123	18.012	0.151	2.16	99	1.5	-	78	-0.047	3.63	2.257
124	18.158	0.146	2.16	99	1.8	-	79	-0.047	3.62	2.276
125	18.307	0.149	2.16	99	1.5	-	79	-0.044	3.64	2.278
126	18.453	0.146	2.16	99	2.0	-	79	-0.048	3.99	1.953
127	18.607	0.154	2.16	99	1.5	-	79	-0.045	4.06	1.906

BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: IHP
Job #: 23-106
Model: S160AGL
Tracking #: 99
Run #: 4
Technician: AK
Date: 6/8/2023

	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	2.16	99	1.6	-	79	-0.044	4.12	1.911
129	18.904	0.151	2.17	99	1.9	-	79	-0.048	4.19	1.911
130	19.048	0.144	2.16	99	1.9	98	79	-0.042	4.19	1.871
131	19.199	0.151	2.16	99	1.5	-	79	-0.044	4.19	1.880
132	19.349	0.150	2.16	99	2.0	-	79	-0.044	4.11	1.946
133	19.497	0.148	2.16	99	2.0	-	79	-0.046	4.05	1.948
134	19.646	0.149	2.16	99	1.8	-	79	-0.044	4.04	1.974
135	19.795	0.149	2.16	99	1.9	-	79	-0.046	4.18	1.887
136	19.944	0.149	2.16	99	2.0	-	79	-0.042	4.12	1.895
137	20.092	0.148	2.16	99	1.8	-	79	-0.042	4.07	1.914
138	20.242	0.150	2.16	99	1.5	-	79	-0.046	4.05	1.853
139	20.393	0.151	2.16	99	1.6	-	79	-0.044	4.02	1.877
140	20.539	0.146	2.16	100	2.0	99	79	-0.042	4.01	1.883
141	20.688	0.149	2.16	100	1.8	-	79	-0.044	3.96	1.828
142	20.837	0.149	2.16	100	1.5	-	79	-0.044	3.95	1.861
143	20.986	0.149	2.16	100	2.0	-	79	-0.043	3.80	1.677
144	21.135	0.149	2.16	100	1.5	-	79	-0.042	3.71	1.727
145	21.286	0.151	2.17	100	1.6	-	79	-0.043	3.73	1.684
146	21.431	0.145	2.16	100	2.0	-	79	-0.044	3.62	1.735
147	21.582	0.151	2.16	100	1.7	-	79	-0.042	3.61	1.734
148	21.731	0.149	2.16	100	1.5	-	79	-0.042	3.61	1.751
149	21.882	0.151	2.15	100	1.6	-	79	-0.043	3.61	1.741
150	22.029	0.147	2.16	100	1.5	100	79	-0.042	3.70	1.677
151	22.178	0.149	2.16	100	1.8	-	79	-0.041	3.72	1.680
152	22.324	0.146	2.17	100	1.7	-	79	-0.042	3.71	1.704
153	22.478	0.154	2.16	100	1.9	-	79	-0.043	3.73	1.662
154	22.623	0.145	2.16	100	1.5	-	79	-0.042	3.77	1.690
155	22.777	0.154	2.17	100	2.0	-	79	-0.043	3.70	1.690
156	22.921	0.144	2.16	100	2.0	-	79	-0.041	3.64	1.665
157	23.072	0.151	2.16	100	1.5	-	79	-0.041	3.65	1.654
158	23.219	0.147	2.16	100	1.5	-	79	-0.041	3.69	1.618
159	23.373	0.154	2.16	100	1.5	-	79	-0.039	3.65	1.630

BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: IHP
Model: S160AGL
Run #: 4

Job #: 23-106
Tracking #: 99
Technician: AK
Date: 6/8/2023

	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	23.520	0.147	2.17	100	1.5	100	79	-0.040	3.65	1.612
161	23.669	0.149	2.17	100	2.0	-	79	-0.041	3.65	1.640
162	23.818	0.149	2.17	100	2.0	-	79	-0.044	3.60	1.647
163	23.967	0.149	2.17	100	1.9	-	79	-0.040	3.65	1.639
164	24.114	0.147	2.17	101	1.6	-	79	-0.042	3.58	1.608
165	24.267	0.153	2.17	101	2.0	-	79	-0.042	3.52	1.580
166	24.414	0.147	2.16	101	1.6	-	79	-0.042	3.57	1.543
167	24.565	0.151	2.17	101	1.6	-	79	-0.043	3.56	1.521
168	24.713	0.148	2.17	101	2.0	-	79	-0.042	3.57	1.504
169	24.864	0.151	2.17	101	2.0	-	79	-0.038	3.63	1.506
170	25.009	0.145	2.17	101	1.5	100	79	-0.039	3.62	1.496
171	25.160	0.151	2.17	101	1.9	-	79	-0.039	3.67	1.513
172	25.310	0.150	2.17	101	1.7	-	79	-0.040	3.46	1.342
173	25.461	0.151	2.17	101	1.6	-	79	-0.039	3.47	1.280
174	25.605	0.144	2.17	101	1.8	-	79	-0.038	3.45	1.321
175	25.759	0.154	2.17	101	1.8	-	79	-0.041	3.52	1.310
176	25.904	0.145	2.18	101	1.5	-	79	-0.037	3.49	1.334
177	26.057	0.153	2.17	101	1.5	-	79	-0.039	3.48	1.344
178	26.205	0.148	2.16	101	2.0	-	79	-0.037	3.54	1.341
179	26.354	0.149	2.17	101	1.6	-	79	-0.037	3.57	1.361
180	26.501	0.147	2.17	101	1.6	100	79	-0.040	3.58	1.409
181	26.654	0.153	2.16	101	1.8	-	79	-0.038	3.56	1.376
182	26.802	0.148	2.16	101	1.5	-	79	-0.038	3.68	1.403
183	26.950	0.148	2.16	101	1.7	-	79	-0.041	3.78	1.352
184	27.101	0.151	2.17	101	1.9	-	79	-0.034	3.78	1.366
185	27.249	0.148	2.16	101	1.5	-	79	-0.037	3.84	1.350
186	27.397	0.148	2.17	101	1.5	-	79	-0.038	3.90	1.359
187	27.551	0.154	2.17	101	1.4	-	79	-0.041	3.89	1.365
188	27.700	0.149	2.17	101	2.0	-	79	-0.040	3.92	1.375
189	27.849	0.149	2.17	101	1.9	-	79	-0.037	3.95	1.358
190	27.996	0.147	2.16	101	1.9	100	79	-0.040	3.98	1.341
191	28.148	0.152	2.17	101	1.6	-	79	-0.039	3.95	1.361

BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: IHP
Job #: 23-106
Model: S160AGL
Tracking #: 99
Run #: 4
Technician: AK
Date: 6/8/2023

	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	28.294	0.146	2.16	101	2.0	-	79	-0.039	4.01	1.330
193	28.444	0.150	2.16	101	2.0	-	79	-0.039	3.99	1.329
194	28.593	0.149	2.17	101	2.0	-	79	-0.040	4.03	1.295
195	28.745	0.152	2.17	101	1.6	-	79	-0.039	4.05	1.301
196	28.895	0.150	2.16	101	1.8	-	79	-0.039	4.10	1.288
197	29.042	0.147	2.16	101	1.8	-	79	-0.038	4.13	1.316
198	29.191	0.149	2.17	101	2.0	-	79	-0.040	4.12	1.334
199	29.343	0.152	2.17	102	1.5	-	79	-0.042	4.09	1.322
200	29.490	0.147	2.16	102	1.9	100	79	-0.038	4.10	1.294
201	29.642	0.152	2.17	102	2.0	-	79	-0.041	4.14	1.279
202	29.792	0.150	2.17	102	1.5	-	79	-0.037	4.13	1.283
203	29.938	0.146	2.17	102	2.0	-	79	-0.038	4.18	1.295
204	30.090	0.152	2.17	102	2.0	-	79	-0.039	4.34	1.269
205	30.237	0.147	2.17	102	1.8	-	79	-0.038	4.36	1.257
206	30.387	0.150	2.17	102	2.0	-	79	-0.037	4.45	1.248
207	30.535	0.148	2.17	102	1.7	-	79	-0.039	4.52	1.231
208	30.687	0.152	2.16	102	2.0	-	79	-0.038	4.59	1.185
209	30.835	0.148	2.17	102	1.5	-	79	-0.039	4.76	1.117
210	30.986	0.151	2.17	102	1.9	100	79	-0.038	4.74	1.159
211	31.134	0.148	2.17	102	1.7	-	79	-0.042	4.74	1.170
212	31.282	0.148	2.17	102	1.8	-	79	-0.040	4.80	1.176
213	31.433	0.151	2.17	102	1.7	-	79	-0.041	4.82	1.172
214	31.584	0.151	2.17	102	1.9	-	79	-0.040	4.81	1.159
215	31.729	0.145	2.17	102	1.9	-	79	-0.041	4.84	1.168
216	31.881	0.152	2.17	102	1.8	-	79	-0.039	4.82	1.208
217	32.028	0.147	2.17	102	1.9	-	79	-0.041	4.79	1.208
218	32.179	0.151	2.17	102	1.7	-	79	-0.039	4.84	1.200
219	32.327	0.148	2.16	102	1.5	98	79	-0.042	4.77	1.227
Avg/Tot	32.327	0.148	2.14	94.9	1.7	100	79.4	-0.058	6.67	1.186

BOX C TEST DATA - ASTM E2780 / ASTM E2515

Client: IHP
Model: S160AGL
Run #: 4

Job #: 23-106
Tracking #: 99
Technician: AK
Date: 6/8/2023

	Particulate Sampling 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)
0	0.000		0.41	79	1.6		74
1	0.151	0.151	1.08	78	1.7	-	75
2	0.304	0.153	1.08	78	1.9	-	75
3	0.463	0.159	1.09	78	1.7	-	75
4	0.618	0.155	1.10	78	1.9	-	75
5	0.774	0.156	1.10	78	1.9	-	76
6	0.930	0.156	1.11	78	1.8	-	76
7	1.087	0.157	1.10	78	1.8	-	76
8	1.244	0.157	1.10	79	1.8	-	76
9	1.402	0.158	1.11	79	1.7	-	77
10	1.560	0.158	1.12	79	1.8	99	77
11	1.718	0.158	1.12	79	1.8	-	77
12	1.874	0.156	1.11	79	1.8	-	77
13	2.030	0.156	1.11	79	1.7	-	77
14	2.189	0.159	1.12	80	1.8	-	77
15	2.347	0.158	1.12	80	1.7	-	78
16	2.506	0.159	1.13	80	1.7	-	77
17	2.666	0.160	1.11	80	1.9	-	78
18	2.823	0.157	1.13	81	1.9	-	78
19	2.985	0.162	1.13	81	1.9	-	78
20	3.142	0.157	1.14	82	1.9	100	78
21	3.301	0.159	1.13	82	1.8	-	78
22	3.464	0.163	1.14	82	1.7	-	78
23	3.625	0.161	1.14	82	1.9	-	78
24	3.784	0.159	1.13	82	1.9	-	78
25	3.943	0.159	1.14	82	1.9	-	78
26	4.106	0.163	1.15	82	1.7	-	78
27	4.264	0.158	1.15	83	1.9	-	78
28	4.428	0.164	1.14	83	1.8	-	78
29	4.587	0.159	1.15	83	1.8	-	79
30	4.747	0.160	1.15	84	1.7	102	79
31	4.912	0.165	1.15	84	1.9	-	79

BOX C TEST DATA - ASTM E2780 / ASTM E2515

Client: IHP
Model: S160AGL
Run #: 4

Job #: 23-106
Tracking #: 99
Technician: AK
Date: 6/8/2023

	Particulate Sampling 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)
32	5.074	0.162	1.16	84	1.8	-	79
33	5.235	0.161	1.15	84	1.9	-	79
34	5.397	0.162	1.16	85	1.9	-	79
35	5.560	0.163	1.16	85	1.9	-	79
36	5.721	0.161	1.15	85	1.8	-	79
37	5.884	0.163	1.16	85	1.9	-	79
38	6.044	0.160	1.17	85	1.9	-	78
39	6.206	0.162	1.16	86	1.8	-	79
40	6.373	0.167	1.17	86	1.8	103	79
41	6.534	0.161	1.15	86	2.0	-	78
42	6.698	0.164	1.17	87	1.9	-	79
43	6.860	0.162	1.16	87	2.0	-	79
44	7.024	0.164	1.16	87	1.8	-	79
45	7.185	0.161	1.17	87	1.9	-	79
46	7.351	0.166	1.16	87	1.8	-	79
47	7.515	0.164	1.17	87	2.0	-	78
48	7.678	0.163	1.16	87	1.9	-	78
49	7.842	0.164	1.17	88	1.8	-	78
50	8.005	0.163	1.17	88	1.8	102	78
51	8.170	0.165	1.17	88	1.9	-	78
52	8.332	0.162	1.17	88	1.8	-	78
53	8.498	0.166	1.17	89	1.8	-	78
54	8.663	0.165	1.18	89	1.9	-	78
55	8.823	0.160	1.16	89	1.8	-	78
56	8.991	0.168	1.18	89	1.9	-	78
57	9.154	0.163	1.17	89	1.9	-	78
58	9.319	0.165	1.18	89	1.9	-	78
59	9.483	0.164	1.17	89	1.9	-	78
60	9.649	0.166	1.18	89	1.9	102	78
Avg/Tot	9.649	0.161	1.13	83.5	1.8	101	77.7

WOODSTOVE SURFACE TEMPERATURE DATA

Client: IHP
Model: S160AGL
Run #: 4

Job #: 23-106
Tracking #: 99
Technician: AK
Date: 6/8/2023

Stove ΔT: 151

	Temperature Data (°F)						
Elapsed Time (min)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
0	513	503	324	312	475	425.3	73.3
1	509	504	337	320	482	430.2	73.4
2	502	497	348	324	471	428.2	73.4
3	497	492	357	345	467	431.6	73.5
4	500	495	362	439	459	451.0	73.4
5	506	504	365	540	454	473.9	73.4
6	509	512	367	597	468	490.5	73.4
7	507	513	370	621	472	496.4	73.4
8	506	513	371	639	474	500.6	73.3
9	508	515	373	654	475	504.8	73.3
10	510	517	376	669	476	509.6	73.2
11	515	521	376	685	476	514.6	73.2
12	520	526	378	703	476	520.5	73.2
13	525	530	378	717	476	525.3	73.2
14	531	536	379	732	476	530.6	73.3
15	537	542	378	745	475	535.3	73.2
16	542	547	357	707	474	525.4	73.3
17	546	553	345	694	472	522.1	73.3
18	551	558	334	685	471	519.9	73.4
19	555	564	325	676	470	518.0	73.5
20	560	570	317	670	469	517.2	73.5
21	565	576	311	667	467	517.2	73.5
22	571	582	305	665	466	517.7	73.4
23	576	588	302	664	464	518.8	73.4
24	581	594	298	664	463	519.9	73.4
25	586	599	295	663	461	520.9	73.4
26	592	605	293	659	460	521.6	73.4
27	597	612	291	655	458	522.4	73.4
28	602	618	289	656	457	524.3	73.4
29	606	623	287	659	455	526.0	73.4
30	610	626	288	657	454	527.0	73.4
31	613	629	287	653	453	526.9	73.6
32	614	630	287	643	452	525.0	73.5
33	613	631	288	629	451	522.2	73.6
34	613	631	287	613	449	518.6	73.6
35	612	631	287	596	448	514.7	73.6
36	611	630	287	581	447	511.3	73.6
37	609	630	288	569	446	508.3	73.6
38	607	630	287	560	444	505.6	73.6
39	605	629	287	552	443	503.1	73.6
40	604	628	288	544	441	501.1	73.6
41	602	628	288	537	440	498.9	73.8
42	601	626	287	531	438	496.7	73.8
43	600	625	288	526	437	495.1	73.8
44	599	623	288	520	435	493.3	73.7
45	599	622	288	514	434	491.4	73.7
46	599	621	288	509	432	489.9	73.7
47	598	621	289	505	431	488.7	73.7

WOODSTOVE SURFACE TEMPERATURE DATA

Client: IHP
Model: S160AGL
Run #: 4

Job #: 23-106
Tracking #: 99
Technician: AK
Date: 6/8/2023

Stove ΔT: 151

	Temperature Data (°F)						
Elapsed Time (min)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
48	599	620	289	503	429	488.0	73.7
49	599	621	289	500	428	487.3	73.7
50	600	621	290	497	426	486.6	73.6
51	600	621	290	494	425	486.0	73.6
52	599	620	289	489	424	484.1	73.7
53	598	617	289	480	423	481.1	73.7
54	595	613	289	468	421	477.3	73.8
55	592	608	290	456	420	473.1	73.7
56	588	602	289	445	419	468.6	73.8
57	584	595	289	434	418	464.3	73.8
58	580	589	288	424	417	459.8	73.8
59	575	583	288	414	416	455.4	73.8
60	570	578	288	405	415	451.2	73.8
61	566	573	287	397	414	447.3	73.8
62	561	568	286	390	413	443.6	73.8
63	557	563	285	383	412	440.2	73.9
64	552	559	284	377	411	436.5	73.8
65	548	555	283	371	410	433.2	73.9
66	543	551	282	368	408	430.3	73.8
67	538	546	280	364	407	427.1	73.8
68	533	541	279	362	406	424.3	73.8
69	528	536	277	360	405	421.0	74.0
70	523	531	277	360	404	418.9	74.0
71	518	526	275	360	403	416.4	73.8
72	513	522	274	360	402	413.9	73.9
73	509	518	272	356	401	411.0	73.8
74	505	515	270	353	399	408.3	73.8
75	501	512	268	352	398	406.0	73.8
76	498	509	267	352	397	404.5	73.9
77	494	507	266	347	396	401.9	73.9
78	491	504	265	341	395	399.1	73.9
79	487	502	264	335	393	396.2	73.7
80	484	498	263	327	393	392.8	73.7
81	482	494	261	320	392	389.6	73.7
82	479	490	260	313	391	386.3	73.8
83	476	486	259	307	390	383.8	73.9
84	474	483	257	301	389	380.8	73.8
85	471	479	257	297	388	378.5	73.8
86	470	476	255	293	387	376.1	73.8
87	467	473	255	289	386	373.9	73.8
88	465	470	253	286	386	371.9	73.7
89	463	467	253	283	385	370.1	73.8
90	462	464	251	281	384	368.3	73.9
91	460	462	249	278	383	366.4	73.9
92	459	459	250	277	382	365.3	73.9
93	458	456	249	276	382	364.2	73.9
94	458	454	249	275	381	363.4	73.8
95	458	452	248	275	380	362.5	73.8

WOODSTOVE SURFACE TEMPERATURE DATA

Client: IHP
Model: S160AGL
Run #: 4

Job #: 23-106
Tracking #: 99
Technician: AK
Date: 6/8/2023

Stove ΔT: 151

	Temperature Data (°F)						
Elapsed Time (min)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
96	459	450	247	274	379	361.6	73.9
97	460	447	247	273	378	361.1	73.8
98	461	446	246	273	377	360.6	73.7
99	461	444	246	273	376	360.2	73.7
100	462	442	246	273	376	359.8	73.7
101	462	441	247	273	374	359.4	73.9
102	462	439	246	272	374	358.5	73.8
103	461	438	246	272	373	357.7	73.8
104	460	436	246	270	372	356.6	73.7
105	458	434	246	268	371	355.3	73.8
106	456	432	246	266	370	353.8	73.7
107	454	430	245	263	369	352.2	73.8
108	451	428	245	260	369	350.4	73.7
109	448	426	245	257	368	348.7	73.8
110	445	423	245	254	367	346.9	73.8
111	443	421	244	251	366	344.9	73.7
112	440	419	244	249	365	343.2	73.8
113	437	417	243	246	365	341.7	73.9
114	434	415	243	244	364	340.1	73.8
115	432	414	242	242	363	338.4	73.7
116	429	412	241	240	362	336.9	73.8
117	427	410	239	239	361	335.2	73.9
118	425	408	238	236	361	333.5	73.9
119	422	407	237	235	360	332.1	73.9
120	419	405	237	232	359	330.4	73.9
121	416	404	235	231	358	328.7	73.9
122	414	402	234	228	358	327.1	74.0
123	411	400	234	226	357	325.7	73.9
124	409	398	233	225	356	324.1	73.9
125	406	397	232	223	356	322.7	73.9
126	404	395	231	222	355	321.4	73.9
127	402	394	230	221	354	320.1	73.8
128	400	392	229	220	354	318.8	73.9
129	398	391	228	219	353	317.6	73.8
130	396	390	227	217	352	316.5	73.9
131	394	389	226	217	352	315.3	73.8
132	393	387	225	215	351	314.3	73.9
133	391	386	225	215	350	313.3	73.7
134	389	384	224	214	350	312.1	73.9
135	388	383	223	213	349	311.3	73.8
136	386	382	222	212	349	310.1	73.9
137	385	380	221	211	348	309.0	73.9
138	384	378	220	210	347	308.0	74.0
139	383	377	220	209	347	307.0	73.9
140	381	375	219	208	346	306.0	73.9
141	380	374	218	208	346	305.1	74.0
142	379	372	218	207	345	304.3	73.9
143	378	371	217	206	345	303.4	73.9

WOODSTOVE SURFACE TEMPERATURE DATA

Client: IHP
Model: S160AGL
Run #: 4

Job #: 23-106
Tracking #: 99
Technician: AK
Date: 6/8/2023

Stove ΔT: 151

	Temperature Data (°F)						
Elapsed Time (min)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
144	377	369	217	205	344	302.5	73.9
145	376	368	216	204	344	301.5	74.0
146	375	366	216	203	343	300.5	74.0
147	373	365	215	202	343	299.6	74.0
148	372	363	215	201	342	298.6	74.0
149	371	362	214	200	342	297.7	74.0
150	370	360	214	200	341	297.0	73.9
151	368	359	214	199	341	296.0	74.0
152	367	357	213	198	340	295.1	74.0
153	365	356	213	197	340	294.3	73.9
154	364	355	213	197	339	293.5	73.9
155	363	354	213	196	339	292.8	73.9
156	362	353	213	195	338	292.0	73.9
157	360	352	213	195	338	291.4	74.0
158	359	351	212	194	337	290.6	74.0
159	358	349	213	194	337	290.0	74.0
160	356	348	213	193	336	289.3	74.0
161	355	348	213	192	336	288.7	74.0
162	354	346	212	192	335	287.9	74.0
163	353	346	212	191	335	287.3	74.0
164	352	345	212	190	334	286.5	74.0
165	351	344	212	190	334	286.0	74.0
166	349	343	212	189	334	285.3	74.0
167	348	342	212	189	333	284.7	74.0
168	347	341	212	188	333	283.9	73.9
169	345	340	212	187	332	283.4	74.0
170	344	339	212	187	332	282.8	74.0
171	343	338	212	187	331	282.3	73.9
172	342	337	213	186	331	281.6	74.0
173	340	336	213	185	331	280.9	74.1
174	339	335	213	184	330	280.2	74.0
175	337	334	213	183	330	279.6	74.1
176	336	333	214	183	330	278.9	74.1
177	334	332	214	182	329	278.3	73.9
178	333	332	213	182	329	277.7	74.0
179	332	331	213	181	329	277.0	74.1
180	331	330	213	181	328	276.4	74.0
181	330	329	213	180	328	275.9	74.1
182	329	329	212	180	327	275.3	74.0
183	328	328	212	180	327	274.9	74.1
184	327	328	211	179	326	274.3	74.2
185	326	327	211	179	326	273.8	74.1
186	325	327	210	179	326	273.4	74.0
187	324	326	210	179	325	273.0	74.1
188	324	326	210	179	325	272.6	74.1
189	323	326	210	179	325	272.3	74.1
190	322	326	210	179	324	272.1	74.1
191	321	325	210	179	324	271.8	74.1

WOODSTOVE SURFACE TEMPERATURE DATA

Client: IHP
Model: S160AGL
Run #: 4

Job #: 23-106
Tracking #: 99
Technician: AK
Date: 6/8/2023

Stove ΔT: **151**

	Temperature Data (°F)						
Elapsed Time (min)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
192	321	325	210	179	323	271.6	74.1
193	320	325	210	179	323	271.5	74.2
194	320	325	210	179	323	271.3	74.1
195	319	325	211	179	323	271.2	74.1
196	318	325	211	179	322	271.0	74.1
197	318	325	211	179	322	270.9	74.1
198	317	324	212	179	322	270.9	74.2
199	317	324	212	180	321	270.9	74.1
200	317	324	213	180	321	270.8	74.1
201	317	323	214	180	321	270.7	74.2
202	316	323	214	180	321	270.7	74.1
203	316	323	215	180	320	270.7	74.2
204	316	322	216	180	320	270.7	74.2
205	316	322	216	180	320	270.6	74.1
206	315	321	217	180	320	270.6	74.1
207	315	321	218	180	320	270.7	74.1
208	315	321	218	180	320	270.8	74.2
209	315	321	219	180	320	270.9	74.3
210	315	321	220	181	320	271.1	74.3
211	315	320	221	181	320	271.3	74.3
212	315	320	222	182	319	271.6	74.2
213	315	320	222	182	319	271.8	74.1
214	316	320	224	183	319	272.2	74.2
215	316	320	224	183	319	272.5	74.3
216	316	320	225	183	319	272.8	74.2
217	317	320	226	184	319	273.2	74.2
218	318	320	227	184	319	273.5	74.1
219	318	320	228	185	319	273.9	74.1
Average	445.6	447.0	254.5	326.2	380.2	370.7	73.8

LAB SAMPLE DATA - ASTM E2515

Client: IHP
Model: S160AGL
Run #: 4

Job #: 23-106
Tracking #: 99
Technician: AK
Date: 6/8/2023

		Sample ID	Tare, mg	Final, mg	Catch, mg
Filters	**A**	G00558	243.4	245.2	1.8
	B	G00559	243.2	245.0	1.8
	C - 1st Hour	G00560	241.6	242.9	1.3
	Amb	G00561	242.1	242.1	0.0
Probes	**A**	15A	117238.9	117238.9	0.0
	B	15B	116751.8	116751.9	0.1
	C - 1st Hour	15C	116846.9	116847.0	0.1
O-rings	**A**	15A	3569.5	3569.8	0.3
	B	15B	3570.9	3571.0	0.1
	C - 1st Hour	15C	3396.5	3396.7	0.2

Placed in Dessicator on:	6/8/2023

Filters	**A**	245.4	6/12 10:18	245.2	6/16 12:07				
	B	245.0	6/12 10:18	245.0	6/16 12:07				
	C - 1st Hour	243.0	6/12 10:18	242.9	6/16 12:07				
	Amb	242.1	6/12 10:18	242.1	6/16 12:07				
Probes	**A**	117238.9	6/12 10:18	117238.9	6/16 12:07				
	B	116751.9	6/12 10:19	116751.9	6/16 12:07				
	C - 1st Hour	116846.9	6/12 10:19	116847.0	6/16 12:07				
O-Rings	**A**	3570.0	6/12 10:19	3569.8	6/16 12:07				
	B	3571.0	6/12 10:19	3571.0	6/16 12:07				
	C - 1st Hour	3396.6	6/12 10:19	3396.7	6/16 12:08				

Train A Aggregate, mg:	**2.1**
Train B Aggregate, mg:	**2.0**
Train C Aggregate, mg:	**1.6**
Ambient, mg:	**0.0**

ASTM E2780 Wood Heater Run Sheets

Client: IHP Job Number: 23-106 Tracking #: 99
Model: S160AGL Run Number: 4 Test Date: 6/8/23

Wood Heater Run Notes

Test Control Settings

Primary Air Setting(s): Open 0.875" from fully closed
Targeted Burn Category: III

Preburn Notes

Time	Notes
73:00	End PB

Test Notes

Test Burn Start Time: 15:20 Test Fuel Loaded by: 55 seconds
Door Closed: 65 seconds Air Control Set at: 300 seconds
Other Loading Notes: Fan on low @ 30 min

Time	Notes
	-None-

Test Burn End Time: 18:59

Flue Gas Concentration Measurement

Calibration Gas Values: Span Gas CO_2 (%): 17.01 CO (%): 4.306
Mid Gas CO_2 (%): 10.09 CO (%): 2.53

Calibration Results:

	Pre Test			Post Test		
	Zero	Span	Mid	Zero	Span	Mid
Time	10:31	10:33	10:34	6/9 08:43	6/9 08:46	6/9 08:50
CO_2	0.00	17.01	10.15	0.07	16.95	10.07
CO	0.000	4.305	2.520	0.010	4.290	2.471

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

Technician Signature: Date: 6/26/23

ASTM E2780 Wood Heater Run Sheets

Client: IHP Job Number: 23-106 Tracking #: 99
Model: S160AGL Run Number: 4 Test Date: 6/8/23



Test Fuel Side View



Test Fuel Iso View



Test Fuel Loaded in Stove



Air Setting

Technician Signature: _____ Date: 6/26/23

WOOD STOVE TEST DATA PACKET
ASTM E2780/E2515



Run 5 Data Summary

Client:	IHP
Model:	S160AGL
Job #:	23-106
Tracking #:	99
Test Date:	6/9/2023

Technician Signature

6/30/2023
Date

TEST RESULTS - ASTM E2780 / ASTM E2515

Client: IHP
Model: S160AGL
Run #: 5

Job #: 23-106
Tracking #: 99
Technician: AK
Date: 6/9/2023

Burn Rate (kg/hr):	1.75

	Ambient Sample	Sample Train A	Sample Train B	1st Hour Filter
Total Sample Volume (ft^3)	20.157	22.836	21.733	9.459
Average Gas Velocity in Dilution Tunnel (ft/sec)	9.0			
Average Gas Flow Rate in Dilution Tunnel (dscf/hr)	23655.5			
Average Gas Meter Temperature (°F)	69.3	88.3	87.6	79.0
Total Sample Volume (dscf)	20.557	22.298	21.052	9.138
Average Tunnel Temperature (°F)	93.2			
Total Time of Test (min)	150			
Total Particulate Catch (mg)	0.0	1.7	1.6	1.6
Particulate Concentration, dry-standard (g/dscf)	0.0000000	0.0000762	0.0000760	0.0001751
Total PM Emissions (g)	0.00	4.51	4.49	4.14
Particulate Emission Rate (g/hr)	0.00	1.80	1.80	4.14
Emissions Factor (g/kg)	-	1.03	1.03	-
Difference from Average Total Particulate Emissions (g)	-	0.01	0.01	-
Difference from Average Total Particulate Emissions (%)	-	0.2%	0.2%	
Difference from Average Emissions Factor (g/kg)	-	0.00	0.00	-

Final Average Results	
Total Particulate Emissions (g)	4.50
Particulate Emission Rate (g/hr)	1.80
Emissions Factor (g/kg)	1.03
HHV Efficiency (%)	68.8%
LHV Efficiency (%)	74.3%
CO Emissions (g/min)	1.80

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	<90 °F	82.5	OK
Face Velocity	< 30 ft/min	8.7	OK
Leakage Rate	Less than 4% of average sample rate	0.001 cfm	OK
Ambient Temp	55-90 °F	Min:67.2/Max:70.3	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
Stove Surface ΔT	<126°F	57.1	OK

B415.1 Efficiency Results

Manufacturer:	IHP
Model:	S160AGL
Date:	06/09/23
Run:	5
Control #:	23-106
Test Duration:	150
Output Category:	3

Test Results in Accordance with CSA B415.1-09

	HHV Basis	LHV Basis
Overall Efficiency	68.8%	74.3%
Combustion Efficiency	95.7%	95.7%
Heat Transfer Efficiency	71.9%	77.7%

Output Rate (kJ/h)	23,700	22,482	**(Btu/h)**
Burn Rate (kg/h)	1.74	3.83	**(lb/h)**
Input (kJ/h)	34,456	32,685	**(Btu/h)**

Test Load Weight (dry kg)	4.35	9.58	**dry lb**
MC wet (%)	16.59		
MC dry (%)	19.89		
Particulate (g)	4.50		
CO (g)	270		
Test Duration (h)	2.50		

Emissions	**Particulate**	**CO**
g/MJ Output	0.08	4.55
g/kg Dry Fuel	1.04	62.03
g/h	1.80	107.89
g/min	0.03	1.80
lb/MM Btu Output	0.18	10.58

Air/Fuel Ratio (A/F)	13.86

VERSION: **2.4** **4/15/2010**

WOODSTOVE FUEL DATA - ASTM E2780

Client: IHP
Model: S160AGL
Run #: 5

Job #: 23-106
Tracking #: 99
Technician: AK
Date: 6/9/2023

Preburn Fuel Information

Size	Length (in)	Moisture Content (% DB)	Size	Length (in)	Moisture Content (% DB)
2x4	9.00	19.7	2x4	16.00	23.2
2x4	13.00	20.7	2x4	16.00	20.0
2x4	13.00	19.4	2x4	16.00	20.3
2x4	13.00	19.5	2x4	16.00	23.9
2x4	13.00	20.9			
2x4	13.00	23.8			
2x4	13.00	22.4			
2x4	16.00	19.5			
Total Fuel Weight (lbs):		16.82	Average Moisture (%DB):		21.1

Firebox Volume (ft^3):	1.54
Total 2x4 Crib Weight, with spacers (lbs):	4.21
Total 4x4 Crib Weight, with spacers (lbs):	7.28
Total Wet Fuel Weight, with spacers (lbs):	11.49

Coal Bed Range (20-25%):
Min (lbs): 2.30
Max (lbs): 2.87

Test Fuel Information

Size	Length (in)	Weight (lbs)	Moisture Content (%DB)			Dry Weight (lbs)
2x4	15.00	1.78	19.7	19.9	19.8	1.49
2x4	15.00	1.62	19.0	19.3	19.7	1.36
4x4	15.00	3.46	19.0	19.1	19.8	2.90
4x4	15.00	3.38	21.2	21.9	20.3	2.79
				Total Dry Weight, no spacers (lbs):		8.53
				Total Dry Weight, with spacers (lbs):		9.66

Spacer Moisture Readings (%DB)

8.4	14.1						
8.7	9.0						
14.7	11.9						
16.0	12.6						
10.5	9.7						
12.3	9.9						

Quality Checks	Requirement	Observed	Result
Fuel Density	25 - 36 (lbs/ft^3, DB)	28.1	OK
Loading Density	6.3 - 7.7 (lbs/ft^3, WB)	7.46	OK
2x4 Fuel Mix	35 - 65 % of total weight	37%	OK

DILUTION TUNNEL & MISC. DATA - ASTM E2780 / E2515

Client:	IHP	Job #:	23-106
Model:	S160AGL	Tracking #:	99
Run #:	5	Technician:	AK
Test Start Time:	10:29	Date:	6/9/2023

Total Sampling Time (min):	150
Recording Interval (min):	1

Meter Box γ Factor:	1.010	(A)
Meter Box γ Factor:	1.001	(B)
Meter Box γ Factor:	0.985	(C)
Meter Box γ Factor:	1.024	(Ambient)

Induced Draft Check (in. H_2O):	0
Smoke Capture Check (%):	100%
Date Flue Pipe Last Cleaned:	6/5/2023

	Pre-Test	Post Test	Avg.
Barometric Pressure (in. Hg)	29.86	29.91	29.89
Relative Humidity (%)	24.5	43.9	
Room Air Velocity (ft/min)	0	0.0	
Scale Audit (lbs)	10.0	10.0	
Ambient Sample Volume:		20.157	ft^3

Leak Checks	Pre-Test		Post-Test	
Pitot	0		0	
	cfm	@ in Hg	cfm	@ in Hg
A	0.001	-7	0.000	-7
B	0.000	-7	0.000	-7
C	0.000	-8	0.000	-8
Ambient	0.000	-12	0.000	-12

DILUTION TUNNEL FLOW

Traverse Data

Point	dP (in H_2O)	Temp (°F)
1	0.012	95
2	0.020	95
3	0.022	95
4	0.020	95
5	0.018	95
6	0.012	95
7	0.014	95
8	0.022	95
9	0.022	95
10	0.022	95
11	0.018	95
12	0.014	95
Center	0.024	95

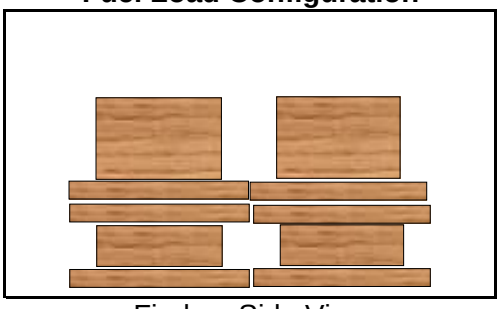
Static Pressure: -0.130 in. H_2O

Dilution Tunnel H_2O:	2.00	percent
Tunnel Diameter:	12	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:	0.7854	ft^2
V_{strav}:	9.07	ft/sec
V_{scent}:	10.54	ft/sec
F_p:	0.861	[ratio]
Initial Tunnel Flow:	397.8	scf/min

TEST FUEL PROPERTIES

Fuel Load Configuration

Firebox Front



Firebox Back

Firebox Side View

Actual Fuel Used Properties

Fuel Type:	D. Fir
HHV (kJ/kg)	19,810
%C	48.73
%H	6.87
%O	43.9
%Ash	0.5
MC (%DB)	19.9

DILUTION TUNNEL & MISC. DATA - ASTM E2780 / E2515

Client:	IHP	Job #:	23-106
Model:	S160AGL	Tracking #:	99
Run #:	5	Technician:	AK
Test Start Time:	10:29	Date:	6/9/2023

Total Sampling Time (min):	150
Recording Interval (min):	1

Meter Box γ Factor:	1.010	(A)
Meter Box γ Factor:	1.001	(B)
Meter Box γ Factor:	0.985	(C)
Meter Box γ Factor:	1.024	(Ambient)

Induced Draft Check (in. H_2O):	0
Smoke Capture Check (%):	100%
Date Flue Pipe Last Cleaned:	6/5/2023

	Pre-Test	Post Test	Avg.
Barometric Pressure (in. Hg)	29.86	29.91	29.89
Relative Humidity (%)	24.5	43.9	
Room Air Velocity (ft/min)	0	0.0	
Scale Audit (lbs)	10.0	10.0	
Ambient Sample Volume:		20.157	ft^3

Leak Checks	Pre-Test		Post-Test	
Pitot	0		0	
	cfm	@ in Hg	cfm	@ in Hg
A	0.001	-7	0.000	-7
B	0.000	-7	0.000	-7

WOODSTOVE PREBURN DATA - ASTM E2780

Client: IHP
Model: S160AGL
Run #: 5

Job #: 23-106
Tracking #: 99
Technician: AK
Date: 6/9/2023

Recording Interval (min): 1
Run Time (min): 74

			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	10.26	-0.119	524	532	331	928	256	514.0	859	68
1	9.95	-0.115	529	541	321	886	265	508.5	768	68
2	9.69	-0.112	533	548	314	849	272	503.1	727	68
3	9.41	-0.112	536	555	308	826	279	500.7	706	67
4	9.12	-0.111	541	561	303	806	285	499.2	692	67
5	8.85	-0.111	546	567	298	793	291	499.0	684	67
6	8.59	-0.111	551	573	295	784	297	500.0	679	67
7	8.32	-0.109	556	578	292	778	302	501.3	678	67
8	8.08	-0.110	561	584	290	772	308	502.9	676	67
9	7.82	-0.108	566	590	288	768	312	504.6	668	67
10	7.58	-0.109	571	596	286	763	316	506.4	664	67
11	7.33	-0.106	576	603	285	758	321	508.5	651	66
12	7.10	-0.118	580	609	284	753	323	509.6	670	66
13	6.69	-0.118	587	616	283	773	319	515.5	806	67
14	6.27	-0.110	595	625	283	773	329	521.0	699	67
15	6.05	-0.105	602	630	283	758	336	521.5	641	67
16	5.86	-0.105	607	633	284	748	341	522.6	626	67
17	5.69	-0.105	610	636	285	740	346	523.3	630	67
18	5.53	-0.103	611	638	286	732	350	523.3	629	67
19	5.36	-0.102	612	638	287	723	354	523.0	617	67
20	5.21	-0.101	614	639	288	715	359	522.7	602	67
21	5.06	-0.100	615	639	288	707	363	522.4	592	67
22	4.92	-0.099	617	639	290	700	366	522.2	577	67
23	4.79	-0.094	619	640	290	689	370	521.5	559	67
24	4.67	-0.093	621	641	291	673	373	519.8	539	67
25	4.56	-0.093	623	642	292	654	376	517.2	524	67
26	4.45	-0.092	624	642	293	638	379	515.2	517	66
27	4.36	-0.090	626	641	293	628	382	514.1	516	67
28	4.25	-0.090	627	640	295	622	384	513.7	514	66
29	4.15	-0.092	628	639	296	616	387	513.3	513	67
30	4.05	-0.090	630	638	297	608	389	512.2	509	67
31	3.96	-0.089	630	637	298	599	392	511.2	503	66
32	3.89	-0.089	629	636	300	595	394	510.8	490	66
33	3.82	-0.085	628	634	301	579	396	507.6	473	66
34	3.76	-0.083	625	632	304	561	399	504.0	457	66
35	3.70	-0.082	621	630	306	542	401	500.0	444	67
36	3.64	-0.080	617	627	308	524	404	495.9	431	66
37	3.60	-0.078	613	624	310	507	406	492.0	421	66
38	3.55	-0.077	609	622	313	491	409	488.7	414	66
39	3.50	-0.077	606	619	315	477	412	485.6	407	66
40	3.46	-0.074	603	616	316	464	415	482.6	399	66
41	3.42	-0.073	599	612	318	447	418	478.8	386	65
42	3.39	-0.072	595	607	318	433	421	474.8	376	65
43	3.37	-0.071	591	602	318	417	425	470.4	366	65
44	3.33	-0.067	586	597	318	402	429	466.2	358	65

WOODSTOVE PREBURN DATA - ASTM E2780

Client: IHP
Model: S160AGL
Run #: 5

Job #: 23-106
Tracking #: 99
Technician: AK
Date: 6/9/2023

Recording Interval (min): 1
Run Time (min): 74

			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
45	3.30	-0.066	581	591	316	391	433	462.4	351	65
46	3.28	-0.068	576	585	316	379	436	458.5	344	65
47	3.25	-0.067	571	580	315	369	440	454.7	338	65
48	3.23	-0.066	566	574	315	359	443	451.3	333	65
49	3.20	-0.064	561	568	313	349	446	447.3	330	64
50	3.18	-0.063	556	563	311	342	449	444.2	326	65
51	3.15	-0.064	552	558	308	333	451	440.6	323	65
52	3.12	-0.063	547	553	306	327	454	437.4	320	65
53	3.11	-0.063	544	549	303	322	455	434.6	318	65
54	3.08	-0.062	540	544	302	318	457	432.3	317	66
55	3.06	-0.061	537	539	299	312	459	429.2	314	66
56	3.03	-0.062	534	535	298	307	461	426.8	312	66
57	3.00	-0.060	531	531	295	304	462	424.5	311	66
58	2.98	-0.061	528	527	293	301	463	422.3	309	66
59	2.95	-0.061	525	523	291	298	464	420.2	308	66
60	2.93	-0.060	523	519	289	296	465	418.4	307	66
61	2.91	-0.060	521	516	287	292	466	416.2	305	66
62	2.88	-0.060	518	512	286	289	467	414.5	303	66
63	2.85	-0.059	516	509	285	287	468	412.9	302	67
64	2.83	-0.058	514	506	282	283	468	410.7	300	66
65	2.81	-0.058	511	503	281	282	469	409.3	299	67
66	2.79	-0.057	509	501	279	279	470	407.6	299	67
67	2.75	-0.056	507	498	278	279	471	406.6	299	67
68	2.74	-0.057	505	496	276	277	472	405.2	298	67
69	2.70	-0.058	503	493	275	277	473	404.1	297	67
70	2.68	-0.059	501	491	274	275	474	403.1	295	67
71	2.66	-0.057	499	489	273	274	474	401.6	293	67
72	2.64	-0.056	497	487	272	272	475	400.3	292	67
73	2.62	-0.056	495	485	271	271	476	399.2	290	67
74	2.60	-0.057	492	482	270	268	477	397.8	287	67

BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: IHP
Model: S160AGL
Run #: 5

Job #: 23-106
Tracking #: 99
Technician: AK
Date: 6/9/2023

	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		0.023	0.73	73	0.7		11.49		86	349	71	67
1	0.134	0.134	0.023	1.91	73	0.8	-	11.30	-0.19	96	288	72	68
2	0.269	0.135	0.024	1.95	73	0.9	-	11.23	-0.07	94	369	73	68
3	0.415	0.146	0.024	1.97	73	0.9	-	11.03	-0.20	99	520	73	68
4	0.554	0.139	0.023	2.00	73	0.9	-	10.78	-0.25	106	626	74	68
5	0.693	0.139	0.022	2.02	73	0.9	-	10.54	-0.24	111	677	75	68
6	0.840	0.147	0.023	2.03	73	0.8	-	10.35	-0.19	105	601	75	68
7	0.976	0.136	0.024	2.06	73	0.9	-	10.22	-0.13	101	540	75	68
8	1.123	0.147	0.024	2.07	73	0.9	-	10.09	-0.13	99	529	75	68
9	1.265	0.142	0.024	2.09	73	0.9	-	9.94	-0.15	99	530	76	68
10	1.412	0.147	0.023	2.11	73	0.9	96	9.81	-0.13	99	525	76	68
11	1.555	0.143	0.024	2.12	74	0.9	-	9.68	-0.13	99	520	76	68
12	1.702	0.147	0.023	2.13	74	0.9	-	9.54	-0.14	99	517	76	68
13	1.846	0.144	0.024	2.14	74	0.9	-	9.39	-0.15	99	522	77	68
14	1.991	0.145	0.024	2.15	74	0.9	-	9.24	-0.15	100	539	77	69
15	2.139	0.148	0.023	2.16	74	0.9	-	9.07	-0.17	101	555	77	69
16	2.285	0.146	0.024	2.16	75	0.9	-	8.89	-0.18	102	569	77	69
17	2.432	0.147	0.024	2.17	75	0.9	-	8.73	-0.16	102	576	78	69
18	2.578	0.146	0.023	2.18	75	0.9	-	8.55	-0.18	103	582	78	69
19	2.727	0.149	0.023	2.19	75	0.9	-	8.38	-0.17	104	596	78	69
20	2.871	0.144	0.023	2.19	76	0.9	100	8.18	-0.20	104	617	79	69
21	3.020	0.149	0.023	2.19	76	0.9	-	7.99	-0.19	105	633	79	69
22	3.167	0.147	0.023	2.20	76	0.9	-	7.78	-0.21	106	645	79	69
23	3.319	0.152	0.023	2.21	77	0.9	-	7.57	-0.21	108	653	79	69
24	3.464	0.145	0.023	2.21	77	0.9	-	7.37	-0.20	108	663	80	69
25	3.616	0.152	0.023	2.22	77	0.9	-	7.17	-0.20	109	671	80	69
26	3.762	0.146	0.023	2.23	77	0.9	-	6.96	-0.21	110	675	80	70
27	3.912	0.150	0.023	2.22	78	0.9	-	6.75	-0.21	111	677	80	70
28	4.059	0.147	0.023	2.23	78	0.9	-	6.55	-0.20	112	681	81	70
29	4.210	0.151	0.024	2.23	78	0.9	-	6.35	-0.20	112	678	81	70
30	4.354	0.144	0.023	2.24	79	0.9	102	6.15	-0.20	112	672	81	70
31	4.504	0.150	0.023	2.23	79	0.9	-	5.98	-0.17	109	666	81	70

BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: IHP
Model: S160AGL
Run #: 5

Job #: 23-106
Tracking #: 99
Technician: AK
Date: 6/9/2023

	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
32	4.652	0.148	0.024	2.24	79	0.9	-	5.80	-0.18	107	659	81	70
33	4.802	0.150	0.023	2.24	80	0.9	-	5.63	-0.17	107	655	82	70
34	4.950	0.148	0.023	2.24	80	1.0	-	5.45	-0.18	107	647	82	70
35	5.104	0.154	0.023	2.25	81	0.9	-	5.27	-0.18	106	636	82	70
36	5.252	0.148	0.023	2.25	81	0.9	-	5.10	-0.17	106	628	82	70
37	5.402	0.150	0.023	2.25	81	0.9	-	4.94	-0.16	106	623	82	70
38	5.551	0.149	0.023	2.26	81	0.9	-	4.78	-0.16	106	619	82	70
39	5.701	0.150	0.023	2.25	82	1.0	-	4.62	-0.16	105	613	82	70
40	5.848	0.147	0.023	2.25	82	0.9	102	4.47	-0.15	105	612	82	70
41	6.001	0.153	0.023	2.26	83	1.0	-	4.30	-0.17	105	611	82	70
42	6.148	0.147	0.023	2.25	83	0.9	-	4.14	-0.16	105	605	82	70
43	6.298	0.150	0.023	2.25	83	0.9	-	3.98	-0.16	105	597	82	70
44	6.448	0.150	0.023	2.25	84	0.9	-	3.85	-0.13	105	589	83	70
45	6.602	0.154	0.023	2.26	84	1.0	-	3.70	-0.15	104	583	83	70
46	6.752	0.150	0.023	2.26	84	1.0	-	3.57	-0.13	103	577	82	70
47	6.903	0.151	0.024	2.26	84	1.0	-	3.44	-0.13	103	568	82	70
48	7.050	0.147	0.023	2.27	85	0.9	-	3.33	-0.11	103	560	82	70
49	7.202	0.152	0.023	2.28	85	0.9	-	3.21	-0.12	102	549	82	70
50	7.355	0.153	0.023	2.28	85	1.0	102	3.11	-0.10	102	540	82	70
51	7.507	0.152	0.023	2.28	86	0.9	-	3.02	-0.09	101	529	82	70
52	7.657	0.150	0.023	2.28	86	1.0	-	2.91	-0.11	100	518	82	70
53	7.810	0.153	0.023	2.28	86	1.0	-	2.84	-0.07	100	507	82	70
54	7.957	0.147	0.023	2.29	86	0.9	-	2.75	-0.09	99	497	82	70
55	8.110	0.153	0.023	2.29	87	0.9	-	2.68	-0.07	98	485	82	70
56	8.260	0.150	0.024	2.29	87	1.0	-	2.61	-0.07	97	474	82	70
57	8.414	0.154	0.024	2.29	87	1.0	-	2.54	-0.07	97	466	82	70
58	8.562	0.148	0.024	2.29	88	0.9	-	2.47	-0.07	96	459	82	70
59	8.720	0.158	0.024	2.29	88	1.0	-	2.40	-0.07	96	454	82	70
60	8.866	0.146	0.024	2.30	88	0.9	100	2.34	-0.06	96	448	82	70
61	9.021	0.155	0.023	2.30	88	1.0	-	2.29	-0.05	95	443	82	70
62	9.171	0.150	0.024	2.31	89	1.0	-	2.22	-0.07	95	440	81	70
63	9.328	0.157	0.023	2.31	89	0.9	-	2.15	-0.07	95	436	81	69

BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: IHP
Model: S160AGL
Run #: 5

Job #: 23-106
Tracking #: 99
Technician: AK
Date: 6/9/2023

	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
64	9.478	0.150	0.024	2.31	89	1.0	-	2.11	-0.04	94	424	81	69
65	9.636	0.158	0.023	2.31	89	1.0	-	2.06	-0.05	94	414	81	69
66	9.786	0.150	0.023	2.33	90	1.0	-	2.02	-0.04	93	406	81	70
67	9.940	0.154	0.024	2.31	90	0.9	-	1.98	-0.04	92	401	81	70
68	10.092	0.152	0.023	2.31	90	0.9	-	1.94	-0.04	92	396	80	69
69	10.246	0.154	0.024	2.31	90	0.9	-	1.89	-0.05	92	390	80	69
70	10.401	0.155	0.023	2.32	90	1.0	101	1.85	-0.04	91	386	80	69
71	10.553	0.152	0.023	2.32	90	1.0	-	1.82	-0.03	91	382	80	70
72	10.709	0.156	0.024	2.33	91	0.9	-	1.78	-0.04	91	378	80	70
73	10.859	0.150	0.023	2.33	91	1.0	-	1.74	-0.04	90	377	80	70
74	11.013	0.154	0.024	2.33	91	1.0	-	1.70	-0.04	90	374	79	70
75	11.166	0.153	0.023	2.32	91	1.0	-	1.67	-0.03	90	371	79	70
76	11.320	0.154	0.024	2.32	91	0.9	-	1.64	-0.03	90	369	79	69
77	11.474	0.154	0.023	2.32	91	1.0	-	1.60	-0.04	89	366	79	69
78	11.631	0.157	0.024	2.33	92	1.0	-	1.56	-0.04	89	365	79	69
79	11.783	0.152	0.023	2.33	92	1.0	-	1.52	-0.04	89	364	79	69
80	11.938	0.155	0.023	2.34	92	1.0	101	1.49	-0.03	89	365	79	69
81	12.091	0.153	0.023	2.33	92	0.9	-	1.45	-0.04	89	363	79	69
82	12.243	0.152	0.024	2.32	92	0.9	-	1.41	-0.04	89	360	79	69
83	12.401	0.158	0.024	2.33	92	1.0	-	1.37	-0.04	89	359	79	69
84	12.554	0.153	0.024	2.34	93	1.0	-	1.34	-0.03	89	358	79	69
85	12.711	0.157	0.023	2.35	93	1.0	-	1.30	-0.04	88	357	79	69
86	12.859	0.148	0.024	2.34	93	0.9	-	1.27	-0.03	88	357	79	69
87	13.017	0.158	0.023	2.34	93	1.0	-	1.23	-0.04	88	357	79	69
88	13.168	0.151	0.024	2.33	93	1.0	-	1.20	-0.03	88	356	79	69
89	13.329	0.161	0.023	2.34	93	1.0	-	1.17	-0.03	88	352	79	69
90	13.481	0.152	0.024	2.34	93	1.0	100	1.15	-0.02	88	349	79	69
91	13.637	0.156	0.024	2.34	94	0.9	-	1.12	-0.03	87	347	78	69
92	13.791	0.154	0.024	2.34	94	1.0	-	1.10	-0.02	87	344	78	69
93	13.947	0.156	0.023	2.33	94	1.0	-	1.08	-0.02	87	342	78	69
94	14.103	0.156	0.024	2.35	94	1.0	-	1.05	-0.03	87	340	78	69
95	14.256	0.153	0.024	2.34	94	1.0	-	1.03	-0.02	87	338	78	69

BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: IHP
Model: S160AGL
Run #: 5

Job #: 23-106
Tracking #: 99
Technician: AK
Date: 6/9/2023

	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
96	14.413	0.157	0.024	2.34	94	1.0	-	1.01	-0.02	87	335	78	70
97	14.565	0.152	0.023	2.34	94	1.0	-	0.98	-0.03	87	334	78	69
98	14.721	0.156	0.023	2.34	94	1.0	-	0.96	-0.02	87	333	78	69
99	14.877	0.156	0.024	2.34	95	1.0	-	0.94	-0.02	86	331	78	69
100	15.034	0.157	0.024	2.36	95	1.0	99	0.91	-0.03	86	330	78	69
101	15.187	0.153	0.024	2.35	95	1.0	-	0.89	-0.02	86	328	78	69
102	15.340	0.153	0.023	2.34	95	0.9	-	0.87	-0.02	86	327	78	69
103	15.500	0.160	0.024	2.35	95	1.0	-	0.84	-0.03	86	324	78	69
104	15.654	0.154	0.024	2.36	95	1.0	-	0.83	-0.01	86	321	78	69
105	15.809	0.155	0.023	2.36	95	1.0	-	0.80	-0.03	86	319	78	69
106	15.961	0.152	0.023	2.35	95	1.0	-	0.78	-0.02	86	317	78	69
107	16.119	0.158	0.023	2.36	95	0.9	-	0.76	-0.02	86	317	78	69
108	16.273	0.154	0.024	2.35	95	1.0	-	0.74	-0.02	85	314	78	69
109	16.431	0.158	0.024	2.35	96	1.0	-	0.72	-0.02	85	312	78	69
110	16.583	0.152	0.024	2.36	96	1.0	99	0.71	-0.01	85	310	78	69
111	16.740	0.157	0.023	2.35	96	1.0	-	0.70	-0.01	85	309	78	69
112	16.897	0.157	0.024	2.35	96	0.9	-	0.69	-0.01	85	307	78	69
113	17.051	0.154	0.023	2.35	96	1.0	-	0.68	-0.01	85	305	78	69
114	17.209	0.158	0.024	2.36	96	1.0	-	0.67	-0.01	85	304	77	69
115	17.361	0.152	0.024	2.35	96	1.0	-	0.65	-0.02	85	303	77	68
116	17.523	0.162	0.024	2.35	96	1.0	-	0.64	-0.01	85	303	77	69
117	17.677	0.154	0.024	2.36	96	1.0	-	0.62	-0.02	84	303	77	69
118	17.833	0.156	0.024	2.36	96	1.0	-	0.60	-0.02	85	302	77	69
119	17.988	0.155	0.024	2.36	96	1.0	-	0.59	-0.01	84	302	77	69
120	18.145	0.157	0.024	2.36	96	1.0	99	0.57	-0.02	84	301	77	69
121	18.303	0.158	0.023	2.36	96	1.0	-	0.56	-0.01	84	300	77	69
122	18.455	0.152	0.024	2.36	97	1.0	-	0.55	-0.01	84	299	77	69
123	18.614	0.159	0.024	2.36	97	1.0	-	0.54	-0.01	84	299	77	69
124	18.768	0.154	0.024	2.35	97	1.0	-	0.52	-0.02	84	300	77	70
125	18.927	0.159	0.024	2.36	97	0.9	-	0.50	-0.02	84	301	77	69
126	19.078	0.151	0.024	2.37	97	1.0	-	0.48	-0.02	84	302	77	69
127	19.235	0.157	0.024	2.36	97	1.0	-	0.46	-0.02	84	301	77	70

BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: IHP
Model: S160AGL
Run #: 5

Job #: 23-106
Tracking #: 99
Technician: AK
Date: 6/9/2023

	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
128	19.394	0.159	0.023	2.36	97	1.0	-	0.44	-0.02	84	299	77	70
129	19.549	0.155	0.023	2.36	97	1.0	-	0.42	-0.02	84	298	77	70
130	19.707	0.158	0.024	2.36	97	1.0	99	0.41	-0.01	84	298	77	70
131	19.858	0.151	0.024	2.36	97	0.9	-	0.40	-0.01	84	297	77	70
132	20.020	0.162	0.024	2.37	97	1.0	-	0.38	-0.02	84	297	77	70
133	20.171	0.151	0.024	2.36	97	1.0	-	0.36	-0.02	84	298	77	70
134	20.332	0.161	0.024	2.36	97	1.0	-	0.35	-0.01	84	299	77	70
135	20.484	0.152	0.024	2.36	97	1.0	-	0.32	-0.03	84	299	77	70
136	20.644	0.160	0.024	2.36	98	1.0	-	0.30	-0.02	84	299	77	70
137	20.803	0.159	0.024	2.37	98	1.0	-	0.28	-0.02	84	299	77	70
138	20.955	0.152	0.023	2.37	98	1.0	-	0.25	-0.03	84	299	77	70
139	21.115	0.160	0.024	2.36	98	1.0	-	0.23	-0.02	84	298	77	70
140	21.267	0.152	0.023	2.37	98	1.0	100	0.21	-0.02	84	298	77	70
141	21.426	0.159	0.024	2.37	98	1.0	-	0.19	-0.02	84	297	77	70
142	21.580	0.154	0.024	2.36	98	1.0	-	0.17	-0.02	84	297	77	70
143	21.737	0.157	0.024	2.36	98	1.0	-	0.14	-0.03	84	297	77	70
144	21.898	0.161	0.024	2.36	98	0.9	-	0.12	-0.02	84	297	77	70
145	22.050	0.152	0.024	2.37	98	1.0	-	0.10	-0.02	84	297	77	70
146	22.209	0.159	0.024	2.37	98	1.0	-	0.09	-0.01	84	296	77	70
147	22.362	0.153	0.024	2.37	98	1.0	-	0.06	-0.03	84	295	77	70
148	22.525	0.163	0.024	2.37	98	0.9	-	0.04	-0.02	84	295	77	70
149	22.679	0.154	0.024	2.37	98	1.0	-	0.03	-0.01	84	294	77	70
150	22.836	0.157	0.023	2.37	98	1.0	101	0.00	-0.03	83	292	77	70
Avg/Tot	22.836	0.152	0.024	2.28	88.3	0.9	100			93.2	428.6	78.7	69.3

BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: IHP
Model: S160AGL
Run #: 5

Job #: 23-106
Tracking #: 99
Technician: AK
Date: 6/9/2023

	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		0.90	72	1.6		71	-0.074	5.99	1.109
1	0.127	0.127	2.06	72	1.7	-	73	-0.050	4.62	0.566
2	0.267	0.140	2.06	72	1.9	-	74	-0.087	2.33	0.674
3	0.409	0.142	2.05	72	1.9	-	75	-0.099	6.95	0.752
4	0.552	0.143	2.06	72	1.5	-	75	-0.101	9.27	0.487
5	0.687	0.135	2.06	72	1.9	-	76	-0.108	10.47	0.348
6	0.833	0.146	2.05	72	1.5	-	77	-0.095	12.94	0.230
7	0.970	0.137	2.06	72	1.5	-	77	-0.092	9.48	0.551
8	1.111	0.141	2.08	72	1.5	-	77	-0.092	8.79	0.604
9	1.253	0.142	2.07	73	2.0	-	77	-0.092	9.11	0.435
10	1.394	0.141	2.07	73	2.0	100	77	-0.091	9.07	0.463
11	1.537	0.143	2.07	73	2.0	-	77	-0.091	8.67	0.527
12	1.677	0.140	2.06	73	1.5	-	77	-0.093	8.41	0.582
13	1.819	0.142	2.07	74	1.8	-	77	-0.093	8.73	0.639
14	1.959	0.140	2.07	74	1.7	-	78	-0.095	10.03	0.538
15	2.100	0.141	2.07	74	1.6	-	78	-0.095	11.17	0.375
16	2.245	0.145	2.07	75	1.8	-	78	-0.096	11.85	0.192
17	2.383	0.138	2.08	75	2.0	-	78	-0.097	12.11	0.130
18	2.530	0.147	2.08	75	2.0	-	79	-0.097	12.26	0.103
19	2.668	0.138	2.07	75	1.6	-	79	-0.099	12.78	0.063
20	2.813	0.145	2.08	76	2.0	102	79	-0.102	14.06	0.112
21	2.952	0.139	2.09	76	1.6	-	79	-0.101	14.63	0.184
22	3.096	0.144	2.08	76	1.5	-	79	-0.103	15.03	0.201
23	3.238	0.142	2.08	77	1.6	-	80	-0.106	15.33	0.210
24	3.379	0.141	2.09	77	1.9	-	80	-0.106	15.62	0.196
25	3.525	0.146	2.08	77	1.7	-	80	-0.104	16.02	0.260
26	3.664	0.139	2.08	78	1.8	-	81	-0.105	16.25	0.370
27	3.809	0.145	2.08	78	1.5	-	81	-0.105	16.14	0.416
28	3.950	0.141	2.09	78	1.9	-	81	-0.106	16.25	0.309
29	4.094	0.144	2.08	78	1.6	-	81	-0.105	16.26	0.347
30	4.233	0.139	2.09	79	2.0	102	81	-0.105	16.13	0.271
31	4.375	0.142	2.08	79	1.7	-	81	-0.105	16.07	0.219

BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: IHP
Job #: 23-106
Model: S160AGL
Tracking #: 99
Run #: 5
Technician: AK
Date: 6/9/2023

	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	4.520	0.145	2.09	79	1.9	-	81	-0.107	15.76	0.198
33	4.660	0.140	2.09	80	2.0	-	81	-0.105	15.62	0.170
34	4.805	0.145	2.09	80	1.5	-	81	-0.103	15.53	0.165
35	4.947	0.142	2.08	80	2.1	-	81	-0.102	15.22	0.170
36	5.092	0.145	2.08	80	1.7	-	81	-0.102	14.84	0.170
37	5.235	0.143	2.10	81	1.5	-	81	-0.103	14.67	0.148
38	5.378	0.143	2.08	81	1.9	-	81	-0.100	14.57	0.134
39	5.521	0.143	2.08	81	1.7	-	81	-0.101	14.49	0.110
40	5.660	0.139	2.09	82	1.8	102	81	-0.099	14.58	0.084
41	5.809	0.149	2.09	82	2.0	-	81	-0.100	14.69	0.115
42	5.948	0.139	2.09	82	1.5	-	81	-0.099	14.53	0.149
43	6.093	0.145	2.09	83	1.9	-	81	-0.098	14.29	0.153
44	6.234	0.141	2.09	83	1.5	-	81	-0.096	13.85	0.106
45	6.382	0.148	2.09	83	1.7	-	81	-0.097	13.55	0.070
46	6.525	0.143	2.10	83	1.6	-	81	-0.094	13.24	0.054
47	6.670	0.145	2.09	84	2.0	-	81	-0.096	12.80	0.035
48	6.810	0.140	2.10	84	1.5	-	81	-0.095	12.30	0.033
49	6.953	0.143	2.09	84	1.7	-	81	-0.092	11.81	0.035
50	7.101	0.148	2.10	85	1.8	102	81	-0.091	11.31	0.033
51	7.244	0.143	2.10	85	2.0	-	81	-0.089	10.79	0.040
52	7.391	0.147	2.10	85	1.5	-	81	-0.089	10.53	0.046
53	7.532	0.141	2.10	85	1.5	-	81	-0.086	10.13	0.052
54	7.676	0.144	2.09	86	1.5	-	81	-0.088	9.73	0.076
55	7.819	0.143	2.10	86	2.0	-	81	-0.085	9.41	0.135
56	7.965	0.146	2.10	86	1.9	-	81	-0.083	9.09	0.173
57	8.109	0.144	2.10	87	1.8	-	80	-0.082	8.96	0.241
58	8.254	0.145	2.10	87	1.6	-	80	-0.082	8.88	0.274
59	8.401	0.147	2.11	87	1.5	-	80	-0.081	8.65	0.312
60	8.542	0.141	2.10	87	2.0	100	80	-0.079	8.56	0.326
61	8.689	0.147	2.11	88	1.7	-	80	-0.082	8.51	0.334
62	8.832	0.143	2.11	88	1.6	-	80	-0.080	8.52	0.327
63	8.980	0.148	2.12	88	1.5	-	80	-0.081	8.48	0.326

BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: IHP
Job #: 23-106
Model: S160AGL
Tracking #: 99
Run #: 5
Technician: AK
Date: 6/9/2023

	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	9.122	0.142	2.11	88	1.6	-	80	-0.078	7.98	0.292
65	9.272	0.150	2.11	88	1.5	-	80	-0.077	6.14	0.252
66	9.415	0.143	2.11	89	1.6	-	79	-0.075	6.11	0.282
67	9.562	0.147	2.11	89	2.0	-	79	-0.077	5.99	0.297
68	9.705	0.143	2.11	89	1.6	-	79	-0.075	5.97	0.310
69	9.852	0.147	2.12	89	1.7	-	79	-0.073	5.85	0.382
70	9.997	0.145	2.12	90	1.7	100	79	-0.073	5.80	0.470
71	10.144	0.147	2.12	90	1.6	-	79	-0.073	5.70	0.529
72	10.288	0.144	2.12	90	1.6	-	78	-0.073	5.61	0.566
73	10.434	0.146	2.12	90	2.1	-	78	-0.072	5.73	0.568
74	10.577	0.143	2.12	91	1.5	-	78	-0.070	5.65	0.609
75	10.724	0.147	2.12	91	1.5	-	78	-0.071	5.62	0.656
76	10.869	0.145	2.12	91	2.0	-	78	-0.072	5.65	0.687
77	11.015	0.146	2.13	91	2.0	-	78	-0.069	5.69	0.715
78	11.163	0.148	2.13	91	2.1	-	78	-0.070	5.87	0.718
79	11.308	0.145	2.12	91	1.5	-	78	-0.072	6.02	0.726
80	11.456	0.148	2.12	91	2.0	101	78	-0.070	6.05	0.724
81	11.599	0.143	2.12	92	1.8	-	78	-0.072	6.14	0.692
82	11.745	0.146	2.12	92	2.1	-	78	-0.071	6.00	0.755
83	11.891	0.146	2.12	92	1.5	-	78	-0.069	6.13	0.739
84	12.039	0.148	2.12	92	1.7	-	78	-0.067	6.08	0.788
85	12.183	0.144	2.12	92	2.1	-	77	-0.070	6.12	0.823
86	12.329	0.146	2.12	92	1.9	-	77	-0.068	6.18	0.853
87	12.474	0.145	2.13	92	1.5	-	77	-0.071	6.19	0.854
88	12.622	0.148	2.13	92	1.5	-	77	-0.067	6.06	0.897
89	12.770	0.148	2.13	93	2.0	-	77	-0.069	5.60	1.052
90	12.916	0.146	2.12	93	1.9	100	77	-0.066	5.51	1.093
91	13.062	0.146	2.12	93	1.5	-	77	-0.065	5.59	1.049
92	13.208	0.146	2.13	93	2.0	-	77	-0.066	5.63	1.024
93	13.355	0.147	2.13	93	1.5	-	77	-0.066	5.53	1.108
94	13.500	0.145	2.12	93	2.0	-	77	-0.065	5.43	1.156
95	13.648	0.148	2.13	93	2.0	-	77	-0.063	5.40	1.194

BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: IHP
Model: S160AGL
Run #: 5

Job #: 23-106
Tracking #: 99
Technician: AK
Date: 6/9/2023

	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	13.793	0.145	2.13	94	1.8	-	77	-0.062	5.37	1.225
97	13.941	0.148	2.13	94	1.5	-	77	-0.063	5.40	1.217
98	14.084	0.143	2.13	94	1.6	-	77	-0.063	5.38	1.233
99	14.235	0.151	2.13	94	1.5	-	76	-0.063	5.40	1.242
100	14.380	0.145	2.13	94	1.9	98	76	-0.063	5.34	1.242
101	14.529	0.149	2.13	94	1.9	-	76	-0.064	5.38	1.272
102	14.670	0.141	2.13	94	1.5	-	76	-0.060	5.36	1.302
103	14.822	0.152	2.13	94	2.1	-	76	-0.063	4.84	1.261
104	14.966	0.144	2.13	94	1.6	-	76	-0.062	4.75	1.322
105	15.112	0.146	2.12	94	1.5	-	76	-0.060	4.67	1.366
106	15.257	0.145	2.13	94	1.9	-	76	-0.060	4.62	1.423
107	15.406	0.149	2.13	94	1.5	-	76	-0.061	4.73	1.372
108	15.550	0.144	2.13	95	1.7	-	76	-0.059	4.64	1.352
109	15.699	0.149	2.13	95	2.0	-	76	-0.062	4.48	1.414
110	15.845	0.146	2.14	95	1.5	98	76	-0.060	4.53	1.386
111	15.994	0.149	2.14	95	1.8	-	76	-0.060	4.49	1.430
112	16.139	0.145	2.13	95	1.8	-	76	-0.061	4.44	1.417
113	16.286	0.147	2.13	95	2.0	-	76	-0.061	4.43	1.457
114	16.433	0.147	2.13	95	1.6	-	76	-0.059	4.40	1.442
115	16.580	0.147	2.13	95	1.6	-	76	-0.061	4.40	1.450
116	16.729	0.149	2.14	95	1.7	-	76	-0.058	4.44	1.464
117	16.876	0.147	2.13	95	2.1	-	76	-0.061	4.43	1.499
118	17.023	0.147	2.14	95	1.5	-	76	-0.058	4.53	1.541
119	17.169	0.146	2.13	95	2.1	-	76	-0.060	4.53	1.557
120	17.317	0.148	2.13	95	1.7	98	76	-0.058	4.60	1.460
121	17.463	0.146	2.14	95	2.1	-	76	-0.056	4.65	1.404
122	17.612	0.149	2.14	95	1.6	-	76	-0.058	4.70	1.408
123	17.757	0.145	2.14	95	1.8	-	76	-0.061	4.79	1.392
124	17.906	0.149	2.14	96	1.8	-	76	-0.057	4.97	1.422
125	18.051	0.145	2.14	95	2.0	-	76	-0.058	5.05	1.423
126	18.199	0.148	2.13	96	1.5	-	76	-0.059	5.09	1.434
127	18.343	0.144	2.13	96	1.8	-	76	-0.059	5.15	1.412

BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: IHP
Job #: 23-106
Model: S160AGL
Tracking #: 99
Run #: 5
Technician: AK
Date: 6/9/2023

	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	18.495	0.152	2.14	96	1.5	-	76	-0.059	4.85	1.375
129	18.640	0.145	2.13	96	2.0	-	76	-0.059	4.83	1.390
130	18.789	0.149	2.14	96	2.0	98	76	-0.058	4.82	1.404
131	18.932	0.143	2.14	96	2.1	-	76	-0.058	4.81	1.393
132	19.084	0.152	2.14	96	1.5	-	76	-0.058	4.88	1.368
133	19.225	0.141	2.13	96	1.7	-	76	-0.059	4.96	1.341
134	19.377	0.152	2.14	96	1.5	-	76	-0.056	5.04	1.302
135	19.520	0.143	2.14	96	1.9	-	76	-0.060	4.98	1.301
136	19.672	0.152	2.14	96	1.6	-	76	-0.058	5.00	1.295
137	19.817	0.145	2.14	96	2.0	-	76	-0.057	4.86	1.323
138	19.967	0.150	2.14	96	2.1	-	76	-0.061	4.77	1.330
139	20.112	0.145	2.15	96	1.9	-	76	-0.059	4.78	1.297
140	20.259	0.147	2.14	96	2.0	99	76	-0.060	4.74	1.284
141	20.405	0.146	2.14	96	1.9	-	76	-0.060	4.74	1.273
142	20.554	0.149	2.14	96	1.7	-	76	-0.057	4.72	1.258
143	20.700	0.146	2.14	96	1.7	-	76	-0.058	4.71	1.244
144	20.851	0.151	2.14	96	1.8	-	76	-0.060	4.75	1.230
145	20.994	0.143	2.14	96	1.5	-	76	-0.059	4.76	1.220
146	21.142	0.148	2.14	96	2.0	-	76	-0.058	4.97	1.191
147	21.289	0.147	2.14	96	1.6	-	76	-0.060	4.89	1.229
148	21.439	0.150	2.14	96	1.5	-	76	-0.059	4.79	1.238
149	21.586	0.147	2.14	96	1.7	-	76	-0.060	4.68	1.271
150	21.733	0.147	2.14	97	2.0	100	76	-0.059	4.66	1.250
Avg/Tot	21.733	0.145	2.10	87.6	1.7	100	77.8	-0.077	8.04	0.756

BOX C TEST DATA - ASTM E2780 / ASTM E2515

Client: IHP
Model: S160AGL
Run #: 5

Job #: 23-106
Tracking #: 99
Technician: AK
Date: 6/9/2023

	Particulate Sampling 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)
0	0.000		0.43	73	1.7		69
1	0.149	0.149	1.06	72	1.7	-	70
2	0.302	0.153	1.06	72	1.8	-	70
3	0.457	0.155	1.06	72	1.8	-	70
4	0.609	0.152	1.06	72	1.7	-	71
5	0.759	0.150	1.07	73	1.8	-	71
6	0.915	0.156	1.07	73	1.7	-	71
7	1.066	0.151	1.08	73	1.9	-	71
8	1.221	0.155	1.08	73	1.7	-	72
9	1.375	0.154	1.09	73	1.8	-	72
10	1.529	0.154	1.08	74	1.7	99	72
11	1.685	0.156	1.08	74	1.9	-	73
12	1.844	0.159	1.10	74	1.7	-	73
13	1.997	0.153	1.10	74	1.9	-	73
14	2.153	0.156	1.10	75	1.9	-	74
15	2.309	0.156	1.10	75	1.9	-	74
16	2.468	0.159	1.10	76	1.7	-	74
17	2.621	0.153	1.10	76	1.9	-	75
18	2.779	0.158	1.09	76	1.8	-	75
19	2.936	0.157	1.10	76	1.9	-	75
20	3.093	0.157	1.10	77	1.9	102	75
21	3.247	0.154	1.11	77	1.8	-	75
22	3.407	0.160	1.11	77	1.9	-	75
23	3.563	0.156	1.11	78	1.9	-	75
24	3.720	0.157	1.10	78	1.8	-	76
25	3.878	0.158	1.11	78	1.9	-	76
26	4.036	0.158	1.12	79	1.9	-	76
27	4.194	0.158	1.12	79	1.9	-	76
28	4.351	0.157	1.12	79	1.9	-	76
29	4.509	0.158	1.11	79	1.9	-	77
30	4.664	0.155	1.11	79	1.7	102	77
31	4.823	0.159	1.12	79	1.8	-	77

BOX C TEST DATA - ASTM E2780 / ASTM E2515

Client: IHP
Model: S160AGL
Run #: 5

Job #: 23-106
Tracking #: 99
Technician: AK
Date: 6/9/2023

	Particulate Sampling 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)
32	4.981	0.158	1.13	79	1.8	-	77
33	5.139	0.158	1.13	80	2.0	-	77
34	5.297	0.158	1.11	80	1.9	-	77
35	5.459	0.162	1.13	80	1.8	-	77
36	5.618	0.159	1.13	80	1.8	-	77
37	5.777	0.159	1.13	81	1.8	-	77
38	5.936	0.159	1.12	81	1.8	-	77
39	6.095	0.159	1.13	81	1.9	-	77
40	6.252	0.157	1.13	82	1.8	103	78
41	6.413	0.161	1.13	82	1.9	-	78
42	6.570	0.157	1.12	82	1.8	-	78
43	6.730	0.160	1.13	82	2.0	-	78
44	6.890	0.160	1.14	82	2.0	-	78
45	7.051	0.161	1.13	83	1.8	-	78
46	7.211	0.160	1.13	83	1.9	-	78
47	7.372	0.161	1.14	83	1.8	-	78
48	7.529	0.157	1.14	84	2.0	-	78
49	7.688	0.159	1.13	84	2.0	-	78
50	7.852	0.164	1.14	84	1.8	103	78
51	8.013	0.161	1.14	85	2.0	-	78
52	8.172	0.159	1.13	84	1.9	-	78
53	8.333	0.161	1.14	85	1.9	-	78
54	8.492	0.159	1.15	85	1.8	-	78
55	8.652	0.160	1.14	85	2.0	-	78
56	8.813	0.161	1.14	85	1.9	-	78
57	8.975	0.162	1.15	86	1.9	-	78
58	9.135	0.160	1.14	85	1.8	-	78
59	9.300	0.165	1.14	85	1.8	-	78
60	9.459	0.159	1.15	85	2.0	101	77
Avg/Tot	9.459	0.158	1.10	79.0	1.8	102	75.5

WOODSTOVE SURFACE TEMPERATURE DATA

Client: IHP
Model: S160AGL
Run #: 5

Job #: 23-106
Tracking #: 99
Technician: AK
Date: 6/9/2023

Stove ΔT: 57

	Temperature Data (°F)						
Elapsed Time (min)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
0	490	481	283	291	467	402.4	68.6
1	486	484	294	300	473	407.3	68.6
2	478	476	306	303	463	405.3	68.6
3	474	470	314	345	459	412.3	68.8
4	476	464	320	410	458	425.6	68.8
5	483	465	324	456	452	435.9	68.9
6	488	468	326	512	460	450.6	68.9
7	486	467	330	527	461	454.1	69.0
8	483	466	332	538	463	456.2	68.9
9	480	465	334	554	463	459.1	68.9
10	477	464	335	566	463	461.1	68.8
11	475	464	336	570	464	461.6	68.9
12	473	463	337	578	463	462.6	68.8
13	473	462	336	584	462	463.6	68.8
14	477	463	336	598	462	467.2	68.9
15	483	466	335	613	461	471.4	68.8
16	488	470	336	624	460	475.5	68.7
17	493	476	335	635	459	479.6	68.7
18	500	483	334	651	457	484.9	68.8
19	508	489	333	664	456	490.1	68.8
20	518	497	333	692	454	498.5	68.8
21	527	505	333	710	453	505.6	68.8
22	537	515	333	735	451	514.1	68.9
23	547	523	333	757	450	522.1	68.9
24	557	532	334	780	449	530.3	68.9
25	566	540	335	801	447	537.7	69.0
26	575	548	336	822	446	545.3	69.0
27	585	555	338	835	444	551.2	69.0
28	594	562	340	847	443	557.1	69.0
29	604	569	341	858	442	562.8	68.9
30	613	576	343	864	441	567.5	68.9
31	623	582	326	823	438	558.3	68.9
32	630	588	316	804	437	555.1	68.8
33	637	594	308	787	435	552.3	68.8
34	641	600	302	774	435	550.3	68.9
35	645	604	297	759	434	547.7	69.0
36	648	609	292	745	433	545.3	69.0
37	651	613	289	736	434	544.4	69.1
38	655	615	287	727	433	543.3	69.2
39	658	618	285	716	432	541.7	69.1
40	661	621	285	706	432	540.8	69.3
41	663	624	284	701	432	540.9	69.3
42	666	627	285	693	432	540.3	69.3
43	668	631	285	685	431	540.0	69.4
44	670	633	286	675	431	538.9	69.5
45	672	635	287	664	431	537.5	69.4
46	673	636	289	651	430	535.8	69.5
47	675	636	291	641	430	534.6	69.5

WOODSTOVE SURFACE TEMPERATURE DATA

Client: IHP
Model: S160AGL
Run #: 5

Job #: 23-106
Tracking #: 99
Technician: AK
Date: 6/9/2023

Stove ΔT: 57

	Temperature Data (°F)						
Elapsed Time (min)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
48	676	636	293	632	430	533.2	69.5
49	675	635	295	621	430	531.2	69.6
50	673	634	297	606	430	528.1	69.7
51	670	633	299	592	430	524.9	69.6
52	668	632	301	578	431	521.8	69.8
53	666	630	304	561	430	518.0	69.7
54	664	628	306	544	430	514.4	69.6
55	659	626	307	527	430	509.8	69.6
56	655	624	310	509	430	505.4	69.7
57	650	622	311	493	429	501.0	69.7
58	646	620	314	480	428	497.5	69.8
59	642	618	315	468	428	494.4	70.0
60	638	616	317	458	427	491.1	70.0
61	635	613	318	448	428	488.3	70.2
62	632	610	319	438	428	485.5	70.1
63	629	608	320	430	428	483.0	70.3
64	626	606	321	420	428	480.1	70.3
65	622	604	323	406	428	476.6	70.3
66	617	602	324	395	429	473.6	70.3
67	613	599	326	387	429	470.8	70.2
68	610	595	326	380	431	468.5	70.1
69	606	591	327	372	431	465.2	70.0
70	602	586	327	363	431	461.7	69.9
71	598	581	327	358	432	458.9	69.9
72	593	576	327	351	431	455.7	69.8
73	589	572	326	345	430	452.3	69.8
74	583	568	325	340	431	449.3	69.9
75	578	563	323	337	430	446.1	69.8
76	573	560	322	332	429	443.0	69.9
77	567	556	320	329	428	439.9	69.7
78	563	553	319	326	426	437.2	69.7
79	558	550	318	323	425	434.8	69.7
80	555	547	315	321	424	432.3	69.6
81	551	545	313	318	423	430.1	69.7
82	548	543	312	316	422	427.9	69.8
83	544	540	309	314	421	425.6	69.7
84	541	538	309	312	420	423.9	69.8
85	538	536	307	310	418	421.8	69.9
86	535	533	306	309	417	420.1	70.0
87	532	530	305	309	416	418.4	69.7
88	530	527	304	307	415	416.5	69.6
89	527	524	303	305	414	414.5	69.6
90	524	520	302	303	413	412.3	69.7
91	522	517	300	300	412	410.1	69.6
92	519	514	299	297	411	407.9	69.7
93	517	510	298	295	410	406.0	69.6
94	515	507	296	292	409	403.8	69.7
95	512	504	294	290	408	401.7	69.6

WOODSTOVE SURFACE TEMPERATURE DATA

Client: IHP
Model: S160AGL
Run #: 5

Job #: 23-106
Tracking #: 99
Technician: AK
Date: 6/9/2023

Stove ΔT: 57

	Temperature Data (°F)						
Elapsed Time (min)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
96	510	501	293	287	407	399.7	69.6
97	507	499	292	285	406	397.8	69.7
98	505	496	290	283	406	396.1	69.7
99	503	493	288	281	405	394.1	69.6
100	502	490	286	279	404	392.3	69.6
101	500	488	286	277	403	390.7	69.6
102	498	485	284	275	402	388.9	69.6
103	495	483	283	274	402	387.3	69.6
104	493	481	282	272	401	385.5	69.8
105	490	479	280	269	400	383.6	69.7
106	487	476	279	267	400	381.9	69.6
107	485	474	278	266	399	380.3	69.6
108	482	472	277	263	399	378.4	69.6
109	479	469	276	262	398	376.7	69.6
110	476	467	274	260	398	374.8	69.6
111	473	464	273	258	397	373.0	69.6
112	470	462	272	256	397	371.2	69.5
113	467	460	271	254	397	369.7	69.6
114	464	458	270	252	396	368.0	69.5
115	461	456	268	251	396	366.4	69.4
116	458	455	267	249	395	364.8	69.6
117	456	453	265	248	395	363.5	69.8
118	453	452	265	247	395	362.3	69.9
119	451	450	264	246	394	361.0	70.0
120	449	449	263	245	394	359.7	70.1
121	447	448	262	243	393	358.5	70.1
122	445	446	261	243	393	357.4	70.1
123	443	445	261	242	392	356.6	70.1
124	442	444	260	241	392	355.7	70.3
125	440	443	260	241	391	355.0	70.3
126	439	442	260	241	390	354.6	70.4
127	438	441	260	241	390	354.0	70.4
128	437	440	260	241	390	353.3	70.5
129	435	439	259	240	389	352.5	70.4
130	434	438	260	239	389	351.8	70.5
131	432	437	260	239	388	351.2	70.6
132	431	436	261	238	388	350.7	70.6
133	430	435	261	238	387	350.1	70.5
134	429	434	261	238	387	349.8	70.6
135	428	433	262	238	386	349.5	70.6
136	428	433	262	238	386	349.3	70.8
137	427	432	263	238	385	349.1	70.8
138	426	431	264	238	385	348.5	70.8
139	425	430	264	238	384	348.3	70.8
140	424	430	265	237	384	347.9	70.8
141	423	429	266	237	384	347.5	70.7
142	422	428	267	237	383	347.3	70.7
143	421	427	267	237	383	346.9	70.7

WOODSTOVE SURFACE TEMPERATURE DATA

Client: IHP
Model: S160AGL
Run #: 5

Job #: 23-106
Tracking #: 99
Technician: AK
Date: 6/9/2023

Stove ΔT: 57

	Temperature Data (°F)						
Elapsed Time (min)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
144	420	427	268	236	382	346.6	70.8
145	419	426	269	236	382	346.5	70.9
146	418	426	270	237	381	346.3	70.8
147	417	426	271	235	381	346.0	70.8
148	417	426	271	235	380	345.8	70.9
149	416	426	272	234	380	345.6	71.0
150	416	426	272	234	380	345.3	70.9
Average	532.3	518.6	298.1	424.5	420.3	438.8	69.7

LAB SAMPLE DATA - ASTM E2515

Client: IHP
Model: S160AGL
Run #: 5

Job #: 23-106
Tracking #: 99
Technician: AK
Date: 6/9/2023

		Sample ID	Tare, mg	Final, mg	Catch, mg
Filters	**A**	G00562	243.4	244.8	1.4
	B	G00563	243.6	245.2	1.6
	C - 1st Hour	G00564	244.0	245.2	1.2
	Amb	G00565	243.6	243.6	0.0
Probes	**A**	16A	116378.0	116378.0	0.0
	B	16B	115860.5	115860.5	0.0
	C - 1st Hour	16C	114147.0	114147.1	0.1
O-rings	**A**	16A	3572.7	3573.0	0.3
	B	16B	3638.6	3638.6	0.0
	C - 1st Hour	16C	3601.3	3601.6	0.3

Placed in Dessicator on:	6/9/2023

Filters	**A**	244.7	6/12 10:18	244.8	6/16 12:07				
	B	245.2	6/12 10:18	245.2	6/16 12:07				
	C - 1st Hour	245.2	6/12 10:18	245.2	6/16 12:07				
	Amb	243.6	6/12 10:18	243.6	6/16 12:07				
Probes	**A**	116378.0	6/12 10:18	116378.0	6/16 12:07				
	B	115860.6	6/12 10:19	115860.5	6/16 12:07				
	C - 1st Hour	114147.2	6/12 10:19	114147.1	6/16 12:07				
O-Rings	**A**	3573.0	6/12 10:19	3573.0	6/16 12:07				
	B	3638.6	6/12 10:19	3638.6	6/16 12:07				
	C - 1st Hour	3601.5	6/12 10:19	3601.6	6/16 12:08				

Train A Aggregate, mg:	**1.7**
Train B Aggregate, mg:	**1.6**
Train C Aggregate, mg:	**1.6**
Ambient, mg:	**0.0**

ASTM E2780 Wood Heater Run Sheets

Client: IHP Job Number: 23-106 Tracking #: 99
Model: S160AGL Run Number: 5 Test Date: 6/9/23

Wood Heater Run Notes

Test Control Settings

Primary Air Setting(s): Open 1.06" from fully closed
Targeted Burn Category: III

Preburn Notes

Time	Notes
74:00	End PB

Test Notes

Test Burn Start Time: 10:29 Test Fuel Loaded by: 35 seconds
Door Closed: 45 seconds Air Control Set at: 300 seconds
Other Loading Notes: Fan on low @ 30 min

Time	Notes
	-None-

Test Burn End Time: 12:59

Flue Gas Concentration Measurement

Calibration Gas Values: Span Gas CO_2 (%): 17.01 CO (%): 4.306
Mid Gas CO_2 (%): 10.09 CO (%): 2.53

Calibration Results:

	Pre Test			Post Test		
	Zero	Span	Mid	Zero	Span	Mid
Time	08:43	08:46	08:50	20:31	20:32	20:33
CO_2	0.07	16.95	10.07	-0.02	16.88	9.93
CO	0.010	4.290	2.471	0.006	4.261	2.457

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

Technician Signature:  Date: 6/26/23

ASTM E2780 Wood Heater Run Sheets

Client: IHP Job Number: 23-106 Tracking #: 99
Model: S160AGL Run Number: 5 Test Date: 6/9/23



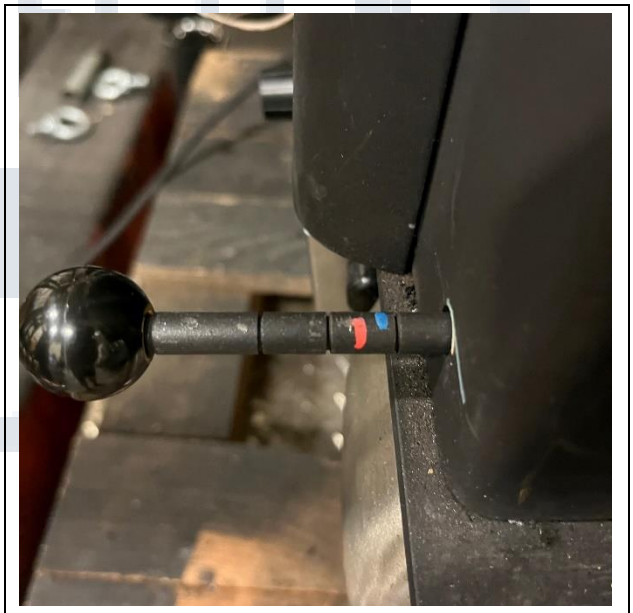
Test Fuel Side View



Test Fuel Iso View



Test Fuel Loaded in Stove



Air Setting

Technician Signature: Date: 6/26/23

WOOD STOVE TEST DATA PACKET
ASTM E2780/E2515



Run 6 Data Summary

Client:	IHP
Model:	S160AGL
Job #:	23-106
Tracking #:	99
Test Date:	6/9/2023

Techician Signature

6/30/2023
Date

TEST RESULTS - ASTM E2780 / ASTM E2515

Client: IHP
Model: S160AGL
Run #: 6

Job #: 23-106
Tracking #: 99
Technician: AK
Date: 6/9/2023

Burn Rate (kg/hr):	1.21

	Ambient Sample	Sample Train A	Sample Train B	1st Hour Filter
Total Sample Volume (ft^3)	16.766	33.915	32.023	9.538
Average Gas Velocity in Dilution Tunnel (ft/sec)	9.0			
Average Gas Flow Rate in Dilution Tunnel (dscf/hr)	23763.7			
Average Gas Meter Temperature (°F)	70.0	95.6	95.0	83.0
Total Sample Volume (dscf)	17.082	32.703	30.621	9.149
Average Tunnel Temperature (°F)	90.4			
Total Time of Test (min)	217			
Total Particulate Catch (mg)	0.0	1.3	1.1	0.6
Particulate Concentration, dry-standard (g/dscf)	0.0000000	0.0000398	0.0000359	0.0000656
Total PM Emissions (g)	0.00	3.42	3.09	1.56
Particulate Emission Rate (g/hr)	0.00	0.94	0.85	1.56
Emissions Factor (g/kg)	-	0.78	0.71	-
Difference from Average Total Particulate Emissions (g)	-	0.16	0.16	-
Difference from Average Total Particulate Emissions (%)	-	5.1%	5.1%	
Difference from Average Emissions Factor (g/kg)	-	0.04	0.04	-

Final Average Results	
Total Particulate Emissions (g)	3.25
Particulate Emission Rate (g/hr)	0.90
Emissions Factor (g/kg)	0.74
HHV Efficiency (%)	71.5%
LHV Efficiency (%)	77.2%
CO Emissions (g/min)	1.51

Quality Checks	Requirement	Observed	Result
Dual Train Precision	Each train within 7.5% of average emissions (in grams), or emission factors within 0.5 g/kg	See Above	OK
Filter Temps	<90 °F	81.9	OK
Face Velocity	< 30 ft/min	8.9	OK
Leakage Rate	Less than 4% of average sample rate	0.001 cfm	OK
Ambient Temp	55-90 °F	Min:68.1/Max:72.3	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
Stove Surface ΔT	<126°F --OR--	152.2	OK
	DQH < 0.085(QFC) DQH=	6237	
	.085(QFC)=	7004	

B415.1 Efficiency Results

Manufacturer:	IHP
Model:	S160AGL
Date:	06/09/23
Run:	6
Control #:	23-106
Test Duration:	217
Output Category:	2

Test Results in Accordance with CSA B415.1-09

	HHV Basis	LHV Basis
Overall Efficiency	71.5%	77.2%
Combustion Efficiency	94.7%	94.7%
Heat Transfer Efficiency	75.5%	81.6%

Output Rate (kJ/h)	16,968	16,096	**(Btu/h)**
Burn Rate (kg/h)	1.20	2.64	**(lb/h)**
Input (kJ/h)	23,744	22,524	**(Btu/h)**

Test Load Weight (dry kg)	4.33	9.55	**dry lb**
MC wet (%)	16.78		
MC dry (%)	20.16		
Particulate (g)	3.25		
CO (g)	327		
Test Duration (h)	3.62		

Emissions	**Particulate**	**CO**
g/MJ Output	0.05	5.33
g/kg Dry Fuel	0.75	75.51
g/h	0.90	90.50
g/min	0.01	1.51
lb/MM Btu Output	0.12	12.40

Air/Fuel Ratio (A/F)	13.35

VERSION: **2.4** **4/15/2010**

WOODSTOVE FUEL DATA - ASTM E2780

Client: IHP
Model: S160AGL
Run #: 6

Job #: 23-106
Tracking #: 99
Technician: AK
Date: 6/9/2023

Preburn Fuel Information

Size	Length (in)	Moisture Content (% DB)	Size	Length (in)	Moisture Content (% DB)
2x4	9.00	19.2	2x4	15.00	22.1
2x4	13.00	19.2	2x4	15.00	20.5
2x4	13.00	22.8			
2x4	13.00	20.4			
2x4	13.00	23.4			
2x4	13.00	19.9			
2x4	15.00	19.0			
2x4	15.00	19.5			
Total Fuel Weight (lbs):		12.24	Average Moisture (%DB):		20.6

Firebox Volume (ft^3):	1.54
Total 2x4 Crib Weight, with spacers (lbs):	4.25
Total 4x4 Crib Weight, with spacers (lbs):	7.26
Total Wet Fuel Weight, with spacers (lbs):	11.51

Coal Bed Range (20-25%):
Min (lbs): 2.30
Max (lbs): 2.88

Test Fuel Information

Size	Length (in)	Weight (lbs)	Moisture Content (%DB)			Dry Weight (lbs)
2x4	15.00	1.77	20.5	22.4	19.4	1.47
2x4	15.00	1.74	19.5	19.0	19.3	1.46
4x4	15.00	3.24	20.5	22.6	19.1	2.68
4x4	15.00	3.56	19.3	20.2	20.1	2.97
					Total Dry Weight, no spacers (lbs):	8.58
					Total Dry Weight, with spacers (lbs):	9.63

Spacer Moisture Readings (%DB)

14.5	9.3						
15.9	14.3						
13.3	9.9						
10.4	12.4						
14.8	8.4						
19.2	20.1						

Quality Checks	Requirement	Observed	Result
Fuel Density	25 - 36 (lbs/ft^3, DB)	28.2	OK
Loading Density	6.3 - 7.7 (lbs/ft^3, WB)	7.47	OK
2x4 Fuel Mix	35 - 65 % of total weight	37%	OK

DILUTION TUNNEL & MISC. DATA - ASTM E2780 / E2515

Client:	IHP	Job #:	23-106
Model:	S160AGL	Tracking #:	99
Run #:	6	Technician:	AK
Test Start Time:	14:28	Date:	6/9/2023

Total Sampling Time (min):	217	
Recording Interval (min):	1	
Meter Box γ Factor:	1.010	(A)
Meter Box γ Factor:	1.001	(B)
Meter Box γ Factor:	0.985	(C)
Meter Box γ Factor:	1.024	(Ambient)
Induced Draft Check (in. H_2O):	0	
Smoke Capture Check (%):	100%	
Date Flue Pipe Last Cleaned:		
Stove Metal Mass :	302.6	lb
Stove Refractory Mass:	53.65	lb

	Pre-Test	Post Test	Avg.
Barometric Pressure (in. Hg)	29.90	29.89	29.90
Relative Humidity (%)	41.0	44.9	
Room Air Velocity (ft/min)	0	0.0	
Scale Audit (lbs)	10.0	10.0	
Ambient Sample Volume:		16.766	ft^3

Leak Checks	Pre-Test		Post-Test	
Pitot	0		0	
	cfm	@ in Hg	cfm	@ in Hg
A	0.001	-7	0.000	-7
B	0.000	-7	0.000	-7
C	0.000	-8	0.000	-8
Ambient	0.000	-12	0.000	-12

DILUTION TUNNEL FLOW

Traverse Data

Point	dP (in H_2O)	Temp (°F)
1	0.012	95
2	0.020	95
3	0.022	95
4	0.020	95
5	0.018	95
6	0.012	95
7	0.014	95
8	0.022	95
9	0.022	95
10	0.022	95
11	0.018	95
12	0.014	95
Center	0.024	95

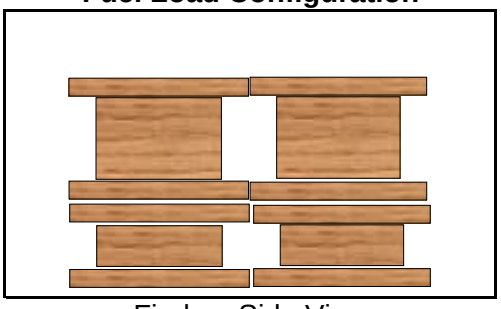
Static Pressure: -0.130 in. H_2O

Dilution Tunnel H_2O:	2.00	percent
Tunnel Diameter:	12	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:	0.7854	ft^2
V_{strav}:	9.07	ft/sec
V_{scent}:	10.53	ft/sec
F_p:	0.861	[ratio]
Initial Tunnel Flow:	397.9	scf/min

TEST FUEL PROPERTIES

Fuel Load Configuration

Firebox Front



Firebox Back

Firebox Side View

Actual Fuel Used Properties

Fuel Type:	D. Fir
HHV (kJ/kg)	19,810
%C	48.73
%H	6.87
%O	43.9
%Ash	0.5
MC (%DB)	20.2

DILUTION TUNNEL & MISC. DATA - ASTM E2780 / E2515

Client:	IHP	Job #:	23-106
Model:	S160AGL	Tracking #:	99
Run #:	6	Technician:	AK
Test Start Time:	14:28	Date:	6/9/2023

Total Sampling Time (min):	217
Recording Interval (min):	1

Meter Box γ Factor:	1.010	(A)
Meter Box γ Factor:	1.001	(B)
Meter Box γ Factor:	0.985	(C)
Meter Box γ Factor:	1.024	(Ambient)

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

	Pre-Test	Post Test	Avg.
Barometric Pressure (in. Hg)	29.90	29.89	29.90
Relative Humidity (%)	41.0	44.9	
Room Air Velocity (ft/min)	0	0.0	
Scale Audit (lbs)	10.0	10.0	
Ambient Sample Volume:		16.766	ft^3

Leak Checks	Pre-Test		Post-Test	
Pitot	0		0	
	cfm	@ in Hg	cfm	@ in Hg
A	0.001	-7	0.000	-7
B	0.000	-7	0.000	-7

WOODSTOVE PREBURN DATA - ASTM E2780

Client: IHP
Model: S160AGL
Run #: 6

Job #: 23-106
Tracking #: 99
Technician: AK
Date: 6/9/2023

Recording Interval (min): 1
Run Time (min): 60

			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	7.14	-0.113	654	648	449	910	394	610.7	778	74
1	6.91	-0.105	657	648	458	881	403	609.1	653	74
2	6.71	-0.104	657	646	469	855	409	607.2	606	73
3	6.50	-0.101	657	644	478	838	416	606.3	576	73
4	6.28	-0.099	657	641	486	817	421	604.5	557	73
5	6.09	-0.099	657	638	490	801	426	602.5	542	74
6	5.91	-0.096	658	637	497	797	431	603.8	533	73
7	5.74	-0.099	659	637	501	791	435	604.5	528	73
8	5.56	-0.095	660	636	504	784	439	604.4	524	73
9	5.38	-0.097	661	635	507	777	442	604.5	519	73
10	5.21	-0.095	662	635	509	770	446	604.3	516	73
11	5.04	-0.093	664	635	512	768	449	605.5	515	73
12	4.86	-0.095	665	636	511	769	452	606.5	516	73
13	4.70	-0.095	667	636	511	771	454	607.7	514	73
14	4.55	-0.091	667	637	510	768	457	607.8	507	73
15	4.40	-0.093	667	637	508	765	459	607.1	501	74
16	4.26	-0.095	666	637	508	761	460	606.7	496	73
17	4.15	-0.092	665	638	509	762	462	607.2	492	73
18	4.04	-0.091	664	638	508	753	464	605.1	487	73
19	3.95	-0.088	662	638	507	757	465	605.8	478	73
20	3.88	-0.085	660	636	504	746	466	602.4	464	73
21	3.81	-0.084	656	635	505	731	467	598.8	452	73
22	3.75	-0.083	653	632	505	717	468	594.9	442	73
23	3.68	-0.080	650	629	503	701	469	590.5	436	73
24	3.62	-0.079	647	626	503	689	470	587.0	430	73
25	3.55	-0.079	643	623	503	677	470	583.1	425	73
26	3.50	-0.081	640	619	504	660	471	578.7	419	73
27	3.44	-0.079	637	616	504	658	471	577.1	414	73
28	3.38	-0.077	634	613	504	648	472	574.2	409	73
29	3.33	-0.077	631	610	505	639	473	571.3	406	73
30	3.27	-0.079	628	607	505	632	473	569.3	404	73
31	3.22	-0.080	627	605	505	627	474	567.3	404	73
32	3.15	-0.079	625	602	504	623	475	565.8	405	73
33	3.09	-0.078	624	601	504	624	475	565.7	407	73
34	3.04	-0.079	623	600	504	625	476	565.4	407	73
35	2.99	-0.076	620	600	504	628	477	565.7	403	73
36	2.95	-0.075	616	598	502	623	478	563.3	397	73
37	2.92	-0.073	612	598	502	612	479	560.4	386	73
38	2.89	-0.070	609	595	502	599	479	556.6	376	73
39	2.86	-0.070	606	592	501	588	480	553.4	368	73
40	2.85	-0.069	602	590	504	573	481	550.1	361	73
41	2.82	-0.070	599	587	504	564	482	547.2	356	73
42	2.79	-0.067	596	585	503	559	483	545.0	351	73
43	2.77	-0.065	593	582	500	551	484	541.9	347	73
44	2.74	-0.066	590	580	500	542	485	539.2	344	72

WOODSTOVE PREBURN DATA - ASTM E2780

Client: IHP
Model: S160AGL
Run #: 6

Job #: 23-106
Tracking #: 99
Technician: AK
Date: 6/9/2023

Recording Interval (min): 1
Run Time (min): 60

			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
45	2.72	-0.066	587	578	500	534	485	536.9	341	73
46	2.69	-0.065	585	576	500	528	486	534.8	339	72
47	2.68	-0.065	582	573	498	519	487	532.0	336	73
48	2.66	-0.067	580	571	497	517	488	530.4	334	73
49	2.63	-0.064	577	569	496	509	489	527.7	332	72
50	2.60	-0.066	574	567	492	508	489	526.1	330	73
51	2.58	-0.065	572	565	490	496	490	522.8	328	73
52	2.55	-0.064	570	564	490	492	491	521.5	326	73
53	2.52	-0.064	568	562	488	489	492	519.7	324	73
54	2.49	-0.064	566	561	486	487	493	518.3	323	72
55	2.46	-0.063	563	560	484	485	493	516.9	322	71
56	2.42	-0.064	561	558	482	478	494	514.7	319	71
57	2.40	-0.062	559	557	481	472	494	512.5	316	71
58	2.38	-0.063	558	555	480	468	495	511.0	314	71
59	2.36	-0.063	555	553	479	468	495	510.0	311	70
60	2.32	-0.063	553	551	477	461	496	507.5	310	70

BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: IHP
Model: S160AGL
Run #: 6

Job #: 23-106
Tracking #: 99
Technician: AK
Date: 6/9/2023

	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		0.023	0.86	86	0.8		11.48		97	409	75	70
1	0.137	0.137	0.023	2.13	85	0.9	-	11.50	0.02	107	334	77	70
2	0.281	0.144	0.024	2.15	85	0.9	-	11.19	-0.31	108	509	78	71
3	0.432	0.151	0.023	2.15	85	0.9	-	10.93	-0.26	114	677	78	70
4	0.576	0.144	0.023	2.16	85	0.9	-	10.62	-0.31	121	773	79	70
5	0.729	0.153	0.023	2.18	85	0.9	-	10.28	-0.34	128	834	80	71
6	0.873	0.144	0.023	2.21	85	0.9	-	10.08	-0.20	115	666	80	71
7	1.027	0.154	0.024	2.22	85	0.9	-	9.95	-0.13	108	578	80	70
8	1.173	0.146	0.024	2.23	84	0.9	-	9.81	-0.14	105	534	80	70
9	1.324	0.151	0.024	2.24	84	0.9	-	9.69	-0.12	103	508	80	70
10	1.473	0.149	0.024	2.25	84	0.9	97	9.57	-0.12	102	492	80	70
11	1.623	0.150	0.024	2.25	84	0.8	-	9.44	-0.13	101	483	80	70
12	1.775	0.152	0.024	2.24	85	0.8	-	9.30	-0.14	100	481	80	70
13	1.931	0.156	0.024	2.27	85	0.9	-	9.17	-0.13	101	484	80	70
14	2.077	0.146	0.024	2.27	85	0.9	-	9.04	-0.13	100	488	80	70
15	2.231	0.154	0.024	2.28	85	0.9	-	8.89	-0.15	101	492	80	69
16	2.381	0.150	0.023	2.27	85	0.9	-	8.74	-0.15	100	496	80	70
17	2.533	0.152	0.024	2.28	85	0.9	-	8.59	-0.15	100	503	80	70
18	2.682	0.149	0.024	2.29	85	0.9	-	8.46	-0.13	100	507	80	69
19	2.838	0.156	0.023	2.29	85	0.9	-	8.31	-0.15	100	511	80	69
20	2.989	0.151	0.024	2.30	85	0.9	99	8.16	-0.15	101	515	80	69
21	3.145	0.156	0.023	2.30	85	0.9	-	8.01	-0.15	101	516	81	69
22	3.292	0.147	0.023	2.30	86	0.9	-	7.88	-0.13	101	518	81	69
23	3.448	0.156	0.024	2.30	86	0.9	-	7.73	-0.15	102	520	81	70
24	3.598	0.150	0.023	2.30	86	0.9	-	7.58	-0.15	101	521	81	70
25	3.754	0.156	0.023	2.31	86	0.9	-	7.44	-0.14	101	520	81	71
26	3.906	0.152	0.024	2.31	86	0.9	-	7.30	-0.14	101	518	81	71
27	4.060	0.154	0.023	2.31	86	0.9	-	7.17	-0.13	101	517	81	71
28	4.212	0.152	0.024	2.31	87	0.9	-	7.03	-0.14	100	515	81	71
29	4.363	0.151	0.023	2.31	87	0.9	-	6.88	-0.15	99	513	81	71
30	4.513	0.150	0.023	2.32	87	0.9	100	6.75	-0.13	99	511	81	71
31	4.670	0.157	0.024	2.32	87	1.0	-	6.61	-0.14	98	512	81	71

BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: IHP
Model: S160AGL
Run #: 6

Job #: 23-106
Tracking #: 99
Technician: AK
Date: 6/9/2023

	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
32	4.825	0.155	0.023	2.33	87	0.9	-	6.45	-0.16	99	512	81	71
33	4.977	0.152	0.024	2.32	88	0.9	-	6.30	-0.15	99	511	81	71
34	5.132	0.155	0.023	2.33	88	0.9	-	6.16	-0.14	100	510	81	71
35	5.282	0.150	0.023	2.32	88	1.0	-	6.02	-0.14	100	511	81	72
36	5.438	0.156	0.024	2.32	88	0.9	-	5.89	-0.13	101	512	81	72
37	5.586	0.148	0.023	2.32	89	0.9	-	5.75	-0.14	101	512	81	72
38	5.747	0.161	0.024	2.33	89	0.9	-	5.62	-0.13	101	511	81	71
39	5.895	0.148	0.024	2.32	89	0.9	-	5.49	-0.13	101	509	81	72
40	6.054	0.159	0.023	2.34	89	1.0	102	5.36	-0.13	101	507	81	72
41	6.206	0.152	0.024	2.34	90	0.9	-	5.23	-0.13	100	504	81	72
42	6.359	0.153	0.023	2.33	90	0.9	-	5.11	-0.12	101	501	81	72
43	6.512	0.153	0.023	2.33	90	0.9	-	5.00	-0.11	101	499	82	72
44	6.667	0.155	0.023	2.33	90	0.9	-	4.89	-0.11	101	494	82	72
45	6.826	0.159	0.024	2.34	90	1.0	-	4.77	-0.12	100	487	82	72
46	6.977	0.151	0.024	2.34	91	1.0	-	4.65	-0.12	100	484	82	72
47	7.134	0.157	0.023	2.34	91	0.9	-	4.55	-0.10	100	482	82	72
48	7.285	0.151	0.024	2.34	91	1.0	-	4.43	-0.12	100	481	82	72
49	7.443	0.158	0.023	2.35	91	1.0	-	4.32	-0.11	101	480	82	71
50	7.595	0.152	0.024	2.34	92	0.9	101	4.20	-0.12	100	477	82	71
51	7.752	0.157	0.024	2.35	92	1.0	-	4.08	-0.12	100	473	82	71
52	7.905	0.153	0.024	2.35	92	0.9	-	3.99	-0.09	100	466	82	71
53	8.060	0.155	0.024	2.34	92	0.9	-	3.89	-0.10	99	459	82	70
54	8.213	0.153	0.024	2.35	92	0.9	-	3.80	-0.09	99	453	81	70
55	8.370	0.157	0.024	2.34	92	0.9	-	3.71	-0.09	99	450	81	70
56	8.525	0.155	0.024	2.36	93	1.0	-	3.62	-0.09	98	445	81	70
57	8.677	0.152	0.023	2.35	93	0.9	-	3.54	-0.08	98	443	81	70
58	8.834	0.157	0.024	2.34	93	1.0	-	3.46	-0.08	98	440	81	70
59	8.990	0.156	0.024	2.36	93	1.0	-	3.39	-0.07	98	435	81	70
60	9.148	0.158	0.024	2.36	93	0.9	100	3.31	-0.08	97	431	81	70
61	9.299	0.151	0.024	2.36	93	1.0	-	3.24	-0.07	97	425	81	70
62	9.457	0.158	0.024	2.36	94	0.9	-	3.17	-0.07	96	421	81	70
63	9.613	0.156	0.024	2.37	94	0.9	-	3.10	-0.07	96	417	81	70

BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: IHP
Model: S160AGL
Run #: 6

Job #: 23-106
Tracking #: 99
Technician: AK
Date: 6/9/2023

	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
64	9.766	0.153	0.024	2.37	94	0.9	-	3.05	-0.05	96	413	81	70
65	9.926	0.160	0.024	2.37	94	0.9	-	2.98	-0.07	95	410	80	70
66	10.078	0.152	0.024	2.36	94	0.9	-	2.91	-0.07	94	405	80	70
67	10.237	0.159	0.024	2.36	94	0.9	-	2.85	-0.06	94	402	80	70
68	10.391	0.154	0.024	2.36	95	0.9	-	2.79	-0.06	94	398	80	69
69	10.549	0.158	0.024	2.37	95	0.9	-	2.74	-0.05	94	395	80	69
70	10.702	0.153	0.023	2.36	95	0.9	100	2.68	-0.06	93	392	80	70
71	10.856	0.154	0.023	2.37	95	1.0	-	2.62	-0.06	94	390	80	69
72	11.016	0.160	0.024	2.37	95	0.9	-	2.56	-0.06	94	389	80	69
73	11.171	0.155	0.024	2.38	95	0.9	-	2.50	-0.06	93	388	79	69
74	11.328	0.157	0.024	2.37	95	1.0	-	2.45	-0.05	93	388	79	69
75	11.481	0.153	0.024	2.36	95	0.9	-	2.38	-0.07	93	390	79	69
76	11.641	0.160	0.024	2.38	95	0.9	-	2.34	-0.04	94	392	79	69
77	11.795	0.154	0.024	2.37	95	0.9	-	2.28	-0.06	93	390	79	69
78	11.952	0.157	0.024	2.38	95	1.0	-	2.23	-0.05	93	386	79	68
79	12.104	0.152	0.024	2.38	96	1.0	-	2.18	-0.05	92	377	79	69
80	12.264	0.160	0.024	2.37	96	1.0	100	2.14	-0.04	92	370	79	68
81	12.423	0.159	0.024	2.38	96	0.9	-	2.10	-0.04	92	363	79	68
82	12.575	0.152	0.024	2.37	96	0.9	-	2.06	-0.04	92	359	79	68
83	12.734	0.159	0.024	2.37	96	1.0	-	2.03	-0.03	92	355	79	68
84	12.889	0.155	0.024	2.37	96	0.9	-	1.98	-0.05	91	351	79	68
85	13.048	0.159	0.024	2.38	96	1.0	-	1.97	-0.01	91	346	79	68
86	13.199	0.151	0.024	2.38	96	1.0	-	1.95	-0.02	91	341	79	68
87	13.359	0.160	0.024	2.38	96	0.9	-	1.92	-0.03	90	336	78	68
88	13.518	0.159	0.024	2.38	96	1.0	-	1.91	-0.01	90	332	78	68
89	13.672	0.154	0.023	2.39	97	1.0	-	1.87	-0.04	90	328	78	68
90	13.829	0.157	0.024	2.38	97	0.9	99	1.86	-0.01	90	325	78	68
91	13.985	0.156	0.024	2.37	97	0.9	-	1.85	-0.01	90	322	78	68
92	14.145	0.160	0.024	2.38	97	1.0	-	1.84	-0.01	90	318	78	68
93	14.297	0.152	0.024	2.39	97	1.0	-	1.82	-0.02	90	315	78	69
94	14.457	0.160	0.024	2.38	97	0.9	-	1.81	-0.01	90	312	78	69
95	14.616	0.159	0.024	2.38	97	1.0	-	1.79	-0.02	90	309	78	69

BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: IHP
Model: S160AGL
Run #: 6

Job #: 23-106
Tracking #: 99
Technician: AK
Date: 6/9/2023

	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
96	14.769	0.153	0.024	2.39	97	1.0	-	1.78	-0.01	89	306	78	69
97	14.929	0.160	0.024	2.38	97	0.9	-	1.77	-0.01	89	303	78	70
98	15.080	0.151	0.023	2.39	97	0.9	-	1.76	-0.01	89	301	78	70
99	15.241	0.161	0.023	2.39	97	1.0	-	1.75	-0.01	89	298	78	70
100	15.398	0.157	0.024	2.39	97	1.0	99	1.73	-0.02	89	296	78	70
101	15.553	0.155	0.024	2.39	97	1.0	-	1.72	-0.01	89	294	78	70
102	15.715	0.162	0.024	2.40	97	0.9	-	1.70	-0.02	89	292	78	70
103	15.870	0.155	0.024	2.39	97	1.0	-	1.68	-0.02	89	291	78	70
104	16.031	0.161	0.024	2.38	97	1.0	-	1.68	0.00	89	289	78	70
105	16.183	0.152	0.023	2.39	97	0.9	-	1.66	-0.02	88	287	78	70
106	16.344	0.161	0.024	2.40	97	1.0	-	1.64	-0.02	88	285	78	70
107	16.498	0.154	0.024	2.39	98	0.9	-	1.63	-0.01	87	284	78	71
108	16.656	0.158	0.023	2.39	98	0.9	-	1.62	-0.01	87	283	78	71
109	16.815	0.159	0.023	2.40	98	1.0	-	1.61	-0.01	86	281	78	70
110	16.970	0.155	0.024	2.40	98	1.0	99	1.60	-0.01	87	280	78	70
111	17.127	0.157	0.023	2.40	98	0.9	-	1.57	-0.03	87	278	78	70
112	17.285	0.158	0.023	2.39	98	0.9	-	1.56	-0.01	88	277	78	70
113	17.445	0.160	0.024	2.39	98	1.0	-	1.55	-0.01	87	275	78	70
114	17.597	0.152	0.023	2.40	98	1.0	-	1.54	-0.01	87	274	78	70
115	17.758	0.161	0.023	2.39	98	1.0	-	1.51	-0.03	87	272	78	70
116	17.918	0.160	0.023	2.40	98	0.9	-	1.50	-0.01	87	271	78	70
117	18.072	0.154	0.024	2.40	98	1.0	-	1.48	-0.02	87	270	78	71
118	18.232	0.160	0.024	2.40	98	1.0	-	1.47	-0.01	87	269	78	71
119	18.388	0.156	0.024	2.39	98	1.0	-	1.45	-0.02	86	268	77	71
120	18.545	0.157	0.024	2.41	98	0.9	99	1.44	-0.01	86	267	77	70
121	18.701	0.156	0.024	2.40	98	0.9	-	1.43	-0.01	86	266	77	71
122	18.859	0.158	0.023	2.40	98	1.0	-	1.41	-0.02	85	266	77	71
123	19.019	0.160	0.024	2.41	98	1.0	-	1.40	-0.01	86	264	77	71
124	19.173	0.154	0.023	2.40	99	1.0	-	1.39	-0.01	85	263	77	71
125	19.334	0.161	0.023	2.39	99	1.0	-	1.37	-0.02	86	263	78	71
126	19.492	0.158	0.024	2.40	99	1.0	-	1.36	-0.01	86	262	77	71
127	19.648	0.156	0.023	2.41	99	1.0	-	1.35	-0.01	86	262	77	71

BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: IHP
Model: S160AGL
Run #: 6

Job #: 23-106
Tracking #: 99
Technician: AK
Date: 6/9/2023

	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
128	19.810	0.162	0.024	2.41	99	0.9	-	1.33	-0.02	86	261	77	70
129	19.966	0.156	0.024	2.40	99	0.9	-	1.33	0.00	86	260	77	70
130	20.126	0.160	0.023	2.41	99	0.9	100	1.31	-0.02	85	259	77	71
131	20.281	0.155	0.023	2.40	99	1.0	-	1.28	-0.03	85	258	77	70
132	20.442	0.161	0.023	2.40	99	1.0	-	1.27	-0.01	85	256	77	71
133	20.594	0.152	0.024	2.41	99	1.0	-	1.26	-0.01	85	256	77	71
134	20.756	0.162	0.024	2.40	99	1.0	-	1.25	-0.01	85	255	77	71
135	20.917	0.161	0.023	2.41	99	1.0	-	1.23	-0.02	85	254	77	70
136	21.071	0.154	0.024	2.41	99	0.9	-	1.21	-0.02	85	254	77	71
137	21.232	0.161	0.024	2.40	99	0.9	-	1.20	-0.01	85	252	77	70
138	21.388	0.156	0.023	2.41	99	1.0	-	1.20	0.00	85	251	77	70
139	21.545	0.157	0.024	2.41	99	1.0	-	1.18	-0.02	84	251	77	70
140	21.706	0.161	0.024	2.40	99	1.0	100	1.16	-0.02	84	250	77	71
141	21.863	0.157	0.024	2.41	99	1.0	-	1.15	-0.01	84	250	77	71
142	22.020	0.157	0.023	2.42	99	0.9	-	1.13	-0.02	84	249	77	71
143	22.178	0.158	0.023	2.41	99	0.9	-	1.12	-0.01	84	249	77	71
144	22.340	0.162	0.023	2.41	100	0.9	-	1.10	-0.02	84	249	77	70
145	22.495	0.155	0.024	2.41	100	1.0	-	1.08	-0.02	84	248	77	70
146	22.654	0.159	0.024	2.41	100	0.9	-	1.07	-0.01	84	247	77	70
147	22.814	0.160	0.023	2.41	100	0.9	-	1.06	-0.01	84	247	77	70
148	22.967	0.153	0.024	2.41	100	0.9	-	1.04	-0.02	84	246	77	70
149	23.131	0.164	0.024	2.41	100	1.0	-	1.03	-0.01	84	245	77	70
150	23.287	0.156	0.024	2.42	100	1.0	99	1.01	-0.02	84	245	77	70
151	23.446	0.159	0.024	2.41	100	0.9	-	0.99	-0.02	84	244	77	70
152	23.601	0.155	0.023	2.41	100	1.0	-	0.98	-0.01	84	244	77	70
153	23.763	0.162	0.023	2.40	100	0.9	-	0.96	-0.02	84	243	77	70
154	23.919	0.156	0.024	2.42	100	1.0	-	0.95	-0.01	84	243	77	70
155	24.078	0.159	0.023	2.40	100	1.0	-	0.94	-0.01	84	242	77	71
156	24.240	0.162	0.024	2.42	100	0.9	-	0.92	-0.02	84	242	77	71
157	24.395	0.155	0.023	2.42	100	1.0	-	0.91	-0.01	84	241	77	70
158	24.555	0.160	0.024	2.42	100	1.0	-	0.90	-0.01	83	241	77	70
159	24.715	0.160	0.023	2.41	100	1.0	-	0.88	-0.02	84	240	77	71

BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: IHP
Model: S160AGL
Run #: 6

Job #: 23-106
Tracking #: 99
Technician: AK
Date: 6/9/2023

	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
160	24.870	0.155	0.024	2.41	100	1.0	99	0.87	-0.01	84	240	77	71
161	25.032	0.162	0.023	2.41	100	0.9	-	0.85	-0.02	84	239	77	71
162	25.188	0.156	0.023	2.42	100	0.9	-	0.83	-0.02	84	239	77	71
163	25.347	0.159	0.023	2.41	100	1.0	-	0.83	0.00	84	239	77	70
164	25.507	0.160	0.024	2.42	100	1.0	-	0.81	-0.02	83	238	77	70
165	25.661	0.154	0.023	2.42	100	1.0	-	0.79	-0.02	84	238	77	70
166	25.821	0.160	0.023	2.43	100	0.9	-	0.77	-0.02	84	238	77	71
167	25.977	0.156	0.023	2.42	100	0.9	-	0.76	-0.01	84	238	77	70
168	26.139	0.162	0.023	2.43	100	0.9	-	0.74	-0.02	83	237	77	70
169	26.295	0.156	0.023	2.42	100	0.9	-	0.73	-0.01	83	236	77	70
170	26.457	0.162	0.023	2.42	100	1.0	100	0.71	-0.02	83	236	77	70
171	26.617	0.160	0.023	2.42	100	0.9	-	0.69	-0.02	83	235	77	71
172	26.772	0.155	0.023	2.41	100	0.9	-	0.68	-0.01	83	235	77	71
173	26.934	0.162	0.023	2.41	100	0.9	-	0.67	-0.01	83	235	77	70
174	27.087	0.153	0.024	2.42	100	1.0	-	0.65	-0.02	83	235	77	70
175	27.249	0.162	0.023	2.41	101	1.0	-	0.63	-0.02	83	234	77	70
176	27.407	0.158	0.023	2.41	100	0.9	-	0.62	-0.01	83	234	77	70
177	27.565	0.158	0.023	2.41	100	0.9	-	0.61	-0.01	83	233	77	70
178	27.727	0.162	0.023	2.41	101	0.9	-	0.60	-0.01	83	233	77	70
179	27.883	0.156	0.023	2.40	101	0.9	-	0.57	-0.03	83	232	77	70
180	28.043	0.160	0.023	2.41	101	0.9	101	0.56	-0.01	83	232	76	70
181	28.197	0.154	0.023	2.39	101	0.9	-	0.55	-0.01	83	232	77	70
182	28.359	0.162	0.023	2.40	101	0.9	-	0.53	-0.02	83	232	77	70
183	28.516	0.157	0.023	2.39	101	1.0	-	0.52	-0.01	83	231	77	70
184	28.675	0.159	0.023	2.39	101	1.0	-	0.51	-0.01	83	231	77	70
185	28.834	0.159	0.024	2.40	100	1.0	-	0.49	-0.02	82	231	76	70
186	28.993	0.159	0.023	2.40	101	1.0	-	0.48	-0.01	83	230	76	70
187	29.152	0.159	0.023	2.41	101	1.0	-	0.46	-0.02	82	230	76	70
188	29.310	0.158	0.024	2.41	101	1.0	-	0.44	-0.02	82	230	76	70
189	29.467	0.157	0.023	2.41	101	0.9	-	0.43	-0.01	82	229	76	70
190	29.627	0.160	0.024	2.40	101	1.0	100	0.41	-0.02	82	229	76	70
191	29.786	0.159	0.023	2.41	101	1.0	-	0.40	-0.01	82	229	76	70

BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: IHP
Model: S160AGL
Run #: 6

Job #: 23-106
Tracking #: 99
Technician: AK
Date: 6/9/2023

	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
192	29.945	0.159	0.023	2.41	101	1.0	-	0.39	-0.01	82	228	76	70
193	30.105	0.160	0.023	2.41	101	0.9	-	0.37	-0.02	82	228	76	70
194	30.261	0.156	0.024	2.41	101	0.9	-	0.35	-0.02	82	228	76	70
195	30.419	0.158	0.024	2.42	101	0.9	-	0.35	0.00	82	228	76	70
196	30.579	0.160	0.024	2.42	101	0.9	-	0.34	-0.01	82	228	76	70
197	30.739	0.160	0.024	2.41	101	0.9	-	0.32	-0.02	82	227	76	70
198	30.897	0.158	0.023	2.41	101	0.9	-	0.30	-0.02	82	227	76	70
199	31.053	0.156	0.023	2.41	101	1.0	-	0.28	-0.02	82	227	76	70
200	31.215	0.162	0.024	2.41	101	1.0	99	0.27	-0.01	82	227	76	69
201	31.368	0.153	0.023	2.41	101	1.0	-	0.26	-0.01	82	227	76	69
202	31.534	0.166	0.024	2.41	101	0.9	-	0.24	-0.02	82	227	76	69
203	31.690	0.156	0.023	2.41	101	0.9	-	0.22	-0.02	82	226	76	69
204	31.849	0.159	0.024	2.41	101	1.0	-	0.20	-0.02	82	226	76	69
205	32.007	0.158	0.024	2.42	101	1.0	-	0.19	-0.01	82	226	76	69
206	32.165	0.158	0.024	2.42	101	0.9	-	0.17	-0.02	82	226	76	69
207	32.328	0.163	0.024	2.42	101	0.9	-	0.16	-0.01	82	225	76	69
208	32.482	0.154	0.024	2.42	101	0.9	-	0.13	-0.03	82	225	76	69
209	32.641	0.159	0.024	2.42	101	1.0	-	0.12	-0.01	82	225	76	69
210	32.803	0.162	0.024	2.41	101	0.9	99	0.11	-0.01	82	225	76	69
211	32.959	0.156	0.024	2.41	101	0.9	-	0.09	-0.02	82	225	76	69
212	33.121	0.162	0.024	2.40	101	0.9	-	0.08	-0.01	82	224	76	69
213	33.275	0.154	0.024	2.41	101	1.0	-	0.07	-0.01	82	224	76	69
214	33.435	0.160	0.024	2.42	101	1.0	-	0.05	-0.02	83	224	76	69
215	33.592	0.157	0.024	2.40	101	1.0	-	0.03	-0.02	83	224	76	69
216	33.752	0.160	0.024	2.41	101	0.9	-	0.02	-0.01	83	225	76	69
217	33.915	0.163	0.024	2.42	101	1.0	99	0.00	-0.02	83	225	75	69
Avg/Tot	33.915	0.156	0.024	2.36	95.6	0.9	100			90.4	340.2	78.3	70.0

BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: IHP
Model: S160AGL
Run #: 6

Job #: 23-106
Tracking #: 99
Technician: AK
Date: 6/9/2023

	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		0.94	85	1.7		75	-0.087	8.83	0.475
1	0.145	0.145	2.14	84	1.7	-	77	-0.057	3.46	0.206
2	0.292	0.147	2.14	84	1.8	-	78	-0.104	5.62	0.588
3	0.435	0.143	2.13	84	1.8	-	79	-0.114	12.54	0.089
4	0.579	0.144	2.13	84	1.6	-	80	-0.119	14.56	0.036
5	0.725	0.146	2.12	84	1.8	-	81	-0.123	15.95	0.026
6	0.869	0.144	2.13	84	1.7	-	81	-0.102	16.35	1.693
7	1.016	0.147	2.13	84	1.5	-	80	-0.094	13.99	0.130
8	1.159	0.143	2.13	84	1.9	-	80	-0.094	12.22	0.169
9	1.304	0.145	2.13	84	1.9	-	80	-0.092	11.47	0.258
10	1.448	0.144	2.13	84	2.0	101	79	-0.091	11.21	0.345
11	1.592	0.144	2.13	84	2.0	-	79	-0.091	11.22	0.365
12	1.738	0.146	2.13	84	2.0	-	79	-0.090	11.63	0.338
13	1.887	0.149	2.13	84	1.8	-	79	-0.092	12.12	0.286
14	2.029	0.142	2.13	84	1.5	-	79	-0.092	12.64	0.236
15	2.176	0.147	2.13	84	1.9	-	79	-0.093	13.09	0.185
16	2.322	0.146	2.13	84	1.6	-	79	-0.093	13.50	0.175
17	2.467	0.145	2.14	84	1.5	-	79	-0.094	13.81	0.158
18	2.610	0.143	2.13	84	1.6	-	79	-0.093	14.12	0.148
19	2.758	0.148	2.13	85	1.8	-	79	-0.093	14.42	0.155
20	2.904	0.146	2.14	85	1.7	101	79	-0.093	14.62	0.184
21	3.051	0.147	2.14	85	1.9	-	79	-0.093	14.76	0.168
22	3.194	0.143	2.13	85	2.0	-	79	-0.095	14.94	0.195
23	3.340	0.146	2.14	85	1.6	-	79	-0.094	15.14	0.229
24	3.485	0.145	2.13	85	1.6	-	79	-0.094	15.18	0.246
25	3.630	0.145	2.14	86	1.4	-	80	-0.091	15.19	0.257
26	3.778	0.148	2.14	86	2.0	-	80	-0.094	15.03	0.209
27	3.923	0.145	2.13	86	1.9	-	80	-0.092	14.94	0.182
28	4.071	0.148	2.13	86	1.6	-	80	-0.092	14.95	0.188
29	4.213	0.142	2.14	86	1.5	-	80	-0.090	14.96	0.198
30	4.359	0.146	2.13	87	1.9	101	80	-0.091	15.09	0.217
31	4.504	0.145	2.13	87	2.0	-	80	-0.090	15.27	0.322

BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: IHP
Job #: 23-106
Model: S160AGL
Tracking #: 99
Run #: 6
Technician: AK
Date: 6/9/2023

	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	4.653	0.149	2.14	87	1.7	-	80	-0.089	15.62	0.337
33	4.796	0.143	2.13	87	1.7	-	80	-0.094	15.75	0.391
34	4.944	0.148	2.13	88	1.9	-	80	-0.091	15.76	0.338
35	5.087	0.143	2.12	88	1.9	-	80	-0.094	15.66	0.306
36	5.236	0.149	2.13	88	1.8	-	81	-0.091	15.45	0.207
37	5.378	0.142	2.13	88	2.0	-	81	-0.092	15.43	0.214
38	5.528	0.150	2.13	89	2.0	-	81	-0.090	15.43	0.155
39	5.671	0.143	2.13	89	2.0	-	81	-0.090	15.35	0.140
40	5.819	0.148	2.12	89	1.5	102	81	-0.090	15.26	0.160
41	5.965	0.146	2.13	89	1.5	-	81	-0.092	15.18	0.172
42	6.107	0.142	2.13	89	2.0	-	81	-0.090	14.96	0.193
43	6.254	0.147	2.12	90	1.5	-	81	-0.087	14.67	0.183
44	6.400	0.146	2.13	90	1.5	-	81	-0.088	14.18	0.131
45	6.550	0.150	2.13	90	2.0	-	81	-0.085	13.59	0.080
46	6.694	0.144	2.13	90	1.8	-	81	-0.088	13.91	0.147
47	6.843	0.149	2.13	90	1.5	-	81	-0.087	14.07	0.225
48	6.988	0.145	2.13	91	1.6	-	81	-0.088	14.15	0.185
49	7.137	0.149	2.13	91	1.5	-	81	-0.088	14.27	0.128
50	7.280	0.143	2.12	91	1.8	101	81	-0.088	14.12	0.096
51	7.429	0.149	2.13	91	1.5	-	81	-0.083	13.85	0.060
52	7.573	0.144	2.13	92	2.0	-	80	-0.086	13.32	0.035
53	7.723	0.150	2.13	92	2.0	-	80	-0.086	12.73	0.029
54	7.864	0.141	2.13	92	1.7	-	80	-0.084	12.17	0.041
55	8.015	0.151	2.13	92	2.0	-	80	-0.082	12.22	0.041
56	8.158	0.143	2.13	92	1.9	-	80	-0.086	12.07	0.043
57	8.306	0.148	2.13	93	1.9	-	80	-0.084	12.00	0.035
58	8.452	0.146	2.14	93	1.6	-	80	-0.083	11.81	0.040
59	8.603	0.151	2.14	93	1.5	-	80	-0.084	11.49	0.054
60	8.749	0.146	2.14	93	2.0	100	79	-0.081	11.31	0.057
61	8.894	0.145	2.13	93	2.0	-	79	-0.083	11.05	0.066
62	9.043	0.149	2.14	93	2.0	-	79	-0.080	10.73	0.112
63	9.190	0.147	2.14	94	2.0	-	79	-0.079	10.55	0.158

BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: IHP
Job #: 23-106
Model: S160AGL
Tracking #: 99
Run #: 6
Technician: AK
Date: 6/9/2023

	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	9.334	0.144	2.14	94	2.0	-	79	-0.079	10.40	0.228
65	9.484	0.150	2.14	94	1.5	-	79	-0.079	10.25	0.331
66	9.631	0.147	2.14	94	1.5	-	79	-0.081	10.05	0.389
67	9.777	0.146	2.14	94	2.0	-	79	-0.077	9.93	0.438
68	9.924	0.147	2.13	94	1.5	-	78	-0.077	9.85	0.438
69	10.070	0.146	2.14	94	2.0	-	78	-0.080	9.76	0.459
70	10.219	0.149	2.14	95	1.5	100	78	-0.078	9.75	0.457
71	10.362	0.143	2.14	95	1.8	-	78	-0.076	9.73	0.480
72	10.514	0.152	2.15	95	1.6	-	78	-0.075	9.78	0.448
73	10.659	0.145	2.14	95	1.5	-	78	-0.076	9.86	0.425
74	10.808	0.149	2.14	95	1.6	-	78	-0.078	9.97	0.386
75	10.954	0.146	2.15	95	1.7	-	78	-0.077	10.19	0.333
76	11.104	0.150	2.15	95	2.0	-	78	-0.076	10.39	0.295
77	11.249	0.145	2.16	95	1.6	-	78	-0.073	10.32	0.300
78	11.399	0.150	2.15	95	1.5	-	77	-0.073	9.75	0.366
79	11.541	0.142	2.15	96	1.5	-	77	-0.075	9.11	0.452
80	11.693	0.152	2.15	96	1.5	100	77	-0.069	9.04	0.306
81	11.839	0.146	2.15	96	1.5	-	77	-0.070	8.58	0.384
82	11.989	0.150	2.15	96	1.6	-	77	-0.072	8.70	0.343
83	12.134	0.145	2.15	96	1.9	-	77	-0.070	8.62	0.328
84	12.284	0.150	2.14	96	1.5	-	77	-0.069	8.42	0.339
85	12.429	0.145	2.15	96	1.5	-	77	-0.067	7.97	0.447
86	12.576	0.147	2.15	96	2.0	-	77	-0.069	7.51	0.556
87	12.724	0.148	2.15	96	1.5	-	77	-0.068	7.22	0.649
88	12.873	0.149	2.14	96	1.7	-	77	-0.067	7.12	0.692
89	13.019	0.146	2.15	96	2.0	-	77	-0.068	7.00	0.752
90	13.167	0.148	2.16	96	1.8	99	76	-0.064	6.99	0.696
91	13.315	0.148	2.15	96	1.5	-	76	-0.065	6.87	0.738
92	13.465	0.150	2.15	96	2.0	-	76	-0.063	6.83	0.775
93	13.609	0.144	2.15	96	1.5	-	76	-0.062	6.74	0.861
94	13.761	0.152	2.16	96	2.0	-	77	-0.060	6.21	1.061
95	13.907	0.146	2.15	96	1.6	-	77	-0.061	5.93	1.251

BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: IHP
Model: S160AGL
Run #: 6

Job #: 23-106
Tracking #: 99
Technician: AK
Date: 6/9/2023

	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	14.054	0.147	2.16	97	2.0	-	77	-0.062	5.80	1.317
97	14.203	0.149	2.16	97	2.0	-	77	-0.058	5.79	1.365
98	14.350	0.147	2.16	97	1.7	-	77	-0.061	5.68	1.420
99	14.498	0.148	2.16	97	1.6	-	77	-0.057	5.52	1.556
100	14.649	0.151	2.16	97	2.0	99	77	-0.061	5.56	1.495
101	14.793	0.144	2.16	97	1.8	-	77	-0.062	5.52	1.533
102	14.945	0.152	2.16	97	1.5	-	77	-0.058	5.43	1.606
103	15.092	0.147	2.15	97	1.8	-	77	-0.058	5.43	1.624
104	15.243	0.151	2.15	97	2.0	-	77	-0.058	5.32	1.732
105	15.387	0.144	2.15	97	2.0	-	77	-0.058	5.29	1.788
106	15.536	0.149	2.15	97	1.5	-	77	-0.058	5.30	1.806
107	15.683	0.147	2.15	97	1.5	-	77	-0.057	5.32	1.751
108	15.832	0.149	2.16	97	1.6	-	77	-0.056	5.26	1.780
109	15.979	0.147	2.16	97	2.0	-	77	-0.056	5.40	1.732
110	16.128	0.149	2.15	97	1.5	99	77	-0.058	5.33	1.867
111	16.273	0.145	2.15	98	1.8	-	77	-0.056	5.32	1.791
112	16.424	0.151	2.16	98	2.0	-	77	-0.057	5.24	1.823
113	16.572	0.148	2.16	98	1.8	-	77	-0.055	5.10	1.940
114	16.716	0.144	2.16	98	2.0	-	77	-0.057	5.02	1.938
115	16.868	0.152	2.16	98	2.0	-	77	-0.055	4.98	1.960
116	17.016	0.148	2.16	98	1.7	-	77	-0.054	4.96	1.978
117	17.165	0.149	2.16	98	2.0	-	77	-0.054	4.93	2.004
118	17.312	0.147	2.16	98	1.9	-	77	-0.057	4.90	2.036
119	17.461	0.149	2.16	98	2.0	-	77	-0.056	4.85	2.059
120	17.605	0.144	2.15	98	1.5	98	77	-0.054	4.84	2.063
121	17.754	0.149	2.15	98	1.8	-	77	-0.056	4.79	2.122
122	17.901	0.147	2.16	98	2.0	-	77	-0.052	5.11	1.755
123	18.051	0.150	2.15	98	2.0	-	77	-0.054	5.18	1.664
124	18.198	0.147	2.16	98	1.8	-	77	-0.054	5.20	1.646
125	18.348	0.150	2.16	98	1.9	-	77	-0.055	5.19	1.659
126	18.497	0.149	2.16	98	1.5	-	77	-0.054	5.19	1.654
127	18.645	0.148	2.16	98	1.5	-	77	-0.053	5.18	1.663

BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: IHP
Job #: 23-106
Model: S160AGL
Tracking #: 99
Run #: 6
Technician: AK
Date: 6/9/2023

	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	18.794	0.149	2.16	98	1.7	-	77	-0.050	5.17	1.662
129	18.943	0.149	2.16	98	2.0	-	77	-0.054	4.75	1.935
130	19.090	0.147	2.16	98	1.5	100	77	-0.053	4.62	2.077
131	19.240	0.150	2.16	98	1.5	-	77	-0.054	4.58	2.093
132	19.387	0.147	2.16	98	1.5	-	77	-0.053	4.80	1.912
133	19.534	0.147	2.16	98	2.0	-	77	-0.053	4.53	2.107
134	19.684	0.150	2.16	98	1.8	-	76	-0.049	4.57	2.098
135	19.834	0.150	2.16	98	1.8	-	76	-0.054	4.68	2.038
136	19.981	0.147	2.16	99	1.9	-	76	-0.051	4.66	2.066
137	20.131	0.150	2.16	99	1.5	-	76	-0.050	4.54	2.177
138	20.278	0.147	2.16	99	1.6	-	76	-0.053	4.67	2.065
139	20.425	0.147	2.16	99	1.7	-	76	-0.052	4.71	2.040
140	20.575	0.150	2.16	99	1.5	100	76	-0.048	4.75	2.005
141	20.725	0.150	2.17	99	2.0	-	76	-0.053	4.74	2.026
142	20.869	0.144	2.17	99	1.9	-	76	-0.050	4.68	2.041
143	21.022	0.153	2.16	99	2.0	-	76	-0.056	4.76	1.981
144	21.168	0.146	2.16	99	1.9	-	76	-0.050	4.77	1.995
145	21.318	0.150	2.16	99	1.5	-	76	-0.050	4.83	1.919
146	21.465	0.147	2.16	99	1.9	-	76	-0.049	4.93	1.894
147	21.616	0.151	2.16	99	1.8	-	76	-0.050	4.95	1.878
148	21.760	0.144	2.17	99	1.5	-	76	-0.048	5.05	1.836
149	21.913	0.153	2.16	99	1.8	-	76	-0.051	5.06	1.868
150	22.060	0.147	2.16	99	2.0	98	76	-0.051	5.08	1.802
151	22.210	0.150	2.16	99	1.6	-	76	-0.048	5.07	1.769
152	22.355	0.145	2.17	99	1.9	-	76	-0.046	4.93	1.805
153	22.507	0.152	2.17	99	1.6	-	76	-0.048	4.88	1.872
154	22.652	0.145	2.17	99	1.5	-	76	-0.048	4.96	1.809
155	22.805	0.153	2.16	99	1.9	-	76	-0.048	4.95	1.834
156	22.951	0.146	2.16	99	1.6	-	76	-0.050	4.80	1.984
157	23.102	0.151	2.16	99	1.8	-	76	-0.046	4.73	2.023
158	23.249	0.147	2.16	99	1.5	-	76	-0.048	4.68	2.051
159	23.399	0.150	2.16	99	1.6	-	76	-0.049	4.66	2.103

BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: IHP
Model: S160AGL
Run #: 6

Job #: 23-106
Tracking #: 99
Technician: AK
Date: 6/9/2023

	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	23.546	0.147	2.16	99	1.9	98	76	-0.050	4.67	2.085
161	23.697	0.151	2.16	99	1.9	-	76	-0.049	4.70	1.976
162	23.843	0.146	2.16	99	2.0	-	76	-0.048	4.57	2.097
163	23.994	0.151	2.16	99	2.0	-	76	-0.049	4.50	2.143
164	24.141	0.147	2.17	99	1.5	-	76	-0.047	4.57	2.080
165	24.290	0.149	2.17	99	1.5	-	76	-0.050	4.56	2.095
166	24.436	0.146	2.16	99	2.0	-	76	-0.048	4.58	2.083
167	24.587	0.151	2.17	99	1.5	-	76	-0.047	4.67	1.954
168	24.734	0.147	2.17	99	1.4	-	76	-0.049	4.56	2.079
169	24.884	0.150	2.16	99	1.8	-	76	-0.047	4.59	2.073
170	25.033	0.149	2.16	99	1.7	100	76	-0.048	4.64	2.012
171	25.183	0.150	2.16	100	1.5	-	76	-0.048	4.73	1.936
172	25.330	0.147	2.16	100	2.0	-	76	-0.048	4.71	1.933
173	25.481	0.151	2.16	99	1.5	-	76	-0.047	4.72	1.885
174	25.626	0.145	2.16	99	1.5	-	76	-0.049	4.70	1.873
175	25.778	0.152	2.17	100	1.5	-	76	-0.048	4.66	1.891
176	25.923	0.145	2.17	99	1.9	-	76	-0.048	4.72	1.884
177	26.075	0.152	2.16	100	1.5	-	76	-0.051	4.77	1.875
178	26.222	0.147	2.17	100	2.0	-	76	-0.049	4.78	1.887
179	26.373	0.151	2.17	100	1.8	-	76	-0.047	4.81	1.882
180	26.519	0.146	2.17	100	1.5	100	76	-0.047	4.82	1.882
181	26.668	0.149	2.16	100	1.5	-	76	-0.048	4.78	1.885
182	26.817	0.149	2.17	100	2.0	-	76	-0.046	4.80	1.886
183	26.966	0.149	2.16	100	1.9	-	76	-0.050	4.83	1.872
184	27.114	0.148	2.16	100	1.7	-	76	-0.048	4.83	1.822
185	27.263	0.149	2.16	100	2.0	-	76	-0.046	4.79	1.851
186	27.411	0.148	2.17	100	2.0	-	76	-0.046	4.74	1.870
187	27.562	0.151	2.17	100	1.9	-	76	-0.047	4.70	1.846
188	27.707	0.145	2.17	100	1.9	-	76	-0.046	4.65	1.846
189	27.860	0.153	2.17	100	1.5	-	75	-0.048	4.62	1.867
190	28.004	0.144	2.16	100	1.8	99	76	-0.047	4.58	1.902
191	28.157	0.153	2.17	100	1.7	-	76	-0.044	4.56	1.935

BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: IHP
Job #: 23-106
Model: S160AGL
Tracking #: 99
Run #: 6
Technician: AK
Date: 6/9/2023

	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	28.303	0.146	2.16	100	1.5	-	75	-0.047	4.60	1.859
193	28.454	0.151	2.16	100	1.5	-	76	-0.047	4.62	1.858
194	28.601	0.147	2.17	100	2.0	-	75	-0.044	4.58	1.889
195	28.750	0.149	2.17	100	1.9	-	76	-0.046	4.57	1.852
196	28.898	0.148	2.16	100	1.7	-	75	-0.045	4.53	1.859
197	29.049	0.151	2.17	100	1.5	-	76	-0.043	4.53	1.846
198	29.195	0.146	2.17	100	1.9	-	76	-0.048	4.57	1.795
199	29.344	0.149	2.17	100	2.0	-	76	-0.047	4.57	1.780
200	29.493	0.149	2.17	100	1.5	98	75	-0.044	4.62	1.757
201	29.642	0.149	2.17	100	1.8	-	75	-0.046	4.73	1.764
202	29.790	0.148	2.17	100	1.5	-	75	-0.045	4.68	1.788
203	29.941	0.151	2.16	100	1.9	-	75	-0.049	4.65	1.823
204	30.088	0.147	2.17	100	1.7	-	75	-0.046	4.62	1.853
205	30.237	0.149	2.17	100	1.8	-	75	-0.045	4.51	1.938
206	30.385	0.148	2.17	100	2.0	-	75	-0.046	4.43	1.934
207	30.536	0.151	2.17	100	1.9	-	75	-0.045	4.45	1.941
208	30.681	0.145	2.17	100	1.5	-	75	-0.045	4.38	1.926
209	30.832	0.151	2.17	100	1.7	-	75	-0.047	4.41	1.915
210	30.980	0.148	2.17	100	2.0	98	75	-0.045	4.40	1.910
211	31.131	0.151	2.17	100	1.5	-	75	-0.044	4.42	1.904
212	31.278	0.147	2.17	100	1.5	-	75	-0.045	4.40	1.879
213	31.427	0.149	2.16	100	1.6	-	75	-0.047	4.55	1.654
214	31.573	0.146	2.17	100	1.5	-	75	-0.046	4.66	1.673
215	31.724	0.151	2.17	100	1.8	-	75	-0.045	4.62	1.719
216	31.871	0.147	2.16	100	1.8	-	75	-0.044	4.60	1.711
217	32.023	0.152	2.17	100	1.7	98	75	-0.047	4.64	1.701
Avg/Tot	32.023	0.148	2.15	95.0	1.7	100	77.3	-0.065	7.93	1.185

BOX C TEST DATA - ASTM E2780 / ASTM E2515

Client: IHP
Model: S160AGL
Run #: 6

Job #: 23-106
Tracking #: 99
Technician: AK
Date: 6/9/2023

	Particulate Sampling 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)
0	0.000		0.44	79	1.6		74
1	0.153	0.153	1.06	78	1.7	-	74
2	0.306	0.153	1.07	78	1.9	-	74
3	0.460	0.154	1.07	78	1.8	-	74
4	0.612	0.152	1.07	78	1.8	-	75
5	0.770	0.158	1.07	78	1.8	-	75
6	0.923	0.153	1.08	78	1.9	-	75
7	1.082	0.159	1.09	78	1.9	-	75
8	1.235	0.153	1.10	78	1.8	-	76
9	1.392	0.157	1.10	78	1.9	-	76
10	1.548	0.156	1.10	79	1.7	99	76
11	1.702	0.154	1.10	79	1.8	-	76
12	1.860	0.158	1.09	79	1.9	-	76
13	2.020	0.160	1.10	79	1.9	-	76
14	2.175	0.155	1.10	79	1.8	-	76
15	2.332	0.157	1.11	79	1.9	-	76
16	2.492	0.160	1.11	79	1.7	-	76
17	2.646	0.154	1.11	80	1.9	-	76
18	2.804	0.158	1.10	80	1.8	-	76
19	2.963	0.159	1.11	80	1.8	-	76
20	3.124	0.161	1.12	81	1.7	100	76
21	3.281	0.157	1.12	81	2.0	-	76
22	3.437	0.156	1.12	81	1.9	-	76
23	3.597	0.160	1.12	81	1.8	-	76
24	3.756	0.159	1.13	81	1.9	-	76
25	3.916	0.160	1.13	82	1.9	-	76
26	4.077	0.161	1.12	82	1.8	-	76
27	4.237	0.160	1.13	82	1.9	-	77
28	4.398	0.161	1.14	82	1.9	-	77
29	4.554	0.156	1.14	83	1.8	-	77
30	4.711	0.157	1.13	83	1.9	101	77
31	4.875	0.164	1.14	83	1.8	-	77

BOX C TEST DATA - ASTM E2780 / ASTM E2515

Client: IHP
Model: S160AGL
Run #: 6

Job #: 23-106
Tracking #: 99
Technician: AK
Date: 6/9/2023

	Particulate Sampling 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)
32	5.035	0.160	1.14	83	2.0	-	77
33	5.194	0.159	1.13	84	1.9	-	77
34	5.355	0.161	1.13	84	1.9	-	77
35	5.515	0.160	1.14	85	1.8	-	78
36	5.674	0.159	1.14	85	2.0	-	77
37	5.832	0.158	1.13	85	1.9	-	77
38	5.996	0.164	1.14	85	1.8	-	77
39	6.154	0.158	1.14	85	1.8	-	77
40	6.316	0.162	1.13	86	2.0	103	77
41	6.477	0.161	1.14	86	2.0	-	77
42	6.635	0.158	1.14	86	1.8	-	77
43	6.794	0.159	1.13	86	1.9	-	78
44	6.956	0.162	1.13	86	1.9	-	78
45	7.120	0.164	1.14	87	2.0	-	78
46	7.279	0.159	1.13	87	2.0	-	78
47	7.440	0.161	1.13	87	1.8	-	78
48	7.602	0.162	1.14	88	1.9	-	78
49	7.761	0.159	1.14	88	1.9	-	78
50	7.923	0.162	1.14	88	1.8	102	78
51	8.085	0.162	1.14	87	2.0	-	78
52	8.244	0.159	1.14	87	1.8	-	78
53	8.407	0.163	1.14	87	1.8	-	78
54	8.566	0.159	1.15	88	2.0	-	78
55	8.729	0.163	1.14	88	1.8	-	78
56	8.888	0.159	1.14	88	1.9	-	78
57	9.050	0.162	1.15	88	1.9	-	77
58	9.211	0.161	1.14	88	1.9	-	77
59	9.376	0.165	1.14	88	1.9	-	77
60	9.538	0.162	1.15	89	1.8	101	77
Avg/Tot	9.538	0.159	1.11	83.0	1.9	101	76.6

WOODSTOVE SURFACE TEMPERATURE DATA

Client: IHP
Model: S160AGL
Run #: 6

Job #: 23-106
Tracking #: 99
Technician: AK
Date: 6/9/2023

Stove ΔT: 152

	Temperature Data (°F)						
Elapsed Time (min)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
0	552	550	476	463	484	505.1	71.4
1	550	549	476	453	490	503.4	70.9
2	542	542	478	468	479	501.7	70.5
3	543	543	477	539	473	515.0	70.5
4	547	548	474	607	467	528.6	70.6
5	556	556	470	675	463	544.2	70.7
6	561	562	468	704	475	554.1	70.7
7	562	564	466	704	479	554.9	70.7
8	561	563	464	697	482	553.4	70.8
9	558	561	462	689	484	550.7	70.9
10	555	558	460	685	485	548.5	70.8
11	552	555	458	678	487	545.9	70.7
12	549	553	455	674	488	543.5	70.8
13	546	551	452	677	488	542.8	70.9
14	544	549	449	679	489	542.0	70.9
15	542	548	445	687	489	542.2	70.7
16	541	547	442	702	489	544.0	70.4
17	541	547	439	705	488	544.1	70.1
18	541	546	436	717	488	545.6	69.8
19	542	546	433	728	487	547.2	70.0
20	544	547	429	734	486	548.1	69.9
21	547	549	429	738	485	549.4	70.2
22	550	550	428	745	484	551.3	70.5
23	553	553	424	751	483	552.8	70.8
24	556	556	422	756	482	554.3	71.1
25	559	558	419	757	480	554.6	71.3
26	562	560	418	762	479	556.3	71.4
27	564	562	417	763	478	556.7	71.6
28	565	564	415	771	476	558.3	71.6
29	568	566	412	764	475	556.7	71.8
30	569	568	411	773	473	558.7	71.8
31	571	569	411	773	472	559.0	71.8
32	572	571	410	772	470	558.8	71.8
33	574	572	409	776	469	559.8	71.8
34	576	573	407	770	467	558.5	71.8
35	577	575	406	769	466	558.5	71.9
36	579	577	408	774	464	560.3	71.8
37	581	579	407	772	463	560.2	71.8
38	583	580	406	774	461	560.9	71.9
39	585	582	405	776	459	561.6	71.9
40	588	584	405	771	458	560.9	72.0
41	591	585	404	770	456	561.3	72.0
42	593	586	405	776	455	563.1	72.1
43	596	588	404	766	454	561.5	72.1
44	599	589	405	766	452	562.4	72.2
45	602	592	405	762	451	562.4	72.2
46	606	594	405	744	450	559.8	72.3
47	610	595	405	741	448	559.8	72.2

WOODSTOVE SURFACE TEMPERATURE DATA

Client: IHP
Model: S160AGL
Run #: 6

Job #: 23-106
Tracking #: 99
Technician: AK
Date: 6/9/2023

Stove ΔT: 152

	Temperature Data (°F)						
Elapsed Time (min)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
48	614	596	405	738	448	560.0	72.0
49	617	596	405	730	446	558.9	71.4
50	619	597	406	726	445	558.5	70.9
51	622	598	406	719	444	557.7	70.6
52	624	598	407	712	443	556.8	70.3
53	626	598	408	703	442	555.1	70.3
54	627	598	407	697	440	553.7	70.2
55	627	597	409	689	439	552.1	70.1
56	627	596	410	680	438	550.3	70.0
57	628	596	411	675	437	549.4	69.9
58	629	596	412	666	436	547.8	69.8
59	629	595	412	662	435	546.7	70.1
60	629	593	413	651	434	544.1	70.0
61	630	591	414	641	433	541.8	70.0
62	630	588	416	636	432	540.3	70.0
63	629	586	417	633	431	538.9	69.8
64	627	584	418	625	430	536.7	69.9
65	625	582	419	616	429	534.1	69.9
66	623	581	420	613	428	532.9	69.9
67	620	580	421	605	427	530.6	69.9
68	618	579	422	601	426	529.2	70.1
69	616	578	423	593	425	526.8	69.9
70	614	578	424	590	424	526.0	69.8
71	612	577	425	582	423	523.6	69.9
72	610	576	426	577	422	522.1	69.9
73	607	575	427	575	422	521.2	69.8
74	605	574	428	574	420	520.3	69.9
75	604	574	429	576	420	520.3	69.9
76	602	573	430	576	419	519.8	70.0
77	601	572	432	578	418	520.1	69.8
78	599	570	433	574	418	518.6	69.8
79	598	568	434	568	417	517.0	69.7
80	597	567	436	557	417	514.5	69.4
81	596	565	437	548	416	512.2	69.5
82	595	562	439	540	415	510.3	69.7
83	594	560	440	536	415	509.0	69.9
84	592	557	442	530	415	507.1	69.8
85	590	554	442	520	414	503.8	69.9
86	586	551	443	515	414	501.6	70.0
87	582	547	443	506	414	498.4	69.6
88	578	544	443	499	414	495.6	69.8
89	575	541	443	492	414	493.0	69.8
90	571	539	443	486	414	490.6	69.9
91	567	537	443	485	414	488.9	69.9
92	563	535	444	476	414	486.3	70.1
93	560	533	443	470	414	483.8	70.4
94	555	530	443	465	414	481.3	70.6
95	551	528	441	459	414	478.5	70.7

WOODSTOVE SURFACE TEMPERATURE DATA

Client: IHP
Model: S160AGL
Run #: 6

Job #: 23-106
Tracking #: 99
Technician: AK
Date: 6/9/2023

Stove ΔT: 152

	Temperature Data (°F)						
Elapsed Time (min)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
96	547	525	440	454	414	475.9	70.8
97	543	522	439	448	414	473.0	71.0
98	539	519	437	444	414	470.4	71.0
99	534	516	435	441	414	468.1	71.2
100	530	513	433	435	414	465.0	71.2
101	527	510	431	428	414	461.9	71.2
102	523	507	429	430	414	460.5	71.4
103	520	504	426	425	414	457.6	71.3
104	516	501	425	415	414	454.2	71.4
105	513	498	422	413	413	451.7	71.4
106	510	495	421	410	413	449.7	71.3
107	507	492	420	410	413	448.4	71.5
108	504	489	417	407	413	445.9	71.6
109	501	487	417	400	412	443.3	71.7
110	498	484	416	398	412	441.7	71.5
111	495	481	414	393	412	439.0	71.6
112	493	479	412	393	412	437.6	71.7
113	490	476	410	392	411	435.8	71.5
114	488	473	408	386	411	433.0	71.7
115	486	471	405	386	411	431.6	71.7
116	483	468	404	382	410	429.4	71.6
117	481	466	400	378	410	426.9	71.6
118	479	463	399	379	410	426.0	71.6
119	477	461	398	377	409	424.4	71.7
120	475	458	395	376	409	422.5	71.6
121	472	456	394	372	408	420.7	71.6
122	471	454	392	367	408	418.2	71.6
123	468	452	392	368	408	417.4	71.6
124	467	450	389	367	407	415.8	71.7
125	465	447	389	364	407	414.3	71.8
126	463	446	387	359	406	412.3	71.8
127	462	444	386	359	406	411.2	71.8
128	460	442	384	356	405	409.5	71.8
129	459	440	385	356	405	409.1	71.8
130	457	438	384	355	405	407.8	71.8
131	455	437	382	352	404	405.7	71.7
132	453	435	381	350	404	404.5	71.7
133	451	433	382	353	403	404.4	71.8
134	450	432	380	346	403	401.9	71.7
135	448	430	378	345	402	400.7	71.8
136	446	429	377	345	402	399.9	71.8
137	444	428	377	345	401	399.1	71.8
138	442	427	377	344	401	398.1	71.9
139	440	426	375	344	400	397.0	71.8
140	439	425	374	338	400	395.0	71.8
141	437	424	374	338	399	394.3	71.9
142	435	423	373	340	398	393.8	71.9
143	433	422	372	339	398	392.9	71.8

WOODSTOVE SURFACE TEMPERATURE DATA

Client: IHP
Model: S160AGL
Run #: 6

Job #: 23-106
Tracking #: 99
Technician: AK
Date: 6/9/2023

Stove ΔT: 152

	Temperature Data (°F)						
Elapsed Time (min)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
144	431	421	372	338	397	391.9	71.9
145	430	420	371	337	397	390.9	71.9
146	428	419	370	334	396	389.5	71.9
147	426	419	369	335	396	389.0	71.9
148	425	418	369	331	395	387.6	71.9
149	423	418	369	333	394	387.5	71.9
150	422	417	369	331	394	386.6	72.0
151	420	417	368	331	393	385.8	72.0
152	419	416	368	332	393	385.6	72.0
153	418	416	367	328	392	384.2	72.0
154	416	415	367	329	392	383.9	72.0
155	415	415	367	326	391	382.8	71.9
156	414	414	366	326	391	382.1	72.0
157	413	414	366	327	390	381.9	72.0
158	411	414	366	326	390	381.2	72.0
159	410	413	365	323	389	380.1	72.0
160	409	413	365	323	388	379.6	72.1
161	408	412	365	323	388	379.1	72.1
162	407	412	364	322	387	378.4	72.1
163	405	411	365	324	387	378.5	72.2
164	404	411	365	324	386	377.9	72.1
165	403	410	365	321	386	376.9	72.1
166	402	410	364	318	385	375.7	72.2
167	401	409	364	318	385	375.3	72.2
168	400	408	363	317	384	374.5	72.2
169	399	408	363	317	384	374.1	72.2
170	397	408	363	316	383	373.3	72.2
171	396	407	363	315	383	372.8	72.1
172	395	407	363	315	382	372.4	72.1
173	394	406	361	315	382	371.6	72.1
174	393	406	362	313	381	371.1	72.1
175	392	406	361	312	381	370.2	72.2
176	391	405	361	311	380	369.7	72.1
177	390	405	361	310	380	369.1	72.1
178	389	405	361	310	379	368.7	72.2
179	388	404	360	310	379	368.1	72.1
180	387	404	360	309	378	367.6	72.1
181	386	404	360	309	378	367.3	72.1
182	385	404	360	309	377	366.9	72.2
183	384	404	359	309	377	366.4	72.1
184	383	404	359	308	376	366.0	72.1
185	382	403	359	308	375	365.5	72.0
186	382	403	360	307	375	365.2	72.1
187	381	403	359	309	374	365.1	72.1
188	380	403	358	306	374	363.9	72.1
189	379	402	359	305	373	363.7	72.0
190	378	402	359	306	373	363.5	72.1
191	377	401	359	304	372	362.8	72.1

WOODSTOVE SURFACE TEMPERATURE DATA

Client: IHP
Model: S160AGL
Run #: 6

Job #: 23-106
Tracking #: 99
Technician: AK
Date: 6/9/2023

Stove ΔT: **152**

	Temperature Data (°F)						
Elapsed Time (min)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
192	376	401	359	303	372	362.1	72.1
193	375	401	359	304	371	361.9	72.1
194	374	400	360	304	371	361.7	72.2
195	373	400	360	305	370	361.5	72.3
196	372	400	360	304	369	361.0	72.3
197	371	400	360	305	369	360.8	72.3
198	370	399	361	304	368	360.6	72.2
199	370	399	361	304	368	360.2	72.3
200	369	399	361	303	367	359.6	72.3
201	368	398	361	302	367	359.0	72.1
202	367	398	361	302	366	358.7	72.1
203	366	397	361	302	366	358.5	72.0
204	365	397	361	302	365	358.2	71.9
205	365	397	361	302	365	357.8	72.0
206	364	396	361	302	364	357.4	72.0
207	363	396	361	300	364	356.6	71.9
208	362	395	361	301	363	356.5	71.9
209	362	395	361	300	363	356.2	72.1
210	361	394	361	300	363	355.6	72.0
211	360	394	361	299	362	355.1	71.9
212	359	393	360	298	362	354.4	71.8
213	359	392	360	299	361	354.3	71.8
214	358	392	360	298	361	353.8	71.8
215	357	392	359	298	361	353.6	71.8
216	357	392	359	298	360	353.1	71.8
217	356	392	358	298	360	352.9	71.7
Average	495.3	490.0	400.0	478.0	416.1	455.9	71.3

LAB SAMPLE DATA - ASTM E2515

Client: IHP
Model: S160AGL
Run #: 6

Job #: 23-106
Tracking #: 99
Technician: AK
Date: 6/9/2023

		Sample ID	Tare, mg	Final, mg	Catch, mg
Filters	**A**	G00566	243.0	243.5	0.5
	B	G00567	242.6	243.0	0.4
	C - 1st Hour	G00568	244.1	244.5	0.4
	Amb	G00569	243.0	243.0	0.0
Probes	**A**	17A	116810.7	116810.8	0.1
	B	17B	117139.9	117139.9	0.0
	C - 1st Hour	17C	113141.3	113141.4	0.1
O-rings	**A**	17A	3613.5	3614.2	0.7
	B	17B	3569.5	3570.2	0.7
	C - 1st Hour	17C	3597.0	3597.1	0.1

Placed in Dessicator on:	6/9/2023

Filters	**A**	243.5	6/12 10:18	243.5	6/16 12:07				
	B	243.0	6/12 10:18	243.0	6/16 12:07				
	C - 1st Hour	244.6	6/12 10:18	244.5	6/16 12:07				
	Amb	243.0	6/12 10:18	243.0	6/16 12:07				
Probes	**A**	116810.7	6/12 10:18	116810.8	6/16 12:07				
	B	117140.0	6/12 10:19	117139.9	6/16 12:07				
	C - 1st Hour	113141.4	6/12 10:19	113141.4	6/16 12:07				
O-Rings	**A**	3614.1	6/12 10:19	3614.2	6/16 12:07				
	B	3570.2	6/12 10:19	3570.2	6/16 12:07				
	C - 1st Hour	3597.2	6/12 10:19	3597.1	6/16 12:08				

Train A Aggregate, mg:	**1.3**
Train B Aggregate, mg:	**1.1**
Train C Aggregate, mg:	**0.6**
Ambient, mg:	**0.0**

ASTM E2780 Wood Heater Run Sheets

Client: IHP Job Number: 23-106 Tracking #: 99
Model: S160AGL Run Number: 6 Test Date: 6/9/23

