
Sherwood Industries Ltd.

Project # 21-694

Model: Enviro Mini 2

AKA:

Enviro P3-2

Regency Greenfire GF40-2

Type: Pellet-Fired Freestanding Heater

May 28, 2021

Revised: December 8, 2025

**ASTM E2779 Standard Test Method for
Determining Particulate Matter Emissions
from Pellet Heaters**

Contact: Garrett Posehn
Sherwood Industries Ltd.
6782 Oldfield Rd.
Victoria, BC Canada
V8M 2A3
250-652-6080

Prepared by: Aaron Kravitz



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

Revision Summary

Date: May 28, 2021 – Original Issue

Date: June 30, 2021 – The following revisions were made per request from the EPA:

- A section was added to the “Settings & Run Notes” table to clarify air damper position for testing, see page 9 of test report. An additional drawing of the corresponding manufacturer’s factory set damper position was added to Appendix D of the CBI report.

- The owner’s manuals were edited to reflect the fact that the damper position is factory set and shall be adjusted by a qualified technician only. See page 10 and 21 of Mini-2 and P3-2 owners manuals, respectively (pages 123 and 97 in Non-CBI report).

- The pre-conditioning test data was revised to include the dates on which conditioning took place, see page 19 of Non-CBI Test Report.

Date: December 8, 2025 – The following revisions were made prior to re-submittal for renewal:

- Replaced sections describing sampling and calibration procedures with more complete descriptions, see pages 14 -19.

- Added results with negative weights uncorrected to Run Narrative, see page 7.

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Affidavit

PFS-TECO was contracted by Sherwood Industries Ltd. to provide testing services for the Enviro Mini 2 Pellet-Fired Fireplace Insert per ASTM E2779, *Determining PM Emissions from Pellet Heaters*. All testing and associated procedures were conducted at PFS-TECO's Portland Laboratory on 4/14/2021. PFS-TECO's Portland Laboratory is located at 11785 SE Highway 212 – Suite 305, Clackamas, Oregon 97015. Testing procedures followed ASTM E2779. Particulate sampling was performed per ASTM E2515, *Standard Test Method for Determination of Particulate Matter Emissions Collected by a Dilution Tunnel*.

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

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



Aaron Kravitz, Testing Supervisor

Introduction

Sherwood Industries Ltd. of Victoria, BC contracted with PFS-TECO to perform EPA certification testing on the Enviro Mini 2 Pellet-Fired Room Heater. All testing was performed at PFS-TECO's Portland Laboratory. Testing was performed by Mr. Aaron Kravitz.

Notes

- Prior to start of testing, 50 hours of conditioning was performed by the manufacturer at medium burn setting in accordance with ASTM E2779.
- Prior to start of testing, the dilution tunnel was cleaned with a steel brush.
- Front filters were changed on sample train A at one hour after the test began.
- A single, integrated test run, in accordance with ASTM E2779 was performed:
 - o 1 Hour at Maximum Burn Setting
 - o 2 Hours at Medium Burn Setting (Defined as <50% of Maximum Burn Rate)
 - o 3 Hours at Minimum Burn Setting

Pellet Heater Identification and Testing

- Appliance Tested: ***Enviro Mini 2***
- Serial Number: ***N/A – Prototype Unit; PFS Tracking Number 0094***
- Manufacturer: ***Sherwood Industries Ltd.***
- Catalyst: ***No***
- Heat exchange blower: ***Integral***
- Type: ***Pellet Stove***
- Style: ***Free Standing***
- Date Received: ***Monday, April 12, 2021***
- Testing Period – Start: ***Wednesday, April 14, 2021*** Finish: ***Wednesday, April 14, 2021***
- Test Location: ***PFS-TECO Portland Laboratory, 11785 SE HWY 212 - Suite 305, Clackamas, OR 97015***
- Elevation: ***≈131 Feet above sea level***
- Test Technician(s): ***Aaron Kravitz***
- Observers: ***Mr. Winslow Howe***

Test Procedures and Equipment

All Sampling and analytical procedures were performed by Aaron Kravitz. All procedures used are directly from ASTM E2779 and ASTM E2515. See the list below for equipment used. See Appendix C submitted with this report for calibration data.

Equipment List:

Equipment ID#	Equipment Description
041	Rice Lake 3'x3' floor scale w/digital weight indicator
053	APEX XC-60 Digital Emissions Sampling Box A
054	APEX XC-60 Digital Emissions Sampling Box B
055	APEX Ambient sampling box
057	California Analytical ZRE CO ₂ /CO/O ₂ IR ANALYZER
109A/B	Troemner 100mg/200mg Audit Weights
107	Sartorius Analytical Balance
097	10 lb audit weight
095	Anemometer
111	Microtector
92302052	Gas Analyzer Calibration Span Gas
91005049	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.

Results

The integrated test run emission rate for test Run 1 was measured to be **0.54 g/hr** with a Higher Heating Values efficiency of **80.2%** and a CO emission rate of **0.03 g/min.** The calculated first hour particulate emission rate was **1.26 g/hr.** The Sherwood Industries Ltd. Model Enviro Mini 2 Pellet-Fired Room Heater meets the 2020 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

EPA Application Table											
Run Number	Date	Segments		Run Time (min)	Heat Output (BTU/hr)	1st Hr Emissions (g/hr)	Integrated Total (g/hr)	CO Emissions (g/min)	Overall CO Emissions (g/min)	Heating Efficiency (%HHV)	Overall Heating Efficiency (%HHV)
		Setting	BR								
1	4/14/2021	H	1.54	60	23892	1.26	0.54	0.09	0.03	81.0%	80.2%
		M	0.69	120	10024			0.04		75.6%	
		L	0.43	180	6881			0.01		83.1%	
		OA	0.70	360	10798			0.03		80.2%	

Test Run Narrative

Run 1

Run 1 was performed on 4/14/2021 as an attempted integrated test run per ASTM E2779. The overall test duration was 360 minutes. The particulate emissions rate for the integrated test run was 0.54 g/hr. The run had an overall HHV efficiency of 80.2%. The train A front filter was changed at 1 hr. All test results were appropriate and valid and the burn rate requirement for the integrated test run were achieved. There were no anomalies and all criteria were met.

One negative sample weight was observed for this run, if its weight is uncorrected, the emissions rate would be 0.52 g/hr.

Test Conditions Summary

Testing conditions for all runs fell within allowable specifications of ASTM E2779 and ASTM E2515. A summary of facility conditions, fuel burned, and run times is listed below.

Runs	Ambient (°F)		Relative Humidity (%)		Average Barometric Pressure (In. Hg.)	Preburn Fuel Weight (lbs)	Test Fuel Weight (lbs)	Test Fuel Moisture (%DB)	Test Run Time (Min)
	Pre	Post	Pre	Post					
1	65	72	23.5	21.7	30.13	3.6	9.8	5.14	360

Appliance Operation and Test Settings

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

Settings & Run Notes

Prior to Testing	Excess combustion air slide adjusted per manufacturers' instructions to 0.06" H ₂ O in firebox. Final slide position of 0.52" open from fully closed; see Appendix D.	
Run 1	Pre-Burn	Test Run
	Heat setting 5 (max), Feed trim 5 (max), Combustion trim* 2	High Segment: Heat Setting 5, Feed trim 5, combustion trim 2 Medium Segment: Heat Setting 2, Feed trim 1, Combustion trim 1 Low Segment: Heat Setting 1 (min), Feed trim 1 (min), Combustion trim 1

*Combustion trim setting does not affect burn rate

Appliance Description

Model(s): Enviro Mini 2

Additional Models Discussion: The Mini-2 is available in several other model designations, but these models (the Enviro P3-2 and Regency Greenfire GF40-2) are marketing designations only and are in all respects that may affect emissions performance identical to the tested unit.

Appliance Type: Pellet-Fired Heater

Air Introduction System: Air enters the burn chamber by being pulled through the firepot, via the exhaust blower, see air flow diagram in Appendix D.

Combustion Control: Feed rate is electronically controlled via user-selectable controls.

Baffles: N/A

Flue Outlet: 3-inch exhaust outlet located on the rear of the appliance.

Appliance Dimensions

Enviro Mini 2 Dimensions

Height	Width	Depth	Firebox Volume	Weight
34"	18"	24"	N/A – Pellet Stove	195 lbs

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

Appliance Front



Appliance Left



Appliance Right



Appliance Rear



Test Fuel Properties

Test fuel used was Lignetics Wood Pellet Fuel, a PFI Certified Premium Pellet Brand. A sample of pellets was sent to Twin Ports Testing for analysis, see report below.



Pellet Fuel Analysis



Twin Ports Testing, Inc.
1301 North 3rd Street
Superior, WI 54880
p: 715-392-7114
p: 800-373-2562
f: 715-392-7163
www.twinportstesting.com

Analytical Test Report

Report No: **USR:W221-0222-01**
Issue No: **1**

Client: PFS-TECO
11785 SE Hwy 212 Ste 305
Clackamas, OR 97015
Attention: Sebastian Button
PO No:

Signed:

Katy Jahr
Chemistry Lab Supervisor

Date of Issue: 5/4/2021

THIS DOCUMENT SHALL NOT BE REPRODUCED EXCEPT IN FULL

Sample Details

Sample Log No: W221-0222-01
Sample Designation: Lignetics
Sample Recognized As: Wood Pellets

Sample Date:
Sample Time:
Arrival Date: 4/19/2021

Test Results

	METHOD	UNITS	MOISTURE FREE	AS RECEIVED
Moisture Total	ASTM E871	wt. %		4.89
Ash	ASTM D1102	wt. %	0.36	0.34
Volatile Matter	ASTM D3175	wt. %		
Fixed Carbon by Difference	ASTM D3172	wt. %		
Sulfur	ASTM D4239	wt. %	0.007	0.007
SO ₂	Calculated	lb/mmbtu		0.017
Net Cal. Value at Const. Pressure	ISO 1928	GJ/tonne	18.53	17.51
Gross Cal. Value at Const. Vol.	ASTM E711	Btu/lb	8698	8272
Carbon	ASTM D5373	wt. %	47.28	44.97
Hydrogen*	ASTM D5373	wt. %	7.83	7.45
Nitrogen	ASTM D5373	wt. %	< 0.20	< 0.19
Oxygen*	ASTM D3176	wt. %	> 44.31	> 42.15
*Note: As received values do not include hydrogen and oxygen in the total moisture.				
Chlorine	ASTM D6721	mg/kg		
Fluorine	ASTM D3761	mg/kg		
Mercury	ASTM D6722	mg/kg		
Bulk Density	ASTM E873	lbs/ft ³		
Fines (Less than 1/8")	TPT CH-P-06	wt. %		
Durability Index	Kansas State	PDI		
Sample Above 1.50"	TPT CH-P-06	wt. %		
Maximum Length (Single Pellet)	TPT CH-P-06	inch		
Diameter, Range	TPT CH-P-05	inch		to
Diameter, Average	TPT CH-P-05	inch		
Stated Bag Weight	TPT CH-P-01	lbs		
Actual Bag Weight	TPT CH-P-01	lbs		

Comments:



PJLA
Testing
Accreditation #60243

Results issued on this report only reflect the analysis of the sample submitted. Our reports and letters are for the exclusive and confidential use of our clients and may not be reproduced, except in their entirety, without the written approval of Twin Ports Testing. Twin Ports Testing Laboratory is accredited to the ISO/IEC 17025:2017 standard by PJLA.

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 of 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.

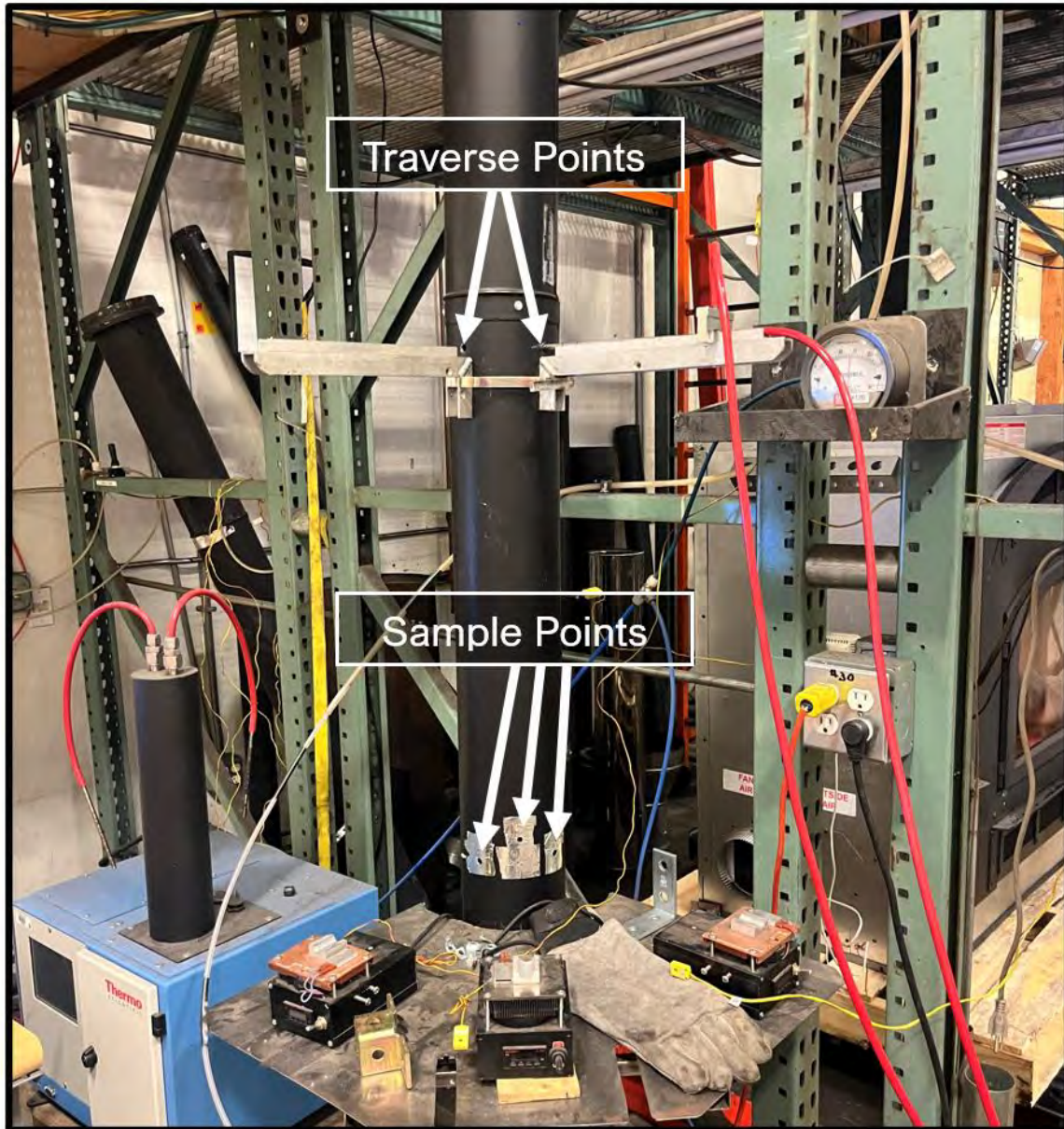
Dilution tunnel temperature was measured by a type K thermocouple probe.

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. 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:

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 90° 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 REQUIREMENTS 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)

Conditioning Burn Data

Date(s):3/23/21 - 3/26/21

Flue 8'	Scale (lb)	Loss (lb)	Time (hr)
174.23	81.4		0
184.45	79.5	1.9	1
182.80	77.4	2.1	2
183.73	75.3	2.1	3
183.39	73.2	2.1	4
196.19	71.0	2.2	5
195.50	69.0	2.0	6
193.22	67.0	2.0	7
198.75	64.9	2.1	8
200.55	62.7	2.2	9
198.93	60.7	2.0	10
196.94	58.6	2.1	11
199.67	56.4	2.2	12
200.17	54.3	2.1	13
201.34	52.1	2.2	14
202.11	49.9	2.2	15
199.57	47.8	2.1	16
207.19	45.5	2.3	17
199.97	43.5	2.0	18
200.56	62.4	-18.9	19
201.96	60.2	2.2	20
203.86	58.0	2.2	21
197.44	78.5	-20.5	22
205.93	76.6	1.9	23
202.18	74.6	2.0	24
204.55	72.4	2.2	25
206.05	70.3	2.1	26
201.10	68.2	2.1	27
205.93	66.0	2.2	28
203.58	63.9	2.1	29
205.16	61.8	2.1	30
205.10	59.6	2.2	31
203.16	57.6	2.0	32
207.00	55.4	2.2	33
205.48	53.3	2.1	34
203.91	51.3	2.0	35
206.16	49.1	2.2	36
205.16	47.0	2.1	37
202.21	44.9	2.1	38
196.70	43.1	1.8	39
170.42	41.6	1.5	40
176.11	80.6	-39.0	41
174.06	78.6	2.0	42
177.65	76.4	2.2	43
178.18	74.3	2.1	44
182.65	72.0	2.3	45

180.40	69.8	2.2	46
178.31	67.7	2.1	47
180.07	65.5	2.2	48
180.10	63.3	2.2	49
181.74	61.2	2.1	50

Mini Test Recommendations

Set-Up

The unit should be set up with a 6in flue and the air dampener in the rear of the unit set to a position that after running on a setting of 5 heat, 5 Feed Trim and 5 Combustion Trim the Vacuum of the fire box should be .06 in H₂O, the CO₂ should be around 7.% in the exhaust and an 8' Flue Temp of around 240 degrees Fahrenheit.

Test Settings

High: 5 Heat, 5 Feed Trim, 2 Combustion Trim

Med: 2 Heat, 2 Feed Trim, 1 Combustion Trim

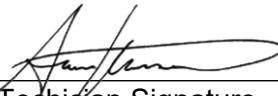
Low: 1 Heat, 1 Feed Trim, 1 Combustion Trim

PELLET TEST DATA PACKET
ASTM E2779/E2515



Run 1 Data Summary

Client: Sherwood
Model: Mini 2
Job #: 21-694
Tracking #: 91
Test Date: 4/14/2021



Technician Signature

5/28/2021

Date

TEST RESULTS - ASTM E2779 / ASTM E2515

Client: Sherwood

Model: Mini 2

Run #: 1

Job #: 21-694

Tracking #: 91

Technician: AK

Date: 4/14/2021

Burn Rate Summary	
High Burn Rate (dry kg/hr)	1.54
Medium Burn Rate (dry kg/hr)	0.69
Low Burn Rate (dry kg/hr)	0.43
Overall Burn Rate (dry kg/hr)	0.70

44.9% of High Burn Rate

28.1% of High Burn Rate

	Ambient Sample	Sample Train A	Sample Train B	1st Hour Filter
Total Sample Volume (ft ³)	63.619	50.718	51.612	8.344
Average Gas Velocity in Dilution Tunnel (ft/sec)	16.9			
Average Gas Flow Rate in Dilution Tunnel (dscf/hr)	11628.2			
Average Gas Meter Temperature (°F)	67.7	91.4	90.0	73.5
Total Sample Volume (dscf)	64.712	48.920	50.966	8.318
Average Tunnel Temperature (°F)	76.1			
Total Time of Test (min)	360			
Total Particulate Catch (mg)	0.0	2.4	2.2	0.9
Particulate Concentration, dry-standard (g/dscf)	0.0000000	0.0000491	0.0000432	0.0001082
Total PM Emissions (g)	0.00	3.42	3.01	1.26
Particulate Emission Rate (g/hr)	0.00	0.57	0.50	1.26
Emissions Factor (g/kg)	-	0.81	0.72	0.82
Difference from Average Total Particulate Emissions (g)	-	0.21	0.21	-
Difference from Average Total Particulate Emissions (%)	-	6.4%	6.4%	-
Difference from Average Emissions Factor (g/kg)	-	0.05	0.05	-

Final Average Results	
Total Particulate Emissions (g)	3.22
Particulate Emission Rate (g/hr)	0.54
Emissions Factor (g/kg)	0.76
HHV Efficiency (%)	80.2%
LHV Efficiency (%)	87.4%
CO Emissions (g/min)	0.03

Quality Checks	Requirement	Observed	Result
Dual Train Precision	Each train within 7.5% of average emissions (in grams), or emission factors within 0.5 g/kg	See Above	OK
Filter Temps	<90 °F	73.9	OK
Face Velocity	< 30 ft/min	8.0	OK
Leakage Rate	Less than 4% of average sample rate	0.001 cfm	OK
Ambient Temp	55-90 °F	Min: 64.6 / Max: 72.4	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
Medium Burn Rate	< 50% of High	44.9%	OK

Overall Pellet Test Efficiency Results

Manufacturer: Sherwood
Model: Mini 2
Date: 04/14/21
Run: 1
Control #: 21-694
Test Duration: 360
Output Category: Integrated

Test Results in Accordance with CSA B415.1-09

	HHV Basis	LHV Basis
Overall Efficiency	80.152%	87.4%
Combustion Efficiency	99.5%	99.5%
Heat Transfer Efficiency	80.6%	87.9%

Output Rate (kJ/h)	11,383	10,798	(Btu/h)
Burn Rate (kg/h)	0.70	1.55	(lb/h)
Input (kJ/h)	14,202	13,472	(Btu/h)

Test Load Weight (dry kg)	4.21	9.28	dry lb
MC wet (%)	4.89		
MC dry (%)	5.14		
Particulate (g)	3.22		
CO (g)	12		
Test Duration (h)	6.00		

Emissions	Particulate	CO
g/MJ Output	0.05	0.18
g/kg Dry Fuel	0.76	2.91
g/h	0.54	2.04
g/min	0.01	0.03
lb/MM Btu Output	0.11	0.42

Air/Fuel Ratio (A/F)	31.02
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VERSION:

2.2

12/14/2009

Max Burn Rate Segment Efficiency Results

Manufacturer: Sherwood
Model: Mini 2
Date: 04/14/21
Run: 1
Control #: 21-694
Test Duration: 60
Output Category: Maximum

Test Results in Accordance with CSA B415.1-09

	HHV Basis	LHV Basis
Overall Efficiency	81.0%	88.4%
Combustion Efficiency	99.5%	99.5%
Heat Transfer Efficiency	81.4%	88.9%

Output Rate (kJ/h)	25,186	23,892	(Btu/h)
Burn Rate (kg/h)	1.54	3.39	(lb/h)
Input (kJ/h)	31,081	29,484	(Btu/h)

Test Load Weight (dry kg)	1.54	3.39	dry lb
MC wet (%)	4.89		
MC dry (%)	5.14		
Particulate (g)	N/A		
CO (g)	5		
Test Duration (h)	1.00		

Emissions	Particulate	CO
g/MJ Output	N/A	0.21
g/kg Dry Fuel	N/A	3.48
g/h	N/A	5.35
g/min	N/A	0.09
lb/MM Btu Output	N/A	0.49

Air/Fuel Ratio (A/F)	17.09
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VERSION:

2.2

12/14/2009

Medium Burn Rate Segment Efficiency Results

Manufacturer: Sherwood
Model: Mini 2
Date: 04/14/21
Run: 1
Control #: 21-694
Test Duration: 120
Output Category: Medium

Test Results in Accordance with CSA B415.1-09

	HHV Basis	LHV Basis
Overall Efficiency	75.6%	82.5%
Combustion Efficiency	99.5%	99.5%
Heat Transfer Efficiency	76.0%	83.0%

Output Rate (kJ/h)	10,567	10,024	(Btu/h)
Burn Rate (kg/h)	0.69	1.52	(lb/h)
Input (kJ/h)	13,969	13,251	(Btu/h)

Test Load Weight (dry kg)	1.38	3.04	dry lb
MC wet (%)	4.89		
MC dry (%)	5.14		
Particulate (g)	N/A		
CO (g)	5		
Test Duration (h)	2.00		

Emissions	Particulate	CO
g/MJ Output	N/A	0.24
g/kg Dry Fuel	N/A	3.71
g/h	N/A	2.56
g/min	N/A	0.04
lb/MM Btu Output	N/A	0.56

Air/Fuel Ratio (A/F)	37.71
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VERSION:

2.2

12/14/2009

Minimum Burn Rate Segment Efficiency Results

Manufacturer: Sherwood
Model: Mini 2
Date: 04/14/21
Run: 1
Control #: 21-694
Test Duration: 180
Output Category: Minimum

Test Results in Accordance with CSA B415.1-09

	HHV Basis	LHV Basis
Overall Efficiency	83.1%	90.6%
Combustion Efficiency	99.5%	99.5%
Heat Transfer Efficiency	83.5%	91.1%

Output Rate (kJ/h)	7,254	6,881	(Btu/h)
Burn Rate (kg/h)	0.43	0.95	(lb/h)
Input (kJ/h)	8,731	8,282	(Btu/h)

Test Load Weight (dry kg)	1.29	2.85	dry lb
MC wet (%)	4.89		
MC dry (%)	5.14		
Particulate (g)	N/A		
CO (g)	2		
Test Duration (h)	3.00		

Emissions	Particulate	CO
g/MJ Output	N/A	0.09
g/kg Dry Fuel	N/A	1.52
g/h	N/A	0.66
g/min	N/A	0.01
lb/MM Btu Output	N/A	0.21

Air/Fuel Ratio (A/F)	36.58
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VERSION:

2.2

12/14/2009

DILUTION TUNNEL & MISC. DATA - ASTM E2779 / E2515

Client: Sherwood
 Model: Mini 2
 Run #: 1
 Test Start Time: 9:05

Job #: 21-694
 Tracking #: 91
 Technician: AK
 Date: 4/14/2021

High Burn End Time (min): 60
 Medium Burn End Time (min): 180
 Total Sampling Time (min): 360
 Recording Interval (min): 1

Meter Box γ Factor: 0.996 (A)
 Meter Box γ Factor: 1.017 (B)
 Meter Box γ Factor: 1.010 (Ambient)

Induced Draft Check (in. H₂O): 0
 Smoke Capture Check (%): 100%
 Date Flue Pipe Last Cleaned: 4/12/2021

	Pre-Test	Post Test	Avg.
Barometric Pressure (in. Hg)	30.18	30.07	30.13
Relative Humidity (%)	23.5	21.7	
Room Air Velocity (ft/min)	0	0	
Scale Audit (lbs)	10.0	10.0	
Ambient Sample Volume:	63.619 ft ³		

Sample Train Post-Test Leak Checks

(A)	0.000	cfm @	-5 in. Hg
(B)	0.001	cfm @	-10 in. Hg
(Ambient)	0.000	cfm @	-10 in. Hg

DILUTION TUNNEL FLOW

Traverse Data

Point	dP (in H ₂ O)	Temp (°F)
1	0.048	72
2	0.072	72
3	0.060	72
4	0.050	72
5	0.054	72
6	0.074	72
7	0.072	72
8	0.048	72
Center	0.076	72

Dilution Tunnel H₂O: 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 ft²

V_{strav} : 16.37 ft/sec
 V_{scent} : 18.26 ft/sec
 F_p : 0.896 [ratio]

Initial Tunnel Flow: 186.2 scf/min

Static Pressure: -0.180 in. H₂O

TEST FUEL PROPERTIES

Default Fuel Values

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

Actual Fuel Used Properties

Pellet Brand:	Lignetics
Pellet Fuel Grade:	PFI Premium
HHV (kJ/kg)	20,232
%C	47.28
%H	7.83
%O	44.31
%Ash	0.36
MC (%DB)	5.14

PELLET STOVE PREBURN DATA - ASTM E2779

Client: SherwoodJob #: 21-694Model: Mini 2Tracking #: 91Run #: 1Technician: AKDate: 4/14/2021
 Recording Interval (min): 1
 Run Time (min): 63

Average:			-0.033	213	63
Elapsed Time (min)	Scale Reading (lbs)	Weight Change (lbs)	Flue Draft (in H ₂ O)	Flue (°F)	Ambient (°F)
0	41.4	-	-0.010	102	62
1	41.3	-0.08	-0.020	117	62
2	41.3	-0.04	-0.020	132	62
3	41.3	0.02	-0.020	145	62
4	41.2	-0.09	-0.030	159	62
5	41.2	0	-0.030	171	62
6	41.1	-0.1	-0.030	178	62
7	41.0	-0.1	-0.030	187	62
8	41.0	-0.03	-0.030	193	62
9	41.1	0.09	-0.030	197	62
10	40.9	-0.16	-0.030	202	62
11	40.8	-0.11	-0.030	206	62
12	40.8	0.01	-0.030	210	62
13	40.7	-0.1	-0.040	213	62
14	40.6	-0.1	-0.030	213	62
15	40.6	0	-0.030	208	62
16	40.5	-0.1	-0.030	208	62
17	40.4	-0.11	-0.030	208	62
18	40.4	0	-0.030	210	63
19	40.3	-0.1	-0.030	211	63
20	40.2	-0.06	-0.030	212	63
21	40.2	-0.02	-0.030	210	63
22	40.1	-0.11	-0.030	208	63
23	40.1	0	-0.030	208	63
24	40.0	-0.11	-0.030	208	63
25	40.0	0.01	-0.030	208	63
26	39.9	-0.1	-0.030	209	63
27	39.9	0	-0.030	209	63
28	39.8	-0.1	-0.030	210	64
29	39.8	0	-0.030	210	63
30	39.7	-0.11	-0.030	210	64
31	39.6	-0.09	-0.030	211	64
32	39.6	-0.01	-0.030	211	64
33	39.5	-0.1	-0.030	212	64
34	39.5	-0.03	-0.030	213	64
35	39.4	-0.06	-0.030	213	64
36	39.3	-0.11	-0.030	213	64
37	39.3	0.01	-0.030	214	64
38	39.2	-0.1	-0.040	214	64
39	39.2	0.01	-0.040	214	64
40	39.1	-0.11	-0.030	214	64
41	39.1	-0.03	-0.030	215	64
42	39.0	-0.07	-0.040	220	64
43	38.9	-0.1	-0.040	229	64
44	38.9	-0.01	-0.040	234	64
45	38.8	-0.09	-0.040	236	64
46	38.8	0	-0.040	237	64

BOX A TEST DATA - ASTM E2779 / ASTM E2515

Client: Sherwood

Job #: 21-694

Model: Mini 2

Tracking #: 91

Run #: 1

Technician: AK

Date: 4/14/2021

Elapsed Time (min)	Particulate Sampling Data							Fuel Weight (lb)		Temperature Data (°F)			
	Gas Meter (ft ³)	Sample Rate (cfm)	Dilution Tunnel dP (in H ₂ O)	Orifice dH (in H ₂ O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Scale Reading	Weight Change	Dilution Tunnel	Flue	Filter	Ambient
0	0.000		0.081	0.38	66.8	0.29		9.8		76	245	64	65
1	0.122	0.122	0.082	1.98	66.6	0.69	90	9.7	-0.1	76	246	64	65
2	0.259	0.137	0.082	2.00	66.5	0.7	101	9.6	-0.1	76	246	65	65
3	0.395	0.136	0.080	2.02	66.6	0.72	101	9.6	0.0	76	246	65	65
4	0.534	0.139	0.081	2.02	66.6	0.73	103	9.5	-0.1	76	246	65	65
5	0.670	0.136	0.082	2.03	66.7	0.71	100	9.5	0.0	76	246	65	65
6	0.811	0.141	0.078	2.05	66.7	0.72	107	9.4	-0.1	76	246	65	65
7	0.948	0.137	0.081	2.05	66.8	0.72	102	9.4	0.0	76	246	65	65
8	1.087	0.139	0.082	2.06	66.9	0.74	102	9.3	-0.1	76	246	65	65
9	1.227	0.140	0.081	2.04	67.1	0.77	104	9.3	0.0	76	245	65	65
10	1.362	0.135	0.083	2.05	67.2	0.75	99	9.2	-0.1	76	246	65	65
11	1.505	0.143	0.081	2.07	67.4	0.75	106	9.1	-0.1	76	246	65	65
12	1.642	0.137	0.079	2.07	67.6	0.76	103	9.1	0.0	76	245	65	65
13	1.782	0.140	0.082	2.07	67.8	0.76	103	9.0	-0.1	76	246	66	65
14	1.922	0.140	0.082	2.08	68.1	0.77	103	9.0	0.0	77	246	66	65
15	2.062	0.140	0.082	2.09	68.3	0.78	103	8.9	-0.1	77	246	66	65
16	2.204	0.142	0.082	2.09	68.6	0.77	104	8.8	-0.1	77	247	66	65
17	2.340	0.136	0.081	2.09	68.9	0.79	100	8.8	0.0	76	247	66	65
18	2.484	0.144	0.084	2.10	69.2	0.79	104	8.7	-0.1	76	247	66	65
19	2.623	0.139	0.080	2.12	69.5	0.78	103	8.7	0.0	77	247	66	65
20	2.766	0.143	0.080	2.12	69.7	0.8	106	8.6	-0.1	76	247	66	66
21	2.903	0.137	0.080	2.06	70.1	0.78	102	8.5	-0.1	76	247	66	65
22	3.042	0.139	0.080	2.07	70.4	0.79	103	8.5	0.0	76	246	66	65
23	3.184	0.142	0.080	2.07	70.8	0.79	105	8.4	-0.1	76	246	66	65
24	3.319	0.135	0.083	2.01	71.1	0.78	98	8.4	0.0	77	247	66	65
25	3.461	0.142	0.078	2.01	71.4	0.78	106	8.3	-0.1	77	247	67	66
26	3.598	0.137	0.081	2.02	71.8	0.79	101	8.3	0.0	77	247	67	66
27	3.737	0.139	0.081	2.02	72.1	0.8	102	8.2	-0.1	78	248	67	66
28	3.876	0.139	0.081	2.02	72.5	0.79	102	8.1	-0.1	78	248	67	66
29	4.014	0.138	0.079	2.03	72.8	0.81	103	8.1	0.0	78	248	67	66
30	4.155	0.141	0.081	2.03	73.2	0.81	103	8.0	-0.1	78	249	67	66
31	4.291	0.136	0.080	2.04	73.5	0.8	100	8.0	0.0	78	249	67	66
32	4.434	0.143	0.080	2.04	73.9	0.81	105	7.9	-0.1	78	249	67	66

BOX A TEST DATA - ASTM E2779 / ASTM E2515

Client: Sherwood

Job #: 21-694

Model: Mini 2

Tracking #: 91

Run #: 1

Technician: AK

Date: 4/14/2021

Elapsed Time (min)	Particulate Sampling Data							Fuel Weight (lb)		Temperature Data (°F)			
	Gas Meter (ft³)	Sample Rate (cfm)	Dilution Tunnel dP (in H ₂ O)	Orifice dH (in H ₂ O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Scale Reading	Weight Change	Dilution Tunnel	Flue	Filter	Ambient
33	4.571	0.137	0.081	2.03	74.3	0.82	100	7.8	-0.1	78	249	67	66
34	4.710	0.139	0.080	2.03	74.6	0.82	102	7.8	0.0	78	249	67	66
35	4.851	0.141	0.082	2.05	74.9	0.81	103	7.7	-0.1	79	249	67	67
36	4.988	0.137	0.079	2.04	75.3	0.83	101	7.7	0.0	79	249	68	67
37	5.130	0.142	0.081	2.04	75.6	0.83	104	7.6	-0.1	79	250	68	66
38	5.268	0.138	0.080	2.04	76	0.87	101	7.5	-0.1	79	249	68	67
39	5.412	0.144	0.080	2.04	76.3	0.84	106	7.5	0.0	79	249	68	67
40	5.549	0.137	0.081	2.05	76.6	0.83	100	7.4	-0.1	79	250	68	67
41	5.689	0.140	0.082	2.05	77	0.84	101	7.4	0.0	79	251	68	68
42	5.830	0.141	0.079	2.06	77.2	0.86	104	7.3	-0.1	79	251	68	67
43	5.969	0.139	0.081	2.05	77.6	0.87	101	7.2	-0.1	79	250	68	67
44	6.112	0.143	0.084	2.05	77.9	0.86	102	7.2	0.0	79	251	68	68
45	6.248	0.136	0.080	2.05	78.2	0.85	100	7.1	-0.1	79	251	68	68
46	6.392	0.144	0.081	2.01	78.6	0.84	105	7.0	-0.1	79	251	68	68
47	6.529	0.137	0.084	2.00	79	0.86	98	7.0	0.0	79	250	68	67
48	6.667	0.138	0.080	2.00	79.2	0.86	101	6.9	-0.1	79	251	68	68
49	6.807	0.140	0.079	2.02	79.5	0.86	103	6.9	0.0	79	251	68	68
50	6.944	0.137	0.081	2.02	79.8	0.85	99	6.8	-0.1	80	251	68	68
51	7.085	0.141	0.080	1.99	80.1	0.86	103	6.7	-0.1	80	250	68	68
52	7.221	0.136	0.083	2.00	80.4	0.86	97	6.7	0.0	79	250	68	68
53	7.364	0.143	0.081	2.00	80.7	0.87	104	6.6	-0.1	79	250	69	68
54	7.501	0.137	0.081	2.00	81	0.87	99	6.6	0.0	80	250	69	68
55	7.639	0.138	0.080	2.01	81.3	0.89	100	6.5	-0.1	80	249	69	68
56	7.782	0.143	0.083	2.02	81.5	0.89	102	6.5	0.0	80	249	69	69
57	7.918	0.136	0.080	2.02	81.9	0.88	99	6.4	-0.1	80	250	69	68
58	8.060	0.142	0.081	2.01	82.2	0.9	103	6.3	-0.1	80	250	69	68
59	8.197	0.137	0.082	2.03	82.5	0.89	98	6.3	0.0	80	250	69	68
60	8.344	0.147	0.081	1.98	82.8	0.71	106	6.2	-0.1	80	249	69	68
61	8.483	0.139	0.082	2.03	83	0.71	100	6.2	0.0	79	243	69	68
62	8.622	0.139	0.082	2.03	83.3	0.73	100	6.1	-0.1	79	239	69	68
63	8.764	0.142	0.080	2.04	83.5	0.72	103	6.1	0.0	79	236	69	68
64	8.904	0.140	0.083	2.04	83.8	0.73	100	6.1	0.0	79	233	69	68
65	9.047	0.143	0.079	2.05	84.1	0.73	104	6.0	-0.1	79	231	69	68

BOX A TEST DATA - ASTM E2779 / ASTM E2515

Client: Sherwood

Job #: 21-694

Model: Mini 2

Tracking #: 91

Run #: 1

Technician: AK

Date: 4/14/2021

Elapsed Time (min)	Particulate Sampling Data							Fuel Weight (lb)		Temperature Data (°F)			
	Gas Meter (ft ³)	Sample Rate (cfm)	Dilution Tunnel dP (in H ₂ O)	Orifice dH (in H ₂ O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Scale Reading	Weight Change	Dilution Tunnel	Flue	Filter	Ambient
66	9.183	0.136	0.081	2.03	84.3	0.73	98	6.0	0.0	79	227	69	68
67	9.328	0.145	0.080	2.04	84.6	0.73	105	6.0	0.0	79	226	69	68
68	9.467	0.139	0.082	2.05	84.8	0.73	99	5.9	-0.1	79	225	69	68
69	9.609	0.142	0.082	2.05	85.1	0.73	101	5.9	0.0	78	224	70	67
70	9.749	0.140	0.081	2.05	85.3	0.74	100	5.9	0.0	78	224	70	68
71	9.889	0.140	0.080	2.02	85.5	0.73	101	5.9	0.0	78	222	69	68
72	10.031	0.142	0.081	2.04	85.8	0.73	102	5.8	-0.1	78	221	69	68
73	10.169	0.138	0.080	2.03	86	0.73	100	5.8	0.0	78	220	70	68
74	10.312	0.143	0.080	2.03	86.2	0.72	103	5.8	0.0	78	218	70	68
75	10.450	0.138	0.080	2.03	86.5	0.74	99	5.8	0.0	78	216	70	68
76	10.594	0.144	0.080	2.05	86.6	0.73	104	5.8	0.0	78	215	70	68
77	10.732	0.138	0.080	2.04	86.9	0.73	99	5.7	-0.1	78	213	70	68
78	10.874	0.142	0.083	2.04	87.1	0.73	100	5.7	0.0	78	211	70	68
79	11.014	0.140	0.080	2.03	87.3	0.72	101	5.7	0.0	78	210	70	68
80	11.154	0.140	0.086	2.05	87.5	0.73	97	5.6	-0.1	78	210	70	68
81	11.297	0.143	0.079	2.05	87.6	0.73	103	5.6	0.0	78	210	70	68
82	11.435	0.138	0.080	2.04	87.8	0.72	99	5.6	0.0	78	210	70	68
83	11.579	0.144	0.082	2.03	88	0.73	102	5.5	-0.1	78	209	70	68
84	11.717	0.138	0.080	2.04	88.2	0.73	99	5.5	0.0	78	209	70	68
85	11.862	0.145	0.079	2.06	88.4	0.73	105	5.5	0.0	78	208	70	68
86	12.001	0.139	0.080	2.05	88.5	0.73	100	5.5	0.0	78	208	70	68
87	12.142	0.141	0.081	2.05	88.8	0.73	100	5.4	-0.1	78	206	70	68
88	12.284	0.142	0.080	2.05	88.9	0.73	102	5.4	0.0	78	206	70	68
89	12.424	0.140	0.080	2.05	89.1	0.73	100	5.4	0.0	78	205	70	68
90	12.568	0.144	0.079	2.03	89.3	0.73	104	5.4	0.0	78	205	70	68
91	12.706	0.138	0.080	2.02	89.4	0.73	99	5.3	-0.1	78	205	70	68
92	12.849	0.143	0.082	2.01	89.6	0.74	101	5.3	0.0	78	204	70	68
93	12.987	0.138	0.081	2.03	89.8	0.73	98	5.3	0.0	78	203	70	68
94	13.131	0.144	0.080	2.03	89.9	0.73	103	5.3	0.0	78	202	70	68
95	13.270	0.139	0.081	2.02	90.1	0.73	99	5.2	-0.1	78	201	70	68
96	13.410	0.140	0.082	2.02	90.2	0.73	99	5.2	0.0	78	201	70	68
97	13.552	0.142	0.081	2.03	90.3	0.73	101	5.2	0.0	78	200	70	68
98	13.693	0.141	0.081	2.04	90.5	0.74	100	5.2	0.0	78	200	70	68

BOX A TEST DATA - ASTM E2779 / ASTM E2515

Client: Sherwood

Job #: 21-694

Model: Mini 2

Tracking #: 91

Run #: 1

Technician: AK

Date: 4/14/2021

Elapsed Time (min)	Particulate Sampling Data							Fuel Weight (lb)		Temperature Data (°F)			
	Gas Meter (ft ³)	Sample Rate (cfm)	Dilution Tunnel dP (in H ₂ O)	Orifice dH (in H ₂ O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Scale Reading	Weight Change	Dilution Tunnel	Flue	Filter	Ambient
99	13.836	0.143	0.080	2.03	90.6	0.73	102	5.1	-0.1	78	199	70	68
100	13.973	0.137	0.079	2.02	90.7	0.72	98	5.1	0.0	78	199	70	68
101	14.117	0.144	0.082	2.03	90.9	0.73	102	5.1	0.0	78	199	70	68
102	14.256	0.139	0.083	2.04	91.1	0.72	97	5.1	0.0	78	198	70	68
103	14.400	0.144	0.081	2.03	91.1	0.73	102	5.0	-0.1	78	198	70	68
104	14.539	0.139	0.080	2.03	91.3	0.74	99	5.0	0.0	78	198	70	67
105	14.680	0.141	0.082	2.03	91.5	0.74	99	5.0	0.0	78	198	70	67
106	14.822	0.142	0.081	2.03	91.6	0.73	101	4.9	-0.1	78	198	70	67
107	14.963	0.141	0.081	2.03	91.7	0.72	100	4.9	0.0	78	197	70	67
108	15.106	0.143	0.082	2.03	91.8	0.74	101	4.9	0.0	78	197	70	67
109	15.243	0.137	0.081	2.04	91.9	0.73	97	4.9	0.0	77	196	70	67
110	15.388	0.145	0.081	2.03	92	0.74	103	4.8	-0.1	77	196	70	67
111	15.527	0.139	0.080	2.05	92.2	0.73	99	4.8	0.0	77	196	70	67
112	15.672	0.145	0.080	2.04	92.2	0.73	103	4.8	0.0	77	195	70	67
113	15.811	0.139	0.081	2.03	92.4	0.73	98	4.7	-0.1	77	194	70	67
114	15.952	0.141	0.083	2.04	92.5	0.72	99	4.7	0.0	77	195	70	67
115	16.095	0.143	0.081	2.04	92.5	0.73	101	4.7	0.0	77	195	70	67
116	16.235	0.140	0.079	2.04	92.6	0.74	100	4.7	0.0	77	195	70	67
117	16.379	0.144	0.080	2.03	92.7	0.73	102	4.7	0.0	77	195	70	67
118	16.518	0.139	0.080	2.03	92.8	0.73	99	4.6	-0.1	77	195	70	67
119	16.662	0.144	0.080	2.04	92.9	0.74	102	4.6	0.0	77	195	70	67
120	16.801	0.139	0.080	2.05	93	0.73	99	4.6	0.0	77	195	69	67
121	16.946	0.145	0.080	2.05	93.1	0.74	103	4.6	0.0	77	194	69	67
122	17.086	0.140	0.083	2.04	93.1	0.73	98	4.5	-0.1	77	193	69	66
123	17.228	0.142	0.081	2.05	93.2	0.74	100	4.5	0.0	77	194	69	67
124	17.368	0.140	0.081	2.03	93.2	0.73	99	4.5	0.0	77	193	69	66
125	17.510	0.142	0.081	2.05	93.3	0.74	100	4.5	0.0	77	193	69	66
126	17.654	0.144	0.080	2.06	93.3	0.75	102	4.4	-0.1	77	194	69	66
127	17.793	0.139	0.081	2.04	93.4	0.72	98	4.4	0.0	77	193	69	66
128	17.938	0.145	0.079	2.04	93.4	0.74	104	4.4	0.0	77	193	69	67
129	18.075	0.137	0.080	2.03	93.5	0.74	97	4.3	-0.1	77	193	69	67
130	18.221	0.146	0.080	2.06	93.6	0.75	104	4.3	0.0	77	193	69	66
131	18.360	0.139	0.082	2.04	93.6	0.73	97	4.3	0.0	77	193	69	67

BOX A TEST DATA - ASTM E2779 / ASTM E2515

Client: Sherwood

Job #: 21-694

Model: Mini 2

Tracking #: 91

Run #: 1

Technician: AK

Date: 4/14/2021

Elapsed Time (min)	Particulate Sampling Data							Fuel Weight (lb)		Temperature Data (°F)			
	Gas Meter (ft ³)	Sample Rate (cfm)	Dilution Tunnel dP (in H ₂ O)	Orifice dH (in H ₂ O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Scale Reading	Weight Change	Dilution Tunnel	Flue	Filter	Ambient
132	18.504	0.144	0.081	2.03	93.7	0.73	102	4.3	0.0	77	192	69	66
133	18.644	0.140	0.081	2.04	93.7	0.73	99	4.3	0.0	77	191	69	67
134	18.786	0.142	0.063	2.04	93.8	0.72	114	4.2	-0.1	77	192	69	66
135	18.929	0.143	0.072	2.05	93.8	0.72	107	4.2	0.0	77	192	69	66
136	19.069	0.140	0.075	2.05	93.8	0.73	103	4.2	0.0	77	192	69	66
137	19.214	0.145	0.076	2.04	93.9	0.75	106	4.1	-0.1	77	192	69	66
138	19.353	0.139	0.078	2.05	94	0.73	100	4.1	0.0	77	191	69	66
139	19.497	0.144	0.079	2.04	94	0.75	103	4.1	0.0	77	191	69	66
140	19.636	0.139	0.080	2.05	94.1	0.74	99	4.1	0.0	77	192	69	66
141	19.781	0.145	0.080	2.05	94.1	0.74	103	4.0	-0.1	77	192	69	66
142	19.921	0.140	0.079	2.05	94.1	0.73	100	4.0	0.0	77	193	69	67
143	20.064	0.143	0.080	2.04	94.2	0.75	101	4.0	0.0	77	193	69	67
144	20.204	0.140	0.080	2.05	94.2	0.74	99	4.0	0.0	77	193	69	67
145	20.346	0.142	0.079	2.04	94.2	0.74	101	3.9	-0.1	77	193	69	67
146	20.489	0.143	0.081	2.04	94.3	0.76	101	3.9	0.0	77	193	69	67
147	20.630	0.141	0.082	2.04	94.4	0.74	99	3.9	0.0	77	193	69	66
148	20.774	0.144	0.081	2.05	94.4	0.75	101	3.8	-0.1	77	194	69	66
149	20.912	0.138	0.079	2.04	94.5	0.74	98	3.8	0.0	77	194	69	67
150	21.057	0.145	0.081	2.05	94.5	0.74	102	3.8	0.0	77	192	69	67
151	21.196	0.139	0.081	2.04	94.6	0.74	98	3.8	0.0	77	193	69	66
152	21.342	0.146	0.080	2.05	94.6	0.74	103	3.7	-0.1	77	192	69	66
153	21.481	0.139	0.081	2.04	94.6	0.75	98	3.7	0.0	77	192	69	67
154	21.624	0.143	0.083	2.04	94.6	0.74	100	3.7	0.0	77	192	69	67
155	21.765	0.141	0.082	2.04	94.7	0.74	99	3.7	0.0	77	191	69	67
156	21.906	0.141	0.080	2.04	94.7	0.74	100	3.6	-0.1	77	191	69	67
157	22.050	0.144	0.080	2.04	94.7	0.76	102	3.6	0.0	77	191	69	67
158	22.190	0.140	0.080	2.05	94.7	0.75	99	3.6	0.0	77	191	69	66
159	22.334	0.144	0.080	2.04	94.7	0.74	102	3.6	0.0	77	190	69	67
160	22.472	0.138	0.082	2.04	94.8	0.75	97	3.6	0.0	77	191	69	67
161	22.617	0.145	0.079	2.04	94.9	0.75	103	3.5	-0.1	77	189	69	67
162	22.758	0.141	0.081	2.05	94.9	0.76	99	3.5	0.0	77	189	69	67
163	22.901	0.143	0.081	2.04	94.9	0.75	101	3.5	0.0	77	189	69	66
164	23.042	0.141	0.081	2.04	95	0.75	99	3.5	0.0	77	188	69	67

