Sherwood Industries Ltd.

Project #: F25-470
Model Name: Ironwood 2.0 Series
Model Nos: IW20SF-1, IW20CF-1, IW20SI-1
Type: Wood Fired Room Heater
Date: 1/26/2026

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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Prepared by: Aaron Kravitz, Laboratory Manager



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Revision Summary

Date: 1/26/2026 – Original Issue

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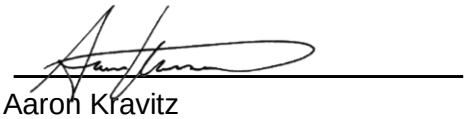
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Affidavit

PFS-TECO was contracted by Sherwood Industries Ltd. to provide testing services for the Ironwood 2.0 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 12/19/2025 and ending on 12/26/2025. 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 Laboratory Accreditation Certificate Number 4. PFS-TECO is accredited by ANAB 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
Laboratory Manager

Introduction

Sherwood Industries Ltd. contracted with PFS-TECO to perform EPA certification testing on the Ironwood 2.0 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 5 test runs were completed in accordance with EPA Method 28R. 1 at the maximum burn rate category, 1 at the medium high burn rate category, 2 at the medium low burn rate category, and 1 at the low burn rate category. All 5 test runs met validity requirements, and all are included in the weighted average. See Run Narrative section for further detail on each run.
- All Filters and O- rings were weighed in pairs in accordance with EPA-ALT154.

Wood Heater Identification and Testing

- Appliance Tested: ***Ironwood 2.0 (Model No. IW20SF-1)***
- PFS Tracking Number: ***243***
- Manufacturer: ***Sherwood Industries Ltd.***
- Catalyst: ***Yes***
- Heat exchange blower: ***Integral***
- Type: ***Wood Stove***
- Style: ***Free Standing Wood Stove***
- Date Received: ***Tuesday, December 16, 2025***
- Testing Period – Start: ***Friday, December 19, 2025***
  Finish: ***Friday, December 26, 2025***
- Test Location: ***PFS TECO***
  11785 SE Hwy 212
  Clackamas, OR 97015
- Elevation: ***~131 Feet above sea level***
- Test Technician(s): ***Aaron Kravitz***
- Observers: ***None***

Results

A total of 5 test runs where performed on the Ironwood 2.0. The weighted average emissions rate for the 5 run test series was measured to be **1.8 g/hr** with a Higher Heating Value efficiency of **77%.** The average CO emission rate for the 4 tests was **0.51 g/min.** The Sherwood Industries Ltd. Ironwood 2.0 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
Date	12/22/2025	12/19/2025	12/23/2025	12/26/2025	12/24/2025
Run Number	2	1	3	5	4
Emission Rate (g/hr)	1.74	1.26	1.55	1.59	2.55
Burn Rate (kg/hr)	0.91	1.02	1.08	1.42	2.04
Heat Output (Btu/hr)	13,677	15,089	15,629	20,377	27,613
Overall Efficiency (% HHV)	79%	79%	77%	77%	74%
CO Emissions (g/MJ Output)	2.61	1.82	1.44	0.98	1.48
CO Emissions (g/kg Dry Fuel)	41.08	28.47	22.07	15.02	21.58
CO Emissions (g/min)	0.63	0.48	0.40	0.35	0.72
Emissions – 1st hr (g/hr)	5.78	3.54	3.70	2.95	5.01

Weighted particulate emission average of 4 test runs: 1.8 grams per hour.
Weighted average HHV efficiency of 4 test runs: 77%.
Average CO Emissions Rate: 0.51 g/min

Test Run Narrative

Run 1

Run 1 was performed on 12/19/2025 as an attempted category 1 test per EPA Method 28R. The total test time was 298 minutes. The particulate emissions rate for the test was 1.26 g/hr, the burn rate was 1.02 kg/hr with an HHV efficiency of 79.1%. All test results were appropriate and valid. There were no anomalies and all test criteria were met.

Run 2

Run 2 was performed on 12/22/2025 as an attempted category 1 test per EPA Method 28R. The total test time was 334 minutes. The particulate emissions rate for the test was 1.17 g/hr, the burn rate was 0.91 kg/hr with an HHV efficiency of 79.4%. 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 3

Run 3 was performed on 12/23/2025 as a category 2 test, per EPA Method 28R. The total test time was 285 minutes. The particulate emissions rate for the test was 1.55 g/hr, the burn rate was 1.08 kg/hr with an HHV efficiency of 77.5%. All test results were appropriate and valid. The fuel for this run was shortened uniformly from the nominal length of 16” to 14.75”. This was done in accordance with ASTM E2780 and Method 28R in order to meet loading density requirements. The resultant loading density for run 3 was 7.63 lb/ft^3.There were no other anomalies and all test criteria were met.

Run 4

Run 4 was performed on 12/24/2025 as a category 4 test, per EPA Method 28R. The total test time was 147 minutes. The particulate emissions rate for the test was 2.55 g/hr, the burn rate was 2.04 kg/hr with an HHV efficiency of 73.6%. All test results were appropriate and valid. There were no anomalies and all test criteria were met.

Run 5

Run 5 was performed on 12/26/2025 as a category 3 test, per EPA Method 28R. The total test time was 204 minutes. The particulate emissions rate for the test was 1.59 g/hr, the burn rate was 1.42 kg/hr with an HHV efficiency of 77.4%. All test results were appropriate and valid. There were no anomalies and all test criteria were met.

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)	Run Time (Min)
	Pre	Post	Pre	Post					
1	67.5	68.5	42.2	32.5	29.70	8.69	13.43	20.7	298
2	67.4	66.0	36.9	32.8	29.73	8.16	13.45	20.6	334
3	66.7	65.2	30.9	29.3	29.61	8.75	13.74	22.0	285
4	69.5	66.7	35.7	30.9	29.40	9.02	13.49	23.8	147
5	66.6	66.1	33.5	29.7	29.65	7.98	12.75	21.5	204

Appliance Operation

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.

Appliance Settings

Run	Pre-Burn Air Settings	Test Run Settings
1	Air control open 1/32”	Air control open 1/32” Fan on high
2	Air control fully closed	Air control fully closed Fan on high
3	Air control open 5/32”	Air control open 5/32” Fan on high
4	Air control fully open	Air control fully open Fan on high
5	Air control open 13/32”	Air control open 13/32” Fan on high

Appliance Description

Model(s): Ironwood 2.0 Series: IW20SF-1, IW20CF-1, IW20SI-1

Appliance Type: Wood-Fired Room Heater

Tota Firebox Volume: 2.40 ft^3
Usable Firebox Volume: 1.80 ft^3

Model Variants: The Ironwood 2.0 is available in three variants, the IW20SF-1, IW20CF-1, and IW20SI-1. The three variants differ only in exterior cladding and are identical in all respects that affect emissions.

Air Introduction System Air is introduced into three different areas of the fire chamber. Primary air is delivered via the adjustable air control to the air wash located above the loading door, and the lower primary air opening located beneath the loading door. Secondary air is introduced through two fixed openings on the sides of the firebox and is routed through secondary air tubes at the top of the firebox beneath the baffle and catalyst.

Baffles: A steel plate is used to mount the combustor and bypass door. A sliding flue bypass is incorporated into the baffle, when opened it allows products of combustion to bypass the catalyst and flow directly to the flue outlet. When closed, products of combustion are directed through the catalyst mounted near the front of the baffle system. The baffle is insulated by a ½" kaowool blanket.

Catalytic Combustor: The appliance features a 6.6" x 2.5" x 2" thick, 16 cell per inch square mesh ceramic substrate catalyst. A bypass mechanism actuated by a handle on the right side of the firebox allows for flue gases to bypass the catalyst during startup.

Combustor Temperature Monitoring System: A combustor monitoring thermometer is located at the top of the firebox, and is inserted into the flue gas stream such that it is located within 1" of the catalyst exit.

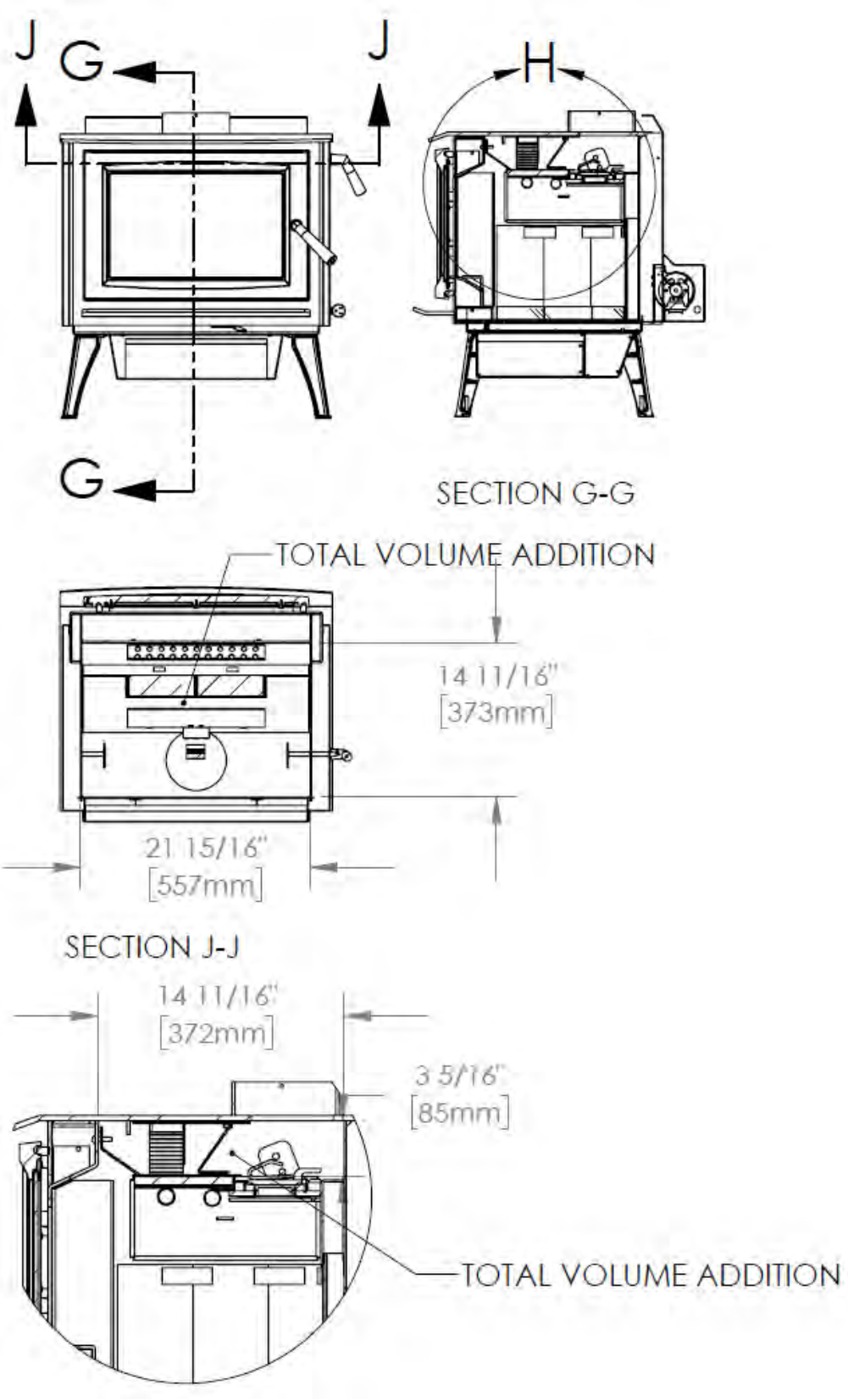
Refractory Insulation: The firebox is lined with 1.25" thick high-density firebrick.

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

Fan: A room air fan is supplied as factory-installed equipment; it features a variable speed control.

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

Firebox Volume Drawing & Calculations



USEABLE FIREBOX VOLUME						
		Depth in	Height in	Width in	in^3	ft^3
Volume 1	Add	12.63	11.50	19.25	2794.86	1.62
Volume 2	Add	3.63	8.25	18.94	283.17	0.16
Volume 3	Add	3.63	1.44	9.63	25.08	0.01
Useable Firebox Volume					3103.11	1.80
Fuel Specifics						
Minimum Weight lbs			11.3			
Ideal Weight lbs			12.6			
Maximum Weight lbs			13.8			
Maximum Length inch			16.0			
Total Firebox Volume (Includes Above Baffle)					4150.28	2.40
Depth in	Height in	Width in	in^3	ft^3		
14.69	3.25	21.94	1047.17	0.61		

Appliance Photographs

Appliance Front



Appliance Left



Appliance Right



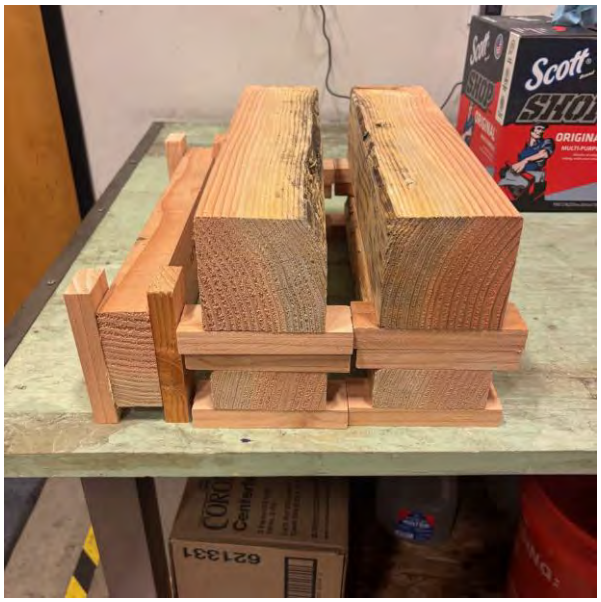
Appliance Rear



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





Test 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
203B	Dilution Tunnel centroid transducer
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
238	Ohaus 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
209	Dewalt Tape Measure
215	Temperature Logger
DT0042934	Gas Analyzer Calibration Span Gas
CC174411	Gas Analyzer Calibration Mid Gas

Barometric Pressure data was taken from a local National Weather Service station, corrected for altitude differences in accordance with ASTM E2515 6.1.2.

Sample Collection

Verified – Yes:☒ No:☐ (if No Explain)

ASTM E2515-11

Four separate, complete particulate sampling trains were used for each run. Filter face velocity at no time exceeded 150mm/sec during any test run. The dry gas meters were calibrated for the flow rates encountered during the test runs.

The 47mm filter holder assemblies consist of an aluminum front housing and polycarbonate rear housing, with the rear housing located 75mm downstream from the front housing. The front filter support frit is stainless steel.

Probe assemblies are constructed from 316 grade stainless steel tubing with an outside diameter or 6.35mm and 310mm length.

A type K thermocouple filter temperature monitor probe is installed behind the front filter housing with its tip directly exposed to the sample gas.

Sample gas drying systems are located prior to each metering system and include temperature sensors.

The metering systems include vacuum gauges, leak-free diaphragm-type pumps, and type K thermocouple temperature sensors. The gas meters have a resolution of 0.001 cubic feet.

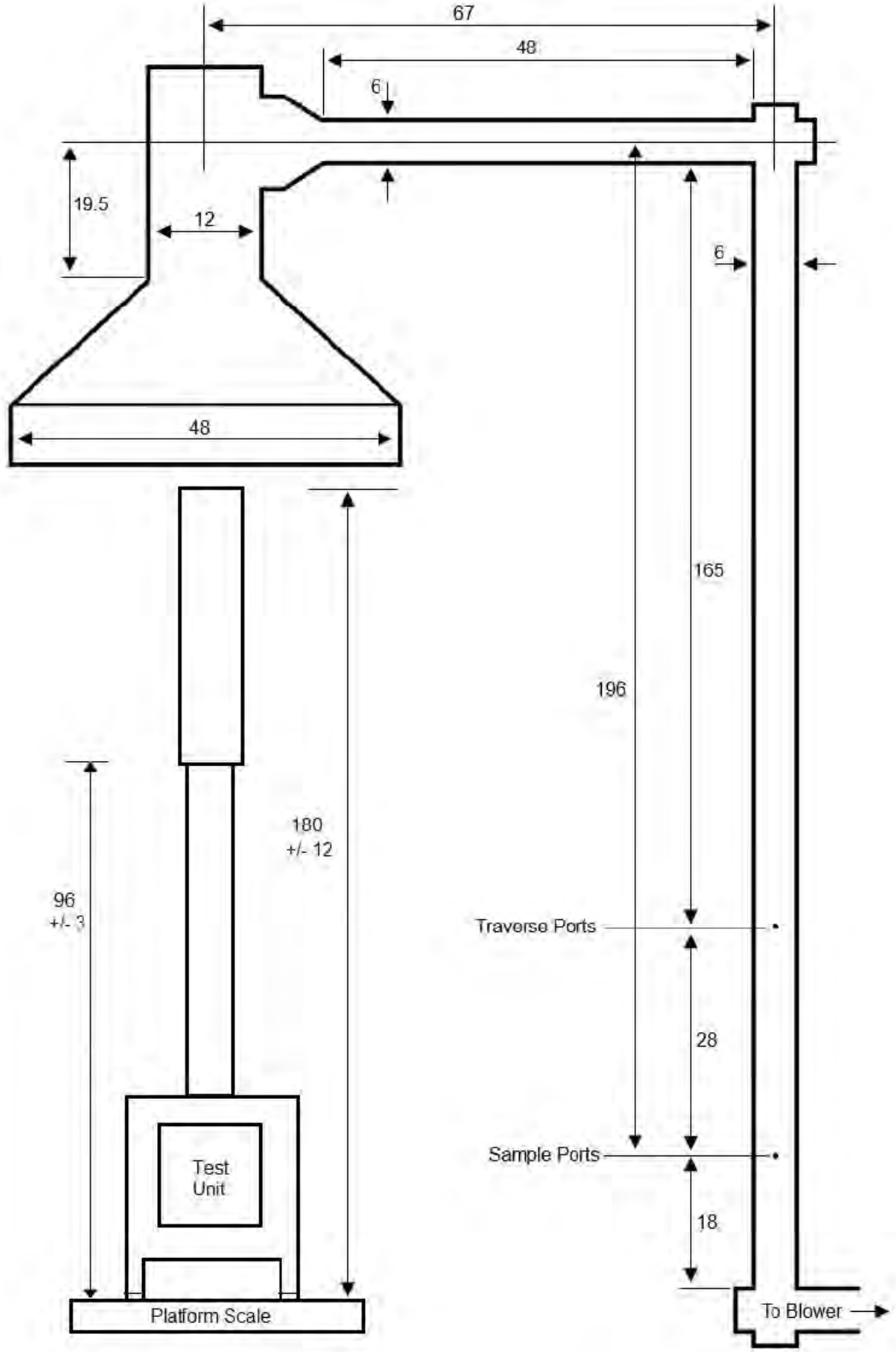
Barometric pressure data was taken from local National Weather Service station KPDX. As PFS and KPDX are at the same altitude, the correction for altitude per ASTM E2515-11 6.1.2 is 1:1.

Dilution tunnel temperature was measured by a type K thermocouple probe.

Dilution tunnel velocity was measured prior to each run by performing a velocity traverse and monitored throughout each run by measuring pitot pressure at the tunnel centroid. No traverse points were located less than 0.5” from the tunnel wall. Traverses were performed using a Dwyer Model 1430 Microtector in accordance with the instrument owners’ manual. This includes leveling and zeroing the instrument prior to each use and performing pre- and post-test leak checks on the pitot tubing.

To monitor and log centroid pitot pressure, the pressure transducer of an Apex Instruments XC-60-DIR sample box was used. Both pieces of equipment offer precision in excess of the +/-0.001” specified in section 6.1.5 of ASTM E2515-11, and are therefore suitable for use with flows under 800 ft/min. Both pieces of equipment are plumbed to the same pitot tube, which is in accordance with the design shown in Appendix X2 of ASTM E2515-11.

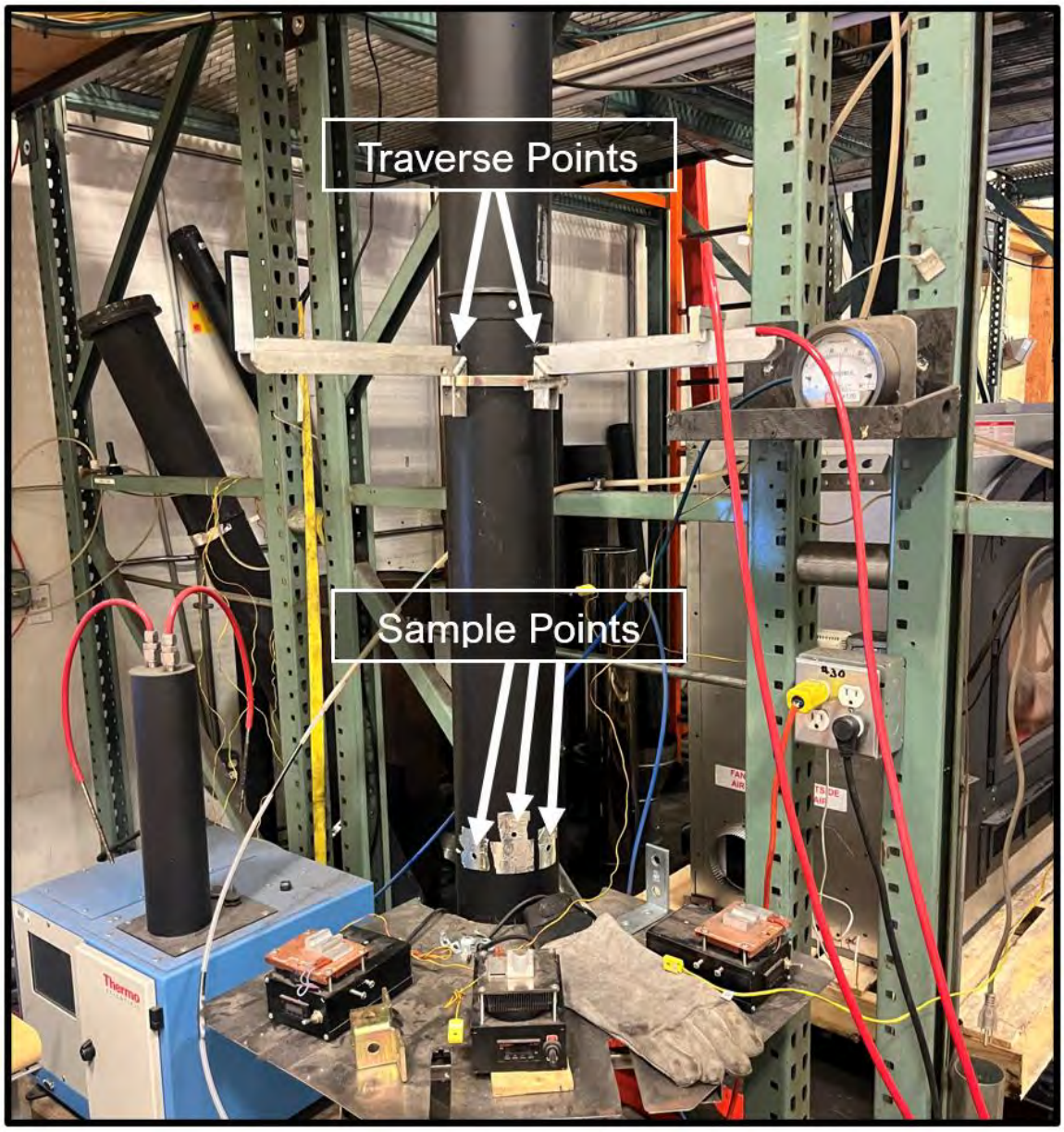
The dilution tunnel is constructed in accordance with the requirements of ASTM E2515-11, as shown below:



Booth #1 Tunnel Schematic

All dimensions are in inches

Sample ports are located 16.3 feet downstream from any disturbances and 1.5 feet upstream from any disturbances. Flow rate traverse data was collected 13.8 feet downstream from any disturbances and 3.8 feet upstream from any disturbances. (See below). Flow is induced and maintained by a centrifugal-type blower.



Test facility temperature is monitored by a type T thermocouple probe, located in a 150mm long, 50mm diameter pipe shield located in the 90-degree arc in front of the test unit, between 1-2m away, and in the horizontal plane of the test unit air intake.

Test facility airflow was measured with an anemometer capable of measuring velocities less than 20 ft/min located within 2 feet of the appliance.

Reagents and Standards

Verified – Yes:☒ No:☐ (if No Explain)

Pall Type A/E Glass fiber 47mm filters having at least 99.95% efficiency at 0.3-micron particles were used.

Test samples were conditioned in an airtight desiccator containing calcium sulfate desiccant, with specific humidity of less than 0.005 g/liter prior to and after the testing.

Acetone was used to clean probe assemblies both prior to pretest desiccation and prior to post-test desiccation.

Calibration and Standardization

Verified – Yes:☒ No:☐ (if No Explain)

The gas metering system is calibrated every six months traceable to NIST and demonstrating an uncertainty of +/- 0.75% of the measured volume. Calibration flow rate range is from 0.05 to 0.30 scfm.

All thermocouples discussed in this report are calibrated traceable to NIST every six months. Both Type T (ambient) and Type K (all others) TCs are monitored by the same piece of equipment, a National Instruments 9213.

The analytical balance has a resolution of 0.1mg and is calibrated traceable to NIST every six months. Before each test and before each weighing of samples (both for tare and final analysis), the balance is audited with a calibrated 200mg weight.

All other measurement equipment used for this test is calibrated traceable to NIST at an appropriate interval. See Appendix C for all calibration records.

Procedures

Verified – Yes:☒ No:☐ (if No Explain)

The following procedures were performed and/or observed prior to testing:

- The dilution tunnel was cleaned with an appropriately sized steel brush.

- Induced draft was evaluated by measuring flue static pressure with the dilution tunnel blower operating and no fire in the appliance. No induced static pressure was observed (all readings <0.005" H2O) in any appliance door/air damper configuration.

- Smoke capture was evaluated by operating the appliance at a high burn rate and visually monitoring smoke collection by the hood. No less than 100% smoke collection was observed at the minimum tunnel flow rate.

Prior to ignition for each run, a velocity traverse was conducted to determine dilution tunnel velocity. Traverse points were determined in accordance with Figures 5 and 6 of ASTM E2515-11, which for a 6" diameter tunnel are 0.5" and 1.5" from either side of the duct, on two axes located at 90º from each other. Velocity calculated in accordance with section 9.3.2, excluding center readings. The pitot tube was placed in the center of the tunnel for the duration of each test run.

Prior to tare analysis, probes were cleaned with acetone, O-rings cleaned of any residue, and filters were visually check for pinhole leaks or irregularities. Filters, O-rings, and probes were desiccated at 20+/-5C for at least 24 hours and weighed at intervals of not less than 6 hours until constant weight was attained. Filters and O-rings were both weighed in pairs.

Tared samples were assembled into three dual filter holder assemblies (A, B, and first hour) and the single ambient filter assembly. Blunt tweezers and surgical gloves were used to avoid damage or contamination of the samples. The three dual filter assemblies were inserted to the appropriate depth in the tunnel (within the 2" diameter centroid, no closer than 1" apart). The ambient filter holder was installed within 10' of the centroid of the dilution tunnel inlet hood, in the same plane and the hood inlet.

Leak checks were performed on sampling systems as follows:

- Leak checks were performed on the pitot tube lines before and after each test run by applying a pressure differential of at least 3" H2O and sealing the pitot tube opening. Pressure remained stable for at least 15 seconds all checks of both the pressure and suction sides, confirming that no leaks were present.

- All four sampling trains were leak-checked before and after each test run. Pre-test leak checks were conducted at the vacuum level corresponding to each sample pump's flow setting, in accordance with Note 5 of ASTM E2515-11. Post-test checks were conducted at the highest vacuum level encountered during the test, or the pre-test vacuum level, whichever was greater. Of the leak rate limits (0.01 cfm or 4% of sample rate), 4% of the sample rate is lower, and at no point was the measured leakage rate greater than this.

- The portion of the sampling trains from the pumps to the dry gas meters (that is, the positive pressure section of the metering system) was leak checked semiannually during

calibration. This check was performed by closing the main inlet valve and pressurizing the outlet of the dry gas meter to at least 7” H2O, and ensuring the pressure remained stable for at least 1 minute.

Sampling began at the start of each test run as defined by the applicable procedure and continued until the defined end of the test run. Readings were collected at 1-minute intervals. During all test runs, the following conditions were maintained:

- Test facility temperature was between 55 and 90 F.
- Air velocities were less than 50ft/min within 2ft of the appliance
- Filter holder temperatures were no greater than 90 F.
- Sample flow rates were maintained within 10% of the initial proportionality ratio.
- Ambient sample flow rate maintained within 20% of the initial flow rate.

Following each test run and its associated leak checks, samples were recovered by disassembling the filter holder components and replacing them in the desiccator. The outside of the probes was cleaned with acetone prior to desiccation.

Sample weights were determined using the same analytical balance and procedures used for tare weights. Filters, O-rings, and probes were desiccated at 20+/-5C for at least 24 hours and weighed at intervals of not less than 6 hours until constant weight was attained. Filters and O-rings were both weighed in pairs. Components were not exposed to laboratory atmosphere for more than 2 minutes per weighing.

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: 6782 Oldfield Rd. Victoria, BC Canada V8M 2A3, 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)

Appendix A

Test Run Data, Technician Notes, and Sample Analysis

EPA Method 28R Weighted Average Emissions

Client: Sherwood
Stove Model: Ironwood 2.0-1
Test Dates: 12/19/25 - 12/26/25
Job Number: 25-470

Signature/Date: 1/14/26

Weighted Average Particulate Emissions (g/hr):	**1.76**
Weighted Average HHV Efficiency (%):	**77.4%**
Weighted Average LHV Efficiency (%):	**83.7%**
Average CO Emissions (g/min):	**0.51**

Individual Run Summaries

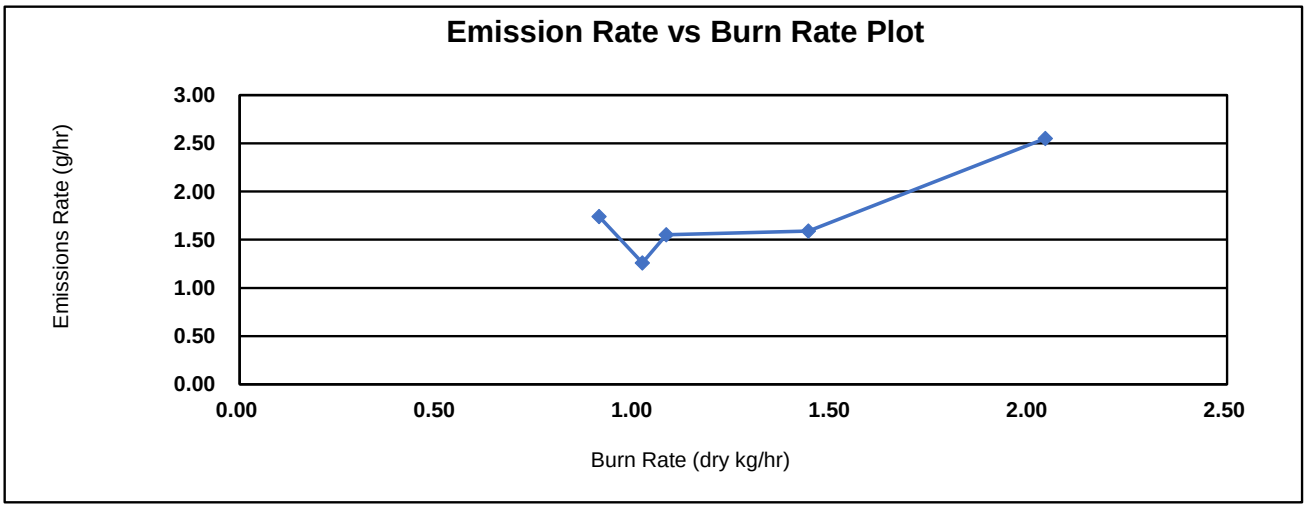
Run Number:	2
Burn Rate (dry kg/hr):	0.91
Emissions Rate (g/hr):	1.74
HHV Efficiency (%):	79.4%
LHV Efficiency (%):	85.9%
Weighting Percentage (%):	24.23%

Run Number:	1
Burn Rate (dry kg/hr):	1.02
Emissions Rate (g/hr):	1.26
HHV Efficiency (%):	79.1%
LHV Efficiency (%):	85.5%
Weighting Percentage (%):	8.26%

Run Number:	3
Burn Rate (dry kg/hr):	1.08
Emissions Rate (g/hr):	1.55
HHV Efficiency (%):	77.5%
LHV Efficiency (%):	83.8%
Weighting Percentage (%):	20.20%

Run Number:	5
Burn Rate (dry kg/hr):	1.44
Emissions Rate (g/hr):	1.59
HHV Efficiency (%):	77.4%
LHV Efficiency (%):	83.7%
Weighting Percentage (%):	29.74%

Run Number	4
Burn Rate (dry kg/hr)	2.04
Emissions (g/hr)	2.55
HHV Efficiency (%)	73.6%
LHV Efficiency (%)	79.5%
Weighting Percentage (%):	17.57%



WOOD STOVE TEST DATA PACKET
ASTM E2780/E2515

Run 1 Data Summary

Client:	Sherwood
Model:	Ironwood 2.0-1
Job #:	25-470
Tracking #:	243
Test Date:	12/19/2025

Techician Signature

1/14/2026
Date

TEST RESULTS - ASTM E2780 / ASTM E2515

Client: Sherwood
Model: Ironwood 2.0-1
Run #: 1

Job #: 25-470
Tracking #: 243
Technician: AK
Date: 12/19/2025

Burn Rate (kg/hr):	1.02

	Ambient Sample	Sample Train A	Sample Train B	1st Hour Filter
Total Sample Volume (ft^3)	64.700	47.472	47.651	8.678
Average Gas Velocity in Dilution Tunnel (ft/sec)	19.4			
Average Gas Flow Rate in Dilution Tunnel (dscf/hr)	12945.4			
Average Gas Meter Temperature (°F)	68.3	94.2	93.7	82.7
Total Sample Volume (dscf)	64.082	46.098	45.406	8.404
Average Tunnel Temperature (°F)	84.7			
Total Time of Test (min)	298			
Total Particulate Catch (mg)	0.0	4.6	4.3	2.3
Particulate Concentration, dry-standard (g/dscf)	0.0000000	0.0000998	0.0000947	0.0002737
Total PM Emissions (g)	0.00	6.42	6.09	3.54
Particulate Emission Rate (g/hr)	0.00	1.29	1.23	3.54
Emissions Factor (g/kg)	-	1.27	1.20	-
Difference from Average Total Particulate Emissions (g)	-	0.16	0.16	-
Difference from Average Total Particulate Emissions (%)	-	2.6%	2.6%	
Difference from Average Emissions Factor (g/kg)	-	0.03	0.03	-

Final Average Results	
Total Particulate Emissions (g)	6.25
Particulate Emission Rate (g/hr)	1.26
Emissions Factor (g/kg)	1.23
HHV Efficiency (%)	79.1%
LHV Efficiency (%)	85.5%
CO Emissions (g/min)	0.48

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	76.1	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:64.5/Max:69.2	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	88.2	OK

B415.1 Efficiency Results

Manufacturer:	Sherwood
Model:	Ironwood 2.0-1
Date:	12/19/25
Run:	1
Control #:	25-470
Test Duration:	298
Output Category:	2

Test Results in Accordance with CSA B415.1-09

	HHV Basis	LHV Basis
Overall Efficiency	79.1%	85.5%
Combustion Efficiency	98.3%	98.3%
Heat Transfer Efficiency	80.4%	86.9%

Output Rate (kJ/h)	15,907	15,089	**(Btu/h)**
Burn Rate (kg/h)	1.02	2.24	**(lb/h)**
Input (kJ/h)	20,113	19,080	**(Btu/h)**

Test Load Weight (dry kg)	5.04	11.11	**dry lb**
MC wet (%)	17.18		
MC dry (%)	20.75		
Particulate (g)	6.25		
CO (g)	144		
Test Duration (h)	4.97		

Emissions	**Particulate**	**CO**
g/MJ Output	0.08	1.82
g/kg Dry Fuel	1.24	28.47
g/h	1.26	28.91
g/min	0.02	0.48
lb/MM Btu Output	0.18	4.22

Air/Fuel Ratio (A/F)	15.48

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

WOODSTOVE FUEL DATA - ASTM E2780

Client: Sherwood
Model: Ironwood 2.0-1
Run #: 1

Job #: 25-470
Tracking #: 243
Technician: AK
Date: 12/19/2025

Preburn Fuel Information

Size	Length (in)	Moisture Content (% DB)	Size	Length (in)	Moisture Content (% DB)
2x4	12.00	24.4			
2x4	12.00	22.5			
2x4	12.00	20.9			
2x4	12.00	23.5			
2x4	12.00	24.4			
2x4	12.00	22.9			

Total Fuel Weight (lbs): 8.69
Average Moisture (%DB): 23.1

Firebox Volume (ft^3): 1.80
Total 2x4 Crib Weight, with spacers (lbs): 5.80
Total 4x4 Crib Weight, with spacers (lbs): 7.63
Total Wet Fuel Weight, with spacers (lbs): 13.43

Coal Bed Range (20-25%):
Min (lbs): 2.69
Max (lbs): 3.36

Test Fuel Information

Size	Length (in)	Weight (lbs)	Moisture Content (%DB)			Dry Weight (lbs)
4x4	16.00	3.59	20.0	21.5	22.0	2.96
4x4	16.00	3.66	20.1	23.3	24.1	2.99
2x4	16.00	1.48	19.3	19.6	19.0	1.24
2x4	16.00	1.54	20.4	21.9	19.7	1.28
2x4	16.00	1.52	19.7	19.7	20.9	1.27

Total Dry Weight, no spacers (lbs): 9.73
Total Dry Weight, with spacers (lbs): 11.17

Spacer Moisture Readings (%DB)

13.8	15.3						
13.8	11.6						
15.2	13.1						
14.9	14.5						
15.1	16.1						
11.6	16.2						
14.4	14.1						
11.8	11.7						

Quality Checks	Requirement	Observed	Result
Fuel Density	25 - 36 (lbs/ft^3, DB)	26.1	OK
Loading Density	6.3 - 7.7 (lbs/ft^3, WB)	7.46	OK
2x4 Fuel Mix	35 - 65 % of total weight	43%	OK

DILUTION TUNNEL & MISC. DATA - ASTM E2780 / E2515

Client:	Sherwood	Job #:	25-470
Model:	Ironwood 2.0-1	Tracking #:	243
Run #:	1	Technician:	AK
Test Start Time:	11:09	Date:	12/19/2025

Total Sampling Time (min):	298	
Recording Interval (min):	1	
Meter Box γ Factor:	1.021	(A)
Meter Box γ Factor:	1.001	(B)
Meter Box γ Factor:	1.001	(C)
Meter Box γ Factor:	0.999	(Ambient)
Induced Draft Check (in. H_2O):	0	
Smoke Capture Check (%):	100%	
Date Flue Pipe Last Cleaned:	12/17/2025	
Test Fuel Scale Audit (lbs)	10.00	
Platform Scale Audit (lbs)	10.0	

	Pre-Test	Post Test	Avg.
Barometric Pressure (in. Hg)	29.66	29.73	29.70
Relative Humidity (%)	42.2	32.5	
Room Air Velocity (ft/min)	<50	<50	
Pitot Tube Leak Check	0	0	
Ambient Sample Volume:		64.700	ft^3

Sample Train Leak Checks

	Pre-test	Post-test			
(A)	0.000	0.000	cfm @	-6	in. Hg
(B)	0.000	0.000	cfm @	-6	in. Hg
(C)	0.000	0.001	cfm @	-7	in. Hg
(Ambient)	0.000	0.000	cfm @	-13	in. Hg

DILUTION TUNNEL FLOW

Traverse Data

Point	dP (in H_2O)	Temp (°F)
1	0.056	69
2	0.094	69
3	0.092	69
4	0.070	69
5	0.080	69
6	0.102	69
7	0.102	69
8	0.060	69
Center	0.090	69

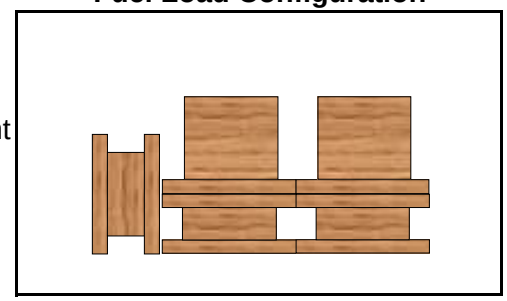
Dilution Tunnel H_2O:	2.00	percent
Tunnel Diameter:	6	inches
Pitot Tube Cp:	0.99	[unitless]
Dilution Tunnel MW(dry):	29.00	lb/lb-mole
Dilution Tunnel MW(wet):	28.78	lb/lb-mole
Tunnel Area:	0.1963	ft^2
V_{strav}:	18.97	ft/sec
V_{scent}:	19.99	ft/sec
F_p:	0.949	[ratio]
Initial Tunnel Flow:	216.8	scf/min

Static Pressure: -0.160 in. H_2O

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)	20.7

WOODSTOVE PREBURN DATA - ASTM E2780

Client: Sherwood
Model: Ironwood 2.0-1
Run #: 1

Job #: 25-470
Tracking #: 243
Technician: AK
Date: 12/19/2025

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	5.86	-0.091	634	645	79	655	509	504.3	637	69
1	5.70	-0.083	634	645	633	626	512	610.0	525	69
2	5.59	-0.079	633	644	608	607	514	601.1	450	69
3	5.48	-0.078	630	641	587	583	517	591.6	414	69
4	5.38	-0.077	626	637	569	561	519	582.5	389	69
5	5.29	-0.071	621	633	553	539	522	573.6	377	69
6	5.22	-0.071	617	627	538	522	524	565.8	366	69
7	5.12	-0.071	612	622	525	504	526	557.8	355	69
8	5.05	-0.069	606	616	514	490	528	550.7	347	68
9	4.96	-0.069	601	610	502	476	529	543.6	341	69
10	4.87	-0.067	595	604	493	464	529	537.2	339	69
11	4.77	-0.066	589	598	483	453	529	530.5	332	68
12	4.69	-0.067	583	593	474	442	529	524.1	325	68
13	4.60	-0.067	577	587	466	431	529	518.0	324	68
14	4.50	-0.063	572	581	458	422	527	512.1	318	68
15	4.41	-0.061	566	576	451	413	526	506.6	314	68
16	4.32	-0.058	561	570	444	405	526	501.2	312	68
17	4.22	-0.062	556	565	437	399	524	496.4	309	68
18	4.12	-0.063	551	561	432	394	523	492.1	306	68
19	4.02	-0.061	547	556	427	389	521	487.9	306	68
20	3.91	-0.062	543	552	423	386	520	484.6	307	68
21	3.81	-0.062	539	549	418	385	518	481.6	308	68
22	3.71	-0.061	535	545	415	383	517	479.0	308	69
23	3.61	-0.061	532	542	411	383	515	476.6	306	69
24	3.50	-0.061	528	540	409	381	513	474.2	302	68
25	3.44	-0.057	525	536	408	380	512	472.2	300	68
26	3.39	-0.060	522	533	405	379	510	469.9	295	68
27	3.31	-0.058	519	531	402	377	508	467.3	291	68
28	3.26	-0.054	517	528	399	376	506	464.9	286	68
29	3.23	-0.054	514	524	396	372	504	462.2	281	68
30	3.20	-0.053	511	521	395	369	502	459.7	276	68
31	3.16	-0.051	508	518	393	366	500	457.1	273	68
32	3.14	-0.049	505	515	391	362	499	454.3	268	68
33	3.12	-0.049	503	512	389	356	496	451.0	264	68
34	3.11	-0.048	499	508	386	351	495	448.0	261	68
35	3.09	-0.049	496	505	384	347	493	445.0	257	68
36	3.07	-0.049	493	501	382	342	492	441.8	256	68
37	3.05	-0.050	489	498	379	337	490	438.5	254	68
38	3.04	-0.049	486	495	377	333	489	436.1	250	68
39	3.01	-0.047	484	492	375	327	487	433.2	247	68
40	3.00	-0.045	481	489	374	322	486	430.5	243	68
41	2.99	-0.047	479	486	371	317	485	427.7	239	68
42	2.97	-0.043	476	483	368	312	484	424.5	237	68
43	2.97	-0.045	473	479	366	306	483	421.5	234	68
44	2.95	-0.041	471	476	362	300	482	417.9	232	67

WOODSTOVE PREBURN DATA - ASTM E2780

Client: Sherwood
Model: Ironwood 2.0-1
Run #: 1

Job #: 25-470
Tracking #: 243
Technician: AK
Date: 12/19/2025

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	2.94	-0.043	468	472	359	295	481	415.0	228	66
46	2.93	-0.043	464	469	356	290	481	412.0	223	66
47	2.91	-0.039	462	466	354	285	480	409.2	221	67
48	2.90	-0.040	459	463	351	280	479	406.5	218	67
49	2.89	-0.041	456	460	349	275	479	403.6	216	67
50	2.88	-0.040	453	457	347	270	479	401.0	211	67
51	2.85	-0.040	450	454	345	266	478	398.4	209	67
52	2.84	-0.038	447	451	342	261	477	395.7	208	67
53	2.83	-0.039	444	449	340	257	477	393.4	207	67
54	2.82	-0.039	441	446	339	254	477	391.2	205	67
55	2.81	-0.040	439	443	337	250	477	389.2	203	67
56	2.79	-0.037	436	441	335	246	477	387.1	201	67
57	2.78	-0.038	434	439	334	243	476	385.2	199	67
58	2.76	-0.035	432	437	332	240	476	383.2	197	67
59	2.75	-0.035	429	435	330	237	476	381.3	196	67
60	2.74	-0.037	427	433	328	234	476	379.6	195	67

BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: Sherwood
Model: Ironwood 2.0-1
Run #: 1

Job #: 25-470
Tracking #: 243
Technician: AK
Date: 12/19/2025

	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		0.089	0.01	73	0.1		13.42		95	271	71	68
1	0.104	0.104	0.089	2.36	73	1.0	-	13.40	-0.02	107	297	73	68
2	0.253	0.149	0.089	2.40	73	1.0	-	13.22	-0.18	104	303	73	68
3	0.406	0.153	0.090	2.41	73	1.0	-	13.09	-0.13	102	332	74	68
4	0.554	0.148	0.090	2.29	73	1.0	-	12.94	-0.15	101	361	74	68
5	0.705	0.151	0.090	2.32	73	1.0	-	12.78	-0.16	101	383	74	68
6	0.853	0.148	0.090	2.33	73	1.0	-	12.70	-0.08	98	347	74	68
7	1.005	0.152	0.091	2.35	73	1.0	-	12.64	-0.06	94	308	74	68
8	1.154	0.149	0.091	2.35	73	1.0	-	12.60	-0.04	92	289	74	68
9	1.307	0.153	0.091	2.38	73	1.0	-	12.53	-0.07	90	277	74	68
10	1.458	0.151	0.090	2.40	73	1.0	97	12.49	-0.04	89	271	74	68
11	1.611	0.153	0.091	2.42	74	1.0	-	12.41	-0.08	89	267	74	68
12	1.765	0.154	0.090	2.44	74	1.0	-	12.36	-0.05	88	266	74	68
13	1.919	0.154	0.091	2.46	74	1.0	-	12.31	-0.05	88	264	74	68
14	2.076	0.157	0.091	2.47	74	1.0	-	12.24	-0.07	88	261	74	68
15	2.225	0.149	0.091	2.30	75	1.0	-	12.17	-0.07	88	262	74	68
16	2.377	0.152	0.092	2.31	75	1.0	-	12.10	-0.07	88	263	74	68
17	2.524	0.147	0.091	2.32	75	1.0	-	12.01	-0.09	88	261	74	68
18	2.677	0.153	0.092	2.32	75	1.0	-	11.95	-0.06	88	258	74	68
19	2.825	0.148	0.090	2.33	76	1.0	-	11.87	-0.08	88	258	74	68
20	2.978	0.153	0.092	2.34	76	1.0	100	11.80	-0.07	88	257	74	68
21	3.126	0.148	0.092	2.35	76	1.0	-	11.74	-0.06	88	256	74	68
22	3.280	0.154	0.094	2.35	77	1.0	-	11.65	-0.09	87	253	74	67
23	3.428	0.148	0.094	2.36	77	1.0	-	11.58	-0.07	87	252	74	66
24	3.584	0.156	0.093	2.36	77	1.0	-	11.51	-0.07	87	253	74	65
25	3.732	0.148	0.093	2.36	78	1.0	-	11.43	-0.08	87	252	74	65
26	3.888	0.156	0.095	2.37	78	1.0	-	11.36	-0.07	87	251	73	65
27	4.038	0.150	0.093	2.38	78	1.0	-	11.28	-0.08	87	253	73	65
28	4.194	0.156	0.093	2.39	79	1.0	-	11.24	-0.04	87	250	73	65
29	4.345	0.151	0.090	2.39	79	1.0	-	11.16	-0.08	87	249	73	65
30	4.501	0.156	0.091	2.40	79	1.0	99	11.10	-0.06	87	251	73	66
31	4.651	0.150	0.092	2.39	80	1.0	-	11.03	-0.07	87	251	73	66

BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: Sherwood
Model: Ironwood 2.0-1
Run #: 1

Job #: 25-470
Tracking #: 243
Technician: AK
Date: 12/19/2025

	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	4.806	0.155	0.091	2.40	80	1.0	-	10.96	-0.07	87	250	73	66
33	4.959	0.153	0.091	2.40	80	1.0	-	10.90	-0.06	86	249	73	67
34	5.113	0.154	0.091	2.41	81	1.0	-	10.83	-0.07	86	250	73	67
35	5.269	0.156	0.093	2.43	81	1.0	-	10.77	-0.06	86	251	73	67
36	5.422	0.153	0.092	2.42	81	1.0	-	10.69	-0.08	86	250	73	67
37	5.577	0.155	0.092	2.43	82	1.0	-	10.62	-0.07	86	251	73	67
38	5.729	0.152	0.092	2.43	82	1.0	-	10.55	-0.07	86	252	73	67
39	5.886	0.157	0.091	2.43	82	1.0	-	10.45	-0.10	86	252	73	67
40	6.039	0.153	0.086	2.43	83	1.0	101	10.38	-0.07	86	255	74	67
41	6.197	0.158	0.092	2.43	83	1.0	-	10.32	-0.06	86	254	74	67
42	6.349	0.152	0.091	2.43	83	1.0	-	10.25	-0.07	86	256	74	67
43	6.506	0.157	0.091	2.44	84	1.0	-	10.17	-0.08	86	258	74	67
44	6.661	0.155	0.091	2.44	84	1.0	-	10.10	-0.07	86	257	74	67
45	6.816	0.155	0.091	2.46	84	1.0	-	10.02	-0.08	86	259	74	67
46	6.974	0.158	0.092	2.45	84	1.0	-	9.96	-0.06	86	261	74	67
47	7.126	0.152	0.091	2.45	85	1.0	-	9.88	-0.08	86	264	74	67
48	7.285	0.159	0.089	2.45	85	1.0	-	9.79	-0.09	86	266	74	67
49	7.439	0.154	0.092	2.46	85	1.0	-	9.71	-0.08	87	267	74	68
50	7.598	0.159	0.093	2.46	86	1.0	101	9.63	-0.08	87	268	74	68
51	7.751	0.153	0.091	2.46	86	1.0	-	9.54	-0.09	87	268	74	68
52	7.909	0.158	0.091	2.47	86	1.0	-	9.45	-0.09	87	268	74	68
53	8.068	0.159	0.091	2.47	87	1.0	-	9.34	-0.11	87	270	74	68
54	8.222	0.154	0.092	2.47	87	1.0	-	9.23	-0.11	88	272	74	68
55	8.381	0.159	0.093	2.47	87	1.0	-	9.13	-0.10	88	274	74	68
56	8.535	0.154	0.091	2.47	87	1.0	-	9.02	-0.11	88	277	74	68
57	8.696	0.161	0.090	2.47	88	1.0	-	8.92	-0.10	88	278	74	68
58	8.849	0.153	0.091	2.47	88	1.0	-	8.82	-0.10	88	278	74	68
59	9.008	0.159	0.092	2.49	88	1.0	-	8.71	-0.11	88	281	74	68
60	9.167	0.159	0.092	2.49	88	1.0	100	8.61	-0.10	88	279	74	68
61	9.322	0.155	0.092	2.48	89	1.0	-	8.50	-0.11	88	280	74	68
62	9.482	0.160	0.093	2.49	89	1.0	-	8.41	-0.09	88	281	74	68
63	9.638	0.156	0.092	2.50	89	1.0	-	8.32	-0.09	88	280	74	68

BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: Sherwood
Model: Ironwood 2.0-1
Run #: 1

Job #: 25-470
Tracking #: 243
Technician: AK
Date: 12/19/2025

	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	9.798	0.160	0.091	2.49	89	1.0	-	8.22	-0.10	88	280	74	68
65	9.954	0.156	0.091	2.50	90	1.0	-	8.13	-0.09	88	281	74	68
66	10.113	0.159	0.092	2.50	90	1.0	-	8.03	-0.10	88	281	74	68
67	10.273	0.160	0.090	2.50	90	1.0	-	7.93	-0.10	88	283	74	68
68	10.427	0.154	0.092	2.49	90	1.0	-	7.84	-0.09	88	281	74	68
69	10.589	0.162	0.091	2.50	91	1.0	-	7.76	-0.08	88	281	74	68
70	10.745	0.156	0.090	2.50	91	1.1	101	7.68	-0.08	88	280	74	68
71	10.904	0.159	0.092	2.51	91	1.1	-	7.60	-0.08	88	281	75	68
72	11.064	0.160	0.092	2.51	91	1.1	-	7.50	-0.10	88	279	74	68
73	11.220	0.156	0.090	2.51	91	1.0	-	7.42	-0.08	88	280	75	69
74	11.381	0.161	0.091	2.50	91	1.0	-	7.34	-0.08	88	279	75	69
75	11.538	0.157	0.090	2.51	92	1.0	-	7.26	-0.08	88	278	75	69
76	11.698	0.160	0.091	2.51	92	1.1	-	7.17	-0.09	88	279	75	69
77	11.855	0.157	0.092	2.52	92	1.0	-	7.09	-0.08	88	281	75	69
78	12.015	0.160	0.091	2.51	92	1.0	-	7.00	-0.09	88	279	75	69
79	12.174	0.159	0.091	2.51	92	1.0	-	6.93	-0.07	88	279	75	69
80	12.331	0.157	0.090	2.51	93	1.0	101	6.85	-0.08	88	279	75	69
81	12.494	0.163	0.090	2.52	93	1.1	-	6.77	-0.08	88	280	75	69
82	12.650	0.156	0.092	2.52	93	1.0	-	6.69	-0.08	88	279	75	69
83	12.810	0.160	0.093	2.52	93	1.0	-	6.60	-0.09	88	278	75	69
84	12.971	0.161	0.091	2.53	93	1.1	-	6.53	-0.07	88	275	75	69
85	13.126	0.155	0.093	2.52	93	1.1	-	6.46	-0.07	88	274	75	69
86	13.290	0.164	0.092	2.53	94	1.0	-	6.38	-0.08	87	274	75	69
87	13.445	0.155	0.091	2.52	94	1.0	-	6.31	-0.07	87	273	75	69
88	13.607	0.162	0.092	2.53	94	1.0	-	6.23	-0.08	87	270	75	69
89	13.768	0.161	0.092	2.53	94	1.0	-	6.16	-0.07	87	270	75	69
90	13.924	0.156	0.091	2.52	94	1.0	101	6.09	-0.07	87	269	75	69
91	14.087	0.163	0.092	2.52	94	1.0	-	6.02	-0.07	87	266	75	69
92	14.243	0.156	0.091	2.53	95	1.1	-	5.96	-0.06	87	266	75	69
93	14.404	0.161	0.092	2.52	95	1.0	-	5.89	-0.07	87	265	75	69
94	14.566	0.162	0.092	2.53	95	1.1	-	5.82	-0.07	87	267	75	69
95	14.722	0.156	0.093	2.53	95	1.1	-	5.74	-0.08	87	271	75	69

BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: Sherwood
Model: Ironwood 2.0-1
Run #: 1

Job #: 25-470
Tracking #: 243
Technician: AK
Date: 12/19/2025

	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	14.885	0.163	0.092	2.53	95	1.0	-	5.69	-0.05	87	271	75	69
97	15.042	0.157	0.092	2.53	95	1.1	-	5.62	-0.07	87	273	75	68
98	15.203	0.161	0.092	2.52	95	1.0	-	5.55	-0.07	87	276	75	68
99	15.364	0.161	0.091	2.52	95	1.1	-	5.50	-0.05	87	278	75	69
100	15.521	0.157	0.091	2.54	95	1.0	101	5.43	-0.07	87	282	75	68
101	15.685	0.164	0.091	2.53	96	1.0	-	5.37	-0.06	87	285	75	69
102	15.842	0.157	0.092	2.53	96	1.0	-	5.30	-0.07	87	287	75	68
103	16.002	0.160	0.092	2.53	96	1.0	-	5.24	-0.06	87	289	75	68
104	16.165	0.163	0.093	2.53	96	1.0	-	5.19	-0.05	87	290	75	68
105	16.321	0.156	0.092	2.53	96	1.1	-	5.12	-0.07	87	288	75	68
106	16.485	0.164	0.091	2.53	96	1.0	-	5.06	-0.06	88	287	75	69
107	16.642	0.157	0.092	2.54	96	1.0	-	5.02	-0.04	88	290	75	69
108	16.803	0.161	0.095	2.54	96	1.0	-	4.97	-0.05	88	289	75	69
109	16.966	0.163	0.093	2.54	96	1.0	-	4.91	-0.06	88	289	75	69
110	17.122	0.156	0.093	2.53	96	1.0	100	4.86	-0.05	88	288	75	68
111	17.286	0.164	0.092	2.54	97	1.0	-	4.80	-0.06	88	288	75	68
112	17.443	0.157	0.092	2.53	97	1.0	-	4.75	-0.05	88	287	75	68
113	17.605	0.162	0.093	2.54	97	1.0	-	4.71	-0.04	88	286	75	68
114	17.767	0.162	0.091	2.55	97	1.0	-	4.66	-0.05	88	285	75	68
115	17.923	0.156	0.090	2.52	97	1.0	-	4.61	-0.05	87	283	75	68
116	18.088	0.165	0.090	2.54	97	1.0	-	4.57	-0.04	87	281	75	68
117	18.245	0.157	0.093	2.55	97	1.0	-	4.52	-0.05	87	281	75	68
118	18.407	0.162	0.093	2.55	97	1.0	-	4.48	-0.04	87	280	75	68
119	18.568	0.161	0.092	2.54	97	1.0	-	4.42	-0.06	87	281	75	68
120	18.725	0.157	0.091	2.54	97	1.1	100	4.38	-0.04	87	280	75	68
121	18.890	0.165	0.091	2.55	97	1.0	-	4.32	-0.06	87	278	75	68
122	19.048	0.158	0.093	2.54	97	1.1	-	4.28	-0.04	87	278	75	68
123	19.209	0.161	0.092	2.54	97	1.1	-	4.23	-0.05	87	278	75	68
124	19.371	0.162	0.092	2.54	97	1.0	-	4.19	-0.04	87	277	75	68
125	19.529	0.158	0.092	2.54	97	1.1	-	4.14	-0.05	87	276	75	68
126	19.692	0.163	0.091	2.53	98	1.0	-	4.09	-0.05	87	276	75	68
127	19.851	0.159	0.091	2.53	98	1.0	-	4.04	-0.05	87	276	75	68

BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: Sherwood
Model: Ironwood 2.0-1
Run #: 1

Job #: 25-470
Tracking #: 243
Technician: AK
Date: 12/19/2025

	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	20.012	0.161	0.090	2.54	98	1.0	-	4.00	-0.04	87	276	75	68
129	20.174	0.162	0.091	2.54	98	1.0	-	3.95	-0.05	87	277	75	68
130	20.332	0.158	0.092	2.53	98	1.1	101	3.91	-0.04	87	277	75	68
131	20.494	0.162	0.092	2.54	98	1.0	-	3.85	-0.06	87	275	75	68
132	20.656	0.162	0.092	2.54	98	1.0	-	3.81	-0.04	87	275	75	69
133	20.814	0.158	0.092	2.55	98	1.1	-	3.75	-0.06	87	275	75	69
134	20.977	0.163	0.091	2.54	98	1.1	-	3.72	-0.03	87	273	75	68
135	21.136	0.159	0.090	2.54	98	1.0	-	3.68	-0.04	87	273	75	68
136	21.297	0.161	0.091	2.53	98	1.0	-	3.62	-0.06	87	272	75	68
137	21.460	0.163	0.092	2.53	98	1.1	-	3.59	-0.03	87	271	75	69
138	21.617	0.157	0.091	2.54	98	1.0	-	3.54	-0.05	87	271	75	68
139	21.782	0.165	0.094	2.55	98	1.0	-	3.49	-0.05	87	274	75	69
140	21.939	0.157	0.092	2.53	98	1.0	100	3.43	-0.06	87	275	75	69
141	22.101	0.162	0.092	2.54	98	1.1	-	3.38	-0.05	87	276	75	69
142	22.264	0.163	0.091	2.54	98	1.0	-	3.32	-0.06	88	278	75	69
143	22.420	0.156	0.091	2.54	98	1.0	-	3.26	-0.06	88	277	75	69
144	22.585	0.165	0.091	2.54	98	1.0	-	3.21	-0.05	88	277	75	69
145	22.743	0.158	0.091	2.54	98	1.1	-	3.14	-0.07	87	274	75	69
146	22.905	0.162	0.092	2.55	98	1.1	-	3.10	-0.04	87	272	75	69
147	23.067	0.162	0.092	2.54	98	1.1	-	3.04	-0.06	87	273	75	68
148	23.225	0.158	0.092	2.54	98	1.1	-	3.00	-0.04	87	272	75	69
149	23.389	0.164	0.091	2.55	98	1.1	-	2.95	-0.05	87	275	75	69
150	23.548	0.159	0.091	2.54	98	1.0	101	2.91	-0.04	87	275	75	69
151	23.710	0.162	0.092	2.55	98	1.1	-	2.85	-0.06	87	277	75	69
152	23.872	0.162	0.093	2.54	99	1.0	-	2.81	-0.04	87	277	75	69
153	24.031	0.159	0.091	2.54	99	1.0	-	2.77	-0.04	87	279	75	69
154	24.193	0.162	0.091	2.56	99	1.1	-	2.73	-0.04	87	280	75	69
155	24.355	0.162	0.091	2.54	99	1.0	-	2.69	-0.04	87	279	75	69
156	24.513	0.158	0.093	2.54	99	1.0	-	2.64	-0.05	87	276	75	69
157	24.677	0.164	0.094	2.54	99	1.0	-	2.60	-0.04	87	276	75	69
158	24.836	0.159	0.092	2.54	99	1.0	-	2.56	-0.04	87	275	75	69
159	24.997	0.161	0.091	2.55	99	1.0	-	2.52	-0.04	87	272	75	69

BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: Sherwood
Model: Ironwood 2.0-1
Run #: 1

Job #: 25-470
Tracking #: 243
Technician: AK
Date: 12/19/2025

	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	25.161	0.164	0.090	2.55	99	1.0	101	2.46	-0.06	87	273	75	69
161	25.318	0.157	0.091	2.54	99	1.0	-	2.44	-0.02	87	273	75	69
162	25.483	0.165	0.092	2.55	99	1.0	-	2.40	-0.04	87	271	75	69
163	25.641	0.158	0.092	2.56	99	1.0	-	2.36	-0.04	87	269	75	69
164	25.803	0.162	0.091	2.55	99	1.0	-	2.32	-0.04	87	269	75	69
165	25.965	0.162	0.092	2.55	99	1.0	-	2.28	-0.04	87	266	75	69
166	26.124	0.159	0.091	2.55	99	1.0	-	2.22	-0.06	87	265	75	69
167	26.287	0.163	0.092	2.55	99	1.0	-	2.18	-0.04	87	266	75	69
168	26.448	0.161	0.091	2.54	99	1.1	-	2.14	-0.04	87	268	75	69
169	26.608	0.160	0.091	2.55	99	1.1	-	2.10	-0.04	87	266	75	69
170	26.771	0.163	0.089	2.55	99	1.1	102	2.03	-0.07	87	266	75	69
171	26.930	0.159	0.091	2.55	99	1.0	-	1.99	-0.04	87	264	75	69
172	27.092	0.162	0.090	2.56	99	1.0	-	1.95	-0.04	87	260	75	69
173	27.255	0.163	0.093	2.54	99	1.1	-	1.92	-0.03	87	257	75	69
174	27.413	0.158	0.092	2.55	99	1.0	-	1.90	-0.02	86	253	75	69
175	27.578	0.165	0.092	2.55	99	1.1	-	1.89	-0.01	86	250	75	69
176	27.736	0.158	0.092	2.55	99	1.1	-	1.87	-0.02	86	247	75	69
177	27.899	0.163	0.091	2.54	99	1.0	-	1.84	-0.03	85	244	75	69
178	28.061	0.162	0.092	2.57	99	1.1	-	1.83	-0.01	85	239	75	69
179	28.220	0.159	0.092	2.55	99	1.0	-	1.80	-0.03	85	237	74	69
180	28.384	0.164	0.091	2.56	99	1.0	101	1.79	-0.01	85	235	74	69
181	28.544	0.160	0.093	2.54	99	1.1	-	1.77	-0.02	85	231	74	69
182	28.706	0.162	0.093	2.56	99	1.0	-	1.75	-0.02	85	227	74	69
183	28.868	0.162	0.092	2.55	99	1.0	-	1.72	-0.03	85	223	74	68
184	29.027	0.159	0.092	2.54	99	1.0	-	1.71	-0.01	84	222	74	69
185	29.190	0.163	0.092	2.55	99	1.0	-	1.69	-0.02	84	217	74	69
186	29.352	0.162	0.091	2.55	99	1.1	-	1.67	-0.02	84	214	74	69
187	29.510	0.158	0.092	2.57	99	1.1	-	1.64	-0.03	84	212	74	69
188	29.676	0.166	0.090	2.56	99	1.1	-	1.63	-0.01	84	210	74	69
189	29.833	0.157	0.092	2.55	99	1.0	-	1.60	-0.03	84	212	74	69
190	29.997	0.164	0.092	2.55	99	1.1	100	1.60	0.00	84	211	74	69
191	30.159	0.162	0.093	2.57	99	1.0	-	1.59	-0.01	83	207	74	69

BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: Sherwood
Model: Ironwood 2.0-1
Run #: 1

Job #: 25-470
Tracking #: 243
Technician: AK
Date: 12/19/2025

	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	30.317	0.158	0.093	2.55	99	1.0	-	1.55	-0.04	83	206	74	69
193	30.483	0.166	0.092	2.56	99	1.1	-	1.54	-0.01	83	206	74	68
194	30.642	0.159	0.092	2.55	99	1.0	-	1.51	-0.03	83	206	74	68
195	30.804	0.162	0.092	2.56	99	1.0	-	1.50	-0.01	83	206	74	68
196	30.967	0.163	0.090	2.56	99	1.1	-	1.49	-0.01	83	203	74	68
197	31.126	0.159	0.093	2.55	99	1.0	-	1.46	-0.03	83	201	74	68
198	31.289	0.163	0.093	2.56	99	1.1	-	1.45	-0.01	83	201	74	68
199	31.451	0.162	0.094	2.56	99	1.0	-	1.43	-0.02	82	202	74	68
200	31.610	0.159	0.092	2.57	99	1.1	100	1.41	-0.02	82	201	74	68
201	31.775	0.165	0.093	2.56	100	1.1	-	1.39	-0.02	82	201	74	68
202	31.933	0.158	0.092	2.55	99	1.0	-	1.36	-0.03	82	200	74	68
203	32.096	0.163	0.092	2.55	99	1.1	-	1.35	-0.01	82	199	74	68
204	32.259	0.163	0.091	2.55	100	1.0	-	1.33	-0.02	82	198	74	68
205	32.418	0.159	0.092	2.56	100	1.0	-	1.32	-0.01	82	197	74	69
206	32.582	0.164	0.094	2.56	100	1.1	-	1.31	-0.01	82	195	74	69
207	32.742	0.160	0.091	2.55	100	1.0	-	1.29	-0.02	82	195	74	69
208	32.904	0.162	0.090	2.56	100	1.0	-	1.27	-0.02	82	194	74	69
209	33.066	0.162	0.091	2.55	100	1.1	-	1.25	-0.02	82	194	74	69
210	33.226	0.160	0.090	2.57	100	1.1	101	1.24	-0.01	81	192	74	69
211	33.388	0.162	0.091	2.55	100	1.1	-	1.23	-0.01	81	192	74	69
212	33.552	0.164	0.092	2.56	100	1.1	-	1.20	-0.03	81	193	74	69
213	33.710	0.158	0.091	2.56	100	1.1	-	1.19	-0.01	81	192	74	69
214	33.875	0.165	0.092	2.56	100	1.1	-	1.17	-0.02	81	193	74	69
215	34.034	0.159	0.092	2.57	100	1.0	-	1.16	-0.01	81	192	74	69
216	34.197	0.163	0.092	2.56	100	1.0	-	1.15	-0.01	81	191	74	69
217	34.359	0.162	0.093	2.56	100	1.0	-	1.12	-0.03	81	190	74	69
218	34.520	0.161	0.093	2.56	100	1.0	-	1.10	-0.02	81	189	74	69
219	34.682	0.162	0.091	2.55	100	1.0	-	1.09	-0.01	81	188	74	69
220	34.845	0.163	0.089	2.56	100	1.0	102	1.08	-0.01	81	190	74	69
221	35.004	0.159	0.092	2.56	100	1.0	-	1.06	-0.02	81	190	74	69
222	35.169	0.165	0.092	2.56	100	1.0	-	1.04	-0.02	80	190	74	69
223	35.328	0.159	0.090	2.56	100	1.0	-	1.02	-0.02	80	189	74	69

BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: Sherwood
Model: Ironwood 2.0-1
Run #: 1

Job #: 25-470
Tracking #: 243
Technician: AK
Date: 12/19/2025

	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	35.490	0.162	0.093	2.55	100	1.1	-	1.01	-0.01	80	188	74	69
225	35.654	0.164	0.091	2.56	100	1.1	-	0.99	-0.02	80	190	74	69
226	35.812	0.158	0.091	2.56	100	1.0	-	0.98	-0.01	80	189	74	69
227	35.978	0.166	0.092	2.57	100	1.0	-	0.97	-0.01	80	188	74	69
228	36.137	0.159	0.092	2.56	100	1.0	-	0.94	-0.03	80	188	73	69
229	36.299	0.162	0.093	2.57	100	1.0	-	0.93	-0.01	80	186	73	69
230	36.462	0.163	0.093	2.57	100	1.0	101	0.92	-0.01	80	185	73	69
231	36.622	0.160	0.091	2.56	100	1.0	-	0.90	-0.02	80	184	73	69
232	36.785	0.163	0.094	2.57	100	1.0	-	0.89	-0.01	80	183	73	69
233	36.948	0.163	0.092	2.55	100	1.1	-	0.87	-0.02	80	182	73	69
234	37.107	0.159	0.092	2.55	100	1.1	-	0.85	-0.02	80	183	73	69
235	37.272	0.165	0.092	2.56	100	1.1	-	0.84	-0.01	80	182	73	69
236	37.430	0.158	0.092	2.57	100	1.0	-	0.83	-0.01	80	181	73	69
237	37.594	0.164	0.092	2.57	100	1.0	-	0.81	-0.02	80	182	73	69
238	37.756	0.162	0.090	2.57	100	1.1	-	0.79	-0.02	80	181	73	69
239	37.917	0.161	0.093	2.57	100	1.1	-	0.78	-0.01	79	182	73	69
240	38.080	0.163	0.093	2.56	100	1.0	99	0.77	-0.01	79	182	73	69
241	38.242	0.162	0.093	2.55	100	1.1	-	0.76	-0.01	79	182	73	69
242	38.402	0.160	0.094	2.55	100	1.0	-	0.74	-0.02	79	182	73	69
243	38.567	0.165	0.094	2.55	100	1.0	-	0.73	-0.01	79	181	73	69
244	38.726	0.159	0.093	2.57	100	1.1	-	0.71	-0.02	79	179	73	69
245	38.888	0.162	0.093	2.57	100	1.1	-	0.69	-0.02	79	179	73	69
246	39.052	0.164	0.092	2.57	100	1.0	-	0.68	-0.01	79	178	73	69
247	39.210	0.158	0.092	2.56	100	1.0	-	0.66	-0.02	79	178	73	69
248	39.376	0.166	0.091	2.56	100	1.0	-	0.66	0.00	79	179	73	69
249	39.535	0.159	0.092	2.55	100	1.1	-	0.64	-0.02	79	178	73	69
250	39.698	0.163	0.092	2.57	100	1.1	100	0.63	-0.01	79	177	73	69
251	39.861	0.163	0.091	2.56	100	1.1	-	0.62	-0.01	79	178	73	69
252	40.021	0.160	0.092	2.56	100	1.0	-	0.59	-0.03	79	179	73	69
253	40.183	0.162	0.093	2.56	100	1.1	-	0.58	-0.01	79	178	73	69
254	40.347	0.164	0.092	2.56	100	1.0	-	0.57	-0.01	79	176	73	69
255	40.505	0.158	0.093	2.57	100	1.0	-	0.56	-0.01	79	177	73	69

BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: Sherwood
Model: Ironwood 2.0-1
Run #: 1

Job #: 25-470
Tracking #: 243
Technician: AK
Date: 12/19/2025

	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	40.671	0.166	0.092	2.56	100	1.1	-	0.53	-0.03	79	176	73	69
257	40.830	0.159	0.093	2.57	100	1.1	-	0.53	0.00	79	176	73	69
258	40.993	0.163	0.094	2.56	100	1.1	-	0.53	0.00	79	175	73	69
259	41.156	0.163	0.093	2.58	100	1.1	-	0.51	-0.02	79	175	73	69
260	41.316	0.160	0.094	2.57	100	1.0	99	0.49	-0.02	79	175	73	69
261	41.478	0.162	0.093	2.57	100	1.0	-	0.48	-0.01	78	175	73	69
262	41.642	0.164	0.091	2.57	100	1.0	-	0.46	-0.02	78	174	73	69
263	41.800	0.158	0.094	2.56	100	1.1	-	0.45	-0.01	78	174	73	69
264	41.966	0.166	0.094	2.56	100	1.1	-	0.44	-0.01	78	175	73	69
265	42.125	0.159	0.093	2.56	100	1.1	-	0.41	-0.03	78	174	73	69
266	42.288	0.163	0.094	2.56	100	1.0	-	0.41	0.00	78	174	73	69
267	42.451	0.163	0.093	2.56	100	1.0	-	0.40	-0.01	78	174	73	69
268	42.610	0.159	0.091	2.57	100	1.0	-	0.38	-0.02	78	174	73	69
269	42.775	0.165	0.093	2.57	100	1.1	-	0.37	-0.01	78	174	73	69
270	42.936	0.161	0.093	2.57	100	1.0	99	0.36	-0.01	78	174	73	69
271	43.097	0.161	0.091	2.57	100	1.0	-	0.35	-0.01	78	174	73	69
272	43.261	0.164	0.092	2.56	100	1.0	-	0.33	-0.02	78	173	73	69
273	43.421	0.160	0.095	2.57	100	1.1	-	0.32	-0.01	78	172	73	69
274	43.583	0.162	0.092	2.56	100	1.0	-	0.30	-0.02	78	172	73	69
275	43.748	0.165	0.093	2.57	100	1.0	-	0.29	-0.01	78	173	73	69
276	43.905	0.157	0.090	2.56	100	1.0	-	0.28	-0.01	78	173	73	69
277	44.071	0.166	0.091	2.57	100	1.1	-	0.26	-0.02	78	174	73	69
278	44.230	0.159	0.093	2.57	100	1.1	-	0.25	-0.01	78	174	73	69
279	44.393	0.163	0.091	2.56	100	1.1	-	0.24	-0.01	78	173	73	69
280	44.556	0.163	0.094	2.57	100	1.0	99	0.22	-0.02	78	174	73	69
281	44.716	0.160	0.092	2.56	100	1.0	-	0.20	-0.02	78	175	73	69
282	44.879	0.163	0.092	2.57	100	1.0	-	0.20	0.00	78	172	73	69
283	45.042	0.163	0.093	2.56	100	1.0	-	0.18	-0.02	78	173	73	69
284	45.201	0.159	0.091	2.57	100	1.0	-	0.17	-0.01	78	172	73	69
285	45.367	0.166	0.094	2.58	100	1.0	-	0.16	-0.01	78	172	72	69
286	45.526	0.159	0.094	2.57	100	1.0	-	0.14	-0.02	78	172	72	69
287	45.689	0.163	0.093	2.57	100	1.0	-	0.13	-0.01	78	172	72	69

BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: Sherwood
Model: Ironwood 2.0-1
Run #: 1

Job #: 25-470
Tracking #: 243
Technician: AK
Date: 12/19/2025

	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
288	45.852	0.163	0.093	2.56	100	1.1	-	0.12	-0.01	78	172	72	69
289	46.012	0.160	0.091	2.57	100	1.0	-	0.10	-0.02	78	171	73	69
290	46.175	0.163	0.092	2.56	100	1.1	99	0.08	-0.02	78	171	73	69
291	46.338	0.163	0.094	2.55	100	1.0	-	0.07	-0.01	78	170	72	68
292	46.497	0.159	0.094	2.56	100	1.0	-	0.06	-0.01	78	171	73	68
293	46.663	0.166	0.094	2.56	100	1.0	-	0.05	-0.01	78	170	72	69
294	46.821	0.158	0.092	2.56	100	1.1	-	0.03	-0.02	78	170	72	69
295	46.985	0.164	0.092	2.56	100	1.1	-	0.02	-0.01	78	170	72	69
296	47.148	0.163	0.092	2.57	100	1.0	-	0.01	-0.01	78	171	72	69
297	47.307	0.159	0.095	2.56	100	1.0	-	0.01	0.00	78	170	72	69
298	47.472	0.165	0.094	2.57	100	1.0	99	0.00	-0.01	78	170	72	69
Avg/Tot	47.472	0.159	0.092	2.51	94.2	1.0	100			84.7	238.4	73.9	68.3

BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: Sherwood
Model: Ironwood 2.0-1
Run #: 1

Job #: 25-470
Tracking #: 243
Technician: AK
Date: 12/19/2025

	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		0.02	73	0.7		73	-0.055	6.54	0.106
1	0.100	0.100	2.46	72	1.7	-	75	-0.055	3.50	0.428
2	0.250	0.150	2.46	72	1.8	-	75	-0.062	2.25	0.409
3	0.406	0.156	2.46	72	1.7	-	75	-0.067	7.47	0.141
4	0.556	0.150	2.46	73	1.6	-	75	-0.070	8.97	0.074
5	0.710	0.154	2.46	73	1.7	-	76	-0.070	9.24	0.066
6	0.862	0.152	2.47	73	1.6	-	76	-0.061	10.24	0.071
7	1.017	0.155	2.48	73	2.0	-	76	-0.061	7.15	0.097
8	1.171	0.154	2.47	73	1.7	-	75	-0.058	5.02	0.090
9	1.324	0.153	2.48	73	1.5	-	75	-0.058	5.01	0.087
10	1.478	0.154	2.48	73	1.8	98	75	-0.055	5.13	0.084
11	1.630	0.152	2.47	74	2.0	-	75	-0.055	5.31	0.086
12	1.788	0.158	2.48	74	1.8	-	75	-0.057	5.18	0.084
13	1.939	0.151	2.48	74	1.6	-	75	-0.056	5.20	0.087
14	2.095	0.156	2.49	74	1.7	-	75	-0.055	5.39	0.090
15	2.247	0.152	2.49	75	2.0	-	75	-0.054	5.37	0.088
16	2.403	0.156	2.49	75	2.1	-	75	-0.056	5.42	0.094
17	2.558	0.155	2.49	75	1.5	-	76	-0.056	5.61	0.099
18	2.712	0.154	2.49	75	1.5	-	76	-0.054	5.82	0.100
19	2.868	0.156	2.50	76	1.9	-	76	-0.054	5.79	0.100
20	3.020	0.152	2.49	76	1.7	101	76	-0.055	6.02	0.102
21	3.178	0.158	2.50	76	1.6	-	76	-0.053	6.01	0.094
22	3.331	0.153	2.50	77	1.8	-	76	-0.052	6.04	0.098
23	3.487	0.156	2.50	77	1.8	-	75	-0.053	6.01	0.106
24	3.641	0.154	2.51	77	2.0	-	75	-0.051	5.93	0.110
25	3.797	0.156	2.50	78	2.0	-	75	-0.052	6.11	0.125
26	3.954	0.157	2.50	78	2.0	-	75	-0.052	6.20	0.131
27	4.107	0.153	2.50	78	1.6	-	75	-0.051	6.37	0.132
28	4.265	0.158	2.51	79	1.6	-	75	-0.053	6.37	0.134
29	4.419	0.154	2.51	79	1.5	-	75	-0.054	6.39	0.131
30	4.575	0.156	2.51	79	2.0	101	75	-0.051	6.50	0.127
31	4.730	0.155	2.51	80	1.7	-	75	-0.052	6.64	0.131

BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: Sherwood
Model: Ironwood 2.0-1
Run #: 1

Job #: 25-470
Tracking #: 243
Technician: AK
Date: 12/19/2025

	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	4.887	0.157	2.52	80	1.6	-	75	-0.052	6.68	0.129
33	5.044	0.157	2.52	80	1.6	-	75	-0.051	6.82	0.126
34	5.198	0.154	2.52	80	1.7	-	75	-0.052	6.94	0.125
35	5.358	0.160	2.52	81	2.1	-	75	-0.052	7.14	0.128
36	5.512	0.154	2.52	81	2.1	-	75	-0.051	7.19	0.134
37	5.669	0.157	2.52	81	1.7	-	75	-0.053	7.40	0.134
38	5.825	0.156	2.52	82	1.9	-	75	-0.052	7.61	0.133
39	5.982	0.157	2.52	82	2.0	-	75	-0.050	7.67	0.143
40	6.140	0.158	2.52	82	2.1	102	75	-0.053	8.08	0.132
41	6.294	0.154	2.53	83	2.0	-	75	-0.049	7.60	0.154
42	6.454	0.160	2.54	83	1.7	-	75	-0.053	7.62	0.173
43	6.608	0.154	2.53	83	1.7	-	75	-0.053	7.66	0.184
44	6.767	0.159	2.53	83	1.6	-	75	-0.053	7.68	0.179
45	6.925	0.158	2.53	84	1.7	-	75	-0.054	7.73	0.172
46	7.080	0.155	2.53	84	1.6	-	75	-0.052	7.82	0.180
47	7.240	0.160	2.53	84	1.7	-	75	-0.054	8.23	0.175
48	7.395	0.155	2.53	85	2.0	-	75	-0.053	8.37	0.170
49	7.554	0.159	2.53	85	2.0	-	75	-0.054	8.52	0.163
50	7.712	0.158	2.54	85	2.0	102	75	-0.056	8.85	0.146
51	7.868	0.156	2.54	86	1.6	-	75	-0.056	9.08	0.138
52	8.027	0.159	2.53	86	1.7	-	75	-0.056	9.11	0.136
53	8.183	0.156	2.53	86	1.6	-	75	-0.056	9.61	0.115
54	8.343	0.160	2.54	86	1.5	-	75	-0.054	11.01	0.395
55	8.500	0.157	2.54	87	1.5	-	75	-0.057	11.06	0.356
56	8.659	0.159	2.54	87	1.8	-	75	-0.057	11.04	0.483
57	8.818	0.159	2.54	87	2.0	-	75	-0.059	11.04	0.456
58	8.974	0.156	2.54	87	1.6	-	75	-0.055	10.84	0.501
59	9.134	0.160	2.55	88	1.8	-	75	-0.056	10.86	0.539
60	9.290	0.156	2.54	88	2.1	100	75	-0.059	10.87	0.547
61	9.450	0.160	2.54	88	1.5	-	75	-0.058	10.78	0.528
62	9.609	0.159	2.55	88	2.0	-	75	-0.057	10.72	0.502
63	9.766	0.157	2.55	89	1.6	-	75	-0.057	10.79	0.448

BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: Sherwood
Model: Ironwood 2.0-1
Run #: 1

Job #: 25-470
Tracking #: 243
Technician: AK
Date: 12/19/2025

	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	9.927	0.161	2.55	89	1.7	-	75	-0.057	10.69	0.434
65	10.083	0.156	2.54	89	1.6	-	75	-0.056	10.52	0.354
66	10.243	0.160	2.55	89	2.1	-	76	-0.059	10.68	0.346
67	10.402	0.159	2.55	89	1.8	-	76	-0.058	10.69	0.312
68	10.560	0.158	2.55	90	1.9	-	76	-0.056	10.65	0.269
69	10.720	0.160	2.55	90	1.7	-	76	-0.054	10.59	0.228
70	10.877	0.157	2.56	90	1.5	101	76	-0.059	10.46	0.171
71	11.038	0.161	2.56	90	1.8	-	76	-0.056	10.52	0.131
72	11.197	0.159	2.55	91	1.7	-	76	-0.058	10.56	0.105
73	11.355	0.158	2.55	91	2.1	-	76	-0.055	10.39	0.083
74	11.516	0.161	2.56	91	1.6	-	76	-0.057	10.28	0.076
75	11.674	0.158	2.55	91	1.6	-	76	-0.056	10.43	0.070
76	11.833	0.159	2.55	91	1.7	-	76	-0.055	10.37	0.074
77	11.994	0.161	2.55	91	1.6	-	76	-0.058	10.23	0.078
78	12.152	0.158	2.55	92	2.0	-	76	-0.059	10.30	0.084
79	12.312	0.160	2.56	92	1.7	-	76	-0.057	10.19	0.064
80	12.472	0.160	2.55	92	1.9	102	76	-0.054	10.09	0.053
81	12.629	0.157	2.56	92	2.1	-	76	-0.056	9.87	0.059
82	12.792	0.163	2.56	92	1.6	-	76	-0.057	9.75	0.069
83	12.949	0.157	2.56	92	1.6	-	76	-0.058	9.62	0.069
84	13.110	0.161	2.56	93	1.9	-	76	-0.055	9.62	0.070
85	13.271	0.161	2.55	93	2.0	-	76	-0.057	9.60	0.068
86	13.428	0.157	2.55	93	1.7	-	76	-0.054	9.73	0.070
87	13.591	0.163	2.56	93	1.6	-	76	-0.056	9.68	0.075
88	13.748	0.157	2.56	93	2.0	-	76	-0.057	9.60	0.067
89	13.909	0.161	2.56	94	1.8	-	76	-0.057	9.49	0.070
90	14.069	0.160	2.55	94	1.8	101	76	-0.055	9.50	0.071
91	14.228	0.159	2.55	94	1.7	-	76	-0.050	9.47	0.077
92	14.389	0.161	2.56	94	1.8	-	76	-0.052	9.19	0.081
93	14.548	0.159	2.55	94	1.7	-	76	-0.057	9.11	0.076
94	14.708	0.160	2.56	94	1.6	-	76	-0.057	8.98	0.174
95	14.870	0.162	2.56	94	1.9	-	76	-0.056	9.39	0.307

BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: Sherwood
Model: Ironwood 2.0-1
Run #: 1

Job #: 25-470
Tracking #: 243
Technician: AK
Date: 12/19/2025

	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	15.029	0.159	2.56	94	1.5	-	76	-0.053	9.18	0.141
97	15.189	0.160	2.55	95	1.7	-	76	-0.056	8.99	0.226
98	15.351	0.162	2.56	95	2.0	-	76	-0.057	9.33	0.336
99	15.508	0.157	2.56	95	1.5	-	76	-0.057	9.41	0.346
100	15.672	0.164	2.56	95	1.9	101	76	-0.058	9.38	0.349
101	15.829	0.157	2.56	95	1.7	-	76	-0.054	9.43	0.358
102	15.991	0.162	2.56	95	2.1	-	76	-0.057	9.41	0.358
103	16.152	0.161	2.57	95	2.1	-	76	-0.056	9.07	0.295
104	16.311	0.159	2.56	95	1.7	-	76	-0.057	9.19	0.362
105	16.473	0.162	2.56	95	1.7	-	76	-0.055	8.97	0.353
106	16.633	0.160	2.56	96	2.1	-	76	-0.058	8.94	0.351
107	16.792	0.159	2.56	96	1.6	-	76	-0.060	8.81	0.348
108	16.955	0.163	2.56	96	1.7	-	76	-0.059	8.84	0.350
109	17.113	0.158	2.57	96	1.9	-	76	-0.055	8.72	0.343
110	17.275	0.162	2.56	96	1.7	100	76	-0.057	8.78	0.334
111	17.436	0.161	2.56	96	1.6	-	76	-0.057	8.59	0.324
112	17.595	0.159	2.56	96	1.5	-	76	-0.052	8.54	0.326
113	17.759	0.164	2.57	96	1.6	-	76	-0.057	8.45	0.325
114	17.917	0.158	2.57	96	2.1	-	76	-0.056	8.42	0.326
115	18.079	0.162	2.57	96	1.9	-	76	-0.055	8.25	0.316
116	18.240	0.161	2.57	96	1.8	-	76	-0.057	8.26	0.312
117	18.400	0.160	2.56	96	1.7	-	76	-0.055	8.17	0.314
118	18.561	0.161	2.56	96	1.7	-	76	-0.054	8.30	0.315
119	18.723	0.162	2.57	97	1.6	-	76	-0.056	8.23	0.311
120	18.881	0.158	2.56	97	1.9	100	76	-0.057	8.12	0.307
121	19.046	0.165	2.57	97	1.8	-	76	-0.055	8.38	0.316
122	19.203	0.157	2.56	97	1.6	-	76	-0.055	8.35	0.313
123	19.366	0.163	2.57	97	2.1	-	76	-0.050	8.33	0.311
124	19.527	0.161	2.56	97	1.9	-	76	-0.057	8.44	0.313
125	19.687	0.160	2.57	97	1.7	-	76	-0.056	8.33	0.311
126	19.848	0.161	2.56	97	1.8	-	76	-0.054	8.32	0.304
127	20.011	0.163	2.57	97	2.0	-	76	-0.054	8.41	0.318

BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: Sherwood
Model: Ironwood 2.0-1
Run #: 1

Job #: 25-470
Tracking #: 243
Technician: AK
Date: 12/19/2025

	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	20.169	0.158	2.56	97	1.7	-	76	-0.056	8.49	0.319
129	20.334	0.165	2.58	97	2.1	-	76	-0.057	8.35	0.315
130	20.491	0.157	2.56	97	1.7	101	76	-0.056	8.33	0.311
131	20.654	0.163	2.57	97	1.6	-	76	-0.053	8.45	0.316
132	20.815	0.161	2.56	97	2.1	-	76	-0.053	8.43	0.318
133	20.975	0.160	2.57	97	2.0	-	76	-0.059	8.42	0.315
134	21.137	0.162	2.57	97	1.9	-	76	-0.054	8.39	0.315
135	21.299	0.162	2.56	97	1.5	-	76	-0.055	8.44	0.319
136	21.457	0.158	2.56	98	1.7	-	76	-0.056	8.46	0.315
137	21.621	0.164	2.57	98	1.8	-	76	-0.055	8.51	0.318
138	21.779	0.158	2.57	98	1.8	-	76	-0.054	8.36	0.312
139	21.942	0.163	2.57	98	1.7	-	76	-0.053	9.01	0.341
140	22.103	0.161	2.56	98	1.7	100	76	-0.056	9.27	0.285
141	22.263	0.160	2.56	98	1.6	-	76	-0.054	9.11	0.190
142	22.425	0.162	2.56	98	1.7	-	76	-0.055	9.38	0.178
143	22.587	0.162	2.56	98	2.1	-	76	-0.054	9.71	0.153
144	22.746	0.159	2.56	98	2.0	-	76	-0.056	9.60	0.155
145	22.910	0.164	2.56	98	1.8	-	76	-0.056	9.46	0.158
146	23.068	0.158	2.57	98	2.1	-	76	-0.055	9.01	0.215
147	23.231	0.163	2.57	98	1.9	-	76	-0.057	9.36	0.322
148	23.392	0.161	2.56	98	1.7	-	76	-0.055	9.34	0.326
149	23.552	0.160	2.56	98	2.0	-	76	-0.055	9.26	0.333
150	23.714	0.162	2.57	98	1.6	100	76	-0.060	9.22	0.335
151	23.876	0.162	2.57	98	2.0	-	76	-0.058	9.12	0.328
152	24.035	0.159	2.57	98	1.8	-	76	-0.057	8.96	0.327
153	24.199	0.164	2.57	98	1.9	-	76	-0.052	8.89	0.322
154	24.357	0.158	2.56	98	1.9	-	76	-0.056	8.94	0.319
155	24.520	0.163	2.57	98	1.5	-	76	-0.054	8.77	0.285
156	24.682	0.162	2.56	98	1.5	-	76	-0.055	8.83	0.318
157	24.842	0.160	2.57	98	2.0	-	76	-0.054	8.83	0.316
158	25.004	0.162	2.57	98	2.0	-	76	-0.053	8.88	0.318
159	25.167	0.163	2.57	98	2.0	-	76	-0.057	8.72	0.303

BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: Sherwood
Model: Ironwood 2.0-1
Run #: 1

Job #: 25-470
Tracking #: 243
Technician: AK
Date: 12/19/2025

	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	25.325	0.158	2.57	98	1.5	101	76	-0.056	8.38	0.221
161	25.490	0.165	2.57	98	1.6	-	76	-0.052	8.57	0.235
162	25.648	0.158	2.57	98	2.1	-	76	-0.054	8.61	0.240
163	25.811	0.163	2.57	98	2.1	-	76	-0.053	8.12	0.128
164	25.973	0.162	2.57	98	1.8	-	76	-0.052	8.65	0.276
165	26.133	0.160	2.57	99	1.6	-	76	-0.053	8.99	0.301
166	26.294	0.161	2.57	99	1.7	-	76	-0.051	8.86	0.286
167	26.457	0.163	2.57	99	2.0	-	76	-0.054	9.03	0.300
168	26.616	0.159	2.57	99	1.7	-	76	-0.053	8.96	0.287
169	26.780	0.164	2.58	99	1.7	-	76	-0.056	8.53	0.102
170	26.939	0.159	2.57	99	1.9	102	76	-0.052	8.96	0.054
171	27.101	0.162	2.57	99	1.6	-	76	-0.049	9.24	0.064
172	27.264	0.163	2.57	99	1.8	-	76	-0.050	9.17	0.050
173	27.423	0.159	2.57	99	1.8	-	76	-0.051	8.56	0.075
174	27.586	0.163	2.57	99	1.8	-	76	-0.049	8.43	0.063
175	27.748	0.162	2.58	99	2.0	-	76	-0.049	7.87	0.092
176	27.908	0.160	2.57	99	2.0	-	76	-0.048	7.68	0.221
177	28.071	0.163	2.58	99	2.1	-	76	-0.047	7.43	0.138
178	28.232	0.161	2.57	99	1.6	-	76	-0.046	7.03	0.089
179	28.392	0.160	2.58	99	1.6	-	76	-0.047	6.98	0.088
180	28.557	0.165	2.57	99	2.1	101	76	-0.046	6.97	0.086
181	28.714	0.157	2.58	99	1.5	-	76	-0.046	7.00	0.088
182	28.878	0.164	2.57	99	2.1	-	76	-0.045	6.91	0.088
183	29.040	0.162	2.58	99	2.1	-	76	-0.044	6.84	0.088
184	29.200	0.160	2.58	99	1.6	-	76	-0.041	6.85	0.089
185	29.363	0.163	2.57	99	1.6	-	76	-0.043	6.70	0.092
186	29.525	0.162	2.57	99	1.9	-	76	-0.041	6.90	0.107
187	29.685	0.160	2.57	99	1.9	-	76	-0.044	7.00	0.112
188	29.849	0.164	2.58	99	1.5	-	75	-0.041	6.85	0.117
189	30.008	0.159	2.58	99	1.9	-	75	-0.043	6.93	0.130
190	30.171	0.163	2.57	99	1.7	100	75	-0.045	7.01	0.133
191	30.333	0.162	2.58	99	1.8	-	75	-0.041	6.79	0.129

BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: Sherwood
Model: Ironwood 2.0-1
Run #: 1

Job #: 25-470
Tracking #: 243
Technician: AK
Date: 12/19/2025

	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	30.494	0.161	2.58	99	2.0	-	75	-0.043	6.91	0.130
193	30.655	0.161	2.57	99	1.6	-	75	-0.040	6.83	0.128
194	30.819	0.164	2.58	99	1.9	-	75	-0.040	7.09	0.130
195	30.977	0.158	2.58	99	1.9	-	75	-0.041	7.02	0.130
196	31.142	0.165	2.59	99	2.0	-	75	-0.040	7.11	0.129
197	31.302	0.160	2.58	99	1.8	-	75	-0.043	6.96	0.127
198	31.463	0.161	2.58	99	2.1	-	75	-0.043	7.02	0.130
199	31.627	0.164	2.58	99	1.6	-	75	-0.038	6.96	0.133
200	31.786	0.159	2.58	99	2.1	100	75	-0.042	7.23	0.134
201	31.950	0.164	2.58	99	1.8	-	75	-0.041	7.24	0.128
202	32.111	0.161	2.58	99	1.6	-	75	-0.040	7.23	0.138
203	32.272	0.161	2.58	99	1.7	-	75	-0.042	7.20	0.141
204	32.435	0.163	2.58	99	1.5	-	75	-0.038	7.11	0.135
205	32.596	0.161	2.58	99	2.0	-	75	-0.042	7.11	0.143
206	32.757	0.161	2.58	99	1.6	-	75	-0.041	7.23	0.136
207	32.921	0.164	2.57	99	1.6	-	75	-0.042	7.21	0.133
208	33.080	0.159	2.58	99	2.1	-	75	-0.041	7.23	0.135
209	33.243	0.163	2.57	99	1.6	-	75	-0.041	7.05	0.129
210	33.405	0.162	2.58	99	1.6	100	75	-0.039	7.04	0.136
211	33.566	0.161	2.58	99	1.6	-	75	-0.039	6.90	0.129
212	33.728	0.162	2.58	99	1.6	-	75	-0.040	6.94	0.139
213	33.892	0.164	2.58	99	1.7	-	75	-0.037	7.14	0.142
214	34.050	0.158	2.59	99	1.9	-	75	-0.039	7.08	0.144
215	34.215	0.165	2.59	99	1.5	-	75	-0.040	7.04	0.141
216	34.375	0.160	2.59	99	1.5	-	75	-0.039	7.06	0.145
217	34.537	0.162	2.58	99	1.8	-	75	-0.039	7.04	0.148
218	34.701	0.164	2.58	99	1.8	-	75	-0.038	7.07	0.150
219	34.859	0.158	2.57	99	1.5	-	75	-0.035	7.11	0.152
220	35.023	0.164	2.58	99	1.5	101	75	-0.038	7.09	0.150
221	35.184	0.161	2.58	99	1.6	-	75	-0.037	7.08	0.111
222	35.345	0.161	2.58	99	2.1	-	75	-0.041	6.96	0.110
223	35.509	0.164	2.59	99	1.6	-	75	-0.037	6.96	0.115

BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: Sherwood
Model: Ironwood 2.0-1
Run #: 1

Job #: 25-470
Tracking #: 243
Technician: AK
Date: 12/19/2025

	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	35.670	0.161	2.58	99	2.1	-	75	-0.040	6.91	0.117
225	35.830	0.160	2.59	99	1.6	-	75	-0.036	6.77	0.112
226	35.995	0.165	2.57	99	2.0	-	75	-0.039	6.85	0.119
227	36.154	0.159	2.58	99	1.7	-	75	-0.039	6.74	0.118
228	36.317	0.163	2.58	99	1.6	-	75	-0.037	6.76	0.120
229	36.479	0.162	2.58	99	2.1	-	75	-0.038	6.68	0.120
230	36.640	0.161	2.58	99	1.8	100	75	-0.037	6.62	0.123
231	36.803	0.163	2.58	99	1.8	-	74	-0.038	6.58	0.123
232	36.966	0.163	2.58	99	1.6	-	74	-0.035	6.64	0.129
233	37.126	0.160	2.58	99	1.5	-	74	-0.038	6.50	0.131
234	37.289	0.163	2.58	99	1.9	-	74	-0.038	6.51	0.130
235	37.450	0.161	2.58	100	1.7	-	74	-0.039	6.49	0.128
236	37.611	0.161	2.58	100	2.1	-	74	-0.039	6.42	0.130
237	37.776	0.165	2.58	100	2.0	-	74	-0.037	6.39	0.131
238	37.934	0.158	2.58	100	1.7	-	74	-0.038	6.45	0.133
239	38.098	0.164	2.58	100	1.8	-	74	-0.036	6.48	0.138
240	38.261	0.163	2.59	100	1.8	99	74	-0.039	6.49	0.136
241	38.421	0.160	2.57	100	2.0	-	74	-0.037	6.43	0.128
242	38.584	0.163	2.59	100	1.9	-	74	-0.035	6.41	0.126
243	38.746	0.162	2.58	100	2.0	-	74	-0.036	6.47	0.130
244	38.906	0.160	2.58	100	1.7	-	74	-0.037	6.47	0.123
245	39.071	0.165	2.58	100	1.9	-	74	-0.037	6.34	0.123
246	39.230	0.159	2.58	100	1.5	-	74	-0.037	6.45	0.134
247	39.393	0.163	2.58	100	2.1	-	74	-0.034	6.42	0.131
248	39.556	0.163	2.58	100	2.1	-	74	-0.038	6.38	0.132
249	39.716	0.160	2.58	100	1.6	-	74	-0.036	6.50	0.132
250	39.879	0.163	2.58	100	1.6	99	74	-0.033	6.50	0.131
251	40.041	0.162	2.58	100	2.0	-	74	-0.037	6.45	0.128
252	40.201	0.160	2.58	100	1.6	-	74	-0.037	6.46	0.126
253	40.365	0.164	2.58	100	1.5	-	74	-0.036	6.47	0.130
254	40.527	0.162	2.57	100	1.7	-	74	-0.040	6.38	0.127
255	40.687	0.160	2.59	100	1.6	-	74	-0.039	6.33	0.127

BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: Sherwood
Model: Ironwood 2.0-1
Run #: 1

Job #: 25-470
Tracking #: 243
Technician: AK
Date: 12/19/2025

	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	40.852	0.165	2.58	100	1.9	-	74	-0.036	6.37	0.129
257	41.011	0.159	2.59	100	1.8	-	74	-0.036	6.35	0.128
258	41.174	0.163	2.58	100	1.6	-	74	-0.038	6.32	0.126
259	41.336	0.162	2.58	100	1.8	-	74	-0.035	6.36	0.129
260	41.497	0.161	2.58	100	1.6	99	74	-0.038	6.25	0.122
261	41.659	0.162	2.58	100	2.1	-	74	-0.038	6.28	0.129
262	41.823	0.164	2.58	100	1.5	-	74	-0.035	6.27	0.127
263	41.982	0.159	2.59	100	2.0	-	74	-0.036	6.25	0.134
264	42.147	0.165	2.59	100	2.0	-	74	-0.034	6.35	0.129
265	42.307	0.160	2.58	100	1.7	-	74	-0.037	6.33	0.135
266	42.468	0.161	2.59	100	1.7	-	74	-0.033	6.26	0.133
267	42.633	0.165	2.59	100	2.0	-	74	-0.036	6.27	0.133
268	42.791	0.158	2.59	100	1.7	-	74	-0.034	6.23	0.136
269	42.956	0.165	2.58	100	1.5	-	74	-0.034	6.21	0.139
270	43.118	0.162	2.59	100	2.0	99	74	-0.035	6.26	0.143
271	43.278	0.160	2.58	100	1.6	-	74	-0.033	6.33	0.139
272	43.442	0.164	2.58	100	1.5	-	74	-0.036	6.34	0.137
273	43.604	0.162	2.58	100	1.6	-	74	-0.033	6.24	0.140
274	43.764	0.160	2.58	100	1.9	-	74	-0.036	6.03	0.135
275	43.929	0.165	2.58	100	1.6	-	74	-0.036	6.04	0.135
276	44.088	0.159	2.59	100	1.8	-	74	-0.035	5.96	0.137
277	44.251	0.163	2.58	100	1.5	-	74	-0.034	6.19	0.132
278	44.414	0.163	2.58	100	1.6	-	74	-0.036	6.10	0.135
279	44.574	0.160	2.58	100	1.6	-	73	-0.037	6.12	0.132
280	44.737	0.163	2.58	100	1.9	99	73	-0.037	6.04	0.135
281	44.899	0.162	2.58	100	1.7	-	73	-0.035	6.06	0.134
282	45.060	0.161	2.58	100	1.9	-	73	-0.033	6.10	0.128
283	45.223	0.163	2.59	100	2.1	-	73	-0.037	6.07	0.128
284	45.385	0.162	2.59	100	2.1	-	73	-0.033	6.12	0.137
285	45.545	0.160	2.59	100	1.9	-	73	-0.031	6.05	0.133
286	45.710	0.165	2.58	100	1.7	-	73	-0.031	6.08	0.135
287	45.869	0.159	2.59	100	1.6	-	73	-0.035	5.94	0.132

BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: Sherwood
Model: Ironwood 2.0-1
Run #: 1

Job #: 25-470
Tracking #: 243
Technician: AK
Date: 12/19/2025

	Particulate Sampling Data							Flue Gas Data		
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Filter (°F)	Flue Draft (in H_2O)	CO_2 (%)	CO (%)
288	46.033	0.164	2.58	100	1.5	-	73	-0.035	6.07	0.140
289	46.195	0.162	2.58	100	1.7	-	73	-0.035	6.18	0.136
290	46.356	0.161	2.58	100	1.5	99	73	-0.036	5.99	0.134
291	46.518	0.162	2.58	100	1.6	-	74	-0.034	6.12	0.140
292	46.681	0.163	2.58	100	1.5	-	74	-0.035	6.05	0.134
293	46.842	0.161	2.59	100	2.1	-	74	-0.032	6.06	0.138
294	47.005	0.163	2.59	100	2.0	-	73	-0.033	5.86	0.135
295	47.166	0.161	2.58	100	1.5	-	73	-0.037	5.90	0.133
296	47.327	0.161	2.59	100	1.6	-	73	-0.034	5.91	0.134
297	47.492	0.165	2.59	100	2.0	-	73	-0.036	5.96	0.137
298	47.651	0.159	2.60	100	2.1	99	73	-0.035	5.99	0.144
Avg/Tot	47.651	0.160	2.55	93.7	1.8	100	75.1	-0.048	7.72	0.182

BOX C TEST DATA - ASTM E2780 / ASTM E2515

Client: Sherwood
Model: Ironwood 2.0-1
Run #: 1

Job #: 25-470
Tracking #: 243
Technician: AK
Date: 12/19/2025

	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		-0.03	76	0.0		72
1	0.104	0.104	0.91	76	1.4	-	72
2	0.241	0.137	0.90	76	1.5	-	72
3	0.380	0.139	0.92	76	1.4	-	72
4	0.517	0.137	0.91	76	1.5	-	73
5	0.656	0.139	0.93	77	1.4	-	73
6	0.795	0.139	0.93	77	1.5	-	73
7	0.934	0.139	0.93	77	1.5	-	73
8	1.075	0.141	0.95	77	1.6	-	73
9	1.216	0.141	0.95	77	1.4	-	73
10	1.356	0.140	0.95	77	1.4	97	73
11	1.499	0.143	0.96	77	1.4	-	73
12	1.641	0.142	0.96	78	1.6	-	73
13	1.782	0.141	0.95	78	1.5	-	73
14	1.925	0.143	0.97	78	1.5	-	73
15	2.069	0.144	0.97	78	1.5	-	73
16	2.211	0.142	0.96	78	1.6	-	73
17	2.354	0.143	0.96	79	1.5	-	73
18	2.497	0.143	0.97	79	1.4	-	73
19	2.641	0.144	0.98	79	1.5	-	73
20	2.784	0.143	0.97	79	1.6	100	73
21	2.928	0.144	0.97	79	1.5	-	73
22	3.071	0.143	0.97	80	1.6	-	73
23	3.217	0.146	0.98	80	1.5	-	73
24	3.361	0.144	0.98	81	1.5	-	73
25	3.506	0.145	0.98	81	1.5	-	73
26	3.650	0.144	0.98	82	1.5	-	73
27	3.795	0.145	0.98	82	1.5	-	73
28	3.940	0.145	0.99	83	1.5	-	73
29	4.087	0.147	1.00	83	1.6	-	73
30	4.234	0.147	1.00	83	1.4	101	73
31	4.380	0.146	1.00	83	1.4	-	73

BOX C TEST DATA - ASTM E2780 / ASTM E2515

Client: Sherwood
Model: Ironwood 2.0-1
Run #: 1

Job #: 25-470
Tracking #: 243
Technician: AK
Date: 12/19/2025

	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	4.526	0.146	1.00	83	1.6	-	73
33	4.672	0.146	0.99	83	1.4	-	73
34	4.819	0.147	1.00	83	1.4	-	73
35	4.965	0.146	0.99	84	1.5	-	73
36	5.112	0.147	0.99	84	1.4	-	73
37	5.259	0.147	1.00	84	1.5	-	73
38	5.406	0.147	1.00	85	1.5	-	73
39	5.554	0.148	1.01	85	1.6	-	73
40	5.702	0.148	1.01	85	1.5	103	73
41	5.851	0.149	1.01	86	1.6	-	73
42	5.999	0.148	1.02	86	1.6	-	73
43	6.147	0.148	1.02	86	1.5	-	73
44	6.295	0.148	1.02	87	1.6	-	73
45	6.443	0.148	1.02	87	1.5	-	73
46	6.592	0.149	1.02	87	1.4	-	73
47	6.741	0.149	1.02	88	1.5	-	73
48	6.889	0.148	1.02	88	1.4	-	73
49	7.038	0.149	1.02	88	1.6	-	73
50	7.187	0.149	1.02	89	1.6	103	73
51	7.336	0.149	1.02	89	1.5	-	73
52	7.484	0.148	1.02	89	1.6	-	73
53	7.634	0.150	1.02	90	1.5	-	73
54	7.783	0.149	1.02	90	1.4	-	73
55	7.932	0.149	1.02	90	1.4	-	73
56	8.081	0.149	1.02	90	1.4	-	73
57	8.230	0.149	1.02	91	1.5	-	73
58	8.379	0.149	1.02	91	1.6	-	73
59	8.529	0.150	1.02	91	1.5	-	73
60	8.678	0.149	1.02	91	1.6	102	73
Avg/Tot	8.678	0.145	0.97	82.7	1.5	101	72.9

WOODSTOVE SURFACE TEMPERATURE DATA

Client: Sherwood
Model: Ironwood 2.0-1
Run #: 1

Job #: 25-470
Tracking #: 243
Technician: AK
Date: 12/19/2025

Stove ΔT: 88

	Temperature Data (°F)						
Elapsed Time (min)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
0	425	432	339	245	475	383.1	629.4
1	424	431	350	251	474	385.9	575.3
2	421	428	355	259	473	387.0	617.6
3	416	423	356	265	471	386.2	707.0
4	411	418	353	274	469	385.1	777.2
5	406	413	351	283	467	383.9	845.6
6	401	407	349	295	466	383.6	856.7
7	396	402	346	307	466	383.1	854.8
8	391	397	343	315	465	382.2	842.9
9	386	393	340	325	465	381.7	827.7
10	382	388	337	332	465	380.7	814.5
11	377	384	335	336	465	379.3	804.3
12	373	380	332	341	465	378.2	795.8
13	369	375	330	344	465	376.6	789.1
14	366	372	328	347	464	375.3	785.9
15	362	368	326	348	464	373.5	786.9
16	358	364	311	331	462	365.1	790.9
17	355	360	297	322	461	358.9	796.4
18	351	356	286	314	460	353.4	801.6
19	348	352	277	307	459	348.5	805.7
20	344	349	269	300	458	344.0	810.0
21	341	345	263	294	456	340.0	812.0
22	338	342	258	289	455	336.3	817.4
23	335	338	252	284	453	332.4	824.2
24	332	334	248	280	451	329.1	831.6
25	329	331	244	276	450	325.9	840.1
26	326	328	240	272	448	322.8	846.8
27	323	324	237	269	447	320.0	853.3
28	320	322	234	267	445	317.7	856.7
29	318	319	231	264	444	315.2	858.6
30	315	316	230	264	442	313.4	861.5
31	313	314	228	262	441	311.4	862.6
32	311	312	226	261	439	309.6	863.5
33	309	310	225	260	438	308.1	864.6
34	307	308	223	260	436	306.7	867.6
35	305	306	222	259	434	305.2	873.7
36	304	304	221	259	433	304.1	881.9
37	303	302	220	259	432	303.0	890.5
38	301	301	219	260	430	302.1	902.3
39	300	299	218	259	429	301.2	908.0
40	299	298	218	261	427	300.7	918.4
41	298	297	217	262	426	300.1	934.9
42	297	296	216	265	424	299.7	946.4
43	297	295	217	266	423	299.5	952.4
44	296	295	216	268	422	299.2	954.9
45	295	294	216	270	421	299.1	956.6
46	295	293	216	272	419	299.0	961.8
47	294	293	216	274	418	298.9	964.6

WOODSTOVE SURFACE TEMPERATURE DATA

Client: Sherwood
Model: Ironwood 2.0-1
Run #: 1

Job #: 25-470
Tracking #: 243
Technician: AK
Date: 12/19/2025

Stove ΔT: 88

	Temperature Data (°F)						
Elapsed Time (min)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
48	294	293	216	277	416	299.0	964.9
49	294	293	216	278	415	299.0	964.7
50	293	292	216	280	414	299.1	961.4
51	294	293	216	282	413	299.2	960.1
52	294	293	216	284	411	299.6	950.7
53	294	293	216	286	410	299.7	942.9
54	295	294	216	288	409	300.1	942.6
55	295	295	217	290	407	300.7	948.6
56	296	295	217	293	406	301.5	957.9
57	298	297	218	296	405	302.5	965.5
58	299	298	218	300	403	303.7	971.4
59	300	299	219	304	402	304.9	978.3
60	302	301	219	307	401	305.9	984.1
61	304	302	220	312	399	307.3	990.5
62	305	304	221	315	398	308.6	994.7
63	307	306	221	319	396	309.8	997.9
64	309	307	222	322	395	311.0	1000.6
65	311	309	223	324	394	312.2	1002.7
66	313	311	224	327	392	313.6	1004.8
67	316	312	225	330	391	314.8	1004.9
68	318	314	226	332	390	315.9	1004.1
69	320	316	227	334	389	317.0	1001.2
70	322	318	228	335	387	318.0	997.4
71	324	319	229	337	386	319.1	992.6
72	326	321	229	338	385	319.8	987.1
73	328	323	231	339	384	320.8	982.6
74	330	324	232	340	383	321.6	978.7
75	332	326	234	340	382	322.6	975.9
76	333	327	235	341	381	323.4	973.8
77	335	329	236	341	380	324.1	972.3
78	337	330	238	341	378	324.9	970.4
79	338	332	240	341	378	325.7	968.3
80	340	334	242	341	377	326.6	964.1
81	342	335	243	341	376	327.4	961.0
82	343	337	246	341	375	328.3	957.2
83	345	338	247	340	374	328.9	953.5
84	346	339	249	340	373	329.6	948.9
85	348	341	250	339	372	329.9	944.6
86	349	342	252	338	372	330.4	940.5
87	350	343	254	338	371	331.2	936.1
88	351	344	255	336	370	331.4	931.8
89	353	345	257	334	370	331.7	927.5
90	353	347	258	334	369	332.1	924.7
91	355	347	259	332	368	332.2	921.4
92	356	349	261	330	368	332.5	917.7
93	356	349	262	329	367	332.7	933.6
94	357	350	263	330	366	333.1	1026.1
95	358	351	263	331	365	333.6	1081.5

WOODSTOVE SURFACE TEMPERATURE DATA

Client: Sherwood
Model: Ironwood 2.0-1
Run #: 1

Job #: 25-470
Tracking #: 243
Technician: AK
Date: 12/19/2025

Stove ΔT: 88

	Temperature Data (°F)						
Elapsed Time (min)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
96	358	351	263	332	365	333.9	1073.8
97	359	352	263	336	364	334.6	1115.2
98	359	352	263	340	364	335.4	1162.8
99	359	353	263	345	363	336.4	1198.4
100	359	353	262	351	363	337.5	1219.5
101	359	353	262	358	362	338.8	1231.0
102	359	354	261	365	362	340.2	1227.1
103	359	355	262	370	361	341.3	1228.4
104	360	355	261	375	361	342.4	1232.8
105	360	356	261	379	361	343.3	1236.6
106	360	357	262	383	361	344.2	1236.3
107	360	357	262	386	360	344.9	1234.0
108	360	358	262	389	360	345.7	1229.9
109	360	359	262	390	360	346.1	1225.2
110	360	359	263	391	360	346.5	1218.7
111	361	360	263	392	359	346.9	1210.7
112	361	361	263	392	359	347.1	1201.6
113	361	362	263	391	359	347.0	1193.4
114	361	363	263	390	359	347.2	1185.7
115	362	363	264	389	359	347.4	1178.1
116	362	364	264	387	359	347.3	1172.2
117	362	365	265	386	360	347.4	1166.6
118	363	366	265	383	360	347.4	1161.3
119	363	367	266	381	360	347.2	1156.3
120	363	367	266	379	360	347.0	1152.9
121	364	368	266	378	360	347.1	1150.5
122	364	369	267	376	360	347.0	1150.0
123	364	369	267	373	360	346.7	1150.4
124	364	370	268	371	361	346.7	1151.2
125	365	371	268	370	361	346.6	1151.9
126	365	371	268	369	361	346.7	1151.8
127	365	372	268	369	361	346.9	1151.9
128	366	372	269	368	361	347.2	1151.4
129	366	373	269	367	361	347.2	1150.0
130	366	374	269	366	361	347.0	1148.3
131	366	374	269	367	361	347.5	1147.0
132	367	374	271	365	362	347.6	1146.8
133	367	375	271	363	362	347.5	1147.2
134	367	375	271	363	362	347.6	1148.4
135	367	376	272	363	362	348.0	1150.6
136	367	376	271	363	362	347.9	1151.8
137	368	376	272	363	363	348.3	1150.3
138	368	377	272	362	363	348.2	1156.7
139	368	377	273	363	363	348.8	1166.9
140	369	377	273	363	363	349.1	1159.3
141	369	378	275	363	363	349.8	1142.8
142	370	379	277	363	364	350.3	1112.6
143	371	380	279	362	364	351.1	1093.2

WOODSTOVE SURFACE TEMPERATURE DATA

Client: Sherwood
Model: Ironwood 2.0-1
Run #: 1

Job #: 25-470
Tracking #: 243
Technician: AK
Date: 12/19/2025

Stove ΔT: 88

	Temperature Data (°F)						
Elapsed Time (min)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
144	372	381	281	360	364	351.7	1068.5
145	373	382	283	357	364	351.8	1062.8
146	374	383	285	355	365	352.2	1100.8
147	375	383	286	354	365	352.5	1146.4
148	375	383	286	355	365	352.9	1179.3
149	376	384	287	358	365	353.7	1199.1
150	376	384	286	360	366	354.2	1208.3
151	377	384	286	363	366	355.2	1211.1
152	377	384	286	366	366	355.9	1210.5
153	378	384	287	369	367	356.7	1205.0
154	378	384	287	370	367	357.3	1192.7
155	379	384	287	372	367	357.8	1186.2
156	380	385	288	373	368	358.5	1184.8
157	381	385	288	373	368	358.7	1182.6
158	382	385	288	373	368	359.1	1174.6
159	383	385	288	373	369	359.4	1155.2
160	384	386	289	372	369	360.0	1133.6
161	385	387	290	370	370	360.3	1117.2
162	386	387	291	368	370	360.5	1085.2
163	387	388	291	364	371	360.0	1073.5
164	388	388	291	360	371	359.7	1086.0
165	389	388	291	358	371	359.4	1103.2
166	390	389	291	355	372	359.3	1119.5
167	390	389	291	354	372	359.3	1129.9
168	391	389	291	353	373	359.4	1109.0
169	392	389	291	352	373	359.5	1055.9
170	392	390	291	352	373	359.6	1005.4
171	393	390	292	347	374	359.0	967.6
172	394	390	291	342	374	358.2	941.4
173	395	391	292	337	375	357.7	925.6
174	395	391	291	333	375	357.0	911.0
175	396	391	291	328	375	356.2	917.7
176	397	392	291	323	376	355.5	931.5
177	397	392	291	319	375	354.9	924.4
178	397	392	290	317	376	354.1	904.1
179	397	392	290	313	376	353.4	881.9
180	397	392	289	308	376	352.3	861.5
181	397	392	288	304	376	351.5	843.6
182	397	392	288	299	376	350.4	828.6
183	397	391	288	295	376	349.4	815.6
184	397	391	287	291	376	348.5	804.9
185	396	391	286	286	376	347.1	797.2
186	396	390	286	282	377	346.2	793.5
187	396	390	284	279	377	345.1	790.5
188	395	390	284	275	377	344.0	787.3
189	395	389	283	272	377	343.3	784.0
190	394	389	282	268	378	342.2	780.9
191	393	388	281	266	378	341.4	778.0

WOODSTOVE SURFACE TEMPERATURE DATA

Client: Sherwood
Model: Ironwood 2.0-1
Run #: 1

Job #: 25-470
Tracking #: 243
Technician: AK
Date: 12/19/2025

Stove ΔT: 88

	Temperature Data (°F)						
Elapsed Time (min)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
192	392	388	280	263	379	340.4	775.3
193	392	388	280	260	379	339.7	772.9
194	391	387	279	258	380	338.8	771.1
195	390	386	279	255	380	338.2	769.8
196	389	386	278	254	381	337.5	768.8
197	389	385	277	252	381	336.9	767.8
198	388	385	277	251	382	336.3	767.0
199	387	384	275	249	383	335.6	766.4
200	386	384	276	247	383	335.2	765.0
201	386	383	275	246	384	334.6	762.0
202	385	383	274	244	385	333.9	757.7
203	384	382	273	244	385	333.7	753.6
204	383	382	273	242	386	333.1	750.0
205	382	382	272	241	387	332.8	746.2
206	381	382	273	240	387	332.7	742.5
207	380	382	272	239	388	332.2	739.2
208	380	382	272	237	389	332.0	736.5
209	379	382	272	236	390	331.8	734.1
210	378	382	271	235	391	331.4	732.1
211	377	382	271	234	391	331.0	730.6
212	376	382	271	234	392	330.9	729.6
213	375	382	270	232	393	330.5	728.8
214	374	382	270	232	393	330.1	728.4
215	374	381	269	231	394	329.7	728.1
216	373	381	269	230	395	329.4	727.9
217	372	381	268	230	395	329.1	728.6
218	371	381	268	229	396	328.7	729.4
219	370	380	267	228	396	328.4	730.6
220	369	380	267	228	397	328.2	730.4
221	369	379	267	228	397	327.9	728.1
222	368	379	266	227	397	327.6	724.8
223	368	378	266	227	398	327.2	721.4
224	368	377	265	227	398	327.0	717.9
225	368	377	265	226	399	326.7	713.9
226	368	376	264	225	399	326.3	710.2
227	368	375	264	225	399	326.1	707.5
228	367	374	263	224	399	325.6	705.8
229	367	374	263	223	399	325.1	704.8
230	367	373	262	222	399	324.7	704.3
231	366	372	262	221	399	324.1	704.1
232	366	371	261	220	400	323.7	703.4
233	366	370	261	220	400	323.2	703.1
234	365	369	260	219	400	322.6	702.8
235	365	368	259	219	400	322.1	702.8
236	364	368	259	218	400	321.6	702.6
237	364	367	258	217	400	321.0	702.3
238	363	366	258	217	400	320.4	701.9
239	362	365	257	216	400	319.9	701.3

WOODSTOVE SURFACE TEMPERATURE DATA

Client: Sherwood
Model: Ironwood 2.0-1
Run #: 1

Job #: 25-470
Tracking #: 243
Technician: AK
Date: 12/19/2025

Stove ΔT: 88

	Temperature Data (°F)						
Elapsed Time (min)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
240	362	364	256	216	399	319.4	700.9
241	361	363	256	215	399	318.9	699.7
242	360	363	255	214	399	318.2	697.6
243	360	362	254	214	399	317.8	695.1
244	359	361	254	214	399	317.3	692.8
245	358	360	253	213	399	316.7	690.9
246	358	359	253	212	399	316.2	689.3
247	357	358	252	212	399	315.8	688.0
248	357	358	252	212	399	315.2	687.1
249	356	357	251	211	399	314.7	686.6
250	355	356	251	211	399	314.3	686.2
251	355	355	250	210	399	313.7	685.8
252	354	355	250	209	399	313.2	685.3
253	353	354	249	209	399	312.8	684.6
254	353	353	249	209	399	312.3	683.8
255	352	352	249	209	399	312.1	683.1
256	351	352	248	208	398	311.4	682.3
257	350	351	248	208	398	311.1	681.3
258	350	350	248	207	398	310.6	680.0
259	349	350	247	207	398	310.1	679.3
260	348	349	247	206	398	309.8	678.8
261	348	348	247	206	398	309.4	678.6
262	347	348	246	205	398	308.9	678.9
263	346	347	246	205	398	308.4	679.1
264	346	346	246	205	398	308.0	679.4
265	345	346	245	205	398	307.7	679.9
266	345	345	245	204	398	307.2	680.2
267	344	344	244	204	397	306.8	680.5
268	344	344	244	204	397	306.5	681.1
269	343	343	244	204	397	306.2	681.7
270	342	343	243	203	397	305.5	681.9
271	342	342	244	203	397	305.4	681.3
272	342	341	243	203	396	305.0	681.4
273	341	341	242	202	396	304.5	681.4
274	341	340	242	202	396	304.2	680.7
275	340	340	242	202	396	303.8	680.2
276	339	339	241	202	396	303.4	679.1
277	339	338	241	202	395	302.9	678.2
278	338	338	240	202	395	302.5	677.2
279	338	337	240	201	395	302.1	676.4
280	337	336	240	201	394	301.7	675.1
281	336	336	239	202	394	301.3	674.7
282	336	335	239	201	394	300.8	673.8
283	335	335	238	200	393	300.4	672.6
284	335	334	238	200	393	300.0	671.8
285	335	334	238	200	392	299.6	671.2
286	334	333	238	200	392	299.3	670.9
287	334	333	236	200	391	298.8	670.5

WOODSTOVE SURFACE TEMPERATURE DATA

Client: Sherwood
Model: Ironwood 2.0-1
Run #: 1

Job #: 25-470
Tracking #: 243
Technician: AK
Date: 12/19/2025

Stove ΔT: **88**

	Temperature Data (°F)						
Elapsed Time (min)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
288	333	332	237	200	391	298.7	668.6
289	333	332	237	199	391	298.1	668.9
290	332	331	236	199	391	297.9	668.4
291	332	331	237	198	390	297.6	668.1
292	332	330	236	198	390	297.3	667.2
293	332	330	236	198	390	297.0	667.5
294	331	329	235	198	389	296.5	667.5
295	331	328	235	198	389	296.1	667.3
296	330	328	234	198	389	295.7	667.2
297	330	327	234	197	388	295.3	667.2
298	329	327	234	197	388	294.9	667.9
Average	355.8	356.5	261.5	288.9	393.0	331.1	892.6

LAB SAMPLE DATA - ASTM E2515

Client: Sherwood
Model: Ironwood 2.0-1
Run #: 1

Job #: 25-470
Tracking #: 243
Technician: AK
Date: 12/19/2025

		Sample ID	Tare, mg	Final, mg	Catch, mg
Filters	**A**	G01445	229.6	233.4	3.8
	B	G01446	229.7	232.9	3.2
	C - 1st Hour	G01447	230.0	231.0	1.0
	Amb	G01448	229.0	229.0	0.0
Probes	**A**	13A	117322.6	117323.1	0.5
	B	13B	116947.9	116948.8	0.9
	C - 1st Hour	13C	115655.0	115655.4	0.4
O-rings	**A**	13A	3588.4	3588.7	0.3
	B	13B	3633.6	3633.8	0.2
	C - 1st Hour	13C	4400.9	4401.8	0.9

Placed in Dessicator on:	12/19/2025

Balance Audit (mg):		200.0		200.0		200.0			
		Weight (mg)	Date/Time	Weight (mg)	Date/Time	Weight (mg)	Date/Time	Weight (mg)	Date/Time
Filters	**A**	233.3	12/26 14:00	233.4	12/29 10:15				
	B	233.0	12/26 14:00	232.9	12/29 10:15				
	C - 1st Hour	231.3	12/26 14:00	231.0	12/29 10:15	231.0	1/5 13:30		
	Amb	229.0	12/26 14:00	229.0	12/29 10:15				
Probes	**A**	117323.8	12/26 14:00	117323.0	12/29 10:15	117323.1	1/5 13:30		
	B	116948.9	12/26 14:00	116948.8	12/29 10:15				
	C - 1st Hour	115655.5	12/26 14:00	115655.4	12/29 10:15				
O-Rings	**A**	3589.1	12/26 14:00	3588.6	12/29 10:15	3588.7	1/5 13:30		
	B	3634.0	12/26 14:00	3633.8	12/29 10:15				
	C - 1st Hour	4402.6	12/26 14:00	4401.6	12/29 10:15	4401.8	1/5 13:30		

Train A Aggregate, mg:	**4.6**
Train B Aggregate, mg:	**4.3**
Train C Aggregate, mg:	**2.3**
Ambient, mg:	**0.0**

ASTM E2780 Wood Heater Run Sheets

Client: Sherwood Job Number: 25-470 Tracking #: 243
Model: Ironwood 2.0-1 Run Number: 1 Test Date: 12/19/25

Wood Heater Run Notes

Test Control Settings

Primary Air Setting(s): Open 1/32" from fully closed (1/4")
Targeted Burn Category: I

Preburn Notes

Time	Notes
	-None-

Test Notes

Test Burn Start Time: 11:09 Test Fuel Loaded by: 30 seconds
Door Closed: 45 seconds Air Control Set at: 300 seconds
Other Loading Notes: Bypass opened & closed with door, fan on high

Time	Notes
	-None-

Test Burn End Time: 16:07

Flue Gas Concentration Measurement

Calibration Gas Values: Span Gas CO_2 (%): 17.32 CO (%): 4.350
Mid Gas CO_2 (%): 10.02 CO (%): 2.530

Calibration Results:

	Pre Test			Post Test		
	Zero	Span	Mid	Zero	Span	Mid
Time	9:22	9:23	9:25	16:45	16:47	16:49
CO_2	0.00	17.34	9.90	0.06	17.44	10.46
CO	0.000	4.357	2.467	0.011	4.375	2.552

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

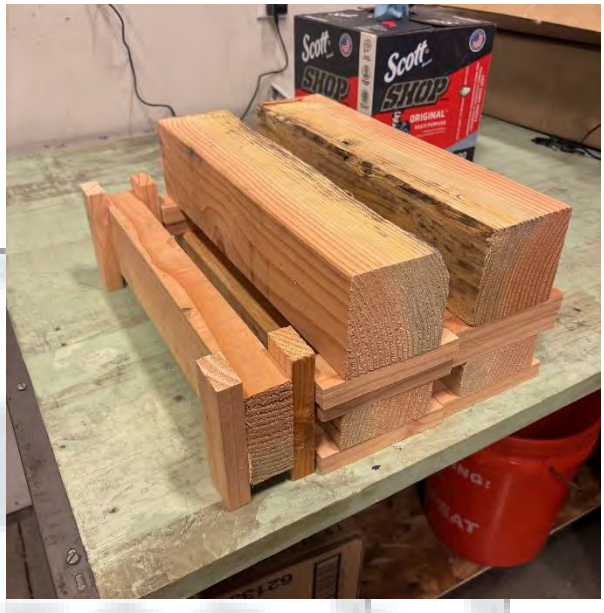
Technician Signature: Date: 1/14/26

ASTM E2780 Wood Heater Run Sheets

Client: Sherwood Job Number: 25-470 Tracking #: 243
Model: Ironwood 2.0-1 Run Number: 1 Test Date: 12/19/25



Test Fuel Front/Side View



Test Fuel Iso View



Test Fuel Loaded in Stove



Air Settings

Technician Signature: Date: 1/14/26

WOOD STOVE TEST DATA PACKET
ASTM E2780/E2515

Run 2 Data Summary

Client:	Sherwood
Model:	Ironwood 2.0-1
Job #:	25-470
Tracking #:	243
Test Date:	12/22/2025

Techician Signature

1/14/2026
Date

TEST RESULTS - ASTM E2780 / ASTM E2515

Client: Sherwood
Model: Ironwood 2.0-1
Run #: 2

Job #: 25-470
Tracking #: 243
Technician: AK
Date: 12/22/2025

Burn Rate (kg/hr):	0.91

	Ambient Sample	Sample Train A	Sample Train B	1st Hour Filter
Total Sample Volume (ft^3)	71.103	51.548	50.050	8.638
Average Gas Velocity in Dilution Tunnel (ft/sec)	19.6			
Average Gas Flow Rate in Dilution Tunnel (dscf/hr)	13139.3			
Average Gas Meter Temperature (°F)	67.0	94.4	93.8	82.5
Total Sample Volume (dscf)	70.681	50.076	47.706	8.379
Average Tunnel Temperature (°F)	83.3			
Total Time of Test (min)	334			
Total Particulate Catch (mg)	0.1	6.9	6.2	3.7
Particulate Concentration, dry-standard (g/dscf)	0.0000014	0.0001378	0.0001300	0.0004416
Total PM Emissions (g)	0.10	9.97	9.40	5.78
Particulate Emission Rate (g/hr)	0.02	1.79	1.69	5.78
Emissions Factor (g/kg)	-	1.96	1.85	-
Difference from Average Total Particulate Emissions (g)	-	0.29	0.29	-
Difference from Average Total Particulate Emissions (%)	-	3.0%	3.0%	
Difference from Average Emissions Factor (g/kg)	-	0.06	0.06	-

Final Average Results	
Total Particulate Emissions (g)	9.69
Particulate Emission Rate (g/hr)	1.74
Emissions Factor (g/kg)	1.90
HHV Efficiency (%)	79.4%
LHV Efficiency (%)	85.9%
CO Emissions (g/min)	0.63

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	76.3	OK
Face Velocity	< 30 ft/min	8.6	OK
Leakage Rate	Less than 4% of average sample rate	0 cfm	OK
Ambient Temp	55-90 °F	Min:65.8/Max:68.3	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	81.4	OK

B415.1 Efficiency Results

Manufacturer:	Sherwood
Model:	Ironwood 2.0-1
Date:	12/22/25
Run:	2
Control #:	25-470
Test Duration:	334
Output Category:	2

Test Results in Accordance with CSA B415.1-09

	HHV Basis	LHV Basis
Overall Efficiency	79.4%	85.9%
Combustion Efficiency	97.3%	97.3%
Heat Transfer Efficiency	81.6%	88.2%

Output Rate (kJ/h)	14,418	13,677	**(Btu/h)**
Burn Rate (kg/h)	0.92	2.02	**(lb/h)**
Input (kJ/h)	18,149	17,216	**(Btu/h)**

Test Load Weight (dry kg)	5.10	11.24	**dry lb**
MC wet (%)	17.11		
MC dry (%)	20.64		
Particulate (g)	9.69		
CO (g)	209		
Test Duration (h)	5.57		

Emissions	**Particulate**	**CO**
g/MJ Output	0.12	2.61
g/kg Dry Fuel	1.90	41.08
g/h	1.74	37.63
g/min	0.03	0.63
lb/MM Btu Output	0.28	6.07

Air/Fuel Ratio (A/F)	14.33

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

WOODSTOVE FUEL DATA - ASTM E2780

Client: Sherwood
Model: Ironwood 2.0-1
Run #: 2

Job #: 25-470
Tracking #: 243
Technician: AK
Date: 12/22/2025

Preburn Fuel Information

Size	Length (in)	Moisture Content (% DB)	Size	Length (in)	Moisture Content (% DB)
2x4	12.00	19.6			
2x4	12.00	19.9			
2x4	12.00	24.6			
2x4	12.00	20.4			
2x4	12.00	21.5			
2x4	12.00	21.7			

Total Fuel Weight (lbs): 8.16
Average Moisture (%DB): 21.3

Firebox Volume (ft^3): 1.80
Total 2x4 Crib Weight, with spacers (lbs): 5.65
Total 4x4 Crib Weight, with spacers (lbs): 7.80
Total Wet Fuel Weight, with spacers (lbs): 13.45

Coal Bed Range (20-25%):
Min (lbs): 2.69
Max (lbs): 3.36

Test Fuel Information

Size	Length (in)	Weight (lbs)	Moisture Content (%DB)			Dry Weight (lbs)
4x4	16.00	3.86	19.6	21.7	23.3	3.18
4x4	16.00	3.64	21.3	19.0	24.5	2.99
2x4	16.00	1.48	19.5	19.4	21.1	1.23
2x4	16.00	1.46	20.9	19.0	21.5	1.21
2x4	16.00	1.55	19.3	19.9	19.6	1.30

Total Dry Weight, no spacers (lbs): 9.91
Total Dry Weight, with spacers (lbs): 11.22

Spacer Moisture Readings (%DB)

11.7	11.1						
11.0	13.3						
10.2	12.8						
11.5	10.9						
12.0	11.0						
13.7	12.5						
12.8	11.3						
13.6	10.2						

Quality Checks	Requirement	Observed	Result
Fuel Density	25 - 36 (lbs/ft^3, DB)	26.6	OK
Loading Density	6.3 - 7.7 (lbs/ft^3, WB)	7.47	OK
2x4 Fuel Mix	35 - 65 % of total weight	42%	OK

DILUTION TUNNEL & MISC. DATA - ASTM E2780 / E2515

Client:	Sherwood	Job #:	25-470
Model:	Ironwood 2.0-1	Tracking #:	243
Run #:	2	Technician:	AK
Test Start Time:	13:23	Date:	12/22/2025

Total Sampling Time (min):	334	
Recording Interval (min):	1	
Meter Box γ Factor:	1.021	(A)
Meter Box γ Factor:	1.001	(B)
Meter Box γ Factor:	1.001	(C)
Meter Box γ Factor:	0.999	(Ambient)

	Pre-Test	Post Test	Avg.
Barometric Pressure (in. Hg)	29.74	29.72	29.73
Relative Humidity (%)	36.9	32.8	
Room Air Velocity (ft/min)	<50	<50	
Pitot Tube Leak Check	0	0	
Ambient Sample Volume:		71.103	ft^3

Induced Draft Check (in. H_2O):	0
Smoke Capture Check (%):	100%
Date Flue Pipe Last Cleaned:	12/17/2025
Test Fuel Scale Audit (lbs)	10.00
Platform Scale Audit (lbs)	10.0

Sample Train Leak Checks

	Pre-test	Post-test			
(A)	0.000	0.000	cfm @	-6	in. Hg
(B)	0.000	0.000	cfm @	-6	in. Hg
(C)	0.000	0.000	cfm @	-7	in. Hg
(Ambient)	0.000	0.000	cfm @	-12	in. Hg

DILUTION TUNNEL FLOW

Traverse Data

Point	dP (in H_2O)	Temp (°F)
1	0.058	66
2	0.094	66
3	0.096	66
4	0.068	66
5	0.074	66
6	0.104	66
7	0.106	66
8	0.064	66
Center	0.091	66

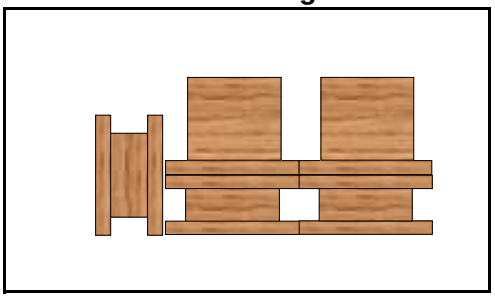
Dilution Tunnel H_2O:	2.00	percent
Tunnel Diameter:	6	inches
Pitot Tube Cp:	0.99	[unitless]
Dilution Tunnel MW(dry):	29.00	lb/lb-mole
Dilution Tunnel MW(wet):	28.78	lb/lb-mole
Tunnel Area:	0.1963	ft^2
V_{strav}:	19.01	ft/sec
V_{scent}:	20.02	ft/sec
F_p:	0.949	[ratio]
Initial Tunnel Flow:	218.8	scf/min

Static Pressure: -0.160 in. H_2O

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)	20.6

WOODSTOVE PREBURN DATA - ASTM E2780

Client: Sherwood
Model: Ironwood 2.0-1
Run #: 2

Job #: 25-470
Tracking #: 243
Technician: AK
Date: 12/22/2025

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	5.82	-0.085	624	636	521	527	517	565.0	583	70
1	5.63	-0.077	623	634	520	521	519	563.3	469	69
2	5.51	-0.075	620	632	514	510	521	559.5	417	69
3	5.42	-0.072	617	628	506	498	523	554.3	389	69
4	5.32	-0.071	613	623	499	483	525	548.6	370	69
5	5.23	-0.071	608	618	490	472	528	543.1	357	69
6	5.15	-0.068	603	612	482	458	529	536.9	348	69
7	5.06	-0.067	598	606	473	449	531	531.3	338	68
8	4.98	-0.066	593	600	465	438	532	525.6	333	68
9	4.90	-0.066	587	594	457	428	533	520.1	327	68
10	4.81	-0.065	582	588	450	420	534	514.8	322	68
11	4.73	-0.063	577	583	443	412	534	509.6	316	68
12	4.65	-0.065	572	577	437	405	534	504.8	313	68
13	4.55	-0.064	567	572	431	398	533	500.1	309	68
14	4.47	-0.063	561	567	426	393	532	495.8	305	68
15	4.39	-0.060	556	562	421	387	531	491.4	305	68
16	4.30	-0.063	552	557	417	384	530	487.8	304	68
17	4.21	-0.062	548	553	412	382	529	484.5	302	68
18	4.13	-0.062	544	548	409	380	527	481.4	300	68
19	4.04	-0.060	539	544	405	379	525	478.6	298	68
20	3.96	-0.064	535	540	402	378	524	476.0	299	68
21	3.87	-0.058	532	537	399	379	522	473.6	295	68
22	3.79	-0.059	528	534	397	378	520	471.2	293	68
23	3.73	-0.057	525	530	394	376	518	468.7	290	68
24	3.67	-0.058	522	528	392	375	516	466.5	287	68
25	3.61	-0.054	519	525	390	374	514	464.2	284	68
26	3.55	-0.056	516	522	387	373	512	462.1	282	68
27	3.49	-0.057	513	520	385	370	510	459.6	281	68
28	3.45	-0.056	511	518	384	368	508	457.4	277	68
29	3.42	-0.053	508	515	381	365	506	455.1	272	68
30	3.39	-0.053	506	513	380	362	503	452.6	268	68
31	3.35	-0.053	503	510	378	359	501	450.3	265	68
32	3.32	-0.050	500	508	375	356	499	447.6	261	68
33	3.28	-0.052	498	505	374	352	497	445.1	257	68
34	3.26	-0.050	495	503	371	348	495	442.3	255	68
35	3.24	-0.049	492	501	369	345	493	439.7	252	68
36	3.21	-0.051	489	499	366	340	490	436.7	250	68
37	3.18	-0.046	486	496	364	335	489	433.9	247	68
38	3.15	-0.048	483	494	361	331	487	431.0	246	68
39	3.12	-0.050	479	492	359	326	485	428.0	243	68
40	3.10	-0.048	476	489	357	320	483	425.1	239	68
41	3.08	-0.047	473	487	354	317	482	422.5	236	68
42	3.06	-0.046	469	484	352	311	480	419.3	233	68
43	3.05	-0.046	466	482	350	306	479	416.6	228	68
44	3.02	-0.045	463	479	347	302	478	413.7	226	68

WOODSTOVE PREBURN DATA - ASTM E2780

Client: Sherwood
Model: Ironwood 2.0-1
Run #: 2

Job #: 25-470
Tracking #: 243
Technician: AK
Date: 12/22/2025

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	3.01	-0.047	460	476	345	297	476	410.8	222	67
46	3.00	-0.045	456	473	342	292	475	407.6	219	67
47	2.99	-0.043	453	469	339	287	474	404.6	218	67
48	2.97	-0.041	450	466	337	283	473	401.6	215	68
49	2.96	-0.041	446	462	334	278	472	398.4	213	68
50	2.95	-0.042	443	458	331	273	471	395.3	211	67
51	2.93	-0.041	440	455	328	269	470	392.4	208	67
52	2.91	-0.040	437	451	325	265	470	389.5	208	67
53	2.90	-0.039	434	448	323	260	469	386.8	205	67
54	2.89	-0.040	431	445	321	257	468	384.3	204	67
55	2.88	-0.041	428	441	318	253	468	381.8	201	67
56	2.86	-0.038	426	438	316	250	467	379.3	201	67
57	2.86	-0.039	423	435	314	246	467	376.7	196	67
58	2.85	-0.037	420	432	311	242	466	374.3	193	67
59	2.83	-0.040	417	429	309	239	466	372.0	191	67
60	2.82	-0.038	415	426	307	236	465	369.8	189	67

BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: Sherwood
Model: Ironwood 2.0-1
Run #: 2

Job #: 25-470
Tracking #: 243
Technician: AK
Date: 12/22/2025

	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		0.091	0.01	73	0.1		13.56		95	279	71	67
1	0.121	0.121	0.093	2.07	73	0.9	-	13.52	-0.04	101	289	72	68
2	0.259	0.138	0.095	2.10	73	0.9	-	13.37	-0.15	100	305	73	68
3	0.407	0.148	0.094	2.12	73	1.0	-	13.20	-0.17	101	347	73	68
4	0.549	0.142	0.092	2.13	73	1.0	-	13.02	-0.18	102	388	73	68
5	0.695	0.146	0.092	2.14	73	1.0	-	12.90	-0.12	102	384	73	68
6	0.838	0.143	0.094	2.16	73	1.0	-	12.84	-0.06	99	347	73	68
7	0.983	0.145	0.095	2.18	73	1.0	-	12.78	-0.06	96	319	73	68
8	1.129	0.146	0.094	2.18	74	1.0	-	12.71	-0.07	94	307	73	68
9	1.274	0.145	0.092	2.19	74	1.0	-	12.65	-0.06	93	300	73	68
10	1.422	0.148	0.093	2.21	74	1.0	98	12.59	-0.06	92	294	74	68
11	1.567	0.145	0.093	2.23	74	1.0	-	12.53	-0.06	92	295	74	68
12	1.717	0.150	0.095	2.26	74	1.0	-	12.47	-0.06	92	293	74	67
13	1.861	0.144	0.095	2.27	75	1.0	-	12.39	-0.08	92	294	74	67
14	2.013	0.152	0.093	2.28	75	1.0	-	12.32	-0.07	92	295	74	67
15	2.159	0.146	0.092	2.29	75	1.0	-	12.24	-0.08	92	293	74	67
16	2.312	0.153	0.093	2.30	75	1.0	-	12.14	-0.10	92	295	74	67
17	2.458	0.146	0.094	2.31	76	1.0	-	12.08	-0.06	92	295	74	67
18	2.612	0.154	0.094	2.32	76	1.0	-	12.00	-0.08	92	296	74	67
19	2.759	0.147	0.094	2.33	76	1.0	-	11.91	-0.09	92	298	74	68
20	2.914	0.155	0.094	2.33	76	1.0	101	11.85	-0.06	92	301	74	67
21	3.062	0.148	0.095	2.33	77	1.0	-	11.77	-0.08	92	300	74	68
22	3.217	0.155	0.091	2.36	77	1.0	-	11.68	-0.09	92	300	74	68
23	3.366	0.149	0.091	2.37	77	1.0	-	11.59	-0.09	92	299	75	68
24	3.521	0.155	0.095	2.37	78	1.0	-	11.51	-0.08	92	301	75	67
25	3.671	0.150	0.092	2.38	78	1.0	-	11.43	-0.08	92	300	75	68
26	3.826	0.155	0.092	2.38	78	1.0	-	11.34	-0.09	92	297	74	68
27	3.975	0.149	0.094	2.38	79	1.0	-	11.27	-0.07	92	298	74	68
28	4.130	0.155	0.093	2.38	79	1.0	-	11.18	-0.09	92	299	75	68
29	4.282	0.152	0.095	2.37	79	1.0	-	11.11	-0.07	92	297	75	68
30	4.436	0.154	0.095	2.40	80	1.0	102	11.03	-0.08	92	298	75	68
31	4.592	0.156	0.093	2.41	80	1.0	-	10.91	-0.12	92	297	75	68

BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: Sherwood
Model: Ironwood 2.0-1
Run #: 2

Job #: 25-470
Tracking #: 243
Technician: AK
Date: 12/22/2025

	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	4.744	0.152	0.094	2.40	80	1.0	-	10.81	-0.10	91	296	75	68
33	4.900	0.156	0.094	2.41	81	1.0	-	10.72	-0.09	91	293	75	68
34	5.050	0.150	0.094	2.41	81	1.0	-	10.62	-0.10	91	292	75	68
35	5.208	0.158	0.092	2.41	82	1.0	-	10.54	-0.08	91	291	75	68
36	5.359	0.151	0.094	2.41	82	1.0	-	10.44	-0.10	91	290	75	67
37	5.517	0.158	0.094	2.42	82	1.0	-	10.33	-0.11	90	288	75	67
38	5.670	0.153	0.094	2.42	83	1.0	-	10.23	-0.10	91	286	75	67
39	5.825	0.155	0.094	2.42	83	1.0	-	10.12	-0.11	91	284	75	68
40	5.979	0.154	0.094	2.42	83	1.0	103	10.02	-0.10	90	284	75	67
41	6.134	0.155	0.094	2.42	84	1.0	-	9.91	-0.11	90	284	75	67
42	6.291	0.157	0.093	2.42	84	1.0	-	9.80	-0.11	90	283	75	67
43	6.444	0.153	0.094	2.41	84	1.1	-	9.71	-0.09	90	282	75	68
44	6.601	0.157	0.094	2.42	84	1.1	-	9.61	-0.10	90	282	74	68
45	6.753	0.152	0.093	2.43	85	1.0	-	9.51	-0.10	90	280	74	68
46	6.911	0.158	0.094	2.42	85	1.1	-	9.42	-0.09	90	278	75	68
47	7.064	0.153	0.093	2.43	85	1.0	-	9.31	-0.11	90	278	74	68
48	7.222	0.158	0.094	2.42	86	1.1	-	9.21	-0.10	89	277	74	68
49	7.373	0.151	0.093	2.41	86	1.1	-	9.13	-0.08	89	277	74	68
50	7.530	0.157	0.094	2.40	86	1.1	103	9.04	-0.09	89	277	74	68
51	7.686	0.156	0.094	2.41	87	1.1	-	8.96	-0.08	89	274	74	68
52	7.840	0.154	0.094	2.41	87	1.1	-	8.87	-0.09	89	275	74	68
53	7.998	0.158	0.094	2.41	87	1.1	-	8.77	-0.10	89	273	74	68
54	8.149	0.151	0.093	2.42	87	1.1	-	8.69	-0.08	89	274	74	68
55	8.307	0.158	0.093	2.40	88	1.1	-	8.61	-0.08	89	274	74	68
56	8.460	0.153	0.094	2.40	88	1.1	-	8.51	-0.10	88	274	74	68
57	8.618	0.158	0.095	2.40	88	1.1	-	8.42	-0.09	88	274	74	68
58	8.770	0.152	0.093	2.39	88	1.2	-	8.35	-0.07	88	274	74	68
59	8.925	0.155	0.094	2.39	89	1.1	-	8.28	-0.07	88	274	74	68
60	9.079	0.154	0.094	2.38	89	1.2	102	8.19	-0.09	88	272	74	68
61	9.235	0.156	0.093	2.39	89	1.1	-	8.12	-0.07	88	271	74	68
62	9.391	0.156	0.093	2.39	89	1.1	-	8.05	-0.07	88	270	74	68
63	9.544	0.153	0.094	2.39	89	1.2	-	7.97	-0.08	88	270	74	68

BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: Sherwood
Model: Ironwood 2.0-1
Run #: 2

Job #: 25-470
Tracking #: 243
Technician: AK
Date: 12/22/2025

	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	9.699	0.155	0.095	2.39	90	1.2	-	7.91	-0.06	87	270	74	68
65	9.851	0.152	0.094	2.38	90	1.2	-	7.84	-0.07	87	269	74	68
66	10.009	0.158	0.095	2.38	90	1.2	-	7.77	-0.07	87	268	74	68
67	10.162	0.153	0.096	2.38	90	1.2	-	7.71	-0.06	87	267	74	68
68	10.319	0.157	0.092	2.39	91	1.2	-	7.64	-0.07	87	267	74	68
69	10.470	0.151	0.094	2.38	91	1.2	-	7.58	-0.06	87	266	74	68
70	10.626	0.156	0.094	2.39	91	1.2	102	7.51	-0.07	87	264	74	68
71	10.780	0.154	0.095	2.37	91	1.2	-	7.45	-0.06	87	263	74	68
72	10.936	0.156	0.095	2.39	91	1.2	-	7.37	-0.08	87	263	74	68
73	11.092	0.156	0.093	2.38	92	1.2	-	7.32	-0.05	87	262	74	68
74	11.244	0.152	0.094	2.38	92	1.2	-	7.26	-0.06	87	262	74	68
75	11.401	0.157	0.094	2.38	92	1.2	-	7.20	-0.06	87	262	74	68
76	11.552	0.151	0.094	2.37	92	1.2	-	7.13	-0.07	87	262	74	68
77	11.711	0.159	0.093	2.38	92	1.2	-	7.07	-0.06	87	262	74	68
78	11.863	0.152	0.094	2.38	92	1.2	-	7.00	-0.07	87	262	74	68
79	12.020	0.157	0.093	2.38	93	1.2	-	6.93	-0.07	87	262	74	68
80	12.173	0.153	0.094	2.39	93	1.2	101	6.87	-0.06	86	261	74	68
81	12.328	0.155	0.094	2.37	93	1.2	-	6.80	-0.07	86	261	74	68
82	12.484	0.156	0.094	2.37	93	1.2	-	6.75	-0.05	86	261	74	68
83	12.638	0.154	0.095	2.37	93	1.2	-	6.67	-0.08	86	260	74	68
84	12.795	0.157	0.094	2.38	93	1.2	-	6.60	-0.07	86	260	74	68
85	12.947	0.152	0.095	2.38	93	1.2	-	6.53	-0.07	86	260	74	68
86	13.104	0.157	0.094	2.38	94	1.2	-	6.46	-0.07	86	258	74	68
87	13.257	0.153	0.094	2.38	94	1.2	-	6.40	-0.06	86	259	74	68
88	13.415	0.158	0.094	2.38	94	1.3	-	6.33	-0.07	86	258	74	68
89	13.567	0.152	0.094	2.38	94	1.2	-	6.28	-0.05	86	257	74	68
90	13.724	0.157	0.095	2.39	94	1.2	101	6.20	-0.08	86	258	74	68
91	13.878	0.154	0.094	2.38	94	1.2	-	6.12	-0.08	86	259	74	68
92	14.034	0.156	0.094	2.38	94	1.2	-	6.06	-0.06	86	260	74	68
93	14.191	0.157	0.094	2.38	95	1.2	-	5.99	-0.07	86	259	74	68
94	14.342	0.151	0.093	2.38	95	1.2	-	5.94	-0.05	86	258	74	68
95	14.501	0.159	0.094	2.38	95	1.2	-	5.86	-0.08	86	259	74	68

BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: Sherwood
Model: Ironwood 2.0-1
Run #: 2

Job #: 25-470
Tracking #: 243
Technician: AK
Date: 12/22/2025

	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	14.653	0.152	0.094	2.39	95	1.2	-	5.80	-0.06	86	259	74	68
97	14.812	0.159	0.094	2.38	95	1.3	-	5.74	-0.06	86	258	74	68
98	14.965	0.153	0.093	2.38	95	1.2	-	5.67	-0.07	86	258	74	68
99	15.120	0.155	0.094	2.38	95	1.2	-	5.61	-0.06	86	256	74	68
100	15.275	0.155	0.094	2.38	95	1.2	101	5.54	-0.07	86	256	74	68
101	15.431	0.156	0.093	2.38	95	1.3	-	5.48	-0.06	86	255	74	68
102	15.588	0.157	0.094	2.39	95	1.2	-	5.44	-0.04	86	255	74	68
103	15.741	0.153	0.094	2.38	96	1.3	-	5.39	-0.05	86	255	74	68
104	15.899	0.158	0.095	2.39	96	1.2	-	5.31	-0.08	86	255	74	68
105	16.051	0.152	0.094	2.38	96	1.2	-	5.26	-0.05	85	253	74	68
106	16.210	0.159	0.095	2.39	96	1.2	-	5.20	-0.06	85	253	74	68
107	16.364	0.154	0.093	2.39	96	1.2	-	5.15	-0.05	85	252	74	68
108	16.520	0.156	0.093	2.38	96	1.2	-	5.09	-0.06	85	252	74	68
109	16.674	0.154	0.094	2.37	96	1.3	-	5.03	-0.06	85	252	74	68
110	16.831	0.157	0.094	2.39	96	1.2	101	4.98	-0.05	85	253	74	68
111	16.988	0.157	0.093	2.38	96	1.2	-	4.92	-0.06	85	252	74	68
112	17.140	0.152	0.095	2.38	96	1.2	-	4.87	-0.05	85	252	74	68
113	17.299	0.159	0.094	2.39	96	1.2	-	4.82	-0.05	85	251	74	68
114	17.452	0.153	0.093	2.38	96	1.2	-	4.74	-0.08	85	250	74	68
115	17.611	0.159	0.094	2.38	97	1.2	-	4.68	-0.06	85	250	74	68
116	17.764	0.153	0.095	2.38	97	1.2	-	4.64	-0.04	85	250	74	68
117	17.921	0.157	0.093	2.39	97	1.2	-	4.59	-0.05	85	249	74	68
118	18.076	0.155	0.095	2.39	97	1.2	-	4.53	-0.06	85	249	74	68
119	18.232	0.156	0.095	2.39	97	1.2	-	4.49	-0.04	85	248	74	68
120	18.390	0.158	0.094	2.38	97	1.2	101	4.45	-0.04	84	245	73	68
121	18.541	0.151	0.095	2.39	97	1.2	-	4.42	-0.03	84	241	74	68
122	18.700	0.159	0.094	2.38	97	1.3	-	4.38	-0.04	84	240	73	68
123	18.854	0.154	0.095	2.39	97	1.2	-	4.34	-0.04	84	240	73	68
124	19.013	0.159	0.095	2.39	97	1.2	-	4.30	-0.04	84	241	73	68
125	19.165	0.152	0.094	2.40	97	1.2	-	4.27	-0.03	84	240	73	68
126	19.322	0.157	0.093	2.39	97	1.2	-	4.22	-0.05	84	240	73	68
127	19.479	0.157	0.093	2.38	97	1.2	-	4.19	-0.03	84	239	73	68

BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: Sherwood
Model: Ironwood 2.0-1
Run #: 2

Job #: 25-470
Tracking #: 243
Technician: AK
Date: 12/22/2025

	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	19.634	0.155	0.093	2.39	97	1.2	-	4.15	-0.04	84	240	73	68
129	19.791	0.157	0.094	2.39	97	1.2	-	4.13	-0.02	84	236	73	68
130	19.944	0.153	0.092	2.39	97	1.3	101	4.08	-0.05	84	237	73	68
131	20.103	0.159	0.095	2.38	97	1.2	-	4.04	-0.04	84	237	73	68
132	20.256	0.153	0.093	2.38	98	1.2	-	4.02	-0.02	84	236	73	68
133	20.414	0.158	0.095	2.38	98	1.2	-	3.99	-0.03	84	237	73	68
134	20.568	0.154	0.093	2.40	98	1.3	-	3.95	-0.04	84	237	73	68
135	20.725	0.157	0.093	2.38	98	1.3	-	3.93	-0.02	83	237	73	68
136	20.882	0.157	0.094	2.38	98	1.2	-	3.90	-0.03	83	238	73	68
137	21.036	0.154	0.095	2.39	98	1.2	-	3.87	-0.03	83	238	73	68
138	21.194	0.158	0.096	2.39	98	1.2	-	3.84	-0.03	83	237	73	68
139	21.346	0.152	0.093	2.38	98	1.2	-	3.79	-0.05	83	236	73	68
140	21.506	0.160	0.093	2.39	98	1.2	102	3.76	-0.03	83	239	73	68
141	21.659	0.153	0.095	2.38	98	1.2	-	3.74	-0.02	83	238	73	68
142	21.815	0.156	0.095	2.38	98	1.2	-	3.71	-0.03	83	237	73	68
143	21.970	0.155	0.094	2.37	98	1.2	-	3.68	-0.03	83	235	73	68
144	22.127	0.157	0.094	2.37	98	1.2	-	3.65	-0.03	83	231	73	68
145	22.284	0.157	0.097	2.38	98	1.3	-	3.62	-0.03	83	233	73	68
146	22.436	0.152	0.094	2.39	98	1.2	-	3.60	-0.02	83	232	73	67
147	22.595	0.159	0.094	2.38	98	1.3	-	3.56	-0.04	83	230	73	67
148	22.747	0.152	0.092	2.37	98	1.3	-	3.55	-0.01	83	228	73	67
149	22.906	0.159	0.095	2.37	98	1.2	-	3.52	-0.03	83	228	73	67
150	23.060	0.154	0.095	2.38	98	1.3	100	3.50	-0.02	83	227	73	67
151	23.216	0.156	0.095	2.37	98	1.3	-	3.48	-0.02	83	225	73	67
152	23.370	0.154	0.094	2.36	98	1.3	-	3.44	-0.04	82	224	73	67
153	23.527	0.157	0.095	2.37	98	1.3	-	3.42	-0.02	82	223	73	67
154	23.684	0.157	0.096	2.37	98	1.2	-	3.40	-0.02	82	220	73	67
155	23.836	0.152	0.094	2.36	98	1.3	-	3.37	-0.03	82	219	73	67
156	23.994	0.158	0.095	2.37	98	1.2	-	3.35	-0.02	82	217	73	67
157	24.146	0.152	0.093	2.36	98	1.3	-	3.32	-0.03	82	218	73	67
158	24.305	0.159	0.093	2.37	98	1.3	-	3.30	-0.02	82	215	73	67
159	24.458	0.153	0.095	2.36	98	1.3	-	3.26	-0.04	82	216	73	67

BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: Sherwood
Model: Ironwood 2.0-1
Run #: 2

Job #: 25-470
Tracking #: 243
Technician: AK
Date: 12/22/2025

	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	24.614	0.156	0.095	2.37	98	1.3	99	3.24	-0.02	82	215	73	67
161	24.768	0.154	0.094	2.36	98	1.3	-	3.21	-0.03	82	213	73	67
162	24.924	0.156	0.095	2.35	98	1.3	-	3.19	-0.02	82	212	73	67
163	25.081	0.157	0.093	2.35	98	1.3	-	3.15	-0.04	82	213	73	67
164	25.234	0.153	0.094	2.36	99	1.3	-	3.13	-0.02	82	214	73	67
165	25.391	0.157	0.094	2.36	99	1.3	-	3.10	-0.03	82	214	73	67
166	25.542	0.151	0.095	2.35	99	1.3	-	3.08	-0.02	82	213	73	67
167	25.701	0.159	0.095	2.35	99	1.3	-	3.05	-0.03	81	213	73	67
168	25.853	0.152	0.094	2.34	99	1.3	-	3.03	-0.02	81	213	73	67
169	26.010	0.157	0.092	2.35	99	1.3	-	2.98	-0.05	81	212	73	67
170	26.162	0.152	0.096	2.34	99	1.3	99	2.95	-0.03	82	213	72	67
171	26.318	0.156	0.096	2.34	99	1.3	-	2.92	-0.03	82	216	73	67
172	26.474	0.156	0.095	2.34	99	1.3	-	2.89	-0.03	82	218	73	67
173	26.627	0.153	0.094	2.34	99	1.3	-	2.85	-0.04	82	219	73	67
174	26.784	0.157	0.094	2.34	99	1.3	-	2.81	-0.04	82	219	73	67
175	26.934	0.150	0.095	2.33	99	1.3	-	2.76	-0.05	82	221	73	67
176	27.092	0.158	0.094	2.33	99	1.3	-	2.72	-0.04	82	222	73	67
177	27.243	0.151	0.095	2.33	99	1.3	-	2.67	-0.05	82	223	72	67
178	27.401	0.158	0.095	2.32	99	1.3	-	2.62	-0.05	82	226	73	67
179	27.552	0.151	0.093	2.31	99	1.4	-	2.58	-0.04	82	229	73	67
180	27.708	0.156	0.094	2.31	99	1.4	99	2.53	-0.05	82	232	72	67
181	27.859	0.151	0.093	2.31	99	1.4	-	2.52	-0.01	82	232	72	67
182	28.014	0.155	0.092	2.30	99	1.4	-	2.47	-0.05	82	233	72	67
183	28.166	0.152	0.095	2.29	99	1.4	-	2.42	-0.05	82	234	72	67
184	28.320	0.154	0.094	2.29	99	1.4	-	2.38	-0.04	82	233	72	67
185	28.475	0.155	0.095	2.30	99	1.4	-	2.34	-0.04	82	235	72	67
186	28.626	0.151	0.096	2.28	99	1.4	-	2.30	-0.04	82	234	72	67
187	28.781	0.155	0.094	2.29	99	1.4	-	2.26	-0.04	82	235	72	67
188	28.931	0.150	0.094	2.29	99	1.4	-	2.23	-0.03	82	236	72	67
189	29.085	0.154	0.094	2.28	99	1.4	-	2.20	-0.03	82	235	72	67
190	29.236	0.151	0.096	2.28	99	1.4	98	2.18	-0.02	82	232	72	67
191	29.391	0.155	0.093	2.28	99	1.4	-	2.16	-0.02	82	230	72	67

BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: Sherwood
Model: Ironwood 2.0-1
Run #: 2

Job #: 25-470
Tracking #: 243
Technician: AK
Date: 12/22/2025

	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	29.540	0.149	0.093	2.28	99	1.4	-	2.12	-0.04	82	230	72	67
193	29.697	0.157	0.093	2.28	99	1.4	-	2.10	-0.02	82	230	72	67
194	29.847	0.150	0.095	2.29	99	1.4	-	2.08	-0.02	82	227	72	67
195	30.003	0.156	0.095	2.27	99	1.4	-	2.05	-0.03	82	223	72	67
196	30.153	0.150	0.094	2.28	99	1.4	-	2.03	-0.02	81	220	72	67
197	30.307	0.154	0.094	2.29	99	1.4	-	2.01	-0.02	81	218	72	67
198	30.457	0.150	0.094	2.28	99	1.4	-	1.99	-0.02	81	215	72	67
199	30.612	0.155	0.095	2.29	99	1.4	-	1.97	-0.02	81	214	72	67
200	30.764	0.152	0.094	2.28	99	1.4	98	1.94	-0.03	81	210	72	67
201	30.918	0.154	0.094	2.35	99	1.4	-	1.94	0.00	81	209	72	67
202	31.074	0.156	0.091	2.35	99	1.4	-	1.91	-0.03	81	206	72	67
203	31.228	0.154	0.093	2.35	99	1.4	-	1.89	-0.02	81	204	72	67
204	31.384	0.156	0.095	2.35	99	1.4	-	1.87	-0.02	81	202	72	67
205	31.536	0.152	0.095	2.34	99	1.4	-	1.86	-0.01	81	201	72	67
206	31.694	0.158	0.095	2.34	99	1.4	-	1.83	-0.03	80	199	72	67
207	31.846	0.152	0.096	2.34	99	1.4	-	1.82	-0.01	80	199	72	67
208	32.005	0.159	0.095	2.35	99	1.4	-	1.80	-0.02	80	197	72	67
209	32.156	0.151	0.094	2.34	99	1.4	-	1.79	-0.01	80	194	72	67
210	32.312	0.156	0.092	2.35	99	1.4	100	1.77	-0.02	80	193	72	67
211	32.468	0.156	0.094	2.35	99	1.4	-	1.75	-0.02	80	193	72	67
212	32.622	0.154	0.096	2.36	99	1.4	-	1.73	-0.02	80	193	72	67
213	32.780	0.158	0.093	2.36	99	1.4	-	1.71	-0.02	80	193	72	67
214	32.930	0.150	0.095	2.35	99	1.4	-	1.69	-0.02	80	192	72	67
215	33.088	0.158	0.094	2.35	99	1.4	-	1.68	-0.01	80	192	72	67
216	33.241	0.153	0.095	2.35	99	1.4	-	1.66	-0.02	80	193	72	67
217	33.399	0.158	0.094	2.35	99	1.4	-	1.64	-0.02	80	193	72	67
218	33.552	0.153	0.095	2.35	99	1.4	-	1.62	-0.02	80	193	72	67
219	33.707	0.155	0.094	2.36	99	1.4	-	1.61	-0.01	80	192	72	67
220	33.861	0.154	0.094	2.34	99	1.4	100	1.60	-0.01	80	193	72	67
221	34.018	0.157	0.095	2.35	99	1.4	-	1.58	-0.02	80	193	72	67
222	34.174	0.156	0.095	2.34	99	1.4	-	1.56	-0.02	80	194	72	67
223	34.327	0.153	0.094	2.36	99	1.4	-	1.55	-0.01	80	194	72	67

BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: Sherwood
Model: Ironwood 2.0-1
Run #: 2

Job #: 25-470
Tracking #: 243
Technician: AK
Date: 12/22/2025

	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	34.484	0.157	0.095	2.36	99	1.4	-	1.52	-0.03	80	193	72	67
225	34.636	0.152	0.094	2.35	99	1.4	-	1.52	0.00	80	191	72	67
226	34.795	0.159	0.094	2.35	99	1.4	-	1.50	-0.02	80	191	72	67
227	34.948	0.153	0.094	2.35	99	1.4	-	1.49	-0.01	80	189	72	67
228	35.104	0.156	0.095	2.36	99	1.4	-	1.48	-0.01	80	190	72	67
229	35.258	0.154	0.092	2.35	99	1.4	-	1.46	-0.02	80	189	72	67
230	35.414	0.156	0.095	2.35	99	1.4	99	1.44	-0.02	80	188	72	67
231	35.570	0.156	0.094	2.36	99	1.4	-	1.44	0.00	80	187	72	67
232	35.724	0.154	0.093	2.36	99	1.4	-	1.42	-0.02	80	187	72	66
233	35.880	0.156	0.094	2.35	99	1.4	-	1.40	-0.02	79	187	72	67
234	36.032	0.152	0.095	2.36	99	1.4	-	1.39	-0.01	79	186	72	67
235	36.191	0.159	0.095	2.35	99	1.4	-	1.38	-0.01	79	186	72	67
236	36.344	0.153	0.095	2.35	99	1.4	-	1.36	-0.02	80	186	72	67
237	36.502	0.158	0.094	2.35	99	1.4	-	1.35	-0.01	80	187	72	67
238	36.653	0.151	0.094	2.35	99	1.4	-	1.34	-0.01	80	188	72	66
239	36.810	0.157	0.095	2.35	99	1.4	-	1.32	-0.02	79	187	72	66
240	36.966	0.156	0.093	2.35	99	1.4	99	1.31	-0.01	79	187	72	66
241	37.120	0.154	0.094	2.34	99	1.4	-	1.30	-0.01	79	187	72	67
242	37.277	0.157	0.095	2.35	99	1.4	-	1.29	-0.01	79	185	71	66
243	37.429	0.152	0.095	2.36	99	1.4	-	1.28	-0.01	79	184	72	67
244	37.587	0.158	0.095	2.35	99	1.4	-	1.26	-0.02	79	183	72	67
245	37.740	0.153	0.095	2.36	99	1.4	-	1.25	-0.01	79	184	72	66
246	37.898	0.158	0.095	2.35	99	1.4	-	1.23	-0.02	79	184	72	66
247	38.050	0.152	0.094	2.36	99	1.4	-	1.22	-0.01	79	184	72	66
248	38.207	0.157	0.095	2.36	99	1.4	-	1.19	-0.03	79	182	71	66
249	38.361	0.154	0.094	2.35	99	1.4	-	1.18	-0.01	79	183	71	66
250	38.517	0.156	0.095	2.36	99	1.4	99	1.18	0.00	79	183	71	66
251	38.674	0.157	0.094	2.36	99	1.4	-	1.16	-0.02	78	182	71	66
252	38.825	0.151	0.093	2.35	99	1.4	-	1.14	-0.02	78	181	71	66
253	38.983	0.158	0.095	2.36	99	1.4	-	1.15	0.01	78	181	71	66
254	39.135	0.152	0.093	2.36	99	1.4	-	1.13	-0.02	79	181	71	66
255	39.294	0.159	0.095	2.35	99	1.4	-	1.11	-0.02	79	182	71	66

BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: Sherwood
Model: Ironwood 2.0-1
Run #: 2

Job #: 25-470
Tracking #: 243
Technician: AK
Date: 12/22/2025

	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	39.447	0.153	0.093	2.36	99	1.4	-	1.10	-0.01	79	182	71	66
257	39.603	0.156	0.095	2.35	99	1.4	-	1.09	-0.01	79	181	71	66
258	39.757	0.154	0.096	2.35	99	1.4	-	1.07	-0.02	79	181	71	66
259	39.913	0.156	0.095	2.35	99	1.4	-	1.06	-0.01	78	181	71	66
260	40.069	0.156	0.094	2.35	99	1.4	99	1.05	-0.01	78	180	71	66
261	40.223	0.154	0.092	2.35	99	1.4	-	1.04	-0.01	78	181	71	66
262	40.379	0.156	0.093	2.35	99	1.4	-	1.03	-0.01	79	181	71	66
263	40.531	0.152	0.095	2.35	99	1.4	-	1.01	-0.02	79	179	71	66
264	40.690	0.159	0.095	2.35	99	1.4	-	1.00	-0.01	79	181	71	66
265	40.843	0.153	0.096	2.35	99	1.4	-	0.99	-0.01	79	180	71	66
266	41.000	0.157	0.095	2.35	99	1.4	-	0.96	-0.03	78	181	71	66
267	41.153	0.153	0.097	2.36	99	1.4	-	0.95	-0.01	78	181	71	66
268	41.309	0.156	0.093	2.34	99	1.4	-	0.95	0.00	78	178	71	66
269	41.466	0.157	0.094	2.36	99	1.4	-	0.94	-0.01	79	179	71	66
270	41.620	0.154	0.094	2.35	99	1.4	99	0.92	-0.02	79	180	71	66
271	41.776	0.156	0.094	2.35	99	1.4	-	0.91	-0.01	79	180	71	66
272	41.928	0.152	0.096	2.35	99	1.4	-	0.88	-0.03	79	181	71	66
273	42.086	0.158	0.095	2.36	99	1.4	-	0.87	-0.01	78	181	71	66
274	42.239	0.153	0.096	2.36	99	1.4	-	0.86	-0.01	78	181	71	66
275	42.397	0.158	0.094	2.35	99	1.4	-	0.85	-0.01	78	181	71	66
276	42.549	0.152	0.095	2.36	99	1.4	-	0.85	0.00	78	181	71	66
277	42.705	0.156	0.095	2.34	99	1.4	-	0.82	-0.03	79	181	71	66
278	42.861	0.156	0.095	2.35	99	1.4	-	0.81	-0.01	79	181	71	66
279	43.016	0.155	0.095	2.35	99	1.4	-	0.79	-0.02	78	181	71	66
280	43.173	0.157	0.093	2.36	99	1.4	100	0.77	-0.02	78	180	71	66
281	43.325	0.152	0.096	2.36	99	1.4	-	0.76	-0.01	78	180	71	66
282	43.483	0.158	0.095	2.35	99	1.4	-	0.74	-0.02	78	180	71	66
283	43.636	0.153	0.093	2.36	99	1.4	-	0.73	-0.01	78	179	71	66
284	43.794	0.158	0.095	2.35	99	1.4	-	0.71	-0.02	78	178	71	66
285	43.946	0.152	0.095	2.35	99	1.4	-	0.70	-0.01	78	178	71	66
286	44.103	0.157	0.095	2.36	99	1.4	-	0.69	-0.01	78	177	71	66
287	44.257	0.154	0.094	2.35	99	1.4	-	0.67	-0.02	78	176	71	66

BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: Sherwood
Model: Ironwood 2.0-1
Run #: 2

Job #: 25-470
Tracking #: 243
Technician: AK
Date: 12/22/2025

	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
288	44.413	0.156	0.093	2.36	99	1.4	-	0.65	-0.02	78	176	71	66
289	44.570	0.157	0.097	2.36	99	1.4	-	0.64	-0.01	78	175	71	66
290	44.721	0.151	0.094	2.35	99	1.4	99	0.62	-0.02	78	174	71	66
291	44.880	0.159	0.094	2.36	99	1.4	-	0.60	-0.02	78	174	71	66
292	45.032	0.152	0.094	2.35	99	1.4	-	0.60	0.00	78	172	71	66
293	45.191	0.159	0.096	2.36	99	1.4	-	0.59	-0.01	78	172	71	66
294	45.344	0.153	0.095	2.36	99	1.4	-	0.57	-0.02	78	172	71	66
295	45.499	0.155	0.093	2.36	99	1.4	-	0.56	-0.01	78	171	71	66
296	45.654	0.155	0.094	2.35	99	1.4	-	0.53	-0.03	78	172	71	66
297	45.810	0.156	0.096	2.36	99	1.4	-	0.51	-0.02	78	172	71	66
298	45.966	0.156	0.094	2.34	99	1.4	-	0.50	-0.01	78	171	71	66
299	46.119	0.153	0.095	2.36	99	1.4	-	0.49	-0.01	77	170	71	66
300	46.277	0.158	0.095	2.35	99	1.4	99	0.49	0.00	77	170	71	66
301	46.428	0.151	0.095	2.35	99	1.4	-	0.48	-0.01	77	172	71	66
302	46.588	0.160	0.096	2.35	99	1.4	-	0.47	-0.01	78	171	71	66
303	46.740	0.152	0.096	2.36	99	1.4	-	0.45	-0.02	78	171	71	66
304	46.896	0.156	0.094	2.34	99	1.4	-	0.42	-0.03	78	172	71	66
305	47.050	0.154	0.095	2.35	99	1.4	-	0.42	0.00	78	171	71	66
306	47.206	0.156	0.093	2.35	99	1.4	-	0.40	-0.02	78	171	71	66
307	47.363	0.157	0.093	2.35	99	1.4	-	0.38	-0.02	78	171	71	66
308	47.516	0.153	0.095	2.36	99	1.4	-	0.37	-0.01	77	171	71	66
309	47.672	0.156	0.092	2.35	99	1.4	-	0.35	-0.02	78	172	71	66
310	47.824	0.152	0.094	2.35	99	1.4	99	0.34	-0.01	78	171	71	66
311	47.984	0.160	0.093	2.35	99	1.4	-	0.33	-0.01	78	171	71	66
312	48.136	0.152	0.096	2.36	99	1.4	-	0.31	-0.02	78	171	71	66
313	48.294	0.158	0.094	2.35	99	1.4	-	0.29	-0.02	78	171	71	66
314	48.445	0.151	0.095	2.35	99	1.4	-	0.28	-0.01	78	172	71	66
315	48.602	0.157	0.093	2.35	99	1.4	-	0.27	-0.01	78	172	71	66
316	48.758	0.156	0.096	2.34	99	1.4	-	0.25	-0.02	77	171	71	66
317	48.912	0.154	0.094	2.35	99	1.4	-	0.25	0.00	77	171	71	66
318	49.069	0.157	0.094	2.36	99	1.4	-	0.23	-0.02	78	171	71	66
319	49.221	0.152	0.095	2.37	99	1.4	-	0.20	-0.03	78	170	71	66

BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: Sherwood
Model: Ironwood 2.0-1
Run #: 2

Job #: 25-470
Tracking #: 243
Technician: AK
Date: 12/22/2025

	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
320	49.379	0.158	0.095	2.35	99	1.4	99	0.20	0.00	78	170	71	66
321	49.532	0.153	0.096	2.35	99	1.4	-	0.18	-0.02	78	172	71	66
322	49.690	0.158	0.096	2.36	99	1.4	-	0.17	-0.01	78	171	71	66
323	49.842	0.152	0.095	2.35	99	1.4	-	0.15	-0.02	78	172	71	66
324	49.999	0.157	0.095	2.35	99	1.4	-	0.15	0.00	78	172	71	66
325	50.153	0.154	0.094	2.35	99	1.4	-	0.13	-0.02	78	171	71	66
326	50.309	0.156	0.094	2.36	99	1.4	-	0.11	-0.02	78	172	71	66
327	50.466	0.157	0.095	2.36	99	1.4	-	0.09	-0.02	78	172	71	66
328	50.617	0.151	0.096	2.35	99	1.4	-	0.08	-0.01	78	172	71	66
329	50.775	0.158	0.091	2.36	99	1.4	-	0.06	-0.02	78	172	71	66
330	50.927	0.152	0.094	2.36	99	1.4	99	0.05	-0.01	78	173	71	66
331	51.086	0.159	0.095	2.36	99	1.4	-	0.04	-0.01	78	174	71	66
332	51.239	0.153	0.094	2.35	99	1.4	-	0.03	-0.01	78	173	71	66
333	51.394	0.155	0.094	2.36	99	1.4	-	0.03	0.00	78	174	71	66
334	51.548	0.154	0.095	2.36	99	1.4	99	0.00	-0.03	78	174	71	66
Avg/Tot	51.548	0.154	0.094	2.35	94.4	1.3	100			83.3	226.6	72.6	67.0

BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: Sherwood
Model: Ironwood 2.0-1
Run #: 2

Job #: 25-470
Tracking #: 243
Technician: AK
Date: 12/22/2025

	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		0.01	73	0.7		73	-0.053	4.85	0.164
1	0.107	0.107	2.46	73	1.7	-	74	-0.057	2.54	0.148
2	0.259	0.152	2.47	73	2.9	-	75	-0.060	3.39	0.294
3	0.414	0.155	2.46	73	2.4	-	75	-0.069	10.53	0.398
4	0.565	0.151	2.46	73	2.1	-	76	-0.073	13.19	0.571
5	0.720	0.155	2.45	73	2.6	-	76	-0.073	13.61	0.540
6	0.871	0.151	2.46	73	1.9	-	76	-0.063	11.41	0.263
7	1.025	0.154	2.45	74	1.8	-	76	-0.063	9.07	0.168
8	1.176	0.151	2.46	74	1.7	-	76	-0.060	7.37	0.146
9	1.331	0.155	2.46	74	2.3	-	76	-0.059	7.48	0.139
10	1.485	0.154	2.46	74	1.8	105	76	-0.063	7.61	0.129
11	1.638	0.153	2.46	74	1.7	-	76	-0.061	7.47	0.132
12	1.792	0.154	2.46	74	2.0	-	76	-0.062	7.66	0.139
13	1.943	0.151	2.47	75	1.9	-	76	-0.061	7.72	0.149
14	2.099	0.156	2.46	75	2.0	-	76	-0.063	7.94	0.149
15	2.250	0.151	2.47	75	2.0	-	76	-0.059	7.89	0.146
16	2.407	0.157	2.47	75	1.6	-	76	-0.062	7.96	0.159
17	2.557	0.150	2.47	76	2.1	-	76	-0.060	8.36	0.142
18	2.713	0.156	2.48	76	1.6	-	76	-0.058	8.50	0.141
19	2.865	0.152	2.47	76	1.9	-	76	-0.062	8.82	0.116
20	3.021	0.156	2.48	77	1.9	107	76	-0.060	9.19	0.113
21	3.177	0.156	2.48	77	2.1	-	76	-0.062	9.38	0.105
22	3.328	0.151	2.47	77	2.1	-	76	-0.062	9.43	0.100
23	3.484	0.156	2.47	77	1.6	-	76	-0.061	9.66	0.105
24	3.637	0.153	2.48	78	1.7	-	76	-0.063	9.80	0.090
25	3.794	0.157	2.48	78	2.1	-	76	-0.061	9.99	0.085
26	3.946	0.152	2.48	78	1.6	-	76	-0.061	9.93	0.089
27	4.102	0.156	2.48	79	1.6	-	76	-0.059	10.14	0.085
28	4.257	0.155	2.49	79	1.9	-	76	-0.064	10.34	0.085
29	4.412	0.155	2.48	79	1.6	-	76	-0.059	10.16	0.075
30	4.568	0.156	2.49	80	1.7	107	76	-0.058	10.49	0.100
31	4.720	0.152	2.49	80	2.1	-	76	-0.060	10.56	0.105

BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: Sherwood
Model: Ironwood 2.0-1
Run #: 2

Job #: 25-470
Tracking #: 243
Technician: AK
Date: 12/22/2025

	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	4.879	0.159	2.49	80	2.1	-	76	-0.060	10.91	0.153
33	5.031	0.152	2.49	81	1.8	-	76	-0.061	11.45	0.255
34	5.188	0.157	2.49	81	1.9	-	76	-0.058	11.47	0.383
35	5.341	0.153	2.48	81	2.1	-	76	-0.061	11.77	0.557
36	5.498	0.157	2.50	82	1.8	-	76	-0.058	12.09	0.820
37	5.655	0.157	2.49	82	2.0	-	76	-0.064	12.07	1.131
38	5.807	0.152	2.48	82	1.6	-	76	-0.059	11.99	1.584
39	5.965	0.158	2.47	83	2.0	-	76	-0.059	11.87	1.931
40	6.118	0.153	2.47	83	1.6	106	76	-0.059	11.63	2.081
41	6.276	0.158	2.47	83	1.7	-	76	-0.058	11.64	2.217
42	6.427	0.151	2.46	83	1.6	-	76	-0.058	11.82	2.215
43	6.584	0.157	2.45	84	2.2	-	76	-0.060	11.70	2.176
44	6.739	0.155	2.44	84	2.1	-	76	-0.058	11.80	2.304
45	6.893	0.154	2.43	84	2.2	-	76	-0.057	11.78	2.326
46	7.047	0.154	2.42	85	2.0	-	76	-0.058	11.90	2.200
47	7.199	0.152	2.42	85	1.7	-	76	-0.056	11.87	2.149
48	7.355	0.156	2.40	85	2.2	-	76	-0.059	12.19	2.296
49	7.506	0.151	2.39	85	1.7	-	76	-0.054	11.76	2.321
50	7.661	0.155	2.37	86	1.9	105	76	-0.057	11.78	2.250
51	7.811	0.150	2.36	86	2.1	-	76	-0.055	11.81	1.936
52	7.964	0.153	2.34	86	2.0	-	76	-0.056	11.76	1.723
53	8.114	0.150	2.34	86	2.3	-	76	-0.056	12.01	1.423
54	8.267	0.153	2.31	87	2.2	-	76	-0.055	11.87	1.386
55	8.417	0.150	2.29	87	2.3	-	76	-0.053	11.65	1.343
56	8.568	0.151	2.28	87	1.9	-	76	-0.057	11.67	1.376
57	8.718	0.150	2.26	88	1.8	-	76	-0.057	11.67	1.390
58	8.867	0.149	2.24	88	2.3	-	76	-0.054	11.55	1.349
59	9.015	0.148	2.22	88	2.4	-	75	-0.057	11.46	1.325
60	9.164	0.149	2.20	88	2.4	102	75	-0.054	11.51	1.201
61	9.309	0.145	2.18	88	2.4	-	75	-0.053	11.54	1.150
62	9.457	0.148	2.16	89	2.3	-	75	-0.052	11.32	0.848
63	9.601	0.144	2.15	89	2.5	-	76	-0.055	11.50	0.656

BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: Sherwood
Model: Ironwood 2.0-1
Run #: 2

Job #: 25-470
Tracking #: 243
Technician: AK
Date: 12/22/2025

	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	9.749	0.148	2.14	89	2.0	-	76	-0.055	11.36	0.553
65	9.893	0.144	2.14	89	2.0	-	75	-0.052	11.29	0.491
66	10.042	0.149	2.14	90	2.2	-	75	-0.053	11.21	0.409
67	10.184	0.142	2.12	90	2.3	-	75	-0.055	11.26	0.392
68	10.332	0.148	2.11	90	2.2	-	75	-0.052	11.08	0.345
69	10.473	0.141	2.10	90	2.0	-	75	-0.051	11.17	0.336
70	10.620	0.147	2.10	90	2.5	98	75	-0.052	11.12	0.323
71	10.763	0.143	2.09	91	2.1	-	75	-0.054	10.89	0.332
72	10.910	0.147	2.09	91	2.0	-	75	-0.055	10.94	0.340
73	11.053	0.143	2.09	91	2.0	-	75	-0.053	11.25	0.381
74	11.196	0.143	2.08	91	2.2	-	75	-0.053	11.24	0.415
75	11.340	0.144	2.07	91	2.6	-	75	-0.054	11.06	0.429
76	11.487	0.147	2.29	92	2.2	-	75	-0.053	10.99	0.404
77	11.639	0.152	2.28	92	2.4	-	75	-0.053	11.06	0.492
78	11.789	0.150	2.28	92	2.5	-	75	-0.053	11.15	0.498
79	11.941	0.152	2.27	92	2.2	-	75	-0.052	11.15	0.526
80	12.091	0.150	2.27	92	2.4	99	75	-0.052	11.09	0.508
81	12.241	0.150	2.26	92	2.4	-	75	-0.051	11.11	0.506
82	12.391	0.150	2.26	92	2.6	-	75	-0.053	11.28	0.487
83	12.541	0.150	2.25	93	2.7	-	75	-0.050	11.21	0.482
84	12.692	0.151	2.25	93	2.4	-	75	-0.052	11.21	0.486
85	12.841	0.149	2.25	93	2.6	-	75	-0.053	11.17	0.458
86	12.992	0.151	2.25	93	2.8	-	75	-0.053	11.17	0.462
87	13.140	0.148	2.24	93	2.8	-	75	-0.051	11.00	0.450
88	13.290	0.150	2.24	93	2.3	-	75	-0.052	11.01	0.485
89	13.438	0.148	2.24	93	2.4	-	75	-0.052	10.98	0.454
90	13.589	0.151	2.24	94	2.7	100	75	-0.053	11.03	0.449
91	13.736	0.147	2.23	94	2.2	-	75	-0.051	11.29	0.450
92	13.887	0.151	2.23	94	2.3	-	75	-0.052	11.23	0.438
93	14.034	0.147	2.22	94	2.8	-	75	-0.049	11.17	0.448
94	14.185	0.151	2.22	94	2.5	-	75	-0.053	11.15	0.437
95	14.332	0.147	2.22	94	2.3	-	75	-0.053	11.09	0.485

BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: Sherwood
Model: Ironwood 2.0-1
Run #: 2

Job #: 25-470
Tracking #: 243
Technician: AK
Date: 12/22/2025

	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	14.483	0.151	2.21	94	2.8	-	75	-0.050	10.82	0.452
97	14.630	0.147	2.22	94	2.5	-	75	-0.053	10.96	0.421
98	14.781	0.151	2.22	94	2.3	-	75	-0.053	10.85	0.408
99	14.929	0.148	2.22	95	2.3	-	75	-0.052	10.68	0.370
100	15.080	0.151	2.22	95	2.5	100	75	-0.050	10.73	0.322
101	15.227	0.147	2.22	95	2.6	-	75	-0.053	10.50	0.291
102	15.378	0.151	2.22	95	2.3	-	75	-0.051	10.48	0.255
103	15.525	0.147	2.22	95	2.8	-	75	-0.051	10.59	0.257
104	15.676	0.151	2.21	95	2.7	-	75	-0.050	10.52	0.252
105	15.823	0.147	2.21	95	2.3	-	75	-0.052	10.51	0.228
106	15.974	0.151	2.22	95	2.8	-	75	-0.051	10.25	0.192
107	16.121	0.147	2.21	95	2.6	-	75	-0.053	10.36	0.186
108	16.273	0.152	2.22	95	2.8	-	75	-0.051	10.43	0.192
109	16.419	0.146	2.21	95	2.4	-	75	-0.054	10.64	0.167
110	16.571	0.152	2.21	95	2.3	100	75	-0.052	10.58	0.167
111	16.719	0.148	2.28	96	2.7	-	75	-0.051	10.58	0.162
112	16.874	0.155	2.28	96	2.6	-	75	-0.050	10.48	0.158
113	17.023	0.149	2.29	96	2.4	-	75	-0.049	10.66	0.138
114	17.177	0.154	2.28	96	2.7	-	75	-0.053	10.60	0.130
115	17.326	0.149	2.28	96	2.3	-	75	-0.051	10.61	0.133
116	17.479	0.153	2.28	96	2.4	-	75	-0.050	10.49	0.147
117	17.627	0.148	2.28	96	2.5	-	75	-0.052	10.49	0.152
118	17.781	0.154	2.28	96	2.5	-	75	-0.056	10.17	0.104
119	17.931	0.150	2.28	96	2.3	-	75	-0.049	10.28	0.083
120	18.083	0.152	2.27	96	2.8	101	75	-0.049	9.48	0.057
121	18.235	0.152	2.28	96	2.6	-	75	-0.047	9.22	0.047
122	18.387	0.152	2.28	96	2.3	-	75	-0.047	8.67	0.065
123	18.538	0.151	2.27	96	2.8	-	75	-0.049	8.71	0.080
124	18.690	0.152	2.28	96	2.5	-	75	-0.049	8.74	0.086
125	18.842	0.152	2.27	96	2.6	-	75	-0.046	8.72	0.101
126	18.991	0.149	2.27	97	2.7	-	75	-0.050	8.44	0.107
127	19.143	0.152	2.27	97	2.8	-	75	-0.051	8.54	0.113

BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: Sherwood
Model: Ironwood 2.0-1
Run #: 2

Job #: 25-470
Tracking #: 243
Technician: AK
Date: 12/22/2025

	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	19.293	0.150	2.27	97	2.8	-	75	-0.049	8.59	0.115
129	19.446	0.153	2.26	97	2.8	-	75	-0.050	8.56	0.115
130	19.595	0.149	2.26	97	2.5	101	75	-0.052	8.20	0.113
131	19.749	0.154	2.26	97	2.4	-	75	-0.050	8.19	0.116
132	19.897	0.148	2.25	97	2.4	-	75	-0.048	8.16	0.116
133	20.050	0.153	2.25	97	2.5	-	75	-0.049	7.89	0.126
134	20.198	0.148	2.24	97	2.4	-	75	-0.047	7.97	0.130
135	20.352	0.154	2.24	97	2.9	-	75	-0.047	7.93	0.155
136	20.500	0.148	2.24	97	2.4	-	75	-0.047	7.85	0.144
137	20.652	0.152	2.24	97	2.4	-	75	-0.048	7.64	0.141
138	20.799	0.147	2.23	97	2.6	-	75	-0.051	7.45	0.147
139	20.951	0.152	2.23	97	2.6	-	75	-0.050	7.70	0.151
140	21.099	0.148	2.23	97	2.8	101	75	-0.046	7.34	0.134
141	21.251	0.152	2.22	97	2.4	-	75	-0.052	7.08	0.122
142	21.399	0.148	2.21	97	2.5	-	75	-0.051	6.97	0.121
143	21.550	0.151	2.21	97	2.8	-	75	-0.046	6.83	0.123
144	21.698	0.148	2.20	97	2.5	-	75	-0.048	6.77	0.124
145	21.848	0.150	2.19	97	2.9	-	74	-0.051	6.66	0.123
146	21.996	0.148	2.19	97	2.6	-	74	-0.046	6.85	0.137
147	22.146	0.150	2.18	98	2.8	-	74	-0.046	6.84	0.145
148	22.293	0.147	2.19	98	2.8	-	74	-0.045	6.70	0.149
149	22.443	0.150	2.18	98	2.6	-	74	-0.047	6.74	0.133
150	22.590	0.147	2.17	98	2.5	99	74	-0.049	6.74	0.146
151	22.740	0.150	2.18	98	3.0	-	74	-0.047	6.79	0.145
152	22.887	0.147	2.17	98	2.9	-	74	-0.046	6.74	0.152
153	23.037	0.150	2.17	98	3.0	-	74	-0.048	6.74	0.147
154	23.183	0.146	2.16	98	2.7	-	74	-0.044	6.74	0.155
155	23.332	0.149	2.16	98	2.7	-	74	-0.045	6.77	0.158
156	23.477	0.145	2.15	98	2.5	-	74	-0.047	6.82	0.160
157	23.628	0.151	2.15	98	2.7	-	74	-0.046	6.98	0.158
158	23.773	0.145	2.14	98	2.7	-	74	-0.047	6.95	0.153
159	23.923	0.150	2.15	98	3.0	-	74	-0.043	6.91	0.143

BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: Sherwood
Model: Ironwood 2.0-1
Run #: 2

Job #: 25-470
Tracking #: 243
Technician: AK
Date: 12/22/2025

	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	24.068	0.145	2.14	98	3.1	97	74	-0.045	6.88	0.147
161	24.218	0.150	2.13	98	3.0	-	74	-0.044	6.91	0.147
162	24.362	0.144	2.12	98	2.6	-	74	-0.044	6.89	0.152
163	24.511	0.149	2.12	98	3.1	-	74	-0.045	6.99	0.160
164	24.655	0.144	2.12	98	2.6	-	74	-0.044	7.16	0.158
165	24.804	0.149	2.11	98	3.1	-	74	-0.043	7.25	0.159
166	24.947	0.143	2.10	98	2.5	-	74	-0.043	7.38	0.165
167	25.095	0.148	2.10	98	3.0	-	74	-0.045	7.70	0.152
168	25.239	0.144	2.10	98	2.7	-	74	-0.042	7.69	0.142
169	25.387	0.148	2.09	98	2.6	-	74	-0.047	7.84	0.136
170	25.532	0.145	2.09	98	2.6	96	74	-0.045	7.86	0.134
171	25.678	0.146	2.08	98	2.6	-	74	-0.045	8.00	0.134
172	25.823	0.145	2.08	98	2.8	-	74	-0.048	8.23	0.135
173	25.967	0.144	2.08	98	2.7	-	74	-0.046	8.42	0.141
174	26.113	0.146	2.06	98	3.1	-	74	-0.046	8.23	0.145
175	26.256	0.143	2.06	98	2.7	-	74	-0.046	8.37	0.150
176	26.403	0.147	2.07	98	2.6	-	74	-0.044	8.65	0.144
177	26.546	0.143	2.06	98	2.6	-	74	-0.046	8.99	0.163
178	26.692	0.146	2.04	98	3.2	-	74	-0.045	8.99	0.171
179	26.833	0.141	2.03	98	3.2	-	74	-0.046	9.33	0.175
180	26.979	0.146	2.02	98	2.7	95	74	-0.051	9.16	0.182
181	27.120	0.141	2.01	98	3.1	-	74	-0.047	9.21	0.156
182	27.265	0.145	2.00	98	2.7	-	73	-0.051	9.02	0.146
183	27.407	0.142	2.00	98	2.9	-	74	-0.048	8.89	0.145
184	27.547	0.140	1.99	98	2.7	-	73	-0.047	9.20	0.149
185	27.692	0.145	1.99	98	3.1	-	73	-0.048	9.63	0.148
186	27.832	0.140	1.98	98	2.9	-	73	-0.046	9.79	0.162
187	27.977	0.145	1.98	98	2.9	-	73	-0.052	9.46	0.157
188	28.116	0.139	1.99	98	3.2	-	73	-0.048	9.19	0.143
189	28.260	0.144	1.98	98	3.1	-	73	-0.050	8.83	0.138
190	28.402	0.142	1.98	98	3.0	94	73	-0.047	8.47	0.127
191	28.542	0.140	1.98	98	2.8	-	73	-0.049	8.33	0.121

BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: Sherwood
Model: Ironwood 2.0-1
Run #: 2

Job #: 25-470
Tracking #: 243
Technician: AK
Date: 12/22/2025

	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	28.685	0.143	1.99	98	3.1	-	73	-0.044	8.26	0.118
193	28.827	0.142	1.99	98	2.8	-	73	-0.044	8.36	0.112
194	28.971	0.144	1.99	98	3.2	-	73	-0.048	7.95	0.103
195	29.110	0.139	1.99	98	3.2	-	73	-0.046	7.73	0.096
196	29.254	0.144	2.00	98	3.3	-	73	-0.044	7.48	0.095
197	29.396	0.142	2.00	98	3.1	-	73	-0.044	7.49	0.087
198	29.538	0.142	2.00	98	3.0	-	73	-0.045	7.49	0.093
199	29.680	0.142	2.00	98	3.0	-	73	-0.042	7.41	0.087
200	29.821	0.141	2.00	98	3.1	93	73	-0.043	7.32	0.089
201	29.973	0.152	2.30	98	3.4	-	73	-0.042	7.28	0.090
202	30.124	0.151	2.30	98	3.2	-	73	-0.039	7.23	0.088
203	30.278	0.154	2.30	98	3.3	-	73	-0.042	7.25	0.091
204	30.430	0.152	2.30	98	3.3	-	73	-0.041	7.12	0.097
205	30.583	0.153	2.30	98	3.1	-	73	-0.041	7.16	0.098
206	30.737	0.154	2.31	98	2.9	-	73	-0.042	7.09	0.102
207	30.887	0.150	2.31	98	2.9	-	73	-0.041	7.10	0.093
208	31.041	0.154	2.31	98	3.3	-	73	-0.041	7.09	0.100
209	31.192	0.151	2.31	98	3.3	-	73	-0.039	7.23	0.105
210	31.348	0.156	2.31	98	3.2	101	73	-0.038	7.26	0.107
211	31.498	0.150	2.31	98	3.4	-	73	-0.040	7.33	0.109
212	31.653	0.155	2.32	98	3.0	-	73	-0.041	7.28	0.111
213	31.803	0.150	2.32	98	3.3	-	73	-0.035	7.23	0.102
214	31.957	0.154	2.32	98	3.4	-	73	-0.037	7.25	0.112
215	32.108	0.151	2.31	98	2.9	-	73	-0.038	7.34	0.106
216	32.263	0.155	2.32	98	3.2	-	73	-0.039	7.42	0.107
217	32.414	0.151	2.24	98	2.9	-	73	-0.040	7.36	0.105
218	32.565	0.151	2.25	98	2.9	-	73	-0.038	7.24	0.116
219	32.716	0.151	2.24	98	3.0	-	73	-0.037	6.96	0.122
220	32.866	0.150	2.24	98	3.1	101	73	-0.041	6.68	0.122
221	33.018	0.152	2.25	98	3.1	-	73	-0.037	6.46	0.116
222	33.167	0.149	2.25	98	3.1	-	73	-0.038	6.52	0.119
223	33.318	0.151	2.25	98	3.3	-	73	-0.040	6.42	0.126

BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: Sherwood
Model: Ironwood 2.0-1
Run #: 2

Job #: 25-470
Tracking #: 243
Technician: AK
Date: 12/22/2025

	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	33.467	0.149	2.25	98	2.9	-	73	-0.040	6.41	0.127
225	33.620	0.153	2.25	98	2.9	-	73	-0.040	6.42	0.125
226	33.769	0.149	2.25	98	3.2	-	73	-0.042	6.29	0.123
227	33.922	0.153	2.24	98	3.2	-	73	-0.038	6.42	0.127
228	34.070	0.148	2.25	98	2.9	-	73	-0.040	6.26	0.121
229	34.224	0.154	2.25	98	3.0	-	73	-0.039	6.31	0.126
230	34.372	0.148	2.25	98	2.9	99	73	-0.038	6.38	0.128
231	34.526	0.154	2.24	98	3.1	-	73	-0.039	6.23	0.129
232	34.674	0.148	2.25	98	2.9	-	73	-0.040	6.26	0.129
233	34.828	0.154	2.25	98	2.9	-	73	-0.043	6.32	0.135
234	34.975	0.147	2.25	98	3.0	-	73	-0.040	6.30	0.132
235	35.128	0.153	2.25	98	2.9	-	73	-0.036	6.37	0.137
236	35.276	0.148	2.25	98	3.2	-	73	-0.033	6.43	0.139
237	35.429	0.153	2.25	98	2.9	-	73	-0.038	6.44	0.146
238	35.578	0.149	2.24	98	3.2	-	73	-0.038	6.46	0.147
239	35.730	0.152	2.24	98	3.3	-	73	-0.038	6.30	0.146
240	35.879	0.149	2.25	98	3.1	99	73	-0.039	6.20	0.148
241	36.031	0.152	2.24	98	2.9	-	73	-0.035	6.20	0.143
242	36.182	0.151	2.25	98	3.3	-	73	-0.038	6.26	0.147
243	36.333	0.151	2.25	98	3.0	-	73	-0.037	6.15	0.145
244	36.484	0.151	2.24	98	2.9	-	73	-0.041	6.05	0.135
245	36.634	0.150	2.25	98	3.1	-	73	-0.041	6.09	0.141
246	36.786	0.152	2.25	98	3.3	-	73	-0.039	5.98	0.144
247	36.934	0.148	2.25	98	3.2	-	73	-0.034	6.03	0.147
248	37.086	0.152	2.24	98	2.9	-	73	-0.039	5.98	0.144
249	37.235	0.149	2.25	98	3.0	-	73	-0.037	5.90	0.145
250	37.388	0.153	2.25	98	3.1	100	73	-0.038	6.04	0.148
251	37.536	0.148	2.24	98	3.0	-	73	-0.037	5.88	0.143
252	37.689	0.153	2.24	98	3.2	-	73	-0.038	5.70	0.136
253	37.837	0.148	2.24	98	2.8	-	73	-0.036	5.76	0.147
254	37.991	0.154	2.24	98	3.3	-	73	-0.036	5.85	0.151
255	38.139	0.148	2.24	98	2.9	-	73	-0.037	5.82	0.156

BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: Sherwood
Model: Ironwood 2.0-1
Run #: 2

Job #: 25-470
Tracking #: 243
Technician: AK
Date: 12/22/2025

	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	38.292	0.153	2.25	98	3.0	-	73	-0.033	5.95	0.165
257	38.440	0.148	2.24	98	3.0	-	73	-0.033	5.76	0.164
258	38.593	0.153	2.24	98	2.9	-	73	-0.042	5.88	0.169
259	38.741	0.148	2.25	98	2.9	-	73	-0.035	5.81	0.169
260	38.894	0.153	2.25	98	3.0	99	73	-0.037	5.84	0.174
261	39.041	0.147	2.24	98	3.3	-	72	-0.040	5.91	0.174
262	39.194	0.153	2.25	98	2.8	-	73	-0.037	6.07	0.181
263	39.343	0.149	2.25	98	3.3	-	72	-0.035	5.79	0.172
264	39.495	0.152	2.24	98	2.8	-	72	-0.037	5.84	0.176
265	39.643	0.148	2.24	98	3.0	-	72	-0.037	5.83	0.177
266	39.796	0.153	2.25	98	3.1	-	72	-0.035	5.84	0.175
267	39.946	0.150	2.24	98	2.8	-	72	-0.038	5.86	0.180
268	40.097	0.151	2.24	98	3.3	-	72	-0.037	5.80	0.177
269	40.248	0.151	2.24	98	2.9	-	72	-0.036	5.88	0.178
270	40.398	0.150	2.25	98	2.9	99	72	-0.035	5.73	0.179
271	40.549	0.151	2.24	98	2.9	-	72	-0.037	5.85	0.203
272	40.700	0.151	2.25	98	2.8	-	72	-0.036	5.74	0.206
273	40.851	0.151	2.25	98	2.9	-	72	-0.034	5.84	0.219
274	40.999	0.148	2.25	98	3.3	-	72	-0.034	5.93	0.217
275	41.151	0.152	2.25	98	3.3	-	72	-0.035	6.25	0.202
276	41.300	0.149	2.25	98	3.0	-	72	-0.036	6.32	0.187
277	41.453	0.153	2.25	98	2.8	-	72	-0.039	6.41	0.185
278	41.601	0.148	2.24	98	3.2	-	72	-0.034	6.45	0.157
279	41.754	0.153	2.25	98	3.3	-	72	-0.039	6.31	0.153
280	41.903	0.149	2.25	98	3.3	100	72	-0.038	6.26	0.152
281	42.056	0.153	2.24	98	3.1	-	72	-0.036	6.23	0.151
282	42.205	0.149	2.25	98	3.0	-	72	-0.034	6.28	0.153
283	42.358	0.153	2.25	98	2.9	-	72	-0.039	6.19	0.149
284	42.506	0.148	2.25	98	3.0	-	72	-0.039	6.19	0.130
285	42.660	0.154	2.25	98	3.2	-	72	-0.035	6.24	0.128
286	42.807	0.147	2.25	98	3.2	-	72	-0.034	6.14	0.117
287	42.960	0.153	2.25	98	3.2	-	72	-0.034	5.99	0.116

BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: Sherwood
Model: Ironwood 2.0-1
Run #: 2

Job #: 25-470
Tracking #: 243
Technician: AK
Date: 12/22/2025

	Particulate Sampling Data							Flue Gas Data		
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Filter (°F)	Flue Draft (in H_2O)	CO_2 (%)	CO (%)
288	43.108	0.148	2.26	98	3.1	-	72	-0.035	6.04	0.114
289	43.261	0.153	2.25	98	3.2	-	72	-0.036	6.05	0.112
290	43.410	0.149	2.25	98	3.1	100	72	-0.037	6.02	0.113
291	43.562	0.152	2.25	98	3.2	-	72	-0.033	6.07	0.106
292	43.713	0.151	2.25	98	3.2	-	72	-0.039	6.07	0.112
293	43.864	0.151	2.25	98	3.3	-	72	-0.034	6.25	0.111
294	44.015	0.151	2.25	98	3.2	-	72	-0.035	6.14	0.110
295	44.166	0.151	2.25	98	2.8	-	72	-0.033	6.36	0.114
296	44.318	0.152	2.26	98	2.9	-	72	-0.035	6.20	0.109
297	44.468	0.150	2.26	98	3.1	-	72	-0.035	6.23	0.108
298	44.619	0.151	2.25	98	3.0	-	72	-0.034	6.26	0.115
299	44.768	0.149	2.25	98	3.2	-	72	-0.038	6.24	0.113
300	44.921	0.153	2.26	98	2.9	99	72	-0.035	6.26	0.115
301	45.070	0.149	2.25	98	3.2	-	72	-0.034	6.37	0.115
302	45.222	0.152	2.25	98	3.2	-	72	-0.032	6.37	0.113
303	45.371	0.149	2.25	98	3.1	-	72	-0.037	6.29	0.116
304	45.525	0.154	2.25	98	3.1	-	72	-0.035	6.32	0.115
305	45.673	0.148	2.25	98	3.0	-	72	-0.034	6.37	0.118
306	45.827	0.154	2.26	98	2.9	-	72	-0.035	6.21	0.118
307	45.975	0.148	2.25	98	3.0	-	72	-0.036	6.28	0.119
308	46.129	0.154	2.26	98	3.0	-	72	-0.033	6.28	0.118
309	46.277	0.148	2.26	98	3.2	-	72	-0.031	6.48	0.129
310	46.429	0.152	2.26	98	3.2	99	72	-0.034	6.35	0.121
311	46.578	0.149	2.26	98	3.1	-	72	-0.035	6.33	0.118
312	46.731	0.153	2.26	98	2.9	-	72	-0.034	6.40	0.115
313	46.880	0.149	2.25	98	3.0	-	72	-0.035	6.39	0.112
314	47.032	0.152	2.25	98	3.1	-	72	-0.033	6.43	0.116
315	47.183	0.151	2.25	98	2.8	-	72	-0.036	6.47	0.113
316	47.335	0.152	2.25	98	3.3	-	72	-0.037	6.47	0.113
317	47.486	0.151	2.26	98	3.0	-	72	-0.034	6.41	0.115
318	47.636	0.150	2.25	98	3.0	-	72	-0.035	6.55	0.120
319	47.788	0.152	2.26	98	3.3	-	72	-0.033	6.48	0.123

BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: Sherwood
Model: Ironwood 2.0-1
Run #: 2

Job #: 25-470
Tracking #: 243
Technician: AK
Date: 12/22/2025

	Particulate Sampling Data							Flue Gas Data		
Elapsed Time (min)	Gas Meter (ft^3)	Sample Rate (cfm)	Orifice dH (in H_2O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Filter (°F)	Flue Draft (in H_2O)	CO_2 (%)	CO (%)
320	47.938	0.150	2.25	98	3.0	99	72	-0.035	6.49	0.115
321	48.090	0.152	2.26	98	2.9	-	72	-0.032	6.39	0.122
322	48.238	0.148	2.25	98	3.2	-	72	-0.035	6.49	0.121
323	48.392	0.154	2.26	98	3.3	-	72	-0.035	6.43	0.122
324	48.540	0.148	2.25	98	2.9	-	72	-0.035	6.42	0.125
325	48.694	0.154	2.25	98	3.1	-	72	-0.034	6.42	0.128
326	48.843	0.149	2.25	98	3.2	-	72	-0.033	6.47	0.137
327	48.997	0.154	2.25	98	3.2	-	72	-0.035	6.43	0.135
328	49.145	0.148	2.26	98	3.0	-	72	-0.038	6.31	0.132
329	49.299	0.154	2.25	98	3.3	-	72	-0.037	6.32	0.135
330	49.447	0.148	2.26	98	3.1	99	72	-0.034	6.19	0.133
331	49.600	0.153	2.26	98	3.3	-	72	-0.035	6.30	0.138
332	49.748	0.148	2.26	98	2.9	-	72	-0.036	6.34	0.140
333	49.901	0.153	2.26	98	3.0	-	72	-0.036	6.33	0.141
334	50.050	0.149	2.26	98	2.9	99	72	-0.035	6.28	0.148
Avg/Tot	50.050	0.150	2.24	93.8	2.7	100	73.9	-0.046	8.23	0.305

BOX C TEST DATA - ASTM E2780 / ASTM E2515

Client: Sherwood
Model: Ironwood 2.0-1
Run #: 2

Job #: 25-470
Tracking #: 243
Technician: AK
Date: 12/22/2025

	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		-0.03	77	0.0		71
1	0.116	0.116	0.93	77	1.4	-	72
2	0.254	0.138	0.92	77	1.5	-	72
3	0.393	0.139	0.93	77	1.3	-	72
4	0.531	0.138	0.91	77	1.5	-	72
5	0.671	0.140	0.93	77	1.5	-	72
6	0.810	0.139	0.93	77	1.4	-	72
7	0.949	0.139	0.93	77	1.5	-	73
8	1.091	0.142	0.95	77	1.5	-	73
9	1.231	0.140	0.94	77	1.4	-	73
10	1.372	0.141	0.94	78	1.5	98	73
11	1.514	0.142	0.96	78	1.5	-	73
12	1.656	0.142	0.95	78	1.5	-	73
13	1.797	0.141	0.94	78	1.5	-	73
14	1.940	0.143	0.96	78	1.6	-	73
15	2.082	0.142	0.96	78	1.4	-	73
16	2.224	0.142	0.96	78	1.4	-	73
17	2.366	0.142	0.95	78	1.5	-	73
18	2.510	0.144	0.96	78	1.5	-	73
19	2.652	0.142	0.96	78	1.6	-	73
20	2.795	0.143	0.96	79	1.6	101	74
21	2.937	0.142	0.96	79	1.6	-	74
22	3.082	0.145	0.97	79	1.4	-	74
23	3.225	0.143	0.97	79	1.4	-	74
24	3.369	0.144	0.97	79	1.5	-	74
25	3.512	0.143	0.96	80	1.6	-	74
26	3.656	0.144	0.97	80	1.4	-	74
27	3.802	0.146	0.98	80	1.5	-	74
28	3.946	0.144	0.98	81	1.6	-	74
29	4.091	0.145	0.98	81	1.6	-	74
30	4.236	0.145	0.98	81	1.5	101	74
31	4.381	0.145	0.98	81	1.4	-	74

BOX C TEST DATA - ASTM E2780 / ASTM E2515

Client: Sherwood
Model: Ironwood 2.0-1
Run #: 2

Job #: 25-470
Tracking #: 243
Technician: AK
Date: 12/22/2025

	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	4.526	0.145	0.98	82	1.5	-	74
33	4.673	0.147	0.99	83	1.5	-	74
34	4.819	0.146	0.99	83	1.6	-	74
35	4.965	0.146	0.99	83	1.4	-	74
36	5.111	0.146	0.99	84	1.6	-	74
37	5.257	0.146	0.99	84	1.4	-	74
38	5.403	0.146	0.99	85	1.5	-	74
39	5.550	0.147	0.98	85	1.6	-	74
40	5.696	0.146	0.98	85	1.6	102	74
41	5.842	0.146	0.99	86	1.6	-	74
42	5.990	0.148	1.00	86	1.5	-	74
43	6.137	0.147	1.00	86	1.6	-	74
44	6.284	0.147	1.00	87	1.5	-	74
45	6.431	0.147	1.00	87	1.5	-	74
46	6.578	0.147	1.00	87	1.6	-	74
47	6.724	0.146	0.99	88	1.6	-	74
48	6.871	0.147	0.99	88	1.6	-	74
49	7.018	0.147	0.99	88	1.5	-	74
50	7.165	0.147	0.99	88	1.5	102	74
51	7.312	0.147	0.98	89	1.5	-	74
52	7.459	0.147	0.99	89	1.4	-	74
53	7.606	0.147	0.99	89	1.4	-	74
54	7.754	0.148	1.00	90	1.6	-	74
55	7.902	0.148	1.00	90	1.6	-	74
56	8.049	0.147	1.00	90	1.6	-	74
57	8.196	0.147	1.00	90	1.6	-	74
58	8.343	0.147	0.99	91	1.4	-	74
59	8.491	0.148	0.99	91	1.4	-	74
60	8.638	0.147	0.99	91	1.5	102	74
Avg/Tot	8.638	0.144	0.96	82.5	1.5	101	73.3

WOODSTOVE SURFACE TEMPERATURE DATA

Client: Sherwood
Model: Ironwood 2.0-1
Run #: 2

Job #: 25-470
Tracking #: 243
Technician: AK
Date: 12/22/2025

Stove ΔT: 81

	Temperature Data (°F)						
Elapsed Time (min)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
0	412	423	321	249	464	373.9	590.5
1	411	420	329	255	464	375.6	550.7
2	408	416	332	262	461	375.8	663.3
3	403	411	332	269	460	374.8	845.7
4	399	406	331	280	458	374.4	993.4
5	394	401	329	295	456	374.9	1047.5
6	390	396	327	318	455	376.9	1026.8
7	385	392	326	333	453	377.7	1021.4
8	381	388	324	353	452	379.5	1015.8
9	377	384	322	367	452	380.3	1008.7
10	374	380	322	378	452	380.9	1002.8
11	370	377	320	388	451	381.2	999.9
12	367	374	319	397	451	381.3	996.8
13	364	371	318	404	450	381.4	994.8
14	361	368	317	408	450	380.7	994.5
15	358	365	316	415	449	380.6	999.1
16	355	363	315	419	448	380.0	999.9
17	353	360	314	421	447	379.0	997.9
18	350	358	314	427	446	379.1	994.0
19	348	356	313	431	445	378.6	989.4
20	346	354	312	433	444	377.9	988.8
21	344	353	312	437	442	377.6	988.9
22	342	352	311	439	441	377.0	989.1
23	341	350	311	442	439	376.6	990.7
24	339	349	310	445	438	376.3	984.1
25	337	348	310	447	436	375.8	976.7
26	336	348	309	444	434	374.4	967.6
27	335	347	309	449	433	374.7	960.9
28	334	347	309	451	432	374.6	958.1
29	334	347	308	452	430	374.2	956.7
30	333	347	308	454	429	374.2	958.7
31	333	347	300	435	426	368.1	963.1
32	332	346	286	424	425	362.4	970.3
33	331	346	275	415	423	358.0	980.7
34	331	346	267	406	421	354.2	996.0
35	330	346	260	399	419	350.8	1013.4
36	330	345	255	392	418	347.8	1028.0
37	329	345	251	389	416	345.8	1034.0
38	329	345	247	383	414	343.5	1033.3
39	328	344	244	379	413	341.6	1030.5
40	328	344	241	376	411	340.0	1025.5
41	327	344	239	374	410	338.7	1022.6
42	327	344	237	371	408	337.4	1023.3
43	327	344	235	368	407	336.0	1022.5
44	326	344	234	366	405	335.0	1020.1
45	326	344	232	365	404	334.0	1019.9
46	326	344	231	363	402	333.1	1025.8
47	326	344	230	362	401	332.2	1031.2

WOODSTOVE SURFACE TEMPERATURE DATA

Client: Sherwood
Model: Ironwood 2.0-1
Run #: 2

Job #: 25-470
Tracking #: 243
Technician: AK
Date: 12/22/2025

Stove ΔT: 81

	Temperature Data (°F)						
Elapsed Time (min)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
48	325	344	229	360	399	331.4	1034.2
49	325	344	227	360	398	330.8	1035.7
50	325	344	226	359	396	330.2	1038.7
51	325	344	226	359	395	329.7	1041.1
52	325	345	225	357	394	329.0	1043.8
53	325	345	225	358	392	328.8	1044.9
54	325	345	224	357	391	328.4	1047.9
55	325	346	224	356	390	328.0	1051.4
56	325	347	224	356	388	327.9	1054.2
57	325	347	224	355	387	327.7	1055.9
58	325	348	224	355	386	327.6	1055.6
59	325	348	224	356	385	327.8	1053.6
60	326	349	224	355	384	327.5	1049.9
61	326	349	225	355	383	327.5	1044.3
62	325	350	224	354	382	326.9	1037.3
63	326	350	224	354	381	326.9	1029.3
64	326	350	224	353	380	326.6	1021.9
65	326	351	224	352	379	326.5	1014.5
66	327	351	224	352	378	326.3	1006.5
67	327	351	224	351	378	326.1	1000.1
68	327	352	224	351	377	326.0	994.3
69	328	352	224	351	376	326.0	989.4
70	328	352	224	349	375	325.7	985.6
71	328	353	224	348	375	325.5	981.9
72	329	353	224	348	374	325.5	979.5
73	329	354	224	347	373	325.3	978.9
74	330	354	224	346	372	325.1	978.6
75	330	354	224	345	372	325.0	978.4
76	330	355	225	345	371	325.0	978.2
77	331	355	225	344	370	324.9	978.8
78	331	355	225	343	370	324.9	979.8
79	332	356	226	343	369	324.9	981.7
80	332	357	226	343	369	325.1	982.6
81	332	357	226	341	368	324.8	982.5
82	333	358	226	341	368	325.0	981.8
83	333	358	227	341	367	325.1	980.9
84	334	359	228	341	367	325.4	979.8
85	334	359	228	339	366	325.3	979.0
86	335	360	228	339	366	325.4	978.0
87	335	360	229	339	365	325.5	976.9
88	336	361	229	338	365	325.7	976.4
89	336	361	230	338	364	325.9	975.7
90	337	362	230	338	364	326.1	974.2
91	337	363	231	337	364	326.3	972.6
92	338	363	231	337	363	326.5	972.0
93	338	364	232	337	363	326.7	972.1
94	339	364	232	337	363	327.0	970.7
95	339	365	233	336	363	327.2	969.5

WOODSTOVE SURFACE TEMPERATURE DATA

Client: Sherwood
Model: Ironwood 2.0-1
Run #: 2

Job #: 25-470
Tracking #: 243
Technician: AK
Date: 12/22/2025

Stove ΔT: 81

	Temperature Data (°F)						
Elapsed Time (min)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
96	340	366	234	336	362	327.4	967.0
97	341	366	234	336	362	327.8	964.0
98	341	367	236	336	362	328.2	960.5
99	342	367	236	336	362	328.5	955.7
100	343	368	237	334	362	328.5	950.2
101	343	368	238	334	361	328.9	945.6
102	344	369	239	333	361	329.0	942.1
103	344	369	239	332	361	329.0	938.9
104	345	369	240	332	361	329.2	935.8
105	346	370	240	330	360	329.2	932.6
106	346	370	241	329	360	329.1	929.9
107	346	370	241	328	360	329.1	927.3
108	347	371	242	328	360	329.3	925.5
109	347	371	242	327	359	329.3	924.1
110	348	371	243	326	359	329.3	923.3
111	348	371	243	325	359	329.3	922.9
112	349	372	244	326	359	329.7	922.2
113	349	372	244	325	358	329.7	921.2
114	350	373	245	324	358	329.8	920.4
115	350	373	245	323	358	329.9	919.7
116	351	373	246	323	358	330.1	918.9
117	351	373	247	323	357	330.4	916.4
118	352	374	247	323	357	330.5	912.1
119	353	374	247	322	357	330.6	906.5
120	353	374	248	321	357	330.5	901.0
121	354	375	248	320	357	330.7	897.5
122	355	375	249	319	357	330.7	899.1
123	355	375	249	318	357	330.7	903.3
124	356	375	249	317	357	330.7	909.0
125	356	376	250	316	356	330.8	914.1
126	356	376	250	315	356	330.6	919.5
127	356	376	251	314	356	330.5	923.1
128	357	376	251	314	356	330.7	924.5
129	357	376	252	313	356	330.5	926.7
130	357	376	252	314	356	330.9	927.8
131	357	376	253	313	356	330.6	928.4
132	357	375	253	312	355	330.3	929.1
133	357	375	254	312	355	330.4	932.7
134	356	375	254	310	355	330.1	946.6
135	356	375	255	311	355	330.2	959.6
136	356	374	255	310	355	329.9	967.8
137	356	374	256	309	354	329.8	973.7
138	355	374	256	309	354	329.6	978.6
139	355	373	257	309	354	329.5	980.2
140	355	372	257	309	354	329.4	970.8
141	355	372	257	309	353	329.0	959.2
142	354	371	257	307	353	328.2	950.9
143	353	370	256	305	353	327.5	945.0

WOODSTOVE SURFACE TEMPERATURE DATA

Client: Sherwood
Model: Ironwood 2.0-1
Run #: 2

Job #: 25-470
Tracking #: 243
Technician: AK
Date: 12/22/2025

Stove ΔT: 81

	Temperature Data (°F)						
Elapsed Time (min)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
144	353	369	255	303	353	326.7	941.3
145	352	369	255	301	353	326.0	938.9
146	351	368	254	300	353	325.3	935.5
147	350	367	253	296	353	323.9	932.5
148	349	367	253	295	354	323.4	928.7
149	348	366	252	294	354	322.7	924.7
150	348	365	251	290	354	321.7	920.4
151	347	364	251	288	354	320.8	916.1
152	346	364	250	286	354	319.8	911.9
153	345	363	250	284	354	319.1	908.4
154	344	362	249	282	354	318.1	905.2
155	343	361	249	280	355	317.3	901.9
156	342	360	247	278	355	316.4	899.1
157	342	359	248	276	355	315.8	895.5
158	341	358	248	274	355	315.1	892.5
159	340	357	248	273	355	314.6	889.6
160	340	357	247	271	355	313.9	886.8
161	339	356	247	269	355	313.2	885.2
162	339	355	247	268	355	312.7	885.2
163	338	354	247	267	355	312.3	887.4
164	337	354	247	267	355	311.9	889.0
165	337	353	247	265	355	311.3	890.9
166	336	352	247	264	355	310.9	892.3
167	336	352	247	263	355	310.6	893.3
168	335	351	248	263	355	310.6	893.0
169	335	351	249	263	356	310.5	891.9
170	335	350	249	262	355	310.3	890.9
171	335	350	251	262	355	310.7	891.1
172	335	350	252	261	354	310.4	893.5
173	335	350	253	261	355	310.7	898.8
174	336	350	254	261	355	311.0	908.0
175	336	350	255	262	355	311.3	916.8
176	336	350	256	262	354	311.7	921.1
177	336	351	257	263	354	312.3	933.7
178	337	351	259	264	354	312.8	945.0
179	337	351	260	267	354	313.9	945.0
180	337	351	260	268	354	314.0	942.9
181	337	351	262	271	354	314.9	942.3
182	337	351	263	272	353	315.4	942.2
183	337	352	264	274	353	316.1	947.7
184	338	353	266	275	353	316.7	959.5
185	338	354	268	276	353	317.6	967.9
186	339	355	270	278	352	318.8	970.4
187	339	357	273	280	352	320.2	966.9
188	340	358	276	282	352	321.5	956.6
189	340	360	279	283	352	322.8	942.7
190	341	362	280	284	351	323.7	926.1
191	342	364	283	284	351	324.8	909.5

WOODSTOVE SURFACE TEMPERATURE DATA

Client: Sherwood
Model: Ironwood 2.0-1
Run #: 2

Job #: 25-470
Tracking #: 243
Technician: AK
Date: 12/22/2025

Stove ΔT: 81

	Temperature Data (°F)						
Elapsed Time (min)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
192	342	366	285	284	351	325.7	895.6
193	343	369	288	282	351	326.6	881.0
194	344	372	289	281	351	327.2	864.6
195	344	374	291	279	350	327.6	846.5
196	345	377	292	276	350	328.0	828.2
197	345	380	292	273	350	328.0	810.8
198	346	382	294	270	350	328.3	794.6
199	346	384	294	267	349	328.2	780.4
200	346	385	295	265	350	328.1	768.1
201	347	387	294	261	350	327.8	757.3
202	347	389	295	258	350	327.6	748.2
203	347	390	295	254	349	327.1	740.5
204	348	391	295	251	349	326.6	734.2
205	347	392	295	249	349	326.2	728.7
206	348	393	294	246	349	325.9	724.2
207	348	393	294	244	349	325.4	720.3
208	347	394	294	241	349	324.9	717.0
209	347	394	293	239	349	324.4	714.1
210	347	395	293	237	349	324.1	711.9
211	347	395	294	235	348	323.7	710.5
212	347	395	294	233	348	323.7	709.5
213	347	395	294	231	348	323.2	709.0
214	347	395	295	230	347	322.8	708.6
215	347	395	296	229	348	322.9	708.5
216	347	395	296	227	347	322.6	709.9
217	347	394	298	227	347	322.5	709.6
218	347	394	297	226	347	322.0	707.4
219	347	393	296	225	347	321.4	705.2
220	346	392	293	225	346	320.5	703.3
221	346	392	291	223	346	319.6	701.9
222	345	391	289	223	346	318.7	700.7
223	344	391	287	221	346	317.7	700.0
224	343	390	284	221	347	317.0	698.9
225	342	389	282	220	347	316.0	697.5
226	341	388	280	220	348	315.3	696.2
227	340	387	278	219	348	314.4	694.5
228	339	386	276	219	349	313.8	693.5
229	338	385	274	218	349	312.9	692.7
230	337	384	273	217	350	312.3	692.2
231	336	384	271	216	351	311.7	691.8
232	335	382	270	215	352	310.8	691.5
233	334	382	269	215	353	310.3	691.6
234	333	381	267	215	354	309.8	691.8
235	332	380	266	214	355	309.3	692.0
236	331	379	265	214	355	308.7	692.9
237	331	378	264	213	356	308.3	693.9
238	330	377	263	212	356	307.6	694.6
239	329	376	262	212	357	307.3	694.8

WOODSTOVE SURFACE TEMPERATURE DATA

Client: Sherwood
Model: Ironwood 2.0-1
Run #: 2

Job #: 25-470
Tracking #: 243
Technician: AK
Date: 12/22/2025

Stove ΔT: 81

	Temperature Data (°F)						
Elapsed Time (min)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
240	328	375	261	212	358	306.6	694.2
241	327	374	260	211	358	306.0	693.1
242	326	373	258	212	359	305.5	691.6
243	326	372	258	211	359	305.1	690.1
244	325	371	257	210	360	304.5	688.8
245	324	370	256	210	360	303.9	687.4
246	323	369	255	210	361	303.5	686.1
247	323	367	254	209	361	302.7	685.1
248	322	366	253	208	360	301.9	684.7
249	321	365	252	208	361	301.5	684.5
250	320	364	251	207	361	300.8	684.4
251	320	362	250	207	362	300.2	684.1
252	319	361	249	207	362	299.6	684.0
253	318	360	248	207	362	298.9	683.7
254	318	358	248	206	362	298.4	683.8
255	317	357	247	206	362	297.8	684.6
256	317	356	247	206	362	297.4	686.3
257	316	354	246	206	362	296.9	688.4
258	316	353	245	205	363	296.4	690.4
259	315	352	244	205	363	295.7	692.0
260	315	350	244	205	363	295.2	693.3
261	314	349	243	205	362	294.8	694.0
262	314	348	243	205	362	294.4	694.8
263	314	347	243	205	362	293.9	695.9
264	314	346	243	204	362	293.6	696.9
265	313	344	242	204	362	293.1	697.8
266	313	343	242	204	362	292.7	698.1
267	313	342	242	203	361	292.1	697.9
268	313	341	241	204	361	291.9	697.3
269	313	340	241	204	360	291.5	697.1
270	312	338	241	203	360	291.0	698.5
271	312	337	241	203	360	290.8	702.4
272	312	336	241	203	360	290.4	707.8
273	312	335	241	203	359	290.0	713.5
274	312	334	240	203	359	289.6	719.6
275	312	333	240	203	358	289.3	724.0
276	312	332	241	204	358	289.5	725.5
277	312	331	242	204	357	289.2	725.2
278	313	331	242	204	357	289.2	722.3
279	313	330	243	204	356	289.1	718.5
280	314	329	243	204	355	289.0	714.7
281	314	329	244	204	355	288.9	711.7
282	315	328	244	203	354	288.9	709.1
283	315	327	245	203	354	288.9	705.3
284	316	327	246	203	353	288.9	697.1
285	316	326	248	203	353	289.2	685.8
286	316	326	250	202	353	289.5	674.6
287	317	326	253	201	352	289.5	665.1

WOODSTOVE SURFACE TEMPERATURE DATA

Client: Sherwood
Model: Ironwood 2.0-1
Run #: 2

Job #: 25-470
Tracking #: 243
Technician: AK
Date: 12/22/2025

Stove ΔT: 81

	Temperature Data (°F)						
Elapsed Time (min)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
288	317	325	255	200	351	289.7	656.5
289	317	325	257	199	351	289.9	648.9
290	318	325	259	198	350	290.1	642.4
291	318	325	261	197	349	289.9	636.8
292	318	325	264	196	349	290.2	631.8
293	318	325	266	195	348	290.3	627.6
294	318	325	268	194	348	290.5	624.6
295	318	325	270	193	347	290.7	622.2
296	319	325	272	192	346	290.7	620.7
297	319	325	274	190	346	290.7	619.6
298	319	325	276	190	345	290.9	619.5
299	319	325	277	189	344	291.0	619.6
300	320	325	279	189	343	291.1	619.9
301	320	325	280	189	343	291.3	619.4
302	321	325	282	189	342	291.5	618.7
303	321	325	283	187	341	291.5	618.7
304	322	325	284	187	340	291.5	618.5
305	322	325	285	187	340	291.8	618.7
306	322	325	286	186	339	291.7	619.0
307	323	324	287	186	338	291.8	619.4
308	323	324	288	186	338	291.8	620.0
309	324	324	288	186	337	291.8	620.2
310	324	324	289	186	336	291.9	620.5
311	324	324	289	186	336	291.8	620.7
312	325	324	291	186	335	291.9	620.6
313	325	323	292	186	334	292.1	620.5
314	326	323	293	185	334	292.1	620.6
315	327	323	294	185	333	292.3	620.6
316	327	323	295	185	332	292.4	620.6
317	327	322	296	185	332	292.6	620.3
318	328	322	298	185	331	292.8	620.2
319	329	322	298	186	331	293.0	620.2
320	329	322	299	185	330	293.0	620.8
321	330	322	300	185	329	293.2	621.5
322	330	322	300	185	329	293.1	622.4
323	331	321	301	185	328	293.2	623.9
324	331	321	301	186	327	293.1	625.3
325	332	321	301	186	327	293.3	627.1
326	332	321	302	186	326	293.2	629.4
327	332	321	301	185	326	293.0	631.5
328	333	321	301	185	325	293.0	633.9
329	333	320	301	186	324	292.9	635.7
330	334	320	301	186	323	292.8	637.7
331	334	320	301	186	323	292.7	639.4
332	334	320	300	187	322	292.7	641.2
333	335	320	300	187	322	292.8	642.9
334	334	320	300	187	321	292.5	645.5
Average	336.7	357.5	263.1	280.3	366.9	320.9	840.9

LAB SAMPLE DATA - ASTM E2515

Client: Sherwood
Model: Ironwood 2.0-1
Run #: 2

Job #: 25-470
Tracking #: 243
Technician: AK
Date: 12/22/2025

		Sample ID	Tare, mg	Final, mg	Catch, mg
Filters	**A**	G01449	229.1	235.6	6.5
	B	G01450	230.2	235.7	5.5
	C - 1st Hour	G01451	230.5	234.1	3.6
	Amb	G01452	228.9	229.0	0.1
Probes	**A**	14A	116638.1	116638.3	0.2
	B	14B	116627.8	116628.2	0.4
	C - 1st Hour	14C	116537.1	116537.2	0.1
O-rings	**A**	14A	3335.6	3335.8	0.2
	B	14B	3359.8	3360.1	0.3
	C - 1st Hour	14C	3435.6	3435.6	0.0

Placed in Dessicator on:	12/22/2025

		Balance Audit (mg):	200.0		200.0		200.0			
			Weight (mg)	Date/Time	Weight (mg)	Date/Time	Weight (mg)	Date/Time	Weight (mg)	Date/Time
Filters	**A**		235.5	12/26 14:00	235.6	12/29 10:15				
	B		235.8	12/26 14:00	235.7	12/29 10:15				
	C - 1st Hour		234.6	12/26 14:00	234.2	12/29 10:15	234.1	1/5 13:30		
	Amb		229.0	12/26 14:00	229.0	12/29 10:15				
Probes	**A**		116638.7	12/26 14:00	116638.3	12/29 10:15	116638.3	1/5 13:30		
	B		116628.8	12/26 14:00	116628.1	12/29 10:15	116628.2	1/5 13:30		
	C - 1st Hour		116537.4	12/26 14:00	116537.2	12/29 10:15				
O-Rings	**A**		3336.1	12/26 14:00	3335.9	12/29 10:15	3335.8	1/5 13:30		
	B		3360.2	12/26 14:00	3360.1	12/29 10:15				
	C - 1st Hour		3435.7	12/26 14:00	3435.6	12/29 10:15				

Train A Aggregate, mg:	**6.9**
Train B Aggregate, mg:	**6.2**
Train C Aggregate, mg:	**3.7**
Ambient, mg:	**0.1**

ASTM E2780 Wood Heater Run Sheets

Client: Sherwood Job Number: 25-470 Tracking #: 243
Model: Ironwood 2.0-1 Run Number: 2 Test Date: 12/22/25

Wood Heater Run Notes

Test Control Settings

Primary Air Setting(s): Fully closed (7/32")
Targeted Burn Category: I

Preburn Notes

Time	Notes
	-None-

Test Notes

Test Burn Start Time: 13:23 Test Fuel Loaded by: 30 seconds
Door Closed: 40 seconds Air Control Set at: 300 seconds
Other Loading Notes: Bypass opened & closed with door, fan on high

Time	Notes
	-None-

Test Burn End Time: 18:57

Flue Gas Concentration Measurement

Calibration Gas Values: Span Gas CO_2 (%): 17.32 CO (%): 4.350
Mid Gas CO_2 (%): 10.02 CO (%): 2.530

Calibration Results:

	Pre Test			Post Test		
	Zero	Span	Mid	Zero	Span	Mid
Time	10:57	10:59	11:00	19:39	19:41	19:42
CO_2	0.00	17.32	10.26	-0.05	17.29	10.22
CO	0.000	4.349	2.533	-0.017	4.339	2.542

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

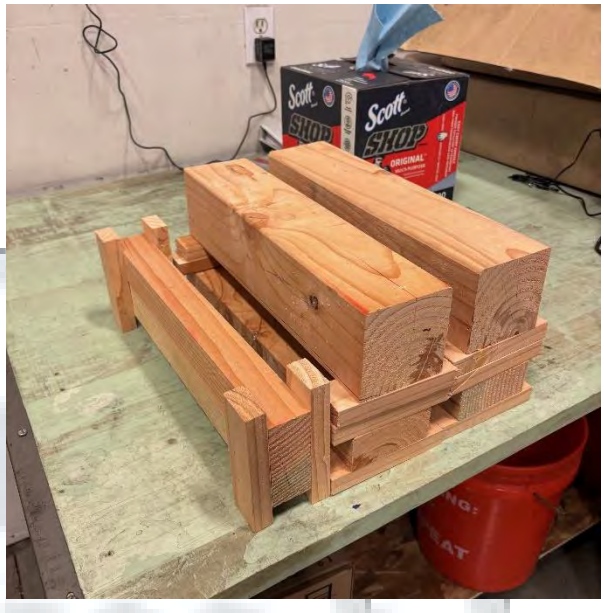
Technician Signature: Date: 1/14/26

ASTM E2780 Wood Heater Run Sheets

Client: Sherwood | Job Number: 25-470 | Tracking #: 243
Model: Ironwood 2.0-1 | Run Number: 2 | Test Date: 12/22/25



Test Fuel Front/Side View



Test Fuel Iso View



Test Fuel Loaded in Stove



Air Settings

Technician Signature: _____ Date: 1/14/26

WOOD STOVE TEST DATA PACKET
ASTM E2780/E2515

Run 3 Data Summary

Client:	Sherwood
Model:	Ironwood 2.0-1
Job #:	25-470
Tracking #:	243
Test Date:	12/23/2025

Technician Signature

1/14/2026
Date

TEST RESULTS - ASTM E2780 / ASTM E2515

Client: Sherwood
Model: Ironwood 2.0-1
Run #: 3

Job #: 25-470
Tracking #: 243
Technician: AK
Date: 12/23/2025

Burn Rate (kg/hr):	1.08

	Ambient Sample	Sample Train A	Sample Train B	1st Hour Filter
Total Sample Volume (ft^3)	60.623	45.711	44.673	8.617
Average Gas Velocity in Dilution Tunnel (ft/sec)	19.7			
Average Gas Flow Rate in Dilution Tunnel (dscf/hr)	12994.0			
Average Gas Meter Temperature (°F)	65.5	91.8	91.8	79.2
Total Sample Volume (dscf)	60.196	44.455	42.590	8.376
Average Tunnel Temperature (°F)	88.9			
Total Time of Test (min)	285			
Total Particulate Catch (mg)	0.1	5.4	5.1	2.4
Particulate Concentration, dry-standard (g/dscf)	0.0000017	0.0001215	0.0001197	0.0002865
Total PM Emissions (g)	0.10	7.39	7.29	3.70
Particulate Emission Rate (g/hr)	0.02	1.56	1.53	3.70
Emissions Factor (g/kg)	-	1.44	1.42	-
Difference from Average Total Particulate Emissions (g)	-	0.05	0.05	-
Difference from Average Total Particulate Emissions (%)	-	0.7%	0.7%	
Difference from Average Emissions Factor (g/kg)	-	0.01	0.01	-

Final Average Results	
Total Particulate Emissions (g)	7.34
Particulate Emission Rate (g/hr)	1.55
Emissions Factor (g/kg)	1.43
HHV Efficiency (%)	77.5%
LHV Efficiency (%)	83.7%
CO Emissions (g/min)	0.40

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	75.4	OK
Face Velocity	< 30 ft/min	9.0	OK
Leakage Rate	Less than 4% of average sample rate	0 cfm	OK
Ambient Temp	55-90 °F	Min:61.8/Max:66.8	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	104.7	OK

B415.1 Efficiency Results

Manufacturer:	Sherwood
Model:	Ironwood 2.0-1
Date:	12/23/25
Run:	3
Control #:	25-470
Test Duration:	285
Output Category:	2

Test Results in Accordance with CSA B415.1-09

	HHV Basis	LHV Basis
Overall Efficiency	77.5%	83.7%
Combustion Efficiency	98.9%	98.9%
Heat Transfer Efficiency	78.3%	84.6%

Output Rate (kJ/h)	16,476	15,629	**(Btu/h)**
Burn Rate (kg/h)	1.07	2.37	**(lb/h)**
Input (kJ/h)	21,273	20,179	**(Btu/h)**

Test Load Weight (dry kg)	5.10	11.24	**dry lb**
MC wet (%)	18.00		
MC dry (%)	21.95		
Particulate (g)	7.34		
CO (g)	113		
Test Duration (h)	4.75		

Emissions	**Particulate**	**CO**
g/MJ Output	0.09	1.44
g/kg Dry Fuel	1.44	22.07
g/h	1.55	23.70
g/min	0.03	0.40
lb/MM Btu Output	0.22	3.34

Air/Fuel Ratio (A/F)	17.23

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

WOODSTOVE FUEL DATA - ASTM E2780

Client: Sherwood
Model: Ironwood 2.0-1
Run #: 3

Job #: 25-470
Tracking #: 243
Technician: AK
Date: 12/23/2025

Preburn Fuel Information

Size	Length (in)	Moisture Content (% DB)	Size	Length (in)	Moisture Content (% DB)
2x4	12.00	20.8			
2x4	12.00	19.4			
2x4	12.00	22.9			
2x4	12.00	23.3			
2x4	12.00	22.7			
2x4	12.00	21.1			

Total Fuel Weight (lbs): 8.75
Average Moisture (%DB): 21.7

Firebox Volume (ft^3): 1.80
Total 2x4 Crib Weight, with spacers (lbs): 5.75
Total 4x4 Crib Weight, with spacers (lbs): 7.99
Total Wet Fuel Weight, with spacers (lbs): 13.74

Coal Bed Range (20-25%):
Min (lbs): 2.75
Max (lbs): 3.44

Test Fuel Information

Size	Length (in)	Weight (lbs)	Moisture Content (%DB)			Dry Weight (lbs)
4x4	14.75	3.87	24.7	24.5	23.8	3.11
4x4	14.75	3.94	22.3	23.3	22.5	3.21
2x4	14.75	1.65	20.4	21.3	22.4	1.36
2x4	14.75	1.55	19.5	21.9	21.8	1.28
2x4	14.75	1.37	20.4	20.5	20.0	1.14

Total Dry Weight, no spacers (lbs): 10.10
Total Dry Weight, with spacers (lbs): 11.32

Spacer Moisture Readings (%DB)

11.9	11.9						
12.4	10.0						
10.3	12.2						
10.2	12.5						
12.2	11.1						
9.7	12.2						
12.2	11.7						
10.1	10.8						

Quality Checks	Requirement	Observed	Result
Fuel Density	25 - 36 (lbs/ft^3, DB)	29.4	OK
Loading Density	6.3 - 7.7 (lbs/ft^3, WB)	7.63	OK
2x4 Fuel Mix	35 - 65 % of total weight	42%	OK

DILUTION TUNNEL & MISC. DATA - ASTM E2780 / E2515

Client:	Sherwood	Job #:	25-470
Model:	Ironwood 2.0-1	Tracking #:	243
Run #:	3	Technician:	AK
Test Start Time:	11:42	Date:	12/23/2025

Total Sampling Time (min):	285	
Recording Interval (min):	1	
Meter Box γ Factor:	1.021	(A)
Meter Box γ Factor:	1.001	(B)
Meter Box γ Factor:	1.001	(C)
Meter Box γ Factor:	0.999	(Ambient)
Induced Draft Check (in. H_2O):	0	
Smoke Capture Check (%):	100%	
Date Flue Pipe Last Cleaned:	12/17/2025	
Test Fuel Scale Audit (lbs)	10.00	
Platform Scale Audit (lbs)	10.0	

	Pre-Test	Post Test	Avg.
Barometric Pressure (in. Hg)	29.67	29.55	29.61
Relative Humidity (%)	30.9	29.3	
Room Air Velocity (ft/min)	<50	<50	
Pitot Tube Leak Check	0	0	
Ambient Sample Volume:		60.623	ft^3

Sample Train Leak Checks

	Pre-test	Post-test			
(A)	0.000	0.000	cfm @	-6	in. Hg
(B)	0.000	0.000	cfm @	-6	in. Hg
(C)	0.000	0.000	cfm @	-7	in. Hg
(Ambient)	0.000	0.000	cfm @	-13	in. Hg

DILUTION TUNNEL FLOW

Traverse Data

Point	dP (in H_2O)	Temp (°F)
1	0.054	74
2	0.096	74
3	0.096	74
4	0.066	74
5	0.078	74
6	0.106	74
7	0.106	74
8	0.060	74
Center	0.092	74

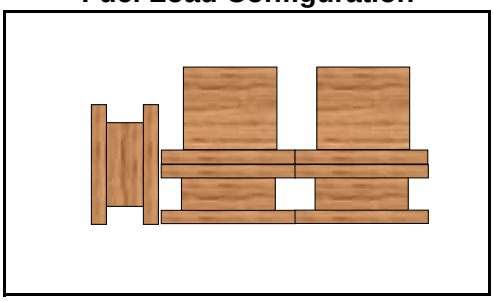
Dilution Tunnel H_2O:	2.00	percent
Tunnel Diameter:	6	inches
Pitot Tube Cp:	0.99	[unitless]
Dilution Tunnel MW(dry):	29.00	lb/lb-mole
Dilution Tunnel MW(wet):	28.78	lb/lb-mole
Tunnel Area:	0.1963	ft^2
V_{strav}:	19.12	ft/sec
V_{scent}:	20.30	ft/sec
F_p:	0.941	[ratio]
Initial Tunnel Flow:	216.1	scf/min

Static Pressure: -0.160 in. H_2O

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)	22.0

WOODSTOVE PREBURN DATA - ASTM E2780

Client: Sherwood
Model: Ironwood 2.0-1
Run #: 3

Job #: 25-470
Tracking #: 243
Technician: AK
Date: 12/23/2025

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	6.47	-0.089	634	653	529	530	519	573.0	673	66
1	6.22	-0.085	635	653	529	527	523	573.5	533	66
2	6.00	-0.082	635	652	527	519	526	571.6	469	66
3	5.84	-0.077	632	648	521	508	528	567.6	430	66
4	5.70	-0.076	628	644	513	495	532	562.6	406	66
5	5.57	-0.077	625	640	506	483	534	557.6	389	66
6	5.45	-0.077	620	636	497	473	536	552.5	377	66
7	5.33	-0.073	616	631	492	462	538	547.8	368	66
8	5.23	-0.073	611	627	483	454	540	542.9	360	65
9	5.11	-0.070	607	622	478	449	541	539.3	354	65
10	5.01	-0.069	603	617	472	441	541	534.9	349	65
11	4.92	-0.072	598	613	465	439	542	531.3	346	65
12	4.83	-0.068	594	608	460	437	542	528.1	343	65
13	4.73	-0.067	590	604	456	436	541	525.1	338	65
14	4.66	-0.066	585	600	452	433	540	521.9	334	65
15	4.57	-0.067	581	595	447	430	539	518.4	332	66
16	4.48	-0.067	577	591	444	428	537	515.5	329	66
17	4.42	-0.067	573	587	440	426	535	512.2	326	66
18	4.35	-0.069	569	583	437	425	534	509.3	325	66
19	4.28	-0.067	565	579	433	423	531	506.1	321	66
20	4.23	-0.063	561	576	428	421	529	503.1	318	66
21	4.18	-0.063	557	573	425	420	526	500.3	315	65
22	4.11	-0.064	554	570	420	418	524	497.3	312	65
23	4.03	-0.064	551	567	416	415	522	494.1	310	65
24	3.99	-0.060	547	563	413	414	520	491.5	308	64
25	3.93	-0.061	544	560	410	412	517	488.5	308	65
26	3.87	-0.060	541	557	407	410	515	485.9	305	65
27	3.83	-0.060	538	553	404	407	513	483.2	303	65
28	3.78	-0.061	534	551	402	403	510	480.1	300	65
29	3.73	-0.058	532	548	400	400	508	477.6	300	65
30	3.69	-0.059	529	545	398	400	506	475.5	299	66
31	3.66	-0.057	527	543	397	395	504	473.1	298	66
32	3.63	-0.060	524	540	396	394	502	471.0	296	66
33	3.60	-0.058	521	537	395	390	499	468.5	294	66
34	3.57	-0.059	519	534	395	387	497	466.4	289	66
35	3.56	-0.057	516	531	394	386	495	464.2	288	66
36	3.54	-0.056	514	527	393	380	492	461.5	285	66
37	3.52	-0.053	512	524	392	376	490	458.7	282	66
38	3.50	-0.055	510	521	390	371	488	455.5	280	66
39	3.47	-0.056	508	517	387	366	486	452.7	280	66
40	3.44	-0.056	505	514	385	361	483	449.6	277	66
41	3.42	-0.053	504	510	383	356	482	446.7	275	66
42	3.41	-0.051	502	507	380	351	480	443.8	271	66
43	3.39	-0.051	500	503	378	345	479	441.0	267	66
44	3.36	-0.053	498	500	376	339	477	438.1	265	66

WOODSTOVE PREBURN DATA - ASTM E2780

Client: Sherwood
Model: Ironwood 2.0-1
Run #: 3

Job #: 25-470
Tracking #: 243
Technician: AK
Date: 12/23/2025

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	3.34	-0.049	497	497	375	335	476	435.8	264	66
46	3.31	-0.052	494	494	372	330	475	433.1	262	66
47	3.31	-0.050	492	491	371	325	473	430.2	260	66
48	3.28	-0.052	489	488	370	319	473	427.6	257	66
49	3.27	-0.050	486	485	368	314	472	425.0	254	66
50	3.23	-0.051	483	482	367	308	472	422.4	252	66
51	3.22	-0.049	480	479	366	303	471	419.9	251	66
52	3.21	-0.050	478	477	364	300	470	417.8	248	66
53	3.20	-0.049	475	474	363	295	470	415.6	245	66
54	3.17	-0.048	473	472	362	291	470	413.5	243	66
55	3.15	-0.047	471	470	361	286	470	411.4	242	66
56	3.13	-0.048	468	468	360	282	470	409.6	241	66
57	3.11	-0.048	466	466	359	279	469	407.7	238	66
58	3.10	-0.048	464	464	358	275	469	406.2	237	66
59	3.08	-0.044	462	462	357	272	470	404.6	237	66
60	3.06	-0.048	460	460	356	269	470	402.9	235	66

BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: Sherwood
Model: Ironwood 2.0-1
Run #: 3

Job #: 25-470
Tracking #: 243
Technician: AK
Date: 12/23/2025

	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		0.093	0.00	72	0.1		13.71		98	301	70	67
1	0.128	0.128	0.094	2.11	71	0.9	-	13.64	-0.07	104	316	71	67
2	0.270	0.142	0.096	2.14	71	1.0	-	13.52	-0.12	104	316	72	67
3	0.413	0.143	0.094	2.17	71	1.0	-	13.33	-0.19	104	346	72	67
4	0.560	0.147	0.093	2.18	71	1.0	-	13.16	-0.17	106	382	73	67
5	0.703	0.143	0.095	2.17	72	1.0	-	13.00	-0.16	107	400	73	67
6	0.851	0.148	0.094	2.19	72	1.0	-	12.88	-0.12	103	363	73	67
7	0.993	0.142	0.094	2.21	72	1.0	-	12.81	-0.07	100	341	73	67
8	1.143	0.150	0.094	2.22	72	1.0	-	12.77	-0.04	98	326	73	67
9	1.286	0.143	0.095	2.24	72	1.0	-	12.70	-0.07	97	317	73	67
10	1.437	0.151	0.094	2.25	72	1.0	94	12.63	-0.07	97	312	73	67
11	1.583	0.146	0.093	2.27	72	1.0	-	12.57	-0.06	96	308	73	67
12	1.735	0.152	0.094	2.30	72	1.0	-	12.50	-0.07	96	304	73	67
13	1.881	0.146	0.094	2.31	73	1.0	-	12.41	-0.09	95	301	73	67
14	2.034	0.153	0.095	2.33	73	1.0	-	12.33	-0.08	96	298	73	67
15	2.181	0.147	0.094	2.34	73	1.0	-	12.24	-0.09	96	298	73	67
16	2.334	0.153	0.093	2.34	73	1.0	-	12.16	-0.08	95	300	74	67
17	2.482	0.148	0.095	2.35	74	1.0	-	12.09	-0.07	95	298	74	66
18	2.635	0.153	0.093	2.36	74	1.0	-	12.01	-0.08	95	298	74	66
19	2.783	0.148	0.096	2.36	74	1.0	-	11.93	-0.08	95	300	74	67
20	2.938	0.155	0.096	2.38	75	1.0	97	11.86	-0.07	95	301	74	66
21	3.087	0.149	0.095	2.39	75	1.0	-	11.78	-0.08	95	301	74	66
22	3.243	0.156	0.096	2.39	75	1.0	-	11.68	-0.10	95	299	74	65
23	3.393	0.150	0.095	2.39	76	1.0	-	11.56	-0.12	95	295	74	65
24	3.550	0.157	0.095	2.41	76	1.0	-	11.48	-0.08	95	294	74	64
25	3.700	0.150	0.095	2.41	76	1.0	-	11.39	-0.09	95	292	74	64
26	3.857	0.157	0.094	2.43	77	1.0	-	11.31	-0.08	94	289	74	64
27	4.007	0.150	0.095	2.42	77	1.0	-	11.22	-0.09	95	290	74	63
28	4.163	0.156	0.096	2.44	78	1.0	-	11.13	-0.09	95	290	74	63
29	4.317	0.154	0.095	2.44	78	1.0	-	11.03	-0.10	95	289	74	63
30	4.472	0.155	0.095	2.44	78	1.0	99	10.95	-0.08	94	288	74	63
31	4.629	0.157	0.096	2.45	79	1.0	-	10.85	-0.10	94	288	74	63

BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: Sherwood
Model: Ironwood 2.0-1
Run #: 3

Job #: 25-470
Tracking #: 243
Technician: AK
Date: 12/23/2025

	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	4.781	0.152	0.095	2.45	79	1.0	-	10.75	-0.10	94	286	73	63
33	4.939	0.158	0.095	2.46	79	1.0	-	10.68	-0.07	94	289	73	62
34	5.090	0.151	0.095	2.45	80	1.0	-	10.58	-0.10	95	288	73	62
35	5.250	0.160	0.095	2.47	80	1.0	-	10.48	-0.10	94	288	73	62
36	5.404	0.154	0.096	2.47	80	1.0	-	10.39	-0.09	94	289	73	62
37	5.560	0.156	0.097	2.48	81	1.0	-	10.29	-0.10	94	289	73	62
38	5.716	0.156	0.096	2.46	81	1.0	-	10.19	-0.10	94	292	73	62
39	5.873	0.157	0.096	2.49	81	1.0	-	10.09	-0.10	94	292	73	62
40	6.031	0.158	0.094	2.49	82	1.0	100	9.98	-0.11	95	294	73	62
41	6.184	0.153	0.095	2.49	82	1.0	-	9.87	-0.11	95	296	73	62
42	6.343	0.159	0.096	2.48	82	1.0	-	9.76	-0.11	95	297	73	62
43	6.498	0.155	0.095	2.50	82	1.0	-	9.66	-0.10	95	299	73	62
44	6.657	0.159	0.096	2.50	83	1.0	-	9.54	-0.12	95	299	73	62
45	6.812	0.155	0.094	2.49	83	1.0	-	9.40	-0.14	95	301	73	62
46	6.970	0.158	0.093	2.50	83	1.0	-	9.27	-0.13	96	304	73	62
47	7.129	0.159	0.095	2.51	84	1.0	-	9.16	-0.11	96	307	73	62
48	7.282	0.153	0.094	2.51	84	1.0	-	9.03	-0.13	96	308	73	62
49	7.443	0.161	0.095	2.50	84	1.0	-	8.92	-0.11	95	310	73	63
50	7.598	0.155	0.093	2.50	84	1.0	101	8.83	-0.09	95	310	73	63
51	7.757	0.159	0.093	2.50	84	1.0	-	8.72	-0.11	95	309	73	63
52	7.914	0.157	0.095	2.50	85	1.0	-	8.62	-0.10	96	307	73	64
53	8.072	0.158	0.095	2.51	85	1.0	-	8.53	-0.09	95	304	73	64
54	8.232	0.160	0.093	2.52	85	1.0	-	8.43	-0.10	95	305	73	64
55	8.386	0.154	0.094	2.51	85	1.1	-	8.33	-0.10	95	303	73	64
56	8.549	0.163	0.095	2.52	85	1.0	-	8.26	-0.07	95	304	73	65
57	8.704	0.155	0.096	2.52	86	1.0	-	8.18	-0.08	95	304	73	65
58	8.863	0.159	0.095	2.52	86	1.0	-	8.07	-0.11	95	306	73	65
59	9.023	0.160	0.094	2.53	86	1.0	-	7.97	-0.10	95	304	73	65
60	9.179	0.156	0.095	2.52	86	1.0	101	7.89	-0.08	95	306	73	65
61	9.340	0.161	0.094	2.53	86	1.0	-	7.80	-0.09	95	305	73	65
62	9.497	0.157	0.095	2.53	87	1.0	-	7.71	-0.09	95	304	73	65
63	9.657	0.160	0.095	2.54	87	1.0	-	7.63	-0.08	94	304	73	65

BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: Sherwood
Model: Ironwood 2.0-1
Run #: 3

Job #: 25-470
Tracking #: 243
Technician: AK
Date: 12/23/2025

	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	9.816	0.159	0.095	2.54	87	1.0	-	7.57	-0.06	94	302	73	65
65	9.975	0.159	0.094	2.55	88	1.0	-	7.47	-0.10	94	304	73	66
66	10.135	0.160	0.094	2.55	88	1.0	-	7.39	-0.08	94	303	73	66
67	10.292	0.157	0.095	2.55	88	1.0	-	7.34	-0.05	94	301	73	66
68	10.454	0.162	0.094	2.55	88	1.0	-	7.25	-0.09	94	300	73	66
69	10.611	0.157	0.094	2.54	88	1.0	-	7.18	-0.07	94	299	73	66
70	10.771	0.160	0.095	2.54	88	1.0	101	7.11	-0.07	93	296	73	66
71	10.932	0.161	0.095	2.56	89	1.0	-	7.05	-0.06	93	294	73	66
72	11.093	0.161	0.093	2.55	89	1.1	-	6.99	-0.06	93	294	73	66
73	11.252	0.159	0.095	2.55	89	1.0	-	6.90	-0.09	93	292	73	66
74	11.409	0.157	0.095	2.56	89	1.0	-	6.84	-0.06	93	294	74	66
75	11.570	0.161	0.094	2.55	89	1.0	-	6.75	-0.09	93	292	74	66
76	11.731	0.161	0.095	2.55	89	1.0	-	6.70	-0.05	93	290	74	66
77	11.889	0.158	0.095	2.56	90	1.0	-	6.63	-0.07	92	290	73	66
78	12.052	0.163	0.094	2.56	90	1.0	-	6.56	-0.07	92	288	73	66
79	12.210	0.158	0.096	2.56	90	1.0	-	6.52	-0.04	92	286	74	66
80	12.371	0.161	0.094	2.56	90	1.0	101	6.43	-0.09	92	286	74	66
81	12.533	0.162	0.093	2.57	90	1.0	-	6.35	-0.08	92	285	73	66
82	12.691	0.158	0.095	2.57	91	1.0	-	6.27	-0.08	92	285	74	66
83	12.853	0.162	0.096	2.57	91	1.0	-	6.20	-0.07	92	283	74	66
84	13.012	0.159	0.095	2.57	91	1.0	-	6.12	-0.08	92	282	74	66
85	13.173	0.161	0.094	2.57	91	1.0	-	6.04	-0.08	92	284	74	66
86	13.335	0.162	0.095	2.56	91	1.1	-	5.97	-0.07	92	284	74	66
87	13.493	0.158	0.096	2.57	91	1.0	-	5.89	-0.08	92	285	74	66
88	13.656	0.163	0.094	2.58	92	1.0	-	5.79	-0.10	92	285	74	66
89	13.817	0.161	0.094	2.57	92	1.0	-	5.72	-0.07	92	287	74	66
90	13.975	0.158	0.094	2.58	92	1.0	101	5.65	-0.07	92	285	74	66
91	14.139	0.164	0.096	2.58	92	1.0	-	5.58	-0.07	92	285	74	66
92	14.298	0.159	0.095	2.58	92	1.1	-	5.52	-0.06	91	285	74	66
93	14.459	0.161	0.093	2.58	92	1.0	-	5.46	-0.06	91	284	74	66
94	14.622	0.163	0.094	2.58	92	1.0	-	5.40	-0.06	91	282	74	66
95	14.780	0.158	0.095	2.59	92	1.0	-	5.36	-0.04	91	280	74	66

BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: Sherwood
Model: Ironwood 2.0-1
Run #: 3

Job #: 25-470
Tracking #: 243
Technician: AK
Date: 12/23/2025

	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	14.945	0.165	0.094	2.59	93	1.0	-	5.28	-0.08	91	278	74	66
97	15.103	0.158	0.094	2.58	93	1.0	-	5.23	-0.05	91	278	74	66
98	15.265	0.162	0.095	2.58	93	1.0	-	5.18	-0.05	90	276	74	66
99	15.427	0.162	0.095	2.58	93	1.0	-	5.13	-0.05	90	275	74	66
100	15.586	0.159	0.094	2.57	93	1.1	101	5.08	-0.05	90	274	74	66
101	15.750	0.164	0.095	2.59	93	1.0	-	5.04	-0.04	90	273	74	66
102	15.910	0.160	0.095	2.59	93	1.0	-	4.99	-0.05	90	272	73	66
103	16.072	0.162	0.095	2.59	93	1.0	-	4.95	-0.04	90	274	73	66
104	16.234	0.162	0.095	2.59	93	1.1	-	4.89	-0.06	90	273	73	66
105	16.395	0.161	0.096	2.60	93	1.0	-	4.85	-0.04	90	272	73	66
106	16.556	0.161	0.096	2.59	94	1.0	-	4.81	-0.04	89	273	73	66
107	16.720	0.164	0.095	2.59	94	1.0	-	4.75	-0.06	89	272	73	66
108	16.878	0.158	0.094	2.61	94	1.0	-	4.72	-0.03	89	272	73	66
109	17.044	0.166	0.095	2.58	94	1.0	-	4.68	-0.04	89	271	73	66
110	17.202	0.158	0.095	2.60	94	1.1	101	4.63	-0.05	89	272	73	66
111	17.365	0.163	0.095	2.59	94	1.1	-	4.59	-0.04	89	270	73	66
112	17.528	0.163	0.095	2.60	94	1.0	-	4.54	-0.05	89	269	73	66
113	17.688	0.160	0.094	2.60	94	1.1	-	4.50	-0.04	89	269	73	66
114	17.851	0.163	0.096	2.59	94	1.0	-	4.45	-0.05	89	271	73	66
115	18.013	0.162	0.094	2.59	94	1.1	-	4.41	-0.04	89	270	73	66
116	18.172	0.159	0.096	2.59	94	1.1	-	4.36	-0.05	89	271	73	66
117	18.338	0.166	0.096	2.60	95	1.0	-	4.32	-0.04	88	271	73	66
118	18.497	0.159	0.094	2.59	95	1.0	-	4.27	-0.05	88	269	73	66
119	18.660	0.163	0.094	2.60	95	1.0	-	4.24	-0.03	88	271	73	66
120	18.823	0.163	0.095	2.60	95	1.1	101	4.18	-0.06	89	272	73	66
121	18.982	0.159	0.094	2.59	95	1.0	-	4.14	-0.04	89	272	73	66
122	19.147	0.165	0.094	2.59	95	1.0	-	4.10	-0.04	89	273	73	66
123	19.308	0.161	0.096	2.60	95	1.0	-	4.05	-0.05	89	272	73	66
124	19.470	0.162	0.094	2.61	95	1.0	-	4.00	-0.05	88	272	73	66
125	19.633	0.163	0.093	2.60	95	1.0	-	3.95	-0.05	88	275	73	66
126	19.794	0.161	0.095	2.60	95	1.0	-	3.90	-0.05	88	274	73	66
127	19.956	0.162	0.095	2.59	95	1.0	-	3.86	-0.04	88	276	73	66

BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: Sherwood
Model: Ironwood 2.0-1
Run #: 3

Job #: 25-470
Tracking #: 243
Technician: AK
Date: 12/23/2025

	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	20.120	0.164	0.095	2.60	95	1.0	-	3.80	-0.06	88	277	73	66
129	20.278	0.158	0.096	2.59	95	1.0	-	3.77	-0.03	88	278	73	66
130	20.445	0.167	0.096	2.60	95	1.0	100	3.72	-0.05	88	278	73	66
131	20.604	0.159	0.096	2.59	95	1.1	-	3.66	-0.06	88	276	73	66
132	20.767	0.163	0.094	2.59	95	1.1	-	3.60	-0.06	89	277	73	66
133	20.930	0.163	0.096	2.59	95	1.0	-	3.56	-0.04	89	278	73	66
134	21.091	0.161	0.096	2.59	96	1.0	-	3.51	-0.05	88	279	73	66
135	21.253	0.162	0.095	2.60	96	1.0	-	3.46	-0.05	88	279	73	66
136	21.418	0.165	0.097	2.60	96	1.0	-	3.41	-0.05	88	278	73	66
137	21.576	0.158	0.095	2.59	96	1.0	-	3.36	-0.05	88	277	73	66
138	21.742	0.166	0.094	2.60	96	1.0	-	3.32	-0.04	88	275	73	66
139	21.902	0.160	0.095	2.60	96	1.0	-	3.25	-0.07	88	275	73	66
140	22.065	0.163	0.094	2.60	96	1.0	100	3.21	-0.04	89	273	73	66
141	22.229	0.164	0.096	2.60	96	1.0	-	3.16	-0.05	88	273	73	66
142	22.389	0.160	0.095	2.61	96	1.1	-	3.12	-0.04	88	274	73	66
143	22.552	0.163	0.096	2.60	96	1.1	-	3.06	-0.06	88	273	73	66
144	22.717	0.165	0.096	2.61	96	1.0	-	3.02	-0.04	88	272	73	66
145	22.875	0.158	0.096	2.61	96	1.0	-	2.97	-0.05	88	271	73	66
146	23.042	0.167	0.094	2.60	96	1.0	-	2.94	-0.03	88	272	73	66
147	23.202	0.160	0.095	2.60	96	1.0	-	2.89	-0.05	88	272	73	66
148	23.365	0.163	0.096	2.61	96	1.0	-	2.82	-0.07	88	271	73	66
149	23.529	0.164	0.094	2.60	96	1.1	-	2.76	-0.06	88	272	73	66
150	23.690	0.161	0.095	2.61	96	1.0	101	2.72	-0.04	88	272	73	66
151	23.852	0.162	0.094	2.60	96	1.0	-	2.67	-0.05	88	273	73	66
152	24.018	0.166	0.095	2.61	96	1.1	-	2.62	-0.05	88	273	73	66
153	24.176	0.158	0.095	2.60	96	1.0	-	2.58	-0.04	88	273	73	66
154	24.343	0.167	0.096	2.62	96	1.0	-	2.54	-0.04	88	273	73	66
155	24.503	0.160	0.094	2.61	96	1.0	-	2.49	-0.05	88	272	73	66
156	24.666	0.163	0.095	2.61	96	1.1	-	2.45	-0.04	88	271	73	66
157	24.830	0.164	0.095	2.60	96	1.0	-	2.41	-0.04	88	271	73	66
158	24.991	0.161	0.094	2.61	97	1.0	-	2.37	-0.04	88	270	73	66
159	25.154	0.163	0.096	2.61	97	1.0	-	2.34	-0.03	88	270	73	66

BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: Sherwood
Model: Ironwood 2.0-1
Run #: 3

Job #: 25-470
Tracking #: 243
Technician: AK
Date: 12/23/2025

	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	25.318	0.164	0.094	2.61	97	1.0	101	2.30	-0.04	87	268	73	66
161	25.477	0.159	0.095	2.60	97	1.0	-	2.27	-0.03	87	265	73	66
162	25.643	0.166	0.095	2.61	97	1.0	-	2.25	-0.02	87	265	73	66
163	25.805	0.162	0.094	2.60	97	1.1	-	2.20	-0.05	87	264	73	66
164	25.966	0.161	0.094	2.61	97	1.0	-	2.17	-0.03	87	263	73	66
165	26.132	0.166	0.094	2.61	97	1.0	-	2.15	-0.02	87	262	73	66
166	26.291	0.159	0.095	2.60	97	1.0	-	2.12	-0.03	87	262	73	66
167	26.456	0.165	0.095	2.60	97	1.0	-	2.10	-0.02	87	263	73	66
168	26.619	0.163	0.095	2.60	97	1.0	-	2.08	-0.02	87	262	73	66
169	26.780	0.161	0.095	2.61	97	1.1	-	2.04	-0.04	86	259	73	66
170	26.944	0.164	0.096	2.61	97	1.0	100	2.03	-0.01	86	257	73	66
171	27.108	0.164	0.096	2.60	97	1.0	-	2.00	-0.03	87	256	73	66
172	27.268	0.160	0.094	2.61	97	1.0	-	1.97	-0.03	87	254	73	66
173	27.435	0.167	0.095	2.61	97	1.0	-	1.96	-0.01	86	253	73	66
174	27.595	0.160	0.096	2.61	97	1.0	-	1.93	-0.03	86	251	73	66
175	27.758	0.163	0.096	2.60	97	1.0	-	1.90	-0.03	86	249	73	66
176	27.923	0.165	0.096	2.62	97	1.1	-	1.90	0.00	86	246	73	66
177	28.083	0.160	0.096	2.61	97	1.0	-	1.87	-0.03	86	244	73	66
178	28.247	0.164	0.095	2.61	97	1.0	-	1.85	-0.02	86	244	73	66
179	28.412	0.165	0.095	2.61	97	1.1	-	1.82	-0.03	86	242	73	66
180	28.571	0.159	0.094	2.61	97	1.1	100	1.81	-0.01	86	240	73	66
181	28.738	0.167	0.096	2.61	97	1.1	-	1.78	-0.03	85	240	73	66
182	28.898	0.160	0.096	2.60	97	1.0	-	1.76	-0.02	85	239	73	66
183	29.062	0.164	0.097	2.61	97	1.0	-	1.75	-0.01	85	236	72	66
184	29.226	0.164	0.096	2.61	97	1.0	-	1.73	-0.02	85	235	73	66
185	29.387	0.161	0.096	2.61	97	1.0	-	1.71	-0.02	85	233	73	66
186	29.550	0.163	0.095	2.60	97	1.0	-	1.69	-0.02	85	234	73	66
187	29.715	0.165	0.096	2.61	97	1.1	-	1.67	-0.02	85	234	73	66
188	29.874	0.159	0.094	2.61	97	1.0	-	1.65	-0.02	85	234	72	66
189	30.040	0.166	0.095	2.60	97	1.0	-	1.63	-0.02	85	233	72	65
190	30.203	0.163	0.095	2.60	97	1.1	101	1.62	-0.01	84	231	72	66
191	30.363	0.160	0.095	2.61	97	1.0	-	1.60	-0.02	85	230	72	66

BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: Sherwood
Model: Ironwood 2.0-1
Run #: 3

Job #: 25-470
Tracking #: 243
Technician: AK
Date: 12/23/2025

	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	30.530	0.167	0.094	2.59	97	1.0	-	1.58	-0.02	85	229	72	66
193	30.689	0.159	0.094	2.61	97	1.0	-	1.56	-0.02	85	230	72	66
194	30.854	0.165	0.095	2.60	97	1.0	-	1.54	-0.02	85	227	72	66
195	31.018	0.164	0.096	2.61	97	1.0	-	1.51	-0.03	84	227	72	66
196	31.179	0.161	0.096	2.60	97	1.0	-	1.50	-0.01	84	226	72	66
197	31.343	0.164	0.095	2.61	97	1.0	-	1.49	-0.01	84	226	72	66
198	31.507	0.164	0.096	2.60	97	1.0	-	1.46	-0.03	84	229	72	66
199	31.667	0.160	0.097	2.61	97	1.0	-	1.44	-0.02	84	233	72	66
200	31.834	0.167	0.096	2.60	97	1.0	100	1.42	-0.02	85	235	72	66
201	31.994	0.160	0.095	2.61	97	1.1	-	1.40	-0.02	85	237	72	66
202	32.158	0.164	0.095	2.62	97	1.0	-	1.39	-0.01	85	237	72	66
203	32.322	0.164	0.096	2.60	98	1.0	-	1.37	-0.02	85	238	72	66
204	32.484	0.162	0.096	2.61	97	1.0	-	1.34	-0.03	85	239	72	66
205	32.647	0.163	0.095	2.61	97	1.0	-	1.33	-0.01	85	237	72	66
206	32.812	0.165	0.097	2.61	97	1.1	-	1.32	-0.01	85	237	72	66
207	32.971	0.159	0.096	2.59	98	1.1	-	1.29	-0.03	85	237	72	66
208	33.138	0.167	0.096	2.61	97	1.0	-	1.28	-0.01	85	235	72	66
209	33.300	0.162	0.095	2.60	97	1.0	-	1.25	-0.03	85	236	72	66
210	33.461	0.161	0.096	2.59	98	1.0	100	1.23	-0.02	85	236	72	66
211	33.628	0.167	0.094	2.60	97	1.0	-	1.21	-0.02	85	236	72	66
212	33.791	0.163	0.094	2.61	97	1.0	-	1.20	-0.01	85	235	72	66
213	33.952	0.161	0.094	2.60	97	1.1	-	1.19	-0.01	84	235	72	66
214	34.116	0.164	0.095	2.61	98	1.0	-	1.16	-0.03	84	235	72	66
215	34.277	0.161	0.096	2.60	97	1.0	-	1.14	-0.02	84	235	72	66
216	34.442	0.165	0.094	2.61	97	1.0	-	1.13	-0.01	84	232	72	66
217	34.606	0.164	0.095	2.61	97	1.1	-	1.11	-0.02	84	232	72	66
218	34.765	0.159	0.096	2.61	98	1.0	-	1.10	-0.01	85	231	72	66
219	34.932	0.167	0.095	2.61	98	1.0	-	1.07	-0.03	85	231	72	66
220	35.093	0.161	0.095	2.61	98	1.0	100	1.05	-0.02	85	232	72	66
221	35.257	0.164	0.095	2.61	98	1.1	-	1.04	-0.01	85	232	72	66
222	35.421	0.164	0.096	2.60	98	1.0	-	1.02	-0.02	85	231	72	66
223	35.583	0.162	0.095	2.60	98	1.0	-	1.00	-0.02	85	232	72	66

BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: Sherwood
Model: Ironwood 2.0-1
Run #: 3

Job #: 25-470
Tracking #: 243
Technician: AK
Date: 12/23/2025

	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	35.746	0.163	0.095	2.61	98	1.1	-	0.99	-0.01	85	231	72	66
225	35.911	0.165	0.095	2.61	98	1.0	-	0.97	-0.02	85	229	72	66
226	36.071	0.160	0.094	2.60	98	1.1	-	0.96	-0.01	85	230	72	66
227	36.236	0.165	0.096	2.61	98	1.0	-	0.94	-0.02	85	230	72	66
228	36.399	0.163	0.095	2.60	97	1.0	-	0.92	-0.02	85	230	72	66
229	36.560	0.161	0.095	2.60	98	1.0	-	0.90	-0.02	85	230	72	66
230	36.727	0.167	0.096	2.60	98	1.0	100	0.89	-0.01	85	229	72	66
231	36.886	0.159	0.096	2.61	98	1.0	-	0.86	-0.03	85	230	72	66
232	37.051	0.165	0.096	2.60	98	1.1	-	0.83	-0.03	84	229	72	66
233	37.216	0.165	0.094	2.61	98	1.0	-	0.83	0.00	84	228	72	66
234	37.377	0.161	0.093	2.60	98	1.0	-	0.80	-0.03	85	228	72	66
235	37.541	0.164	0.095	2.61	98	1.0	-	0.78	-0.02	85	228	72	66
236	37.706	0.165	0.096	2.60	98	1.0	-	0.77	-0.01	85	228	72	66
237	37.865	0.159	0.094	2.61	98	1.1	-	0.74	-0.03	85	227	72	66
238	38.033	0.168	0.096	2.61	98	1.0	-	0.73	-0.01	84	226	72	66
239	38.194	0.161	0.094	2.60	98	1.0	-	0.70	-0.03	84	225	72	66
240	38.357	0.163	0.094	2.60	98	1.1	100	0.70	0.00	84	225	72	66
241	38.523	0.166	0.095	2.60	98	1.0	-	0.70	0.00	84	225	72	66
242	38.682	0.159	0.096	2.61	98	1.0	-	0.68	-0.02	84	225	72	66
243	38.847	0.165	0.096	2.60	98	1.0	-	0.66	-0.02	84	225	72	66
244	39.011	0.164	0.095	2.61	98	1.0	-	0.64	-0.02	84	225	72	66
245	39.173	0.162	0.095	2.61	98	1.0	-	0.62	-0.02	84	223	72	66
246	39.338	0.165	0.095	2.62	98	1.1	-	0.60	-0.02	84	222	72	66
247	39.502	0.164	0.097	2.61	98	1.1	-	0.58	-0.02	84	223	72	66
248	39.662	0.160	0.096	2.61	98	1.0	-	0.58	0.00	84	223	72	66
249	39.829	0.167	0.094	2.60	98	1.1	-	0.56	-0.02	84	223	72	66
250	39.990	0.161	0.093	2.60	98	1.0	101	0.54	-0.02	84	223	72	66
251	40.154	0.164	0.096	2.61	98	1.1	-	0.53	-0.01	84	223	72	66
252	40.319	0.165	0.097	2.61	98	1.0	-	0.51	-0.02	84	223	72	66
253	40.480	0.161	0.096	2.61	98	1.1	-	0.49	-0.02	84	223	72	66
254	40.644	0.164	0.096	2.60	98	1.0	-	0.48	-0.01	84	222	72	66
255	40.809	0.165	0.095	2.62	98	1.0	-	0.46	-0.02	83	221	72	66

BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: Sherwood
Model: Ironwood 2.0-1
Run #: 3

Job #: 25-470
Tracking #: 243
Technician: AK
Date: 12/23/2025

	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	40.969	0.160	0.096	2.60	98	1.0	-	0.45	-0.01	83	222	72	66
257	41.134	0.165	0.094	2.62	98	1.0	-	0.44	-0.01	83	222	72	66
258	41.299	0.165	0.093	2.61	98	1.0	-	0.42	-0.02	84	221	72	66
259	41.460	0.161	0.096	2.62	98	1.0	-	0.41	-0.01	84	221	72	66
260	41.626	0.166	0.097	2.60	98	1.0	100	0.39	-0.02	84	221	72	66
261	41.787	0.161	0.096	2.61	98	1.0	-	0.37	-0.02	84	220	72	66
262	41.951	0.164	0.095	2.61	98	1.0	-	0.35	-0.02	83	221	72	65
263	42.116	0.165	0.096	2.60	98	1.0	-	0.34	-0.01	83	222	72	65
264	42.278	0.162	0.096	2.61	98	1.1	-	0.32	-0.02	83	220	72	65
265	42.441	0.163	0.095	2.61	98	1.0	-	0.31	-0.01	83	220	72	66
266	42.607	0.166	0.096	2.61	98	1.0	-	0.28	-0.03	83	220	72	65
267	42.767	0.160	0.095	2.60	98	1.1	-	0.28	0.00	83	220	72	65
268	42.932	0.165	0.096	2.60	98	1.1	-	0.26	-0.02	83	221	72	65
269	43.096	0.164	0.096	2.60	98	1.0	-	0.24	-0.02	83	220	72	65
270	43.256	0.160	0.096	2.61	98	1.1	99	0.22	-0.02	83	220	72	65
271	43.424	0.168	0.093	2.60	98	1.0	-	0.21	-0.01	83	221	72	65
272	43.584	0.160	0.095	2.61	98	1.1	-	0.20	-0.01	83	220	72	65
273	43.748	0.164	0.095	2.60	98	1.1	-	0.18	-0.02	83	220	72	65
274	43.913	0.165	0.096	2.61	98	1.0	-	0.17	-0.01	83	218	72	65
275	44.075	0.162	0.096	2.60	98	1.0	-	0.16	-0.01	83	220	72	65
276	44.238	0.163	0.094	2.61	98	1.0	-	0.15	-0.01	83	219	72	65
277	44.404	0.166	0.096	2.62	98	1.1	-	0.12	-0.03	83	219	72	65
278	44.563	0.159	0.095	2.61	98	1.1	-	0.10	-0.02	83	219	72	65
279	44.730	0.167	0.096	2.61	98	1.0	-	0.09	-0.01	83	219	72	65
280	44.893	0.163	0.094	2.61	98	1.0	100	0.08	-0.01	83	218	72	65
281	45.054	0.161	0.097	2.61	98	1.0	-	0.07	-0.01	83	217	72	65
282	45.221	0.167	0.096	2.61	98	1.1	-	0.05	-0.02	83	218	72	65
283	45.382	0.161	0.094	2.61	98	1.0	-	0.03	-0.02	83	219	72	65
284	45.546	0.164	0.096	2.61	98	1.0	-	0.02	-0.01	83	218	72	65
285	45.711	0.165	0.095	2.61	98	1.0	100	0.00	-0.02	83	217	72	65
Avg/Tot	45.711	0.160	0.095	2.55	91.8	1.0	100			88.9	264.1	72.8	65.5

BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: Sherwood
Model: Ironwood 2.0-1
Run #: 3

Job #: 25-470
Tracking #: 243
Technician: AK
Date: 12/23/2025

	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		0.02	71	0.7		72	-0.059	7.63	0.103
1	0.119	0.119	3.01	71	1.7	-	74	-0.059	3.43	0.203
2	0.277	0.158	2.39	71	1.7	-	74	-0.067	2.18	0.194
3	0.424	0.147	2.38	71	2.3	-	75	-0.071	7.19	0.163
4	0.577	0.153	2.39	71	2.6	-	75	-0.075	11.53	0.207
5	0.725	0.148	2.39	71	2.7	-	75	-0.070	13.32	0.360
6	0.878	0.153	2.40	71	2.4	-	75	-0.067	11.98	0.404
7	1.025	0.147	2.40	72	1.7	-	75	-0.069	7.09	0.153
8	1.178	0.153	2.39	72	1.6	-	75	-0.069	5.23	0.103
9	1.326	0.148	2.40	72	1.6	-	75	-0.065	5.00	0.090
10	1.479	0.153	2.40	72	1.8	99	75	-0.063	5.38	0.090
11	1.629	0.150	2.40	72	1.8	-	75	-0.061	5.79	0.088
12	1.781	0.152	2.40	72	1.6	-	75	-0.060	6.00	0.089
13	1.932	0.151	2.41	73	1.9	-	75	-0.061	6.21	0.095
14	2.084	0.152	2.40	73	1.8	-	75	-0.063	6.53	0.095
15	2.236	0.152	2.40	73	1.9	-	75	-0.065	6.45	0.101
16	2.387	0.151	2.42	73	1.6	-	75	-0.064	6.56	0.106
17	2.539	0.152	2.41	74	1.9	-	75	-0.065	6.21	0.103
18	2.688	0.149	2.41	74	1.9	-	75	-0.065	5.98	0.107
19	2.842	0.154	2.41	74	1.9	-	75	-0.060	6.03	0.111
20	2.992	0.150	2.41	75	1.5	100	75	-0.064	6.09	0.116
21	3.147	0.155	2.42	75	1.5	-	75	-0.064	6.09	0.121
22	3.297	0.150	2.42	75	1.6	-	75	-0.063	6.21	0.120
23	3.451	0.154	2.42	76	1.9	-	75	-0.064	6.24	0.122
24	3.601	0.150	2.43	76	1.5	-	75	-0.062	6.37	0.125
25	3.755	0.154	2.42	76	1.5	-	75	-0.065	6.45	0.128
26	3.906	0.151	2.43	77	1.5	-	75	-0.061	6.62	0.125
27	4.059	0.153	2.42	77	1.9	-	75	-0.060	6.73	0.133
28	4.212	0.153	2.43	77	1.8	-	75	-0.063	6.98	0.138
29	4.365	0.153	2.43	78	1.8	-	75	-0.061	7.03	0.137
30	4.520	0.155	2.44	78	1.7	101	75	-0.063	7.06	0.141
31	4.670	0.150	2.43	78	1.5	-	75	-0.060	7.15	0.139

BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: Sherwood
Model: Ironwood 2.0-1
Run #: 3

Job #: 25-470
Tracking #: 243
Technician: AK
Date: 12/23/2025

	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	4.826	0.156	2.44	79	1.5	-	75	-0.060	7.28	0.141
33	4.976	0.150	2.43	79	2.0	-	75	-0.062	7.46	0.135
34	5.133	0.157	2.45	79	1.9	-	75	-0.057	8.03	0.111
35	5.283	0.150	2.44	80	1.7	-	75	-0.057	8.43	0.100
36	5.439	0.156	2.44	80	2.0	-	75	-0.060	8.75	0.109
37	5.590	0.151	2.45	80	1.5	-	74	-0.061	9.01	0.117
38	5.745	0.155	2.44	80	1.9	-	74	-0.061	9.06	0.130
39	5.899	0.154	2.45	81	1.9	-	74	-0.060	9.28	0.155
40	6.053	0.154	2.44	81	1.9	101	74	-0.061	9.47	0.172
41	6.208	0.155	2.45	81	1.9	-	74	-0.062	9.70	0.231
42	6.359	0.151	2.44	82	2.0	-	74	-0.064	10.32	0.330
43	6.516	0.157	2.45	82	1.7	-	74	-0.062	10.80	0.397
44	6.668	0.152	2.44	82	1.6	-	74	-0.067	10.61	0.658
45	6.825	0.157	2.46	82	1.9	-	74	-0.063	10.72	0.877
46	6.975	0.150	2.45	83	1.9	-	74	-0.064	10.64	0.997
47	7.131	0.156	2.45	83	1.9	-	74	-0.064	10.57	0.991
48	7.285	0.154	2.45	83	2.0	-	74	-0.065	10.71	0.915
49	7.440	0.155	2.45	83	1.8	-	74	-0.065	10.58	0.802
50	7.595	0.155	2.46	84	1.8	101	74	-0.062	10.55	0.617
51	7.748	0.153	2.45	84	1.6	-	74	-0.065	10.21	0.401
52	7.905	0.157	2.46	84	1.6	-	74	-0.063	9.88	0.271
53	8.058	0.153	2.46	84	2.0	-	74	-0.061	9.75	0.210
54	8.215	0.157	2.46	85	1.6	-	74	-0.065	9.53	0.189
55	8.367	0.152	2.45	85	1.5	-	74	-0.062	9.49	0.165
56	8.524	0.157	2.46	85	1.8	-	74	-0.064	9.39	0.155
57	8.679	0.155	2.46	85	1.7	-	74	-0.063	9.55	0.180
58	8.833	0.154	2.46	86	1.5	-	74	-0.059	9.42	0.200
59	8.990	0.157	2.46	86	1.8	-	74	-0.063	9.56	0.219
60	9.143	0.153	2.46	86	1.9	101	74	-0.062	9.20	0.219
61	9.301	0.158	2.45	86	1.8	-	74	-0.064	9.55	0.225
62	9.453	0.152	2.46	86	1.8	-	75	-0.061	9.35	0.247
63	9.610	0.157	2.46	87	1.6	-	75	-0.063	8.85	0.270

BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: Sherwood
Model: Ironwood 2.0-1
Run #: 3

Job #: 25-470
Tracking #: 243
Technician: AK
Date: 12/23/2025

	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	9.765	0.155	2.46	87	1.9	-	75	-0.064	8.95	0.223
65	9.921	0.156	2.47	87	1.5	-	75	-0.063	8.65	0.164
66	10.076	0.155	2.47	87	1.5	-	75	-0.061	8.58	0.122
67	10.230	0.154	2.46	88	1.9	-	75	-0.061	8.36	0.090
68	10.389	0.159	2.47	88	1.8	-	75	-0.061	8.25	0.079
69	10.542	0.153	2.47	88	1.8	-	75	-0.059	8.24	0.080
70	10.699	0.157	2.47	88	1.5	101	75	-0.063	8.18	0.076
71	10.854	0.155	2.46	88	1.8	-	75	-0.061	8.02	0.075
72	11.013	0.159	2.47	89	1.5	-	75	-0.060	8.04	0.071
73	11.166	0.153	2.47	89	1.7	-	75	-0.061	8.11	0.077
74	11.320	0.154	2.46	89	1.8	-	75	-0.062	8.11	0.076
75	11.480	0.160	2.47	89	1.5	-	75	-0.064	8.10	0.078
76	11.633	0.153	2.47	89	1.7	-	75	-0.060	7.94	0.074
77	11.791	0.158	2.47	89	1.7	-	75	-0.059	7.93	0.076
78	11.947	0.156	2.48	90	1.9	-	75	-0.059	7.93	0.074
79	12.103	0.156	2.48	90	1.9	-	75	-0.058	8.01	0.072
80	12.260	0.157	2.48	90	1.5	101	75	-0.058	8.26	0.076
81	12.414	0.154	2.47	90	1.5	-	75	-0.057	8.35	0.073
82	12.574	0.160	2.47	90	1.8	-	75	-0.057	8.24	0.074
83	12.726	0.152	2.47	91	1.8	-	75	-0.060	8.45	0.071
84	12.885	0.159	2.48	91	1.5	-	75	-0.058	8.65	0.078
85	13.042	0.157	2.47	91	1.9	-	75	-0.060	8.89	0.079
86	13.196	0.154	2.47	91	1.7	-	75	-0.061	9.05	0.083
87	13.355	0.159	2.47	91	1.8	-	75	-0.060	9.15	0.097
88	13.509	0.154	2.48	91	1.6	-	75	-0.061	9.13	0.103
89	13.668	0.159	2.48	91	1.8	-	75	-0.058	9.24	0.094
90	13.822	0.154	2.47	92	1.5	101	75	-0.059	9.04	0.084
91	13.981	0.159	2.48	92	1.5	-	75	-0.061	8.76	0.078
92	14.138	0.157	2.48	92	2.0	-	75	-0.058	8.90	0.078
93	14.292	0.154	2.48	92	1.8	-	75	-0.058	8.62	0.074
94	14.453	0.161	2.48	92	1.5	-	75	-0.060	8.41	0.079
95	14.607	0.154	2.48	92	1.7	-	75	-0.057	8.23	0.074

BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: Sherwood
Model: Ironwood 2.0-1
Run #: 3

Job #: 25-470
Tracking #: 243
Technician: AK
Date: 12/23/2025

	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	14.765	0.158	2.48	92	1.7	-	75	-0.056	8.01	0.076
97	14.922	0.157	2.48	93	2.0	-	75	-0.057	7.75	0.082
98	15.078	0.156	2.48	93	1.6	-	75	-0.056	7.60	0.087
99	15.236	0.158	2.48	93	1.7	-	75	-0.057	7.51	0.091
100	15.392	0.156	2.48	93	1.7	101	75	-0.060	7.48	0.095
101	15.551	0.159	2.48	93	1.6	-	75	-0.057	7.31	0.094
102	15.705	0.154	2.48	93	1.5	-	75	-0.058	7.36	0.103
103	15.864	0.159	2.48	93	1.7	-	75	-0.057	7.16	0.108
104	16.022	0.158	2.49	93	1.5	-	75	-0.058	7.17	0.111
105	16.177	0.155	2.48	93	1.9	-	75	-0.054	7.11	0.115
106	16.337	0.160	2.49	93	1.5	-	75	-0.056	6.90	0.115
107	16.491	0.154	2.49	94	1.9	-	75	-0.058	7.07	0.119
108	16.650	0.159	2.48	94	1.9	-	75	-0.057	7.07	0.115
109	16.808	0.158	2.49	94	1.9	-	75	-0.055	6.97	0.115
110	16.964	0.156	2.48	94	1.7	100	75	-0.057	6.99	0.118
111	17.123	0.159	2.48	94	1.6	-	75	-0.057	7.08	0.122
112	17.279	0.156	2.48	94	1.8	-	75	-0.056	7.11	0.117
113	17.438	0.159	2.48	94	2.0	-	75	-0.057	7.00	0.116
114	17.595	0.157	2.49	94	1.5	-	75	-0.055	7.20	0.119
115	17.753	0.158	2.49	94	1.5	-	75	-0.056	7.32	0.120
116	17.911	0.158	2.49	94	2.0	-	75	-0.057	7.43	0.120
117	18.067	0.156	2.49	95	1.8	-	75	-0.056	7.49	0.117
118	18.227	0.160	2.48	95	1.9	-	75	-0.055	7.29	0.120
119	18.382	0.155	2.49	95	1.7	-	74	-0.054	7.38	0.131
120	18.541	0.159	2.49	95	1.7	100	74	-0.057	7.37	0.132
121	18.699	0.158	2.49	95	1.7	-	75	-0.056	7.31	0.132
122	18.854	0.155	2.48	95	2.0	-	75	-0.055	7.20	0.134
123	19.015	0.161	2.48	95	2.0	-	74	-0.056	7.36	0.130
124	19.169	0.154	2.49	95	1.5	-	74	-0.056	7.41	0.126
125	19.329	0.160	2.48	95	1.7	-	74	-0.058	7.51	0.125
126	19.487	0.158	2.48	95	1.8	-	74	-0.056	7.51	0.123
127	19.642	0.155	2.49	95	1.5	-	74	-0.056	7.49	0.119

BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: Sherwood
Model: Ironwood 2.0-1
Run #: 3

Job #: 25-470
Tracking #: 243
Technician: AK
Date: 12/23/2025

	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	19.803	0.161	2.49	95	1.9	-	74	-0.057	7.58	0.122
129	19.959	0.156	2.49	95	2.0	-	74	-0.057	7.62	0.122
130	20.118	0.159	2.49	95	1.6	100	74	-0.053	7.81	0.123
131	20.275	0.157	2.49	95	1.9	-	74	-0.054	7.90	0.127
132	20.432	0.157	2.49	95	1.6	-	74	-0.057	7.86	0.118
133	20.591	0.159	2.48	95	1.7	-	74	-0.055	7.94	0.124
134	20.747	0.156	2.49	96	1.6	-	74	-0.055	7.94	0.122
135	20.906	0.159	2.49	96	1.5	-	74	-0.058	7.90	0.117
136	21.063	0.157	2.49	96	1.7	-	74	-0.056	7.79	0.117
137	21.222	0.159	2.49	96	1.5	-	74	-0.059	7.80	0.113
138	21.381	0.159	2.49	96	1.9	-	74	-0.056	8.25	0.114
139	21.537	0.156	2.49	96	1.8	-	74	-0.057	8.08	0.105
140	21.697	0.160	2.49	96	1.9	100	74	-0.057	8.20	0.106
141	21.852	0.155	2.49	96	2.0	-	74	-0.056	8.05	0.107
142	22.012	0.160	2.49	96	1.6	-	74	-0.057	8.10	0.103
143	22.170	0.158	2.49	96	1.6	-	74	-0.056	8.04	0.104
144	22.326	0.156	2.50	96	1.7	-	74	-0.056	8.14	0.102
145	22.487	0.161	2.49	96	1.7	-	74	-0.057	8.08	0.099
146	22.642	0.155	2.50	96	1.9	-	74	-0.055	8.20	0.099
147	22.802	0.160	2.50	96	1.6	-	74	-0.055	8.32	0.102
148	22.961	0.159	2.49	96	1.5	-	74	-0.058	8.41	0.100
149	23.116	0.155	2.49	96	1.9	-	74	-0.055	8.44	0.099
150	23.277	0.161	2.50	96	1.9	100	74	-0.054	8.58	0.094
151	23.432	0.155	2.49	96	1.5	-	74	-0.056	8.61	0.090
152	23.592	0.160	2.50	96	1.6	-	74	-0.056	8.71	0.091
153	23.751	0.159	2.49	96	1.6	-	74	-0.057	8.56	0.096
154	23.907	0.156	2.50	96	1.9	-	74	-0.057	7.70	0.088
155	24.067	0.160	2.49	97	1.7	-	74	-0.059	7.56	0.090
156	24.223	0.156	2.50	97	1.6	-	74	-0.052	7.42	0.091
157	24.382	0.159	2.49	97	1.8	-	74	-0.053	7.54	0.098
158	24.541	0.159	2.49	97	1.8	-	74	-0.054	7.44	0.098
159	24.697	0.156	2.49	97	1.9	-	74	-0.056	7.34	0.100

BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: Sherwood
Model: Ironwood 2.0-1
Run #: 3

Job #: 25-470
Tracking #: 243
Technician: AK
Date: 12/23/2025

	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	24.858	0.161	2.49	97	2.0	100	74	-0.051	7.31	0.101
161	25.014	0.156	2.49	97	1.8	-	74	-0.056	7.29	0.095
162	25.173	0.159	2.49	97	1.9	-	74	-0.054	7.15	0.096
163	25.332	0.159	2.50	97	1.5	-	74	-0.052	7.20	0.095
164	25.489	0.157	2.49	97	1.8	-	74	-0.055	7.18	0.097
165	25.648	0.159	2.48	97	1.5	-	74	-0.054	6.93	0.099
166	25.805	0.157	2.49	97	1.9	-	74	-0.054	6.86	0.097
167	25.965	0.160	2.50	97	1.8	-	74	-0.058	6.87	0.099
168	26.122	0.157	2.49	97	1.9	-	74	-0.055	6.71	0.096
169	26.281	0.159	2.49	97	1.9	-	74	-0.051	6.60	0.090
170	26.440	0.159	2.48	97	1.8	100	74	-0.052	6.54	0.082
171	26.597	0.157	2.48	97	1.9	-	74	-0.053	6.48	0.083
172	26.756	0.159	2.49	97	1.6	-	74	-0.054	6.49	0.083
173	26.914	0.158	2.49	97	1.6	-	74	-0.051	6.50	0.084
174	27.073	0.159	2.49	97	1.9	-	74	-0.052	6.51	0.085
175	27.232	0.159	2.49	97	1.8	-	74	-0.050	6.43	0.087
176	27.389	0.157	2.49	97	1.7	-	74	-0.049	6.37	0.086
177	27.548	0.159	2.49	97	2.0	-	74	-0.049	6.44	0.087
178	27.705	0.157	2.49	97	1.7	-	74	-0.050	6.46	0.086
179	27.865	0.160	2.50	97	1.9	-	74	-0.052	6.48	0.086
180	28.024	0.159	2.50	97	1.7	100	74	-0.050	6.46	0.085
181	28.181	0.157	2.49	97	1.7	-	74	-0.050	6.53	0.081
182	28.341	0.160	2.49	97	1.8	-	74	-0.050	6.46	0.085
183	28.498	0.157	2.49	97	1.9	-	74	-0.050	6.47	0.084
184	28.658	0.160	2.49	97	1.5	-	74	-0.048	6.48	0.086
185	28.816	0.158	2.50	97	1.8	-	74	-0.047	6.47	0.086
186	28.973	0.157	2.49	97	1.8	-	74	-0.049	6.21	0.098
187	29.134	0.161	2.49	97	1.7	-	74	-0.049	6.24	0.104
188	29.289	0.155	2.48	97	1.6	-	74	-0.050	6.16	0.100
189	29.450	0.161	2.49	97	1.8	-	74	-0.047	6.15	0.101
190	29.608	0.158	2.50	97	2.0	100	73	-0.045	6.13	0.097
191	29.765	0.157	2.49	97	1.9	-	74	-0.050	6.16	0.098

BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: Sherwood
Model: Ironwood 2.0-1
Run #: 3

Job #: 25-470
Tracking #: 243
Technician: AK
Date: 12/23/2025

	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	29.926	0.161	2.49	97	2.0	-	74	-0.050	6.14	0.099
193	30.081	0.155	2.49	97	1.9	-	73	-0.048	6.22	0.103
194	30.242	0.161	2.49	97	1.5	-	73	-0.046	6.11	0.100
195	30.400	0.158	2.50	98	2.0	-	73	-0.047	5.96	0.101
196	30.557	0.157	2.49	97	1.6	-	73	-0.051	6.04	0.103
197	30.719	0.162	2.49	98	1.8	-	73	-0.046	6.02	0.104
198	30.874	0.155	2.49	97	1.6	-	73	-0.048	6.01	0.104
199	31.034	0.160	2.49	97	1.7	-	73	-0.050	6.05	0.107
200	31.192	0.158	2.50	97	1.9	99	73	-0.049	6.04	0.113
201	31.349	0.157	2.49	97	1.5	-	73	-0.048	5.99	0.110
202	31.511	0.162	2.49	98	1.9	-	73	-0.050	5.84	0.115
203	31.666	0.155	2.50	98	1.7	-	73	-0.053	5.84	0.117
204	31.827	0.161	2.50	98	1.9	-	73	-0.049	5.88	0.112
205	31.985	0.158	2.49	97	1.9	-	73	-0.050	5.84	0.110
206	32.142	0.157	2.49	97	1.5	-	73	-0.052	5.80	0.113
207	32.304	0.162	2.50	98	1.6	-	73	-0.049	5.70	0.108
208	32.459	0.155	2.49	97	1.8	-	73	-0.051	5.63	0.108
209	32.619	0.160	2.49	98	1.5	-	73	-0.050	5.59	0.109
210	32.778	0.159	2.49	98	1.9	99	73	-0.050	5.57	0.112
211	32.934	0.156	2.49	98	1.8	-	73	-0.048	5.69	0.112
212	33.098	0.164	2.49	98	1.7	-	73	-0.051	5.49	0.107
213	33.251	0.153	2.50	98	2.0	-	73	-0.050	5.52	0.113
214	33.411	0.160	2.49	98	1.7	-	73	-0.051	5.46	0.109
215	33.570	0.159	2.49	98	2.0	-	73	-0.049	5.57	0.117
216	33.726	0.156	2.49	98	1.9	-	73	-0.048	5.54	0.115
217	33.888	0.162	2.49	98	1.9	-	73	-0.049	5.50	0.116
218	34.043	0.155	2.50	98	1.9	-	73	-0.050	5.52	0.114
219	34.204	0.161	2.49	98	2.0	-	73	-0.047	5.49	0.119
220	34.363	0.159	2.49	98	1.8	99	73	-0.048	5.57	0.113
221	34.519	0.156	2.49	98	2.0	-	73	-0.048	5.54	0.111
222	34.680	0.161	2.49	98	1.9	-	73	-0.052	5.44	0.110
223	34.836	0.156	2.49	98	2.0	-	73	-0.049	5.32	0.112

BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: Sherwood
Model: Ironwood 2.0-1
Run #: 3

Job #: 25-470
Tracking #: 243
Technician: AK
Date: 12/23/2025

	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	34.996	0.160	2.49	98	1.7	-	73	-0.049	5.34	0.110
225	35.155	0.159	2.49	98	1.5	-	73	-0.049	5.32	0.110
226	35.311	0.156	2.49	98	2.0	-	73	-0.048	5.32	0.110
227	35.473	0.162	2.48	98	1.8	-	73	-0.047	5.34	0.112
228	35.628	0.155	2.50	98	2.0	-	73	-0.049	5.32	0.112
229	35.789	0.161	2.49	98	1.5	-	73	-0.049	5.33	0.111
230	35.948	0.159	2.49	98	1.4	99	73	-0.049	5.35	0.110
231	36.103	0.155	2.49	98	1.7	-	73	-0.048	5.63	0.102
232	36.265	0.162	2.49	98	1.5	-	73	-0.048	5.58	0.099
233	36.420	0.155	2.49	98	1.8	-	73	-0.044	5.39	0.101
234	36.581	0.161	2.49	98	1.7	-	73	-0.049	5.28	0.094
235	36.741	0.160	2.49	98	1.9	-	73	-0.048	5.26	0.095
236	36.896	0.155	2.49	98	1.5	-	73	-0.048	5.17	0.095
237	37.058	0.162	2.49	98	1.8	-	73	-0.047	5.20	0.089
238	37.213	0.155	2.49	98	1.7	-	73	-0.049	5.09	0.090
239	37.374	0.161	2.50	98	2.0	-	73	-0.045	5.08	0.095
240	37.534	0.160	2.50	98	1.5	100	73	-0.047	5.05	0.088
241	37.689	0.155	2.49	98	1.5	-	73	-0.051	5.13	0.093
242	37.851	0.162	2.49	98	1.9	-	73	-0.047	5.14	0.095
243	38.006	0.155	2.50	98	1.8	-	73	-0.042	5.19	0.097
244	38.167	0.161	2.49	98	1.7	-	73	-0.050	5.17	0.097
245	38.327	0.160	2.49	98	1.5	-	73	-0.048	5.14	0.097
246	38.482	0.155	2.49	98	1.5	-	73	-0.047	5.12	0.096
247	38.644	0.162	2.49	98	1.7	-	73	-0.048	5.20	0.102
248	38.799	0.155	2.49	98	1.5	-	73	-0.048	5.03	0.101
249	38.960	0.161	2.49	98	1.8	-	73	-0.046	5.01	0.111
250	39.120	0.160	2.50	98	1.9	100	73	-0.045	5.03	0.113
251	39.275	0.155	2.50	98	1.9	-	73	-0.050	5.07	0.111
252	39.438	0.163	2.49	98	1.8	-	73	-0.046	5.03	0.110
253	39.592	0.154	2.49	98	1.9	-	73	-0.044	5.03	0.114
254	39.753	0.161	2.49	98	1.5	-	73	-0.047	5.02	0.107
255	39.913	0.160	2.49	98	1.5	-	73	-0.050	5.00	0.110

BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: Sherwood
Model: Ironwood 2.0-1
Run #: 3

Job #: 25-470
Tracking #: 243
Technician: AK
Date: 12/23/2025

	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	40.069	0.156	2.49	98	1.8	-	73	-0.050	5.02	0.110
257	40.231	0.162	2.50	98	1.5	-	73	-0.047	5.12	0.112
258	40.385	0.154	2.50	98	1.5	-	73	-0.047	5.18	0.106
259	40.547	0.162	2.49	98	1.9	-	73	-0.049	5.08	0.111
260	40.706	0.159	2.49	98	1.7	100	73	-0.048	5.12	0.111
261	40.862	0.156	2.49	98	1.6	-	73	-0.047	5.17	0.106
262	41.024	0.162	2.49	98	1.5	-	73	-0.048	5.12	0.110
263	41.179	0.155	2.49	98	1.8	-	73	-0.046	5.12	0.109
264	41.340	0.161	2.49	98	1.8	-	73	-0.047	5.17	0.109
265	41.500	0.160	2.49	98	1.5	-	73	-0.048	5.26	0.112
266	41.655	0.155	2.49	98	1.8	-	73	-0.047	5.23	0.111
267	41.817	0.162	2.49	98	1.8	-	73	-0.046	5.25	0.113
268	41.972	0.155	2.49	98	1.9	-	73	-0.047	5.21	0.116
269	42.133	0.161	2.49	98	1.5	-	73	-0.047	5.15	0.112
270	42.293	0.160	2.49	98	1.9	99	73	-0.047	5.18	0.116
271	42.448	0.155	2.49	98	1.9	-	73	-0.047	5.15	0.119
272	42.610	0.162	2.49	98	2.0	-	73	-0.047	5.14	0.115
273	42.765	0.155	2.50	98	1.9	-	73	-0.044	4.90	0.111
274	42.926	0.161	2.49	98	1.9	-	73	-0.045	4.83	0.116
275	43.086	0.160	2.50	98	1.9	-	73	-0.046	4.85	0.110
276	43.242	0.156	2.49	98	1.6	-	73	-0.046	4.78	0.110
277	43.404	0.162	2.49	98	1.9	-	73	-0.048	4.85	0.113
278	43.558	0.154	2.50	98	1.7	-	73	-0.047	4.87	0.117
279	43.720	0.162	2.49	98	1.8	-	73	-0.047	4.80	0.117
280	43.879	0.159	2.50	98	1.9	100	73	-0.043	4.86	0.112
281	44.035	0.156	2.49	98	1.9	-	73	-0.047	4.93	0.120
282	44.197	0.162	2.49	98	1.6	-	73	-0.049	4.91	0.119
283	44.352	0.155	2.50	98	1.5	-	73	-0.046	5.00	0.119
284	44.513	0.161	2.49	98	1.5	-	73	-0.046	5.00	0.120
285	44.673	0.160	2.50	98	1.5	99	73	-0.049	4.88	0.118
Avg/Tot	44.673	0.157	2.47	91.8	1.7	100	74.0	-0.055	6.97	0.134

BOX C TEST DATA - ASTM E2780 / ASTM E2515

Client: Sherwood
Model: Ironwood 2.0-1
Run #: 3

Job #: 25-470
Tracking #: 243
Technician: AK
Date: 12/23/2025

	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		-0.03	75	0.0		70
1	0.114	0.114	0.91	75	1.4	-	70
2	0.251	0.137	0.90	75	1.4	-	71
3	0.389	0.138	0.92	75	1.4	-	71
4	0.526	0.137	0.91	74	1.4	-	71
5	0.665	0.139	0.92	75	1.4	-	71
6	0.803	0.138	0.92	75	1.6	-	71
7	0.941	0.138	0.92	75	1.6	-	71
8	1.081	0.140	0.94	75	1.5	-	72
9	1.221	0.140	0.93	75	1.4	-	72
10	1.362	0.141	0.95	75	1.6	97	72
11	1.503	0.141	0.95	75	1.5	-	72
12	1.643	0.140	0.94	75	1.5	-	72
13	1.785	0.142	0.95	75	1.6	-	72
14	1.927	0.142	0.95	75	1.5	-	72
15	2.068	0.141	0.95	76	1.5	-	72
16	2.209	0.141	0.95	76	1.5	-	72
17	2.352	0.143	0.96	76	1.6	-	73
18	2.494	0.142	0.95	76	1.4	-	73
19	2.635	0.141	0.94	76	1.5	-	73
20	2.778	0.143	0.96	76	1.5	100	73
21	2.921	0.143	0.96	77	1.6	-	73
22	3.063	0.142	0.96	77	1.5	-	73
23	3.206	0.143	0.95	77	1.6	-	73
24	3.349	0.143	0.97	77	1.5	-	73
25	3.493	0.144	0.97	77	1.6	-	73
26	3.636	0.143	0.96	77	1.5	-	73
27	3.779	0.143	0.96	77	1.5	-	73
28	3.923	0.144	0.97	78	1.4	-	73
29	4.068	0.145	0.98	78	1.6	-	72
30	4.213	0.145	0.98	78	1.5	101	72
31	4.357	0.144	0.97	79	1.4	-	72

BOX C TEST DATA - ASTM E2780 / ASTM E2515

Client: Sherwood
Model: Ironwood 2.0-1
Run #: 3

Job #: 25-470
Tracking #: 243
Technician: AK
Date: 12/23/2025

	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	4.501	0.144	0.97	79	1.5	-	72
33	4.646	0.145	0.97	79	1.5	-	72
34	4.792	0.146	0.98	79	1.4	-	72
35	4.938	0.146	0.99	79	1.6	-	72
36	5.083	0.145	0.99	80	1.6	-	72
37	5.229	0.146	0.99	80	1.5	-	72
38	5.375	0.146	0.98	80	1.5	-	72
39	5.521	0.146	0.98	81	1.6	-	72
40	5.667	0.146	0.98	81	1.6	102	72
41	5.813	0.146	0.99	81	1.6	-	72
42	5.960	0.147	0.99	81	1.5	-	71
43	6.107	0.147	1.00	81	1.5	-	71
44	6.254	0.147	1.00	82	1.5	-	71
45	6.401	0.147	1.00	82	1.5	-	71
46	6.548	0.147	1.00	83	1.5	-	71
47	6.695	0.147	1.00	83	1.6	-	71
48	6.842	0.147	0.99	83	1.6	-	71
49	6.989	0.147	0.99	83	1.4	-	71
50	7.136	0.147	0.99	84	1.6	103	71
51	7.284	0.148	0.99	84	1.6	-	71
52	7.431	0.147	0.99	84	1.6	-	71
53	7.579	0.148	0.99	85	1.4	-	71
54	7.726	0.147	1.00	85	1.6	-	71
55	7.874	0.148	1.00	86	1.6	-	72
56	8.022	0.148	1.00	86	1.4	-	72
57	8.171	0.149	1.00	87	1.6	-	72
58	8.319	0.148	1.01	87	1.6	-	72
59	8.468	0.149	1.01	87	1.6	-	72
60	8.617	0.149	1.01	88	1.5	103	72
Avg/Tot	8.617	0.144	0.95	79.2	1.5	101	71.8

WOODSTOVE SURFACE TEMPERATURE DATA

Client: Sherwood
Model: Ironwood 2.0-1
Run #: 3

Job #: 25-470
Tracking #: 243
Technician: AK
Date: 12/23/2025

Stove ΔT: 105

	Temperature Data (°F)						
Elapsed Time (min)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
0	459	459	368	281	470	407.3	712.7
1	457	457	378	291	471	410.8	646.3
2	454	453	382	293	470	410.1	699.9
3	449	447	381	301	469	409.2	823.2
4	443	441	378	311	468	407.8	961.2
5	437	435	374	324	466	407.1	1045.4
6	431	429	370	338	466	407.0	1014.4
7	426	424	366	356	465	407.3	966.2
8	421	418	362	368	465	406.9	923.4
9	415	413	358	378	465	405.6	891.3
10	410	408	355	378	464	403.0	869.0
11	404	403	352	385	464	401.6	853.9
12	400	399	349	383	464	398.8	843.5
13	395	394	347	385	463	396.7	838.5
14	391	390	344	391	462	395.5	837.6
15	387	386	343	394	461	394.2	842.9
16	383	383	340	392	460	391.4	846.7
17	379	379	340	397	458	390.6	849.9
18	375	376	338	394	457	388.0	853.8
19	372	373	336	395	456	386.4	856.8
20	369	370	335	396	454	384.6	857.4
21	366	367	335	395	452	382.8	857.3
22	363	364	334	395	450	381.3	858.3
23	360	362	315	374	448	371.7	861.1
24	357	359	301	364	446	365.4	867.4
25	354	356	291	357	444	360.5	872.9
26	352	354	283	349	441	355.6	876.7
27	349	351	276	340	439	351.2	880.5
28	347	349	270	332	437	347.0	884.2
29	344	347	265	328	435	343.7	887.5
30	342	344	260	323	434	340.6	893.1
31	340	342	257	318	431	337.5	899.0
32	338	340	253	315	429	335.1	903.8
33	336	338	251	311	427	332.4	903.1
34	334	336	248	309	425	330.2	900.0
35	332	334	245	307	423	328.3	898.8
36	331	332	243	306	421	326.7	903.2
37	330	331	241	304	419	324.9	913.1
38	329	329	240	306	417	324.2	923.9
39	328	329	238	306	415	323.0	933.7
40	327	328	236	306	413	321.9	942.4
41	326	327	235	308	411	321.5	957.1
42	326	327	234	310	410	321.1	985.4
43	326	327	233	312	408	321.1	1012.1
44	326	327	232	317	407	321.6	1037.4
45	326	327	232	322	405	322.4	1064.9
46	327	328	232	326	404	323.2	1089.3
47	327	328	232	331	402	324.2	1102.5

WOODSTOVE SURFACE TEMPERATURE DATA

Client: Sherwood
Model: Ironwood 2.0-1
Run #: 3

Job #: 25-470
Tracking #: 243
Technician: AK
Date: 12/23/2025

Stove ΔT: 105

	Temperature Data (°F)						
Elapsed Time (min)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
48	328	329	232	337	401	325.5	1104.9
49	330	330	233	343	399	326.9	1098.2
50	331	331	234	346	398	328.0	1083.3
51	332	333	235	350	396	329.2	1065.1
52	333	334	236	353	395	329.9	1047.7
53	335	335	236	355	394	330.9	1033.1
54	335	336	237	357	392	331.4	1021.2
55	337	337	237	358	391	331.9	1012.3
56	338	338	237	359	389	332.2	1006.6
57	339	339	238	357	388	332.0	1007.2
58	340	341	238	359	387	332.7	1013.6
59	341	342	239	357	385	332.7	1018.8
60	341	343	239	358	384	333.1	1023.3
61	342	344	241	358	383	333.5	1026.1
62	343	345	242	360	382	334.2	1020.8
63	344	346	242	359	381	334.4	1007.7
64	345	347	243	359	380	334.8	994.3
65	346	347	243	360	380	335.2	983.6
66	347	348	243	360	378	335.3	975.9
67	348	349	245	357	377	335.1	968.5
68	349	349	246	355	377	335.1	961.1
69	349	350	246	354	376	335.0	953.4
70	350	350	246	351	375	334.5	946.5
71	351	351	246	350	373	334.2	940.5
72	351	352	246	348	373	334.1	936.5
73	352	352	247	346	372	333.8	932.3
74	353	353	247	343	371	333.2	928.0
75	353	353	247	341	371	333.0	923.5
76	354	354	247	339	370	332.5	919.1
77	354	355	247	337	369	332.3	914.9
78	354	355	247	333	368	331.4	911.5
79	355	355	247	332	367	331.2	908.9
80	355	356	247	330	367	330.8	906.9
81	355	357	247	330	366	330.8	905.2
82	355	358	248	327	364	330.3	904.8
83	356	358	248	324	364	329.9	906.7
84	356	359	248	324	363	330.0	910.9
85	357	360	249	324	361	329.9	917.1
86	357	360	248	322	361	329.9	923.5
87	358	361	249	322	361	330.0	930.0
88	358	362	249	322	360	330.3	934.0
89	359	363	250	322	359	330.6	935.1
90	359	364	250	323	359	331.0	934.4
91	360	365	251	323	358	331.1	932.2
92	360	366	251	323	357	331.3	928.8
93	361	367	251	324	357	331.9	923.6
94	361	368	251	323	356	332.0	918.7
95	362	369	252	323	356	332.3	913.5

WOODSTOVE SURFACE TEMPERATURE DATA

Client: Sherwood
Model: Ironwood 2.0-1
Run #: 3

Job #: 25-470
Tracking #: 243
Technician: AK
Date: 12/23/2025

Stove ΔT: 105

	Temperature Data (°F)						
Elapsed Time (min)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
96	362	370	252	323	356	332.6	908.0
97	363	372	253	322	355	333.0	903.3
98	363	373	254	321	354	333.1	901.5
99	364	374	255	319	354	332.9	905.1
100	364	375	255	318	353	333.0	906.8
101	364	376	256	317	353	333.1	908.0
102	365	377	256	315	353	333.1	909.4
103	365	378	257	314	352	333.1	910.6
104	366	378	257	312	352	333.0	911.2
105	366	379	258	311	352	333.0	911.1
106	366	379	258	309	350	332.5	910.9
107	367	380	259	306	351	332.3	909.6
108	367	380	259	306	350	332.4	909.0
109	367	380	259	305	350	332.1	907.2
110	367	381	260	302	350	331.6	905.9
111	367	381	260	301	349	331.6	904.3
112	367	381	261	299	349	331.4	903.7
113	368	381	260	299	349	331.2	903.4
114	368	381	261	297	349	331.1	903.6
115	368	381	262	296	348	330.9	903.7
116	368	381	262	295	348	330.7	904.0
117	368	381	262	293	348	330.5	905.9
118	368	381	263	292	348	330.4	917.3
119	369	381	263	292	348	330.6	930.4
120	369	381	264	292	348	330.8	940.8
121	370	381	265	293	348	331.4	947.4
122	371	381	266	293	347	331.7	951.1
123	372	382	267	294	347	332.2	952.3
124	374	382	269	294	347	332.8	951.1
125	375	382	270	294	347	333.5	951.4
126	377	382	271	295	347	334.2	950.5
127	379	382	272	295	347	334.8	950.8
128	380	382	274	295	347	335.6	950.1
129	382	382	275	295	347	336.2	950.9
130	384	383	277	295	346	336.8	952.4
131	385	383	278	294	346	337.4	954.7
132	387	384	280	295	347	338.4	956.5
133	388	385	282	295	347	339.3	957.2
134	389	385	284	295	346	339.9	957.8
135	391	386	286	296	346	340.9	954.2
136	393	387	287	296	346	341.8	947.9
137	394	389	289	295	346	342.4	937.0
138	396	390	290	296	346	343.2	925.8
139	397	391	291	295	346	343.8	917.8
140	398	392	291	295	346	344.4	912.5
141	400	393	293	295	346	345.2	908.1
142	401	395	294	295	346	346.0	905.2
143	402	396	295	293	347	346.5	902.7

WOODSTOVE SURFACE TEMPERATURE DATA

Client: Sherwood
Model: Ironwood 2.0-1
Run #: 3

Job #: 25-470
Tracking #: 243
Technician: AK
Date: 12/23/2025

Stove ΔT: 105

	Temperature Data (°F)						
Elapsed Time (min)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
144	404	398	296	292	347	347.2	902.2
145	405	399	297	292	347	348.0	902.3
146	406	401	298	292	348	348.9	902.9
147	408	403	299	292	348	349.8	904.4
148	409	404	300	291	348	350.5	906.0
149	411	406	302	291	349	351.6	906.1
150	412	407	303	292	349	352.5	905.2
151	413	409	304	292	350	353.6	904.1
152	415	410	305	292	350	354.2	905.4
153	415	412	306	292	350	355.0	899.2
154	416	413	306	291	351	355.3	892.3
155	416	413	306	291	351	355.4	892.8
156	416	414	305	292	352	355.6	900.4
157	415	415	303	292	352	355.5	905.1
158	415	415	302	293	353	355.5	909.5
159	414	416	302	292	353	355.3	913.7
160	414	417	301	293	353	355.4	912.8
161	413	417	300	293	354	355.2	909.4
162	412	418	299	292	354	355.0	907.5
163	412	418	300	291	354	355.0	904.9
164	411	419	300	291	354	355.1	905.6
165	411	419	300	291	355	355.1	907.0
166	410	420	299	290	355	354.8	905.0
167	409	419	301	289	356	354.8	894.1
168	409	419	301	288	356	354.6	877.5
169	408	419	302	286	356	354.3	859.8
170	408	419	302	284	357	354.0	843.2
171	408	419	302	282	357	353.4	828.3
172	408	418	303	280	357	353.2	815.5
173	408	418	303	278	358	352.9	804.5
174	408	418	303	275	359	352.2	794.8
175	407	417	303	273	359	351.9	787.1
176	407	417	304	270	360	351.2	780.6
177	407	416	304	266	360	350.6	774.7
178	407	415	305	263	361	350.1	770.1
179	407	415	305	262	361	349.7	765.5
180	406	414	305	259	362	349.4	761.1
181	406	414	306	257	362	349.0	756.8
182	406	413	306	255	363	348.4	752.6
183	406	412	305	252	363	347.7	748.8
184	405	411	306	250	363	347.2	744.9
185	405	411	306	248	364	346.8	743.0
186	405	409	305	248	365	346.3	744.5
187	404	408	304	246	365	345.5	746.3
188	404	407	303	244	366	344.7	747.0
189	403	405	302	243	366	343.9	746.4
190	403	404	301	243	366	343.3	745.0
191	402	402	300	241	367	342.5	743.5

WOODSTOVE SURFACE TEMPERATURE DATA

Client: Sherwood
Model: Ironwood 2.0-1
Run #: 3

Job #: 25-470
Tracking #: 243
Technician: AK
Date: 12/23/2025

Stove ΔT: 105

	Temperature Data (°F)						
Elapsed Time (min)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
192	402	401	299	240	368	341.7	742.7
193	401	399	299	240	368	341.3	742.0
194	400	398	298	239	368	340.7	741.5
195	400	397	298	238	369	340.2	741.1
196	399	396	297	237	369	339.7	740.2
197	398	395	296	235	369	338.8	738.5
198	398	394	296	235	369	338.2	738.6
199	398	392	296	235	370	338.1	739.5
200	397	391	296	234	369	337.3	739.5
201	397	390	296	233	370	337.1	739.3
202	396	389	296	233	370	337.0	739.5
203	396	389	296	233	370	336.7	739.5
204	396	388	296	233	370	336.4	738.3
205	396	387	296	231	369	335.8	736.8
206	396	386	296	231	370	335.6	734.8
207	396	385	296	231	369	335.3	732.0
208	396	384	296	231	369	334.9	729.2
209	396	383	296	230	369	334.8	727.1
210	396	382	296	229	369	334.3	725.5
211	395	381	296	229	369	334.0	724.0
212	395	380	296	229	368	333.7	722.5
213	395	379	296	228	368	333.3	720.7
214	395	379	295	228	368	332.9	719.0
215	395	378	296	227	368	332.5	717.6
216	395	377	296	226	368	332.1	716.2
217	395	376	296	226	368	332.0	714.6
218	395	375	296	225	367	331.6	713.5
219	395	374	297	224	367	331.2	712.8
220	395	373	297	224	366	331.1	711.8
221	395	372	297	223	366	330.7	710.3
222	395	372	298	222	366	330.5	708.2
223	394	371	299	222	365	330.1	705.2
224	394	370	300	221	365	329.9	701.9
225	393	369	301	221	365	329.8	698.8
226	393	368	301	220	365	329.5	696.2
227	393	367	301	220	364	329.1	693.9
228	392	366	302	218	364	328.6	692.0
229	391	366	303	218	364	328.3	690.6
230	391	365	303	218	364	327.9	689.0
231	390	364	301	217	364	327.0	686.0
232	389	363	298	216	363	325.9	683.6
233	388	362	296	215	363	325.0	681.4
234	387	362	293	215	364	324.2	679.3
235	386	361	291	215	364	323.3	676.8
236	385	360	291	214	363	322.6	674.2
237	383	359	289	213	363	321.5	671.6
238	382	359	288	213	363	321.0	669.5
239	381	358	286	212	363	320.1	667.8

WOODSTOVE SURFACE TEMPERATURE DATA

Client: Sherwood
Model: Ironwood 2.0-1
Run #: 3

Job #: 25-470
Tracking #: 243
Technician: AK
Date: 12/23/2025

Stove ΔT: 105

	Temperature Data (°F)						
Elapsed Time (min)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
240	379	357	285	211	363	319.2	666.8
241	378	356	284	212	363	318.6	666.4
242	377	356	283	210	364	317.9	666.5
243	376	355	282	210	363	317.0	666.5
244	375	354	282	210	363	316.7	666.2
245	374	353	280	209	364	316.1	666.4
246	373	353	280	209	364	315.5	667.0
247	371	352	279	208	363	314.8	667.7
248	370	351	278	208	363	314.0	668.6
249	370	351	278	207	363	313.6	669.8
250	369	350	277	207	363	313.1	670.9
251	368	349	277	207	363	312.7	671.7
252	367	349	277	207	364	312.4	672.1
253	366	348	276	207	363	312.1	672.3
254	365	347	276	206	364	311.6	672.3
255	365	347	276	206	363	311.3	672.1
256	364	346	275	206	363	310.9	671.7
257	364	345	275	206	362	310.3	671.2
258	363	345	275	205	363	310.2	670.8
259	363	344	274	206	362	309.7	670.3
260	362	344	274	205	362	309.5	669.6
261	362	344	274	205	362	309.3	668.8
262	362	343	274	205	362	309.0	668.3
263	361	343	274	205	362	308.9	667.8
264	361	342	274	204	361	308.3	667.2
265	360	342	274	204	361	308.3	666.7
266	360	342	274	204	361	308.0	666.5
267	360	341	274	204	360	307.7	666.4
268	359	341	274	204	360	307.6	666.7
269	359	341	274	203	360	307.4	667.2
270	359	341	274	203	360	307.1	667.8
271	359	340	274	203	360	307.0	668.3
272	359	340	273	203	359	306.8	666.2
273	358	339	273	203	359	306.4	663.6
274	357	339	273	202	358	305.8	661.4
275	357	338	274	202	358	305.7	659.9
276	356	337	274	202	358	305.4	659.0
277	355	337	274	201	358	305.0	658.6
278	354	337	274	201	358	304.7	658.1
279	353	336	274	201	357	304.3	657.7
280	352	336	274	201	357	303.9	657.3
281	352	335	275	200	356	303.6	657.5
282	351	335	275	200	356	303.3	658.0
283	350	334	276	200	356	303.2	657.7
284	350	334	276	199	356	303.0	656.6
285	349	334	277	198	355	302.6	655.6
Average	376.8	373.1	281.7	282.5	375.0	337.8	836.4

LAB SAMPLE DATA - ASTM E2515

Client: Sherwood
Model: Ironwood 2.0-1
Run #: 3

Job #: 25-470
Tracking #: 243
Technician: AK
Date: 12/23/2025

		Sample ID	Tare, mg	Final, mg	Catch, mg
Filters	**A**	G01453	229.5	234.1	4.6
	B	G01454	227.7	232.0	4.3
	C - 1st Hour	G01455	230.8	232.4	1.6
	Amb	G01456	229.9	230.0	0.1
Probes	**A**	15A	117250.1	117250.8	0.7
	B	15B	116762.4	116762.8	0.4
	C - 1st Hour	15C	116849.1	116849.2	0.1
O-rings	**A**	15A	3565.1	3565.2	0.1
	B	15B	3566.4	3566.8	0.4
	C - 1st Hour	15C	3389.2	3389.9	0.7

Placed in Dessicator on:	12/23/2025

		200.0		200.0					
Balance Audit (mg):		Weight (mg)	Date/Time	Weight (mg)	Date/Time	Weight (mg)	Date/Time	Weight (mg)	Date/Time
Filters	**A**	234.1	12/29 10:15	234.1	1/5 13:30				
	B	231.9	12/29 10:15	232.0	1/5 13:30				
	C - 1st Hour	232.2	12/29 10:15	232.4	1/5 13:30				
	Amb	229.9	12/29 10:15	230.0	1/5 13:30				
Probes	**A**	117250.7	12/29 10:15	117250.8	1/5 13:30				
	B	116762.7	12/29 10:15	116762.8	1/5 13:30				
	C - 1st Hour	116849.1	12/29 10:15	116849.2	1/5 13:30				
O-Rings	**A**	3565.3	12/29 10:15	3565.2	1/5 13:30				
	B	3566.8	12/29 10:15	3566.8	1/5 13:30				
	C - 1st Hour	3389.8	12/29 10:15	3389.9	1/5 13:30				

Train A Aggregate, mg:	**5.4**
Train B Aggregate, mg:	**5.1**
Train C Aggregate, mg:	**2.4**
Ambient, mg:	**0.1**

ASTM E2780 Wood Heater Run Sheets

Client: Sherwood Job Number: 25-470 Tracking #: 243
Model: Ironwood 2.0-1 Run Number: 3 Test Date: 12/23/25

Wood Heater Run Notes

Test Control Settings

Primary Air Setting(s): Open 5/32" from fully closed (3/8")
Targeted Burn Category: III

Preburn Notes

Time	Notes
	-None-

Test Notes

Test Burn Start Time: 11:42 Test Fuel Loaded by: 35 seconds
Door Closed: 45 seconds Air Control Set at: 300 seconds
Other Loading Notes: Bypass opened & closed with door, fan on high

Time	Notes
	-None-

Test Burn End Time: 16:27

Flue Gas Concentration Measurement

Calibration Gas Values: Span Gas CO_2 (%): 17.32 CO (%): 4.350
Mid Gas CO_2 (%): 10.02 CO (%): 2.530

Calibration Results:

	Pre Test			Post Test		
	Zero	Span	Mid	Zero	Span	Mid
Time	9:51	9:53	9:55	17:01	17:02	17:04
CO_2	0.00	17.32	10.20	-0.08	17.23	10.08
CO	0.000	4.350	2.521	0.010	4.324	2.513

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

Technician Signature: Date: 1/14/26

ASTM E2780 Wood Heater Run Sheets

Client: Sherwood | Job Number: 25-470 | Tracking #: 243
Model: Ironwood 2.0-1 | Run Number: 3 | Test Date: 12/23/25



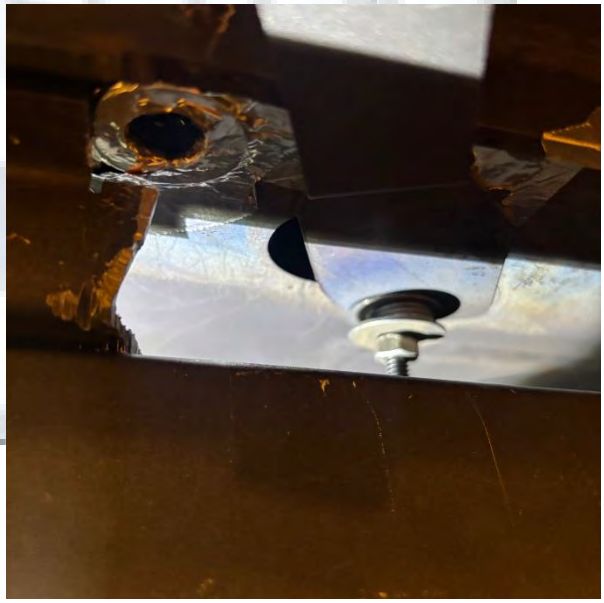
Test Fuel Front/Side View



Test Fuel Iso View



Test Fuel Loaded in Stove



Air Settings

Technician Signature: _____ Date: 1/14/26

WOOD STOVE TEST DATA PACKET
ASTM E2780/E2515

Run 4 Data Summary

Client:	Sherwood
Model:	Ironwood 2.0-1
Job #:	25-470
Tracking #:	243
Test Date:	12/24/2025

Technician Signature

1/14/2026
Date

TEST RESULTS - ASTM E2780 / ASTM E2515

Client: Sherwood
Model: Ironwood 2.0-1
Run #: 4

Job #: 25-470
Tracking #: 243
Technician: AK
Date: 12/24/2025

Burn Rate (kg/hr):	2.04

	Ambient Sample	Sample Train A	Sample Train B	1st Hour Filter
Total Sample Volume (ft^3)	31.253	23.264	22.554	8.524
Average Gas Velocity in Dilution Tunnel (ft/sec)	20.1			
Average Gas Flow Rate in Dilution Tunnel (dscf/hr)	12504.8			
Average Gas Meter Temperature (°F)	69.0	89.2	88.9	82.7
Total Sample Volume (dscf)	30.603	22.566	21.454	8.172
Average Tunnel Temperature (°F)	116.4			
Total Time of Test (min)	147			
Total Particulate Catch (mg)	0.1	4.4	4.7	3.3
Particulate Concentration, dry-standard (g/dscf)	0.0000033	0.0001950	0.0002191	0.0004038
Total PM Emissions (g)	0.10	5.87	6.61	5.01
Particulate Emission Rate (g/hr)	0.04	2.40	2.70	5.01
Emissions Factor (g/kg)	-	1.17	1.32	-
Difference from Average Total Particulate Emissions (g)	-	0.37	0.37	-
Difference from Average Total Particulate Emissions (%)	-	5.9%	5.9%	
Difference from Average Emissions Factor (g/kg)	-	0.07	0.07	-

Final Average Results	
Total Particulate Emissions (g)	6.24
Particulate Emission Rate (g/hr)	2.55
Emissions Factor (g/kg)	1.25
HHV Efficiency (%)	73.6%
LHV Efficiency (%)	79.5%
CO Emissions (g/min)	0.72

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	81.6	OK
Face Velocity	< 30 ft/min	9.0	OK
Leakage Rate	Less than 4% of average sample rate	0 cfm	OK
Ambient Temp	55-90 °F	Min:66.7/Max:69.8	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	112.8	OK

B415.1 Efficiency Results

Manufacturer:	Sherwood
Model:	Ironwood 2.0-1
Date:	12/24/25
Run:	4
Control #:	25-470
Test Duration:	147
Output Category:	4

Test Results in Accordance with CSA B415.1-09

	HHV Basis	LHV Basis
Overall Efficiency	73.6%	79.5%
Combustion Efficiency	98.7%	98.7%
Heat Transfer Efficiency	74.5%	80.6%

Output Rate (kJ/h)	29,109	27,613	**(Btu/h)**
Burn Rate (kg/h)	2.00	4.40	**(lb/h)**
Input (kJ/h)	39,559	37,526	**(Btu/h)**

Test Load Weight (dry kg)	4.89	10.78	**dry lb**
MC wet (%)	19.23		
MC dry (%)	23.81		
Particulate (g)	6.24		
CO (g)	106		
Test Duration (h)	2.45		

Emissions	**Particulate**	**CO**
g/MJ Output	0.09	1.48
g/kg Dry Fuel	1.28	21.58
g/h	2.55	43.09
g/min	0.04	0.72
lb/MM Btu Output	0.20	3.44

Air/Fuel Ratio (A/F)	13.08

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

WOODSTOVE FUEL DATA - ASTM E2780

Client: Sherwood
Model: Ironwood 2.0-1
Run #: 4

Job #: 25-470
Tracking #: 243
Technician: AK
Date: 12/24/2025

Preburn Fuel Information

Size	Length (in)	Moisture Content (% DB)	Size	Length (in)	Moisture Content (% DB)
2x4	12.00	19.5			
2x4	12.00	19.7			
2x4	12.00	20.1			
2x4	12.00	23.3			
2x4	12.00	21.8			
2x4	12.00	24.0			

Total Fuel Weight (lbs): 9.02
Average Moisture (%DB): 21.4

Firebox Volume (ft^3): 1.80
Total 2x4 Crib Weight, with spacers (lbs): 5.80
Total 4x4 Crib Weight, with spacers (lbs): 7.69
Total Wet Fuel Weight, with spacers (lbs): 13.49

Coal Bed Range (20-25%):
Min (lbs): 2.70
Max (lbs): 3.37

Test Fuel Information

Size	Length (in)	Weight (lbs)	Moisture Content (%DB)			Dry Weight (lbs)
4x4	16.00	3.35	24.2	24.1	24.5	2.70
4x4	16.00	3.90	24.0	23.7	24.9	3.14
2x4	16.00	1.43	22.4	22.5	24.8	1.16
2x4	16.00	1.54	23.8	23.8	24.1	1.24
2x4	16.00	1.50	22.5	23.6	24.2	1.22

Total Dry Weight, no spacers (lbs): 9.45
Total Dry Weight, with spacers (lbs): 11.03

Spacer Moisture Readings (%DB)

14.1	11.8						
11.9	13.2						
15.2	10.9						
10.8	11.3						
13.4	14.3						
13.1	12.4						
12.5	10.7						
13.9	11.8						

Quality Checks	Requirement	Observed	Result
Fuel Density	25 - 36 (lbs/ft^3, DB)	25.4	OK
Loading Density	6.3 - 7.7 (lbs/ft^3, WB)	7.49	OK
2x4 Fuel Mix	35 - 65 % of total weight	43%	OK

DILUTION TUNNEL & MISC. DATA - ASTM E2780 / E2515

Client:	Sherwood	Job #:	25-470
Model:	Ironwood 2.0-1	Tracking #:	243
Run #:	4	Technician:	AK
Test Start Time:	12:14	Date:	12/24/2025

Total Sampling Time (min):	147	
Recording Interval (min):	1	
Meter Box γ Factor:	1.021	(A)
Meter Box γ Factor:	1.001	(B)
Meter Box γ Factor:	1.001	(C)
Meter Box γ Factor:	0.999	(Ambient)
Induced Draft Check (in. H_2O):	0	
Smoke Capture Check (%):	100%	
Date Flue Pipe Last Cleaned:	12/17/2025	
Test Fuel Scale Audit (lbs)	10.00	
Platform Scale Audit (lbs)	10.0	

	Pre-Test	Post Test	Avg.
Barometric Pressure (in. Hg)	29.30	29.49	29.40
Relative Humidity (%)	35.7	30.9	
Room Air Velocity (ft/min)	<50	<50	
Pitot Tube Leak Check	0	0	
Ambient Sample Volume:		31.253	ft^3

Sample Train Leak Checks

	Pre-test	Post-test			
(A)	0.000	0.000	cfm @	-6	in. Hg
(B)	0.000	0.000	cfm @	-6	in. Hg
(C)	0.000	0.000	cfm @	-7	in. Hg
(Ambient)	0.000	0.000	cfm @	-12	in. Hg

DILUTION TUNNEL FLOW

Traverse Data

Point	dP (in H_2O)	Temp (°F)
1	0.058	80
2	0.092	80
3	0.098	80
4	0.062	80
5	0.074	80
6	0.104	80
7	0.104	80
8	0.062	80
Center	0.090	80

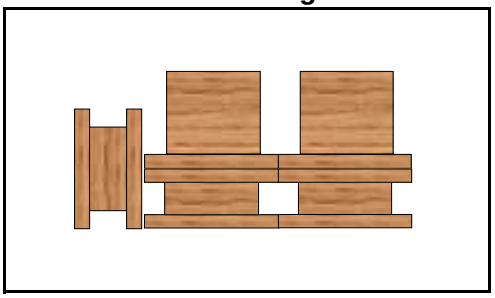
Dilution Tunnel H_2O:	2.00	percent
Tunnel Diameter:	6	inches
Pitot Tube Cp:	0.99	[unitless]
Dilution Tunnel MW(dry):	29.00	lb/lb-mole
Dilution Tunnel MW(wet):	28.78	lb/lb-mole
Tunnel Area:	0.1963	ft^2
V_{strav}:	19.24	ft/sec
V_{scent}:	20.32	ft/sec
F_p:	0.947	[ratio]
Initial Tunnel Flow:	213.0	scf/min

Static Pressure: -0.160 in. H_2O

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)	23.8

WOODSTOVE PREBURN DATA - ASTM E2780

Client: Sherwood
Model: Ironwood 2.0-1
Run #: 4

Job #: 25-470
Tracking #: 243
Technician: AK
Date: 12/24/2025

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	11.36	-0.078	611	600	572	407	490	535.9	449	68
1	11.17	-0.080	608	598	552	403	492	530.4	439	68
2	10.96	-0.081	602	592	527	401	496	523.5	451	68
3	10.76	-0.084	595	586	501	403	497	516.4	467	68
4	10.53	-0.084	587	579	479	413	499	511.4	480	69
5	10.31	-0.085	580	571	460	425	500	507.2	488	68
6	10.09	-0.086	573	565	444	440	501	504.4	495	68
7	9.87	-0.087	566	559	431	452	501	501.7	500	69
8	9.65	-0.087	559	553	421	468	501	500.6	505	69
9	9.42	-0.086	553	548	412	483	501	499.7	508	69
10	9.19	-0.087	548	544	405	496	501	498.9	511	69
11	8.96	-0.086	543	540	399	507	501	498.0	514	69
12	8.74	-0.090	539	536	395	520	501	498.1	516	68
13	8.49	-0.086	536	533	391	528	500	497.3	516	68
14	8.26	-0.086	533	531	389	537	499	497.5	517	69
15	8.02	-0.088	530	528	387	545	499	498.0	518	69
16	7.80	-0.086	529	527	386	552	498	498.2	518	69
17	7.58	-0.089	528	526	386	558	496	498.6	517	69
18	7.35	-0.088	526	525	387	562	496	499.1	517	69
19	7.14	-0.087	526	524	388	567	495	499.9	517	69
20	6.93	-0.086	525	524	389	571	494	500.7	518	69
21	6.68	-0.089	525	524	392	573	494	501.5	521	69
22	6.44	-0.088	525	524	395	577	494	502.8	522	69
23	6.23	-0.087	525	525	398	579	493	503.8	522	69
24	6.02	-0.088	526	526	401	583	492	505.3	522	69
25	5.82	-0.089	527	527	405	582	492	506.5	522	69
26	5.62	-0.086	528	528	410	583	491	508.0	521	69
27	5.42	-0.085	529	530	416	585	490	509.9	519	69
28	5.24	-0.087	530	532	421	585	491	511.7	516	69
29	5.05	-0.085	532	533	426	585	491	513.3	516	69
30	4.87	-0.087	533	535	432	584	490	514.8	515	69
31	4.69	-0.083	535	537	437	584	490	516.7	514	70
32	4.54	-0.085	537	540	442	581	490	518.1	513	70
33	4.39	-0.084	539	542	449	582	489	520.2	514	69
34	4.24	-0.085	542	545	456	581	490	522.7	514	70
35	4.10	-0.085	545	547	462	580	489	524.5	514	70
36	4.00	-0.085	548	550	470	582	488	527.7	514	70
37	3.87	-0.085	550	553	477	582	490	530.2	511	69
38	3.76	-0.085	553	556	484	580	489	532.6	508	69
39	3.66	-0.083	556	559	490	577	489	534.4	501	70
40	3.57	-0.082	560	563	495	574	490	536.3	492	69
41	3.50	-0.081	563	567	500	568	490	537.6	482	69
42	3.46	-0.081	566	571	503	558	490	537.7	473	69
43	3.40	-0.078	568	575	506	549	491	537.8	463	70
44	3.36	-0.079	570	578	509	536	491	536.7	454	70

WOODSTOVE PREBURN DATA - ASTM E2780

Client: Sherwood
Model: Ironwood 2.0-1
Run #: 4

Job #: 25-470
Tracking #: 243
Technician: AK
Date: 12/24/2025

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	3.32	-0.078	573	580	513	523	490	535.8	446	70
46	3.28	-0.074	575	583	515	510	491	534.8	437	70
47	3.24	-0.074	576	584	518	495	491	533.0	429	69
48	3.20	-0.075	577	585	519	482	492	531.0	421	69
49	3.16	-0.073	578	585	520	468	493	528.8	415	69
50	3.12	-0.071	579	585	521	456	492	526.6	409	69
51	3.10	-0.074	580	585	521	444	493	524.6	404	69
52	3.07	-0.072	580	584	521	431	494	522.1	401	69
53	3.03	-0.070	581	583	520	421	494	519.8	396	69
54	3.00	-0.070	581	582	519	411	495	517.7	393	69
55	2.96	-0.071	581	580	518	403	495	515.7	390	69
56	2.93	-0.072	582	579	517	393	496	513.4	388	69
57	2.90	-0.068	582	578	516	385	495	511.3	387	69
58	2.86	-0.070	581	577	515	379	497	509.7	383	69
59	2.82	-0.069	581	576	513	372	497	507.7	380	69
60	2.79	-0.068	580	574	513	368	497	506.5	377	69

BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: Sherwood
Model: Ironwood 2.0-1
Run #: 4

Job #: 25-470
Tracking #: 243
Technician: AK
Date: 12/24/2025

	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		0.091	0.01	73	0.1		13.35		120	389	72	70
1	0.100	0.100	0.089	2.12	73	0.9	-	13.29	-0.06	130	389	75	70
2	0.242	0.142	0.093	2.15	73	1.0	-	13.06	-0.23	129	387	76	70
3	0.390	0.148	0.091	2.17	73	1.0	-	12.84	-0.22	126	414	76	70
4	0.533	0.143	0.091	2.19	73	1.0	-	12.62	-0.22	125	443	77	69
5	0.682	0.149	0.091	2.19	73	1.0	-	12.41	-0.21	125	464	77	70
6	0.827	0.145	0.090	2.20	73	1.0	-	12.19	-0.22	126	479	78	70
7	0.975	0.148	0.091	2.20	73	1.0	-	11.97	-0.22	127	489	78	69
8	1.120	0.145	0.091	2.22	73	1.0	-	11.74	-0.23	127	497	79	69
9	1.269	0.149	0.092	2.24	74	1.0	-	11.53	-0.21	128	502	79	69
10	1.415	0.146	0.093	2.25	74	1.0	93	11.32	-0.21	128	507	79	69
11	1.563	0.148	0.091	2.26	74	1.0	-	11.10	-0.22	129	511	80	69
12	1.712	0.149	0.091	2.28	74	1.0	-	10.88	-0.22	129	512	80	69
13	1.861	0.149	0.090	2.29	74	1.0	-	10.67	-0.21	130	514	80	69
14	2.011	0.150	0.091	2.29	75	1.0	-	10.47	-0.20	130	514	80	69
15	2.161	0.150	0.091	2.30	75	1.0	-	10.27	-0.20	130	515	81	69
16	2.312	0.151	0.091	2.32	75	1.1	-	10.07	-0.20	130	512	81	69
17	2.463	0.151	0.091	2.32	75	1.0	-	9.88	-0.19	130	510	81	69
18	2.614	0.151	0.092	2.34	76	1.0	-	9.69	-0.19	130	508	81	69
19	2.767	0.153	0.092	2.35	76	1.1	-	9.51	-0.18	129	504	81	69
20	2.918	0.151	0.092	2.35	76	1.1	98	9.34	-0.17	129	500	81	69
21	3.072	0.154	0.092	2.36	77	1.1	-	9.17	-0.17	129	498	81	69
22	3.222	0.150	0.092	2.37	77	1.1	-	8.98	-0.19	129	498	81	70
23	3.377	0.155	0.092	2.38	77	1.1	-	8.80	-0.18	128	496	80	70
24	3.527	0.150	0.091	2.38	78	1.1	-	8.66	-0.14	128	492	80	69
25	3.683	0.156	0.093	2.39	78	1.1	-	8.52	-0.14	127	484	80	69
26	3.833	0.150	0.092	2.38	78	1.1	-	8.39	-0.13	127	477	80	69
27	3.990	0.157	0.089	2.40	79	1.0	-	8.27	-0.12	126	470	80	69
28	4.142	0.152	0.091	2.41	79	1.1	-	8.15	-0.12	125	465	80	69
29	4.299	0.157	0.093	2.41	80	1.1	-	8.03	-0.12	125	460	80	69
30	4.451	0.152	0.091	2.41	80	1.1	100	7.91	-0.12	124	456	81	69
31	4.607	0.156	0.093	2.42	80	1.1	-	7.79	-0.12	123	453	81	69

BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: Sherwood
Model: Ironwood 2.0-1
Run #: 4

Job #: 25-470
Tracking #: 243
Technician: AK
Date: 12/24/2025

	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	4.761	0.154	0.093	2.42	81	1.0	-	7.69	-0.10	123	449	81	69
33	4.917	0.156	0.091	2.44	81	1.0	-	7.58	-0.11	122	446	81	69
34	5.075	0.158	0.092	2.45	81	1.1	-	7.48	-0.10	122	443	81	69
35	5.227	0.152	0.094	2.44	82	1.1	-	7.37	-0.11	122	442	81	69
36	5.386	0.159	0.092	2.45	82	1.1	-	7.26	-0.11	121	440	81	69
37	5.541	0.155	0.091	2.46	82	1.0	-	7.16	-0.10	121	440	81	69
38	5.700	0.159	0.091	2.47	83	1.1	-	7.05	-0.11	121	440	81	69
39	5.854	0.154	0.092	2.47	83	1.0	-	6.93	-0.12	121	440	81	69
40	6.011	0.157	0.092	2.48	83	1.0	101	6.84	-0.09	120	440	81	69
41	6.171	0.160	0.091	2.47	84	1.1	-	6.74	-0.10	120	440	81	69
42	6.325	0.154	0.091	2.48	84	1.0	-	6.63	-0.11	120	440	81	69
43	6.485	0.160	0.092	2.47	85	1.0	-	6.53	-0.10	120	439	81	69
44	6.641	0.156	0.091	2.50	85	1.0	-	6.41	-0.12	120	439	81	69
45	6.800	0.159	0.092	2.49	85	1.0	-	6.32	-0.09	120	441	81	69
46	6.956	0.156	0.092	2.49	85	1.0	-	6.20	-0.12	120	443	81	69
47	7.115	0.159	0.092	2.51	86	1.0	-	6.09	-0.11	120	445	81	69
48	7.275	0.160	0.091	2.50	86	1.1	-	5.97	-0.12	120	447	81	69
49	7.429	0.154	0.092	2.51	86	1.1	-	5.84	-0.13	120	449	81	69
50	7.592	0.163	0.092	2.51	87	1.1	101	5.74	-0.10	121	451	81	69
51	7.748	0.156	0.092	2.52	87	1.1	-	5.61	-0.13	121	453	81	69
52	7.907	0.159	0.090	2.51	87	1.0	-	5.50	-0.11	121	455	81	69
53	8.067	0.160	0.094	2.52	87	1.0	-	5.39	-0.11	121	455	81	69
54	8.223	0.156	0.092	2.53	88	1.1	-	5.27	-0.12	121	456	81	69
55	8.385	0.162	0.092	2.51	88	1.0	-	5.16	-0.11	121	456	81	69
56	8.542	0.157	0.091	2.52	88	1.1	-	5.05	-0.11	121	455	81	69
57	8.702	0.160	0.092	2.53	89	1.0	-	4.93	-0.12	121	455	81	69
58	8.862	0.160	0.091	2.53	89	1.0	-	4.83	-0.10	121	454	81	70
59	9.021	0.159	0.091	2.54	89	1.0	-	4.72	-0.11	121	453	81	69
60	9.181	0.160	0.092	2.53	89	1.1	101	4.60	-0.12	121	453	81	69
61	9.339	0.158	0.092	2.54	90	1.0	-	4.51	-0.09	121	452	82	69
62	9.500	0.161	0.092	2.54	90	1.1	-	4.40	-0.11	121	452	82	69
63	9.659	0.159	0.091	2.54	90	1.0	-	4.29	-0.11	121	453	81	69

BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: Sherwood
Model: Ironwood 2.0-1
Run #: 4

Job #: 25-470
Tracking #: 243
Technician: AK
Date: 12/24/2025

	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	9.819	0.160	0.092	2.53	90	1.0	-	4.18	-0.11	121	453	82	69
65	9.980	0.161	0.092	2.54	91	1.1	-	4.07	-0.11	121	452	82	69
66	10.138	0.158	0.092	2.55	91	1.0	-	3.98	-0.09	121	451	81	69
67	10.299	0.161	0.091	2.55	91	1.0	-	3.89	-0.09	121	449	81	69
68	10.458	0.159	0.091	2.55	91	1.0	-	3.79	-0.10	120	447	81	69
69	10.619	0.161	0.092	2.55	91	1.0	-	3.68	-0.11	120	444	81	69
70	10.780	0.161	0.092	2.55	91	1.1	101	3.60	-0.08	120	441	81	69
71	10.938	0.158	0.092	2.56	92	1.0	-	3.52	-0.08	120	437	81	69
72	11.100	0.162	0.091	2.55	92	1.1	-	3.44	-0.08	119	434	81	69
73	11.261	0.161	0.092	2.55	92	1.0	-	3.35	-0.09	119	432	81	69
74	11.420	0.159	0.092	2.56	92	1.1	-	3.27	-0.08	119	429	81	69
75	11.583	0.163	0.091	2.56	92	1.1	-	3.20	-0.07	118	426	81	69
76	11.742	0.159	0.090	2.56	93	1.1	-	3.12	-0.08	118	423	81	69
77	11.903	0.161	0.091	2.55	93	1.1	-	3.04	-0.08	118	421	81	69
78	12.065	0.162	0.093	2.56	93	1.1	-	2.96	-0.08	117	418	81	69
79	12.223	0.158	0.092	2.56	93	1.1	-	2.90	-0.06	117	415	81	69
80	12.388	0.165	0.093	2.56	93	1.0	101	2.83	-0.07	116	414	81	69
81	12.545	0.157	0.093	2.57	93	1.0	-	2.77	-0.06	116	410	81	69
82	12.708	0.163	0.092	2.57	94	1.0	-	2.69	-0.08	116	407	81	69
83	12.871	0.163	0.092	2.57	94	1.1	-	2.63	-0.06	115	405	81	69
84	13.028	0.157	0.092	2.56	94	1.1	-	2.56	-0.07	115	403	81	69
85	13.194	0.166	0.093	2.58	94	1.0	-	2.50	-0.06	115	400	81	69
86	13.352	0.158	0.092	2.57	94	1.1	-	2.43	-0.07	115	397	81	69
87	13.514	0.162	0.093	2.56	94	1.0	-	2.37	-0.06	114	397	81	69
88	13.677	0.163	0.092	2.58	94	1.1	-	2.31	-0.06	114	394	81	69
89	13.836	0.159	0.092	2.57	95	1.0	-	2.24	-0.07	113	391	81	69
90	13.999	0.163	0.091	2.58	95	1.0	101	2.19	-0.05	113	389	81	70
91	14.162	0.163	0.093	2.58	95	1.1	-	2.13	-0.06	113	389	81	70
92	14.320	0.158	0.090	2.57	95	1.0	-	2.07	-0.06	113	386	81	70
93	14.485	0.165	0.093	2.57	95	1.1	-	2.01	-0.06	112	385	81	69
94	14.644	0.159	0.092	2.57	95	1.1	-	1.96	-0.05	112	383	81	69
95	14.807	0.163	0.092	2.57	95	1.1	-	1.91	-0.05	112	381	80	69

BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: Sherwood
Model: Ironwood 2.0-1
Run #: 4

Job #: 25-470
Tracking #: 243
Technician: AK
Date: 12/24/2025

	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	14.971	0.164	0.092	2.57	95	1.1	-	1.85	-0.06	111	378	80	69
97	15.129	0.158	0.092	2.58	96	1.1	-	1.80	-0.05	111	376	80	69
98	15.294	0.165	0.092	2.58	96	1.1	-	1.75	-0.05	111	374	80	69
99	15.455	0.161	0.093	2.58	96	1.1	-	1.70	-0.05	111	373	80	69
100	15.617	0.162	0.093	2.57	96	1.0	101	1.64	-0.06	111	372	80	69
101	15.780	0.163	0.093	2.58	96	1.1	-	1.59	-0.05	110	371	80	69
102	15.941	0.161	0.093	2.58	96	1.0	-	1.54	-0.05	110	370	80	69
103	16.103	0.162	0.093	2.57	96	1.1	-	1.50	-0.04	110	369	80	69
104	16.268	0.165	0.093	2.58	96	1.0	-	1.44	-0.06	110	366	80	69
105	16.425	0.157	0.092	2.57	96	1.0	-	1.39	-0.05	109	365	80	69
106	16.592	0.167	0.095	2.59	96	1.0	-	1.34	-0.05	109	364	80	68
107	16.751	0.159	0.094	2.58	97	1.0	-	1.29	-0.05	109	364	80	68
108	16.914	0.163	0.091	2.59	97	1.1	-	1.26	-0.03	109	363	80	68
109	17.078	0.164	0.091	2.59	97	1.1	-	1.20	-0.06	108	362	80	68
110	17.239	0.161	0.092	2.58	97	1.1	100	1.16	-0.04	108	362	80	68
111	17.401	0.162	0.091	2.58	97	1.0	-	1.12	-0.04	108	361	79	68
112	17.566	0.165	0.091	2.59	97	1.1	-	1.08	-0.04	108	361	79	68
113	17.724	0.158	0.092	2.57	97	1.1	-	1.04	-0.04	108	361	79	68
114	17.890	0.166	0.093	2.59	97	1.1	-	1.01	-0.03	108	362	79	68
115	18.050	0.160	0.093	2.58	97	1.1	-	0.97	-0.04	108	361	79	68
116	18.213	0.163	0.093	2.59	97	1.1	-	0.94	-0.03	107	359	79	68
117	18.377	0.164	0.091	2.58	97	1.0	-	0.90	-0.04	107	356	79	68
118	18.538	0.161	0.093	2.59	97	1.0	-	0.86	-0.04	107	355	79	69
119	18.700	0.162	0.093	2.59	98	1.0	-	0.83	-0.03	107	354	79	69
120	18.865	0.165	0.093	2.59	98	1.1	100	0.79	-0.04	107	355	79	69
121	19.023	0.158	0.094	2.57	98	1.0	-	0.76	-0.03	107	353	79	69
122	19.190	0.167	0.091	2.58	98	1.1	-	0.73	-0.03	107	352	79	69
123	19.350	0.160	0.092	2.59	98	1.1	-	0.70	-0.03	106	353	79	69
124	19.513	0.163	0.092	2.59	98	1.1	-	0.67	-0.03	106	351	79	69
125	19.677	0.164	0.092	2.58	98	1.1	-	0.64	-0.03	106	353	79	69
126	19.838	0.161	0.093	2.60	98	1.0	-	0.62	-0.02	106	351	79	69
127	20.001	0.163	0.092	2.59	98	1.1	-	0.58	-0.04	106	349	79	69

BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: Sherwood
Model: Ironwood 2.0-1
Run #: 4

Job #: 25-470
Tracking #: 243
Technician: AK
Date: 12/24/2025

	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	20.166	0.165	0.092	2.58	98	1.1	-	0.55	-0.03	106	350	79	69
129	20.325	0.159	0.092	2.58	98	1.0	-	0.53	-0.02	106	349	79	69
130	20.491	0.166	0.092	2.59	98	1.1	100	0.50	-0.03	105	347	79	69
131	20.652	0.161	0.092	2.60	98	1.1	-	0.47	-0.03	105	348	79	69
132	20.814	0.162	0.093	2.59	98	1.1	-	0.45	-0.02	105	347	79	69
133	20.979	0.165	0.092	2.59	98	1.1	-	0.43	-0.02	105	346	79	69
134	21.139	0.160	0.091	2.60	98	1.1	-	0.39	-0.04	105	344	79	69
135	21.303	0.164	0.092	2.60	98	1.1	-	0.37	-0.02	105	344	79	69
136	21.467	0.164	0.093	2.60	98	1.1	-	0.33	-0.04	106	348	79	69
137	21.628	0.161	0.093	2.60	98	1.1	-	0.30	-0.03	105	343	79	69
138	21.792	0.164	0.094	2.59	99	1.1	-	0.26	-0.04	105	340	79	68
139	21.956	0.164	0.094	2.60	99	1.1	-	0.24	-0.02	105	339	79	68
140	22.116	0.160	0.096	2.60	99	1.1	99	0.20	-0.04	104	338	79	68
141	22.283	0.167	0.094	2.59	99	1.1	-	0.17	-0.03	104	335	79	68
142	22.443	0.160	0.094	2.60	99	1.1	-	0.14	-0.03	104	333	78	68
143	22.607	0.164	0.093	2.59	99	1.0	-	0.12	-0.02	103	333	78	68
144	22.771	0.164	0.092	2.61	99	1.1	-	0.07	-0.05	103	332	78	67
145	22.932	0.161	0.092	2.59	99	1.1	-	0.05	-0.02	103	332	78	67
146	23.096	0.164	0.094	2.59	99	1.1	-	0.02	-0.03	103	331	78	67
147	23.264	0.168	0.094	2.60	99	1.1	100	0.00	-0.02	103	331	78	67
Avg/Tot	23.264	0.158	0.092	2.48	89.2	1.0	100			116.4	414.2	80.0	69.0

BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: Sherwood
Model: Ironwood 2.0-1
Run #: 4

Job #: 25-470
Tracking #: 243
Technician: AK
Date: 12/24/2025

	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		0.02	73	0.7		75	-0.069	8.30	0.074
1	0.099	0.099	2.32	73	1.8	-	77	-0.068	4.96	0.116
2	0.251	0.152	2.32	73	1.8	-	78	-0.075	3.03	0.186
3	0.397	0.146	2.32	73	1.7	-	79	-0.080	11.70	0.319
4	0.549	0.152	2.31	73	1.8	-	79	-0.084	15.49	0.754
5	0.695	0.146	2.31	73	1.9	-	79	-0.081	15.55	0.755
6	0.846	0.151	2.32	73	1.7	-	80	-0.085	15.32	0.717
7	0.993	0.147	2.31	73	1.8	-	80	-0.083	15.44	0.744
8	1.145	0.152	2.31	73	1.7	-	80	-0.085	15.70	0.740
9	1.291	0.146	2.32	73	1.8	-	81	-0.087	15.53	0.718
10	1.442	0.151	2.31	74	1.9	97	81	-0.087	15.24	0.514
11	1.588	0.146	2.31	74	1.9	-	81	-0.089	15.14	0.479
12	1.740	0.152	2.31	74	1.8	-	81	-0.087	15.28	0.476
13	1.886	0.146	2.31	74	1.9	-	81	-0.086	15.16	0.482
14	2.038	0.152	2.31	74	2.0	-	81	-0.087	14.93	0.389
15	2.184	0.146	2.32	75	1.9	-	82	-0.086	14.79	0.319
16	2.336	0.152	2.31	75	1.9	-	82	-0.085	14.70	0.219
17	2.482	0.146	2.32	75	1.7	-	82	-0.087	14.48	0.144
18	2.634	0.152	2.32	76	1.9	-	82	-0.086	14.23	0.101
19	2.781	0.147	2.32	76	1.8	-	82	-0.085	13.82	0.075
20	2.933	0.152	2.32	76	1.7	101	81	-0.086	13.70	0.066
21	3.080	0.147	2.32	77	1.6	-	81	-0.085	13.79	0.065
22	3.232	0.152	2.33	77	1.9	-	81	-0.084	13.92	0.075
23	3.379	0.147	2.32	77	1.6	-	81	-0.084	14.05	0.078
24	3.531	0.152	2.33	78	1.7	-	81	-0.082	13.04	0.049
25	3.679	0.148	2.33	78	1.7	-	81	-0.082	11.68	0.015
26	3.831	0.152	2.33	78	1.9	-	81	-0.080	10.80	0.013
27	3.980	0.149	2.33	79	1.9	-	81	-0.081	10.45	0.020
28	4.132	0.152	2.33	79	1.6	-	81	-0.082	9.98	0.030
29	4.282	0.150	2.34	79	1.9	-	81	-0.080	9.94	0.031
30	4.434	0.152	2.34	80	1.7	101	81	-0.080	9.94	0.031
31	4.585	0.151	2.35	80	1.7	-	81	-0.080	9.80	0.030

BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: Sherwood
Model: Ironwood 2.0-1
Run #: 4