Wood Heater Run Notes

Test Control Settings

Primary Air Setting(s): Open 0.53" from fully closed
Targeted Burn Category: II

Preburn Notes

Time	Notes
60:00	End PB

Test Notes

Test Burn Start Time: 14:28 Test Fuel Loaded by: 40 seconds
Door Closed: 55 seconds Air Control Set at: 300 seconds
Other Loading Notes: Fan on low @ 30 min

Time	Notes
	-None-

Test Burn End Time: 18:05

Flue Gas Concentration Measurement

Calibration Gas Values: Span Gas CO_2 (%): 17.01 CO (%): 4.306
Mid Gas CO_2 (%): 10.09 CO (%): 2.53

Calibration Results:

	Pre Test			Post Test		
	Zero	Span	Mid	Zero	Span	Mid
Time	08:43	08:46	08:50	20:31	20:32	20:33
CO_2	0.07	16.95	10.07	-0.02	16.88	9.93
CO	0.010	4.290	2.471	0.006	4.261	2.457

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

Technician Signature:  Date: 6/26/23

ASTM E2780 Wood Heater Run Sheets

Client: IHP Job Number: 23-106 Tracking #: 99
Model: S160AGL Run Number: 6 Test Date: 6/9/23



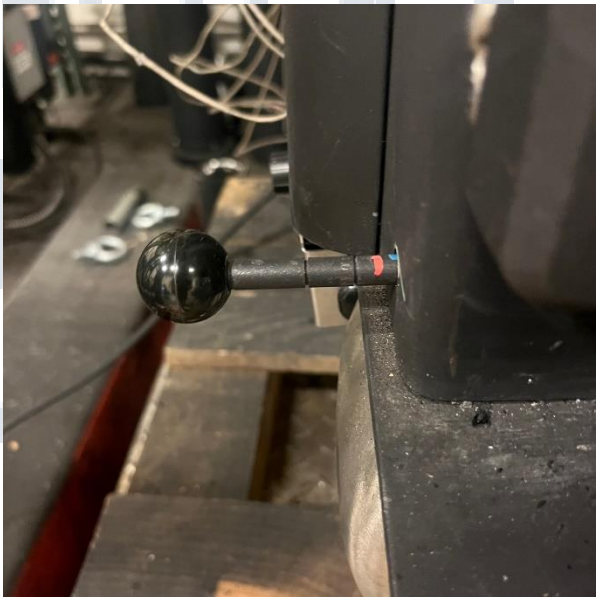
Test Fuel Side View



Test Fuel Iso View



Test Fuel Loaded in Stove



Air Setting

Technician Signature: Date: 6/26/23

ASTM E2515 - Glass Filters

Sample	Weight 1	Weight 2	Weigth 3	Weight 4	Initial	Project	Run
G00541	241.9	241.9	-	-	SB	23-144	#1
G00542	242.2	242.0	—	-	SB	23-114	#1
G00543	242.9	242.9	—	-	SB	↓	↓
G00544	243.4	243.5	—	-	SB		
G00545	241.7	241.5	—	-	SB	↓	↓
G00546	241.6	241.6	—	-	SB	23-106	#1
G00547	243.0	242.8	—	-	SB	↓	↓
G00548	243.2	243.2	—	-	SB		
G00549	243.0	242.9	—	—	SB	↓	↓
G00550	243.6	243.7	—	-	SB	23-101	#2
G00551	243.8	243.9	—	-	SB	↓	↓
G00552	241.6	241.7	—	-	SB		
G00553	241.9	241.8	-	-	SB	↓	↓
G00554	244.4	244.2	—	-	SB	23-106	#3
G00555	243.5	243.6	-	-	SB	↓	↓
G00556	242.6	242.5	-	-	SB		
G00557	242.8	242.7	-	-	SB	↓	↓
G00558	243.5	243.4	—	-	SB	23-106	#4

Weight 1 Date/Time:
5/4 - 11:00
Weight 2 Date/Time:
5/5 - 8:00
Weight 3 Date/Time:
Weight 4 Date/Time:

Sample	Weight 1	Weight 2	Weigth 3	Weight 4	Initial	Project	Run
G00559	243.3	243.2	-	-	SB	23-106	#4
G00560	241.7	241.6	-	-	SB	↓	↓
G00561	242.3	242.1	-	-	SB	↓	↓
G00562	243.3	243.4	-	-	SB	23-106	#5
G00563	243.6	243.6	-	-	SB	↓	↓
G00564	244.2	244.0	-	-	SB		
G00565	243.4	243.6	-	-	SB	↓	↓
G00566	243.1	243.0	-	-	SB	23-106	#6
G00567	242.7	242.6	-	-	SB	↓	↓
G00568	243.1	244.1	-	-	SB	↓	↓
G00569	243.0	243.0	-	-	SB	↓	↓
G00570	242.7	242.6	-	-	SB	23-153	#1
G00571	242.1	242.2	-	-	SB	↓	↓
G00572	242.0	241.9	-	-	SB	↓	↓
G00573	241.6	241.8	-	-	SB	↓	↓
G00574	242.3	242.3	-	-	SB	23-153	#2
G00575	242.2	242.3	-	-	SB	↓	↓
G00576	241.9	242.0	-	-	SB	↓	↓

Weight 1 Date/Time:
6/5 17:45
Weight 2 Date/Time:
6/7 1045
Weight 3 Date/Time:
Weight 4 Date/Time:

ASTM E2515 - Probe Samples 11-20

Date:	5/31/23	6/1/23	6/2/23	6/3/23			
Time:	10:00	15:30	11:00	08:00			
	Weight 1	**Weight 2**	**Weigth 3**	**Weight 4**	**Initial**	**Project**	**Run**
11A	116864.4	116864.2	-	-	A	23-161	#8
11B	117338.8	117338.6	-	-	A		
11C	116184.9	116184.9	-	-	A		
12A	116704.7	116704.4	116704.9	116704.4	A	23-106	#1
12B	117770.7	117770.6	-	-	A		
12C	117170.7	117170.6	-	-	A		
13A	117313.8	117313.4	117313.9	117313.8	A	23-106	#2
13B	116941.0	116940.5	116941.2	116941.0	A		
13C	115649.5	115649.6	-	-	A		
14A	116632.5	11663*	116632.7	-	A	23-106	#3
14B	116618.2	-	116618.4	-	A		
14C	116529.9	-	116530.1	-	A		
15A	117238.7	-	117238.9	-	A	23-106	#4
15B	116751.6	-	116751.8	-	A		
15C	116846.7	-	116846.9	-	A		

Date:	6/5/23	6/7/23					
Time:	1800	1030					
	Weight 1	**Weight 2**	**Weigth 3**	**Weight 4**	**Initial**	**Project**	**Run**
16A	116378.0	116378.0	-	-	A	23-106	#5
16B	115860.5	115860.5	-	-	A		
16C	114147.1	114147.0	-	-	A		
17A	116810.6	116810.7	-	-	A	23-106	#6
17B	117140.0	117139.9	-	-	A		
17C	113141.1	113141.3	-	-	A		
18A	117499.1	117499.2	-	-	A	23-153	#1
18B	117331.1	117331.2	-	-	A		
18C	114334.7	114334.8	-	-	A		
19A	117026.3	117026.5	-	-	A	23-153	#2
19B	117013.2	117013.4	-	-	A		
19C	114231.4	114231.3	-	-	A		
20A	115626.3	115626.4	-	-	A	23-153	#3
20B	115965.9	115966.0	-	-	A		
20C	113775.2	113775.1	-	-	A		

ASTM E2515 - O-Ring Samples 11-20

Date:	5/30/23	5/31/23					
Time:	16:00	8:00					
	Weight 1	**Weight 2**	**Weigth 3**	**Weight 4**	**Initial**	**Project**	**Run**
11A	3423.5	3423.5	–	–	SB	23-161	#8
11B	4233.8	4233.9	–	–	SB		
11C	3588.5	3588.4	–	–	SB		
12A	3586.1	3586.2	–	–	SB	23-106	#1
12B	3550.5	3550.7	–	–	SB		
12C	3616.2	3616.3	–	–	SB		
13A	3595.7	3595.7	–	–	SB	23-106	#2
13B	3641.9	3641.9	–	–	SB		
13C	4408.9	4408.9	–	–	SB		
14A	3366.2	3366.4	–	–	SB	23-106	#3
14B	3341.2	3341.3	–	–	SB		
14C	3445.2	3445.2	–	–	SB		
15A	3569.5	3569.5	–	–	SB	23-106	#4
15B	3570.8	3570.9	–	–	SB		
15C	3396.5	3396.5	–	–	SB		

Date:	6/5/23	6/7/23					
Time:	1800	1030					
	Weight 1	**Weight 2**	**Weigth 3**	**Weight 4**	**Initial**	**Project**	**Run**
16A	3572.8	3572.7	-	-		23-106	#5
16B	3638.7	3638.6	-	-			
16C	3601.5	3601.3	-	-			
17A	3613.7	3613.5	-	-		23-106	#6
17B	3569.5	3569.5	-	-			
17C	3597.2	3597.0	-	-			
18A	3602.4	3602.6	-	-		23-153	#1
18B	3545.6	3545.8	-	-			
18C	3527.9	3528.1	-	-			
19A	3585.7	3585.5	-	-		23-153	#2
19B	3633.0	3633.1	-	-			
19C	3614.9	3615.0	-	-			
20A	3558.9	3559.1	-	-		23-153	#3
20B	3614.3	3614.5	-	-			
20C	3610.6	3610.8	-	-			

Pre-Conditioning Data

Client: IHP
Job #: 23-106
Model: S160AGL
Tracking #: 99
Date(s): 3/23/23 - 4/21/23
Technician: Matt Romanow

Elapsed Time (hrs)	Flue (°F)	Catalyst Exit (°F)	Notes: Indicate initial air setting and any changes in in setting during conditioning, as well as weight and average moisture content of all fuel additions.
0	241		+10.8lb, 24.3%DB, air medium
1	389		
2	182		
3	172		
4	162		+9.1lb, 19.2%DB, air medium
5	457		
6	214		
7	166		
8	243		+10.1lb, 22.5%DB, air medium
9	285		
10	199		
11	186		
12	221		+11.6lb, 21.1%DB, air medium
13	364		
14	202		
15	210		
16	206		+9.4lb, 21.1%DB, air medium
17	449		
18	221		
19	187		
20	190		+10.3lb, 24.8%DB, air medium
21	376		
22	198		
23	163		
24	245		+10.5lb, 20.2%DB, air medium
25	419		
26	259		
27	204		
28	230		+11.0lb, 20.9%DB, air medium
29	462		
30	238		
31	186		
32	203		+10.2lb, 20.2%DB, air medium
33	388		
34	201		
35	167		
36	201		+10.4lb, 20.8%DB, air medium
37	325		
38	209		
39	174		
40	167		+10.4lb, 21.2%DB, air medium
41	332		
42	224		
43	190		
44	193		+10.5lb, 19.0%DB, air medium
45	404		
46	213		
47	173		
48	221		+10.6lb, 19.1%DB, air medium
49	374		
50	221		

Signature/Date:  6/30/2023

Sample Calculations – ASTM E2780 & E2515

Client: IHP
Model: S160
Run: 5

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

M_{Sdb} – Weight of test fuel spacers, dry basis, kg

M_{Cdb}– Weight of test fuel crib, excluding nails and spacers, dry basis, kg

D_{Cdb} - Density of fuel crib, excluding spacers and nails, dry basis, lbs/ft^3

M_{FTAdb} - Total weight of fuel crib excluding nails, dry basis, kg

BR – Dry burn rate, kg/hr

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

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

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

m_n – Total particulate matter collected, mg

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

E_T – Total particulate emissions, g

PR - Proportional rate variation

PM_R – Particulate emissions for test run, g/hr

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

M_{Sdb} – Weight of test fuel spacers, dry basis, kg
ASTM E2780 equation (1)

$$M_{Sdb} = (M_{Swb})(100/(100 + FM_S))$$

Where,

FM_S = average fuel moisture of test fuel spacers, % dry basis

M_{Swb} = weight of test fuel spacers, wet basis, kg

Sample Calculation:

FM_S = 11.5 %

M_{Swb} = 1.3 lbs

0.4536 = Conversion factor from lbs to kg

M_{Sdb} = [(1.3 x 0.4536) (100/(100 + 11.5)

M_{Sdb} = **0.51** kg

M_{Cdb}– Weight of test fuel crib, excluding nails and spacers, dry basis, kg
ASTM E2780 equation (2)

$$M_{Cdb} = \Sigma[(M_{CPnwb})(100/(100 + FM_{CPn}))]$$

Where,

M_{CPnwb} = weight of each test fuel piece n in fuel crib, excluding nails and spacers, wet basis, kg

FM_{CPn} = Average fuel moisture of test fuel n in fuel crib, % dry basis

Sample Calculation (test fuel piece 1):

MC_{Pnwb} = 1.78

FM_{CPn} = 19.8

= 1.8 (100/(100+ 19.8)

= 1.5 lbs

Total dry crib weight, excluding spacers = 8.53 lbs

M_{Cdb} = **3.87** kg

D_{Cdb} - Density of fuel crib, excluding spacers and nails, dry basis, lbs/ft^3
ASTM E2780 equation (3)

$$D_{Cdb} = M_{Cdb}/V_C$$

Where,

V_C = Volume of fuel crib, ft^3

Sample calculation:

V_C = 525 in^3

1728 = conversion from in^3 to ft^3

D_{Cdb} = 8.53 / 525 * 1728

= **28.09** lbs/ft^3

M_{FTAdb} - Total weight of fuel crib excluding nails, dry basis, kg
ASTM E2780 equation (4)

$$M_{FTAdb} = M_{Sdb} + M_{Cdb}$$

Sample calculation:

$$M_{FTAdb} = 0.51 + 3.87$$

$$= \mathbf{4.38} \text{ kg}$$

BR – dry burn rate, kg/hr
ASTM E2780 equation (5)

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

Where,

θ = Total length of test run, min

Sample Calculation:

M_{Bdb} = 4.38 kg
θ = 150 min

$$BR = \frac{60 \times 4.38}{150}$$

BR = **1.75** kg/hr

V_s – Average gas velocity in the dilution tunnel, ft/sec
ASTM E2515 equations (9)

$$v_s = F_P \times k_p \times C_p \times (\sqrt{\Delta P})_{avg} \times \sqrt{\frac{T_{s(avg)}}{P_s \times M_s}}$$

Where:

F_p	=	Adjustment factor for 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:

$$Fp = \frac{9.07}{10.54} = 0.861$$

$$V_s = 0.861 \times 85.49 \times 0.99 \times 0.153 \times \left(\frac{93.2 + 460}{\left(29.89 + \frac{-0.13}{13.6}\right) \times 28.78} \right)^{1/2}$$

V_s = **8.96** 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:

$$Q_{sd} = 3600 \times (1 - 0.02) \times 8.96 \times 0.7854 \times \frac{528}{93.2 + 460} \times \frac{29.89 + \frac{-0.13}{13.6}}{29.92}$$

Q_{sd} = **23655.5** dscf/hr

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

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

Where:

K_1	=	17.64 °R/in. Hg
V_m	=	Volume of gas sample measured at the dry gas meter, dcf
Y	=	Dry gas meter calibration factor, dimensionless
P_{bar}	=	Barometric pressure at the testing site, in. Hg
ΔH	=	Average pressure differential across the orifice meter, in. H_2O
T_m	=	Absolute average dry gas meter temperature, °R

Sample Calculation:

Using equation for Train A:

$$V_{m(std)} = 17.64 \times 22.836 \times 1.01 \times \frac{\left(29.89 + \frac{2.28}{13.6}\right)}{(88.3 + 460)}$$

$V_{m(std)}$ = **22.298** dscf

Using equation for Train B:

$$V_{m(std)} = 17.64 \times 21.733 \times 1.001 \times \frac{\left(29.89 + \frac{2.10}{13.6}\right)}{(87.6 + 460)}$$

$V_{m(std)}$ = **21.052** dscf

Using equation for ambient train:

$$V_{m(std)} = 17.64 \times 20.16 \times 1.024 \times \frac{\left(29.885 + \frac{0.00}{13.6}\right)}{(69.3 + 460)}$$

$V_{m(std)}$ = **20.557** 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:

m_n = 0.0 + 1.4 + 0.3

m_n = **1.7** mg

Using equation for Train B:

m_n = 0 + 1.6 + 0

m_n = **1.6** 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 A:

$$C_s = 0.001 \times \frac{1.7}{22.30}$$

C_s = **0.00008** g/dscf

For Train B

$$C_s = 0.001 \times \frac{1.6}{21.05}$$

C_s = **0.00008** g/dscf

For Ambient Train

$$C_r = 0.001 \times \frac{0.0}{20.56}$$

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 A

E_T = (0.000076 - 0.000000) x 23655.5 x 150 /60

E_T = **4.51** g

For Train B

E_T = (0.000076 - 0.000000) x 23655.5 x 150 /60

E_T = **4.49** g

Average

E = **4.50** g

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 10-min interval of Train 1):

$$PR = \left(\frac{150 \times 1.412 \times 8.96 \times (98.9 + 460) \times (88.3 + 460)}{10 \times 22.836 \times 8.91 \times (93.2 + 460) \times (73.2 + 460)} \right) \times 100$$

PR = **97** %

PM_R – Particulate emissions for test run, g/hr
ASTM E2780 equation (6)

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

Where,

E_T = Total particulate emissions, grams

θ = Total length of full integrated test run, min

Sample Calculation:

E_T (Dual train average) = 4.50 g

θ = 150 min

$PM_R = 60 \times (4.50 / 150)$

PM_R = **1.80** g/hr

PM_F – Particulate emission factor for test run, g/dry kg of fuel burned
ASTM E2780 equation (7)

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

Sample Calculation:

E_T (Dual train average) = 4.50 g

M_{Bdb} = 4.38 kg

PM_F = 4.50 / 4.38

PM_F = **1.03** g/kg

Stack Loss Efficiency and CO emissions calculations are done in accordance with CSA B415.1, using the password protected excel spreadsheet provided with the test standard. No alterations or alternative calculations are used for determining efficiency or CO emissions. The following pages are a sample of the calculations page from the B415.1 Spreadsheet (V2_4 - Dated April 15, 2010).

Manufacturer:	IHP
Model:	S160
Date:	06/09/23
Run:	5
Control #:	23-106
Test Duration:	**150** min

Note: In the “Input data”, "Calc. % O_2", "Fuel Properties", and “Mass Balance” columns, [e], [d], [g], [a]. [b], [c], [h], [u], [w], [j], and [k] refer to their respective variables in Clauses 13.7.3 to 13.7.5.

	HHV	LHV
Eff	**68.78%**	**74.34%**
Comb Eff	**95.70%**	**95.70%**
HT Eff	**71.88%**	**77.68%**
Output	**23,700**	**kJ/h**
Burn Rate	**1.74**	**kg/h**
Grams CO	**270**	**g**
Input	**34,456**	**kJ/h**
MC wet	**16.59**	

	Ultimate CO_2
$CO_{2\text{-ult}}$	19.64
	F_0
	1.061

Overall Heating Efficiency:	68.78%	Air Fue		
Combustion Efficiency:	95.70%	Dry Molecular W		
Heat Transfer Efficiency:	71.88%	Dry Moles Exhaus		
		Air Fuel Ratio		
Heat Output:	22,482	Btu/h	23,700	kJ/h
Heat Input:	32,685	Btu/h	34,456	kJ/h
Burn Duration:	2.50	h		
Burn Rate:	3.83	lb/h	1.739	kg/h
Stack Temp:	429.1	Deg. F	220.6	Deg. C

Averages	**0.76**	**8.04**	**1.55**	**20.36**	**11.94**	**220.34**	**20.72**	**91.0%**	**71.8%**	**65.3%**	**15.03**	**1.43**
INPUT DATA			**Oxygen Calculation**			**Input Data**		**Combust Eff**	**Heat Transfer**	**Net Eff**	**Air Fuel**	**Wet Wt Now**
Elapsed Time	**Weight Remaining (kg)**	**% CO [e]**	**% CO_2 [d]**	**Excess Air EA**	**Total O_2**	**Calc. % O_2 [g]**	**Flue Gas (°C)**	**Room Temp (°C)**	**%**	**%**	**%**	**Ratio**	**Wt**
0	5.21	1.11	5.99	176.6%	20.47	13.92	176.0	19.6	87.5%	72.3%	63.3%	16.2	5.21
1	5.13	0.57	4.62	278.9%	20.60	15.70	142.3	19.6	91.7%	72.6%	66.6%	22.5	5.13
2	5.10	0.67	2.33	553.2%	20.74	18.07	187.4	19.7	83.1%	46.9%	39.0%	38.2	5.10
3	5.00	0.75	6.95	154.9%	20.43	13.10	271.1	19.8	92.3%	65.3%	60.3%	15.1	5.00
4	4.89	0.49	9.27	101.4%	20.30	10.78	330.1	19.9	96.1%	66.1%	63.5%	12.1	4.89
5	4.78	0.35	10.47	81.6%	20.23	9.58	358.4	20.0	97.5%	66.4%	64.8%	10.9	4.78
6	4.70	0.23	12.94	49.2%	20.07	7.02	316.3	19.9	98.7%	72.7%	71.8%	9.0	4.70
7	4.64	0.55	9.48	95.9%	20.28	10.53	282.4	19.8	95.7%	70.2%	67.1%	11.7	4.64
8	4.58	0.60	8.79	109.0%	20.32	11.22	275.9	19.8	94.9%	69.4%	65.9%	12.5	4.58
9	4.51	0.44	9.11	105.8%	20.31	10.98	276.5	19.8	96.5%	70.0%	67.5%	12.3	4.51
10	4.45	0.46	9.07	106.1%	20.31	11.01	273.8	20.0	96.2%	70.1%	67.5%	12.4	4.45
11	4.39	0.53	8.67	113.6%	20.33	11.40	270.8	20.1	95.5%	69.6%	66.5%	12.8	4.39
12	4.33	0.58	8.41	118.5%	20.35	11.65	269.6	19.9	94.9%	69.2%	65.6%	13.0	4.33
13	4.26	0.64	8.73	109.7%	20.32	11.28	272.2	20.1	94.6%	69.6%	65.8%	12.5	4.26
14	4.19	0.54	10.03	85.9%	20.24	9.95	281.9	20.2	96.0%	71.2%	68.3%	11.1	4.19
15	4.12	0.38	11.17	70.2%	20.18	8.82	290.7	20.4	97.5%	72.2%	70.4%	10.2	4.12
16	4.03	0.19	11.85	63.1%	20.14	8.20	298.2	20.7	98.8%	72.7%	71.8%	9.9	4.03
17	3.96	0.13	12.11	60.4%	20.13	7.95	302.0	20.7	99.3%	72.8%	72.2%	9.7	3.96
18	3.88	0.10	12.26	58.9%	20.12	7.81	305.7	20.7	99.5%	72.7%	72.3%	9.6	3.88
19	3.80	0.06	12.78	53.0%	20.09	7.28	313.2	20.6	99.8%	72.8%	72.6%	9.3	3.80
20	3.71	0.11	14.06	38.6%	20.00	5.89	324.9	20.5	99.5%	73.4%	73.0%	8.4	3.71
21	3.63	0.18	14.63	32.6%	19.96	5.24	333.7	20.6	99.0%	73.4%	72.7%	8.0	3.63
22	3.53	0.20	15.03	29.0%	19.93	4.80	340.4	20.4	99.0%	73.4%	72.7%	7.8	3.53
23	3.43	0.21	15.33	26.4%	19.91	4.47	345.1	20.6	98.9%	73.4%	72.6%	7.7	3.43
24	3.34	0.20	15.62	24.2%	19.90	4.18	350.3	20.7	99.0%	73.4%	72.7%	7.5	3.34
25	3.25	0.26	16.02	20.7%	19.87	3.72	355.1	20.8	98.7%	73.5%	72.5%	7.3	3.25
26	3.16	0.37	16.25	18.2%	19.84	3.41	357.0	20.7	98.2%	73.5%	72.2%	7.1	3.16
27	3.06	0.42	16.14	18.6%	19.85	3.50	358.6	20.9	97.9%	73.4%	71.8%	7.2	3.06
28	2.97	0.31	16.25	18.6%	19.85	3.45	360.6	20.8	98.5%	73.4%	72.2%	7.2	2.97
29	2.88	0.35	16.26	18.3%	19.84	3.41	359.0	20.9	98.3%	73.4%	72.2%	7.2	2.88
30	2.79	0.27	16.13	19.8%	19.86	3.59	355.7	21.0	98.7%	73.5%	72.6%	7.2	2.79
31	2.71	0.22	16.07	20.6%	19.86	3.68	352.4	21.1	98.9%	73.7%	72.9%	7.3	2.71
32	2.63	0.20	15.76	23.1%	19.89	4.03	348.4	21.2	99.0%	73.6%	72.9%	7.5	2.63
33	2.55	0.17	15.62	24.4%	19.90	4.19	345.8	21.2	99.2%	73.7%	73.1%	7.5	2.55
34	2.47	0.17	15.53	25.2%	19.90	4.29	341.5	21.2	99.2%	73.8%	73.2%	7.6	2.47
35	2.39	0.17	15.22	27.7%	19.92	4.62	335.7	21.2	99.2%	73.9%	73.2%	7.7	2.39
36	2.31	0.17	14.84	30.9%	19.95	5.03	331.3	21.1	99.1%	73.8%	73.1%	7.9	2.31
37	2.24	0.15	14.67	32.5%	19.96	5.21	328.1	21.0	99.3%	73.8%	73.3%	8.0	2.24

el Ratio (A/F)	
Weight (M_d)	29.76
st Gas (N_t):	482.96
o (A/F)	13.86

%HC 0.88

Combustion Efficiency: 95.70%
Total Input (kJ): 86,140 81,699 (Btu)
Total Output (kJ): 59,250 56,196 (Btu)
Efficiency: 68.78%
Total CO (g): 269.73

Moisture of Wood (wet basis): 16.5914
Initial Dry Weight Wt_{do} (kg): 4.35
Moisture Content Dry 19.89

Load Weight (kg): **5.21**

Fuel Heating	**HHV**	**LHV**		**HHV**
Value in kj/kg - CV:	**19,810**	**18,329**	Btu/lb	**8522.5**

72.58	1.24	71.58	86268	4.06	6.87	2.74	19810.00	16.59	79.26	21.02	2.19	7.34	0.09	0.22	35.68
% Wet Consumed	Dry Wt. Now	% Dry Comsumed	Total	Fuel Properties: Carbon	Hydrogen	Oxygen	Calorific	Mw Moisture	Mass Balance (moles/100 mole dry flue gas)					kg Wood per 100 mole dfp	
x	Wt_{dn}	y	Input	/12= [a]	/1= [b]	/16= [c]	Value	Fuel Burnt	[h]	[u]	[w]	[j]	[k]	Nk	CO_2
0.00	4.35	0.00	0	4.06	6.87	2.74	19810.00	16.59	78.97	20.95	1.78	5.85	0.14	0.18	33.78
1.65	4.28	1.65	1687	4.06	6.87	2.74	19810.00	16.59	79.12	20.99	1.29	4.32	0.06	0.13	35.96
2.26	4.25	2.26	1012	4.06	6.87	2.74	19810.00	16.59	78.92	20.93	0.76	2.46	0.07	0.08	30.95
4.00	4.17	4.00	1687	4.06	6.87	2.74	19810.00	16.59	79.19	21.01	1.92	6.42	0.09	0.19	36.41
6.18	4.08	6.18	1837	4.06	6.87	2.74	19810.00	16.59	79.46	21.08	2.42	8.19	0.05	0.24	38.56
8.27	3.99	8.27	1612	4.06	6.87	2.74	19810.00	16.59	79.60	21.11	2.67	9.11	0.04	0.27	39.37
9.92	3.92	9.92	1200	4.06	6.87	2.74	19810.00	16.59	79.81	21.17	3.25	11.11	0.02	0.32	40.03
11.05	3.87	11.05	975	4.06	6.87	2.74	19810.00	16.59	79.45	21.07	2.48	8.41	0.06	0.25	38.33
12.18	3.82	12.18	1050	4.06	6.87	2.74	19810.00	16.59	79.38	21.06	2.33	7.87	0.07	0.23	37.91
13.49	3.76	13.49	1050	4.06	6.87	2.74	19810.00	16.59	79.47	21.08	2.36	8.02	0.05	0.24	38.77
14.62	3.71	14.62	975	4.06	6.87	2.74	19810.00	16.59	79.46	21.08	2.36	8.00	0.05	0.23	38.63
15.75	3.66	15.75	1012	4.06	6.87	2.74	19810.00	16.59	79.40	21.06	2.28	7.71	0.06	0.23	38.23
16.97	3.61	16.97	1087	4.06	6.87	2.74	19810.00	16.59	79.36	21.05	2.23	7.53	0.07	0.22	37.89
18.28	3.55	18.28	1125	4.06	6.87	2.74	19810.00	16.59	79.36	21.05	2.32	7.84	0.08	0.23	37.73
19.58	3.50	19.58	1200	4.06	6.87	2.74	19810.00	16.59	79.49	21.08	2.62	8.87	0.06	0.26	38.51
21.06	3.43	21.06	1312	4.06	6.87	2.74	19810.00	16.59	79.63	21.12	2.85	9.72	0.04	0.28	39.35
22.63	3.36	22.63	1274	4.06	6.87	2.74	19810.00	16.59	79.76	21.16	2.97	10.17	0.01	0.30	40.11
24.02	3.30	24.02	1274	4.06	6.87	2.74	19810.00	16.59	79.80	21.17	3.02	10.35	0.01	0.30	40.36
25.59	3.24	25.59	1312	4.06	6.87	2.74	19810.00	16.59	79.82	21.17	3.04	10.45	0.00	0.30	40.46
27.07	3.17	27.07	1387	4.06	6.87	2.74	19810.00	16.59	79.88	21.19	3.16	10.86	0.00	0.31	40.62
28.81	3.10	28.81	1462	4.06	6.87	2.74	19810.00	16.59	79.94	21.20	3.49	11.98	0.01	0.35	40.47
30.46	3.02	30.46	1499	4.06	6.87	2.74	19810.00	16.59	79.95	21.21	3.65	12.51	0.02	0.36	40.26
32.29	2.94	32.29	1574	4.06	6.87	2.74	19810.00	16.59	79.97	21.21	3.76	12.86	0.02	0.37	40.22
34.12	2.86	34.12	1537	4.06	6.87	2.74	19810.00	16.59	79.98	21.22	3.83	13.12	0.02	0.38	40.20
35.86	2.79	35.86	1499	4.06	6.87	2.74	19810.00	16.59	80.01	21.22	3.90	13.35	0.02	0.39	40.25
37.60	2.71	37.60	1537	4.06	6.87	2.74	19810.00	16.59	80.00	21.22	4.02	13.73	0.03	0.40	40.08
39.43	2.63	39.43	1574	4.06	6.87	2.74	19810.00	16.59	79.97	21.21	4.10	14.00	0.05	0.41	39.79
41.25	2.55	41.25	1537	4.06	6.87	2.74	19810.00	16.59	79.95	21.21	4.09	13.94	0.06	0.41	39.66
42.99	2.48	42.99	1499	4.06	6.87	2.74	19810.00	16.59	80.00	21.22	4.09	13.96	0.04	0.41	39.96
44.73	2.40	44.73	1499	4.06	6.87	2.74	19810.00	16.59	79.98	21.22	4.10	13.99	0.05	0.41	39.85
46.48	2.33	46.48	1387	4.06	6.87	2.74	19810.00	16.59	80.01	21.22	4.05	13.83	0.03	0.40	40.06
47.95	2.26	47.95	1312	4.06	6.87	2.74	19810.00	16.59	80.03	21.23	4.02	13.75	0.03	0.40	40.20
49.52	2.19	49.52	1312	4.06	6.87	2.74	19810.00	16.59	80.01	21.22	3.94	13.47	0.02	0.39	40.25
51.00	2.13	51.00	1312	4.06	6.87	2.74	19810.00	16.59	80.02	21.22	3.89	13.33	0.02	0.39	40.33
52.57	2.06	52.57	1349	4.06	6.87	2.74	19810.00	16.59	80.01	21.22	3.87	13.25	0.02	0.38	40.34
54.13	1.99	54.13	1312	4.06	6.87	2.74	19810.00	16.59	79.99	21.22	3.79	13.00	0.02	0.38	40.32
55.61	1.93	55.61	1237	4.06	6.87	2.74	19810.00	16.59	79.97	21.21	3.70	12.67	0.02	0.37	40.31
57.01	1.87	57.01	1200	4.06	6.87	2.74	19810.00	16.59	79.96	21.21	3.65	12.52	0.01	0.36	40.37

Moisture Content M_{Cwb}: 16.59137

Dry kg : 4.35
CA: 49
HY: 7
OX: 43.9

LHV
7885.2

68.39	4.58	0.56	411.95	33.41	11.05	493.49	8253.25	6077.53	5877.11	5818.86	8237.65	7022.46	293.87	46207.89	51117.14
Moles per kg of Dry Wood					Moisture	Stack Temp	Heat Content Change - Ambient to Stack Temperature Flue Gas Constituent						Room Temp		
O_2	CO	HC	N_2	H_2O	Present	K	CO_2	O_2	CO	N_2	CH_4	H_2O	K	CO_2	O_2
78.47	6.25	0.78	445.11	32.95	11.05	449.15	6304.23	4712.16	4574.31	4525.27	6139.34	5471.38	292.71	212.94	369.78
122.23	4.41	0.45	616.08	33.63	11.05	415.43	4885.32	3677.81	3576.71	3537.00	4700.11	4280.21	292.71	175.67	449.53
239.76	8.94	0.92	1047.07	32.69	11.05	460.59	6786.92	5060.62	4909.52	4857.53	6636.44	5871.35	292.87	210.07	1213.33
68.60	3.94	0.46	414.66	33.60	11.05	544.26	10475.38	7678.07	7415.87	7344.28	10533.96	8858.24	292.93	381.42	526.70
44.87	2.03	0.22	330.62	34.08	11.05	603.26	13193.61	9557.97	9203.20	9120.36	13513.64	10984.12	293.09	508.78	428.89
36.05	1.31	0.13	299.38	34.26	11.05	631.59	14535.78	10472.60	10069.16	9981.64	15014.70	12012.92	293.15	572.28	377.49
21.71	0.71	0.07	246.94	34.39	11.05	589.48	12550.44	9116.66	8784.56	8704.15	12800.95	10486.48	293.04	502.42	197.91
42.58	2.23	0.26	321.37	34.01	11.05	555.54	10986.26	8034.29	7755.33	7681.44	11087.62	9262.25	292.98	421.07	342.14
48.38	2.60	0.30	342.17	33.92	11.05	549.04	10690.15	7827.90	7558.67	7486.11	10766.53	9028.20	292.98	405.23	378.71
46.72	1.85	0.19	338.12	34.13	11.05	549.65	10720.05	7848.92	7578.75	7506.04	10798.55	9052.11	292.93	415.58	366.66
46.92	1.97	0.21	338.55	34.10	11.05	546.98	10590.42	7757.81	7491.73	7419.65	10659.66	8948.48	293.15	409.08	364.03
50.29	2.32	0.26	350.21	34.01	11.05	543.98	10452.23	7661.10	7399.48	7328.05	10510.67	8838.66	293.21	399.59	385.24
52.48	2.62	0.30	357.62	33.93	11.05	542.71	10398.57	7623.90	7364.09	7292.88	10452.07	8796.55	293.09	394.02	400.10
48.74	2.76	0.32	343.06	33.87	11.05	545.37	10513.08	7703.47	7439.84	7368.14	10576.75	8886.69	293.26	396.61	375.47
38.19	2.07	0.24	305.23	34.04	11.05	555.04	10948.65	8006.96	7728.99	7655.34	11049.27	9230.81	293.37	421.60	305.78
31.10	1.32	0.14	280.63	34.24	11.05	563.82	11344.01	8281.34	7990.11	7914.76	11480.58	9541.47	293.54	446.37	257.52
27.76	0.65	0.05	270.01	34.42	11.05	571.37	11680.99	8514.11	8211.35	8134.62	11850.59	9804.59	293.82	468.55	236.35
26.49	0.43	0.02	265.87	34.48	11.05	575.15	11853.28	8633.15	8324.49	8247.06	12039.71	9939.15	293.87	478.38	228.73
25.79	0.34	0.01	263.48	34.51	11.05	578.87	12025.52	8752.16	8437.62	8359.48	12228.74	10073.70	293.87	486.60	225.72
23.16	0.20	-0.01	253.96	34.54	11.05	586.32	12375.43	8993.85	8667.31	8587.75	12613.00	10346.88	293.76	502.69	208.31
16.97	0.32	0.02	230.16	34.48	11.05	598.09	12929.85	9375.32	9029.48	8947.75	13225.02	10777.48	293.65	523.27	159.06
14.41	0.51	0.05	219.93	34.42	11.05	606.82	13337.77	9654.58	9294.22	9210.98	13678.45	11092.11	293.71	536.92	139.08
12.86	0.54	0.06	213.98	34.41	11.05	613.54	13659.53	9874.80	9502.98	9418.56	14036.20	11340.22	293.59	549.34	126.97
11.73	0.55	0.06	209.68	34.40	11.05	618.26	13879.14	10024.17	9644.33	9559.17	14282.41	11508.12	293.71	557.95	117.59
10.77	0.51	0.06	206.17	34.41	11.05	623.48	14121.09	10188.31	9799.53	9713.57	14554.62	11692.45	293.87	568.39	109.68
9.31	0.65	0.08	200.22	34.36	11.05	628.26	14346.82	10341.55	9944.45	9857.75	14808.39	11864.57	293.93	575.05	96.26
8.36	0.91	0.12	195.87	34.29	11.05	630.15	14439.20	10404.47	10004.02	9916.99	14911.77	11935.33	293.87	574.50	86.97
8.59	1.02	0.14	196.40	34.25	11.05	631.71	14507.27	10450.06	10046.96	9959.75	14989.65	11986.28	294.04	575.29	89.77
8.47	0.76	0.10	196.74	34.33	11.05	633.76	14607.83	10518.45	10111.68	10024.13	15102.39	12063.15	293.98	583.66	89.12
8.37	0.85	0.11	196.08	34.30	11.05	632.15	14528.55	10464.49	10060.61	9973.33	15013.58	12002.48	294.04	578.98	87.59
8.92	0.67	0.08	198.68	34.36	11.05	628.87	14367.56	10354.83	9956.80	9870.08	14833.42	11879.16	294.15	575.50	92.35
9.21	0.55	0.07	200.16	34.39	11.05	625.54	14206.35	10245.11	9852.95	9766.78	14652.83	11755.80	294.21	571.09	94.37
10.29	0.51	0.06	204.36	34.41	11.05	621.54	14011.62	10112.26	9727.14	9641.65	14435.39	11606.31	294.32	563.96	104.04
10.83	0.44	0.05	206.61	34.43	11.05	618.98	13888.05	10027.92	9647.25	9562.20	14297.48	11511.38	294.37	560.06	108.61
11.16	0.43	0.04	207.88	34.43	11.05	614.65	13682.53	9887.81	9514.58	9430.25	14067.76	11353.76	294.37	551.94	110.32
12.24	0.45	0.05	211.92	34.43	11.05	608.82	13408.84	9701.10	9337.75	9254.39	13762.12	11143.66	294.32	540.59	118.76
13.66	0.46	0.05	217.26	34.43	11.05	604.48	13206.72	9563.02	9206.93	9124.29	13536.81	10988.20	294.26	532.30	130.67
14.35	0.41	0.04	220.00	34.45	11.05	601.26	13059.43	9462.51	9111.73	9029.61	13372.39	10875.09	294.15	527.20	135.75

SUMS					AVERAGE	SUMS						
198650.62	323273.57	75396.58	257553.44	85089.61	6869.46	26884.14	3699.54	23184.59	59384.32	3705.25	269.73	17.50
Energy Losses (kJ/kg of Dry Fuel)					Total							
Flue Gas Constituent					Loss	Total	Chemical	Sensible and	Total	Chem	Grams Produced	
CO	N_2	CH_4	H_2O Comb	H_2O Fuel MC	Rate	Loss	Loss 1	Latent Loss	Output	Loss 2	CO	HC
1797.11	2014.23	703.47	1629.20	546.37	7273.10	0.00	0	0.00	0	0	0.00	0.00
1263.00	2179.09	398.93	1622.67	533.20	6622.09	563.87	140	423.88	1123	140	10.51	0.61
2574.46	5086.19	823.02	1629.14	550.79	12087.00	617.52	171	446.50	395	171	12.79	0.75
1143.48	3045.35	417.56	1774.75	583.79	7873.06	670.39	130	540.37	1016	130	9.39	0.63
592.09	3015.42	201.68	1872.60	607.29	7226.74	670.05	72	598.46	1167	72	5.26	0.33
383.57	2988.31	120.20	1917.77	618.66	6978.29	567.79	40	528.03	1044	40	2.98	0.17
207.63	2149.39	62.13	1872.45	601.79	5593.71	338.70	16	322.80	861	16	1.21	0.07
648.03	2468.57	231.06	1810.39	588.26	6509.52	320.25	42	277.99	654	42	3.07	0.20
756.48	2561.50	271.79	1797.63	585.67	6757.01	358.00	53	304.73	692	53	3.86	0.26
537.76	2537.93	175.34	1809.79	585.94	6429.01	340.62	37	303.69	709	37	2.75	0.16
573.04	2511.90	191.03	1804.41	584.79	6438.28	316.75	37	280.00	658	37	2.72	0.17
674.97	2566.35	232.29	1795.82	583.58	6637.84	339.13	45	293.79	673	45	3.32	0.21
761.48	2608.06	268.25	1790.17	583.11	6805.20	373.43	55	318.15	714	55	4.03	0.26
802.27	2527.71	292.06	1790.44	584.11	6768.67	384.23	61	323.47	740	61	4.39	0.29
600.60	2336.65	216.02	1811.09	587.91	6279.64	380.24	48	331.92	819	48	3.50	0.23
384.53	2221.10	128.57	1832.06	591.34	5861.50	388.19	33	355.02	924	33	2.45	0.15
189.28	2196.41	45.18	1851.02	594.25	5581.03	359.06	15	344.35	915	15	1.17	0.05
126.17	2192.66	18.50	1858.84	595.74	5499.03	353.78	9	344.72	921	9	0.78	0.02
99.08	2202.59	7.28	1864.82	597.23	5483.32	363.15	7	356.30	949	7	0.63	0.01
58.42	2180.94	-7.28	1876.00	600.25	5419.33	379.42	3	375.95	1008	3	0.39	-0.01
94.17	2059.44	17.81	1887.83	605.00	5346.58	394.56	8	386.53	1067	8	0.67	0.02
147.95	2025.80	45.74	1895.28	608.48	5399.26	408.66	14	394.41	1091	14	1.07	0.06
157.32	2015.41	52.19	1903.03	611.22	5415.48	430.38	16	414.20	1144	16	1.20	0.07
161.11	2004.40	55.51	1908.41	613.08	5418.05	420.34	16	404.01	1117	16	1.20	0.08
147.88	2002.62	50.94	1915.31	615.12	5409.94	409.47	15	394.86	1090	15	1.07	0.07
190.61	1973.73	72.28	1918.60	617.02	5443.54	422.31	20	402.51	1115	20	1.41	0.10
265.52	1942.43	107.38	1916.70	617.80	5511.30	438.00	29	409.22	1136	29	2.02	0.15
299.48	1956.07	122.33	1916.60	618.36	5577.90	432.74	32	400.97	1104	32	2.22	0.17
222.73	1972.11	87.94	1923.49	619.21	5498.26	416.15	23	393.33	1083	23	1.61	0.12
249.29	1955.53	100.05	1919.91	618.54	5509.89	417.03	26	391.37	1082	26	1.80	0.13
197.15	1961.01	75.79	1918.67	617.18	5437.66	380.70	19	362.15	1006	19	1.32	0.09
160.41	1954.95	58.84	1916.52	615.82	5371.99	355.77	14	341.67	956	14	1.02	0.07
148.03	1970.39	51.71	1912.25	614.16	5364.55	355.28	13	342.43	957	13	0.94	0.06
128.46	1975.66	42.11	1910.16	613.11	5338.17	353.53	11	342.56	958	11	0.81	0.05
125.39	1960.32	40.27	1904.96	611.37	5304.57	361.34	11	350.38	988	11	0.82	0.05
131.66	1961.14	41.54	1897.57	609.05	5300.31	351.03	11	339.88	961	11	0.84	0.05
134.96	1982.33	40.98	1892.28	607.33	5320.85	332.25	11	321.57	905	11	0.81	0.05
118.94	1986.53	32.77	1889.38	606.08	5296.66	320.72	9	311.78	879	9	0.69	0.04

CONTACT YOUR LOCAL BUILDING OR FIRE OFFICIALS ABOUT RESTRICTIONS AND INSTALLATION INSPECTION IN YOUR AREA
COMMUNIQUEZ AVEC LES AUTORITÉS LOCALES EN BÂTIMENT OU LE SERVICE DE PRÉVENTION DES INCENDIES POUR CONNAÎTRE LES NORMES D'INSTALLATION ET D'INSPECTION DE VOTRE RÉGION

Listed Factory-built or Masonry Fireplace Accessory/Insert / Poêle encastrable certifié pour installation dans un foyer de maçonnerie ou préfabriqué

IRONSTRIKE® HEAT FOR LIFE

Manufactured By / Fabriqué Par:
INNOVATIVE HEARTH PRODUCTS
1502 14th Street NW
Auburn, WA 98001 USA

PFS® C US

"PREVENT HOUSE FIRES"
Install and use only in accordance with manufacturer's installation instructions and your local building codes. Do not connect this unit to a chimney flue serving another appliance.

Optional Blower, Part No.s: H7907 (black), H7909 (nickel), H7910 (brushed nickel)
Blower Electrical Rating: 120V, 60 Hz, 1 Amp
Do not route power cord under or in front of appliance.

Report No./Numéro de Rapport: 23-106

Serial No.
Numéro de série C160GL-

Model / Modèle: C160TGL ☐
C160AGL ☐

Tested to/Testé selon: UL 1482, ULC S628
Type Of Fuel: Solid Wood Only

"PREVENTION DES INCENDIES"
Installer et utiliser l'appareil en conformité avec les directives d'installation du fabricant et des autorités locales en bâtiment ou le service de prévention des incendies. Ne pas brancher cette unité à un conduit de fumée raccordé à un autre appareil.

Ventilateur Optionnel, No. De Pièces: H7907 (noir), H7909 (plaqué nickel), H7910 (plaqué nickel, fini brossé)
Spécification Électrique Du Ventilateur: 120V, 60 Hz, 1 Amp

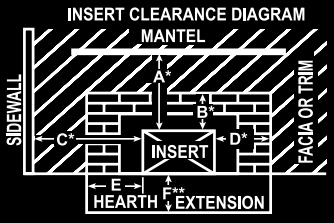
Ne pas faire passer le fil électrique sous ou en avant de l'appareil

Type de combustible: Bois seulement

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.
Certified to comply with 2020 particulate emission standards using crib wood. - Emissions: 1.7 grams/hr

Cet appareil de chauffage au bois doit être inspecté et entretenu périodiquement pour fonctionner correctement. Voir le manuel du propriétaire pour plus d'information. L'utilisation de cet appareil de chauffage au bois de manière incompatible avec les instructions du manuel du propriétaire constitue une infraction aux régulations fédérales.
Valeur d'émission du test d'homologation 1,7 g/h selon la norme 2020

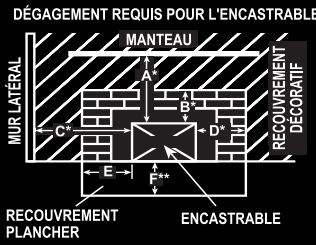
Minimum Clearance to Combustible Materials - Inches (millimeters)



(A) Clearance from Insert top to Mantel = USA-24", CAN-26" (660mm). Maximum mantel depth = 9"
(B) Clearance from insert top to combustible = USA -15" CAN-18" (450mm)
(C) Minimum clearance to combustible sidewall = 20" (508mm)
(D) Minimum clearance to combustible side trim = 12" (305mm)
(E) Minimum distance of floor protection to the side = 8" (200mm). This is measured from the sides of the door opening in the USA and from the sides of the insert in Canada.
(F) Minimum distance from front of insert to combustible = 18" (450mm).

The hearth and/or floor protection must be a thermally rated non-combustible hearth/floor protector meeting or exceeding a thermal rating of k=.84 or equivalent with a listed thickness of 3/8" (9.5mm) minimum in USA (3/4" - 19mm minimum in Canada). Install only in a masonry fireplace, built to UBC Chapter 37 or approved factory-built fireplace (see owner's manual). Do not remove brick or mortar from masonry fireplace to accommodate insert. Use flue outlet with or without a direct connector. Approved with minimum 6" (152mm) diameter stainless steel listed reline system. Remove and clean behind unit frequently, as creosote build up may occur rapidly. See owner's manual for reductions on mantel, trim and floor protection.
* Reduced clearances may be available for A, B, C, and D dimensions by using optional mantel and/or side shields. Consult with your Innovative Hearth Products dealer for the dimensions of the shields.
** Hearth extension reductions: 2" (51mm) reduction for 2" (51mm) raised hearth. 16" (406mm) minimum hearth extension on all inserts as measured from the door opening of the unit.

Dégagements Minimums Aux Matériaux Combustibles - En Pouces (millimètres)



(A) Espace entre l'encastrable et le manteau de cheminée = USA-24", CAN-26" (660mm). Profondeur maximum de la tablette du manteau de cheminée 9"
(B) Espace entre l'encastrable et les matériaux combustibles du haut = USA -15" CAN-18" (450mm)
(C) Espace minimum entre l'encastrable et le mur de côté combustible = 20" (508mm)
(D) Espace minimum entre l'encastrable et les matériaux combustibles du côté = 12" (305mm)
(E) Minimum requis de matériel non combustible au plancher, de chaque côté de l'ouverture de l'appareil = 8" (200mm)
(F) Minimum requis de matériel non combustible à l'avant de l'appareil = 18" (450mm)

Installer seulement dans un foyer de maçonnerie construit selon UBC Chapitre 37 ou dans un foyer approuvé par le fabricant (référez-vous au manuel). Ne pas enlever de ciment ou de briques pour installer l'encastrable. L'installation de la cheminée peut s'effectuer avec ou sans connecteur à la sortie de l'appareil. Approuvé pour raccordement avec un conduit de tubage certifié en acier inoxydable de 6" (152mm) de diamètre. Tirer l'appareil et nettoyer l'arrière fréquemment car le créosote peut s'y accumuler rapidement.
*Les dégagements minimums peuvent être réduits pour A, B, C, D en utilisant un manteau optionnel et / ou des protecteurs latéraux. Contacter votre détaillant Innovative Hearth Products pour la dimension des protecteurs requise.
**Réduction du recouvrement de plancher : 2" (51mm) de moins si l'encastrable est élevé de 2" (51mm). Respecter 16" (406mm) de recouvrement de plancher minimum à l'avant de l'encastrable.

CAUTION: HOT WHILE IN OPERATION. DO NOT TOUCH. KEEP CHILDREN, CLOTHING, FURNISHINGS AND COMBUSTIBLE MATERIAL A CONSIDERABLE DISTANCE AWAY. CONTACT MAY CAUSE SKIN BURNS. SEE NAMEPLATE AND INSTRUCTIONS. DO NOT OVERFIRE. IF HEATER OR CHIMNEY CONNECTOR GLOWS, YOU ARE OVERFIRING. INSPECT AND CLEAN CHIMNEY AND CONNECTOR FREQUENTLY. UNDER CERTAIN CONDITIONS OF USE, CREOSOTE BUILDUP MAY OCCUR RAPIDLY. DO NOT USE GRATE OR ELEVATE FIRE - BUILD WOOD FIRE DIRECTLY ON HEARTH. FEED DOOR MUST BE CLOSED DURING FIRING EXCEPT WHEN ADDING FUEL. KEEP ASH DOOR CLOSED TO AVOID EXCESS HEAT. DANGER: RISK OF ELECTRICAL SHOCK. DISCONNECT POWER BEFORE SERVICING UNIT. TYPE OF FUEL: SOLID WOOD ONLY.

ATTENTION: L'APPAREIL EST CHAUD LORS DE L'OPÉRATION. NE PAS Y TOUCHER. RISQUE DE BRÛLURES CUTANÉES. TENIR LES ENFANTS, LES MATÉRIAUX COMBUSTIBLES, LES VÊTEMENTS ET LES MEUBLES ELOIGNÉS DE L'APPAREIL. VOIR LA PLAQUE SIGNALÉTIQUE ET LES DIRECTIVES. NE PAS SURCHAUFFER L'APPAREIL. SI L'APPAREIL OU LE TUYAU DE CHEMINÉE ROUGIT, VOUS SURCHAUFFEZ. INSPECTER ET NETTOYER LA CHEMINÉE ET LE TUYAU CONNECTEUR FRÉQUEMMENT. SOUS CERTAINES CONDITIONS, IL SE PEUT QUE LE CRÉOSOTE S'ACCUMULE RAPIDEMENT. NE SURÉLEVER PAS LE FEU À L'AIDE D'UN CHENET. DÉPOSER LES BÛCHES DE BOIS DIRECTEMENT SUR L'ÂTRE. LA PORTE DOIT ÊTRE FERMÉE PENDANT L'USAGE SAUF POUR ALIMENTER LE FEU. GARDER LA PORTE "BY-PASS" (CENDRES) FERMÉE POUR ÉVITER DE SURCHAUFFER.

DANGER: RISQUES DE DÉCHARGE ÉLECTRIQUE. DÉCONNECTER LE FIL ÉLECTRIQUE DE LA PRISE DE CONTACT AVANT LE SERVICE. NE PAS FAIRE PASSER LE FIL ÉLECTRIQUE SOUS OU EN AVANT DE L'APPAREIL.

TYPE DE COMBUSTIBLE: BOIS SEULEMENT

Date of Manufacture / Date De Fabrication

2023	2024	2025	JAN. JANV	FEB. FEVR	MAR. MARS	APR AVR	MAY MAI	JUN JUIN	JUL JUIL	AUG AOÛT	SEP SEPT	OCT OCT	NOV NOV	DEC DEC
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

U.S. ENVIRONMENTAL PROTECTION AGENCY
Certified to comply with 2020 particulate emission standards.

Part No./ No. pièce #900902-00 Rev. 1, 06/2023 DO NOT REMOVE THIS LABEL Made in U.S.A.

NE PAS ENLEVER OU RECOUVRIR CETTE ÉTIQUETTE Fabriqué aux U.S.A.

CONTACT YOUR LOCAL BUILDING OR FIRE OFFICIALS ABOUT RESTRICTIONS AND INSTALLATION INSPECTION IN YOUR AREA. LISTED ROOM HEATERS, SOLID FUEL TYPE ALSO FOR USE IN MOBILE HOME INSTALLATION (USA ONLY) PURSUANT TO (UM) 84-HUD

Model: S160GL Report Number 23-106	Serial No.	S160GL-

IRONSTRIKE® HEAT FOR LIFE

Manufactured By:
INNOVATIVE HEARTH PRODUCTS
1502 14th St NW
Auburn, WA 98001 USA

PFS C US

"PREVENT HOUSE FIRES"

Install and use only in accordance with manufacturer's installation and operating instructions and your local building codes.

CAUTION: Special methods are required when passing chimney through a wall or ceiling, refer to local building codes. Do not connect this unit to a chimney flue serving another appliance.

WARNING: (MOBILE HOME USA Only) An outside air inlet must be provided for combustion, and be unrestricted while unit is in use. Do not install appliance in a sleeping room. The structural integrity of the mobile home floor, walls and ceiling/roof must be maintained. Approval void when label is missing.

Replace glass only with 5mm ceramic.

Model / Modèle: S160TGL
S160AGL

Tested to/Testé selon: UL 1482, ULC S627

Type Of Fuel: Solid Wood Only

Optional Blower, Part No. H7917

Blower Electrical Rating: 120V, 60 Hz, 1 Amp

Do not route power cord under or in front of appliance.

Burning improper fuel (i.e. Charcoal) can result in carbon monoxide poisoning, which may lead to death!