BOX A TEST DATA - ASTM E2779 / ASTM E2515

Client: Sherwood

Job #: 21-694

Model: Mini 2

Tracking #: 91

Run #: 1

Technician: AK

Date: 4/14/2021

Elapsed Time (min)	Particulate Sampling Data							Fuel Weight (lb)		Temperature Data (°F)			
	Gas Meter (ft³)	Sample Rate (cfm)	Dilution Tunnel dP (in H ₂ O)	Orifice dH (in H ₂ O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Scale Reading	Weight Change	Dilution Tunnel	Flue	Filter	Ambient
165	23.183	0.141	0.080	2.03	95	0.75	100	3.4	-0.1	77	189	69	67
166	23.326	0.143	0.081	2.04	95	0.74	101	3.4	0.0	77	190	69	67
167	23.467	0.141	0.081	2.05	95	0.75	99	3.4	0.0	77	190	69	67
168	23.612	0.145	0.081	2.05	95	0.74	102	3.3	-0.1	77	191	69	66
169	23.751	0.139	0.081	2.04	95.1	0.75	98	3.3	0.0	77	190	69	67
170	23.895	0.144	0.079	2.04	95.1	0.75	103	3.3	0.0	77	190	69	67
171	24.034	0.139	0.081	2.05	95.1	0.75	98	3.3	0.0	77	191	69	67
172	24.179	0.145	0.083	2.04	95.1	0.74	101	3.2	-0.1	77	192	69	67
173	24.319	0.140	0.080	2.05	95.1	0.76	99	3.2	0.0	77	193	69	67
174	24.463	0.144	0.080	2.04	95.2	0.76	102	3.2	0.0	77	192	69	67
175	24.603	0.140	0.080	2.04	95.2	0.74	99	3.2	0.0	77	191	69	67
176	24.744	0.141	0.081	2.04	95.2	0.74	99	3.1	-0.1	77	192	69	67
177	24.887	0.143	0.082	2.05	95.2	0.75	100	3.1	0.0	77	191	69	67
178	25.029	0.142	0.081	2.04	95.2	0.75	100	3.1	0.0	77	191	69	66
179	25.173	0.144	0.080	2.05	95.3	0.75	102	3.0	-0.1	77	192	69	67
180	25.312	0.139	0.080	2.03	95.3	0.75	98	3.0	0.0	77	192	69	67
181	25.456	0.144	0.080	2.04	95.3	0.75	102	3.0	0.0	76	177	69	67
182	25.595	0.139	0.081	2.04	95.3	0.76	98	3.0	0.0	75	164	69	67
183	25.741	0.146	0.080	2.05	95.3	0.76	103	3.0	0.0	75	157	69	67
184	25.881	0.140	0.080	2.04	95.4	0.76	99	2.9	-0.1	74	152	69	67
185	26.024	0.143	0.081	2.04	95.4	0.75	100	3.0	0.1	74	149	69	67
186	26.164	0.140	0.081	2.03	95.4	0.76	98	2.9	-0.1	74	146	69	67
187	26.306	0.142	0.084	2.05	95.4	0.74	98	2.9	0.0	74	144	69	67
188	26.450	0.144	0.080	2.05	95.5	0.77	102	2.9	0.0	74	143	69	67
189	26.590	0.140	0.082	2.03	95.5	0.76	98	2.9	0.0	74	142	69	67
190	26.735	0.145	0.080	2.04	95.5	0.76	102	2.9	0.0	74	142	69	67
191	26.872	0.137	0.082	2.05	95.6	0.76	95	2.9	0.0	74	141	69	67
192	27.018	0.146	0.079	2.04	95.5	0.76	104	2.8	-0.1	73	140	69	67
193	27.157	0.139	0.081	2.04	95.6	0.76	97	2.8	0.0	73	139	69	67
194	27.303	0.146	0.082	2.04	95.6	0.76	102	2.8	0.0	73	139	69	67
195	27.442	0.139	0.079	2.04	95.6	0.76	99	2.8	0.0	73	139	69	67
196	27.585	0.143	0.084	2.03	95.6	0.75	98	2.8	0.0	73	139	69	67
197	27.726	0.141	0.080	2.04	95.7	0.76	99	2.8	0.0	73	138	69	67

BOX A TEST DATA - ASTM E2779 / ASTM E2515

Client: Sherwood

Job #: 21-694

Model: Mini 2

Tracking #: 91

Run #: 1

Technician: AK

Date: 4/14/2021

Elapsed Time (min)	Particulate Sampling Data							Fuel Weight (lb)		Temperature Data (°F)			
	Gas Meter (ft ³)	Sample Rate (cfm)	Dilution Tunnel dP (in H ₂ O)	Orifice dH (in H ₂ O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Scale Reading	Weight Change	Dilution Tunnel	Flue	Filter	Ambient
198	27.867	0.141	0.081	2.04	95.7	0.75	99	2.7	-0.1	73	138	69	67
199	28.012	0.145	0.082	2.03	95.7	0.76	101	2.7	0.0	73	138	69	67
200	28.151	0.139	0.079	2.04	95.7	0.76	99	2.7	0.0	73	139	69	67
201	28.295	0.144	0.080	2.03	95.8	0.76	101	2.7	0.0	73	138	69	67
202	28.433	0.138	0.082	2.03	95.8	0.76	96	2.7	0.0	73	138	69	67
203	28.578	0.145	0.081	2.04	95.8	0.75	102	2.7	0.0	73	138	69	67
204	28.719	0.141	0.081	2.04	95.8	0.75	99	2.6	-0.1	73	137	68	67
205	28.863	0.144	0.081	2.03	95.9	0.75	101	2.6	0.0	73	137	69	67
206	29.003	0.140	0.085	2.03	96	0.76	96	2.6	0.0	73	137	69	67
207	29.144	0.141	0.080	2.03	95.9	0.75	99	2.6	0.0	73	137	69	67
208	29.287	0.143	0.080	2.04	95.9	0.76	101	2.6	0.0	73	136	68	67
209	29.428	0.141	0.080	2.04	96	0.75	99	2.6	0.0	73	136	68	67
210	29.572	0.144	0.081	2.03	96	0.76	101	2.5	-0.1	73	136	68	67
211	29.710	0.138	0.079	2.03	96	0.77	98	2.5	0.0	73	136	68	67
212	29.855	0.145	0.081	2.03	96	0.76	102	2.5	0.0	73	136	68	67
213	29.994	0.139	0.081	2.04	96.1	0.77	97	2.5	0.0	73	136	68	67
214	30.139	0.145	0.081	2.04	96.1	0.77	101	2.5	0.0	73	136	68	67
215	30.279	0.140	0.079	2.03	96.1	0.76	99	2.5	0.0	73	136	68	67
216	30.422	0.143	0.083	2.03	96.1	0.78	99	2.4	-0.1	73	136	68	67
217	30.562	0.140	0.083	2.02	96.1	0.77	97	2.4	0.0	73	136	68	67
218	30.703	0.141	0.080	2.04	96.1	0.77	99	2.4	0.0	73	136	68	67
219	30.847	0.144	0.079	2.03	96.1	0.77	102	2.4	0.0	73	136	68	67
220	30.986	0.139	0.081	2.03	96.2	0.77	97	2.4	0.0	73	136	68	67
221	31.131	0.145	0.080	2.02	96.2	0.76	102	2.3	-0.1	73	135	68	67
222	31.268	0.137	0.082	2.02	96.2	0.77	95	2.3	0.0	73	135	68	67
223	31.414	0.146	0.075	2.03	96.3	0.77	106	2.3	0.0	73	135	68	67
224	31.553	0.139	0.076	2.04	96.3	0.75	100	2.3	0.0	73	135	68	67
225	31.697	0.144	0.076	2.03	96.3	0.78	104	2.3	0.0	73	135	68	67
226	31.837	0.140	0.079	2.02	96.3	0.76	99	2.3	0.0	73	135	68	67
227	31.978	0.141	0.080	2.02	96.4	0.77	99	2.2	-0.1	73	135	68	67
228	32.121	0.143	0.079	2.03	96.4	0.78	101	2.3	0.1	73	134	68	67
229	32.261	0.140	0.080	2.03	96.4	0.78	99	2.2	-0.1	73	135	68	67
230	32.405	0.144	0.080	2.02	96.4	0.77	101	2.2	0.0	73	136	68	67

BOX A TEST DATA - ASTM E2779 / ASTM E2515

Client: Sherwood

Job #: 21-694

Model: Mini 2

Tracking #: 91

Run #: 1

Technician: AK

Date: 4/14/2021

Elapsed Time (min)	Particulate Sampling Data							Fuel Weight (lb)		Temperature Data (°F)			
	Gas Meter (ft ³)	Sample Rate (cfm)	Dilution Tunnel dP (in H ₂ O)	Orifice dH (in H ₂ O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Scale Reading	Weight Change	Dilution Tunnel	Flue	Filter	Ambient
231	32.543	0.138	0.080	2.02	96.5	0.77	97	2.2	0.0	73	136	68	67
232	32.687	0.144	0.080	2.02	96.5	0.77	101	2.2	0.0	73	134	68	67
233	32.826	0.139	0.082	2.03	96.4	0.78	97	2.2	0.0	73	133	68	67
234	32.972	0.146	0.080	2.03	96.5	0.78	103	2.2	0.0	73	133	68	67
235	33.111	0.139	0.080	2.02	96.5	0.77	98	2.1	-0.1	73	134	68	67
236	33.253	0.142	0.080	2.02	96.5	0.78	100	2.1	0.0	73	134	68	67
237	33.394	0.141	0.080	2.02	96.6	0.77	99	2.1	0.0	73	135	68	67
238	33.534	0.140	0.080	2.01	96.6	0.76	99	2.1	0.0	73	135	68	67
239	33.679	0.145	0.080	2.02	96.6	0.77	102	2.1	-0.1	73	135	68	67
240	33.818	0.139	0.080	2.03	96.6	0.79	98	2.0	-0.1	73	136	68	67
241	33.961	0.143	0.081	2.02	96.6	0.78	100	2.0	0.0	73	136	68	67
242	34.100	0.139	0.082	2.02	96.6	0.78	97	2.0	0.0	73	136	68	67
243	34.244	0.144	0.080	2.03	96.6	0.77	101	2.0	0.0	73	136	68	67
244	34.384	0.140	0.081	2.02	96.6	0.78	98	2.0	0.0	73	136	68	67
245	34.527	0.143	0.081	2.02	96.6	0.78	100	2.0	0.0	73	136	68	67
246	34.666	0.139	0.082	2.02	96.6	0.79	97	1.9	-0.1	73	136	68	67
247	34.808	0.142	0.083	2.03	96.6	0.78	98	1.9	0.0	73	136	68	67
248	34.951	0.143	0.082	2.02	96.7	0.78	99	1.9	0.0	73	136	68	67
249	35.090	0.139	0.081	2.01	96.7	0.8	97	1.9	0.0	73	136	68	67
250	35.234	0.144	0.080	2.02	96.7	0.78	101	1.9	0.0	73	135	68	67
251	35.372	0.138	0.081	2.01	96.7	0.79	97	1.8	-0.1	73	136	68	67
252	35.516	0.144	0.080	2.01	96.8	0.78	101	1.9	0.1	73	136	68	67
253	35.656	0.140	0.082	2.02	96.9	0.77	97	1.8	-0.1	73	136	68	67
254	35.799	0.143	0.079	2.01	96.8	0.79	101	1.8	0.0	73	135	68	67
255	35.939	0.140	0.081	2.01	96.8	0.79	98	1.8	0.0	73	135	68	67
256	36.080	0.141	0.080	2.01	96.9	0.79	99	1.8	0.0	73	135	68	67
257	36.223	0.143	0.081	2.02	96.9	0.79	100	1.7	-0.1	73	136	68	67
258	36.363	0.140	0.081	2.02	96.9	0.78	98	1.7	0.0	74	136	69	68
259	36.507	0.144	0.079	2.02	97	0.79	102	1.7	0.0	74	136	69	68
260	36.644	0.137	0.081	2.01	97	0.79	96	1.7	0.0	74	136	69	68
261	36.788	0.144	0.081	2.01	97	0.78	101	1.7	0.0	74	136	69	68
262	36.928	0.140	0.084	2.01	97	0.8	96	1.7	0.0	73	135	69	68
263	37.071	0.143	0.080	2.01	97	0.78	101	1.7	0.0	73	135	69	68

BOX A TEST DATA - ASTM E2779 / ASTM E2515

Client: SherwoodJob #: 21-694Model: Mini 2Tracking #: 91Run #: 1Technician: AKDate: 4/14/2021

Elapsed Time (min)	Particulate Sampling Data							Fuel Weight (lb)		Temperature Data (°F)			
	Gas Meter (ft ³)	Sample Rate (cfm)	Dilution Tunnel dP (in H ₂ O)	Orifice dH (in H ₂ O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Scale Reading	Weight Change	Dilution Tunnel	Flue	Filter	Ambient
264	37.211	0.140	0.080	2.01	97.1	0.79	98	1.6	-0.1	74	135	69	68
265	37.351	0.140	0.080	2.01	97.1	0.78	98	1.6	0.0	74	135	69	67
266	37.493	0.142	0.081	2.02	97.1	0.79	99	1.6	0.0	74	135	69	68
267	37.634	0.141	0.083	2.02	97.1	0.8	97	1.6	0.0	74	135	69	68
268	37.778	0.144	0.080	2.01	97.1	0.79	101	1.6	0.0	74	135	69	68
269	37.915	0.137	0.082	2.01	97.2	0.8	95	1.6	0.0	74	135	69	68
270	38.060	0.145	0.082	2.00	97.2	0.8	101	1.5	-0.1	74	135	69	68
271	38.198	0.138	0.080	2.02	97.2	0.79	97	1.5	0.0	74	135	69	68
272	38.342	0.144	0.082	2.00	97.2	0.8	100	1.5	0.0	74	135	69	68
273	38.482	0.140	0.081	2.01	97.2	0.79	98	1.5	0.0	74	135	69	68
274	38.622	0.140	0.081	2.01	97.3	0.81	98	1.5	0.0	74	135	69	68
275	38.764	0.142	0.084	2.01	97.3	0.8	97	1.5	0.0	74	135	69	68
276	38.905	0.141	0.078	2.01	97.3	0.79	100	1.4	-0.1	74	134	69	68
277	39.048	0.143	0.082	2.01	97.3	0.8	99	1.4	0.0	74	135	69	68
278	39.185	0.137	0.080	2.00	97.3	0.78	96	1.4	0.0	74	135	69	69
279	39.330	0.145	0.080	2.00	97.3	0.8	102	1.4	0.0	74	135	69	69
280	39.469	0.139	0.080	2.01	97.4	0.81	98	1.4	0.0	74	136	69	69
281	39.612	0.143	0.084	2.00	97.4	0.8	98	1.4	0.0	74	136	69	69
282	39.751	0.139	0.081	2.00	97.4	0.8	97	1.4	0.0	74	136	69	69
283	39.891	0.140	0.079	2.00	97.4	0.82	99	1.3	0.0	74	137	69	69
284	40.034	0.143	0.079	2.00	97.4	0.78	101	1.3	0.0	74	137	69	69
285	40.173	0.139	0.080	2.00	97.4	0.81	98	1.3	0.0	74	137	69	69
286	40.317	0.144	0.082	2.00	97.4	0.8	100	1.3	0.0	74	137	69	69
287	40.453	0.136	0.082	1.99	97.5	0.81	95	1.3	0.0	74	137	69	69
288	40.597	0.144	0.081	2.00	97.5	0.82	101	1.2	-0.1	75	138	69	69
289	40.737	0.140	0.081	2.00	97.5	0.8	98	1.2	0.0	75	138	70	69
290	40.879	0.142	0.081	2.00	97.6	0.82	99	1.2	0.0	75	138	70	69
291	41.018	0.139	0.080	1.99	97.6	0.82	98	1.2	0.0	75	138	70	69
292	41.159	0.141	0.081	2.00	97.7	0.82	99	1.1	-0.1	75	139	70	69
293	41.302	0.143	0.081	2.00	97.7	0.82	100	1.1	0.0	75	139	70	69
294	41.440	0.138	0.080	1.99	97.7	0.81	97	1.1	0.0	75	138	70	69
295	41.583	0.143	0.080	1.98	97.7	0.81	101	1.1	0.0	75	137	70	69
296	41.720	0.137	0.080	1.99	97.8	0.82	96	1.1	0.0	75	136	70	69

BOX A TEST DATA - ASTM E2779 / ASTM E2515

Client: SherwoodJob #: 21-694Model: Mini 2Tracking #: 91Run #: 1Technician: AKDate: 4/14/2021

Elapsed Time (min)	Particulate Sampling Data							Fuel Weight (lb)		Temperature Data (°F)			
	Gas Meter (ft ³)	Sample Rate (cfm)	Dilution Tunnel dP (in H ₂ O)	Orifice dH (in H ₂ O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Scale Reading	Weight Change	Dilution Tunnel	Flue	Filter	Ambient
297	41.864	0.144	0.080	2.00	97.8	0.82	101	1.1	0.0	75	136	70	69
298	42.003	0.139	0.081	1.99	97.8	0.82	97	1.1	0.0	75	136	70	69
299	42.143	0.140	0.081	1.99	97.8	0.82	98	1.0	-0.1	75	136	70	69
300	42.284	0.141	0.083	1.98	97.9	0.82	97	1.0	0.0	75	136	70	69
301	42.424	0.140	0.082	2.00	97.9	0.83	97	1.0	0.0	75	135	70	69
302	42.567	0.143	0.080	2.00	98	0.82	101	1.0	0.0	75	136	70	70
303	42.704	0.137	0.080	1.98	98.1	0.82	96	1.0	0.0	75	135	70	70
304	42.847	0.143	0.080	1.99	98.1	0.82	101	0.9	-0.1	75	135	70	69
305	42.986	0.139	0.081	1.99	98.1	0.81	97	0.9	0.0	75	135	70	70
306	43.129	0.143	0.080	1.98	98.1	0.82	101	0.9	0.0	75	136	70	70
307	43.267	0.138	0.081	1.99	98.2	0.83	96	0.9	0.0	75	136	70	70
308	43.407	0.140	0.082	1.98	98.2	0.82	97	0.9	0.0	75	136	70	70
309	43.550	0.143	0.080	1.98	98.2	0.83	101	0.9	0.0	75	136	70	70
310	43.688	0.138	0.081	1.99	98.2	0.81	96	0.8	-0.1	75	135	70	70
311	43.831	0.143	0.079	1.98	98.3	0.83	101	0.8	0.0	75	136	70	70
312	43.969	0.138	0.078	1.98	98.3	0.82	98	0.8	0.0	75	136	71	70
313	44.112	0.143	0.082	1.99	98.3	0.83	99	0.8	0.0	75	136	71	70
314	44.251	0.139	0.081	2.00	98.4	0.84	97	0.8	0.0	75	135	71	70
315	44.391	0.140	0.081	1.98	98.4	0.83	98	0.8	0.0	75	135	71	71
316	44.532	0.141	0.080	1.98	98.5	0.81	99	0.7	-0.1	76	135	71	70
317	44.672	0.140	0.081	1.99	98.5	0.81	98	0.7	0.0	76	135	71	70
318	44.815	0.143	0.080	1.98	98.5	0.83	101	0.7	0.0	76	135	71	70
319	44.951	0.136	0.080	1.98	98.6	0.82	96	0.7	0.0	77	135	71	71
320	45.095	0.144	0.080	1.99	98.6	0.84	101	0.7	0.0	77	134	71	71
321	45.233	0.138	0.082	1.99	98.6	0.84	96	0.7	0.0	77	135	71	71
322	45.376	0.143	0.080	1.98	98.7	0.83	101	0.6	-0.1	77	135	71	71
323	45.514	0.138	0.082	1.98	98.7	0.83	96	0.6	0.0	78	135	71	71
324	45.654	0.140	0.081	2.00	98.7	0.83	98	0.6	0.0	78	135	71	71
325	45.797	0.143	0.078	1.99	98.8	0.83	102	0.6	0.0	78	135	71	71
326	45.934	0.137	0.082	1.98	98.7	0.83	95	0.6	0.0	78	135	72	71
327	46.077	0.143	0.082	1.97	98.8	0.83	99	0.6	0.0	78	135	72	72
328	46.214	0.137	0.081	1.98	98.8	0.84	96	0.5	-0.1	78	135	72	71
329	46.358	0.144	0.080	1.98	98.9	0.83	101	0.5	0.0	78	135	72	71

BOX A TEST DATA - ASTM E2779 / ASTM E2515

Client: Sherwood

Job #: 21-694

Model: Mini 2

Tracking #: 91

Run #: 1

Technician: AK

Date: 4/14/2021

Elapsed Time (min)	Particulate Sampling Data							Fuel Weight (lb)		Temperature Data (°F)			
	Gas Meter (ft ³)	Sample Rate (cfm)	Dilution Tunnel dP (in H ₂ O)	Orifice dH (in H ₂ O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Scale Reading	Weight Change	Dilution Tunnel	Flue	Filter	Ambient
330	46.496	0.138	0.079	1.98	98.9	0.84	98	0.5	0.0	78	135	72	71
331	46.636	0.140	0.079	1.98	99	0.84	99	0.5	0.0	78	135	72	71
332	46.777	0.141	0.080	1.98	99	0.84	99	0.5	0.0	79	136	72	71
333	46.917	0.140	0.084	1.97	99.1	0.84	96	0.4	-0.1	79	136	72	72
334	47.059	0.142	0.080	1.98	99.1	0.85	100	0.4	0.0	78	136	72	71
335	47.195	0.136	0.080	1.97	99.1	0.85	96	0.4	0.0	78	136	72	71
336	47.339	0.144	0.085	1.98	99.2	0.86	98	0.4	0.0	78	136	72	71
337	47.477	0.138	0.081	1.98	99.2	0.83	97	0.4	0.0	79	136	72	71
338	47.618	0.141	0.081	1.97	99.2	0.86	99	0.4	0.0	79	136	72	71
339	47.758	0.140	0.080	1.97	99.3	0.84	99	0.3	-0.1	79	136	72	71
340	47.897	0.139	0.079	1.98	99.3	0.85	98	0.3	0.0	79	136	72	71
341	48.040	0.143	0.081	1.98	99.4	0.82	100	0.3	0.0	79	136	72	72
342	48.176	0.136	0.080	1.97	99.4	0.85	96	0.3	0.0	79	136	72	72
343	48.320	0.144	0.080	1.98	99.4	0.84	101	0.3	0.0	79	136	73	72
344	48.458	0.138	0.081	1.98	99.5	0.84	97	0.3	0.0	79	136	73	71
345	48.600	0.142	0.080	1.96	99.5	0.84	100	0.2	-0.1	78	135	73	71
346	48.738	0.138	0.079	1.97	99.6	0.84	98	0.2	0.0	78	136	73	71
347	48.878	0.140	0.080	1.98	99.6	0.85	98	0.2	0.0	78	136	73	71
348	49.021	0.143	0.081	1.97	99.7	0.83	100	0.2	0.0	78	136	73	71
349	49.158	0.137	0.080	1.97	99.7	0.85	96	0.2	0.0	78	136	73	71
350	49.300	0.142	0.080	1.97	99.7	0.86	100	0.2	0.0	78	136	73	71
351	49.439	0.139	0.080	2.03	99.7	0.86	98	0.2	-0.1	78	135	73	72
352	49.584	0.145	0.080	2.03	99.8	0.88	102	0.1	0.0	78	135	73	72
353	49.724	0.140	0.080	2.03	99.8	0.86	98	0.1	0.0	78	135	73	72
354	49.868	0.144	0.083	2.03	99.9	0.87	99	0.1	0.0	78	135	73	72
355	50.008	0.140	0.082	2.02	99.9	0.87	97	0.1	0.0	77	134	73	72
356	50.150	0.142	0.080	2.03	99.9	0.88	100	0.0	-0.1	77	134	73	72
357	50.294	0.144	0.081	2.03	100	0.88	101	0.1	0.1	77	135	73	71
358	50.435	0.141	0.080	2.03	100	0.88	99	0.0	-0.1	77	135	73	71
359	50.579	0.144	0.081	2.03	100.1	0.87	100	0.0	0.0	77	135	73	72
360	50.718	0.139	0.081	2.02	100.1	0.87	97	0.0	0.0	77	134	73	72

BOX A TEST DATA - ASTM E2779 / ASTM E2515

Client: Sherwood
 Model: Mini 2
 Run #: 1

Job #: 21-694
 Tracking #: 91
 Technician: AK
 Date: 4/14/2021

Elapsed Time (min)	Particulate Sampling Data							Fuel Weight (lb)		Temperature Data (°F)			
	Gas Meter (ft ³)	Sample Rate (cfm)	Dilution Tunnel dP (in H ₂ O)	Orifice dH (in H ₂ O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Scale Reading	Weight Change	Dilution Tunnel	Flue	Filter	Ambient
Avg/Tot	50.718	0.141	0.081	2.02	91	0.78	100			76	176	69	68

BOX B TEST DATA - ASTM E2779 / ASTM E2515

Client: SherwoodJob #: 21-694Model: Mini 2Tracking #: 91Run #: 1Technician: AKDate: 4/14/2021

Elapsed Time (min)	Particulate Sampling Data							Flue Gas Data		
	Gas Meter (ft ³)	Sample Rate (cfm)	Orifice dH (in H ₂ O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Filter (°F)	Flue Draft (in H ₂ O)	CO ₂ (%)	CO (%)
0	0.000		0.65	67.1	1.27		68	-0.040	8.20	0.03
1	0.129	0.129	2.06	67.1	1.54	93	68	-0.040	6.42	0.03
2	0.271	0.142	2.05	66.9	1.51	103	68	-0.040	6.57	0.03
3	0.410	0.139	2.05	66.8	1.54	102	68	-0.040	6.95	0.03
4	0.548	0.138	2.05	67	1.52	100	68	-0.040	6.96	0.02
5	0.690	0.142	2.04	67	1.52	102	68	-0.040	7.14	0.03
6	0.827	0.137	2.05	67	1.52	101	68	-0.040	6.83	0.02
7	0.971	0.144	2.06	67.2	1.54	105	68	-0.040	6.77	0.02
8	1.109	0.138	2.06	67.4	1.51	99	68	-0.040	5.91	0.02
9	1.248	0.139	2.06	67.4	1.52	101	68	-0.040	7.37	0.02
10	1.391	0.143	2.06	67.7	1.52	102	68	-0.040	7.52	0.02
11	1.528	0.137	2.05	67.8	1.55	99	68	-0.040	6.50	0.02
12	1.672	0.144	2.05	67.9	1.56	106	68	-0.040	7.03	0.02
13	1.810	0.138	2.06	68.1	1.52	99	68	-0.040	7.00	0.02
14	1.949	0.139	2.05	68.4	1.57	100	68	-0.040	7.78	0.03
15	2.092	0.143	2.05	68.7	1.56	103	68	-0.040	6.89	0.03
16	2.229	0.137	2.05	69	1.53	99	68	-0.040	8.08	0.03
17	2.372	0.143	2.05	69.3	1.53	103	68	-0.040	7.47	0.02
18	2.511	0.139	2.05	69.5	1.56	99	68	-0.040	6.92	0.03
19	2.650	0.139	2.06	69.8	1.56	101	68	-0.040	6.67	0.02
20	2.793	0.143	2.05	70	1.53	104	68	-0.040	6.96	0.02
21	2.931	0.138	2.05	70.3	1.57	100	68	-0.040	6.94	0.02
22	3.074	0.143	2.06	70.7	1.57	104	68	-0.040	6.77	0.02
23	3.213	0.139	2.06	70.9	1.58	101	68	-0.040	7.28	0.03
24	3.353	0.140	2.06	71.1	1.57	100	68	-0.040	6.61	0.03
25	3.497	0.144	2.06	71.4	1.58	106	68	-0.040	7.22	0.03
26	3.635	0.138	2.05	71.7	1.57	99	68	-0.040	6.78	0.02
27	3.777	0.142	2.05	72.1	1.54	102	68	-0.040	7.15	0.03
28	3.918	0.141	2.05	72.3	1.58	102	68	-0.040	7.39	0.02
29	4.058	0.140	2.05	72.6	1.6	102	68	-0.040	7.39	0.02
30	4.201	0.143	2.05	73	1.6	103	68	-0.040	7.87	0.02
31	4.340	0.139	2.06	73.3	1.59	101	68	-0.040	6.81	0.03

BOX B TEST DATA - ASTM E2779 / ASTM E2515

Client: SherwoodJob #: 21-694Model: Mini 2Tracking #: 91Run #: 1Technician: AKDate: 4/14/2021

Elapsed Time (min)	Particulate Sampling Data							Flue Gas Data		
	Gas Meter (ft ³)	Sample Rate (cfm)	Orifice dH (in H ₂ O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Filter (°F)	Flue Draft (in H ₂ O)	CO ₂ (%)	CO (%)
32	4.483	0.143	2.05	73.5	1.57	103	68	-0.040	6.69	0.02
33	4.623	0.140	2.05	74	1.59	101	68	-0.040	7.95	0.02
34	4.765	0.142	2.05	74.3	1.59	103	68	-0.040	7.17	0.02
35	4.906	0.141	2.06	74.6	1.57	101	69	-0.040	7.18	0.02
36	5.047	0.141	2.05	75	1.6	102	69	-0.040	7.57	0.02
37	5.190	0.143	2.05	75.2	1.6	102	69	-0.040	7.61	0.02
38	5.328	0.138	2.06	75.6	1.56	99	69	-0.040	7.07	0.02
39	5.473	0.145	2.06	75.8	1.58	104	69	-0.040	6.44	0.02
40	5.613	0.140	2.05	76.2	1.61	100	69	-0.040	7.66	0.02
41	5.753	0.140	2.06	76.5	1.61	99	69	-0.040	7.42	0.02
42	5.897	0.144	2.05	76.7	1.61	104	69	-0.040	7.23	0.02
43	6.036	0.139	2.05	77.2	1.63	99	69	-0.040	6.43	0.02
44	6.180	0.144	2.06	77.5	1.61	101	69	-0.040	7.13	0.02
45	6.321	0.141	2.05	77.8	1.62	101	69	-0.040	7.32	0.02
46	6.462	0.141	2.05	78.1	1.59	101	69	-0.040	6.97	0.03
47	6.604	0.142	2.06	78.4	1.62	99	69	-0.040	7.21	0.02
48	6.745	0.141	2.05	78.6	1.6	101	69	-0.040	7.27	0.02
49	6.889	0.144	2.05	78.9	1.63	104	69	-0.040	7.10	0.02
50	7.028	0.139	2.05	79.2	1.65	99	70	-0.040	7.56	0.02
51	7.173	0.145	2.05	79.5	1.64	104	70	-0.040	7.08	0.02
52	7.314	0.141	2.04	79.7	1.65	99	70	-0.040	7.47	0.02
53	7.455	0.141	2.05	80.1	1.61	100	70	-0.040	7.35	0.02
54	7.600	0.145	2.04	80.2	1.66	103	70	-0.040	7.08	0.02
55	7.739	0.139	2.04	80.6	1.63	99	70	-0.040	6.80	0.02
56	7.883	0.144	2.05	80.8	1.65	101	70	-0.040	7.31	0.02
57	8.024	0.141	2.04	81.1	1.65	101	70	-0.040	7.15	0.01
58	8.166	0.142	2.04	81.4	1.62	101	70	-0.040	7.62	0.02
59	8.308	0.142	2.04	81.7	1.65	100	70	-0.040	7.05	0.02
60	8.449	0.141	2.04	82	1.65	100	70	-0.040	7.60	0.02
61	8.593	0.144	2.04	82.1	1.65	101	70	-0.040	6.75	0.02
62	8.732	0.139	2.03	82.3	1.65	98	70	-0.040	6.71	0.02
63	8.877	0.145	2.04	82.6	1.63	103	70	-0.040	5.08	0.01

BOX B TEST DATA - ASTM E2779 / ASTM E2515

Client: SherwoodJob #: 21-694Model: Mini 2Tracking #: 91Run #: 1Technician: AKDate: 4/14/2021

Elapsed Time (min)	Particulate Sampling Data							Flue Gas Data		
	Gas Meter (ft ³)	Sample Rate (cfm)	Orifice dH (in H ₂ O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Filter (°F)	Flue Draft (in H ₂ O)	CO ₂ (%)	CO (%)
64	9.019	0.142	2.05	82.8	1.66	99	70	-0.040	4.24	0.03
65	9.160	0.141	2.04	83.1	1.67	101	70	-0.040	3.23	0.03
66	9.303	0.143	2.04	83.4	1.67	101	70	-0.040	3.82	0.02
67	9.445	0.142	2.04	83.7	1.67	101	70	-0.040	5.30	0.01
68	9.590	0.145	2.04	83.9	1.64	102	70	-0.040	4.79	0.02
69	9.730	0.140	2.04	84	1.64	98	70	-0.030	3.20	0.01
70	9.875	0.145	2.04	84.3	1.67	102	70	-0.040	4.16	0.01
71	10.016	0.141	2.05	84.6	1.67	100	70	-0.030	4.12	0.02
72	10.158	0.142	2.05	84.7	1.67	100	70	-0.030	2.99	0.01
73	10.303	0.145	2.04	84.9	1.68	103	71	-0.040	3.57	0.01
74	10.444	0.141	2.05	85.1	1.65	100	70	-0.030	2.69	0.02
75	10.588	0.144	2.05	85.4	1.66	102	71	-0.030	2.52	0.02
76	10.729	0.141	2.05	85.5	1.67	100	70	-0.030	3.51	0.01
77	10.875	0.146	2.05	85.6	1.68	103	71	-0.030	3.00	0.01
78	11.017	0.142	2.05	85.9	1.68	99	71	-0.030	2.35	0.02
79	11.158	0.141	2.05	86.1	1.67	100	71	-0.030	3.46	0.01
80	11.303	0.145	2.04	86.3	1.66	99	71	-0.030	3.75	0.01
81	11.445	0.142	2.04	86.3	1.67	101	71	-0.030	4.16	0.01
82	11.591	0.146	2.05	86.5	1.64	103	71	-0.030	3.93	0.01
83	11.732	0.141	2.05	86.7	1.68	98	71	-0.030	2.76	0.01
84	11.877	0.145	2.05	87	1.67	102	71	-0.030	3.81	0.01
85	12.019	0.142	2.05	87.1	1.65	101	71	-0.030	3.77	0.01
86	12.162	0.143	2.05	87.2	1.67	101	71	-0.030	2.84	0.01
87	12.307	0.145	2.05	87.3	1.67	102	71	-0.030	3.84	0.01
88	12.449	0.142	2.05	87.7	1.64	100	71	-0.030	2.83	0.01
89	12.595	0.146	2.06	87.7	1.65	103	71	-0.030	3.16	0.01
90	12.735	0.140	2.05	87.9	1.68	99	71	-0.030	3.15	0.01
91	12.881	0.146	2.05	88.1	1.65	103	71	-0.030	3.50	0.01
92	13.024	0.143	2.06	88.2	1.68	99	71	-0.030	3.13	0.01
93	13.168	0.144	2.06	88.4	1.67	101	71	-0.030	3.31	0.01
94	13.311	0.143	2.05	88.6	1.67	101	71	-0.030	2.86	0.01
95	13.453	0.142	2.06	88.7	1.68	99	71	-0.030	2.93	0.01

BOX B TEST DATA - ASTM E2779 / ASTM E2515

Client: Sherwood
 Model: Mini 2
 Run #: 1

Job #: 21-694
 Tracking #: 91
 Technician: AK
 Date: 4/14/2021

Elapsed Time (min)	Particulate Sampling Data							Flue Gas Data		
	Gas Meter (ft ³)	Sample Rate (cfm)	Orifice dH (in H ₂ O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Filter (°F)	Flue Draft (in H ₂ O)	CO ₂ (%)	CO (%)
96	13.601	0.148	2.06	88.7	1.68	103	71	-0.030	3.30	0.01
97	13.742	0.141	2.05	88.8	1.67	98	71	-0.030	2.34	0.01
98	13.887	0.145	2.05	89.1	1.69	101	71	-0.030	3.36	0.01
99	14.029	0.142	2.06	89.2	1.66	100	71	-0.030	2.95	0.01
100	14.176	0.147	2.06	89.3	1.68	104	71	-0.030	3.17	0.01
101	14.319	0.143	2.06	89.5	1.68	99	71	-0.030	2.88	0.01
102	14.461	0.142	2.06	89.6	1.66	98	71	-0.030	2.92	0.01
103	14.607	0.146	2.06	89.8	1.68	102	71	-0.030	2.79	0.01
104	14.750	0.143	2.06	89.9	1.68	100	71	-0.030	3.40	0.01
105	14.896	0.146	2.06	90	1.68	101	71	-0.030	3.50	0.01
106	15.037	0.141	2.06	90.1	1.69	98	71	-0.030	2.69	0.01
107	15.184	0.147	2.06	90.1	1.68	102	71	-0.030	3.17	0.01
108	15.326	0.142	2.06	90.3	1.69	98	71	-0.030	2.31	0.01
109	15.472	0.146	2.06	90.4	1.71	102	71	-0.030	3.09	0.01
110	15.616	0.144	2.06	90.6	1.67	100	71	-0.030	3.89	0.01
111	15.758	0.142	2.06	90.7	1.65	99	71	-0.030	2.62	0.01
112	15.904	0.146	2.06	90.6	1.66	102	71	-0.030	3.25	0.01
113	16.047	0.143	2.06	90.8	1.65	99	71	-0.030	2.55	0.01
114	16.194	0.147	2.06	91	1.68	101	71	-0.030	3.36	0.01
115	16.335	0.141	2.04	91	1.65	98	71	-0.030	3.25	0.00
116	16.481	0.146	2.06	91	1.69	103	70	-0.030	3.22	0.01
117	16.625	0.144	2.06	91.1	1.68	101	70	-0.030	3.90	0.01
118	16.770	0.145	2.06	91.3	1.66	101	70	-0.030	3.00	0.00
119	16.914	0.144	2.05	91.2	1.69	101	70	-0.030	2.44	0.01
120	17.057	0.143	2.07	91.3	1.69	100	70	-0.030	3.46	0.01
121	17.204	0.147	2.06	91.4	1.68	103	70	-0.030	2.62	0.01
122	17.346	0.142	2.06	91.5	1.69	97	70	-0.030	2.45	0.01
123	17.493	0.147	2.06	91.6	1.69	102	70	-0.030	3.40	0.01
124	17.634	0.141	2.06	91.6	1.68	98	70	-0.030	2.34	0.01
125	17.780	0.146	2.06	91.7	1.69	101	70	-0.030	2.41	0.01
126	17.925	0.145	2.06	91.8	1.68	101	70	-0.030	4.21	0.01
127	18.069	0.144	2.06	91.7	1.67	100	70	-0.030	2.95	0.01

BOX B TEST DATA - ASTM E2779 / ASTM E2515

Client: SherwoodJob #: 21-694Model: Mini 2Tracking #: 91Run #: 1Technician: AKDate: 4/14/2021

Elapsed Time (min)	Particulate Sampling Data							Flue Gas Data		
	Gas Meter (ft ³)	Sample Rate (cfm)	Orifice dH (in H ₂ O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Filter (°F)	Flue Draft (in H ₂ O)	CO ₂ (%)	CO (%)
128	18.213	0.144	2.05	91.8	1.68	101	70	-0.030	2.92	0.01
129	18.356	0.143	2.07	91.9	1.66	100	70	-0.030	3.27	0.01
130	18.504	0.148	2.05	91.8	1.67	103	70	-0.030	2.51	0.01
131	18.646	0.142	2.06	91.9	1.66	98	70	-0.030	3.10	0.01
132	18.792	0.146	2.06	91.9	1.67	101	70	-0.030	3.15	0.01
133	18.934	0.142	2.06	92.1	1.66	98	70	-0.030	1.92	0.01
134	19.081	0.147	2.06	92.1	1.67	116	70	-0.030	2.95	0.01
135	19.225	0.144	2.05	92.1	1.7	106	70	-0.030	2.66	0.01
136	19.369	0.144	2.06	92.2	1.66	104	70	-0.030	3.53	0.01
137	19.513	0.144	2.05	92.2	1.69	103	70	-0.030	3.11	0.01
138	19.656	0.143	2.06	92.4	1.68	101	70	-0.030	3.15	0.01
139	19.804	0.148	2.05	92.3	1.68	104	70	-0.030	2.14	0.01
140	19.946	0.142	2.06	92.4	1.69	99	70	-0.030	3.42	0.01
141	20.093	0.147	2.06	92.4	1.69	103	70	-0.030	3.20	0.01
142	20.235	0.142	2.06	92.4	1.68	100	70	-0.030	3.34	0.01
143	20.381	0.146	2.06	92.5	1.69	102	70	-0.030	3.50	0.01
144	20.525	0.144	2.06	92.6	1.69	100	70	-0.030	2.84	0.01
145	20.669	0.144	2.06	92.6	1.69	101	70	-0.030	3.20	0.01
146	20.813	0.144	2.05	92.5	1.7	100	70	-0.030	3.72	0.01
147	20.956	0.143	2.06	92.7	1.69	98	70	-0.030	2.73	0.01
148	21.104	0.148	2.05	92.6	1.68	103	70	-0.030	3.18	0.01
149	21.246	0.142	2.06	92.7	1.68	100	70	-0.030	3.83	0.01
150	21.393	0.147	2.06	92.7	1.67	102	70	-0.030	2.02	0.01
151	21.535	0.142	2.06	92.7	1.67	98	70	-0.030	2.99	0.01
152	21.681	0.146	2.05	92.8	1.68	102	70	-0.030	3.17	0.01
153	21.825	0.144	2.05	92.9	1.67	100	70	-0.030	2.83	0.01
154	21.969	0.144	2.06	92.8	1.7	99	70	-0.030	3.24	0.01
155	22.114	0.145	2.05	92.8	1.67	100	70	-0.030	2.60	0.01
156	22.256	0.142	2.06	92.9	1.68	99	70	-0.030	2.32	0.01
157	22.405	0.149	2.05	93	1.7	104	70	-0.030	2.93	0.01
158	22.547	0.142	2.06	93	1.68	99	70	-0.030	2.11	0.01
159	22.693	0.146	2.05	93	1.7	102	70	-0.030	2.93	0.01

BOX B TEST DATA - ASTM E2779 / ASTM E2515

Client: SherwoodJob #: 21-694Model: Mini 2Tracking #: 91Run #: 1Technician: AKDate: 4/14/2021

Elapsed Time (min)	Particulate Sampling Data							Flue Gas Data		
	Gas Meter (ft ³)	Sample Rate (cfm)	Orifice dH (in H ₂ O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Filter (°F)	Flue Draft (in H ₂ O)	CO ₂ (%)	CO (%)
160	22.835	0.142	2.06	93.1	1.69	98	70	-0.030	3.23	0.01
161	22.981	0.146	2.05	93	1.7	102	70	-0.030	2.15	0.01
162	23.125	0.144	2.05	93	1.67	100	70	-0.030	2.23	0.01
163	23.270	0.145	2.05	93.1	1.7	100	70	-0.030	3.22	0.01
164	23.414	0.144	2.05	93.1	1.7	100	70	-0.030	2.53	0.00
165	23.557	0.143	2.05	93.2	1.7	100	70	-0.030	2.69	0.00
166	23.705	0.148	2.05	93.2	1.71	102	70	-0.030	3.85	0.00
167	23.847	0.142	2.06	93.3	1.67	98	70	-0.030	3.04	0.01
168	23.993	0.146	2.05	93.3	1.67	101	70	-0.030	3.05	0.00
169	24.135	0.142	2.05	93.2	1.66	98	70	-0.030	2.86	0.01
170	24.281	0.146	2.05	93.4	1.69	102	70	-0.030	2.12	0.00
171	24.425	0.144	2.05	93.4	1.7	100	70	-0.030	3.92	0.00
172	24.570	0.145	2.05	93.3	1.7	99	70	-0.030	3.85	0.01
173	24.714	0.144	2.05	93.3	1.7	100	70	-0.030	3.29	0.01
174	24.857	0.143	2.05	93.4	1.71	100	70	-0.030	3.90	0.00
175	25.005	0.148	2.05	93.5	1.71	103	70	-0.030	2.11	0.01
176	25.147	0.142	2.05	93.4	1.67	98	70	-0.030	2.87	0.01
177	25.293	0.146	2.06	93.4	1.68	100	70	-0.030	3.59	0.00
178	25.435	0.142	2.05	93.6	1.68	98	70	-0.030	2.34	0.01
179	25.582	0.147	2.05	93.5	1.7	102	70	-0.030	3.45	0.01
180	25.725	0.143	2.04	93.6	1.71	100	70	-0.030	2.99	0.01
181	25.869	0.144	2.05	93.5	1.7	100	70	-0.030	2.64	0.01
182	26.014	0.145	2.05	93.5	1.7	100	70	-0.020	2.58	0.01
183	26.157	0.143	2.05	93.5	1.7	99	70	-0.020	3.79	0.01
184	26.305	0.148	2.05	93.7	1.7	103	70	-0.020	3.71	0.01
185	26.447	0.142	2.05	93.5	1.7	98	70	-0.020	2.13	0.01
186	26.593	0.146	2.05	93.7	1.7	101	70	-0.020	2.42	0.01
187	26.735	0.142	2.05	93.8	1.69	96	70	-0.020	3.34	0.01
188	26.882	0.147	2.05	93.7	1.67	102	70	-0.020	4.13	0.01
189	27.025	0.143	2.04	93.7	1.7	98	70	-0.020	3.27	0.01
190	27.169	0.144	2.04	93.8	1.71	100	70	-0.020	2.99	0.01
191	27.314	0.145	2.05	93.9	1.71	99	70	-0.020	2.93	0.01

BOX B TEST DATA - ASTM E2779 / ASTM E2515

Client: SherwoodJob #: 21-694Model: Mini 2Tracking #: 91Run #: 1Technician: AKDate: 4/14/2021

Elapsed Time (min)	Particulate Sampling Data							Flue Gas Data		
	Gas Meter (ft ³)	Sample Rate (cfm)	Orifice dH (in H ₂ O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Filter (°F)	Flue Draft (in H ₂ O)	CO ₂ (%)	CO (%)
192	27.457	0.143	2.05	93.7	1.7	100	70	-0.020	3.03	0.01
193	27.605	0.148	2.05	93.8	1.72	102	70	-0.020	2.03	0.02
194	27.747	0.142	2.05	93.8	1.7	97	70	-0.020	2.73	0.01
195	27.892	0.145	2.04	93.8	1.68	101	70	-0.020	4.50	0.01
196	28.035	0.143	2.05	93.8	1.67	97	70	-0.020	3.43	0.01
197	28.182	0.147	2.05	93.8	1.71	102	70	-0.020	2.64	0.01
198	28.325	0.143	2.04	94	1.67	98	70	-0.020	3.04	0.00
199	28.469	0.144	2.04	93.8	1.69	99	70	-0.020	3.41	0.00
200	28.614	0.145	2.05	93.9	1.68	101	70	-0.020	2.86	0.01
201	28.756	0.142	2.05	94	1.7	98	70	-0.020	3.18	0.01
202	28.904	0.148	2.04	93.9	1.71	101	70	-0.020	2.46	0.01
203	29.046	0.142	2.05	93.9	1.71	98	69	-0.020	2.95	0.01
204	29.191	0.145	2.04	93.8	1.71	100	69	-0.020	2.94	0.01
205	29.334	0.143	2.04	93.9	1.7	99	69	-0.020	2.63	0.01
206	29.481	0.147	2.04	94.1	1.7	99	70	-0.020	3.47	0.01
207	29.624	0.143	2.04	94	1.71	99	69	-0.020	2.52	0.01
208	29.767	0.143	2.05	94.1	1.71	99	69	-0.020	3.17	0.01
209	29.913	0.146	2.04	94	1.71	101	69	-0.020	3.58	0.01
210	30.056	0.143	2.04	94.1	1.71	98	69	-0.020	3.29	0.01
211	30.203	0.147	2.04	94	1.71	103	69	-0.020	3.64	0.01
212	30.344	0.141	2.04	94.2	1.72	97	69	-0.020	3.84	0.01
213	30.490	0.146	2.04	94.1	1.7	101	69	-0.020	3.22	0.01
214	30.633	0.143	2.04	94.1	1.71	98	69	-0.020	2.75	0.01
215	30.779	0.146	2.04	94.1	1.71	102	69	-0.020	3.38	0.01
216	30.923	0.144	2.04	94.1	1.71	98	69	-0.020	3.15	0.01
217	31.065	0.142	2.03	94.2	1.71	97	69	-0.020	3.48	0.00
218	31.211	0.146	2.04	94.3	1.71	101	69	-0.020	2.83	0.01
219	31.355	0.144	2.04	94.2	1.7	100	69	-0.020	3.28	0.01
220	31.501	0.146	2.04	94.2	1.72	101	69	-0.020	3.39	0.01
221	31.642	0.141	2.04	94.2	1.72	98	69	-0.020	3.39	0.01
222	31.789	0.147	2.04	94.2	1.72	101	69	-0.020	2.96	0.01
223	31.932	0.143	2.04	94.3	1.69	102	69	-0.020	3.75	0.01

BOX B TEST DATA - ASTM E2779 / ASTM E2515

Client: SherwoodJob #: 21-694Model: Mini 2Tracking #: 91Run #: 1Technician: AKDate: 4/14/2021

Elapsed Time (min)	Particulate Sampling Data							Flue Gas Data		
	Gas Meter (ft ³)	Sample Rate (cfm)	Orifice dH (in H ₂ O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Filter (°F)	Flue Draft (in H ₂ O)	CO ₂ (%)	CO (%)
224	32.077	0.145	2.03	94.3	1.7	103	69	-0.020	3.36	0.01
225	32.221	0.144	2.04	94.4	1.71	102	69	-0.020	2.94	0.01
226	32.363	0.142	2.04	94.4	1.72	99	69	-0.020	2.99	0.01
227	32.509	0.146	2.03	94.3	1.72	101	69	-0.020	3.69	0.01
228	32.652	0.143	2.03	94.5	1.71	100	69	-0.020	3.57	0.00
229	32.798	0.146	2.04	94.4	1.73	101	69	-0.020	3.46	0.01
230	32.939	0.141	2.03	94.5	1.72	98	69	-0.020	3.42	0.01
231	33.085	0.146	2.04	94.5	1.71	101	69	-0.020	3.30	0.01
232	33.230	0.145	2.04	94.4	1.72	100	69	-0.020	2.53	0.01
233	33.374	0.144	2.03	94.5	1.73	98	69	-0.020	2.99	0.01
234	33.517	0.143	2.03	94.5	1.74	99	69	-0.020	3.21	0.01
235	33.660	0.143	2.03	94.5	1.72	99	69	-0.020	2.88	0.01
236	33.808	0.148	2.03	94.5	1.69	102	69	-0.020	3.71	0.01
237	33.949	0.141	2.03	94.7	1.71	98	69	-0.020	3.57	0.00
238	34.095	0.146	2.03	94.7	1.71	101	69	-0.020	3.91	0.01
239	34.237	0.142	2.03	94.7	1.73	98	69	-0.020	3.49	0.01
240	34.383	0.146	2.03	94.7	1.71	101	69	-0.020	3.37	0.01
241	34.526	0.143	2.03	94.7	1.71	98	69	-0.020	4.36	0.00
242	34.669	0.143	2.03	94.6	1.72	98	69	-0.020	3.78	0.00
243	34.814	0.145	2.03	94.6	1.72	100	69	-0.020	3.36	0.01
244	34.957	0.143	2.03	94.8	1.72	98	69	-0.020	2.58	0.01
245	35.104	0.147	2.02	94.7	1.71	101	69	-0.020	2.91	0.00
246	35.245	0.141	2.03	94.9	1.71	96	70	-0.020	3.06	0.01
247	35.391	0.146	2.03	94.7	1.73	99	70	-0.020	4.25	0.00
248	35.533	0.142	2.03	94.8	1.7	97	70	-0.020	3.48	0.00
249	35.679	0.146	2.02	94.9	1.71	100	70	-0.020	2.64	0.01
250	35.822	0.143	2.03	94.9	1.73	99	70	-0.020	2.65	0.00
251	35.965	0.143	2.03	94.9	1.72	98	70	-0.020	3.82	0.00
252	36.111	0.146	2.03	94.8	1.73	101	70	-0.020	3.40	0.01
253	36.253	0.142	2.02	94.9	1.72	97	70	-0.020	3.35	0.01
254	36.399	0.146	2.02	95	1.73	102	70	-0.020	2.77	0.01
255	36.540	0.141	2.02	94.9	1.73	97	70	-0.020	3.69	0.00

