



OMNI-Test Laboratories, Inc.

EPA Standard of Performance for New Residential Wood Heaters

Certification Test Report

Non-Confidential Business Information (Non-CBI)

Manufacturer: Sherwood Industries

Heater Type: Pellet-Fired, Freestanding

Model: Maxx-1

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AUTHORIZED SIGNATORIES

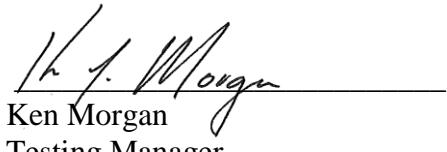
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Section 1

Appliance, Testing, & Results

- 1.1 - Appliance Description**
- 1.2 – Procedures and Results Summary**
- 1.3 - Summary Tables**

1.1 - Appliance Description

Appliance Manufacturer: Sherwood Industries

Pellet Stove Model: Maxx-1

Type: Freestanding, air-circulating type, pellet-fired room heater.

The Maxx-1's principle elements include a fuel hopper, grey cast iron firebox chamber, ductile iron burn pot, and electrical fuel feed, combustion air, and convection air supply systems. The frame of the unit is constructed of mild steel, as is the outer fascia and door.

Combustion products are routed out of the firebox chamber via a baffle-type heat exchanger through a 4-inch diameter flue outlet located on the rear of the unit.

Fuel is supplied from the hopper to the burn pot via a screw-type auger. Fuel supply rate is varied by cycling the auger motor as needed.

Ashes fall through the burn pot into a removable ash drawer located at the bottom of the unit. The drawer is accessed through the front firebox door, which also features a 14" x 9.5" glass panel.

The electrical systems are regulated by a user-operated control board featuring up/down buttons to achieve desired heat output. The unit can also be controlled by an external thermostat system.

More detailed information is shown in the manufacturer's design drawings, Appendix C of this report. This information is considered confidential business information (CBI) by the manufacturer and is not included in the non-CBI version of this report.

Appliance Photographs

Maxx-1

Test Date: 4/17/2018

	
Maxx-1 Front	Maxx-1 Back

	
Maxx-1 Left	Maxx-1 Right

1.2 - Procedures and Results Summary

INTRODUCTION

Sherwood Industries retained OMNI-Test Laboratories, Inc. (*OMNI*) to perform U.S. Environmental Protection Agency (EPA) certification testing on the Maxx-1. The Maxx-1 is a freestanding pellet-burning residential heating appliance.

The testing was performed at *OMNI*'s testing facility in Portland, Oregon. The altitude of the laboratory is 30 feet above sea level. The unit was received in good condition and logged in at the *OMNI*'s testing facility on April 12, 2018. It was assigned and labeled with *OMNI* ID #2284. *OMNI* representative Aaron Kravitz conducted the certification testing and completed all testing by April 17, 2018.

This report is organized in accordance with the EPA-recommended outline and is summarized in the Table of Contents immediately preceding this section. The results in this report are limited to the item(s) submitted.

SUMMARY OF RESULTS

The average particulate emission rate over the complete, integrated test run was measured to be 1.87 g/hr.

The average particulate emission factor for the complete, integrated test run was measured to be 1.35 g/dry kg of fuel.

The average thermal efficiency for the complete, integrated test run was measured to be 77.4%.

The particulate emission rate calculated from the one-hour filter was 7.74 g/hr.

The proportionality results and sample train agreement for the test run was acceptable. Quality check results for each test run are presented in Section 3 of this report.

1.2 - Procedures and Results Summary

TESTING PROCEDURE

The Maxx-1 was tested in accordance with the U.S. EPA 40 CFR Part 60, Subpart AAA – Standards of Performance for New Residential Wood Heaters using ASTM E2515 and ASTM E2779. The fuel used for certification testing was Lignetics brand densified wood pellet fuel; this fuel was graded as Premium by the Pellet Fuels Institute and was produced at registered mill # 03208. Particulate emissions were measured using dual sampling trains consisting of two sets of filters (front and back).

The unit was installed and adjusted in accordance with the manufacturer's instructions, adjusting an air inlet slide to achieve a static pressure of 0.15 inches of water after 30 minutes at maximum burn rate. This slide was fixed in place throughout the integrated test runs.

Two test runs were performed. The first run was aborted due to an inadvertent mode adjustment during the heat output adjustment from high to medium. This caused the unit to enter its shutoff cycle, and was noted at minute 107 of the test run. The unit was re-adjusted to the proper heat setting to confirm the error, and at minute 133 the test run was aborted. All notes and data are presented in this report.

The second run was completed in full and fulfilled all validity criteria. All results data was computed from this second integrated test run.

The results of the integrated test run indicate an average particulate emission rate of 1.87 g/hr. The Maxx-1 results are within the emission limit of 2.0 g/hr for affected appliances manufactured on or after May 15, 2020 or sold at retail after December 31, 2020.

The model Maxx-1 was tested for thermal efficiency and carbon monoxide (CO) emissions in accordance with CSA B415.1-10. The heater has a demonstrated an average thermal efficiency of 77.4%. The calculated CO emission rate was 1.14 g/min.

Upon completion of emissions certification testing, the sample unit was sealed and will be stored by the manufacturer in accordance with the requirements of the CFR.



1.3 - Summary Tables

Table 1 – Particulate Emissions

	One-Hour Filter	Integrated Total
Emission Rate (g/hr)	7.739	1.865
Emission Factor (g/dry kg)	2.378	1.348

Table 2 – Efficiency and CO

	Burn Rate Segment			Integrated Total
	Maximum	Medium	Minimum	
Time (minutes)	60	121	181	362
Burn Rate (dry kg/hr)	3.256	1.253	0.852	1.385
Heat Input Rate (BTU/hr, HHV)	63,386	24,400	16,588	26,956
Heat Output Rate (BTU/hr, HHV)	50,627	19,030	12,190	20,861
Efficiency (%, HHV)	79.9%	78.0%	73.5%	77.4%
Efficiency (%, LHV)	85.3%	83.3%	78.5%	82.7%
CO Emission Rate (g/min)	2.18	0.87	0.96	1.14

1.3 - Summary Tables

Table 3 – Test Facility Conditions

	Initial	Middle	Final
Room Temperature (°F)	70	72	71
Barometric Pressure (in Hg)	30.33	30.31	30.28
Air Velocity (ft/min)	< 50	< 50	< 50
Induced Draft (in H ₂ O)	0	0	0

Table 4 – Fuel Measurement Summary

Pretest	Burn Rate Segment			Integrated Total
	Maximum	Medium	Minimum	
Time (min)	61	60	121	181
Burn Rate (dry kg/hr)	3.51	3.26	1.25	0.85
Consumed Fuel (lbs)	8.3	7.6	5.9	6.0
Moisture Content (dry basis %)	5.91	5.91	5.91	5.91

1.3 - Summary Tables

Table 5 – Dilution Tunnel and Flue Gas Measurements

	Burn Rate Segment			Integrated Total
	Maximum	Medium	Minimum	
Flue Draft (in H ₂ O)	-0.058	-0.040	-0.042	-0.044
Tunnel Velocity (ft/sec)	13.61	13.56	14.12	13.85
Tunnel Flow Rate (dscf/min)	-	-	-	154.8
Tunnel Temperature (°F)	109	95	85	92.1