Job #: 25-470
Tracking #: 243
Technician: AK
Date: 12/24/2025

	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	4.736	0.151	2.34	80	1.8	-	81	-0.078	9.59	0.035
33	4.889	0.153	2.36	81	1.9	-	81	-0.078	9.51	0.057
34	5.039	0.150	2.36	81	2.0	-	81	-0.077	9.32	0.068
35	5.191	0.152	2.36	81	2.0	-	81	-0.078	9.16	0.082
36	5.342	0.151	2.36	82	1.6	-	81	-0.078	9.22	0.077
37	5.495	0.153	2.35	82	1.9	-	81	-0.077	9.43	0.073
38	5.645	0.150	2.35	82	1.7	-	81	-0.078	9.52	0.072
39	5.801	0.156	2.36	83	1.7	-	81	-0.079	9.50	0.070
40	5.950	0.149	2.35	83	1.9	101	81	-0.078	9.57	0.077
41	6.105	0.155	2.36	83	1.7	-	81	-0.077	9.57	0.068
42	6.254	0.149	2.36	84	1.6	-	81	-0.079	9.50	0.074
43	6.408	0.154	2.36	84	1.9	-	81	-0.080	9.43	0.085
44	6.559	0.151	2.35	84	1.7	-	81	-0.078	9.35	0.103
45	6.713	0.154	2.36	85	2.0	-	81	-0.078	9.57	0.116
46	6.866	0.153	2.37	85	1.5	-	81	-0.077	9.89	0.126
47	7.019	0.153	2.37	85	2.0	-	81	-0.081	10.04	0.156
48	7.172	0.153	2.37	85	1.7	-	81	-0.077	10.28	0.173
49	7.323	0.151	2.37	86	1.7	-	81	-0.078	10.37	0.183
50	7.478	0.155	2.36	86	1.5	101	82	-0.078	10.55	0.186
51	7.629	0.151	2.37	86	2.0	-	81	-0.081	10.71	0.185
52	7.785	0.156	2.38	87	1.7	-	82	-0.080	10.67	0.190
53	7.936	0.151	2.38	87	1.9	-	81	-0.081	10.55	0.176
54	8.091	0.155	2.37	87	1.6	-	82	-0.079	10.34	0.181
55	8.242	0.151	2.38	87	1.7	-	82	-0.080	10.36	0.210
56	8.398	0.156	2.38	88	1.6	-	82	-0.080	10.45	0.209
57	8.551	0.153	2.38	88	2.0	-	82	-0.082	10.29	0.196
58	8.705	0.154	2.39	88	1.9	-	82	-0.080	10.15	0.200
59	8.859	0.154	2.38	88	1.9	-	82	-0.077	10.03	0.198
60	9.011	0.152	2.38	89	1.9	101	82	-0.079	9.98	0.209
61	9.167	0.156	2.38	89	2.0	-	82	-0.078	9.97	0.208
62	9.318	0.151	2.38	89	1.8	-	82	-0.082	10.06	0.226
63	9.475	0.157	2.39	89	1.6	-	82	-0.077	10.30	0.222

BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: Sherwood
Model: Ironwood 2.0-1
Run #: 4

Job #: 25-470
Tracking #: 243
Technician: AK
Date: 12/24/2025

	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	9.625	0.150	2.39	90	2.0	-	82	-0.078	10.31	0.194
65	9.781	0.156	2.38	90	1.9	-	82	-0.080	10.25	0.191
66	9.935	0.154	2.38	90	1.7	-	81	-0.080	9.97	0.180
67	10.089	0.154	2.38	90	2.0	-	81	-0.075	9.86	0.176
68	10.244	0.155	2.38	91	2.0	-	81	-0.080	9.80	0.173
69	10.396	0.152	2.39	91	1.6	-	81	-0.079	9.66	0.156
70	10.553	0.157	2.39	91	1.7	101	81	-0.081	9.47	0.152
71	10.705	0.152	2.39	91	1.9	-	81	-0.080	9.35	0.149
72	10.863	0.158	2.39	91	1.9	-	81	-0.076	9.26	0.147
73	11.013	0.150	2.39	92	2.0	-	81	-0.079	9.00	0.147
74	11.169	0.156	2.39	92	1.8	-	81	-0.076	8.85	0.147
75	11.324	0.155	2.39	92	1.9	-	81	-0.076	8.76	0.142
76	11.479	0.155	2.40	92	1.7	-	81	-0.077	8.73	0.143
77	11.634	0.155	2.39	92	1.6	-	81	-0.078	8.65	0.133
78	11.787	0.153	2.40	93	1.9	-	81	-0.076	8.55	0.141
79	11.945	0.158	2.39	93	2.0	-	81	-0.077	8.45	0.147
80	12.097	0.152	2.39	93	1.9	100	81	-0.076	8.27	0.130
81	12.254	0.157	2.40	93	1.5	-	81	-0.074	8.14	0.124
82	12.406	0.152	2.40	93	1.6	-	81	-0.075	8.10	0.129
83	12.563	0.157	2.40	93	1.9	-	81	-0.073	8.11	0.121
84	12.719	0.156	2.40	93	1.6	-	81	-0.073	8.09	0.121
85	12.872	0.153	2.40	94	1.8	-	81	-0.074	8.08	0.119
86	13.029	0.157	2.39	94	1.8	-	81	-0.073	8.02	0.113
87	13.183	0.154	2.40	94	1.6	-	81	-0.072	7.97	0.107
88	13.341	0.158	2.41	94	1.9	-	81	-0.072	7.92	0.106
89	13.492	0.151	2.40	94	2.0	-	81	-0.072	7.87	0.111
90	13.650	0.158	2.40	94	1.9	100	81	-0.074	7.82	0.105
91	13.806	0.156	2.41	95	1.9	-	81	-0.073	7.76	0.101
92	13.961	0.155	2.40	95	1.8	-	81	-0.070	7.71	0.102
93	14.117	0.156	2.41	95	1.7	-	81	-0.070	7.74	0.099
94	14.271	0.154	2.40	95	1.9	-	81	-0.071	7.76	0.094
95	14.429	0.158	2.41	95	2.0	-	81	-0.069	7.73	0.102

BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: Sherwood
Model: Ironwood 2.0-1
Run #: 4

Job #: 25-470
Tracking #: 243
Technician: AK
Date: 12/24/2025

	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	14.581	0.152	2.40	95	2.0	-	80	-0.072	7.66	0.092
97	14.738	0.157	2.40	95	1.9	-	80	-0.071	7.66	0.097
98	14.895	0.157	2.41	95	2.0	-	80	-0.071	7.61	0.098
99	15.051	0.156	2.41	96	1.8	-	80	-0.070	7.66	0.097
100	15.206	0.155	2.41	96	1.8	100	80	-0.072	7.71	0.095
101	15.360	0.154	2.40	96	1.6	-	80	-0.072	7.64	0.103
102	15.519	0.159	2.40	96	1.7	-	80	-0.071	8.24	0.084
103	15.671	0.152	2.41	96	1.8	-	80	-0.070	8.07	0.078
104	15.829	0.158	2.40	96	1.7	-	80	-0.068	7.74	0.081
105	15.985	0.156	2.41	96	1.6	-	80	-0.069	7.63	0.077
106	16.141	0.156	2.41	96	1.6	-	80	-0.068	7.60	0.097
107	16.297	0.156	2.42	96	2.0	-	80	-0.070	7.56	0.095
108	16.451	0.154	2.41	97	2.0	-	80	-0.070	7.56	0.093
109	16.610	0.159	2.41	97	1.6	-	80	-0.070	7.53	0.093
110	16.763	0.153	2.41	97	1.7	99	80	-0.069	7.50	0.097
111	16.920	0.157	2.40	97	1.9	-	80	-0.070	7.50	0.092
112	17.077	0.157	2.41	97	1.9	-	80	-0.070	7.51	0.095
113	17.233	0.156	2.41	97	2.0	-	80	-0.070	7.42	0.094
114	17.389	0.156	2.41	97	1.8	-	80	-0.071	7.30	0.105
115	17.543	0.154	2.41	97	1.9	-	80	-0.068	7.16	0.106
116	17.703	0.160	2.41	97	1.9	-	80	-0.071	7.06	0.109
117	17.855	0.152	2.42	97	2.0	-	80	-0.071	6.96	0.113
118	18.013	0.158	2.41	97	1.9	-	80	-0.069	6.89	0.117
119	18.170	0.157	2.41	97	1.5	-	79	-0.067	6.88	0.123
120	18.324	0.154	2.41	97	1.9	99	79	-0.070	6.76	0.130
121	18.482	0.158	2.41	97	1.8	-	79	-0.068	6.37	0.130
122	18.637	0.155	2.41	98	1.5	-	79	-0.069	6.29	0.153
123	18.796	0.159	2.41	98	1.6	-	79	-0.070	6.29	0.151
124	18.949	0.153	2.41	98	1.8	-	79	-0.068	6.35	0.151
125	19.107	0.158	2.41	98	1.9	-	79	-0.066	6.38	0.150
126	19.265	0.158	2.42	98	2.0	-	79	-0.066	6.44	0.144
127	19.418	0.153	2.42	98	1.6	-	79	-0.066	6.34	0.154

BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: Sherwood
Model: Ironwood 2.0-1
Run #: 4

Job #: 25-470
Tracking #: 243
Technician: AK
Date: 12/24/2025

	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	19.577	0.159	2.41	98	1.7	-	79	-0.071	6.37	0.178
129	19.731	0.154	2.41	98	2.0	-	79	-0.068	6.37	0.178
130	19.889	0.158	2.42	98	1.8	99	79	-0.069	6.35	0.172
131	20.044	0.155	2.41	98	1.7	-	79	-0.068	6.36	0.176
132	20.202	0.158	2.41	98	2.0	-	79	-0.069	6.28	0.175
133	20.358	0.156	2.42	98	1.9	-	79	-0.068	6.27	0.179
134	20.512	0.154	2.41	98	1.8	-	79	-0.069	6.13	0.176
135	20.672	0.160	2.41	98	2.0	-	79	-0.065	5.87	0.175
136	20.826	0.154	2.42	98	1.6	-	79	-0.069	5.82	0.197
137	20.984	0.158	2.41	98	1.7	-	79	-0.065	6.29	0.148
138	21.140	0.156	2.42	98	1.5	-	79	-0.066	6.29	0.121
139	21.297	0.157	2.42	98	1.5	-	79	-0.067	6.32	0.109
140	21.454	0.157	2.42	98	1.5	98	79	-0.069	6.39	0.107
141	21.609	0.155	2.42	98	2.0	-	79	-0.069	6.36	0.106
142	21.769	0.160	2.42	99	2.0	-	79	-0.064	6.39	0.109
143	21.922	0.153	2.42	99	1.8	-	79	-0.065	6.47	0.101
144	22.080	0.158	2.42	99	1.5	-	79	-0.067	6.52	0.102
145	22.237	0.157	2.43	99	1.6	-	79	-0.067	6.53	0.094
146	22.391	0.154	2.42	99	2.0	-	79	-0.065	6.45	0.099
147	22.554	0.163	2.42	99	2.0	99	79	-0.068	6.44	0.110
Avg/Tot	22.554	0.153	2.36	88.9	1.8	100	80.4	-0.075	9.19	0.162

BOX C TEST DATA - ASTM E2780 / ASTM E2515

Client: Sherwood
Model: Ironwood 2.0-1
Run #: 4

Job #: 25-470
Tracking #: 243
Technician: AK
Date: 12/24/2025

	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		-0.03	78	0.0		73
1	0.115	0.115	0.91	78	1.4	-	73
2	0.252	0.137	0.90	78	1.3	-	74
3	0.391	0.139	0.91	78	1.5	-	75
4	0.528	0.137	0.90	78	1.4	-	75
5	0.667	0.139	0.92	78	1.5	-	75
6	0.804	0.137	0.91	78	1.5	-	76
7	0.943	0.139	0.92	78	1.5	-	76
8	1.082	0.139	0.92	78	1.4	-	76
9	1.220	0.138	0.92	78	1.5	-	77
10	1.361	0.141	0.92	78	1.4	97	77
11	1.499	0.138	0.92	78	1.5	-	77
12	1.639	0.140	0.92	78	1.5	-	78
13	1.778	0.139	0.92	78	1.6	-	78
14	1.917	0.139	0.91	78	1.5	-	78
15	2.057	0.140	0.92	78	1.5	-	78
16	2.196	0.139	0.92	79	1.5	-	78
17	2.335	0.139	0.92	79	1.5	-	78
18	2.476	0.141	0.93	79	1.6	-	78
19	2.614	0.138	0.91	79	1.6	-	78
20	2.755	0.141	0.93	79	1.4	100	78
21	2.895	0.140	0.92	79	1.6	-	78
22	3.034	0.139	0.92	80	1.5	-	78
23	3.176	0.142	0.93	80	1.6	-	78
24	3.316	0.140	0.93	80	1.6	-	78
25	3.456	0.140	0.93	80	1.5	-	78
26	3.598	0.142	0.94	81	1.6	-	78
27	3.739	0.141	0.93	81	1.5	-	78
28	3.880	0.141	0.93	81	1.6	-	78
29	4.023	0.143	0.94	81	1.6	-	79
30	4.165	0.142	0.95	82	1.5	101	79
31	4.307	0.142	0.94	82	1.5	-	79

BOX C TEST DATA - ASTM E2780 / ASTM E2515

Client: Sherwood
Model: Ironwood 2.0-1
Run #: 4

Job #: 25-470
Tracking #: 243
Technician: AK
Date: 12/24/2025

	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	4.449	0.142	0.95	82	1.6	-	79
33	4.594	0.145	0.95	83	1.6	-	79
34	4.737	0.143	0.96	83	1.4	-	79
35	4.880	0.143	0.95	83	1.5	-	79
36	5.023	0.143	0.95	84	1.5	-	79
37	5.167	0.144	0.96	84	1.4	-	79
38	5.312	0.145	0.97	85	1.5	-	79
39	5.456	0.144	0.96	85	1.5	-	79
40	5.600	0.144	0.96	85	1.5	102	79
41	5.745	0.145	0.96	85	1.5	-	79
42	5.890	0.145	0.97	85	1.6	-	79
43	6.036	0.146	0.97	86	1.5	-	79
44	6.181	0.145	0.97	86	1.4	-	79
45	6.327	0.146	0.97	87	1.5	-	79
46	6.472	0.145	0.97	87	1.5	-	79
47	6.617	0.145	0.97	87	1.5	-	79
48	6.763	0.146	0.97	87	1.5	-	79
49	6.909	0.146	0.98	88	1.6	-	79
50	7.056	0.147	0.98	88	1.5	102	79
51	7.203	0.147	0.98	88	1.6	-	79
52	7.349	0.146	0.98	89	1.4	-	79
53	7.496	0.147	0.98	89	1.6	-	79
54	7.643	0.147	0.98	89	1.4	-	79
55	7.789	0.146	0.97	89	1.5	-	79
56	7.936	0.147	0.98	90	1.4	-	79
57	8.083	0.147	0.98	90	1.5	-	79
58	8.230	0.147	0.98	90	1.4	-	79
59	8.377	0.147	0.98	91	1.5	-	79
60	8.524	0.147	0.99	91	1.5	102	79
Avg/Tot	8.524	0.142	0.93	82.7	1.5	101	78.0

WOODSTOVE SURFACE TEMPERATURE DATA

Client: Sherwood
Model: Ironwood 2.0-1
Run #: 4

Job #: 25-470
Tracking #: 243
Technician: AK
Date: 12/24/2025

Stove ΔT: 113

	Temperature Data (°F)						
Elapsed Time (min)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
0	580	573	511	361	497	504.2	813.4
1	579	570	499	356	499	500.5	665.0
2	574	562	478	348	499	492.2	835.6
3	567	552	452	345	500	483.1	1041.9
4	558	541	430	348	500	475.4	1146.2
5	549	530	410	357	500	469.0	1199.6
6	540	519	391	371	500	464.3	1235.4
7	531	509	376	386	499	460.2	1261.7
8	523	499	363	405	498	457.6	1280.9
9	515	491	352	423	498	455.5	1288.8
10	507	483	343	439	496	453.5	1295.3
11	500	475	335	455	495	452.0	1301.1
12	494	469	328	468	493	450.3	1307.6
13	489	463	322	479	493	449.0	1305.7
14	484	458	317	489	491	447.7	1300.9
15	479	453	313	499	490	446.6	1292.2
16	475	449	309	504	488	445.1	1278.2
17	471	445	306	511	487	443.9	1272.7
18	468	442	303	512	485	441.9	1264.6
19	466	440	301	516	484	441.2	1252.0
20	464	438	298	516	482	439.5	1245.0
21	462	436	297	515	480	438.2	1245.5
22	461	435	295	514	479	436.8	1249.2
23	461	434	294	513	478	436.0	1243.2
24	460	434	294	512	477	435.2	1208.0
25	460	434	292	509	475	434.0	1169.6
26	459	434	291	504	474	432.4	1144.8
27	459	435	290	499	472	430.9	1121.9
28	458	435	289	491	471	428.8	1104.3
29	457	435	288	484	470	426.8	1089.8
30	457	435	287	477	468	424.8	1077.5
31	456	435	287	470	466	422.7	1068.0
32	456	435	286	463	465	420.8	1060.7
33	455	435	285	456	463	418.8	1055.3
34	454	435	285	449	460	416.7	1051.1
35	453	435	284	443	459	414.9	1047.9
36	452	435	284	438	458	413.4	1045.4
37	451	435	283	434	456	411.8	1044.1
38	450	435	283	430	454	410.3	1043.8
39	449	435	283	425	453	408.8	1045.6
40	448	435	283	422	451	407.6	1045.8
41	447	435	283	420	449	406.7	1045.1
42	446	435	284	418	447	405.8	1046.8
43	445	436	285	416	444	405.0	1049.7
44	444	436	286	414	443	404.5	1056.3
45	443	436	288	413	442	404.3	1066.9
46	443	437	291	413	440	404.6	1077.5
47	443	437	295	413	437	404.9	1090.8

WOODSTOVE SURFACE TEMPERATURE DATA

Client: Sherwood
Model: Ironwood 2.0-1
Run #: 4

Job #: 25-470
Tracking #: 243
Technician: AK
Date: 12/24/2025

Stove ΔT: 113

	Temperature Data (°F)						
Elapsed Time (min)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
48	444	438	299	414	435	406.0	1098.3
49	444	438	304	415	434	407.0	1099.7
50	444	438	308	417	433	408.0	1100.8
51	444	438	313	418	431	408.8	1100.9
52	444	439	319	420	429	410.0	1101.7
53	444	439	324	422	428	411.2	1099.8
54	445	439	329	424	425	412.4	1096.9
55	445	440	334	425	425	413.7	1096.0
56	444	441	339	428	423	414.8	1097.5
57	443	441	343	428	422	415.5	1098.8
58	443	442	348	429	420	416.4	1097.2
59	443	442	352	428	419	416.7	1093.7
60	443	443	356	427	417	417.3	1090.7
61	444	444	360	427	415	417.9	1090.5
62	444	445	365	426	414	418.7	1095.3
63	445	445	370	426	413	419.8	1098.9
64	445	446	375	426	412	420.8	1093.3
65	446	447	379	425	411	421.4	1085.4
66	447	447	382	424	410	422.1	1074.8
67	448	448	386	423	409	423.0	1068.5
68	449	449	390	422	408	423.7	1061.1
69	451	451	394	421	407	424.7	1051.1
70	452	454	399	418	406	425.7	1041.2
71	454	457	403	416	406	426.9	1032.0
72	456	461	405	413	404	427.8	1024.4
73	457	465	409	410	403	428.7	1016.7
74	459	469	411	407	403	429.5	1009.6
75	460	472	413	403	402	429.9	1003.6
76	461	476	414	398	400	430.0	996.0
77	463	480	415	396	399	430.4	987.5
78	464	483	415	392	398	430.3	980.7
79	465	486	415	388	398	430.3	973.8
80	466	488	416	385	398	430.4	966.0
81	467	491	415	381	396	430.1	958.3
82	467	493	417	377	395	429.9	951.2
83	469	496	417	374	395	429.9	944.4
84	469	498	418	370	393	429.7	939.4
85	470	501	419	366	393	429.7	933.5
86	471	504	421	364	392	430.2	927.2
87	472	506	422	361	391	430.4	921.7
88	473	508	423	357	390	430.2	918.0
89	475	509	424	354	390	430.5	912.6
90	477	511	425	351	389	430.4	907.3
91	479	512	426	348	388	430.7	901.9
92	480	513	427	347	387	430.8	896.6
93	482	513	429	343	388	431.0	891.2
94	485	514	430	340	386	430.8	886.3
95	487	514	431	338	385	430.8	880.5

WOODSTOVE SURFACE TEMPERATURE DATA

Client: Sherwood
Model: Ironwood 2.0-1
Run #: 4

Job #: 25-470
Tracking #: 243
Technician: AK
Date: 12/24/2025

Stove ΔT: 113

	Temperature Data (°F)						
Elapsed Time (min)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
96	489	514	433	335	384	431.0	873.1
97	491	515	435	333	384	431.4	866.5
98	494	515	437	329	383	431.5	861.5
99	496	515	439	327	383	432.0	858.1
100	497	515	440	325	382	432.1	854.2
101	499	516	442	323	381	432.4	853.1
102	501	516	446	321	382	433.1	850.3
103	503	517	451	319	381	434.1	843.0
104	505	518	455	318	381	435.2	836.8
105	506	519	458	316	380	435.8	833.0
106	507	521	461	314	379	436.2	830.9
107	508	522	464	313	379	437.1	829.9
108	508	524	465	310	379	437.0	828.5
109	508	526	467	309	378	437.6	828.3
110	508	528	469	308	378	438.0	827.6
111	507	530	470	306	378	438.2	825.8
112	506	531	471	305	378	438.3	823.6
113	506	532	470	304	378	438.1	822.3
114	505	532	469	303	378	437.6	821.2
115	504	531	465	302	378	435.9	818.1
116	503	530	461	301	378	434.6	815.7
117	501	529	457	300	378	433.2	814.0
118	500	528	453	299	379	431.9	812.6
119	499	527	449	298	378	430.2	812.6
120	497	526	445	297	378	428.5	810.5
121	495	525	439	296	379	426.7	811.4
122	493	525	433	296	379	424.9	814.9
123	490	524	426	294	379	422.7	816.9
124	488	523	420	295	378	420.8	817.8
125	485	521	415	294	381	419.4	816.7
126	483	520	411	294	381	417.7	815.0
127	481	519	406	293	382	416.1	818.1
128	478	518	402	292	383	414.5	822.2
129	476	516	400	292	384	413.4	822.0
130	474	513	397	292	386	412.5	821.4
131	471	511	395	292	387	411.1	819.9
132	469	508	393	291	388	409.7	818.0
133	467	506	391	291	390	408.9	816.2
134	465	504	388	290	392	407.6	810.7
135	463	501	387	288	392	406.1	806.2
136	461	499	384	287	394	404.9	793.4
137	459	496	379	286	395	403.0	783.8
138	456	494	376	284	395	401.0	776.4
139	454	491	372	282	396	399.2	770.4
140	452	489	369	280	397	397.5	766.1
141	450	488	365	279	398	396.0	762.6
142	449	486	364	278	399	395.1	760.3
143	447	485	361	276	400	394.0	757.8

WOODSTOVE SURFACE TEMPERATURE DATA

Client: Sherwood
Model: Ironwood 2.0-1
Run #: 4

Job #: 25-470
Tracking #: 243
Technician: AK
Date: 12/24/2025

Stove ΔT: **113**

	Temperature Data (°F)						
Elapsed Time (min)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
144	446	484	360	274	401	393.0	755.5
145	445	483	359	273	402	392.4	753.2
146	444	483	357	271	404	391.7	751.3
147	444	482	356	270	405	391.4	750.9
Average	473.9	481.7	377.7	379.0	421.3	426.7	983.5

LAB SAMPLE DATA - ASTM E2515

Client: Sherwood
Model: Ironwood 2.0-1
Run #: 4

Job #: 25-470
Tracking #: 243
Technician: AK
Date: 12/24/2025

		Sample ID	Tare, mg	Final, mg	Catch, mg
Filters	**A**	G01457	232.7	237.0	4.3
	B	G01458	226.1	230.4	4.3
	C - 1st Hour	G01459	230.1	232.9	2.8
	Amb	G01460	229.3	229.4	0.1
Probes	**A**	16A	116380.8	116380.9	0.1
	B	16B	115864.0	115864.0	0.0
	C - 1st Hour	16C	114149.2	114149.5	0.3
O-rings	**A**	16A	3568.1	3568.0	0.0
	B	16B	3532.8	3533.2	0.4
	C - 1st Hour	16C	3593.8	3594.0	0.2

**Negative value corrected to zero*

Placed in Dessicator on:	12/24/2025

Balance Audit (mg):		200.0		200.0					
		Weight (mg)	Date/Time	Weight (mg)	Date/Time	Weight (mg)	Date/Time	Weight (mg)	Date/Time
Filters	**A**	237.0	12/29 10:15	237.0	1/5 13:30				
	B	230.3	12/29 10:15	230.4	1/5 13:30				
	C - 1st Hour	233.1	12/29 10:15	232.9	1/5 13:30				
	Amb	229.4	12/29 10:15	229.4	1/5 13:30				
Probes	**A**	116380.8	12/29 10:15	116380.9	1/5 13:30				
	B	115864.1	12/29 10:15	115864.0	1/5 13:30				
	C - 1st Hour	114149.4	12/29 10:15	114149.5	1/5 13:30				
O-Rings	**A**	3568.2	12/29 10:15	3568.0	1/5 13:30				
	B	3533.1	12/29 10:15	3533.2	1/5 13:30				
	C - 1st Hour	3593.9	12/29 10:15	3594.0	1/5 13:30				

Train A Aggregate, mg:	**4.4**
Train B Aggregate, mg:	**4.7**
Train C Aggregate, mg:	**3.3**
Ambient, mg:	**0.1**

ASTM E2780 Wood Heater Run Sheets

Client: Sherwood | Job Number: 25-470 | Tracking #: 243
Model: Ironwood 2.0-1 | Run Number: 4 | Test Date: 12/24/25

Wood Heater Run Notes

Test Control Settings

Primary Air Setting(s): Fully Open (1 1/2")
Targeted Burn Category: IV

Preburn Notes

Time	Notes
	-None-

Test Notes

Test Burn Start Time: 12:14 | Test Fuel Loaded by: 40 seconds
Door Closed: 50 seconds | Air Control Set at: 0 seconds
Other Loading Notes: Bypass opened & closed with door, fan on high

Time	Notes
	-None-

Test Burn End Time: 14:41

Flue Gas Concentration Measurement

Calibration Gas Values: Span Gas CO_2 (%): 17.32 CO (%): 4.350
Mid Gas CO_2 (%): 10.02 CO (%): 2.530

Calibration Results:

	Pre Test			Post Test		
	Zero	Span	Mid	Zero	Span	Mid
Time	10:51	10:53	10:55	15:14	15:15	15:17
CO_2	0.00	17.32	10.29	0.00	17.36	10.29
CO	0.000	4.353	2.540	0.022	4.376	2.553

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

Technician Signature: Date: 1/14/26

ASTM E2780 Wood Heater Run Sheets

Client: Sherwood Job Number: 25-470 Tracking #: 243
Model: Ironwood 2.0-1 Run Number: 4 Test Date: 12/24/25



Test Fuel Front/Side View



Test Fuel Iso View



Test Fuel Loaded in Stove



Air Settings

Technician Signature: Date: 1/14/26

WOOD STOVE TEST DATA PACKET
ASTM E2780/E2515

Run 5 Data Summary

Client:	Sherwood
Model:	Ironwood 2.0-1
Job #:	25-470
Tracking #:	243
Test Date:	12/26/2025

Technician Signature

1/14/2026
Date

TEST RESULTS - ASTM E2780 / ASTM E2515

Client: Sherwood
Model: Ironwood 2.0-1
Run #: 5

Job #: 25-470
Tracking #: 243
Technician: AK
Date: 12/26/2025

Burn Rate (kg/hr):	1.42

	Ambient Sample	Sample Train A	Sample Train B	1st Hour Filter
Total Sample Volume (ft^3)	43.415	32.565	31.638	8.650
Average Gas Velocity in Dilution Tunnel (ft/sec)	19.4			
Average Gas Flow Rate in Dilution Tunnel (dscf/hr)	12617.8			
Average Gas Meter Temperature (°F)	66.6	90.1	90.0	81.0
Total Sample Volume (dscf)	43.076	31.811	30.297	8.391
Average Tunnel Temperature (°F)	97.0			
Total Time of Test (min)	204			
Total Particulate Catch (mg)	0.2	4.0	4.1	2.0
Particulate Concentration, dry-standard (g/dscf)	0.0000046	0.0001257	0.0001353	0.0002384
Total PM Emissions (g)	0.20	5.20	5.61	2.95
Particulate Emission Rate (g/hr)	0.06	1.53	1.65	2.95
Emissions Factor (g/kg)	-	1.08	1.16	-
Difference from Average Total Particulate Emissions (g)	-	0.21	0.21	-
Difference from Average Total Particulate Emissions (%)	-	3.8%	3.8%	
Difference from Average Emissions Factor (g/kg)	-	0.04	0.04	-

Final Average Results	
Total Particulate Emissions (g)	5.40
Particulate Emission Rate (g/hr)	1.59
Emissions Factor (g/kg)	1.12
HHV Efficiency (%)	77.4%
LHV Efficiency (%)	83.7%
CO Emissions (g/min)	0.35

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	78.4	OK
Face Velocity	< 30 ft/min	9.1	OK
Leakage Rate	Less than 4% of average sample rate	0.001 cfm	OK
Ambient Temp	55-90 °F	Min:66.1/Max:67.3	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	55.9	OK

B415.1 Efficiency Results

Manufacturer:	Sherwood
Model:	Ironwood 2.0-1
Date:	12/26/25
Run:	5
Control #:	25-470
Test Duration:	204
Output Category:	3

Test Results in Accordance with CSA B415.1-09

	HHV Basis	LHV Basis
Overall Efficiency	77.4%	83.7%
Combustion Efficiency	99.3%	99.3%
Heat Transfer Efficiency	78.0%	84.3%

Output Rate (kJ/h)	21,481	20,377	**(Btu/h)**
Burn Rate (kg/h)	1.40	3.09	**(lb/h)**
Input (kJ/h)	27,740	26,314	**(Btu/h)**

Test Load Weight (dry kg)	4.76	10.49	**dry lb**
MC wet (%)	17.70		
MC dry (%)	21.51		
Particulate (g)	5.40		
CO (g)	72		
Test Duration (h)	3.40		

Emissions	**Particulate**	**CO**
g/MJ Output	0.07	0.98
g/kg Dry Fuel	1.13	15.02
g/h	1.59	21.03
g/min	0.03	0.35
lb/MM Btu Output	0.17	2.28

Air/Fuel Ratio (A/F)	15.28

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

WOODSTOVE FUEL DATA - ASTM E2780

Client: Sherwood
Model: Ironwood 2.0-1
Run #: 5

Job #: 25-470
Tracking #: 243
Technician: AK
Date: 12/26/2025

Preburn Fuel Information

Size	Length (in)	Moisture Content (% DB)	Size	Length (in)	Moisture Content (% DB)
2x4	12.00	24.2			
2x4	12.00	24.5			
2x4	12.00	22.2			
2x4	12.00	22.4			
2x4	12.00	23.8			
2x4	12.00	22.1			

Total Fuel Weight (lbs): 7.98
Average Moisture (%DB): 23.2

Firebox Volume (ft^3): 1.80
Total 2x4 Crib Weight, with spacers (lbs): 5.61
Total 4x4 Crib Weight, with spacers (lbs): 7.14
Total Wet Fuel Weight, with spacers (lbs): 12.75

Coal Bed Range (20-25%):
Min (lbs): 2.55
Max (lbs): 3.19

Test Fuel Information

Size	Length (in)	Weight (lbs)	Moisture Content (%DB)			Dry Weight (lbs)
4x4	16.00	3.46	21.0	19.5	21.6	2.87
4x4	16.00	3.26	22.3	19.1	19.8	2.71
2x4	16.00	1.49	22.2	23.3	19.7	1.22
2x4	16.00	1.49	21.0	21.2	24.5	1.22
2x4	16.00	1.64	23.3	21.9	22.2	1.34

Total Dry Weight, no spacers (lbs): 9.36
Total Dry Weight, with spacers (lbs): 10.62

Spacer Moisture Readings (%DB)

12.6	14.2						
13.6	12.7						
10.5	12.8						
10.4	10.8						
10.3	10.6						
10.2	10.6						
9.7	10.3						
13.2	10.8						

Quality Checks	Requirement	Observed	Result
Fuel Density	25 - 36 (lbs/ft^3, DB)	25.1	OK
Loading Density	6.3 - 7.7 (lbs/ft^3, WB)	7.08	OK
2x4 Fuel Mix	35 - 65 % of total weight	44%	OK

DILUTION TUNNEL & MISC. DATA - ASTM E2780 / E2515

Client:	Sherwood	Job #:	25-470
Model:	Ironwood 2.0-1	Tracking #:	243
Run #:	5	Technician:	AK
Test Start Time:	12:02	Date:	12/26/2025

Total Sampling Time (min):	204	
Recording Interval (min):	1	
Meter Box γ Factor:	1.021	(A)
Meter Box γ Factor:	1.001	(B)
Meter Box γ Factor:	1.001	(C)
Meter Box γ Factor:	0.999	(Ambient)

	Pre-Test	Post Test	Avg.
Barometric Pressure (in. Hg)	29.60	29.70	29.65
Relative Humidity (%)	33.5	29.7	
Room Air Velocity (ft/min)	<50	<50	
Pitot Tube Leak Check	0	0	
Ambient Sample Volume:		43.415	ft^3

Induced Draft Check (in. H_2O):	0
Smoke Capture Check (%):	100%
Date Flue Pipe Last Cleaned:	12/17/2025
Test Fuel Scale Audit (lbs)	10.00
Platform Scale Audit (lbs)	10.0

Sample Train Leak Checks

	Pre-test	Post-test			
(A)	0.000	0.000	cfm @	-6	in. Hg
(B)	0.000	0.000	cfm @	-6	in. Hg
(C)	0.001	0.001	cfm @	-7	in. Hg
(Ambient)	0.000	0.000	cfm @	-12	in. Hg

DILUTION TUNNEL FLOW

Traverse Data

Point	dP (in H_2O)	Temp (°F)
1	0.064	74
2	0.096	74
3	0.094	74
4	0.064	74
5	0.070	74
6	0.108	74
7	0.106	74
8	0.064	74
Center	0.097	74

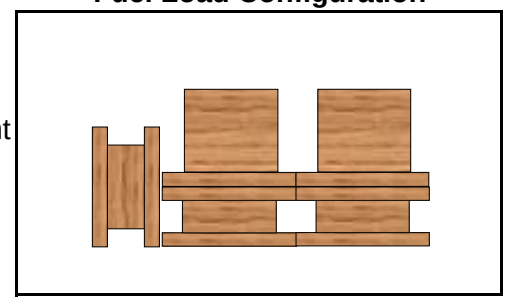
Dilution Tunnel H_2O:	2.00	percent
Tunnel Diameter:	6	inches
Pitot Tube Cp:	0.99	[unitless]
Dilution Tunnel MW(dry):	29.00	lb/lb-mole
Dilution Tunnel MW(wet):	28.78	lb/lb-mole
Tunnel Area:	0.1963	ft^2
V_{strav}:	19.22	ft/sec
V_{scent}:	20.87	ft/sec
F_p:	0.921	[ratio]
Initial Tunnel Flow:	217.2	scf/min

Static Pressure: -0.160 in. H_2O

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)	21.5

WOODSTOVE PREBURN DATA - ASTM E2780

Client: Sherwood
Model: Ironwood 2.0-1
Run #: 5

Job #: 25-470
Tracking #: 243
Technician: AK
Date: 12/26/2025

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	8.07	-0.086	576	586	423	529	481	518.8	529	66
1	7.89	-0.087	571	580	416	533	483	516.4	481	66
2	7.73	-0.085	565	574	411	533	484	513.3	452	66
3	7.59	-0.084	560	567	406	526	486	509.1	432	66
4	7.44	-0.084	554	561	402	519	487	504.6	418	66
5	7.31	-0.081	548	555	398	511	488	500.0	406	66
6	7.17	-0.078	542	550	393	505	489	495.7	397	66
7	7.05	-0.080	537	545	389	495	489	491.0	390	66
8	6.90	-0.077	532	540	385	487	489	486.5	386	66
9	6.78	-0.080	527	535	383	481	489	482.9	384	66
10	6.63	-0.080	523	530	380	476	489	479.6	382	66
11	6.47	-0.080	518	526	379	468	488	476.0	381	66
12	6.32	-0.080	515	522	378	466	487	473.6	380	66
13	6.17	-0.080	511	518	377	466	486	471.8	381	66
14	6.03	-0.079	508	515	378	465	485	470.0	381	66
15	5.90	-0.078	506	512	377	468	484	469.2	379	66
16	5.78	-0.077	504	509	378	468	483	468.1	378	66
17	5.63	-0.078	502	506	378	469	481	467.2	375	66
18	5.51	-0.077	501	504	378	466	480	465.7	372	66
19	5.35	-0.078	500	502	378	466	479	465.0	370	66
20	5.24	-0.077	500	500	379	466	477	464.3	368	66
21	5.09	-0.077	499	499	380	464	476	463.5	368	66
22	4.96	-0.078	499	497	381	463	474	462.9	367	66
23	4.83	-0.077	499	497	382	464	473	462.9	366	66
24	4.70	-0.076	500	496	383	464	471	462.9	365	66
25	4.57	-0.076	501	496	384	465	469	463.2	364	66
26	4.46	-0.077	502	497	385	465	468	463.5	363	66
27	4.34	-0.076	503	497	387	464	467	463.6	361	66
28	4.22	-0.077	504	498	388	465	465	464.0	359	66
29	4.11	-0.076	505	499	390	465	464	464.6	359	66
30	4.02	-0.075	506	500	391	467	463	465.1	358	67
31	3.95	-0.075	507	501	393	465	461	465.4	355	67
32	3.83	-0.074	508	502	394	464	460	465.6	353	67
33	3.75	-0.073	509	503	395	461	459	465.3	351	67
34	3.66	-0.072	510	504	396	458	457	465.0	346	67
35	3.60	-0.072	510	506	398	454	456	464.7	343	67
36	3.54	-0.072	510	510	398	450	455	464.4	339	67
37	3.49	-0.070	510	514	400	441	453	463.5	334	67
38	3.45	-0.069	510	515	400	434	452	462.1	329	67
39	3.40	-0.069	509	515	399	427	451	460.1	323	67
40	3.38	-0.067	508	514	398	417	450	457.5	318	66
41	3.36	-0.067	508	512	396	409	449	454.8	313	66
42	3.33	-0.065	507	511	395	399	447	451.7	310	66
43	3.31	-0.066	506	509	393	392	447	449.0	308	66
44	3.27	-0.065	505	507	391	383	445	446.1	304	67

WOODSTOVE PREBURN DATA - ASTM E2780

Client: Sherwood
Model: Ironwood 2.0-1
Run #: 5

Job #: 25-470
Tracking #: 243
Technician: AK
Date: 12/26/2025

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	3.26	-0.064	505	504	389	374	445	443.4	299	66
46	3.23	-0.063	505	502	387	367	444	440.8	296	67
47	3.20	-0.063	504	500	385	358	443	437.9	293	67
48	3.17	-0.063	504	498	384	349	442	435.2	290	67
49	3.16	-0.062	503	495	382	343	442	432.8	288	67
50	3.14	-0.061	502	492	380	335	441	430.0	286	67
51	3.11	-0.060	502	490	379	328	440	427.6	284	66
52	3.09	-0.061	501	487	377	322	440	425.4	282	66
53	3.07	-0.060	501	485	375	316	439	423.1	280	66
54	3.03	-0.059	500	482	373	311	439	420.9	278	66
55	3.01	-0.059	499	480	371	306	438	418.8	276	66
56	2.99	-0.060	498	478	369	300	438	416.6	275	67
57	2.98	-0.057	497	475	367	296	438	414.5	272	67
58	2.95	-0.058	495	473	364	292	437	412.2	271	67
59	2.94	-0.058	494	471	361	288	437	410.0	270	67
60	2.92	-0.056	491	469	359	284	437	407.9	268	66

BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: Sherwood
Model: Ironwood 2.0-1
Run #: 5

Job #: 25-470
Tracking #: 243
Technician: AK
Date: 12/26/2025

	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		0.095	0.02	71	0.1		12.75		103	301	70	67
1	0.096	0.096	0.096	2.09	71	1.0	-	12.70	-0.05	111	316	72	67
2	0.237	0.141	0.095	2.13	71	1.0	-	12.53	-0.17	111	323	73	67
3	0.380	0.143	0.093	2.15	71	1.0	-	12.38	-0.15	110	348	73	67
4	0.529	0.149	0.093	2.17	71	1.0	-	12.20	-0.18	110	376	73	67
5	0.671	0.142	0.094	2.18	71	1.0	-	12.04	-0.16	111	400	74	67
6	0.819	0.148	0.095	2.20	71	1.0	-	11.88	-0.16	110	389	74	67
7	0.961	0.142	0.097	2.20	71	1.0	-	11.78	-0.10	108	370	74	67
8	1.111	0.150	0.093	2.21	71	1.0	-	11.67	-0.11	106	358	74	67
9	1.257	0.146	0.094	2.23	71	1.0	-	11.54	-0.13	105	351	74	67
10	1.407	0.150	0.093	2.24	72	1.0	92	11.41	-0.13	105	353	75	67
11	1.553	0.146	0.095	2.26	72	1.0	-	11.27	-0.14	105	354	75	67
12	1.704	0.151	0.094	2.28	72	1.0	-	11.12	-0.15	105	358	75	66
13	1.851	0.147	0.094	2.30	72	1.0	-	10.97	-0.15	105	365	75	66
14	2.003	0.152	0.094	2.32	72	1.0	-	10.81	-0.16	105	369	75	67
15	2.151	0.148	0.094	2.33	73	1.0	-	10.65	-0.16	105	374	76	67
16	2.304	0.153	0.094	2.35	73	1.0	-	10.50	-0.15	106	378	76	66
17	2.452	0.148	0.092	2.35	73	1.0	-	10.35	-0.15	106	381	76	67
18	2.606	0.154	0.094	2.36	74	1.0	-	10.18	-0.17	106	383	76	67
19	2.754	0.148	0.093	2.37	74	1.0	-	10.02	-0.16	106	386	76	67
20	2.909	0.155	0.092	2.38	74	1.0	99	9.88	-0.14	106	387	76	66
21	3.058	0.149	0.093	2.37	75	1.0	-	9.72	-0.16	106	388	76	66
22	3.214	0.156	0.092	2.39	75	1.0	-	9.58	-0.14	107	389	76	67
23	3.365	0.151	0.096	2.40	75	1.0	-	9.43	-0.15	107	388	76	67
24	3.521	0.156	0.095	2.41	76	1.0	-	9.28	-0.15	107	388	76	67
25	3.670	0.149	0.093	2.41	76	1.0	-	9.13	-0.15	107	387	77	67
26	3.826	0.156	0.093	2.43	76	1.0	-	9.00	-0.13	106	385	77	67
27	3.977	0.151	0.093	2.42	77	1.0	-	8.86	-0.14	106	383	77	67
28	4.133	0.156	0.093	2.43	77	1.0	-	8.74	-0.12	106	381	77	67
29	4.287	0.154	0.094	2.44	77	1.0	-	8.62	-0.12	106	376	77	67
30	4.442	0.155	0.095	2.45	78	1.0	100	8.49	-0.13	105	373	77	67
31	4.600	0.158	0.095	2.46	78	1.0	-	8.37	-0.12	105	370	77	67

BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: Sherwood
Model: Ironwood 2.0-1
Run #: 5

Job #: 25-470
Tracking #: 243
Technician: AK
Date: 12/26/2025

	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	4.751	0.151	0.092	2.46	79	1.0	-	8.23	-0.14	105	368	77	67
33	4.909	0.158	0.093	2.45	79	1.0	-	8.11	-0.12	105	366	77	67
34	5.066	0.157	0.093	2.47	79	1.0	-	7.97	-0.14	105	367	77	67
35	5.225	0.159	0.094	2.48	80	1.0	-	7.84	-0.13	105	367	77	67
36	5.377	0.152	0.098	2.47	80	1.0	-	7.72	-0.12	105	369	77	67
37	5.534	0.157	0.096	2.48	80	1.0	-	7.63	-0.09	105	368	77	67
38	5.693	0.159	0.096	2.49	81	1.0	-	7.50	-0.13	105	366	77	67
39	5.848	0.155	0.096	2.49	81	1.0	-	7.38	-0.12	105	364	77	67
40	6.006	0.158	0.096	2.50	81	1.0	100	7.27	-0.11	105	362	77	67
41	6.160	0.154	0.095	2.50	82	1.0	-	7.17	-0.10	105	358	77	67
42	6.318	0.158	0.093	2.50	82	1.0	-	7.08	-0.09	105	356	77	67
43	6.473	0.155	0.094	2.50	82	1.0	-	6.97	-0.11	104	353	77	67
44	6.631	0.158	0.096	2.50	83	1.0	-	6.88	-0.09	104	352	77	67
45	6.789	0.158	0.094	2.51	83	1.0	-	6.78	-0.10	104	349	77	67
46	6.946	0.157	0.094	2.52	83	1.0	-	6.68	-0.10	104	346	77	67
47	7.105	0.159	0.095	2.52	84	1.0	-	6.59	-0.09	104	346	77	67
48	7.261	0.156	0.093	2.52	84	1.0	-	6.50	-0.09	103	345	77	67
49	7.422	0.161	0.094	2.53	84	1.0	-	6.41	-0.09	103	343	77	67
50	7.577	0.155	0.092	2.54	85	1.0	101	6.33	-0.08	103	340	77	67
51	7.737	0.160	0.094	2.53	85	1.0	-	6.25	-0.08	102	337	77	67
52	7.898	0.161	0.096	2.54	85	1.0	-	6.18	-0.07	102	336	77	67
53	8.054	0.156	0.094	2.53	86	1.0	-	6.11	-0.07	102	333	77	67
54	8.217	0.163	0.094	2.53	86	1.0	-	6.04	-0.07	102	329	77	67
55	8.373	0.156	0.094	2.53	86	1.0	-	5.97	-0.07	101	329	77	67
56	8.532	0.159	0.094	2.53	86	1.0	-	5.90	-0.07	101	327	77	67
57	8.694	0.162	0.095	2.54	87	1.0	-	5.83	-0.07	101	323	77	67
58	8.849	0.155	0.093	2.54	87	1.0	-	5.76	-0.07	101	321	77	67
59	9.012	0.163	0.095	2.54	87	1.0	-	5.71	-0.05	100	319	77	67
60	9.170	0.158	0.094	2.55	87	1.0	102	5.65	-0.06	100	317	77	67
61	9.327	0.157	0.096	2.57	88	1.0	-	5.58	-0.07	100	316	77	67
62	9.487	0.160	0.095	2.55	88	1.0	-	5.53	-0.05	100	315	77	67
63	9.646	0.159	0.092	2.56	88	1.0	-	5.47	-0.06	100	314	77	67

BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: Sherwood
Model: Ironwood 2.0-1
Run #: 5

Job #: 25-470
Tracking #: 243
Technician: AK
Date: 12/26/2025

	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	9.810	0.164	0.095	2.56	88	1.0	-	5.38	-0.09	99	311	77	67
65	9.968	0.158	0.095	2.57	89	1.0	-	5.33	-0.05	99	310	77	67
66	10.126	0.158	0.096	2.57	89	1.0	-	5.27	-0.06	99	311	77	67
67	10.287	0.161	0.095	2.57	89	1.0	-	5.19	-0.08	99	311	77	67
68	10.445	0.158	0.097	2.57	89	1.0	-	5.14	-0.05	99	310	77	67
69	10.607	0.162	0.095	2.56	89	1.0	-	5.06	-0.08	99	308	76	67
70	10.766	0.159	0.094	2.56	90	1.0	101	5.01	-0.05	99	306	76	67
71	10.927	0.161	0.096	2.58	90	1.0	-	4.92	-0.09	99	306	76	67
72	11.089	0.162	0.095	2.57	90	1.0	-	4.84	-0.08	99	305	76	67
73	11.246	0.157	0.093	2.57	90	1.0	-	4.77	-0.07	98	305	76	67
74	11.411	0.165	0.095	2.57	90	1.0	-	4.71	-0.06	98	306	76	67
75	11.571	0.160	0.095	2.57	91	1.0	-	4.63	-0.08	98	305	76	67
76	11.733	0.162	0.096	2.57	91	1.0	-	4.56	-0.07	98	305	76	67
77	11.896	0.163	0.097	2.58	91	1.0	-	4.47	-0.09	98	306	76	67
78	12.052	0.156	0.094	2.57	91	1.0	-	4.39	-0.08	98	306	76	67
79	12.218	0.166	0.094	2.58	91	1.0	-	4.31	-0.08	98	306	76	67
80	12.376	0.158	0.097	2.59	91	1.0	101	4.24	-0.07	98	308	76	67
81	12.538	0.162	0.093	2.58	92	1.0	-	4.17	-0.07	98	307	76	67
82	12.700	0.162	0.094	2.59	92	1.0	-	4.11	-0.06	97	305	76	67
83	12.856	0.156	0.097	2.59	92	1.0	-	4.05	-0.06	97	304	76	67
84	13.020	0.164	0.095	2.59	92	1.1	-	3.99	-0.06	97	305	76	67
85	13.180	0.160	0.095	2.58	92	1.0	-	3.95	-0.04	97	304	76	67
86	13.342	0.162	0.095	2.59	92	1.0	-	3.90	-0.05	97	303	76	67
87	13.504	0.162	0.095	2.59	92	1.0	-	3.84	-0.06	97	301	76	67
88	13.664	0.160	0.093	2.58	93	1.0	-	3.79	-0.05	96	301	76	67
89	13.826	0.162	0.096	2.59	93	1.0	-	3.74	-0.05	96	301	76	67
90	13.989	0.163	0.095	2.58	93	1.0	100	3.69	-0.05	96	301	76	67
91	14.148	0.159	0.095	2.60	93	1.0	-	3.64	-0.05	96	300	76	67
92	14.316	0.168	0.093	2.59	93	1.0	-	3.59	-0.05	96	301	76	67
93	14.475	0.159	0.096	2.61	93	1.0	-	3.54	-0.05	96	301	76	67
94	14.637	0.162	0.094	2.60	93	1.0	-	3.50	-0.04	96	300	76	67
95	14.801	0.164	0.094	2.60	93	1.1	-	3.45	-0.05	96	301	76	67

BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: Sherwood
Model: Ironwood 2.0-1
Run #: 5

Job #: 25-470
Tracking #: 243
Technician: AK
Date: 12/26/2025

	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	14.960	0.159	0.092	2.60	94	1.0	-	3.40	-0.05	96	301	76	67
97	15.123	0.163	0.095	2.62	94	1.0	-	3.36	-0.04	96	301	76	67
98	15.286	0.163	0.095	2.61	94	1.0	-	3.31	-0.05	96	301	76	67
99	15.443	0.157	0.096	2.60	94	1.0	-	3.27	-0.04	96	299	76	67
100	15.608	0.165	0.094	2.61	94	1.0	101	3.22	-0.05	96	298	76	67
101	15.767	0.159	0.095	2.60	94	1.0	-	3.18	-0.04	96	297	76	67
102	15.931	0.164	0.093	2.60	94	1.0	-	3.14	-0.04	95	295	76	67
103	16.094	0.163	0.095	2.60	94	1.0	-	3.09	-0.05	95	295	76	67
104	16.253	0.159	0.096	2.60	94	1.0	-	3.05	-0.04	95	293	76	67
105	16.418	0.165	0.095	2.61	95	1.0	-	3.01	-0.04	95	293	76	67
106	16.579	0.161	0.094	2.60	95	1.0	-	2.97	-0.04	95	293	75	67
107	16.742	0.163	0.094	2.60	95	1.0	-	2.94	-0.03	95	293	75	67
108	16.908	0.166	0.094	2.60	95	1.0	-	2.88	-0.06	94	292	75	67
109	17.067	0.159	0.095	2.61	95	1.0	-	2.85	-0.03	94	292	75	67
110	17.231	0.164	0.094	2.59	95	1.0	101	2.81	-0.04	94	291	75	67
111	17.394	0.163	0.094	2.60	95	1.0	-	2.77	-0.04	94	291	75	67
112	17.554	0.160	0.095	2.60	95	1.0	-	2.73	-0.04	94	291	75	67
113	17.719	0.165	0.095	2.61	95	1.0	-	2.70	-0.03	94	293	75	67
114	17.878	0.159	0.093	2.62	95	1.0	-	2.66	-0.04	94	291	75	67
115	18.040	0.162	0.094	2.61	95	1.0	-	2.63	-0.03	94	291	75	67
116	18.204	0.164	0.094	2.61	95	1.0	-	2.59	-0.04	94	291	75	67
117	18.365	0.161	0.095	2.62	95	1.0	-	2.56	-0.03	94	290	75	67
118	18.528	0.163	0.094	2.60	96	1.0	-	2.52	-0.04	94	291	75	67
119	18.692	0.164	0.094	2.62	96	1.0	-	2.46	-0.06	94	289	75	67
120	18.855	0.163	0.095	2.61	96	1.0	101	2.43	-0.03	94	288	75	67
121	19.019	0.164	0.096	2.61	96	1.0	-	2.39	-0.04	94	289	75	67
122	19.183	0.164	0.096	2.62	96	1.0	-	2.35	-0.04	94	290	75	67
123	19.342	0.159	0.096	2.61	96	1.0	-	2.32	-0.03	94	290	75	67
124	19.509	0.167	0.096	2.62	96	1.0	-	2.29	-0.03	94	288	75	67
125	19.665	0.156	0.096	2.62	96	1.0	-	2.25	-0.04	94	290	75	67
126	19.830	0.165	0.095	2.62	96	1.0	-	2.21	-0.04	94	290	75	67
127	19.993	0.163	0.096	2.62	96	1.0	-	2.16	-0.05	93	289	75	67

BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: Sherwood
Model: Ironwood 2.0-1
Run #: 5

Job #: 25-470
Tracking #: 243
Technician: AK
Date: 12/26/2025

	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	20.154	0.161	0.093	2.62	96	1.0	-	2.13	-0.03	93	289	75	67
129	20.321	0.167	0.094	2.63	96	1.0	-	2.09	-0.04	93	287	75	67
130	20.485	0.164	0.096	2.61	96	1.0	100	2.05	-0.04	93	286	75	67
131	20.645	0.160	0.094	2.62	96	1.0	-	2.01	-0.04	93	286	75	67
132	20.809	0.164	0.095	2.62	96	1.0	-	1.96	-0.05	93	287	75	67
133	20.969	0.160	0.096	2.62	96	1.0	-	1.92	-0.04	93	286	75	67
134	21.136	0.167	0.095	2.63	96	1.1	-	1.89	-0.03	93	286	75	66
135	21.300	0.164	0.095	2.62	96	1.0	-	1.84	-0.05	93	285	75	66
136	21.458	0.158	0.095	2.61	97	1.0	-	1.79	-0.05	93	283	75	66
137	21.621	0.163	0.096	2.62	97	1.0	-	1.75	-0.04	93	284	75	67
138	21.789	0.168	0.094	2.61	97	1.0	-	1.71	-0.04	93	286	75	66
139	21.948	0.159	0.096	2.62	97	1.1	-	1.66	-0.05	93	287	75	66
140	22.113	0.165	0.094	2.62	97	1.0	100	1.62	-0.04	93	286	75	66
141	22.273	0.160	0.095	2.61	97	1.0	-	1.57	-0.05	93	286	75	66
142	22.438	0.165	0.094	2.62	97	1.0	-	1.53	-0.04	93	286	75	66
143	22.601	0.163	0.096	2.61	97	1.0	-	1.50	-0.03	93	285	75	66
144	22.762	0.161	0.096	2.62	97	1.0	-	1.47	-0.03	93	285	75	66
145	22.929	0.167	0.097	2.61	97	1.0	-	1.45	-0.02	93	286	75	67
146	23.092	0.163	0.093	2.62	97	1.0	-	1.40	-0.05	93	286	75	66
147	23.251	0.159	0.095	2.62	97	1.0	-	1.36	-0.04	93	285	75	66
148	23.415	0.164	0.095	2.62	97	1.0	-	1.33	-0.03	93	286	75	67
149	23.582	0.167	0.096	2.62	97	1.1	-	1.31	-0.02	93	286	75	67
150	23.739	0.157	0.095	2.62	97	1.0	100	1.27	-0.04	93	286	75	67
151	23.906	0.167	0.095	2.62	97	1.0	-	1.25	-0.02	93	286	75	67
152	24.069	0.163	0.094	2.61	97	1.0	-	1.20	-0.05	93	286	75	67
153	24.233	0.164	0.096	2.61	97	1.0	-	1.18	-0.02	93	284	75	67
154	24.395	0.162	0.094	2.62	97	1.0	-	1.15	-0.03	93	283	75	66
155	24.559	0.164	0.094	2.62	97	1.0	-	1.11	-0.04	92	282	75	66
156	24.722	0.163	0.095	2.61	97	1.1	-	1.10	-0.01	92	281	75	66
157	24.886	0.164	0.101	2.62	97	1.0	-	1.07	-0.03	92	281	75	67
158	25.044	0.158	0.095	2.61	97	1.0	-	1.03	-0.04	92	281	75	67
159	25.213	0.169	0.098	2.62	97	1.0	-	1.01	-0.02	92	280	75	67

BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: Sherwood
Model: Ironwood 2.0-1
Run #: 5

Job #: 25-470
Tracking #: 243
Technician: AK
Date: 12/26/2025

	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	25.376	0.163	0.097	2.61	97	1.0	100	0.97	-0.04	92	279	75	66
161	25.535	0.159	0.095	2.61	97	1.0	-	0.94	-0.03	92	278	75	66
162	25.704	0.169	0.093	2.62	97	1.0	-	0.91	-0.03	92	278	75	66
163	25.865	0.161	0.096	2.62	97	1.0	-	0.87	-0.04	92	278	75	66
164	26.026	0.161	0.094	2.62	97	1.0	-	0.85	-0.02	92	278	75	66
165	26.190	0.164	0.095	2.62	98	1.0	-	0.82	-0.03	92	276	75	66
166	26.355	0.165	0.095	2.62	97	1.0	-	0.78	-0.04	92	275	75	66
167	26.516	0.161	0.094	2.63	98	1.0	-	0.76	-0.02	92	275	75	66
168	26.681	0.165	0.095	2.61	98	1.0	-	0.74	-0.02	92	275	75	66
169	26.843	0.162	0.096	2.61	98	1.1	-	0.71	-0.03	91	274	75	66
170	27.010	0.167	0.097	2.62	98	1.0	99	0.69	-0.02	91	273	74	66
171	27.169	0.159	0.096	2.61	98	1.0	-	0.67	-0.02	91	274	74	66
172	27.334	0.165	0.095	2.61	98	1.0	-	0.64	-0.03	91	273	74	66
173	27.501	0.167	0.096	2.61	98	1.0	-	0.62	-0.02	91	271	74	66
174	27.659	0.158	0.096	2.63	98	1.0	-	0.60	-0.02	91	270	74	66
175	27.826	0.167	0.094	2.62	98	1.0	-	0.58	-0.02	91	269	74	66
176	27.991	0.165	0.097	2.64	98	1.0	-	0.56	-0.02	91	268	74	66
177	28.149	0.158	0.096	2.62	98	1.0	-	0.53	-0.03	91	268	74	66
178	28.313	0.164	0.096	2.63	98	1.0	-	0.51	-0.02	91	267	74	66
179	28.481	0.168	0.096	2.62	98	1.1	-	0.49	-0.02	91	268	74	66
180	28.638	0.157	0.095	2.62	98	1.0	99	0.47	-0.02	90	266	74	66
181	28.806	0.168	0.095	2.62	98	1.0	-	0.44	-0.03	90	266	74	66
182	28.970	0.164	0.096	2.62	98	1.1	-	0.42	-0.02	90	264	74	66
183	29.132	0.162	0.097	2.62	98	1.0	-	0.42	0.00	90	263	74	67
184	29.296	0.164	0.102	2.62	98	1.1	-	0.39	-0.03	90	263	74	66
185	29.457	0.161	0.099	2.62	98	1.0	-	0.37	-0.02	90	262	74	67
186	29.624	0.167	0.097	2.62	98	1.0	-	0.35	-0.02	90	260	74	66
187	29.786	0.162	0.096	2.62	98	1.0	-	0.33	-0.02	90	260	74	66
188	29.948	0.162	0.094	2.63	98	1.0	-	0.30	-0.03	90	259	74	66
189	30.115	0.167	0.096	2.62	98	1.0	-	0.28	-0.02	90	258	74	66
190	30.280	0.165	0.094	2.62	98	1.1	101	0.25	-0.03	90	258	74	66
191	30.437	0.157	0.095	2.62	98	1.0	-	0.24	-0.01	90	258	74	66

BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: Sherwood
Model: Ironwood 2.0-1
Run #: 5

Job #: 25-470
Tracking #: 243
Technician: AK
Date: 12/26/2025

	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	30.607	0.170	0.094	2.62	98	1.0	-	0.22	-0.02	90	259	74	66
193	30.769	0.162	0.095	2.62	98	1.0	-	0.20	-0.02	90	259	74	66
194	30.930	0.161	0.098	2.63	98	1.1	-	0.18	-0.02	89	258	74	66
195	31.095	0.165	0.096	2.62	98	1.0	-	0.15	-0.03	89	257	74	66
196	31.258	0.163	0.099	2.63	98	1.0	-	0.13	-0.02	89	256	74	66
197	31.424	0.166	0.094	2.62	98	1.0	-	0.11	-0.02	89	256	74	66
198	31.585	0.161	0.095	2.63	98	1.0	-	0.10	-0.01	89	254	74	66
199	31.750	0.165	0.093	2.62	98	1.1	-	0.08	-0.02	89	255	74	66
200	31.914	0.164	0.097	2.62	98	1.0	100	0.06	-0.02	89	254	74	66
201	32.076	0.162	0.100	2.62	98	1.0	-	0.05	-0.01	89	253	74	66
202	32.239	0.163	0.093	2.62	98	1.0	-	0.03	-0.02	89	252	74	66
203	32.407	0.168	0.096	2.63	98	1.0	-	0.01	-0.02	89	252	74	66
204	32.565	0.158	0.095	2.62	98	1.0	99	0.00	-0.01	89	252	74	66
Avg/Tot	32.565	0.160	0.095	2.54	90.1	1.0	100			97.0	307.2	75.3	66.6

BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: Sherwood
Model: Ironwood 2.0-1
Run #: 5

Job #: 25-470
Tracking #: 243
Technician: AK
Date: 12/26/2025

	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		0.03	71	0.8		73	-0.063	5.59	0.075
1	0.099	0.099	2.34	71	1.7	-	74	-0.064	3.42	0.168
2	0.249	0.150	2.34	71	1.7	-	75	-0.067	2.87	0.184
3	0.397	0.148	2.33	71	1.7	-	76	-0.075	8.63	0.146
4	0.546	0.149	2.34	71	1.8	-	76	-0.078	11.01	0.119
5	0.695	0.149	2.34	71	1.8	-	76	-0.079	12.12	0.154
6	0.844	0.149	2.34	71	1.6	-	76	-0.077	12.04	0.182
7	0.993	0.149	2.35	71	1.9	-	76	-0.076	10.11	0.134
8	1.142	0.149	2.35	71	1.7	-	76	-0.075	8.71	0.098
9	1.295	0.153	2.35	71	1.7	-	76	-0.071	8.95	0.101
10	1.444	0.149	2.35	71	1.9	97	76	-0.075	9.90	0.084
11	1.594	0.150	2.35	72	2.0	-	77	-0.072	11.62	0.103
12	1.743	0.149	2.35	72	1.5	-	77	-0.074	12.11	0.167
13	1.893	0.150	2.35	72	2.0	-	77	-0.076	12.03	0.170
14	2.042	0.149	2.36	72	1.7	-	77	-0.076	12.68	0.288
15	2.194	0.152	2.36	73	2.0	-	77	-0.077	12.81	0.385
16	2.342	0.148	2.36	73	2.0	-	77	-0.077	12.68	0.387
17	2.493	0.151	2.36	73	2.0	-	77	-0.079	12.76	0.374
18	2.641	0.148	2.36	74	1.8	-	77	-0.076	12.89	0.407
19	2.792	0.151	2.36	74	1.8	-	77	-0.080	12.91	0.377
20	2.941	0.149	2.37	74	1.6	102	78	-0.078	12.92	0.339
21	3.094	0.153	2.37	75	1.7	-	78	-0.077	12.83	0.282
22	3.242	0.148	2.36	75	1.7	-	78	-0.078	12.85	0.333
23	3.395	0.153	2.36	75	1.6	-	78	-0.076	12.99	0.352
24	3.543	0.148	2.37	76	1.9	-	78	-0.076	12.99	0.350
25	3.694	0.151	2.38	76	2.0	-	78	-0.076	12.79	0.332
26	3.843	0.149	2.37	76	1.7	-	78	-0.076	12.56	0.233
27	3.997	0.154	2.38	77	1.5	-	78	-0.076	12.16	0.127
28	4.145	0.148	2.37	77	1.7	-	78	-0.075	12.13	0.071
29	4.300	0.155	2.39	77	1.8	-	78	-0.076	11.96	0.064
30	4.448	0.148	2.38	78	1.7	101	78	-0.075	11.80	0.062
31	4.601	0.153	2.39	78	1.5	-	78	-0.073	11.78	0.051

BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: Sherwood
Model: Ironwood 2.0-1
Run #: 5

Job #: 25-470
Tracking #: 243
Technician: AK
Date: 12/26/2025

	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	4.751	0.150	2.39	78	1.9	-	78	-0.075	11.73	0.042
33	4.904	0.153	2.38	79	1.6	-	78	-0.075	11.94	0.081
34	5.059	0.155	2.39	79	2.0	-	78	-0.075	12.21	0.109
35	5.211	0.152	2.39	79	2.0	-	78	-0.075	12.55	0.105
36	5.365	0.154	2.39	80	2.0	-	78	-0.075	12.77	0.103
37	5.515	0.150	2.40	80	1.6	-	78	-0.074	12.58	0.054
38	5.668	0.153	2.40	80	1.5	-	78	-0.076	11.88	0.038
39	5.819	0.151	2.39	81	1.5	-	78	-0.072	11.16	0.037
40	5.974	0.155	2.40	81	1.8	101	78	-0.071	10.64	0.030
41	6.125	0.151	2.40	81	2.0	-	78	-0.074	10.19	0.022
42	6.278	0.153	2.40	82	1.9	-	78	-0.073	9.94	0.021
43	6.429	0.151	2.41	82	1.9	-	78	-0.075	9.69	0.018
44	6.583	0.154	2.41	82	2.0	-	78	-0.072	9.53	0.017
45	6.734	0.151	2.41	83	1.7	-	78	-0.073	9.30	0.013
46	6.889	0.155	2.41	83	1.8	-	78	-0.072	9.41	0.014
47	7.043	0.154	2.41	83	2.0	-	78	-0.072	9.28	0.014
48	7.196	0.153	2.41	84	2.0	-	78	-0.073	9.43	0.013
49	7.351	0.155	2.42	84	1.5	-	78	-0.073	9.18	0.015
50	7.502	0.151	2.42	84	1.5	101	78	-0.070	8.82	0.014
51	7.658	0.156	2.42	84	2.0	-	78	-0.071	8.41	0.018
52	7.810	0.152	2.42	85	1.5	-	78	-0.070	8.14	0.019
53	7.970	0.160	2.42	85	1.6	-	78	-0.072	7.91	0.038
54	8.120	0.150	2.41	85	1.5	-	78	-0.071	7.44	0.047
55	8.276	0.156	2.41	86	2.0	-	78	-0.071	7.56	0.059
56	8.431	0.155	2.42	86	1.6	-	78	-0.070	7.41	0.065
57	8.585	0.154	2.42	86	1.7	-	78	-0.070	7.31	0.074
58	8.740	0.155	2.42	86	2.0	-	78	-0.068	7.15	0.070
59	8.892	0.152	2.42	87	1.7	-	78	-0.067	7.00	0.079
60	9.050	0.158	2.43	87	1.6	102	78	-0.067	6.97	0.078
61	9.199	0.149	2.43	87	1.8	-	78	-0.069	6.94	0.083
62	9.357	0.158	2.43	87	1.9	-	78	-0.068	6.91	0.086
63	9.508	0.151	2.43	88	1.9	-	78	-0.069	7.07	0.098

BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: Sherwood
Model: Ironwood 2.0-1
Run #: 5

Job #: 25-470
Tracking #: 243
Technician: AK
Date: 12/26/2025

	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	9.667	0.159	2.43	88	1.5	-	78	-0.068	6.86	0.084
65	9.822	0.155	2.43	88	1.6	-	78	-0.067	6.87	0.078
66	9.974	0.152	2.43	88	2.0	-	78	-0.066	7.01	0.114
67	10.129	0.155	2.43	89	1.9	-	78	-0.070	7.12	0.087
68	10.282	0.153	2.42	89	1.8	-	78	-0.066	7.27	0.080
69	10.441	0.159	2.44	89	2.0	-	78	-0.067	7.52	0.064
70	10.593	0.152	2.43	89	1.7	101	78	-0.070	7.63	0.056
71	10.749	0.156	2.44	89	2.0	-	78	-0.068	7.78	0.053
72	10.903	0.154	2.43	90	1.5	-	78	-0.069	7.96	0.047
73	11.060	0.157	2.44	90	1.7	-	78	-0.068	8.06	0.048
74	11.216	0.156	2.44	90	2.0	-	78	-0.066	8.14	0.050
75	11.371	0.155	2.43	90	1.6	-	77	-0.067	8.19	0.042
76	11.530	0.159	2.44	90	1.9	-	77	-0.066	8.44	0.042
77	11.683	0.153	2.45	91	2.0	-	77	-0.067	8.32	0.027
78	11.839	0.156	2.44	91	1.9	-	77	-0.066	8.69	0.032
79	11.994	0.155	2.44	91	2.0	-	77	-0.068	8.70	0.026
80	12.151	0.157	2.44	91	1.6	100	77	-0.068	8.99	0.023
81	12.307	0.156	2.44	91	1.7	-	77	-0.068	8.69	0.021
82	12.461	0.154	2.44	91	1.6	-	77	-0.068	8.32	0.021
83	12.616	0.155	2.44	92	1.6	-	77	-0.069	8.10	0.022
84	12.769	0.153	2.44	92	1.5	-	77	-0.065	7.82	0.026
85	12.927	0.158	2.45	92	2.0	-	77	-0.067	7.56	0.028
86	13.081	0.154	2.44	92	1.6	-	77	-0.066	7.15	0.040
87	13.239	0.158	2.45	92	1.6	-	77	-0.066	6.78	0.054
88	13.396	0.157	2.45	92	1.5	-	77	-0.066	6.76	0.074
89	13.549	0.153	2.45	92	1.5	-	77	-0.068	7.19	0.075
90	13.708	0.159	2.44	93	1.7	99	77	-0.065	7.52	0.070
91	13.862	0.154	2.45	93	2.0	-	77	-0.066	7.38	0.082
92	14.022	0.160	2.45	93	1.6	-	77	-0.067	7.27	0.087
93	14.177	0.155	2.45	93	1.9	-	77	-0.066	7.24	0.093
94	14.334	0.157	2.45	93	1.5	-	77	-0.065	7.33	0.090
95	14.491	0.157	2.45	93	1.5	-	77	-0.066	7.39	0.092

BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: Sherwood
Model: Ironwood 2.0-1
Run #: 5

Job #: 25-470
Tracking #: 243
Technician: AK
Date: 12/26/2025

	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	14.645	0.154	2.45	93	1.6	-	77	-0.068	7.43	0.087
97	14.805	0.160	2.45	94	2.0	-	77	-0.065	7.48	0.096
98	14.958	0.153	2.45	94	1.6	-	77	-0.065	7.53	0.095
99	15.114	0.156	2.45	94	2.0	-	77	-0.065	7.78	0.089
100	15.270	0.156	2.45	94	2.0	100	77	-0.067	7.83	0.081
101	15.427	0.157	2.45	94	2.0	-	77	-0.065	7.75	0.051
102	15.584	0.157	2.45	94	1.5	-	77	-0.066	7.52	0.052
103	15.738	0.154	2.45	94	1.5	-	77	-0.063	7.35	0.057
104	15.898	0.160	2.45	94	1.9	-	77	-0.063	7.38	0.069
105	16.051	0.153	2.45	94	2.0	-	77	-0.066	7.36	0.073
106	16.210	0.159	2.45	94	2.0	-	77	-0.064	7.47	0.083
107	16.370	0.160	2.45	95	1.5	-	77	-0.065	7.49	0.084
108	16.524	0.154	2.46	95	1.8	-	76	-0.064	7.41	0.090
109	16.684	0.160	2.45	95	1.6	-	76	-0.066	7.24	0.099
110	16.839	0.155	2.45	95	1.7	101	76	-0.066	7.21	0.101
111	16.996	0.157	2.45	95	1.6	-	76	-0.063	7.30	0.098
112	17.152	0.156	2.45	95	2.0	-	76	-0.064	7.36	0.104
113	17.310	0.158	2.46	95	1.5	-	76	-0.063	7.41	0.096
114	17.464	0.154	2.46	95	1.5	-	76	-0.062	7.33	0.096
115	17.619	0.155	2.45	95	1.5	-	76	-0.065	7.39	0.091
116	17.779	0.160	2.45	95	1.5	-	76	-0.064	7.35	0.098
117	17.932	0.153	2.45	95	1.5	-	76	-0.062	7.32	0.094
118	18.091	0.159	2.45	95	1.6	-	76	-0.059	7.31	0.090
119	18.249	0.158	2.45	96	1.9	-	76	-0.064	7.15	0.102
120	18.407	0.158	2.46	96	2.0	100	76	-0.062	7.08	0.107
121	18.566	0.159	2.46	96	1.8	-	76	-0.064	7.09	0.105
122	18.721	0.155	2.46	96	1.6	-	76	-0.063	7.14	0.107
123	18.880	0.159	2.46	96	1.6	-	76	-0.064	7.15	0.109
124	19.036	0.156	2.45	96	2.0	-	76	-0.064	7.00	0.107
125	19.191	0.155	2.45	96	1.6	-	76	-0.064	7.16	0.110
126	19.348	0.157	2.46	96	2.0	-	76	-0.062	7.31	0.112
127	19.503	0.155	2.46	96	2.0	-	76	-0.066	7.45	0.094

BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: Sherwood
Model: Ironwood 2.0-1
Run #: 5

Job #: 25-470
Tracking #: 243
Technician: AK
Date: 12/26/2025

	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	19.664	0.161	2.45	96	1.8	-	76	-0.064	7.38	0.093
129	19.821	0.157	2.46	96	1.5	-	76	-0.065	7.42	0.080
130	19.979	0.158	2.45	96	1.5	100	76	-0.062	7.35	0.081
131	20.138	0.159	2.46	96	1.5	-	76	-0.065	7.42	0.073
132	20.289	0.151	2.46	96	1.5	-	76	-0.062	7.56	0.075
133	20.450	0.161	2.45	97	2.0	-	76	-0.062	7.63	0.074
134	20.607	0.157	2.46	97	1.7	-	76	-0.064	7.68	0.066
135	20.765	0.158	2.46	97	1.6	-	76	-0.066	7.62	0.063
136	20.919	0.154	2.46	97	1.6	-	76	-0.064	7.58	0.063
137	21.077	0.158	2.45	97	1.5	-	76	-0.064	7.67	0.072
138	21.238	0.161	2.46	97	1.8	-	76	-0.065	7.84	0.069
139	21.393	0.155	2.46	97	1.5	-	76	-0.062	7.93	0.064
140	21.551	0.158	2.46	97	2.0	100	76	-0.062	7.75	0.069
141	21.705	0.154	2.46	97	2.0	-	76	-0.063	7.46	0.064
142	21.866	0.161	2.46	97	1.7	-	76	-0.061	7.48	0.067
143	22.022	0.156	2.46	97	1.7	-	76	-0.062	7.35	0.061
144	22.177	0.155	2.45	97	1.5	-	76	-0.063	7.27	0.068
145	22.339	0.162	2.45	97	1.8	-	76	-0.060	7.04	0.072
146	22.493	0.154	2.46	97	2.0	-	76	-0.064	6.89	0.087
147	22.650	0.157	2.45	97	1.5	-	76	-0.063	6.85	0.093
148	22.807	0.157	2.46	97	1.6	-	76	-0.064	6.89	0.095
149	22.966	0.159	2.45	97	1.6	-	76	-0.064	6.94	0.097
150	23.122	0.156	2.45	97	2.0	100	76	-0.061	6.69	0.096
151	23.278	0.156	2.46	97	2.0	-	76	-0.062	6.68	0.095
152	23.440	0.162	2.46	97	2.0	-	76	-0.064	6.77	0.100
153	23.596	0.156	2.46	97	1.6	-	76	-0.063	6.68	0.098
154	23.752	0.156	2.45	97	1.7	-	76	-0.064	6.64	0.099
155	23.912	0.160	2.46	97	1.7	-	76	-0.062	6.41	0.076
156	24.068	0.156	2.45	97	1.7	-	76	-0.061	6.46	0.080
157	24.225	0.157	2.46	97	1.9	-	76	-0.065	6.50	0.082
158	24.380	0.155	2.46	97	1.5	-	76	-0.062	6.59	0.080
159	24.542	0.162	2.46	97	1.9	-	76	-0.062	6.59	0.083

BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: Sherwood
Model: Ironwood 2.0-1
Run #: 5

Job #: 25-470
Tracking #: 243
Technician: AK
Date: 12/26/2025

	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	24.700	0.158	2.46	97	1.6	99	76	-0.062	6.47	0.080
161	24.852	0.152	2.46	98	1.6	-	76	-0.063	6.51	0.084
162	25.015	0.163	2.46	97	1.5	-	76	-0.061	6.49	0.080
163	25.170	0.155	2.46	98	1.5	-	76	-0.060	6.35	0.079
164	25.326	0.156	2.46	98	1.9	-	76	-0.062	6.30	0.073
165	25.484	0.158	2.46	98	1.6	-	76	-0.062	6.14	0.071
166	25.643	0.159	2.46	98	1.5	-	76	-0.063	6.28	0.077
167	25.800	0.157	2.45	98	1.9	-	76	-0.063	6.24	0.076
168	25.956	0.156	2.45	98	1.9	-	76	-0.060	6.17	0.077
169	26.117	0.161	2.46	98	1.8	-	76	-0.062	5.99	0.073
170	26.274	0.157	2.45	98	2.0	99	76	-0.060	5.97	0.080
171	26.430	0.156	2.46	98	1.6	-	76	-0.063	5.97	0.088
172	26.590	0.160	2.46	98	2.0	-	75	-0.062	5.94	0.090
173	26.746	0.156	2.46	98	1.6	-	75	-0.060	5.93	0.086
174	26.904	0.158	2.46	98	1.6	-	75	-0.063	5.77	0.083
175	27.061	0.157	2.45	98	1.8	-	75	-0.061	5.84	0.088
176	27.221	0.160	2.46	98	1.5	-	75	-0.062	5.79	0.092
177	27.376	0.155	2.46	98	1.7	-	75	-0.061	5.74	0.092
178	27.532	0.156	2.46	98	1.5	-	75	-0.060	5.70	0.085
179	27.695	0.163	2.47	98	1.9	-	75	-0.060	5.65	0.083
180	27.847	0.152	2.46	98	1.8	99	75	-0.059	5.58	0.082
181	28.007	0.160	2.46	98	1.9	-	75	-0.061	5.60	0.079
182	28.168	0.161	2.46	98	1.9	-	75	-0.058	5.72	0.076
183	28.323	0.155	2.46	98	1.5	-	75	-0.059	5.65	0.081
184	28.481	0.158	2.46	98	1.5	-	75	-0.059	5.62	0.070
185	28.637	0.156	2.46	98	1.5	-	75	-0.058	5.57	0.080
186	28.798	0.161	2.46	98	1.7	-	75	-0.059	5.57	0.083
187	28.953	0.155	2.46	98	1.7	-	75	-0.057	5.59	0.083
188	29.110	0.157	2.46	98	1.5	-	75	-0.059	5.57	0.082
189	29.273	0.163	2.46	98	1.8	-	75	-0.059	5.52	0.085
190	29.428	0.155	2.46	98	2.0	100	75	-0.056	5.57	0.085
191	29.584	0.156	2.46	98	1.8	-	75	-0.057	5.59	0.087

BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: Sherwood
Model: Ironwood 2.0-1
Run #: 5

Job #: 25-470
Tracking #: 243
Technician: AK
Date: 12/26/2025

	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	29.744	0.160	2.46	98	1.5	-	75	-0.058	5.50	0.082
193	29.902	0.158	2.47	98	1.8	-	75	-0.055	5.61	0.089
194	30.058	0.156	2.47	98	1.7	-	75	-0.056	5.48	0.080
195	30.214	0.156	2.46	98	2.0	-	75	-0.057	5.43	0.086
196	30.377	0.163	2.47	98	1.5	-	75	-0.056	5.44	0.085
197	30.533	0.156	2.47	98	1.5	-	75	-0.056	5.35	0.087
198	30.689	0.156	2.46	98	1.6	-	75	-0.059	5.24	0.087
199	30.850	0.161	2.47	98	1.7	-	75	-0.059	5.28	0.087
200	31.006	0.156	2.46	98	2.0	99	75	-0.057	5.30	0.084
201	31.164	0.158	2.46	98	1.8	-	75	-0.058	5.31	0.084
202	31.322	0.158	2.47	98	1.6	-	75	-0.057	5.34	0.087
203	31.482	0.160	2.46	98	2.0	-	75	-0.058	5.30	0.089
204	31.638	0.156	2.46	98	1.8	99	75	-0.057	5.30	0.089
Avg/Tot	31.638	0.155	2.42	90.0	1.7	100	76.6	-0.066	7.92	0.094

BOX C TEST DATA - ASTM E2780 / ASTM E2515

Client: Sherwood
Model: Ironwood 2.0-1
Run #: 5

Job #: 25-470
Tracking #: 243
Technician: AK
Date: 12/26/2025

	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		-0.01	75	0.2		71
1	0.114	0.114	0.92	75	1.5	-	71
2	0.252	0.138	0.91	75	1.5	-	71
3	0.391	0.139	0.92	75	1.5	-	72
4	0.529	0.138	0.92	75	1.4	-	72
5	0.668	0.139	0.92	74	1.5	-	72
6	0.807	0.139	0.93	74	1.5	-	72
7	0.946	0.139	0.92	75	1.4	-	72
8	1.087	0.141	0.94	75	1.5	-	73
9	1.230	0.143	0.95	75	1.6	-	73
10	1.370	0.140	0.94	75	1.5	97	73
11	1.512	0.142	0.95	75	1.5	-	73
12	1.654	0.142	0.95	76	1.5	-	73
13	1.795	0.141	0.94	76	1.4	-	74
14	1.937	0.142	0.95	76	1.4	-	74
15	2.079	0.142	0.96	76	1.4	-	74
16	2.221	0.142	0.95	76	1.6	-	74
17	2.362	0.141	0.94	77	1.5	-	74
18	2.506	0.144	0.96	77	1.5	-	74
19	2.648	0.142	0.96	77	1.5	-	74
20	2.789	0.141	0.95	78	1.4	101	74
21	2.931	0.142	0.95	78	1.5	-	74
22	3.075	0.144	0.96	78	1.5	-	75
23	3.218	0.143	0.96	78	1.5	-	75
24	3.360	0.142	0.96	78	1.5	-	75
25	3.501	0.141	0.96	79	1.5	-	75
26	3.645	0.144	0.97	79	1.4	-	75
27	3.788	0.143	0.96	79	1.4	-	75
28	3.932	0.144	0.96	80	1.4	-	75
29	4.075	0.143	0.97	80	1.6	-	75
30	4.221	0.146	0.98	80	1.5	101	75
31	4.366	0.145	0.98	81	1.4	-	75

BOX C TEST DATA - ASTM E2780 / ASTM E2515

Client: Sherwood
Model: Ironwood 2.0-1
Run #: 5

Job #: 25-470
Tracking #: 243
Technician: AK
Date: 12/26/2025

	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	4.511	0.145	0.98	81	1.4	-	75
33	4.656	0.145	0.98	81	1.4	-	75
34	4.803	0.147	0.98	82	1.4	-	75
35	4.948	0.145	0.97	82	1.4	-	75
36	5.094	0.146	0.98	83	1.6	-	75
37	5.241	0.147	0.99	83	1.4	-	75
38	5.388	0.147	0.99	83	1.4	-	75
39	5.534	0.146	1.00	83	1.6	-	75
40	5.680	0.146	1.00	84	1.5	101	76
41	5.827	0.147	0.99	84	1.4	-	75
42	5.971	0.144	0.99	85	1.4	-	76
43	6.118	0.147	0.99	85	1.5	-	76
44	6.266	0.148	0.99	85	1.6	-	76
45	6.413	0.147	0.99	86	1.4	-	76
46	6.561	0.148	1.00	86	1.4	-	76
47	6.709	0.148	1.00	86	1.6	-	76
48	6.857	0.148	1.00	87	1.4	-	76
49	7.006	0.149	1.01	87	1.6	-	76
50	7.154	0.148	1.01	87	1.6	103	76
51	7.303	0.149	1.01	88	1.6	-	76
52	7.452	0.149	1.02	88	1.5	-	76
53	7.603	0.151	1.01	88	1.5	-	76
54	7.752	0.149	1.01	88	1.6	-	76
55	7.901	0.149	1.01	88	1.4	-	76
56	8.051	0.150	1.02	89	1.4	-	75
57	8.201	0.150	1.02	89	1.6	-	75
58	8.351	0.150	1.01	90	1.6	-	75
59	8.500	0.149	1.01	90	1.4	-	75
60	8.650	0.150	1.01	90	1.6	104	75
Avg/Tot	8.650	0.144	0.96	81.0	1.5	101	74.4

WOODSTOVE SURFACE TEMPERATURE DATA

Client: Sherwood
Model: Ironwood 2.0-1
Run #: 5

Job #: 25-470
Tracking #: 243
Technician: AK
Date: 12/26/2025

Stove ΔT: 56

	Temperature Data (°F)						
Elapsed Time (min)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
0	489	467	368	296	437	411.4	703.1
1	487	465	379	301	438	414.0	598.2
2	484	461	383	303	436	413.3	703.7
3	478	455	382	310	436	412.2	821.6
4	471	449	379	316	436	410.0	914.0
5	464	443	375	325	435	408.3	992.1
6	456	437	359	325	434	402.2	1011.8
7	449	431	341	329	433	396.6	1002.8
8	442	426	325	333	433	391.8	996.2
9	435	421	312	336	432	387.2	998.3
10	429	416	303	337	432	383.2	1010.3
11	422	411	294	338	431	379.4	1031.4
12	417	407	287	341	431	376.4	1052.7
13	411	403	280	345	431	374.0	1075.6
14	406	400	274	349	430	371.7	1106.3
15	401	397	270	354	429	370.1	1131.8
16	397	395	266	359	428	369.0	1145.9
17	393	392	262	366	428	368.3	1160.2
18	389	391	259	373	427	367.8	1170.0
19	386	389	257	380	426	367.5	1177.2
20	383	388	254	388	425	367.5	1179.0
21	380	387	252	392	424	367.2	1178.1
22	378	387	251	397	422	367.1	1178.4
23	377	386	249	402	421	367.1	1178.1
24	376	386	248	407	420	367.2	1177.4
25	375	386	248	410	419	367.5	1161.3
26	374	386	247	412	418	367.5	1139.0
27	374	386	246	413	417	367.3	1118.3
28	374	387	246	415	416	367.4	1101.1
29	375	387	245	412	415	366.8	1088.4
30	376	388	244	412	414	366.6	1079.7
31	376	388	243	410	413	366.3	1072.0
32	377	389	243	409	412	366.0	1068.7
33	378	390	242	407	412	365.7	1074.5
34	379	391	242	405	411	365.4	1083.2
35	380	392	242	404	410	365.6	1091.7
36	381	393	242	405	409	365.9	1093.1
37	382	394	242	404	408	366.2	1090.9
38	384	396	242	404	408	366.5	1088.5
39	385	397	243	405	407	367.2	1087.6
40	386	398	244	404	406	367.5	1084.1
41	387	399	244	403	405	367.8	1077.2
42	388	400	245	404	404	368.3	1066.4
43	389	401	246	403	403	368.4	1056.5
44	389	402	247	401	402	368.1	1046.7
45	390	403	247	399	401	367.9	1039.5
46	391	403	248	397	400	367.5	1034.3
47	391	403	248	395	398	367.1	1030.7

WOODSTOVE SURFACE TEMPERATURE DATA

Client: Sherwood
Model: Ironwood 2.0-1
Run #: 5

Job #: 25-470
Tracking #: 243
Technician: AK
Date: 12/26/2025

Stove ΔT: 56

	Temperature Data (°F)						
Elapsed Time (min)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
48	392	404	249	392	397	366.7	1027.9
49	392	404	250	390	396	366.3	1022.1
50	393	405	250	387	394	365.9	1014.5
51	393	405	251	386	393	365.6	1006.3
52	394	405	251	383	391	364.8	998.5
53	394	406	252	380	389	364.1	991.4
54	394	405	252	377	388	363.4	983.7
55	394	405	253	374	386	362.4	977.2
56	394	405	253	370	385	361.4	971.1
57	394	405	253	367	384	360.5	965.2
58	393	404	253	364	382	359.4	959.2
59	393	404	253	359	381	357.9	953.9
60	393	403	253	357	379	357.0	949.2
61	392	403	253	352	378	355.4	943.9
62	392	402	253	349	376	354.3	941.1
63	391	402	253	346	375	353.1	940.5
64	390	401	253	342	374	351.9	935.7
65	390	400	253	339	373	351.0	935.3
66	390	399	253	337	371	350.0	944.5
67	389	399	254	334	370	349.0	935.3
68	389	398	254	331	369	348.1	922.8
69	389	398	254	328	368	347.1	910.4
70	388	397	254	326	366	346.2	902.9
71	388	397	254	324	365	345.4	898.0
72	388	397	254	322	363	344.9	895.6
73	388	397	254	320	362	344.0	895.4
74	388	397	254	319	361	343.6	895.7
75	388	397	253	316	360	343.0	894.8
76	388	398	253	316	359	342.8	893.9
77	389	399	252	315	359	342.7	894.1
78	390	400	252	315	357	342.6	896.8
79	391	401	251	314	356	342.3	899.9
80	392	402	250	314	355	342.7	902.8
81	393	403	250	316	354	343.2	904.3
82	394	404	249	315	353	343.3	903.6
83	396	406	249	315	353	343.7	902.2
84	397	407	249	315	352	344.2	901.2
85	399	408	249	316	351	344.7	900.9
86	400	409	249	316	350	345.0	901.6
87	402	410	250	315	350	345.3	911.4
88	403	411	251	314	349	345.5	921.0
89	404	412	252	315	349	346.1	921.3
90	405	412	252	314	348	346.1	920.2
91	406	413	252	314	347	346.4	920.8
92	406	414	252	313	346	346.3	922.7
93	407	415	251	312	346	346.3	921.5
94	408	415	251	312	346	346.4	919.1
95	409	416	252	311	345	346.7	915.9

WOODSTOVE SURFACE TEMPERATURE DATA

Client: Sherwood
Model: Ironwood 2.0-1
Run #: 5

Job #: 25-470
Tracking #: 243
Technician: AK
Date: 12/26/2025

Stove ΔT: 56

	Temperature Data (°F)						
Elapsed Time (min)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
96	410	418	252	311	345	346.9	913.0
97	411	419	252	310	345	347.2	911.2
98	412	420	252	309	345	347.5	907.9
99	415	422	253	308	345	348.3	904.3
100	418	423	254	307	345	349.2	896.3
101	421	425	255	305	346	350.1	882.7
102	422	426	256	304	346	350.8	872.7
103	423	427	257	302	346	351.0	868.2
104	424	428	257	301	347	351.3	867.2
105	425	429	258	299	347	351.5	867.5
106	425	430	259	297	347	351.7	868.0
107	426	430	260	296	348	352.0	869.0
108	426	431	260	295	349	352.3	871.4
109	426	432	261	293	350	352.3	874.2
110	427	432	261	292	351	352.6	876.7
111	427	432	262	292	352	352.9	877.5
112	427	433	262	290	353	352.9	877.3
113	427	433	263	290	354	353.3	875.6
114	427	433	263	290	354	353.6	873.9
115	428	434	264	289	356	354.0	870.8
116	429	434	264	288	357	354.3	870.2
117	429	435	265	288	358	354.8	868.5
118	430	435	265	287	358	354.8	867.4
119	430	435	266	286	359	355.3	869.0
120	430	435	267	285	360	355.6	870.3
121	431	436	267	285	361	355.9	870.6
122	431	436	268	284	362	356.2	871.5
123	431	436	269	284	363	356.4	873.0
124	432	436	269	284	363	356.8	872.7
125	432	436	270	282	364	356.8	873.9
126	433	437	270	282	364	357.1	871.0
127	434	437	271	282	365	357.7	864.8
128	435	437	272	282	366	358.4	861.1
129	437	438	272	281	366	358.9	858.2
130	440	438	273	281	367	359.8	855.9
131	443	439	275	280	368	360.6	853.8
132	446	439	276	279	368	361.5	852.7
133	449	440	277	279	369	362.6	849.8
134	453	440	279	278	369	363.7	846.8
135	456	441	280	277	369	364.7	845.0
136	459	442	281	277	370	365.7	844.5
137	463	442	284	277	370	367.0	845.0
138	466	443	286	276	370	368.1	845.8
139	469	444	288	275	370	369.2	845.5
140	472	444	290	275	371	370.3	845.3
141	475	445	292	275	371	371.6	843.7
142	478	445	294	275	371	372.6	840.9
143	480	446	296	275	371	373.5	838.8