BOX B TEST DATA - ASTM E2779 / ASTM E2515

Client: SherwoodJob #: 21-694Model: Mini 2Tracking #: 91Run #: 1Technician: AKDate: 4/14/2021

Elapsed Time (min)	Particulate Sampling Data							Flue Gas Data		
	Gas Meter (ft ³)	Sample Rate (cfm)	Orifice dH (in H ₂ O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Filter (°F)	Flue Draft (in H ₂ O)	CO ₂ (%)	CO (%)
256	36.686	0.146	2.02	95	1.71	101	70	-0.020	3.55	0.01
257	36.830	0.144	2.02	95.1	1.74	99	70	-0.020	3.94	0.01
258	36.974	0.144	2.02	95	1.71	99	70	-0.020	2.52	0.01
259	37.117	0.143	2.02	95.1	1.71	100	70	-0.020	2.85	0.00
260	37.260	0.143	2.02	95.1	1.71	98	70	-0.020	3.45	0.00
261	37.407	0.147	2.02	95	1.74	101	70	-0.020	2.79	0.01
262	37.548	0.141	2.02	95.2	1.73	95	70	-0.020	2.41	0.01
263	37.694	0.146	2.02	95.2	1.74	101	70	-0.020	2.67	0.00
264	37.836	0.142	2.02	95.1	1.71	98	70	-0.020	3.35	0.00
265	37.982	0.146	2.03	95.2	1.72	101	70	-0.020	3.73	0.00
266	38.125	0.143	2.02	95.2	1.73	98	70	-0.020	2.91	0.01
267	38.267	0.142	2.02	95.3	1.74	96	70	-0.020	3.46	0.00
268	38.413	0.146	2.02	95.2	1.71	101	70	-0.020	2.07	0.01
269	38.556	0.143	2.02	95.3	1.73	98	70	-0.020	3.60	0.01
270	38.702	0.146	2.02	95.3	1.74	100	70	-0.020	3.55	0.00
271	38.842	0.140	2.02	95.2	1.73	97	70	-0.020	3.43	0.00
272	38.988	0.146	2.02	95.2	1.73	100	70	-0.020	2.96	0.01
273	39.132	0.144	2.02	95.2	1.71	99	70	-0.020	3.54	0.00
274	39.276	0.144	2.02	95.3	1.71	99	70	-0.020	3.65	0.01
275	39.419	0.143	2.01	95.4	1.73	97	70	-0.020	3.99	0.00
276	39.561	0.142	2.02	95.5	1.7	99	70	-0.020	2.75	0.01
277	39.709	0.148	2.02	95.4	1.74	101	70	-0.020	3.95	0.00
278	39.850	0.141	2.02	95.6	1.74	98	70	-0.020	2.36	0.01
279	39.995	0.145	2.01	95.5	1.74	100	70	-0.020	2.17	0.01
280	40.137	0.142	2.01	95.6	1.75	98	70	-0.020	2.52	0.01
281	40.284	0.147	2.02	95.5	1.76	99	70	-0.020	3.68	0.00
282	40.426	0.142	2.01	95.6	1.75	98	70	-0.020	3.43	0.01
283	40.568	0.142	2.01	95.5	1.73	99	70	-0.020	2.94	0.00
284	40.713	0.145	2.02	95.6	1.74	101	70	-0.020	3.80	0.00
285	40.856	0.143	2.02	95.6	1.74	99	71	-0.020	3.49	0.00
286	41.002	0.146	2.01	95.5	1.76	100	71	-0.020	3.81	0.00
287	41.142	0.140	2.00	95.7	1.74	96	71	-0.020	3.00	0.01

BOX B TEST DATA - ASTM E2779 / ASTM E2515

Client: SherwoodJob #: 21-694Model: Mini 2Tracking #: 91Run #: 1Technician: AKDate: 4/14/2021

Elapsed Time (min)	Particulate Sampling Data							Flue Gas Data		
	Gas Meter (ft ³)	Sample Rate (cfm)	Orifice dH (in H ₂ O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Filter (°F)	Flue Draft (in H ₂ O)	CO ₂ (%)	CO (%)
288	41.288	0.146	2.01	95.6	1.74	100	71	-0.020	2.99	0.01
289	41.431	0.143	2.01	95.7	1.73	98	71	-0.020	3.77	0.00
290	41.575	0.144	2.01	95.8	1.75	99	71	-0.020	4.06	0.00
291	41.718	0.143	2.01	95.9	1.75	99	71	-0.020	3.59	0.00
292	41.860	0.142	2.01	95.9	1.74	98	71	-0.020	2.75	0.00
293	42.007	0.147	2.00	96	1.75	101	71	-0.020	4.06	0.00
294	42.148	0.141	2.00	95.9	1.76	98	71	-0.020	4.88	0.00
295	42.293	0.145	2.00	96	1.75	100	71	-0.020	3.86	0.00
296	42.435	0.142	2.00	96	1.73	98	71	-0.020	2.26	0.01
297	42.579	0.144	2.00	95.9	1.75	100	71	-0.020	2.75	0.01
298	42.722	0.143	2.00	96.1	1.76	98	71	-0.020	3.42	0.00
299	42.864	0.142	2.00	96	1.74	98	71	-0.020	2.79	0.00
300	43.011	0.147	2.00	96.2	1.76	100	71	-0.020	3.60	0.00
301	43.152	0.141	2.00	96.2	1.75	96	71	-0.020	4.48	0.00
302	43.296	0.144	2.00	96.1	1.74	100	71	-0.020	4.65	0.00
303	43.438	0.142	2.00	96.3	1.76	98	71	-0.020	3.93	0.00
304	43.584	0.146	2.00	96.2	1.77	101	71	-0.020	3.70	0.00
305	43.726	0.142	2.00	96.3	1.74	98	71	-0.020	3.33	0.00
306	43.868	0.142	1.99	96.4	1.75	98	71	-0.020	3.19	0.00
307	44.013	0.145	2.00	96.5	1.76	100	71	-0.020	3.59	0.00
308	44.155	0.142	1.99	96.5	1.74	97	72	-0.020	2.93	0.00
309	44.300	0.145	1.99	96.6	1.76	100	72	-0.020	3.30	0.00
310	44.441	0.141	1.99	96.5	1.77	97	72	-0.020	3.08	0.00
311	44.587	0.146	2.00	96.6	1.77	102	72	-0.020	4.01	0.00
312	44.729	0.142	2.00	96.6	1.77	99	72	-0.020	3.43	0.00
313	44.871	0.142	2.00	96.7	1.76	97	72	-0.020	3.88	0.00
314	45.016	0.145	2.00	96.6	1.78	100	72	-0.020	3.29	0.00
315	45.158	0.142	1.99	96.7	1.76	98	72	-0.020	4.45	0.00
316	45.304	0.146	1.99	96.7	1.75	101	72	-0.020	3.52	0.00
317	45.443	0.139	1.99	96.7	1.77	96	72	-0.020	2.50	0.00
318	45.588	0.145	1.99	96.9	1.76	100	72	-0.020	3.23	0.00
319	45.732	0.144	1.99	96.7	1.78	100	72	-0.020	4.52	0.00

BOX B TEST DATA - ASTM E2779 / ASTM E2515

Client: SherwoodJob #: 21-694Model: Mini 2Tracking #: 91Run #: 1Technician: AKDate: 4/14/2021

Elapsed Time (min)	Particulate Sampling Data							Flue Gas Data		
	Gas Meter (ft ³)	Sample Rate (cfm)	Orifice dH (in H ₂ O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Filter (°F)	Flue Draft (in H ₂ O)	CO ₂ (%)	CO (%)
320	45.875	0.143	1.99	96.8	1.77	99	72	-0.020	4.17	0.00
321	46.018	0.143	1.99	96.8	1.76	98	72	-0.020	3.47	0.00
322	46.160	0.142	1.99	96.8	1.77	98	72	-0.020	3.80	0.00
323	46.306	0.146	1.99	96.8	1.77	100	72	-0.020	2.67	0.00
324	46.446	0.140	1.99	96.8	1.78	96	72	-0.020	2.86	0.00
325	46.591	0.145	1.99	97	1.77	102	72	-0.020	3.46	0.00
326	46.734	0.143	1.98	97.1	1.77	98	73	-0.020	2.94	0.00
327	46.877	0.143	1.99	97.1	1.77	98	73	-0.020	3.40	0.00
328	47.020	0.143	1.98	97	1.78	98	73	-0.020	4.51	0.00
329	47.161	0.141	1.99	97	1.77	98	73	-0.020	4.07	0.00
330	47.308	0.147	1.98	97.2	1.78	102	73	-0.020	3.56	0.00
331	47.448	0.140	1.98	97.2	1.78	98	73	-0.020	3.72	0.00
332	47.593	0.145	1.99	97.2	1.78	100	73	-0.020	4.34	0.00
333	47.735	0.142	1.98	97.2	1.76	96	73	-0.020	3.88	0.00
334	47.879	0.144	1.98	97.3	1.77	100	73	-0.020	4.04	0.00
335	48.021	0.142	1.98	97.3	1.77	98	73	-0.020	4.29	0.00
336	48.162	0.141	1.98	97.5	1.79	95	73	-0.020	3.32	0.00
337	48.309	0.147	1.98	97.5	1.78	101	73	-0.020	3.51	0.00
338	48.449	0.140	1.98	97.4	1.78	96	73	-0.020	3.32	0.00
339	48.594	0.145	1.98	97.6	1.78	100	73	-0.020	3.69	0.00
340	48.736	0.142	1.98	97.6	1.78	99	73	-0.020	3.32	0.00
341	48.880	0.144	1.98	97.7	1.79	99	73	-0.020	4.52	0.00
342	49.022	0.142	1.97	97.7	1.77	98	74	-0.020	3.92	0.00
343	49.163	0.141	1.98	97.6	1.79	98	74	-0.020	3.07	0.00
344	49.310	0.147	1.98	97.7	1.78	101	74	-0.020	3.31	0.00
345	49.450	0.140	1.98	97.9	1.8	97	74	-0.020	3.80	0.00
346	49.595	0.145	1.98	98	1.75	101	74	-0.020	4.02	0.00
347	49.737	0.142	1.98	98	1.78	98	74	-0.020	3.64	0.00
348	49.881	0.144	1.98	97.9	1.79	99	74	-0.020	3.15	0.00
349	50.023	0.142	1.98	98	1.78	98	74	-0.020	3.13	0.00
350	50.164	0.141	1.98	98	1.76	97	74	-0.020	2.91	0.00
351	50.311	0.147	2.03	98	1.79	102	74	-0.020	2.40	0.00

LAB SAMPLE DATA - ASTM E2515

Client: Sherwood
 Model: Mini 2
 Run #: 1

Job #: 21-694
 Tracking #: 91
 Technician: AK
 Date: 4/14/2021

	Sample ID	Tare, mg	Total, mg	Final, mg	Catch, mg
Train A Filters - First Hour	G0027	121.0	121.0	121.9	0.9
Train A Filters - Remainder	G0028	118.0	238.0	239.5	1.5
	G0029	120.0			
Train A Probe	16A	116380.9	116380.9	116380.9	0.0
Train A O-Rings	16A	3573.6	3573.6	3573.5	0.0*
Train B Filters	G0030	121.3	240.9	243.1	2.2
	G0031	119.6			
Train B Probe	16B	115865.1	115865.1	115865.1	0.0
Train B O-Rings	16B	3638.6	3638.6	3638.6	0.0
Background Filter	G0032	119.8	119.8	119.8	0.0

*Negative value corrected to zero

Placed in Dessicator on:	4/14 - 16:30
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Train A Filters - First Hour	121.9	4/24 15:16	121.9	4/29 12:28				
Train A Filters - Remainder	239.5	4/24 15:16	239.5	4/29 12:28				
Train A Probe	116380.9	4/24 15:17	116380.9	4/29 12:26				
Train A O-Rings	3573.4	4/24 15:19	3573.5	4/29 12:27				
Train B Filters	243.0	4/24 15:16	243.1	4/29 12:28				
Train B Probe	115865.2	4/24 15:18	115865.1	4/29 12:26				
Train B O-Rings	3638.7	4/24 15:19	3638.6	4/29 12:27				
Background Filter	119.9	4/24 15:16	119.8	4/29 12:29				

1st hour Sub-Total, mg:	0.9
Remainder Sub-Total, mg:	1.5
Train 1 Aggregate, mg:	2.4
Train 2 Aggregate, mg:	2.2
Ambient Aggregate, mg:	0.0

Client: Sherwood Appliance: Mini 2 Project: 21-694
Pellet Heater Control Settings

High Burn Rate Settings: 5 Heat, 5 Feed Trim, 2 Combustion Trim

Medium Burn Rate Settings: 2 Heat, 1 Feed Trim, 1 Combustion Trim

Low Burn Rate Settings: 1 Heat, 1 Feed Trim, 1 Combustion Trim

Preburn Notes

Preburn Start Time: 08:05

Time	Notes
	-None-

Test Notes

Test Burn Start Time: 09:05

Time	Notes
60:00	Changed front filter A, adjusted settings to medium
180:00	Adjusted settings to low
360:00	Test end

Test Burn End Time: 15:05

Flue Gas Concentration Measurement

Calibration Gas Values: Span Gas CO₂ (%): 17.14 CO (%): 4.30
 Mid Gas CO₂ (%): 9.90 CO (%): 2.47

Calibration Results:

	Pre Test			Post Test		
	Zero	Mid	Span	Zero	Mid	Span
Time	07:38	07:41	07:40	16:01	16:07	16:03
CO ₂	0.00	10.05	17.14	0.01	10.18	17.04
CO	0.00	2.510	4.301	-0.049	2.406	4.254

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

Technician Signature: 

Date: 5/5/2021

ASTM E2515 - Glass Filters

Sample	Weight 1	Weight 2	Weight 3	Weight 4	Initial	Project	Run
G00001	120.5	120.5	-	-	A	21-686	#1
G00002	120.8	120.8	-	-	A	↓	↓
G00003	120.0	120.0	-	-	A	↓	↓
G00004	121.2	121.2	-	-	A	↓	↓
G00005	119.8	119.6	-	-	A	↓	↓
G00006	121.1	121.3	-	-	A	21-686	#2
G00007	119.8	119.0	-	-	A	↓	↓
G00008	239.120.3	120.2	-	-	A	↓	↓
G00009	120.3	120.4	-	-	A	↓	↓
G00010	119.8	119.8	-	-	A	↓	↓
G00011	120.4	120.5	-	-	A	21-686	#3
G00012	119.7	119.7	-	-	A	↓	↓
G00013	120.3	120.3	-	-	A	↓	↓
G00014	120.5	120.3	-	-	A	↓	↓
G00015	121.5	121.4	-	-	A	↓	↓
G00016	120.0	120.0	-	-	A	21-686	#4
G00017	120.3	120.4	-	-	A	↓	↓
G00018	120.2	120.1	-	-	A	↓	↓

Weight 1 Date/Time:

3/18 9:45

Weight 2 Date/Time:

3/21 11:30

Weight 3 Date/Time:

Weight 4 Date/Time:

Sample	Weight 1	Weight 2	Weight 3	Weight 4	Initial	Project	Run
G0019	119.8	119.6	-	-	A	21-686	#4
G0020	119.4	119.5	-	-	A	↓	↓
G0021	121.0	121.0	-	-	A	21-695	#1
G0022	119.6	119.7	-	-	A	↓	↓
G0023	121.7	121.8	-	-	A	↓	↓
G0024	117.6	117.6	-	-	A	↓	↓
G0025	121.0	120.9	-	-	A	↓	↓
G0026	120.8	120.6	-	-	A	↓	↓
G0027	120.8	121.0	-	-	A	21-694	#1
G0028	117.9	118.0	-	-	A	↓	↓
G0029	120.0	120.0	-	-	A	↓	↓
G0030	121.3	121.3	-	-	A	↓	↓
G0031	119.5	119.6	-	-	A	↓	↓
G0032	119.7	119.8	-	-	A	↓	↓
G0033	120.5	120.4	-	-	A	21-661	#1
G0034	121.0	121.0	-	-	A	↓	↓
G0035	119.6	119.0	-	-	A	↓	↓
G0036	120.8	120.7	-	-	A	↓	↓

Weight 1 Date/Time:

3/18 9:45

Weight 2 Date/Time:

3/21 11:30

Weight 3 Date/Time:

Weight 4 Date/Time:

ASTM E2515 - O-Rings

Sample	Weight 1	Weight 2	Weight 3	Weight 4	Initial	Project	Run
1A	3562.1	3563.2	3563.9	-	SB	20-635	#1
1B	3552.3	3552.3	-	-	SB		
2A	3549.7	3549.4	-	-	SB	20-635	#2
2B	3568.4	3568.4	-	-	SB		
3A	3577.0	3577.3	3577.3	-	SB	20-635	#3
3B	3568.2	3565.6	3565.6	-	SB		
4A	3619.3	3619.9	3620.1	-	SB	20-651	#1
4B	3577.3	3577.5	-	-	SB		
5A	3531.8	3531.9	-	-	SB	20-651	#2
5B	3528.1	3528.4	3528.5	-	SB		
6A	3613.4	3613.6	-	-	✓	20-651	#3
6B	3402.3	3394.6	3394.6	-	✓		
7A	3571.0	3571.0	-	-	A	20-651	#4
7B	3520.9	3521.1	-	-	A		
8A	3550.2	3550.1	-	-	A	21-661	#1
8B	3584.0	3584.0	-	-	A		
9A	3579.9	3579.9	-	-	A	21-661	#2
9B	3523.0	3523.2	-	-	A		
10A	3428.3	3429.1	3429.2	-	✓	-	-
10B	3568.9	3569.0	-	-	A		
11A	3424.6	3424.1	3424.2	-	SB	21-686	#1
11B	4234.5	4234.1	4234.3	-	SB		
12A	3404.1	3403.8	3403.8	-	SB	21-686	#2
12B	3396.2	3396.0	3396.0	-	SB		
13A	3360.1	3359.6	3359.7	-	SB	21-686	#3
13B	3445.2	3444.7	3444.9	-	SB		
14A	3366.8	3366.6	3366.6	-	SB	21-686	#4
14B	3341.9	3341.5	3341.7	-	SB		
15A	3571.2	3570.1	3570.1	-	SB	21-695	#1
15B	3570.4	3570.9	3571.1	-	SB		
16A	3573.8	3573.6	-	-	SB	21-694	#1
16B	3638.8	3638.6	-	-	SB		
17A	3612.6	3612.5	-	-	SB	21-661	#1
17B	3569.1	3569.0	-	-	SB		
18A	3396.8	3396.6	-	-	SB	21-661	#1/#2
18B	3367.7	3367.5	-	-	SB		
19A	3366.3	3366.1	-	-	✓	21-661	#2
19B	3439.3	3439.1	-	-	✓		
20A	3593.0	3592.8	-	-	✓	-	-
20B	3426.2	3426.0	-	-	✓		

Weight 1 Date/Time:

10/9/20 10:00

Weight 2 Date/Time:

10/12 - 9:30

Weight 3 Date/Time:

10/13 8:30

Weight 4 Date/Time:

Weight 1 Date/Time:

12/15/20 17:00

Weight 2 Date/Time:

12/16 10:00

Weight 3 Date/Time:

12/16 16:00

Weight 4 Date/Time:

Weight 1 Date/Time:

2/24 - 16:00

Weight 2 Date/Time:

3/21 - 10:00

Weight 3 Date/Time:

3/22 - 7:00

Weight 4 Date/Time:

Weight 1 Date/Time:

4/2 - 11:00

Weight 2 Date/Time:

4/5 - 9:45

Weight 3 Date/Time:

4/11 - 12:00

Weight 4 Date/Time:

ASTM E2515 - Probes

Sample	Weight 1	Weight 2	Weight 3	Weight 4	Initial	Project	Run
1A	115627.6	115627.5	—	—	SB	20-635	#1
1B	1156 115901.1	115900.9	—	—	SB		
2A	116075.6	116074.4	116074.4	—	SB	20-635	#2
2B	116202.2	116201.6	116201.5	—	SB		
3A	115901.4	115900.0	115899.9	—	SB	20-635	#3
3B	116151.4	116150.4	116150.3	—	SB		
4A	116037.3	116036.5	116036.5	—	SB	20-651	#1
4B	116192.0	116190.4	116190.3	—	SB		
5A	116767.7	116767.4	116767.7	116767.5	A	20-651	#2
5B	116875.3	116874.9	116875.5	116875.3	fu		
6A	116400.5	116400.4	—	—	A	20-651	#3
6B	115961.2	115961.7	—	—	A		
7A	116573.2	116573.2	—	—	A	20-651	#4
7B	117148.4	117148.5	—	—	A		
8A	116679.5	116679.6	—	—	A	21-661	#1
8B	116676.4	116676.3	—	—	A		
9A	116538.8	116538.4	—	—	A	21-661	#2
9B	117244.0	117244.2	—	—	A		
10A	116651.2	116651.0	—	—	A	—	—
10B	117755.5	117755.4	—	—	A		
11A	116888.7	116888.6	—	—	SB	21-686	#1
11B	117342.2	117341.0	117341.1	—	SB		
12A	116708.2	116708.1	—	—	SB	21-686	#2
12B	117735.0	117734.4	117734.6	—	SB		
13A	117316.7	117316.6	—	—	SB	21-686	#3
13B	116943.2	116942.8	116943.0	—	SB		
14A	116664.7	116661.3	116661.5	—	SB	21-686	#4
14B	116622.6	116620.4	116621.0	116620.9	SB		
15A	117244.6	117243.6	117243.6	—	SB	21-686	#1
15B	116757.7	116756.5	116756.6	—	SB		
16A	116381.4	116380.9	116380.9	—	A	21-694	#1
16B	115865.7	115865.3	115865.1	—	A		
17A	116808.9	116808.6	116808.6	—	A	21-661	#1
17B	117138.6	117138.5	—	—	A		
18A	117496.7	117496.2	117496.0	—	A	21-661	#1/#2
18B	117329.0	117329.7	117328.6	—	A		
19A	117024.5	117024.3	—	—	A	21-661	#2
19B	117009.9	117009.7	—	—	A		
20A	115624.7	115623.9	115624.1	—	A		
20B	115964.1	115963.5	115963.7	—	A		

Weight 1 Date/Time:
10/12 9:30
Weight 2 Date/Time:
10/12 - 16:30
Weight 3 Date/Time:
10/13 - 8:30
Weight 4 Date/Time:
12/15

Weight 1 Date/Time:
12/15 17:00
Weight 2 Date/Time:
12/16 10:00
Weight 3 Date/Time:
Weight 4 Date/Time:

Weight 1 Date/Time:
2/24 - 16:00
Weight 2 Date/Time:
3/21 - 10:00
Weight 3 Date/Time:
3/22 - 7:00
Weight 4 Date/Time:

Weight 1 Date/Time:
4/2 - 11:00
Weight 2 Date/Time:
4/5 - 9:45
Weight 3 Date/Time:
4/11 - 12:00
Weight 4 Date/Time:
4/12 - 09:30

Equations and Sample Calculations – ASTM E2779 & E2515

Client Sherwood
 Model: Mini 2
 Tracking #: 91
 Run: 1

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

M_{Bdb} – Weight of test fuel burned during test run, dry basis, kg

M_{BSidb} – Weight of test fuel burned during test run segment i , dry basis, kg

BR – Average dry burn rate over full integrated test run, kg/hr

BR_{Si} – Average dry burn rate over test run segment i , 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 – Average particulate emissions for full integrated test run, g/hr

PM_F – Average particulate emission factor for full integrated test run, g/dry kg of fuel burned

M_{Bdb} – Weight of test fuel burned during test run, dry basis, kg

ASTM E2779 equation (1)

$$M_{Bdb} = (M_{Swb} - M_{Ewb})(100/(100 + FM))$$

Where,

FM = average fuel moisture of test fuel, % dry basis

M_{Swb} = weight of test fuel in hopper at start of test run, wet basis, kg

M_{Ewb} = weight of test fuel in hopper at end of test run, wet basis, kg

Sample Calculation:

$$FM = 5.14 \%$$

$$M_{Swb} = 9.8 \text{ lbs}$$

$$M_{Ewb} = 0.0 \text{ lbs}$$

0.4536 = Conversion factor from lbs to kg

$$M_{Bdb} = [(9.8 \times 0.4536) - (0.0 \times 0.4536)] (100/(100 + 5.14))$$

$$M_{Bdb} = 4.21 \text{ kg}$$

M_{BSidb} – Weight of test fuel burned during test run segment i , dry basis, kg
 ASTM E2779 equation (2)

$$M_{BSidb} = (M_{SSiwb} - M_{ESiwb})(100/(100 + FM))$$

Where,

M_{SSiwb} = weight of test fuel in hopper at start of test run segment i , wet basis, kg

M_{ESiwb} = weight of test fuel in hopper at end of test run segment i , wet basis, kg

Sample Calculation (from medium burn rate segment):

$$FM = 5.14 \%$$

$$M_{SSiwb} = 6.2 \text{ lbs}$$

$$M_{ESiwb} = 3.0 \text{ lbs}$$

$$0.4536 = \text{Conversion factor from lbs to kg}$$

$$M_{BSidb} = [(6.2 \times 0.4536) - (3.0 \times 0.4536)] (100/(100 + 5.14))$$

$$M_{BSidb} = 1.38 \text{ kg}$$

BR – Average dry burn rate over full integrated test run, kg/hr

ASTM E2779 equation (3)

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

Where,

θ = Total length of full integrated test run, min

Sample Calculation:

$$M_{Bdb} = 4.21 \quad \text{kg}$$

$$\theta = 360 \quad \text{min}$$

$$BR = \frac{60 \times 4.21}{360}$$

$$BR = \mathbf{0.70} \quad \text{kg/hr}$$

BR_{Si} – Average dry burn rate over test run segment *i*, kg/hr
 ASTM E2779 equation (4)

$$BR_{Si} = \frac{60 M_{BSidb}}{\theta_{Si}}$$

Where,

$$\theta_{Si} = \text{Total length of test run segment } i, \text{ min}$$

Sample Calculation (from medium burn rate segment):

$$M_{BSidb} = 1.38 \text{ kg}$$

$$\theta = 120 \text{ min}$$

$$BR = \frac{60 \times 1.38}{120}$$

$$BR = \mathbf{0.69} \text{ kg/hr}$$

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

ASTM E2515 equations (9)

$$V_s = F_p \times K_p \times C_p \times (\sqrt{\Delta P})_{avg} \times \sqrt{\frac{T_s}{P_s \times M_s}}$$

Where:

- F_p = Adjustment factor for center of tunnel pitot tube placement, $F_p = \frac{V_{strav}}{V_{scent}}$, 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 H₂O
 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. H₂O; (in Hg = in H₂O/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:

$$F_p = \frac{16.37}{18.26} = 0.896$$

$$V_s = 0.896 \times 85.49 \times 0.99 \times 0.284 \times \left(\frac{76.1 + 460}{30.13 + \frac{-0.18}{13.6}} \times 28.78 \right)^{1/2}$$

$$V_s = \mathbf{16.94 \text{ ft/s}}$$

*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 M_s 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)

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

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	=	Absolute average gas temperature in the dilution tunnel, °R; (°R = °F + 460)
P _{std}	=	Standard absolute pressure, 29.92 in Hg

Sample calculation:

$$Q_{sd} = 3600 \times (1 - 0.02) \times 16.94 \times 0.1963 \times \frac{528}{76.1 + 460} \times \frac{30.13 + \frac{-0.18}{13.6}}{29.92}$$

$$Q_{sd} = 11628.2 \text{ dscf/hr}$$

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

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

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 ₂ O
T_m	=	Absolute average dry gas meter temperature, °R

Sample Calculation:

Using equation for Train A:

$$V_{m(std)} = 17.64 \times 50.718 \times 0.996 \times \frac{(30.13 + \frac{2.02}{13.6})}{(91.4 + 460)}$$

$$V_{m(std)} = \mathbf{48.920} \text{ dscf}$$

Using equation for Train B:

$$V_{m(std)} = 17.64 \times 51.612 \times 1.017 \times \frac{(30.13 + \frac{2.03}{13.6})}{(90.0 + 460)}$$

$$V_{m(std)} = \mathbf{50.966} \text{ dscf}$$

Using equation for ambient train:

$$V_{m(std)} = 17.64 \times 63.62 \times 1 \times \frac{(30.13 + \frac{0.00}{13.6})}{(67.7 + 460)}$$

$$V_{m(std)} = \mathbf{64.072} \text{ dscf}$$

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

$$m_n = m_p + m_f + m_g$$

Where:

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

Sample Calculation:

Using equation for Train A (first hour):

$$m_n = 0.0 + 0.9 + 0.0$$

$$m_n = 0.9 \text{ mg}$$

Using equation for Train A (remainder):

$$m_n = 0.0 + 1.5 + 0.0$$

$$m_n = 1.5 \text{ mg}$$

Train A Aggregate = **2.4 mg**

Using equation for Train B:

$$m_n = 0.0 + 2.2 + 0.0$$

$$m_n = \mathbf{2.2 \text{ mg}}$$

C_s - Concentration of particulate matter in tunnel gas, dry basis, corrected to standard conditions, 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:

$$C_s = 0.001 \times \frac{2.4}{48.92}$$

$$C_s = \mathbf{0.00005} \text{ g/dscf}$$

For Train B:

$$C_s = 0.001 \times \frac{2.2}{50.97}$$

$$C_s = \mathbf{0.00004} \text{ g/dscf}$$

For Ambient Train

$$C_r = 0.001 \times \frac{0.0}{64.07}$$

$$C_r = \mathbf{0.000000} \text{ g/dscf}$$

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

$$E_T = (\underline{0.000049} - 0.000000) \times \underline{11628.2} \times \underline{360} / 60$$

$$E_T = \underline{3.42} \text{ g}$$

For Train B

$$E_T = (\underline{0.000043} - 0.000000) \times \underline{11628.2} \times \underline{360} / 60$$

$$E_T = \underline{3.01} \text{ g}$$

Average

$$E = \underline{3.22} \text{ g}$$

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

$$7.5\% \text{ of the average} = \underline{0.24}$$

$$\text{Train A difference} = \underline{0.21}$$

$$\text{Train B difference} = \underline{0.21}$$

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, °R
 T_m = Absolute average dry gas meter temperature, °R
 T_{si} = Absolute average gas temperature in the dilution tunnel during the "ith" time interval, °R
 T_s = Absolute average gas temperature in the dilution tunnel, °R

Sample calculation (for the first 1 minute interval of Train A):

$$PR = \left(\frac{360 \times 0.122 \times 16.94 \times (91.4 + 460) \times (76.1 + 460)}{1 \times 50.718 \times 17.08 \times (76.1 + 460) \times (66.6 + 460)} \right) \times 100$$

$$PR = \underline{90} \%$$

PM_R – Average particulate emissions for full integrated test run, g/hr
ASTM E2779 equation (5)

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

Where,

E_T = Total particulate emissions, grams

θ = Total length of full integrated test run, min

Sample Calculation:

$$E_T \text{ (Dual train average)} = 3.22 \text{ g}$$

$$\theta = 360 \text{ min}$$

$$PM_R = 60 \times (3.22 / 360)$$

$$PM_R = \mathbf{0.54} \text{ g/hr}$$

PM_F – Average particulate emission factor for full integrated test run, g/dry kg of fuel burned
ASTM E2779 equation (6)

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

Where,

E_T = Total particulate emissions, grams

M_{Bdb} = Weight of test fuel burned during test run, dry basis, kg

Sample Calculation:

$$E_T \text{ (Dual train average)} = 3.22 \text{ g}$$

$$M_{Bdb} = 4.21 \text{ kg}$$

$$PM_F = 3.22 / 4.21)$$

$$PM_F = \mathbf{0.76} \text{ g/kg}$$



GREENFIRE MODEL / MODELE : **GF40-2**

Listed Room Heater, Pelletized Fuel Type (Appareil de chauffage à granules certifié)
Suitable For Mobile Home Installation (Accepté pour l'installation dans une maison mobile, test)
Certified to (agréé): ASTM E1509-12, ULC S627-00

Refer to Intertek's Directory of Building Products for detailed information. / Reportez-vous à Intertek's Annuaire des produits du bâtiment pour obtenir des informations détaillées.

This pellet appliance has been tested and listed for use in manufactured homes in accordance with Oregon Administration Rules 814-23-900 through 814-23-909. Install and use only in accordance with the Manufacturer's installation and operating instructions. Contact local building or fire officials about restrictions and installation inspection in your area. Do not connect this unit to a chimney flue serving another appliance. See local building codes and manufacturers instructions for precautions required for passing a chimney through a combustible wall or ceiling. Electrical rating: 120 volts, 60 hz, 4.1 Amps. Route cord away from the heater.

Cet appareil de boulette a été teste et repertoire pour une utilisation dans les maisons pre fabriquées conformément aux reglements l'Administration d'Oregon Gouverne, 814-33-900 à 814-23-909. Installer et ulitiser uniquement conformément aux instructions d'installtion et d'utilisation du fabricant. Contacter les autories locales de la construction ou de la protection incendie pour vous informer sur les restrictions et l'inspection d'installtion dans votre region. Ne branchez pas cette unité sur un conduit de cheminée utilise pour un utre appereil. Consultez les codes de construction locaux et les instructions du fabricant pour les précautions necessaires pur faire passer une cheminée a travers un mur ou un plafold combustible. Le classement électrique : 120 volts, 60 hz, 4.1 Amplis. Maintenez le fil a l'ecart de l'appereil de chauffage.

For Use With Only Pelletized Wood fuels. Operate only with viewing door and ash removal door closed. Only replace glass with ceramic glass. Components required for installation: a 3 inch (75 mm) or 4inch (100 mm) listed PL vent, complete with components. Hearth mount installations; a listed single wall chimney liner may be used. Inspect and clean Exhaust Venting system frequently.

Pour l'usage avec les combustibles sous forme de boulets uniquement. Fonctionner seulement avec la vue de porte et la porte d'enlèvement de cendre ont fermé. Seulement remplacer le verre avec le verre de ceramique. Les composants ont exigé pour l'installation: 3 pouce (75 mm) ou 4 pouce (100 mm) a énuméré le conduit de PL complète avec les composants. Les installations de mont de foyer ; un paquebot de cheminée de mur de seul énuméré peut être utilisé.

This wood heater needs periodic inspection and repair for proper operation. Consult the owner's manual for further information. It is against federal regulations to operate this wood heater in a manner inconsistent with the operating instructions in the owner's manual. U.S. ENVIRONMENTAL PROTECTION AGENCY Certified to comply with 2020 particulate emission standards. Under specific test conditions this heater has been shown to have a particulate emission level of .54 g/hr. Ce poêle à granulés besoins inspection périodique et la réparation pour un fonctionnement correct. Consultez le manuel d'owner's pour plus d'informations. Il est contre les règlements fédéraux pour exploiter cette pastille chauffe d'une manière incompatible avec les instructions de fonctionnement dans le manuel d'owner's. Ce poêle répond aux normes limites d'émission de l'Environmental Protection Agency des États-Unis 2020. Dans des conditions de test spécifiques, ce poêle a été montré pour avoir un niveau d'émission de particules de .54 g / h.

DO NOT REMOVE THIS LABEL
N'ENLEVEZ PAS CETTE ETIQUETTE

OUTPUT Rating: 6,881 to 23,892 BTU/Hr (2.01 to 7.00 kWh)

LIGHTING INSTRUCTIONS:
- Press and release the on / off button
- Once fire has started, set the heat output to the desired setting.
TO TURN THE UNIT OFF:
- Push the on / off button
(Refer to owners manual for detailed instructions)

INSTRUCTIONS POUR L'ALLUMAGE:
- Presse et relaease le sur / de bouton.
- Une fois le feu a commence, a regle le production de chaleur au montage desire.
POUR ETEINDRE L'UNITE:
- Appuyer le sur / de bouton
(Referez-vous au guide de l'utilisateur pou un mode d'emploi detaille.)

CAUTION:
Hot while operating.
Do not touch, severe burns may result. Keep children, clothing, furniture, gasoline or other flammable vapors away.

See installation and operating instructions accompanying appliance.



ATTENTION:
Très chaud quand allumé.
Ne touchez pas, les brûlures sévères peuvent résulter. Tenez loin des enfants, des vêtements, des meubles, de l'essence ou d'autres fluides produisant des vapeurs inflammables.

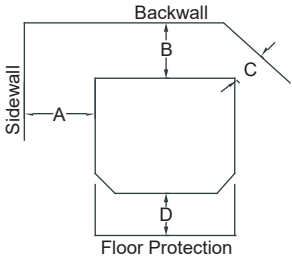
Consultez le manuel avec les instructions d'installation et d'opération.

INSTALLED AS A FREESTANDING STOVE MODEL (FS) /
A INSTALLE COMME UN MODELE SUR PIED DE POELE

Minimum clearances to combustible materials; conventional or mobile home./ Les dégagements minimums aux matériels combustibles; la maison conventionnelle ou mobile.

- A) Sidewall to unit / De mur lateral à l'unité 8" (200 mm)
B) Backwall to unit / De mur du fond à l'unité 4" (100 mm)
C) Corner to unit / Du coin à l'unité 3" (75 mm)
D) Combustible floor must be protected by a non-combustible material extending 6 inches (150 mm) in front of the unit, as shown or use part #50-1219 Hearth Pad - See Owners Manual.
Le plancher combustible doit être protégé par un matériel incombustible étendant 6 pouces (150 mm) devant l'unité, comme indiquée. Ou la partie d'usage #50-1219 Coussin de Coeur - Consultez le manual.

ALCOVE
Largeur Minimum Width 36" (915 mm)
Hauteur Minimum Height 48" (1220 mm)
Profondeur Minimum Depth 30" (760 mm)



Manufactured in Canada for /
Fabriqué dans le Canada pour:
FPI Fireplace Products International Ltd.
Delta, BC, Canada

PFS TECO
REPORT
#21-694



Intertek
4001609

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

DATE OF MANUFACTURE / DATE DE FABRICATION:

J F M A M J J A S O N D 2021 2022 2023



ENVIRO MODEL / MODELE : **P3-2**

Listed Room Heater, Pelletized Fuel Type (Appareil de chauffage à granules certifié)
Suitable For Mobile Home Installation (Accepté pour l'installation dans une maison mobile, test)
Certified to (agréé): ASTM E1509-12, ULC S627-00

Refer to Intertek's Directory of Building Products for detailed information. / Reportez-vous à Intertek's Annuaire des produits du bâtiment pour obtenir des informations détaillées.

This pellet appliance has been tested and listed for use in manufactured homes in accordance with Oregon Administration Rules 814-23-900 through 814-23-909. Install and use only in accordance with the Manufacturer's installation and operating instructions. Contact local building or fire officials about restrictions and installation inspection in your area. Do not connect this unit to a chimney flue serving another appliance. See local building codes and manufacturers instructions for precautions required for passing a chimney through a combustible wall or ceiling. Electrical rating: 120 volts, 60 hz, 4.1 Amps. Route cord away from the heater.
Cet appareil de boulette a été testé et répertoire pour une utilisation dans les maisons pré fabriquées conformément aux règlements l'Administration d'Oregon Gouverne, 814-33-900 à 814-23-909. Installer et utiliser uniquement conformément aux instructions d'installtion et d'utilisation du fabricant. Contacter les autorités locales de la construction ou de la protection incendie pour vous informer sur les restrictions et l'inspection d'installtion dans votre région. Ne branchez pas cette unité sur un conduit de cheminée utilise pour un utre appareil. Consultez les codes de construction locaux et les instructions du fabricant pour les précautions nécessaires pur faire passer une cheminée a travers un mur ou un plafold combustible. Le classement électrique : 120 volts, 60 hz, 4.1 Amplis. Maintenez le fil a l'ecart de l'apperreil de chauffage.

For Use With Only Pelletized Wood fuels. Operate only with viewing door and ash removal door closed. Only replace glass with ceramic glass. Components required for installation: a 3 inch (75 mm) or 4inch (100 mm) listed PL vent, complete with components. Hearth mount installations; a listed single wall chimney liner may be used. Inspect and clean Exhaust Venting system frequently.
Pour l'usage avec les combustibles sous forme de boulets uniquement. Fonctionner seulement avec la vue de porte et la porte d'enlèvement de cendre ont fermé. Seulement remplacer le verre avec le verre de ceramique. Les composants ont exigé pour l'installation: 3 pouce (75 mm) ou 4 pouce (100 mm) a énuméré le conduit de PL complète avec les composants. Les installations de mont de foyer ; un paquebot de cheminée de mur de seul énuméré peut être utilisé.
This wood heater needs periodic inspection and repair for proper operation. Consult the owner's manual for further information. It is against federal regulations to operate this wood heater in a manner inconsistent with the operating instructions in the owner's manual. U.S. ENVIRONMENTAL PROTECTION AGENCY Certified to comply with 2020 particulate emission standards. Under specific test conditions this heater has been shown to have a particulate emission level of .54 g/hr. Ce poêle à granulé besoins inspection périodique et la réparation pour un fonctionnement correct. Consultez le manuel d'owner's pour plus d'informations. Il est contre les règlements fédéraux pour exploiter cette pastille chauffe d'une manière incompatible avec les instructions de fonctionnement dans le manuel d'owner's. Ce poêle répond aux normes limites d'émission de l'Environmental Protection Agency des États-Unis 2020. Dans des conditions de test spécifiques, ce poêle a été montré pour avoir un niveau d'émission de particules de .54 g / h.

**DO NOT REMOVE THIS LABEL
N'ENLEVEZ PAS CETTE ETIQUETTE**

OUTPUT Rating: 6,881 to 23,892 BTU/Hr (2.01 to 7.00 kWh)

LIGHTING INSTRUCTIONS:
- Press and release the on / off button
- Once fire has started, set the heat output to the desired setting.
TO TURN THE UNIT OFF:
- Push the on / off button
(Refer to owners manual for detailed instructions)

INSTRUCTIONS POUR L'ALLUMAGE:
- Presse et relaease le sur / de bouton.
- Une fois le feu a commence, a regle le production de chaleur au montage desire.
POUR ETEINDRE L'UNITE:
- Appuyer le sur / de bouton
(Referez-vous au guide de l'utilisateur pou un mode d'emploi detaille.)

CAUTION:
Hot while operating.
Do not touch, severe burns may result. Keep children, clothing, furniture, gasoline or other flammable vapors away.

See installation and operating instructions accompanying appliance.

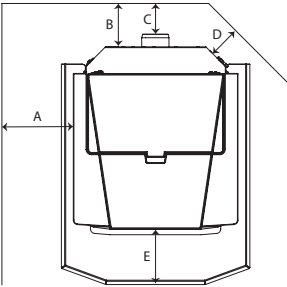


ATTENTION:
Très chaud quand allumé.
Ne touchez pas, les brûlures sévères peuvent résulter. Tenez loin des enfants, des vêtements, des meubles, de l'essence ou d'autres fluides produisant des vapeurs inflammables.
Consultez le manuel avec les instructions d'installation et d'opération.

**DO NOT REMOVE THIS LABEL
/ N'ENLEVEZ PAS CETTE ETIQUETTE**
**INSTALLED AS A FREESTANDING STOVE MODEL (FS)
/A INSTALLE COMME UN MODELE SUR PIED DE POELE**

Minimum clearances to combustible materials; conventional or mobile home./ Les dégagements minimums aux matériels combustibles; la maison conventionnelle ou mobile.
A) Sidewall to unit / De mur lateral à l'unité 8" (200 mm)
B) `to unit / De mur du fond à l'unité 5.5" (140 mm)
C) Backwall to Chimney Connector / Paroi arrière au connecteur de cheminée 4" (100 mm)
D) Corner to unit / Du coin à l'unité 3" (75 mm)
E) If supplied Hearth Pad is used no floor protection is required. If unit is installed on a combustible floor and the supplied Hearth Pad is not used the floor must be protected by a certified non-combustible Hearth Pad extending 6 inches (150 mm) in front of the glass. /Si fourni Foyers Pad est utilisé aucune protection de plancher est requise. Si l'appareil est installé sur un plancher combustible et le foyer Pad fourni n'est pas utilisé le sol doit être protégé par une plaque de foyer non combustible certifié s'étendant de 6 pouces (150 mm) à l'avant du verre.

ALCOVE
Largeur / Width Minimum 36" (915 mm)
Hauteur / Height Minimum 48" (1220 mm)
Profondeur / Depth Minimum 30" (760 mm)



PFS TECO
REPORT
#21-694



MANUFACTURED BY / FABRIQUE PAR:
SHERWOOD INDUSTRIES LTD.
VICTORIA BC CANADA

C-15548

DATE OF MANUFACTURE / DATE DE FABRICATION:
J F M A M J J A S O N D 2021 2022 2023

Intertek
4001609
Certified for use in Canada & USA
Certifié pour installation au
Canada et aux Etats-Unis.



ENVIRO MODEL / MODELE : **MINI-2**

Listed Room Heater, Pelletized Fuel Type (Appareil de chauffage à granules certifié)
Suitable For Mobile Home Installation (Accepté pour l'installation dans une maison mobile, test)
Certified to (agréé): ASTM E1509-12, ULC S627-00

Refer to Intertek's Directory of Building Products for detailed information. / Reportez-vous à Intertek's Annuaire des produits du bâtiment pour obtenir des informations détaillées.

This pellet appliance has been tested and listed for use in manufactured homes in accordance with Oregon Administration Rules 814-23-900 through 814-23-909. Install and use only in accordance with the Manufacture's installation and operating instructions. Contact local building or fire officials about restrictions and installation inspection in your area. Do not connect this unit to a chimney flue serving another appliance. See local building codes and manufacturers instructions for precautions required for passing a chimney through a combustible wall or ceiling. Electrical rating: 120 volts, 60 hz, 4.1 Amps. Route cord away from the heater.

Cet appareil de boulette a été teste et repertoire pour une utilisation dans les maisons pre fabriquées conformément aux reglements l'Administration d'Oregon Gouverne, 814-33-900 à 814-23-909. Installer et utiliser uniquement conformément aux instructions d'installtion et d'utilisation du fabricant. Contacter les auries locales de la construction ou de la protection incendie pour vous informer sur les restrictions et l'inspection d'installation dans votre region. Ne branchez pas cette unité sur un conduit de cheminée utilise pour un utre appereil. Consultez les codes de construction locaux et les instructions du fabricant pour les précautions necessaires pur faire passer une cheminée a travers un mur ou un plafold combustible. Le classement électrique : 120 volts, 60 hz, 4.1 Ampls. Maintenez le fil a l'ecart de l'appereil de chauffage.

For Use With Only Pelletized Wood fuels. Operate only with viewing door and ash removal door closed. Only replace glass with ceramic glass. Components required for installation: a 3 inch (75 mm) or 4inch (100 mm) listed PL vent, complete with components. Hearth mount installations; a listed single wall chimney liner may be used. Inspect and clean Exhaust Venting system frequently.
Pour l'usage avec les combustibles sous forme de boulets uniquement. Fonctionner seulement avec la vue de porte et la porte d'enlèvement de cendre ont fermé. Seulement remplacer le verre avec le verre de ceramique. Les composants ont exigé pour l'installation: 3 pouce (75 mm) ou 4 pouce (100 mm) a énuméré le conduit de PL complète avec les composants. Les installations de mont de foyer ; un paquebot de cheminée de mur de seul énuméré peut être utilisé.

This wood heater needs periodic inspection and repair for proper operation. Consult the owner's manual for further information. It is against federal regulations to operate this wood heater in a manner inconsistent with the operating instructions in the owner's manual. U.S. ENVIRONMENTAL PROTECTION AGENCY Certified to comply with 2020 particulate emission standards. Under specific test conditions this heater has been shown to have a particulate emission level of .54g/hr. Ce poêle à granules besoins inspection périodique et la réparation pour un fonctionnement correct. Consultez le manuel d'owner's pour plus d'informations. Il est contre les règlements fédéraux pour exploiter cette pastille chauffe d'une manière incompatible avec les instructions de fonctionnement dans le manuel d'owner's. Ce poêle répond aux normes limites d'émission de l'Environmental Protection Agency des États-Unis 2020. Dans des conditions de test spécifiques, ce poêle a été montré pour avoir un niveau d'émission de particules de .54g / h.

**DO NOT REMOVE THIS LABEL
N'ENLEVEZ PAS CETTE ETIQUETTE**

OUTPUT Rating: 6,881 to 23,892 BTU/Hr (2.01 to 7.00 kWh)

LIGHTING INSTRUCTIONS:
- Press and release the on / off button
- Once fire has started, set the heat output to the desired setting.

TO TURN THE UNIT OFF:
- Push the on / off button
(Refer to owners manual for detailed instructions)

INSTRUCTIONS POUR L'ALLUMAGE:
- Presse et relaease le sur / de bouton.
- Une fois le feu a commence, a regle le production de chaleur au montage desire.

POUR ETEINDRE L'UNITE:
- Appuyer le sur / de bouton
(Referez-vous au guide de l'utilisateur pou un mode d'emploi detaille.)

CAUTION:
Hot while operating.
Do not touch, severe burns may result. Keep children, clothing, furniture, gasoline or other flammable vapors away.

See installation and operating instructions accompanying appliance.



ATTENTION:
Très chaud quand allumé. Ne touchez pas, les brûlures sévères peuvent résulter. Tenez loin des enfants, des vêtements, des meubles, de l'essence ou d'autres fluides produisant des vapeurs inflammables.

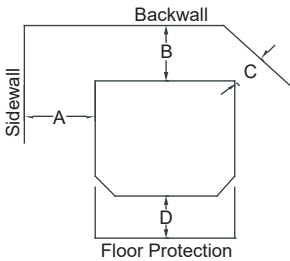
Consultez le manuel avec les instructions d'installation et d'opération.

INSTALLED AS A FREESTANDING STOVE MODEL (FS) /
A INSTALLE COMME UN MODELE SUR PIED DE POELE

Minimum clearances to combustible materials; conventional or mobile home./ Les dégagements minimums aux matériels combustibles; la maison conventionnelle ou mobile.

- A) Sidewall to unit / De mur lateral à l'unité 8" (200 mm)
 - B) Backwall to unit / De mur du fond à l'unité 4" (100 mm)
 - C) Corner to unit / Du coin à l'unité 3" (75 mm)
 - D) Combustible floor must be protected by a non-combustible material extending 6 inches (150 mm) in front of the unit, as shown or use part #50-1219 Hearth Pad - See Owners Manual.
- Le plancher combustible doit être protégé par un matériel incombustible étendant 6 pouces (150 mm) devant l'unité, comme indiquée. Ou la partie d'usage #50-1219 Coussin de Cœur - Consultez le manual.