Table 6 – Heater Configuration

Pretest	Burn Rate Segment		
	Maximum	Medium	Minimum
Heat Output Setting	5 (max)	5 (max)	2
			1 (min)

Section 2

Test Data

- 2.1 Test Data by Run**
- 2.2 Sample Analysis & Tares**

Pellet Heater Conditioning Data - ASTM E2779

Manufacturer: Sherwood
 Model: Maxx FS
 Tracking No.: 2284
 Project No.: 0268PF028E
 Test Date: 3/19/18-3/27/18
 Operation Category: Medium (Settings 2,3,4)

Elapsed Time (hours)	Scale Reading (lbs)	Stack (°F)
1	453.4	369
2	444.0	369
3	434.3	269
4	420.8	337
5	492.1	49
6	482.4	344
7	481.5	222
8	479.1	199
9	475.9	204
10	473.7	209
11	473.0	206
12	469.4	214
13	470.0	50
14	467.2	190
15	464.4	205
16	462.4	204
17	460.8	209
18	456.9	208
19	457.1	54
20	445.0	356
21	435.2	371
22	429.1	374
23	422.1	391
24	404.1	399
25	398.7	404
26	397.6	54
27	394.8	273
28	388.3	289
29	383.7	282
30	506.3	284
31	498.9	290
32	494.1	281
33	482.2	288
34	476.1	287
35	475.0	67
36	469.0	277
37	460.2	282
38	455.1	275
39	448.2	288
40	448.7	438
41	442.4	269
42	438.9	268
43	420.8	267
44	408.1	265
45	402.7	269
46	402.7	54
47	394.4	274
48	390.1	276
49	385.6	242
50	507.2	257

2.1 - Test Data by Run

Run 1 Data (Aborted Run)



Pellet Heater Preburn Data - ASTM E2779

Manufacturer: Sherwood
 Model: Maxx FS
 Tracking No.: 2284
 Project No.: 0268PF028E
 Test Date: 4/16/2018

 PB Length: 80 min
 Recording Interval: 1 min

Averages:	309	65	-0.05	10.61	0.82
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Elapsed Time (min)	Scale Reading	Weight Change	Stack (F)	Ambient (F)	Draft ("H2O)	CO2 (%)	CO (%)
1	10.7	-	259	63	-0.04	N/A	N/A
2	10.6	-0.1	264	63	-0.04	N/A	N/A
3	10.4	-0.2	266	64	-0.04	N/A	N/A
4	10.3	-0.1	268	63	-0.05	N/A	N/A
5	10.1	-0.2	272	64	-0.05	N/A	N/A
6	10.4	0.3	275	63	-0.05	N/A	N/A
7	10.3	-0.1	280	64	-0.05	N/A	N/A
8	10.2	-0.1	282	64	-0.05	N/A	N/A
9	10.1	-0.1	283	64	-0.05	N/A	N/A
10	9.9	-0.2	285	64	-0.05	N/A	N/A
11	9.8	-0.1	287	65	-0.05	N/A	N/A
12	9.7	-0.1	289	64	-0.05	N/A	N/A
13	9.4	-0.3	290	64	-0.05	N/A	N/A
14	9.4	0	292	64	-0.05	N/A	N/A
15	9.2	-0.2	293	64	-0.05	N/A	N/A
16	9.1	-0.1	294	64	-0.05	N/A	N/A
17	8.9	-0.2	294	65	-0.05	N/A	N/A
18	8.8	-0.1	295	64	-0.05	N/A	N/A
19	8.7	-0.1	296	64	-0.05	N/A	N/A
20	8.7	0	297	65	-0.05	N/A	N/A
21	8.6	-0.1	297	65	-0.05	11.02	1.87
22	8.2	-0.4	298	65	-0.05	11.18	2.11
23	8.0	-0.2	298	65	-0.05	11.13	0.62
24	7.8	-0.2	299	65	-0.05	11.10	1.44
25	7.7	-0.1	299	65	-0.05	11.21	0.49
26	7.0	-0.7	300	66	-0.05	10.95	0.44
27	7.3	0.3	300	66	-0.05	11.08	0.46
28	7.2	-0.1	301	65	-0.05	11.21	1.13
29	7.4	0.2	303	65	-0.05	11.07	1.66
30	7.0	-0.4	305	66	-0.05	11.12	0.60
31	7.6	0.6	304	65	-0.05	10.95	0.76
32	14.8	7.2	305	65	-0.05	11.08	0.57
33	6.6	-8.2	305	65	-0.05	10.89	0.46
34	6.5	-0.1	305	65	-0.05	11.00	0.78
35	6.3	-0.2	306	66	-0.05	0.05	0.00
36	6.2	-0.1	305	65	-0.05	10.57	0.78
37	6.0	-0.2	305	65	-0.05	10.80	0.96
38	5.9	-0.1	305	65	-0.05	10.90	1.05
39	5.8	-0.1	305	66	-0.05	11.03	1.12
40	5.6	-0.2	305	65	-0.05	10.84	0.84
41	5.5	-0.1	311	66	-0.05	10.80	0.55
42	5.3	-0.2	317	66	-0.05	9.32	0.07
43	5.2	-0.1	320	65	-0.05	10.69	0.57
44	5.1	-0.1	320	66	-0.05	10.72	0.57
45	4.9	-0.2	321	66	-0.05	10.90	0.71
46	4.8	-0.1	322	65	-0.05	10.68	0.77
47	4.7	-0.1	323	65	-0.05	10.92	0.53
48	4.5	-0.2	323	66	-0.05	10.84	0.95
49	4.4	-0.1	324	66	-0.06	11.03	0.80



Pellet Heater Preburn Data - ASTM E2779

Manufacturer: Sherwood
 Model: Maxx FS
 Tracking No.: 2284
 Project No.: 0268PF028E
 Test Date: 4/16/2018