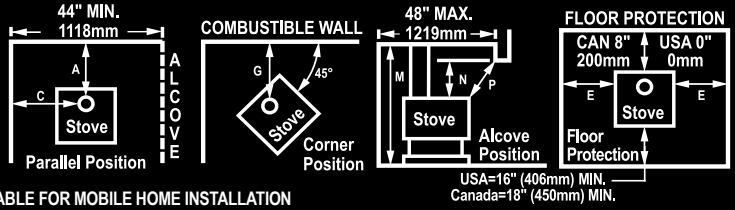
WARNING: Do Not obstruct the space beneath the heater.

OPERATE ONLY WITH DOOR CLOSED

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.

Certified to comply with 2020 particulate emission standards using crib wood. - Emissions: 1.7 grams/hr.

Minimum Clearance to Combustible Materials - Inches (millimeters)



SUITABLE FOR MOBILE HOME INSTALLATION

PIPE	INSTALLATION	A	C	E†	G	M	N❶	P❶
Single Wall	Residential or Alcove	USA-16" CAN-483mm	USA-21" CAN-610mm	8" 200mm	USA-18" CAN-533mm	84" 2134mm	30" 762mm	36" 914mm
Single w/ Pipe Shield	Residential or Alcove	USA-10" CAN-330mm	USA-18" CAN-533mm	8" 200mm	USA-13.5" CAN-419mm	84" 2134mm	30" 762mm	36" 914mm
Double Wall	Residential or Alcove or Mobile Home*	USA-10" CAN-330mm	USA-18" CAN-533mm	8" 200mm	USA-13.5" CAN-419mm	72" 1829mm	30" 762mm	36" 914mm

† USA=8" (200mm) from door opening, Canada=8" (200mm) from sides and back of unit
❶ Dimensions to Stove Body * Mobile Home - USA only

ALCOVE DIMENSIONS (single wall pipe): Minimum 48"(1219mm) width, maximum 48" (1219mm) depth.

ALCOVE DIMENSIONS (double wall pipe): Minimum 44"(1117mm) width, maximum 48" (1219mm) depth.

FLOOR PROTECTOR: The hearth and/or floor protection must be a non-combustible hearth/floor protector with a minimum thickness of 3/8" (9.5mm), extending beneath the heater and to the front, sides, and rear as indicated.

NOTICE: A header constructed of COMBUSTIBLE material must meet both N & P clearances. All mobile home installations require outside air kits (OAK).

Clearance dimensions are to 6" (152mm) flue collar. If a single wall connector pipe with shield is used, a 1 inch air space is needed between pipe and shield. Shield attaches to rear of stove pipe and must run from stove top to ceiling. Pipe shield shall be UL listed.

CHIMNEY & CONNECTOR: Minimum 6" diameter, minimum 24 MSG black steel connector pipe with listed factory-built chimney suitable for use with solid fuels or masonry chimney. Horizontal connection not tested, refer to local building codes for installation. Restrictions apply! Read instructions before installing.

Minimum alcove width between combustibles: 44" with double wall pipe and 48" all other installations.

MOBILE HOME approved Class A - UL 103HT chimneys and double wall connectors:

- Security
- Metal Fab
- Projet
- Ameri-Tec
- Jakes Evans
- Metalbestos
- Dura-Vent
- Industrial Chimney

RESIDENTIAL chimney systems must be from the same brands as listed for mobile homes but connector pipe may be double wall, single wall or single wall with shield as listed above.

Connector pipe and chimney must be of the same brand.

COMPONENTS REQUIRED FOR INSTALLATIONS: Legs AND Bottom Heat Shield or Pedestal Base attached as shown in the installation instructions. If optional blower is NOT used, Rear Heat Shield Block Off Plate shall be installed.



CAUTION: HOT WHILE IN OPERATION. DO NOT TOUCH, KEEP CHILDREN, CLOTHING AND FURNITURE AWAY. CONTACT MAY CAUSE SKIN BURNS. SEE NAME-PLATE AND INSTRUCTIONS. DO NOT OVERFIRE - IF HEATER OR CHIMNEY CONNECTOR GLOWS, YOU ARE OVERFIRING. INSPECT AND CLEAN CHIMNEY FREQUENTLY - UNDER CERTAIN CONDITIONS OF USE, CREOSOTE BUILDUP MAY OCCUR RAPIDLY. DO NOT USE GRATE OR ELEVATE FIRE - BUILD WOOD FIRE DIRECTLY ON HEARTH. FEED DOOR MUST BE CLOSED DURING FIRING EXCEPT WHEN ADDING FUEL. KEEP ASH DOOR CLOSED TO AVOID EXCESS HEAT. DANGER: RISK OF ELECTRICAL SHOCK. DISCONNECT POWER BEFORE SERVICING UNIT. FOR USE WITH SOLID WOOD FUEL ONLY.

Date of Manufacture / Date De Fabrication

2023	2024	2025	JAN. JANV	FEB. FEVR	MAR. MARS	APR AVR	MAY MAI	JUN JUIN	JUL JUIL	AUG AOÛT	SEP SEPT	OCT OCT	NOV NOV	DEC DEC
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U.S. ENVIRONMENTAL PROTECTION AGENCY
Certified to comply with 2020 particulate emission standards.

Part No. 900902-01 Rev. 1, 06/2023 DO NOT REMOVE THIS LABEL Made in U.S.A.

CONTACT YOUR LOCAL BUILDING OR FIRE OFFICIALS ABOUT RESTRICTIONS AND INSTALLATION INSPECTION IN YOUR AREA. LISTED ROOM HEATERS, SOLID FUEL TYPE ALSO FOR USE IN MOBILE HOME INSTALLATION (USA ONLY) PURSUANT TO (UM) 84-HUD

Model: T160GL Report Number 23-106	Serial No.	T160GL-

IRONSTRIKE® HEAT FOR LIFE

Manufactured By:
INNOVATIVE HEARTH PRODUCTS
1502 14th St NW
Auburn, WA 98001 USA

PFS® C US

"PREVENT HOUSE FIRES"

Install and use only in accordance with manufacturer's installation and operating instructions and your local building codes.

CAUTION: Special methods are required when passing chimney through a wall or ceiling, refer to local building codes. Do not connect this unit to a chimney flue serving another appliance.

WARNING: (MOBILE HOME USA Only) An outside air inlet must be provided for combustion, and be unrestricted while unit is in use. Do not install appliance in a sleeping room. The structural integrity of the mobile home floor, walls and ceiling/roof must be maintained. Approval void when label is missing.

Replace glass only with 5mm ceramic.

Model / Modèle: T160GL

Tested to/Testé selon: UL 1482, ULC S627

Type Of Fuel: Solid Wood Only

Optional Blower, Part No. H8873

Blower Electrical Rating: 120V, 60 Hz, 1 Amp

Do not route power cord under or in front of appliance.

Burning improper fuel (i.e. Charcoal) can result in carbon monoxide poisoning, which may lead to death!

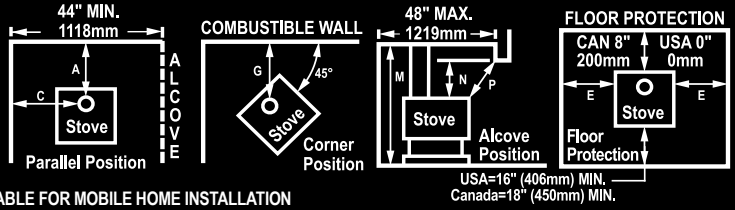
WARNING: Do Not obstruct the space beneath the heater.

OPERATE ONLY WITH DOOR CLOSED

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.

Certified to comply with 2020 particulate emission standards using crib wood. - Emissions: 1.7 grams/hr.

Minimum Clearance to Combustible Materials - Inches (millimeters)



SUITABLE FOR MOBILE HOME INSTALLATION

PIPE	INSTALLATION	A	C	E†	G	M	N❶	P❶
Single Wall	Residential or Alcove	USA-16" CAN-483mm	USA-21" CAN-610mm	8" 200mm	USA-18" CAN-533mm	84" 2134mm	30" 762mm	36" 914mm
Single w/ Pipe Shield	Residential or Alcove	USA-10" CAN-330mm	USA-18" CAN-533mm	8" 200mm	USA-13.5" CAN-419mm	84" 2134mm	30" 762mm	36" 914mm
Double Wall	Residential or Alcove or Mobile Home*	USA-10" CAN-330mm	USA-18" CAN-533mm	8" 200mm	USA-13.5" CAN-419mm	72" 1829mm	30" 762mm	36" 914mm

† USA=8" (200mm) from door opening, Canada=8" (200mm) from sides and back of unit
❶ Dimensions to Stove Body * Mobile Home - USA only

ALCOVE DIMENSIONS (single wall pipe): Minimum 48"(1219mm) width, maximum 48" (1219mm) depth.

ALCOVE DIMENSIONS (double wall pipe): Minimum 44"(1117mm) width, maximum 48" (1219mm) depth.

FLOOR PROTECTOR: The hearth and/or floor protection must be a non-combustible hearth/floor protector with a minimum thickness of 3/8" (9.5mm), extending beneath the heater and to the front, sides, and rear as indicated.

NOTICE: A header constructed of COMBUSTIBLE material must meet both N & P clearances. All mobile home installations require outside air kits (OAK).

Clearance dimensions are to 6" (152mm) flue collar. If a single wall connector pipe with shield is used, a 1 inch air space is needed between pipe and shield. Shield attaches to rear of stove pipe and must run from stove top to ceiling. Pipe shield shall be UL listed.

CHIMNEY & CONNECTOR: Minimum 6" diameter, minimum 24 MSG black steel connector pipe with listed factory-built chimney suitable for use with solid fuels or masonry chimney. Horizontal connection not tested, refer to local building codes for installation. Restrictions apply! Read instructions before installing.

Minimum alcove width between combustibles: 44" with double wall pipe and 48" all other installations.

MOBILE HOME approved Class A - UL 103HT chimneys and double wall connectors:

- Security
- Metal Fab
- Projet
- Ameri-Tec
- Jakes Evans
- Metalbestos
- Dura-Vent
- Industrial Chimney

RESIDENTIAL chimney systems must be from the same brands as listed for mobile homes but connector pipe may be double wall, single wall or single wall with shield as listed above.

Connector pipe and chimney must be of the same brand.

COMPONENTS REQUIRED FOR INSTALLATIONS: Pedestal Base must be attached as shown in the installation instructions. If optional blower is NOT used, Rear Heat Shield Block Off Plate shall be installed.



CAUTION: HOT WHILE IN OPERATION. DO NOT TOUCH, KEEP CHILDREN, CLOTHING AND FURNITURE AWAY. CONTACT MAY CAUSE SKIN BURNS. SEE NAME-PLATE AND INSTRUCTIONS. DO NOT OVERFIRE - IF HEATER OR CHIMNEY CONNECTOR GLOWS, YOU ARE OVERFIRING. INSPECT AND CLEAN CHIMNEY FREQUENTLY - UNDER CERTAIN CONDITIONS OF USE, CREOSOTE BUILDUP MAY OCCUR RAPIDLY. DO NOT USE GRATE OR ELEVATE FIRE - BUILD WOOD FIRE DIRECTLY ON HEARTH. FEED DOOR MUST BE CLOSED DURING FIRING EXCEPT WHEN ADDING FUEL. KEEP ASH DOOR CLOSED TO AVOID EXCESS HEAT. DANGER: RISK OF ELECTRICAL SHOCK. DISCONNECT POWER BEFORE SERVICING UNIT. FOR USE WITH SOLID WOOD FUEL ONLY.

Date of Manufacture / Date De Fabrication

2023	2024	2025	JAN. JANV	FEB. FEVR	MAR. MARS	APR AVR	MAY MAI	JUN JUIN	JUL JUIL	AUG AOÛT	SEP SEPT	OCT OCT	NOV NOV	DEC DEC

U.S. ENVIRONMENTAL PROTECTION AGENCY
Certified to comply with 2020 particulate emission standards.

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CONTACT YOUR LOCAL BUILDING OR FIRE OFFICIALS ABOUT RESTRICTIONS AND INSTALLATION INSPECTION IN YOUR AREA. LISTED ROOM HEATERS, SOLID FUEL TYPE ALSO FOR USE IN MOBILE HOME INSTALLATION (USA ONLY) PURSUANT TO (UM) 84-HUD

Model: WXS2016 Report Number 23-106	Serial No.	WXS2016-

Superior FIREPLACES®

Manufactured By:
INNOVATIVE HEARTH PRODUCTS
1502 14th St NW
Auburn, WA 98001 USA

PFS C US

"PREVENT HOUSE FIRES"

Install and use only in accordance with manufacturer's installation and operating instructions and your local building codes.

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Replace glass only with 5mm ceramic.

Model / Modèle: WXS2016 ■

Tested to/Testé selon: UL 1482, ULC S627

Type Of Fuel: Solid Wood Only

Optional Blower, Part No. H8873

Blower Electrical Rating: 120V, 60 Hz, 1 Amp

Do not route power cord under or in front of appliance.

Burning improper fuel (i.e. Charcoal) can result in carbon monoxide poisoning, which may lead to death!

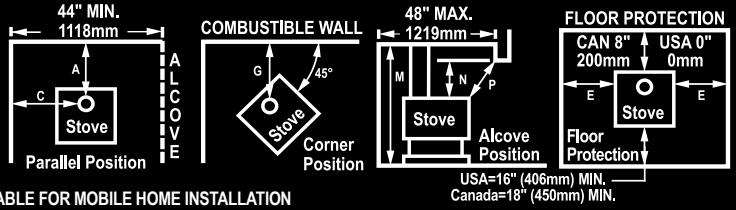
WARNING: Do Not obstruct the space beneath the heater.

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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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2023	2024	2025	JAN. JANV	FEB. FEVR	MAR. MARS	APR AVR	MAY MAI	JUN JUIN	JUL JUIL	AUG AOÛT	SEP SEPT	OCT OCT	NOV NOV	DEC DEC
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U.S. ENVIRONMENTAL PROTECTION AGENCY
Certified to comply with 2020 particulate emission standards.

Part No. 900902-05 Rev. 1, 06/2023 DO NOT REMOVE THIS LABEL Made in U.S.A.

IRONSTRIKE®
HEAT FOR LIFE

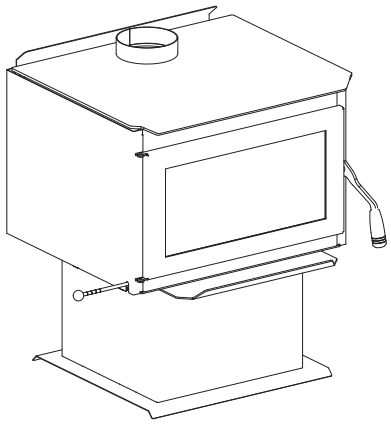
INSTALLATION AND OPERATION MANUAL

Free-Standing
EPA Certified
Wood-Burning Stoves

Save These Instructions
For Future Reference

P/N 900916-00, Rev. B, 06/2023

P900916-00



Tahoma™ 1600GL

Wood-Burning Stove
Model T160GL

PFS® C US

Report # 23-106

NATIONAL FIREPLACE INSTITUTE NFI CERTIFIED
www.nficertified.org

We recommend that our woodburning hearth products be installed and serviced by professionals who are certified in the U.S. by the National Fireplace Institute® (NFI) as NFI Woodburning Specialists or who are certified in Canada by Wood Energy Technical Training (WETT).

Wood Energy Technical Training www.wettinc.ca

A French manual is available upon request. Order P/N 900916-01.

Ce manuel d'installation est disponible en francais, simplement en faire la demande. Numéro de la pièce 900916-01.

This appliance must be properly installed and operated in order to prevent the possibility of a house fire. Please read this entire installation and operation manual before installing and using your wood stove. Failure to follow these instructions could result in property damage, bodily injury or even death. Contact your local building or fire officials to obtain a permit and information on any installation requirements and inspection requirements in your area.

⚠ WARNING

- **Hot! Do not touch! The glass and surfaces of this appliance will be hot during operation and will retain heat for a while after shutting off the appliance. Severe burns may result.**
- **Carefully supervise children in the same room as appliance.**

CONGRATULATIONS!

When you purchased your new wood stove, you joined the ranks of thousands of individuals whose answer to their home heating needs reflects their concern for aesthetics, efficiency and our environment. We extend our continued support to help you achieve the maximum benefit and enjoyment available from your new wood stove.

Thank you for selecting an Innovative Hearth Products, LLC (IHP) Stove as the answer to your home supplemental heating needs.

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USING THIS MANUAL

Please read and carefully follow all of the instructions found in this manual. Please pay special attention to the safety instructions provided in this manual.

PRODUCT IS SUBJECT TO CHANGE WITHOUT NOTICE

IMPORTANT SAFETY AND WARNING INFORMATION

READ THIS MANUAL IN ITS ENTIRETY AND UNDERSTAND THESE RULES TO FOLLOW FOR SAFETY.

1. When this room heater is not properly installed, a house fire may result. To reduce the risk of fire, follow the installation instructions. Contact local building or fire officials about restrictions and installation inspection requirements in your area.
2. Wear gloves during installation to avoid injury from sharp edges on the stove and/or its parts.
3. This unit is designed and engineered to burn only dry, well-seasoned wood. Burning wet wood will greatly reduce the stove's efficiency, produce excessive amounts of smoke and can cause dangerous chimney fires due to creosote build-up.
4. Before opening the door, the draft control must be fully open to avoid possible combustion flash (ignition of hot volatile gases as the door is opened).
5. Never use gasoline, gasoline-type lantern fuel, kerosene, charcoal lighter fluid, or similar liquids to start or 'freshenup' a fire in this heater. Keep all such liquids well away from the heater while it is in use. DO NOT USE CHEMICALS OR FLUIDS TO START THE FIRE.
6. While burning, fuel utilizes oxygen from the air in the room. Be sure to allow an adequate amount of fresh air into the room where the stove is burning.
7. The outside surface of the stove will be hot while burning properly and can set items like clothing and curtains on fire. Keep furnishings and other combustible materials away from the stove. Using the heat from the stove to dry wet clothing can be hazardous if clothes are placed too near the surface of the stove.
8. HOT WHILE IN OPERATION. KEEP CHILDREN, CLOTHING FURNISHINGS AND COMBUSTIBLE MATERIAL A CONSIDERABLE DISTANCE AWAY. CONTACT MAY CAUSE SKIN BURNS. Do not allow children to play near the stove without close supervision. Do not touch the stove while it is burning. Use extreme caution while the unit is in use. Surface temperatures become dangerously hot and can cause serious burns.
9. Do not allow anyone to operate the stove who is not familiar with the operating instructions.
10. Attempts to achieve heat output rates that exceed stove design specifications can result in permanent damage to the stove. Never leave your stove unattended on high burn rates. This may cause overfiring. Overfiring the stove may cause a house fire. If the stove glows, you are overfiring.
11. Keep a water hose or hand-operated fire extinguisher close for safety.
12. Smoke Detectors - Since there are always several potential sources of fire in any home, we recommend installing smoke detectors. If possible, install the smoke detector in a hallway adjacent to the room (to reduce the possibility of occasional false activation from the heat produced by the stove). If your local code requires a smoke detector be installed within the same room, you must follow the requirements of your local code. Check with your local building department for requirements in your area.
13. Inspect your chimney at least once a month during the burning season to check for soot and creosote accumulations. Any accumulations over 1/8" thick should be removed by a professional chimney sweep. Do not attempt to burn out heavy creosote accumulations with a hot fire. If large accumulations are occurring, review your burning procedures.
14. If a creosote fire should develop, the fire department should be called immediately and then attempts should be made to control the fire until assistance arrives. If a "runaway" fire should develop causing over-heating of the stove, the door and draft regulators should be closed immediately. The fire should die down once deprived of oxygen. After a severe chimney fire, the complete chimney system should be checked before further use.
15. Do Not Use Grate Or Elevate Fire - Build Wood Fire Directly On Hearth (firebrick). Do not use andirons or other methods of supporting the fuel.
16. Please read this entire manual before you install and use your new room heater. Failure to follow instructions may result in property damage, bodily injury, or even death.
17. Check all local building and safety codes before installation. The installation instructions and appropriate code requirements must be followed exactly and without compromise. In the absence of local codes the following standards and codes must be followed.
18. In the U.S.A, install in accordance with the National Fire Protection Association's Code, NFPA 211, Standards for Chimneys, Fireplaces, Vents and Solid-Fuel-Burning Appliances, or similar regulations, may apply to the installation of a Solid-Fuel-Burning appliance in your area. In Canada, the guideline is established by the CSA Standard, CAN/CSA-B365-M93, Installation Code for Solid-Fuel-Burning Appliances and Equipment.
19. DO NOT CONNECT TO OR USE IN CONJUNCTION WITH ANY AIR DISTRIBUTION DUCTWORK UNLESS SPECIFICALLY APPROVED FOR SUCH INSTALLATIONS.
20. WARNING: BURNING IMPROPER FUEL (I.E. CHARCOAL) CAN RESULT IN CARBON MONOXIDE POISONING, WHICH MAY LEAD TO DEATH!
21. Carbon Monoxide Poisoning – Early signs of carbon monoxide poisoning resemble the flu with headaches, dizziness, or nausea. If you have these signs, get fresh air at once! Have the heater inspected by a qualified service technician. Some people are more affected by carbon monoxide than others. These include pregnant women, people with heart or lung disease or anemia, those under the influence of alcohol, and those at high altitudes.
22. Failure to use manufacturer provided parts, variations in techniques and construction materials or practices other than those described in this manual may create a fire hazard and void the limited warranty.
23. Do not make any make-shift compromises during installation. Any modification or alteration may result in damage to the appliance or dwelling and will void the warranty, certification and listings of this unit.
24. These appliances are designed as supplemental heaters. Therefore, it is advisable to have an alternate heat source when installed in a dwelling.

25. **Do Not Overfire – If Heater or Chimney Connector Glows, You Are Overfiring.**
26. **DO NOT CONNECT THIS UNIT TO A CHIMNEY FLUE SERVING ANOTHER APPLIANCE.**
27. **DO NOT BURN GARBAGE OR FLAMMABLE FLUIDS SUCH AS GASOLINE, NAPHTHA OR ENGINE OIL.**
28. **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.**

⚠ WARNING

This product can expose you to chemicals including Carbon Black, which is known to the State of California to cause cancer, and Carbon Monoxide, which is known to the State of California to cause birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov

TESTING INFORMATION

This manual describes the installation and operation of these non-catalytic wood heaters. These heaters meet the U.S. Environmental Protection Agency's emissions limits, and are compliant with 2020 EPA NSPS. These heaters have been developed, tested and constructed in accordance with the requirements of UL 1482, ULC S627 and HUD standards and are listed by PFS TECO. These heaters have been approved for residential and mobile home installations.

Modèle	Taux d'émission		Intervalle d'essai de l'EPA (BTU/h)	Rendement**	
	Particulate	CO *		HHV	LHV
T160GL	1.7 g/hr	1.8 g/min	12,800-39,400	72%	78%

** Average, subject to standard variations.*
**** Low burn rate. CSA B415.1**

DRAFT REQUIREMENTS

This appliance is dependent upon a properly functioning chimney for optimum performance. It is a high efficiency appliance that loses much less heat up the chimney than older appliances and fireplaces. For this reason it is important to match the stove to the chimney. The chimney has two functions:

1. It draws combustion air into the appliance (without air, no fuel will burn) and
2. It exhausts combustion by-products. Your new appliance is what is known as a "natural draft" appliance.

The appliance depends solely on the natural draft of the chimney system to draw combustion air into the unit. Draft is the force that moves air from the appliance up into 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 (overfiring). Slow or inadequate draft equals poor combustion and possible smoking problems.

The following are some conditions that may contribute to poor chimney draft:

1. A chimney too large for your appliance.
2. A chimney with not enough height to produce adequate draft.
3. A chimney with excessive height (this may allow exhaust to cool too much before exiting, which will stall the rate the exhaust exits).
4. Offsets in the venting system are too restrictive (see *Chimney Guidelines)*.

Inadequate draft will cause the appliance to leak smoke into the room through the stove and the chimney connector joints.

Excessive draft may cause an uncontrollable burn or a glowing red stove or chimney part.

Overfiring Damage - If the heater or chimney connector glows, you are overfiring. Other symptoms may include: Cracking, warping or burning out of components, stove glass may develop a haze, which will not come off with cleaning.

Overfiring of a stove is a condition where excessive temperatures are reached, beyond the design capabilities of the appliance. The damage that occurs from overfiring is not covered under the manufacturer's limited warranty.

Also see *Troubleshooting* on ***Page 23***.

SELECTING THE PROPER VENTING SYSTEM

The appliance is merely one component of a larger system. The other equally important component is the venting system. This is necessary for achieving the required flow of combustion air to the fire chamber and for safely removing unwanted combustion by-products from the appliance. If the venting system's design does not promote these ends, the system may not function properly. Poorly functioning venting systems may create performance problems as well as be a safety hazard. **A draft test should read greater than .04' W.C. (inches water column) and less than .08" W.C**. As per NFPA-211 standard (see paragraph below), the installer must take into account all variables within the installation and install the appliance in such a manner that satisfies the draft requirements of the appliance. See *Chimney Guidelines* below to assist you in selecting the proper venting system for your installation.

American National Standards Institute ANSI/NFPA 211, Standard for Chimneys, Fireplaces, Vents, and Solid Fuel-Burning Appliances - See Draft Section: A chimney or vent shall be so designed and constructed to develop a flow sufficient to completely remove all flue and vent gases to the outside atmosphere. The venting system shall satisfy the draft requirements of the connected appliance in accordance with the manufacturer's instructions.

Chimney Guidelines:

- This appliance requires approximately 12 feet minimum of "effective draw" provided by the venting system. As a rule of thumb, every 90 degree total direction change in the venting will result in a loss of approximately 5 feet of "effective draw." Example: If two 45 degree offsets are used, subtract 5 feet from the actual vertical vent height to determine your "effective draw." In this case if you had 14 feet of vertical vent, the effective draw would only be approximately 9 feet (14 ft. - 5 ft. = 9 ft.), therefore it may be necessary to add additional height to the venting system.
- Do not install an offset within the first two feet above the flue outlet on the appliance.
- In well insulated and weather tight homes, it may be difficult to establish a good draft up your chimney. The poor draft is caused by a shortage of air in the house. In this situation an Outside Air Kit may need to be installed *(See Negative Pressure Warning on **Page 5** and Outside Combustion Air on **Page 12**)*.

Chimney Height Requirements

The chimney must extend 3' (.92m) above the level of roof penetration and a minimum of 2' (.61m) higher than any roof surface within 10' (3m) *(see **Figure 1**)*. Check with your local building officials for additional requirements for your area.

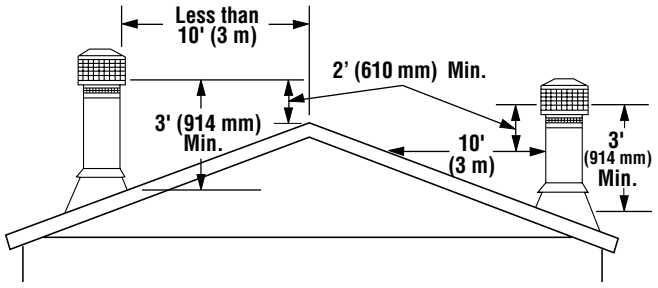


***Figure 1** - Chimney Height Requirements*

To pass inspection in nearly any jurisdiction, the chimney must meet both safety and exhaust flow requirements. The (3' by) 2' by 10' rule applies to both masonry and factory-built chimneys.

**** Ref. USA - National Standard, NFPA 211-latest edition and Canada National Standard CSA B365-01-latest edition. Vents installed with a listed cap shall terminate in accordance with the terms of the cap's listings.***

NEGATIVE PRESSURE WARNING

This appliance is not designed to be operated in a negative pressure. In very airtight homes with large kitchen exhaust fans, furnace cold air returns, fresh air exchange systems and any other air system in close proximity to the heating appliance may create a negative pressure in the same room as the heating appliance. This can create dangerous back drafting of the stove and chimney joints, drawing combustion by-products into the home. Be sure your home has adequate makeup air to eliminate negative pressures caused by the above-mentioned sources. Outside air connected to the appliance probably will not resolve such a problem as the appliance is not the source of negative pressure. IHP accepts no liability for damages resulting from negative pressures described here.

Ventilation Requirements - Provide adequate air for combustion. The fresh air requirements of this appliance must be met within the space where it will be installed. Ventilation is essential when using a Solid-Fuel-Burning heater. In well insulated and weather tight homes, it may be difficult to establish a good draft up the chimney (caused by a shortage of air in the home). The lack of air is caused by many common household appliances which exhaust air from the home (such as a furnace, heat pump, air conditioner, clothes dryer, exhaust fans, fireplaces, and other fuel burning appliances). Also, the combustion process of this heater uses oxygen from inside the dwelling. If the available fresh air delivery in the dwelling is insufficient to support the demands of these appliances, problems can result (i.e. excessive negative pressure can develop in the dwelling which will affect the rate at which this appliance can draft thus resulting in performance problems. To correct this problem it may help to open a window (preferably on the windward side of the house) or install an optional outside air kit.

NOTE: DIAGRAMS & ILLUSTRATIONS ARE NOT TO SCALE.

CLEARANCES TO COMBUSTIBLES

WARNING: BE ABSOLUTELY SURE THE DISTANCE BETWEEN THE HEATER AND THE SURFACE OF ANY COMBUSTIBLE CONSTRUCTION IS NOT LESS THAN SHOWN IN THE FIGURES ON PAGE 7.

Floor Protection

USA - The floor in front and under the heater must be protected with noncombustible material. The covering must extend 16" in front of the door opening of the heater and 8" to either side of the door opening.

Canada - The floor in front and under the heater must be protected with noncombustible material. The covering must extend 450 mm in front of the door opening of the heater and 200 mm to either side of the stove body and 200 mm to the rear or to the wall, whichever is smaller.

USA and Canada - A chimney connector / venting extends horizontally over the floor, protection must also cover the floor under the connector / venting and at least 2" (51 mm) to either side.

CHIMNEY AND CONNECTOR

Minimum 6" diameter, minimum 24 MSG black steel connector pipe with UL103HT listed factory-built chimney suitable for use with solid fuels or masonry chimney. Horizontal connection not tested, refer to local building codes for installation. See installation instructions for details. Restrictions apply! Read instructions before installing.

Residential chimney systems must be from the same brands as listed for mobile homes but connector pipe may be double wall, single wall or single wall with shield as listed above.

This appliance may be vented into a code-approved masonry chimney with flue liner.

WARNING: CHIMNEY CONNECTOR MUST BE IN GOOD CONDITION AND KEPT CLEAN. DO NOT INSTALL DAMAGED PARTS.

All of the stove connector pipe used must be of the same brand. The chimney that the stove pipe transitions into may be a different brand. Other than the transition of the stove pipe into the chimney, do Not mix different brand vent components. Install all vent components per vent manufacturer's instructions.

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

There must be an effective vapor barrier at the location where the chimney or other component penetrates to the exterior of the structure. Follow the vent manufacturer's detailed instructions.

IMPORTANT NOTE: See *Draft Requirements* and *Selecting a Proper Venting System* on ***Page 4*** to assist you in choosing the proper venting system for your installation.

Clearance dimensions are to flue collar. If a single wall connector pipe with shield is used, a 1 inch air space is needed between pipe and shield. Shield attaches to rear of stove pipe and must run from stove top to ceiling. Pipe shield shall be UL listed.

NOTE: DIAGRAMS & ILLUSTRATIONS ARE NOT TO SCALE.

INSTALLATION CLEARANCES - REFER TO *FIGURES 2, 3 AND 4*

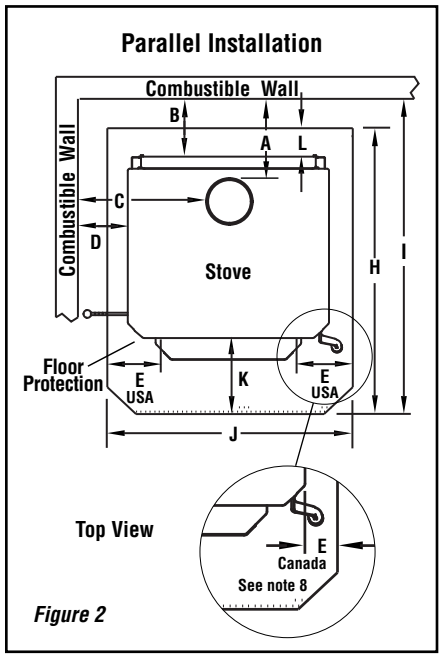


Figure 2

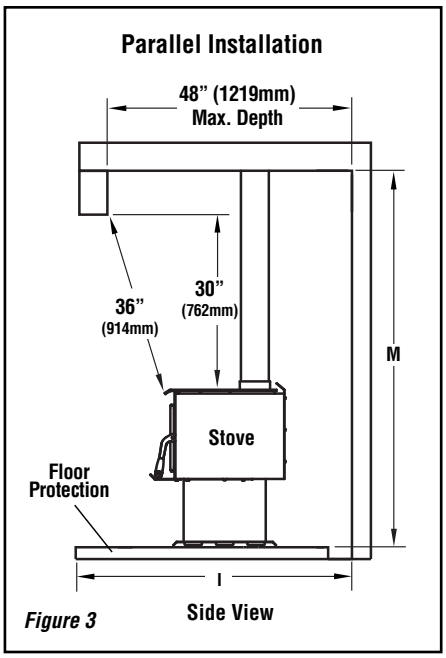


Figure 3

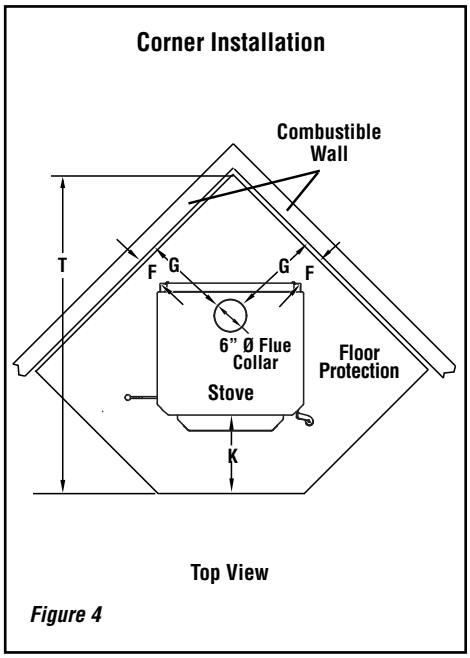


Figure 4

USA - inches (millimeters)

PIPE	INSTALLATION	A (3)	B (1)	C (3)	D (1)	E (8)	F (1)	G (3)	H (2)	I (6)	J (2)	K (7)	L (5)	M	T (6)
Single Wall	Residential	14-1/4 (362)	11-1/2 (292)	23 (584)	13-3/8 (340)	8 (200)	9 (229)	18 (457)	37-5/8 (956)	49 (1245)	34-7/8 (886)	16 (406)	0 (0)	84 (2134)	61-1/2 (1562)
Double Wall	Residential or Mobile Home	12 (305)	9-1/8 (232)	19-1/2 (495)	9-5/8 (245)	8 (200)	6 (152)	15 (381)	37-5/8 (956)	46-3/4 (1188)	34-7/8 (886)	16 (406)	0 (0)	84 (2134)	57-1/2 (1461)

CANADA - inches (millimeters)

PIPE	INSTALLATION	A (3)	B (1)	C (3)	D (1)	E (8)	F (1)	G (3)	H (2)	I (6)	J (2)	K (7)	L (5)	M	T (6)
Single Wall	Residential	14-1/4 (362)	11-1/2 (292)	23 (584)	13-3/8 (340)	8 (200)	9 (229)	18 (457)	47-5/8 (1210)	51 (1295)	40-7/8 (1038)	18 (450)	8 (200)	84 (2134)	63-1/2 (1613)
Double Wall	Residential or Mobile Home	12 (305)	9-1/8 (232)	19-1/2 (495)	9-5/8 (245)	8 (200)	6 (152)	15 (381)	47-5/8 (1210)	48-3/4 (1238)	40-7/8 (1038)	18 (450)	8 (200)	84 (2134)	59-1/2 (1511)

Footnotes:

1- These dimensions to the stove body are for reference only. Actual distances should be measured from the stove's flue collar.

2- Minimum noncombustible hearth pad dimensions.

3- Clearances to connector pipe shall be measured from the flue collar of the stove.

5- In corner applications, when installed at minimum back wall clearances, the required floor protection is dimensioned off the back plane of the stove, therefore the floor protection required off the back corners (at a 45 degree angle) only needs to extend to the wall. This situation will only occur in CANADA installations.

6- Reference dimension only, to assist in planning the installation.

7- Measured from front of floor protection to the front of firebox.

8- USA=8" (200mm) from door opening, Canada=8" (200mm) from sides and back of unit.

NOTE: DIAGRAMS & ILLUSTRATIONS ARE NOT TO SCALE.

SPECIFICATIONS - Tahoma™ 1600GL

Product Reference Information			
Cat. No.	Description	Ship. Weight	Ship. Volume
F4019	Tahoma™ 1600GL Wood-Burning Stove	280 lb.	23 cu. ft.

NOTES:

- *Dimensions shown are approximations only (+/- 1/4")*
- *Diagrams, illustrations and photographs are not to scale – consult installation instructions. Product designs, materials, dimensions, specifications, colors and prices are subject to change or discontinuance without notice.*
- *Approved for residential and manufactured (mobile) home installations.*
- *Optional Kits Available:*

  Blower
  Outside Air Kit

❶ *Square-foot heating capacities and burn times are approximations only. Actual performance may vary depending upon home design and insulation, ceiling heights, climate, condition and type of wood used, appliance location, burn rate, accessories chosen, chimney installation and how the appliance is operated.*

Specifications

Stove Pipe Diameter Single Wall or Double Wall	**6" (152 mm)**
Log Length	**16" Max. (406 mm Max.)**
Firebox	**Volume = 1.52 cu. ft.**
Cord Wood: ❶	**55,600 BTUs/hr.**
Maximum Burn Times ❶	**7-9 hours**
Heating Capacity ❶	**1,200 to 2,000 sq. ft.**
EPA Grams Per Hour	**1.7 gr/hr**

EPA Phase II and Washington State Approved

Listing

The Tahoma™ 1600GL woodstove is safety listed with the following agency:

- *PFS TECO, Tested to UL 1482, ULC S627*

Report # 23-106

Dimensions

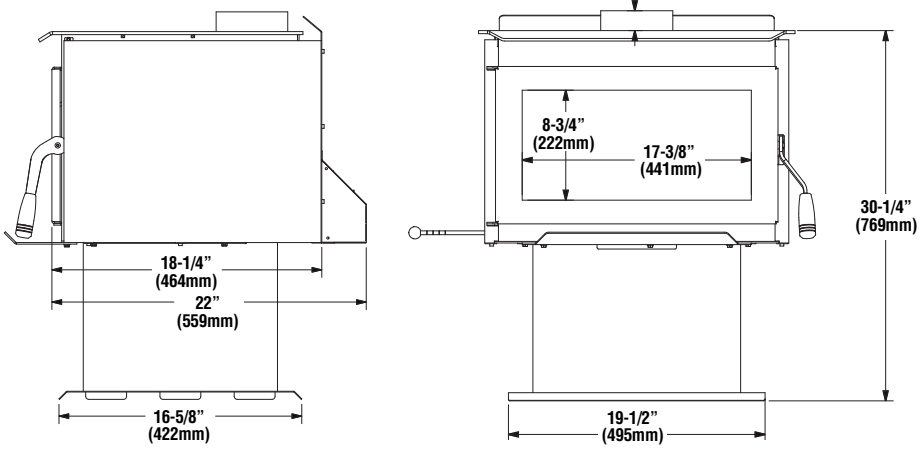


Figure 5

NOTE: DIAGRAMS & ILLUSTRATIONS ARE NOT TO SCALE.

TYPICAL INSTALLATIONS

YOUR CHIMNEY INSTALLATION MUST COMPLY WITH LOCAL BUILDING AND FIRE CODES.

Single Wall Pipe
Using 6" Diameter Single Wall Connector Pipe

INSTALL VENTING SYSTEM PER VENT MANUFACTURERS INSTRUCTIONS!

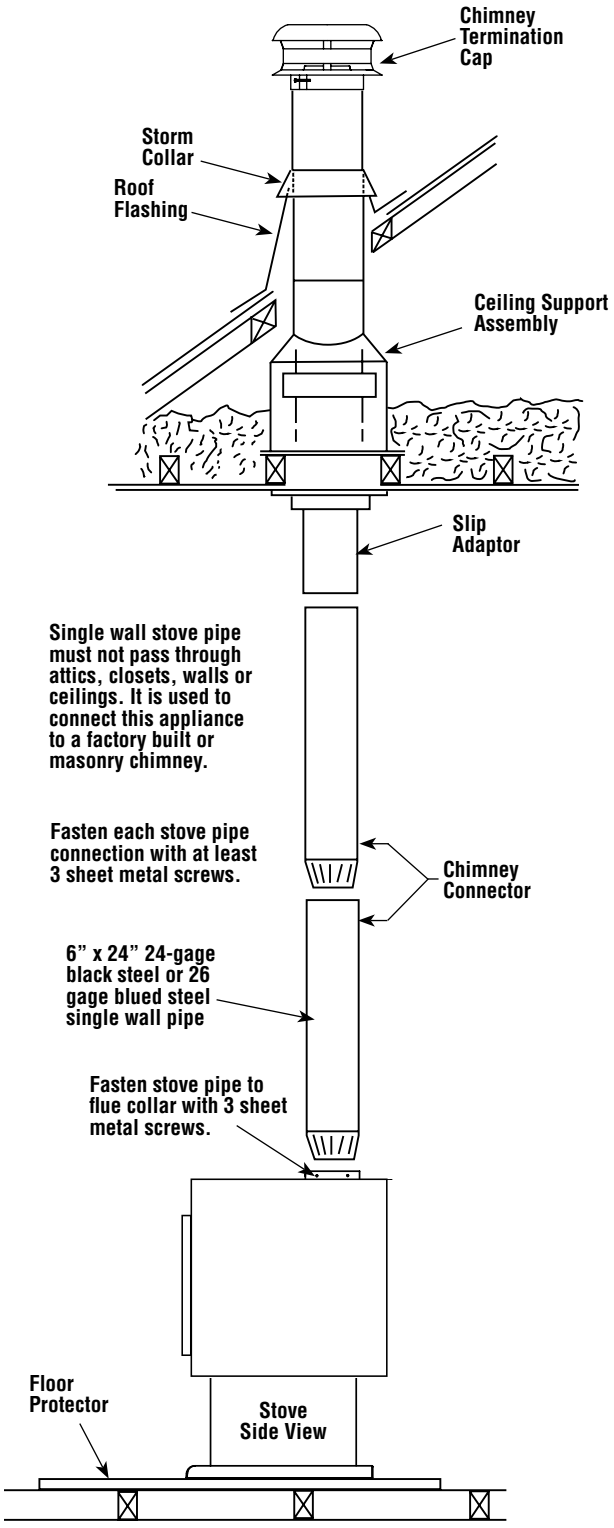


Figure 6A - Typical Installation

NOTE: DIAGRAMS & ILLUSTRATIONS ARE NOT TO SCALE.

CHIMNEY INSTALLATION

- Install chimney as per manufacturer's instructions. Some brands of pipe may require removal of the spacer ring in the flue collar.
- All horizontal runs of pipe should be as short as possible and are required by NFPA No. 211 to have an upward pitch or rise in the same direction the smoke travels of no less than 1/4" to the linear foot. The connector pipe must meet minimum clearances in any direction to walls or other combustible materials. It must attach to a listed double wall metal chimney at least 6" in diameter or to a masonry chimney with a flue passage of at least 48 square inches.
- It is required that a chimney connector pipe not extend further than the inner wall of the flue when it is connected to a masonry chimney and that it either be cemented to the masonry or be installed without cement in a thimble connected to the masonry wall. When the connector is inserted into a thimble, the joint must be tight enough so that it will not be dislodged in normal use.
- Chimney connector pipes should never pass through a floor, ceiling, fire wall, partition, or combustible construction of any type unless certain precautions are taken. The best method is to use a listed thimble and a listed chimney in accordance with the manufacturer's directions. NFPA No. 211 gives approved methods for passing a flue pipe through combustible constructions *(see **Page 11**)*.

Approved Chimney - Your stove is approved for use with Class A, UL 103 HT (U.S.) / ULC-S629 (Canada) Listed Residential Type and Building Heating Appliance Chimney (HT chimney - 2100° Fahrenheit) and double wall connector pipe**.** Approved chimney brands are Security Chimneys™, Jakes Evans/GSW, Dura-vent, Metal Fab, Ameri-Tec, Metalbestos, Industrial Chimney (ICC) and IHP Snap Pak.

Clearances to connector shall be measured from 6" flue collar. Restrictions apply! Read instructions before installing.

YOUR CHIMNEY INSTALLATION MUST COMPLY WITH LOCAL BUILDING AND FIRE CODES.

Manufactured Home Installations *(ref. **Figure 6B**)*

This appliance is approved for installation into a manufactured (mobile) home.

Installation should be in accordance with the Mobile Home Construction and Safety Standard, Title 24 CFR, Part 3280 (in Canada CAN/CSA Z240 MH), or, when such a standard is not applicable, the Standard for Mobile Home Installations, ANSI A225.1.

All mobile home installations require an outside air kit (see ***Page 25*** for ordering information). The stove must be secured to the floor and grounded to the chassis of the mobile home.

WARNING: DO NOT INSTALL IN SLEEPING ROOM OF A MOBILE HOME.

CAUTION: THE STRUCTURAL INTEGRITY OF THE MOBILE HOME FLOOR, WALL AND CEILING/ROOF MUST BE MAINTAINED.

Double Wall Pipe
Using 6" Diameter Type L-Vent Connector Pipe
Manufactured (Mobile) Home Installation Shown

INSTALL VENTING SYSTEM PER VENT MANUFACTURERS INSTRUCTIONS!

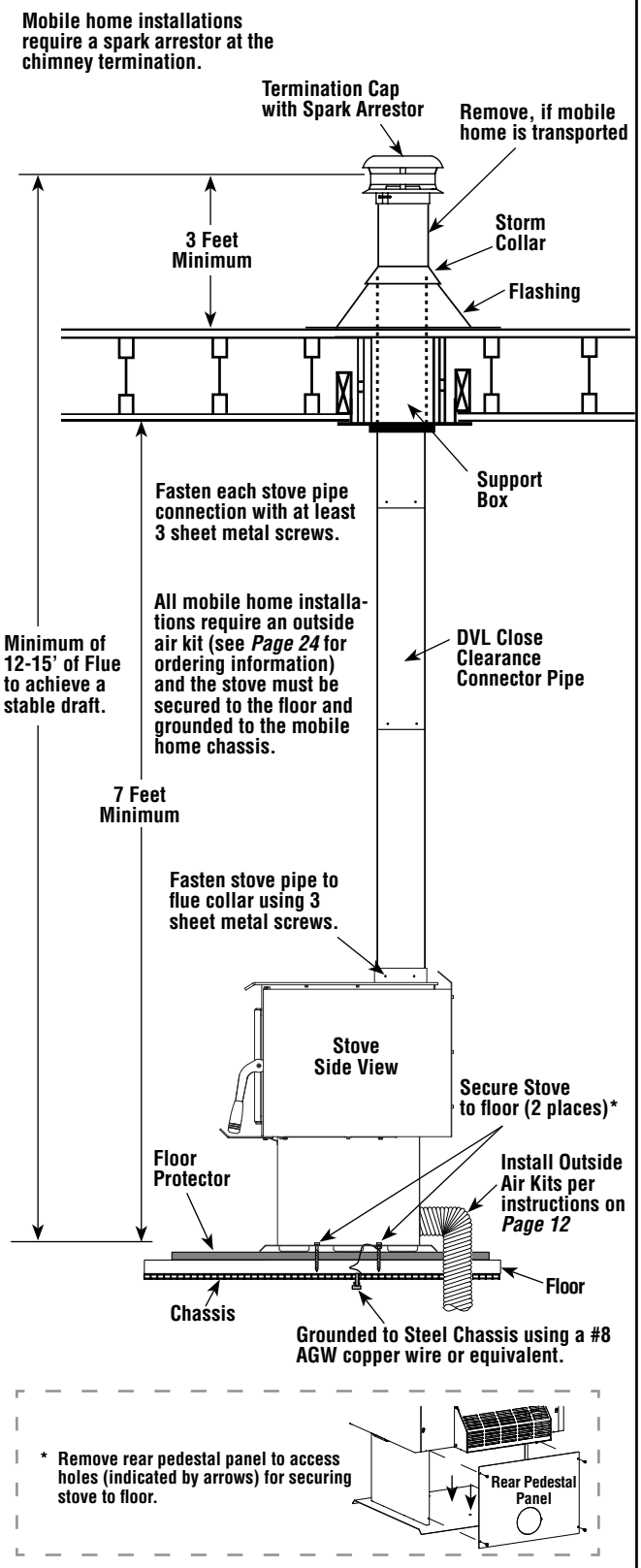


Figure 6B - Typical Installation

Chimney Connector Systems and Clearances from Combustible Walls for Residential Heating Appliances (NFPA 211) - Refer to *Figure 7*

System A. Minimum 3.5 in. (90 mm) thick brick masonry wall framed into combustible wall with a minimum of 12 in. (305 mm) brick separation from clay liner to combustibles. Fireclay liner (ASTM C 315, Standard Specification for Clay Flue Linings, or equivalent), minimum 5/8 in. (16 mm) wall thickness, shall run from outer surface of brick wall to, but not beyond, the inner surface of chimney flue liner and shall be firmly cemented in place.

Clearance: 12 in. (305 mm)

System B. Solid-insulated, listed factory-built chimney length of the same inside diameter as the chimney connector and having 1 in. (25.4 mm) or more of insulation with a minimum 9 in. (229 mm) air space between the outer wall of the chimney length and combustibles.

The inner end of the chimney length shall be flush with the inside of the masonry chimney flue and shall be sealed to the flue and to the brick masonry penetration with non-water-soluble refractory cement. Supports shall be securely fastened to wall surfaces on all sides.

Fasteners between supports and the chimney length shall not penetrate the chimney liner.

Clearance: 9 in. (229 mm)

System C. Sheet steel chimney connector, minimum 24 gage [0.024 in. (0.61 mm)] in thickness, with a ventilated thimble, minimum 24 gage [0.024 in. (0.61 mm)] in thickness, having two 1 in. (25.4 mm) air channels, separated from combustibles by a minimum of 6 in. (152 mm) of glass fiber insulation. Opening shall be covered, and thimble supported with a sheet steel support, minimum 24 gage [0.024 in. (0.61 mm)] in thickness.

Supports shall be securely fastened to wall surfaces on all sides and shall be sized to fit and hold chimney section. Fasteners used to secure chimney section shall not penetrate chimney flue liner.

Clearance: 6 in. (152 mm)

System D. Solid-insulated, listed factory-built chimney length with an inside diameter 2 in. (51 mm) larger than the chimney connector and having 1 in. (25.4 mm) or more of insulation, serving as a pass-through for a single wall sheet steel chimney connector of minimum 24 gage [0.024 in. (0.61 mm)] thickness, with a minimum 2 in. (51 mm) air space between the outer wall of chimney section and combustibles. Minimum length of chimney section shall be 12 in. (305 mm). Chimney section concentric with and spaced 1 in. (25.4 mm) away from connector by means of sheet steel support plates on both ends of chimney section. Opening shall be covered, and chimney section supported on both sides with sheet steel supports of minimum 24 gage [0.024 in. (0.61 mm)] thickness.

Supports shall be securely fastened to wall surfaces on all sides and shall be sized to fit and hold chimney section. Fasteners used to secure chimney section shall not penetrate chimney flue liner.

Clearance: 2 in. (51 mm)

Additional requirements:

1. **Insulation material used as part of wall pass-through system shall be of noncombustible material and shall have a thermal conductivity of 1.0 Btu-in./hr-ft² - ºF (4.88 kg-cal/hr-m² - ºC) or less.**
2. **All clearances and thicknesses are minimums; larger clearances and thicknesses shall be permitted.**
3. **Any material used to close up an opening for the connector shall be of noncombustible material.**
4. **A connector to a masonry chimney, except for System B, shall extend in one continuous piece through the wall pass-through system and the chimney wall to the inner face of the flue liner, but not beyond.**

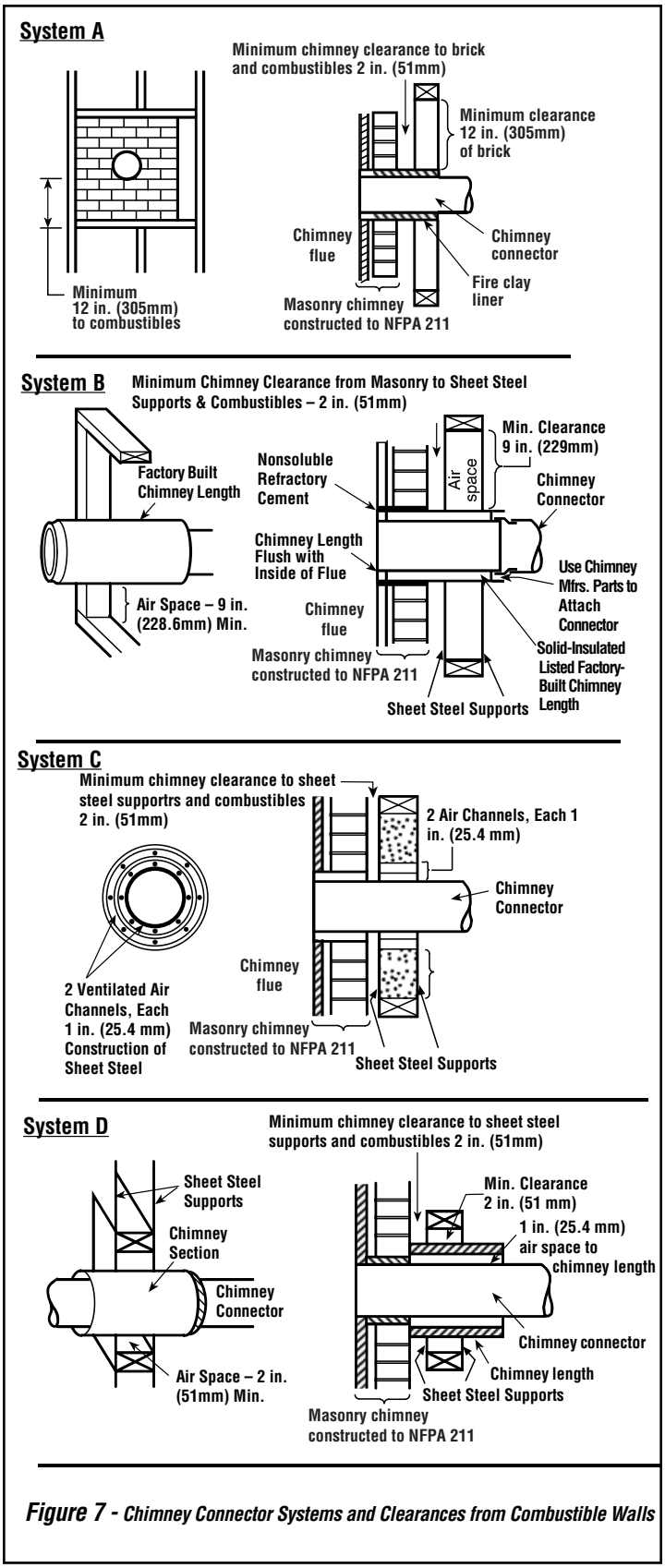


***Figure 7** - Chimney Connector Systems and Clearances from Combustible Walls*

NOTE: DIAGRAMS & ILLUSTRATIONS ARE NOT TO SCALE.

OUTSIDE COMBUSTION AIR KIT INSTALLATION

Outside Air Kits

Order:

1 ea. P/N UZIAD Outside Air Coupler Kit (connects outside air ducting, UZI, to stove) ***AND***
1 ea. P/N UZI Outside Air Ducting Kit (includes 4" insulated flex x 10' long) ***AND***
1 ea. P/N F4062 Outside Air Panel and Air Channel Kit (includes rear pedestal panel and side and front air channels)

An outside air kit is required in Manufactured (mobile) Home installations. For residential installations, check with local authorities having jurisdiction in your area, it may be mandatory.