ALCOVE
Largeur Minimum Width 36" (915 mm)
Hauteur Minimum Height 48" (1220 mm)
Profondeur Minimum Depth 30" (760 mm)



MANUFACTURED BY / FABRIQUE PAR:
SHERWOOD INDUSTRIES LTD.
VICTORIA BC CANADA

PFS TECO
REPORT
#21-694



Intertek
4001609

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

DATE OF MANUFACTURE / DATE DE FABRICATION:
J F M A M J J A S O N D 2021 2022 2023

C-16231



WARRANTY REGISTRATION
ENVIRO.COM/WARRANTY

P3-2

FREESTANDING PELLET STOVE

OWNER'S MANUAL



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

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

INSTALLER: LEAVE THIS MANUAL WITH THE WOOD STOVE.
CONSUMER: RETAIN THIS MANUAL FOR FUTURE REFERENCE.

50-2970



Version française: www.enviro.com/fr

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INTRODUCTION

IMPORTANT SAFETY DATA:

Please read this entire Owner's Manual before installing or operating your ENVIRO Pellet Stove. Failure to follow these instructions may result in property damage, bodily injury or even death. Any unauthorized modification of the appliance or use of replacement parts not recommended by the manufacturer is prohibited.

Contact your local building or fire official to obtain a permit and any information on installation restrictions and inspection requirements for your area. All local regulations, including those referring to national and European Standards need to be complied with when installing this appliance.

To prevent the possibility of a fire, ensure that the appliance is properly installed by adhering to the installation instructions. An ENVIRO dealer will be happy to assist you in obtaining information with regards to your local building codes and installation restrictions.

The stove's exhaust system works with negative combustion chamber pressure and a slightly positive chimney pressure. It is very important to ensure that the exhaust system be sealed and airtight. The ash pan and viewing door must be locked securely for proper and safe operation of the pellet stove. Operating with door open could cause a fire inside the house as well as the release of carbon monoxide into the living space.

Carbon monoxide is a colorless and odorless gas, to prevent it from poisoning you or your family know the symptoms of carbon monoxide poisoning: headache, dizziness, weakness, sleepiness, nausea, vomiting, and confusion. Carbon monoxide reduces the blood's ability to carry oxygen. Low blood oxygen levels can result in loss of consciousness and death.

Do not burn with insufficient combustion air. A periodic check is recommended to ensure proper combustion air is admitted to the combustion chamber. Setting the proper combustion air is achieved by adjusting the slider damper located on the left side of the stove.

When installing the stove in a mobile home, it must be electrically grounded to the steel chassis of the home and bolted to the floor. Make sure that the structural integrity of the home is maintained and all construction meets local building codes.

Consider all large air moving devices when installing your unit and provide room air accordingly. NOTE: Extractor fans when operating in the same room or space as the appliance, may cause problems. Limited air for combustion may result in poor performance, smoking and other side effects of poor combustion.

Soot or creosote may accumulate when the stove is operated under incorrect conditions such as an extremely rich burn (black tipped, lazy orange flames).

Be sure to maintain the structural integrity of your home when passing a vent through walls, ceilings, or roofs. It is recommended that the unit be secured into its position in order to avoid any displacement. This appliance must be installed on a floor with an adequate load bearing capacity. If an existing construction doesn't meet these prerequisite, suitable measures (e.g. load distributing plate) shall be taken to achieve it.

FRESH AIR: Outside Fresh Air connection is optional. Fresh Air must be connected to all units installed in Mobile Homes and Air Tight Homes (R2000) or where required by local codes.

If you have any questions with regards to your stove or the above-mentioned information, please feel free to contact your local dealer for further clarification and comments.

EMISSIONS AND EFFICIENCIES

EMISSIONS AND EFFICIENCY - P3:

This manual describes the installation and operation of the Enviro Mini pellet heater. This heater is U.S. ENVIRONMENTAL PROTECTION AGENCY Certified to comply with 2020 particulate emission standards. Under specific test conditions this heater has been shown to deliver heat at rates ranging from 6,447 - 19,996 Btu/hr.

Efficiency: 80.2%* HHV (PFS TECO 21-694)

*When using optional top vent adapter kit. (50-4116)

WARNING: This pellet heater needs periodic inspection and repair for proper operation. It is against federal regulations to operate this pellet heater in a manner inconsistent with operating instructions in this manual.

WARNING: This wood pellet 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 pellet heater in a manner inconsistent with operating instructions in this manual.

INTRODUCTION

SAFETY WARNINGS AND RECOMMENDATIONS:

Caution: Do not connect to any air distribution duct or system. Do not burn garbage or flammable fluids such as gasoline, naphtha or engine oil. Unit hot while in operation. Keep children, clothing and furniture away. Contact may cause skin burns.

Warning: Parts of the appliance, especially the external surfaces, will be hot to touch when in operation and due care will need to be taken. Never place wood, paper, furniture, drapes or other combustible materials within 80cm (31½") of the front of the unit, 20cm (7⅞") from each side, and 10cm (4") from the back of the unit. Do not let children or pets touch it when it is hot.

To prevent the possibility of a fire, ensure that the appliance is properly installed by adhering to the installation instructions. An ENVIRO dealer will be happy to assist you in obtaining information with regards to your local building codes and installation restrictions.

FIRE EXTINGUISHER AND SMOKE DETECTION: All homes with a pellet 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 device within the room; DO NOT REMOVE THE SMOKE OR CARBON MONOXIDE DETECTORS FROM THE ROOM.

CHIMNEY OR RUN AWAY FIRE: Call local fire department (or dial 911). Close the draft fully. 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. IMPORTANT: Do not operate the stove again until you are certain the chimney and its lining have not been damaged.

FUEL: This pellet stove is designed and approved to only burn wood pellet fuel with up to 3% ash content. Dirty fuel will adversely affect the operation and performance of the unit and may void the warranty. Check with your dealer for fuel recommendations.

THE USE OF CORD WOOD IS PROHIBITED BY LAW.

SOOT and FLYASH: Formation and Need for Removal - The products of combustion will contain small particles of flyash. The flyash will collect in the exhaust venting system and restrict the flow of flue gases. Incomplete combustion, such as occurs during startup, shutdown, or incorrect operation of the room heater will lead to some soot formation which will collect in the exhaust venting system. The exhaust venting system should be inspected at least once every year to determine if cleaning is necessary.

CREOSOTE: When wood is slowly burned it produces tar and other organic vapours and these combine with expelled moisture to form creosote. The creosote vapours condense in the relatively cool chimney flue associated with a slow burning fire. As a result, creosote residue accumulates on the flue lining. When ignited this creosote can result in an extremely hot chimney fire.

CLEANING: There will be some build up of fly ash and small amounts of creosote in the exhaust. This will vary due to the ash content of the fuel used and the operation of the stove. It is advisable to inspect and clean the exhaust vent semi-annually or every two tons of pellets.

ASHES: Disposed ashes should be placed in a metal container with a tight fitting lid. The closed container of ashes should be on a non-combustible floor on the ground, well away from all combustible materials

INTRODUCTION

pending final disposal. If the ashes are disposed of by burial in soil or otherwise locally dispensed, they should be retained in the closed container until all cinders have been thoroughly cooled.

ELECTRICAL: The use of a surge protected power bar is recommended. The unit must be grounded. The grounded electrical cord should be connected to a standard 110-120 volts, nominal average 2.0 Amps (4.1 Amps peak), 60 hertz electrical outlet and also must be accessible. Ensure the polarity to the outlet the unit will be plugged into is correct as incorrect polarity can affect the unit's operation. If this power cord should become damaged, a replacement power cord must be purchased from the manufacturer or a qualified ENVIRO dealer. Be careful that the electrical cord is not trapped under the appliance and that it is clear of any hot surfaces or sharp edges. This unit's maximum power requirement is 184 watts (600 watts peak).

GLASS: Do not abuse the glass by striking or slamming the door. Do not attempt to operate the stove with broken glass. The stove uses ceramic glass. Replacement glass must be purchased from an ENVIRO dealer. Do not attempt to open the door and clean the glass while the unit is in operation or if glass is hot. To clean the glass, use a soft cotton cloth and mild window cleaner, gas or wood stove glass cleaner, or take a damp paper towel and dip into the fly ash. This is a very mild abrasive and will not damage the glass.

FLAMMABLE LIQUIDS: Never use gasoline, gasoline-type lantern fuel, kerosene, charcoal lighter fluid, or similar liquids to start or "freshen up" a fire in the heater. Keep all such liquids well away from the heater while it is in use.

SMOKE DETECTOR: Smoke detectors should be installed and maintained in the structure when installing and operating a pellet burning appliance.

OPERATION: The ash pan and door must be closed securely for proper and safe operation of the pellet stove. Also ensure all gaskets on the door are checked and replaced when necessary.

KEEP ASH PAN FREE OF RAW FUEL.

Do not lace unburned fuel or new fuel in ash pan. A fire in the ash pan may occur.

INSTALLATION: Be sure to maintain the structural integrity of your home when passing a vent through walls, ceilings, or roofs. It is recommended that the unit be secured into its position in order to avoid any displacement.

DO NOT INSTALL A FLUE DAMPER IN THE EXHAUST VENTING SYSTEM OF THIS UNIT.

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

FRESH AIR: Outside Fresh Air connection is optional. Must be connected to all units installed in Mobile and "Air Tight Homes" (R2000) or where required by local codes. Consider all large air moving devices when installing your unit and provide fresh air accordingly. Limited air for combustion may result in poor performance, smoking and other side effects of poor combustion.

If you have any questions with regards to your stove or the above-mentioned information, please feel free to contact your local dealer for further clarification and comments.

SINCE SHERWOOD INDUSTRIES LTD. HAS NO CONTROL OVER THE INSTALLATION OF YOUR STOVE, SHERWOOD INDUSTRIES LTD. GRANTS NO WARRANTY IMPLIED OR STATED FOR THE INSTALLATION OR MAINTENANCE OF YOUR STOVE. THEREFORE, SHERWOOD INDUSTRIES LTD. ASSUMES NO RESPONSIBILITY FOR ANY CONSEQUENTIAL DAMAGE(S).

SAVE THIS INSTRUCTION MANUAL FOR FUTURE REFERENCE

INTRODUCTION

RATING LABEL LOCATION:

The rating label is located on the back of the ash pan access cover.

PELLET QUALITY:

Pellet quality is important, please read the following:

Your Enviro pellet stove has been designed to burn wood pellets only. Do not use any other type of fuel, as this will void any warranties stated in this manual.

The performance of your pellet stove is greatly affected by the type and quality of wood pellets being burned. As the heat output of various quality wood pellets differs, so will the performance and heat output of the pellet stove.

CAUTION: It is important to select and use only pellets that are dry and free of dirt or any impurities such as high salt content. Dirty fuel will adversely affect the operation and performance of the unit and will void the warranty. Pellet Fuel Industries (P. F. I.) has established standards for wood pellet manufacturers. We recommend the use of pellets that meet or exceed these standards. Ask your dealer for a recommended pellet type.

P. F. I. PELLET STANDARDS:

Fines (fine particles).....	1% maximum through a 1/8" screen
Bulk Density.....	40 pound per cubic foot minimum
Size.....	1/4" to 5/16" diameter 1/2 – 1 1/2" long maximum
Ash Content.....	1% maximum (Premium grade)
	3% maximum (Standard grade)
Moisture Content.....	8% maximum
Heat Content.....	approximately 8200 BTU per pound minimum

ASH: The ash content of the fuel and operation of your stove will directly determine the frequency of cleaning. The use of high ash fuels may result in the stove needing to be cleaned daily. A low ash fuel may allow longer intervals between cleaning.

CLINKERING: [clinkers are silica (sand) or other impurities in the fuel that will form a hard mass during the burning process]. This hard mass will block the air flow through the Burn Pot Liner and affect the performance of the stove. Any fuel, even approved types, may tend to clinker. Check the Burn-Pot Liner daily to ensure that the holes are not blocked with clinkers. If they become blocked, remove the liner (when the unit is cold) and clean/scrape the clinkers out. Clean the holes with a small pointed object if required. Refer to the section Routine Cleaning and Maintenance.

PELLET FEED RATES: Due to different fuel densities and sizes, pellet feed rates may vary. This may require an adjustment to the slider damper setting or to the auger feed trim setting on low.

Since Sherwood Industries Ltd. has no control over the quality of pellets that you use, we assume no liability for your choice in wood pellets.

Store pellets in a dry area at least 36" (1 m) away from the pellet stove.

INSTALLATION

DECIDING WHERE TO LOCATE YOUR PELLET APPLIANCE:

1. Check the "Clearances to Combustibles" section for proper spacing.
2. Do not obtain combustion air from an attic, garage or any unventilated space. Combustion air may be obtained from a ventilated crawlspace.
3. Do not install the stove in a bedroom.
4. You can vent the stove through an exterior wall behind the unit or connect it to an existing masonry or metal wood stove chimney (must be lined if the chimney is over 6" (15 cm) diameter, or over 28 inches² (180 cm²) cross sectional area). An interior vent can be used with approved pipe passing through the ceiling and roof.
5. Locate the stove in a large and open room that is centrally located in the house. This will optimize heat circulation.
6. The power cord is 8 feet (2.43 m) long and may require a grounded extension cord to reach the nearest electrical outlet.
7. Stove must sit on a non-combustible pad that extends six inches in front of the door or the included hearth pad (50-2929).



www.nficertified.org

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



UNPACKING AND REMOVING PELLET STOVE FROM PALLET

1. Start by removing the crating and unit bag, you will need a pry bar and hammer to remove the crating. A sawzall can be used to cut the staples as well.
2. Loosen six screws securing Back Grill, once loose slide downwards and remove.
3. Use a 5/16" wrench or socket to remove the shipping bolts holding the unit to the pallet.

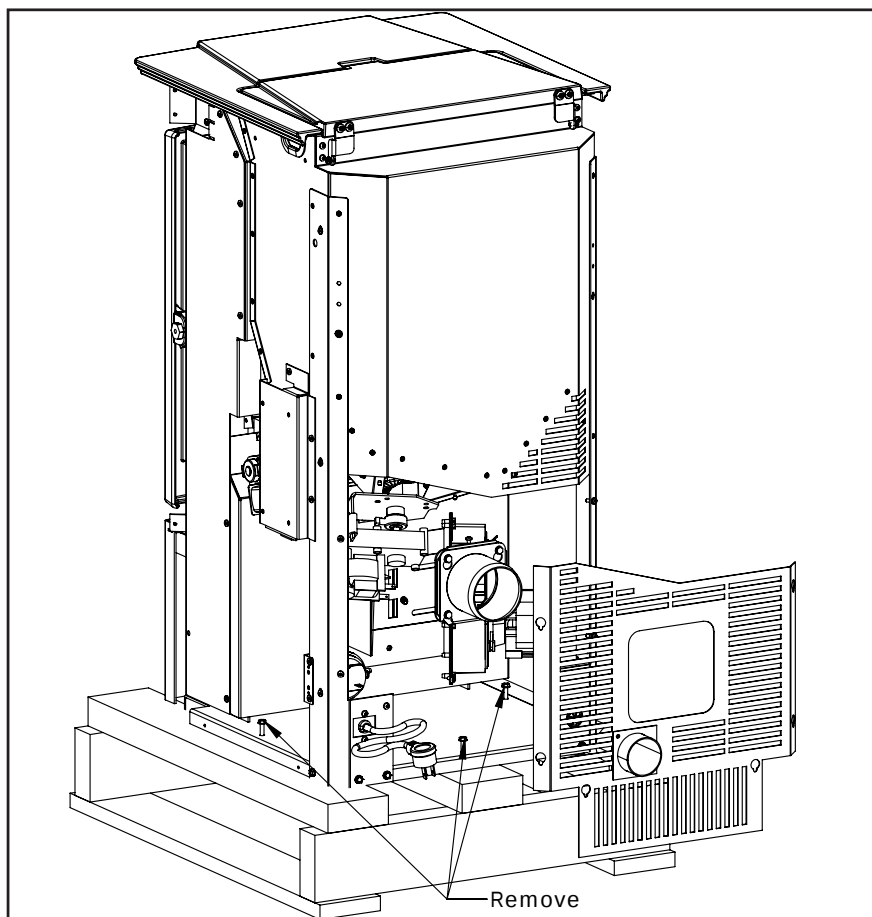


Figure 1: Shipping Bolt Removal

INSTALLATION

ASSEMBLY

1. First install the hearth pad if you plan on using it. You may have to unscrew feet to raise unit up. Tilt the unit so it is balancing on the back feet, slide the hearth pad under the unit while making sure the side mounting tabs are on the outside of the base flange. once holes are aligned secure with provided T-20 thread rolling screws. See Figure 2.

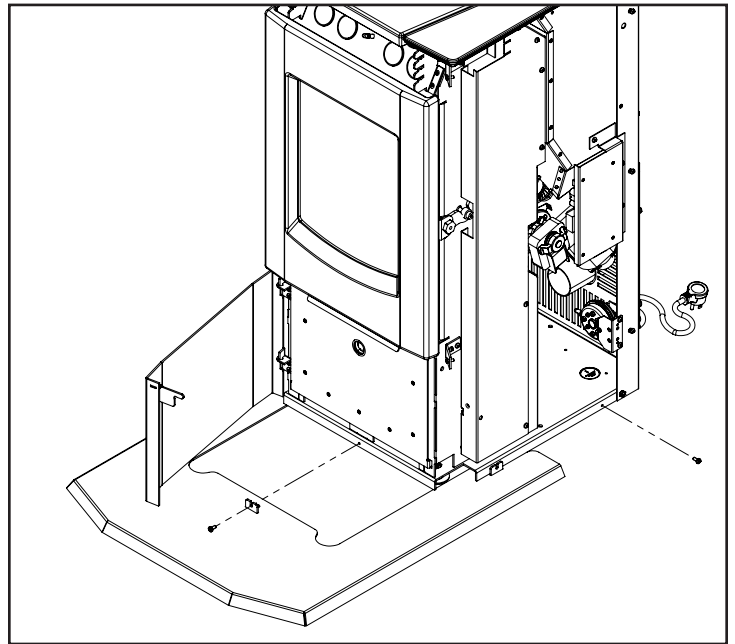


Figure 2: Hearth Pad Install

2. Next install the Cabinet Sides. There are six screws for mounting each cabinet side. Start by installing screws at front top of the panels, Do not fully tighten screws. Now get the back top screws started. Now install the rest of the screws and tighten them down. See Figure 3.

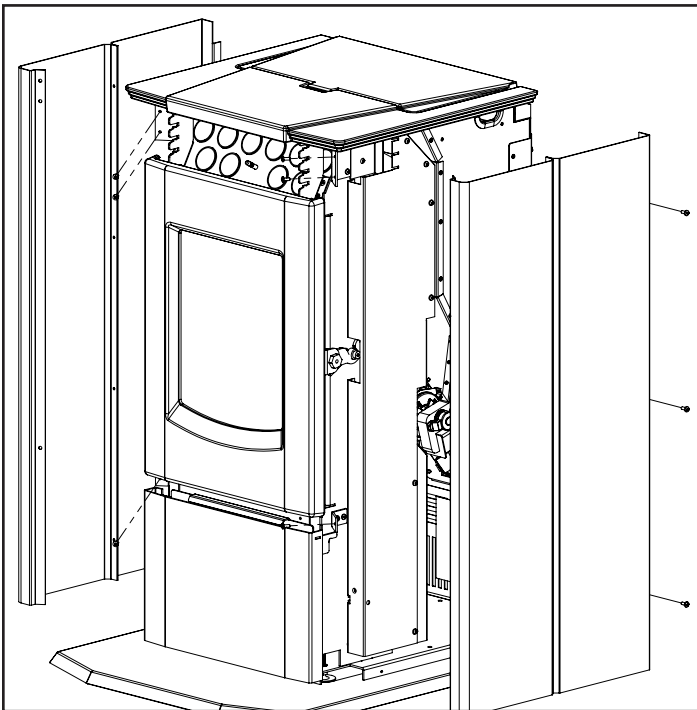


Figure 3: Cabinet Side Install

3. Now Install Ash Shelf and Louvers. Ash Shelf is mounted using two T-20 thread roller screws. The Louvers are installed by inserting into slots cut into louver mounting brackets located above the door. If properly aligned the louvers should catch on the bracket tabs and sit at a 15 degree angle.

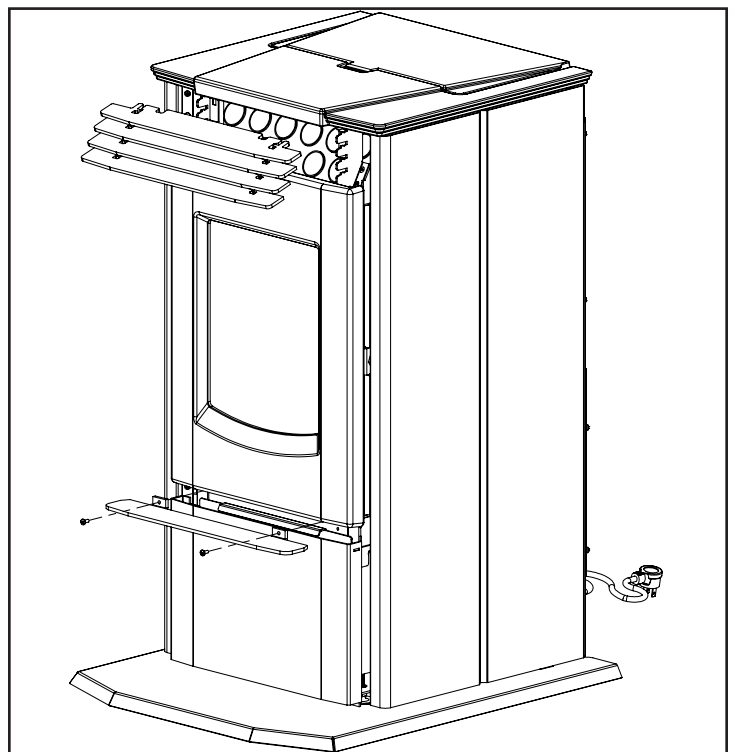
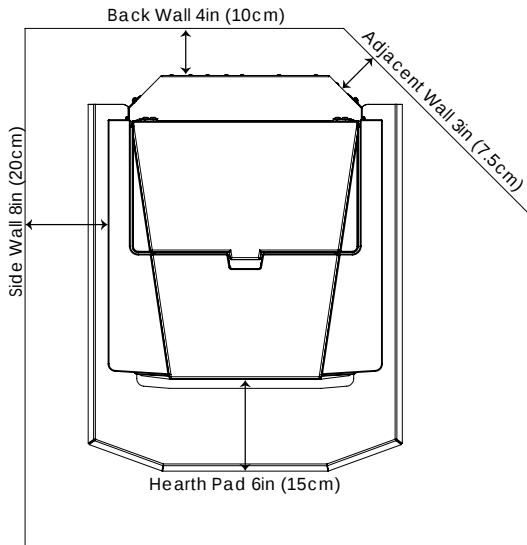


Figure 4: Louver and Ash Shelf Install

INSTALLATION

CLEARANCES TO COMBUSTIBLES:

IMPORTANT: The P3 must have a Hearth Pad when installing the unit on a combustible floor. The included hearth pad meet all the requirement of a proper hearth pad. If you do not use the included hearth pad a certified non combustible Hearth Pad with a minimum R Value of at least 0.84 must be placed underneath the unit and extend six inches in front of the unit measured from the glass. If the P3 is installed on carpet the use of a solid non combustible Hearth Pad must be used under leveling legs.



These dimensions are minimum clearances but it is recommended that you ensure sufficient room for servicing, routine cleaning and maintenance.

A. Side wall to unit	8 inches (20 cm)
B. Back wall to unit	5.5 inches (14 cm)
C. Back wall to Chimney Connector	4in inches (10cm)
D. Corner to unit	3 inches (7.5 cm)
E. Glass to Hearth Pad	6 inches (15 cm)

Figure 5: Minimum Install Clearances

ALCOVE CLEARANCES:

The unit may be installed in an alcove if desired. These minimum clearances to combustibles must be maintained at all times. Be sure to leave room for servicing, routine cleaning, and maintenance. These are inside dimensions.

Minimum Alcove Width	36 inches (91.5 cm)
Minimum Alcove Height	48 inches (122 cm)
Minimum Alcove Depth	30 inches (76 cm)

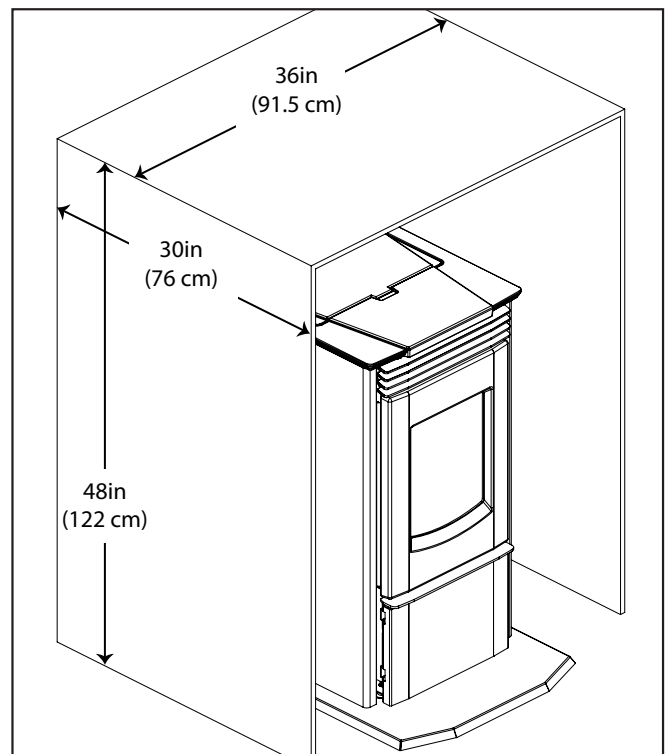


Figure 6: Minimum Alcove Clearances

INSTALLATION

VENT TERMINATION REQUIREMENTS:

IT IS RECOMMENDED THAT YOUR PELLET STOVE BE INSTALLED BY AN AUTHORIZED DEALER/INSTALLER.

Table 1: Use in conjunction with Figure 6 for allowable exterior vent termination locations.

Letter	Minimum Clearance	Description
A	24 in (61 cm)	Above grass, top of plants, wood, or any other combustible materials.
B	48 in (122 cm)	Beside/below any door or window that may be opened. (18" (46 cm) if outside fresh air installed.)
C	12 in (30 cm)	Above any door or window that may be opened. (9" (23 cm) if outside fresh air installed.)
D	24 in (61 cm)	To any adjacent building, fences and protruding parts of the structure.
E	24 in (61 cm)	Below any eave or roof overhang
F	12 in (30 cm)	To outside corner.
G	12 in (30 cm)	To inside corner, combustible wall (vertical and horizontal terminations).
H	3 ft (91 cm) within a height of 15 ft (4.5 m) above the meter/regulator assembly	To each side of center line extended above natural gas or propane meter/regulator assembly or mechanical vent.
I	3 ft (91 cm)	From any forced air intake of other appliance
J	12 in (30 cm)	Clearance to non-mechanical air supply inlet to building, or the combustion air inlet to any appliance.
K	24 in (61 cm)	Clearance above roof line for vertical terminations.
L	7 ft (2.13 m)	Clearance above paved sidewalk or paved driveway located on public property.

1. Do not terminate the vent in any enclosed or semi-enclosed areas such as a carport, garage, attic, crawlspace, narrow walkway, closely fenced area, under a sun deck or porch, or any location that can build up a concentration of fumes such as stairwells, covered breezeway, etc.

2. Vent surfaces can become hot enough to cause burns if touched by children. Non-combustible shielding or guards may be required.

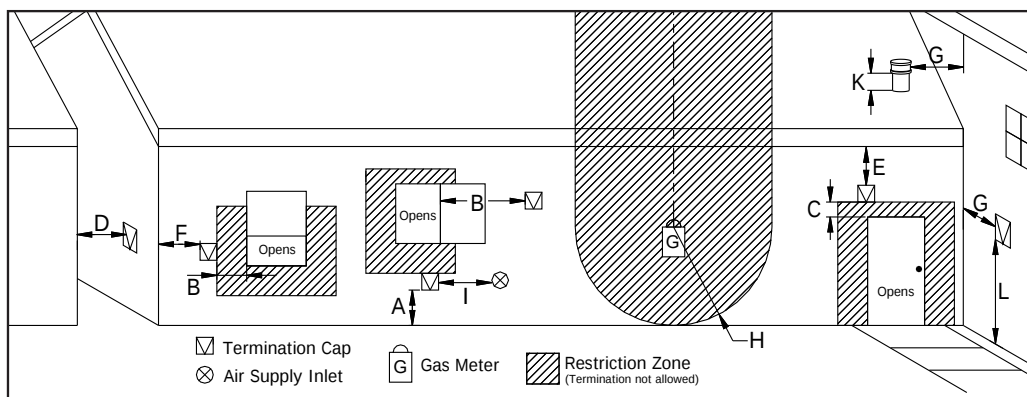


Figure 7: Use in conjunction with Table 1 for allowable exterior vent termination locations.

3. Termination must exhaust above the inlet elevation. It is recommended that at least five feet of vertical pipe be installed outside when the appliance is vented directly through a wall, to create some natural draft to prevent the possibility of smoke or odor during appliance shut down or power failure. This will keep exhaust from causing a nuisance or hazard from exposing people or shrubs to high temperatures. In any case, the safest and preferred venting method is to extend the vent through the roof vertically.
4. Distance from the bottom of the termination and grade is 12" (30 cm) minimum. This is conditional upon the plants and nature of grade surface. The exhaust gases are hot enough to ignite grass, plants and shrubs located in the vicinity of termination. The grade surface must not be lawn.
5. If the unit is incorrectly vented or the air to fuel mixture is out of balance, a slight discoloration of the exterior of the house might occur. Since these factors are beyond the control of Sherwood Industries Ltd, we grant no guarantee against such incidents.

NOTE: Venting terminals shall not be recessed into walls or siding.

INSTALLATION

OUTSIDE FRESH AIR CONNECTION:

Outside fresh air is mandatory when installing this unit in airtight homes (R2000) and mobile homes.

A Fresh-air intake is strongly recommended for all installations. Failure to install a fresh air intake may result in improper combustion as well as the unit smoking during power failures.

When connecting to an outside fresh air source, do not use plastic or combustible pipe. A 2" minimum (51 mm) ID (inside diameter) steel, aluminum or copper pipe should be used. It is recommended, when you are installing a fresh air system, to keep the number of bends in the pipe to a minimum.

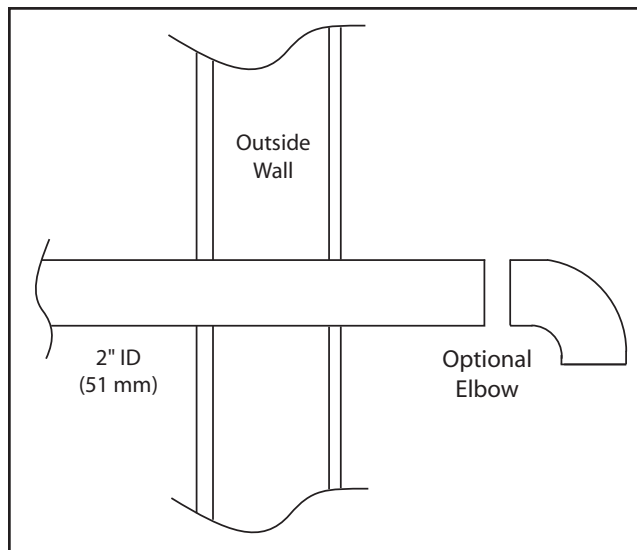


Figure 8: Outside Air Connection.

EXHAUST AND INTAKE LOCATIONS:

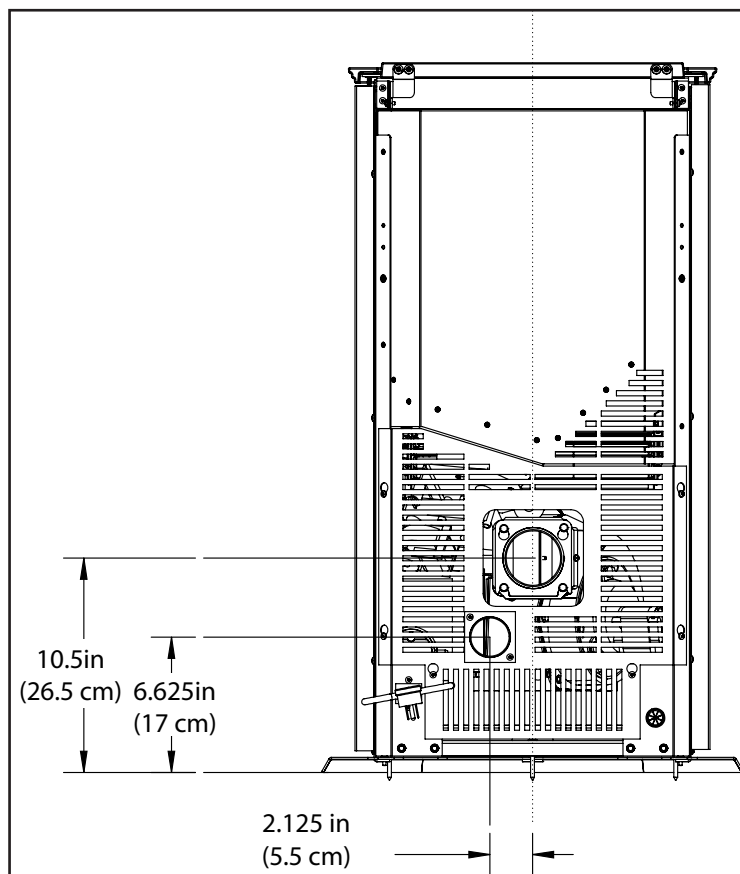


Figure 9: P3 Inlet and Outlet Location.

EXHAUST

Base of unit to center of flue	10.5 in	(265 mm)
Center of unit to center of flue	0 in	(0 mm)
	[at center of unit]	

FRESH AIR INTAKE

Base of unit to center of intake	6.625 in	(170 mm)
Center of unit to center of intake	2.125 in	(53 mm)

IMPORTANT: When attaching the exhaust venting system to the unit or when joining vent sections three screw must be used at each joint. If vented horizontally, joints shall be made gas tight with aluminum foil duct tape.

INSTALLATION

MOBILE HOME INSTALLATION:

- Secure the heater to the floor using the two holes in the pedestal.
- Ensure the unit is electrically grounded to the chassis of your home (permanently).
- Do not install in a room people sleep in.
- Outside fresh air is mandatory. Secure outside air connections directly to fresh air intake pipe and secure with three screws evenly spaced.

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

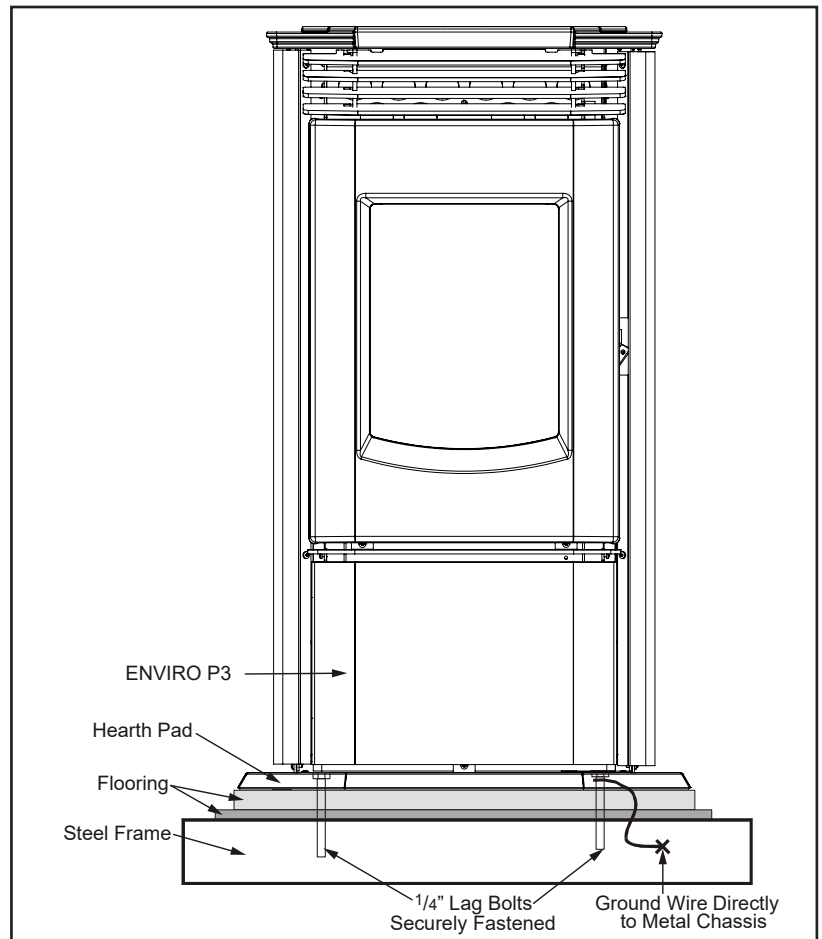


Figure 10: Mobile home installation.

CORNER THROUGH WALL INSTALLATION:

Minimum clearances must be maintained for a corner installation as shown in figure 11.

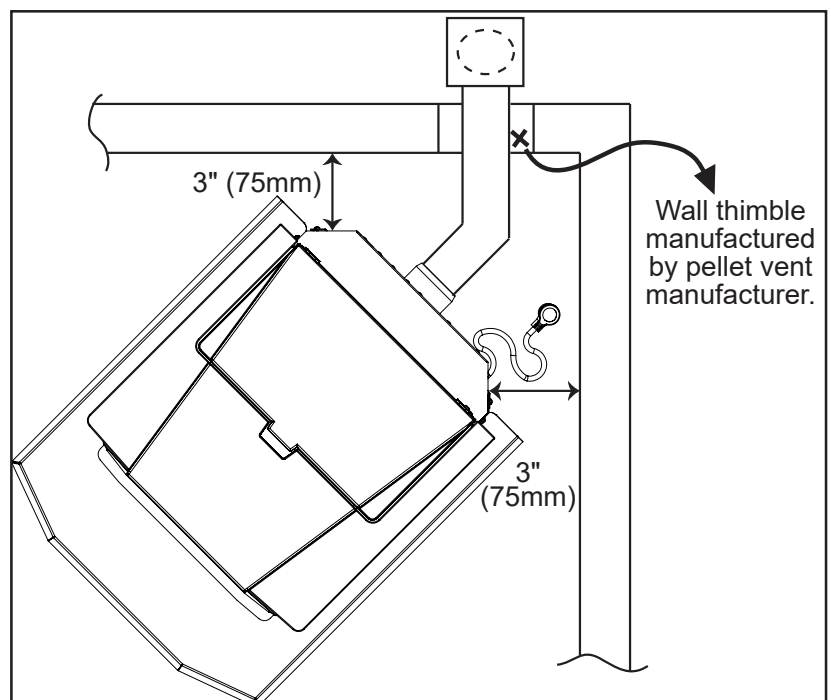


Figure 11: Corner Installation.

INSTALLATION

HORIZONTAL EXHAUST THROUGH WALL INSTALLATION:

Vent installation: install vent at clearances specified by the vent manufacturer.

A chimney connector shall not pass through an attic or roof space, closet or similar concealed spaces, or a floor, or ceiling. Where passage through a wall or partition of combustible construction is desired, the installation shall conform to CAN/CSA-B365 Installation Code for Solid-Fuel-Burning Appliances and Equipment. Only use venting of L or PL type with an inside diameter of 3 or 4 inches (7.6 or 10.1 cm).

1. Choose a location for your stove that meets the requirements stated in this manual and allows installation with the least amount of interference to house framing, plumbing, wiring, etc.
2. Install a non-combustible hearth pad (where necessary).
3. Place the appliance 15" (37.5 cm) away from the wall. If the stove is to be set on a hearth pad, set the unit on it, and adjust the leveling legs.
4. Locate the center of the exhaust pipe on the stove. Extend that line to the wall. Once you have located the center point on the wall, refer to pellet vent manufacturer installation instructions for correct hole size and clearance to combustibles.
5. Install the wall thimble as per the instructions written on the thimble. Maintain an effective vapour barrier in accordance with local building codes.
6. Install a length of 3" (75 mm) or 4" (100 mm) vent pipe into the wall thimble. The pipe should install easily into the thimble.
7. Connect the exhaust vent pipe to the exhaust pipe on the stove. Seal the connection with high temperature silicone.
8. Push the stove straight back, leaving a minimum of 5.5" (14cm) clearance from the back of the stove to the wall. Seal the vent pipe to the thimble with high temperature silicone.
9. The pipe must extend at least 12" (30 cm) away from the building. If necessary, bring another length of pipe (PL type) to the outside of the home to connect to the first section. Do not forget to place high temperature silicone around the pipe that passes through the thimble.

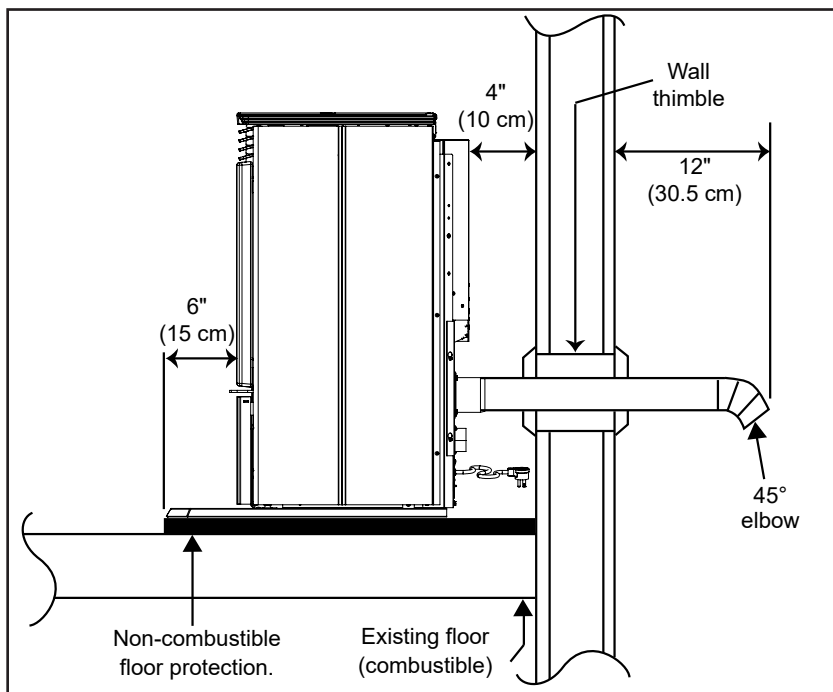


Figure 12: Straight through wall Installation.

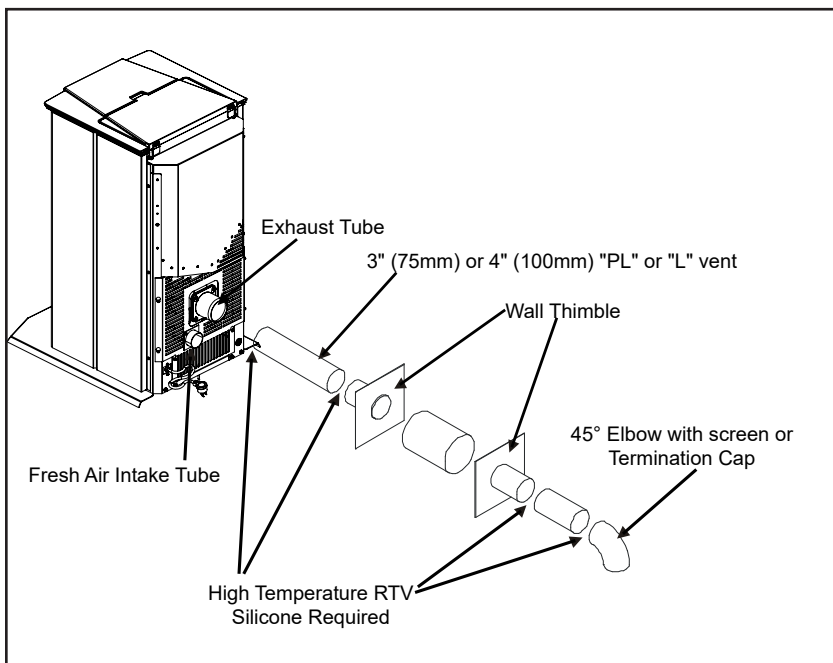


Figure 13: Venting to use with straight through wall Installation.

INSTALLATION

10. Install a vertical pipe, or if all requirements for direct venting are met, install vent termination. The stainless steel cap termination manufactured by the vent manufacturer is recommended. However, when the vent terminates several feet above ground level and there are no trees, plants, etc. within several feet, a 45° elbow can be used as termination. The elbow must be turned down to prevent rain from entering.

NOTE:

- It is recommended that horizontal through wall installations have 3 to 5 feet (91 to 152 cm) of vertical pipe in the system to help naturally draft the unit in the event of extreme weather or a power outage.
- Some horizontal through wall installations may require a “T” and 3 to 5 feet (91 to 152 cm) of vertical pipe outside the building to help draft the unit. This may be required if a proper burn cannot be maintained, after the stove has been tested and the airflow set. This is due to the back pressure in the exhaust caused by airflow around the structure.
- Follow vent manufacturer guidelines for installation of venting. High temp sealant must be used when connecting vent pipe to the unit's starter pipe. Improper seals at the vent joints may cause combustion by-products to leak into the room where installed - **seal as required**.

THROUGH WALL VERTICAL RISE HORIZONTAL TERMINATION INSTALLATION - FREESTANDING:

A termination cap is always recommended for this type of install but a stainless steel termination hood or a 45° elbow may be used in place of the cap.

Figure 14 is the recommended installation set up, venting length is negligible.

Figure 15 is the installation to use if there is a concrete or retaining wall in line with exhaust vent on a pellet stove. The termination must be 12” (30 cm) from the outside wall and 12” (30 cm) above the ground.

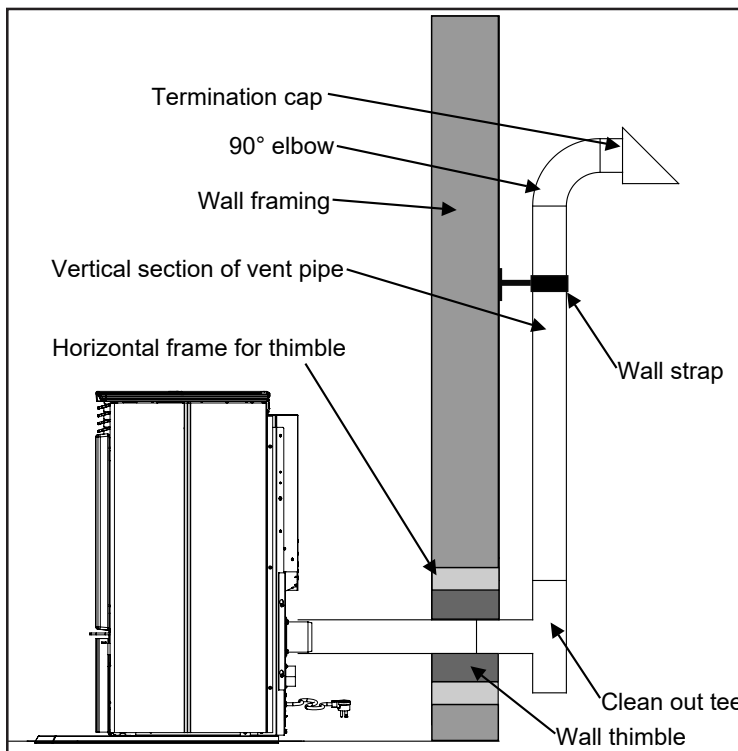


Figure 14: Venting horizontally with rise.

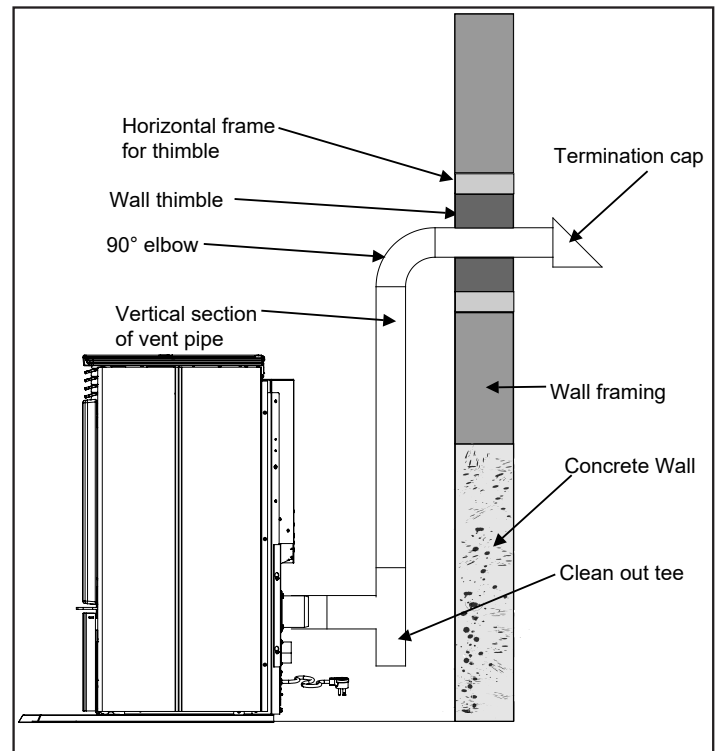


Figure 15: Venting with concrete wall behind unit .

INSTALLATION

INSIDE VERTICAL INSTALLATIONS:

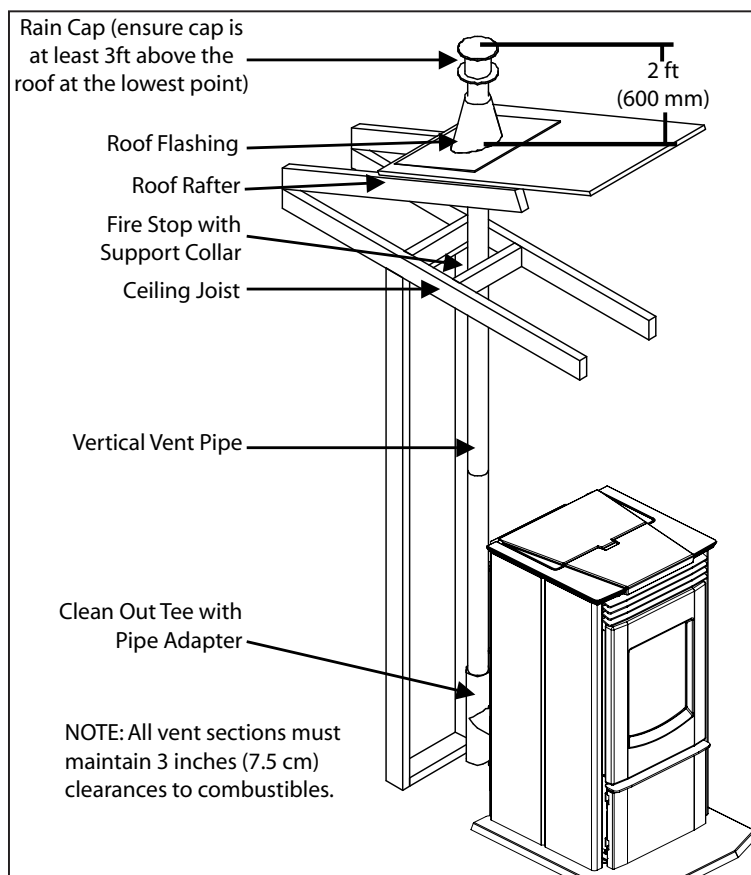


Figure 16: Inside Vertical Installation.