 PB Length: 80 min
 Recording Interval: 1 min

Averages:	309	65	-0.05	10.61	0.82
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49	50	4.2	-0.2	324	65	-0.06	10.80	0.86
50	51	4.1	-0.1	325	65	-0.06	10.93	0.83
51	52	3.9	-0.2	325	66	-0.05	10.72	0.50
52	53	3.8	-0.1	325	66	-0.06	10.97	0.88
53	54	3.6	-0.2	326	67	-0.05	10.88	1.38
54	55	3.5	-0.1	327	66	-0.05	10.90	0.71
55	56	3.3	-0.2	327	66	-0.05	10.85	0.65
56	57	3.2	-0.1	328	66	-0.05	N/A	N/A
57	58	3.1	-0.1	327	66	-0.05	N/A	N/A
58	59	2.9	-0.2	328	67	-0.05	N/A	N/A
59	60	2.8	-0.1	328	66	-0.05	N/A	N/A
60	61	2.6	-0.2	328	66	-0.05	N/A	N/A
61	62	2.5	-0.1	328	66	-0.05	N/A	N/A
62	63	2.4	-0.1	328	66	-0.05	N/A	N/A
63	64	2.2	-0.2	328	66	-0.05	N/A	N/A
64	65	2.1	-0.1	328	66	-0.05	N/A	N/A
65	66	2.0	-0.1	328	66	-0.05	N/A	N/A
66	67	1.8	-0.2	328	66	-0.05	N/A	N/A
67	68	1.7	-0.1	328	66	-0.05	N/A	N/A
68	69	1.6	-0.1	328	66	-0.05	N/A	N/A
69	70	1.4	-0.2	327	66	-0.05	N/A	N/A
70	71	1.3	-0.1	327	67	-0.05	N/A	N/A
71	72	1.2	-0.1	327	66	-0.06	N/A	N/A
72	73	1.0	-0.2	327	65	-0.05	N/A	N/A
73	74	0.9	-0.1	327	66	-0.05	N/A	N/A
74	75	0.8	-0.1	327	66	-0.06	N/A	N/A
75	76	0.7	-0.1	327	66	-0.05	N/A	N/A
76	77	0.5	-0.2	326	66	-0.05	N/A	N/A
77	78	0.4	-0.1	326	66	-0.06	N/A	N/A
78	79	0.3	-0.1	326	66	-0.06	10.31	0.97
79	80	0.2	-0.1	326	67	-0.06	11.04	0.48
80	81	0.0	-0.2	327	66	-0.06	11.27	0.87

 RUN ABORTED

Pellet Heater Test Data - ASTM E2779 / ASTM E2515

Run:	1
Manufacturer:	Sherwood
Model:	Maxx FS
Tracking No.:	2284
Project No.:	0268PF028E
Test Date:	16-Apr-18

High Burn End Time: 60
 Medium Burn End Time: 61
 Total Sampling Time: 133 min
 Recording Interval: 1 min

PM Control Modules: 335/336

Dilution Tunnel MW(dry): 29.00 lb/lb-mole
 Dilution Tunnel MW(wet): 28.78 lb/lb-mole
 Dilution Tunnel H2O: 2.00 percent
 Dilution Tunnel Static: -0.190 "H2O
 Tunnel Area: 0.19635 ft²
 Pitot Tube Cp: 0.99

Avg. Tunnel Velocity: 13.68 ft/sec.
 Initial Tunnel Flow: 154.1 scfm
 Average Tunnel Flow: 153.6 cfm
 Post-Test Leak Check (1): N/A cfm @ N/A in. Hg
 Post-Test Leak Check (2): N/A cfm @ N/A in. Hg
 Fuel Moisture (%): 5.910 Dry Basis 5.580 Wet Basis

Beginning Clock Time: 10:15Background Sample Volume: 0 cubic feetMeter Box Y Factor: 0.977 (1) 0.979 (2) 0 (Amb)Barometric Pressure: Begin Middle End Average
29.92 N/A N/A 29.92 "Hg

Velocity Traverse Data

	Pt.1	Pt.2	Pt.3	Pt.4	Pt.5	Pt.6	Pt.7	Pt.8	Center
Initial dP	<u>0.036</u>	<u>0.054</u>	<u>0.050</u>	<u>0.032</u>	<u>0.040</u>	<u>0.048</u>	<u>0.050</u>	<u>0.032</u>	<u>0.065</u>
Temp:	<u>91</u>								