INSTALLATION INSTRUCTIONS

1. **(Manufactured Home Installations Only)** Secure stove to floor per instructions in ***Figure 6B*** on ***Page 10***.
2. **Install rear pedestal panel as shown in *Figure 8*.**
3. **Outside Air Kit Coupler (one of the following)**
   Collar with Collar Holder: - Center the 4" dia. collar on the air intake opening and then secure with the collar holder, using the four (4) 5/8" Tek Screws provided, lining the plate up with the capture holes on the unit. In some instances the capture holes may be absent; the tek screws should then be used to start the holes directly *(**Figure 8**)*.
   One-Piece Collar: To install the outside air kit coupler onto the stove, line up the "V" notch in the coupler with the "V" notch in the open on the bottom of the stove. Push and twist so the rolled edge catches the bottom of the stove and continue turning full 360° to lock the coupler in place.
4. **Install Ducting and Air Register *(refer to Figures 8 through 11)*** - The outside air assembly may be installed according to the following requirements:
   a) Duct length should be kept to a minimum.
   b) The air intake register must not be installed more than ten (10) feet (3050 mm) above the base of the stove.
   c) The fresh air must come from outside the house. The air intake must not draw air from the attic, from the basement or garage.
   d) The air intake should be installed where it is not likely to be blocked by snow or exposed to extreme wind and away from automobile exhaust fumes, gas meters and other vents.
   e) The duct and register may be installed above or below floor level.

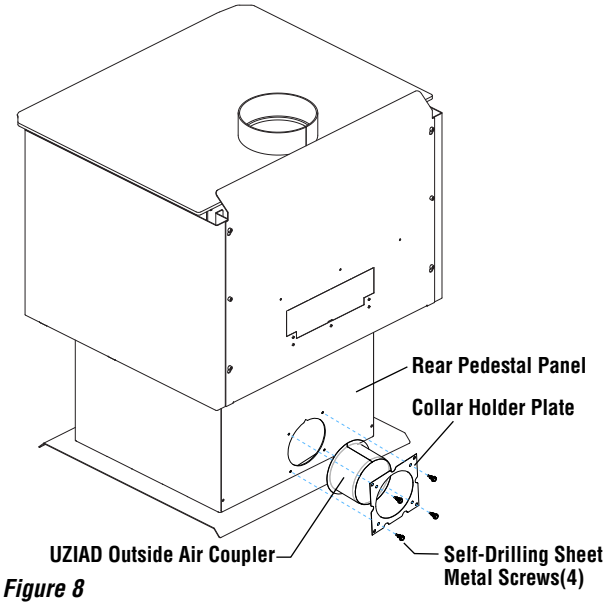


Figure 8

- Make a 4-1/4" (110 mm) hole in the outside wall of the house at the chosen location. From outside, place the outside air register in the hole (open side down) and fasten the register to the wall, with screws as shown *(see **Figures 10 and 11**)*.
- Install the coupler onto the existing collar on stove *(see **Figure 8**)*.
- Attach the duct to the coupler on stove *(see **Figures 9 and 10**)*. Using the aluminium tape provided, wrap the tape around the joint between the flexible duct and the air inlet.

5. **Install Front and Side Air Channels** - Install the front and side air channels per the instructions in ***Figure 12*** on ***Page 13***.

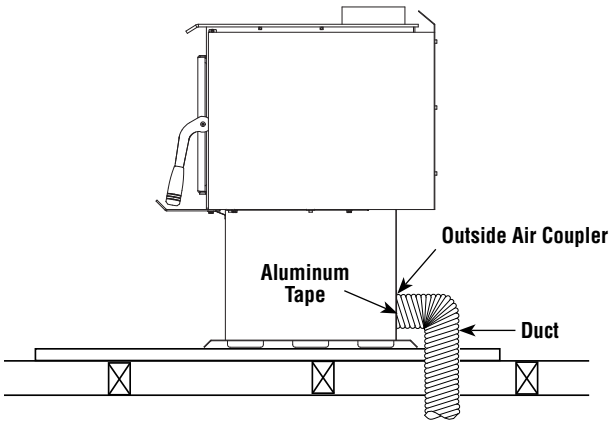


Figure 9 - Outside Air Connection, Through the Floor

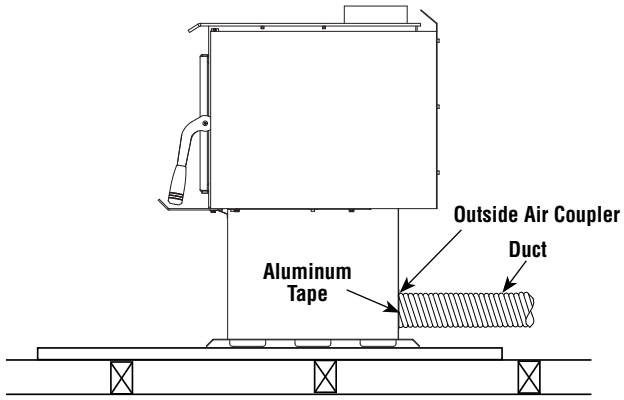


Figure 10 - Outside Air Connection, Through the Wall

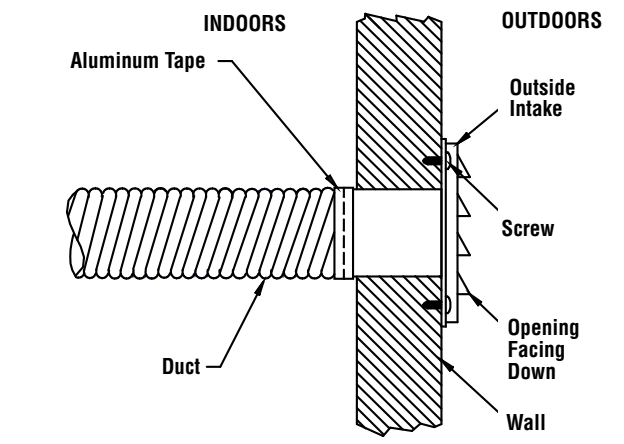
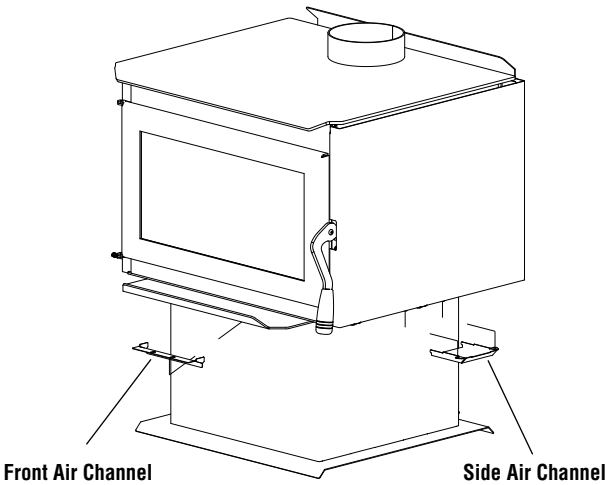
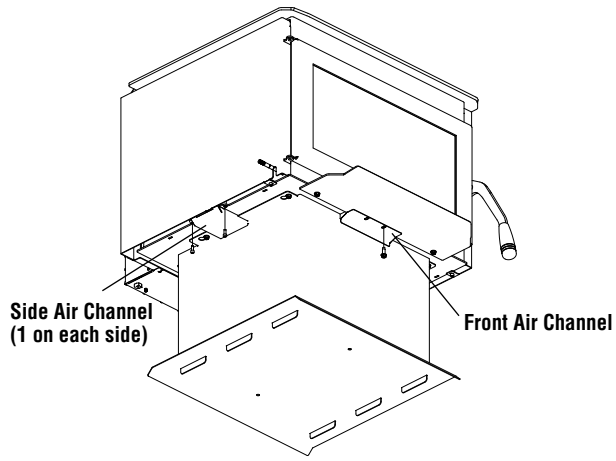


Figure 11 - Through the Wall, Outside Air Termination

See *Figure 6B on Page 10* for additional Manufactured Home requirements.

NOTE: DIAGRAMS & ILLUSTRATIONS ARE NOT TO SCALE.





Using the existing screws on the stove, install the front and side air channels as shown here.

Figure 12 - Install Front and Side Air Channels

BRICK INSTALLATION

CAUTION: Wear gloves during brick installation in case of sharp edges inside the stove.

NOTE: *Installation of the baffle boards and baffle blanket is easier when you can still access the flue outlet, (before connecting the flue vent).* ***Be sure the baffle blanket is placed flat on the baffle boards so as not to block exhaust flow to the flue.*** *Use a ruler or a piece of kindling to reach over the baffle blanket to be sure it is completely flat on top of the baffle boards.*

Measure bricks before installing, as per list of dimensions on next page, to be sure the correct bricks are installed in the correct location.

1. Install bricks #1-18 in the numbered sequence shown in ***Figure 13 (Page 14).***
2. Next, you will install the rear baffle boards which are the smaller two of the four baffle boards. The boards will be installed with the 3-9/16" dimension from the front to the rear of the firebox. These boards will be placed on the top side of the rear baffle just to the rear of the middle secondary tube, you will push the baffle boards towards the rear of the firebox until they fall in place at the rear side of the middle secondary tube. You will place one board to the far left side of the firebox and one board to far right side of the firebox. Confirm that both boards are laying flat on the rear baffle and that they are not overlapping each other.
3. Next, you will install the baffle blanket. It will be installed with the 11" dimension from the front to rear of the firebox. Install by lifting it into place between the front and rear baffle. Place the blanket over the rear baffle and rear baffle boards that you have just installed. Next you will place the baffle blanket that is protruding beyond the front side rear baffle on the top side of the front baffle.
4. The final step of the baffle board & baffle blanket installation will be installing the front baffle boards. The front baffle boards will be the two remaining baffle boards which are the larger two baffle boards of the four baffle board kit. They will be installed with the 7-3/8" dimension from the front to rear of the firebox. Start by setting the back side of the board on the rear baffle making sure that it is placed far enough back to lift up and onto the front baffle. Next you will place the front edge of the front baffle boards on the top side of the front baffle and slide them towards the firebox front until it stops against the front baffle edge. You will do this with each front baffle board with one to the right side of the firebox and one to the left side of the firebox. Confirm that the baffle blanket is directly on top of the baffle boards and that it does not protrude beyond the front baffle or front baffle boards as shown in ***Figure 14*** (also see note above).

Brick Sizes

A = 4-1/4" x 9"
B = 2-1/4" x 8-7/8"
D = 2-1/4" x 9"
E = 1-1/2" x 8-7/8"
F = Full Brick (4-1/2" x 9")
G = 1-1/2" x 9"

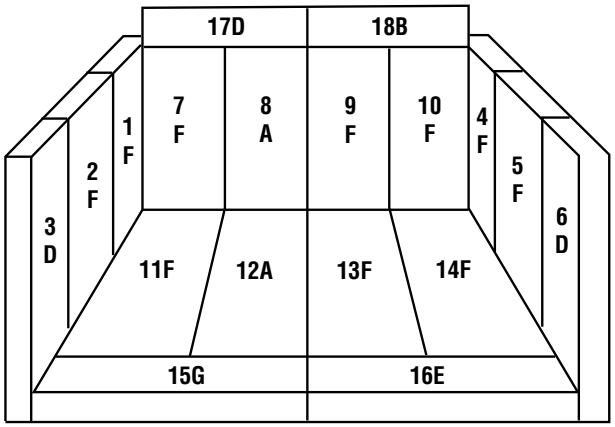


Figure 13

Side Cut-A-Way View of Firebox

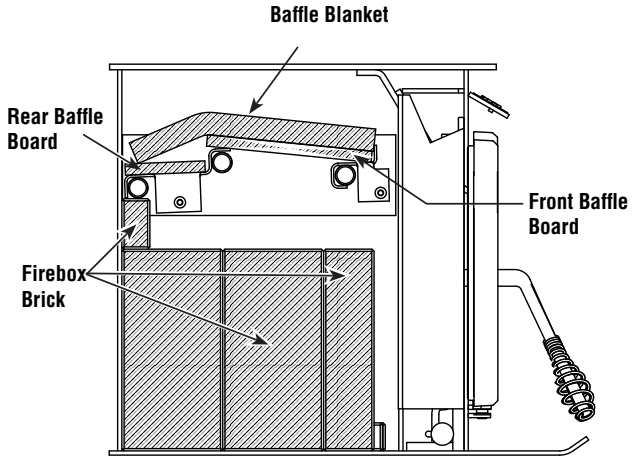


Figure 14

Baffle Insulation Parts

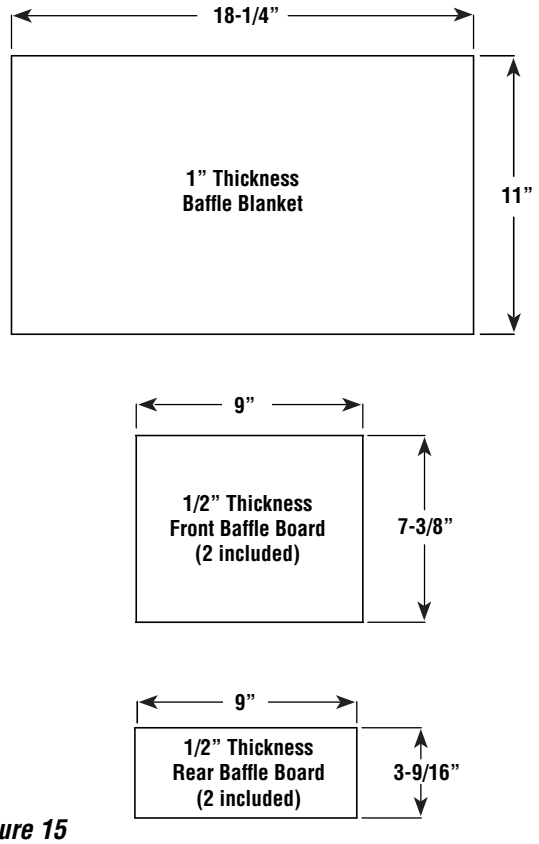
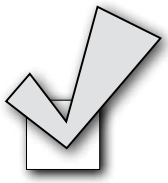


Figure 15

NOTE: DIAGRAMS & ILLUSTRATIONS ARE NOT TO SCALE.

POST INSTALLATION CHECKS

- ☐ **Check that all chimney pipe joints are secured and installed according to the manufacturers instruction.**
- ☐ **If used, make sure the outside air kit is properly installed and unobstructed.**
- ☐ **Double check all stove clearances.**
- ☐ **Be sure bricks and baffle boards are properly installed.**



FOR YOUR OWN PROTECTION AND INSURANCE PURPOSES, HAVE YOUR CHIMNEY AND CONNECTOR PIPE INSTALLATION INSPECTED BY YOUR LOCAL BUILDING CODE AUTHORITY OR FIRE MARSHAL BEFORE STARTING A FIRE IN YOUR STOVE. NOTIFY YOUR INSURANCE COMPANY.

PAINT CURING

Do not close the door tightly during the "Burn-In Period." Also, open the door frequently (every 5-10 minutes) to keep the gasket from adhering to the curing paint. Ventilate the house well during these first firings as the paint gives off carbon dioxide and unpleasant odors. It is recommended that persons sensitive to an imbalance in the indoor air quality avoid the appliance during the curing process.

Your new appliance is painted with a high temperature paint that cures during the first few firings. We recommend that you put your stove or fireplace insert through a regimen of three burns. The first two should last for 20 minutes each at 250 degrees (the appliance should be allowed to cool completely between each burn). The third should be a burn of at least 450 degrees F. for 45-60 minutes. The paint will become soft, gummy and emit non-toxic smoke during these burns. After the appliance cools down for the third time, the paint will harden. **DO NOT BUILD A LARGE ROARING FIRE UNTIL THIS CURING EFFECT IS COMPLETE OR YOU MAY DAMAGE THE FINISH OF YOUR STOVE.** Spray can touch-ups should be done only with a high temperature stove paint (cat. no. H8159), available from all IHP dealers.

OPERATING HINTS

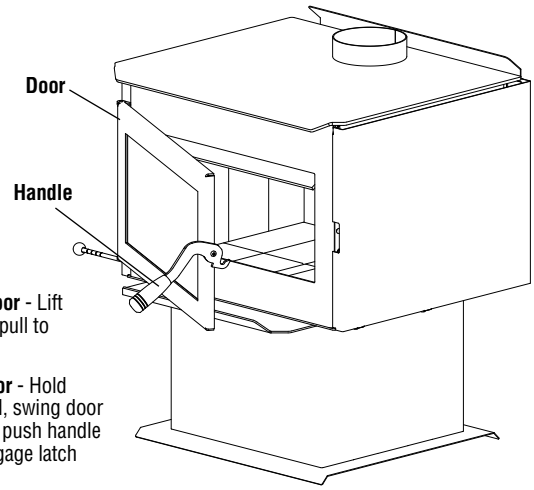
1. Burn only dry, well-seasoned cord wood. In some states it is illegal to burn wet wood or anything other than clean, dry wood products.
2. Your stove or fireplace insert is designed to operate with the door closed! Operate only with the door shut tightly at all times except when loading wood and possibly on start up to establish a draft. Never leave the unit unattended while the front door is opened.
3. **DO NOT** contact or move the baffle boards while loading wood. Occasionally check the baffle to assure that the boards are in there correct location.
4. **CAUTION: THE DRAFT CONTROL MUST BE FULLY OPEN BEFORE OPENING THE DOOR TO AVOID POSSIBLE COMBUSTION FLASH!!** (Ignition of hot volatile gases as the door is opened).
5. Feeding excessive amounts of fuel to the appliance should be avoided. It is important to supply it with sufficient draft and fuel to maintain a moderately hot fire. If, during overnight burns, heavy creosote deposits develop inside your stove and on the door, the draft is set too low - review your burning habits!

DOOR OPERATION

Do not operate the appliance with the door open or ajar other than possibly during start up to create a draft (Do not leave the unit unattended while the front door is slightly open during start up). Operating the appliance with the door open other than in initial start up if needed will produce extreme temperatures within the appliance. Damage caused from over-firing is not covered under the manufacturers limited warranty.

⚠ WARNING

Be careful not to abuse door assembly by striking or slamming it. If the door assembly or glass is broken or damaged, they must be replaced with factory original parts before heater can be safely operated. Use only components provided by the manufacturer as replacement parts.



Opening Door - Lift handle and pull to open door

Closing Door - Hold handle lifted, swing door closed then push handle down to engage latch

Figure 16

NOTE: DIAGRAMS & ILLUSTRATIONS ARE NOT TO SCALE.

STARTING AND MAINTAINING A FIRE

1. **NEVER USE FLAMMABLE LIQUIDS TO START OR REKINDLE A SOLID FUEL FIRE!!**
2. Fully open the primary draft control by placing draft control (wood handle located on left side of the stove) in the highest position. This control determines the amount of air entering the stove. Lowering this control reduces the burn rate of the stove.
3. Place a small amount of crumpled paper in the front of the firebox and cover it with a few pieces of kindling.
4. Light the paper and allow sufficient time for the kindling to become fully engulfed in flames. You will now close the wood units front door. Your wood units front door may or may not need to be left slightly open during this start up process, this depends on the stove model and the amount of draft present.
5. **When operating any wood burning appliance, it is important to become familiar with how the damper control affects heat output and the overall temperature of the appliance. A stove thermometer can be a helpful tool to help ensure you are not over-firing your appliance and it will also ensure you are burning fuel at a rate that is most efficient. Place a stove thermometer on the top of the appliance as shown in *Figure 17*. Monitor the temperature every 15 minutes or so until you become more familiar with your appliance. Close the damper all the way down if you begin to reach 600 degrees, as this is a sign that you are operating your appliance at too high a temperature.**

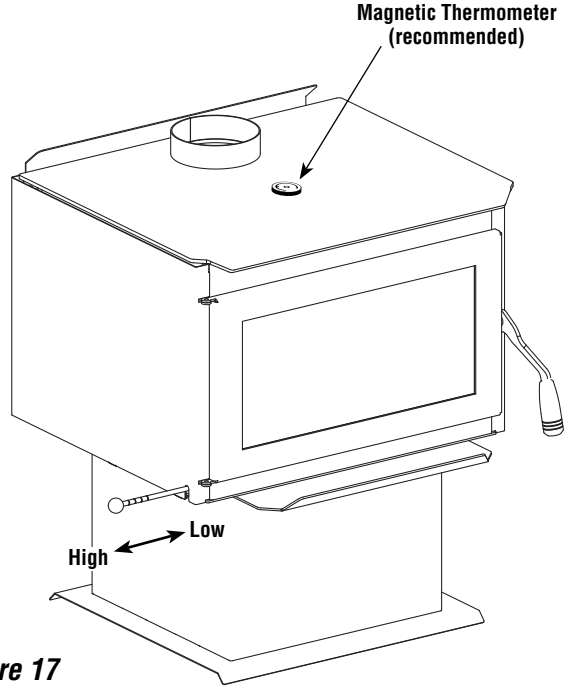


Figure 17

DO NOT LEAVE THE STOVE UNATTENDED WHILE THE FRONT DOOR IS SLIGHTLY OPEN.

CAUTION: Do Not alter the adjustment range of the draft control for increased firing for any reason.

Operate only with fuel door closed. Maintain all seals in good condition. Do not operate with broken glass.

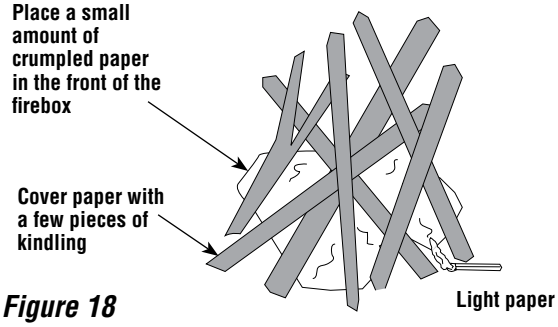


Figure 18

SEE MAINTENANCE SECTION FOR GLASS CLEANING GUIDELINES AND TIPS FOR KEEPING THE GLASS CLEAN *(Page 22)*.

6. Once kindling is burning well, larger pieces of wood may be added, then the door should be fully closed if there was the need to keep it slightly open during start up.
7. For best results, use smaller pieces of wood and light the fire from the top of the kindling pile to get the appliance temperature very high before loading larger wood for sustained burns. If necessary, crack the door to allow ignition of the fuel charge. Now you can add larger pieces of wood and after several minutes of high burn, set the left control for the desired heat output. Check the exhaust in about 15 to 20 minutes *(see **Figure 20**)*. Large amounts of smoke indicate an improper burn setting (either too high or too low). Adjust and recheck in 5 to 10 minutes.

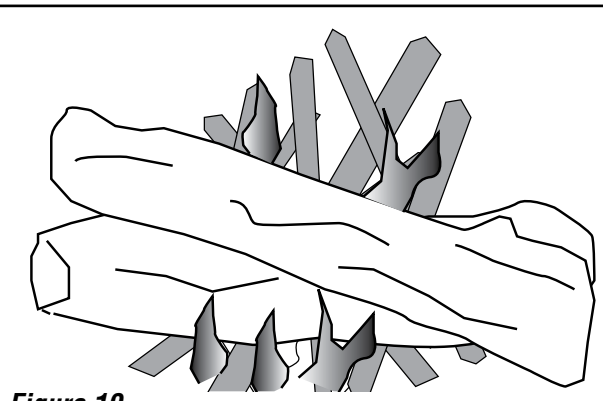


Figure 19

NOTE: DIAGRAMS & ILLUSTRATIONS ARE NOT TO SCALE.

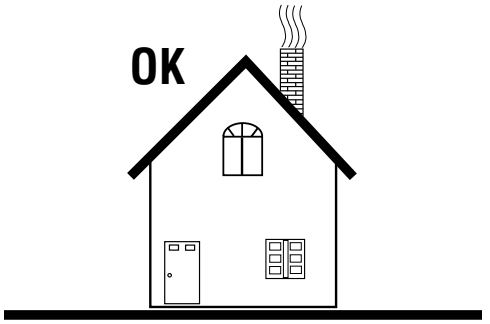




Figure 20

FUEL

This appliance is designed to burn dry seasoned natural wood only (see *Page 20* for a list of prohibited fuels). Failure to burn proper fuels only will void the certification and the warranty of the appliance.

Dry, seasoned wood is that which has been cut, split and allowed to dry under a covered area where air is free to flow and circulate under and around the wood (not under a tarp or plastic). Make sure wood is not stacked directly on the ground, it may absorb moisture from the ground. It should be allowed to dry in these conditions for a minimum of six months, preferably one year or more. **IT MUST BE UNDERSTOOD THAT WOOD CANNOT BE LEFT IN ANY KIND OF WET OR DAMP AREA OR IT WILL NEVER BECOME COMPLETELY SEASONED.**

Do Not store fuel within space heater installation clearances or within the space required for refueling and ash removal.

DO NOT OVERFIRE THIS HEATER

Attempts to achieve heat output rates that exceed heater design specifications can result in permanent damage to the heater.

What does "Well-Seasoned" mean?

When a tree is cut down, the wood is green, full of sap and moisture. This moisture content can exceed 80%, which must be reduced to less than 20%. Wood properly seasoned is then capable of generating the heat the stove was designed to provide.

Green wood does not burn easily. Attempting to burn green wood often results in a lot of smoke and very little fire. Time is the most important factor in seasoning wood. Ideally the moisture content should be reduced to 11-20%. ***NOTE: The use of a firewood moisture meter is recommended to ensure the firewood contains less than 20% moisture. Refer to moisture meter's owner's manual for proper operating instructions.***

Seasoning Guide
Softwoods – 6 months to 18 months
Hardwoods – 12 months to 24 months

Logs that are 5" diameter across or larger should be split in half, three pieces if over 8 inches, and four pieces when over a foot across. If a tree has been dead for 2 – 4 years it still needs to be cut, split, and seasoned for 6 to 24 months depending on the wood.

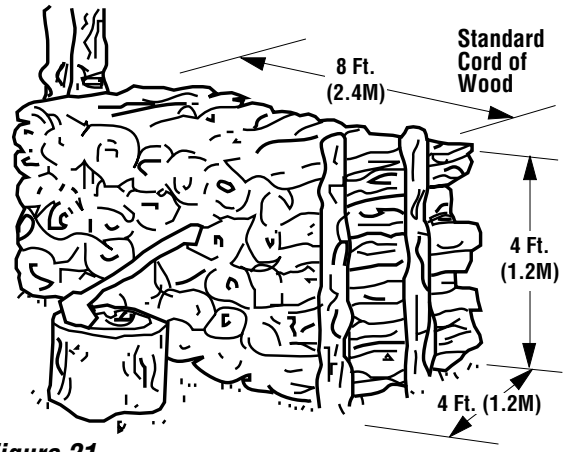


Figure 21

NOTE: DIAGRAMS & ILLUSTRATIONS ARE NOT TO SCALE.

GETTING THE MOST OUT OF YOUR STOVE

Recent developments in wood-burning technology have made wood-burning a cleaner and more convenient way to heat your home. Overall efficiency in a wood-burning appliance is a combination of combustion efficiency and heat transfer efficiency. Whether heating your entire home or just a room or two, your understanding of how to best operate your stove or insert will enhance its overall efficiency and performance. What this can mean to you is longer, cleaner burns, less wood use and more heat.

The following sections will outline techniques you can use to "get the most out of your stove." Please read them carefully.

MAXIMIZING YOUR STOVE'S OVERALL EFFICIENCY

It is important to know that for clean highly efficient burns you will need to have sufficient temperatures inside the firebox for thorough combustion. The best method for determining if you have sufficient temperatures is to watch the brick lining in your firebox. When you first light your stove or fireplace insert, the firebrick will turn a dark brown or black. After 20 to 30 minutes of a hot fire, most of the bricks should return to near their original beige color. This means the firebrick have reached a high enough temperature for your stove to achieve high combustion efficiency and you are ready to adjust the draft control to a lower setting.

Second and just as important, is achieving a high level of heat transfer efficiency. Slowing the rate of flow through the stove or insert enhances heat transfer, thus allowing more time for heat to be transferred into your home. To do this, be sure to thoroughly preheat your stove and then reduce the amount of primary air by closing the draft control down to about 1/2" open to fully closed. (More air may produce a slightly greater amount of heat, but will greatly increase wood consumption).

To get the most out of your appliance, you will need to combine good combustion efficiency with good heat transfer practices. The following are some tips on how to operate your stove to achieve the highest overall efficiency.

1. Thoroughly preheat your stove before slowing the burn rate by closing the draft control.
2. When loading wood into a preheated stove or fireplace insert, allow a vigorous fire to build before lowering the draft control.
3. Operate your stove as much as possible in the low to medium burn ranges.
4. Do not lower the draft setting so low as to completely extinguish the flames in the firebox. Check for at least some small flames twenty minutes after setting the draft control.
5. Do not continually operate your stove or fireplace insert in the high (wide open) setting. This wastes wood by carrying a great deal of heat up the chimney and can damage your stove or fireplace insert and chimney.
6. Go outside and check your chimney. More than a very small amount of smoke indicates wasted heat, creosote build up and pollution *(see **Figure 20**)*.

ACHIEVING CLEAN, LONG BURNS

To achieve long burn times, after having thoroughly preheated the stove, load the firebox without blocking the small air opening found in the center front of the firebox. At this point, you may need to burn the stove with the draft open for a few minutes to ignite the wood. All IHP stoves are EPA tested for emissions at low burn with the air control completely closed. Whether or not you should burn your stove with the air control completely closed will depend on the following factors:

- How you load your wood
- Your chimney type, height and draft
- Your wood type and its moisture content
- The temperature of the appliance
- Which model stove or insert you have

In order to maximize the burn time of your stove you may need to experiment to get the right balance of starting temperature, wood type, and draft control setting for your particular venting configuration. Do not reload the stove for long burns when the stainless secondary tubes or baffles are glowing red, or when the stove is uncomfortably hot to load. This indicates the stove is too hot to load for a long burn.

NOTE: DIAGRAMS & ILLUSTRATIONS ARE NOT TO SCALE.

OPTIONAL BLOWER KIT

The optional blower is controlled by a Dial-a-Temp *(see **Figure 22**)*. It contains an On/Off line switch with variable speed control from low to high.

1) Install the optional blower kit per the instructions provided in the blower kit.
2) Plug the blower power cord into the receptacle on the bottom of the Dial-A-Temp.
3) Plug the connected Dial-A-Temp into a properly grounded, 120 VAC wall outlet.
4) To operate, rotate the dial on the Dial-A-Temp clockwise until it clicks on. Rotate the dial further clockwise for a lower speed, then counter-clockwise for a higher speed.

NOTE: Turn blower off before opening the door to load the fuel.

⚠ WARNING

The blower must be plugged directly into a properly grounded three-prong receptacle, 120 VAC, 60 Hz, single phase. Do not cut or remove the grounding prong from this plug. Do not route power cord under or in front of appliance.

Installation must be in accordance with National Electrical Code, ANSI/NFPA 70 - latest edition. In Canada, the current CSA C22.1 Canadian Electrical Code - latest edition.

DANGER: Disconnect power before servicing blower.

OPTIONAL BLOWER KIT

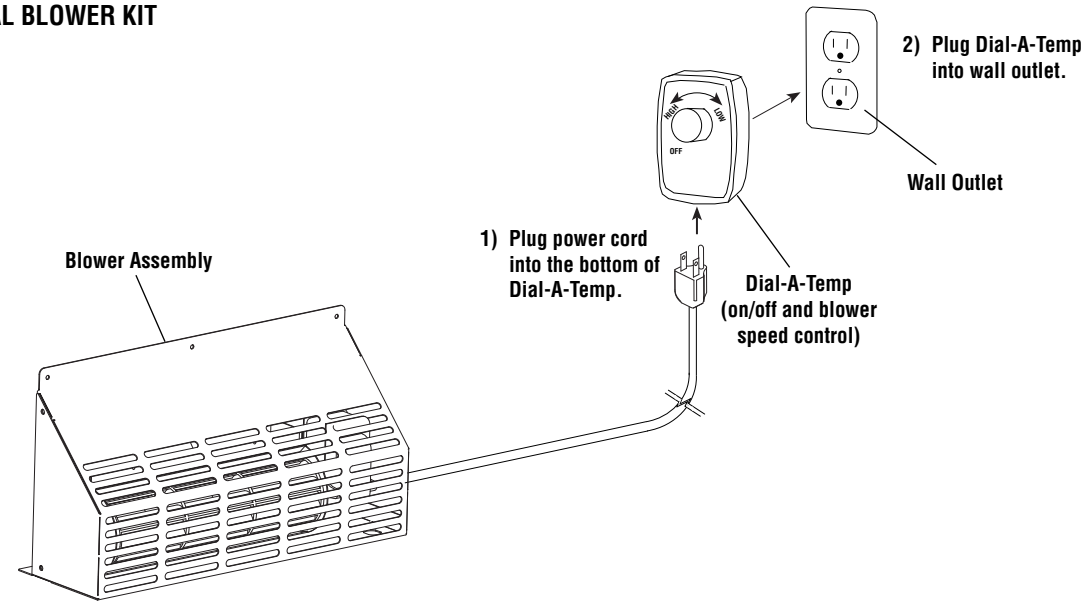


Figure 22

⚠ WARNING

In the event that you remove the blower for any reason, the rear heatshield must be returned to its original condition or replaced before using the heater. Excessive rear wall temperatures will result if the stove is burned with the blower opening unobstructed.

NOTE: DIAGRAMS & ILLUSTRATIONS ARE NOT TO SCALE.

DO'S AND DON'TS

DO NOT: Install or operate the appliance before reading this manual.

DO NOT: Close the draft beyond the point at which the flames are completely extinguished.

DO NOT: Open the appliance door without **fully opening** the draft first.

DO NOT: Burn driftwood or wood that has been in salt water. This includes some mill ends and scrap lumber that has been floated in salt water on the way to the mill. (This will void your warranty).

DO NOT: Force oversized logs into the firebox as this may dislodge the baffle assembly.

DO NOT: Close the door tightly during Burn-In Period.

DO: Consult local building department if other than recommended clearances are desired.

DO: Read instructions for the baffle boards occasionally to ensure you have not bumped or moved them out of place when loading wood.

DO: Check the chimney and baffle monthly to make sure they are clean.

DO: Burn seasoned, dry wood only! (RAIN = WET WOOD)

DO: Open the door frequently during Burn-In Period to keep gasket from adhering to the curing paint.

DO: Enjoy the warm feeling of your new IHP appliance.

Smoke Detector Recommended

Since there are always several potential sources of fire in any home, we recommend installing smoke detectors. If possible, install the smoke detector in a hallway adjacent to the room (to reduce the possibility of occasional false activation from the heat produced by these appliances). If your local code requires a smoke detector be installed within the same room, you must follow the requirements of your local code. Check with your local building department for requirements in your area.

Carbon Monoxide Monitor Recommended

Carbon Monoxide Poisoning: Early signs of carbon monoxide poisoning are similar to the flu with headaches, dizziness and/or nausea. If you have these signs, obtain fresh air immediately. Some people are more affected by carbon monoxide than others, including pregnant women, people with heart or lung disease or anemia, those under the influence of alcohol, and those at high altitudes.

It is against federal regulations to operate wood heaters in a manner inconsistent with operating instructions in the manual.

PROHIBITED FUELS

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:

- **Garbage;**
- **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 or pressure-treated wood;**
- **Manure or animal remains;**
- **Salt water driftwood or other previously salt water saturated materials;**
- **Unseasoned wood;**
- **Christmas tree branches;**
- **Paper products, colored paper, cardboard, plywood, or particleboard;**
- **gasoline;**
- **naphtha;**
- **engine oil;**
- **flammable liquids;**
- **solvents;**
- **grease; or**
- **coal**

The prohibition against burning these materials does not prohibit the use of fire starters made from paper, cardboard, saw dust, wax and similar substances for the purpose of starting a fire in an affected wood heater.

Burning these materials may result in release of toxic fumes or render the heater ineffective and cause smoke. Intense firing with these materials may overheat the fireplace, causing damage to the unit, a fire or even possibly igniting a chimney fire if the chimney is creosoted. Burning unapproved fuel, resulting in excessive pollutants being emitted, may be prohibited and subject to a fine or other penalty by the authority having jurisdiction in your area.

MAINTENANCE

Have your product inspected at least once a year by a qualified service technician to ensure gaskets, air tubes, baffles, and venting are in good repair to ensure proper performance. Have degraded items replaced by a qualified service technician.

THIS WOOD HEATER NEEDS PERIODIC INSPECTION AND REPAIR FOR PROPER OPERATION. IT IS AGAINST FEDERAL REGULATIONS TO OPERATE THIS WOOD HEATER IN A MANNER INCONSISTENT WITH OPERATING INSTRUCTIONS IN THIS MANUAL.

DOOR HINGES: If door hinges need lubricating, use an anti-seize compound (never use oil) available from your IHP dealer.

DOOR LATCH: Adjustment Instructions -

1. Using a 5/32" hex wrench, remove the side heat shield by removing 3 screws on the back, 2 screws on the bottom, and 1 screw at the top-front corner.
2. With the door open, loosen the latch nuts using a 3/8" wrench. Slide the latch assembly forward to loosen the door and backward to tighten the door.
3. Secure the nuts in place and test the door. If more adjustment is required, repeat step 2.
4. Replace the heat shield before burning the stove.

The hinge side of the door can also be adjusted if necessary. Repeat the procedure above on the hinge side of the stove.

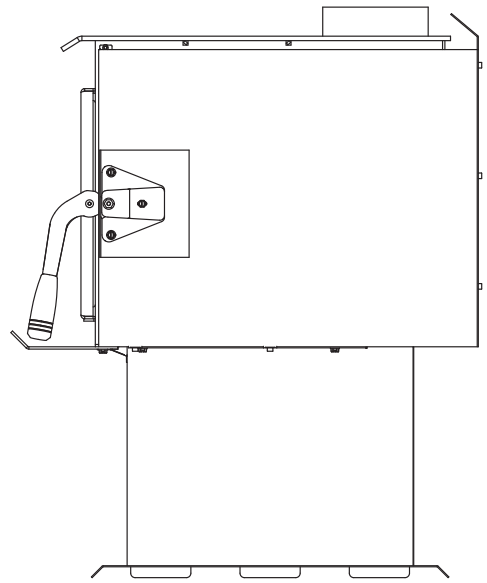


Figure 23

DOOR GASKET: Periodically check gasket to make sure it is not over-compressed. If compressed, replace with a IHP approved woven door rope. (Don't try substituting rope, only use IHP approved door rope).

BAFFLE BOARDS: Your baffle boards should be inspected during every chimney cleaning. If either board is damaged then replace baffle boards.

CREOSOTE FORMATION AND NEED FOR REMOVAL

When wood is burned slowly, it produces tar and other organic vapors, which combine with expelled moisture to form creosote. 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 makes an extremely hot fire.

The chimney and chimney connector should be inspected at least once monthly during the heating season to determine if a creosote buildup has occurred. If creosote has accumulated (1/8" [3 mm] or more), it should be removed to reduce the risk of a chimney fire.

Establish a routine for the fuel, wood burner and firing technique. Check daily for creosote build-up until experience shows how often you need to clean to be safe. Be aware that the hotter the fire the less creosote is deposited, and weekly cleaning may be necessary in mild weather even though monthly cleaning may be enough in the coldest months. Contact your local municipal or provincial fire authority for information on how to handle a chimney fire. Have a clearly understood plan to handle a chimney fire.

DISPOSAL OF ASHES

Whenever ashes get 3 to 4 inches deep in your firebox, and when the fire has burned down and cooled, remove excess ashes. Leave an ash bed approximately 1 inch deep on the firebox bottom to help maintain a hot charcoal bed.

Ashes should be scooped out of a cool stove or fireplace insert with a small metal shovel. Ashes should be placed in a steel container with a tight fitting lid and moved outdoors immediately. Other waste shall not be placed in this container. The closed container of ashes should be placed on a non-combustible floor or on the ground, well away from all combustible materials, pending final disposal. If the ashes are disposed of by burial in soil or otherwise locally dispersed, they should be retained in the closed container until all the cinders have thoroughly cooled. Ashes can ignite up to 72 hours after removal from the appliance.

⚠ WARNING

Inspect and clean chimney and connector frequently. Under certain conditions of use, creosote buildup may occur rapidly.

MAINTENANCE

GLASS REPLACEMENT INSTRUCTIONS

*(Refer to **Figure 24**)*

Step 1. Remove Door Assembly - Remove the upper and lower hinge pins by pressing the bottom of each hinge pin up, then pull out from the top. Lift off door and place face down on a soft surface.

Step 2. Remove Glass Retainer Nuts (10 ea.) - Using an 3/8" nut driver or wrench remove the ten glass retainer nuts. To locate nuts, peel back the door gasket as necessary.

Step 3. Remove Glass - Carefully remove broken glass one piece at a time (protective leather gloves are recommended).

Step 4. Clean Door Frame - Clean the area of the door frame where the new glass with gasket will be installed.

Step 5. Install New Glass Assembly - Install the new glass with gasket (use only factory supplied 5mm ceramic glass with gasket. Do not substitute).

Step 6. Reinstall Retainer and Nuts - Carefully reinstall the glass retainer and nuts. Be very careful not to overtighten the nuts (this could result in glass breakage when the stove is hot).

Step 7. Reinstall Door - Align hinges on door frame with corresponding hinge holes on the face of stove. Reinstall the upper and lower hinge pins from the top.

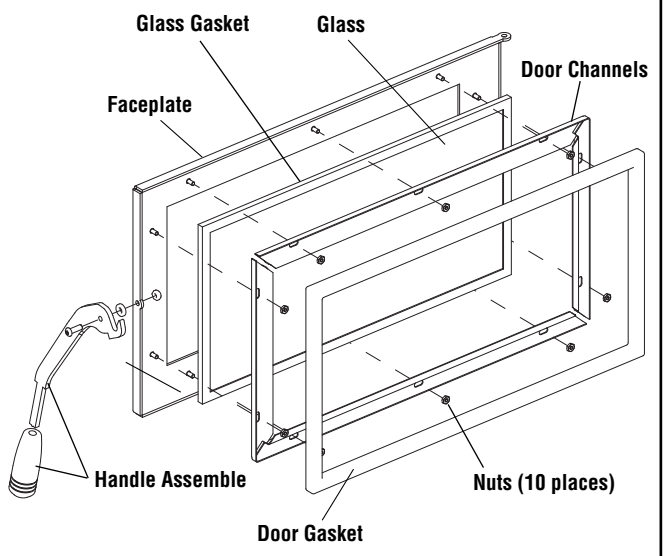


Figure 24 - Glass Replacement

GLASS CLEANING GUIDELINES

WARNING: DO NOT CLEAN GLASS WHEN APPLIANCE IS HOT!

Glass on any wood stove will not stay perfectly clean. Here are some guidelines for cleaning and caring for the glass:

- **Ensure the stove is cold prior to cleaning glass.**
- This appliance is designed to provide a flow of air over the inside of the glass, where along with high heat helps inhibit build-up on the glass. When build-up occurs, a commercial glass cleaner designed for stoves is recommended. Regular household glass cleaners will not clean creosote.
- Do not use abrasives such as steel pads, steel wool or oven cleaner as they will scratch the glass. Never scrape glass with a razor blade as this may pit the glass and make it impossible to clean in the future.
- Do not use chemical glass cleaners as they may damage the gaskets or painted surfaces.

TIPS FOR KEEPING THE GLASS CLEAN

- Burn only dry seasoned cord wood. **Wet wood = Dirty glass.**
- A short, hot fire (15 - 20 minutes) may help to clean off some of the normal buildup. **Lower burns = more build-up. Higher burns = less build-up.**
- Keep freshly loaded wood away from the glass.
- After reloading, allow all the wood to catch flame before dampering down the stove.

⚠ CAUTION

Cleaning Glass: Ensure appliance is cold prior to cleaning glass. A commercial glass cleaner designed for stoves is recommended. Do not use abrasive cleaners. Do not clean with any materials, which may scratch or otherwise damage the glass. Scratches on the glass can develop into cracks or break. Inspect the glass regularly. If you detect a crack, extinguish the fire and contact your dealer for a replacement.

NOTE: DIAGRAMS & ILLUSTRATIONS ARE NOT TO SCALE.

TROUBLESHOOTING

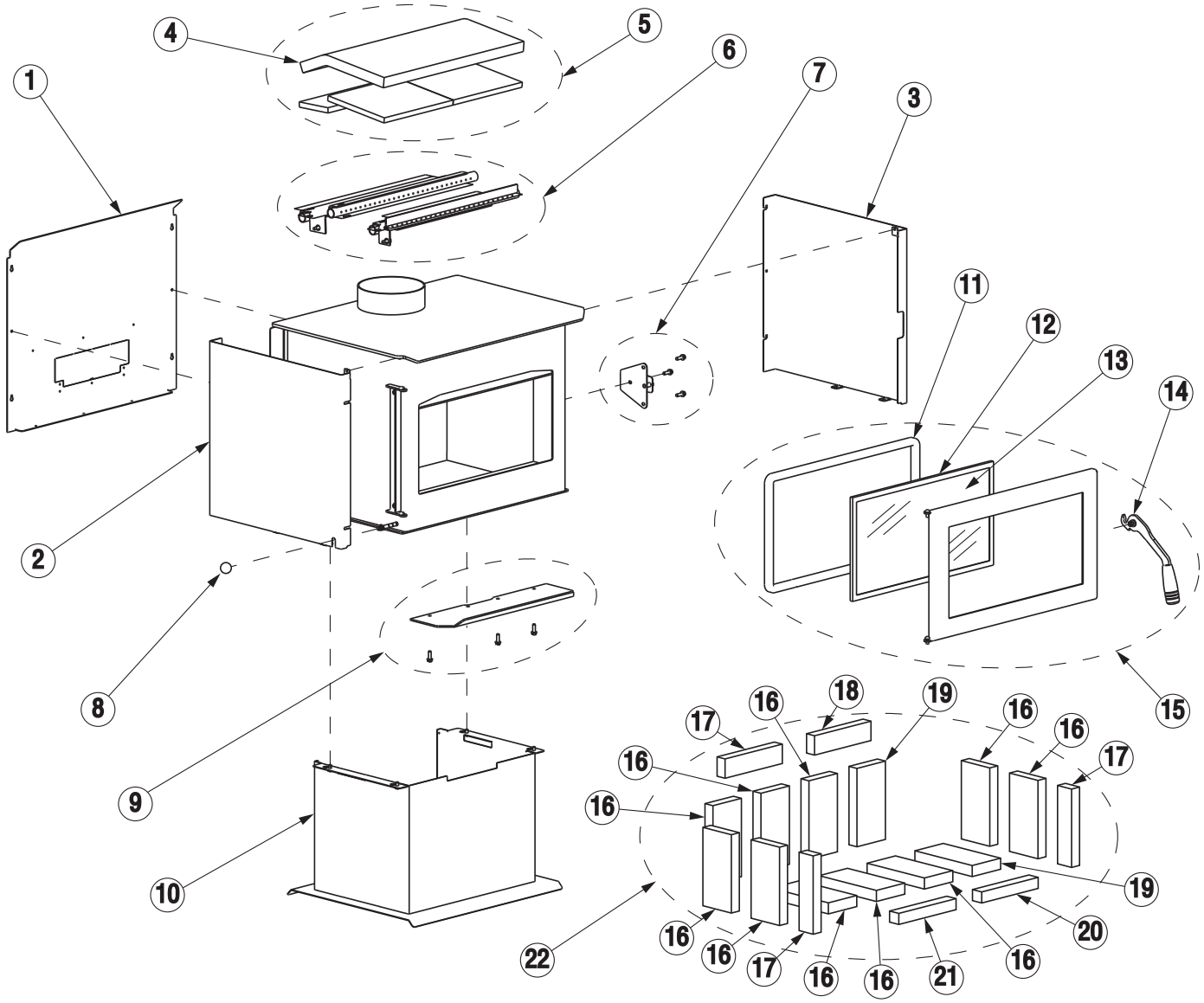
Problem	Solution
POOR DRAFT:	Extend chimney in length or have the chimney realigned to the proper size flue. Oversized chimneys normally have poor drafts. Remember, the appliances' draft depends solely on the natural draft of the chimney (See Draft Requirements on ***Page 4***). If your stove or fireplace insert is not drafting properly, your chimney is the problem. All stoves are thoroughly tested to ensure proper draft with the correct size chimney flue.
EXCESSIVE DRAFT:	With better chimneys being more common, excessive draft can be an issue. Alleviate excessive draft by slowing the burn rate of the appliance once it has reached proper operating temperature (See Maximizing Your Stoves Overall Efficiency on ***Page 18***).
DIRTY GLASS:	1) Burn smaller, hotter fires and check to make sure you are not setting the draft down too far with the draft control. 2) Make sure your wood is well-seasoned and dry (not open to rain - see Creosote and Fuel sections on ***Pages 17 and 20***). 3) See Poor Draft section (above) and Cleaning Glass on ***Pages 4 and 22***.
SMOKES WHEN DOOR IS OPEN:	1) If smoke is entering the room, check to make sure your baffle boards are properly installed. 2) Check the chimney for blockage due to creosote (see Chimney and Creosote sections on ***Page 22***). 3) Check draft (See POOR DRAFT section above).
WOOD BURNS TOO FAST:	1) The draft control must be closed further. 2) Add fuel at lower firebox temperatures. 3) Load wood side to side and reduce the flow of air under wood. 4) The door seal may need replacing, check for leakage. 5) See "Excessive Draft."
POOR HEAT OUTPUT:	1) Check your wood. Wet, moist, unseasoned wood will not produce heat. 2) Your stove or fireplace insert needs to be seasoned (moisture removed from the steel and brick). Continue to burn a fire. It normally takes from one to three weeks of burning to season your stove (See Burn-In Period on ***Page 15***). 3) See Excessive Draft section above.
PAINT GIVES OFF ODOR (smoke):	Paint is tempering-in. Burn only moderately hot for the first few days until paint is fully cured. Then burn a very hot fire to cure any paint that may not easily cure. Open windows or door to ventilate (See Burn-In Period on ***Page 15***).

REPLACEMENT PARTS - MODEL TAHOMA™ 1600GL

Contact an IHP dealer to obtain any of these parts. Never use substitute materials. Use of non-approved parts can result in poor performance and safety hazards.

Item #	Cat. #	Description
1	F4085	Rear Heat Shield
2	F4086	Left Heat Shield
3	F4087	Right Heat Shield
4	H8017	Baffle Blanket, 20” x 11” x 1”
5	H8016	Baffle Blanket and Board Kit
6	H3103	Secondary Tube Kit (includes clamps and hardware)
7	H8902	Door Latch Kit (includes hardware)
8	H5650	Draft Rod Knob
9	F4088	Ash Lip Kit (includes hardware)

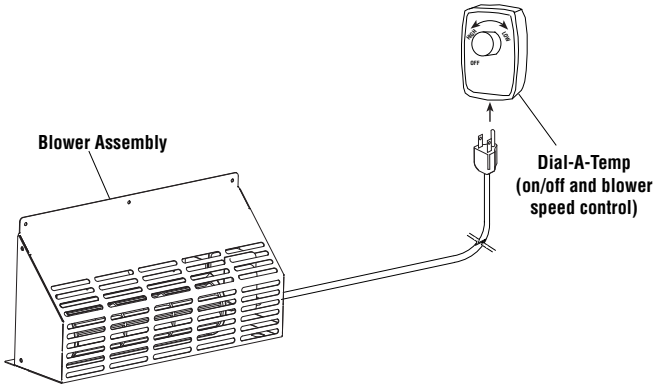
Item #	Cat. #	Description
10	F4101	Pedestal Assembly
11	H5639	Door Rope Kit (6’ 2”)
12	H5640	Glass Gasket Kit (8’ 4”)
13	F4089	Ceramic Glass w/ Gasket
14	H8901	Door Handle Assembly w/ Hardware
15	F4090	Door Assembly w/ Pins
16	H5612	Firebrick, 4-1/2” x 9”, each (10 per unit)
17	H5607	Firebrick, 2-1/4” x 9”, each (3 per unit)
18	H3095	Firebrick, 2-1/4” x 8-7/8”, each (1 per unit)
19	H5576	Firebrick, 4-1/4” x 9”, each (2 per unit)
20	H5597	Firebrick, 1-1/2” x 8-7/8”, each (1 per unit)
21	H5604	Firebrick, 1-1/2” x 9”, each (1 per unit)
22	F4091	Complete Firebrick Kit



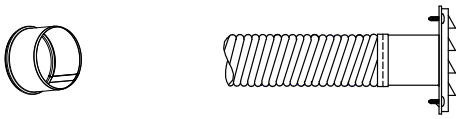
ACCESSORIES - MODEL TAHOMA™ 1600GL

OPTIONAL ACCESSORIES		
Cat. No.	Model	Description
BLOWER		
H8873	BLWR-ES-S-150	Blower Kit, Tahoma
OUTSIDE AIR KIT		
UZIAD	UZIAD	Outside Air Coupler Kit (connects outside air ducting, UZI, to stove) AND -
UZI	UZI	Outside Air Ducting Kit (includes 4" insulated flex x 10' long) AND -
F4062	OUTAIRKIT-ES	Outside Air Panel and Air Channel Kit (includes rear pedestal panel and side and front air channels)
MISC.		
H8159	TSPK-B	Touch-Up Paint , Metallic Black, 12 oz. Aerosol

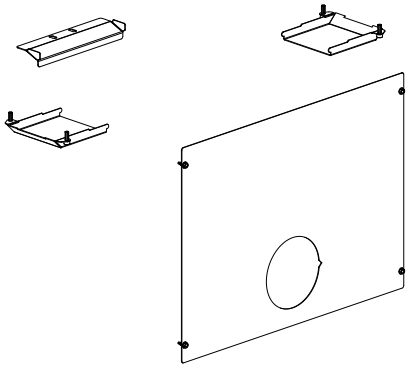
OPTIONAL BLOWER KIT



OUTSIDE AIR KITS



UZIAD UZI



F4062

TOUCH-UP PAINT



NOTE: DIAGRAMS & ILLUSTRATIONS ARE NOT TO SCALE.

SAFETY / LISTING LABEL - MODEL T160GL

CONTACT YOUR LOCAL BUILDING OR FIRE OFFICIALS ABOUT RESTRICTIONS AND INSTALLATION INSPECTION IN YOUR AREA. LISTED ROOM HEATERS, SOLID FUEL TYPE ALSO FOR USE IN MOBILE HOME INSTALLATION (USA ONLY) PURSUANT TO (UM) 84-HUD

Model: T160GL Report Number 23-106	Serial No.	T160GL-

IRONSTRIKE® HEAT FOR LIFE

Manufactured By:
INNOVATIVE HEARTH PRODUCTS
1502 14th St NW
Auburn, WA 98001 USA

PFS® C US

"PREVENT HOUSE FIRES"

Install and use only in accordance with manufacturer's installation and operating instructions and your local building codes.

CAUTION: Special methods are required when passing chimney through a wall or ceiling, refer to local building codes. Do not connect this unit to a chimney flue serving another appliance.

WARNING: (MOBILE HOME USA Only) An outside air inlet must be provided for combustion, and be unrestricted while unit is in use. Do not install appliance in a sleeping room. The structural integrity of the mobile home floor, walls and ceiling/roof must be maintained. Approval void when label is missing.

Replace glass only with 5mm ceramic.

Model / Modèle: T160GL

Tested to/Testé selon: UL 1482, ULC S627

Type Of Fuel: Solid Wood Only

Optional Blower, Part No. H8873

Blower Electrical Rating: 120V, 60 Hz, 1 Amp

Do not route power cord under or in front of appliance.

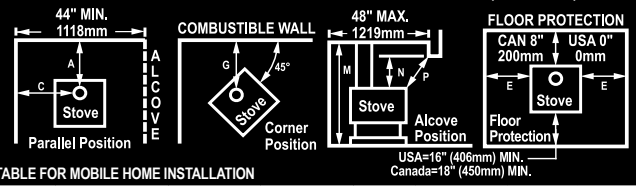
Burning improper fuel (i.e. Charcoal) can result in carbon monoxide poisoning, which may lead to death!

WARNING: Do Not obstruct the space beneath the heater.

OPERATE ONLY WITH DOOR CLOSED

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.
Certified to comply with 2020 particulate emission standards using crib wood. - Emissions: 1.7 grams/hr.