OUTSIDE VERTICAL INSTALLATIONS:

To accomplish a outside vertical pipe installation, follow steps 1 through 5 in the "INSIDE VERTICAL INSTALLATIONS - FREESTANDING" section and then finish it by performing the following (refer to Figure 17).

1. Install a tee with clean out on the outside of the house.
2. Install PL vent upward from the tee. Make sure that you install support brackets to keep the vent straight and secure.
3. Install ceiling thimble and secure the flashing as you go through the roof.
4. Ensure that the rain cap is approximately 24" (600 mm) above the roof.

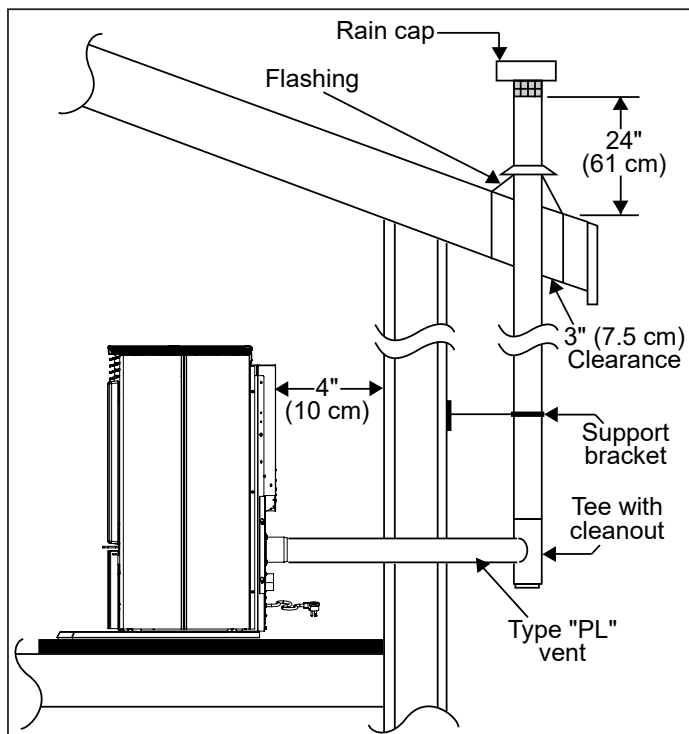


Figure 17: Outside Vertical Installation.

INSTALLATION

HEARTH MOUNT INSTALLATION:

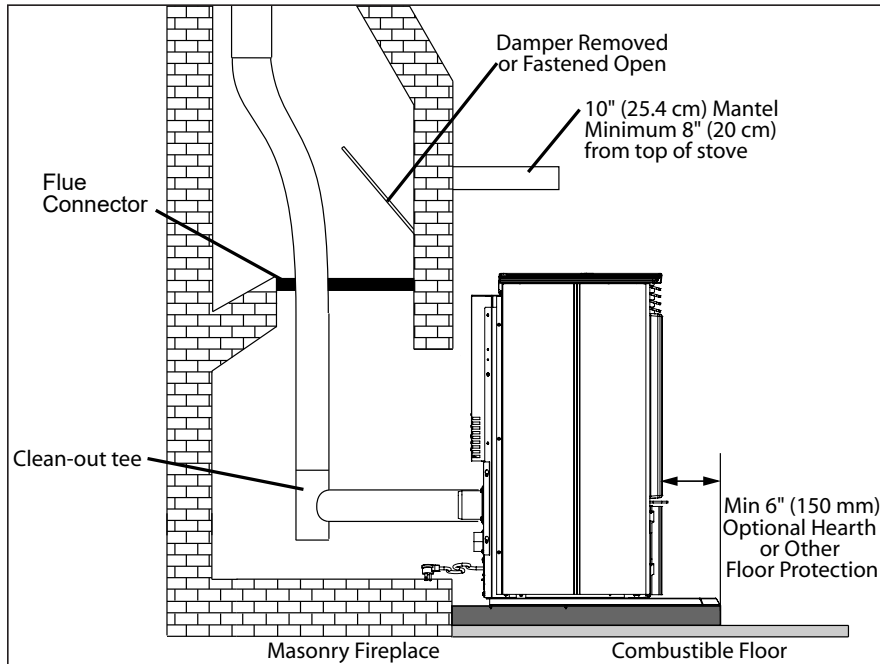


Figure 18: Freestanding hearth mount installation.

Refer to Figures 18 and 19.

1. Install the hearth pad.
2. Lock the fireplace damper in the open position.
3. Install a positive flue connector at the fireplace dampers or seal the chimney at the top.
4. Connect a tee to the exhaust pipe.
5. Install flexible stainless steel liner or listed pellet vent to the top of the chimney.

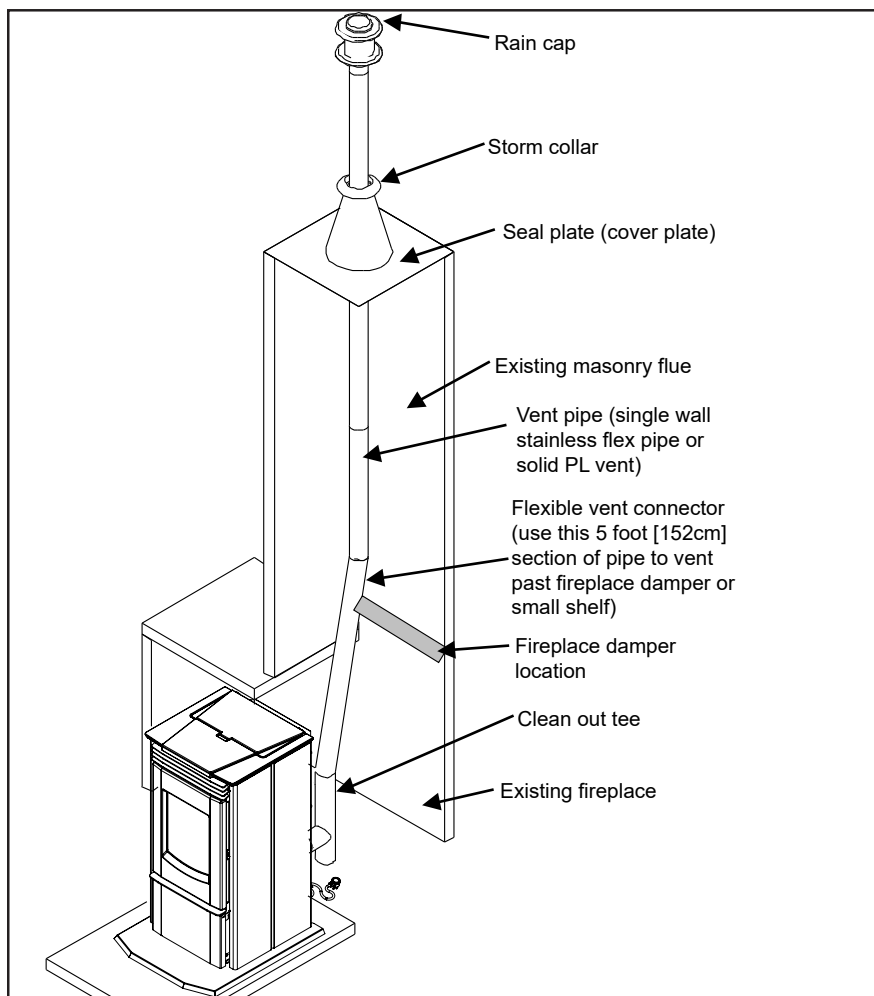


Figure 19: Freestanding hearth mount installation overview.

INSTALLATION

THERMOSTAT INSTALLATION:

1. Install the wall thermostat in a location that is not too close to the unit but will effectively heat the desired area.
2. The Right Cabinet Side will need to be removed to access the Control Board. Once the side has been removed you can remove three screws securing the Control Board Cover.
3. Now that the board can be accessed, wire the Thermostat using two 18 gauge, 2 connector wire from the unit to the thermostat.

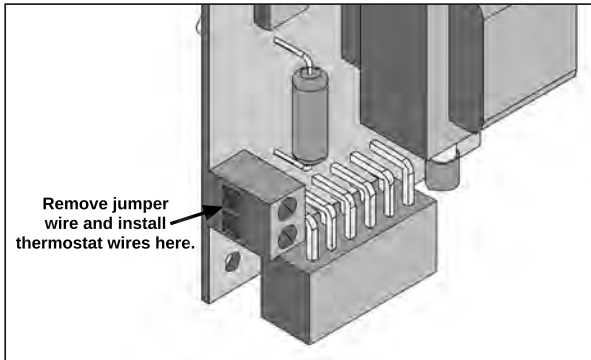
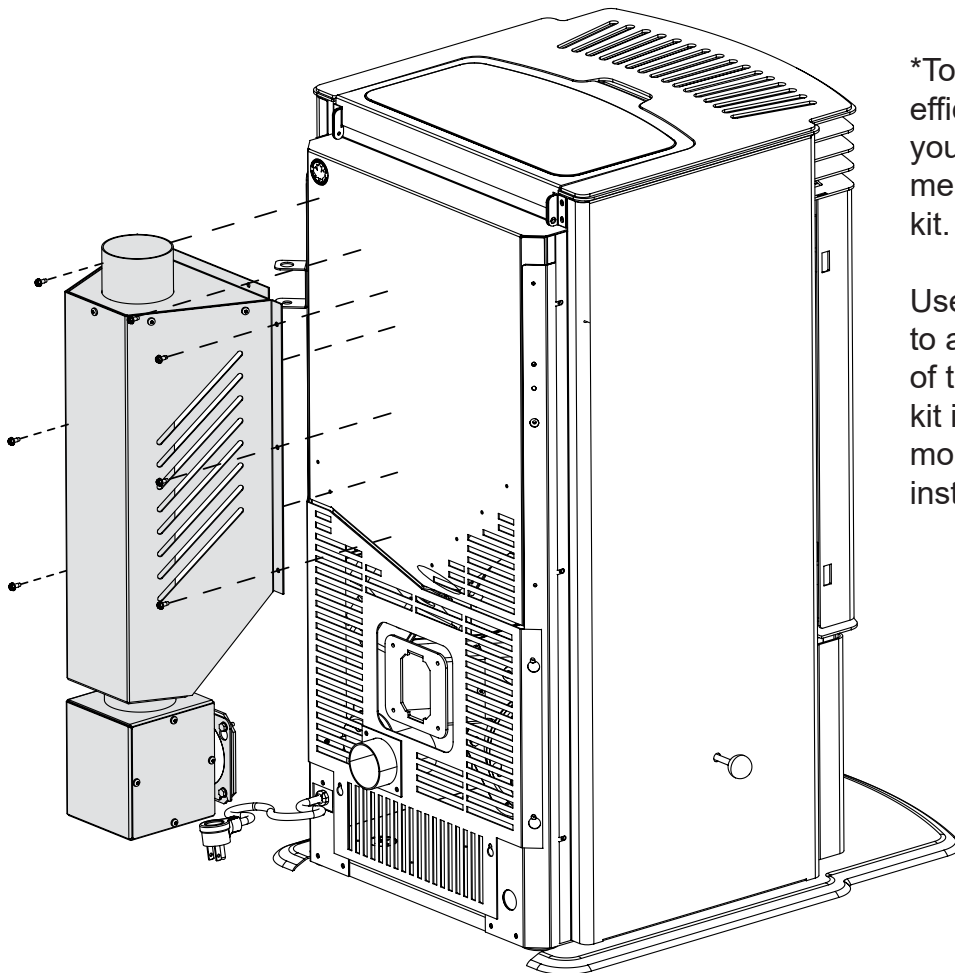


Figure 20: Thermostat wire placement.

TOP VENT ADAPTER KIT

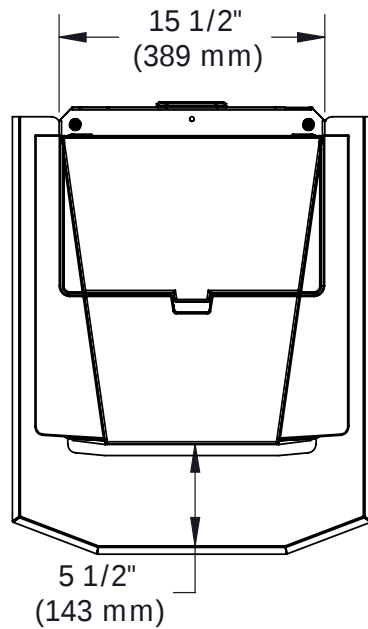


*To achieve Maximum efficiency of 80.2% HHV you will need to purchase meridian top vent adapter kit. (50-4116)

Use the sheet metal screws to attach the kit to the rear of the unit. Please see kit instruction manual for more detailed installation instructions.

SPECIFICATIONS

DIMENSIONS AND SPECIFICATIONS:



Weight (with full hopper): 275 lb (125 Kg)

Hopper Capacity: up to 62 lb (28 Kg)

Voltage: 110 - 120 V

Max Current: 4.1 Amps

Consumption on High: 3.1 lb/hr (1.4 Kg/hr)*

Consumption on Low: 1.3 lb/hr (0.6 Kg/hr)*

(Note: Consumption will vary with the type of fuel used.)

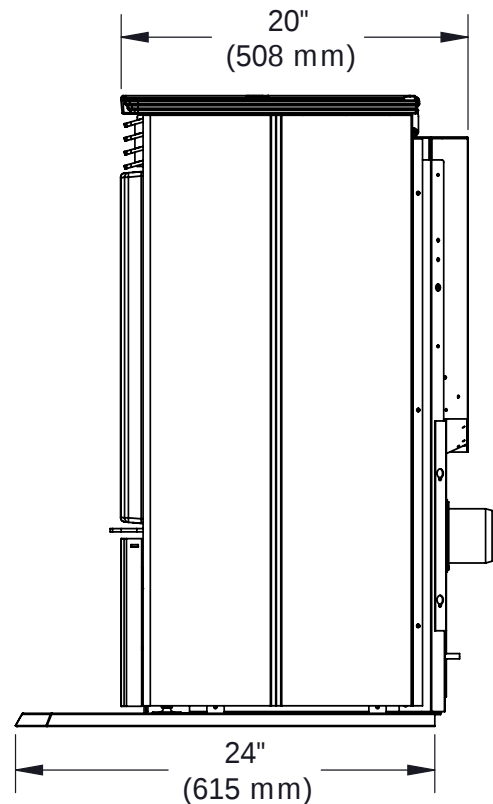
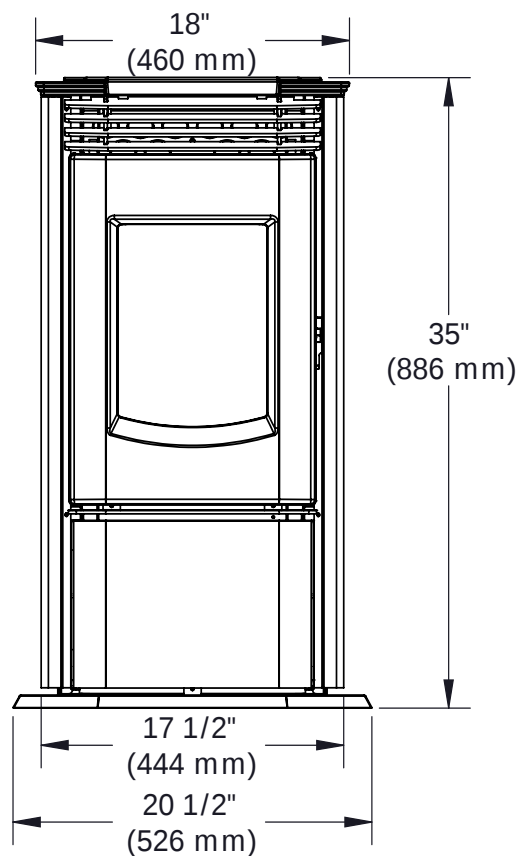


Figure 21: Dimensions of P3.

OPERATING INSTRUCTIONS

CONTROL BOARD FUNCTIONS:

1. **POWER BUTTON:** This is the green button with the power symbol, it is used to turn the unit on and off. When the power is on and the blue LED beside the button will be illuminated. The LED will flash during the start-up cycle. Once start-up cycle is complete the power LED will stay on.
2. **AUTO BUTTON:** Located below the Power button, when pressed this activates Auto or “Comfort” mode. LED beside button will be illuminated when active.
3. **THERMOSTAT BUTTON:** Located below the Auto Button. This is for external thermostat control. LED beside button will be illuminated when active.
4. **ARROW BUTTONS:** The Arrow Buttons are used to adjust heat level and trim settings.

START-UP: When the unit is turned on it will go into a start-up cycle while trying to light a fire. During start-up you have no control over the settings. The Power LED will flash until start-up is complete. You can adjust heat levels or toggle the different modes during start-up but these adjustments will not come into affect until the start-up cycle is complete.

MANUAL MODE: Once the start-up cycle is completed you will be in either Manual mode or Auto mode. When in Manual mode the Power LED is illuminated and AUTO LED is not. Use the Arrow buttons to adjust heat level from L1-L5.

AUTO MODE: Press the Auto button to activate Auto or “Comfort” mode. When activated the Power and Auto LED's will be illuminated. Use the Arrow buttons to adjust from C1-C9. Each setting corresponds to a different temperature set point. The stove will automatically adjust to hold this temperature. As the room temperature gets close to the set point the fire will decrease in size. If room temperature is above the set point for a certain amount of time the stove will shut down and go into Suspend mode.

SUSPEND MODE: Once a stove has gone into Suspend mode the fire will go out. This means the room has heated up beyond the Auto set point. Once temperature in the room drops below the Auto set point the stove start back up and run until the room gets to hot once again. When in suspend mode the Auto LED will flash.

THERMOSTAT MODE: This can only be used in Manual mode, and is for external thermostat control. A external thermostat can be wiring to the main control board. When activated the LED beside the Thermostat Button will be illuminated.

FEED/COMBUSTION TRIM: To adjust the Feed Trim you must be in Manual mode heat level 1. Press the hidden button located under the down arrow. The Display will then change from P (Program) to A (Auger) to C (Combustion) with a two second delay between changes. When the display shows an A use the arrows to adjust the feed trim. To adjust the combustion fan trim wait until the display shows C then use the arrows to adjust.

SERVICE INDICATOR: If you see the “S1” on the LED display this is a maintenance recommended indicator. The “S1” will come on when your stove has run for so many hours. It is recommended that you contact your local dealer for component inspection and servicing. Pellet stoves require regular maintenance to keep running efficiently.

AUTOMATIC SAFETY FEATURES OF YOUR PELLET STOVE:

- A. The stove will shut off if the fire unexpectedly goes out, once exhaust temperature drops below 120°F (49°C), you will see an **E3** code on the LED display.
- B. The stove has a high temperature safety switch. If the temperature on the hopper reaches 200°F (93°C), the auger will automatically stop and the stove will shut down. The LED display will show an **E4** error code, see Troubleshooting section. If this happens, call your local dealer to reset the 200°F (93°C) high limit switch. **ALSO FIND THE REASONS WHY THE UNIT OVERHEATED.** This code can also be cause by leaving the hopper lid open, there is a magnetic safety switch.
- C) The unit is equipped with a vacuum switch to monitor the venting pressure; if it becomes blocked the vacuum switch will turn off the auger and there will be an **E2** error code on The LED Display.



Figure 22: Circuit Board Control Panel Decal.

OPERATING INSTRUCTIONS

OPERATING YOUR PELLET STOVE:

PRE-BURN INSTRUCTIONS: The burn pot liner holes must be clear and the liner installed properly against the ignitor tube for proper operation. Check the hopper for enough pellets to start the unit.

DO NOT OPERATE THE UNIT WITH THE DOOR OR ASH PAN OPEN.

TO START: Press the Power button. The stove will turn on. The LED beside the Power button will flash to indicate a start-up cycle. The Heat Level is shown on the LED display, you can change the Heat Level and mode but these adjustments will not take affect until the start-up cycle is complete. If this is the first time the unit has been started or the unit has run out of fuel, the auger will need to be primed. You may need restart the unit if an **E3** error occurs, to do this just press the Power button again. Once you see pellets start to drop the auger is primed.

TO OPERATE: When a fire has been established, the Power LED will turn solid (after approximately 10 - 15 minutes) and the current settings will now take affect.

The convection blower (room air blower) will turn on once the start-up cycle is complete. The speed of this blower is automatically controlled and is based off the heat level setting.

TURNING YOUR PELLET STOVE OFF:

To turn off your Pellet stove just press the Power button. This will not shut off the stove instantly, it will go into a shut down cycle and take approximately 5 minutes for the fire to burn out. The fans will stay running until the unit has cooled sufficiently.

NEVER unplug a unit that is running!

DO NOT unplug unit while Combustion fan is running.

Unplugging may cause smoke to be released into the home.

DAMPER SET-UP:

THE SLIDER / DAMPER HAS BEEN SET AT THE FACTORY. This is used to regulate the airflow through the pellet stove. The slider damper knob is located on the left cab side (see Figure 23).

The slider damper factory setting has been set for peak efficiency operation (see Figure 24).

If the fire should happen to go out and the heat output indicator has been set on the lowest setting, the

Slider Damper may need to be adjusted by a qualified technician only. Contact your local dealer.

For troubleshooting purposes the firebox vacuum pressure may need to be confirmed. This should be done only on a hot stove (operating for thirty (30) minutes or more) by placing a Magnahelic Pressure Gauge in the firebox. The reading can be taken from the 1/8" (3 mm) hole located in the front of the firebox under the door (see Figure 25). **The factory setting should read approximately 0.06 inches of water column on the high fire setting.**

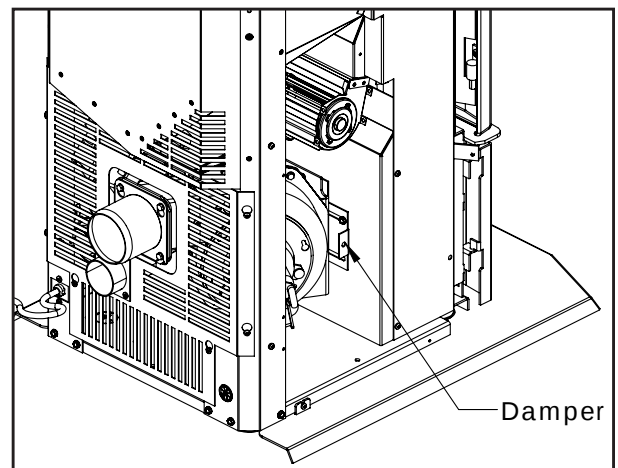


Figure 23: Slider/Damper Adjustment

OPERATING INSTRUCTIONS

SPECIAL NOTES:

Pellet quality is a major factor in how the Pellet stove will operate. If the pellets have a high moisture content or ash content the fire will be less efficient and has a higher possibility of the fire building up and creating clinkers (hard silica ash build-up).

Overfiring should not occur if stove is operating properly, if stove looks like it is burning unusually high turn off the unit with the power button, **DO NOT** unplug. There is a built in safety switch if unit gets too hot from overfiring it will shut down automatically.



Figure 24: Efficient Flame.

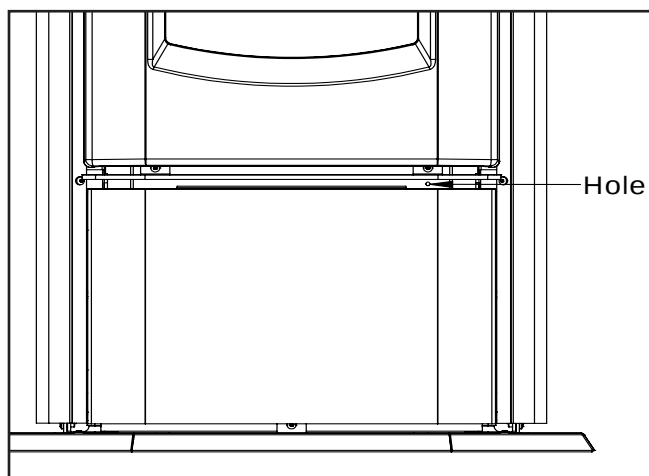


Figure 25: Magnehelic Test Hole.

GUIDELINES FOR FINE-TUNING FOR FUEL QUALITY:

Due to fuel quality the slider damper and control board trims may need to be fine-tuned.

1. If the unit has excesses ash build-up in the liner on the lower feed settings, the Combustion Blower Trim should be increased one setting at a time until the problem improves (Factory Setting is #2).
2. If the fire is going out on low because the airflow is too great, the Combustion Blower Trim can be lowered to the #1 setting.
3. If the stove has excesses ash build-up in the liner on the higher settings the Feed Rate Trim should be trimmed down a setting at a time until the problem improves (Factory setting is #4).
4. If you need more heat and the fuel has long pellets, the majority are over 1" (2.5cm) in length, the Feed Rate Trim can be moved up to the #5 setting. NOTE: Only do this if the fuel burns without building up.

ROUTINE CLEANING AND MAINTENANCE

The following list of components should be inspected and maintained routinely to ensure that the appliance is operating at its' optimum and giving you excellent heat value:

<u>2-3 Days / Weekly</u>	<u>Semi-annually or 2 Tons of Fuel</u>
Burn Pot and Liner	Exhaust Vent
Heat Exchanger Tubes	Air Intake
Ash Pan	Blower Mechanisms
Door Glass	Heat Exchanger Tubes
Inside Firebox	Behind Firebox Liners & Covers
Ash Pan and Door Gaskets	All Hinges
Door Latch	Post Season Clean-up

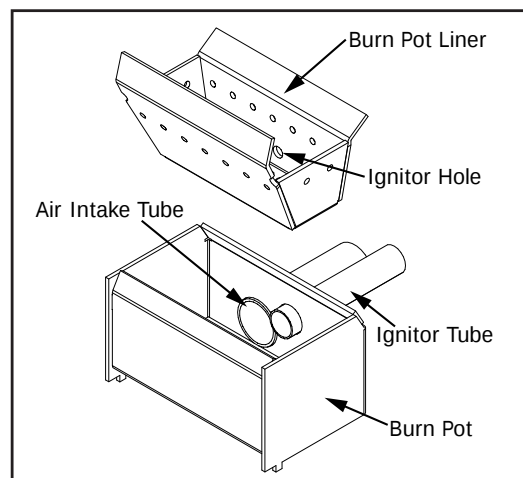


Figure 26: P3 Burn pot and Liner

TOOLS REQUIRED TO CLEAN UNIT:

Torx T-20 Screwdriver, $\frac{5}{16}$ " wrench or socket, Brush, Soft Cloth, Vacuum with fine filter bag

BURNER POT AND LINER (2-3 days)

Every two to three days (when the unit is cold), remove the burn-pot liner from the stove. Using a metal scraper, remove material that has accumulated or is clogging the liner's holes. Then dispose of the scraped ashes from the liner and from inside the burn-pot. Place the burn-pot back into the stove, making sure that the pipes are properly inserted into the burn pot. Place the liner back into the burn-pot, making sure that the ignitor hole in the liner is aligned with the ignitor tube (shown in Figure 32). Push the liner up against the ignitor tube.

If after long periods of burning, the fire continually builds up and overflows the burn pot or there is a build up of clinkers, this is an indication that the pellet fuel quality is poor, the stove may need cleaning, or the air adjusted. Check the stove for ash build up (clean if required) and adjust the damper to produce the proper clean combustion.

HEAT EXCHANGER TUBES (2-3 days)

A rod is located in the center of the stove just above the door behind the top louvers, see Figure 35. This rod is to be pulled up and down a few times (ONLY WHEN THE UNIT IS COLD) in order to clean away any fly ash that may have collected on the heat exchanger tubes. As different types of pellets produce different amounts of ash, cleaning of the tubes should be done on a regular basis to enable the unit to run efficiently. Do not pull on rod excessively if it is not sliding. If stuck inspect rod for bend and try and free up scraper plate from inside firebox.

ASH PAN AND DOOR GASKETS (weekly)

After extended use the gasket may come loose. To repair this, glue the gasket on using high-temperature fiberglass gasket glue available from your local dealer. This is important to maintain an airtight assembly.

ROUTINE CLEANING AND MAINTENANCE

DOOR GLASS CLEANING (2-3 days)

Cleaning of the glass must only be done when stove is cold. Open the door. The glass can be cleaned by wiping down the outside and inside of the glass with a soft dry cloth.

If the glass has build up that can not be removed with only the cloth, clean the glass using paper towel and a gas appliance glass cleaner, this may be purchased through most dealers. If a gas appliance glass cleaner is not available, use a damp paper towel dipped in fly ash to clean the glass. After the glass has been cleaned use the dry soft cloth to wiping down the outside and inside of the glass.

ASH PAN (weekly)

This part is located behind the bottom door. To remove the ash pan, open the cover from the right hand side, and lift the ash pan up and out. Dump the ashes into a metal container stored away from combustibles. Monitor the ash level every week. Remember that different pellet fuels will have different ash contents. Ash content is a good indication of fuel efficiency and quality. Refer to "SAFETY WARNINGS AND RECOMMENDATIONS" for disposal of ashes. Vacuum the inside of the ash pan compartment inside the pedestal including the hole at the top back of the compartment. Replace the ash pan, close the latch, and close pedestal door. **DO NOT PLACE UNBURNED OR RAW PELLET FUEL IN ASH PAN.**

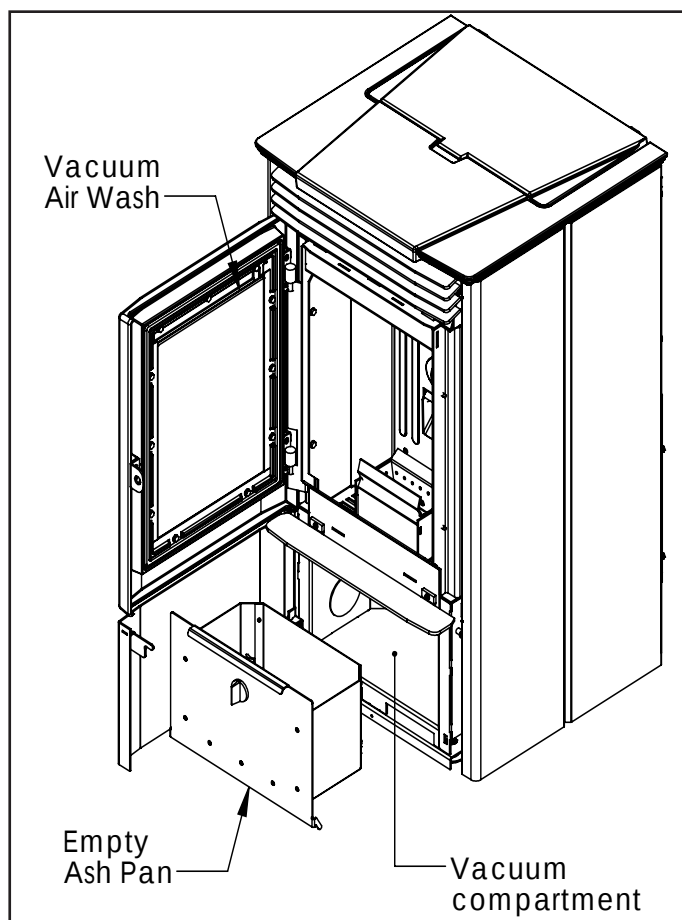


Figure 27: P3 Open

AIR INTAKE (semi-annually)

Inspect periodically to be sure that it is not clogged with any foreign materials.

EXHAUST PASSAGES (Semi-annually)

To prevent build up of fly-ash all the exhaust passages must be cleaned and vacuumed.

Clean behind clean-out covers:

- Open ash box cover.
- Remove ash box.
- Using a $\frac{5}{16}$ " socket, loosen the six screws in the ash box compartment; four on the back.
- Rotate the back cover counter clockwise.
-

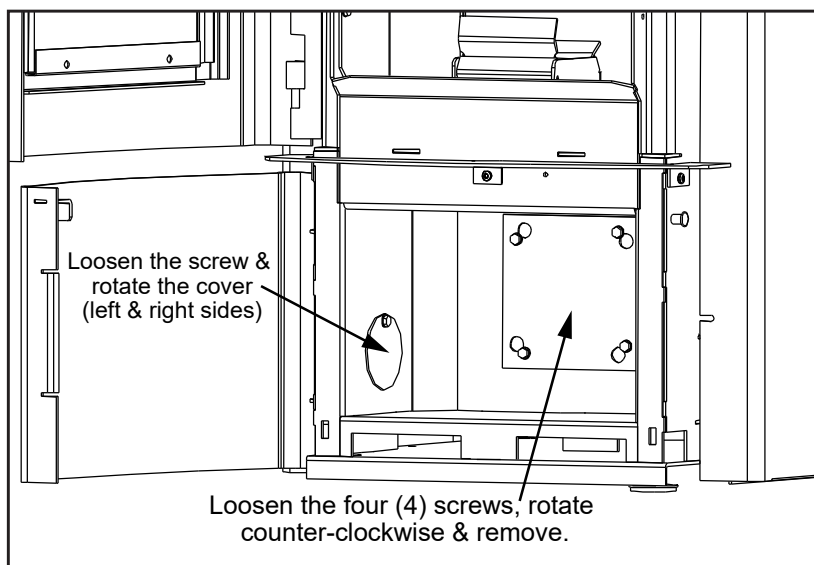


Figure 27: P3 Clean-Out Covers.

ROUTINE CLEANING AND MAINTENANCE

- To remove and rotate the side covers to open them.
- Vacuum out all three chambers.
- Close all the clean-out covers and tighten the screws.

HEAT EXCHANGER TUBES (2-3 days)

- The heat exchanger tubes are located behind the Louver assembly. To access Heat Exchanger Scraper Rod, remove middle two louvers by tipping up and pulling out.
- Pull out the Scraper Rod shown in Figure 35 in order to remove any fly ash that may have collected on the heat exchanger tubes. This will allow for optimal heat transfer to convection air.

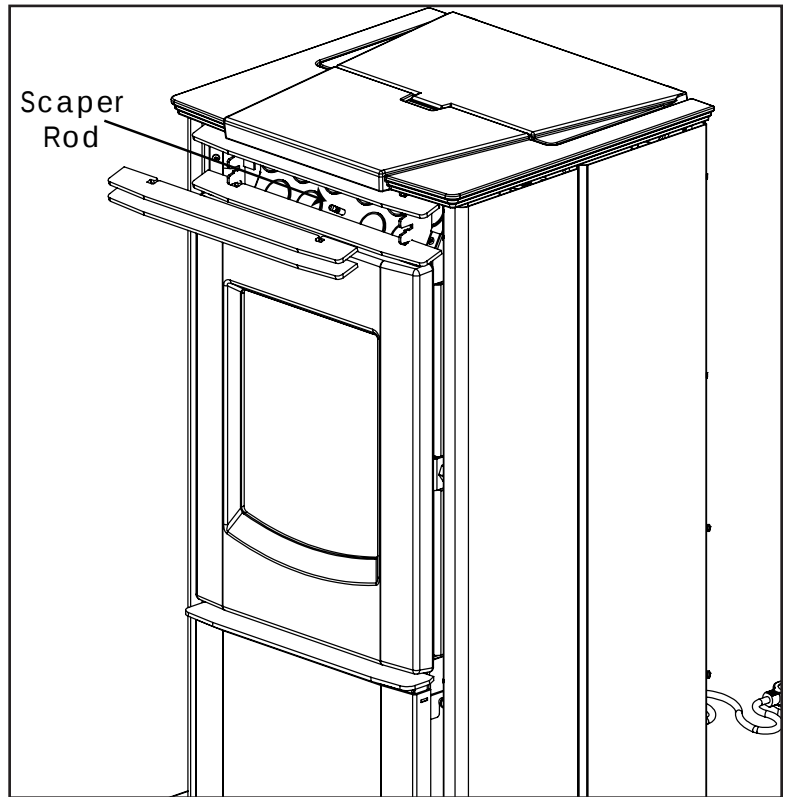


Figure 29: P3 Heat Exchanger Tubes

REMOVAL OF FIREBOX PANELS

- Open the door, remove the door, burn pot and burn pot liner.
- Lubricate all screws with penetrating oil.
- Remove the four screws that hold the side panels in place.
- With the tip of a flat screwdriver, gently lift up the side panels and remove the side panels.
- Pull the center panel out.
- Vacuum thoroughly.
- Re-install panel by inserting center panel.
- Place the side panels back into the firebox locking them into place and re-install the two screws on each side.
- Clean thoroughly.

Note: Screws that secure left side panel also secure hinge bracket which holds cast door. Remove door before unscrewing.

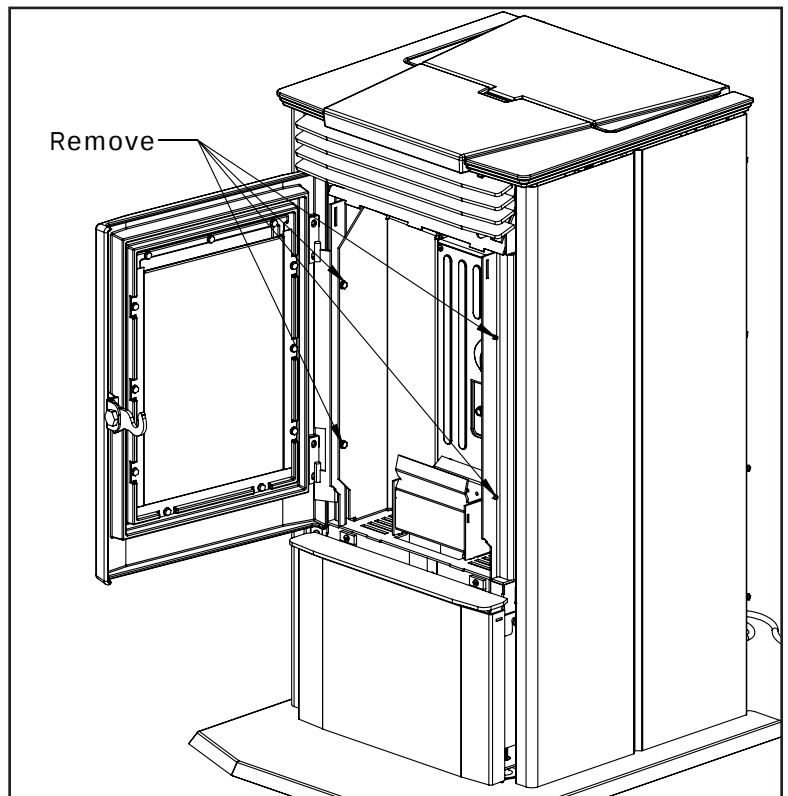


Figure 30: P3 Firebox Panels

ROUTINE CLEANING AND MAINTENANCE

FIREBOX (weekly)

The paint on the steel firebox panels may peel. This is due to extreme conditions applied to the paint and is in no way covered by warranty. Brush and vacuum up all soot and flyash from firebox.

AIR WASH (semi-annually)

Vacuum out the air wash passages at the top of the glass (see Figure 33). We recommend that a soft brush nozzle head is used on the vacuum.

EXHAUST VENT (semi-annually)

This vent should be cleaned every year or after two tons of pellets. We recommend contacting your dealer for professional cleaning. To clean the vent pipe, tap lightly on the pipe to dislodge any loose ash. Open the bottom of the "T" to dump the ash, then vacuum as much of the ash out of the vent pipe as possible. Failure to clean exhaust venting can result in a serious creosote fire.

BLOWER MECHANISMS (semi-annually)

Unplug the stove then open the right and left side panels to access the two blowers. Vacuum all dust from motors. DO NOT lubricate the motors. Check gaskets and replace if needed.

HINGES

Check to make sure all hinges are working properly. You may use high temp anti-sieze on door hinges for smoother operation.

POST SEASON CLEAN-UP

Once you are finished using the pellet appliance for the season, unplug the stove for added electrical protection. It is very important that the stove be thoroughly cleaned and serviced. Pellet should be regularly serviced for optimum efficiency and prolonged life.

DOOR GLASS REPLACEMENT

Never run a stove with broken glass, new glass must be purchased and installed by a Enviro dealer. The door glass is made of high temperature "PYROCERAM" ceramic glass. The proper glass size is 13" x 9.5" x 0.2" (5mm). To replace the glass, unscrew and remove the seven retainer screws. Carefully remove the glass and any broken pieces using protective gloves. High temperature fiberglass tape should be used around the glass on the sides and bottom. Place glass with fiberglass tape around outside into cast door, there should be no gasket at the top. Use the same retainers to secure the glass in place, make sure glass is properly seated in the cast door before tightening screws. Do not strike or slam door shut this can cause glass to break. The use of substitute glass materials is prohibited use only part 50-2942.

How can I reduce the visible emissions?

If all of the steps for cleaning and operating are followed, there should be no visible emissions.

TROUBLESHOOTING

DO NOT:

- Service the stove with wet hands. The stove is an electrical appliance, which may pose a shock hazard if handled improperly. Only qualified technicians should deal with possible internal electrical failures.
- Do not remove any screws from the firebox without penetrating oil lubrication.

WHAT TO DO IF:

1. The stove will not start.
2. E2 on LED Display.
3. E3 on LED Display.
4. E4 on LED Display.
5. The Exhaust Blower will not function normally.
6. The Auger is not feeding pellets.
7. The Convection Blower will not function normally.
8. The Igniter not working.
9. Control settings (Heat Level) has no effect on the fire.

***NOTE: All troubleshooting procedures should be carried out by qualified technicians or installers.**

1. The stove will not start.

- Make sure the stove is plugged in and the wall outlet is supplying 115-120V AC power.
- If the Control Board has been set to Thermostat mode, turn the thermostat up to call for heat.
- Check the LED display for error codes. - If Display reads **E2, E3**, or **E4** use Troubleshoot sections.
- Check the fuses on the circuit board.
- If the unit still does not start, contact your local service dealer for service.

2. E2 on LED Display (The Vacuum Switch contacts have opened for more than 1:00 min)

- Pinch, break or blockage in Vacuum Hose - Check hose for pinch points or damage, replace or re-route as required. Blow out Vacuum Hose with compressed air.
- Blocked Hose Barb on Exhaust Channel - Use a paper clip to clean out Hose Barb or remove the Vacuum Hose from the Vacuum Switch and blow into the hose to remove blockage.
- Blocked exhaust / venting system - Have stove and venting cleaned and inspected.
- Air Damper is closed or set to low - open damper slightly.
- Severe negative pressure in area where unit is installed - Check the operation by opening a window, does this solve the problem? If it does, install fresh air intake to unit or room. Venting system may require vertical section to move termination into a low pressure zone.
- Vacuum Switch failure - Bypass the vacuum switch, if this corrects the problem check for above problems before replacing the Vacuum Switch.
- Damage to gray wires between Circuit Board and Vacuum Switch - Inspect wires and connectors
- Combustion Blower failure - If the Combustion Blower is not turning fast enough to generate the proper vacuum in the Exhaust Channel. Visually Check if the blower motor is turning, check the Exhaust Blower voltage across the blower wires ($\geq 115V$ on #5 setting and $\geq 82V$ on #1 setting). – Replace the Circuit Board if the Voltage reading is less than 82 V. with a line voltage $>115 V AC$.
- Check Vacuum levels in the exhaust channel by bypassing the vacuum switch, then remove the Vacuum hose from Vacuum Switch. Check exhaust vacuum readings by placing the open end of the Vacuum Hose on a Magnehelic Gauge. (readings must be above .09" WC on low fire).
- If the motor fails to reach a 0.09" WC readings, then replace the Combustion Blower

To reset Circuit Board after a trouble code - press Power button.

TROUBLESHOOTING

3. E3 on LED Display (Proof of Fire Failure)

- If a fire is not detected, or if the fire has gone out the display will read E3 because the exhaust temperature is too low causing Exhaust Temperature Sensor's contacts to open.
- Check the hopper for fuel. Auger may need to be primed if stove has run out of pellet or being fired for the first time.
- Incorrect air damper setting. - Excessive air may consume the fire too quickly before the next drop of fuel, leaving completely unburned fuel in the burn pot liner. - Insufficient air will cause build up, further restricting the air flow through the Burn Pot Liner. This in turn will cause the fuel to burn cold and very slowly. Fuel may build up and smother the fire. In this case clean the burn pot. **(NOTE: unit may require a changes to the vent system or installation of fresh air intake to correct Air to Fuel ratio problems).**
- Combustion Blower failure. - The Combustion Blower is not turning fast enough to generate the proper vacuum in the fire box. Visual Check – is the blower motor turning.
- Check the Exhaust Blower voltage across the blower wires ($\geq 114V$ on #5 setting and $\geq 82V$ on #1 setting). – Replace the Circuit Board if the Voltage reading is less than 82 V. with a line voltage $>114 V$ AC.
- Check Vacuum levels in the exhaust channel by bypassing the Vacuum Switch, then remove the Vacuum hose from Vacuum Switch. Check exhaust vacuum readings by placing the open end of the Vacuum Hose on a Magnehelic Gauge (readings must be above .10" WC on low fire).
- Poor Quality Fuel – Insufficient energy in the fuel to produce enough heat to keep the stove burning or operational.
- Exhaust Temperature Sensor failure. – Bypass the sensor located on Exhaust Blower, if stove now operates properly, the unit may require cleaning or a new sensor. Contact your local dealer for service.
- Check the fuse on the circuit board.

4. E4 on LED Display (High Limit or Lid Switch Failure)

- If unit has been running normally and you now have an E4 this could be a High Limit switch. This is a safety feature, if the hopper gets too hot the unit will shut off. The High limit switch is located the right side of the hopper near the bottom.
- If the high limit has tripped something is wrong with the unit, possibly a component failure or a hopper fire has occurred.
- Slowly open the hopper lid, if you see and smoke at all keep it closed. A fire extinguisher or water can be used to put out a fire.
- If there is no smoke the Hopper Lid switch may not be engaged or there has been a component failure. The components will need to be tested, contact an Enviro dealer. The High limit switch is a manual reset switch and a small red button on the back of the switch will need to be manually pressed in order for the unit be started again.
- To check Hopper Lid switch make sure Hopper Lid is fully closed, If you think it is properly closed, open and close the lid, you should hear an audible click from magnetic Hopper Lid switch located in control board area.
- If no click is heard check that magnet on underside of Hopper Lid is still magnetic. This is a strong magnet.
- If magnet is good, alignment is out or switch is bad.
- Test switch for audible click with another magnet, switch is right above LED Display on control board.

5. The Combustion Blower will not function normally.

- If the Combustion "Exhaust" Blower is not functioning properly the stove will most likely will give an E2 or E3 error code.
- Check the wiring against the wiring diagram to make sure everything is connected properly.
- The fan can be directly hooked up to power to check motor.

NOTE: DO NOT attempt any electrical troubleshooting without knowledge of electrical systems, make sure unit is not plugged in. It is recommended to call an authorized Enviro dealer or service technician.

TROUBLESHOOTING

6. Auger is not Feeding Pellets.

- If this is the first time starting the unit or during the previous burn the unit ran out of pellets the Auger will need to be primed. You may get an E3 while auger is filling with pellets, just press the power button again. Once the Auger is full of pellets it will start dropping them into the burn pot.
- If Auger is primed and no pellets are dropping remove the Rear Grill to see Auger motor, you will see the auger collar and set screw rotating if the Auger is operating properly.
- If the motor's armature tries to spin but the auger shaft doesn't then the auger is jammed. – Try to break apart jam by poking at the jam through the drop tube. If this fails then empty the hopper and remove the Auger Cover **Remember to re-seal the cover with silicone after clearing jam**
- Check the set screw locking the motor shaft to the auger shaft. This needs to be tightened to the flat on the motor shaft for proper rotation.
- Check the fuses on the main circuit board.

7. The Convection Blower will not function normally.

- The Convection fan should come on when the unit is started. Speed is automatically controlled, the higher the heat level the higher the convection fan voltage will be.
- Check Wiring against wiring diagram.
- AC wall voltage can be directly hooked up to fan to test motor.
- Check that blade spins with very little friction.
- Check fuses on main circuit board.

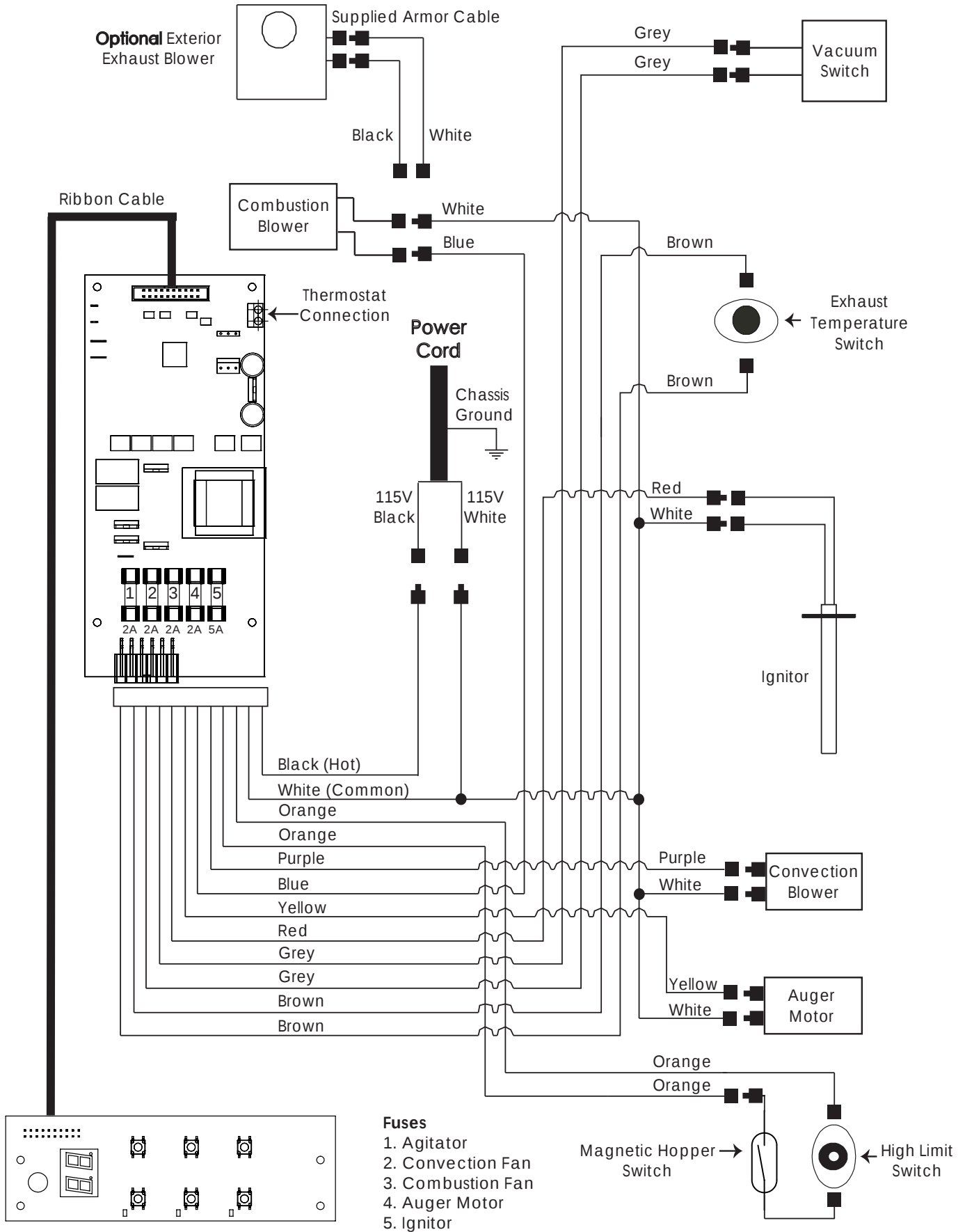
8. Ignitor not working

- If pellets are feeding and the combustion blower is working your stove should light a fire or at least start smoking.
- Make sure the burn pot and burn pot liner are correctly installed square to the Ignitor and air tube.
- If stove errors out before lighting open door and carefully check to see if pellets around the Ignitor hole are warm - If not remove ignitor and test, replace if it does not heat up.
- If the air damper is closed too much or Combustion Blower is not working the stove will not light.
- Check the fuses on the main circuit board.