"H2O

°F

V_{strav} 13.93 ft/sec V_{scent} 17.26 ft/sec F_p 0.807

Elapsed Time (min)	Particulate Sampling Data													Fuel Weight (lb)		Temperature Data (°F)					Stack Gas Data						
	Gas Meter 1 (ft ³)	Gas Meter 2 (ft ³)	Sample Rate 1 (cfm)	Sample Rate 2 (cfm)	Orifice dH 1 ("H ₂ O)	Meter Temp 1 (°F)	Meter Vacuum 1 ("Hg)	Orifice dH 2 ("H ₂ O)	Meter Temp 2 (°F)	Meter Vacuum 2 ("Hg)	Dilution Tunnel (°F)	Tunnel Center dP	sqrt dp	vsi	Pro. Rate 1	Pro. Rate 2	Scale Reading	Weight Change	Stack	Filter 1	Dryer 1	Filter 2	Dryer 2	Ambient	Draft ("H ₂ O)	CO ₂ (%)	CO (%)
0	0.000	0.000			0.51	67	1.72	0.59	66	0.70	91	0.061	0.247	13.50		29.7		327	66	66	64	66	-0.055	11.04	0.790		
1	0.145	0.140	0.15	0.14	1.25	67	1.85	1.02	66	0.90	91	0.060	0.245	13.39	105	100	29.6	-0.1	326	67	65	67	64	66	-0.054	10.68	0.320
2	0.302	0.287	0.16	0.15	1.23	67	1.86	1.02	66	0.90	91	0.062	0.249	13.61	111	103	29.4	-0.2	326	67	65	67	64	65	-0.055	10.93	0.580
3	0.457	0.435	0.16	0.15	1.22	67	1.88	1.01	66	1.00	91	0.059	0.243	13.28	113	107	29.3	-0.1	326	67	65	67	64	66	-0.054	10.31	0.270
4	0.613	0.580	0.16	0.15	1.21	67	1.90	1.00	67	1.00	91	0.060	0.245	13.39	113	103	29.2	-0.1	326	67	65	67	64	67	-0.054	10.84	0.510
5	0.766	0.725	0.15	0.15	1.16	67	1.88	0.98	67	1.00	91	0.062	0.249	13.61	109	102	29.0	-0.2	326	67	65	67	64	66	-0.054	11.09	0.180
6	0.916	0.869	0.15	0.14	1.14	67	1.91	0.96	67	1.10	91	0.062	0.249	13.61	107	101	28.9	-0.1	327	67	65	67	64	66	-0.054	11.15	1.370
7	1.067	1.012	0.15	0.14	1.13	67	1.94	0.95	67	1.10	90	0.063	0.251	13.71	106	100	28.8	-0.1	326	67	65	67	64	66	-0.054	10.32	0.370
8	1.214	1.160	0.15	0.15	1.12	68	1.97	1.02	67	1.30	90	0.062	0.249	13.60	104	104	28.6	-0.2	326	67	65	67	64	67	-0.054	10.91	0.840
9	1.362	1.308	0.15	0.15	1.10	68	2.01	1.00	67	1.30	91	0.062	0.249	13.61	105	104	28.5	-0.1	326	68	65	67	65	66	-0.055	10.99	0.990
10	1.510	1.455	0.15	0.15	1.08	68	2.03	0.99	67	1.40	90	0.061	0.247	13.49	106	104	28.4	-0.1	326	67	65	67	65	66	-0.055	10.84	1.200
11	1.656	1.600	0.15	0.15	1.07	68	2.07	0.97	67	1.40	90	0.065	0.255	13.92	101	99	28.2	-0.2	326	68	65	67	65	66	-0.056	10.67	0.720
12	1.801	1.743	0.15	0.14	1.05	68	2.11	0.96	68	1.40	90	0.062	0.249	13.60	103	100	28.4	0.2	327	68	65	67	65	67	-0.055	10.90	1.410
13	1.945	1.886	0.14	0.14	1.04	68	2.14	0.94	68	1.50	91	0.062	0.249	13.61	102	100	28.0	-0.4	328	68	66	67	65	66	-0.055	10.95	0.950
14	2.089	2.027	0.14	0.14	1.04	68	2.15	0.96	68	1.50	91	0.063	0.251	13.72	101	98	27.8	-0.2	330	68	66	67	65	66	-0.055	10.62	0.250
15	2.231	2.177	0.14	0.15	1.02	69	2.18	1.03	68	1.70	92	0.060	0.245	13.40	102	107	27.7	-0.1	331	68	66	68	65	66	-0.056	10.89	0.810
16	2.374	2.325	0.14	0.15	1.02	69	2.19	1.02	68	1.70	91	0.065	0.255	13.93	99	101	27.6	-0.1	332	68	66	68	65	67	-0.056	10.31	0.330
17	2.517	2.473	0.14	0.15	1.03	69	2.27	1.01	69	1.70	92	0.062	0.249	13.62	101	104	27.5	-0.1	332	68	66	68	65	67	-0.056	10.81	0.730
18	2.660	2.620	0.14	0.15	1.03	69	2.29	1.00	69	1.80	92	0.063	0.251	13.73	100	102	27.3	-0.2	332	68	66	68	65	67	-0.055	10.65	1.030
19	2.804	2.767	0.14	0.15	1.08	69	2.42	1.02	69	1.90	92	0.063	0.251	13.73	101	102	27.2	-0.1	332	68	66	68	65	66	-0.055	10.73	0.920
20	2.950	2.916	0.15	0.15	1.07	69	2.45	1.01	69	1.90	92	0.066	0.257	14.05	100	101	27.1	-0.1	333	68	66	68	65	66	-0.055	10.51	0.490
21	3.095	3.064	0.15	0.15	1.06	69	2.46	1.00	69	1.90	92	0.064	0.253	13.84	101	102	27.0	-0.1	333	68	66	68	65	67	-0.055	10.65	0.510
22	3.240	3.211	0.15	0.15	1.05	70	2.49	1.00	70	2.00	92	0.067	0.259	14.16	99	99	26.8	-0.2	333	68	67	68	66	66	-0.056	10.58	0.380
23	3.384	3.357	0.14	0.15	1.05	70	2.50	0.99	70	2.00	92	0.061	0.247	13.51	103	103	26.7	-0.1	333	68	67	68	66	66	-0.055	10.62	0.440
24	3.528	3.503	0.14	0.15	1.03	70	2.53	0.98	70	2.00	92	0.063	0.251	13.73	101	101	26.6	-0.1	333	68	67	68	66	66	-0.055	11.17	0.900
25	3.672	3.648	0.14	0.15	1.02	70	2.56	0.97	70	2.00	92	0.065	0.255	13.95	99	99	26.5	-0.1	333	68	67	68	66	67	-0.055	10.34	0.290
26	3.815	3.792	0.14	0.14	1.02	70	2.56	0.97	70	2.00	92	0.064	0.253	13.84	99	99	26.4	-0.1	333	68	67	68	66	67	-0.056	9.96	0.140
27	3.957	3.937	0.14	0.15	1.01	70	2.58	0.96	70	2.10	92	0.062	0.249	13.62	100	101	26.2	-0.2	332	68	67	68	66	66	-0.055	10.78	0.350
28	4.099	4.080	0.14	0.14	1.00	71	2.60	0.95	71	2.10	92	0.062	0.249	13.62	100	100	26.1	-0.1	333	68	67	68	66	66	-0.055	10.36	0.370
29	4.240	4.223	0.14	0.14	1.00	71	2.61	0.95	71	2.10	92	0.061	0.247	13.51	100	101	26.0	-0.1	333	68	67	68	66	66	-0.055	10.42	0.320
30	4.382	4.366	0.14	0.14	1.00	71	2.62	0.94	71	2.10	92	0.065	0.255	13.95	98	97	25.9	-0.1	332	68	67	68	66	66	-0.055	9.99	0.150
31	4.523	4.508	0.14	0.14	0.99	71	2.64	0.93	71	2.10	92	0.064	0.253	13.84	98	97	25.8	-0.1	332	68	68	68	66	66	-0.055	10.25	0.230
32	4.666	4.650	0.14	0.14	1.03	71	2.74	0.93	71	2.20	92	0.065	0.255	13.95	99	97	25.6	-0.2	332	68	68	68	66	66	-0.055	10.77	0.390
33	4.810	4.793	0.14	0.14	1.02	71	2.74	0.93	72	2.20	92	0.063	0.251	13.73	101	99	25.5	-0.1	332	68	68	68	67	66	-0.055	10.08	0.120
34	4.953	4.936	0.14	0.14	1.02	72	2.79	1.05																			

Pellet Heater Test Data - ASTM E2779 / ASTM E2515

RUN ABORTED

Run:	1
Manufacturer:	Sherwood
Model:	Maxx FS
Tracking No.:	2284
Project No.:	0268PF028E
Test Date:	16-Apr-18
Beginning Clock Time:	10:15
Meter Box Y Factor:	0.977 (1) 0.979 (2) 0 (Amb)
Barometric Pressure:	Begin Middle End Average 29.92 N/A N/A 29.92 "Hg

High Burn End Time: 60
 Medium Burn End Time: 61
 Total Sampling Time: 133 min
 Recording Interval: 1 min

PIM Control Modules: 335/336
 Dilution Tunnel MW(dry): 29.00 lb/lb-mole
 Dilution Tunnel MW(wet): 28.78 lb/lb-mole
 Dilution Tunnel H2O: 2.00 percent
 Dilution Tunnel Static: -0.190 "H2O
 Tunnel Area: 0.19635 ft²
 Pitot Tube Cp: 0.99
 Avg. Tunnel Velocity: 13.68 ft/sec.
 Intial Tunnel Flow: 154.1 scfm
 Average Tunnel Flow: 153.6 cfm
 Post-Test Leak Check (1): N/A cfm @ N/A in. Hg
 Post-Test Leak Check (2): N/A cfm @ N/A in. Hg
 Fuel Moisture (%): 5.910 Dry Basis 5.580 Wet Basis

Background Sample Volume: 0 cubic feet

Velocity Traverse Data										
	Pt.1	Pt.2	Pt.3	Pt.4	Pt.5	Pt.6	Pt.7	Pt.8	Center	
Initial dP	0.036	0.054	0.050	0.032	0.040	0.048	0.050	0.032	0.065	"H2O
Temp:	91	91	91	91	91	91	91	91	91	°F