Minimum Clearance to Combustible Materials - Inches (millimeters)



SUITABLE FOR MOBILE HOME INSTALLATION

PIPE	INSTALLATION	A	C	E†	G	M	N ❶	P ❶
Single Wall	Residential or Alcove	USA-16" CAN-483mm	USA-21" CAN-610mm	8" 200mm	USA-18" CAN-533mm	84" 2134mm	30" 762mm	36" 914mm
Single w/ Pipe Shield	Residential or Alcove	USA-10" CAN-330mm	USA-18" CAN-533mm	8" 200mm	USA-13.5" CAN-419mm	84" 2134mm	30" 762mm	36" 914mm
Double Wall	Residential or Alcove or Mobile Home*	USA-10" CAN-330mm	USA-18" CAN-533mm	8" 200mm	USA-13.5" CAN-419mm	72" 1829mm	30" 762mm	36" 914mm

† USA=8" (200mm) from door opening, Canada=8" (200mm) from sides and back of unit
❶ Dimensions to Stove Body * Mobile Home - USA only

ALCOVE DIMENSIONS (single wall pipe): Minimum 48"(1219mm) width, maximum 48" (1219mm) depth.
ALCOVE DIMENSIONS (double wall pipe): Minimum 44"(1117mm) width, maximum 48" (1219mm) depth.

FLOOR PROTECTOR: The hearth and/or floor protection must be a non-combustible hearth/floor protector with a minimum thickness of 3/8" (9.5mm), extending beneath the heater and to the front, sides, and rear as indicated.

NOTICE: A header constructed of COMBUSTIBLE material must meet both N & P clearances. All mobile home installations require outside air kits (OAK).

Clearance dimensions are to 6" (152mm) flue collar. If a single wall connector pipe with shield is used, a 1 inch air space is needed between pipe and shield. Shield attaches to rear of stove pipe and must run from stove top to ceiling. Pipe shield shall be UL listed.

CHIMNEY & CONNECTOR: Minimum 6" diameter, minimum 24 MSG black steel connector pipe with listed factory-built chimney suitable for use with solid fuels or masonry chimney. Horizontal connection not tested, refer to local building codes for installation. Restrictions apply! Read instructions before installing.

Minimum alcove width between combustibles: 44" with double wall pipe and 48" all other installations.

MOBILE HOME approved Class A - UL 103HT chimneys and double wall connectors:

- Security
- Metal Fab
- Projet
- Ameri-Tec
- Jakes Evans
- Metalbestos
- Dura-Vent
- Industrial Chimney

RESIDENTIAL chimney systems must be from the same brands as listed for mobile homes but connector pipe may be double wall, single wall or single wall with shield as listed above.

Connector pipe and chimney must be of the same brand.

COMPONENTS REQUIRED FOR INSTALLATIONS: Pedestal Base must be attached as shown in the installation instructions. If optional blower is NOT used, Rear Heat Shield Block Off Plate shall be installed.



CAUTION: HOT WHILE IN OPERATION. DO NOT TOUCH, KEEP CHILDREN, CLOTHING AND FURNITURE AWAY. CONTACT MAY CAUSE SKIN BURNS. SEE NAME-PLATE AND INSTRUCTIONS. DO NOT OVERFIRE - IF HEATER OR CHIMNEY CONNECTOR GLOWS, YOU ARE OVERFIRING. INSPECT AND CLEAN CHIMNEY FREQUENTLY - UNDER CERTAIN CONDITIONS OF USE, CREOSOTE BUILDUP MAY OCCUR RAPIDLY. DO NOT USE GRATE OR ELEVATE FIRE - BUILD WOOD FIRE DIRECTLY ON HEARTH. FEED DOOR MUST BE CLOSED DURING FIRING EXCEPT WHEN ADDING FUEL. KEEP ASH DOOR CLOSED TO AVOID EXCESS HEAT. DANGER: RISK OF ELECTRICAL SHOCK. DISCONNECT POWER BEFORE SERVICING UNIT. FOR USE WITH SOLID WOOD FUEL ONLY.

Date of Manufacture / Date De Fabrication

2023	2024	2025	JAN. JANV	FEB. FEVR	MAR. MARS	APR AVR	MAY MAI	JUN JUIN	JUL JUIL	AUG AOUT	SEP SEPT	OCT OCT	NOV NOV	DEC DEC

U.S. ENVIRONMENTAL PROTECTION AGENCY
Certified to comply with 2020 particulate emission standards.

Part No. 900902-03 Rev. 1, 06/2023 DO NOT REMOVE THIS LABEL Made in U.S.A.

Innovative Hearth Products
IronStrike® Brand Wood Burning Stove and Insert
Limited Lifetime Warranty

THE WARRANTY

Innovative Hearth Products ("IHP") Limited Lifetime Warranty warrants your IronStrike® Brand Wood Burning Stove or Insert ("Product") to be free from defects in materials and workmanship at the time of manufacture. The Product body, firebox and ceramic glass carry the Limited Lifetime Warranty. Ceramic glass carries the Limited Lifetime Warranty against thermal breakage only. After installation, if covered components manufactured by IHP are found to be defective in materials or workmanship during the Limited Lifetime Warranty period and while the Product remains at the site of the original installation, IHP will, at its option, repair or replace the covered components. If repair or replacement is not commercially practical, IHP will, at its option, refund the purchase price or wholesale price of the IHP product, whichever is applicable. IHP will also pay IHP prevailing labor rates, as determined in its sole discretion, incurred in repairing or replacing such components for up to five years. THERE ARE EXCLUSIONS AND LIMITATIONS to this Limited Lifetime Warranty as described herein.

COVERAGE COMMENCEMENT DATE

Warranty coverage begins on the date of purchase. In the case of new home construction, warranty coverage begins on the date of first occupancy of the dwelling or six months after the sale of the Product by an independent IHP dealer/distributor, whichever occurs earlier. The warranty shall commence no later than 24 months following the date of product shipment from IHP, regardless of the installation or occupancy date.

EXCLUSIONS AND LIMITATIONS

This Limited Lifetime Warranty applies only if the Product is installed in the United States or Canada and only if operated and maintained in accordance with the printed instructions accompanying the Product and in compliance with all applicable installation and building codes and good trade practices.

This warranty is non-transferable and extends to the original owner only. The Product must be purchased through a listed supplier of IHP and proof of purchase must be provided. The Product body and firebox carry the Limited Lifetime Warranty from the date of installation. Vent components, trim components and paint are excluded from this Limited Lifetime Warranty. The following do not carry a Limited Lifetime Warranty but are warranted as follows:

Cast Iron Heat Exchanger – Replacement for five years from the date of installation
Cast iron parts – Replacement for one year from the date of installation
Catalyst – Carries a separate warranty. Refer to the warranty certificate provided for that part
Electrical components – Repair or replacement for one year from date of installation
Gaskets – Replacement for one year from the date of installation.
Gold & nickel plating – Replacement for two years from date of installation. Excludes tarnishing
Refractory & screens – Replacement for two years from date of installation. Excludes hairline cracks
Removable air tubes – Repair or replacement for seven years from date of installation. IHP prevailing labor rates for years one through five.
Labor coverage – Prevailing IHP labor rates apply for the warranty period of the component, unless otherwise noted

Parts not otherwise listed carry a 90 day warranty from the date of installation.

Whenever practicable, IHP will provide replacement parts, if available, for a period of 10 years from the last date of manufacture of the Product.

IHP will not be responsible for: (a) damages caused by normal wear and tear, accident, riot, fire, flood or acts of God; (b) damages caused by abuse, negligence, misuse, or unauthorized alteration or repair of the Product affecting its stability or performance. (The Product must be subject to normal use with approved fuels listed in the Operation Manual provided with the product. Fuel products with abnormal burning characteristics, including but not limited to fuel such as driftwood, coal or plywood and wood products using a binder may burn at excessive temperatures and may cause damage to the Product or may cause it to function improperly; IHP stoves, inserts and high efficiency EPA fireplaces are approved for burning dry seasoned wood only.); (c) damages caused by failing to provide proper maintenance and service in accordance with the instructions provided with the Product; (d) damages, repairs or inefficiency resulting from faulty installation or application of the Product.

Coverage of this Limited Lifetime Warranty is conditional upon the appliance being operated without the use of grates, irons or any other method to elevate the fire.

IHP is not responsible for inadequate system draft caused by air conditioning and heating systems, mechanical ventilation systems, or general construction conditions which may generate negative air pressure in the room in which the appliance is installed. Additionally IHP assumes no responsibility for smoking conditions caused by inadequate chimney height, adjoining trees or buildings, adverse wind conditions or unusual environmental factors and conditions. Certain IHP Products are listed for use with Security Chimneys International, Ltd. chimney systems only. Use of chimney components other than that specified in the Product manual will void the Product warranty.

This Limited Lifetime Warranty covers only parts and labor as provided herein. In no case shall IHP be responsible for materials, components or construction which are not manufactured or supplied by IHP or for the labor necessary to install, repair or remove such materials, components or construction. Additional utility bills incurred due to any malfunction or defect in equipment are not covered by this Limited Lifetime Warranty. All replacement or repair components will be shipped F.O.B. from the nearest stocking IHP factory.

LIMITATION ON LIABILITY

It is expressly agreed and understood that IHP's sole obligation and the purchaser's exclusive remedy under this warranty, under any other warranty, expressed or implied, or in contract, tort or otherwise, shall be limited to replacement, repair, or refund, as specified herein.

In no event shall IHP be liable for any incidental or consequential damages caused by defects in the Product, whether such damage occurs or is discovered before or after replacement or repair, and whether such damage is caused by IHP's negligence. IHP has not made and does not make any representation or warranty of fitness for a particular use or purpose, and there is no implied condition of fitness for a particular use or purpose.

IHP makes no expressed warranties except as stated in this Limited Lifetime Warranty. The duration of any implied warranty is limited to the duration of this expressed warranty.

No one is authorized to change this Limited Lifetime Warranty or to create for IHP any other obligation or liability in connection with the Product. Some states and provinces do not allow the exclusion or limitation of incidental or consequential damages, so the above limitations or exclusions may not apply to you. The provisions of this Limited Lifetime Warranty are in addition to and not a modification of or subtraction from any statutory warranties and other rights and remedies provided by law.

INVESTIGATION OF CLAIMS AGAINST WARRANTY

IHP reserves the right to investigate any and all claims against this Limited Lifetime Warranty and to decide, in its sole discretion, upon the method of settlement.

To receive the benefits and advantages described in this Limited Lifetime Warranty, the appliance must be installed and repaired by a licensed contractor approved by IHP.

Contact IHP at the address provided herein to obtain a listing of approved dealers/distributors. **IHP shall in no event be responsible for any warranty work done by a contractor that is not approved without first obtaining IHP's prior written consent.**

HOW TO REGISTER A CLAIM AGAINST WARRANTY

In order for any claim under this warranty to be valid, you must contact the IHP dealer/distributor from which you purchased the product. If you cannot locate the dealer/distributor, then you must notify IHP in writing. IHP must be notified of the claimed defect in writing within 90 days of the date of failure. Notices should be directed to the IHP Warranty Department at 1769 East Lawrence Street; Russellville, AL 35654 or visit our website at WWW.IRONSTRIKE.US.COM.

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P/N 900205-00, Rev. B 02/2018

Innovative Hearth Products
1769 East Lawrence Street • Russellville, AL 35654

WARRANTY

Your wood appliance is covered by a limited warranty (provided with the appliance). Please read the warranty to be familiar with its coverage.

Retain this manual. File it with your other documents for future reference.

REPLACEMENT PARTS

See ***Page 24*** for a complete replacement parts list. Use only parts supplied from the manufacturer.

Normally, all parts should be ordered through your IHP distributor or dealer. Parts will be shipped at prevailing prices at time of order.

When ordering repair parts, always give the following information:

1. The model number of the appliance.
2. The Serial Number of the appliance.
3. The part number.
4. The description of the part.
5. The quantity required.
6. The installation date of the appliance.

If you encounter any problems or have any questions concerning the installation or application of this system, please contact your dealer.

Innovative Hearth Products
1769 East Lawrence Street
Russellville, AL 35654
IronStrike.us.com

PRODUCT REFERENCE INFORMATION

We recommend that you record the following important information about your appliance. If you did not purchase your appliance directly from an IHP dealer, then contact us at IronStrike.us.com to find your nearest IHP dealer who will answer your questions or address your concerns.

Model Number _____

Serial Number _____

Date Installed _____

Your Dealer's Name _____

NATIONAL FIREPLACE INSTITUTE NFI CERTIFIED www.nficertified.org

We recommend that our woodburning hearth products be installed and serviced by professionals who are certified in the U.S. by the National Fireplace Institute® (NFI) as NFI Woodburning Specialists or who are certified in Canada by Wood Energy Technical Training (WETT).

Wood Energy Technical Training www.wettinc.ca

Innovative Hearth Products (IHP) reserves the right to make changes at any time, without notice, in design, materials, specifications, and prices, and also to discontinue colors, styles, and products. Consult your local distributor for fireplace code information.

INNOVATIVE HEARTH PRODUCTS

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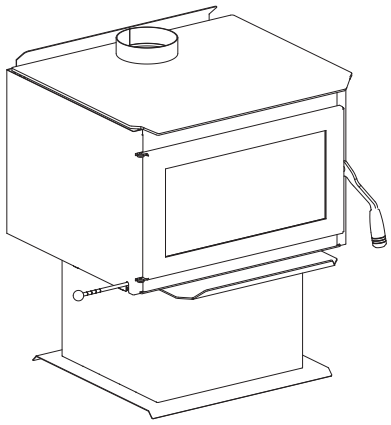
P900916-00

INSTALLATION AND OPERATION MANUAL

Free-Standing
EPA Certified
Wood-Burning Stoves

Save These Instructions
For Future Reference

P/N 900917-00, Rev. C, 06/2023



Model WXS2016

P900917-00

Wood-Burning Stove
Model WXS2016

Report # 23-106

A French manual is available upon request. Order P/N 900917-01.

Ce manuel d'installation est disponible en francais, simplement en faire la demande. Numéro de la pièce 900917-01.

This appliance must be properly installed and operated in order to prevent the possibility of a house fire. Please read this entire installation and operation manual before installing and using your wood stove. Failure to follow these instructions could result in property damage, bodily injury or even death. Contact your local building or fire officials to obtain a permit and information on any installation requirements and inspection requirements in your area.

NATIONAL FIREPLACE INSTITUTE
CERTIFIED
www.nficertified.org

We recommend that our woodburning hearth products be installed and serviced by professionals who are certified in the U.S. by the National Fireplace Institute® (NFI) as NFI Woodburning Specialists or who are certified in Canada by Wood Energy Technical Training (WETT).

Wood Energy Technical Training

⚠ WARNING

- **Hot! Do not touch! The glass and surfaces of this appliance will be hot during operation and will retain heat for a while after shutting off the appliance. Severe burns may result.**
- **Carefully supervise children in the same room as appliance.**

IRONSTRIKE®
HEAT FOR LIFE

INSTALLATION AND OPERATION MANUAL

COUNTRY® COLLECTION

Free-Standing EPA Certified Wood-Burning Stoves

Save These Instructions For Future Reference

P/N 900901-00, Rev. A, 06/2023

P900901-00



Striker™ S160GL Series

Striker™ Wood Stoves Models

S160TGL (Traditional Door)
S160AGL (Arched Door)

PFS® C US

Report # 23-106

A French manual is available upon request. Order P/N 900901-01.

Ce manuel d'installation est disponible en francais, simplement en faire la demande. Numéro de la pièce 900901-01.

This appliance must be properly installed and operated in order to prevent the possibility of a house fire. Please read this entire installation and operation manual before installing and using your wood stove. Failure to follow these instructions could result in property damage, bodily injury or even death. Contact your local building or fire officials to obtain a permit and information on any installation requirements and inspection requirements in your area.

NATIONAL FIREPLACE INSTITUTE® NFI CERTIFIED
www.nficertified.org

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Wood Energy Technical Training www.wettinc.ca

⚠ WARNING

- **Hot! Do not touch! The glass and surfaces of this appliance will be hot during operation and will retain heat for a while after shutting off the appliance. Severe burns may result.**
- **Carefully supervise children in the same room as appliance.**

IRONSTRIKE®
HEAT FOR LIFE

INSTALLATION AND OPERATION MANUAL

COUNTRY® COLLECTION

EPA Certified Wood-Burning Fireplace Insert

Save These Instructions For Future Reference

P/N 900900-00, REV. A, 06/2022

P900900-00



C160TGL



C160AGL

Striker™ Wood Fireplace Inserts Models C160TGL and C160AGL

PFS® C US

Report # 23-106

NATIONAL FIREPLACE INSTITUTE NFI CERTIFIED
www.nficertified.org

We recommend that our woodburning hearth products be installed and serviced by professionals who are certified in the U.S. by the National Fireplace Institute® (NFI) as NFI Woodburning Specialists or who are certified in Canada by Wood Energy Technical Training (WETT).

Wood Energy Technical Training www.wettinc.ca

A French manual is available upon request. Order P/N 900900-01.

Ce manuel d'installation est disponible en francais, simplement en faire la demande. Numéro de la pièce 900900-01.

This appliance must be properly installed and operated in order to prevent the possibility of a house fire. Please read this entire installation and operation manual before installing and using your wood fireplace insert. Failure to follow these instructions could result in property damage, bodily injury or even death. Contact your local building or fire officials to obtain a permit and information on any installation requirements and inspection requirements in your area.

⚠ WARNING

- **Hot! Do not touch! The glass and surfaces of this appliance will be hot during operation and will retain heat for a while after shutting off the appliance. Severe burns may result.**
- **Carefully supervise children in the same room as appliance.**

Established 1974

QUALITY CONTROL SERVICES

LABORATORY EQUIPMENT • SALES • SERVICE • CALIBRATION • REPAIRS

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

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

A2LA ACCREDITED
CERTIFICATE #1550.01

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

Report Number: DIRI0182484A0912013i221214

A2LA ACCREDITED
CERTIFICATE OF CALIBRATION WITH DATA

INSTRUMENT INFORMATION

Item	Make	Model	Serial Number	Customer ID	Location
Scale	Digiweigh	DWP12i 300kg x 0.	82484A0912013i	#050	Lab
Units	**Readability**	**SOP**	**Cal Date**	**Last Cal Date**	**Cal Due Date**
kg	0.01	QC033	12/14/22	1/27/22	12/2023

FUNCTIONAL CHECKS

SHIFT TEST	LINEARITY	REPEATABILITY	ENVIRONMENTAL CONDITIONS
Test Wt: 100 Tol: 0.05	Test Wt: HB44 Tol: HB44	Test Wt: 100 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: 18.6°C

CALIBRATION DATA

Standard	As-Found	As-Left	Expanded Uncertainty
200	200.00	200.00	0.005
120	100.00	100.00	0.005
80	80.00	80.00	0.005
40	40.00	40.00	0.005
20	20.00	20.00	0.005
10	10.00	10.00	0.005

CALIBRATION STANDARDS

Item	Make	Model	Serial Number	Cal Date	Cal Due Date	NIST ID
Weight Set	R.L./Troemner	10kg to 1mg	G782	4/14/22	4/2023	20220751
Weight Set	Rice Lake	.001 to 10lb	PW0990	1/19/21	1/2023	20202519

Permanent Information Concerning this Equipment:

Comments/Information Concerning this Calibration

12/22: RH-46.7%

Report prepared/reviewed by: KD **Date:** 12/14/22 **Technician:** Ke Dexter

Signature:

THIS CERTIFICATE SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE APPROVAL OF QUALITY CONTROL SERVICES, INC.

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. Calibrations comply with ISO/IEC 17025 and ANSI/Z540-1-1994 quality standards.

Dry Gas Meter Calibration

DUT	
Manufacturer:	APEX
Model:	XC-60
Lab ID #:	53
Serial #:	1902130
Calibration Date:	1/26/2023
Calibration Expiration:	7/26/2023
Barometric Pressure:	30.51 in. Hg

Equipment Used:	Ref. Std. DGM	Thermometer	Barometer	Manometer
Manufacturer:	Apex	Fluke	Aquatech	Dwyer
Model:	SK25DA	52 II	DBX2	475
Lab ID#:	47	196	202	174
Calibration Expiration Date:	3/30/2023	11/29/2023	4/16/2023	3/29/2023
Calibration γ Factor:	0.9978			

Use in accordance with EPA Method 5, sections 10.3 and 16.1. Use only calibrated, NIST traceable reference standard DGM. Caibrate over expected operating flow range of DUT.

Calibration Data	Run 1	Run 2	Run 3
Standard DGM Initial Volume (L)	0.000	0.000	0.000
Standard DGM Final Volume (L)	149.049	145.786	156.580
Standard DGM Temperature (°F)	64.0	64.0	64.0
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)	5.425	5.311	5.765
DGM Temperature (°F)	89.0	92.0	94.0
DGM Pressure (in H_2O)	2.00	3.50	1.2
Net Volume for Standard DGM (ft^3)	5.264	5.148	5.530
Net Volume for DGM (ft^3)	5.425	5.311	5.765

Dry Gas Meter γ Factor	1.009	1.010	1.009
γ Factor Deviation From Average	1.009	1.010	1.009

Average Gas Meter γ Factor: 1.010

Measurement Uncertainty: Total measurement uncertainty +/- 0.748% RD, K=2

Calculations:

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

Technician:

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Address 5777 SE International Way Milwaukie, OR 97222

Local 503-654-9620

ACCREDITED CERT #4986.01

Report #:	28140-203323-14	**Customer PO#:** 1090	
Customer Name:	PFS TECO		
Customer Address:	11785 SE Highway 212 Ste 305		
City:	Clackamas	**State:** OR	**Zip:** 97015
Contact:	Aaron Kravitz		
Service Address:	11785 SE Highway 212 Ste 305	Clackamas, OR 97015	

Calibration Standards

19-00269 | Thermo-Hygrometer | Comark | SN: 6237360167 | Cal: 09/14/2022 | Due: 08/31/2023 | Vendor: Cal-Cert | Range: 122 °F 95 %RH | Report #: 25699-30694-3486
LA-01776 | Pressure Transducer | Fluke | SN: 5956001 | Cal: 11/25/2022 | Due: 11/25/2023 | Range: 10 in H2O | Report #: EVL846346

Instrument Data

Calibration Date:	March 1, 2023	**Reference:**	ASME B40.100
Recommended Due Date:	March 1, 2024	**Cal-Cert Procedure:**	CP-003
Calibration Frequency:	12 Months	**Indicating System:**	Digital
Manufacturer:	Unknown	**Temperature:**	69 °F
Type:	Pressure Transducer	**Humidity:**	36% RH
Model Number:	Unknown	**Cal Factor:**	None
Serial #:	Unknown	**Asset #:**	53B
Capacity:	1 In H2O	**Service Location:**	Service Address
Tolerance:	± 1.00% of Span	**As Found:**	Pass
Gauge Class:	A	**As Left:**	Pass

Instrument Range: 1.00 **Range Resolution:** 0.01 **Mode Verified:** Pressure

UUT Reading In H2O	Standard As Found In H2O	Standard Verification Reading #1 In H2O	Error In H2O	Standard Verification Reading #2 In H2O	Error In H2O	Tolerance In H2O	Expanded Uncertainty ± In H2O
0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.005
0.10	0.10	0.10	0.00	0.10	0.00	0.01	0.005
0.25	0.25	0.25	0.00	0.25	0.00	0.01	0.005
0.50	0.50	0.50	0.00	0.50	0.00	0.01	0.005
0.75	0.75	0.75	0.00	0.75	0.00	0.01	0.005
1.00	1.00	1.00	0.00	1.00	0.00	0.01	0.005
0.75	0.75	0.75	0.00	0.75	0.00	0.01	0.005
0.50	0.50	0.50	0.00	0.50	0.00	0.01	0.005
0.25	0.25	0.25	0.00	0.25	0.00	0.01	0.005
0.10	0.10	0.10	0.00	0.10	0.00	0.01	0.005
0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.005

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Manufacturer: Unknown **Type:** Pressure Transducer **Serial #:** Unknown

Remarks:

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All tolerances were derived from the applicable standards and pass/fail determination is based on those tolerances. The customer determined any recommended due dates indicated on the certificate.

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Service Engineer: Jon Rau **Date:** March 1, 2023

Technical Manager: Marshall Doyle **Signature:** 

Report #: 28140-203323-14

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Local 503-654-9620

A2LA ACCREDITED CERT #4986.01

Report #:	28140-203324-14	**Customer PO#:**	1090		
Customer Name:	PFS TECO				
Customer Address:	11785 SE Highway 212 Ste 305				
City:	Clackamas	**State:**	OR	**Zip:**	97015
Contact:	Aaron Kravitz				
Service Address:	11785 SE Highway 212 Ste 305	Clackamas, OR 97015			

Calibration Standards

19-00269 | Thermo-Hygrometer | Comark | SN: 6237360167 | Cal: 09/14/2022 | Due: 08/31/2023 | Vendor: Cal-Cert | Range: 122 °F 95 %RH | Report #: 25699-30694-3486
LA-01776 | Pressure Transducer | Fluke | SN: 5956001 | Cal: 11/25/2022 | Due: 11/25/2023 | Range: 10 in H2O | Report #: EVL846346

Instrument Data

Calibration Date:	March 1, 2023	**Reference:**	ASME B40.100
Recommended Due Date:	March 1, 2024	**Cal-Cert Procedure:**	CP-003
Calibration Frequency:	12 Months	**Indicating System:**	Digital
Manufacturer:	Newport	**Temperature:**	73 °F
Type:	Pressure Transducer	**Humidity:**	30% RH
Model Number:	Unknown	**Cal Factor:**	None
Serial #:	Unknown	**Asset #:**	53C
Capacity:	5 In H2O	**Service Location:**	Service Address
Tolerance:	± 1.00% of Span	**As Found:**	Pass
Gauge Class:	A	**As Left:**	Pass

Instrument Range: 5.00 **Range Resolution:** 0.01 **Mode Verified:** Pressure

UUT Reading In H2O	Standard As Found In H2O	Standard Verification Reading #1 In H2O	Error In H2O	Standard Verification Reading #2 In H2O	Error In H2O	Tolerance In H2O	Expanded Uncertainty ± In H2O
0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.005
0.50	0.50	0.50	0.00	0.50	0.00	0.05	0.005
1.25	1.25	1.25	0.00	1.25	0.00	0.05	0.005
2.50	2.50	2.50	0.00	2.50	0.00	0.05	0.006
3.75	3.75	3.75	0.00	3.75	0.00	0.05	0.007
5.00	5.00	5.00	0.00	5.00	0.00	0.05	0.008
3.75	3.75	3.75	0.00	3.75	0.00	0.05	0.007
2.50	2.50	2.50	0.00	2.50	0.00	0.05	0.006
1.25	1.25	1.25	0.00	1.25	0.00	0.05	0.005
0.50	0.50	0.50	0.00	0.50	0.00	0.05	0.005
0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.005

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Manufacturer: Newport **Type:** Pressure Transducer **Serial #:** Unknown

Remarks:

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Service Engineer: Jon Rau **Date:** March 1, 2023

Technical Manager: Marshall Doyle **Signature:** 

Report #: 28140-203324-14

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A2LA ACCREDITED CERT #4986.01

Report #: 26398-201253-5 **Customer PO#:** 1079
Customer Name: PFS TECO
Customer Address: 11785 SE Highway 212
City: Clackamas **State:** OR **Zip:** 97015
Contact: Ethan Frederick
Service Address: 5777 SE International Way Milwaukie, OR 97222

Calibration Standards

LP-00397 | Gage Block Set | Mitutoyo | SN: 509020 | Cal: 11/25/2020 | Due: 11/30/2022 | Vendor: BHD Test and Measurement | Report #: 112520A
LP-01346 | Thermo-Hygrometer | Comark | SN: 06210350198 | Cal: 02/07/2022 | Due: 02/28/2023 | Vendor: Cal-Cert | Range: 122 °F 95 %RH | Report #: 22748-67215-3486

Instrument Data

Calibration Date:	October 21, 2022	**Reference:**	ASME B89.1.14 2018
Calibration Due Date:	October 21, 2023	**Cal-Cert Procedure:**	CP-008
Calibration Frequency:	12 Months	**Indicating System:**	Digital
Manufacturer:	Mitutoyo	**Temperature:**	69 °F
Type:	Digital Caliper	**Humidity:**	38% RH
Model Number:	CD-P6"S	**Asset #:**	208
Serial #:	B22159310	**Service Location:**	Cal-Cert Lab
Capacity:	6 Inches	**As Found:**	PASS
Resolution:	0.0005 Inches	**As Left:**	PASS

Instrument Range: 6.0000 Inches **Range Resolution:** 0.0005 Inches

Outside Jaws / Linearity

Calibration Standard Inches	As Found Inches	As Left Reading 1 Inches	As Left Reading 2 Inches	Tolerance ± Inches
0.0000	0.0000	0.0000	0.0000	0.0000
0.0500	0.0500	0.0500	0.0500	0.0010
0.3000	0.3000	0.3000	0.3000	0.0010
0.6000	0.6005	0.6005	0.6005	0.0010
1.2000	1.2000	1.2000	1.2000	0.0010
2.4000	2.4005	2.4005	2.4005	0.0010
3.5000	3.5000	3.5000	3.5000	0.0010
5.0000	5.0005	5.0005	5.0005	0.0010
6.0000	6.0005	6.0005	6.0005	0.0010

Expanded Uncertainty ± 0.00036 Inches

Verifications (for information only)

	Target	Measured	Tolerance ±
Resolution Check	0.1005	0.10050	N/A
Depth	1.000	1.00000	N/A
Step	1.000	1.00000	N/A
Inside Jaws	1.000	1.00000	N/A

Inspections

Jaws Parallel	Acceptable

Remarks:

We sincerely thank you for your business. Please call us at 503-654-9620 for all your sales and calibration needs.
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Service Engineer: Cameron Walling **Date:** October 21, 2022

Technical Manager: Marshall Doyle **Signature:**

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Dry Gas Meter Calibration

DUT	
Manufacturer:	APEX
Model:	XC-60
Lab ID #:	54
Serial #:	1902133
Calibration Date:	1/26/2023
Calibration Expiration:	7/26/2023
Barometric Pressure:	30.49 in. Hg

Equipment Used:	Ref. Std. DGM	Thermometer	Barometer	Manometer
Manufacturer:	Apex	Fluke	Aquatech	Dwyer
Model:	SK25DA	52 II	DBX2	475
Lab ID#:	47	196	202	174
Calibration Expiration Date:	3/30/2023	11/29/2023	4/16/2023	3/29/2023
Calibration γ Factor:	0.9978			

Use in accordance with EPA Method 5, sections 10.3 and 16.1. Use only calibrated, NIST traceable reference standard DGM. Caibrate over expected operating flow range of DUT.

Calibration Data	Run 1	Run 2	Run 3
Standard DGM Initial Volume (L)	0.000	0.000	0.000
Standard DGM Final Volume (L)	160.750	154.658	151.064
Standard DGM Temperature (°F)	64.0	65.0	66.0
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)	5.962	5.736	5.621
DGM Temperature (°F)	97.0	96.0	97.0
DGM Pressure (in H_2O)	3.00	2.00	1.0
Net Volume for Standard DGM (ft^3)	5.677	5.462	5.335
Net Volume for DGM (ft^3)	5.962	5.736	5.621

Dry Gas Meter γ Factor	1.003	1.001	1.000
γ Factor Deviation From Average	1.003	1.001	1.000

Average Gas Meter γ Factor: 1.001

Measurement Uncertainty: Total measurement uncertainty +/- 0.748% RD, K=2

Calculations:

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

Technician:

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CERT #4986.01

Report #:	28140-203325-14	**Customer PO#:** 1090	
Customer Name:	PFS TECO		
Customer Address:	11785 SE Highway 212 Ste 305		
City:	Clackamas	**State:** OR	**Zip:** 97015
Contact:	Aaron Kravitz		
Service Address:	11785 SE Highway 212 Ste 305	Clackamas, OR 97015	

Calibration Standards

19-00269 | Thermo-Hygrometer | Comark | SN: 6237360167 | Cal: 09/14/2022 | Due: 08/31/2023 | Vendor: Cal-Cert | Range: 122 °F 95 %RH | Report #: 25699-30694-3486
LA-01776 | Pressure Transducer | Fluke | SN: 5956001 | Cal: 11/25/2022 | Due: 11/25/2023 | Range: 10 in H2O | Report #: EVL846346

Instrument Data

Calibration Date:	March 1, 2023	**Reference:**	ASME B40.100
Recommended Due Date:	March 1, 2024	**Cal-Cert Procedure:**	CP-003
Calibration Frequency:	12 Months	**Indicating System:**	Digital
Manufacturer:	Newport	**Temperature:**	68 °F
Type:	Pressure Transducer	**Humidity:**	37% RH
Model Number:	Unknown	**Cal Factor:**	None
Serial #:	Unknown	**Asset #:**	54B
Capacity:	1 In H2O	**Service Location:**	Service Address
Tolerance:	± 1.00% of Span	**As Found:**	Pass
Gauge Class:	A	**As Left:**	Pass

Instrument Range: 1.00 **Range Resolution:** 0.01 **Mode Verified:** Pressure

UUT Reading In H2O	Standard As Found In H2O	Standard Verification Reading #1 In H2O	Error In H2O	Standard Verification Reading #2 In H2O	Error In H2O	Tolerance In H2O	Expanded Uncertainty ± In H2O
0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.005
0.10	0.10	0.10	0.00	0.10	0.00	0.01	0.005
0.25	0.25	0.25	0.00	0.25	0.00	0.01	0.005
0.50	0.50	0.50	0.00	0.50	0.00	0.01	0.005
0.75	0.75	0.75	0.00	0.75	0.00	0.01	0.005
1.00	0.99	0.99	-0.01	0.99	-0.01	0.01	0.005
0.75	0.75	0.75	0.00	0.75	0.00	0.01	0.005
0.50	0.50	0.50	0.00	0.50	0.00	0.01	0.005
0.25	0.25	0.25	0.00	0.25	0.00	0.01	0.005
0.10	0.10	0.10	0.00	0.10	0.00	0.01	0.005
0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.005

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Manufacturer: Newport **Type:** Pressure Transducer **Serial #:** Unknown

Remarks:

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Service Engineer: Jon Rau **Date:** March 1, 2023

Technical Manager: Marshall Doyle **Signature:** 

Report #: 28140-203325-14

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Dry Gas Meter Calibration

DUT	
Manufacturer:	APEX
Model:	XC-50-DIR
Lab ID #:	203
Serial #:	A2204292
Calibration Date:	1/26/2023
Calibration Expiration:	7/26/2023
Barometric Pressure:	30.50 in. Hg

Equipment Used:	Ref. Std. DGM	Thermometer	Barometer	Manometer
Manufacturer:	Apex	Fluke	Aquatech	Dwyer
Model:	SK25DA	52 II	DBX2	475
Lab ID#:	47	196	202	174
Calibration Expiration Date:	3/30/2023	11/29/2023	4/16/2023	3/29/2023
Calibration γ Factor:	0.9978			

Use in accordance with EPA Method 5, sections 10.3 and 16.1. Use only calibrated, NIST traceable reference standard DGM. Caibrate over expected operating flow range of DUT.

Calibration Data	Run 1	Run 2	Run 3
Standard DGM Initial Volume (L)	0.000	0.000	0.000
Standard DGM Final Volume (L)	230.939	193.894	200.071
Standard DGM Temperature (°F)	66.0	66.0	66.0
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)	8.610	7.251	7.491
DGM Temperature (°F)	92.0	92.0	91.0
DGM Pressure (in H_2O)	2.56	1.30	0.8
Net Volume for Standard DGM (ft^3)	8.156	6.847	7.065
Net Volume for DGM (ft^3)	8.610	7.251	7.491

Dry Gas Meter γ Factor	0.986	0.986	0.984
γ Factor Deviation From Average	0.986	0.986	0.984

Average Gas Meter γ Factor: 0.985

Measurement Uncertainty: Total measurement uncertainty +/- 0.748% RD, K=2

Calculations:

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

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Report #:	28140-203319-14	**Customer PO#:** 1090	
Customer Name:	PFS TECO		
Customer Address:	11785 SE Highway 212 Ste 305		
City:	Clackamas	**State:** OR	**Zip:** 97015
Contact:	Aaron Kravitz		
Service Address:	11785 SE Highway 212 Ste 305	Clackamas, OR 97015	

Calibration Standards

19-00269 | Thermo-Hygrometer | Comark | SN: 6237360167 | Cal: 09/14/2022 | Due: 08/31/2023 | Vendor: Cal-Cert | Range: 122 °F 95 %RH | Report #: 25699-30694-3486
LA-01776 | Pressure Transducer | Fluke | SN: 5956001 | Cal: 11/25/2022 | Due: 11/25/2023 | Range: 10 in H2O | Report #: EVL846346

Instrument Data

Calibration Date:	March 1, 2023	**Reference:**	ASME B40.100
Recommended Due Date:	March 1, 2024	**Cal-Cert Procedure:**	CP-003
Calibration Frequency:	12 Months	**Indicating System:**	Digital
Manufacturer:	Red Lion	**Temperature:**	69 °F
Type:	Pressure Transducer	**Humidity:**	35% RH
Model Number:	Unknown	**Cal Factor:**	None
Serial #:	Unknown	**Asset #:**	203B
Capacity:	1 In H2O	**Service Location:**	Service Address
Tolerance:	± 1.00% of Span	**As Found:**	Pass
Gauge Class:	A	**As Left:**	Pass

Instrument Range: 1.00 **Range Resolution:** 0.001 **Mode Verified:** Pressure

UUT Reading In H2O	Standard As Found In H2O	Standard Verification Reading #1 In H2O	Error In H2O	Standard Verification Reading #2 In H2O	Error In H2O	Tolerance In H2O	Expanded Uncertainty ± In H2O
0.000	0.000	0.000	0.00	0.000	0.00	0.01	0.0005
0.100	0.100	0.100	0.00	0.100	0.00	0.01	0.0005
0.250	0.250	0.250	0.00	0.250	0.00	0.01	0.0006
0.500	0.500	0.500	0.00	0.500	0.00	0.01	0.0008
0.750	0.750	0.750	0.00	0.750	0.00	0.01	0.001
1.000	1.000	1.000	0.00	1.000	0.00	0.01	0.0012
0.750	0.750	0.750	0.00	0.750	0.00	0.01	0.001
0.500	0.500	0.500	0.00	0.500	0.00	0.01	0.0008
0.250	0.250	0.250	0.00	0.250	0.00	0.01	0.0006
0.100	0.100	0.100	0.00	0.100	0.00	0.01	0.0005
0.000	0.000	0.000	0.00	0.000	0.00	0.01	0.0005

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Manufacturer: Red Lion **Type:** Pressure Transducer **Serial #:** Unknown

Remarks:

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Service Engineer: Jon Rau **Date:** March 1, 2023

Technical Manager: Marshall Doyle **Signature:** 

Report #: 28140-203319-14

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Local 503-654-9620

A2LA ACCREDITED CERT #4986.01

Report #:	28140-203320-14	**Customer PO#:** 1090	
Customer Name:	PFS TECO		
Customer Address:	11785 SE Highway 212 Ste 305		
City:	Clackamas	**State:** OR	**Zip:** 97015
Contact:	Aaron Kravitz		
Service Address:	11785 SE Highway 212 Ste 305	Clackamas, OR 97015	

Calibration Standards

19-00269 | Thermo-Hygrometer | Comark | SN: 6237360167 | Cal: 09/14/2022 | Due: 08/31/2023 | Vendor: Cal-Cert | Range: 122 °F 95 %RH | Report #: 25699-30694-3486
LA-01776 | Pressure Transducer | Fluke | SN: 5956001 | Cal: 11/25/2022 | Due: 11/25/2023 | Range: 10 in H2O | Report #: EVL846346

Instrument Data

Calibration Date:	March 1, 2023	**Reference:**	ASME B40.100
Recommended Due Date:	March 1, 2024	**Cal-Cert Procedure:**	CP-003
Calibration Frequency:	12 Months	**Indicating System:**	Digital
Manufacturer:	Red Lion	**Temperature:**	73 °F
Type:	Pressure Transducer	**Humidity:**	30% RH
Model Number:	Unknown	**Cal Factor:**	None
Serial #:	Unknown	**Asset #:**	203C
Capacity:	5 In H2O	**Service Location:**	Service Address
Tolerance:	± 1.00% of Span	**As Found:**	Pass
Gauge Class:	A	**As Left:**	Pass

Instrument Range: 5.00 **Range Resolution:** 0.01 **Mode Verified:** Pressure

UUT Reading In H2O	Standard As Found In H2O	Standard Verification Reading #1 In H2O	Error In H2O	Standard Verification Reading #2 In H2O	Error In H2O	Tolerance In H2O	Expanded Uncertainty ± In H2O
0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.005
0.50	0.50	0.50	0.00	0.50	0.00	0.05	0.005
1.25	1.25	1.25	0.00	1.25	0.00	0.05	0.005
2.50	2.50	2.50	0.00	2.50	0.00	0.05	0.006
3.75	3.75	3.75	0.00	3.75	0.00	0.05	0.007
5.00	5.00	5.00	0.00	5.00	0.00	0.05	0.008
3.75	3.75	3.75	0.00	3.75	0.00	0.05	0.007
2.50	2.50	2.50	0.00	2.50	0.00	0.05	0.006
1.25	1.25	1.25	0.00	1.25	0.00	0.05	0.005
0.50	0.50	0.50	0.00	0.50	0.00	0.05	0.005
0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.005

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Manufacturer: Red Lion **Type:** Pressure Transducer **Serial #:** Unknown

Remarks:

We sincerely thank you for your business. Please call us at 503-654-9620 for all your sales and calibration needs.
Cleaning and preventative maintenance were performed as part of this service.

Cal-Cert is accredited by A2LA under Calibration Laboratory Code #4986.01.
A2LA is recognized under the ILAC mutual recognition agreement (MRA).

This certificate is hereby issued that the above instrument was tested for accuracy with calibrated standards traceable to the National Institute of Standards and Technology (NIST). The information provided on this form complies with the data gathering and reporting requirements of ISO/IEC 17025 and ANSI/NCSL Z540.1, and meets the requirements of all applicable references and Cal-Cert procedures listed above.
Any stated measurement uncertainty includes the uncertainty of the Calibration standards used, combined with the uncertainty of the measurement process using the RSS method with a k=2 for an approximate 95% level of confidence. The calibration process meets or exceeds a ratio of 4:1 unless otherwise stated.
All tolerances were derived from the applicable standards and pass/fail determination is based on those tolerances. The customer determined any recommended due dates indicated on the certificate.

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Service Engineer: Jon Rau **Date:** March 1, 2023

Technical Manager: Marshall Doyle **Signature:** 

Report #: 28140-203320-14

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Report and Certificate of Calibration

CAL-CERT CALIBRATION CERTIFICATION

www.Cal-Cert.com

Toll Free 800-356-4662

Address 5777 SE International Way Milwaukie, OR 97222

Local 503-654-9620

A2LA ACCREDITED CERT #4986.01

Report #:	28140-203326-14	**Customer PO#:** 1090	
Customer Name:	PFS TECO		
Customer Address:	11785 SE Highway 212 Ste 305		
City:	Clackamas	**State:** OR	**Zip:** 97015
Contact:	Aaron Kravitz		
Service Address:	11785 SE Highway 212 Ste 305	Clackamas, OR 97015	

Calibration Standards

19-00269 | Thermo-Hygrometer | Comark | SN: 6237360167 | Cal: 09/14/2022 | Due: 08/31/2023 | Vendor: Cal-Cert | Range: 122 °F 95 %RH | Report #: 25699-30694-3486
LA-01776 | Pressure Transducer | Fluke | SN: 5956001 | Cal: 11/25/2022 | Due: 11/25/2023 | Range: 10 in H2O | Report #: EVL846346

Instrument Data

Calibration Date:	March 1, 2023	**Reference:**	ASME B40.100
Recommended Due Date:	March 1, 2024	**Cal-Cert Procedure:**	CP-003
Calibration Frequency:	12 Months	**Indicating System:**	Digital
Manufacturer:	Newport	**Temperature:**	73 °F
Type:	Pressure Transducer	**Humidity:**	30% RH
Model Number:	Unknown	**Cal Factor:**	None
Serial #:	Unknown	**Asset #:**	54C
Capacity:	5 In H2O	**Service Location:**	Service Address
Tolerance:	± 1.00% of Span	**As Found:**	Pass
Gauge Class:	A	**As Left:**	Pass

Instrument Range: 5.00 **Range Resolution:** 0.01 **Mode Verified:** Pressure

UUT Reading In H2O	Standard As Found In H2O	Standard Verification Reading #1 In H2O	Error In H2O	Standard Verification Reading #2 In H2O	Error In H2O	Tolerance In H2O	Expanded Uncertainty ± In H2O
0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.005
0.50	0.50	0.50	0.00	0.50	0.00	0.05	0.005
1.25	1.25	1.25	0.00	1.25	0.00	0.05	0.005
2.50	2.50	2.50	0.00	2.50	0.00	0.05	0.006
3.75	3.75	3.75	0.00	3.75	0.00	0.05	0.007
5.00	5.00	5.00	0.00	5.00	0.00	0.05	0.008
3.75	3.75	3.75	0.00	3.75	0.00	0.05	0.007
2.50	2.50	2.50	0.00	2.50	0.00	0.05	0.006
1.25	1.25	1.25	0.00	1.25	0.00	0.05	0.005
0.50	0.50	0.50	0.00	0.50	0.00	0.05	0.005
0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.005

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Manufacturer: Newport **Type:** Pressure Transducer **Serial #:** Unknown

Remarks:

We sincerely thank you for your business. Please call us at 503-654-9620 for all your sales and calibration needs.
Cleaning and preventative maintenance were performed as part of this service.

Cal-Cert is accredited by A2LA under Calibration Laboratory Code #4986.01.
A2LA is recognized under the ILAC mutual recognition agreement (MRA).

This certificate is hereby issued that the above instrument was tested for accuracy with calibrated standards traceable to the National Institute of Standards and Technology (NIST). The information provided on this form complies with the data gathering and reporting requirements of ISO/IEC 17025 and ANSI/NCSL Z540.1, and meets the requirements of all applicable references and Cal-Cert procedures listed above.
Any stated measurement uncertainty includes the uncertainty of the Calibration standards used, combined with the uncertainty of the measurement process using the RSS method with a k=2 for an approximate 95% level of confidence. The calibration process meets or exceeds a ratio of 4:1 unless otherwise stated.
All tolerances were derived from the applicable standards and pass/fail determination is based on those tolerances. The customer determined any recommended due dates indicated on the certificate.

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Service Engineer: Jon Rau **Date:** March 1, 2023

Technical Manager: Marshall Doyle **Signature:** 

Report #: 28140-203326-14

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Dry Gas Meter Calibration

DUT	
Manufacturer:	APEX
Model:	Apex-AK-600
Lab ID #:	55
Serial #:	810016
Calibration Date:	1/27/2023
Calibration Expiration:	7/27/2023
Barometric Pressure:	30.15 in. Hg

Equipment Used:	Ref. Std. DGM	Thermometer	Barometer	Manometer
Manufacturer:	Apex	Fluke	Aquatech	Dwyer
Model:	SK25DA	52 II	DBX2	475
Lab ID#:	47	196	202	174
Calibration Expiration Date:	3/30/2023	11/29/2023	4/16/2023	3/29/2023
Calibration γ Factor:	0.9978			

Use in accordance with EPA Method 5, sections 10.3 and 16.1. Use only calibrated, NIST traceable reference standard DGM. Caibrate over expected operating flow range of DUT.

Calibration Data	Run 1	Run 2	Run 3
Standard DGM Initial Volume (L)	0.000	0.000	0.000
Standard DGM Final Volume (L)	155.374	168.471	375.274
Standard DGM Temperature (°F)	65.0	66.0	67.0
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)	5.505	5.830	13.012
DGM Temperature (°F)	73.0	74.0	75.0
DGM Pressure (in H_2O)	0.50	0.50	0.5
Net Volume for Standard DGM (ft^3)	5.487	5.949	13.253
Net Volume for DGM (ft^3)	5.505	5.830	13.012

Dry Gas Meter γ Factor	1.008	1.032	1.030
γ Factor Deviation From Average	1.008	1.032	1.030

Average Gas Meter γ Factor: 1.024

Measurement Uncertainty: Total measurement uncertainty +/- 0.748% RD, K=2

Calculations:

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

Technician

Report and Certificate of Calibration

CAL-CERT
CALIBRATION CERTIFICATION

Portland Laboratory
5777 SE International Way
Milwaukie, OR 97222
800-356-4662
503-654-9620

Anaheim Laboratory
120 S. Chaparral Ct Suite 110
Anaheim Hills, CA 92808
888-700-4100
714-696-5300

www.Cal-Cert.com

Report #:	25314-28785-47	**Customer PO#:** 1073	
Customer Name:	PFS TECO		
Customer Address:	11785 SE Highway 212		
City:	Clackamas	**State:** OR	**Zip:** 97015
Contact:	John Steinert		
Service Address:	120 S. Chaparral Court, Suite 110	Anaheim Hills, CA 92808	

Calibration Standards

2-01754 | Thermo-Hygrometer | Comark | SN: 06257740553 | Cal: 08/12/2022 | Due: 07/31/2023 | Report #: 25476-198970-3646
ACS318 | Electrical Meter | Fluke | SN: 895650804 | Cal: 06/26/2022 | Due: 06/30/2024 | Vendor: Fluke | Range: Various | Report #: EVL809627
ACS403 | Electrical Meter | Extech | SN: H241956 | Cal: 04/02/2022 | Due: 04/30/2023 | Vendor: Associated Calibration Inc. | Range: 11111110 Ohms | Report #: 23340-70023-1546

Instrument Data

Calibration Date:	August 19, 2022	**Reference:**	Manufactures Tolerances
Recommended Due Date:	August 19, 2023	**Cal-Cert Procedure:**	CP-080
Calibration Frequency:	12 Months	**Indicating System:**	Gauge
Manufacturer:	Delmhorst	**Temperature:**	71.9 °F
Type:	Resistivity Meter	**Humidity:**	48% RH
Model Number:	MCS-1	**Asset #:**	#094
Serial #:	#094	**Service Location:**	Cal-Cert Lab
Capacity:	120 Megaohms	**As Found:**	Pass
Tolerance:	5.00 % of indication	**As Left:**	Pass

Instrument Range: 120 Megaohms **Resolution:** N/A **Mode Verified:** Resistance

Standard Reading	UUT As Found	UUT Reading #1	Error	UUT Reading #2	Error
0.000	0.000	0.000	0.000	0.000	0.000
1.100	1.095	1.095	-0.005	1.095	-0.005
120.000	121.20	121.20	1.200	121.31	1.310
0.000	0.000	0.000	0.000	0.000	0.000
0.000	0.000	0.000	0.000	0.000	0.000

Expanded Uncertainty± **2.50 Megaohms**

Remarks:

We sincerely thank you for your business. Please call us at 714-696-5300 for all your sales and calibration needs.
Cleaning and preventative maintenance were performed as part of this service.

This certificate is hereby issued that the above instrument was tested for accuracy with calibrated standards traceable to the National Institute of Standards and Technology (NIST). The information provided on this form complies with the data gathering and reporting requirements of ANSI/NCSL Z540.1, and meets the requirements of all applicable references and Cal-Cert procedures listed above.
Any stated measurement uncertainty includes the uncertainty of the Calibration standards used, combined with the uncertainty of the measurement process using the RSS method with a k=2 for an approximate 95% level of confidence. The calibration process meets or exceeds a ratio of 4:1 unless otherwise stated.
All tolerances were derived from the applicable standards and pass/fail determination is based on those tolerances. The customer determined any recommended due dates indicated on the certificate.

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Service Engineer:	Michael Rondeau	**Date:**	August 19, 2022
Technical Manager:	Marshall Doyle	**Signature:**	

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CERTIFICATE OF CALIBRATION

CUSTOMER:	**PFS-TECO :** CLACKAMAS, OR	**CALIBRATION DATE:**	05/03/2022
PO NUMBER:	1071	**CALIBRATION DUE:**	05/03/2023
INST. MANUFACTURER:	DWYER	**PROCEDURE:**	T.O.33K6-4-1769-1
INST. DESCRIPTION:	VELOMETER	**CALIBRATION FLUID:**	AIR @ 14.7 PSIA 70°F
MODEL NUMBER:	471	**RECEIVED CONDITION:**	WITHIN MFG. SPECS.
SERIAL NUMBER:	CP288559 ID# 095	**LEFT CONDITION:**	WITHIN MFG. SPECS.
RATED ACCURACY:	SEE NOTES BELOW.	**AMBIENT CONDITIONS:**	763mm HGA 51% RH 72°F
UNCERTAINTY GIVEN:	± 0.43% RD ; k=2	**CERTIFICATE FILE #:**	490265.2021

NOTES: ± 3% FS (0-500 / 0-1500) *** ± 4% F.S. (0-5000) ***± 5% F.S. (0-15000) *** ± 2 °F

Q.MANUAL IM 2.0 REV 2020.2 DATED 7-27-2020 ** DECISION RULE : NO PFA%**

UUT INDICATED FT/MIN	DM.STD. ACTUAL FT/MIN	UUT INDICATED DEG. F	DM STD. ACTUAL DEG. F
65	68	0 TO 200°F	0 TO 200°F
129	133	45.1	44.2
260	266	71.7	70.9
498	509	99.3	98.5
526	534		
1039	1058		
1484	1517		
523	534		
3076	3151		
4998	5127		
6752	6907		
14679	15068		

STANDARDS USED:		
A24: HART SCIENTIFIC TEMP. STANDARD | ± 0.024 F | TRACE# 1617259390	DUE	04/12/2023
A800: FLOW-DYNE SONIC NOZZLE SYSTEM | 0 – 1086 CFM ± 0.46% RD. | TRACE# 1329407628, 89576, 152043238	DUE	12/10/2022

All instruments used in the performance of the shown calibration have traceability to the National Institute of Standards and Technology (NIST). The uncertainty ratio between the calibration standards (DM.STD.) and the Unit Under Test (UUT) is a minimum of 4:1, unless otherwise noted. Calibration has been performed according to the shown procedure. The use of IAS/ILAC logo indicates calibrations are in accordance to ISO/IEC 17025:2017.

Dick Munns Company · 11133 Winners Circle, Los Alamitos, CA 90720
Phone: 714-827-1215 · www.dickmunns.com

This Calibration Certificate shall not be reproduced except, in full, without approval by Dick Munns Company. The data shown applies only to the instrument being calibrated and under the stated conditions of calibration.

Issuing Date: 05/03/2022 Approved By: [signature] Cal. Technician: D.C

Calibrated at: ✓ Lab ___ On-Site (Customer's)

Certificate of Calibration

Certificate Number: 743892

JJ Calibrations, Inc.
7724 SE Aspen Summit Drive
Portland, OR 97266-9217
Phone 503.786.3005
FAX 503.786.2994

PFS TECO
11785 SE Hwy 212
Suite 305
Clackamas, OR 97015

ACCREDITED
0723.01
Calibration

PO: 1033
Order Date: 03/08/2021
Authorized By: N/A

Property #: 097
User: N/A
Department: N/A
Make: Unknown
Model: 10 Lbs.
Serial #: 097
Description: Mass
Procedure: DCN 500901
Accuracy: Raw Data

Calibrated on: 03/18/2021
*Recommended Due: 03/18/2026
Environment: 19 °C 41 % RH
* As Received: Other - See Remarks
* As Returned: Other - See Remarks
Action Taken: Calibrated
Technician: 126

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

Data is provided for your determination of acceptability. Received/returned without accessories.