9. Control settings (Heat Level) has no effect on the fire.

- If the LED beside the Power button is flashing the Control Board has complete control of the unit. This means the unit is in start-up mode, once the start-up cycle is complete the light will go solid.
- If running in Auto or "Comfort mode" and the LED light beside the Auto button is flashing the unit is in suspend mode because it has overshot the set point. Once temperature drops below the set point the stove will turn back on.

WIRING DIAGRAM



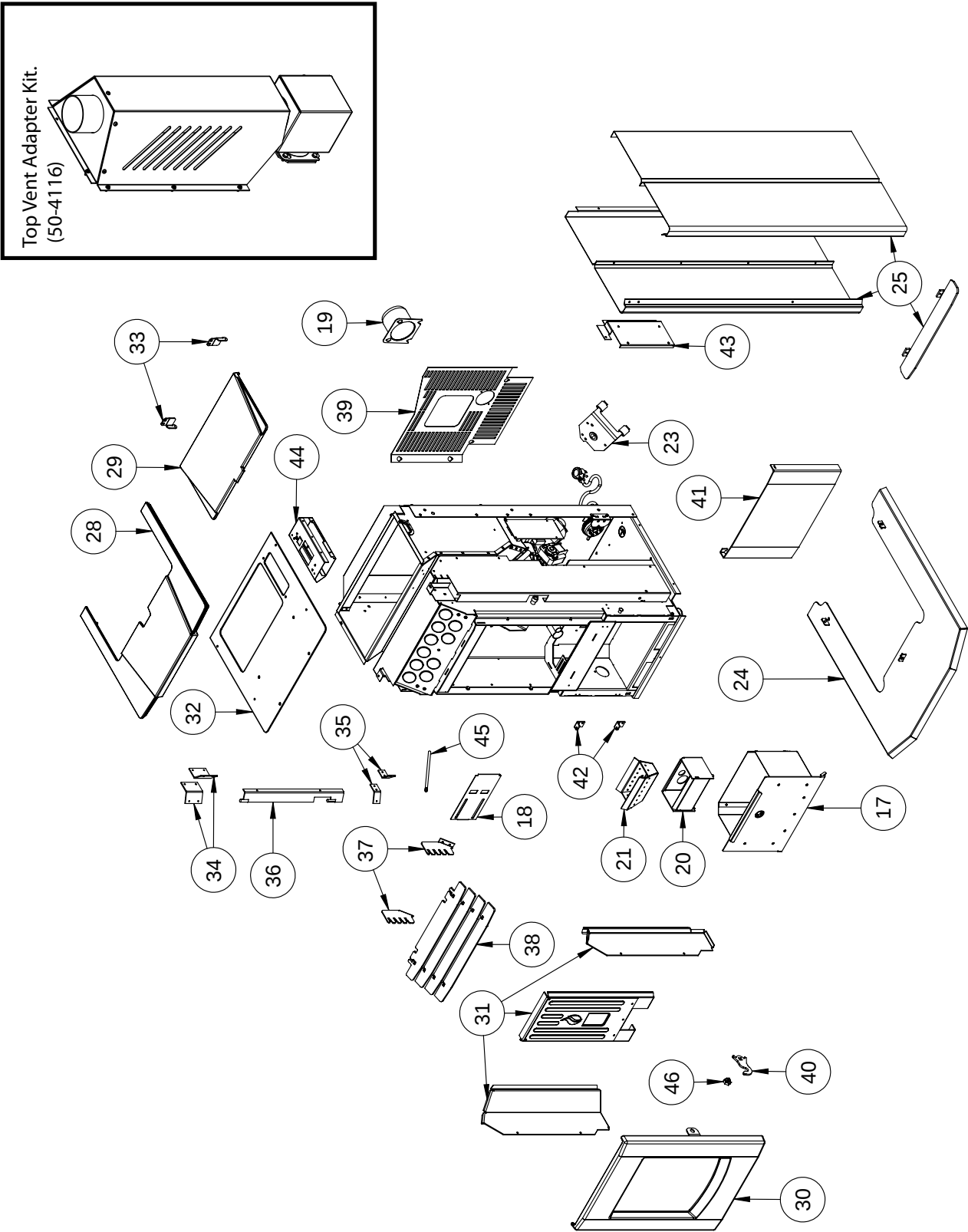
PARTS LIST

Ref. #	Description	Part #
1	120°F Ceramic Fan Temperature Sensor	EC-001
2	Auger Motor - 115V	EF-001
3	High Limit Temp Sensor 200°F (93°C) Manual Reset	EF-016
4	Vacuum Switch - 115V	EF-017
5	Silicone Hose	EF-018
6	SS Ash Pan Latch	50-2588
7	Domestic Power Cord - 115V	EC-042
8	400 Watt Ignitor - 115V	50-619
9	Exhaust Blower Assembly - 115V	50-901
10	60mm Tangential Blower Mini - 115V	50-1217
11	Leveling Legs (Set of 4)	50-1296
12	Hopper Switch (magnetic)	50-2052
13	P3 Glass With Gasket	50-2942
14	LED Motherboard	50-2943
15	LED Daughterboard	50-2944
16	Control Decal	50-2948
17	Ash Pan With SS Latch	50-1969
18	Draft Slider	50-1178
19	Starter Pipe 3"	50-1185
20	Burn Pot	50-1922
21	Burn Pot Liner	50-1923
22	Auger with Paddles Weldment	50-1161
23	Auger Stop Plate	50-2206
24	P3 Hearth Pad With Mounting Hardware	50-2929
25	P3 Cabinet Sides and Ash Shelf (PAINTED)	50-2945
26	P3 Cabinet Sides and Ash Shelf (RED)	50-2946
27	P3 Cabinet Sides and Ash Shelf (IVORY)	50-2947
28	P3 Cast Top	50-2949
29	P3 Cast Hopper Lid	50-2950
30	P3 Cast Door Assembly	50-2951
31	P3 Firebox Panel Set With Insulation	50-2952

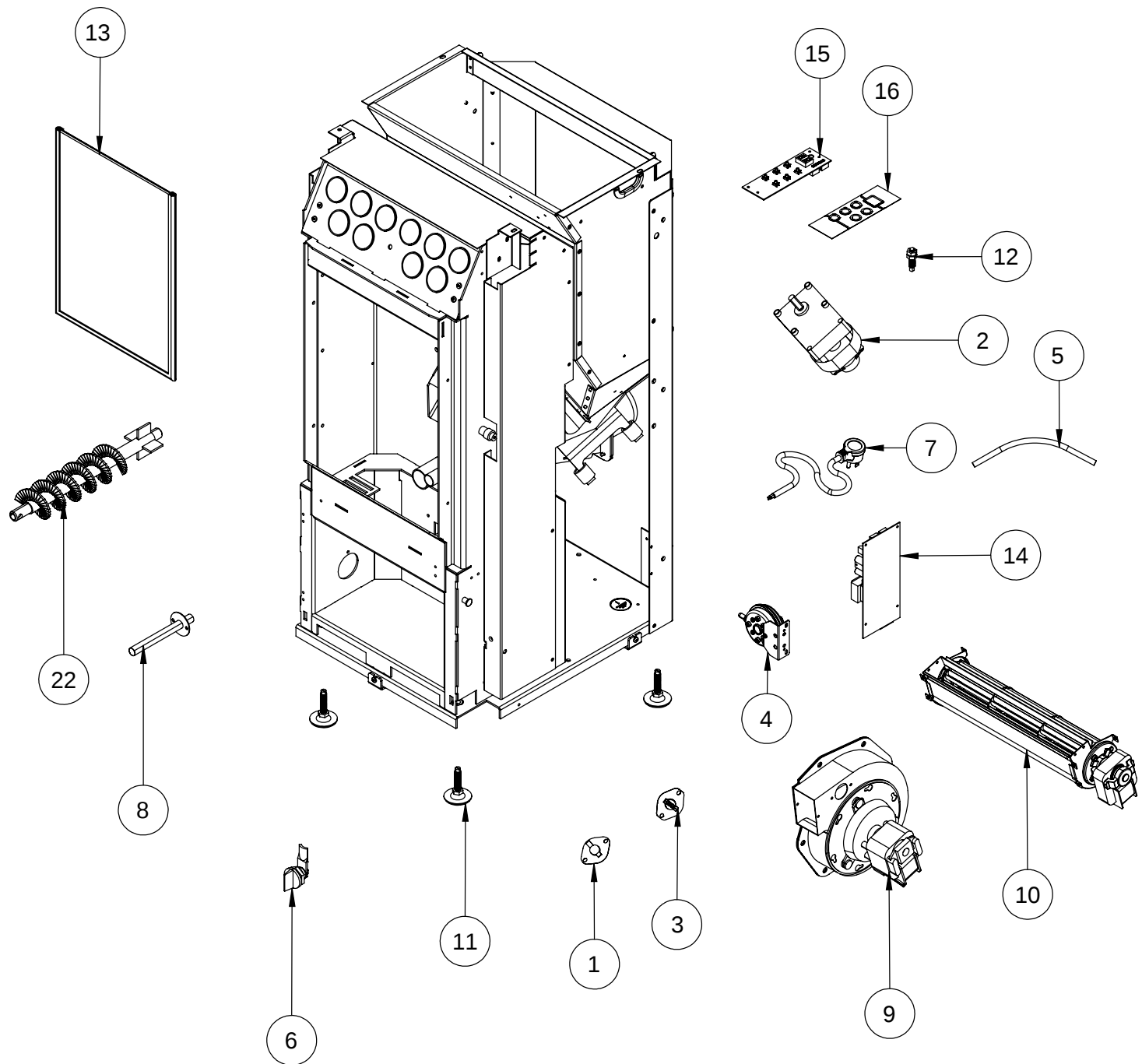
PARTS LIST

Ref. #	Description	Part #
32	Top Cast Mount Plate	50-2953
33	Hopper Hinge Set (Left And Right)	50-2954
34	Top Cabinet Mount Set (2)	50-2955
35	Bottom Cabinet Mount Set (2)	50-2956
36	Door Hinge Weldment	50-2957
37	Louver Bracket Set (Left And Right)	50-2958
38	Louver Set	50-2959
39	P3 Rear Grill	50-2960
40	Steel Door Latch	50-2961
41	Ash Pan Access Door	50-2962
42	Ash Pan Access Door Hinge Set (2)	50-2963
43	Motherboard Mounting Bracket	50-2964
44	Daughterboard Mount Box	50-2965
45	P3 Heat Exchanger Scaper Rod	50-2966
46	Machined Door Latch Nut	50-2967
	Chrome Plated Ash Shelf	50-3006
	25ft Extension Probe	50-3005
	P3 Door Gasket 54" with Joint Tape	50-2968
	Aluminum Hose Barb (Vacuum Line)	EF-019
	Auger Brass Bushings (Set of 2)	50-1806
	External Exhaust Back (For Optional Kit)	EF5-143
	External Exhaust Box (For Optioal Kit)	EF5-144
	External Exhaust Bottom (For Optioal Kit)	EF5-145
	External Exhaust Kit (3")	20-070
	Circuit Board 2 Amp Fuse - 115V (single)	50-2075
	Circuit Board 5 Amp Fuse - 115V (Pair)	50-833
	5/8" ID Auger Collar with Screw	50-968
	Wire Harness	50-1157
	Auger Stops (Clear Tube)	50-1559
	Burnpot Scraper Tool	50-1254
	Cleaning Brush	EF-156
	P3 Door Tool	50-2969

PARTS DIAGRAM



PARTS DIAGRAM





Warranty for Enviro Pellet 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.
- This 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.
- The 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.
- This warranty is void if the unit is used to burn materials for which the unit is not certified by the EPA and void if not operated according to the Owner's Manual.

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/

Category	One Year	Two Year	Limited Lifetime (7yr)
Parts ¹ (unit serial number required)		✓	
Firebox Brick Panels (Cast)		✓	
Firebox			✓
Heat Exchanger			✓
Burn Pot			✓
Burn Pot Liner		✓	
Firebox Liner Panels w/Insulation			✓
Ceramic Glass ²	✓		
Pedestal / Legs (excluding finish)			✓
Surround Panels (excluding finish)			✓
Exterior Panels (excluding finish)			Up to 5 years
Electrical Components		✓	
Steel Brick Liner (Metal)	✓		
Exterior Surface Finishing ³	✓		
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 Glass is covered for thermal breakage. Photos of box, inside of door, and unit serial # must be supplied for breakage due to shipping.

³ Exterior Surface finishing covers Plating, Enamel or Paint and excludes colour changes, chipping, and fingerprints.

Gaskets not covered by Warranty.

Travel costs not included.

Cast Agitator: 1 year for pellet. Not covered when burning alternative fuels. (Cast agitators are a consumable item)

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)
MAGNEHELIC AT INSTALL: _____
INSTALLER'S SIGNATURE:

NAME OF INSTALLER:

ADDRESS:

PHONE: _____

NOTES

MANUFACTURED BY:
SHERWOOD INDUSTRIES LTD.
6782 OLDFIELD RD. SAANICHTON, BC, CANADA V8M 2A3
www.enviro.com
August 28th 2018
C-15544



MINI-2

FREE-STANDING PELLET STOVE

WARRANTY REGISTRATION
enviro.com/warranty

OWNER'S MANUAL



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



Intertek
4001609

Contact your building or fire officials about restrictions and installation inspection requirements in your area.

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INTRODUCTION

RATING LABEL LOCATION:

The rating label is located on the back of the ash pan cover.

IMPORTANT SAFETY DATA:

Please read this entire Owner's Manual before installing or operating your ENVIRO Pellet Stove. Failure to follow these instructions may result in property damage, bodily injury or even death. Contact your local building or fire official to obtain a permit and any information on installation restrictions and inspection requirements for your area.

To prevent the possibility of a fire, ensure that the appliance is properly installed by adhering to the installation instructions. An ENVIRO dealer will be happy to assist you in obtaining information with regards to your local building codes and installation restrictions.

Be sure to maintain the structural integrity of the home when passing a vent through walls, ceilings, or roofs.

The stove's exhaust system works with negative combustion chamber pressure and a slightly positive chimney pressure. It is very important to ensure that the exhaust system be sealed and airtight. The ash pan and viewing door must be locked securely for proper and safe operation of the pellet stove.

Do not burn with insufficient combustion air. A periodic check is recommended to ensure proper combustion air is admitted to the combustion chamber. Setting the proper combustion air is achieved by adjusting the slider damper located on the left side of the stove.

When installing the stove in a mobile home, it must be electrically grounded to the steel chassis of the home and bolted to the floor. Make sure that the structural integrity of the home is maintained and all construction meets local building codes.

Minor soot or creosote may accumulate when the stove is operated under incorrect conditions such as an extremely rich burn (black tipped, lazy orange flames).

If you have any questions with regard to your stove or the above-mentioned information, please feel free to contact your local dealer for further clarification and comments.

SAFETY WARNINGS AND RECOMMENDATIONS:

Caution: Do not connect to any air distribution duct or system.

Do not burn garbage or flammable fluids such as gasoline, naptha or engine oil.

DO NOT BURN: treated wood, salt water wood, coal, charcoal, garbage, plastic, solvents, or colored papers. These material contain chlorides which will rapidly corrode and warp metal surfaces which voids warranty.

Unit hot while in operation. Keep children, clothing and furniture away. Contact may cause skin burns.

Please read this entire Owner's Manual before installing or operating your ENVIRO Pellet Stove. Failure to follow these instructions may result in property damage, bodily injury or even death. Any unauthorized modification of the appliance or use of replacement parts not recommended by the manufacturer is prohibited.

Warning: Parts of the appliance, especially the external surfaces, will be hot to touch when in operation and due care will need to be taken. Never place wood, paper, furniture, drapes or other combustible materials within 80cm (31½") of the front of the unit, 20cm (7⅞") from each side, and 10cm (4") from the back of the unit. Do not let children or pets touch it when it is hot.

INTRODUCTION

To prevent the possibility of a fire, ensure that the appliance is properly installed by adhering to the installation instructions. An ENVIRO dealer will be happy to assist you in obtaining information with regards to your local building codes and installation restrictions.

FIRE EXTINGUISHER AND SMOKE DETECTION: All homes with a pellet 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 device within the room; **DO NOT REMOVE THE SMOKE OR CARBON MONOXIDE DETECTORS FROM THE ROOM.**

CHIMNEY OR RUN AWAY FIRE: Call local fire department (or dial 911). Close the draft fully. 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. **IMPORTANT:** Do not operate the stove again until you are certain the chimney and its lining have not been damaged.

FUEL: This pellet stove is designed and approved to only burn wood pellet fuel with up to 3% ash content. Dirty fuel will adversely affect the operation and performance of the unit and may void the warranty. Check with your dealer for fuel recommendations.

DO NOT use this appliance as an incinerator. DO NOT use unsuitable and non recommended fuels, including liquid fuels.

THE USE OF CORDWOOD IS PROHIBITED BY LAW.

FLAMMABLE LIQUIDS: **Never** use gasoline, gasoline-type lantern fuel, kerosene, charcoal lighter fluid, or similar liquids to start or “freshen up” a fire in the heater. Keep all such liquids well away from the heater while it is in use.

SOOT: Operation of the stove with insufficient combustion air will result in the formation of soot which will collect on the glass, the heat exchanger, the exhaust vent system, and may stain the outside of the house. This is a dangerous situation and is inefficient. Frequently check your stove and adjust the slider/damper as needed to ensure proper combustion. **See: “SLIDER/DAMPER SETTING”.**

CLEANING: There will be some build up of fly ash and small amounts of creosote in the exhaust. This will vary due to the ash content of the fuel used and the operation of the stove. It is advisable to inspect and clean the exhaust vent semi-annually or every two tons of pellets.

The appliance, flue gas connector and the chimney flue require regular cleaning. Check them for blockage prior to re-lighting after a prolonged shut down period.

ASHES: Disposed ashes should be placed in a metal container with a tight fitting lid. The closed container of ashes should be on a non-combustible floor on the ground, well away from all combustible materials pending final disposal. If the ashes are disposed of by burial in soil or otherwise locally dispensed, they should be retained in the closed container until all cinders have been thoroughly cooled.

ELECTRICAL: **The use of a surge protected power bar is recommended.** The unit must be grounded. The grounded electrical cord should be connected to a standard 110-120 volts, nominal average 2.0 Amps (4.1 Amps peak), 60 hertz electrical outlet and also must be accessible. Ensure the polarity to the outlet, the unit will be plugged into, is correct as incorrect polarity can affect the unit's operation. If this power cord should become damaged, a replacement power cord must be purchased from a qualified ENVIRO dealer. Be careful that the electrical cord is not trapped under the appliance and that it is clear of any hot surfaces or sharp edges. This unit's maximum power requirement is 184 watts (600 watts peak).

INTRODUCTION

When installing the stove in a mobile home, it must be electrically grounded to the steel chassis of the home and bolted to the floor. Make sure that the structural integrity of the home is maintained and all construction meets local building codes.

GLASS: Do not abuse the glass by striking or slamming the door. Do not attempt to operate the stove with broken glass. The stove uses ceramic glass. Replacement glass must be purchased from an ENVIRO dealer. Do not attempt to open the door and clean the glass while the unit is in operation or if glass is hot. To clean the glass, use a soft cotton cloth and mild window cleaner, gas or wood stove glass cleaner, or take a damp paper towel and dip into the fly ash. This is a very mild abrasive and will not damage the glass.

OPERATION: The door and ash drawer cover must be kept closed securely except during ignition, refuelling and removal of residue material to prevent fume spillage and for proper and safe operation of the pellet stove. Also ensure all gaskets on the door are checked and replaced when necessary.

IMPORTANT: The door and ash drawer cover must be kept closed except during ignition, refueling and removal of residue material to prevent fume spillage.

CAUTION: When operating during adverse weather, if the unit exhibits dramatic changes in combustion stop using the unit immediately.

KEEP ASH PAN FREE OF RAW FUEL. DO NOT PLACE UNBURNED OR NEW PELLET FUEL IN ASH PAN. A fire in the ash pan may occur.

INSTALLATION: Contact your local building or fire official to obtain a permit and any information on installation restrictions and inspection requirements for your area. All local regulations, including those referring to national and European Standards need to be complied with when installing this appliance.

Be sure to maintain the structural integrity of your home when passing a vent through walls, ceilings, or roofs. It is recommended that the unit be secured into its position in order to avoid any displacement. This appliance must be installed on a floor with an adequate load bearing capacity. If an existing construction doesn't meet these prerequisite, suitable measures (e.g. load distributing plate) shall be taken to achieve it.

DO NOT INSTALL A FLUE DAMPER IN THE EXHAUST VENTING SYSTEM OF THIS UNIT.
DO NOT CONNECT THIS UNIT TO A CHIMNEY FLUE SERVING ANOTHER APPLIANCE.

FRESH AIR: Outside Fresh Air connection is optional. Fresh Air must be connected to all units installed in Mobile and "Air Tight Homes" (R2000) or where required by local codes.

Consider all large air moving devices when installing your unit and provide room air accordingly. **NOTE:** Extractor fans when operating in the same room or space as the appliance, may cause problems. Limited air for combustion may result in poor performance, smoking and other side effects of poor combustion.

The stove's exhaust system works with negative combustion chamber pressure and a slightly positive chimney pressure. It is very important to ensure that the exhaust system be sealed and airtight. The ash pan and viewing door must be locked securely for proper and safe operation of the pellet stove.

Do not burn with insufficient combustion air. A periodic check is recommended to ensure proper combustion air is admitted to the combustion chamber. Setting the proper combustion air is achieved by adjusting the slider damper located on the left side of the stove.

Minor soot or creosote may accumulate when the stove is operated under incorrect conditions such as an extremely rich burn (black tipped, lazy orange flames).

INTRODUCTION

If you have any questions with regards to your stove or the above-mentioned information, please feel free to contact your local dealer for further clarification and comments.

SINCE SHERWOOD INDUSTRIES LTD. HAS NO CONTROL OVER THE INSTALLATION OF YOUR STOVE, SHERWOOD INDUSTRIES LTD. GRANTS NO WARRANTY IMPLIED OR STATED FOR THE INSTALLATION OR MAINTENANCE OF YOUR STOVE. THEREFORE, SHERWOOD INDUSTRIES LTD. ASSUMES NO RESPONSIBILITY FOR ANY CONSEQUENTIAL DAMAGE(S).

PELLET QUALITY:

Pellet quality is important, please read the following:

Your enviro pellet stove has been designed to burn wood pellets only. Do not use any other type of fuel, as this will void any warranties stated in this manual.

The performance of your pellet stove is greatly affected by the type and quality of wood pellets being burned. As the heat output of various quality wood pellets differs, so will the performance and heat output of the pellet stove.

CAUTION: It is important to select and use only pellets that are dry and free of dirt or any impurities such as high salt content. Dirty fuel will adversely affect the operation and performance of the unit and will void the warranty. The Pellet Fuel Industries (P.F.I.) has established standards for wood pellet manufacturers. We recommend the use of pellets that meet or exceed these standards. Ask your dealer for a recommended pellet type.

P.F.I. PELLET STANDARDS:

Fines (fine particles).....	1% maximum through a 1/8" screen
Bulk Density.....	40 pound per cubic foot minimum
Size.....	1/4" to 5/16" diameter 1/2 – 1 1/2" long maximum
Ash Content.....	1% maximum (Premium grade)
	3% maximum (Standard grade)
Moisture Content.....	8% maximum
Heat Content.....	approximately 8200 Btu per pound minimum

ASH: The ash content of the fuel and operation of your stove will directly determine the frequency of cleaning. The use of high ash fuels may result in the stove needing to be cleaned daily. A low ash fuel may allow longer intervals between cleaning.

CLINKERING: [clinkers are silica (sand) or other impurities in the fuel that will form a hard mass during the burning process]. This hard mass will block the air flow through the Burn Pot Liner and affect the performance of the stove. Any fuel, even approved types, may tend to clinker. Check the Burn-Pot Liner daily to ensure that the holes are not blocked with clinkers. If they become blocked, remove the liner (when the unit is cold) and clean/scrape the clinkers out. Clean the holes with a small pointed object if required. Refer to the section Routine Cleaning and Maintenance.

PELLET FEED RATES: Due to different fuel densities and sizes, pellet feed rates may vary. This may require an adjustment to the slider damper setting or to the auger feed trim setting on low.

Since Sherwood Industries Ltd. has no control over the quality of pellets that you use, we assume no liability for your choice in wood pellets.

Store pellets at least 36" (1 m) away from the pellet stove.

EMISSIONS AND EFFICIENCIES

EMISSIONS AND EFFICIENCY - MINI:

This manual describes the installation and operation of the Enviro Mini pellet heater. This heater is U.S. ENVIRONMENTAL PROTECTION AGENCY Certified to comply with 2020 particulate emission standards. Under specific test conditions this heater has been shown to deliver heat at rates ranging from 6,881-23,892 Btu/hr.

Efficiency: 80.2% * HHV (PFS TECO 21-694)

*When using optional top vent adapter kit. (50-4116)

WARNING: This pellet heater needs periodic inspection and repair for proper operation. It is against federal regulations to operate this pellet heater in a manner inconsistent with operating instructions in this manual.

WARNING: This wood pellet 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 pellet heater in a manner inconsistent with operating instructions in this manual.

OPERATING INSTRUCTIONS

CONTROL BOARD FUNCTIONS:

1. **AUGER LIGHT:** This green light will flash in conjunction with the auger pulse.
2. **MODE LIGHT:** Responsible for signaling the state of the control board. When the light is flashing the stove is in an automatic start mode or the thermostat has control of the unit. When the light is solid, the Heat Level Setting can be altered.
3. **THERMOSTAT SWITCH:** Used to set the unit's controls to one of three mode settings; manual, high/low, or auto/off.
4. **FEED RATE TRIM BUTTON:** Used to change the feed rate trims in $\frac{1}{4}$ second increments for all feed settings. When this button is pressed, all the light will light up on the Heat Output Indicator except for the one that shows the current setting; the default setting is the number 4 light. To adjust the setting hold the Feed Rate Trim button down and press the Heat Level up or down buttons to adjust the setting.
5. **COMBUSTION BLOWER TRIM BUTTON:** Used to change the Combustion Blower trims in 5 volt increments for all feed settings until it reaches line voltage. When this button is pressed, all the light will light up on the Heat Output Indicator except for the one that shows the current setting; the default setting is the number 2 light. To adjust the setting hold the Combustion Blower Trim button down and press the Heat Level up or down buttons to adjust the setting.
6. **ON/OFF BUTTON:** Used to turn the unit ON and OFF.
7. **ROOM AIR FAN ON/OFF BUTTON:** Used to turn convection fan on or off.
8. **HEAT LEVEL ADJUSTMENT BUTTONS:** When pressed, will change the heat level setting of the unit up or down.
9. **HEAT OUTPUT INDICATOR:** Shows the present heat output setting.

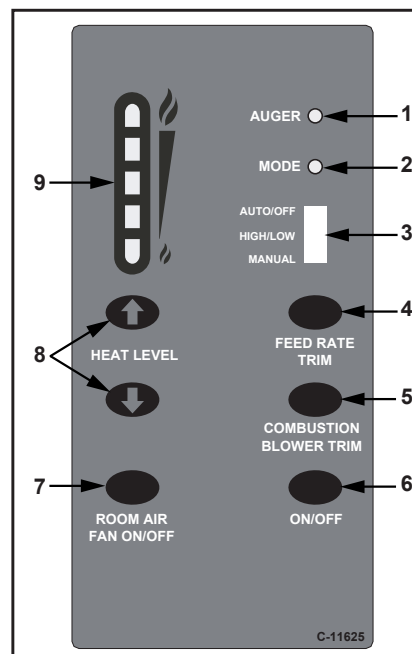


Figure 1: Circuit Board Control Panel Decal.

AUTOMATIC SAFETY FEATURES OF YOUR PELLET STOVE:

- A. The stove will shut off when the fire goes out and the exhaust temperature drops below 120°F (49°C).
- B. The stove has a high temperature safety switch. If the temperature on the hopper reaches 200°F (93°C), the auger will automatically stop and the stove will shut down when the exhaust temperature cools #4 light flashes. Dealer will have to reset the sensor. If this happens, call your local dealer to reset the 200°F (93°C) high limit switch. **ALSO FIND THE REASONS WHY THE UNIT OVERHEATED.**
- C) The unit is equipped with a vacuum switch to monitor the venting; if it becomes blocked the vacuum switch will turn off the auger and the #2 light on the control board will flash.

OPERATING YOUR PELLET STOVE:

PRE-BURN INSTRUCTIONS: The burn pot liner holes must be clear and the liner installed properly against the ignitor tube for proper operation. Check the hopper for enough pellets to start the unit.

DO NOT OPERATE THE UNIT WITH THE DOOR OR ASH PAN OPEN.

Note: The thermostat mode can be changed during normal operation.

OPERATING INSTRUCTIONS

MANUAL MODE:

All control of circuit board function is adjusted at the circuit board.

To START: Press the ON / OFF button. The stove will turn on. The system light will flash. The Auger Light will flash with each pulse of the auger (the Auger Feed Rate is pre-programmed during start-up). The Heat Level Indicator will show the Heat Level that the stove will run at after start-up and can be adjusted but the change will not take affect until the start -up has finished.

If this is the first time the unit has been started or the unit has run out of fuel, the auger will need to be primed. This can be done by restarting the unit five (5) minutes into its start-up or by putting a small hand full of pellets into the burnpot.

To OPERATE: When a fire has been established, the System Light will turn solid (after approximately 10 - 15 minutes) and the Auger Light will continue to flash to the corresponding Heat Level setting.

The convection blower (room air blower) will turn on. The speed of this blower is controlled by the setting of the heat level output indicator. The convection blower can be turned OFF by depressing the convection blower control button. For the best efficiency the convection blower should be left on at all times.

HIGH/LOW MODE: (Requires a thermostat)

INITIAL START-UP: See manual mode above.

OPERATION: When the thermostat calls for heat (contacts are closed) the stove settings are adjustable as per Manual Mode. When the thermostat contacts open, the HEAT LEVEL and Fans will drop down to the LOW setting until the thermostat contacts close again. *The LOW heat setting can be adjusted for different fuel qualities (see "OPERATING INSTRUCTIONS - CONTROL BOARD FUNCTIONS"). The stove will come back to the previous HEAT LEVEL setting when the thermostat contacts close again.

AUTO/OFF MODE: (Requires a thermostat)

INITIAL START-UP: See manual mode above.

OPERATION: When the thermostat contacts close, the unit will light automatically. Once up to temperature, the stove operates the same as in MANUAL. When the thermostat contacts open, the stove's HEAT LEVEL and Fans will drop down to the LOW setting for 30 minutes. If the thermostat contacts close within the 30 minutes, the HEAT LEVEL will return to the previous MANUAL setting. If the thermostat contacts remain open the stove automatically begins its shutdown routine. The ON / OFF button can be presses at any time the the stove will immediately shut down. The stove will re-light when the thermostat contacts close again.

TURNING YOUR PELLET STOVE OFF:

- **MANUAL and HI / LOW mode:** To turn the unit OFF, simply press the ON / OFF button. This will stop the feed of pellets. The blowers will continue to operate and cool the stove down. When cool enough, the stove will turn off.
- **AUTO / OFF mode:** To turn the unit OFF, turn the thermostat down or off. NOTE: The unit will run on low for three (3) minutes before it turns off.

**DO NOT unplug unit while Combustion fan is operating.
This may lead to smoke escaping from the stove.**

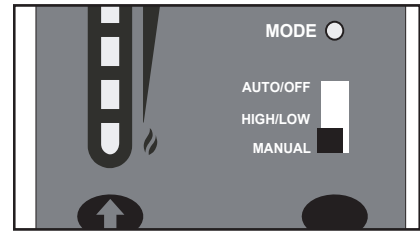


Figure 2: Thermostat Switch in MANUAL position.

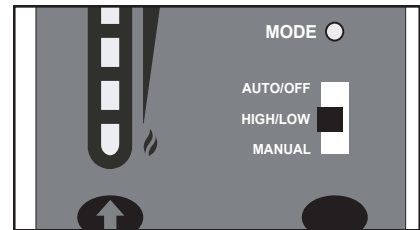


Figure 3: Thermostat Switch in HIGH/LOW position.

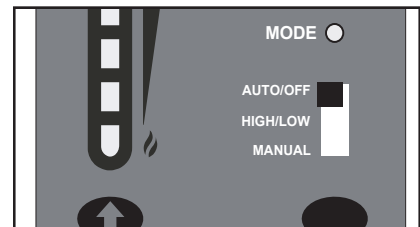


Figure 4: Thermostat Switch in ON/OFF position.

OPERATING INSTRUCTIONS

SLIDER/DAMPER SET-UP:

THE SLIDER / DAMPER HAS BEEN SET AT THE FACTORY. This is used to regulate the airflow through the pellet stove. The slider damper knob is located on the left cab side (see Figure 5).

The slider damper factory setting has been set for peak efficiency operation (see Figure 6).

If the fire should happen to go out and the heat output indicator has been set on the lowest setting, the Slider Damper may need to be adjusted by a qualified technician only. Contact your local dealer.

For troubleshooting purposes the firebox vacuum pressure may need to be confirmed. This should be done only on a hot stove (operating for thirty (30) minutes or more) by placing a Magnahelic Pressure Gauge in the firebox. The reading can be taken from the 1/8" (3 mm) hole located in the front of the firebox under the door. **The factory setting should read approximately 0.06 inches of water column on the high fire setting.**

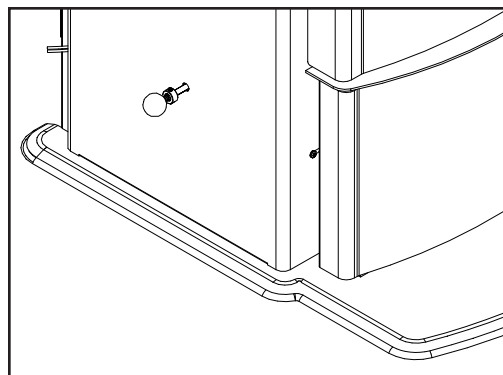


Figure 5: Slider/Damper Knob.

SPECIAL NOTES:

Pellet quality is a major factor in how the Pellet stove will operate. If the pellets have a high moisture content or ash content the fire will be less efficient and has a higher possibility of the fire building up and creating clinkers (hard silica ash build-up).

Overfiring should not occur if stove is operating properly, if stove looks like it is burning unusually high turn off the unit with the power button, **DO NOT** unplug. There is a built in safety switch if unit gets too hot from overfiring it will shut down automatically.



Figure 6: Efficient Flame.

GUIDELINES FOR FINE-TUNING FOR FUEL QUALITY:

Due to fuel quality the slider damper and control board trims may need to be fine-tuned.

1. If the unit has excesses ash build-up in the liner on the lower feed settings, the Combustion Blower Trim should be increased one setting at a time until the problem improves (Factory Setting is #2).
2. If the fire is going out on low because the airflow is too great, the Combustion Blower Trim can be lowered to the #1 setting.
3. If the stove has excesses ash build-up in the liner on the higher settings the Feed Rate Trim should be trimmed down a setting at a time until the problem improves (Factory setting is #4).
4. If you need more heat and the fuel has long pellets, the majority are over 1" (2.5cm) in length, the Feed Rate Trim can be moved up to the #5 setting. NOTE: Only do this if the fuel burns without building up.

ROUTINE CLEANING AND MAINTENANCE

The following list of components should be inspected and maintained routinely to ensure that the appliance is operating at its' optimum and giving you excellent heat value:

<u>2-3 Days / Weekly</u>	<u>Semi-annually or 2 Tons of Fuel</u>
Burn Pot and Liner	Exhaust Vent
Heat Exchanger Tubes	Air Intake
Ash Pan	Blower Mechanisms
Door Glass	Heat Exchanger Tubes
Inside Firebox	Behind Firebox Liners & Covers
Ash Pan and Door Gaskets	All Hinges
Door Latch	Post Season Clean-up

TOOLS REQUIRED TO CLEAN UNIT:

Torx T-20 Screwdriver, $\frac{5}{16}$ " wrench or socket, Brush, Soft Cloth, Vacuum with fine filter bag

BURNER POT AND LINER (2-3 days)

Every two to three days (when the unit is cold), remove the burn-pot liner from the stove. Using a metal scraper, remove material that has accumulated or is clogging the liner's holes. Then dispose of the scraped ashes from the liner and from inside the burn-pot. Place the burn-pot back into the stove, making sure that the pipes are properly inserted into the burn pot. Place the liner back into the burn-pot, making sure that the ignitor hole in the liner is aligned with the ignitor tube (shown in Figure 7). Push the liner up against the ignitor tube.

If, after long periods of burning, the fire continually builds up and overflows the burn pot or there is a build up of clinkers, this is an indication that the pellet fuel quality is poor, the stove may need cleaning, or the air adjusted. Check the stove for ash build up (clean if required) and adjust the slider / damper to produce the proper clean combustion.

HEAT EXCHANGER TUBES (2-3 days)

A handle is located in the center of the stove just above the door. This handle is to be pulled up and down a few times (ONLY WHEN THE UNIT IS COLD) in order to clean away any fly ash that may have collected on the heat exchanger tubes. As different types of pellets produce different amounts of ash, cleaning of the tubes should be done on a regular basis to enable the unit to run efficiently.

ASH PAN AND DOOR GASKETS (weekly)

After extended use the gasketing may come loose. To repair this, glue the gasketing on using high-temperature fiberglass gasket glue available from your local dealer. This is important to maintain an airtight assembly.

DOOR GLASS CLEANING (2-3 days)

Cleaning of the glass must only be done when stove is cold. Open the door by lifting the handle. The glass can be cleaned by wiping down the outside and inside of the glass with a dry soft cloth.

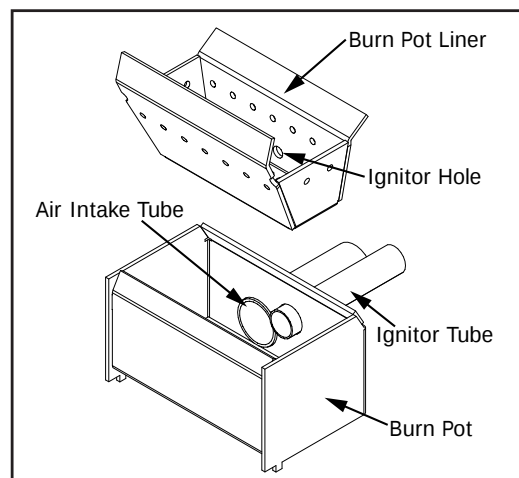


Figure 7: Mini Burn pot and Liner

ROUTINE CLEANING AND MAINTENANCE

If the glass has build up that can not be removed with only the cloth, clean the glass using paper towel and a gas appliance glass cleaner, this may be purchased through most dealers. If a gas appliance glass cleaner is not available, use a damp paper towel dipped in fly ash to clean the glass. After the glass has been cleaned use the dry soft cloth to wiping down the outside and inside of the glass.

ASH PAN (weekly)

This part is located under the door. To remove the ash pan, open the cover from the right hand side, and lift the ash pan up and out. Dump the ashes into a metal container stored away from combustibles. Monitor the ash level every week. Remember that different pellet fuels will have different ash contents. Ash content is a good indication of fuel efficiency and quality. Refer to "SAFETY WARNINGS AND RECOMMENDATIONS" for disposal of ashes. Vacuum the inside of the ash pan compartment inside the pedestal including the hole at the top back of the compartment. Replace the ash pan and close pedestal door. **DO NOT PLACE UNBURNED OR RAW PELLET FUEL IN ASH PAN.**

AIR INTAKE (semi-annually)

Inspect periodically to be sure that it is not clogged with any foreign materials.

EXHAUST PASSAGES (semi-annually)

To prevent build up of fly-ash all the exhaust passages must be cleaned and vacuumed.

Clean behind clean-out covers:

- Open ash box cover.
- Remove ash box.
- Using a $\frac{5}{16}$ " socket, loosen the six (6) screws in the ash box compartment; four (4) on the back and one (1) on each side (see Figure 9).
- Rotate the back cover counter-clockwise to remove and rotate the side covers to open them.
- Vacuum out all three (3) chambers.
- Close all the clean-out covers and tighten the screws.

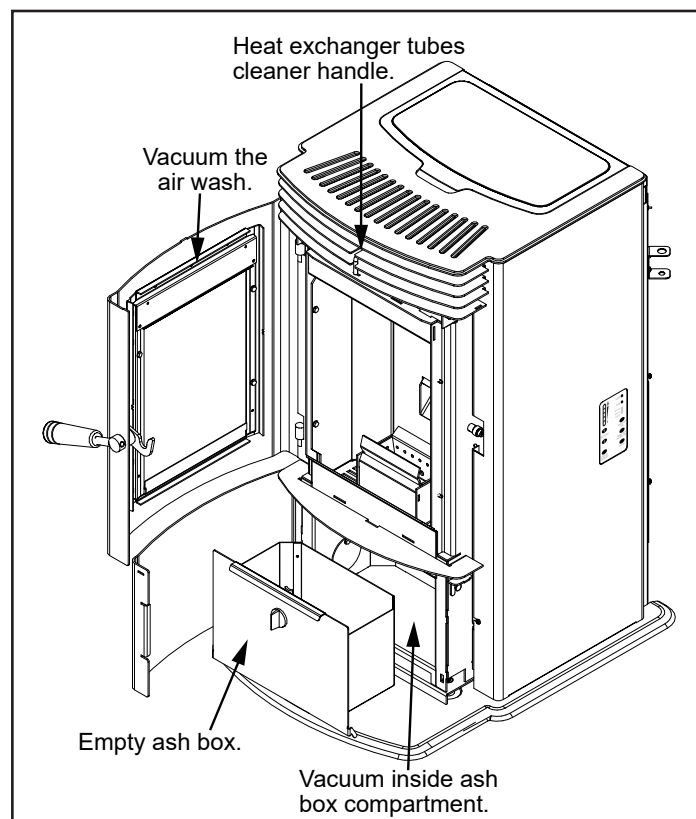


Figure 8: Mini Open

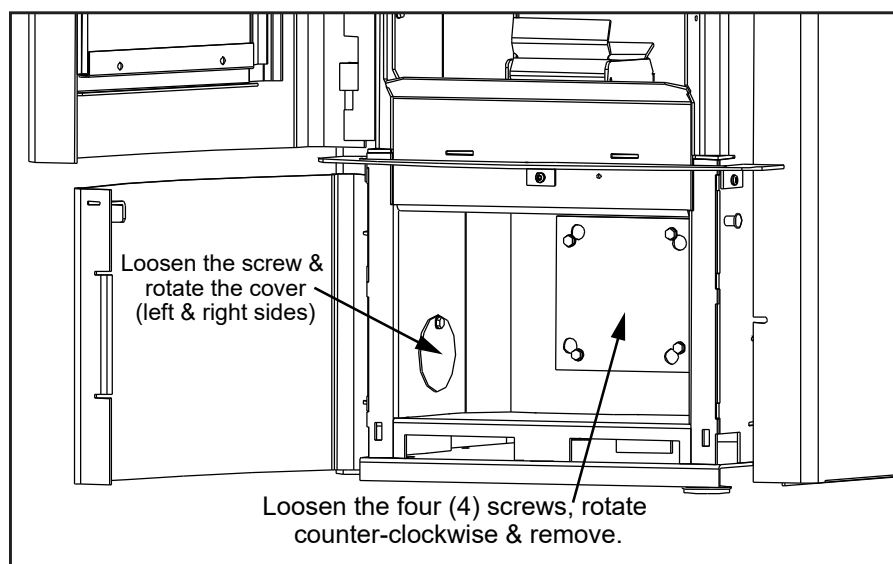


Figure 9: Mini Clean-Out Covers.

INSTALLATION

DECIDING WHERE TO LOCATE YOUR PELLET APPLIANCE:

1. Check clearances to combustibles.
2. Do not obtain combustion air from an attic, garage or any unventilated space. Combustion air may be obtained from a ventilated crawlspace.
3. Do not install the stove in a bedroom.
4. You can vent the stove through an exterior wall behind the unit or connect it to an existing masonry or metal wood stove chimney (must be lined if the chimney is over 6" (15 cm) diameter, or over 28 inches² (180 cm²) cross sectional area). An interior vent can be used with approved pipe passing through the ceiling and roof.
5. Locate the stove in a large and open room that is centrally located in the house. This will optimize heat circulation.
6. The power cord is 8 feet (2.43 m) long and may require a grounded extension cord to reach the nearest electrical outlet.



www.nficertified.org

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



APPLIANCE DIMENSIONS AND SPECIFICATIONS:

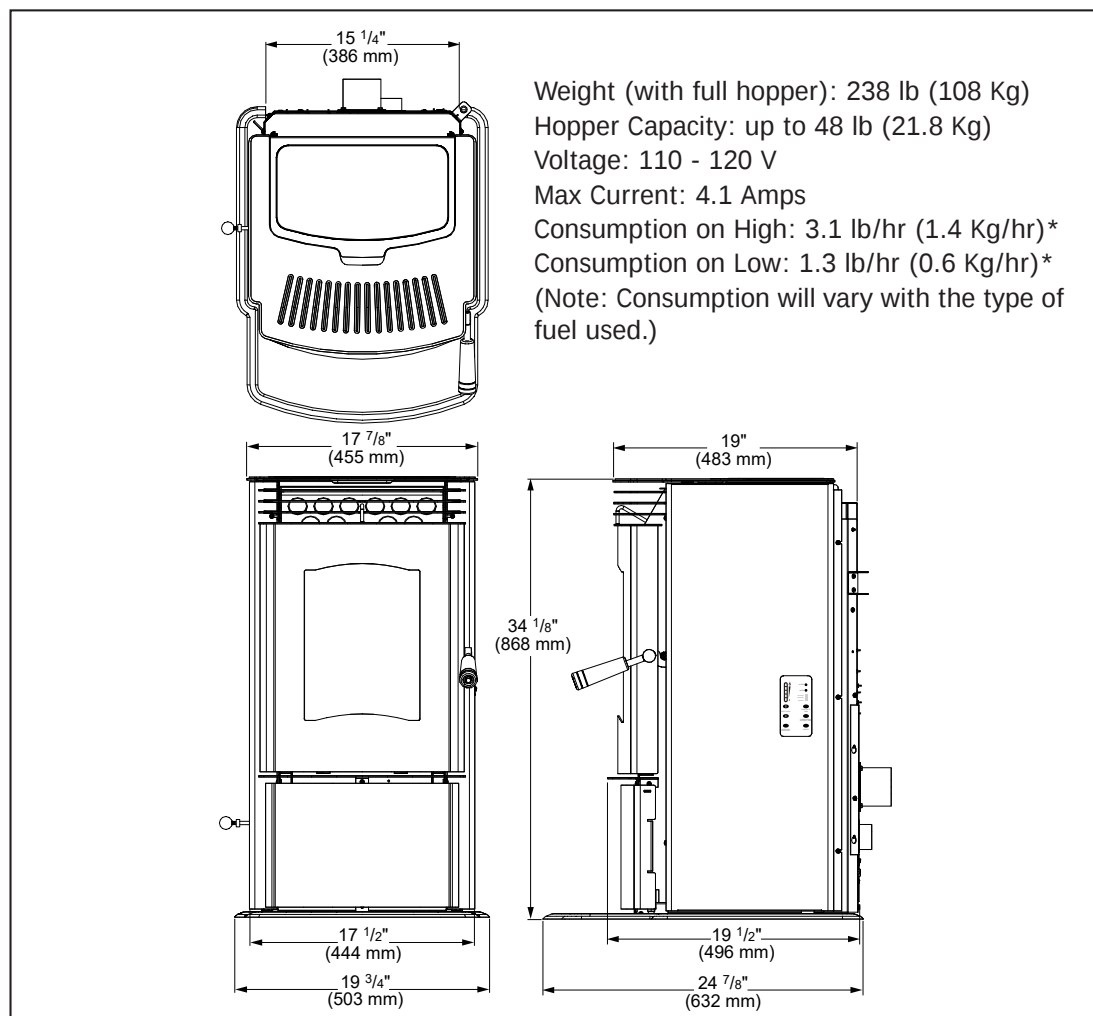


Figure 10: Dimensions of Mini.

INSTALLATION

REMOVING PELLET STOVE FROM PALLET AND INSTALLING HEARTH PAD:

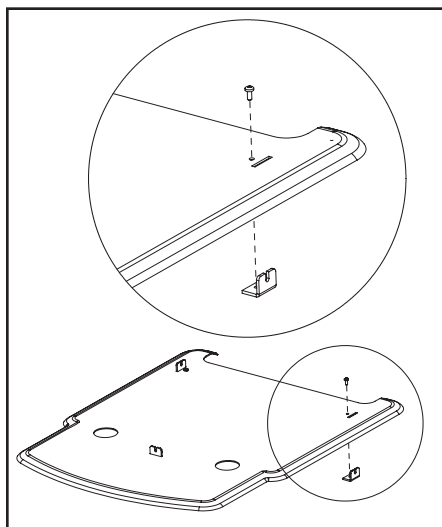


Figure 12: Installing tabs into hearth pad.