V_{strav} 13.93 ft/sec V_{scent} 17.26 ft/sec F_p 0.807

Elapsed Time (min)	Particulate Sampling Data												Fuel Weight (lb)		Temperature Data (°F)					Stack Gas Data							
	Gas Meter 1 (ft ³)	Gas Meter 2 (ft ³)	Sample Rate 1 (cfm)	Sample Rate 2 (cfm)	Orifice dH 1 ("H ₂ O)	Meter Temp 1 (°F)	Meter Vacuum 1 ("Hg)	Orifice dH 2 ("H ₂ O)	Meter Temp 2 (°F)	Meter Vacuum 2 ("Hg)	Dilution Tunnel (°F)	Tunnel Center dP	sqrt dp	vsi	Pro. Rate 1	Pro. Rate 2	Scale Reading	Weight Change	Stack	Filter 1	Dryer 1	Filter 2	Dryer 2	Ambient	Draft ("H ₂ O)	CO ₂ (%)	CO (%)
59	8.564	8.611	0.15	0.15	1.05	74	3.67	1.01	75	3.40	93	0.065	0.255	13.96	100	101	22.3	-0.2	333	69	71	69	69	67	-0.054	10.57	0.660
60	8.710	8.760	0.15	0.15	1.11	74	1.69	1.01	75	3.50	93	0.064	0.253	13.85	101	102	22.2	-0.1	333	69	71	69	69	67	-0.054	9.77	0.280
61	8.855	8.908	0.15	0.15	1.05	74	1.65	1.00	75	3.50	89	0.065	0.255	13.91	99	100	22.1	-0.1	322	70	71	69	69	67	-0.052	10.76	0.410
62	9.000	9.057	0.15	0.15	1.05	74	1.64	1.00	75	3.50	87	0.065	0.255	13.88	99	100	22.1	0.0	311	70	71	69	69	67	-0.051	7.35	0.030
63	9.146	9.205	0.15	0.15	1.05	75	1.65	1.00	75	3.50	86	0.066	0.257	13.98	99	99	22.0	-0.1	301	70	71	69	69	67	-0.049	6.80	0.010
64	9.292	9.353	0.15	0.15	1.06	75	1.66	1.00	75	3.50	85	0.065	0.255	13.86	99	99	22.0	0.0	292	70	71	69	69	68	-0.048	6.79	0.010
65	9.438	9.501	0.15	0.15	1.05	75	1.65	1.00	75	3.50	84	0.066	0.257	13.95	98	99	21.9	-0.1	283	70	71	69	69	68	-0.047	5.72	0.000
66	9.585	9.650	0.15	0.15	1.05	75	1.65	1.00	75	3.50	83	0.066	0.257	13.94	99	99	21.9	0.0	274	70	71	69	69	67	-0.046	4.16	0.020
67	9.731	9.799	0.15	0.15	1.05	75	1.65	1.00	75	3.50	81	0.067	0.259	14.02	97	98	21.9	0.0	263	69	71	69	69	67	-0.044	4.30	0.010
68	9.876	9.948	0.15	0.15	1.06	75	1.66	1.00	76	3.50	80	0.065	0.255	13.79	98	99	21.8	-0.1	254	69	71	69	70	67	-0.043	5.77	0.000
69	10.022	10.095	0.15	0.15	1.05	75	1.66	1.00	76	3.50	80	0.066	0.257	13.90	98	97	21.8	0.0	246	69	72	68	70	67	-0.042	5.68	0.000
70	10.168	10.244	0.15	0.15	1.05	75	1.66	1.00	76	3.50	79	0.065	0.255	13.78	99	99	21.7	-0.1	239	69	72	69	70	67	-0.040	5.72	0.000
71	10.314	10.393	0.15	0.15	1.05	75	1.65	1.00	76	3.50	79	0.065	0.255	13.78	99	99	21.7	0.0	233	69	72	69	70	67	-0.039	4.29	0.010
72	10.461	10.542	0.15	0.15	1.05	75	1.66	0.99	76	3.50	78	0.064	0.253	13.66	100	100	21.7	0.0	227	69	72	69	70	67	-0.039	4.95	0.000
73	10.607	10.690	0.15	0.15	1.05	75	1.65	1.00	76	3.50	78	0.067	0.259	13.98	97	97	21.6	-0.1	223	69	72	69	70	67	-0.038	6.30	0.000
74	10.753	10.838	0.15	0.15	1.05	75	1.65	1.00	76	3.50	77	0.067	0.259	13.97	97	97	21.6	0.0	218	69	72	68	70	67	-0.037	5.39	0.000
75	10.898	10.987	0.15	0.15	1.05	75	1.65	1.00	76	3.50	77	0.064	0.253	13.65	99	100	21.5	-0.1	215	69	72	68	70	67	-0.036	5.93	0.000
76	11.044	11.135	0.15	0.15	1.06	75	1.66	1.00	76	3.50	77	0.064	0.253	13.65	99	99	21.5	0.0	212	69	72	68	70	67	-0.036	5.62	0.000
77	11.191	11.284	0.15	0.15	1.05	75	1.65	1.00	76	3.50	77	0.063	0.251	13.64	101	101	21.5	0.0	209	69	72	68	70	67	-0.036	5.87	0.000
78	11.337	11.433	0.15	0.15	1.06	75	1.66	0.99	76	3.50	76	0.063	0.251	13.53	100	101	21.4	-0.1	207	69	72	68	70	67	-0.035	5.90	0.000
79	11.483	11.581	0.15	0.15	1.05	76	1.65	1.00	76	3.50	76	0.064	0.253	13.64	99	99	21.4	0.0	204	69	72	68	70	67	-0.035	5.51	0.000
80	11.630	11.730	0.15	0.15	1.05	76	1.66	1.00	76	3.50	76	0.062	0.249	13.42	101	101	21.3	-0.1	202	69	72	68	70	67	-0.034	5.41	0.000
81	11.775	11.879	0.15	0.15	1.06	76	1.66	0.99	76	3.50	76	0.067	0.259	13.95	96	98	21.3	0.0	200	69	72	68	70	66	-0.034	5.33	0.000
82	11.921	12.027	0.15	0.15	1.05	76	1.66	0.99	76	3.50	75	0.065	0.255	13.73	98	98	21.3	0.0	197	68	72	68	70	67	-0.034	5.21	0.000
83	12.067	12.177	0.15	0.15	1.05	76	1.66	1.00	76	3.50	74	0.065	0.255	13.72	98	100	21.2	-0.1	192	68	72	68	70	67	-0.032	4.85	0.000
84	12.214	12.325	0.15	0.15	1.05	76	1.66	1.00	76	3.50	74	0.065	0.255	13.72	99	98	21.2	0.0	185	68	72	68	70	67	-0.031	4.89	0.000
85	12.360	12.473	0.15	0.15	1.05	76	1.66	1.00	76	3.50	73	0.067	0.259	13.91	96	97	21.2	0.0	180	68	72	68	70	67	-0.030	6.28	0.000
86	12.506	12.622	0.15	0.15	1.05	76	1.66	1.00	77	3.50	73	0.065	0.255	13.71	98	99	21.2	0.0	176	68	72	68	70	67	-0.029	2.72	0.060
87	12.652	12.771	0.15	0.15	1.06	76	1.66	1.00	77	3.50	72	0.066	0.257	13.80	97	98	21.2	0.0	172	68	72	68	70	66	-0.028	3.65	0.010
88	12.798	12.920	0.15	0.15	1.06	76	1.66	1.00	77	3.50	72	0.065	0.255	13.69	98	99	21.2	0.0	168	68	72	68	70	66	-0.028	2.83	0.020
89	12.944	13.068	0.15	0.15	1.06	76	1.66	1.00	77	3.50	72	0.064	0.253	13.59	99	99	21.1	-0.1	165	68	72	68	70	66	-0.027	4.86	0.000
90	13.091	13.217	0.15	0.15	1.05	76	1.66	1.00	77	3.50	71	0.066	0.257	13.78	98	98	21.2	0.1	161	68	72	67	70	66	-0.026	1.79	0.060
91	13.237	13.366	0.15	0.15	1.05	76	1.66	1.00	77	3.50	71	0.065	0.255	13.68	98	98	21.1	-0.1	158	68	72	67	70	66	-0.025	3.25	0.010
92	13.384	13.515	0.15	0.15	1.05	76	1.66	0.99	77	3.50	71	0.062	0.249	13.36	101	101	21.1	0.0	156	68	72	67	70	66	-0.025	4.02	0.010
93	13.530	13.664	0.15	0.15	1.05	76	1.66	0.99	77	3.50	71	0.064	0.253	13.57	98	99	21.1	0.0	153	67	72	67	70	66	-0.024	2.82	0.010
94	13.675	13.812	0.15	0.15	1.06	76	1.66</td																				