Standards Used

Std ID	Manufacturer	Model	Nomenclature	Due Date	Trace ID
484A	Rice Lake	1kg-10kg (Class ASTM 1)	Mass Set,	05/28/2021	699197
503A	Rice Lake	1mg-200g (Class 0)	Mass Set,	09/11/2021	729241
550A	And (A&D) Co.	HP-30K	Balance 30 Kg	12/31/2021	739307
723A	Rice Lake	1mg-200g (Class 0)	Mass Set,	06/09/2021	723431

Measurement Data

Parameter / Measurement Description	Range	Unit	Reference	Min	Max	*Error	UUT	Uncertainty
Before/After								Accredited = ü
Mass								
Raw Data		g	4535.92370000	0.0000000	0.0000000	0.1785299	4536.1022299 g	3.5E-01 ü

This instrument has been calibrated in accordance with the JJ Calibrations Quality Assurance Manual and is traceable to either the SI or to National Institute of Standards and Technology (NIST). The quality system and this certificate are in compliance with ANSI/NCSL Z540-1-1994, ISO/IEC 17025-2017, ISO 10012-1, the ISO 9000 family and QS 9000. The expanded uncertainties of measurements for this calibration are based upon 95% (2 sigma) confidence limits. Unless stated in the comments, certificates reflect the "Simple Acceptance Rule" as specified by JCGM 106:2012. Unless otherwise stated, a test accuracy ratio (TAR) of 4:1, if achievable, is maintained. The results reported herein apply only to the calibration of the item described above. This report may not be reproduced, except in full, without written approval of JJ Calibrations.

Reviewer

3 Issued 03/25/2021 Rev # 15

Inspector

Established 1974

QUALITY CONTROL SERVICES

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A2LA ACCREDITED

CERTIFICATE #1550.01

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

Report Number: DIRI0134307497221214

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	12/14/22	6/9/22	12/2023

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.	100.0002	5.	1000.0003	9.	1000.0003
2.	1000.0001	6.	1000.0002	10.	1000.0002
3.	1000.0002	7.	1000.0002	Result	
4.	1000.0002	8.	1000.0003	284.60499	

ENVIRONMENTAL CONDITIONS
☐ Good ☑ Fair ☐ Poor
Temperature: 20.6°C

A2LA ACCREDITED SECTION OF REPORT

Standard	As-Found	As-Left	Expanded Uncertainty
200	200.0009	200.0004	569.20999
100	100.0005	100.0002	569.20999
50	50.0004	50.0001	569.20999
20	20.0003	20.0000	569.20999
1	1.0001	1.0000	569.20999
0.1	0.1001	0.1000	569.20999

CALIBRATION STANDARDS

Item	Make	Model	Serial Number	Cal Date	Cal Due Date	NIST ID
Weight Set	Rice Lake	20 kg to 1mg	2831W	3/1/22	3/2023	20220382

Permanent Information Concerning this Equipment:
6 month calibration cycle
1/22 Extra checkpoint to encapsulate user range 0.05g.
AF= 0.0500g A/L= 0.0500

Comments/Info Concerning this Calibration:
12/22 RH= 45%. Adjusted span.

Report prepared/reviewed by: JC **Date:** 12/14/22 **Technician:** J. Colacchio

Signature:

THIS CERTIFICATE SHALL NOT BE REPRODUCED WITHOUT THE APPROVAL OF QUALITY CONTROL SERVICES, INC.

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.

Established 1974

QUALITY CONTROL SERVICES

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ACCREDITED
CERTIFICATE #1550.01

Report of Calibration

Firm: PFS-TECO
Address: 11785 SE Hwy 212, Ste 305
City/State/Zip: Clackamas, OR 97015

Test Completed: 05/09/22
Purchase Order: 1067
Traceable Number: 20220682

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

Manufacturer: Troemner
Customer ID: Listed in Table

Material	Assumed Density	Range	Tolerance Class
Stainless Steel	7.95 g/cm^3	200 mg & 100 mg	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:
100 g to 1 mg Working Standards Were Calibrated: 07/02/21 Due: 07/31/22 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. 8.0 g/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: 05/09/22

Signature David S. Thompson

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Member: National Conference of Standards Laboratories and Weights & Measures

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ACCREDITED
CERTIFICATE #1550.01

Report of Calibration

Firm: PFS-TECO
Address: 11785 SE Hwy 212, Ste 305
City/State/Zip: Clackamas, OR 97015

Test Completed: 05/09/22
Purchase Order: 1067
Traceable Number: 20220682

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

Manufacturer: Troemner
Customer ID: Listed in Table

Laboratory Environment at time of test

Temperature °C	Pressure mmHg	Humidity %RH
21.93 to 21.94	760.7 to 760.8	47.8 to 47.9

Conventional Mass Value

Nominal Value	As Found Value (g)	As Found Correction* (mg)	As Left Value (g)	As Left Correction* (mg)	Uncertainty (mg)	Tolerance (mg)
200 mg, 1000101395, #109-B	0.2000082	0.0082	0.2000082	0.0082	0.0014	0.010
100 mg, 1000126267, #109-A	0.1000065	0.0065	0.1000065	0.0065	0.0014	0.010

*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 ASTM Class 1 tolerances As Found.

Recalibration Due: The customer has requested a 5-year calibration cycle. The calibration due date for these weights is 05/09/27. The values listed above were found at the time of calibration. Any number of factors may cause these items to drift out of calibration before the calibration interval has expired.

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 17025:2017 *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: 05/09/22

Signature David S. Thompson

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Member: National Conference of Standards Laboratories and Weights & Measures

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.

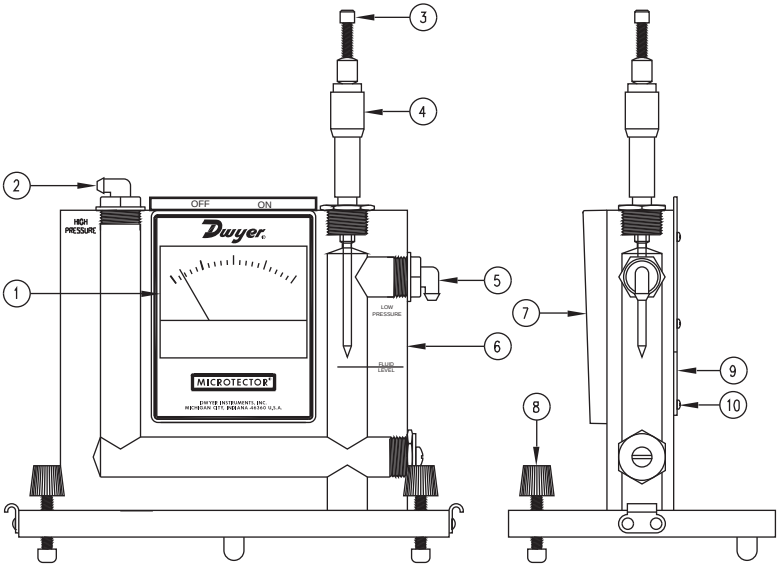
SPECIFICATIONS AND FEATURES

- 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



Microtector® Gage

Precision Pressure Measurement

The Microtector® Gage combines the time-proven principles of the Hook Gage type manometer and modern solid-state integrated circuit electronics. It provides an inexpensive means of achieving accuracy and repeatability within ± .00025 inches water column throughout its 0 to 2 inches w.c. range. It is truly a new standard in precision measuring devices.

Principles of Operation

A pressure to be measured is applied to the manometer fluid which is displaced in each leg of the manometer by an amount equal to 1/2 the applied pressure. A micrometer mounted point is then lowered until it contacts the manometer gage fluid. The instant of contact is detected by completion of a low-power A.C. circuit. Current for this circuit is supplied by a 1.5 volt penlight cell feeding two semiconductor amplifiers which act as a free-running multivibrator operating at a frequency of approximately two kilohertz. Completion of the A.C. circuit activates a bridge rectifier which provides the signal for indication on a sensitive (0 to 50 microamps) D.C. microammeter.

On indication of contact, the operator stops lowering the point and reads the micrometer which indicates one half the applied pressure. By interpolating eight divisions (each being .000125″ w.c.) between .001 micrometer graduations, a total accuracy of .00025 can easily be achieved. The micrometer complies with Federal Specification GGG-C-105A and is traceable to a master at the NIST.

Locating and Opening

Stand the Microtector® Gage and case on a firm flat level surface. Remove cover by releasing the latches and lifting it straight up. If it is necessary to move the gage without case, handle only the base plate or clear acrylic block. (**CAUTION:** Do not handle gage by grasping meter-electronic package housing Item 7 on drawing.)

Fluid Level

Level the gage by adjusting the two front leveling screws (Item 8 on drawing) until the bubble in the spirit level is centered in the small circle. After leveling the gage, open both rapid shut-off valve tube connectors (Items 2 and 5). Back off the micrometer (Item 4), if necessary, to make sure that the point is not immersed in the gage fluid. The fluid level in the gage should now coincide with the mark on the right hand bore (Item 6) plus or minus approximately 1/32 inch. If the level of fluid is too high, fluid can be removed with an eye dropper pipette or carefully poured out of the right connection (Item 5).

If the level is too low, remove the top left rapid shut-off valve tube connector (Item 2) and add distilled water pre-mixed with the proper amount of green concentrate. (See maintenance instructions for proportions. After correcting the fluid level, re-install the rapid shut-off connectors and, with these in the open position, re-level the Microtector® Gage. The gage is now ready to be zeroed.

Zeroing

Turn the Micrometer barrel (Item 4) until its lower end just coincides with the zero mark on the scale and the zero on the barrel scale coincides with the vertical line on the internal scale. Note that the internal scale is graduated every .025″ from 0 to 1.00 inch and the barrel scale is graduated in one thousandths from 0 to .025″. Turn the meter circuit switch at the top of gage to the “on” position. While holding the barrel at the zero position (and with gage level), raise or lower the point by turning the knurled knob (Item 3) until the point is above, but near, the fluid.

Check to be sure that the meter registers zero. Watch the meter, hold the barrel, and lower the point slowly by turning the top knurled knob. As the knob is turned, the point will contact the fluid and the meter pointer will move from zero to some upscale position.

After making contact, turn the point out of the fluid by turning the micrometer barrel counterclockwise to a reading of .010 or more. Again, watch the meter and, this time, lower the point by turning the micrometer barrel. The point position where the meter pointer begins to move up scale is the zero position. This position should correspond to the zero reading on the micrometer. Adjust the point in relation to the micrometer barrel by turning the top knob while holding the barrel steady. Repeat lowering the point, watching the meter for contact, and adjusting the point until the zero position and zero reading exactly coincide. The gage is now zeroed and should not be moved.

An alternative method of zeroing and reading can be used wherein, instead of zeroing the gage completely, a zero correction reading is taken and recorded, then subtracted from the final reading. Comparable results can be obtained with either method.

Positive Pressure Measurement

With the fluid at its proper level, a pressure of 2.0″ water column maximum can be measured. Positive pressure should be applied to the top left connection (Item 2) with the micrometer zeroed as described above. This will permit a simple direct reading to be taken.

After an unknown pressure has been applied at the top left connection, the fluid level will drop in the left bore and rise over the point in the right bore. Note that the indicating meter point has moved upscale because the point is immersed in the fluid. Turn the micrometer counter-clockwise until the point leaves the fluid as indicated by the meter pointer dropping to zero on its scale. Then slowly turn the micrometer down until its point just touches the fluid surface, causing movement of the meter pointer. Withdraw the point and repeat several times, noting each time the micrometer reading where the meter pointer begins. The average of these readings multiplied by two is the pressure applied to the gage. (Avg. reading x 2 = pressure applied in inches w.c. The degree of uncertainty for the operator is indicated by the difference in these readings.

When the readings are complete, the pressure should be removed and the zero setting of Microtector® Gage rechecked. Any change in the zero position will indicate inaccurate readings. Should this happen, the zero-set and pressure measurement procedure should be repeated.

Negative Pressure or Vacuum Measurement

Zero the gage. Connect the source of vacuum or negative pressure to the right-side gage connection (Item 5) and proceed as described under Positive Pressure Measurement section. Remember that the pressure measured in this way is negative.

Differential Pressure Measurement

Differential pressures may be measured by connecting the higher (more positive) pressure to the left connection (Item 2) and the lower pressure to the right connection (Item 5).

Storage

Turn meter circuit switch to "off" position and withdraw the point well clear of fluid (by turning micrometer clockwise) when gage is not in use. This will conserve the batteries and minimize build-up of oxides, etc., on the point. Keep the unit covered and in an area free of strong solvent fumes.

Maintenance

When the meter reading becomes reduced or the pointer movement gets sluggish (with the circuit on and the point in fluid), the following should be done:

(1) Remove the point (by unscrewing) and clean the tip lightly using fine crocus cloth. Wipe off all grit and dirt with a clean rag; reassemble and recheck meter operation.

(2) If the meter operation continues to be sluggish, replace the size AA, 1.5 volt battery. (Replace the battery at least once a year to avoid deterioration of battery and damage to gage. Leakproof alkaline battery is recommended.)

To replace the battery, remove center screw (Item 10) located in the back of the electronic enclosure. Cover (Item 9) will come off, exposing the battery. Pull the old battery out and push a new battery into the battery holder with the positive (center) terminal to the right (to the end marked with + on the holder).

If the fluid becomes contaminated and requires replacement: empty old fluid from gage; flush out with clear water and replace with distilled water and A-126 fluorescein green color concentrate mixed with 3/4 oz. concentrate to each quart of water.

CAUTION:

1. Do not substitute other gage fluids, as proper gage operation depends on use of the specified gage fluid to provide proper surface tension, wetting ability and electrolyte capability with unity specific gravity.

If the gage bore is very dirty, a mild soap solution may be used to aid in cleaning prior to flushing with clear water.

2. Do not clean with liquid soaps, special solvent, de-greasers, aromatic hydrocarbons, etc. Such cleaners and solvents may contain chlorine, fluorine, acetone and related compounds that will permanently damage the gage and prevent proper operation.

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J-2000

owner's manual



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INSTRUMENT CO.

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A2LA ACCREDITED
CERTIFICATE #1550.01

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

Report Number: DIRI01C101887027221214

A2LA ACCREDITED
CERTIFICATE OF CALIBRATION WITH DATA

INSTRUMENT INFORMATION

Item	Make	Model	Serial Number	Customer ID	Location
Scale	Mettler	IND570 - 1000lbx0	C101887027	#189	Lab
Units	**Readability**	**SOP**	**Cal Date**	**Last Cal Date**	**Cal Due Date**
lbs	0.02	QC033	12/14/22	1/27/22	12/2023

FUNCTIONAL CHECKS

SHIFT TEST	LINEARITY	REPEATABILITY	ENVIRONMENTAL CONDITIONS
Test Wt: 400 Tol: 0.10	Test Wt: HB44 Tol: HB44	Test Wt: 200 Tol: 0.04	☐ Good ☑ Fair ☐ Poor
As-Found: Pass:☑ Fail:☐	As-Found: Pass:☑ Fail:☐	As-Found: Pass:☑ Fail:☐	Temperature: 16.7°C
As-Left: Pass:☑ Fail:☐	As-Left: Pass:☑ Fail:☐	As-Left: Pass:☑ Fail:☐	

CALIBRATION DATA

Standard	As-Found	As-Left	Expanded Uncertainty
1000	1000.84	1000.02	0.012
600	600.32	600.00	0.011
400	400.10	400.00	0.011
200	200.00	199.98	0.011
100	100.00	99.98	0.011
50	50.00	50.00	0.011

CALIBRATION STANDARDS

Item	Make	Model	Serial Number	Cal Date	Cal Due Date	NIST ID
Avoirdupois Cast W	Rice Lake	25 and 50lb	PWO990-CA	7/18/22	7/2024	20221688

Permanent Information Concerning this Equipment:

Comments/Information Concerning this Calibration

12/14 As-Found Failed Linearity. Performed 3 point Linearity adjustment. As-Left Passed Linearity. Adjusted span.

Report prepared/reviewed by: JC **Date:** 12/14/22 **Technician:** J. Colacchio **Signature:**

THIS CERTIFICATE SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE APPROVAL OF QUALITY CONTROL SERVICES, INC.

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.

DICK MUNNS COMPANY
LIQUID & GAS FLOW CALIBRATION

ISO 17025:2017
ACCREDITED LABORATORY
Cert# CL-122

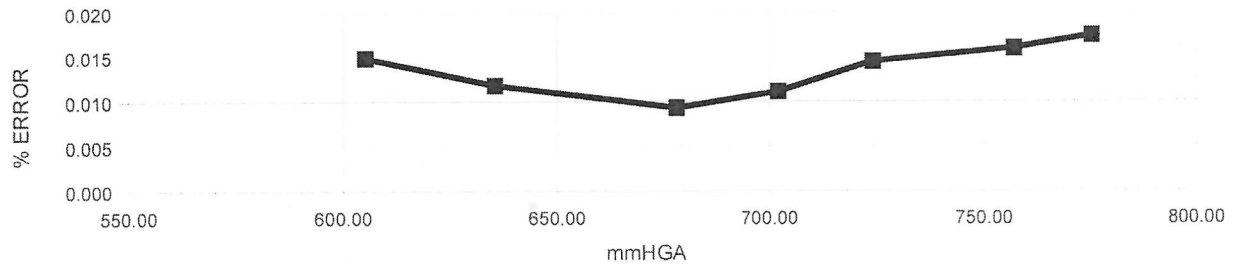
IAS ACCREDITED
Calibration Laboratory

CERTIFICATE OF CALIBRATION

CUSTOMER:	PFS-TECO; CLACKAMAS, OR	**CALIBRATION DATE:**	05/23/2023
PO NUMBER:	1096	**CALIBRATION DUE:**	05/23/2024
INST. MANUFACTURER:	AQUATECH SCIENTIFIC INSTRUMENTS	**PROCEDURE:**	NAVAIR-17-20MP-03
INST. DESCRIPTION:	DIGITAL BAROMETER	**CALIBRATION FLUID:**	AIR @ 70F
MODEL NUMBER:	DBX2	**STANDARD(S) USED:**	A321, A22 DUE 3-2024
SERIAL NUMBER:	118222	**NIST TRACE #' S:**	1236086968,1583142077
RATED ACCURACY:	+/- .18 mmHGA	**AMBIENT CONDITIONS:**	757 mmHGA, 60% RH, 68F
UNCERTAINTY GIVEN:	+/- ..03mmHGA.;k=2	**CERTIFICATE FILE #:**	533813

NOTES: AS REC./AS LEFT WITHIN SPECS. ** DECISION RULE: PFA NOT USED TO DETERMINE CONFORMITY **

TEST POINT NUMBER	UUT INDICATED mmHGA	DM.STD. ACTUAL mmHGA	% RD. ERROR
1	605.24	605.330	0.015
2	635.45	635.525	0.012
3	678.24	678.303	0.009
4	702.18	702.258	0.011
5	724.19	724.295	0.014
6	757.11	757.231	0.016
7	775.39	775.525	0.017



All instruments used in the performance of the shown calibration have traceability to the National Institute of Standards and Technology (NIST). The uncertainty ratio between the calibration standards (DM.STD.) and the Unit Under Test (UUT) is a minimum of 4:1, unless otherwise noted. Calibration has been performed according to the shown procedure. The use of IAS/ILAC logo indicates calibrations are in accordance to ISO/IEC 17025:2017.

Dick Munns Company · 11133 Winners Circle, Los Alamitos, CA 90720
Phone: 714-827-1215 · www.dickmunns.com

This Calibration Certificate shall not be reproduced except, in full, without approval by Dick Munns Company. The data shown applies only to the instrument being calibrated and under the stated conditions of calibration.

Issuing Date: 5-23-2023

Approved By:

Cal. Technician:

Calibrated at: ✓ Lab
___ On-Site (Customer's)

Report and Certificate of Calibration

CAL-CERT CALIBRATION CERTIFICATION

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Toll Free 800-356-4662

Address 5777 SE International Way Milwaukie, OR 97222

Local 503-654-9620

A2LA ACCREDITED CERT #4986.01

Revision to Report #: 26398-201251-5 to correct serial number. Date: 2/20/23

Report #: 26398-201251-5-01 **Customer PO#:** 1079

Customer Name: PFS TECO

Customer Address: 11785 SE Highway 212

City: Clackamas **State:** OR **Zip:** 97015

Contact: Ethan Frederick

Service Address: 5777 SE International Way Milwaukie, OR 97222

Calibration Standards

10-00515 | Steel Rule | SPI | SN: 00515 | Cal: 06/01/2022 | Due: 05/31/2023 | Vendor: Cal-Cert | Range: 24 Inches | Report #: 24589-30769-3616
LP-01346 | Thermo-Hygrometer | Comark | SN: 06210350198 | Cal: 02/07/2022 | Due: 02/28/2023 | Vendor: Cal-Cert | Range: 122 °F 95 %RH | Report #: 22748-67215-3486

Instrument Data

Calibration Date:	October 21, 2022	**Reference:**	Manufacturer's Spec
Calibration Due Date:	October 21, 2023	**Cal-Cert Procedure:**	CP-115
Calibration Frequency:	12 Months	**Indicating System:**	Scaling
Manufacturer:	Starrett	**Temperature:**	69 °F
Type:	Tape Measure	**Humidity:**	3% RH
Model Number:	Exact	**Asset #:**	207
Serial #:	138054-2203-00002249	**Service Location:**	Cal-Cert Lab
Capacity:	192.00 Inches	**As Found:**	Pass
		As Left:	Pass

Instrument Range: 192.000 Inches **Range Resolution:** 0.031 Inches

Calibration Standard	As Found Reading	Verification Reading #1	Verification Reading #2
24.000	24.000	24.000	24.000
48.000	48.000	48.000	48.000
96.000	96.000	96.000	96.000
120.000	120.000	120.000	120.000
144.000	144.000	144.000	144.000
168.000	168.000	168.000	168.000
192.000	192.000	192.000	192.000

Expanded Uncertainty ± 0.03580 Inches

Remarks:

We sincerely thank you for your business. Please call us at 503-654-9620 for all your sales and calibration needs.
Cleaning and preventative maintenance were performed as part of this service.

Cal-Cert is accredited by A2LA under Calibration Laboratory Code #4986.01.
A2LA is recognized under the ILAC mutual recognition agreement (MRA).

This certificate is hereby issued that the above instrument was tested for accuracy with calibrated standards traceable to the National Institute of Standards and Technology (NIST). The information provided on this form complies with the data gathering and reporting requirements of ISO/IEC 17025 and ANSI/NCSL Z540.1, and meets the requirements of all applicable references and Cal-Cert procedures listed above. Any stated measurement uncertainty includes the uncertainty of the Calibration standards used, combined with the uncertainty of the measurement process using the RSS method with a k=2 for an approximate 95% level of confidence. The calibration process meets or exceeds a ratio of 4:1 unless otherwise stated.
All tolerances were derived from the applicable standards and pass/fail determination is based on those tolerances. The customer determined any recommended due dates indicated on the certificate.

This report shall not be reproduced except in full, without written approval from Cal-Cert.

Service Engineer: Cameron Walling **Date:** October 21, 2022

Technical Manager: Marshall Doyle **Signature:** 

Dimensional Measurement CF-115-01

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Revision 7 **7/25/2017**

Report and Certificate of Calibration

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A2LA ACCREDITED CERT #4986.01

Report #: 26398-201253-5 **Customer PO#:** 1079
Customer Name: PFS TECO
Customer Address: 11785 SE Highway 212
City: Clackamas **State:** OR **Zip:** 97015
Contact: Ethan Frederick
Service Address: 5777 SE International Way Milwaukie, OR 97222

Calibration Standards

LP-00397 | Gage Block Set | Mitutoyo | SN: 509020 | Cal: 11/25/2020 | Due: 11/30/2022 | Vendor: BHD Test and Measurement | Report #: 112520A
LP-01346 | Thermo-Hygrometer | Comark | SN: 06210350198 | Cal: 02/07/2022 | Due: 02/28/2023 | Vendor: Cal-Cert | Range: 122 °F 95 %RH | Report #: 22748-67215-3486

Instrument Data

Calibration Date:	October 21, 2022	**Reference:**	ASME B89.1.14 2018
Calibration Due Date:	October 21, 2023	**Cal-Cert Procedure:**	CP-008
Calibration Frequency:	12 Months	**Indicating System:**	Digital
Manufacturer:	Mitutoyo	**Temperature:**	69 °F
Type:	Digital Caliper	**Humidity:**	38% RH
Model Number:	CD-P6"S	**Asset #:**	208
Serial #:	B22159310	**Service Location:**	Cal-Cert Lab
Capacity:	6 Inches	**As Found:**	PASS
Resolution:	0.0005 Inches	**As Left:**	PASS

Instrument Range: 6.0000 Inches **Range Resolution:** 0.0005 Inches

Outside Jaws / Linearity

Calibration Standard Inches	As Found Inches	As Left Reading 1 Inches	As Left Reading 2 Inches	Tolerance ± Inches
0.0000	0.0000	0.0000	0.0000	0.0000
0.0500	0.0500	0.0500	0.0500	0.0010
0.3000	0.3000	0.3000	0.3000	0.0010
0.6000	0.6005	0.6005	0.6005	0.0010
1.2000	1.2000	1.2000	1.2000	0.0010
2.4000	2.4005	2.4005	2.4005	0.0010
3.5000	3.5000	3.5000	3.5000	0.0010
5.0000	5.0005	5.0005	5.0005	0.0010
6.0000	6.0005	6.0005	6.0005	0.0010

Expanded Uncertainty ± 0.00036 Inches

Verifications (for information only)

	Target	Measured	Tolerance ±
Resolution Check	0.1005	0.10050	N/A
Depth	1.000	1.00000	N/A
Step	1.000	1.00000	N/A
Inside Jaws	1.000	1.00000	N/A

Inspections

Jaws Parallel	Acceptable

Remarks:

We sincerely thank you for your business. Please call us at 503-654-9620 for all your sales and calibration needs.
Cleaning and preventative maintenance were performed as part of this service.

Cal-Cert is accredited by A2LA under Calibration Laboratory Code #4986.01.
A2LA is recognized under the ILAC mutual recognition agreement (MRA).

This certificate is hereby issued that the above instrument was tested for accuracy with calibrated standards traceable to the National Institute of Standards and Technology (NIST). The information provided on this form complies with the data gathering and reporting requirements of ISO/IEC 17025 and ANSI/NCSL Z540.1, and meets the requirements of all applicable references and Cal-Cert procedures listed above.
Any stated measurement uncertainty includes the uncertainty of the Calibration standards used, combined with the uncertainty of the measurement process using the RSS method with a k=2 for an approximate 95% level of confidence. The calibration process meets or exceeds a ratio of 4:1 unless otherwise stated.
All tolerances were derived from the applicable standards and pass/fail determination is based on those tolerances. The customer determined any recommended due dates indicated on the certificate.

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Service Engineer: Cameron Walling **Date:** October 21, 2022

Technical Manager: Marshall Doyle **Signature:**

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A2LA ACCREDITED CERT #4986.01

Report #: 28134-206391-14 **Customer PO#:** 1090
Customer Name: PFS TECO
Customer Address: 11785 SE Highway 212 Ste 305
City: Clackamas **State:** OR **Zip:** 97015
Contact: Aaron Kravitz
Service Address: 11785 SE Highway 212 Ste 305 Clackamas, OR 97015

Calibration Standards

19-00269 | Thermo-Hygrometer | Comark | SN: 6237360167 | Cal: 09/14/2022 | Due: 08/31/2023 | Vendor: Cal-Cert | Range: 122 °F 95 %RH | Report #: 25699-30694-3486
19-01135 | Thermocouple Meter | Tegam | SN: T-312250 | Cal: 08/01/2022 | Due: 08/31/2023 | Vendor: Cal-Cert | Range: 2,450 °F | Report #: 25315-30977-3646

Instrument Data

Calibration Date:	February 28, 2023	**Reference:**	NAVAIR 17-20.ST-95
Recommended Due Date:	February 28, 2024	**Cal-Cert Procedure:**	CP-013
Calibration Frequency:	12 Months	**Indicating System:**	Digital
Manufacturer:	National Instruments	**Temperature:**	70 °F
Type:	Data Logger	**Humidity:**	31% RH
Model Number:	NI 9213	**Asset #:**	215 Booth 1
Serial #:	1B182FB	**Service Location:**	Service Address
Resolution:	0.1 °F	**As Found:**	Pass
Capacity:	2500 °F	**As Left:**	Pass
Tolerance:	± 3.0 °F		
Additional Error	± - °F		

Type K Thermocouple
METER FUNCTION

Channel	Calibration Standard	UUT As Found	UUT As Left Reading 1	UUT As Left Reading 2	As Left Error	Expanded Uncertainty±
Tunnel	0.00	0.20	0.20	0.20	0.20	0.346
	500.00	500.30	500.30	500.30	0.30	
	1000.00	1000.40	1000.40	1000.40	0.40	
	1500.00	1500.40	1500.40	1500.40	0.40	
	2000.00	2000.50	2000.50	2000.50	0.50	
	2400.00	2400.70	2400.70	2400.70	0.70	

Type K Thermocouple
METER FUNCTION

Channel	Calibration Standard	UUT As Found	UUT As Left Reading 1	UUT As Left Reading 2	As Left Error	Expanded Uncertainty±
Flue	0.00	0.10	0.10	0.10	0.10	0.346
	500.00	500.30	500.30	500.30	0.30	
	1000.00	1000.30	1000.30	1000.30	0.30	
	1500.00	1500.30	1500.30	1500.30	0.30	
	2000.00	2000.50	2000.50	2000.50	0.50	
	2400.00	2400.60	2400.60	2400.60	0.60	

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Manufacturer: National Instruments **Type:** Data Logger **Serial #:** 1B182FB

	Type K Thermocouple METER FUNCTION					
Channel	**Calibration Standard**	**UUT As Found**	**UUT As Left Reading 1**	**UUT As Left Reading 2**	**As Left Error**	**Expanded Uncertainty±**
Filter A	0.00	0.10	0.10	0.10	0.10	0.346
	500.00	500.10	500.10	500.10	0.10	
	1000.00	1000.20	1000.20	1000.20	0.20	
	1500.00	1500.30	1500.30	1500.30	0.30	
	2000.00	2000.30	2000.30	2000.30	0.30	
	2400.00	2400.40	2400.40	2400.40	0.40	

	Type K Thermocouple METER FUNCTION					
Channel	**Calibration Standard**	**UUT As Found**	**UUT As Left Reading 1**	**UUT As Left Reading 2**	**As Left Error**	**Expanded Uncertainty±**
Back	0.00	0.10	0.10	0.10	0.10	0.346
	500.00	500.00	500.00	500.00	0.00	
	1000.00	1000.20	1000.20	1000.20	0.20	
	1500.00	1500.50	1500.50	1500.50	0.50	
	2000.00	2000.60	2000.60	2000.60	0.60	
	2400.00	2400.70	2400.70	2400.70	0.70	

	Type K Thermocouple METER FUNCTION					
Channel	**Calibration Standard**	**UUT As Found**	**UUT As Left Reading 1**	**UUT As Left Reading 2**	**As Left Error**	**Expanded Uncertainty±**
Catgalyst	0.00	-0.30	-0.30	-0.30	-0.30	0.346
	500.00	499.90	499.90	499.90	-0.10	
	1000.00	1000.10	1000.10	1000.10	0.10	
	1500.00	1500.10	1500.10	1500.10	0.10	
	2000.00	2000.10	2000.10	2000.10	0.10	
	2400.00	2400.20	2400.20	2400.20	0.20	

	Type K Thermocouple METER FUNCTION					
Channel	**Calibration Standard**	**UUT As Found**	**UUT As Left Reading 1**	**UUT As Left Reading 2**	**As Left Error**	**Expanded Uncertainty±**
Meter A	0.00	-0.50	-0.50	-0.50	-0.50	0.346
	500.00	499.70	499.70	499.70	-0.30	
	1000.00	999.90	999.90	999.90	-0.10	
	1500.00	1500.00	1500.00	1500.00	0.00	
	2000.00	2000.00	2000.00	2000.00	0.00	
	2400.00	2400.00	2400.00	2400.00	0.00	

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Manufacturer: National Instruments **Type:** Data Logger **Serial #:** 1B182FB

	Type K Thermocouple METER FUNCTION					
Channel	**Calibration Standard**	**UUT As Found**	**UUT As Left Reading 1**	**UUT As Left Reading 2**	**As Left Error**	**Expanded Uncertainty±**
Left	0.00	-0.50	-0.50	-0.50	-0.50	0.346
	500.00	499.70	499.70	499.70	-0.30	
	1000.00	999.70	999.70	999.70	-0.30	
	1500.00	1500.00	1500.00	1500.00	0.00	
	2000.00	2000.10	2000.10	2000.10	0.10	
	2400.00	2400.20	2400.20	2400.20	0.20	

	Type K Thermocouple METER FUNCTION					
Channel	**Calibration Standard**	**UUT As Found**	**UUT As Left Reading 1**	**UUT As Left Reading 2**	**As Left Error**	**Expanded Uncertainty±**
Right	0.00	-0.60	-0.60	-0.60	-0.60	0.346
	500.00	499.70	499.70	499.70	-0.30	
	1000.00	999.80	999.80	999.80	-0.20	
	1500.00	1499.80	1499.80	1499.80	-0.20	
	2000.00	1999.90	1999.90	1999.90	-0.10	
	2400.00	2400.00	2400.00	2400.00	0.00	

	Type K Thermocouple METER FUNCTION					
Channel	**Calibration Standard**	**UUT As Found**	**UUT As Left Reading 1**	**UUT As Left Reading 2**	**As Left Error**	**Expanded Uncertainty±**
Filter B	0.00	0.00	0.00	0.00	0.00	0.346
	500.00	500.80	500.80	500.80	0.80	
	1000.00	1000.60	1000.60	1000.60	0.60	
	1500.00	1500.20	1500.20	1500.20	0.20	
	2000.00	2000.00	2000.00	2000.00	0.00	
	2400.00	2399.70	2399.70	2399.70	-0.30	

	Type K Thermocouple METER FUNCTION					
Channel	**Calibration Standard**	**UUT As Found**	**UUT As Left Reading 1**	**UUT As Left Reading 2**	**As Left Error**	**Expanded Uncertainty±**
Top	0.00	-0.80	-0.80	-0.80	-0.80	0.346
	500.00	499.30	499.30	499.30	-0.70	
	1000.00	999.50	999.50	999.50	-0.50	
	1500.00	1499.60	1499.60	1499.60	-0.40	
	2000.00	1999.60	1999.60	1999.60	-0.40	
	2400.00	2399.70	2399.70	2399.70	-0.30	

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Manufacturer: National Instruments **Type:** Data Logger **Serial #:** 1B182FB

	Type K Thermocouple METER FUNCTION					
Channel	**Calibration Standard**	**UUT As Found**	**UUT As Left Reading 1**	**UUT As Left Reading 2**	**As Left Error**	**Expanded Uncertainty±**
Bottom	0.00	-1.00	-1.00	-1.00	-1.00	0.346
	500.00	499.20	499.20	499.20	-0.80	
	1000.00	999.50	999.50	999.50	-0.50	
	1500.00	1499.50	1499.50	1499.50	-0.50	
	2000.00	1999.60	1999.60	1999.60	-0.40	
	2400.00	2399.60	2399.60	2399.60	-0.40	

	Type K Thermocouple METER FUNCTION					
Channel	**Calibration Standard**	**UUT As Found**	**UUT As Left Reading 1**	**UUT As Left Reading 2**	**As Left Error**	**Expanded Uncertainty±**
Meter B	0.00	-0.80	-0.80	-0.80	-0.80	0.346
	500.00	499.30	499.30	499.30	-0.70	
	1000.00	999.50	999.50	999.50	-0.50	
	1500.00	1499.50	1499.50	1499.50	-0.50	
	2000.00	1999.60	1999.60	1999.60	-0.40	
	2400.00	2399.50	2399.50	2399.50	-0.50	

	Type K Thermocouple METER FUNCTION					
Channel	**Calibration Standard**	**UUT As Found**	**UUT As Left Reading 1**	**UUT As Left Reading 2**	**As Left Error**	**Expanded Uncertainty±**
Meter C	0.00	-1.20	-1.20	-1.20	-1.20	0.346
	500.00	499.00	499.00	499.00	-1.00	
	1000.00	999.20	999.20	999.20	-0.80	
	1500.00	1499.30	1499.30	1499.30	-0.70	
	2000.00	1999.30	1999.30	1999.30	-0.70	
	2400.00	2399.30	2399.30	2399.30	-0.70	

	Type K Thermocouple METER FUNCTION					
Channel	**Calibration Standard**	**UUT As Found**	**UUT As Left Reading 1**	**UUT As Left Reading 2**	**As Left Error**	**Expanded Uncertainty±**
Filter C	0.00	-1.00	-1.00	-1.00	-1.00	0.346
	500.00	499.20	499.20	499.20	-0.80	
	1000.00	999.40	999.40	999.40	-0.60	
	1500.00	1499.50	1499.50	1499.50	-0.50	
	2000.00	1999.50	1999.50	1999.50	-0.50	
	2400.00	2399.50	2399.50	2399.50	-0.50	

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Manufacturer: National Instruments **Type:** Data Logger **Serial #:** 1B182FB

	Type T Thermocouple METER FUNCTION					
Channel	**Calibration Standard**	**UUT As Found**	**UUT As Left Reading 1**	**UUT As Left Reading 2**	**As Left Error**	**Expanded Uncertainty±**
Ambient	0.00	0.00	0.00	0.00	0.00	0.346
	20.00	17.70	17.70	17.70	-2.30	
	40.00	37.80	37.80	37.80	-2.20	
	60.00	57.70	57.70	57.70	-2.30	
	80.00	77.90	77.90	77.90	-2.10	
	100.00	97.90	97.90	97.90	-2.10	

Remarks:

15 Channels tested. Ambient is Type T, tested from 0 to 100 °F per customer request.

We sincerely thank you for your business. Please call us at 503-654-9620 for all your sales and calibration needs.
Cleaning and preventative maintenance were performed as part of this service.

Cal-Cert is accredited by A2LA under Calibration Laboratory Code #4986.01.
A2LA is recognized under the ILAC mutual recognition agreement (MRA).

This certificate is hereby issued that the above instrument was tested for accuracy with calibrated standards traceable to the National Institute of Standards and Technology (NIST). The information provided on this form complies with the data gathering and reporting requirements of ISO/IEC 17025 and ANSI/NCSL Z540.1, and meets the requirements of all applicable references and Cal-Cert procedures listed above.
Any stated measurement uncertainty includes the uncertainty of the Calibration standards used, combined with the uncertainty of the measurement process using the RSS method with a k=2 for an approximate 95% level of confidence. The calibration process meets or exceeds a ratio of 4:1 unless otherwise stated. All tolerances were derived from the applicable standards and pass/fail determination is based on those tolerances. The customer determined any recommended due dates indicated on the certificate.

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Service Engineer: Jon Rau **Date:** February 28, 2023

Technical Manager Marshall Doyle **Signature:** 

Report #: 28134-206391-14

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Report and Certificate of Calibration

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800-356-4662

Address
5777 SE International Way
Milwaukie, OR 97222

Local
503-654-9620

A2LA ACCREDITED
CERT #4986.01

Report #:	28134-206391-14	**Customer PO#:**	1090		
Customer Name:	PFS TECO				
Customer Address:	11785 SE Highway 212 Ste 305				
City:	Clackamas	**State:**	OR	**Zip:**	97015
Contact:	Aaron Kravitz				
Service Address:	11785 SE Highway 212 Ste 305	Clackamas, OR 97015			

Calibration Standards

19-00269 | Thermo-Hygrometer | Comark | SN: 6237360167 | Cal: 09/14/2022 | Due: 08/31/2023 | Vendor: Cal-Cert | Range: 122 °F 95 %RH | Report #: 25699-30694-3486
19-01135 | Thermocouple Meter | Tegam | SN: T-312250 | Cal: 08/01/2022 | Due: 08/31/2023 | Vendor: Cal-Cert | Range: 2,450 °F | Report #: 25315-30977-3646

Instrument Data

Calibration Date:	February 28, 2023		**Reference:**	NAVAIR 17-20.ST-95	
Recommended Due Date:	February 28, 2024		**Cal-Cert Procedure:**	CP-013	
Calibration Frequency:	12 Months		**Indicating System:**	Digital	
Manufacturer:	National Instruments		**Temperature:**	72	°F
Type:	Data Logger		**Humidity:**	30%	RH
Model Number:	NI 9213		**Asset #:**	215 Booth 1	
Serial #:	1B182FB		**Service Location:**	Service Address	
Resolution:	0.1	°F	**As Found:**	Pass	
Capacity:	2500	°F	**As Left:**	Pass	
Tolerance:	± 2.0	°F			
Additional Error	± -	°F			

Type K Thermocouple
METER FUNCTION

Channel	Calibration Standard	UUT As Found	UUT As Left Reading 1	UUT As Left Reading 2	As Left Error	Expanded Uncertainty±
Tunnel	0.00	-0.20	-0.20	-0.20	-0.20	0.346
	500.00	499.80	499.80	499.80	-0.20	
	1000.00	1000.00	1000.00	1000.00	0.00	
	1500.00	1500.10	1500.10	1500.10	0.10	
	2000.00	2000.10	2000.10	2000.10	0.10	
	2400.00	2400.10	2400.10	2400.10	0.10	

Type K Thermocouple
METER FUNCTION

Channel	Calibration Standard	UUT As Found	UUT As Left Reading 1	UUT As Left Reading 2	As Left Error	Expanded Uncertainty±
Flue	0.00	-0.40	-0.40	-0.40	-0.40	0.346
	500.00	499.60	499.60	499.60	-0.40	
	1000.00	999.70	999.70	999.70	-0.30	
	1500.00	1499.90	1499.90	1499.90	-0.10	
	2000.00	1999.80	1999.80	1999.80	-0.20	
	2400.00	2400.00	2400.00	2400.00	0.00	

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	Type K Thermocouple METER FUNCTION					
Channel	**Calibration Standard**	**UUT As Found**	**UUT As Left Reading 1**	**UUT As Left Reading 2**	**As Left Error**	**Expanded Uncertainty±**
Filter A	0.00	-0.60	-0.60	-0.60	-0.60	0.346
	500.00	499.50	499.50	499.50	-0.50	
	1000.00	999.60	999.60	999.60	-0.40	
	1500.00	1499.70	1499.70	1499.70	-0.30	
	2000.00	1999.80	1999.80	1999.80	-0.20	
	2400.00	2399.80	2399.80	2399.80	-0.20	

	Type K Thermocouple METER FUNCTION					
Channel	**Calibration Standard**	**UUT As Found**	**UUT As Left Reading 1**	**UUT As Left Reading 2**	**As Left Error**	**Expanded Uncertainty±**
Back	0.00	-0.70	-0.70	-0.70	-0.70	0.346
	500.00	499.50	499.50	499.50	-0.50	
	1000.00	999.50	999.50	999.50	-0.50	
	1500.00	1499.60	1499.60	1499.60	-0.40	
	2000.00	1999.70	1999.70	1999.70	-0.30	
	2400.00	2399.60	2399.60	2399.60	-0.40	

	Type K Thermocouple METER FUNCTION					
Channel	**Calibration Standard**	**UUT As Found**	**UUT As Left Reading 1**	**UUT As Left Reading 2**	**As Left Error**	**Expanded Uncertainty±**
Catgalyst	0.00	-0.70	-0.70	-0.70	-0.70	0.346
	500.00	499.40	499.40	499.40	-0.60	
	1000.00	999.60	999.60	999.60	-0.40	
	1500.00	1499.60	1499.60	1499.60	-0.40	
	2000.00	1999.70	1999.70	1999.70	-0.30	
	2400.00	2399.70	2399.70	2399.70	-0.30	

	Type K Thermocouple METER FUNCTION					
Channel	**Calibration Standard**	**UUT As Found**	**UUT As Left Reading 1**	**UUT As Left Reading 2**	**As Left Error**	**Expanded Uncertainty±**
Meter A	0.00	-1.30	-1.30	-1.30	-1.30	0.346
	500.00	498.80	498.80	498.80	-1.20	
	1000.00	999.10	999.10	999.10	-0.90	
	1500.00	1499.10	1499.10	1499.10	-0.90	
	2000.00	1999.10	1999.10	1999.10	-0.90	
	2400.00	2399.10	2399.10	2399.10	-0.90	

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	Type K Thermocouple METER FUNCTION					
Channel	**Calibration Standard**	**UUT As Found**	**UUT As Left Reading 1**	**UUT As Left Reading 2**	**As Left Error**	**Expanded Uncertainty±**
Left	0.00	-1.30	-1.30	-1.30	-1.30	0.346
	500.00	498.90	498.90	498.90	-1.10	
	1000.00	999.00	999.00	999.00	-1.00	
	1500.00	1499.20	1499.20	1499.20	-0.80	
	2000.00	1999.20	1999.20	1999.20	-0.80	
	2400.00	2399.20	2399.20	2399.20	-0.80	

	Type K Thermocouple METER FUNCTION					
Channel	**Calibration Standard**	**UUT As Found**	**UUT As Left Reading 1**	**UUT As Left Reading 2**	**As Left Error**	**Expanded Uncertainty±**
Right	0.00	-1.40	-1.40	-1.40	-1.40	0.346
	500.00	498.90	498.90	498.90	-1.10	
	1000.00	999.00	999.00	999.00	-1.00	
	1500.00	1499.00	1499.00	1499.00	-1.00	
	2000.00	1999.00	1999.00	1999.00	-1.00	
	2400.00	2399.10	2399.10	2399.10	-0.90	

	Type K Thermocouple METER FUNCTION					
Channel	**Calibration Standard**	**UUT As Found**	**UUT As Left Reading 1**	**UUT As Left Reading 2**	**As Left Error**	**Expanded Uncertainty±**
Filter B	0.00	0.00	0.00	0.00	0.00	0.346
	500.00	500.60	500.60	500.60	0.60	
	1000.00	1000.30	1000.30	1000.30	0.30	
	1500.00	1500.10	1500.10	1500.10	0.10	
	2000.00	1999.80	1999.80	1999.80	-0.20	
	2400.00	2399.50	2399.50	2399.50	-0.50	

	Type K Thermocouple METER FUNCTION					
Channel	**Calibration Standard**	**UUT As Found**	**UUT As Left Reading 1**	**UUT As Left Reading 2**	**As Left Error**	**Expanded Uncertainty±**
Top	0.00	-1.40	-1.40	-1.40	-1.40	0.346
	500.00	498.90	498.90	498.90	-1.10	
	1000.00	999.00	999.00	999.00	-1.00	
	1500.00	1499.10	1499.10	1499.10	-0.90	
	2000.00	1999.00	1999.00	1999.00	-1.00	
	2400.00	2399.00	2399.00	2399.00	-1.00	

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	Type K Thermocouple METER FUNCTION					
Channel	**Calibration Standard**	**UUT As Found**	**UUT As Left Reading 1**	**UUT As Left Reading 2**	**As Left Error**	**Expanded Uncertainty±**
Bottom	0.00	-1.50	-1.50	-1.50	-1.50	0.346
	500.00	498.80	498.80	498.80	-1.20	
	1000.00	999.00	999.00	999.00	-1.00	
	1500.00	1499.00	1499.00	1499.00	-1.00	
	2000.00	1999.00	1999.00	1999.00	-1.00	
	2400.00	2399.00	2399.00	2399.00	-1.00	

	Type K Thermocouple METER FUNCTION					
Channel	**Calibration Standard**	**UUT As Found**	**UUT As Left Reading 1**	**UUT As Left Reading 2**	**As Left Error**	**Expanded Uncertainty±**
Meter B	0.00	-1.30	-1.30	-1.30	-1.30	0.346
	500.00	499.00	499.00	499.00	-1.00	
	1000.00	999.00	999.00	999.00	-1.00	
	1500.00	1499.20	1499.20	1499.20	-0.80	
	2000.00	1999.20	1999.20	1999.20	-0.80	
	2400.00	2399.10	2399.10	2399.10	-0.90	

	Type K Thermocouple METER FUNCTION					
Channel	**Calibration Standard**	**UUT As Found**	**UUT As Left Reading 1**	**UUT As Left Reading 2**	**As Left Error**	**Expanded Uncertainty±**
Meter C	0.00	-1.20	-1.20	-1.20	-1.20	0.346
	500.00	498.90	498.90	498.90	-1.10	
	1000.00	999.10	999.10	999.10	-0.90	
	1500.00	1499.20	1499.20	1499.20	-0.80	
	2000.00	1999.20	1999.20	1999.20	-0.80	
	2400.00	2399.20	2399.20	2399.20	-0.80	

	Type K Thermocouple METER FUNCTION					
Channel	**Calibration Standard**	**UUT As Found**	**UUT As Left Reading 1**	**UUT As Left Reading 2**	**As Left Error**	**Expanded Uncertainty±**
Filter C	0.00	-1.20	-1.20	-1.20	-1.20	0.346
	500.00	499.10	499.10	499.10	-0.90	
	1000.00	999.20	999.20	999.20	-0.80	
	1500.00	1499.30	1499.30	1499.30	-0.70	
	2000.00	1999.30	1999.30	1999.30	-0.70	
	2400.00	2399.20	2399.20	2399.20	-0.80	

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Manufacturer: National Instruments **Type:** Data Logger **Serial #:** 1B182FB

	Type T Thermocouple METER FUNCTION					
Channel	**Calibration Standard**	**UUT As Found**	**UUT As Left Reading 1**	**UUT As Left Reading 2**	**As Left Error**	**Expanded Uncertainty±**
Ambient	0.00	-1.40	-1.40	-1.40	-1.40	0.346
	20.00	18.80	18.80	18.80	-1.20	
	40.00	38.80	38.80	38.80	-1.20	
	60.00	58.70	58.70	58.70	-1.30	
	80.00	78.80	78.80	78.80	-1.20	
	100.00	98.70	98.70	98.70	-1.30	

Remarks:

15 Channels tested. Ambient is Type T, tested from 0 to 100 °F per customer request.

We sincerely thank you for your business. Please call us at 503-654-9620 for all your sales and calibration needs.
Cleaning and preventative maintenance were performed as part of this service.

Cal-Cert is accredited by A2LA under Calibration Laboratory Code #4986.01.
A2LA is recognized under the ILAC mutual recognition agreement (MRA).

This certificate is hereby issued that the above instrument was tested for accuracy with calibrated standards traceable to the National Institute of Standards and Technology (NIST). The information provided on this form complies with the data gathering and reporting requirements of ISO/IEC 17025 and ANSI/NCSL Z540.1, and meets the requirements of all applicable references and Cal-Cert procedures listed above.
Any stated measurement uncertainty includes the uncertainty of the Calibration standards used, combined with the uncertainty of the measurement process using the RSS method with a k=2 for an approximate 95% level of confidence. The calibration process meets or exceeds a ratio of 4:1 unless otherwise stated. All tolerances were derived from the applicable standards and pass/fail determination is based on those tolerances. The customer determined any recommended due dates indicated on the certificate.

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Service Engineer: Jon Rau **Date:** February 28, 2023

Technical Manager Marshall Doyle **Signature:** MDoyle

Report #: 28134-206391-14

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Airgas
an Air Liquide company

Airgas Specialty Gases
Airgas USA LLC
11711 S. Alameda Street
Los Angeles, CA 90059
Airgas.com

CERTIFICATE OF ANALYSIS

Grade of Product: EPA PROTOCOL STANDARD

Part Number:	E04NI61E15A0574	Reference Number:	48-402546580-1
Cylinder Number:	CC121798	Cylinder Volume:	143.7 CF
Laboratory:	124 - Los Angeles (SAP) - CA	Cylinder Pressure:	2016 PSIG
PGVP Number:	B32022	Valve Outlet:	590
Gas Code:	CO,CO2,O2,BALN	Certification Date:	Sep 23, 2022

Expiration Date: Sep 23, 2030

Certification performed in accordance with "EPA Traceability Protocol for Assay and Certification of Gaseous Calibration Standards (May 2012)" document EPA 600/R-12/531, using the assay procedures listed. Analytical Methodology does not require correction for analytical interference. This cylinder has a total analytical uncertainty as stated below with a confidence level of 95%. There are no significant impurities which affect the use of this calibration mixture. All concentrations are on a mole/mole basis unless otherwise noted.

Do Not Use This Cylinder below 100 psig, i.e. 0.7 megapascals.

ANALYTICAL RESULTS

Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty	Assay Dates
CARBON MONOXIDE	4.250 %	4.306 %	G1	+/- 0.6% NIST Traceable	09/23/2022
CARBON DIOXIDE	17.00 %	17.01 %	G1	+/- 0.6% NIST Traceable	09/23/2022
OXYGEN	17.00 %	17.11 %	G1	+/- 0.7% NIST Traceable	09/23/2022
NITROGEN	Balance				

CALIBRATION STANDARDS

Type	Lot ID	Cylinder No	Concentration	Uncertainty	Expiration Date
NTRM	12061520	CC354777	19.87 % CARBON DIOXIDE/NITROGEN	+/- 0.6%	Jan 11, 2024
NTRM	98051002	SG9150866BAL	12.05 % OXYGEN/NITROGEN	+/- 0.7%	Dec 14, 2023
NTRM	08061402	CC267714	1.959 %W CARBON MONOXIDE/NITROGEN	+/- 0.6%	Jul 02, 2024

ANALYTICAL EQUIPMENT

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
SIEMENS 6E CO2	NDIR	Sep 16, 2022
SIEMENS 6E CO HIGH	NDIR	Sep 06, 2022
SIEMENS OXYMAT 6	PARAMAGNETIC	Sep 12, 2022

Triad Data Available Upon Request

Approved for Release

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5700 S. Alameda Street
Los Angeles CA 90058
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PGVP ID: F22019

CERTIFICATE OF ANALYSIS / EPA PROTOCOL GAS

Customer & Order Information

PXPKG TUALATIN OR H
10450 SW TUALATIN SHERWOOD ROAD
TUALATIN OR 97062-9547

Certificate Issuance Date: 10/16/2019
Praxair Order Number: 71120745
Part Number: NI CD10CO33E-AS
Customer PO Number: 79106732

Fill Date: 10/08/2019
Lot Number: 70086928102
Cylinder Style & Outlet: AS CGA 590
Cylinder Pressure and Volume: 2000 psig 140 ft3

Certified Concentration

ProSpec EZ Cert

Expiration Date:	10/16/2027	NIST Traceable
Cylinder Number:	CC139173	Expanded Uncertainty
10.09 %	Carbon dioxide	± 0.4 %
2.53 %	Carbon monoxide	± 0.6 %
10.48 %	Oxygen	± 0.4 %
Balance	Nitrogen	

Certification Information:

Certification Date: 10/16/2019 Term: 96 Months Expiration Date: 10/16/2027

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 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: 10.09 %
Instrument Used: Horiba VIA-510 S/N 20C194WK
Analytical Method: NDIR
Last Multipoint Calibration: 09/18/2019

First Analysis Data:						Date	10/16/2019
Z:	0	R:	14	C:	10.09	Conc:	10.09
R:	14	Z:	0	C:	10.1	Conc:	10.1
Z:	0	C:	10.1	R:	14.01	Conc:	10.1
UOM:	%				Mean Test Assay:		10.09 %

Reference Standard: Type / Cylinder #: GMIS / CC164230
Concentration / Uncertainty: 14.00 % ±0.265%
Expiration Date: 04/16/2027
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: 2.53 %
Instrument Used: Horiba VIA-510 S/N UB9UCSYX
Analytical Method: NDIR
Last Multipoint Calibration: 09/19/2019

First Analysis Data:						Date	10/16/2019
Z:	0	R:	5	C:	2.53	Conc:	2.53
R:	5	Z:	0	C:	2.53	Conc:	2.53
Z:	0	C:	2.54	R:	5.01	Conc:	2.54
UOM:	%				Mean Test Assay:		2.53 %

Reference Standard: Type / Cylinder #: GMIS / CC242633
Concentration / Uncertainty: 5.00 % ±0.543%
Expiration Date: 04/03/2025
Traceable to: SRM # / Sample # / Cylinder #: SRM 2642a / 51-D-23 / FF23106
SRM Concentration / Uncertainty: 7.859% / ±0.039%
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: 10.48 %
Instrument Used: OXYMAT 5E
Analytical Method: Paramagnetic
Last Multipoint Calibration: 09/18/2019

First Analysis Data:						Date	10/16/2019
Z:	0	R:	9.88	C:	10.49	Conc:	10.48
R:	9.88	Z:	0	C:	10.49	Conc:	10.48
Z:	0	C:	10.5	R:	9.89	Conc:	10.49
UOM:	%				Mean Test Assay:		10.48 %

Reference Standard: Type / Cylinder #: NTRM / DT0010384
Concentration / Uncertainty: 9.875 % ±0.4%
Expiration Date: 11/18/2022
Traceable to: SRM # / Sample # / Cylinder #: NTRM / 170701 / NTRM DT0010384
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: Jose Vasquez

Certified By: Jenna Lockman

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