Tool Required:

- T-20 screwdriver
- $\frac{5}{16}$ " socket or flat head screwdriver

Installation:

1. Slide a hearth pad tab through each of the three (3) slots on the hearth pad so the slotted end is up and secure in place with a T-20 screw through the pad into the tab (refer to Figure 11).
2. Open the ash pan cover from the right then lift the cover up and out to unhook the hinges at the left.
3. Remove the cab sides.
 - a) Ensure the screws behind the ash box (Figure 12) and the three (3) on each side at the back (Figure 13) are loosened.

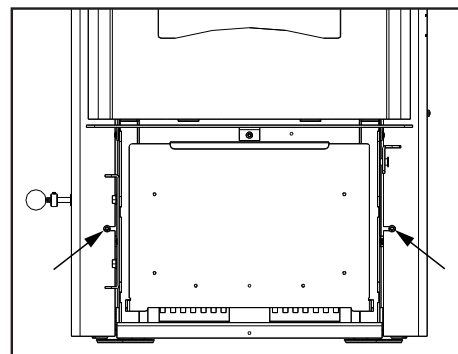


Figure 11: Screw behind ash box.

- b) Remove knob and collar from slider rod.
 - c) Pull the cab sides straight out.
4. Using a $\frac{5}{16}$ " socket or flat head screwdriver, remove the three (3) wood screws that are holding the bottom of the stove to the pallet. There is one (1) screw behind each side panel and one (1) at the back behind the back grill (refer to Figure 14).
 5. Loosen the three (3) T-20 screws from the base of the unit (see Figure 15).

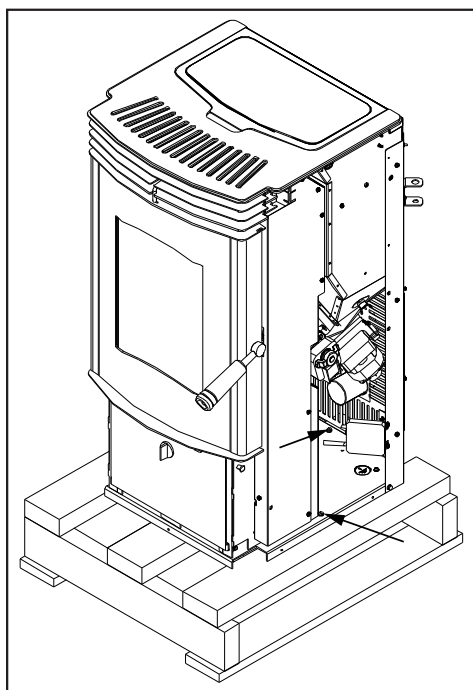


Figure 14: Screws to take out to remove stove from pallet.

6. Either lift the unit up and place it into the hearth pad or carefully place the unit on its back; it can rest on the pallet it was shipped on (allow the pipes to fit through an opening in the pallet).
7. Align the three (3) tabs on the hearth pad to the three (3) screws on the unit, slide together, and tighten the T-20 screws.
8. Adjust the leveling legs to level and support stove.
9. Re-install the cab sides and ash pan cover.

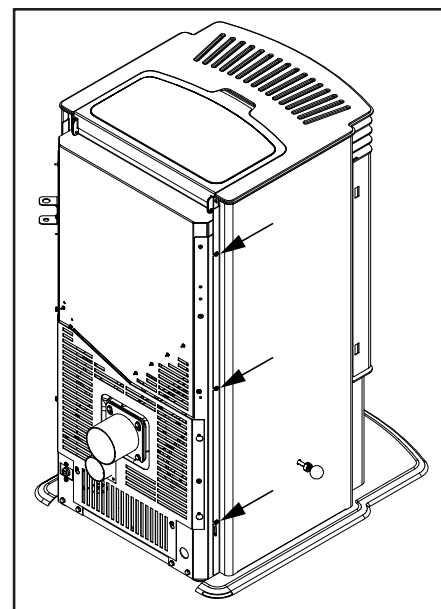


Figure 13: Screws at the back of the cabinet side.

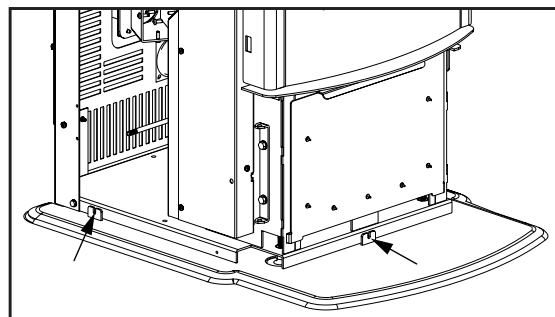


Figure 15: Mini Bern Hearth Pad in Place.

INSTALLATION

CLEARANCES TO COMBUSTIBLES:

IMPORTANT: Attach the Mini's Hearth Pad when installing the unit on a combustible floor. The supplied hearth pad meet all the requirement of a proper hearth pad. If you do not use the supplied hearth pad a hearth pad must be used when on combustible material.

If the Mini is installed on carpet the use of a solid material must be used under leveling legs.

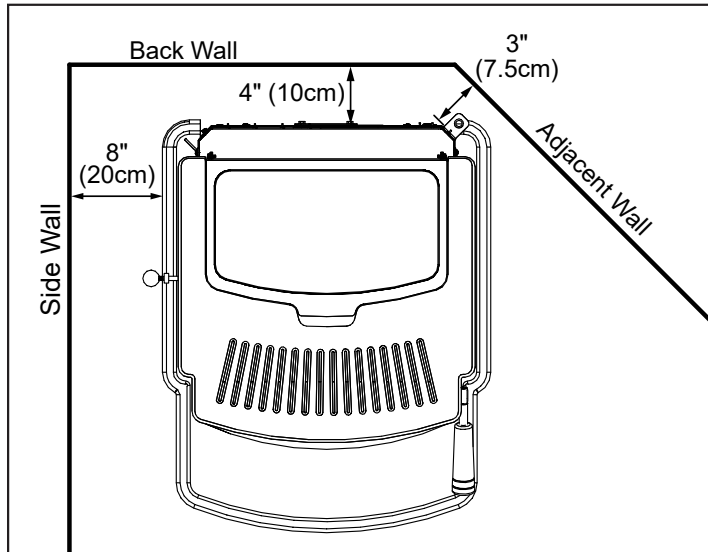


Figure 16: Mini Clearance to Combustibles.

These dimensions are minimum clearances but it is recommended that you ensure sufficient room for servicing, routine cleaning and maintenance.

Side wall to unit	8 inches	(20 cm)
Back wall to unit	4 inches	(10 cm)
Corner to unit	3 inches	(7.5 cm)

ALCOVE CLEARANCES:

This unit may be installed in an alcove. Maintain these clearances to combustibles.

Minimum Alcove width	36 inches	(91.5 cm)
Minimum Alcove height	48 inches	(122 cm)
Maximum Alcove depth	30 inches	(76 cm)

Install vent at clearances specified by the vent manufacturer.

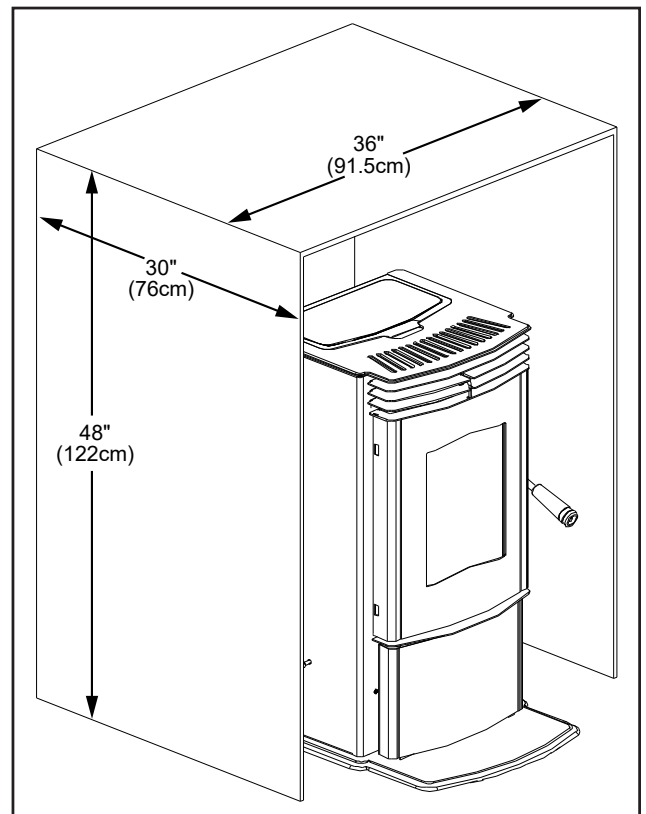


Figure 17: Mini Minimum Alcove Size.

INSTALLATION

VENT TERMINATION REQUIREMENTS:

IT IS RECOMMENDED THAT YOUR PELLET STOVE BE INSTALLED BY AN AUTHORIZED DEALER/INSTALLER.

Table 1: Use in conjunction with Figure 18 for allowable exterior vent termination locations.

Letter	Minimum Clearance	Description
A	24 in (61 cm)	Above grass, top of plants, wood, or any other combustible materials.
B	48 in (122 cm)	Beside/below any door or window that may be opened. (18" (46 cm) if outside fresh air installed.)
C	12 in (30 cm)	Above any door or window that may be opened. (9" (23 cm) if outside fresh air installed.)
D	24 in (61 cm)	To any adjacent building, fences and protruding parts of the structure.
E	24 in (61 cm)	Below any eave or roof overhang
F	12 in (30 cm)	To outside corner.
G	12 in (30 cm)	To inside corner, combustible wall (vertical and horizontal terminations).
H	3 ft (91 cm) within a height of 15 ft (4.5 m) above the meter/regulator assembly	To each side of center line extended above natural gas or propane meter/regulator assembly or mechanical vent.
I	3 ft (91 cm)	From any forced air intake of other appliance
J	12 in (30 cm)	Clearance to non-mechanical air supply inlet to building, or the combustion air inlet to any appliance.
K	24 in (61 cm)	Clearance above roof line for vertical terminations.
L	7 ft (2.13 m)	Clearance above paved sidewalk or paved driveway located on public property.

1. Do not terminate the vent in any enclosed or semi-enclosed areas such as a carport, garage, attic, crawlspace, narrow walkway, closely fenced area, under a sundeck or porch, or any location that can build up a concentration of fumes such as stairwells, covered breezeway, etc.

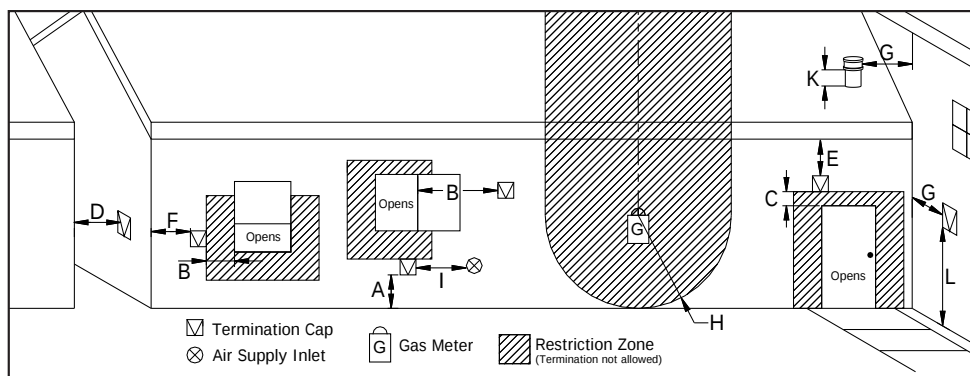


Figure 18: Use in conjunction with Table 1 for allowable exterior vent termination locations.

2. Vent surfaces can become hot enough to cause burns if touched by children. Non-combustible shielding or guards may be required.
3. Termination must exhaust above the inlet elevation. It is recommended that at least five feet of vertical pipe be installed outside when the appliance is vented directly through a wall, to create some natural draft to prevent the possibility of smoke or odor during appliance shut down or power failure. This will keep exhaust from causing a nuisance or hazard from exposing people or shrubs to high temperatures. In any case, the safest and preferred venting method is to extend the vent through the roof vertically.
4. Distance from the bottom of the termination and grade is 12" (30 cm) minimum. This is conditional upon the plants and nature of grade surface. The exhaust gases are hot enough to ignite grass, plants and shrubs located in the vicinity of termination. The grade surface must not be lawn.
5. If the unit is incorrectly vented or the air to fuel mixture is out of balance, a slight discoloration of the exterior of the house might occur. Since these factors are beyond the control of Sherwood Industries Ltd, we grant no guarantee against such incidents.

NOTE: Venting terminals shall not be recessed into walls or siding.

INSTALLATION

OUTSIDE FRESH-AIR CONNECTION:

Outside fresh air is mandatory when installing this unit in airtight homes and mobile homes.

A Fresh-air intake is strongly recommended for all installations. Failure to install intake air may result in improper combustion as well as the unit smoking during power failures.

When connecting to an outside fresh air source, do not use plastic or combustible pipe. A 2" minimum (51 mm) ID (inside diameter) steel, aluminum or copper pipe should be used. It is recommended, when you are installing a fresh air system, to keep the number of bends in the pipe to a minimum.

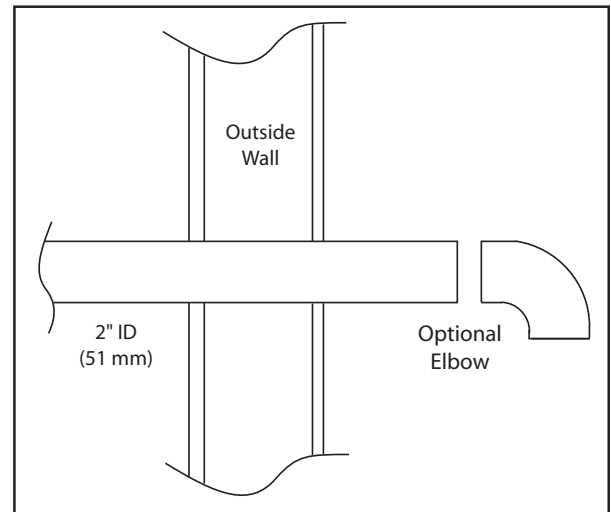


Figure 19: Outside Air Connection.

EXHAUST AND INTAKE LOCATIONS:

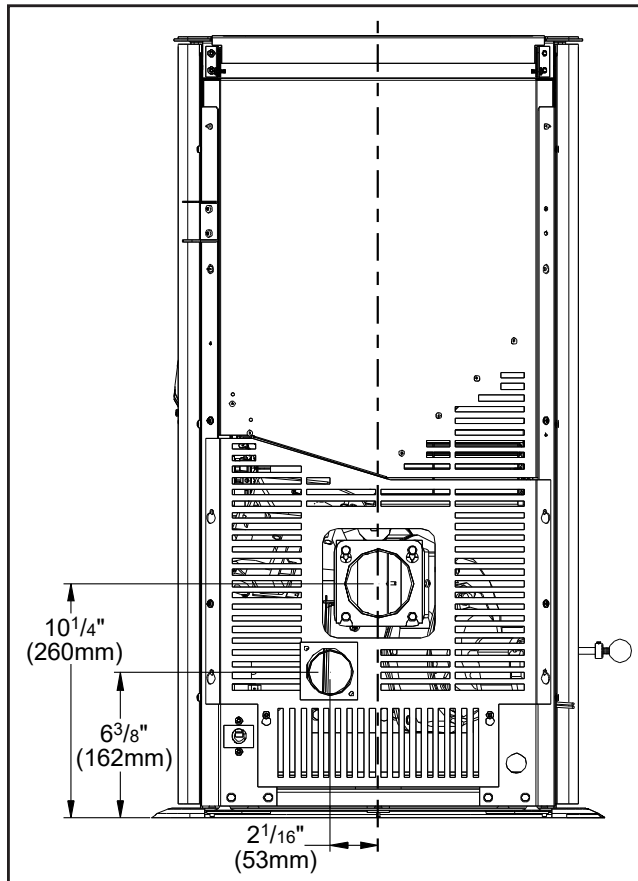


Figure 20: Mini Inlet and Outlet Location.

EXHAUST

Base of unit to center of flue	10 $\frac{1}{4}$ " (255 mm)
Center of unit to center of flue	0" (0 mm) [at center of unit]

FRESH AIR INTAKE.

Base of unit to center of intake	6 $\frac{3}{8}$ " (162 mm)
Center of unit to center of intake	2 $\frac{1}{16}$ " (53 mm)

INSTALLATION

MOBILE HOME INSTALLATION:

- Secure the heater to the floor using the two holes in the pedestal.
- Ensure the unit is electrically grounded to the chassis of your home (permanently).
- Do not install in a room people sleep in.
- Outside fresh air is mandatory. Secure outside air connections directly to fresh air intake pipe and secure with three (3) screws evenly spaced.

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

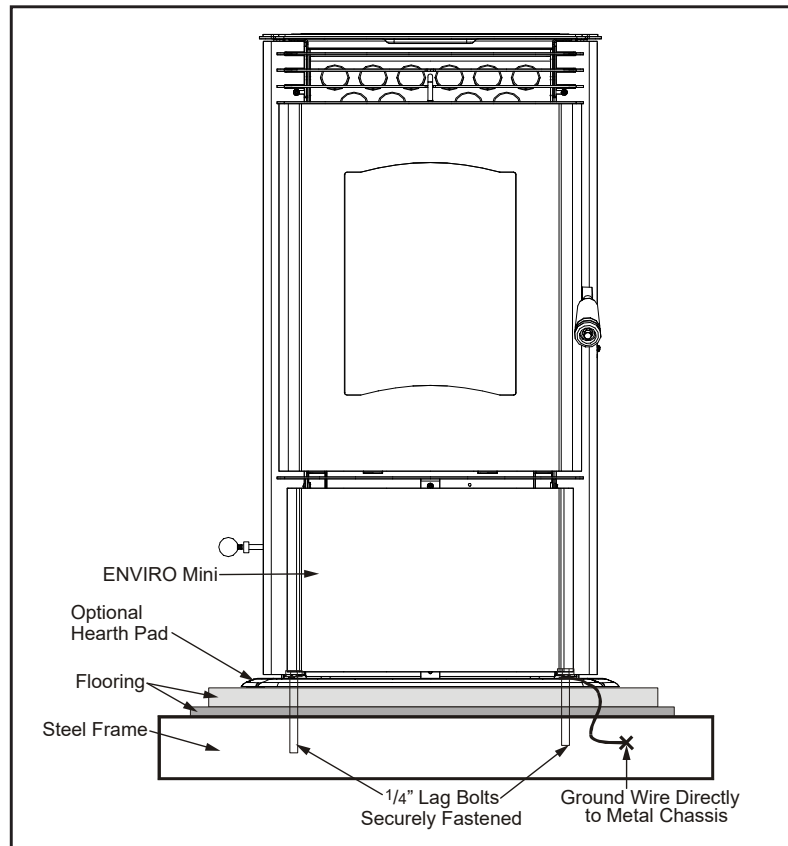


Figure 21: Mobile home installation.

CORNER THROUGH WALL INSTALLATION:

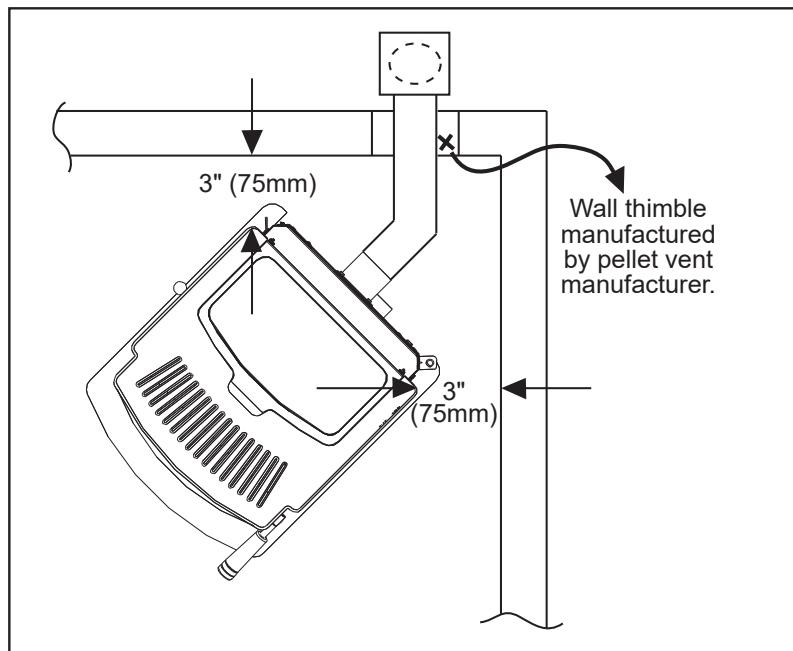


Figure 22: Corner Installation.

INSTALLATION

HORIZONTAL EXHAUST THROUGH WALL INSTALLATION:

Vent installation: install vent at clearances specified by the vent manufacturer.

A chimney connector shall not pass through an attic or roof space, closet or similar concealed spaces, or a floor, or ceiling. Where passage through a wall or partition of combustible construction is desired, the installation shall conform to CAN/CSA-B365 Installation Code for Solid-Fuel-Burning Appliances and Equipment. Only use venting of L or PL type with an inside diameter of 3 or 4 inches (7.6 or 10.1 cm).

1. Choose a location for your stove that meets the requirements stated in this manual and allows installation with the least amount of interference to house framing, plumbing, wiring, etc.
2. Install a non-combustible hearth pad (where necessary).
3. Place the appliance 15" (37.5 cm) away from the wall. If the stove is to be set on a hearth pad, set the unit on it, and adjust the leveling legs.
4. Locate the center of the exhaust pipe on the stove. Extend that line to the wall. Once you have located the center point on the wall, refer to pellet vent manufacturer installation instructions for correct hole size and clearance to combustibles.
5. Install the wall thimble as per the instructions written on the thimble.

Maintain an effective vapour barrier in accordance with local building codes.

6. Install a length of 3" (75 mm) or 4" (100 mm) vent pipe into the wall thimble. The pipe should install easily into the thimble.
7. Connect the exhaust vent pipe to the exhaust pipe on the stove. Seal the connection with high temperature silicone.
8. Push the stove straight back, leaving a minimum of 4" (10 cm) clearance from the back of the stove to the wall. Seal the vent pipe to the thimble with high temperature silicone.

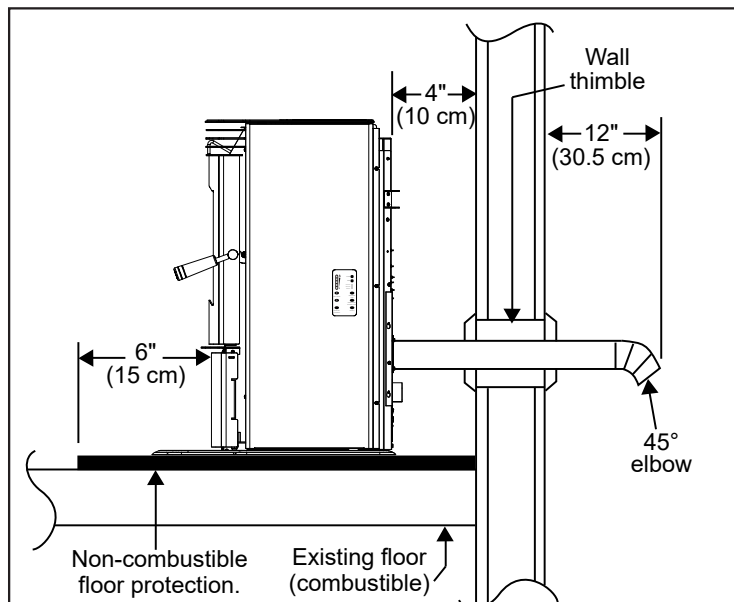


Figure 23: Straight through wall Installation.

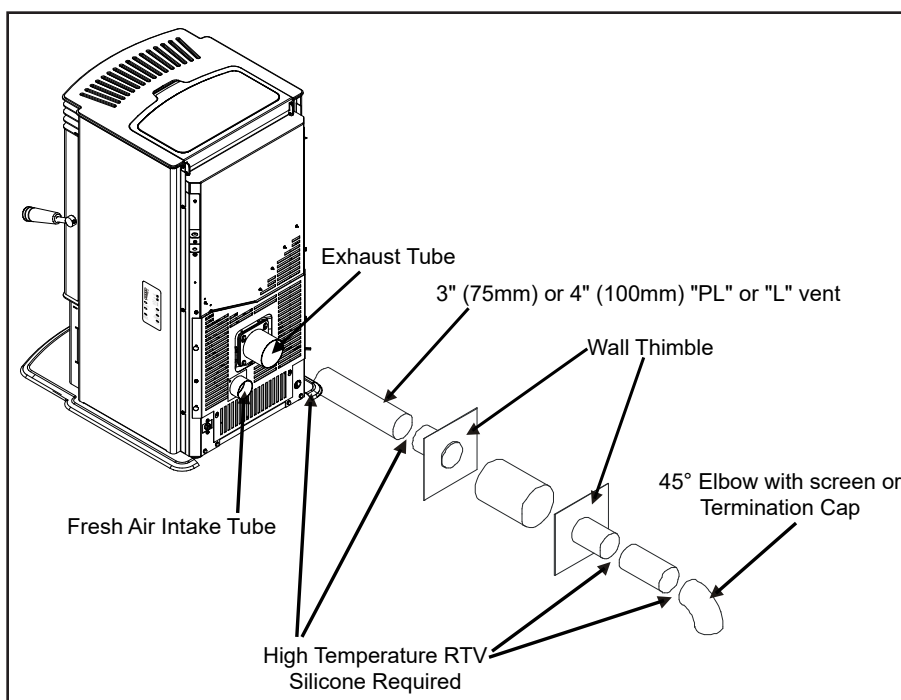


Figure 24: Venting to use with straight through wall Installation.

INSTALLATION

9. The pipe must extend at least 12" (30 cm) away from the building. If necessary, bring another length of pipe (PL type) to the outside of the home to connect to the first section. Do not forget to place high temperature silicone around the pipe that passes through the thimble.
10. Install a vertical pipe, or if all requirements for direct venting are met, install vent termination. The stainless steel cap termination manufactured by the vent manufacturer is recommended. However, when the vent terminates several feet above ground level and there are no trees, plants, etc. within several feet, a 45° elbow can be used as termination. The elbow must be turned down to prevent rain from entering.

NOTE:

- It is recommended that horizontal through wall installations have 3 to 5 feet (91 to 152 cm) of vertical pipe in the system to help naturally draft the unit in the event of extreme weather or a power outage.
- Some horizontal through wall installations may require a "T" and 3 to 5 feet (91 to 152 cm) of vertical pipe outside the building to help draft the unit. This may be required if a proper burn cannot be maintained, after the stove has been tested and the airflow set. This is due to the back pressure in the exhaust caused by airflow around the structure.
- Follow vent manufacturer guidelines for installation of venting. High temp Sealent must be used when connecting vent pipe to the unit's starter pipe. Improper seals at the vent joints may cause combustion by-products to leak into the room where installed - **seal as required**.

THROUGH WALL WITH VERTICAL RISE AND HORIZONTAL TERMINATION INSTALLATION - FREESTANDING:

A 45° elbow may be used in place of the termination cap (or stainless steel termination hood).

Figure 25 is the recommended installation set up.

Figure 26 is the installation to use if there is a concrete or retaining wall in line with exhaust vent on a pellet stove. The termination must be 12" (30 cm) from the outside wall and 12" (30 cm) above the ground.

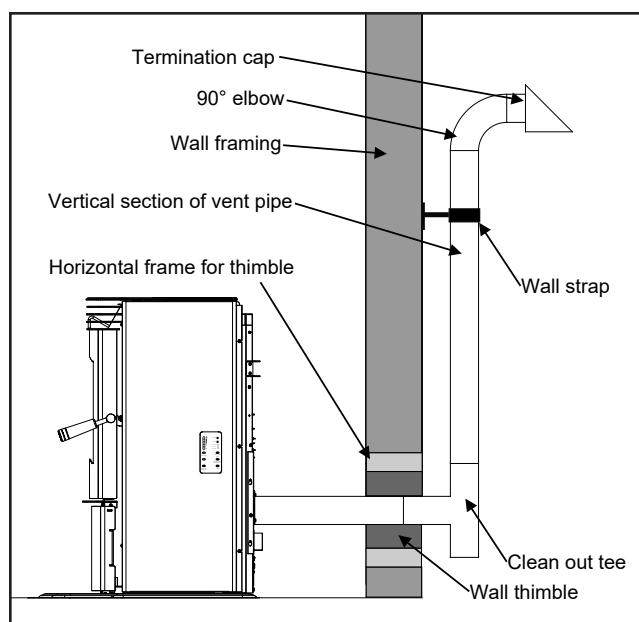


Figure 25: Venting horizontally with rise.

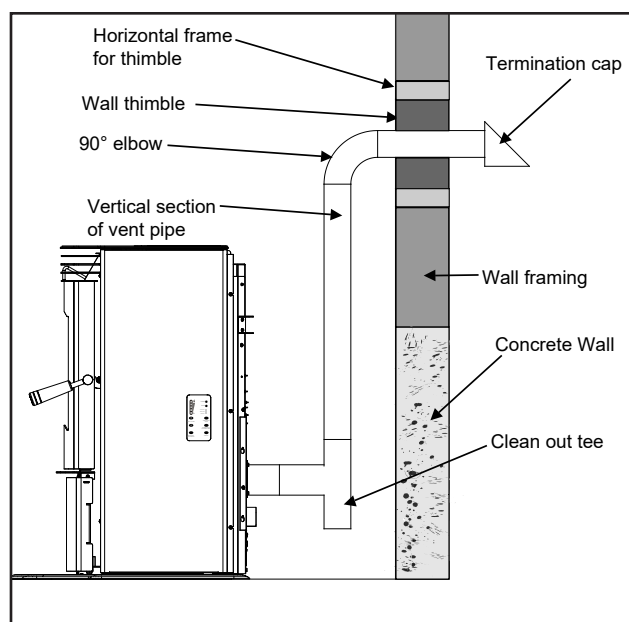


Figure 26: Venting with concrete wall behind unit .

INSTALLATION

INSIDE VERTICAL INSTALLATIONS:

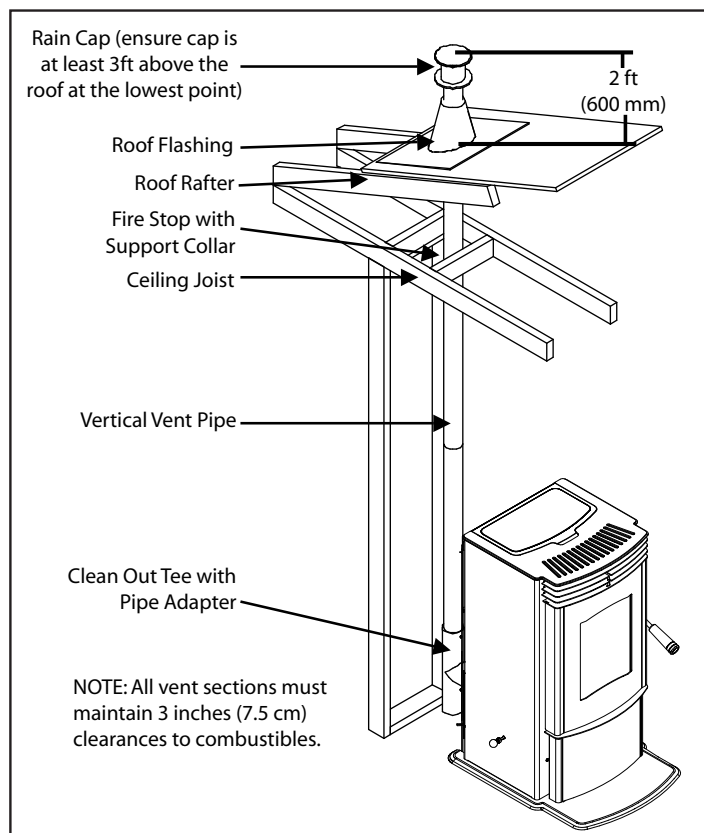


Figure 27: Inside Vertical Installation.

1. Choose a stove location that is ideal. See the section "DECIDING WHERE TO LOCATE YOUR PELLET APPLIANCE."
2. Place a non-combustible hearth pad where necessary.
3. Place the unit on the hearth pad (if installed on a combustible surface) and space the unit in a manner so when the pellet vent is installed vertically, it will be 3" (7.5 cm) away from a combustible wall.
4. Install the tee with clean out.
5. Install the pellet vent upward from there. When you reach the ceiling, make sure that the vent goes through the ceiling fire stop. Maintain a 3" (7.5 cm) distance to combustibles and keep attic insulation away from the vent pipe. Maintain an effective vapor barrier.
6. Finally, extend the pellet vent to go through the roof flashing.
7. Ensure that the rain cap is approximately 24" (600 mm) above the roof.

OUTSIDE VERTICAL INSTALLATIONS:

To accomplish a outside vertical pipe installation, follow steps 1 through 5 in the "INSIDE VERTICAL INSTALLATIONS - FREESTANDING" section and then finish it by performing the following (refer to Figure 16).

1. Install a tee with clean out on the outside of the house.
2. Install PL vent upward from the tee. Make sure that you install support brackets to keep the vent straight and secure.
3. Install ceiling thimble and secure the flashing as you go through the roof.
4. Ensure that the rain cap is approximately 24" (600 mm) above the roof.

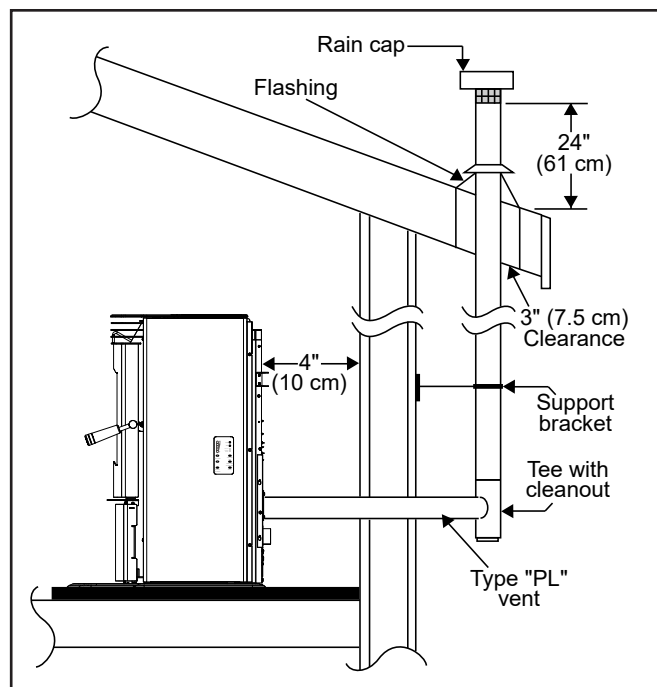


Figure 28: Outside Vertical Installation.

INSTALLATION

HEARTH MOUNT INSTALLATION:

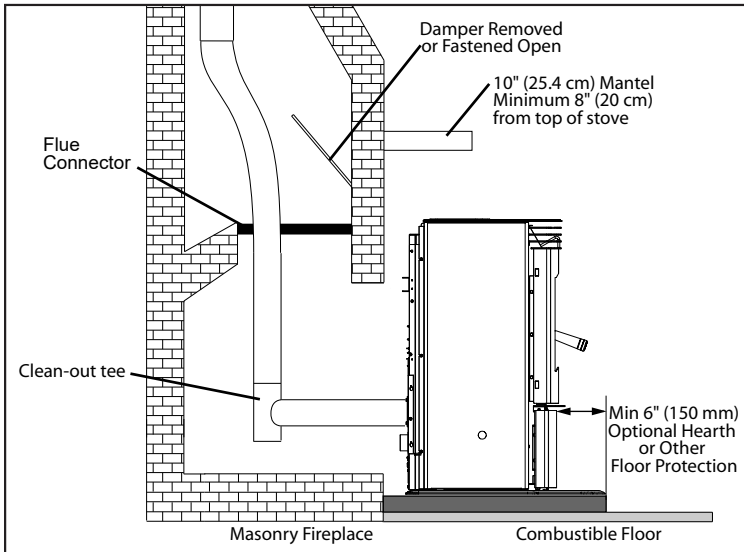


Figure 29: Freestanding hearth mount installation.

Refer to Figures 29 and 30.

1. Install the hearth pad.
2. Lock the fireplace damper in the open position.
3. Install a positive flue connector at the fireplace dampers or seal the chimney at the top.
4. Connect a tee to the exhaust pipe.
5. Install flexible stainless steel liner or listed pellet vent to the top of the chimney.

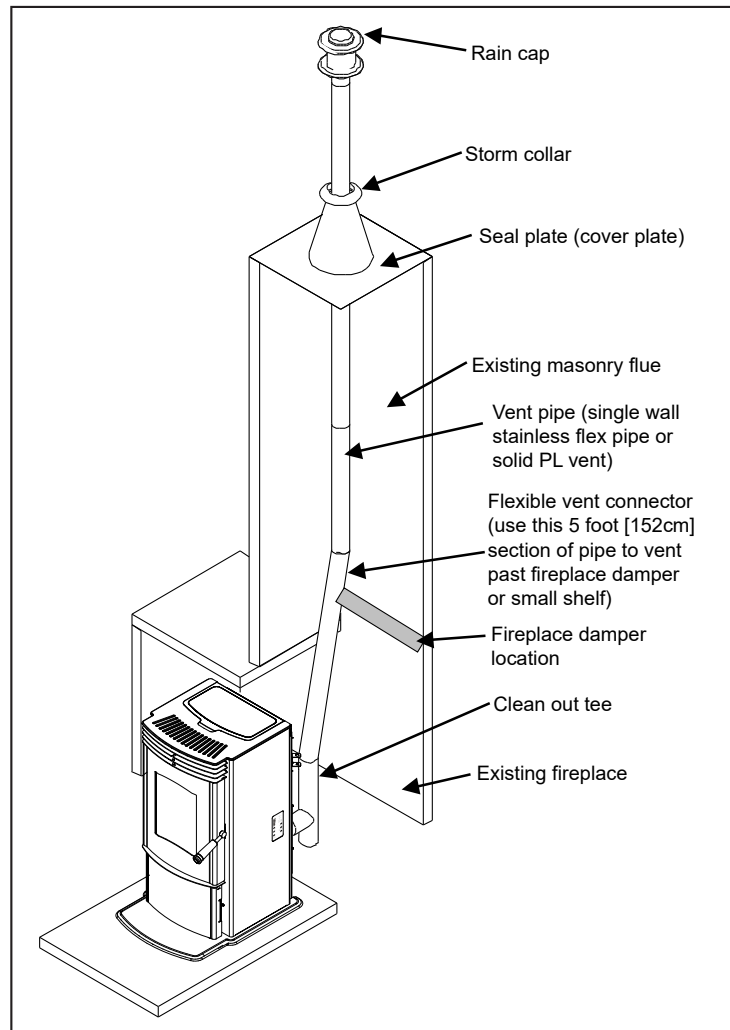
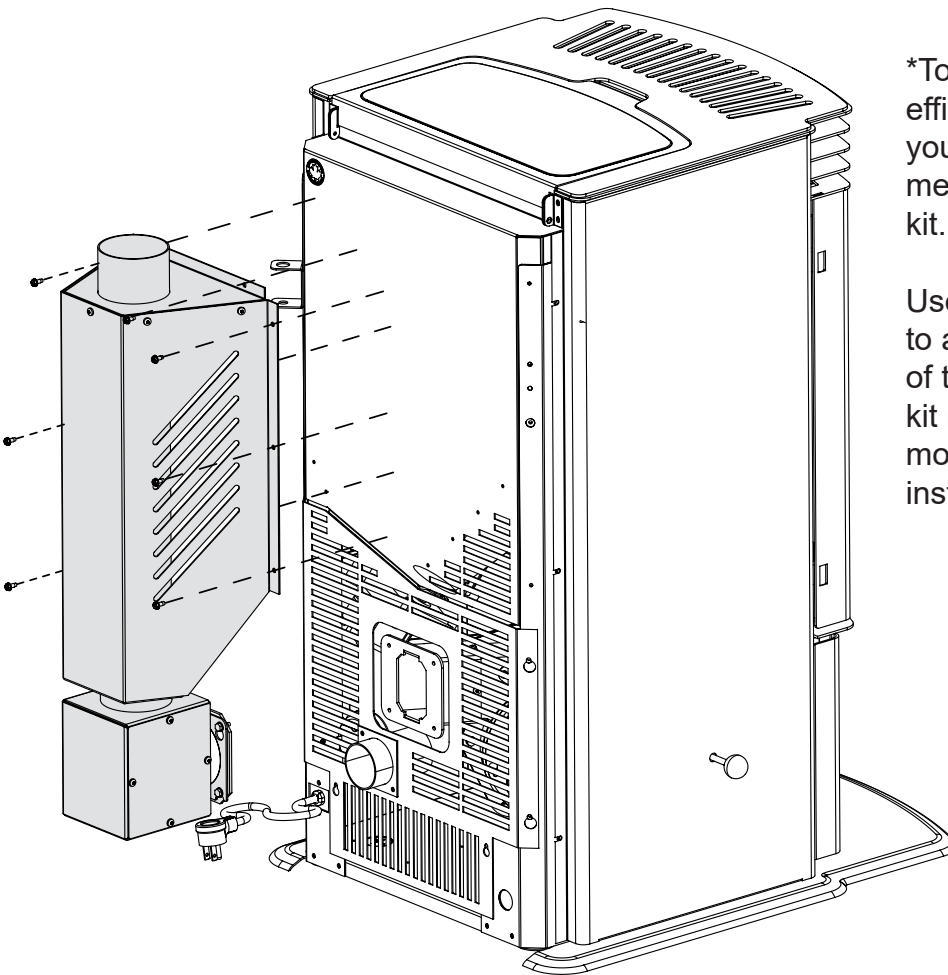


Figure 30: Freestanding hearth mount installation overview.

INSTALLATION

TOP VENT ADAPTER KIT



*To achieve Maximum efficiency of 80.2% HHV you will need to purchase meridian top vent adapter kit. (50-4116)

Use the sheet metal screws to attach the kit to the rear of the unit. Please see kit instruction manual for more detailed installation instructions.

THERMOSTAT INSTALLATION:

1. Install the wall thermostat in a location that is not too close to the unit but will effectively heat the desired area.
2. Install a 12 or 24 Volt Thermostat using an 18 x 2 gauge wire from the unit to the thermostat.

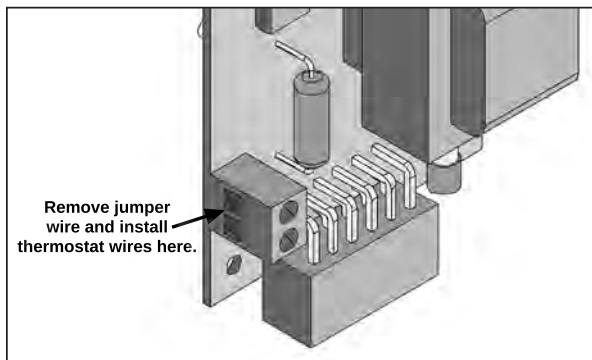


Figure 37: Thermostat wire placement.

If the unit has been placed in the HI / LOW mode, the unit will be taken to a low or idle setting when the thermostat is not calling for heat. When the thermostat calls for heat, the unit will go to the setting that is displayed on the control board Heat Indicator.

TROUBLESHOOTING

DO NOT:

- Service the stove with wet hands. The stove is an electrical appliance, which may pose a shock hazard if handled improperly. Only qualified technicians should deal with possible internal electrical failures.
- Do not remove from the firebox any screws without penetrating oil lubrication.

WHAT TO DO IF:

1. The stove will not start.
2. The stove will not operate when hot.
3. The exhaust blower will not function normally.
4. Light # 2 on Heat output bar flashing.
5. Auger light flashes but auger motor does not turn at all
6. Light # 4 on Heat output bar flashing.
7. The convection blower will not function normally.
8. Igniter- the pellets will not light.
9. Control settings (Heat Level) has no effect on the fire.
10. The stove keeps going out.

***NOTE: All troubleshooting procedures should be carried out by qualified technicians or installers.**

1. The stove will not start.

- ✓Make sure the stove is plugged in and the wall outlet is supplying power..
- ✓If the Control Board has been placed in the ON /OFF thermostat mode, then turn the thermostat up to call for heat.
- ✓Check the Heat Level Indicator. - If the # 2 light is flashing (see the # 2 light is flashing)
- ✓Check the fuse on the circuit board.
- ✓If the unit still does not start, contact your local service dealer for service.

2. The stove will not operate when hot.

- ✓Check the Heat Level Indicator if a fire is not detected, or if the fire has gone out **the #3 light will flash** because the Exhaust Temperature Sensor's contacts have opened.
- ✓Check the hopper for fuel.
- ✓Incorrect air damper setting. - Excessive air may consume the fire too quickly before the next drop of fuel, leaving completely unburned fuel in the burn pot liner. - Insufficient air will cause build up, further restricting the air flow through the Burn Pot Liner. This in turn will cause the fuel to burn cold and very slowly. Fuel may build up and smother the fire. In this case clean the burn pot. **(NOTE: unit may require a change to the vent system or installation of fresh air to correct Air to Fuel ratio problems).**
- ✓Combustion Blower failure. - The Combustion Blower is not turning fast enough to generate the proper vacuum in the fire box. Visual Check – is the blower motor turning.
- ✓Check the Exhaust Blower voltage across the blower wires ($\geq 114V$ on #5 setting and $\geq 82V$ on #1 setting). – Replace the Circuit Board if the Voltage reading is less than 82 V. with a line voltage >114 V AC.
- ✓Check Vacuum levels in the exhaust channel by bypassing the Vacuum Switch, then remove the Vacuum hose from Vacuum Switch. Check exhaust vacuum readings by placing the open end of the Vacuum Hose on a Magnahelic Gauge (readings must be above .10" W.C. on low fire).

If the motor fails to reach a 0.10" W.C. readings, then replace the Combustion Blower.

TROUBLESHOOTING

- ✓Poor Quality Fuel – Insufficient energy in the fuel to produce enough heat to keep the stove burning or operational.
- ✓Exhaust Temperature Sensor failure. – Bypass sensor located on Exhaust Blower if stove now operates properly, the unit may require cleaning or a new sensor. Contact your local dealer for service.
- ✓Check the fuse on the circuit board.

3. The exhaust motor will not function normally.

- ✓Open the left side access panel; check all connections against the wiring diagram.
- ✓See “2. The stove will not operate when hot.” section.

4. Light # 2 on Heat output bar flashing.

(The Vacuum Switch contacts have opened for more than 15 sec.)

- ✓Pinch, break or blockage in Vacuum Hose - Check hose for pinch points or damage, replace or re-route as required. Blow out Vacuum Hose
- ✓Blocked Hose Barb on Exhaust Channel - Use a paper clip to clean out Hose Barb or remove the Vacuum Hose from the Vacuum Switch and blow into the hose to remove blockage.
- ✓Blocked exhaust / venting system - Have stove and venting cleaned and inspected.
- ✓Severe negative pressure in area where unit is installed - Check the operation by opening a window, does this solve the problem? If it does, install fresh air intake to unit or room. Venting system may require vertical section to move termination into a low pressure zone.
- ✓Vacuum Switch failure - Bypass the vacuum switch, if this corrects the problem check for above problems before replacing the Vacuum Switch.
- ✓Damage to gray wires between Circuit Board and Vacuum Switch - Inspect wires and connectors
- ✓Combustion Blower failure - The Combustion Blower is not turning fast enough to generate the proper vacuum in the Exhaust Channel. Visual Check; is the blower motor turning? Check the Exhaust Blower voltage across the blower wires ($\geq 114V$ on #5 setting and $\geq 82V$ on #1 setting). – Replace the Circuit Board if the Voltage reading is less than 82 V. with a line voltage $>114 V AC$.
- ✓Check Vacuum levels in the exhaust channel by bypassing the vacuum switch, then remove the Vacuum hose from Vacuum Switch. Check exhaust vacuum readings by placing the open end of the Vacuum Hose on a Magnahelic Gauge. (readings must be above .10” W.C. on low fire).

If the motor fails to reach a 0.10” W.C. readings, then replace the Combustion Blower

To reset Circuit Board after a trouble code - push the ON/OFF button

5. Auger light flashes but auger motor does not turn at all.

- ✓If the Auger gear box does not turn but the motor's armature does try to spin then the auger is jammed. – Try to break apart jam by poking at the jam through the drop tube. If this fails then empty the hopper and remove the Auger Cover **Remember to re-seal the cover after installation**
- ✓Check the fuse on the circuit board.

6. Light # 4 on Heat output bar flashing.

- ✓Reset high limit sensor and determine cause – was it Convection Blower failure?

TROUBLESHOOTING

7. The convection blower will not function normally.

- ✓Clean all grill openings at the back and below unit .
- ✓Press the fan button; does the fan come on? Press again to verify that the blower turns on; if, not contact your local dealer for service.

8. Ignitor- the pellets will not light.

- ✓Everything else in the stove operates but the ignitor will not light the pellets.
- ✓Make sure the burn pot liner is up tight and square to the ignitor tube by pushing the burn pot back against the ignitor tube.
- ✓Check to see if the exhaust blower is operating. If not, contact your local dealer for service.
- ✓Check the fuse on the circuit board.

NOTE: The ignitor should be bright orange in color. If not replace the ignitor.

9. Control settings (Heat Level) has no effect on the fire.

- ✓NOTE: If the system light is flashing the Control Board has complete control of the unit. When the units system light becomes solid then control of the unit is given back to the operator.
- ✓If there is no control of the Heat Level button make sure the thermostat is calling for heat.
- ✓Call your local dealer for service.