Pellet Heater Test Data - ASTM E2779 / ASTM E2515

Run: **1**
 Manufacturer: **Sherwood**
 Model: **Maxx FS**
 Tracking No.: **2284**
 Project No.: **0268PF028E**
 Test Date: **16-Apr-18**
 Beginning Clock Time: **10:15**

High Burn End Time: **60**
 Medium Burn End Time: **61**
 Total Sampling Time: **133** min
 Recording Interval: **1** min

Background Sample Volume: **0** cubic feet

Meter Box Y Factor: **0.977** (1) **0.979** (2) **0** (Amb)

Barometric Pressure: Begin **29.92** Middle **N/A** End **N/A** Average **29.92** "Hg

PM Control Modules: **335/336**

Dilution Tunnel MW(dry): **29.00** lb/lb-mole
 Dilution Tunnel MW(wet): **28.78** lb/lb-mole
 Dilution Tunnel H₂O: **2.00** percent
 Dilution Tunnel Static: **-0.190** "H₂O
 Tunnel Area: **0.19635** ft²
 Pitot Tube Cp: **0.99**

Avg. Tunnel Velocity: **13.68** ft/sec.
 Initial Tunnel Flow: **154.1** scfm
 Average Tunnel Flow: **153.6** scfm
 Post-Test Leak Check (1): **N/A** cfm @ **N/A** in. Hg
 Post-Test Leak Check (2): **N/A** cfm @ **N/A** in. Hg
 Fuel Moisture (%): **5.910** Dry Basis **5.580** Wet Basis

Velocity Traverse Data									
	Pt.1	Pt.2	Pt.3	Pt.4	Pt.5	Pt.6	Pt.7	Pt.8	Center
Initial dP	0.036	0.054	0.050	0.032	0.040	0.048	0.050	0.032	0.065
Temp:	91								

"H₂O
°F

V_{strav} **13.93** ft/sec V_{scent} **17.26** ft/sec F_p **0.807**

Elapsed Time (min)	Particulate Sampling Data												Fuel Weight (lb)		Temperature Data (°F)					Stack Gas Data							
	Gas Meter 1 (ft ³)	Gas Meter 2 (ft ³)	Sample Rate 1 (cfm)	Sample Rate 2 (cfm)	Orifice dH 1 ("H ₂ O)	Meter Temp 1 (°F)	Meter Vacuum 1 ("Hg)	Orifice dH 2 ("H ₂ O)	Meter Temp 2 (°F)	Meter Vacuum 2 ("Hg)	Dilution Tunnel (°F)	Tunnel Center dP	sqrt dp	vsi	Pro. Rate 1	Pro. Rate 2	Scale Reading	Weight Change	Stack	Filter 1	Dryer 1	Filter 2	Dryer 2	Ambient	Draft ("H ₂ O)	CO ₂ (%)	CO (%)
118	17.181	17.376	0.15	0.15	1.04	77	1.68	0.98	77	3.50	74	0.061	0.247	13.29	101	101	20.5	-0.1	163	67	72	67	70	67	-0.026	6.49	0.000
119	17.327	17.526	0.15	0.15	1.04	77	1.69	0.99	77	3.50	75	0.061	0.247	13.30	101	101	20.5	0.0	165	67	72	70	67	-0.027	6.81	0.010	
120	17.472	17.673	0.15	0.15	1.05	77	1.69	0.98	77	3.50	75	0.062	0.249	13.41	100	100	20.4	-0.1	167	67	72	70	68	-0.028	6.18	0.000	
121	17.617	17.821	0.15	0.15	1.04	77	1.69	0.98	77	3.50	75	0.064	0.253	13.62	98	99	20.4	0.0	169	67	72	67	70	68	-0.028	6.73	0.000
122	17.762	17.970	0.15	0.15	1.04	77	1.69	0.98	77	3.50	75	0.064	0.253	13.62	98	100	20.4	0.0	171	67	72	67	70	68	-0.028	6.38	0.000
123	17.908	18.118	0.15	0.15	1.04	77	1.70	0.97	77	3.50	76	0.061	0.247	13.31	101	101	20.3	-0.1	173	67	72	67	70	68	-0.029	7.59	0.040
124	18.053	18.265	0.15	0.15	1.04	77	1.69	0.98	78	3.50	76	0.064	0.253	13.64	98	98	20.2	-0.1	175	67	72	67	70	68	-0.029	6.53	0.000
125	18.199	18.413	0.15	0.15	1.03	77	1.70	0.97	78	3.50	76	0.060	0.245	13.20	102	102	20.2	0.0	177	67	72	67	70	68	-0.029	6.38	0.000
126	18.344	18.560	0.15	0.15	1.04	77	1.71	0.98	78	3.50	76	0.061	0.247	13.31	100	101	20.2	0.0	179	68	72	67	70	68	-0.030	6.71	0.000
127	18.489	18.708	0.15	0.15	1.03	77	1.71	0.98	78	3.60	77	0.060	0.245	13.22	101	102	20.1	-0.1	181	68	72	67	70	68	-0.030	6.03	0.000
128	18.634	18.855	0.15	0.15	1.03	77	1.71	0.97	78	3.60	77	0.062	0.249	13.44	100	100	20.1	0.0	182	68	72	67	70	68	-0.030	6.38	0.010
129	18.778	19.003	0.14	0.15	1.04	77	1.72	0.97	78	3.60	77	0.065	0.255	13.76	97	98	20.0	-0.1	183	68	72	68	70	68	-0.031	5.94	0.000
130	18.923	19.151	0.15	0.15	1.03	77	1.72	0.97	78	3.60	77	0.062	0.249	13.44	100	100	20.0	0.0	184	68	72	68	70	68	-0.030	6.24	0.010
131	19.067	19.298	0.14	0.15	1.03	77	1.71	0.97	78	3.60	77	0.058	0.241	12.99	102	103	19.9	-0.1	185	68	72	68	70	68	-0.031	6.05	0.000
132	19.212	19.445	0.15	0.15	1.03	77	1.71	0.97	78	3.60	78	0.063	0.251	13.56	99	99	19.9	0.0	186	68	72	68	70	68	-0.031	6.44	0.000
133	19.357	19.592	0.15	0.15	1.03	77	1.71	0.97	78	3.60	77	0.061	0.247	13.33	101	101	19.8	-0.1	186	68	72	68	70	68	-0.030	6.62	0.000
Avg/Tot	19.357	19.592	0.15	0.15	1.05	74	2.11	0.99	74	2.90	83	0.06	0.252		100	100			251	68	70	68	68	67	-0.041	7.61	0.256