WOODSTOVE SURFACE TEMPERATURE DATA

Client: Sherwood
Model: Ironwood 2.0-1
Run #: 5

Job #: 25-470
Tracking #: 243
Technician: AK
Date: 12/26/2025

Stove ΔT: 56

	Temperature Data (°F)						
Elapsed Time (min)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
144	482	446	298	275	371	374.4	838.4
145	483	446	300	275	371	374.9	839.7
146	484	446	302	274	371	375.3	842.9
147	484	446	304	275	371	375.8	845.5
148	483	446	305	275	371	375.8	846.7
149	483	446	306	275	371	375.9	847.0
150	482	446	306	275	371	376.0	847.6
151	481	445	307	275	371	375.9	848.6
152	480	445	307	275	371	375.7	848.3
153	479	444	308	275	371	375.5	847.9
154	478	444	309	275	371	375.3	845.2
155	477	444	308	275	371	375.0	833.2
156	476	444	308	275	371	374.7	824.6
157	475	444	309	274	371	374.4	817.3
158	474	443	309	273	371	374.0	812.0
159	473	444	311	272	371	374.0	810.2
160	472	444	312	271	371	373.7	808.6
161	470	444	314	270	370	373.4	807.3
162	469	444	315	269	370	373.3	805.6
163	467	443	316	268	370	372.9	803.1
164	466	443	317	267	370	372.6	801.0
165	464	443	318	266	370	372.2	799.5
166	463	443	319	266	369	372.0	797.3
167	462	443	320	264	369	371.5	794.6
168	461	443	320	264	369	371.1	791.7
169	459	443	321	263	368	370.7	788.7
170	458	442	322	261	368	370.2	787.8
171	457	442	322	261	368	369.8	789.1
172	456	441	322	261	368	369.4	788.9
173	455	440	323	260	367	368.7	786.7
174	454	439	323	258	367	368.2	783.6
175	453	438	324	258	367	367.7	779.9
176	452	437	325	257	366	367.3	776.7
177	451	435	326	256	366	366.7	773.0
178	450	434	326	254	366	365.9	767.4
179	449	433	329	254	365	365.9	761.7
180	448	431	331	252	365	365.4	756.9
181	447	430	333	251	364	365.0	752.1
182	446	428	336	251	364	364.8	747.4
183	445	427	337	249	364	364.4	743.2
184	445	425	341	247	364	364.2	739.6
185	444	424	342	246	363	363.6	736.9
186	443	423	345	245	363	363.5	734.8
187	442	422	346	243	362	363.1	733.1
188	441	420	347	242	362	362.5	731.6
189	440	419	349	240	361	361.9	730.0
190	439	418	349	240	361	361.5	728.4
191	439	417	350	239	361	360.9	727.0

WOODSTOVE SURFACE TEMPERATURE DATA

Client: Sherwood
Model: Ironwood 2.0-1
Run #: 5

Job #: 25-470
Tracking #: 243
Technician: AK
Date: 12/26/2025

Stove ΔT: **56**

	Temperature Data (°F)						
Elapsed Time (min)	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
192	438	416	351	237	360	360.4	724.8
193	438	414	352	237	360	360.0	722.5
194	437	413	352	236	359	359.3	720.1
195	436	412	351	234	359	358.6	717.8
196	436	411	351	234	358	358.1	715.6
197	436	410	350	233	357	357.2	712.9
198	435	409	351	232	357	356.8	710.0
199	435	408	352	231	357	356.4	707.2
200	434	407	353	230	357	356.3	704.6
201	434	406	355	229	356	356.1	702.9
202	433	405	357	228	356	355.7	700.9
203	433	404	358	228	355	355.6	699.0
204	432	403	360	227	355	355.4	698.0
Average	424.8	419.6	284.0	310.4	376.9	363.1	898.9

LAB SAMPLE DATA - ASTM E2515

Client: Sherwood
Model: Ironwood 2.0-1
Run #: 5

Job #: 25-470
Tracking #: 243
Technician: AK
Date: 12/26/2025

		Sample ID	Tare, mg	Final, mg	Catch, mg
Filters	**A**	G01461	228.5	232.2	3.7
	B	G01462	230.1	233.6	3.5
	C - 1st Hour	G01463	229.7	231.2	1.5
	Amb	G01464	228.0	228.2	0.2
Probes	**A**	17A	116812.1	116812.1	0.0
	B	17B	117142.4	117142.4	0.0
	C - 1st Hour	17C	113142.9	113143.1	0.2
O-rings	**A**	17A	3606.6	3606.9	0.3
	B	17B	3563.7	3564.3	0.6
	C - 1st Hour	17C	3590.0	3590.3	0.3

Placed in Dessicator on:	12/26/2025

Balance Audit (mg):		200.0		200.0		200.0			
		Weight (mg)	Date/Time	Weight (mg)	Date/Time	Weight (mg)	Date/Time	Weight (mg)	Date/Time
Filters	**A**	232.0	12/29 10:15	232.2	1/5 13:30				
	B	233.4	12/29 10:15	233.6	1/5 13:30				
	C - 1st Hour	231.4	12/29 10:15	231.2	1/5 13:30				
	Amb	228.2	12/29 10:15	228.2	1/5 13:30				
Probes	**A**	116812.2	12/29 10:15	116812.1	1/5 13:30				
	B	117142.4	12/29 10:15	117142.4	1/5 13:30				
	C - 1st Hour	113143.2	12/29 10:15	113143.1	1/5 13:30				
O-Rings	**A**	3607.4	12/29 10:15	3607.0	1/5 13:30	3606.9	1/6 8:30		
	B	3564.2	12/29 10:15	3564.3	1/5 13:30				
	C - 1st Hour	3590.3	12/29 10:15	3590.3	1/5 13:30				

Train A Aggregate, mg:	**4.0**
Train B Aggregate, mg:	**4.1**
Train C Aggregate, mg:	**2.0**
Ambient, mg:	**0.2**

ASTM E2780 Wood Heater Run Sheets

Client: Sherwood Job Number: 25-470 Tracking #: 243
Model: Ironwood 2.0-1 Run Number: 5 Test Date: 12/26/25

Wood Heater Run Notes

Test Control Settings

Primary Air Setting(s): Open 13/32" from fully closed (5/8")
Targeted Burn Category: III

Preburn Notes

Time	Notes
	-None-

Test Notes

Test Burn Start Time: 12:02 Test Fuel Loaded by: 25 seconds
Door Closed: 35 seconds Air Control Set at: 300 seconds
Other Loading Notes: Bypass opened & closed with door, fan on high

Time	Notes
	-None-

Test Burn End Time: 15:26

Flue Gas Concentration Measurement

Calibration Gas Values: Span Gas CO_2 (%): 17.32 CO (%): 4.350
Mid Gas CO_2 (%): 10.02 CO (%): 2.530

Calibration Results:

	Pre Test			Post Test		
	Zero	Span	Mid	Zero	Span	Mid
Time	10:18	10:20	10:21	15:55	15:57	15:59
CO_2	0.00	17.32	10.31	0.06	17.41	10.42
CO	0.000	4.351	2.524	0.028	4.388	2.568

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

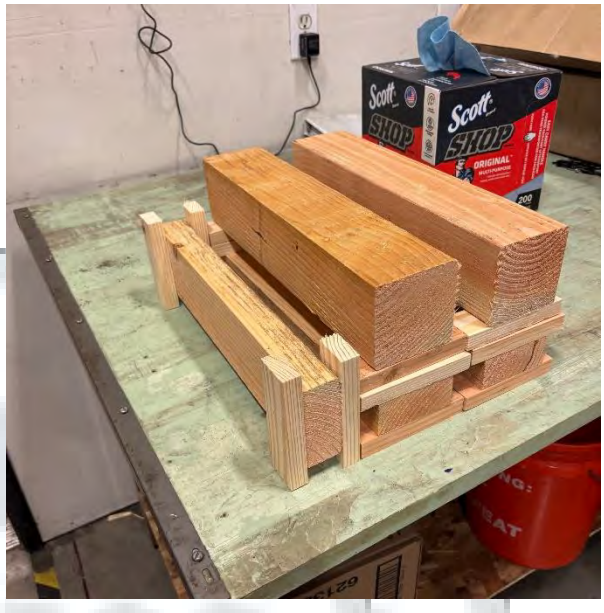
Technician Signature:  Date: 1/14/26

ASTM E2780 Wood Heater Run Sheets

Client: Sherwood Job Number: 25-470 Tracking #: 243
Model: Ironwood 2.0-1 Run Number: 5 Test Date: 12/26/25



Test Fuel Front/Side View



Test Fuel Iso View



Test Fuel Loaded in Stove



Air Settings

Technician Signature: Date: 1/14/26

Enviro Ironwood 2.0, Model Numbers: **IW20SF-1, IW20CF-1, IW20SI-1**

Seasoning Data (Catalyst Equipped)

Performed by: Ken Davis, Sherwood Industries

Total Hours	53

R&D 17			
Date			12/03//2025
Catalyst Equipped (Y/N)			Y
Fuel Moisture % as tested			20
Fuel weight lbs as tested			15
1-hour temps as tested			
Time (hr)	Stack ˚F	Catalyst Exit ˚F	Other˚F
0	114.6	189.7	NA
1	528.6	889.7	NA
2	442.6	1101.8	NA
3	204.5	755.7	NA
4	203.2	730.6	NA
5	297.1	1099.9	NA
6	245.2	943.5	NA
7	186.0	747.1	NA
8	175.1	709.5	NA
Total			8

R&D 16			
Date			12/02/2025
Catalyst Equipped (Y/N)			Y
Fuel Moisture % as tested			19.5
Fuel weight lbs as tested			14.6
1-hour temps as tested			
Time (hr)	Stack ˚F	Catalyst Exit ˚F	Other˚F
0	157.4	240.2	NA
1	512.4	835.3	NA
2	370.4	1282.4	NA
3	308.3	943.7	NA
4	336.9	1135.1	NA
5	296.8	953.8	NA
6	255.1	834.0	NA
7	237.3	762.2	NA
8	220.1	665.6	NA
Total			8

R&D 15			
Date			12/01/2025
Catalyst Equipped (Y/N)			Y
Fuel Moisture % as tested			21.2
Fuel weight lbs as tested			14.7
1-hour temps as tested			
Time (hr)	Stack ˚F	Catalyst Exit ˚F	Other˚F
0	157.4	240.2	NA
1	512.4	835.3	NA
2	370.4	1282.4	NA
3	308.4	943.7	NA
4	336.9	1135.1	NA
5	296.8	953.8	NA
6			NA
7			NA
8			NA
Total			5

R&D 14			
Date			11/28/2025
Catalyst Equipped (Y/N)			Y
Fuel Moisture % as tested			20.8
Fuel weight lbs as tested			13.6
1-hour temps as tested			
Time (hr)	Stack ˚F	Catalyst Exit ˚F	Other˚F
0	328.0	298.0	NA
1	496.4	846.6	NA
2	297.4	981.0	NA
3	227.3	738.4	NA
4	307.5	794.6	NA
5	306.9	1006.8	NA
6	235.9	766.2	NA
7	228.2	745.9	NA
8			NA
Total			7

R&D 13			
Date			11/27/2025
Catalyst Equipped (Y/N)			Y
Fuel Moisture % as tested			21.9
Fuel weight lbs as tested			13.9
1-hour temps as tested			
Time (hr)	Stack ˚F	Catalyst Exit ˚F	Other˚F
0	192.9	338.9	NA
1	326.4	754.0	NA
2	548.4	852.0	NA
3	300.9	877.3	NA
4	302.1	894.0	NA
5	269.5	967.1	NA
6	231.6	803.6	NA
7	206.0	702.0	NA
8	180.6	611.4	NA
Total			8

R&D 12			
Date			11/26/2025
Catalyst Equipped (Y/N)			Y
Fuel Moisture % as tested			19.9
Fuel weight lbs as tested			13.8
1-hour temps as tested			
Time (hr)	Stack ˚F	Catalyst Exit ˚F	Other˚F
0	132.3	244.5	NA
1	343.8	679.0	NA
2	425.2	725.8	NA
3	573.4	805.3	NA
4	242.7	822.0	NA
5	672.1	1016.3	NA
6	475.9	773.0	NA
7	346.6	589.7	NA
8	214.6	363.0	NA
Total			8

R&D 11			
Date			11/25/2025
Catalyst Equipped (Y/N)			Y
Fuel Moisture % as tested			20.6
Fuel weight lbs as tested			16.2
1-hour temps as tested			
Time (hr)	Stack ˚F	Catalyst Exit ˚F	Other˚F
0	279.0	387.9	NA
1	282.1	437.1	NA
2	572.7	929.0	NA
3	554.5	990.1	NA
4	319.7	1107.1	NA
5	280.8	774.2	NA
6	333.3	884.1	NA
7	331.0	1090.6	NA
8	276.3	928.0	NA
9	230.8	772.2	NA
Total			9

ASTM E2515 - Glass Fiber Filters

Paired Filter Weights

Date/Time:	12/17 13:30	12/19 08:30	-	-			
Audit:	200.0	200.0	-	-			
	Weight 1	**Weight 2**	**Weigth 3**	**Weight 4**	**Initial**	**Project**	**Run**
G001445	229.6	229.6	-	-	A	25-470	#1
G001446	229.8	229.7	-	-	A	↓	↓
G001447	230.1	230.0	-	-	A	↓	↓
G001448	229.1	229.0	-	-	A	↓	↓
G001449	229.3	229.1	-	-	A	↓	#2
G001450	230.4	230.2	-	-	A	↓	↓
G001451	230.4	230.5	-	-	A	↓	↓
G001452	228.7	228.9	-	-	A	↓	↓
G001453	229.6	229.5	-	-	A	↓	#3
G001454	227.6	227.7	-	-	A	↓	↓
G001455	230.9	230.8	-	-	A	↓	↓
G001456	230.0	229.9	-	-	A	↓	↓
G001457	232.6	232.7	-	-	A	↓	#4
G001458	226.1	226.1	-	-	A	↓	↓
G001459	230.4	230.3	-	-	A	↓	↓
G001460	229.3	229.3	-	-	A	↓	↓

Date/Time:	12/22 13:30	12/23 08:00	-	-			
Audit:	200.0	200.0	-	-			
	Weight 1	**Weight 2**	**Weigth 3**	**Weight 4**	**Initial**	**Project**	**Run**
G001461	228.7	228.5	-	-	A	25-470	#5
G001462	230.2	230.1	-	-	A	↓	↓
G001463	229.9	229.7	-	-	A	↓	↓
G001464	228.2	228.0	-	-	A	↓	↓
G001465	229.6	229.7	-	-	A		
G001466	229.7	229.9	-	-	A		
G001467	231.1	231.3	-	-	A		
G001468	229.4	229.6	-	-	A		
G001469	230.8	231.0	-	-	A		
G001470	228.7	228.9	-	-	A		
G001471	229.3	229.5	-	-	A		
G001472	230.0	230.2	-	-	A		
G001473	230.3	230.2	-	-	A		
G001474	228.2	228.3	-	-	A		
G001475	230.5	230.7	-	-	A		
G001476	228.9	229.1	-	-	A		

ASTM E2515 - Probe Samples 11-20

Date/Time:	12/10 10:30	12/11 15:00	12/12 10:15	-			
Audit:	200.0	200.0	200.0	-			
	Weight 1	**Weight 2**	**Weigth 3**	**Weight 4**	**Initial**	**Project**	**Run**
11A	116876.1	116876.2	-	-	A	25-466	#5
11B	117349.5	117349.7	-	-	A		
11C	116198.5	116198.6	-	-	A		
12A	116719.2	116720.1	116720.2	-	A	25-466	#6
12B	117783.0	117783.0	-	-	A		
12C	117181.2	117181.9	117182.0	-	A		
13A	117322.7	117322.6	-	-	A	25-470	#1
13B	116947.7	116947.9	-	-	A		
13C	115654.9	115655.6	-	-	A		
14A	116637.2	116637.9	116638.1	-	A	25-470	#2
14B	116627.2	116627.9	116627.8	-	A		
14C	116536.6	116537.3	116537.1	-	A		
15A	117249.2	117250.1	117250.1	-	A	25-470	#3
15B	116762.5	116762.4	-	-	A		
15C	116848.7	116849.2	116849.1	-	A		

Date/Time:	12/19 15:00	12/22 17:30	12/23 0815	-			
Audit:	200.0	200.0	200.0	-			
	Weight 1	**Weight 2**	**Weigth 3**	**Weight 4**	**Initial**	**Project**	**Run**
16A	116380.9	116380.8	-	-	A	25-470	#4
16B	115864.2	115864.0	-	-	A		
16C	114149.3	114149.2	-	-	A		
17A	116812.3	116812.1	-	-	A	25-470	#5
17B	117142.5	117142.4	-	-	A		
17C	113143.0	113142.9	-	-	A		
18A	117503.4	117503.3	-	-	A		
18B	117335.3	117335.0	117334.9	-	A		
18C	114337.2	114337.1	-	-	A		
19A	117028.4	117028.0	117028.1	-	A		
19B	117015.8	117015.3	117015.5	-	A		
19C	114233.7	114233.6	-	-	A		
20A	115628.7	115628.5	-	-	A		
20B	115968.7	115968.6	-	-	A		
20C	113777.5	113776.9	113777.1	-	A		

ASTM E2515 - O-Ring Samples 11-20

Paired Weights

Date/Time:	12/10 11:00	12/11 15:15	12/12 10:30	-
Audit:	200.0	200.0	200.0	-

	Weight 1	Weight 2	Weigth 3	Weight 4	Initial	Project	Run
11A	3414.1	3414.1	-	-	A	25-466	#5
11B	4226.6	4226.8	-	-	A		
11C	3580.3	3580.1	-	-	A		
12A	3577.2	3577.1	-	-	A	25-466	#6
12B	3607.0	3607.0	-	-	A		
12C	3542.8	3542.8	-	-	A		
13A	3588.2	3588.4	-	-	A	25-470	#1
13B	3633.8	3633.5	3633.6	-	A		
13C	4401.1	4400.9	-	-	A		
14A	3336.0	3335.6	3335.6	-	A	25-470	#2
14B	3360.2	3359.7	3359.8	-	A		
14C	3436.0	3435.7	3435.6	-	A		
15A	3565.9	3565.3	3565.1	-	A	25-470	#3
15B	3566.9	3566.5	3566.4	-	A		
15C	3390.0	3389.2	3389.2	-	A		

Date/Time:	12/19 15:30	12/22 13:30	12/23 0830	-
Audit:	200.0	200.0	200.0	-

	Weight 1	Weight 2	Weigth 3	Weight 4	Initial	Project	Run
16A	3567.7	3568.3	3568.1	-	A	25-470	#4
16B	3632.8	3632.8	-	-	A		
16C	3593.9	3593.8	-	-	A		
17A	3606.6	3606.6	-	-	A	25-470	#5
17B	3563.8	3563.7	-	-	A		
17C	3590.2	3590.0	-	-	A		
18A	3595.2	3594.9	3595.1	-	A		
18B	3538.2	3538.5	3538.4	-	A		
18C	3521.2	3521.0	-	-	A		
19A	3578.7	3578.7	-	-	A		
19B	3624.2	3623.8	3623.8	-	A		
19C	3606.7	3606.6	-	-	A		
20A	3551.9	3552.1	-	-	A		
20B	3606.5	3606.4	-	-	A		
20C	3602.5	3602.4	-	-	A		

Sample Calculations – ASTM E2780 & E2515

Client: Sherwood
Model: Ironwood 2.0-1
Run: 2

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

M_{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 = 11.9 %

M_{Swb} = 1.5 lbs

0.4536 = Conversion factor from lbs to kg

M_{Sdb} = [(1.5 x 0.4536) (100/(100 + 11.9)

M_{Sdb} = **0.59** kg

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

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

Where,

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

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

Sample Calculation (test fuel piece 1):

MC_{Pnwb} = 3.86

FM_{CPn} = 21.5

= 3.9 (100/(100+ 21.5)

= 3.2 lbs

Total dry crib weight, excluding spacers = 9.91 lbs

M_{Cdb} = **4.50** 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 = 644 in^3

1728 = conversion from in^3 to ft^3

D_{Cdb} = 9.91 / 644 * 1728

= **26.59** 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:

$$M_{FTAdb} = 0.59 + 4.50$$

$$= \mathbf{5.09}\ \text{kg}$$

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} = 5.09 kg
θ = 334 min

$$BR = \frac{60 \times 5.09}{334}$$

BR = **0.91** 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:

$$Fp = \frac{19.01}{20.02} = 0.949$$

$$V_s = 0.949 \times 85.49 \times 0.99 \times 0.307 \times \left(\frac{83.3 + 460}{\left(29.73 + \frac{-0.16}{13.6}\right) \times 28.78} \right)^{1/2}$$

V_s = **19.65** ft/s

*The ASTM test standard mistakenly has the square root of the average delta p instead of the average of the square root of delta p. The current EPA Method 2 is also incorrect. This was verified by Mike Toney at EPA.

**The ASTM test standard mistakenly identifies Ms as the dry molecular weight. It should be the wet molecular weight as indicated in EPA Method 2.

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

ASTM E2515 equation (3)

$$Q_{sd} = 3600 \times (1 - B_{ws}) \times v_s \times A \times \frac{T_{std}}{T_{s(avg)}} \times \frac{P_s}{P_{std}}$$

Where:

3600	=	Conversion from seconds to hours (ASTM method uses 60 to convert in minutes)
B_{ws}	=	Water vapor in gas stream, proportion by volume; assume 2%
A	=	Cross sectional area of dilution tunnel, ft^2
T_{std}	=	Standard absolute temperature, 528 °R
P_s	=	Absolute average gas static pressure in dilution tunnel, = P_{bar} + P_g , in Hg
$T_{s(avg)}$	=	Absolute average gas temperature in the dilution tunnel, °R; (°R = °F + 460)
P_{std}	=	Standard absolute pressure, 29.92 in Hg

Sample calculation:

$$Q_{sd} = 3600 \times (1 - 0.02) \times 19.65 \times 0.1963 \times \frac{528}{83.3 + 460} \times \frac{29.73 + \frac{-0.16}{13.6}}{29.92}$$

Q_{sd} = **13139.3** dscf/hr

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

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

Where:

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

Sample Calculation:

Using equation for Train A:

$$V_{m(std)} = 17.64 \times 51.548 \times 1.021 \times \frac{\left(29.73 + \frac{2.35}{13.6}\right)}{(94.4 + 460)}$$

$V_{m(std)}$ = **50.076** dscf

Using equation for Train B:

$$V_{m(std)} = 17.64 \times 50.050 \times 1.001 \times \frac{\left(29.73 + \frac{2.24}{13.6}\right)}{(93.8 + 460)}$$

$V_{m(std)}$ = **47.706** dscf

Using equation for ambient train:

$$V_{m(std)} = 17.64 \times 71.10 \times 0.999 \times \frac{\left(29.73 + \frac{0.00}{13.6}\right)}{(67.0 + 460)}$$

$V_{m(std)}$ = **70.681** 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 = 0.2 + 6.5 + 0.2

m_n = **6.9** mg

Using equation for Train B:

m_n = 0.4 + 5.5 + 0.3

m_n = **6.2** 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:

$$C_s = 0.001 \times \frac{6.9}{50.08}$$

C_s = **0.00014** g/dscf

For Train B

$$C_s = 0.001 \times \frac{6.2}{47.71}$$

C_s = **0.00013** g/dscf

For Ambient Train

$$C_r = 0.001 \times \frac{0.1}{70.68}$$

C_r = **0.000001** g/dscf

E_T – Total Particulate Emissions, g
ASTM E2515 equation (15)

$$E_T = (c_s - c_r) \times Q_{std} \times \theta$$

Where:

C_s	=	Concentration of particulate matter in tunnel gas, g/dscf
C_r	=	Concentration particulate matter room air, g/dscf
Q_{std}	=	Average dilution tunnel gas flow rate, dscf/hr
θ	=	Total time of test run, minutes

Sample calculation:

For Train A

E_T = (0.000138 - 0.000001) x 13139.3 x 334 /60

E_T = **9.97** g

For Train B

E_T = (0.000130 - 0.000001) x 13139.3 x 334 /60

E_T = **9.40** g

Average

E = **9.69** 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):

$$PR = \left(\frac{334 \times 1.422 \times 19.65 \times (92.2 + 460) \times (94.4 + 460)}{10 \times 51.548 \times 19.69 \times (83.3 + 460) \times (73.9 + 460)} \right) \times 100$$

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) = 9.69 g

θ = 334 min

$PM_R = 60 \times (9.69 / 334)$

PM_R = **1.74** 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) = 9.69 g

M_{Bdb} = 5.09 kg

PM_F = 9.69 / 5.09

PM_F = **1.90** 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: Sherwood
Model: Ironwood 2.0-1
Date: 12/22/25
Run: 2
Control #: 25-470
Test Duration: 334 min

	HHV	LHV
Eff	79.44%	85.87%
Comb Eff	97.33%	97.33%
HT Eff	81.63%	88.22%
Output	14,418	kJ/h
Burn Rate	0.92	kg/h
Grams CO	209	g
Input	18,149	kJ/h
MC wet	17.11	

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.

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

Overall Heating Efficiency: 79.44%
Combustion Efficiency: 97.33%
Heat Transfer Efficiency: 81.63%

Heat Output: 13,677 Btu/h 14,418 kJ/h
Heat Input: 17,216 Btu/h 18,149 kJ/h

Burn Duration: 5.57 h

Burn Rate: 2.02 lb/h 0.916 kg/h

Stack Temp: 226.4 Deg. F 108.0 Deg. C

Air Fue
Dry Molecular W
Dry Moles Exhaus
Air Fuel Ratio

Averages	0.30	8.23	1.48	20.38	11.99	108.11	19.47	97.9%	82.2%	80.5%	14.95	1.92		
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	6.15	0.16	4.85	291.6%	20.61	15.67	137.4	19.7	98.1%	74.1%	72.7%	23.6	6.15	
1	6.13	0.15	2.54	632.1%	20.76	18.15	142.9	19.7	97.3%	59.8%	58.2%	44.1	6.13	
2	6.07	0.29	3.39	433.1%	20.70	17.16	151.4	19.8	94.6%	65.4%	61.9%	31.9	6.07	
3	5.99	0.40	10.53	79.7%	20.22	9.49	174.9	19.8	97.2%	79.2%	77.0%	10.8	5.99	
4	5.91	0.57	13.19	42.8%	20.03	6.56	197.8	19.8	96.6%	79.6%	77.0%	8.6	5.91	
5	5.85	0.54	13.61	38.8%	20.01	6.12	195.5	19.8	96.9%	80.0%	77.6%	8.3	5.85	
6	5.83	0.26	11.41	68.2%	20.17	8.62	174.9	19.8	98.3%	80.0%	78.6%	10.1	5.83	
7	5.80	0.17	9.07	112.6%	20.33	11.17	159.4	19.7	98.8%	79.1%	78.1%	12.8	5.80	
8	5.77	0.15	7.37	161.3%	20.44	13.00	152.7	19.7	98.9%	77.6%	76.7%	15.7	5.77	
9	5.74	0.14	7.48	157.8%	20.44	12.89	149.1	19.8	98.9%	78.1%	77.3%	15.5	5.74	
10	5.71	0.13	7.61	153.8%	20.43	12.75	145.7	19.7	99.1%	78.6%	77.8%	15.3	5.71	
11	5.69	0.13	7.47	158.6%	20.44	12.91	146.3	19.7	99.0%	78.3%	77.6%	15.6	5.69	
12	5.66	0.14	7.66	151.8%	20.42	12.69	145.1	19.7	99.0%	78.7%	77.9%	15.2	5.66	
13	5.62	0.15	7.72	149.8%	20.42	12.63	145.4	19.6	98.9%	78.7%	77.8%	15.1	5.62	
14	5.59	0.15	7.94	142.8%	20.41	12.39	145.9	19.7	98.9%	78.9%	78.1%	14.6	5.59	
15	5.55	0.15	7.89	144.6%	20.41	12.45	145.1	19.7	98.9%	78.9%	78.1%	14.7	5.55	
16	5.51	0.16	7.96	141.8%	20.40	12.36	145.9	19.7	98.8%	79.0%	78.0%	14.6	5.51	
17	5.48	0.14	8.36	131.0%	20.38	11.94	146.0	19.6	99.0%	79.4%	78.6%	13.9	5.48	
18	5.44	0.14	8.50	127.3%	20.37	11.80	146.9	19.7	99.0%	79.5%	78.7%	13.7	5.44	
19	5.40	0.12	8.82	119.9%	20.35	11.48	147.7	19.7	99.3%	79.8%	79.2%	13.3	5.40	
20	5.38	0.11	9.19	111.2%	20.33	11.08	149.4	19.7	99.3%	80.0%	79.4%	12.8	5.38	
21	5.34	0.11	9.38	107.0%	20.31	10.88	148.8	19.7	99.4%	80.2%	79.7%	12.5	5.34	
22	5.30	0.10	9.43	106.2%	20.31	10.84	148.6	19.8	99.4%	80.3%	79.8%	12.5	5.30	
23	5.26	0.11	9.66	101.3%	20.30	10.59	148.6	19.8	99.4%	80.5%	80.0%	12.2	5.26	
24	5.22	0.09	9.80	98.7%	20.29	10.45	149.2	19.7	99.5%	80.5%	80.2%	12.0	5.22	
25	5.19	0.09	9.99	95.0%	20.27	10.24	148.7	19.7	99.6%	80.7%	80.4%	11.8	5.19	
26	5.15	0.09	9.93	96.1%	20.28	10.31	147.2	19.7	99.5%	80.8%	80.4%	11.8	5.15	
27	5.11	0.09	10.14	92.1%	20.26	10.08	148.0	19.7	99.6%	80.9%	80.6%	11.6	5.11	
28	5.07	0.09	10.34	88.3%	20.25	9.86	148.1	19.8	99.6%	81.0%	80.7%	11.4	5.07	
29	5.04	0.08	10.16	91.9%	20.26	10.06	147.0	19.8	99.7%	81.0%	80.7%	11.6	5.04	
30	5.00	0.10	10.49	85.5%	20.24	9.70	147.6	19.7	99.5%	81.2%	80.7%	11.2	5.00	
31	4.95	0.11	10.56	84.2%	20.24	9.62	147.1	19.7	99.4%	81.2%	80.8%	11.1	4.95	
32	4.90	0.15	10.91	77.5%	20.21	9.22	146.5	19.8	99.1%	81.5%	80.7%	10.7	4.90	
33	4.86	0.26	11.45	67.8%	20.17	8.59	144.9	19.8	98.4%	81.9%	80.6%	10.1	4.86	
34	4.82	0.38	11.47	65.7%	20.16	8.50	144.2	19.7	97.5%	81.9%	79.8%	10.0	4.82	
35	4.78	0.56	11.77	59.3%	20.13	8.08	143.7	19.7	96.4%	82.0%	79.0%	9.6	4.78	
36	4.74	0.82	12.09	52.2%	20.09	7.59	143.1	19.7	94.8%	82.1%	77.9%	9.1	4.74	
37	4.69	1.13	12.07	48.8%	20.07	7.43	142.4	19.7	93.0%	82.0%	76.3%	8.8	4.69	

el Ratio (A/F)	
Weight (M_d)	29.80
st Gas (N_t):	497.98
o (A/F)	14.33

%HC 0.88

Combustion Efficiency: 97.33%
Total Input (kJ): 101,028 95,820 (Btu)
Total Output (kJ): 80,261 76,124 (Btu)
Efficiency: 79.44%
Total CO (g): 209.49

Moisture of Wood (wet basis): 17.1088
Initial Dry Weight Wt_{do} (kg): 5.10
Moisture Content Dry 20.64

Load Weight (kg): **6.15**

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

68.84	1.70	66.66	101156	4.06	6.87	2.74	19810.00	17.11	79.47	21.08	2.11	7.19	0.03	0.21	39.52
% Wet Consumed	Dry Wt. Now	% Dry Comsumed		Fuel Properties				Mw Moisture	Mass Balance (moles/100 mole dry flue gas)					kg Wood per 100 mole dfp	
x	Wt_{dn}	y	Total Input	Carbon /12= [a]	Hydrogen /1= [b]	Oxygen /16= [c]	Calorific Value	Fuel Burnt	[h]	[u]	[w]	[j]	[k]	Nk	CO_2
0.00	5.10	0.00	0	4.06	6.87	2.74	19810.00	17.11	79.31	21.04	1.23	4.24	0.00	0.12	39.49
0.29	5.08	0.29	857	4.06	6.87	2.74	19810.00	17.11	79.16	21.00	0.66	2.28	-0.01	0.07	38.67
1.40	5.03	1.40	1192	4.06	6.87	2.74	19810.00	17.11	79.16	21.00	0.91	3.10	0.02	0.09	37.40
2.65	4.96	2.65	1304	4.06	6.87	2.74	19810.00	17.11	79.58	21.11	2.70	9.20	0.04	0.27	39.17
3.98	4.90	3.98	1118	4.06	6.87	2.74	19810.00	17.11	79.68	21.14	3.41	11.55	0.07	0.34	38.91
4.87	4.85	4.87	671	4.06	6.87	2.74	19810.00	17.11	79.72	21.15	3.50	11.89	0.07	0.35	39.06
5.31	4.83	5.31	447	4.06	6.87	2.74	19810.00	17.11	79.70	21.14	2.88	9.85	0.02	0.29	39.81
5.75	4.81	5.75	484	4.06	6.87	2.74	19810.00	17.11	79.59	21.11	2.28	7.81	0.01	0.23	40.04
6.27	4.78	6.27	484	4.06	6.87	2.74	19810.00	17.11	79.48	21.08	1.85	6.36	0.00	0.18	40.02
6.71	4.76	6.71	447	4.06	6.87	2.74	19810.00	17.11	79.49	21.09	1.88	6.44	0.00	0.19	40.07
7.15	4.74	7.15	447	4.06	6.87	2.74	19810.00	17.11	79.51	21.09	1.91	6.55	0.00	0.19	40.14
7.60	4.71	7.60	447	4.06	6.87	2.74	19810.00	17.11	79.50	21.09	1.87	6.43	0.00	0.19	40.11
8.04	4.69	8.04	522	4.06	6.87	2.74	19810.00	17.11	79.51	21.09	1.92	6.60	0.00	0.19	40.09
8.63	4.66	8.63	559	4.06	6.87	2.74	19810.00	17.11	79.50	21.09	1.94	6.65	0.00	0.19	40.03
9.14	4.63	9.14	559	4.06	6.87	2.74	19810.00	17.11	79.52	21.09	1.99	6.84	0.00	0.20	40.05
9.73	4.60	9.73	671	4.06	6.87	2.74	19810.00	17.11	79.52	21.09	1.98	6.79	0.00	0.20	40.06
10.47	4.57	10.47	596	4.06	6.87	2.74	19810.00	17.11	79.52	21.09	2.00	6.87	0.00	0.20	40.00
10.91	4.54	10.91	522	4.06	6.87	2.74	19810.00	17.11	79.55	21.10	2.09	7.19	0.00	0.21	40.12
11.50	4.51	11.50	633	4.06	6.87	2.74	19810.00	17.11	79.56	21.10	2.13	7.31	0.00	0.21	40.14
12.17	4.48	12.17	559	4.06	6.87	2.74	19810.00	17.11	79.59	21.11	2.20	7.56	0.00	0.22	40.29
12.61	4.46	12.61	522	4.06	6.87	2.74	19810.00	17.11	79.62	21.12	2.29	7.87	0.00	0.23	40.32
13.20	4.43	13.20	633	4.06	6.87	2.74	19810.00	17.11	79.63	21.12	2.34	8.03	0.00	0.23	40.37
13.86	4.39	13.86	671	4.06	6.87	2.74	19810.00	17.11	79.64	21.12	2.35	8.06	0.00	0.23	40.40
14.53	4.36	14.53	633	4.06	6.87	2.74	19810.00	17.11	79.65	21.13	2.40	8.26	0.00	0.24	40.38
15.12	4.33	15.12	596	4.06	6.87	2.74	19810.00	17.11	79.67	21.13	2.43	8.37	0.00	0.24	40.46
15.71	4.30	15.71	633	4.06	6.87	2.74	19810.00	17.11	79.68	21.14	2.48	8.53	0.00	0.25	40.48
16.37	4.26	16.37	596	4.06	6.87	2.74	19810.00	17.11	79.68	21.13	2.47	8.48	0.00	0.25	40.46
16.89	4.24	16.89	596	4.06	6.87	2.74	19810.00	17.11	79.69	21.14	2.52	8.66	0.00	0.25	40.49
17.55	4.20	17.55	596	4.06	6.87	2.74	19810.00	17.11	79.71	21.14	2.57	8.83	0.00	0.26	40.49
18.07	4.18	18.07	559	4.06	6.87	2.74	19810.00	17.11	79.70	21.14	2.52	8.67	-0.01	0.25	40.53
18.66	4.15	18.66	745	4.06	6.87	2.74	19810.00	17.11	79.71	21.14	2.61	8.96	0.00	0.26	40.43
19.54	4.10	19.54	820	4.06	6.87	2.74	19810.00	17.11	79.71	21.14	2.63	9.02	0.00	0.26	40.41
20.28	4.07	20.28	708	4.06	6.87	2.74	19810.00	17.11	79.71	21.14	2.73	9.35	0.01	0.27	40.22
20.94	4.03	20.94	708	4.06	6.87	2.74	19810.00	17.11	79.71	21.14	2.89	9.88	0.02	0.29	39.84
21.68	3.99	21.68	671	4.06	6.87	2.74	19810.00	17.11	79.65	21.13	2.93	9.98	0.04	0.29	39.35
22.27	3.96	22.27	671	4.06	6.87	2.74	19810.00	17.11	79.60	21.11	3.05	10.35	0.07	0.30	38.75
23.01	3.93	23.01	782	4.06	6.87	2.74	19810.00	17.11	79.50	21.09	3.21	10.80	0.11	0.32	37.90
23.82	3.89	23.82	782	4.06	6.87	2.74	19810.00	17.11	79.37	21.05	3.29	10.99	0.15	0.33	36.89

Moisture Content M_{Cwb}: 17.10875

Dry kg : 5.10

CA: 49

HY: 7

OX: 43.9

LHV
7885.2

65.12	**1.22**	**0.07**	**409.60**	**34.38**	**11.47**	**381.26**	**3493.57**	**2645.62**	**2576.72**	**2547.31**	**3327.07**	**3084.74**	**292.62**	**46064.08**	**52709.72**
						Stack Temp	**Heat Content Change - Ambient to Stack Temperature Flue Gas Constituent**						**Room Temp**		
Moles per kg of Dry Wood					**Moisture**										
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**
127.57	1.33	-0.01	645.46	34.54	11.47	410.54	4678.12	3525.44	3429.41	3391.15	4492.86	4104.22	292.82	184.73	449.74
276.93	2.26	-0.12	1207.62	34.76	11.47	416.04	4906.51	3693.20	3591.53	3551.69	4721.75	4297.90	292.82	189.74	1022.77
189.25	3.24	0.17	873.07	34.19	11.47	424.59	5257.19	3949.79	3839.26	3797.05	5075.34	4593.77	292.98	196.63	747.51
35.28	1.48	0.16	295.98	34.20	11.47	448.04	6248.50	4671.38	4534.94	4486.28	6083.16	5424.35	292.93	244.77	164.81
19.35	1.68	0.21	235.12	34.09	11.47	470.93	7227.52	5377.41	5213.94	5159.34	7092.96	6234.49	292.98	281.25	104.05
17.58	1.55	0.20	228.82	34.13	11.47	468.65	7129.20	5306.78	5146.08	5092.06	6990.96	6153.54	292.98	278.50	93.28
30.08	0.92	0.09	278.00	34.35	11.47	448.04	6246.39	4669.75	4533.34	4484.70	6081.22	5422.43	292.98	248.67	140.48
49.33	0.74	0.03	351.32	34.47	11.47	432.59	5597.17	4198.18	4078.95	4034.47	5419.00	4880.02	292.87	224.12	207.09
70.58	0.79	0.00	431.52	34.52	11.47	425.82	5312.59	3990.47	3878.56	3835.97	5130.90	4640.73	292.87	212.60	281.63
69.05	0.74	0.00	425.90	34.53	11.47	422.21	5157.29	3876.71	3768.71	3727.17	4974.58	4509.51	292.98	206.65	267.70
67.28	0.68	-0.01	419.38	34.54	11.47	418.87	5022.40	3778.09	3673.52	3632.88	4838.38	4395.82	292.87	201.60	254.18
69.35	0.71	-0.01	427.15	34.54	11.47	419.43	5045.56	3795.07	3689.91	3649.12	4861.68	4415.40	292.87	202.38	263.21
66.40	0.73	0.00	415.90	34.52	11.47	418.26	4996.93	3759.42	3655.48	3615.03	4812.77	4374.28	292.87	200.31	249.61
65.54	0.77	0.01	412.54	34.51	11.47	418.59	5015.04	3772.87	3668.52	3627.93	4830.61	4389.87	292.76	200.76	247.28
62.49	0.75	0.01	401.07	34.50	11.47	419.09	5033.77	3786.51	3681.67	3640.96	4849.64	4405.57	292.82	201.61	236.63
63.27	0.74	0.01	404.03	34.51	11.47	418.26	4999.04	3761.06	3657.08	3616.61	4814.71	4376.20	292.82	200.28	237.95
62.08	0.80	0.02	399.35	34.49	11.47	419.09	5033.77	3786.51	3681.67	3640.96	4849.64	4405.57	292.82	201.34	235.05
57.31	0.68	0.01	381.67	34.51	11.47	419.15	5038.20	3789.85	3684.91	3644.16	4853.90	4409.45	292.76	202.15	217.18
55.73	0.67	0.01	375.75	34.51	11.47	420.04	5073.16	3815.38	3709.54	3668.56	4889.27	4438.86	292.82	203.63	212.63
52.46	0.53	-0.01	363.78	34.54	11.47	420.87	5107.94	3840.85	3734.14	3692.92	4924.29	4468.24	292.82	205.80	201.48
48.65	0.50	-0.01	349.48	34.53	11.47	422.54	5175.45	3890.18	3781.75	3740.08	4992.49	4525.10	292.87	208.69	189.26
46.80	0.45	-0.01	342.62	34.54	11.47	421.98	5154.34	3874.82	3766.94	3725.41	4971.03	4507.42	292.82	208.08	181.35
46.43	0.43	-0.01	341.30	34.55	11.47	421.76	5138.72	3863.12	3755.58	3714.17	4955.86	4493.83	292.98	207.58	179.38
44.28	0.44	-0.01	333.13	34.54	11.47	421.71	5138.51	3863.06	3755.54	3714.13	4955.46	4493.79	292.93	207.50	171.07
43.13	0.37	-0.02	328.98	34.55	11.47	422.37	5168.48	3885.08	3776.83	3735.20	4985.47	4519.22	292.87	209.10	167.57
41.52	0.34	-0.02	322.95	34.56	11.47	421.82	5147.38	3869.72	3762.02	3720.54	4964.01	4501.55	292.82	208.39	160.65
42.00	0.36	-0.01	324.71	34.55	11.47	420.37	5084.96	3823.93	3717.78	3676.72	4901.34	4448.70	292.87	205.76	160.59
40.24	0.34	-0.02	318.15	34.55	11.47	421.15	5117.43	3847.70	3740.74	3699.46	4934.03	4476.12	292.87	207.20	154.84
38.62	0.33	-0.01	312.02	34.55	11.47	421.26	5119.95	3849.47	3742.42	3701.13	4936.76	4478.12	292.93	207.32	148.66
40.15	0.30	-0.02	317.90	34.56	11.47	420.15	5073.57	3815.50	3709.62	3668.65	4890.06	4438.95	292.93	205.65	153.18
37.40	0.39	0.00	307.28	34.53	11.47	420.71	5098.87	3834.12	3727.62	3686.47	4915.34	4460.45	292.87	206.15	143.41
36.83	0.40	0.00	305.07	34.52	11.47	420.26	5080.32	3820.53	3714.50	3673.48	4896.67	4444.78	292.87	205.30	140.73
33.99	0.56	0.03	293.85	34.47	11.47	419.65	5052.72	3800.22	3694.87	3654.03	4869.07	4421.32	292.93	203.22	129.19
29.88	0.89	0.08	277.31	34.36	11.47	418.04	4983.44	3749.37	3645.73	3605.37	4799.58	4362.61	292.98	198.56	112.02
29.16	1.31	0.14	273.31	34.23	11.47	417.32	4957.59	3730.58	3627.62	3587.43	4773.23	4341.00	292.87	195.10	108.77
26.60	1.83	0.22	262.08	34.07	11.47	416.87	4939.08	3717.01	3614.51	3574.45	4754.64	4325.34	292.87	191.41	98.86
23.79	2.57	0.34	249.28	33.85	11.47	416.21	4911.33	3696.65	3594.85	3554.98	4726.77	4301.85	292.87	186.16	87.96
22.71	3.46	0.47	242.54	33.59	11.47	415.59	4888.02	3679.63	3578.43	3538.71	4703.19	4282.24	292.82	180.31	83.57

SUMS					AVERAGE	SUMS						
117008.75	331054.03	21989.21	541810.69	180750.53	3854.89	20765.72	2700.05	18065.68	80390.61	2701.20	209.49	10.47
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
382.24	2188.87	-9.56	1660.64	551.24	5407.91	0.00	0	0.00	0	0	0.00	0.00
647.03	4289.11	-104.21	1677.54	553.46	8275.45	357.92	23	334.77	499	23	2.73	-0.08
930.11	3315.07	150.58	1660.18	556.86	7556.94	454.74	64	390.51	737	64	5.46	0.16
425.60	1327.83	142.51	1689.48	566.38	4561.38	300.21	37	263.33	1004	37	2.73	0.17
485.58	1213.05	192.43	1711.62	575.67	4563.64	257.45	38	219.79	860	38	2.66	0.19
446.57	1165.15	177.31	1710.55	574.74	4446.11	150.49	21	129.69	520	21	1.47	0.11
263.77	1246.74	76.47	1696.69	566.36	4239.18	95.66	8	88.09	351	8	0.58	0.03
212.89	1417.37	25.74	1683.59	560.14	4330.95	105.88	6	100.12	378	6	0.51	0.01
227.39	1655.30	1.79	1677.94	557.40	4614.04	112.80	6	107.27	371	6	0.54	0.00
213.56	1587.41	-2.27	1673.85	555.89	4502.79	101.61	5	96.90	345	5	0.47	0.00
195.06	1523.55	-8.10	1670.56	554.59	4391.44	99.10	4	94.93	348	4	0.43	0.00
203.34	1558.72	-7.33	1671.15	554.81	4446.27	100.33	4	95.97	347	4	0.45	0.00
208.43	1503.50	-0.74	1669.02	554.34	4384.46	115.43	5	110.03	406	5	0.54	0.00
221.63	1496.66	6.49	1668.77	554.52	4396.11	124.00	6	117.65	435	6	0.61	0.00
215.44	1460.29	8.06	1669.15	554.70	4345.87	122.58	6	116.36	436	6	0.59	0.00
212.65	1461.23	5.68	1668.39	554.36	4340.54	146.92	7	139.62	524	7	0.70	0.00
228.92	1454.03	14.79	1668.42	554.70	4357.26	131.10	7	123.86	465	7	0.67	0.01
195.31	1390.86	6.36	1669.46	554.74	4236.08	111.52	5	106.28	410	5	0.50	0.00
190.92	1378.45	6.63	1670.45	555.08	4217.79	134.83	6	128.60	498	6	0.60	0.00
152.02	1343.40	-6.37	1672.87	555.42	4124.62	116.34	4	112.29	442	4	0.42	0.00
142.25	1307.10	-5.34	1674.72	556.07	4072.74	107.22	4	103.67	414	4	0.37	0.00
129.55	1276.41	-8.46	1674.45	555.87	4017.25	128.42	4	124.61	505	4	0.40	0.00
122.89	1267.65	-10.95	1674.25	555.71	3996.51	135.28	4	131.54	535	4	0.41	-0.01
125.92	1237.29	-6.47	1673.76	555.71	3964.78	126.75	4	122.98	507	4	0.39	0.00
106.58	1228.82	-13.62	1675.42	556.00	3929.86	118.24	3	115.48	478	3	0.31	-0.01
98.79	1201.53	-14.84	1674.94	555.80	3885.26	124.20	3	121.56	509	3	0.31	-0.01
103.99	1193.88	-13.15	1672.93	555.19	3879.20	116.72	3	114.02	479	3	0.31	-0.01
97.30	1176.97	-13.68	1673.93	555.51	3852.06	115.90	2	113.42	480	2	0.29	-0.01
95.41	1154.84	-12.20	1673.84	555.53	3823.40	115.04	2	112.57	481	2	0.28	-0.01
85.77	1166.27	-18.78	1673.20	555.08	3820.37	107.76	2	105.90	451	2	0.24	-0.01
110.53	1132.76	-3.57	1672.30	555.33	3816.92	143.55	4	139.58	601	4	0.41	0.00
115.21	1120.67	-0.61	1671.44	555.15	3807.89	157.53	5	152.85	662	5	0.47	0.00
161.69	1073.73	24.63	1667.90	554.88	3815.24	136.31	7	129.74	571	7	0.56	0.02
254.31	999.81	72.72	1660.68	554.21	3852.31	137.64	12	126.08	570	12	0.89	0.05
376.67	980.47	129.46	1653.81	553.96	3998.24	135.33	17	118.39	535	17	1.25	0.08
525.63	936.78	200.95	1645.56	553.78	4152.96	140.57	24	116.24	530	24	1.74	0.12
736.84	886.18	301.13	1633.95	553.51	4385.73	173.19	41	132.63	609	41	2.84	0.21
990.48	858.29	418.15	1620.66	553.29	4704.75	185.79	55	130.74	597	55	3.82	0.30

Enviro Ironwood 2.0, Model Numbers: **IW20SF-1, IW20CF-1, IW20SI-1**

Seasoning Data (Catalyst Equipped)

Performed by: Ken Davis, Sherwood Industries

Total Hours	53

R&D 17			
Date			12/03//2025
Catalyst Equipped (Y/N)			Y
Fuel Moisture % as tested			20
Fuel weight lbs as tested			15
1-hour temps as tested			
Time (hr)	Stack ˚F	Catalyst Exit ˚F	Other˚F
0	114.6	189.7	NA
1	528.6	889.7	NA
2	442.6	1101.8	NA
3	204.5	755.7	NA
4	203.2	730.6	NA
5	297.1	1099.9	NA
6	245.2	943.5	NA
7	186.0	747.1	NA
8	175.1	709.5	NA
Total			8

R&D 16			
Date			12/02/2025
Catalyst Equipped (Y/N)			Y
Fuel Moisture % as tested			19.5
Fuel weight lbs as tested			14.6
1-hour temps as tested			
Time (hr)	Stack ˚F	Catalyst Exit ˚F	Other˚F
0	157.4	240.2	NA
1	512.4	835.3	NA
2	370.4	1282.4	NA
3	308.3	943.7	NA
4	336.9	1135.1	NA
5	296.8	953.8	NA
6	255.1	834.0	NA
7	237.3	762.2	NA
8	220.1	665.6	NA
Total			8

R&D 15			
Date			12/01/2025
Catalyst Equipped (Y/N)			Y
Fuel Moisture % as tested			21.2
Fuel weight lbs as tested			14.7
1-hour temps as tested			
Time (hr)	Stack ˚F	Catalyst Exit ˚F	Other˚F
0	157.4	240.2	NA
1	512.4	835.3	NA
2	370.4	1282.4	NA
3	308.4	943.7	NA
4	336.9	1135.1	NA
5	296.8	953.8	NA
6			NA
7			NA
8			NA
Total			5

R&D 14			
Date			11/28/2025
Catalyst Equipped (Y/N)			Y
Fuel Moisture % as tested			20.8
Fuel weight lbs as tested			13.6
1-hour temps as tested			
Time (hr)	Stack ˚F	Catalyst Exit ˚F	Other˚F
0	328.0	298.0	NA
1	496.4	846.6	NA
2	297.4	981.0	NA
3	227.3	738.4	NA
4	307.5	794.6	NA
5	306.9	1006.8	NA
6	235.9	766.2	NA
7	228.2	745.9	NA
8			NA
Total			7

R&D 13			
Date			11/27/2025
Catalyst Equipped (Y/N)			Y
Fuel Moisture % as tested			21.9
Fuel weight lbs as tested			13.9
1-hour temps as tested			
Time (hr)	Stack ˚F	Catalyst Exit ˚F	Other˚F
0	192.9	338.9	NA
1	326.4	754.0	NA
2	548.4	852.0	NA
3	300.9	877.3	NA
4	302.1	894.0	NA
5	269.5	967.1	NA
6	231.6	803.6	NA
7	206.0	702.0	NA
8	180.6	611.4	NA
Total			8

R&D 12			
Date			11/26/2025
Catalyst Equipped (Y/N)			Y
Fuel Moisture % as tested			19.9
Fuel weight lbs as tested			13.8
1-hour temps as tested			
Time (hr)	Stack ˚F	Catalyst Exit ˚F	Other˚F
0	132.3	244.5	NA
1	343.8	679.0	NA
2	425.2	725.8	NA
3	573.4	805.3	NA
4	242.7	822.0	NA
5	672.1	1016.3	NA
6	475.9	773.0	NA
7	346.6	589.7	NA
8	214.6	363.0	NA
Total			8

R&D 11			
Date			11/25/2025
Catalyst Equipped (Y/N)			Y
Fuel Moisture % as tested			20.6
Fuel weight lbs as tested			16.2
1-hour temps as tested			
Time (hr)	Stack ˚F	Catalyst Exit ˚F	Other˚F
0	279.0	387.9	NA
1	282.1	437.1	NA
2	572.7	929.0	NA
3	554.5	990.1	NA
4	319.7	1107.1	NA
5	280.8	774.2	NA
6	333.3	884.1	NA
7	331.0	1090.6	NA
8	276.3	928.0	NA
9	230.8	772.2	NA
Total			9

Operating Instructions: Ironwood 2.0-1

December 20, 2025
Mr. John Steinert
PFS TECO Laboratories.
11785 SE Highway 212 – Suite 305
Clackamas, OR 97015

RE: Operating Instructions for the Ironwood 2.0-1 FS Woodstove

John: The operating Instructions for the Ironwood 2.0-1 FS are as follows:

Primary Air Control (PAC):

To open the primary air inlet orifice and increase the amount of air entering the stove, push the end of the handle underneath the ash lip to the right. To close the primary air inlet orifice and decrease the amount of air entering the stove, pull the end of the handle underneath the ash lip to the right.

Burn Category	Primary Air Control (PAC)
Low:	Set control at the stop. At the stop, the primary air inlet orifice should be set to a height of 7/32". Be certain to verify this.
Medium Low:	Set PAC between 7/32" (stop) to 3/8" open.
Medium High:	Set PAC between 3/8" open to 3/4" open.
High:	Wide Open. Pull the handle all the way to the right. (Maximum stop)
Fan Confirmation:	Set PAC between 7/32" (stop) to 3/8" open.

Door:

As soon as the fuel is loaded, leave the door open 1 – 2" until fuel is ignited. Monitor and adjust the door so that the impact of the air flow is maximized, i.e. watch the hot coals in the coal bed and adjust the door so that they become as bright as possible. Close the door as soon as the fuel load ignites. If the flames falter or go out, open the door again until the fuel reignites.

Bypass Damper:

Before opening the door, open the catalyst bypass damper full open (rotate clockwise). When the catalyst temperature indicator is in the active range (above 500˚F) and after closing the door, close the catalyst bypass damper (rotate counterclockwise). Ensure in each condition the catalyst bypass damper is in the locked position. If the indicator drops below the active range (above 500˚F), adjust the bypass damper as necessary to reengage the catalyst.

Operating Instructions: Ironwood 2.0-1

<u>Convection Air Fan:</u>

Operate the convection fan as follows:

Low: Turn the fan on Low within 20 minutes.

Medium Low, Medium High: Turn the fan on Medium within 20 minutes.

High: Turn the fan on high at the beginning of the test.

Fan Confirmation: Fan is <u>off</u> for the duration of the test.

Ken Davis | Product Designer | Sherwood Industries Ltd.

6782 Oldfield Road | Victoria, B.C. V8M 2A3, Canada

Ph 250 652 6080 Ext.288 | Fax 250 652 0567

ken@enviro.com | enviro.com

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
RESEARCH TRIANGLE PARK, NC 27711

OFFICE OF
AIR QUALITY PLANNING
AND STANDARDS

Mr. Ken Morgan
Technical Services Director
OMNI-Test Laboratories, INC
Post Office Box 301367
Portland, Oregon, 97294

01/21/2025

Dear Mr. Morgan,

This letter is a modification of my original response letter dated December 13, 2024. This modification is made to include approval to use this alternative 40 CFR part 60, Subpart QQQQ - Standards of Performance for New Residential Hydronic Heaters and Forced-Air Furnaces (Subpart QQQQ). The approval to also use this alternative on central heaters under Subpart QQQQ should have been included in the original response letter. These letters are written in response to your emails and letter dated November 20, 2023, requesting that the Environmental Protection Agency approve for use an alternative test method (ATM) for demonstrating compliance with New Source Performance Standard (NSPS) Subpart AAA, Standards of Performance for New Residential Wood Heaters (Subpart AAA). Specifically, the filter weighing procedures as outlined in ASTM E2515-11 to determine compliance for wood heaters under 40 CFR Part 60. The Office of Air Quality Planning and Standards, as the delegated authority, must make the determination on any major alternatives to test methods and procedures required under 40 CFR parts 59, 60, 61, 63, and 65. Your proposed alternative test method and our approval decisions are discussed below.

Your letter outlines concerns with the gravimetric analysis of the pair of filters used to capture particulate during each compliance test. Specifically, you state that the method suggests that weighing filters and filter assemblies in pairs will reduce measurement error, but that the method provides direction inconsistent with achieving error reduction.

As detailed in your letter ASTM E2515-11 section 9.4.4 states:

> *"9.4.4 Desiccate the filters, filter gaskets, and the probe assemblies at 20 +/- 5.6°C (68 +/- 10°F) and ambient pressure for at least 24 h. Weigh each component at intervals of not less than 6 h until a constant weight is achieved. Record results to the nearest 0.1 mg. During each weighing, the period for which the components are exposed to the laboratory environment shall be less than 2 min. The filter gaskets can be weighed in sets to be used in each filter holder and kept in an identified container at all times except during sampling and weighing. The filter holder assembly after the front filter need not*

be desiccated or weighed."

As shown above, section 9.4.4 states that "…the filter gaskets may be weighed in pairs", however it does not say that you may do so for the filter tares.

In contrast, section 10.2.1 of ASTM E2515-11 states:

> *"10.2.1 Desiccate the filters and filter gaskets at 20 +/- 5.6°C (68 +/-10°F) and ambient pressure for at least 24 h. Weigh each component at intervals of at least 6 h until a constant weight is achieved. Report the results to the nearest 0.1 mg. Filters and filter gaskets may be weighed directly without a Petri dish. They may be weighed in pairs (front and back filters and front and back filter gaskets from same filter train) to reduce handling and weighing errors. During each weighing, the components shall not be exposed to the laboratory atmosphere for longer than 2 min. For the room air background sample filter and filter gasket, treat negative particulate catch weights as "zero" when determining total room air particulate weight in accordance with 10.2."*

Additionally, you point out that section 10.2.1 allows, during post-test analysis, the filters to be weighed in pairs. You also assert that not only does this section state that filters may be weighed in pairs, but it also expresses that it is advantageous to do in order to reduce handling and weighing errors.

Furthermore, during our recent discussions of this issue, you pointed out that since ASTM E2515-11 does not specify that filters may be weighed in pairs during pre-test processing, doing so would likely lead to concerns regarding whether proper procedures were being followed. Also,in response to our inquiry of whether ASTM E2515-11 could be followed as written, where one would weigh both filters independently during pre-test processing (clause 9.4.4) and in pairs during post-test processing (section 10.2.1), you point out that this defeats the intent of section 10.2.1 in that more measurements are being performed than necessary and this goes against the stated intent of reducing handling and weighing errors.

It is your opinion, given the language in ASTM E2515-11 discussed above, that the authors originally intended that both filter gaskets and filters should be weighed in pairs during both pre-test and post-test procedures in order to reduce such errors (as evidenced by the language in section 10.2.1). Based on this, you are asking for consideration and approval of an alternative test method that would allow pre-test processing (taring) of filters in pairs as is currently allowed for filter gaskets in section 9.4.4. As you state, you seek this alternative because the errors imposed by the extra weighing of independent filters can account for a very high degree of error on today's cleaner stoves where a ±0.1 mg of measured catch can mean ± 0.2 grams of emissions under ordinary conditions. In light of these circumstances, we agree that appropriate paired weighings must be done during both pre and post test weighings.

We have reviewed your request to perform the pre-test processing (taring) of filters in pairs as is currently allowed for filter gaskets in section 9.4.4 when conducting testing testing of wood heaters under Subpart AAA. Because of the similarities in the requirements, we are also approving this alternative for use on central heaters under Subpart QQQQ. This approval is contingent on the following conditions:

- All of the pieces of the filter and filter assemblies that are tared together during pre-test assessment must also be weighed together when the post-test gravimetric assessment is made and the results of these assessments must be recorded to the nearest 0.1 mg. Please note that this alternative method approval is valid until such time that Subpart AAA and QQQQ are revised or replaced to require a different certification method, and at such time, this alternative will be reconsidered and possibly withdrawn. A copy of this letter must be included in each certification test report where this alternative test method is utilized.

Since this alternative test method may be of interest to others performing testing as described in ASTM2515-11 on wood heaters subject to 40 CFR 60, Subpart AAA or central heaters subject to Subpart QQQQ, we believe it is reasonable to make it broadly applicable. Therefore, we will post this letter as ALT-154 on the EPA website at *https://www.epa.gov/emc/broadly-applicable-approved-alternative-test-methods* for use by other interested parties.

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

Sincerely,

Steffan M. Johnson, Group Leader
Measurement Technology Group

cc: Shannon Banner, EPA/OAQPS/SPPD
Lessard, Patrick, EPA/OAQPS/SPPD
Rafael Sanchez, EPA/OECA
Robert Scinta, EPA/OECA
Michael Toney, EPA/OAQPS/AQAD
Mark Turner, EPA/OAQPS/SPPD
Richard Wayland, EPA/OAQPS/AQAD

Appendix B

Labels and Manuals

Tested & Listed By

Intertek

Certified for use in Canada & USA /
Certifié pour installation au Canada et aux Etats-Unis.

DO NOT REMOVE THIS LABEL / NE PAS ENLEVER CETTE ÉTIQUETTE
LISTED SOLID FUEL SPACE HEATER / IDENTIFIE COMME UN FOYER A COMBUSTIBLE SOLIDE

Serial No. / No. De Serié:

Model Number/ Modèle Nombre:
Report/Rapport no.

☐ IW20SF-1 ☐ IW20CF-1 ☐ IW20SI-1

Model Enviro Ironwood 2.0 Freestanding units: Room Heater, Solid Fuel Type, Also For Use In Mobile Homes. Tested to ULC-S627-23, ULC-S628-22(FPI only),UL-1390-24(FPI only) & UL-1482-11.

Install and use only in accordance with the manufacturers installation and operating instructions. Contact local building or fire officials about restrictions and installation inspection in your area. Use 6" (150 mm) diameter minimum 24 MSG black or 25 MSG blued steel connector listed factory-built chimney suitable for use with solid fuels or masonry chimney. See local building code and manufacturer's instructions for precautions required for passing a chimney through a combustible wall or ceiling. Do not pass chimney connector through a combustible wall or ceiling. Minimum clearances from horizontal connector and ceiling 18" (455 mm). Do not connect this unit to a chimney flue servicing another appliance.

Modèles Enviro Ironwood 2.0items indépendants: Chauffage pièce, le type de combustible solide, également pour une utilisation dans les maisons mobiles. Testé selon ULC-S627-23, ULC-S628-22(FPI seulement), UL-1390-24(FPI seulement),& UL-1482-11.

Ce dispositif doit entre installé et opéré conformément aux instructions d'installation et d'opération du manufacturier contactez le service local de l'inspection des bâtiments ou l'officier pompier concernant les restrictions et l'inspection d'installation dans votre localité. Utiliser des connecteurs répertoriés 24 MSG noir ou 25 MSG en acier bronzée de 6" (150 mm) minimum, et une cheminée de fabrication industrielle, appropriée pour utilisation avec des combustibles solides ou avec une cheminée de maçonnerie. Vérifiez les précautions a prendre exigées parle code local et les instructions du manufacturier concernant les conditions pour passer la cheminée a travers un mur ou un plafond combustible. Net pas installer le connecteur de la cheminée a travers un mur ou un plafond combustible. Espaces libres minimum d'un connecteur horizontal et plafond sont 18" (455 mm) ne pas connecter ce dispositif a un conduit de cheminée qui sert déjà un autre dispositif.

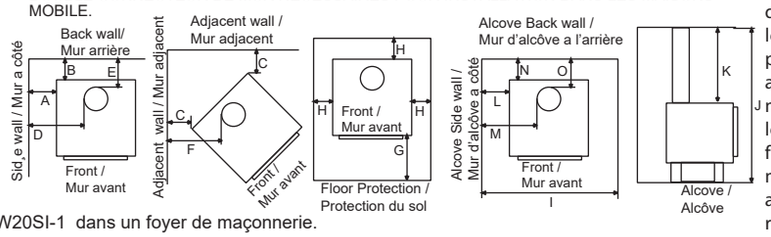
	Minimum Clearances to Combustible Materials / Espaces Libres Aux Materiax Combustibles.	Single wall pipe / Seul connecteur de mur		**Double wall pipe / Double connecteur de mur		Double wall pipe with efficiency shield (Flat top model only) / Double connecteur de mur avec la protection d'efficacité (Le modèle plat seulement		Top vent out back wall with min. 24" (610mm) vertical rise; double wall pipe / Donné vent hors de la paroi arrière avec le min. 24" (610 mm) l'ascension verticale; double connecteur de mur	
	Model Number/ Modèle Nombre	IW20FS-1	IW20CS1	IW20FS-1	IW20CS1	IW20FS-1	IW20CS1	IW20FS-1	IW20CS1
A	Sidewall to unit / De la paroi latérale au dispositif	13" (330 mm)	13" (330 mm)	13" (330 mm)	13" (330 mm)	13" (330 mm)	13" (330 mm)	14" (356 mm)	14" (356 mm)
B	Backwall to unit / De la paroi arrière au dispositif	11" (279 mm)	11" (279 mm)	10" (254 mm)	10" (254 mm)	8" (203 mm)	8" (203 mm)	12" (305 mm)	12" (305 mm)
C	Adjacent wall to corner of unit / De la paroi adjacent au coin de dispositif	9" (229 mm)	9" (229 mm)	8" (203 mm)	8" (203 mm)	6½" (165 mm)	6½" (165 mm)		
D	Sidewall to connector / De la paroi latérale au connecteur	22" (559 mm)	22" (559 mm)	22" (559 mm)	22" (559 mm)	22" (559 mm)	22" (559 mm)	23" (584 mm)	23" (584 mm)
E	Backwall to connector / De la paroi arrière au connecteur	14" (356 mm)	14" (356 mm)	13" (330 mm)	13" (330 mm)	11" (279 mm)	11" (279 mm)	15" (381 mm)	15" (381 mm)
F	Adjacent wall to connector/ De la paroi adjacent au connecteur	17½" (445 mm)	17½" (445 mm)	16½" (419 mm)	16½" (419 mm)	15" (381 mm)	15" (381 mm)		
G	† Front of door opening to edge of hearth / Le devant d'ouverture de porte au bord de coussin de coeur	USA 16" (406 mm) CND 18" (450 mm)							
H	† Side/back of unit to edge of hearth / Le latérale/arrière de dispositif au bord de coussin de coeur	USA 6" (152 mm) CND 8" (200 mm)							

CAUTION: An uninsulated smoke pipe must not pass through an attic, roof space, closet or similar concealed space, or through a floor, ceiling, wall, or partition, or any combustible construction.
† FLOOR PROTECTION: If a stove is installed on a combustible floor, it must have the legs or pedestal attached and be on a NON COMBUSTIBLE hearth pad
* ALL CLEARANCES CAN BE REDUCED WITH SHIELDING ACCEPTABLE TO THE LOCAL AUTHORITY.
SINGLE WALL:
IN CANADA: Any ULC-S629 listed chimney system with the accompanying listed single wall vent connector.
IN U.S.A.: Any UL 103 HT listed chimney system with the accompanying listed single wall vent connector.
**DOUBLE WALL :
IN CANADA: Any ULC-S629 listed chimney system with the accompanying listed double wall vent connector.
IN U.S.A.: Any UL 103 HT listed chimney system with the accompanying listed double wall vent connector.
DOUBLEWALL IS REQUIRED FOR MOBILE HOME INSTALLATIONS.

MISE EN GARDE: Un uninsulated tuyau de fumée ne doit pas passer par un grenier, un espace de toit, le placard ou l'espace dissimulé similaire, ou par un plancher, un plafond, un mur, ou une cloison, ou une construction combustible.
† PROTÉGER LE PLANCHER: Si une cuisinière est installée sur un sol combustible, il doit avoir un piédestal attache et être sur un coussinet non- combustible.
TOUS "ESPACES LIBRES AUX MATERIAX COMBUSTIBLES" PEUVENT ÊTRE RÉDUITS AVEC PROTÉGEANT ACCEPTABLE À L'AUTORITÉ LOCALE.
Seul Connecteur de Mur:
Au Canada: Certifiée seul connecteur de mur avec toute systèmes de cheminée listée sous ULC-S629.
Aux États-Unis: Certifiée seul connecteur de mur avec toute systèmes de cheminée listée sous UL 103 HT.
**Double Connecteur de Mur:
Au Canada: Certifiée double connecteur de mur avec toute systèmes de cheminée listée sous ULC-S629.
Aux États-Unis: Certifiée double connecteur de mur avec toute systèmes de cheminée listée sous UL 103 HT.

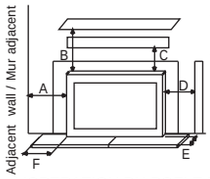
	**Alcove (Use double wall pipe) / Alcôve (Utilisant le double connecteur de mur)	Model/Modèle	IW20SF-1/IW20CF-1
I	Total width / Largeur totale	55" (1397 mm)	55" (1397 mm)
J	Total height / Hauteur totale	78" (1981 mm)	78" (1981 mm)
K	Top of stove to ceiling / Le sommet de poêle au plafond	49" (1245 mm)	49" (1245 mm)
L	Sidewall to unit / De la paroi latérale au dispositif	15" (381 mm)	15" (381 mm)
M	Sidewall to connector / De la paroi latérale au connecteur	24" (610 mm)	24" (610 mm)
N	Backwall to unit / De la paroi arrière au dispositif	12" (305 mm)	12" (305 mm)
O	Backwall to connector / De la paroi arrière au connecteur	15" (381 mm)	15" (381 mm)
P	Maximum Depth / Profondeur maximum	48" (1220 mm)	48" (1220 mm)

DOUBLE CONNECTEUR DE MUR NÉCESSAIRES POUR INSTALLATION DANS LES MAISONS MOBILE.



Models IW20SI-1 inserts may be installed as an insert in a masonry fireplace. / On peut encastrer le modèles IW20SI-1 dans un foyer de maçonnerie.

	Model Number/ Modèle Nombre	IW 20SI-1	
A	To unshielded side wall / aux mur non protegé	10" (254 mm)	
B	To an unshielded 8" (203 mm) mantle / aux manteau 8" non protegé	21" (533 mm)	
C	To top facing (protruding ¾" [19 mm]) clearance / aux revêtement supérieur	17½" (445 mm)	
D	To side facing (protruding ¾" [19 mm]) clearance / aux revêtement a côté	1" (25 mm)	
E	† From door opening of unit to edge of floor protection / De ouverture de la porte de l'unité à bord de la protection de plancher	USA 16" (406mm) / CND 18" (450mm)	
F	† From side of unit to edge of floor protection / Du côté de l'unité au bord de la protection de plancher	USA 6" (152 mm) / CND 8" (200 mm)	



† FLOOR PROTECTION / PROTÉGER LE PLANCHER:
If unit is raised / Si l'appareil est soulevé:
0" - 2" (0mm - 51mm); 1" (25mm) non-combustible material with R = 1.19 or equivalent / 1" (25mm) le matériel incombustible avec la valeur de R = 1.19 ou équivalent.
2" - 8" (51mm - 203mm); ½" (13mm) non-combustible material with R = 1.19 or equivalent / ½" (13mm) le matériel incombustible avec la valeur de R = 1.19 ou équivalent.
Greater than/Plus grand que 8" (203 mm) any non-combustible material / n'importe quel type de matériel incombustible.

OPERATE ONLY WITH DOORS CLOSED. Only open door to feed fire. For use with solid wood fuels only. Do not use any other type of fuel. Do not use grate or elevate-fire build wood fire directly on hearth. Do not overfire. Do not obstruct beneath the heater. If heater or chimney connector glows, you are overfiring. Inspect and clean chimney frequently-under certain conditions of use, creosote buildup may occur rapidly. The provided insulation materials are required for operation. Keep furnishing and other combustibles well away from heater. Replace glass only with 5 mm thick ceramic glass. Optional component for FS: fan, electrical rating 115V, 60 Hz 1 Amp (Part # EFW-261). Combustion air openings are not to be obstructed.
Danger: Risk of electrical shock. Disconnect power before servicing unit. Route cord away from heater.

L'OPERATION DU POELE DOIT SE FAIRE AVEC LA PORTE FERME. N'ouvrir la porte que pour alimenter le feu. N'utilisez que des combustibles solides. Ne pas utiliser un autre type de carburant. N'employez pas de grille de foyer ou ne surélevez pas le feu. Mettez le bois à brûler directement sur l'âtre. Pour éviter la surchauffeur, ne mettez pas trop de bois. N'obstruez pas les ouvertures d'air comburant. Si le poêle ou le connecteur commencent à luire, vous surchauffez le poêle. Inspectez et nettoyez la cheminée souvent. Dans certaines conditions, le créosoté peut s'accumuler rapidement. Les matériaux d'isolation fournis sont requis pour l'opération.Tenez loin les meubles et d'autres produits combustibles. Ne remplacez le verre qu'avec du verre céramique, 5mm épais. Équipement en option pour un FS: ventilateur caractéristiques assignées 115V, 60 Hz, 1 Amp (pièce # EFW-261) tenez le câble électrique loin du poêle. **Danger:** Le risque de choc électrique. Débrancher le dispositif avant d'entretenir. Ouvertures d'air de combustion ne doivent pas être obstrués.

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

MISE EN GARDE: TRÈS CHAUD QUAND ALLUMÉ. NE TOUCHEZ PAS. TENIR LOIS LES ENFANTS, LES VÊTEMENTS ET LES MEUBLES. LE CONTACT PEUT CAUSER DES BRÛLURES. LISEZ ATTENTIVEMENT L'ÉTIQUETTE ET LES INSTRUCTIONS.

MADE IN CANADA / FABRIQUE AU CANADA

MANUFACTURED BY / FABRIQUE PAR: SHERWOOD INDUSTRIES LTD. 6782 OLDFIELD ROAD, SAANICHTON, BC CANADA

Enviro

DATE OF MANUFACTURE / DATE DE FABRICATION:

J F M A M J J A S O N D 2025 2026 2027 2028 2029 C-XXXXX

U.S. ENVIRONMENTAL PROTECTION AGENCY
Certified to comply with 2020 particulate emission standards. 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 heater in a manner inconsistent with the operating instructions in the owner`s manual. This heater meets the 2020 U.S. Environmental Protection Agency's wood emission limits for wood units sold after May 15, 2020 Under specific test conditions the IW20FS-1 heater has been shown to have a particulate emission level of 1.76 g/hr.

ENVIRONMENTAL PROTECTION AGENCY US
conforme aux normes 2015 d'émission de particules. Ce poêle à bois doit inspection et de réparation périodiques pour un fonctionnement correct. Consultez le manuel d'owner`s pour plus d'informations. Il est contre les règlements fédéraux pour faire fonctionner cet appareil de chauffage d'une manière incompatible avec les instructions de fonctionnement dans le manuel d'owner`s. Cet appareil de chauffage répond aux limites d'émission de bois de la US Environmental Protection Agency 2015 pour les unités de bois vendus après le 15 mai 2020 Dans des conditions d'essai conditions de test spécifiques au dispositif de chauffageIW20FS-1 a été montré pour avoir un niveau de 1.76g / h d'émission de particules.

WARRANTY REGISTRATION
enviro.com/warranty

Enviro Ironwood 2.0
IW20SF-1,IW20CF-1,IW20SI-1

WOOD STOVE

OWNER'S MANUAL



PLEASE READ THIS ENTIRE MANUAL BEFORE INSTALLATION AND USE OF THIS WOOD BURNING ROOM HEATER. FAILURE TO FOLLOW THESE INSTRUCTIONS COULD RESULT IN PROPERTY DAMAGE, BODILY HARM, OR EVEN DEATH.

CONTACT YOUR BUILDING OR FIRE OFFICIALS ABOUT RESTRICTIONS AND INSTALLATION INSPECTION REQUIREMENTS IN YOU AREA.

THIS HEATER MEETS THE 2020 U. S. ENVIRONMENTAL PROTECTION AGENCY'S CRIB-WOOD EMISSION LIMITS FOR WOOD HEATERS SOLD AFTER MAY 15, 2020. UNDER SPECIFIC CONDITIONS THIS HEATER HAS BEEN SHOWN TO DELIVER HEAT AT RATES RANGING FROM 11,479 TO 34,196 BTU PER HOUR. THESE STOVES HAVE BEEN CERTIFICATION TESTED TO STANDARDS UL-1482-22 AND ULC-S627-23. CERTIFICATION TESTING COMPLETED BY ITS LABORATORIES.

Fr Version Française: www.enviro.com/fr.html

INSTALLER: LEAVE THIS MANUAL WITH THE WOOD STOVE.

CONSUMER: RETAIN THIS MANUAL FOR FUTURE REFERENCE.

50-2920

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Safety Precautions

PLEASE READ THIS ENTIRE MANUAL BEFORE YOU INSTALL AND USE OF YOUR NEW WOOD STOVE. FAILURE TO FOLLOW INSTRUCTIONS MAY RESULT IN PROPERTY DAMAGE, BODILY INJURY OR EVEN DEATH. BE AWARE THAT LOCAL CODES AND REGULATIONS MAY OVERRIDE SOME ITEMS IN THIS MANUAL. PLEASE CHECK WITH YOUR LOCAL BUILDING OR FIRE AUTHORITY.

- This appliance becomes extremely hot when in use and can cause burns if contacted.
- Young children should be carefully supervised when they are in the same room as the appliance.
- Make sure you have incorporated proper safety measures to protect infants/toddlers from touching hot surfaces.
- Even after the appliance is out, the firebox and glass will remain hot for an extended period of time.
- If this appliance is not properly installed, operated, and maintained a serious house fire could result.
- Installation of appliance must be completed by a certified installer.
- Wear protective gloves and safety glasses during installation, sheet metal edges may be sharp.
- Do not operate without fully assembling all components.
- Do not use any makeshift materials during installation, maintenance, or replacement.
- Any changes or alterations to this appliance are dangerous and prohibited.
- This appliance has been designed to burn dried and seasoned hardwoods.
- Do not use chemical fluids to start or re-fresh the fire.
- Do not burn coal, charcoal, or treated wood as there is danger of carbon monoxide being produced.
- Do not burn garbage or flammable fluids such as gasoline, grease, naphtha or engine oil.
- Never let the stove become hot enough to get any part glowing red.
- Do not operate with door open, door must be tightly closed.
- Do not strike or slam shut the ceramic glass door. If the door glass is broken or a gasket is missing or damaged appliance must be repair by a qualified service technician before resuming use.
- At least 12 square inches (77.4 cm²) of fresh outside air should be admitted into the room or directly to the stove through a 4 inch (10.16 cm) diameter pipe.
- Do not burn wet unseasoned wood, this can causes excessive creosote accumulation. When this is ignited it can cause a chimney fire that may result in a serious house fire.
- Do not use grates, andirons or any other methods to support or raise the fire up off the fire bricks.
- Do not place clothing, furniture, draperies, or any other flammable materials on or near the appliance.
- Objects placed in front of the appliance must be kept at least of 48" away from the front face of the appliance.
- Do not connect appliance to a chimney flue pipe servicing another solid fuel burning appliance.
- Do not install in a mobile home this appliance is not Certified for that application.
- Do not attach to any kind of heat distribution ducting system.
- The chimney must be sound and free of cracks. Clean your chimney a minimum of twice a year and as required.
- Your appliance requires periodic maintenance and cleaning. Failure to maintain your appliance may lead to smoke spillage in your home.
- A chimney connector shall not pass through an attic, roof space, floor, ceiling, closet or similar concealed space.
- Do not store wood within appliance installation clearances or within the space required for refueling and ash removal.
- Ashes must be disposed in a metal container with a tight lid and placed on a non-combustible surface well away from the home or structure until completely cool.
- Ensure proper clearances to combustibles are maintained when building a mantel or shelves above the appliance.

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IMPORTANT: The following must be done to ensure proper operation. Failure to do so will cause extreme overheating and possible personal injury or property damage. If an outside air supply has not been added to this appliance, please ensure that the 4" inch fresh air inlet on the back of the pedestal is removed. Also ensure the ash plug is installed in the firebox.

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

Emissions and Efficiencies

Emissions and Efficiency -

Enviro Ironwood 2.0 ModelNumbers: IW20SF-1, IW20CF-1, IW20SI-1

Rates: **This manual describes the installation and operation of the Enviro Ironwood 2.0 wood heater. U.S. ENVIRONMENTAL PROTECTION AGENCY CERTIFIED TO COMPLY WITH 2020 PARTICULATE EMISSION STANDARDS USING CRIB WOOD." TESTED TO METHOD 28R, E2780-10, E2515-11.**Under specific test conditions this heater has been shown to deliver heat at rates ranging from 11,500-34,000 Btu/hr.

Efficiency: 77.3%

Emissiona: 1.76 g/hr

Stress Lines:

Stress lines located within the firebox at the secondary air channels may result from the repeated expansion and contraction of metal during regular use. These lines, when narrower than the thickness of a coin, do not compromise the safety or efficiency of the unit and as such do not necessitate repair or replacement.

Similarly, stress lines that may appear on the firebox front due to regular use also do not compromise safety or efficiency of the unit, with the possible exception of the door gasket. In the event that these extend beyond the door gasket, they may have a minor effect on the integrity of the seal and will then be covered by the warranty point for repair.

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

WARNING: 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

Operating Instructions

FIRST START

When first installed, the chimney, firebricks, Catalyst and steel are cold and it usually takes several hours on a fairly high burn for them to become hot and dry enough for the stove to function well. We recommend during the unit's first burn that a door and window are opened to vent the smoke and fumes created from the unit's paint curing. The paint will smell a little for the first burn or two as it cures.

DISPOSAL OF ASHES:

If you let the ashes accumulate two or three inches on the floor they tend to burn themselves up.

The fireplace insert models do not have and ash drawer so the ashes will need to be scooped into a metal container with a tightly fitting lid. Place the closed container on a non-combustible floor, well away from combustible materials.

The freestanding models are equipped with a small tap door in the firebox and an ash drawer. Open the trap door located on the floor of the unit. Push the ashes that have accumulated into the hole were the ashes would drop into the ash pan. Ensure that the trap door is closed properly before relighting the unit. When the ash drawer is ready to be emptied lift the front of the drawer up then slowly pull the drawer straight out and close the lid on the ash drawer (see Figure 1); this is to prevent making a mess with the ashes when transporting the ash drawer through the house. When re-installing the ash drawer ensure that the lid is open and line up the rails on the bottom of the ash drawer with the notches in the opening on the pedestal (see Figure 2). Slide the drawer into place, the front of the drawer will drop a bit when it is all the way in.

If the ashes are to be buried in soil or otherwise locally dispersed, keep them in a closed container until all cinders have cooled. Small amounts of cold wood ash can be used in the garden or compost.

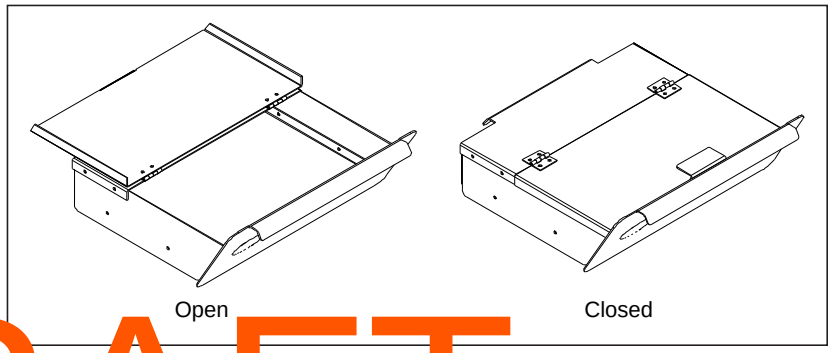


Figure 2: Ash Drawer and Open and Close.

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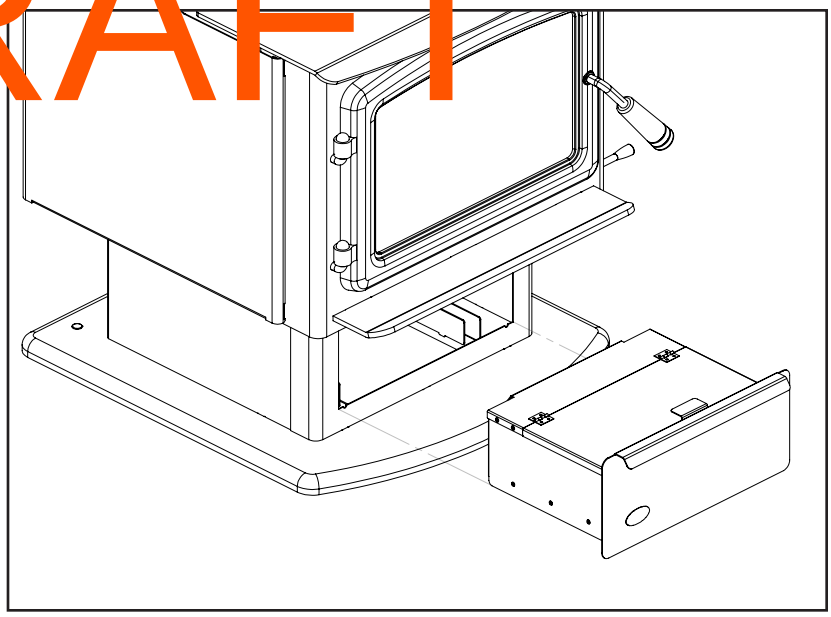


Figure 3: Installing Ash Drawer.

FAN OPERATION:

All models have been approved for operation with the fan supplied by the manufacturer. On medium or high burns, using a fan will increase the heat transfer slightly. Route the power supply cord along the floor behind the stove where it will remain cool.

Operating Instructions

1. Plug the fan assembly into a standard three (3) prong grounded electrical receptacle.
2. Freestanding - turn the rotary fan controller to the desired setting.

Inserts - an auto/off/manual rocker switch allows the fan to be turned on manually, or automatically. When this switch is pushed right toward the unit, it will be set to manual operation; the center position is off, and when pushed left away from the unit, it will be set to automatic.

3. In automatic mode (& for freestanding units), set the rotary switch to the desired setting, once operating temperature is reached, the fan temperature sensor will turn the fan on. When the unit cools down, the fan temperature sensor will shut the fan off automatically.
4. In manual mode (Inserts only) the fan can be turned on and off any time using the rotary switch.

REPLACING THE GLASS:

Never strike or slam the door, hit the glass or let burning wood rest against it. If the glass cracks when the fire is burning, do not open the door until the fire is out and do not operate the stove again until the glass has been replaced. If the glass is damaged in any way, a factory replacement is required (see "Parts List"). To remove the door, open and lift. To replace the glass, remove the steel retaining clips and all loose glass. Replace only with Neoceram 5 mm glass 16.61" (422 mm) x 10.63" (270 mm) and wrap the edges with 0.125" (3.2 mm) x 0.5" (13 mm) self-adhesive fiberglass gasket.

Wear gloves when handling damaged glass door assembly to prevent personal injury. When the glass door assembly is being transported, it must be wrapped in newsprint and tape and/or a strong plastic bag. **The glass must be purchased from an ENVIRO dealer. No substitute materials are allowed.**

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CLEANING THE PLATED SURFACES:

Painted faces should be wiped with a damp cloth periodically. If plated door has been purchased, it should be unpacked carefully to avoid getting anything on the surface of the finish, including cleaners, polish and finger prints. It is important to note that fingerprints and other marks can leave a permanent stain on plated finishes. **To avoid this, give the face a quick wipe with denatured alcohol on a soft cloth BEFORE lighting the fireplace.** Never clean the door when it is hot. Do not use other cleaners as they may leave a residue, which can become permanently etched into the surface.

FIRE EXTINGUISHER AND SMOKE DETECTION:

All homes with a wood burning stove should have at least one fire extinguisher in a central location known to all in the household. Smoke detectors and carbon monoxide detectors should be installed and maintained in the room containing the stove. If it sounds the alarm, correct the cause but do not deactivate. You may choose to relocate the smoke detection devise within the room; DO NOT REMOVE THE SMOKE OR CARBON MONOXIDE DETECTORS FROM THE ROOM.

CREOSOTE - ITS FORMATION AND REMOVAL:

When wood is burned slowly, it may produce tar and other vapors that, combined with moisture, form creosote. These vapors condense in the relatively cooler chimney flue of a slow burning fire and, if ignited, make an extremely hot fire. Therefore, the smoke pipe and chimney should be inspected biweekly during the heating season to determine if a build-up has occurred. If creosote has accumulated it should be removed to reduce the risk of a chimney fire.

MAINTENANCE:

At the end of each heating season clean the chimney and the smoke pipe. If soot has accumulated above the top baffle bricks, remove, clean, and then replace them. If the secondary air tube is badly eroded, replace it. Replace worn door gaskets and broken bricks as needed.

Operating Instructions

FAILURE TO INSPECT AND CLEAN YOUR CHIMNEY SYSTEM REGULARLY CAN RESULT IN A CHIMNEY FIRE, WHICH COULD DAMAGE THE CHIMNEY OR CAUSE A HOUSE FIRE.

CHIMNEY OR RUN AWAY FIRE:

1. Call local fire department (or dial 911)

2. Close the draft fully

3. Examine the flue pipes, chimney, attic, and roof of the house, to see if any part has become hot enough to catch fire. If necessary, spray with fire extinguisher or water from the garden hose.

4. Do not operate the stove again until you are certain the chimney and its lining have not been damaged.

Building Your Fire:

Proper operation of your stove will help to ensure safe, efficient heating. Please take a few moments to review these simple operating procedures.

IMPORTANT: Please be aware when loading your stove that the air tubes in the rear are lower.

1. Fuel Selection:

This stove 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 the following: treated wood, coal, garbage, solvents, colored papers, or trash. Burning these may result in the release of toxic fumes and may poison or render the catalytic ineffective. Burning coal, cardboard, or glossy paper can produce soot, or large flakes of char or fly ash that can coat the combustor, causing smoke spillage into the room and rendering the combustor ineffective.