10. The stove keeps going out.

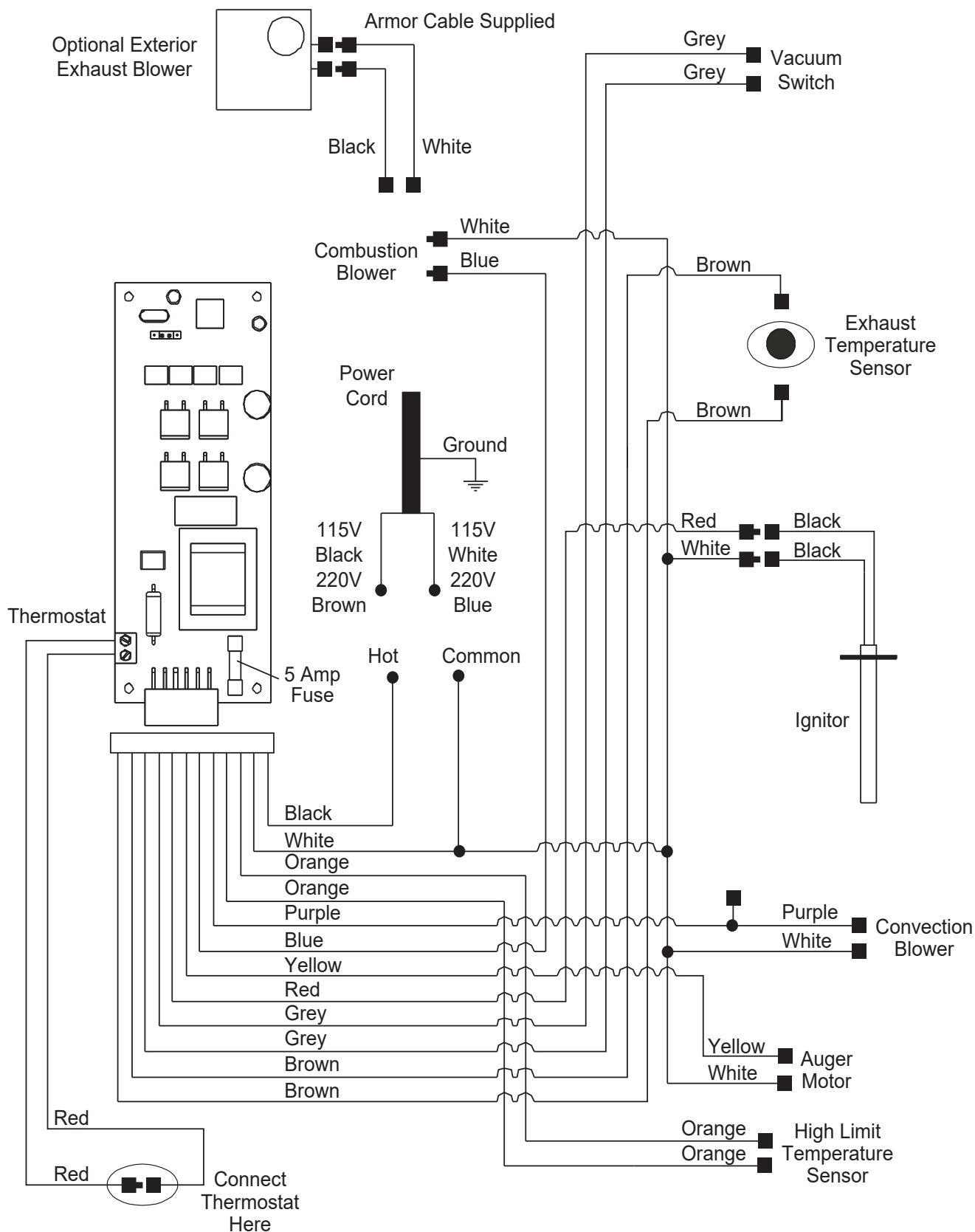
If the stove goes out and leaves fresh unburned pellets or cigarette-like ashes in the burn pot liner, the fire is going out before the stove shuts off.

- ✓Check to see that the Slider / Damper is in the correct position (set with a magnehelic gauge).
- ✓Turn the Heat Level up slightly (poor quality pellets will require slightly higher settings).

If the stove goes out and there are partially burned pellets left in the burn pot liner, the stove has shut down due to a lack of air, exhaust temperature, or power failure.

- ✓Adjust the Slider / Damper.
- ✓Adjust the trim settings
- ✓Check to see if the stove needs a more complete cleaning.
- ✓Turn the Heat Level up slightly (poor quality pellets will require slightly higher settings).
- ✓Did the power go out?
- ✓Contact your local Dealer for service.

WIRING DIAGRAM



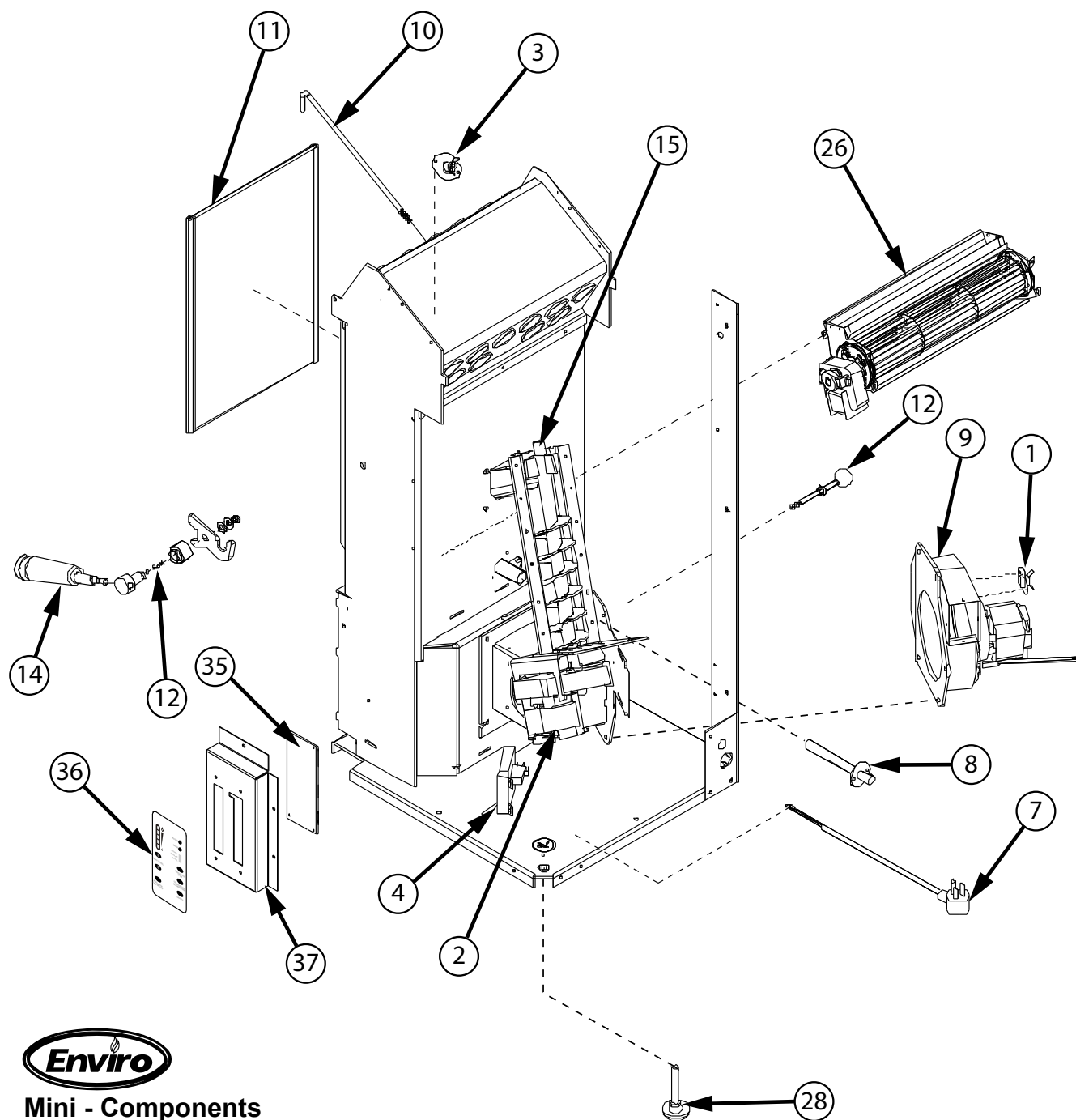
PARTS LIST

Reference Number	Description	Part Number
1	120°F (49°C) Ceramic Fan Temperature Sensor	EC-001
2	Auger Motor - 115V	EF-001
3	High Limit Temp Sensor 200°F (93°C) Manual Reset	EF-016
4	Vacuum Switch - 115V	EF-017
	Silicone Hose	EF-018
	Aluminum Hose Barb	EF-019
	Shoulder Bolt, Hardened Bushing & Nut (Set of 2)	EF-124
	Combustion Blower motor with mount	EF-161
5	Ash Pan Latch	50-2588
	Auger Brass Bushings (Set of 2)	50-1806
6	Door Hinge Bracket	EF5-135
	External Exhaust Back (For Optional Kit)	EF5-143
	External Exhaust Box (For Optional Kit)	EF5-144
	External Exhaust Bottom (For Optional Kit)	EF5-145
7	Domestic Power Cord - 115V	EC-042
	Hardened Bushing	20-020
	External Exhaust Kit (3")	20-070
8	400 Watt Ignitor - 115V	50-619
	Circuit Board 5 Amp Fuse - 115V (Pair)	50-833
9	Exhaust Blower Assembly - 115V	50-901
	5/8" ID Auger Collar with Screw	50-968
10	Heat Exchanger Rod	50-1154
11	Glass with Gasket (356mm x 244mm)	50-1155
12	Slider Damper Rod & Knob	50-1156
	Wire Harness	50-1157
13	Latch Assembly	50-1158
14	Door Handle	50-1159

PARTS LIST

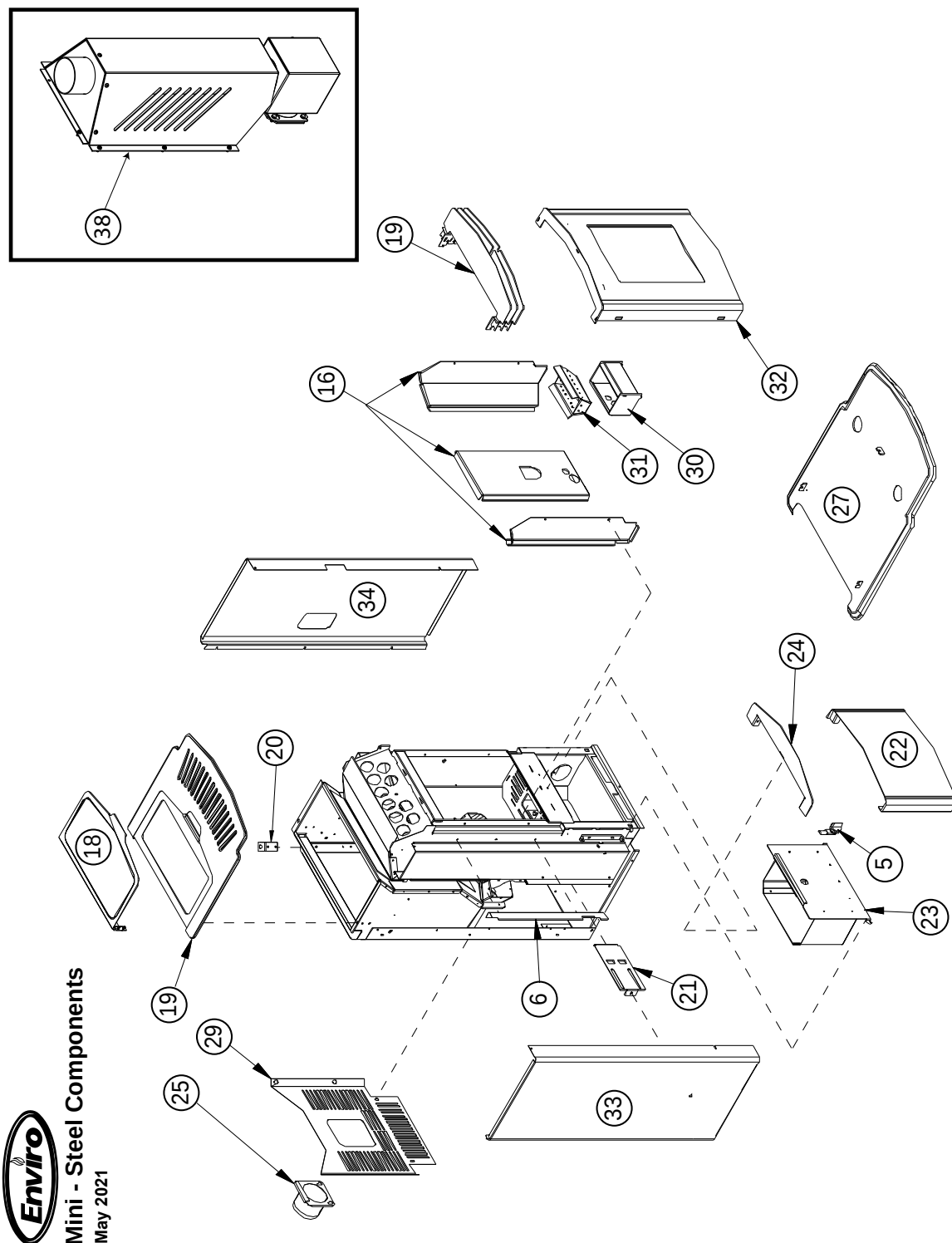
Reference Number	Description	Part Number
15	Auger	50-1161
16	Firebox Panel Set with Insulation	50-1162
17	Front Louvers	50-1169
18	Lid Set	50-1171
19	Stove Top Assembly	50-1172
	Hopper Guard	50-1174
20	Handle Bracket	50-1177
21	Draft Slider	50-1178
22	Ash Pan Cover	50-1180
23	Ash Pan	50-1969
24	Ash Shelf Louver	50-1182
25	Starter Pipe 3"	50-1185
26	60mm Tangential Blower Mini - 115V	50-1217
27	Mini Hearth Pad	50-1219
	Burner Scraper Tool	50-1254
28	Leveling Legs (Set of 4)	50-1342
29	Back Grill	50-1297
30	Burn Pot	50-1922
31	Burn Pot Liner	50-1923
32	Door Assembly Complete	50-1924
33	Cabinet Side Left	50-1925
34	Cabinet Side Right	50-1926
	Mini Owners Manual	50-1927
35	Circuit Board DHC 4100 - 115V	50-1929
36	Control Panel Decal	50-1930
37	Control Panel and Decal	50-1931
38	Top Vent adapter kit	50-4116

PARTS DIAGRAM - COMPONENTS



Mini - Components
September 2008

PARTS DIAGRAM - STEEL





Warranty for Enviro Pellet 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.
- This 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.
- The 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.
- This warranty is void if the unit is used to burn materials for which the unit is not certified by the EPA and void if not operated according to the Owner's Manual.

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/

Category	One Year	Two Year	Limited Lifetime (7yr)
Parts ¹ (unit serial number required)		✓	
Firebox Brick Panels (Cast)		✓	
Firebox			✓
Heat Exchanger			✓
Burn Pot			✓
Burn Pot Liner		✓	
Firebox Liner Panels w/Insulation			✓
Ceramic Glass ²	✓		
Pedestal / Legs (excluding finish)			✓
Surround Panels (excluding finish)			✓
Exterior Panels (excluding finish)			Up to 5 years
Electrical Components		✓	
Steel Brick Liner (Metal)	✓		
Exterior Surface Finishing ³	✓		
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 Glass is covered for thermal breakage. Photos of box, inside of door, and unit serial # must be supplied for breakage due to shipping.

³ Exterior Surface finishing covers Plating, Enamel or Paint and excludes colour changes, chipping, and fingerprints.

Gaskets not covered by Warranty.

Travel costs not included.

Cast Agitator: 1 year for pellet. Not covered when burning alternative fuels. (Cast agitators are a consumable item)

NOTES

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)
MAGNEHELIC AT INSTALL: _____
INSTALLER'S SIGNATURE:

NAME OF INSTALLER:

ADDRESS:

PHONE: _____

MANUFACTURED BY:
SHERWOOD INDUSTRIES LTD.
6782 OLDFIELD RD. SAANICHTON, BC, CANADA V8M 2A3
www.enviro.com
August 28, 2018
C-15267

Certificate of Calibration

Certificate Number: **743897**



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

PO: **1033**

Order Date: **03/08/2021**

Authorized By: **N/A**

Calibrated on: **03/18/2021**

*Recommended Due: **03/18/2022**

Environment: **22 °C 37 % RH**

* As Received: **Within Tolerance**

* As Returned: **Within Tolerance**

Action Taken: **Calibrated w/Parts**

Technician: **146**



0723.01

Calibration

Property #: **064**

User: **N/A**

Department: **N/A**

Make: **Control Company**

Model: **4198**

Serial #: **80531676**

Description: **Digital Temp. / Barometer**

Procedure: **404323**

Accuracy: **$\pm 1^{\circ}\text{C} \pm 0.2362\text{Hg}(\pm 8\text{mb})$**

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.

Replaced batteries.

Standards Used

Std ID	Manufacturer	Model	Nomenclature	Due Date	Trace ID
644A	Thunder Scientific	1200	Two Pressure Humidity Generator	11/17/2021	734190
847A	Fluke	RPM4	Reference Pressure Monitor	12/30/2021	738139

Parameter

Measurement Data

Measurement Description	Range Unit	Reference	Min	Max	*Error	UUT	Uncertainty
Before/After Temperature							Accredited = Ü
	°C	20.00	19.0	21.0	0.1	20.1 °C	8.1E-02 Ü
	°C	30.00	29.0	31.0	0.2	30.2 °C	8.1E-02 Ü
	°C	40.00	39.0	41.0	0.7	39.3 °C	8.1E-02 Ü
Barometer							
	mbar	1013.0	1005	1021	8	1005 mbar	6.2E-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/NCCL Z540-1-1994, ISO/IEC 17025-2017, ISO 10012-1, the ISO 9000 family and QS 9000. The expanded uncertainties of measurements for this calibration are based upon 95% (2 sigma) confidence limits. Unless stated in the comments, certificates reflect the "Simple Acceptance Rule" as specified by JCGM 106:2012. Unless otherwise stated, a test accuracy ratio (TAR) of 4:1, if achievable, is maintained. The results reported herein apply only to the calibration of the item described above. This report may not be reproduced, except in full, without written approval of JJ Calibrations.

Reviewer

3 Issued 03/25/2021

Rev # 15

Inspector



CERTIFICATE OF CALIBRATION

CUSTOMER: PFS-TECO : CLACKAMAS, OR
PO NUMBER: 1016
INST. MANUFACTURER: DWYER
INST. DESCRIPTION: VELOMETER
MODEL NUMBER: 471
SERIAL NUMBER: CP288559 (ID# 095)
RATED UNCERTAINTY: SEE NOTES BELOW.
UNCERTAINTY GIVEN: $\pm 0.43\%$ RD ; k=2
NOTES: $\pm 3\%$ FS (0-500 / 0-1500) *** $\pm 4\%$ F.S. (0-5000) *** $\pm 5\%$ F.S. (0-15000) *** $\pm 2^\circ\text{F}$
NOTES CONT. : Q.MANUAL IM 1.5 REV 2017.1 DATED 7-18-2017

CALIBRATION DATE: 04/30/2020
CALIBRATION DUE: 04/30/2021
PROCEDURE: T.O.33K6-4-1769-1
CALIBRATION FLUID: AIR @ 14.7 PSIA 70°F
RECEIVED CONDITION: WITHIN MFG. SPECS.
LEFT CONDITION: WITHIN MFG. SPECS.
AMBIENT CONDITIONS: 763mm HGA 46% RH 69°F
CERTIFICATE FILE #: 490265.2020

UUT INDICATED FT/MIN	DM.STD. ACTUAL FT/MIN	UUT INDICATED DEG. F	DM.STD. ACTUAL DEG. F
55	56	0 TO 200°F	0 TO 200°F
128	130	43.9	43.2
219	223	71.4	70.7
499	509	99.0	98.4
542	546		
1019	1029		
1490	1510		
511	516		
3268	3308		
4995	5077		
6028	6137		
14519	14815		

STANDARDS USED:

A263A: KURZ / DMC WIND TUNNEL LFE 0 - 14000 FPM $\pm .122\%$ RD. TRACE# 1453296155,1329407628	DUE	06/08/2020
A24: HART SCIENTIFIC TEMP. STANDARD $\pm .024^\circ\text{F}$ TRACE# 1520423238	DUE	03/04/2021

All instruments used in the performance of the shown calibration have traceability to the National Institute of Standards and Technology (NIST). The uncertainty ratio between the calibration standards (DM.STD.) used and the unit under test (UUT) is a minimum of 4:1, unless otherwise noted. Calibration has been performed per the shown procedure number, in accordance with ISO 10012:2003, ISO 17025:2005, ANSI/NCSL-Z-540.3, and/or MIL-STD-45662A. Test methods: API2530-92 & ASME MFC-3M-1989.

Dick Munns Company • 11133 Winners Circle • Los Alamitos, CA 90720
Phone (714) 827-1215 • Fax (714) 827-0823

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.

Date:

Approved By:

Calibration Technician:

04/30/2020

[Signature]

[Signature]

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

PO: 1033

Order Date: 03/08/2021

Authorized By: N/A

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



0723.01

Calibration

Property #: 097

User: N/A

Department: N/A

Make: Unknown

Model: 10 Lbs.

Serial #: 097

Description: Mass

Procedure: DCN 500901

Accuracy: Raw Data

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

Parameter

Measurement Data

Measurement Description	Range Unit	Reference	Min	Max	*Error	UUT	Uncertainty
Before/After							Accredited = $\bar{U}$
Mass							
Raw Data	g	4535.92370000	0.0000000	0.0000000	0.1785299	4536.1022299 g	3.5E-01 $\bar{U}$

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/NCCL Z540-1-1994, ISO/IEC 17025-2017, ISO 10012-1, the ISO 9000 family and QS 9000. The expanded uncertainties of measurements for this calibration are based upon 95% (2 sigma) confidence limits. Unless stated in the comments, certificates reflect the "Simple Acceptance Rule" as specified by JCGM 106:2012. Unless otherwise stated, a test accuracy ratio (TAR) of 4:1, if achievable, is maintained. The results reported herein apply only to the calibration of the item described above. This report may not be reproduced, except in full, without written approval of JJ Calibrations.

Reviewer

3 Issued 03/25/2021

Rev # 15

Inspector



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



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

Report Number: DIRI0134307497200624

A2LA ACCREDITED **CERTIFICATE OF CALIBRATION WITH DATA**

INSTRUMENT INFORMATION

Item	Make	Model	Serial Number	Customer ID	Location
Balance	Sartorius	ENTRIS224-1S	34307497	#107	Lab
Units	Readability	SOP	Cal Date	Last Cal Date	Cal Due Date
g	0.0001	QC012	6/24/20	1/10/20	12/2020

FUNCTIONAL CHECKS

ECCENTRICITY		LINEARITY		STANDARD DEVIATION			ENVIRONMENTAL CONDITIONS
Test Wt:	Tol:	Test Wt:	Tol:	Test Wt:	Tol:		
100	0.0003	50 x 4	0.0002	100	0.0001		☐ ☒ ☐
As-Found:		As-Found:		1. 100.0001	5. 100.0001	9. 100.0000	Good Fair Poor
Pass: ☒	Fail: ☐	Pass: ☒	Fail: ☐	2. 100.0001	6. 100.0001	10. 100.0001	
As-Left:		As-Left:		3. 100.0001	7. 100.0001	Result	Temperature: 21.3°C
Pass: ☒	Fail: ☐	Pass: ☒	Fail: ☐	4. 100.0001	8. 100.0001	0.00003	

A2LA ACCREDITED SECTION OF REPORT

Standard	As-Found	As-Left	Expanded Uncertainty
200	199.9982	200.0000	0.00014
100	99.9992	100.0001	0.00014
50	49.9996	50.0001	0.00013
20	19.9998	20.0000	0.00013
1	1.0000	1.0000	0.00013
0.1	0.1000	0.1000	0.00013

CALIBRATION STANDARDS

Item	Make	Model	Serial Number	Cal Date	Cal Due Date	NIST ID
Weight Set	Rice Lake	20 kg to 1mg	2831W	2/5/20	2/2021	20190236

Permanent Information Concerning this Equipment:

6 month calibration cycle
6/20 Extra checkpoint to encapsulate user range 0.05g.
AF/AL= 0.0500g

Comments/Info Concerning this Calibration:

6/20 RH= 42%. Leveled unit & adjusted span.

Report prepared/reviewed by: XC

Date: 6/24/20

Technician: J. Colacchio

Signature: [Signature]

THIS CERTIFICATE SHALL NOT BE REPRODUCED WITHOUT THE APPROVAL OF QUALITY CONTROL SERVICES, INC.

The uncertainty is calculated according to the ISO Guide to the Expression of Uncertainty in Measurement and includes the uncertainty of standards used combined with the observed standard deviation and readability of the unit under test. The uncertainty is expanded with a k factor of 2 for an approximate 95% level of confidence. Instruments listed above were calibrated using standards traceable to the National Institute of Standards and Technology (NIST). Calibration data reflect results at the time and location of calibration. Calibration data should be reviewed to insure that the instrument is performing to its required accuracy. Calibrations comply with ISO/IEC 17025 and ANSI/Z540-1-1994 quality standards.



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

Report Number: DIRI0134307497201208

A2LA ACCREDITED **CERTIFICATE OF CALIBRATION WITH DATA**

INSTRUMENT INFORMATION

Item	Make	Model	Serial Number	Customer ID	Location
Balance	Sartorius	ENTRIS224-1S	34307497	#107	Lab
Units	Readability	SOP	Cal Date	Last Cal Date	Cal Due Date
g	0.0001	QC012	12/8/20	6/24/20	6/2021

FUNCTIONAL CHECKS

ECCENTRICITY		LINEARITY		STANDARD DEVIATION			ENVIRONMENTAL CONDITIONS		
Test Wt:	Tol:	Test Wt:	Tol:	Test Wt:	Tol:		☐	☒	☐
100	0.0003	50 x 4	0.0002	100	0.0001		☐	☒	☐
As-Found:		As-Found:		1.99.9999	5.99.9999	9.99.9999	Good	Fair	Poor
Pass: ☒	Fail: ☐	Pass: ☒	Fail: ☐	2.100.0000	6.99.9999	10.100.0000	Temperature: 20.6°C		
As-Left:		As-Left:		3.100.0000	7.100.0000	<u>Result</u>			
Pass: ☒	Fail: ☐	Pass: ☒	Fail: ☐	4.99.9999	8.99.9999	0.00005			

A2LA ACCREDITED SECTION OF REPORT

Standard	As-Found	As-Left	Expanded Uncertainty
200	200.0005	199.9999	0.00017
100	100.0003	99.9999	0.00016
50	50.0003	50.0000	0.00015
20	20.0001	20.0000	0.00015
1	1.0001	1.0000	0.00015
0.1	0.0999	0.1000	0.00015

CALIBRATION STANDARDS

Item	Make	Model	Serial Number	Cal Date	Cal Due Date	NIST ID
Weight Set	Rice Lake	10 kg to 1 mg	10565	6/26/20	6/2021	20191192

Permanent Information Concerning this Equipment:

6 month calibration cycle
 12/20 Extra checkpoint to encapsulate user range 0.05g.
 AF= 0.0499g A/L= 0.0500

Comments/Info Concerning this Calibration:

12/20 - Cleaned, leveled, & adjusted span. RH = 42%

Report prepared/reviewed by: 

Date: 12/20

Technician: D.Oudeans

Signature: 

THIS CERTIFICATE SHALL NOT BE REPRODUCED WITHOUT THE APPROVAL OF QUALITY CONTROL SERVICES, INC.

The uncertainty is calculated according to the ISO Guide to the Expression of Uncertainty in Measurement and includes the uncertainty of standards used combined with the observed standard deviation and readability of the unit under test. The uncertainty is expanded with a k factor of 2 for an approximate 95% level of confidence. Instruments listed above were calibrated using standards traceable to the National Institute of Standards and Technology (NIST). Calibration data reflect results at the time and location of calibration. Calibration data should be reviewed to insure that the instrument is performing to its required accuracy. Calibrations comply with ISO/IEC 17025 and ANSI/Z540-1-1994 quality standards.

Dry Gas Meter Calibration

Meter Manufacturer: Apex
 Model: XC-60
 Lab ID #: 53
 Serial #: 1902130
 Calibration Date: 3/10/2021
 Calibration Expiration: 9/10/2021
 Barometric Pressure: 30.10 in. Hg



Reference Standard DGM	
Manufacturer:	Apex
Model:	SK25DA
Lab ID#:	47
Serial #:	1101001
Calibration Expiration Date:	3/24/2021
Calibration γ Factor:	0.998

Unit Under Test Previous Calibration	
Date	9/22/2020
γ Factor:	1.014
Allowable Deviation ($\pm 5\%$):	0.0507
Actual Deviation:	0.02
Result:	PASS

Calibration Data	Run 1	Run 2	Run 3
Standard DGM Initial Volume (L)	0.000	0.000	0.000
Standard DGM Final Volume (L)	206.530	153.421	370.875
Standard DGM Temperature ($^{\circ}\text{F}$)	61.0	61.0	62.0
Standard DGM Pressure (in H_2O)	0.00	0.00	0.0
DGM Initial Volume (ft^3)	0.000	0.000	0.000
DGM Final Volume (ft^3)	7.447	5.615	13.804
DGM Temperature ($^{\circ}\text{F}$)	78.0	83.0	87.0
DGM Pressure (in H_2O)	2.28	3.56	1.1
Time (min)			
Net Volume for Standard DGM (ft^3)	7.294	5.418	13.097
Net Volume for DGM (ft^3)	7.447	5.615	13.804
Dry Gas Meter γ Factor	1.004	0.995	0.990
γ Factor Deviation From Average	1.004	0.995	0.990

Average Gas Meter γ Factor

0.996

Calculations:

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

Standard Reference Meter is calibrated to NIST traceable standards. Uncertainty of measurement is $\pm 0.5\%$.

Dry Gas Meter Calibration

Meter Manufacturer: Apex
 Model: XC-60
 Lab ID #: 54
 Serial #: 1902133
 Calibration Date: 3/10/2021
 Calibration Expiration: 9/10/2021
 Barometric Pressure: 30.10 in. Hg



Reference Standard DGM	
Manufacturer:	Apex
Model:	SK25DA
Lab ID#:	47
Serial #:	1101001
Calibration Expiration Date:	3/24/2021
Calibration γ Factor:	0.998

Unit Under Test Previous Calibration	
Date	9/22/2020
γ Factor:	1.002
Allowable Deviation ($\pm 5\%$):	0.0501
Actual Deviation:	0.02
Result:	PASS

Calibration Data	Run 1	Run 2	Run 3
Standard DGM Initial Volume (L)	0.000	0.000	0.000
Standard DGM Final Volume (L)	140.142	250.780	502.892
Standard DGM Temperature ($^{\circ}\text{F}$)	61.0	61.0	60.0
Standard DGM Pressure (in H_2O)	0.00	0.00	0.0
DGM Initial Volume (ft^3)	0.000	0.000	0.000
DGM Final Volume (ft^3)	5.009	9.013	18.359
DGM Temperature ($^{\circ}\text{F}$)	80.0	86.0	89.0
DGM Pressure (in H_2O)	2.64	3.47	1.1
Time (min)			
Net Volume for Standard DGM (ft^3)	4.949	8.856	17.759
Net Volume for DGM (ft^3)	5.009	9.013	18.359
Dry Gas Meter γ Factor	1.015	1.019	1.017
γ Factor Deviation From Average	1.015	1.019	1.017

Average Gas Meter γ Factor

1.017

Calculations:

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

Standard Reference Meter is calibrated to NIST traceable standards. Uncertainty of measurement is $\pm 0.5\%$.

Dry Gas Meter Calibration

Meter Manufacturer: Apex
 Model: Apex-AK-600
 Lab ID #: 55
 Serial #: 810016
 Calibration Date: 3/31/2021
 Calibration Expiration: 9/30/2021
 Barometric Pressure: 30.31 in. Hg



Reference Standard DGM	
Manufacturer:	apex
Model:	SK25DA
Lab ID#:	47
Serial #:	1101001
Calibration Expiration Date:	
Calibration γ Factor:	0.998

Unit Under Test Previous Calibration	
Date	6/14/2019
γ Factor:	0.992
Allowable Deviation ($\pm 5\%$):	0.0496
Actual Deviation:	0.02
Result:	PASS

Calibration Data	Run 1	Run 2	Run 3
Standard DGM Initial Volume (L)	0.000	0.000	0.000
Standard DGM Final Volume (L)	151.130	140.010	142.787
Standard DGM Temperature ($^{\circ}\text{F}$)	64.7	64.7	65.4
Standard DGM Pressure (in H_2O)	0.00	0.00	0.0
DGM Initial Volume (ft^3)	0.000	0.000	0.000
DGM Final Volume (ft^3)	5.162	4.905	5.019
DGM Temperature ($^{\circ}\text{F}$)	63.0	67.0	68.0
DGM Pressure (in H_2O)	2.20	2.20	2.2
Time (min)	27.0	25.0	25.0
Net Volume for Standard DGM (ft^3)	5.337	4.944	5.042
Net Volume for DGM (ft^3)	5.162	4.905	5.019
Dry Gas Meter γ Factor	1.023	1.005	1.002
γ Factor Deviation From Average	1.023	1.005	1.002

Average Gas Meter γ Factor

1.010

Calculations:

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

Standard Reference Meter is calibrated to NIST traceable standards. Uncertainty of measurement is $\pm 0.5\%$.

Pressure Gauge Calibration Work Sheet

Gauge Manufacturer: Apex
Maximum Range (inH₂O): 1
Instrument ID #: 053 (dP)
Calibration Date: 3/10/2021
Calibration Expiration: 3/10/2022
Barometric Pressure: 30.10 in. Hg



Reference Standard Gauge

Manufacturer:	Dwyer
Model:	475-000
Instrument ID#:	76
Calibration Expiration Date:	7/27/2021

Calibration Point (inH ₂ O)	Reference Gauge Reading (inH ₂ O)	Pressure Gauge Reading (inH ₂ O)	Difference (Reference - UUT)	% Error of Full Range
0.0 - 0.2	0.19	0.21	0.02	2.0%
0.2 - 0.4	0.26	0.24	0.02	2.0%
0.4 - 0.6	0.58	0.56	0.02	2.0%
0.6 - 0.8	0.79	0.77	0.02	2.0%
0.8 - 1.0	0.90	0.89	0.01	1.0%

Acceptable tolerance is 4%

Technican Signature: _____

Date: 3/12/2021

Uncertainty is 0.4 inH₂O, based on minumum uncertainty ration of 4:1 between standard reference meter and unit under test.

Pressure Gauge Calibration Work Sheet

Gauge Manufacturer: Apex
Maximum Range (inH₂O): 1
Instrument ID #: 054 (dP)
Calibration Date: 3/10/2021
Calibration Expiration: 3/10/2022
Barometric Pressure: 30.00 in. Hg



Reference Standard Gauge

Manufacturer:	Dwyer
Model:	475-000
Instrument ID#:	76
Calibration Expiration Date:	7/27/2021

Calibration Point (inH ₂ O)	Reference Gauge Reading (inH ₂ O)	Pressure Gauge Reading (inH ₂ O)	Difference (Reference - UUT)	% Error of Full Range
0.0 - 0.2	0.14	0.13	0.01	1.0%
0.2 - 0.4	0.25	0.23	0.02	2.0%
0.4 - 0.6	0.59	0.58	0.01	1.0%
0.6 - 0.8	0.71	0.70	0.01	1.0%
0.8 - 1.0	0.90	0.89	0.01	1.0%

Acceptable tolerance is 4%

Technican Signature: _____

Date: 3/12/2021

Uncertainty is 0.4 inH₂O, based on minumum uncertainty ration of 4:1 between standard reference meter and unit under test.

Emissions Sampling System Thermocouple Calibration Check

Calibration based on NIST Monograph 175 per ASTM E2515-11

All thermocouples are type "K"

Date: 3/10/2021

Sampling System ID Numbers: 053/054

Performed By: A. Kravitz

Calibration Instrument ID Number: 165

Reference Temperature (F)	Acceptable Error (F)	Thermocouple Location						
		FB Left	FB Right	FB Back	FB Top	FB Bottom	Catalyst Exit	Flue
0	± 4.0	0	0	0	0	0	0	0
200	± 4.0	200	200	200	200	200	200	200
400	± 4.0	400	400	400	400	400	400	400
600	± 4.5	600	600	600	600	600	600	600
800	± 6.0	800	800	800	800	800	800	800

Reference Temperature (F)	Acceptable Error (F)	Thermocouple Location					
		Ambient	Filter A	Filter B	Meter A	Meter B	Dilution Tunnel
0	± 4.0	0	0	0	0	0	1
200	± 4.0	200	200	201	200	200	200
400	± 4.0	400	400	401	400	400	400
600	± 4.5	600	600	601	600	600	600
800	± 6.0	800	800	801	800	800	800

Technician Signature: 

Date: 3/10/2021



ISO 17025
ACCREDITED LABORATORY

55 N. 4th Street
Beaumont, TX 77701

Certificate of Analysis – EPA Protocol Gas

Customer:
Inter-Mountain Labs
555 Absaraka St.
Sheridan, WY 82801

PO Number: 196148
Reference#: CGS-10-20029 (2 of 2)
Date Filled:
Customer Part #:

Cylinder Number	Size	Concentration Basis	Standard type	Certificate ID
91005049	ALS	Mole	EPA Protocol	02-03112002

Certified Concentration

Carbon Monoxide=	2.47%	+/- 0.018%
Carbon Dioxide=	9.9%	+/- 0.1%
Oxygen=	10.37%	+/- 0.06%
Nitrogen =	Balance Gas	

Analytical Information

Component	Analyzer Make/Model/SN	Analytical Principle	Last Calibration Date
Carbon Monoxide	MKS/2031DJG2EKVS137/017146467	FT-IR	3/13/2020
Carbon Dioxide	Thermo 410I/1162980025	NDIR	3/4/2020
Oxygen	Thermo 410I/1162980025	MPA	2/11/2020

First Assay Date 3/13/2020

Reference Standard(s)

Component	GMIS #	Cylinder #	NIST Reference	Concentration	Uncertainty	Exp Date
Carbon Monoxide	CC219495.20151013g	CC219495	2642a	2.488%	+/- 0.015%	1/11/2024
Carbon Dioxide	EB007908.20190327	EB007908	C1579010.02	9.5%	+/- 0.02%	6/18/2027
Oxygen	EB0080793.20180118	EB0080793	071001	11.97%	+/- 0.06%	7/21/2026
Oxygen	EB0087693.20180504	EB0087693	071001	12%	+/- 0.12%	7/21/2026
Carbon Dioxide	EB0097897.20171018	EB0097897	C1309410.01	24.9%	+/- 0.10%	2/6/2026
Nitrogen				Balance Gas		

This calibration standard has been certified per the 2012 EPA Traceability Protocol, Document EPA 600/R-12/531, using the procedure G1.

Do Not Use This Standard Below 100 psig (0.7 Megapascals).

Valve Outlet Connection CGA: 660
Mix Pressure(psig)@70F: 2000
Certification Date: 3/13/2020
Shelf Life: 8 years
Expiration Date: 3/11/2028

Certified By:

Jennifer Healy

Reviewed By:

Kelly Ray

Produced By:
Red Ball Technical Gas Service Phone: 800-551-8150
555 Craig Kennedy Way Shreveport, LA 71107
Red Ball Technical Gas Service PGVP Vendor ID: G12020



Model 1430 Microtector® Electronic Point Gage

Installation and Operating Instructions



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

SPECIFICATIONS AND FEATURES

- Accurate and repeatable to $\pm .00025$ inches water column
- Pressure range: 0 - 2" w.c., positive, negative, or differential pressures
- Non-toxic and inexpensive gage fluid consists of distilled water mixed with a small amount of fluorescein green color concentrate
- Convenient, portable, lightweight and self-contained, the unit requires no external power connections and is operated by a 1.5 volt penlight cell
- A.C. detector current eliminates point plating, fouling and erosion
- Micrometers are manufactured in accordance with ASME B89.1.13-2001, and are traceable to a standard at the National Institute of Standards and Technology

- Three-point mounting, dual leveling adjustment, and circular level vial assure rapid setup
- Durablock® precision-machined acrylic plastic gage body
- Sensitive 0 - 50 microamp D.C. meter acts as a detector and also indicates battery and probe condition
- Heavy 2" thick steel base plate provides steady mounting
- Top-quality glass epoxy circuit board and solid-state, integrated circuit electronics
- Electronic enclosure of tough, molded styrene acrylonitrile provides maximum protection to components yet allows easy access to battery compartment
- Rugged sheet steel cover and carrying case protects the entire unit when not in use
- Accessories included are (2) 3-foot lengths Tygon® tubing, (2) 1/8" pipe thread adapters and 3/4 oz. bottle of fluorescein green color concentrate with wetting agent

Maximum pressure: 100 psig with optional pipe thread connections.

Tygon® is a registered trademark of Saint-Gobain Corporation

DWYER INSTRUMENTS, INC.

P.O. BOX 373

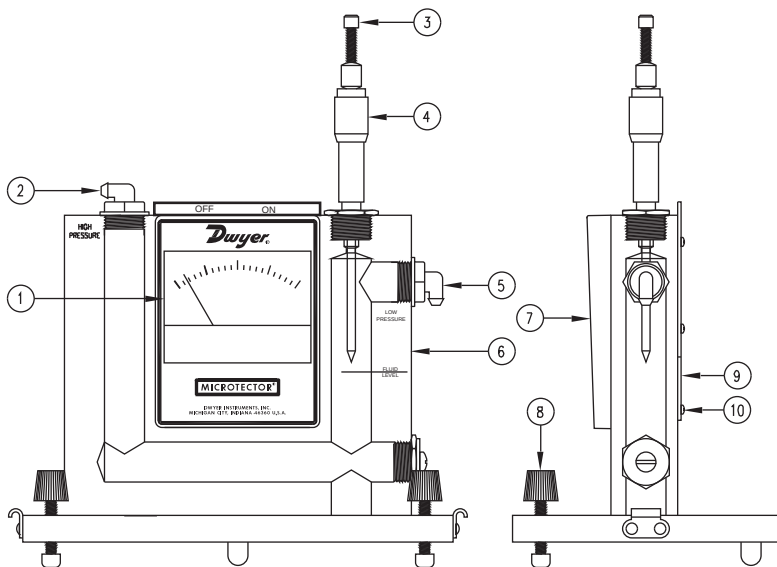
MICHIGAN CITY, INDIANA 46361, U.S.A

Phone: 219/879-8000

Fax: 219/872-9057

www.dwyer-inst.com

e-mail: info@dwyer-inst.com



Microtector® Gage

Precision Pressure Measurement

The Microtector® Gage combines the time-proven principles of the Hook Gage type manometer and modern solid-state integrated circuit electronics. It provides an inexpensive means of achieving accuracy and repeatability within $\pm .00025$ inches water column throughout its 0 to 2 inches w.c. range. It is truly a new standard in precision measuring devices.

Principles of Operation

A pressure to be measured is applied to the manometer fluid which is displaced in each leg of the manometer by an amount equal to $1/2$ the applied pressure. A micrometer mounted point is then lowered until it contacts the manometer gage fluid. The instant of contact is detected by completion of a low-power A.C. circuit. Current for this circuit is supplied by a 1.5 volt penlight cell feeding two semiconductor amplifiers which act as a free-running multivibrator operating at a frequency of approximately two kilohertz. Completion of the A.C. circuit activates a bridge rectifier which provides the signal for indication on a sensitive (0 to 50 microamps) D.C. microammeter.

On indication of contact, the operator stops lowering the point and reads the micrometer which indicates one half the applied pressure. By interpolating eight divisions (each being $.000125$ " w.c.) between $.001$ micrometer graduations, a total accuracy of $.00025$ can easily be achieved. The micrometer complies with Federal Specification GGG-C-105A and is traceable to a master at the NIST.

Locating and Opening

Stand the Microtector® Gage and case on a firm flat level surface. Remove cover by releasing the latches and lifting it straight up. If it is necessary to move the gage without case, handle only the base plate or clear acrylic block. (**CAUTION:** Do not handle gage by grasping meter-electronic package housing Item 7 on drawing.)

Fluid Level

Level the gage by adjusting the two front leveling screws (Item 8 on drawing) until the bubble in the spirit level is centered in the small circle. After leveling the gage, open both rapid shut-off valve tube connectors (Items 2 and 5). Back off the micrometer (Item 4), if necessary, to make sure that the point is not immersed in the gage fluid. The fluid level in the gage should now coincide with the mark on the right hand bore (Item 6) plus or minus approximately 1/32 inch. If the level of fluid is too high, fluid can be removed with an eye dropper pipette or carefully poured out of the right connection (Item 5).

If the level is too low, remove the top left rapid shut-off valve tube connector (Item 2) and add distilled water pre-mixed with the proper amount of green concentrate. (See maintenance instructions for proportions. After correcting the fluid level, re-install the rapid shut-off connectors and, with these in the open position, re-level the Microtector® Gage. The gage is now ready to be zeroed.

Zeroing

Turn the Micrometer barrel (Item 4) until its lower end just coincides with the zero mark on the scale and the zero on the barrel scale coincides with the vertical line on the internal scale. Note that the internal scale is graduated every .025" from 0 to 1.00 inch and the barrel scale is graduated in one thousandths from 0 to .025". Turn the meter circuit switch at the top of gage to the "on" position. While holding the barrel at the zero position (and with gage level), raise or lower the point by turning the knurled knob (Item 3) until the point is above, but near, the fluid.

Check to be sure that the meter registers zero. Watch the meter, hold the barrel, and lower the point slowly by turning the top knurled knob. As the knob is turned, the point will contact the fluid and the meter pointer will move from zero to some upscale position.

After making contact, turn the point out of the fluid by turning the micrometer barrel counter-clockwise to a reading of .010 or more. Again, watch the meter and, this time, lower the point by turning the micrometer barrel. The point position where the meter pointer begins to move up scale is the zero position. This position should correspond to the zero reading on the micrometer. Adjust the point in relation to the micrometer barrel by turning the top knob while holding the barrel steady. Repeat lowering the point, watching the meter for contact, and adjusting the point until the zero position and zero reading exactly coincide. The gage is now zeroed and should not be moved.

An alternative method of zeroing and reading can be used wherein, instead of zeroing the gage completely, a zero correction reading is taken and recorded, then subtracted from the final reading. Comparable results can be obtained with either method.

Positive Pressure Measurement

With the fluid at its proper level, a pressure of 2.0" water column maximum can be measured. Positive pressure should be applied to the top left connection (Item 2) with the micrometer zeroed as described above. This will permit a simple direct reading to be taken.

After an unknown pressure has been applied at the top left connection, the fluid level will drop in the left bore and rise over the point in the right bore. Note that the indicating meter point has moved upscale because the point is immersed in the fluid. Turn the micrometer counter-clockwise until the point leaves the fluid as indicated by the meter pointer dropping to zero on its scale. Then slowly turn the micrometer down until its point just touches the fluid surface, causing movement of the meter pointer. Withdraw the point and repeat several times, noting each time the micrometer reading where the meter pointer begins. The average of these readings multiplied by two is the pressure applied to the gage. (Avg. reading $\times 2$ = pressure applied in inches w.c. The degree of uncertainty for the operator is indicated by the difference in these readings.

When the readings are complete, the pressure should be removed and the zero setting of Microtector® Gage rechecked. Any change in the zero position will indicate inaccurate readings. Should this happen, the zero-set and pressure measurement procedure should be repeated.

Negative Pressure or Vacuum Measurement

Zero the gage. Connect the source of vacuum or negative pressure to the right-side gage connection (Item 5) and proceed as described under Positive Pressure Measurement section. Remember that the pressure measured in this way is negative.

Differential Pressure Measurement

Differential pressures may be measured by connecting the higher (more positive) pressure to the left connection (Item 2) and the lower pressure to the right connection (Item 5).

Storage

Turn meter circuit switch to "off" position and withdraw the point well clear of fluid (by turning micrometer clockwise) when gage is not in use. This will conserve the batteries and minimize build-up of oxides, etc., on the point. Keep the unit covered and in an area free of strong solvent fumes.

Maintenance

When the meter reading becomes reduced or the pointer movement gets sluggish (with the circuit on and the point in fluid), the following should be done:

(1) Remove the point (by unscrewing) and clean the tip lightly using fine crocus cloth. Wipe off all grit and dirt with a clean rag; reassemble and recheck meter operation.

(2) If the meter operation continues to be sluggish, replace the size AA, 1.5 volt battery. (Replace the battery at least once a year to avoid deterioration of battery and damage to gage. Leakproof alkaline battery is recommended.)

To replace the battery, remove center screw (Item 10) located in the back of the electronic enclosure. Cover (Item 9) will come off, exposing the battery. Pull the old battery out and push a new battery into the battery holder with the positive (center) terminal to the right (to the end marked with + on the holder).

If the fluid becomes contaminated and requires replacement: empty old fluid from gage; flush out with clear water and replace with distilled water and A-126 fluorescein green color concentrate mixed with 3/4 oz. concentrate to each quart of water.

CAUTION:

1. Do not substitute other gage fluids, as proper gage operation depends on use of the specified gage fluid to provide proper surface tension, wetting ability and electrolyte capability with unity specific gravity.

If the gage bore is very dirty, a mild soap solution may be used to aid in cleaning prior to flushing with clear water.

2. Do not clean with liquid soaps, special solvents, de-greasers, aromatic hydrocarbons, etc. Such cleaners and solvents may contain chlorine, fluorine, acetone and related compounds that will permanently damage the gage and prevent proper operation.



IS 17025

55 N. 4th Street
Beaumont, TX 77701

Certificate of Analysis – EPA Protocol Gas

Customer:
Inter-Mountain Labs
555 Absaraka St.
Sheridan, WY 82801PO Number: 196148
Reference#: CGS-10-20029 (1 of 2)
Date Filled:
Customer Part #:

Cylinder Number	Size	Concentration Basis	Standard type	Certificate ID
92302052	ALS	Mole	EPA Protocol	02-03112001

Certified Concentration

Carbon Monoxide=	4.18%	+/- 0.03%
Carbon Dioxide=	16.9%	+/- 0.16%
Oxygen=	16.85%	+/- 0.09%
Nitrogen =	Balance Gas	

Analytical Information

Component	Analyzer Make/Model/SN	Analytical Principle	Last Calibration Date
Carbon Monoxide	MKS/2031DJG2EKVS13T/017146467	FT-IR	3/13/2020
Carbon Dioxide	Thermo 410i/1162980025	NDIR	3/4/2020
Oxygen	Thermo 410i/1162980025	MPA	2/11/2020

First Assay Date 3/13/2020

Reference Standard(s)

Component	GMIS #	Cylinder #	NIST Reference	Concentration	Uncertainty	Exp Date
Carbon Monoxide	CC219495.20151013g	CC219495	2642a	2.488%	+/- 0.015%	1/11/2024
Oxygen	CC722682.20190405	CC722682	2659a	20%	+/- 0.10%	12/3/2027
Carbon Dioxide	EB0016852.20180323	EB0016852	101001	19.5%	+/- 0.15%	7/15/2026
Oxygen	EB0087693.20180504	EB0087693	071001	24%	+/- 0.12%	7/21/2026
Carbon Dioxide	EB0097897.20171018	EB0097897	C1309410.01	24.9%	+/- 0.10%	2/6/2026
Nitrogen				Balance Gas		

This calibration standard has been certified per the 2012 EPA Traceability Protocol, Document EPA 600/R-12/531, using the procedure G1.

Do Not Use This Standard Below 100 psig (0.7 Megapascals).

Valve Outlet Connection CGA: 660
Mix Pressure(psig)@70F: 2000
Certification Date: 3/13/2020
Shelf Life: 8 years
Expiration Date: 3/11/2028

Certified By:

Reviewed By:

Produced By:

Red Ball Technical Gas Service Phone 800-551-8150
555 Craig Kennedy Way Shreveport, LA 71107
Red Ball Technical Gas Service PGVP Vendor ID: G12020