RUN ABORTED

Pellet Heater Certification Run Sheets

Client: Sherwood Project Number: 0268PF028E Run Number: 1
 Model: Maxx FS Tracking Number: 2284 Date: 4/16/18
 Test Crew: A. Kravitz
 OMNI Equipment ID numbers: _____

ASTM E2779 Run Notes**Air Control Settings**High Burn Rate Target: 100%Settings: Setting 5 (max)Additional Settings
Notes:

Adjust trim
slide @ 30 min
from start
per mfg. instr.

Medium Burn Rate Target: <50%Settings: Setting 2Low Burn Rate Target: MinimumSettings: Setting 1 (min)Pellet Moisture Content: 5.58% WBPellet Specifications: Lignetics Premium Mill #03208Pellet Analysis Notes: TPT Report # V218-0140-01**Preburn Notes**

Time	Notes
	- None -

Test Notes

Time	Notes
60:00	Changed filter A
61:00	Reduced to max
107:00	Noted extreme flame drop, likely due to misadjustment/power loss to unit. Reset to power 2 to confirm
133:00	Confirmed adjustment error, RUN ABORTED

Technician Signature: A. KravitzDate: 4/16/18

Pellet Heater Certification Run Sheets

Client: Sherwood Project Number: 0268PF028E Run Number: 1
 Model: Max FS Tracking Number: 2284 Date: 4/11/18
 Test Crew: A. Kravitz
 OMNI Equipment ID numbers: _____

ASTM E2515 Sampling Information

Test Location: E1 Test Start Time: 10:15
 Span Gas Concentrations: 11.03 / 5.000 / 101

Test Run Validation Checks	Pre Test	Post Test
Zero Stack Gas Leakage	✓	N/A
Zero Pitot Line Leakage	✓	ABORTED
Zero Induced Draft	✓	
100% Smoke Capture	✓	

Test Run Validation Measurements	Pre Test	Post Test
Scale Audit (lbs)	10.0	
CO ₂ % (Zero/Span)	0.00	16.01 4.944 psd
CO % (Zero/Span)	0.000	7.111 16.01 psd
CO ppm (Zero/Span)	0	101
Sample A Leakage (cfm@"Hg)	6 @ 9"	
Sample B Leakage (cfm@"Hg)	8 @ 7"	
Room Air Velocity (ft/min)	< 50	
Barometric Pressure (" Hg)	29.92	
Relative Humidity (%)	30.0	
Tunnel Static (in. H ₂ O)	~ 0.19	

Last Cleaning Dates

Flue Pipe	4/13/18
Dilution Tunnel	4/13/18
Sample Dryers	4/13/18

Dilution Tunnel Traverse

Traverse Point	1	2	Center	3	4	5	6	Center	7	8
Δp (" H ₂ O)	0.031	0.054	0.065	0.050	0.032	0.046	0.048	X	0.050	0.052
T (°F)	91	—	—	—	—	—	—	X	—	—

Technician Signature: A. Kravitz

Date: 4/16/18

2.1 - Test Data by Run

Run 2 Results & Data (Certification)

Pellet Heater Test Results - ASTM E2779 / ASTM E2515

Manufacturer: Sherwood
 Model: Maxx FS
 Project No.: 0268PF028E
 Tracking No.: 2284
 Run: 2

Technician Signature: 

Test Date: 04/17/18

Integrated Test Run		First Hour Emissions	
Particulate Emission Rate	1.87 g/hr	Particulate Emission Rate	7.74 g/hr
Total Particulate Emissions - E_T	11.25 g	Total Particulate Emissions - E_T	7.74 g
Emissisons Factor	1.35 g/kg	Emissisons Factor	2.38 g/kg

Burn Rate (Composite)	1.38 kg/hr dry	
Burn Rate (High)	3.25 kg/hr dry	
Burn Rate (Medium)	1.25 kg/hr dry	38.5% Of High
Burn Rate (Low)	0.85 kg/hr dry	26.2% Of High
Average Tunnel Temperature	92 degrees F	
Avg. Velocity in Dilution Tunnel - v_s	13.85 ft/second	
Avg. Flow Rate in Dilution Tunnel - Q_{sd}	9288.1 dscf/hour	
Average Δp	0.060 inches H2O	
Average ΔH	1.09 inches H2O	
Total Time of Test	362 minutes	

	1 st Hour	Sample Train 1	Sample Train 2	Ambient Sample	Unit
Total Sample Volume - V_m	8.779	53.814	53.580		ft ³
Average Gas Meter Temperature	79.51	83.28	83.72		°F
Sample Volume (Std. Conditions) - V_{mstd}	8.521	51.873	51.693		dsf ³
Total Particulates - m_n	7.1	10.3	10.5	<i>Not Applicable</i>	mg
Particulate Concentration - C_r/C_s	8.332E-04	1.986E-04	2.031E-04		g/dsf ³
Total Particulate Emissions - E_T	7.74	11.13	11.38		g
Particulate Emission Rate	7.74	1.84	1.89		g/hr
Emissisons Factor	2.38	1.33	1.36		g/kg
Delta from Avg. Particulate Emissions		0.13	0.13		g

Quality Checks			
Filter Temps < 90 °F	OK	Ambient Temp (55-90°F)	OK
Filter Face Velocity	OK	Negative Probe Weight	OK
Leakage Rate	OK	Pro-Rate Variation	OK
Medium Burn Rate < 50%	OK	Dual Train Comparison	OK



CSA Method B415 Results - Overall & By Category

Manufacturer: Sherwood
Model: Maxx FS
Date: 04/17/18

Run: 2
Control #: 0268PF028E
Test Duration: 362

Test Results in Accordance with CSA B415.1-09 - Overall

	HHV Basis	LHV Basis
Overall Efficiency	77.4%	82.7%
Combustion Efficiency	97.3%	97.3%
Heat Transfer Efficiency	80%	85.0%
Output Rate (kJ/h)	21,991	20,861 (Btu/h)
Burn Rate (kg/h)	1.38	3.05 (lb/h)
Input (kJ/h)	28,416	26,956 (Btu/h)
Test Load Weight (dry kg)	8.35	18.41
MC wet (%)	5.58	
MC dry (%)	5.91	
Particulate (g)	11.25	
CO (g)	414	
Test Duration (h)	6.03	
Emissions	Particulate	CO
g/MJ Output	0.08	3.12
g/kg Dry Fuel	1.35	49.54
g/h	1.87	68.59
Ib/MM Btu Output	0.20	7.25
Air/Fuel Ratio (A/F)	24.06	