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2. Building / Maintaining a Fire:

a) Open the primary air slide by pulling it all the way to the right.

b) Place a base of crumpled uncolored newspaper in the bottom of the stove. Lay pieces of kindling on top of the newspaper and light it.

CAUTION: Never use gasoline, gasoline-type lantern fuel, kerosene, charcoal lighter fluid, or similar liquids to start or "freshen up" a fire in this heater. Keep all such liquids well away from heater while it is in use.

c) As the kindling begins to burn, add several larger pieces of wood until the fire is burning well. At this point, regular size logs may be added.

CAUTION: Never allow the fire to rest directly on the glass. Space the logs at least one inch off the glass to allow for proper air flow.

NOTE: Until the fire is burning well, leave the air controls fully open.

d) Regulate the heat output of the stove by adjusting the air controls to allow a larger fire and vice versa. A short period of experimentation with the control settings will allow you to regulate the heat output to keep your home comfortable.

Do not use a grate or elevate the fire. Build wood fire on the stove firebox hearth floor.

3. Refueling the Stove:

Use a long pair of gloves (barbecue gloves) when feeding the fire because these stoves burn at the front. They are clean and efficient but they are also very hot and gloves are useful. Keep a small steel shovel and whisk nearby for moving a log or lifting a fallen ember and for keeping the hearth clean.

Operating Instructions

a) Before attempting to add fuel to the stove, OPEN the damper control fully by pulling it all the way out. This allows the chimney to carry away the additional smoke, which occurs when the door is open.

b) **DO NOT OVERLOAD THE STOVE.** Normally, three or four logs will provide heat for several hours. Never operate this stove where portions glow red hot. Using more than five logs at a time can cause overfiring. Keep logs a few inches from the lowest point of the top of the firebox. If any logs are touching the tubes in the top of the firebox, you can damage the air tubes. Overloading the stove can cause damage to the firebox and air tubes and will void the warranty.

c) **DO NOT OVERFIRE**. If the heater or chimney connector glows, you are overfiring. If the stove top temperatures exceed 550°F, you are overfiring. Overfiring your stove will void the warranty.

d) **WHAT IS OVERFIRING?** Overfiring is when the stove is generating too much heat in the firebox, causing parts within your stove to glow red and warp. To spot overfiring, place a thermometer on the stove top. If the stove top temperatures exceed 550°F, you are overfiring. Another way to spot overfiring is if the heater or chimney connector glows.

e) **CAUTION:** DO NOT PLACE FUEL OR COMBUSTIBLE MATERIAL WITHIN SPACE HEATER INSTALLATION CLEARANCES OR WITHIN THE SPACE REQUIRED FOR CHARGING AND ASH REMOVAL. LOGS SHOULD BE KEPT IN A BIN OR CONTAINER TO REDUCE THE RISK OF LOGS ROLLING INTO THE UNIT'S CLEARANCES.

f) **HOW TO AVOID OVERFIRING:** To avoid overfiring, do not overfill your firebox. Usually a maximum of four logs at a time is sufficient enough to avoid overfiring. Keeping stove top temperatures under 550°F will also prevent overfiring.

g) **KEEP THE ASH LIP CLEAR OF EMBERS AND ASH.** If the door is closed with debris in the way, the door gasket seal could be compromised.

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4. For Maximum Efficiency:

When the stove is hot, load it fully to the top of the door opening and burn at medium low settings. When the fuel is mostly consumed, leaving a bed of red coals, repeat the process. Maximum heat for minimum fuel occurs when the stove top temperature is between 250°F (120°C) and 550°F (290°C). The most likely causes of dirty glass are: not enough fuel to get the stove thoroughly hot, burning green or wet wood, closing the draft until there is insufficient air for complete combustion, or a weak chimney draw. Indeed, the cleanness of the glass is a good indicator of the stove operating efficiently.

Helpful Hints Worth Repeating

1. Helpful advice on the correct way to start your fire.

a) You will need small pieces of dry wood, called kindling, and paper. Use only newspaper or paper that has not been coated or had other materials glued or applied to it. Never use coated (typically advertising flyers) or coloured paper.

b) Always open the door of the wood stove slowly to prevent suction and drawing smoke into the room.

c) Crumple several pieces of paper and place them in the center of the firebox and directly onto the firebricks of the wood stove. Never use a grate to elevate the fire.

d) Place small pieces of dry wood (kindling) over the paper in a "teepee" manner. This allows for good air circulation, which is critical for good combustion.

e) Light the crumpled paper in 2 or 3 locations. Note: It is important to heat the air in the stovepipe for draft to start.

f) Fully open the air controls of the wood stove and close the door until it is slightly open, allowing for much needed air to be introduced into the firebox. Never leave the door fully open, as sparks from the kindling may fly out of the stove, causing damage or injury. As the fire begins to burn the kindling,

some additional kindling may be needed to sustain the fire. DO NOT add more paper after the fire has started.

g) Once the kindling has started to burn, add some smaller pieces of seasoned, dry firewood. Note: Adding large pieces at the early stages will only serve to smother the fire. Continue adding small pieces of seasoned dry firewood, keeping the door slightly open until each piece starts to ignite. Remember to always open the door slowly between placing wood into the fire.

h) Once the wood has started to ignite and the smoke has reduced, close the wood stove door fully. The reduction of smoke is a good indication that the draft in the chimney has started and good combustion is now possible. Larger pieces of seasoned, dry firewood can now be added when there is sufficient space in the firebox. Adjust the air control setting to desired setting. Note: The lower the air control setting, the longer the burn time of your firewood.

2. What type of wood is best to use as firewood?

Both hardwood and softwood burn well in this stove. Both woods contain about 8,000 BTU/lb (18,570 KJ/Kg), but hardwood is generally more dense, will weigh more per cord, and burns a little slower and longer. Cutting firewood so that it will fit horizontally, front to back, makes it easier loading and less likely for the fuel to roll on the glass. Except for a cold start, there is no need to crisis-cross the logs. Ideal length for the logs used in the 1200 would be about 16" (381 mm) but it can burn pieces up to 18" long. Ideal length for the logs used in the 1700 would be about 18" (381 mm) but it can burn pieces up to 20" long logs. Burn only dry, seasoned wood. It produces more heat and less soot or creosote. Freshly cut wood has about 50% moisture. A 10 pound (4.5 Kg) log contains 5 pounds (2.3 Kg) of water. To season firewood, split and stack it so that air can get to all parts of the wood. Burn beach wood only if its salt content has been washed away in a season of rain and then the wood dried. To prevent smoke spillage when refueling, open the door slowly.

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3. What does dry, seasoned wood mean?

Wood that has been dried for a period of one year in a well-ventilated and sheltered area would be considered dry, seasoned wood. Wood from slow-growing trees is generally considered better than wood from fast-growing trees. To season firewood, split and stack it so that air can get to all parts of the wood.

4. Will following the above-listed steps for starting a fire mean perfect results every time?

The quick answer is 'most of the time'. There are many variables that may affect your success when starting a fire. Most of those variables and how to deal with them will be learned through experience. Your ability to start a good fire will significantly increase with time and patience. Some of the reasons for poor stove performance will be covered in the next section of these instructions.

5. Why can't I get the fire lit?

Damp or wet wood and poor drafts are the main reasons for poor results in starting a fire. Always use dry, seasoned wood for your fire. Even wood dried for two years will be difficult to ignite if it has become wet.

6. Is it normal for soot to cover the glass at the beginning of a fire?

Your stove has been built with an air-wash system that will help keep the glass clear when the firebox has reached a good operating temperature and has a good draft. Normally a hot stove will keep the glass clean, but if you must clean the glass, use a soft cloth with no abrasive and clean only when cold. Cold firebox temperature and poor draft cause sooting of the glass. Once the firebox temperature and the draft increase, the soot will burn off. **Do not use abrasive cleaners on glass.**

7. What is draft?

Draft is the ability of the chimney to exhaust or draw smoke produced during the normal combustion process. Too much draft may cause excessive temperatures in the appliance and may damage the appliance. Inadequate draft may cause backpuffing or "plugging" of the chimney. There is a certain

amount of draft that is required to allow for your stove to function at its' highest efficiency. A water column gauge can be used to reference this amount.

8. What can cause a poor draft?

The most common factors for poor draft are:

a) Air supply
b) Environmental conditions
c) Cold chimney temperature
d) Poor chimney installation and maintenance
e) Atmospheric pressure

a) Air supply – Inside the home, normal household appliances such as clothes dryers and forced-air furnaces compete for air, resulting in air starvation to the fire. This creates a condition in the house known as negative pressure. When a house experiences negative pressure, the combustion gases can be drawn from the chimney and into the house. This condition is commonly referred to as down-drafting. Increased amounts of insulation, vinyl windows, extra caulking in various places and door seals can all keep heat in but may also make a home too airtight. An easy way to stop negative pressure in a home is to crack a window in the room containing the stove.

b) Environmental Conditions - High trees, low-lying house location such as in a valley, tall buildings or structures surrounding your house and windy conditions can cause poor draft or down-drafting.

c) Cold Chimney Temperature - Avoid cold chimney temperatures by burning a hot fire for the first fifteen to forty minutes, being careful not to over-fire the stove. If any part of the chimney or parts of the stove start to glow, you are over-firing the stove. Where possible, install a temperature gauge on the chimney so temperature drops can be seen.

d) Chimney Installation and Maintenance - Avoid using too many elbows or long horizontal runs. Too short a chimney can cause difficult start-up, dirty glass, back smoking when door is open, and even reduced heat output. Too tall a chimney may prompt excessive draft, which can result in very short burn times and excessive heat output. If in doubt, contact a chimney expert and/or chimney manufacturer for help. Clean chimney, rain caps and especially the spark arrestor regularly, to prevent creosote build-up, which will significantly reduce chimney draw and possibly a chimney fire.

Note: These instructions are intended as an aid and do not supercede any local, provincial or state requirements. Check with officials or authorities having jurisdiction in your area.

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Operating Instructions

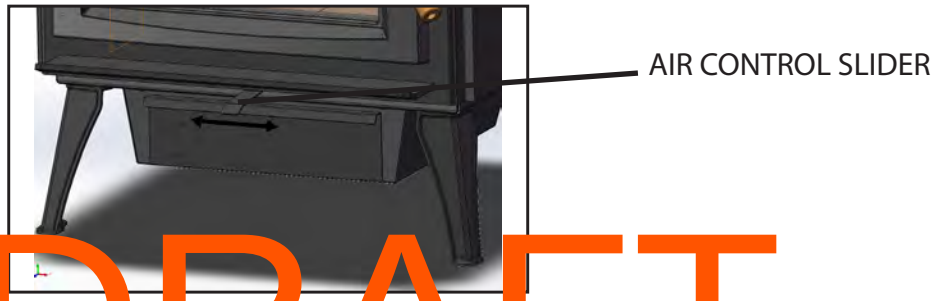
Air Control:

The air wash and pilot air (control the amount of air to the fire) are controlled by the slider located on the front of the unit under the ashlip. To increase your air, pull the slider to the right, and to decrease, push the slider to the left. All the units have a secondary air that flows through the tubes at the top of the firebox, just below the baffles.

Pull this control all the way out when first starting the stove. Once the fire has been established you may adjust this control to set the burn rate of the fire. If this damper is closed at first start-up, the fire will burn very slowly and could soot the appliance.

When shutting down the stove, fully open the air control. This allows the chimney temperatures to remain as high as possible for as long as possible. Cold chimney temperatures create creosote. If all of these steps are followed, there should be no visible emissions.

Figure 4: Air Control Slider.



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How It Works:

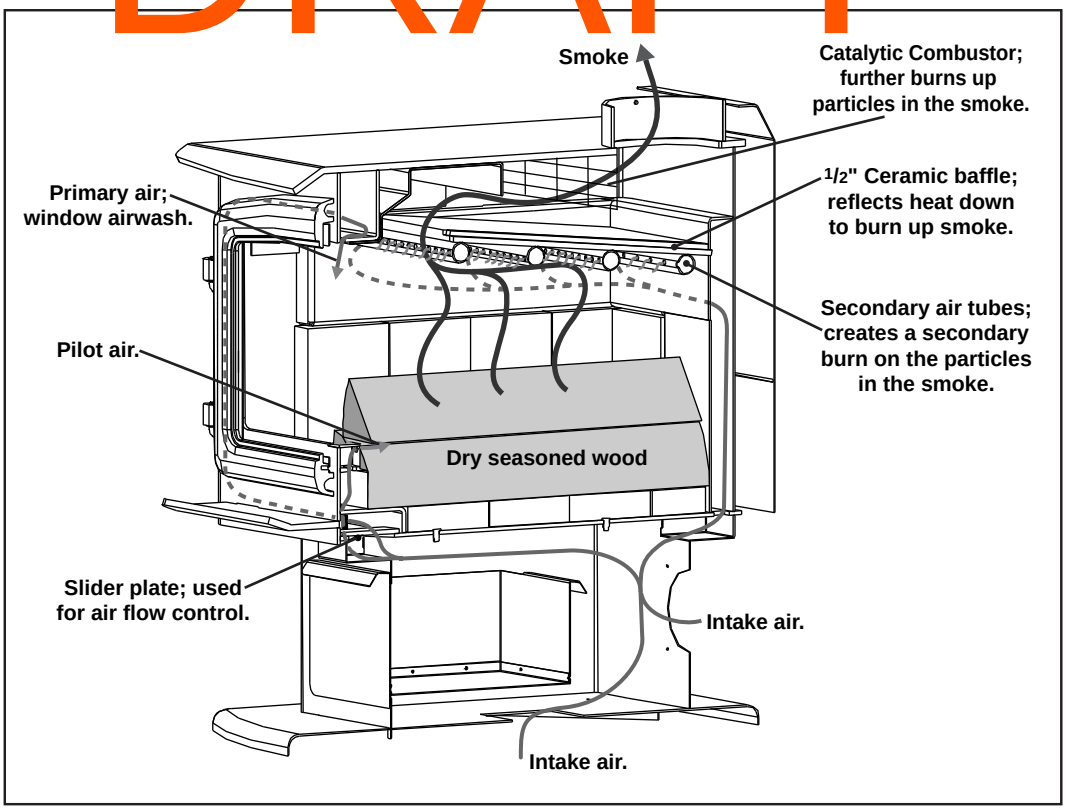


Figure 5: Air Flow Path.

Operating Instructions

Catalytic Combustor: Replacement Catalyst can be purchased through Condor Catalyst or an authorized Enviro dealer Part#: C-17430

Achieving and Maintaining Catalyst Light-Off:

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

Catalyst Monitoring:

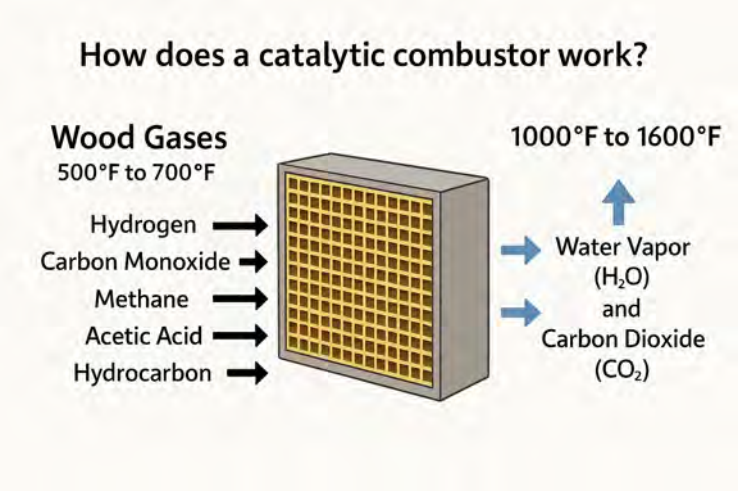
It is important to periodically monitor the operation of the catalytic combustor to ensure that it is functioning properly and to determine when it needs to be replaced. A non-functioning combustor will result in a loss of heating efficiency, and an increase in creosote and emissions. Following is a list of items that should be checked on a periodic basis.

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• Combustors should be visually inspected at least three times during the heating season to determine if physical degradation has occurred. Actual removal of the combustor is not recommended unless more detailed inspection is warranted because of decreased performance.

• A good combustor is designed to withstand approximately 12,000 hours of continuous use. This will translate into five to ten years of use, depending on the length of your heating season and how often you use your stove. Proper maintenance will increase the combustor's effectiveness and prevent many problems. Inspect your combustor before each heating season, and during the season if your stove's performance seems to change.

How it Works:



Catalyst Troubleshooting:

Normal Catalyst Condition



Creosote Plugged



Cause	Solution
Burning materials that produce excessive char and fly-ash	Do not burn materials such as garbage, gift wrap, or cardboard.
Burning wet, pitchy woods or burning large loads of small diameter wood	Burn dry, seasoned wood.
Combustor not functioning. If proper burning procedures have been followed to no avail, the combustor may not be functioning.	Inspect and replace the combustor with a new combustor from the manufacturer.

Catalyst Troubleshooting:

Masked - Fly Ash/ Soot



Cause	Solution
Accumulation of fly-ash: (The catalyst is coated with a layer of fly-ash or soot which prevents catalytic activity)	Brush cooled combustor with a soft-bristled brush or vacuum lightly at least once per burning season.

Cracking, Thermal/ Mechanical

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Cause	Solution
Mishandling, abuse, impact during cleaning or assembly	Handle with care, follow instructions when cleaning.
Normal Operation	If cracking results in large pieces tofall out, replace the combustor

Operating Instructions

Catalyst Removal:

DO NOT OPERATE WITH INSULATION , CATALYST OR TUBES REMOVED.

Removal:

1. Slide the tube to the right to disengage the left end of the tube from the baffle airbox and remove the tube from the unit. Repeat the first two steps with the second baffle tube.

3. Grasp the front edge of the Insulation Cover Plate and tilt up at the back. Guide the cover plate down and through the door opening.

4. Remove the Combustor heat shield by tilting the bottom up then push towards the back, down and out the door opening.

5. Reach up and remove the Catalyst retainer tabs, then pull the combustor forward, down and out of the dooropening.

6. Reverse these steps to reinstall the combustor, the Insulation Cover Plate and baffle tubes.

Catalyst Bypass Operation:

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DO NOT OPERATE THE WOOD HEATER WITH THE DOOR OPEN AND BYPASS CLOSED. THIS MAY CAUSE SMOKE ROLLOUT INTO THE ROOM.

Your catalytic wood burning appliance is fitted with a bypass door which allows exhaust from the fire to temporarily bypass the catalytic combustor. The bypass door is located inside the dome of the firebox at the top of the appliance. It is a hinged, steel plate door and is controlled by the bypass handle located on the right side of the appliance. When the handle is pointing to the rear of the appliance, the bypass door is open. To close the bypass door you must rotate the handle counter clockwise until it points to the bottom of the appliance. To ensure the bypass door is fully closed, push down on the bypass handle until you hear a positive click.

Catalytic Thermometer:

The catalytic thermometer is located on the right of the appliance. Its sole purpose is measure the exhaust gasses after they have passed through the combustor to indicate whether the combustor is ACTIVE or INACTIVE. It is important to ensure that the appliance is operated in the ACTIVE zone. When the thermometer reads INACTIVE it means that the combustor temperature is below 500F and is not producing a clean burn.



BYPASS CLOSED



BYPASS OPEN

Specifications

Enviro Ironwood 2.0 Specifications:

Table 1: Enviro Ironwood 2.0 General Information.

Model	Ironwood 2.0	
	Flat Top	Step Top
Width x Depth	25″ x 22 7/16″ (635 mm x 570 mm)	
Height with pedestal or legs	28 ¼″ (718mm)	31 ¼″ (794 mm)
Height of body	18 ¼″ (464 mm)	21 ¼″ (540 mm)
Fire box size (depth x width x height)	16.1″ x 18.25″ x 11.15″ (409 mm x 464 mm x 283 mm)	
Capacity	1.85 feet^3 (0.0526 meter^3)	
* Approximate heating a ea	220 feet^2 (205 eter^2)	
**E.P.A. output rating	1,479 t 34 196 BTU/hour (3,361 to 10,013 watt)	
*Duration on low burn	6 -10 hours	
Weight with packaging	335 lb (151.95 Kg)	375 lb (170.10 Kg)
E.P.A. Emissions	1.77grams/hour (0.51 g/min)	
Standard (width x height)		
Oversized (width x height)		
Rating Label Location	Back of Unit	

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Specifications

Clearances To Combustibles - Enviro Ironwood 2.0 Freestanding:

MAINTAIN THESE MINIMUM CLEARANCES TO UNSHIELDED COMBUSTIBLES*

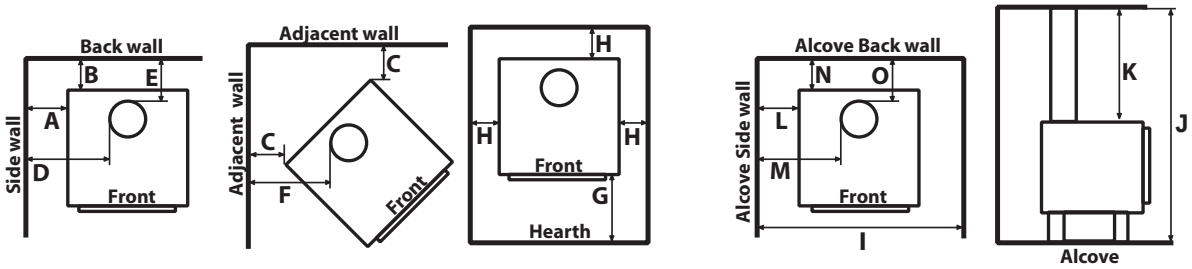


Table 3: Enviro Ironwood 2.0 Freestanding Clearance to Combustibles.

		Single Wall Pipe	Double Wall Pipe**	Double Wall Pipe with Heat Efficiency Shield 50-1088 (Flat top model only)	Top vent out back wall with min. 24" (610 mm) vertical rise; double wall
A	From side wall to side of unit	13" (330 mm)	13" (330 mm)	13" (330 mm)	14" (356 mm)
B	From rear wall to back of unit	11" (279 mm)	10" (254 mm)	8" (203 mm)	12" (305 mm)
C	From adjacent wall to corner of unit	9" (229 mm)	8" (203 mm)	6½" (165 mm)	
D	From side wall to collar	22" (559 mm)	22" (559 mm)	21½" (546 mm)	23" (584 mm)
E	From rear wall to collar	14" (356 mm)	13" (330 mm)	11" (279 mm)	15" (381 mm)
F	From adjacent wall to collar	17½" (445 mm)	16½" (419 mm)	15" (368 mm)	
G	† From door opening to edge of hearth pad	USA 16" (406 mm) CND 18" (450 mm)	USA 16" (406 mm) CND 18" (450 mm)	USA 16" (406 mm) CND 18" (450 mm)	USA 16" (406 mm) CND 18" (450 mm)
H	† From side/back of unit to edge of hearth pad	USA 6" (152 mm) CND 8" (200 mm)	USA 6" (152 mm) CND 8" (200 mm)	USA 6" (152 mm) CND 8" (200 mm)	USA 6" (152 mm) CND 8" (200 mm)
Alcove (48" [1220 mm] Deep)					
I	Total Width		55" (1397 mm)		
J	Total Height		78" (1981 mm)		
K	Top of stove to ceiling		49" (1245 mm)		
L	Side wall to stove		15" (381 mm)		
M	Side wall to pipe		24" (610 mm)		
N	Back wall to unit		12" (305 mm)		
O	Back wall to pipe		15" (381 mm)		

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CAUTION: An uninsulated smoke pipe must not pass through an attic, roof space, closet or similar concealed space, or through a floor, ceiling, wall, or partition, or any combustible construction.

† **FLOOR PROTECTION:** If a stove is installed on a combustible floor, it must have a pedestal or leg kit with ash pan attached and be on a NON-COMBUSTIBLE hearth pad

* ALL CLEARANCES CAN BE REDUCED WITH SHIELDING ACCEPTABLE TO THE LOCAL AUTHORITY.

**DOUBLE WALL:

IN CANADA: Any ULC-S629 listed chimney system with the accompanying listed double wall vent connector.

IN U.S.A.: Any UL 103 HT listed chimney system with the accompanying listed double wall vent connector.

Specifications

Clearances To Combustibles - Enviro Ironwood 2.0 Freestanding:

MAINTAIN THESE MINIMUM CLEARANCES TO UNSHIELDED COMBUSTIBLES*

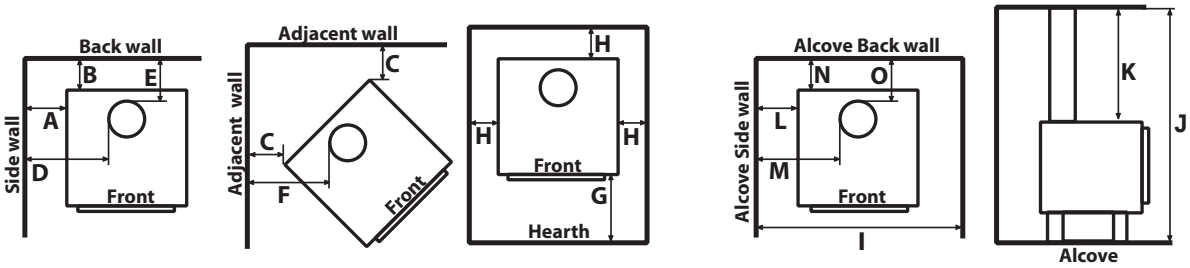


Table 4: Enviro Ironwood 2.0 Freestanding Clearance to Combustibles.

		Single Wall Pipe	Double Wall Pipe**	Double Wall Pipe with Heat Efficiency Shield 50-1088 (Flat top model only)	Top vent out back wall with min. 24" (610 mm) vertical rise; double wall
A	From side wall to side of unit	20" (508 mm)	13" (330 mm)	13" (330 mm)	11" (279 mm)
B	From rear wall to back of unit	12" (305 mm)	10" (254 mm)	7" (178 mm)	13" (330 mm)
C	From adjacent wall to corner of unit	10" (254 mm)	8½" (216 mm)	6" (152 mm)	
D	From side wall to collar	29" (737 mm)	22" (559 mm)	22" (559 mm)	20" (508 mm)
E	From rear wall to collar	25" (581 mm)	13" (330 mm)	10" (254 mm)	16" (406 mm)
F	From adjacent wall to collar	18½" (470 mm)	17" (432 mm)	14½" (368 mm)	
G	† From door opening to edge of hearth pad	USA 16" (406 mm) CND 18" (450 mm)	USA 16" (406 mm) CND 18" (450 mm)	USA 16" (406 mm) CND 18" (450 mm)	USA 16" (406 mm) CND 18" (450 mm)
H	† From side/back of unit to edge of hearth pad	USA 6" (152 mm) CND 8" (200 mm)	USA 6" (152 mm) CND 8" (200 mm)	USA 6" (152 mm) CND 8" (200 mm)	USA 6" (152 mm) CND 8" (200 mm)
Alcove (48" Deep)					
I	Total Width		51" (1295 mm)		
J	Total Height		72" (1829 mm)		
K	Top of stove to ceiling		44" (1118 mm)		
L	Side wall to stove		13" (330 mm)		
M	Side wall to pipe		22" (559 mm)		
N	Back wall to unit		8" (203 mm)		
O	Back wall to pipe		11" (279 mm)		

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CAUTION: An uninsulated smoke pipe must not pass through an attic, roof space, closet or similar concealed space, or through a floor, ceiling, wall, or partition, or any combustible construction.

† **FLOOR PROTECTION:** If a stove is installed on a combustible floor, it must have a pedestal or leg kit with ash pan attached and be on a NON-COMBUSTIBLE hearth pad

* ALL CLEARANCES CAN BE REDUCED WITH SHIELDING ACCEPTABLE TO THE LOCAL AUTHORITY.

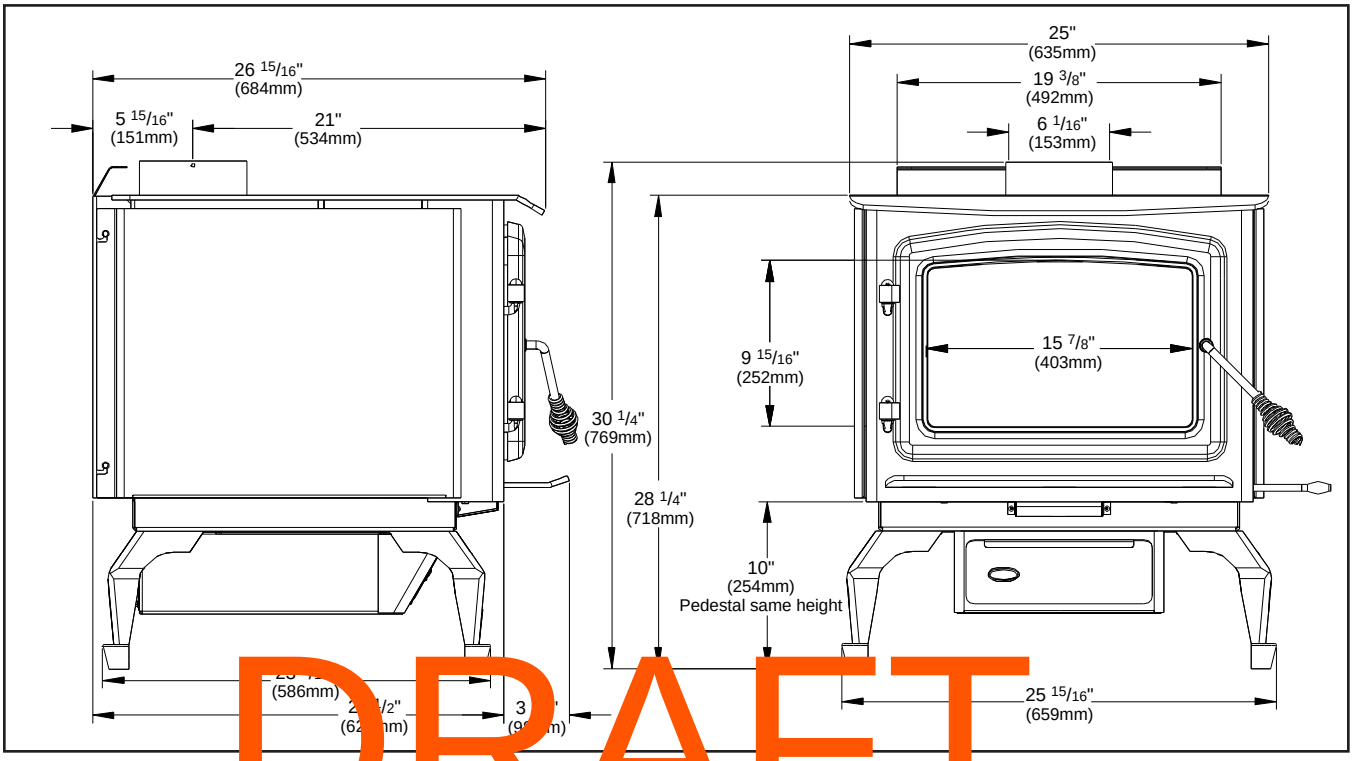
**DOUBLE WALL:

IN CANADA: Any ULC-S629 listed chimney system with the accompanying listed double wall vent connector.

IN U.S.A.: Any UL 103 HT listed chimney system with the accompanying listed double wall vent connector.

Specifications

Dimensions - Enviro Ironwood 2.0 Freestanding:



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Figure 9: Ironwood Freestanding Flat Top Dimensions.

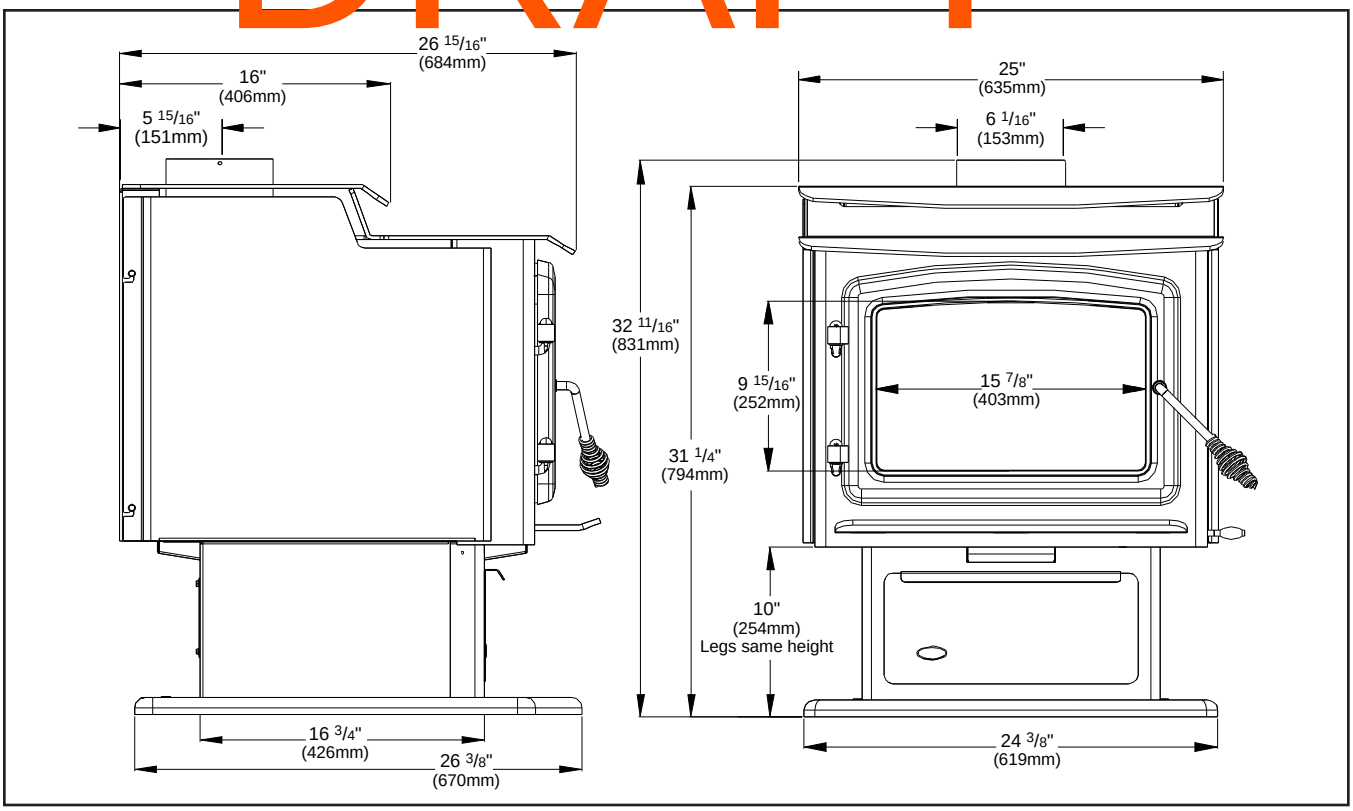
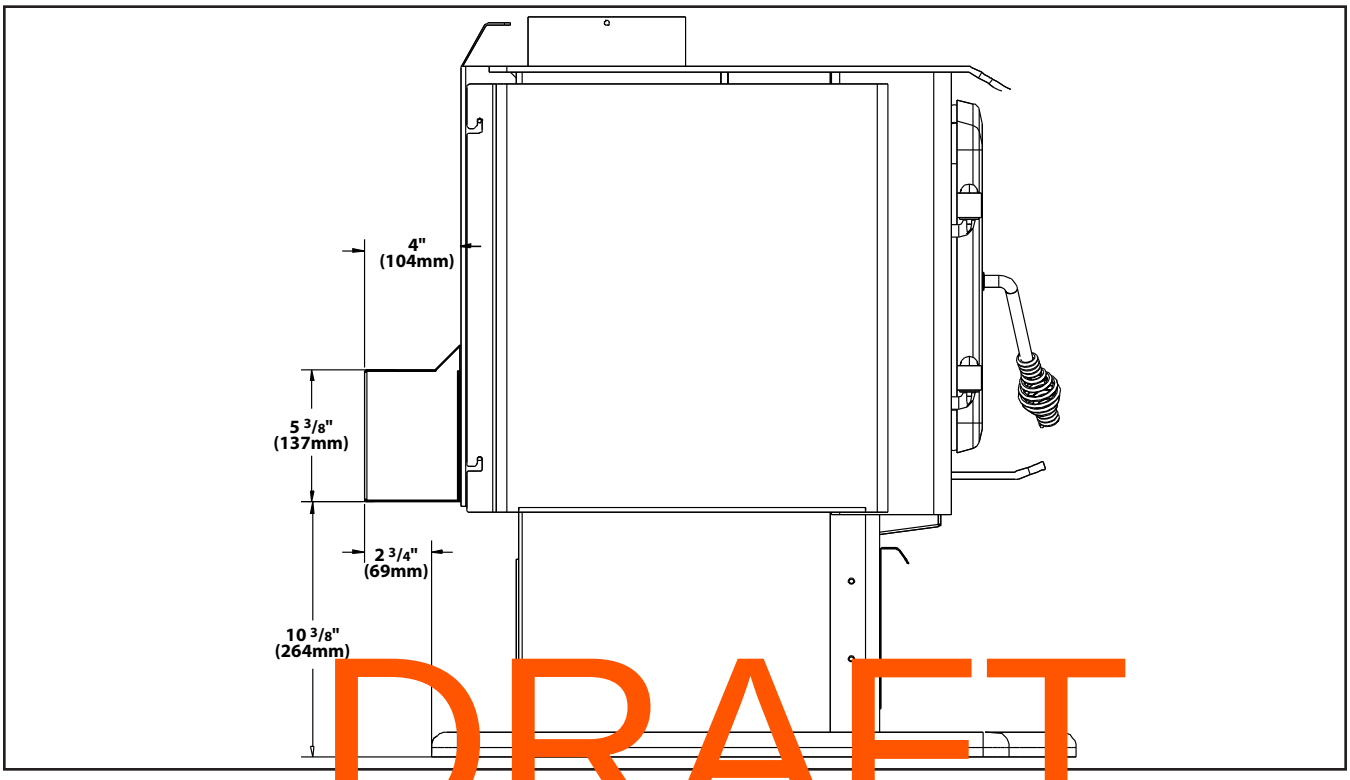


Figure 10: Ironwood Freestanding Step Top Dimensions.

Specifications

Freestanding Side Dimensions For Fan Kit:



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Figure [illegible]: Envi 5 Ironwood 2.0 Freestanding with Fan Kit Dimensions.

Installation

Please read and understand these instructions before installing pedestal or ash pan and leg option. Failure to follow these instructions carefully could cause personal injury or property damage. All screws are pre-installed on the base of the unit.

Removal From Pallet:

- Remove the bricks from the unit before starting.
- Remove the two (2) lag bolts (shown in Figure 1) that secure the unit to the pallet from inside the firebox.

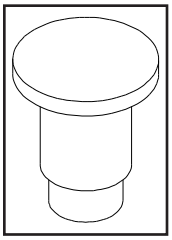


Figure 13: Rivet.

Note: After the pedestal or legs and ash pan have been installed but before the bricks are installed, rivets (Figure 13) must be placed in the two (2) holes (shown in Figure 14) in the firebox that lag bolts came out of. This is done to make unit burn more efficiently.

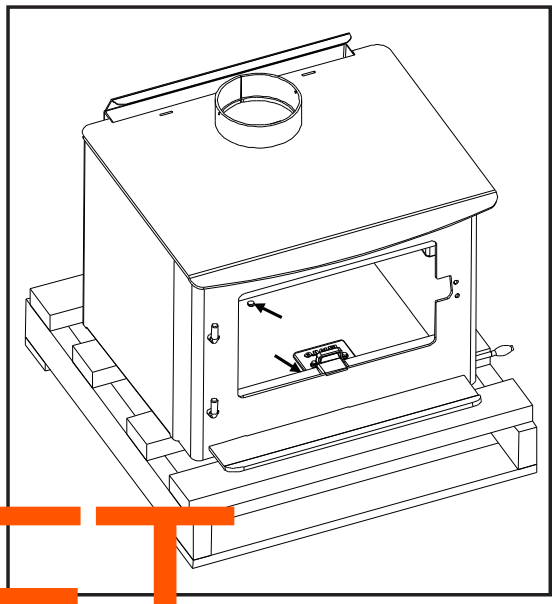


Figure 14: Bolts to remove.

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Pedestal Installation - Freestanding:

- Place the unit on the pallet on its back.
- Remove the front two (2) provided Pedestal bolts, slide the pedestal assembly over the rear bolts located on the base of the unit, and re-install the front bolts through the Pedestal holes.
- Tighten all four (4) bolts ensuring the pedestal is properly aligned to the edges of the unit.
- Stand the unit on the pedestal and set the unit in the location ready for installation.
- If fresh air supply is being supplied from the bottom of the unit please install the cover plate supplied to the rear of the pedestal covering the 4" (10 cm) hole.

Note: In seismically active areas, it is recommend that your unit is secured to the floor by using the bolt down holes at the rear of the pedestal.

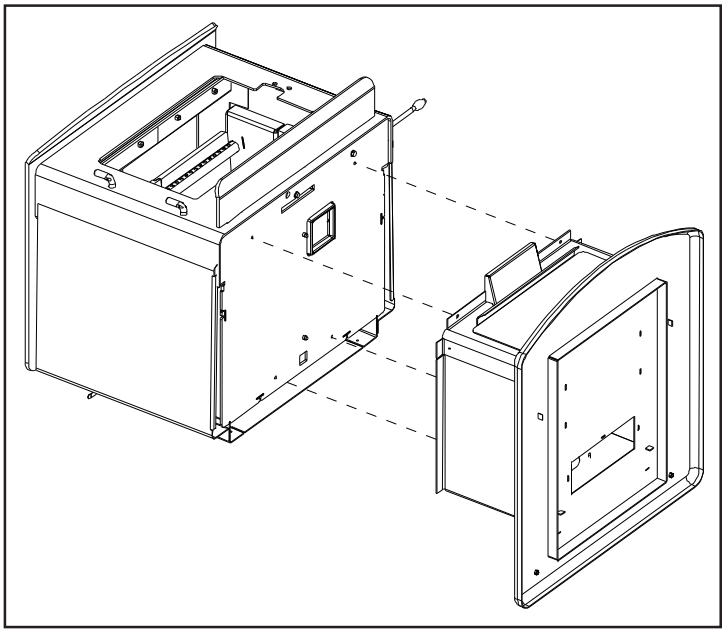


Figure 15: Installing Pedestal.

Legs And Ash Pan Installation - Freestanding:

- Place the unit on the pallet on its back.
- Attach the Leg Adaptor Plate to the bottom of the unit using the supplied screws
-
- Remove the rear two provided Leg Box bolts, slide the Leg Box assembly over the front bolts located on the base of the unit, and reinstall the rear bolts thru the Leg Box holes and tighten all four (4) bolts.
- Carefully remove the cast iron legs from the packaging and secure each leg with two (2) bolts provided.
- Secure all four (4) legs, push the leg towards the center of the stove and align the legs with the outer edges of the firebox.
- Stand the unit on the legs and set the unit in the location ready for installation.

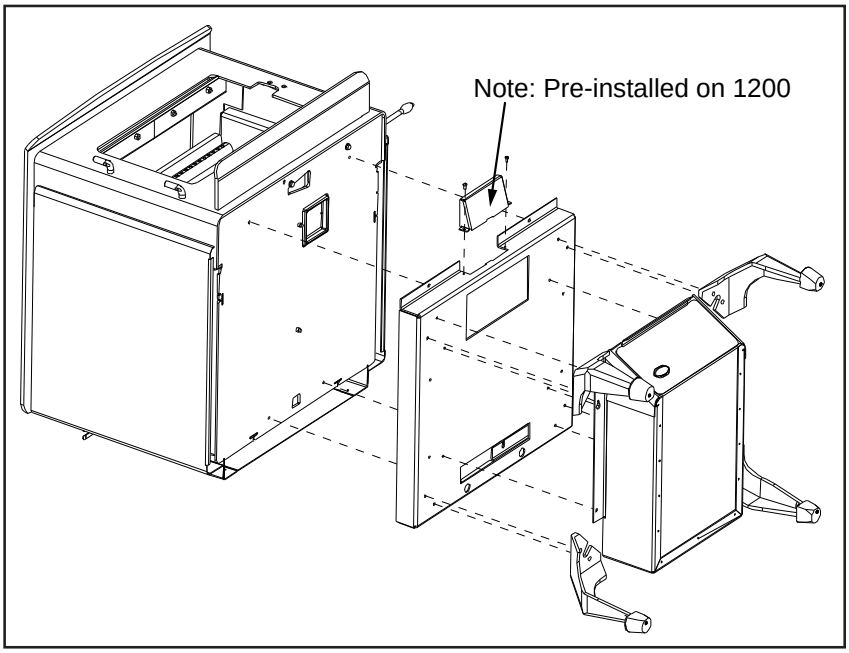


Figure 16: Installing Legs and Ash Pan Assembly.

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Installation Of Heat-Efficiency Shield - Freestanding Flat Top:

The heat-efficiency shield is installed to lower the clearances to combustibles on the flat top freestanding model.

1. The unit must be in position for the installation and with the venting ready to be assembled.
2. Loosen the two (2) top screws on the back of the unit using a 5/16" socket.
3. Place the heat-efficiency shield on top of unit.
4. Slide chimney connector through the heat-efficiency shield and over the flue.
5. Lift the heat-efficiency shield and screw the chimney connector to the flue.
6. Slide the heat-efficiency shield down and hook the slot at the back of the shield, around the loosened screws at the back of the unit.
7. Tighten the two (2) screws at the back.

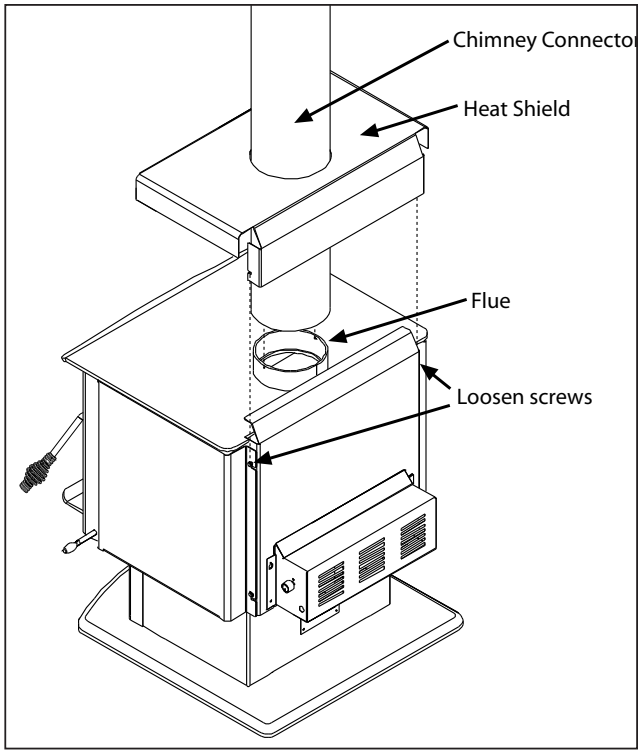


Figure 17: Installing Heat Shield.

Hearth Protection Examples:

Table 5: Examples of Hearth Pad Sizing Using Clearances From Tables 3 &4 (refer to Figures 16 & 17).

	Canada	USA
	IW20 SF-1	IW20 SF-1
(A) Minimum Width	40½" (1028mm)	36½" (926mm)
(B) Minimum Depth	46" (1168mm)	42" (1067mm)
OPTIONAL - Corner removal		
(C) Maximum Front Corners - Adjacent	8¾" (314mm)	6¾" (171mm)
(D) Maximum Back Corners - Adjacent	6¼" (160mm)	5⅛" (130mm)
(E) Maximum Front Corners - Diagonal	12⅜" (314mm)	9½" (242mm)
(F) Maximum Back Corners - Diagonal	8⅞" (227mm)	7¼" (185mm)
(G) Minimum Width remaining without corners - Front	23" (583mm)	23" (583mm)
(H) Minimum Width remaining without corners - Back	27⅛" (707mm)	26⅛" (665mm)

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Table 6: Examples of Parallel Installation Using Clearances From Tables 3 & 4 (refer to Figure 16).

	Model	Country	(I) Far Edge of Hearth Pad to Side Wall - Minimum	(J) Front of Hearth Pad to Back Wall - Minimum
Single Wall Pipe	IW20SF-1	Canada	45½" (1156mm)	49¼" (1252mm)
		USA	43½" (1104mm)	47¼" (1201mm)
Double Wall Pipe	IW20SF-1	Canada	45½" (1156mm)	48¼" (1226mm)
		USA	43½" (1104mm)	46¼" (1175mm)
Double Wall Pipe with Heat Efficiency Shield 50-1088 (Flat top model only)	IW20SF-1	Canada	45½" (1156mm)	46¼" (1175mm)
		USA	43½" (1104mm)	44¼" (1125mm)
Top vent out back wall with min. 24" (610mm) vertical rise; double wall	IW20SF-1	Canada	46½" (1181mm)	50¼" (1277mm)
		USA	44½" (1129mm)	48¼" (1226mm)

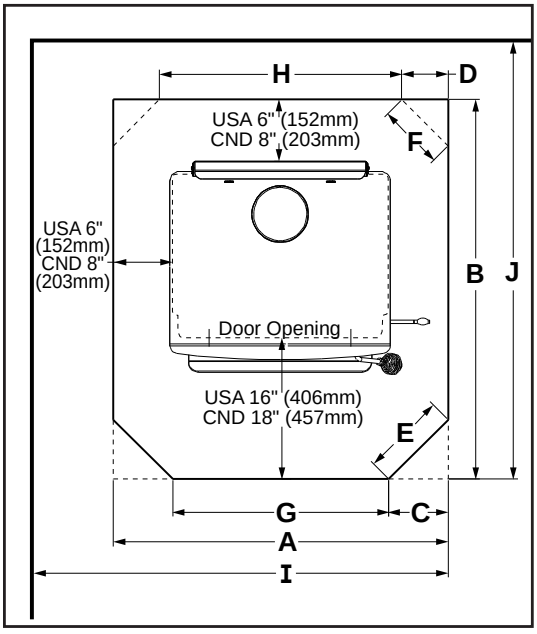


Figure 18: General Parallel Installation (refer to Tables 5 & 6).

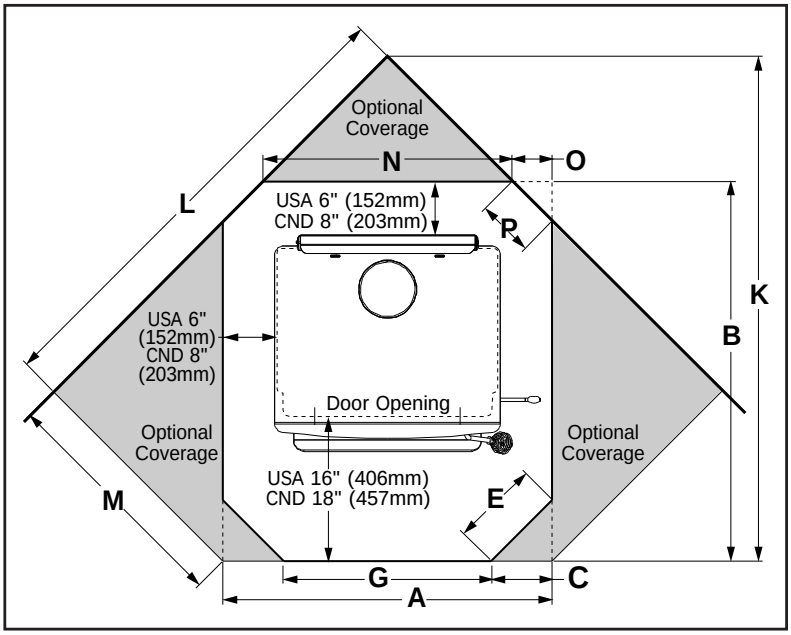


Figure 19: General Corner Installation (refer to Tables 5 & 7).

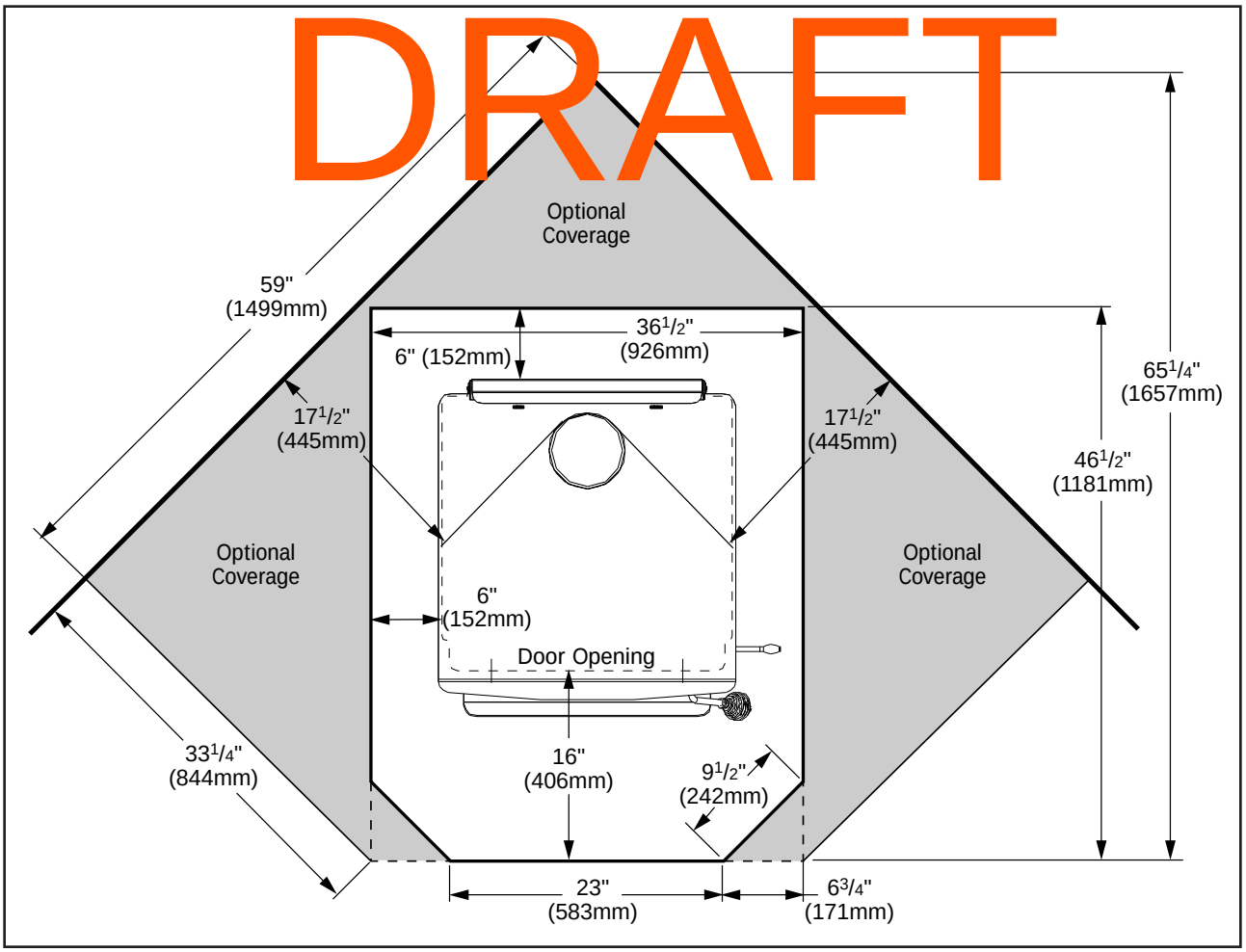


Figure 20: Corner Installation for Enviro Ironwood 2.0 in USA using Single Wall Pipe (refer to Tables 4, 5, & 7).

Table 7: Examples of Corner Installation Using Clearances From Tables 9 &10 (refer to Figures 23 & 24).

			(K) Front of Hearth Pad to Corner	(L) Adjacent Wall	(M) Edge of Hearth Pad to Adjacent Wall	(N) Width at back of Hearth Pad	(O) Back Corner Removed - Adjacent	(P) Back Corner Removed - Diagonal
Single Wall Pipe	IW2.0-1	Canada	61⅜" (1558mm)	57⅝" (1465mm)	29⅛" (738mm)	30⅝" (779mm)	4⅞" (124mm)	7⅛" (182mm)
		USA	59⅜" (1507mm)	54⅞" (1393mm)	(738mm)	34⅝" (881mm)	⅞" (23mm)	1¼" (32mm)
Double Wall Pipe	IW2.0-1	Canada	59⅞" (1522mm)	56⅝" (1439mm)	28⅛" (713mm)	27⅞" (707mm)	6¼" (160mm)	8⅞" (227mm)
		USA	57⅞" (1471mm)	53⅞" (1368mm)	(713mm)	31⅞" (809mm)	2¼" (59mm)	3¼" (83mm)
Double Wall Pipe with Heat Efficiency Shield 50-1088 (Flat top model only)	IW2.0-1	Canada	59⅞" (1522mm)	56⅝" (1439mm)	28⅛" (713mm)	27⅞" (707mm)	6¼" (160mm)	8⅞" (227mm)
		USA	55¾" (1417mm)	52⅜" (1330mm)	(675mm)	27⅝" (701mm)	4⅜" (133mm)	6¼" (160mm)

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Outside Air Kit:

It is mandatory to use outside air for installations in mobile homes.

A 4" (10.2 cm) fresh air adaptor kit is available. This adaptor can be installed either on the back pedestal or through the floor under the pedestal. The cover plate must be installed on the unit if your stove is located in a mobile home or if using outside air from the bottom.

Place the ¼" mesh screen between the fresh air adaptor and the body of the pedestal (as shown to right).

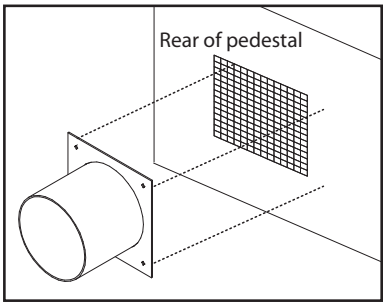


Figure 21: Fresh Air Adaptor onto the Back of the Pedestal.

NOTE: Fresh air connection to the unit must be a non-combustible pipe, example: 4" (10.2 cm) single wall aluminum flex pipe.

NOTE: Remove the cover plate on the rear of the pedestal if room air is to be used for combustion air.

Recommended Heights and Diameters For Flue Pipe:

The minimum flue pipe height at sea level is 12 feet (3.7 m) straight up from top of the unit. For every 1000 feet (305 m) above sea level, 4% could be added to the overall height. Use Tables 8, 9, and 10 to calculate the required vertical rise required.

Table 8: Recommended Height for Flue Pipe.

Elevation above sea level	Minimum recommended flue pipe height for # of elbows (Note: No m… than … offset… 4 elbow… can be u…d. 2x45° … x90
feet	0	2 … 15°	4 x …5°	2 x 30°	… x 30°	2 … 45°	… x 45°
0-1000	12.0	…7	13…	…8	14.7	14…	…
1000-2000	12.5	…2	…8	13.8	15…	14.…	16.6
2000-3000	13.0	13.7	14.4	14.4	15.9	15.1	17.3
3000-4000	13.4	14.2	14.9	14.9	16.5	15.7	17.9
4000-5000	13.9	14.7	15.4	15.4	17.1	16.2	18.6
5000-6000	14.4	15.2	16.0	16.0	17.6	16.8	19.2
6000-7000	14.9	15.7	16.5	16.5	18.2	17.4	19.8
7000-8000	15.4	16.3	17.0	17.0	18.8	17.9	20.5
8000-9000	15.8	16.8	17.6	17.6	19.4	18.5	21.1
9000-10000	16.3	17.3	18.1	18.1	20.0	19.0	21.8
meters	0	2 x 15°	4 x 15°	2 x 30°	4 x 30°	2 x 45°	4 x 45°
0-305	3.7	3.9	4.1	4.1	4.5	4.3	4.9
305-610	3.8	4.0	4.2	4.2	4.6	4.4	5.1
610-915	4.0	4.2	4.4	4.4	4.8	4.6	5.3
915-1220	4.1	4.3	4.6	4.6	5.0	4.8	5.5
1220-1525	4.2	4.5	4.7	4.7	5.2	4.9	5.7
1525-1830	4.4	4.6	4.9	4.9	5.4	5.1	5.9
1830-2135	4.5	4.8	5.0	5.0	5.5	5.3	6.0
2135-2440	4.7	4.9	5.2	5.2	5.7	5.5	6.2
2440-2745	4.8	5.1	5.4	5.4	5.9	5.6	6.4
2745-3050	5.0	5.3	5.5	5.5	6.1	5.8	6.6

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Table 9: Distance to add to overall vertical height.

	Distance to add	
Part …sed	feet	meters
45° e…bow	1.0	0.3
90° e…bow	2.0	0.6
"…	3.0	0.9
1 ft (0.3m) of horizontal run	2.0	0.6

Table 10: Examples of calculating overall vertical height required.

	Height
sea level with 2 x 30° elbows	13.3 ft (4.1 m)
one "T"	3.0 ft (0.9 m)
1½ ft (0.6 m) horizontal run	3.0 ft (0.9 m)
Total 1	19.3 ft (5.9 m)
4000-5000 ft (1220-1525 m) above sea level	13.9 ft (4.2 m)
one "T"	3.0 ft (0.9 m)
2 ft (0.6 m) horizontal run	4.0 ft (1.2 m)
Total 2	20.9 ft (6.3 m)

We recommend the use of a 6" (150mm) diameter flue pipe. However, the CSA-B365, NFPA 211 Chapter 12.4.4-1, and the WETT Training Manual state that the flue pipe may be reduced in cross-sectional area provided that the installer ensures sufficient draft is available at the appliance.

Chimney Installation Through Wall:

Here are four (4) methods of combustible wall chimney connector pass-throughs. Information was provided from NFPA 211.

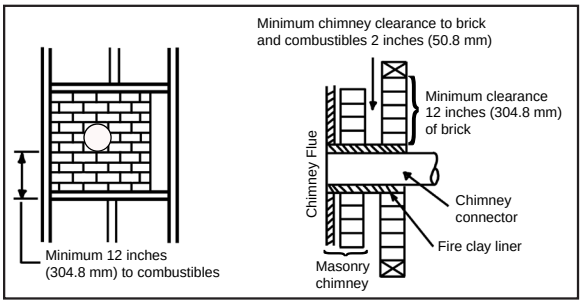


Figure 22: Chimney Through Wall - Method A.

Method A. 12" (304.8 mm) Clearance to Combustible Wall Member: Using a minimum thickness 3.5" (89 mm) brick and a ⅝" (15.9 mm) minimum wall thickness clay liner, construct a wall pass-through. The clay liner must conform to ASTM C315 (Standard Specification for Clay Fire Linings) or its equivalent. Keep a minimum of 12" (305 mm) of brick masonry between the clay liner and wall combustibles. The clay liner shall run from the brick masonry outer surface to the inner surface of the chimney flue liner but not past the inner surface. Firmly grout or cement the clay liner in place to the chimney flue liner.

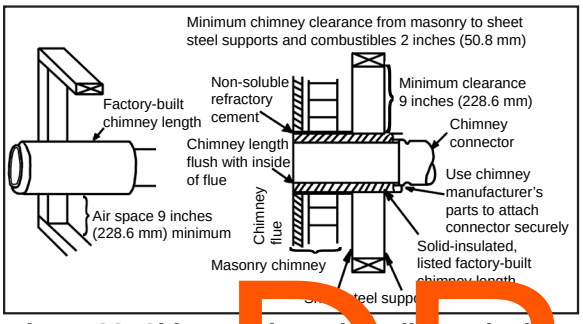


Figure 23: Chimney Through Wall - Method B.

Method B. 9" (229 mm) Clearance to Combustible Wall Member: Using a 6" (152 mm) inside diameter, factory-built Solid-Pak chimney section with insulation of 1" (25.4 mm) or more, build a wall pass-through with a minimum 9" (229 mm) air space between the outer wall of the chimney length and wall combustibles. Use sheet metal supports, fastened securely to wall surfaces on all sides, to maintain the 9" (229 mm) air space. When fastening supports to chimney length, do not penetrate the chimney liner (the inside wall of the Solid-Pak chimney). The inner end of the Solid-Pak chimney section shall be flush with the inside of the masonry chimney flue and sealed with a non-water soluble refr[illegible]ory cem[illegible] also seal to the brick masonry pe[illegible]tion.

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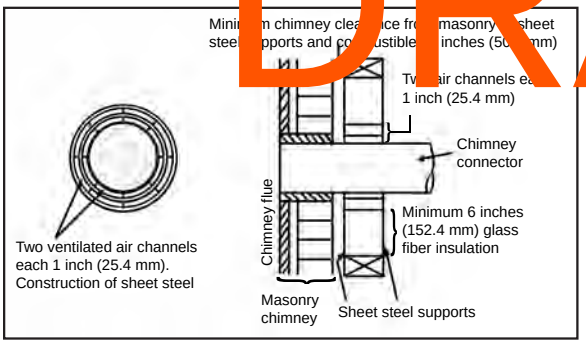


Figure 24: Chimney Through Wall - Method C.

Method C. 6" (152.4 mm) Clearance to Combustible Wall Member: Starting with a minimum 24 gauge (.024" [0.6 mm]) 6" (152.4 mm) metal chimney connector and a minimum 24 gauge ventilated wall thimble which has two air channels of 1" (25.4 mm) each, construct a wall pass-through. There shall be a minimum 6" (152.4 mm) separation area containing fiberglass insulation, from the outer surface of the wall thimble to wall combustibles. Support the wall thimble and cover its opening with a 24 gauge minimum sheet metal support. Maintain the 6" (152.4 mm) space. There should also be a support sized to fit and hold the metal chimney connector. See that the supports are fastened securely to wall surfaces on all sides. Make sure fasteners used to secure the metal chimney connector do not penetrate chimney flue liner.

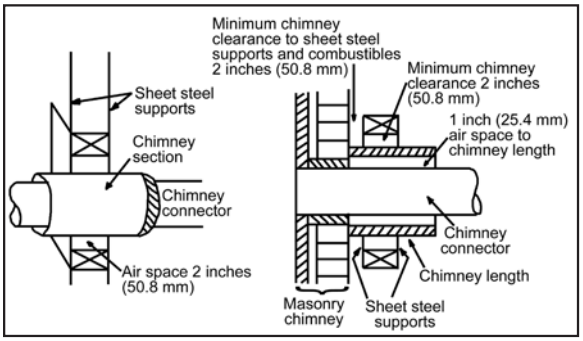


Figure 25: Chimney Through Wall - Method D.

Method D. 2" (50.8 mm) Clearance to Combustible Wall Member: Start with a solid-pak listed factory-built chimney section at least 12" (304 mm) long, with insulation of 1" (25.4 mm) or more, and an inside diameter of 8" (2" [51 mm] larger than the 6" [152.4 mm] chimney connector). Use this as a pass-through for a minimum 24 gauge single-wall steel chimney connector. Keep solid-pak section concentric with and spaced 1" (25.4 mm) off the chimney connector by way of sheet metal support plates at both ends of chimney section. Cover opening, and support chimney section on both sides, with 24 gauge minimum sheet metal supports. See that the supports are fastened securely to wall surfaces on all sides. Make sure fasteners are used to secure chimney flue liner.

NOTES:

1. Connectors to a masonry chimney, excepting method B, shall extend in one continuous section through the wall pass-through system and the chimney wall, to but not past the inner flue liner face.
2. A chimney connector shall not pass through an attic or roof space, closet or similar concealed space, or a floor, or ceiling.

Installation of A Listed, Factory Built Chimney - Freestanding:

This is a generic set of instructions; always follow the chimney manufacturer's instructions explicitly. Also refer to "Recommended Heights For Flue Pipe".

1.Set floor protector and stove in location in accordance with the "Clearances To Combustibles - IW20SF-1 Freestanding"

2.Mark the position for the ceiling hole by suspending a plumb bob from the ceiling over the exact center of your stove flue and mark a spot on the ceiling to indicate the center of the chimney.

3.Move this location, if necessary, to avoid floor joists, ceiling rafters, electrical wiring and plumbing while still maintaining required clearances. If floor joists or ceiling rafters must be cut they must be made structurally sound again. Install chimney according to chimney manufacturers instructions. A chimney connector cannot pass through an attic or roof space, closet or similar concealed space, or floor, ceiling, wall or partition of combustible construction. In Canada, if passage through a wall or partition of combustible construction is desired, the installation shall conform to CAN/CSA-B365 Installation Code for Solid-Fuel Burning Appliances and Equipment and NFPA 211 Standard for Chimneys, Fireplaces, Vents, and Solid Fuel-Burning Appliances.

4.Mark the hole for the outside air kit.

5.Move the stove out of the way.

6.Cut a pilot hole in the ceiling.

7.Cut a hole for the ceiling penetration components and frame in the sides of the hole in both the ceiling and roof. Check, and follow chimney manufacturer's instructions for all of these steps.

8.Install the support box and chimney through the roof. Install the slip section for the chimney connector.

9.Slip the roof flashing over the chimney and secure to the roof, being careful to keep the pipe centered in the opening. To meet the code, the chimney must extend above the roof penetration at least 3 feet (91.4 cm), and in any area within 10 feet (304.8 cm) of the

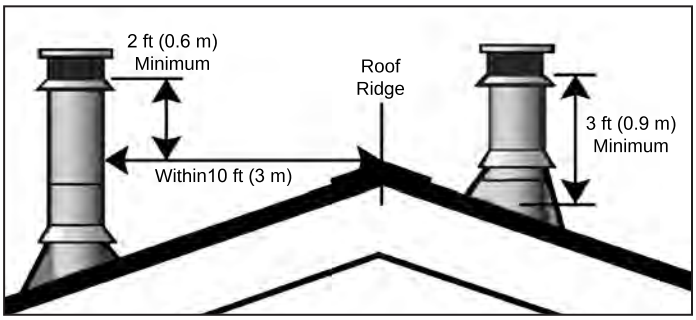


Figure 24: Roof Clearances.

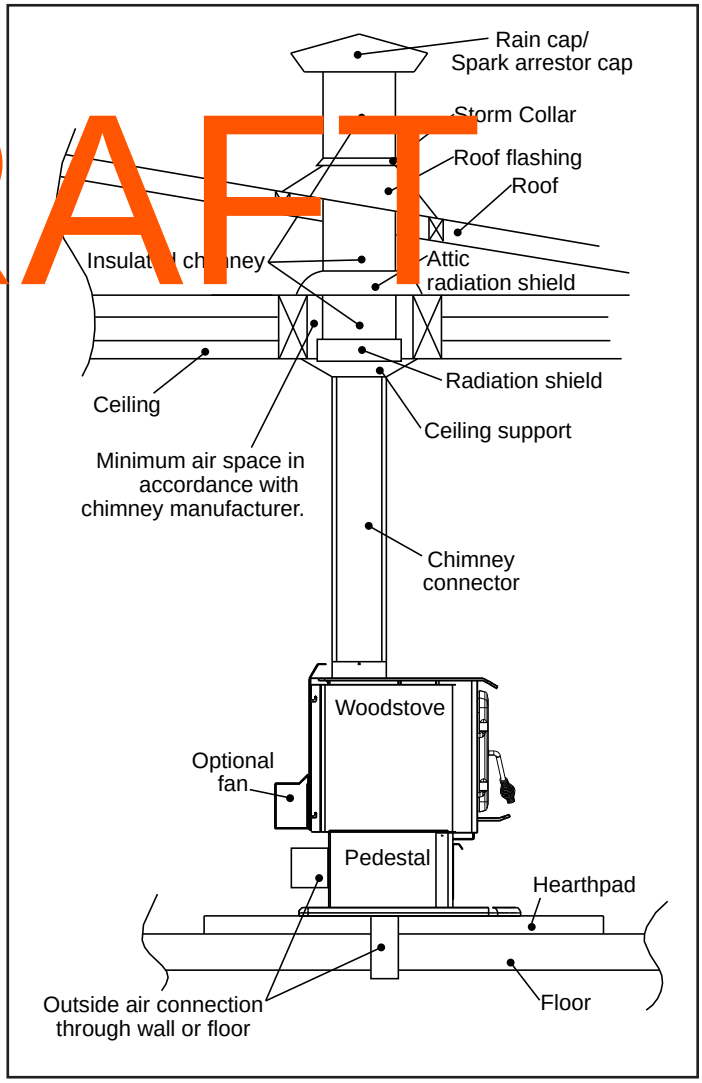


Figure 26: Standard Vertical Installation.

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roof ridge, the chimney must be 2 feet (60.9 cm) above the ridge. Refer to Figure 30.

Note: Increasing the chimney height above the roof may help your unit to draft better. This greater draft can decrease problems such as difficult start-ups, smoke coming out when door is open, and dirty glass. You may initially try the minimum required height and if problems do arise, add additional height later.

10. Slide the roof flashing over your chimney and seal the flashing to the roof with a roofing compound. Secure the roof flashing to your roof with nails or screws.
11. Place the storm collar over the flashing and seal the joints with silicone caulking.
12. Fasten the rain cap / spark arrestor cap to the top of your chimney.
13. Place the stove back into position.
14. Install the chimney connector pipe with the lower (crimped) edge of the pipe inside the flue collar. Any creosote formed will then run back down into the stove. All connections must be tight and secured with three sheet metal screws equally spaced. Double wall pipe is recommended over single wall.
15. Also install an outside air flex pipe to the stove.

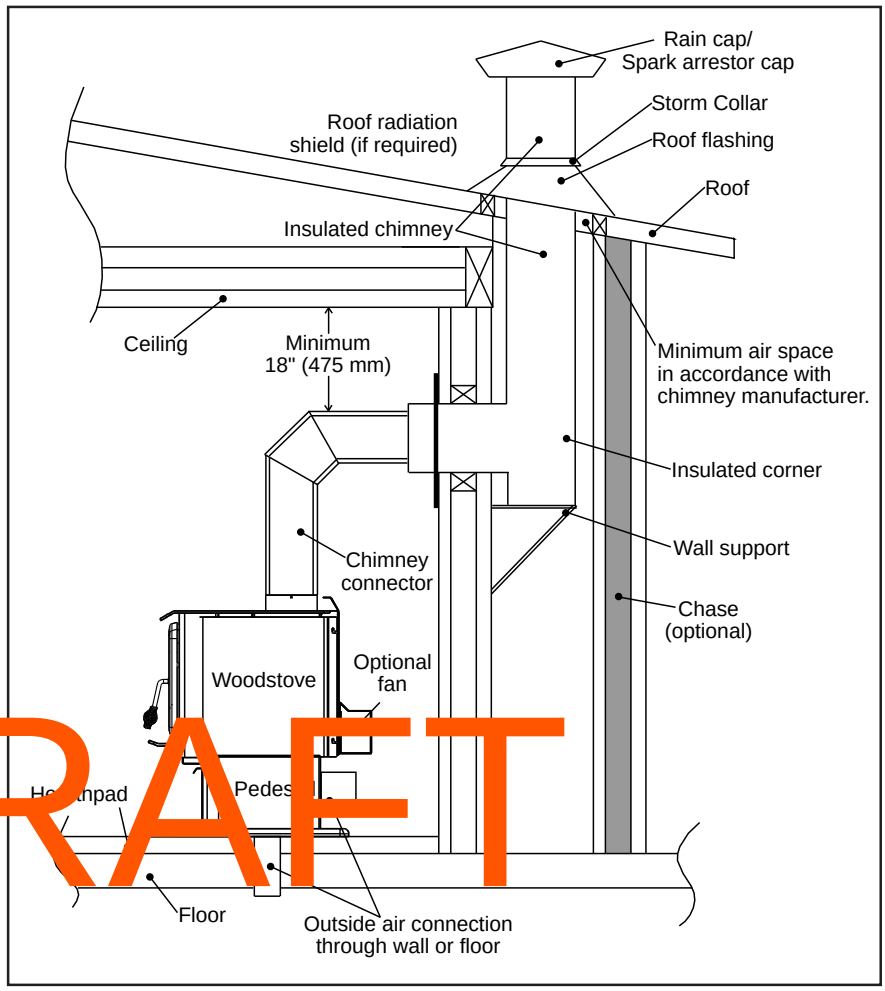


Figure 27: Standard Horizontal Installation.

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IMPORTANT: When a metal prefabricated chimney is used, the manufacturer's installation instructions must be followed. You must also purchase and install the ceiling support package or wall pass-through and "T" section package, firestops (where needed), insulation shield, roof flashing, chimney cap, etc. Maintain proper clearance to the structure as recommended by the manufacturer. The chimney must be the required height above the roof or other obstructions for safety and proper draft operation.

Note: If you are using a horizontal connector (refer to Figure 32), the chimney connector should be as high as possible while still maintaining the 18" (475 mm) minimum distance from the horizontal connector to the ceiling.

Masonry Chimney Installation - Freestanding:

DO NOT CONNECT THIS UNIT TO OR USE IN CONJUNCTION WITH ANY AIR DISTRIBUTION DUCTWORK UNLESS SPECIFICALLY APPROVED FOR SUCH INSTALLATIONS

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

A non-combustible floor protector is required under all freestanding units; refer to "Clearances To Combustibles - Enviro Ironwood 2.0 FS" . When venting into a masonry chimney, the floor protector must be installed directly below the chimney vent and 2" (50.8 mm) on either side of the chimney vent.

Vent the stove into a clean, lined, approved masonry chimney in good condition, conforming to local building codes and meeting the minimum standards of the National Fire Protection Association (NFPA). Make sure there are no cracks, loose mortar or other signs of deterioration and blockage. Have the chimney cleaned before the stove is installed and operated, or vent with a listed 6" (150 mm) factory-built chimney suitable for use with solid fuels and conforming to ULC-S629 Standard for 650°C factory-Built Chimneys in CANADA or UL 103 HT Factory-Built Chimneys for Residential Type and Building Heating Appliances in the U.S.A. Connect the stove to this chimney with a short and straight 6" (150 mm), 24 gauge or heavier, single-wall black or blued steel smoke pipe. Connection to all masonry chimneys must be a metal or masonry thimble cemented in place. All smoke pipes must slope upwards, all connections must be tight and secured with three sheet metal screws equally spaced. The smoke pipe length should not exceed 40% of the chimney height above the stove.

When connecting the stove through a combustible wall to a masonry chimney, additional steps are required. Consult the chimney connector manufacturer and refer to Figure 28

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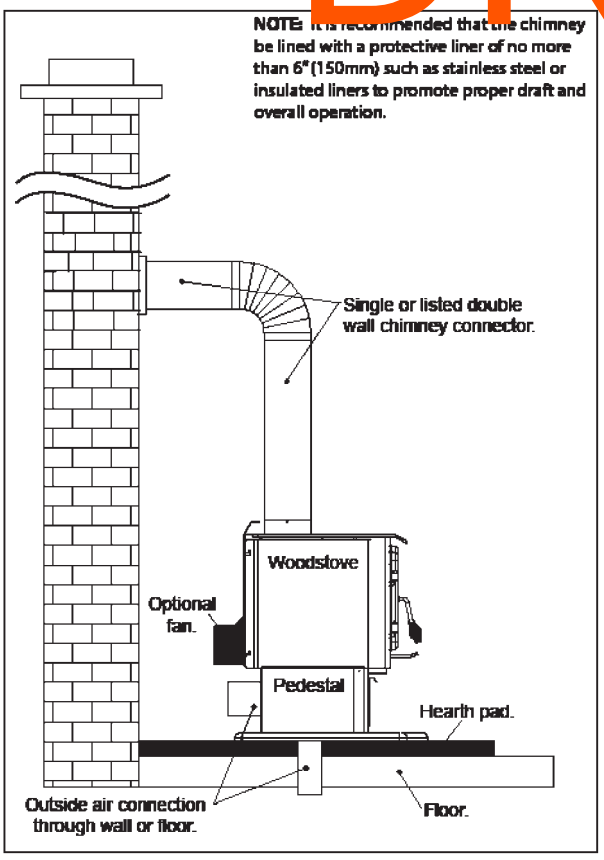


Figure 28: Installation into a masonry chimney.

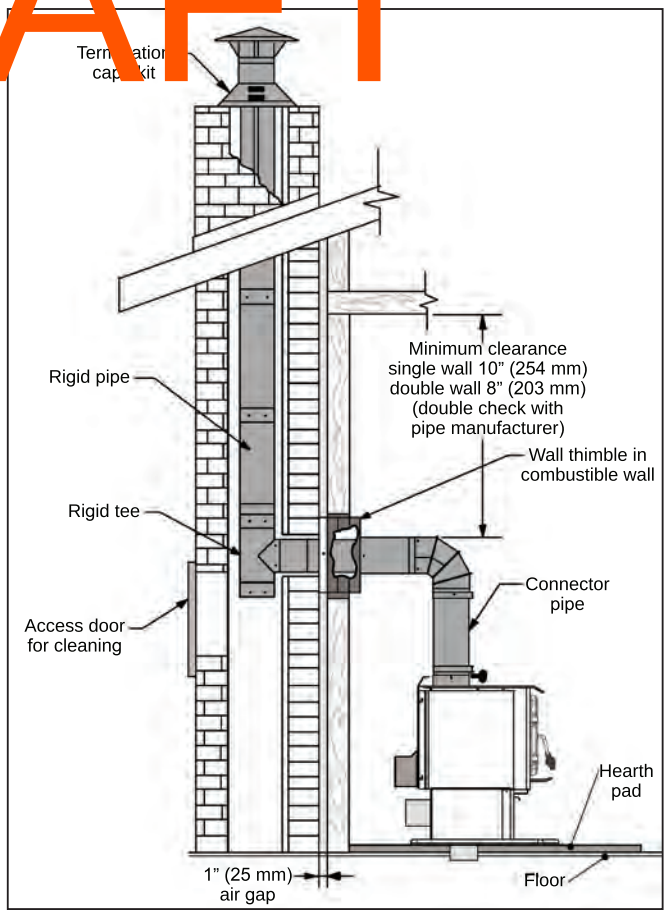
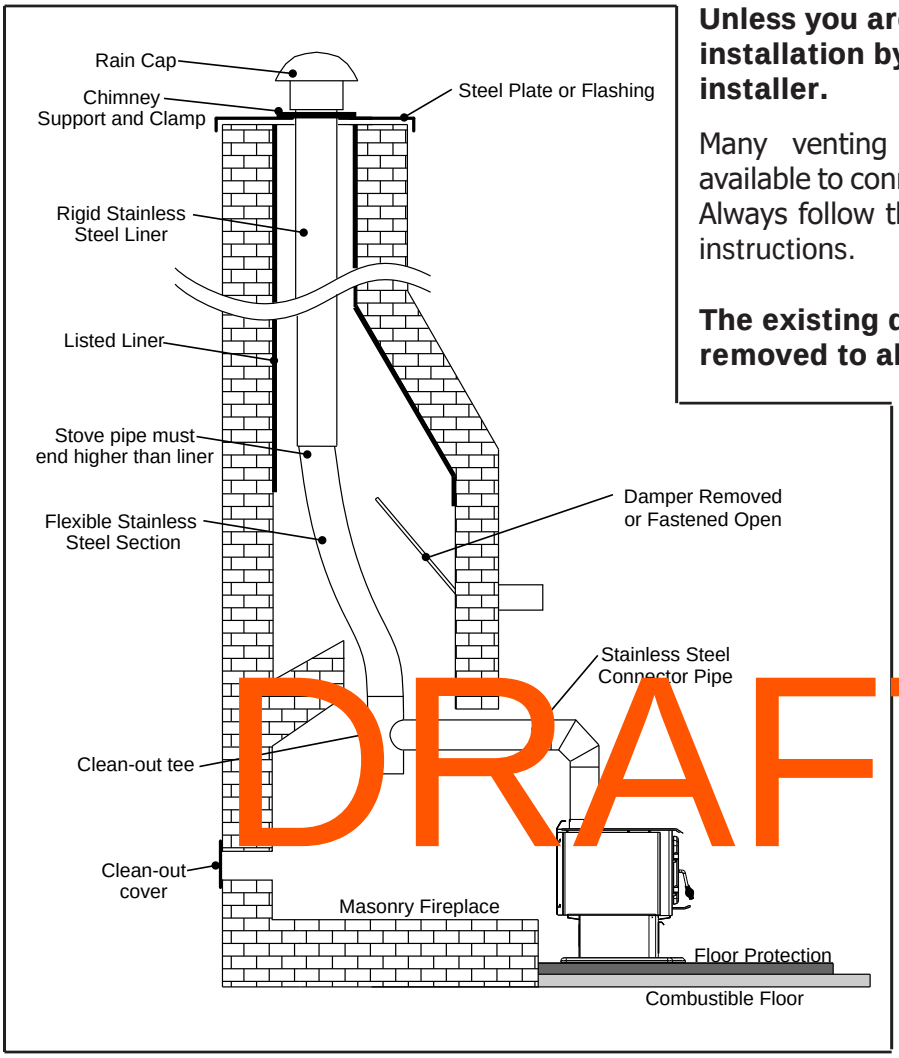


Figure 29: Installation into chimney through a combustible wall.

Masonry Fireplace Installation - Freestanding:



Unless you are experienced, we recommend installation by your dealer or a professional installer.

Many venting manufacturers have listed kits available to connect a stove to a masonry fireplace. Always follow the vent manufacturer's installation instructions.

The existing damper may have to be removed to allow installation.

Figure 30: Freestanding Installation into existing fireplace.

Mobile Home Installation:

SPECIAL REQUIREMENTS: Pedestal model Enviro Ironwood 2.0 Freestanding is approved for mobile homes. A Ironwood 2.0- Insert may also be installed into a Mobile Home in the U.S. provided there is a Mobile Home approved Factory Built Fireplace installed with adequate fresh air supply, and that the Factory Built Fireplace is not altered beyond the damper or ash shelf being modified. In Canada, Insert Mobile Home installations must be pre-approved by the local inspector. All freestanding installation requirements in "*Installation Of A Listed, Factory Built Chimney*", must comply with all local codes that may apply, and the following must be met:

VENTING:

In Canada: Any ULC-S629 listed chimney system with the accompanying double-wall vent connector.

In U.S.A. Any UL-103-HT listed chimney system with the accompanying double-wall vent connector. Do not connect a listed chimney of one manufacture with a listed double wall connector from another manufacture.

These connectors must be installed in accordance with the manufacturer's instructions. Use only specified components. The chimney and pipe must extend at least 10 feet (2.4 m) above the stove and 3 feet (0.9 m) above the highest point of the roof. Install a rain cap with spark arrestor at the top that will not impede the smoke exhaust. The chimney must be supported at the ceiling or roof so that its weight will not sit on the stove. Seal with silicone to maintain vapor barrier at the chimney and outside air penetrations.

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

OUTSIDE AIR :

Connection from the stoves air intake to the outside is **mandatory**, (MOBILE HOMES ONLY) either through a hole in the wall not higher than the stoves bottom or through a hole in the floor beneath the pedestal, using the fresh air adaptor provided. If the air intake is through the floor, the hole in the pedestal back must be closed with the sheet metal cover provided. Avoid cutting any floor joists, wall studs, electrical wiring or plumbing. Seal around the outside air pipe with insulation to prevent drafts. Also install a ¼" mesh rodent or pest screen in the end of fresh-air pipe. Fresh-air connection must be of a non-combustible material, example: 4" (10.16 cm) flexible aluminum single wall pipe.

Fresh air could also be supplied from a **vented crawlspace.**

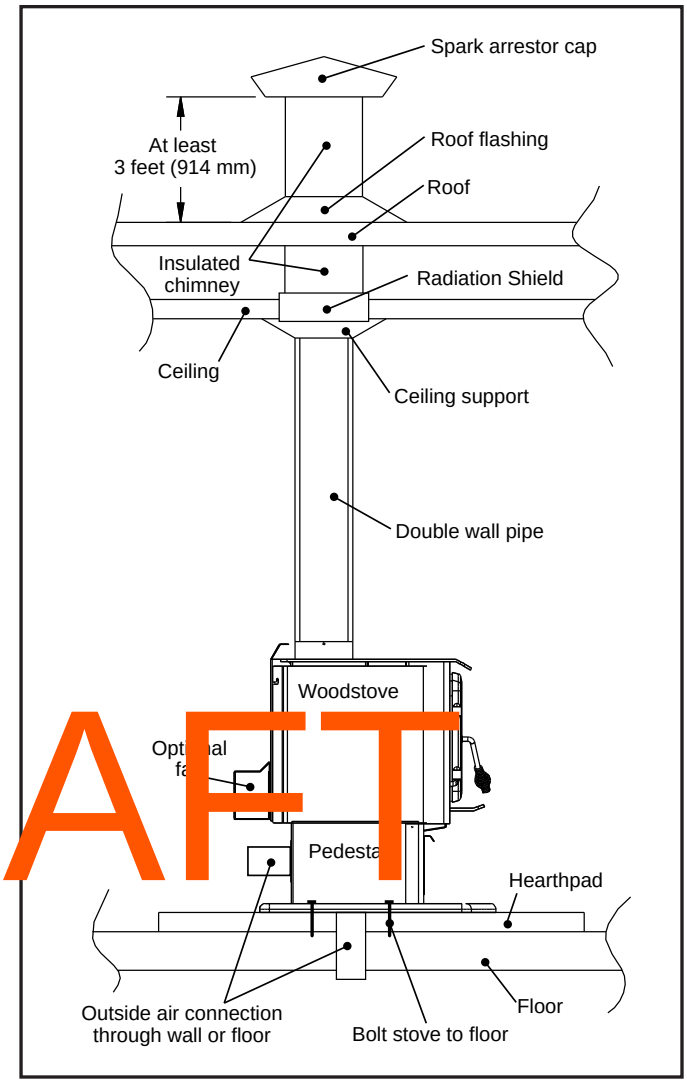


Figure 31: Freestanding installation into mobile home.

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The pedestal must be firmly bolted to the floor using two (2) ¼" bolts. Be sure to replace any insulation or panels removed when fastening the bottom nuts.

If room air starvation occurs because the air intake is blocked with ice, leaves etc. or because the stove door was left open, or due to a strong exhaust fan operating, dangerous fumes could be sucked into the room.

IN SOME AREAS IT MAY BE REQUIRED TO ELECTRICALLY GROUND THE STOVE TO THE STEEL CHASSIS OF THE MOBILE HOME.

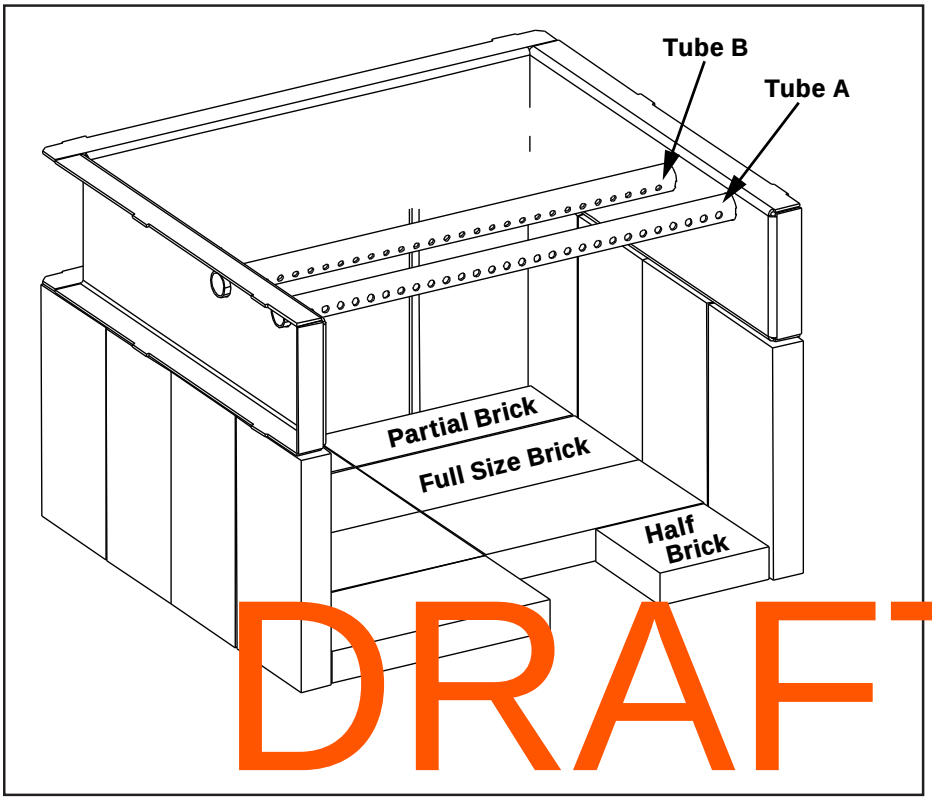
When this unit is installed in a Mobile Home it must be grounded to the steel chassis or connected to a grounding rod.

Manufactured (Mobile) home installation must be in accordance with the Manufactured Home Construction and Safety Standard, UL 307B, Title 24 CFR, Part 3280 and/or The Standard for Manufactured Home Installations, ANSI A225.1/NFPA 501A.

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

Model EnviroIronwood 2.0 Brick Placement & Tube Locations:

COMPLETE THE STOVE AND SMOKE PIPE INSTALLATION BEFORE PLACING THESE BRICKS.



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Figure 33: Brick Placement for IW20SF-1 shown with Secondary Air Channel and Tubes.

1. Place the four (4) full size bricks along each side of the firebox and one (1) full size brick on either side of the back of the firebox.
2. To place the floor bricks, lay the two (2) partial bricks along the back of the floor. Then on the left, lay three (3) full size bricks and on the right, lay two (2) full size bricks in the center and the half brick in the front (for the ash dump). The spaces between the bricks will soon fill with ashes.

When replacing bricks, use only pumas type fire bricks.

TOTAL BRICKS:

15 - Full size bricks9" long x 4.5" wide x 1.25" thick
(22.9 cm long x 11.4 cm wide x 3.2 cm thick)

2 - Partial bricks 9" long x 3" wide x 1.25" thick
(22.9 cm long x 7.6 cm wide 3.2 cm thick)

1 - Half brick 4.5 " long x 4.5" wide x 1.25" thick
(11.43 cm long x 11.43 cm wide x 3.175 cm thick)

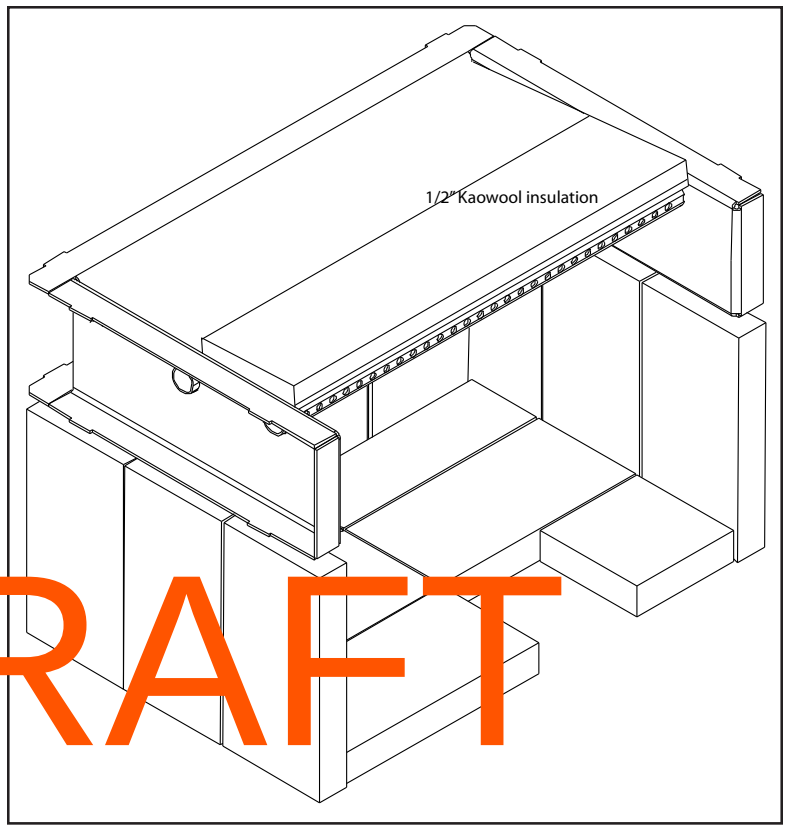
Removing Air Tube: If a secondary air tube needs to be removed, place a screwdriver (any style except flat head) into one of the air holes and tap it with a hammer/mallet to the left until the right end of the tube is freed. To installation a secondary air tube reverse the above instructions.

IMPORTANT: All secondary air tubes must be in place for proper operation.

Installation

Baffle Installation:

1. Slide the Baffle plate and Insulation in over the secondary air tubes at the top of the firebox. The tab must be on the top and pointing towards the center and the smooth side is to face down.



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Figure 34: Installation of Baffle.

Fan Wiring Diagrams:

This appliance, when installed, must be electrically connected and grounded in accordance with local codes or in the absence of local codes, with the current CSA C22.1 CANADIAN ELECTRICAL CODE. Part 1, SAFETY STANDARDS FOR ELECTRICAL INSTALLATIONS, or THE NATIONAL ELECTRICAL CODE ANSI / NFPA 70 in the USA.

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

DO NOT oil the fan bearings.
DO NOT cut or remove the grounding prong from the plug.
DO NOT route the power cord beneath the heater.

WARNING: This appliance is equipped with a three-prong (grounding) plug for your protection against shock hazard and should be plugged into a properly grounded three-prong receptacle.

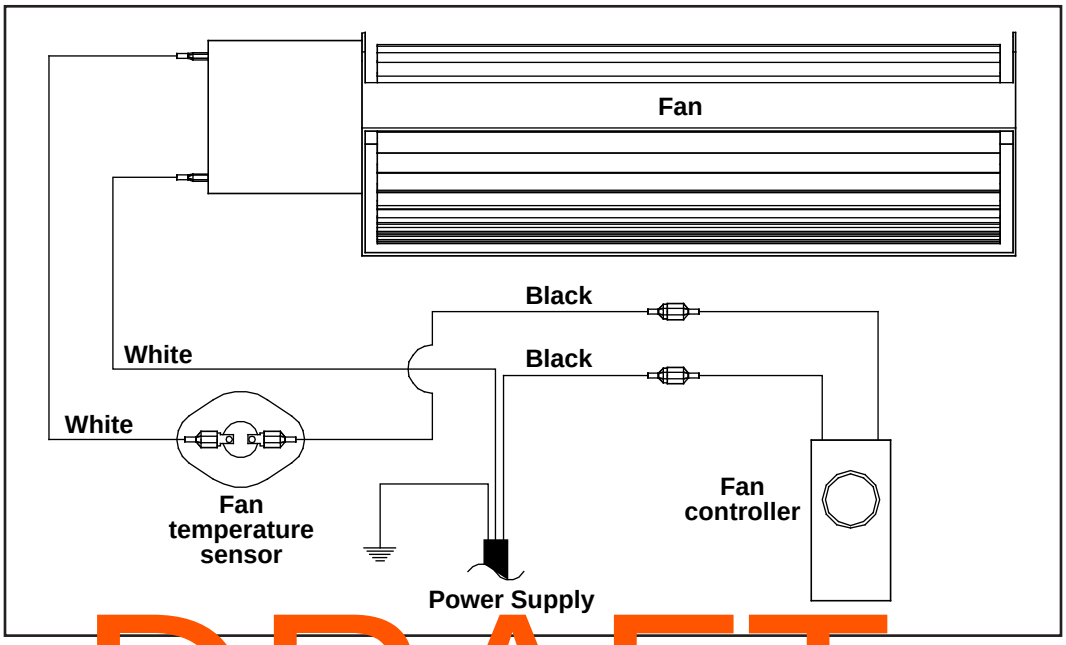


Figure 35: Freestanding Fan Kit Wiring Diagram

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Optional Fan Installation - Freestanding:

Refer to Fan Wiring Diagram before installing your optional fan kit.

1. Remove the fan assembly from the box and inspect for any damage to the assembly. If damage is noticed call your dealer, distributor or courier company and have components replaced before installing kit.
2. Remove the knock out at the bottom of the back panel of the appliance by using a flat head screwdriver as a lever, hook the tip of the screwdriver under the panel beside the tabs and push the panel out.
3. Install two (2) T-20 screws into the top two (2) holes. Place the blower assembly over these two (2) screws.
4. Ensure the temperature sensor will touch the unit when mounted. If it does not touch, adjust the sensor so it does. Tighten the two (2) top screws and install the two (2) bottom screws and tighten.
5. Plug the fan assembly in and check for proper operation.

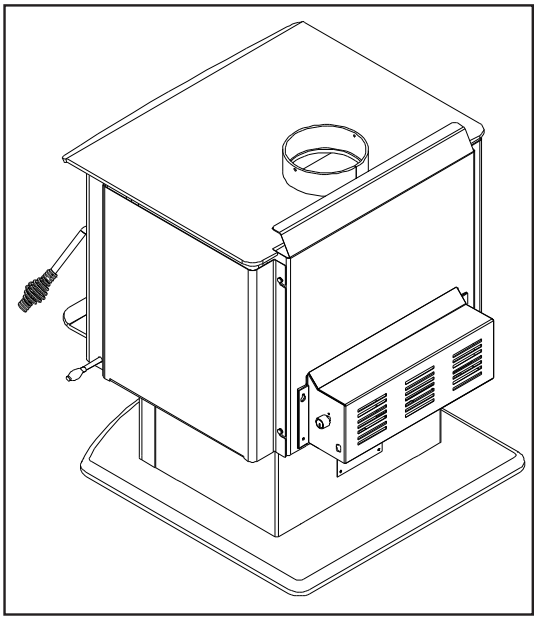


Figure 36: Back View of Freestanding Unit with Fan Kit.

Rating Label

XXXXXXXXXXX

Tested & Listed By Intertek
Certified for use in Canada & USA / Certifié pour installation au Canada et aux Etats-Unis.

DO NOT REMOVE THIS LABEL / NE PAS ENLEVER CETTE ÉTIQUETTE
LISTED SOLID FUEL SPACE HEATER / IDENTIFIE COMME UN FOYER A COMBUSTIBLE SOLIDE

Serial No. / No. De Serié:

☐ IW20SF-1 ☐ IW20CF-1 ☐ IW20SI-1

Model Number/ Modèle Nombre:
Report/Rapport no.

Model Enviro Ironwood 2.0 Freestanding units: Room Heater, Solid Fuel Type, Also For Use In Mobile Homes. Tested to ULC-S627-23, ULC-S628-22(FPI only),UL-1390-24(FPI only) & UL-1482-11.

Install and use only in accordance with the manufacturers installation and operating instructions. Contact local building or fire officials about restrictions and installation inspection in your area. Use 6" (150 mm) diameter minimum 24 MSG black or 25 MSG blued steel connector listed factory-built chimney suitable for use with solid fuels or masonry chimney. See local building code and manufacturer's instructions for precautions required for passing a chimney through a combustible wall or ceiling. Do not pass chimney connector through a combustible wall or ceiling. Minimum clearances from horizontal connector and ceiling 18" (455 mm). Do not connect this unit to a chimney flue servicing another appliance.

Modèles Enviro Ironwood 2.0items indépendants: Chauffage pièce, le type de combustible solide, également pour une utilisation dans les maisons mobiles. Testé selon ULC-S627-23, ULC-S628-22(FPI seulement), UL-1390-24(FPI seulement),& UL-1482-11.

Ce dispositif doit entre installé et opéré conformément aux instructions d'installation et d'opération du manufacturier contactez le service local de l'inspection des bâtiments ou l'officier pompier concernant les restrictions et l'inspection d'installation dans votre localité. Utiliser des connecteurs répertoriés 24 MSG noir ou 25 MSG en acier bronzée de 6" (150 mm) minimum, et une cheminée de fabrication industrielle, appropriée pour utilisation avec des combustibles solides ou avec une cheminée de maçonnerie. Vérifiez les précautions a prendre exigées parle code local et les instructions du manufacturier concernant les conditions pour passer la cheminée a travers un mur ou un plafond combustible. Net pas installer le connecteur de la cheminée a travers un mur ou un plafond combustible. Espaces libres minimum d'un connecteur horizontal et plafond sont 18" (455 mm) ne pas connecter ce dispositif a un conduit de cheminée qui sert déjà un autre dispositif.

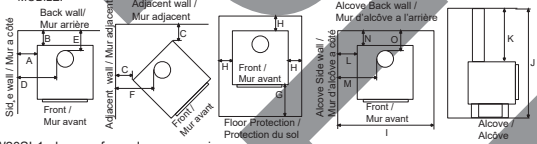
	Minimum Clearances to Combustible Materials / Espaces Libres Aux Materiax Combustibles.	Single wall pipe / Seul connecteur de mur		**Double wall pipe / Double connecteur de mur		Double wall pipe with efficiency shield (Flat top model only) / Double connecteur de mur avec la protection d'efficacité (Le modèle plat seulement		Top vent out back wall with min. 24" (610mm) vertical rise; double wall pipe / Donné vent hors de la paroi arrière avec le min. 24" (610 mm) l'ascension verticale; double connecteur de mur	
	Model Number/ Modèle Nombre	IW20FS-1	IW20CS1	IW20FS-1	IW20CS1	IW20FS-1	IW20CS1	IW20FS-1	IW20CS1
A	Sidewall to unit / De la paroi latérale au dispositif	13" (330 mm)	13" (330 mm)	13" (330 mm)	13" (330 mm)	13" (330 mm)	13" (330 mm)	14" (356 mm)	14" (356 mm)
B	Backwall to unit / De la paroi arrière au dispositif	11" (279 mm)	11" (279 mm)	10" (254 mm)	10" (254 mm)	8" (203 mm)	8" (203 mm)	12" (305 mm)	12" (305 mm)
C	Adjacent wall to corner of unit / De la paroi adjacent au coin de dispositif	9" (229 mm)	9" (229 mm)	8" (203 mm)	8" (203 mm)	6½" (165 mm)	6½" (165 mm)		
D	Sidewall to connector / De la paroi latérale au connecteur	22" (559 mm)	22" (559 mm)	22" (559 mm)	22" (559 mm)	22" (559 mm)	22" (559 mm)	23" (584 mm)	23" (584 mm)
E	Backwall to connector / De la paroi arrière au connecteur	14" (356 mm)	14" (356 mm)	13" (330 mm)	13" (330 mm)	11" (279 mm)	11" (279 mm)	15" (381 mm)	15" (381 mm)
F	Adjacent wall to connector/ De la paroi adjacent au connecteur	17½" (445 mm)	17½" (445 mm)	16½" (419 mm)	16½" (419 mm)	15" (381 mm)	15" (381 mm)		
G	† Front of door opening to edge of hearth / Le devant d'ouverture de porte au bord de coussin de coeur	USA 16" (406 mm) CND 18" (450 mm)							
H	† Side/back of unit to edge of hearth / Le latérale/arrière de dispositif au bord de coussin de co	USA 6" (152 CND 8" (200							

CAUTION: An uninsulated smoke pipe must not pass through an , roof space, close similar co aled space, or through a floor, ceiling, wall, or partition, or any combus construction.
† FLOOR PROTECTION: If a stove is installed on a combustible , it must have the le pedes attached and be on a NON COMBUSTIBLE hearth pad
* ALL CLEARANCES CAN BE REDUCED WITH SHIELDING A PTABLE TO THE L AUTH
SINGLE WALL:
IN CANADA: Any ULC-S629 listed chimney system with the acc anying listed sing vent co tor.
IN U.S.A.: Any UL 103 HT listed chimney system with the accom ing listed single vent conne
**DOUBLE WALL :
IN CANADA: Any ULC-S629 listed chimney system with the accompanying listed double wall vent connector.
IN U.S.A.: Any UL 103 HT listed chimney system with the accompanying listed double wall vent connector.
DOUBLEWALL IS REQUIRED FOR MOBILE HOME INSTALLATIONS.

MISE EN GARDE: Un uninsulated tuyau de fumée ne pas passer par un grenier, un espace e toit, le placard ou l'espace simulé similaire ou par un plancher, un pla , un mur, ou une cloison, ou une c truction combustible.
† PROTÉGER LE PLANCHER: Si un poêle est installé sur un sol combustible, il doit avoir un piédestal attache et un coussinet non combustible
* TOUS LES "ESPACES LIBRES" AUX MATÉRIAUX COMBUSTIBLES PEUVENT ÊTRE RÉDUITS AVEC PROTÉGEANT ACCEPTABLE À L'AUTORITÉ COMPÉTENTE
Seul connecteur de
Au Canada: Certifié seul connecteur de avec toutes systèmes de cheminée listée sous UL S629.
Aux États-Unis: C seul connecteur de avec systèmes de cheminée listée sous UL 103 HT.
**Double connecteur de Mur
Au Canada: Certifiée double connecteur de mur avec toute systèmes de cheminée listée sous ULC-S629.
Aux États-Unis: Certifiée double connecteur de mur avec toute systèmes de cheminée listée sous UL 103 HT.

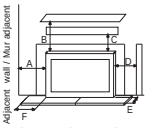
	**Alcove (Use double wall pipe) / Alcôve (Utilisant le double connecteur de mur)	Model/Modèle	IW20SF-1/IW20CF-1
I	Total width / Largeur totale	55" (1397 mm)	55" (1397 mm)
J	Total height / Hauteur totale	78" (1981 mm)	78" (1981 mm)
K	Top of stove to ceiling / Le sommet de poêle au plafond	49" (1245 mm)	49" (1245 mm)
L	Sidewall to unit / De la paroi latérale au dispositif	15" (381 mm)	15" (381 mm)
M	Sidewall to connector / De la paroi latérale au connecteur	24" (610 mm)	24" (610 mm)
N	Backwall to unit / De la paroi arrière au dispositif	12" (305 mm)	12" (305 mm)
O	Backwall to connector / De la paroi arrière au connecteur	15" (381 mm)	15" (381 mm)
P	Maximum Depth / Profondeur maximum	48" (1220 mm)	48" (1220 mm)

DOUBLE CONNECTEUR DE MUR NÉCESSAIRES POUR INSTALLATION DANS LES MAISONS MOBILE.



Models IW20SI-1 inserts may be installed as an insert in a masonry fireplace. / On peut encastrer le modèles IW20SI-1 dans un foyer de maçonnerie.

	Model Number/ Modèle Nombre	IW 20SI-1	
A	To unshielded side wall / aux mur non protegé	10" (254 mm)	
B	To an unshielded 8" (203 mm) mantle / aux manteau 8" non protegé	21" (533 mm)	
C	To top facing (protruding ¾" [19 mm]) clearance / aux revêtement supérieur	17½" (445 mm)	
D	To side facing (protruding ¾" [19 mm]) clearance / aux revêtement a côté	1" (25 mm)	
E	† From door opening of unit to edge of floor protection / De ouverture de la porte de l'unité à bord de la protection de plancher	USA 16" (406mm) / CND 18" (450mm)	
F	† From side of unit to edge of floor protection / Du côté de l'unité au bord de la protection de plancher	USA 6" (152 mm) / CND 8" (200 mm)	



† FLOOR PROTECTION / PROTÉGER LE PLANCHER:
If unit is raised / Si l'appareil est soulevé:
0" - 2" (0mm - 51mm); 1" (25mm) non-combustible material with R = 1.19 or equivalent / 1" (25mm) le matériel incombustible avec la valeur de R = 1.19 ou équivalent.
2" - 8" (51mm - 203mm); ½" (13mm) non-combustible material with R = 1.19 or equivalent / ½" (13mm) le matériel incombustible avec la valeur de R = 1.19 ou équivalent.
Greater than/Plus grand que 8" (203 mm) any non-combustible material / n'importe quel type de matériel incombustible.

OPERATE ONLY WITH DOORS CLOSED. Only open door to feed fire. For use with solid wood fuels only. Do not use any other type of fuel. Do not use grate or elevate-fire build wood fire directly on hearth. Do not overfire. Do not obstruct beneath the heater. If heater or chimney connector glows, you are overfiring. Inspect and clean chimney frequently-under certain conditions of use, creosote buildup may occur rapidly. The provided insulation materials are required for operation. Keep furnishing and other combustibles well away from heater. Replace glass only with 5 mm thick ceramic glass. Optional component for FS: fan, electrical rating 115V, 60 Hz 1 Amp (Part # EFW-261). Combustion air openings are not to be obstructed.
Danger: Risk of electrical shock. Disconnect power before servicing unit. Route cord away from heater.

L'OPERATION DU POELE DOIT SE FAIRE AVEC LA PORTE FERME. N'ouvrir la porte que pour alimenter le feu. N'utilisez que des combustibles solides. Ne pas utiliser un autre type de carburant. N'employez pas de grille de foyer ou ne surélevez pas le feu. Mettez le bois à brûler directement sur l'âtre. Pour éviter la surchauffeur, ne mettez pas trop de bois. N'obstruez pas les ouvertures d'air comburant. Si le poêle ou le connecteur commencent à luire, vous surchauffez le poêle. Inspectez et nettoyez la cheminée souvent. Dans certaines conditions, le créosoté peut s'accumuler rapidement. Les matériaux d'isolation fournis sont requis pour l'opération.Tenez loin les meubles et d'autres produits combustibles. Ne remplacez le verre qu'avec du verre céramique, 5mm épais. Équipement en option pour un FS: ventilateur caractéristiques assignées 115V, 60 Hz, 1 Amp (pièce # EFW-261) tenez le câble électrique loin du poêle. **Danger:** Le risque de choc électrique. Débrancher le dispositif avant d'entretenir. Ouvertures d'air de combustion ne doivent pas être obstruées.

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

MISE EN GARDE: TRÈS CHAUD QUAND ALLUMÉ. NE TOUCHEZ PAS. TENIR LOIS LES ENFANTS, LES VÊTEMENTS ET LES MEUBLES. LE CONTACT PEUT CAUSER DES BRÛLURES. LISEZ ATTENTIVEMENT L'ÉTIQUETTE ET LES INSTRUCTIONS.

MADE IN CANADA / FABRIQUE AU CANADA

MANUFACTURED BY / FABRIQUE PAR: SHERWOOD INDUSTRIES LTD. 6782 OLDFIELD ROAD, SAANICHTON, BC CANADA

Enviro

DATE OF MANUFACTURE / DATE DE FABRICATION:

J F M A M J J A S O N D 2025 2026 2027 2028 2029 C-XXXXX

U.S. ENVIRONMENTAL PROTECTION AGENCY Certified to comply with 2020 particulate emission standards. 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 heater in a manner inconsistent with the operating instructions in the owner`s manual. This heater meets the 2020 U.S. Environmental Protection Agency's wood emission limits for wood units sold after May 15, 2020 Under specific test conditions the IW20FS-1 heater has been shown to have a particulate emission level of 1.76 g/hr.

ENVIRONMENTAL PROTECTION AGENCY US conforme aux normes 2015 d'émission de particules. Ce poêle à bois doit inspection et de réparation périodiques pour un fonctionnement correct. Consultez le manuel d'owner`s pour plus d'informations. Il est contre les règlements fédéraux pour faire fonctionner cet appareil de chauffage d'une manière incompatible avec les instructions de fonctionnement dans le manuel d'owner`s. Cet appareil de chauffage répond aux limites d'émission de bois de la US Environmental Protection Agency 2015 pour les unités de bois vendus après le 15 mai 2020 Dans des conditions d'essai conditions de test spécifiques au dispositif de chauffageIW20FS-1 a été montré pour avoir un niveau de 1.76g / h d'émission de particules.

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Parts List

Reference #	Description	Part #
5	Door Gasket - 7 feet (2.13m)	EF-168
	Fresh Air Kit	EF-186
6	One Leg - Painted	EFW-253
6	One Leg - Gold	EFW-254
6	One leg - nickel	EFW-255
7	Freestanding Fan Kit	EFW-261
7	Freestanding Convection Blower - 115V	EC-069
8	Glass with Tape	10-000
9	Damper Handle Spring - Brass	EF-191
9	Damper Handle Spring - Nickel	10-005
10	Door Handle Spring - Brass	10-006
10	Door Handle Spring - Nickel	10-007
	Enviro Logo Gel Decal	50-322
11	Leg Kit with ash drawer - Nickel	50-979
11	Leg Kit with ash drawer - Gold	50-980
11	Leg Kit with ash drawer - Painted	50-981
11	Leg Kit with ash drawer - Brushed Nickel	50-1470
1	Free tanding edestal inted	50-982
1	eg it with a draw - N kel	50-983
1	Leg it with sh dra	50-984
1	Leg it with a dr ver - Pain d	50-985
13	Leg Kit with ash drawer - Brushed Nickel	50-1471
14	Freestanding Pedestal - Painted	50-986
15	Door - Painted	50-2897
15	Door - Gold	50-2898
15	Door - Nickel	50-2899
15	Door - Nickel Trim	50-2904
15	Door - Gold Trim	50-2903
16	Owner's Manual	50-2920
17	Heat Efficiency Shield	50-1088
18	Front Secondary Air Tube A	50-1099
19	Rear Secondary Air Tube C	50-1100
20	Middle Secondary Air Tube B	50-1101
21	Rear Secondary Air Tube E	50-1102
22	Middle Secondary Air Tube D	50-1103
23	Pumice Bricks - 3" X 9" (76mm x 229mm)	50-1104

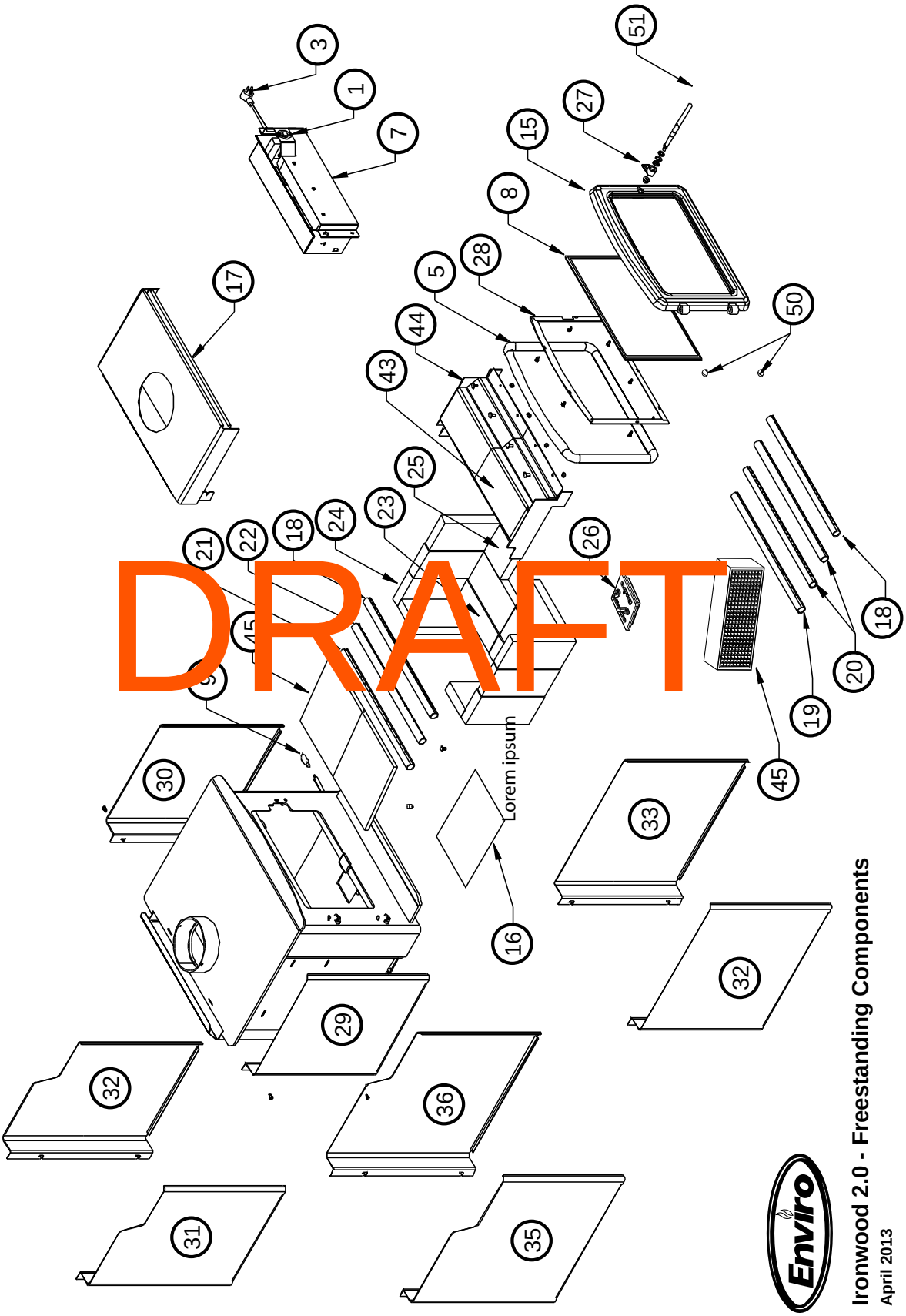
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Parts List

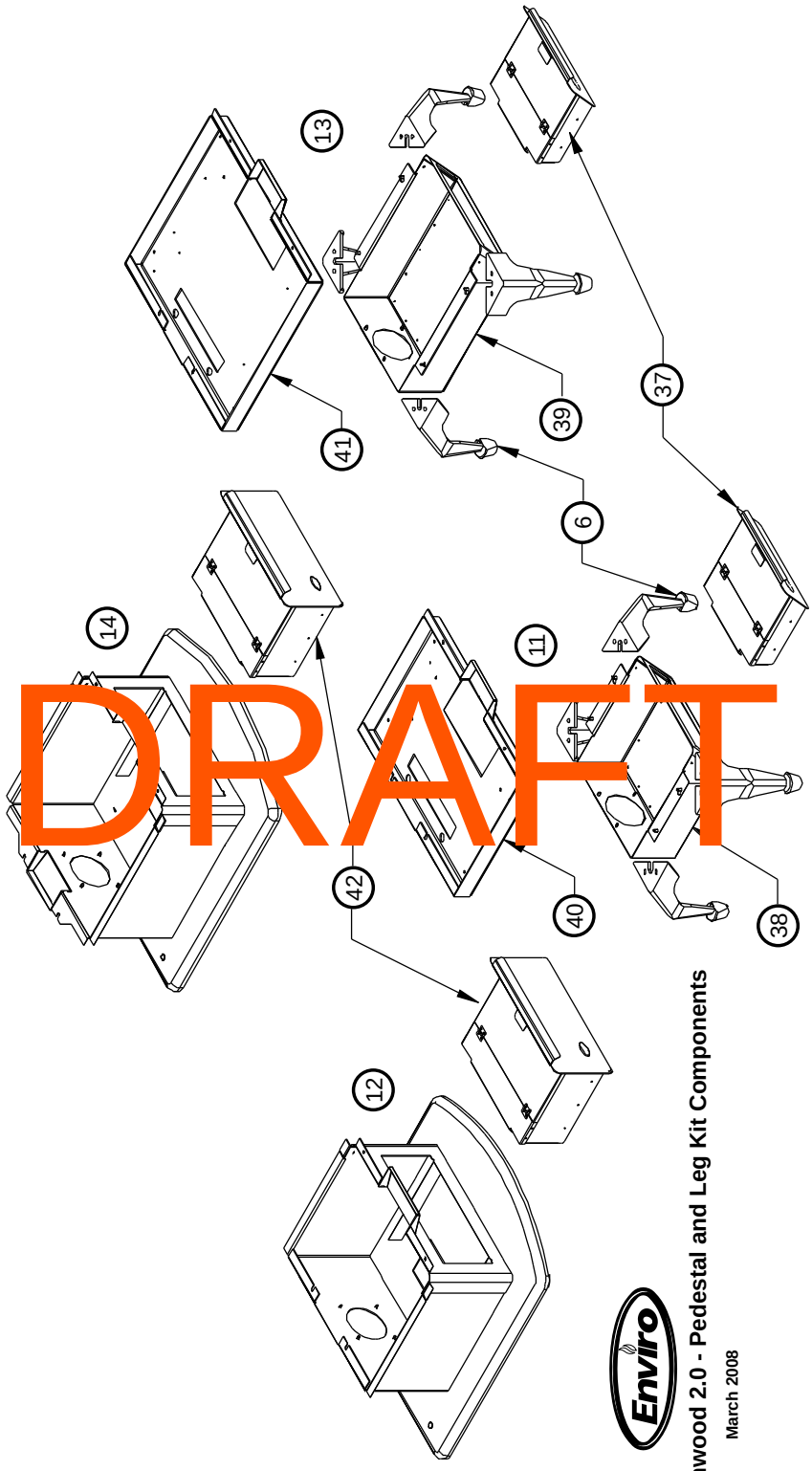
Reference #	Description	Part #
24	Pumice Bricks - 4½" X 9" (114mm x 229mm)	50-1105
25	Pumice Bricks - 4½" X 4½" (114mm x 114mm)	50-1106
26	Cast Ash Plug	50-1120
27	Door Handle Assembly (Rod, Cast Latch, Brass Spring)	50-1121
27	Cast Latch	50-1381
28	Wood Door Glass Retainer Kit (With Screws)	50-1122
29	Freestanding Flat Top Left Side Cabinet	50-1123
30	Freestanding Flat Top Right Side Cabinet	50-1124
31	Freestanding Step Top Left Side Cabinet	50-1125
32	Freestanding Step Top Right Side Cabinet	50-1126
33	Freestanding Flat Top Left Side Cabinet	50-1127
34	Freestanding Flat Top Right Side Cabinet	50-1128
35	Freestanding Step Top Left Side Cabinet	50-1129
36	Freestanding Step Top Right Side Cabinet	50-1130
37	Leg Kit Ash Drawer	50-1131
38	Leg Kit Ash Drawer Box	50-1132
39	Leg Kit Ash Drawer Box	50-1133
40	Leg Kit Adapter Plate	50-1134
41	Leg Kit Adapter Plate	50-1135
42	Pedestal Kit Ash Drawer	50-1136
43	Left Shield Assembly	50-1144
44	Right Shield Assembly	50-1145
45	Catalyst, Ceramic 1 Piece Set	C-17430
50	Door Hinge Pin Cap	50-1815
51	Wood Handle w/ Hardware	50-2909

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Parts Diagram - Freestanding



Parts Diagram - Pedestals & Legs



Notes

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Notes

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Warranty for Enviro **Wood** Products

Sherwood Industries Ltd. ("Sherwood") hereby warrants, subject to the terms and conditions herein set forth, this product against defects in material and workmanship during the specified warranty period starting from the date of original purchase at retail. In the event of a defect of material or workmanship during the specified warranty period, Sherwood reserves the right to make repairs or to assess the replacement of a defective product at Sherwood's factory. The shipping costs are to be paid by the consumer. All warranties by Sherwood are set forth herein and no claim shall be made against Sherwood on any oral warranty or representation.

Conditions

- A completed warranty registration must be submitted to Sherwood within 90 days of original purchase via the online warranty registration page or via the mail-in warranty registration card provided. Have the installer fill in the installation data sheet in the back of the manual for warranty and future reference.
- Warranty applies only to the original owner in the original location from date of install.
- The unit must have been properly installed by a qualified technician or installer, and must meet all local and national building code requirements.
- Warranty does not cover removal and re-installation costs.
- Sherwood Industries Ltd. reserves the right to make changes without notice.
- Sherwood Industries Ltd. and its employees or representatives will not assume any damages, either directly or indirectly caused by improper usage, operation, installation, servicing or maintenance of this appliance.
- A proof of original purchase must be provided by you or the dealer including serial number.

Exclusions

An expanded list of exclusions is available at www.enviro.com/help/warranty.html

This warranty does not cover:

- Damage as a result of improper usage or abuse.
- Damage caused from over-firing due to incorrect setup or tampering.
- Damage caused by incorrect installation.

To the Dealer

- Provide name, address and telephone number of purchaser and date of purchase.
- Provide date of purchase. Name of installer and dealer. Serial number of the appliance. Nature of complaint, defects or malfunction, description and part # of any parts replaced.
- Pictures or return of damaged or defective product may be required.

To the Distributor

- Sign and verify that work and information are correct.

Sherwood Industries Ltd.
6782 Oldfield Road, Victoria, BC . Canada V8M 2A3
Online warranty registration: www.enviro.com/warranty/

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Category	One Year	Two Year	Seven Year	Eleven Year
Parts [1] (unit serial number required)		✔		
Firebox (excluding bricks) [2]			✔	
Ceramic Baffle [3]			✔	
Secondary Air Tubes			✔	
Surround Panels (excluding finish)			✔	
Pedestals / Legs (excluding finish)			✔	
Ceramic Glass [4]	✔			
Door Assembly (excluding gasket)			✔	
Slider Control			✔	
Shield Assembly			✔	
Electrical Components		✔		
Convection Fan		✔		
Gasket	✔			
Ceramic Catalyst				✔
Labour		✔		

[1] Whereas warranty has expired, replacement parts will be warrantied for 90 days from part purchase date. Labour not included. Unit serial number required.
[2] Warranty does not cover damage caused from burning artificial/firestarter log varieties.
[3] Excludes damage caused by loading wood, cleaning or service.
[4] Glass is covered for thermal breakage. Photos of box, inside of door, and unit serial # must be supplied for breakage due to shipping.

Additional Limitations: Travel costs not included. No warranty on replacement firebricks

January 2026

Installation Data Sheet

The following information must be recorded by the installer for warranty purposes and future reference.

NAME OF OWNER:

_____

ADDRESS:

_____

_____

_____

PHONE:_____

NAME OF DEALER:

_____

ADDRESS:

_____

_____

_____

PHONE:_____

MODEL:_____

SERIAL NUMBER:_____

DATE OF PURCHASE: _____(dd/mm/yyyy)

DATE OF INSTALLATION:_____(dd/mm/yyyy)

INSTALLER'S SIGNATURE:

_____

NAME OF INSTALLER

_____

ADDRESS:

_____

_____

_____

PHONE:_____

DRAFT

MANUFACTURED BY:
SHERWOOD INDUSTRIES LTD.
6782 OLDFIELD RD. SAANICHTON, BC, CANADA V8M 2A3
www.enviro.com
October 28, 2015
C-14582

Appendix C

Equipment Calibration Records

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: DIRI0182484A0912013i241204

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	12/4/24	12/28/23	12/2025

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:☐	Temperature: 17.2°C
As-Left: Pass:☑ Fail:☐	As-Left: Pass:☑ Fail:☐	As-Left: Pass:☑ Fail:☐	

CALIBRATION DATA

Standard	As-Found	As-Left	Expanded Uncertainty
400	399.98	399.98	0.006
200	200.00	200.00	0.005
100	100.00	100.00	0.005
75	75.00	75.00	0.005
50	50.00	50.00	0.005
25	25.00	25.00	0.005

CALIBRATION STANDARDS

Item	Make	Model	Serial Number	Cal Date	Cal Due Date	NIST ID
Avoirdupois Cast W	Rice Lake	25 and 50lb	PWO990-CA	7/26/24	7/2026	20221688

Permanent Information Concerning this Equipment:
12 month calibration cycle. Scale calibrates in kg only.

Comments/Information Concerning this Calibration
12/04/2024: RH-37%

Report prepared/reviewed by: TLP **Date:** 12.04.2024 **Technician:** T.Peterson
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:	8/11/2025
Calibration Expiration:	2/11/2026
Barometric Pressure:	29.81 in. Hg

Equipment Used:	Ref. Std. DGM	Thermometer	Barometer	Manometer
Manufacturer:	Apex	Fluke	Aquatech	
Model:	SK25Da	52II	DBX2	
Lab ID#:	47	196	202	
Calibration Expiration Date:	6/30/2026	2/11/2026	7/1/2026	
Calibration γ Factor:	0.998			

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)	122.491	76.363	62.504
Standard DGM Temperature (°F)	76.0	76.0	76.7
Standard DGM Pressure (in H_2O)	0.00	0.00	0.0
DGM Initial Volume (ft^3)	0.000	4.194	6.860
DGM Final Volume (ft^3)	4.194	6.860	9.075
DGM Temperature (°F)	77.0	86.6	90.9
DGM Pressure (in H_2O)	3.40	2.40	1.8
Net Volume for Standard DGM (ft^3)	4.326	2.697	2.207
Net Volume for DGM (ft^3)	4.194	2.666	2.215

Dry Gas Meter γ Factor	1.023	1.023	1.016
γ Factor Deviation From Average	1.023	1.023	1.016

Average Gas Meter γ Factor: 1.021

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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Toll Free 800-356-4662

Address 5777 SE International Way Milwaukie, OR 97222

Local 503-654-9620

A2LA ACCREDITED CERT #4986.01

Report #:	38860-203324-21	**Customer PO#:** 1126	
Customer Name:	PFS TECO		
Customer Address:	11785 SE Highway 212, Suite 305		
City:	Clackamas	**State:** OR	**Zip:** 97015
Contact:	Ethan Frederick		
Service Address:	11785 SE Highway 212, Suite 305	Clackamas, OR 97015	

Calibration Standards

10-01442 | Compound Gauge | Fluke | SN: 4582643 | Cal: 01/24/2025 | Due: 01/31/2026 | Vendor: Fluke | Report #: EVL1027223
14-01349 | Thermo-Hygrometer | Comark | SN: 06210350162 | Cal: 08/23/2024 | Due: 08/31/2025 | Vendor: Cal-Cert | Range: 122 °F 95 %RH | Report #: 36408-71148-5

Instrument Data

Calibration Date:	February 27, 2025	**Reference:**	ASME B40.100
Recommended Due Date:	February 27, 2026	**Cal-Cert Procedure:**	CP-003
Calibration Frequency:	12 Months	**Indicating System:**	Digital
Manufacturer:	Newport Industries	**Temperature:**	67 °F
Type:	Pressure Transducer	**Humidity:**	41% 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	0.4981	0.4981	0.00	0.5048	0.00	0.05	0.018
1.25	1.2278	1.2278	-0.02	1.2351	-0.01	0.05	0.019
2.50	2.4664	2.4664	-0.03	2.4746	-0.03	0.05	0.022
3.75	3.7213	3.7213	-0.03	3.7158	-0.03	0.05	0.016
5.00	4.9584	4.9584	-0.04	4.9521	-0.05	0.05	0.018
3.75	3.7024	3.7024	-0.05	3.7233	-0.03	0.05	0.054
2.50	2.4709	2.4709	-0.03	2.4769	-0.02	0.05	0.016
1.25	1.2356	1.2356	-0.01	1.2386	-0.01	0.05	0.009
0.50	0.4978	0.4978	0.00	0.5010	0.00	0.05	0.01
0.00	0.0000	0.0000	0.00	0.0000	0.00	0.05	0.005

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Manufacturer: Newport Industries **Type:** Pressure Transducer **Serial #:** Unknown

Remarks:

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This certificate is hereby issued that the above instrument was tested for accuracy with calibrated standards traceable to the National Institute of Standards and Technology (NIST). The information provided on this form complies with the data gathering and reporting requirements of ISO/IEC 17025 and ANSI/NCSL Z540.1, 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: Samuel Owens **Date:** February 27, 2025

Quality Manager: Tony Lewandowski **Signature:**

Report #: 38860-203324-21

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Dry Gas Meter Calibration

DUT	
Manufacturer:	Apex
Model:	XC-60
Lab ID #:	54
Serial #:	1902133
Calibration Date:	8/11/2025
Calibration Expiration:	2/11/2026
Barometric Pressure:	29.81 in. Hg

Equipment Used:	Ref. Std. DGM	Thermometer	Barometer	Manometer
Manufacturer:	Apex	Fluke	Aquatech	
Model:	SK25Da	52II	DBX2	
Lab ID#:	47	196	202	
Calibration Expiration Date:	6/30/2026	2/11/2026	7/1/2026	
Calibration γ Factor:	0.998			

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)	111.016	90.681	65.623
Standard DGM Temperature (°F)	78.1	78.8	79.3
Standard DGM Pressure (in H_2O)	0.00	0.00	0.0
DGM Initial Volume (ft^3)	0.000	3.899	7.131
DGM Final Volume (ft^3)	3.899	7.131	9.497
DGM Temperature (°F)	82.4	88.7	93.2
DGM Pressure (in H_2O)	3.11	2.51	1.75
Net Volume for Standard DGM (ft^3)	3.920	3.202	2.317
Net Volume for DGM (ft^3)	3.899	3.232	2.366

Dry Gas Meter γ Factor	1.004	1.001	0.998
γ Factor Deviation From Average	0.003	0.000	0.003

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. $\gamma = [V_{std} \times (\gamma_{Std}) \times (P_{bar}+P_{std}/13.6) \times (T_{DGM} + 460)] / [V_{DGM} \times (T_{std} + 460) \times (P_{bar} + P_{DGM}/ 13.6)]$

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A2LA ACCREDITED CERT #4986.01

Report #: 38860-203325-21 **Customer PO#:** 1126

Customer Name: PFS TECO

Customer Address: 11785 SE Highway 212, Suite 305

City: Clackamas **State:** OR **Zip:** 97015

Contact: Ethan Frederick

Service Address: 11785 SE Highway 212, Suite 305 Clackamas, OR 97015

Calibration Standards

10-01442 | Compound Gauge | Fluke | SN: 4582643 | Cal: 01/24/2025 | Due: 01/31/2026 | Vendor: Fluke | Report #: EVL1027223
14-01349 | Thermo-Hygrometer | Comark | SN: 06210350162 | Cal: 08/23/2024 | Due: 08/31/2025 | Vendor: Cal-Cert | Range: 122 °F 95 %RH | Report #: 36408-71148-5

Instrument Data

Calibration Date:	February 27, 2025	**Reference:**	ASME B40.100
Recommended Due Date:	February 27, 2026	**Cal-Cert Procedure:**	CP-003
Calibration Frequency:	12 Months	**Indicating System:**	Digital
Manufacturer:	Newport Industries	**Temperature:**	66 °F
Type:	Pressure Transducer	**Humidity:**	41% 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	0.1058	0.1058	0.01	0.1024	0.00	0.01	0.01
0.25	0.2534	0.2534	0.00	0.2546	0.00	0.01	0.006
0.50	0.5056	0.5056	0.01	0.5073	0.01	0.01	0.007
0.75	0.7502	0.7502	0.00	0.7589	0.01	0.01	0.023
1.00	1.0081	1.0081	0.01	1.0051	0.01	0.01	0.009
0.75	0.7533	0.7533	0.00	0.7544	0.00	0.01	0.006
0.50	0.5079	0.5079	0.01	0.5036	0.00	0.01	0.012
0.25	0.2584	0.2584	0.01	0.2576	0.01	0.01	0.006
0.10	0.1096	0.1096	0.01	0.1083	0.01	0.01	0.006
0.00	0.0000	0.0000	0.00	0.0000	0.00	0.01	0.005

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Manufacturer: Newport Industries **Type:** Pressure Transducer **Serial #:** Unknown

Remarks:

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Cleaning and preventative maintenance were performed as part of this service.

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This certificate is hereby issued that the above instrument was tested for accuracy with calibrated standards traceable to the National Institute of Standards and Technology (NIST). The information provided on this form complies with the data gathering and reporting requirements of ISO/IEC 17025 and ANSI/NCSL Z540.1, and meets the requirements of all applicable references and Cal-Cert procedures listed above.
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Service Engineer: Samuel Owens **Date:** February 27, 2025

Quality Manager: Tony Lewandowski **Signature:** 

Report #: 38860-203325-21

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Local 503-654-9620

A2LA ACCREDITED CERT #4986.01

Report #: 38860-203326-21 **Customer PO#:** 1126

Customer Name: PFS TECO

Customer Address: 11785 SE Highway 212, Suite 305

City: Clackamas **State:** OR **Zip:** 97015

Contact: Ethan Frederick

Service Address: 11785 SE Highway 212, Suite 305 Clackamas, OR 97015

Calibration Standards

10-01442 | Compound Gauge | Fluke | SN: 4582643 | Cal: 01/24/2025 | Due: 01/31/2026 | Vendor: Fluke | Report #: EVL1027223
14-01349 | Thermo-Hygrometer | Comark | SN: 06210350162 | Cal: 08/23/2024 | Due: 08/31/2025 | Vendor: Cal-Cert | Range: 122 °F 95 %RH | Report #: 36408-71148-5

Instrument Data

Calibration Date:	February 27, 2025	**Reference:**	ASME B40.100
Recommended Due Date:	February 27, 2026	**Cal-Cert Procedure:**	CP-003
Calibration Frequency:	12 Months	**Indicating System:**	Digital
Manufacturer:	Newport Industries	**Temperature:**	66 °F
Type:	Pressure Transducer	**Humidity:**	43% 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	0.4690	0.4690	-0.03	0.5120	0.01	0.05	0.112
1.25	1.2455	1.2455	0.00	1.2373	-0.01	0.05	0.022
2.50	2.4891	2.4891	-0.01	2.4813	-0.02	0.05	0.021
3.75	3.7327	3.7327	-0.02	3.7142	-0.04	0.05	0.048
5.00	4.9519	4.9519	-0.05	4.9562	-0.04	0.05	0.013
3.75	3.7261	3.7261	-0.02	3.7208	-0.03	0.05	0.015
2.50	2.4775	2.4775	-0.02	2.4740	-0.03	0.05	0.011
1.25	1.2316	1.2316	-0.02	1.2336	-0.02	0.05	0.007
0.50	0.4971	0.4971	0.00	0.4990	0.00	0.05	0.007
0.00	0.0000	0.0000	0.00	0.0000	0.00	0.05	0.005

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Manufacturer: Newport Industries **Type:** Pressure Transducer **Serial #:** Unknown

Remarks:

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Service Engineer: Samuel Owens **Date:** February 27, 2025

Quality Manager: Tony Lewandowski **Signature:** 

Report #: 38860-203326-21

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Dry Gas Meter Calibration

DUT

Manufacturer:	Apex
Model:	XC-50-DIR
Lab ID #:	203
Serial #:	A2204292
Calibration Date:	8/11/2025
Calibration Expiration:	2/11/2026
Barometric Pressure:	30.02 in. Hg

Equipment Used:	Ref. Std. DGM	Thermometer	Barometer	Manometer
Manufacturer:	Apex	Fluke	Aquatech	
Model:	SK25Da	52II	DBX2	
Lab ID#:	47	196	202	
Calibration Expiration Date:	6/30/2026	2/11/2026	7/1/2026	
Calibration γ Factor:	0.998			

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)	121.289	118.017	129.138
Standard DGM Temperature (°F)	78.0	77.5	77.9
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)	4.197	4.129	4.557
DGM Temperature (°F)	73.8	85.0	90.0
DGM Pressure (in H_2O)	2.03	2.76	3.5
Net Volume for Standard DGM (ft^3)	4.283	4.168	4.560
Net Volume for DGM (ft^3)	4.197	4.129	4.557

Dry Gas Meter γ Factor	1.006	1.015	1.013
γ Factor Deviation From Average	1.006	1.015	1.013

Average Gas Meter γ Factor: 1.011

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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A2LA ACCREDITED CERT #4986.01

Report #:	38860-203319-21	**Customer PO#:** 1126	
Customer Name:	PFS TECO		
Customer Address:	11785 SE Highway 212, Suite 305		
City:	Clackamas	**State:** OR	**Zip:** 97015
Contact:	Ethan Frederick		
Service Address:	11785 SE Highway 212, Suite 305	Clackamas, OR 97015	

Calibration Standards

10-01442 | Compound Gauge | Fluke | SN: 4582643 | Cal: 01/24/2025 | Due: 01/31/2026 | Vendor: Fluke | Report #: EVL1027223
14-01349 | Thermo-Hygrometer | Comark | SN: 06210350162 | Cal: 08/23/2024 | Due: 08/31/2025 | Vendor: Cal-Cert | Range: 122 °F 95 %RH | Report #: 36408-71148-5

Instrument Data

Calibration Date:	February 27, 2025	**Reference:**	ASME B40.100
Recommended Due Date:	February 27, 2026	**Cal-Cert Procedure:**	CP-003
Calibration Frequency:	12 Months	**Indicating System:**	Digital
Manufacturer:	Red Lion	**Temperature:**	66 °F
Type:	Pressure Transducer	**Humidity:**	43% 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	0.00	0.00	0.00	0.00	0.00	0.01	0.0005
0.100	0.0929	0.0929	-0.01	0.0992	0.00	0.01	0.0164
0.250	0.2473	0.2473	0.00	0.2488	0.00	0.01	0.0039
0.500	0.4955	0.4955	0.00	0.4990	0.00	0.01	0.0091
0.750	0.7533	0.7533	0.00	0.7427	-0.01	0.01	0.0276
1.000	1.0045	1.0045	0.00	0.9909	-0.01	0.01	0.0354
0.750	0.7462	0.7462	0.00	0.7517	0.00	0.01	0.0143
0.500	0.4976	0.4976	0.00	0.4925	-0.01	0.01	0.0132
0.250	0.2431	0.2431	-0.01	0.2447	-0.01	0.01	0.0042
0.100	0.1020	0.1020	0.00	0.1008	0.00	0.01	0.0031
0.000	0.0000	0.0000	0.00	0.0000	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: Samuel Owens **Date:** February 27, 2025

Quality Manager: Tony Lewandowski **Signature:** 

Report #: 38860-203319-21

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Report #:	38860-203320-21	**Customer PO#:** 1126	
Customer Name:	PFS TECO		
Customer Address:	11785 SE Highway 212, Suite 305		
City:	Clackamas	**State:** OR	**Zip:** 97015
Contact:	Ethan Frederick		
Service Address:	11785 SE Highway 212, Suite 305	Clackamas, OR 97015	

Calibration Standards

10-01442 | Compound Gauge | Fluke | SN: 4582643 | Cal: 01/24/2025 | Due: 01/31/2026 | Vendor: Fluke | Report #: EVL1027223
14-01349 | Thermo-Hygrometer | Comark | SN: 06210350162 | Cal: 08/23/2024 | Due: 08/31/2025 | Vendor: Cal-Cert | Range: 122 °F 95 %RH | Report #: 36408-71148-5

Instrument Data

Calibration Date:	February 27, 2025	**Reference:**	ASME B40.100
Recommended Due Date:	February 27, 2026	**Cal-Cert Procedure:**	CP-003
Calibration Frequency:	12 Months	**Indicating System:**	Digital
Manufacturer:	Red Lion	**Temperature:**	66 °F
Type:	Pressure Transducer	**Humidity:**	43% 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	0.5048	0.5048	0.00	0.4973	0.00	0.05	0.02
1.25	1.2453	1.2453	0.00	1.2210	-0.03	0.05	0.063
2.50	2.4656	2.4656	-0.03	2.4846	-0.02	0.05	0.049
3.75	3.7075	3.7075	-0.04	3.7111	-0.04	0.05	0.011
4.20	4.1508	4.1508	-0.05	4.1511	-0.05	0.05	0.007
3.75	3.7093	3.7093	-0.04	3.7095	-0.04	0.05	0.007
2.50	2.4595	2.4595	-0.04	2.4755	-0.02	0.05	0.042
1.25	1.2296	1.2296	-0.02	1.2305	-0.02	0.05	0.006
0.50	0.4982	0.4982	0.00	0.5109	0.01	0.05	0.033
0.00	0.0000	0.0000	0.00	0.0000	0.00	0.05	0.005

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Manufacturer: Red Lion **Type:** Pressure Transducer **Serial #:** Unknown

Remarks:

Device stopped reading at 4.27

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Service Engineer: Samuel Owens **Date:** February 27, 2025

Quality Manager: Tony Lewandowski **Signature:** 

Report #: 38860-203320-21

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Dry Gas Meter Calibration

DUT	
Manufacturer:	Apex
Model:	XC-60
Lab ID #:	55
Serial #:	810016
Calibration Date:	8/11/2025
Calibration Expiration:	2/11/2026
Barometric Pressure:	30.02 in. Hg

Equipment Used:	Ref. Std. DGM	Thermometer	Barometer	Manometer
Manufacturer:	Apex	Fluke	Aquatech	
Model:	SK25Da	52II	DBX2	
Lab ID#:	47	196	202	
Calibration Expiration Date:	6/30/2026	2/11/2026	7/1/2026	
Calibration γ Factor:	0.998			

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)	111.833	85.340	79.311
Standard DGM Temperature (°F)	76.7	76.9	77.1
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)	3.988	3.043	2.850
DGM Temperature (°F)	83.4	84.1	84.4
DGM Pressure (in H_2O)	0.00	0.00	0.00
Net Volume for Standard DGM (ft^3)	3.949	3.014	2.801
Net Volume for DGM (ft^3)	3.988	3.043	2.850

Dry Gas Meter γ Factor	1.001	1.002	0.994
γ Factor Deviation From Average	1.001	1.002	0.994

Average Gas Meter γ Factor: 0.999

Measurement Uncertainty: Total measurement uncertainty +/- 0.748% RD, K=2

Calculations:

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

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 #:	41210-28785-3646	**Customer PO#:**	1131
Customer Name:	PFS TECO		
Customer Address:	11785 SE Highway 212, Suite 305		
City:	Clackamas	**State:** OR	**Zip:** 97015
Contact:	Ethan Frederick		
Service Address:	5777 SE International Way Milwaukie, OR 97222		

Calibration Standards

10-00391 | Thermo-Hygrometer | Comark | SN: 6217150001 | Cal: 04/09/2025 | Due: 04/30/2026 | Vendor: Cal-Cert | Range: 122 °F 95 %RH | Report #: 39951-30759-5013
LP-01158 | Electrical Meter | Keithley | SN: 1388607 | Cal: 07/24/2023 | Due: 07/31/2025 | Vendor: Techmaster Electronics | Report #: TSV-0-545118

Instrument Data

Calibration Date:	July 7, 2025	**Reference:**	Manufactures Tolerances
Recommended Due Date:	July 7, 2027	**Cal-Cert Procedure:**	CP-080
Calibration Frequency:	24 Months	**Indicating System:**	Digital
Manufacturer:	Delmhorst	**Temperature:**	81 °F
Type:	Resistivity Standard	**Humidity:**	40% RH
Model Number:	MCS-1	**Asset #:**	94
Serial #:	94	**Service Location:**	Cal-Cert Lab
Capacity:	120 Megaohms	**As Found:**	Pass
Tolerance:	1.00 % of indication	**As Left:**	Pass

Instrument Range: 120 Megaohms **Resolution:** 0.001 **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	120.450	120.450	0.450	120.450	0.450
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 503-654-9620 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:	Brent Enbysk	**Date:**	July 7, 2025
Quality Manager:	Tony Lewandowski	**Signature:**	

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CERTIFICATE OF CALIBRATION

CUSTOMER:	**PFS-TECO :** CLACKAMAS, OR	**CALIBRATION DATE:**	***07/01/2025***
PO NUMBER:	1130	**CALIBRATION DUE:**	*07/01/2026*
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 45% RH 72°F
UNCERTAINTY GIVEN:	± 0.69% RD ; k=2	**CERTIFICATE FILE #:**	**490265.2025**

NOTES: ± 3.0% FS (0-500 / 0-1500) ** ± 4.0% F.S. (0-5000) **± 5.0% F.S. (0-15000) ** ± 2 °F

Q.MANUAL IM 2.0 REV 2020.2 DATED 7-27-2020

DECISION RULE: SIMPLE ACCEPTANCE. MEASUREMENT UNCERTAINTIES NOT TAKEN INTO CONSIDERATION WHEN DETERMINING PASS/FAIL

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
149	154	42.8	44.3
280	289	70.6	72.1
491	504	97.5	99.0
543	557		
1017	1044		
1495	1535		
528	552		
3242	3327		
4990	5130		
6986	7220		
14859	15348		

STANDARDS USED:		
A312 ± .02% RD -140 TO 1372 DEG °C TRACE# DMCA1328	DUE	04/24/26
A69 12INCH AIR FLOW 50 – 8000FPM +/- 0.69 % RD TRACE#1649766843,06290041521,1616396227	DUE	03/31/26

All instruments used in the performance of the shown calibration have traceability to the National Institute of Standards and Technology (NIST). Unless otherwise directed by the customer, **Dick Munns uses a decision rule of Simple Acceptance as defined in ILAC G8 with a TUR of 1:1 or better.** 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: 07/01/2025

Approved By:

Cal. Technician: A.V.

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

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

Maggie Moore
Inspector

Report and Certificate of Calibration

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Address 5777 SE International Way Milwaukie, OR 97222

Local 503-654-9620

A2LA ACCREDITED CERT #4986.01

Report #:	42818-1223707-4239	**Customer PO#:**	
Customer Name:	PFS TECO		
Customer Address:	11785 SE Highway 212, Suite 305		
City:	Clackamas	**State:** OR	**Zip:** 97015
Contact:	Aaron Kravitz		
Service Address:	11785 SE Highway 212, Suite 305	Clackamas, OR 97015	

Calibration Standards

17-01019 | Weight | Troemner | SN: 50384 | Cal: 08/20/2025 | Due: 08/30/2030 | Vendor: CO Dept of Agriculture | Report #: 20251741
17-01616 | Thermo-Hygrometer | Comark | SN: 06210350346 | Cal: 07/10/2025 | Due: 06/30/2026 | Report #: 41434-183372-5539

Instrument Data

Calibration Date:	October 2, 2025	**Reference:**	ASTM E898-20, D4753-15
Calibration Due Date:	October 2, 2026	**Cal-Cert Procedure:**	CP-002
Calibration Frequency:	12 Months	**Indicating System:**	Digital
Manufacturer:	Ohaus	**Temperature:**	68 °F
Model Number:	PR224	**Humidity:**	42% RH
Type:	Digital Balance	**Asset #:**	None
Serial #:	C525207572	**Service Location:**	Service Address
Scale Capacity:	200 grams	**As Found:**	PASS
		As Left:	PASS

Scale Linear Test

Instrument Range: 200.0000 grams **Resolution:** 0.0001 grams

Calibration Standard grams	As Found UUT grams	As Found Error grams	As Left UUT grams	As Left Error grams	As Left % of Error	Tolerance (As Left) Allowable Error		
						Error	Condition	Expanded Unc. (grams)
0.0000	0.0000	0.0000	0.0000	0.0000	0.00	0.0000	PASS	0.00000
20.0000	20.0052	0.0052	20.0052	0.0052	0.03	0.0200	PASS	0.00466
40.0000	40.0083	0.0083	40.0083	0.0083	0.02	0.0400	PASS	0.00926
60.0000	60.0110	0.0110	60.0110	0.0110	0.02	0.0600	PASS	0.01387
80.0000	80.0143	0.0143	80.0143	0.0143	0.02	0.0800	PASS	0.01849
100.0000	100.0021	0.0021	100.0021	0.0021	0.00	0.1000	PASS	0.02310
120.0000	120.0056	0.0056	120.0056	0.0056	0.00	0.1200	PASS	0.02772
140.0000	140.0088	0.0088	140.0088	0.0088	0.01	0.1400	PASS	0.03234
160.0000	160.0133	0.0133	160.0133	0.0133	0.01	0.1600	PASS	0.03696
180.0000	180.0167	0.0167	180.0167	0.0167	0.01	0.1800	PASS	0.03926
200.0000	200.0188	0.0188	200.0188	0.0188	0.01	0.2000	PASS	0.04619
100.0000	100.0024	0.0024	100.0024	0.0024	0.00	0.1000	PASS	0.02310
0.0000	0.0000	0.0000	0.0000	0.0000	0.00	0.0000	PASS	0.00000

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Manufacturer: Ohaus **Type:** Digital Balance **Serial #:** C525207572

FUNCTIONAL CHECKS					
ECCENTRIC LOAD TEST:		**HYSTERESIS: Load Increments**		**REPEATABILITY:**	
Loading position	100.0000	Test Weight Applied. % of load	Readings	Test Weight Applied	100.0000
Right	100.0028	0%	0.0000	1st	100.0023
Left	100.0023	(R1) 50%	100.0021	2nd	100.0024
Front	100.0023	100%	200.0188	3rd	100.0023
Back	100.0031	(R2)50%	100.0024	4th	100.0023
Center	100.0021	0%	0.0000	5th	100.0023
As Left	PASS	As Left	PASS	As Left	PASS
Tolerance: The maximum error of the eccentric loading must be less than .1% of center load value.		Tolerance: The Difference of R1 and R2 must be within 0.1%		Tolerance: Deviation of lowest and highest reading within 0.1%	

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: Ryan Wills **Date:** October 2, 2025

Quality Manager: Tony Lewandowski **Signature:** 

REPORT#: 42818-1223707-4239

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A2LA ACCREDITED
CERTIFICATE #1550.01

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

Report Number: DIRI01C101887027251205

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	12/5/25	12/4/24	12/2026

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: 16.6°C
As-Left: Pass:☑ Fail:☐	As-Left: Pass:☑ Fail:☐	As-Left: Pass:☑ Fail:☐	

CALIBRATION DATA

Standard	As-Found	As-Left	Expanded Uncertainty
1000	1000.06	1000.06	0.012
600	600.00	600.00	0.011
400	400.00	400.00	0.011
200	200.00	200.00	0.011
100	99.98	99.98	0.011
50	49.98	49.98	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	7/26/24	7/2026	20221688

Permanent Information Concerning this Equipment:

Comments/Information Concerning this Calibration

12/5/25: RH 77%

Report prepared/reviewed by: CC **Date:** 12-5-25 **Technician:** C.Call

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.

Report and Certificate of Calibration

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Address 5777 SE International Way Milwaukie, OR 97222

Local 503-654-9620

A2LA ACCREDITED CERT #4986.01

Report #: 39356-1216144-4847 **Customer PO#:** 1128
Customer Name: PFS TECO
Customer Address: 11785 SE Highway 212, Suite 305
City: Clackamas **State:** OR **Zip:** 97015
Contact: Ethan Frederick
Service Address: 5777 SE International Way Milwaukie, OR 97222

Calibration Standards

10-00027 | Gage Block Set | Mitutoyo | SN: 975536 | Cal: 03/28/2023 | Due: 03/31/2025 | Vendor: Cal-Cert | Report #: 28026-56355-5
10-00954 | Gage Block Set | Shars | SN: 120018 | Cal: 05/26/2023 | Due: 05/26/2025 | Vendor: American Gage | Report #: 109141
LP-01346 | Thermo-Hygrometer | Comark | SN: 06210350198 | Cal: 03/08/2024 | Due: 03/31/2025 | Vendor: Cal-Cert | Range: 122 °F 95 %RH | Report #: 33563-67215-3616

Instrument Data

Calibration Date: March 5, 2025
Calibration Due Date: March 5, 2026
Calibration Frequency: 12 Months
Manufacturer: Craftsman
Type: Tape Measure
Model Number: CMHT37365
Serial #: Unknown
Capacity: 25.00 Feet

Reference: Manufacturer's Spec
Cal-Cert Procedure: CP-115
Indicating System: Scaling
Temperature: 66 °F
Humidity: 40% RH
Asset #: 209
Service Location: Cal-Cert Lab
As Found: Pass
As Left: Pass

Instrument Range: 25.000 Feet **Range Resolution:** 0.06250 Feet

Calibration Standard	As Found Reading	Verification Reading #1	Verification Reading #2
0.0000	0.0000	0.0000	0.0000
0.5000	0.5000	0.5000	0.5000
0.1000	0.1000	0.1000	0.1000
12.0000	12.0000	12.0000	12.0000
48.0000	48.0000	48.0000	48.0000
96.0000	96.0000	96.0000	96.0000
192.0000	192.0000	192.0000	192.0000

Expanded Uncertainty ± 0.07217 Feet

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.
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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: Justin Roye **Date:** March 5, 2025

Quality Manager: Tony Lewandowski **Signature:**

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Report and Certificate of Calibration

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Address 5777 SE International Way Milwaukie, OR 97222

Local 503-654-9620

A2LA ACCREDITED CERT #4986.01

Report #: 38860-206391-21 **Customer PO#:** 1126
Customer Name: PFS TECO
Customer Address: 11785 SE Highway 212, Suite 305
City: Clackamas **State:** OR **Zip:** 97015
Contact: Ethan Frederick
Service Address: 11785 SE Highway 212, Suite 305 Clackamas, OR 97015

Calibration Standards

14-00235 | Thermocouple Meter | Tegam | SN: T-276988 | Cal: 08/23/2024 | Due: 08/31/2025 | Vendor: Cal-Cert | Range: 2400 °F | Report #: 36408-30865-3646
14-01349 | Thermo-Hygrometer | Comark | SN: 06210350162 | Cal: 08/23/2024 | Due: 08/31/2025 | Vendor: Cal-Cert | Range: 122 °F 95 %RH | Report #: 36408-71148-5

Instrument Data

Calibration Date:	February 28, 2025	**Reference:**	Navair 17-20ST-95
Recommended Due Date:	February 28, 2026	**Cal-Cert Procedure:**	CP-013
Calibration Frequency:	12 Months	**Indicating System:**	Computer
Manufacturer:	National Instruments	**Temperature:**	61 °F
Type:	Data Logger	**Humidity:**	45% RH
Model Number:	NI 9213	**Asset #:**	215 Booth 1
Serial #:	1B182FB	**Service Location:**	Service Address
Resolution:	0.1 °F	**As Found:**	Pass
Capacity:	2,500 °F	**As Left:**	Pass
Tolerance:	± 3.0 °F		
Thermocouple Type:	K		

Thermocouple LOGGING 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	0.40	0.40	0.50	0.45	0.784
	500.00	500.10	500.10	500.30	0.20	
	1000.00	1000.10	1000.10	1000.20	0.15	
	1500.00	1499.70	1499.70	1500.40	0.05	
	2000.00	2000.10	2000.10	2000.20	0.15	
	2400.00	2399.90	2399.90	2400.00	-0.05	
	0.00	0.50	0.50	0.40	0.45	

Thermocouple LOGGING 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	0.30	0.30	0.40	0.35	0.511
	500.00	500.10	500.10	500.20	0.15	
	1000.00	1000.10	1000.10	1000.20	0.15	
	1500.00	1500.00	1500.00	1500.10	0.05	
	2000.00	1999.80	1999.80	1999.90	-0.15	
	2400.00	2399.80	2399.80	2399.80	-0.20	
	0.00	0.00	0.00	0.20	0.10	

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	Thermocouple LOGGING 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	0.436
	500.00	500.00	500.00	500.00	0.00	
	1000.00	1000.00	1000.00	1000.00	0.00	
	1500.00	1500.10	1500.10	1500.00	0.05	
	2000.00	1999.80	1999.80	1999.80	-0.20	
	2400.00	2399.70	2399.70	2399.70	-0.30	
	0.00	0.10	0.10	0.00	0.05	

	Thermocouple LOGGING 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	0.00	0.00	0.00	0.00	0.511
	500.00	499.90	499.90	499.90	-0.10	
	1000.00	999.90	999.90	999.90	-0.10	
	1500.00	1499.90	1499.90	1499.90	-0.10	
	2000.00	1999.70	1999.70	1999.60	-0.35	
	2400.00	2399.50	2399.50	2399.70	-0.40	
	0.00	0.00	0.00	0.00	0.00	

	Thermocouple LOGGING FUNCTION					
Channel	**Calibration Standard**	**UUT As Found**	**UUT As Left Reading 1**	**UUT As Left Reading 2**	**As Left Error**	**Expanded Uncertainty±**
Catalyst	0.00	(0.30)	(0.30)	(0.30)	0.30	0.738
	500.00	499.70	499.70	499.70	-0.30	
	1000.00	999.60	999.60	999.70	-0.35	
	1500.00	1499.60	1499.60	1499.50	-0.45	
	2000.00	1999.40	1999.40	1999.40	-0.60	
	2400.00	2399.40	2399.40	2399.40	-0.60	
	0.00	(0.30)	(0.30)	0.30	0.00	

	Thermocouple LOGGING 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	-0.40	-0.40	-0.40	0.40	0.436
	500.00	499.50	499.50	499.50	-0.50	
	1000.00	999.50	999.50	999.50	-0.50	
	1500.00	1499.50	1499.50	1499.40	-0.55	
	2000.00	1999.30	1999.30	1999.40	-0.65	
	2400.00	2399.20	2399.20	2399.20	-0.80	
	0.00	0.00	0.00	0.00	0.00	

	Thermocouple LOGGING 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	-0.40	-0.40	-0.40	0.40	0.436
	500.00	499.50	499.50	499.50	-0.50	
	1000.00	999.50	999.50	999.50	-0.50	
	1500.00	1499.50	1499.50	1499.50	-0.50	
	2000.00	1999.20	1999.20	1999.30	-0.75	
	2400.00	2399.30	2399.30	2399.20	-0.75	
	0.00	-0.40	-0.40	-0.40	0.40	

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Manufacturer: National Instruments **Type:** Data Logger **Serial #:** 1B182FB

	Thermocouple LOGGING 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	-0.50	-0.50	-0.50	0.50	0.436
	500.00	499.40	499.40	499.50	-0.55	
	1000.00	999.40	999.40	999.50	-0.55	
	1500.00	1499.30	1499.30	1499.30	-0.70	
	2000.00	1999.30	1999.30	1999.20	-0.75	
	2400.00	2399.10	2399.10	2399.10	-0.90	
	0.00	-0.50	-0.50	-0.40	0.45	

	Thermocouple LOGGING 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	0.436
	500.00	500.80	500.80	500.80	0.80	
	1000.00	1000.40	1000.40	1000.40	0.40	
	1500.00	1500.00	1500.00	1500.00	0.00	
	2000.00	1999.40	1999.40	1999.50	-0.55	
	2400.00	2399.10	2399.10	2399.10	-0.90	
	0.00	0.00	0.00	0.00	0.00	

	Thermocouple LOGGING 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	-0.50	-0.50	-0.50	0.50	0.511
	500.00	499.50	499.50	499.40	-0.55	
	1000.00	999.40	999.40	999.50	-0.55	
	1500.00	1499.40	1499.40	1499.40	-0.60	
	2000.00	1999.20	1999.20	1999.20	-0.80	
	2400.00	2399.10	2399.10	2398.90	-1.00	
	0.00	-0.50	-0.50	-0.50	0.50	

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: Samuel Owens **Date:** February 28, 2025

Quality Manager: Tony Lewandowski **Signature:**

Report #: 38860-206391-21

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Report and Certificate of Calibration

CAL-CERT CALIBRATION CERTIFICATION

www.Cal-Cert.com

Toll Free 800-856-4662

Address 5777 SE International Way Milwaukie, OR 97222

Local 503-654-9620

A2LA ACCREDITED CERT #4986.01

Report #: 38860-206391-21-B **Customer PO#:** 1126
Customer Name: PFS TECO
Customer Address: 11785 SE Highway 212, Suite 305
City: Clackamas **State:** OR **Zip:** 97015
Contact: Ethan Frederick
Service Address: 11785 SE Highway 212, Suite 305 Clackamas, OR 97015

Calibration Standards

14-00235 | Thermocouple Meter | Tegam | SN: T-276988 | Cal: 08/23/2024 | Due: 08/31/2025 | Vendor: Cal-Cert | Range: 2400 °F | Report #: 36408-30865-3646
14-01349 | Thermo-Hygrometer | Comark | SN: 06210350162 | Cal: 08/23/2024 | Due: 08/31/2025 | Vendor: Cal-Cert | Range: 122 °F 95 %RH | Report #: 36408-71148-5

Instrument Data

Calibration Date:	February 28, 2025	**Reference:**	Navair 17-20ST-95
Recommended Due Date:	February 28, 2026	**Cal-Cert Procedure:**	CP-013
Calibration Frequency:	12 Months	**Indicating System:**	Computer
Manufacturer:	National Instruments	**Temperature:**	65 °F
Type:	Data Logger	**Humidity:**	40% RH
Model Number:	NI 9213	**Asset #:**	215 Booth 1
Serial #:	1B182FB	**Service Location:**	Service Address
Resolution:	0.1 °F	**As Found:**	Pass
Capacity:	2,400 °F	**As Left:**	Pass
Tolerance:	± 3.0 °F		
Thermocouple Type:	K		

Thermocouple LOGGING 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	-0.60	-0.60	-0.60	0.60	0.511
	500.00	499.30	499.30	499.50	-0.60	
	1000.00	999.40	999.40	999.40	-0.60	
	1500.00	1499.30	1499.30	1499.30	-0.70	
	2000.00	1999.10	1999.10	1999.20	-0.85	
	2400.00	2399.00	2399.00	2399.00	-1.00	
	0.00	-0.60	-0.60	-0.60	0.60	

Thermocouple LOGGING 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	-0.60	-0.60	-0.60	0.60	0.436
	500.00	499.50	499.50	499.50	-0.50	
	1000.00	999.40	999.40	999.50	-0.55	
	1500.00	1499.40	1499.40	1499.40	-0.60	
	2000.00	1999.20	1999.20	1999.30	-0.75	
	2400.00	2399.10	2399.10	2399.10	-0.90	
	0.00	-0.60	-0.60	-0.60	0.60	

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Manufacturer: National Instruments **Type:** Data Logger **Serial #:** 1B182FB

	Thermocouple LOGGING 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	2.50	2.50	2.80	2.65	0.738
	500.00	502.40	502.40	502.60	2.50	
	1000.00	1002.30	1002.30	1002.60	2.45	
	1500.00	1502.70	1502.70	1502.70	2.70	
	2000.00	2002.70	2002.70	2002.30	2.50	
	2400.00	2402.80	2402.80	2403.40	3.10	
	0.00	2.80	2.80	2.80	2.80	

	Thermocouple LOGGING 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	-0.20	-0.20	-0.20	0.20	0.511
	500.80	499.80	499.80	499.60	-1.10	
	1000.40	999.70	999.70	999.60	-0.75	
	1500.00	1499.50	1499.50	1499.50	-0.50	
	1999.40	1999.40	1999.40	1999.40	0.00	
	2399.10	2399.20	2399.20	2399.20	0.10	
	0.00	-0.20	-0.20	-0.20	0.20	

	Thermocouple LOGGING 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	0.436
	20.00	18.20	18.20	18.20	-1.80	
	40.00	38.20	38.20	38.20	-1.80	
	60.00	58.10	58.10	58.20	-1.85	
	80.00	78.40	78.40	78.40	-1.60	
	100.00	98.40	98.40	98.30	-1.65	
	0.00	0.00	0.00	0.00	0.00	

Remarks:

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Cal-Cert is accredited by A2LA under Calibration Laboratory Code #4986.01.
A2LA is recognized under the ILAC mutual recognition agreement (MRA).

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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: Samuel Owens **Date:** February 28, 2025

Quality Manager: Tony Lewandowski **Signature:**

Report #: 38860-206391-21-B

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Thermocouple Readout Calibration

DUT	
Manufacturer:	National Instruments
Model:	NI 9213
Lab ID #:	215
Serial #:	1B182FB
Calibration Date:	8/26/2025
Calibration Expiration:	2/26/2026
Barometric Pressure:	29.91 in. Hg

Equipment Used:	Ref. Std. TC Signal Generator
Manufacturer:	Omega
Model:	CL23A
Lab ID#:	165
Cal. Expiration Date:	2/11/2026

Calibrate in accordance with EA-10/11 • EA Guidelines on the Calibration of Temperature Indicators and Simulators by Electrical Simulation and Measurement. Use procedure specified for thermocouple indicators without cold junction compensation.

Use only calibrated, NIST traceable reference standard signal generator.

Stated uncertainty calcuated with RSS method with k=2 for a 95% confidence interval.

Channel	Std. TC Signal	DUT	Error	Expanded Uncertainty
	0	0.9	0.9	
	500	500.8	0.8	
Tunnel	1000	1000.9	0.9	0.906
Type K	1500	1500.8	0.8	
	2000	2000.6	0.6	

Channel	Std. TC Signal	DUT	Error	Expanded Uncertainty
	0	0.8	0.8	
	500	500.8	0.8	
Flue	1000	1000.9	0.9	0.906
Type K	1500	1500.2	0.2	
	2000	2000.4	0.4	

Channel	Std. TC Signal	DUT	Error	Expanded Uncertainty
	0	0.9	0.9	
	500	500.8	0.8	
Filter A	1000	1000.6	0.6	0.906
Type K	1500	1500.4	0.4	
	2000	2000.2	0.2	

Channel	Std. TC Signal	DUT	Error	Expanded Uncertainty
	0	0.9	0.9	
	500	500.8	0.8	
Filter B	1000	1000.6	0.6	0.906
Type K	1500	1500.4	0.4	
	2000	2000.2	0.2	

Channel	Std. TC Signal	DUT	Error	Expanded Uncertainty
	0	0.9	0.9	
	500	500.8	0.8	
Filter C	1000	1000.6	0.6	0.906
Type K	1500	1500.4	0.4	
	2000	2000.2	0.2	

Thermocouple Readout Calibration

DUT	
Manufacturer:	National Instruments
Model:	NI 9213
Lab ID #:	215
Serial #:	1B182FB
Calibration Date:	8/26/2025
Calibration Expiration:	2/26/2026
Barometric Pressure:	29.91 in. Hg

Equipment Used:	Ref. Std. TC Signal Generator
Manufacturer:	Omega
Model:	CL23A
Lab ID#:	165
Cal. Expiration Date:	2/11/2026

Calibrate in accordance with EA-10/11 • EA Guidelines on the Calibration of Temperature Indicators and Simulators by Electrical Simulation and Measurement. Use procedure specified for thermocouple indicators without cold junction compensation.

Use only calibrated, NIST traceable reference standard signal generator.

Stated uncertainty calcuated with RSS method with k=2 for a 95% confidence interval.

Channel	Std. TC Signal	DUT	Error	Expanded Uncertainty
	0	0.8	0.8	
	500	500.8	0.8	
Meter A	1000	1000.6	0.6	0.906
Type K	1500	1500.4	0.4	
	2000	2000.2	0.2	

Channel	Std. TC Signal	DUT	Error	Expanded Uncertainty
	0	0.8	0.8	
	500	500.8	0.8	
Meter B	1000	1000.6	0.6	0.906
Type K	1500	1500.4	0.4	
	2000	2000.2	0.2	

Channel	Std. TC Signal	DUT	Error	Expanded Uncertainty
	0	0.3	0.3	
	500	500.2	0.2	
Meter C	1000	1000	0	0.906
Type K	1500	1500	0	
	2000	1999.7	0.3	

Channel	Std. TC Signal	DUT	Error	Expanded Uncertainty
	0	0.5	0.5	
	500	500.2	0.2	
FB Top	1000	1000.3	0.3	0.906
Type K	1500	1500.2	0.2	
	2000	1999.9	0.1	

Channel	Std. TC Signal	DUT	Error	Expanded Uncertainty
	0	0.3	0.3	
	500	500.2	0.2	
FB Bottom	1000	1000	0	0.906
Type K	1500	1500	0	
	2000	1999.7	0.3	

Thermocouple Readout Calibration

DUT	
Manufacturer:	National Instruments
Model:	NI 9213
Lab ID #:	215
Serial #:	1B182FB
Calibration Date:	8/26/2025
Calibration Expiration:	2/26/2026
Barometric Pressure:	29.91 in. Hg

Equipment Used:	Ref. Std. TC Signal Generator
Manufacturer:	Omega
Model:	CL23A
Lab ID#:	165
Cal. Expiration Date:	2/11/2026

Calibrate in accordance with EA-10/11 • EA Guidelines on the Calibration of Temperature Indicators and Simulators by Electrical Simulation and Measurement. Use procedure specified for thermocouple indicators without cold junction compensation.

Use only calibrated, NIST traceable reference standard signal generator.

Stated uncertainty calcuated with RSS method with k=2 for a 95% confidence interval.

Channel	Std. TC Signal	DUT	Error	Expanded Uncertainty
	0	0.3	0.3	
	500	500.2	0.2	
FB Back	1000	1000	0	0.906
Type K	1500	1500	0	
	2000	1999.7	0.3	

Channel	Std. TC Signal	DUT	Error	Expanded Uncertainty
	0	0.3	0.3	
	500	500.2	0.2	
FB Left	1000	1000	0	0.906
Type K	1500	1500	0	
	2000	1999.7	0.3	

Channel	Std. TC Signal	DUT	Error	Expanded Uncertainty
	0	0.3	0.3	
	500	500.2	0.2	
FB Right	1000	1000	0	0.906
Type K	1500	1500	0	
	2000	1999.7	0.3	

Channel	Std. TC Signal	DUT	Error	Expanded Uncertainty
	0	0.5	0.5	
	500	500.3	0.3	
Catalyst	1000	1000.2	0.2	0.906
Type K	1500	1500.2	0.2	
	2000	1999.7	0.3	

Channel	Std. TC Signal	DUT	Error	Expanded Uncertainty
	0	0.3	0.3	
	50	500.2	450.2	
Ambient	100	1000	900	0.906
Type T	150	1500	1350	
	200	1999.7	1799.7	

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Linde Gas & Equipment Inc.
5700 S. Alameda Street
Los Angeles CA 90058
Tel: 323-585-2154
Fax: 714-542-6689
PGVP ID: F22024

CERTIFICATE OF ANALYSIS / EPA PROTOCOL GAS

Customer & Order Information

LGEPKG TUALATIN OR H
10450 SW TUALATIN SHERWOOD ROAD
TUALATIN OR 97062-9547

Certificate Issuance Date: 09/30/2024
Linde Order Number: 72931026
Part Number: NI CD17CO8E-AS
Customer PO Number: 80945951

Fill Date: 09/17/2024
Lot Number: 70086426104
Cylinder Style & Outlet: AS CGA 590
Cylinder Pressure and Volume: 1290 psig 99 ft3

Certified Concentration

ProSpec EZ Cert

Expiration Date: 09/26/2032		NIST Traceable
Cylinder Number: DT0042934		Expanded Uncertainty
17.32 %	Carbon dioxide	± 0.16 %
4.35 %	Carbon monoxide	± 0.02 %
16.96 %	Oxygen	± 0.05 %
Balance	Nitrogen	

Certification Information:

Certification Date: 09/26/2024 Term: 96 Months Expiration Date: 09/26/2032

This cylinder was certified according to the 2012 EPA Traceability Protocol, Document #EPA-600/R-12/531, using Procedure G1. Uncertainty above is expressed as absolute expanded uncertainty at a level of confidence of approximately 95% with a coverage factor k = 2. Do Not Use this Standard if Pressure is less than 100 PSIG.

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

Analytical Data:

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

1. **Component:** Carbon dioxide

Requested Concentration: 17 %
Certified Concentration: 17.32 %
Instrument Used: Horiba VIA-510 S/N 20C194WK
Analytical Method: NDIR
Last Multipoint Calibration: 08/30/2024

First Analysis Data:							Date 09/26/2024
Z: 0	R: 19.34	C: 17.38	Conc: 17.43
R: 19.28	Z: 0	C: 17.22	Conc: 17.27
Z: 0	C: 17.2	R: 19.23	Conc: 17.25
UOM: %			Mean Test Assay: 17.32 %

Reference Standard: Type / Cylinder #: NTRM / CC725981
Concentration / Uncertainty: 19.34 % ±0.16 %
Expiration Date: 01/12/2027
Traceable to: SRM # / Sample # / Cylinder #: NTRM / 190701 / CC725973
SRM Concentration / Uncertainty: 19.34% / ±0.16%
SRM Expiration Date: 01/12/2027

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: 4.25 %
Certified Concentration: 4.35 %
Instrument Used: Horiba VIA-510 S/N UB9UCSYX
Analytical Method: NDIR
Last Multipoint Calibration: 08/30/2024

First Analysis Data:							Date 09/26/2024
Z: 0	R: 5.04	C: 4.35	Conc: 4.35
R: 5.04	Z: 0	C: 4.35	Conc: 4.35
Z: 0	C: 4.35	R: 5.05	Conc: 4.35
UOM: %			Mean Test Assay: 4.35 %

Reference Standard: Type / Cylinder #: GMIS / CC239379
Concentration / Uncertainty: 5.04 % ±0.03 %
Expiration Date: 12/27/2031
Traceable to: SRM # / Sample # / Cylinder #: 2642a / 51-D-23 / FF23106
SRM Concentration / Uncertainty: 7.859% / ±0.039%
SRM Expiration Date: 05/18/2026

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: 17 %
Certified Concentration: 16.96 %
Instrument Used: Siemens Oxymat 6E S/N 7MB20211AA000CA1
Analytical Method: Paramagnetic
Last Multipoint Calibration: 09/04/2024

First Analysis Data:							Date 09/26/2024
Z: 0	R: 20.86	C: 16.98	Conc: 16.96
R: 20.88	Z: 0	C: 16.96	Conc: 16.94
Z: 0	C: 16.99	R: 20.9	Conc: 16.97
UOM: %			Mean Test Assay: 16.96 %

Reference Standard: Type / Cylinder #: GMIS / DT0040804
Concentration / Uncertainty: 20.86 % ±0.05 %
Expiration Date: 09/09/2032
Traceable to: SRM # / Sample # / Cylinder #: 2659a / 71-D-23 / CAL015788
SRM Concentration / Uncertainty: 20.720 % / ±0.043%
SRM Expiration Date: 02/28/2026

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: Miriam Bahena

Certified By: Nelson Ma

Information contained herein has been prepared at your request by qualified experts within Linde Gas & Equipment Inc. While we believe that the information is accurate within the limits of the analytical methods employed and is complete to the extent of the specific analyses performed, we make no warranty or representation as to the suitability of the use of the information for any purpose The information is offered with the understanding that any use of the information is at the sole discretion and risk of the user. In no event shall the liability of Linde Gas & Equipment Inc. , arising out of the use of the information contained herein exceed the fee established for providing such information.

Linde Gas & Equipment Inc.
5700 S. Alameda Street
Los Angeles CA 90058
Tel: 323-585-2154
Fax: 714-542-6689
PGVP ID: F22024

DocNumber: 577393

CERTIFICATE OF ANALYSIS / EPA PROTOCOL GAS

Customer & Order Information

LGEPKG TUALATIN OR H
10450 SW TUALATIN SHERWOOD ROAD
TUALATIN OR 97062-9547

Certificate Issuance Date: 07/29/2024
Linde Order Number: 72854903
Part Number: NI CD10CO80E-AS
Customer PO Number: 80868921

Fill Date: 06/22/2024
Lot Number: 70086417403
Cylinder Style & Outlet: AS CGA 590
Cylinder Pressure and Volume: 2000 psig 148 ft3

Certified Concentration

ProSpec EZ Cert

Expiration Date: 07/29/2032		NIST Traceable
Cylinder Number: CC174411		Expanded Uncertainty
10.02 %	Carbon dioxide	± 0.08 %
2.53 %	Carbon monoxide	± 0.02 %
10.07 %	Oxygen	± 0.04 %
Balance	Nitrogen	

Certification Information:

Certification Date: 07/29/2024 Term: 96 Months Expiration Date: 07/29/2032

This cylinder was certified according to the 2012 EPA Traceability Protocol, Document #EPA-600/R-12/531, using Procedure G1. Uncertainty above is expressed as absolute expanded uncertainty at a level of confidence of approximately 95% with a coverage factor k = 2. 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: 10.02 %
Instrument Used: Horiba VIA-510 S/N 20C194WK
Analytical Method: NDIR
Last Multipoint Calibration: 07/25/2024

Reference Standard: Type / Cylinder #: NTRM / DT0030310
Concentration / Uncertainty: 7.011 % ±0.058 %
Expiration Date: 01/27/2027
Traceable to: SRM # / Sample # / Cylinder #: NTRM#DT0030296 / 190702 / DT0030296
SRM Concentration / Uncertainty: 7.011 / ±0.058
SRM Expiration Date: 01/27/2027

First Analysis Data:							Date 07/29/2024
Z: 0	R: 7.01	C: 10.02	Conc: 10.02				
R: 7.01	Z: 0	C: 10.03	Conc: 10.03				
Z: 0	C: 10.03	R: 7.02	Conc: 10.03				
UOM: %			Mean Test Assay: 10.02 %				

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: 07/25/2024

Reference Standard: Type / Cylinder #: GMIS / CC109418
Concentration / Uncertainty: 2.004 % ±0.012 %
Expiration Date: 10/18/2026
Traceable to: SRM # / Sample # / Cylinder #: SRM 2640a / 53-C-38 / CAL013925
SRM Concentration / Uncertainty: 1.978% / ±0.011%
SRM Expiration Date: 07/30/2022

First Analysis Data:							Date 07/29/2024
Z: 0	R: 2	C: 2.52	Conc: 2.53				
R: 1.99	Z: 0	C: 2.52	Conc: 2.53				
Z: 0	C: 2.52	R: 2	Conc: 2.53				
UOM: %			Mean Test Assay: 2.53 %				

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 %
Certified Concentration: 10.07 %
Instrument Used: Siemens Oxymat 6E S/N 7MB20211AA000CA1
Analytical Method: Paramagnetic
Last Multipoint Calibration: 07/26/2024

Reference Standard: Type / Cylinder #: GMIS / CC506236
Concentration / Uncertainty: 15.08 % ±0.03 %
Expiration Date: 10/10/2031
Traceable to: SRM # / Sample # / Cylinder #: 2659a / 71-E-19 / FF22331
SRM Concentration / Uncertainty: 20.863% / ±0.021%
SRM Expiration Date: 02/27/2026

First Analysis Data:							Date 07/29/2024
Z: 0	R: 15.08	C: 10.06	Conc: 10.07				
R: 15.06	Z: 0	C: 10.06	Conc: 10.07				
Z: 0	C: 10.06	R: 15.07	Conc: 10.07				
UOM: %			Mean Test Assay: 10.07 %				

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: Miriam Bahena

Certified By: Nelson Ma

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