Test Results in Accordance with CSA B415.1-09 - Maximum

	HHV Basis	LHV Basis
Overall Efficiency	79.9%	85.3%
Combustion Efficiency	97.4%	97.4%
Heat Transfer Efficiency	82%	87.6%
Output Rate (kJ/h)	53,369	50,627 (Btu/h)
Burn Rate (kg/h)	3.26	7.18 (lb/h)
Input (kJ/h)	66,820	63,386 (Btu/h)
Test Load Weight (dry kg)	3.26	7.18
MC wet (%)	5.58	
MC dry (%)	5.91	
Particulate (g)	7.10	
CO (g)	131	
Test Duration (h)	1.00	
Emissions	Particulate	CO
g/MJ Output	0.13	2.45
g/kg Dry Fuel	2.18	40.09
g/h	7.10	130.53
Ib/MM Btu Output	0.31	5.68
Air/Fuel Ratio (A/F)	11.56	

Test Results in Accordance with CSA B415.1-09 - Medium

	HHV Basis	LHV Basis
Overall Efficiency	78.0%	97.9%
Combustion Efficiency	97.9%	85.1%
Heat Transfer Efficiency	80%	85.1%
Output Rate (kJ/h)	20,061	19,030 (Btu/h)
Burn Rate (kg/h)	1.25	2.76 (lb/h)
Input (kJ/h)	25,722	24,400 (Btu/h)
Test Load Weight (dry kg)	2.53	5.57
MC wet (%)	5.58	
MC dry (%)	5.91	
Particulate (g)	-	
CO (g)	106	
Test Duration (h)	2.02	
Emissions	Particulate	CO
g/MJ Output	-	2.61
g/kg Dry Fuel	-	41.83
g/h	-	52.43
Ib/MM Btu Output	-	6.07
Air/Fuel Ratio (A/F)	26.05	

Test Results in Accordance with CSA B415.1-09 - Minimum

	HHV Basis	LHV Basis
Overall Efficiency	73.5%	96.6%
Combustion Efficiency	96.6%	81.3%
Heat Transfer Efficiency	76%	81.3%
Output Rate (kJ/h)	12,850	12,190 (Btu/h)
Burn Rate (kg/h)	0.85	1.88 (lb/h)
Input (kJ/h)	17,487	16,588 (Btu/h)
Test Load Weight (dry kg)	2.57	5.67
MC wet (%)	5.58	
MC dry (%)	5.91	
Particulate (g)	-	
CO (g)	174	
Test Duration (h)	3.02	
Emissions	Particulate	CO
g/MJ Output	-	4.50
g/kg Dry Fuel	-	67.86
g/h	-	57.82
Ib/MM Btu Output	-	10.46
Air/Fuel Ratio (A/F)	34.64	

Pellet Heater Preburn Data - ASTM E2779

Manufacturer: Sherwood
 Model: Maxx FS
 Tracking No.: 2284
 Project No.: 0268PF028E
 Test Date: 4/17/2018

PB Length: 60 min
 Recording Interval: 1 min

Averages:	355	75	-0.06	10.39	0.46
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Elapsed Time (min)	Scale Reading	Weight Change	Stack (F)	Ambient (F)	Draft ("H2O)	CO2 (%)	CO (%)
1	8.3	-	347	75	-0.06	N/A	N/A
2	8.1	-0.2	346	74	-0.06	N/A	N/A
3	8.0	-0.1	347	74	-0.06	N/A	N/A
4	7.9	-0.1	346	74	-0.06	N/A	N/A
5	7.7	-0.2	347	74	-0.06	N/A	N/A
6	7.6	-0.1	348	74	-0.06	N/A	N/A
7	7.4	-0.2	348	74	-0.06	N/A	N/A
8	7.3	-0.1	347	74	-0.06	N/A	N/A
9	7.2	-0.1	348	75	-0.06	N/A	N/A
10	7.0	-0.2	349	75	-0.06	N/A	N/A
11	6.9	-0.1	349	74	-0.06	N/A	N/A
12	6.7	-0.2	349	75	-0.06	N/A	N/A
13	6.6	-0.1	350	74	-0.06	N/A	N/A
14	6.4	-0.2	351	74	-0.06	N/A	N/A
15	6.3	-0.1	351	75	-0.06	N/A	N/A
16	6.2	-0.1	351	74	-0.06	N/A	N/A
17	6.0	-0.2	352	75	-0.06	N/A	N/A
18	5.9	-0.1	352	74	-0.06	N/A	N/A
19	5.7	-0.2	352	74	-0.06	N/A	N/A
20	5.6	-0.1	352	75	-0.06	N/A	N/A
21	5.5	-0.1	352	75	-0.06	N/A	N/A
22	5.3	-0.2	353	75	-0.06	N/A	N/A
23	5.2	-0.1	354	75	-0.06	N/A	N/A
24	5.0	-0.2	355	75	-0.06	N/A	N/A
25	4.9	-0.1	355	75	-0.06	N/A	N/A
26	4.8	-0.1	356	75	-0.06	N/A	N/A
27	4.6	-0.2	356	75	-0.06	N/A	N/A
28	4.5	-0.1	356	75	-0.06	N/A	N/A
29	4.3	-0.2	356	75	-0.06	N/A	N/A
30	4.2	-0.1	356	75	-0.06	N/A	N/A
31	4.1	-0.1	355	75	-0.06	N/A	N/A
32	3.9	-0.2	356	76	-0.06	N/A	N/A
33	3.8	-0.1	357	76	-0.06	N/A	N/A
34	3.6	-0.2	357	76	-0.06	N/A	N/A
35	3.5	-0.1	358	75	-0.06	N/A	N/A
36	3.4	-0.1	357	76	-0.06	N/A	N/A
37	3.3	-0.1	356	75	-0.06	N/A	N/A
38	3.1	-0.2	356	75	-0.06	N/A	N/A
39	3.0	-0.1	355	75	-0.06	N/A	N/A
40	2.9	-0.1	356	76	-0.06	10.34	0.40
41	2.7	-0.2	356	76	-0.06	10.28	0.25
42	2.6	-0.1	356	75	-0.06	10.43	0.56
43	2.4	-0.2	356	75	-0.06	9.29	0.10
44	2.3	-0.1	356	75	-0.06	10.38	0.25
45	2.2	-0.1	356	76	-0.06	10.64	0.70
46	2.0	-0.2	357	76	-0.06	10.56	0.59
47	1.9	-0.1	357	75	-0.06	10.44	0.31
48	1.7	-0.2	358	75	-0.06	10.81	1.09
49	1.6	-0.1	359	76	-0.06	10.56	0.36



Pellet Heater Preburn Data - ASTM E2779

Manufacturer: Sherwood
 Model: Maxx FS
 Tracking No.: 2284
 Project No.: 0268PF028E
 Test Date: 4/17/2018

PB Length: 60 min
 Recording Interval: 1 min

Averages:	355	75	-0.06	10.39	0.46
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49	50	1.5	-0.1	359	76	-0.06	10.73	0.74
50	51	1.3	-0.2	359	75	-0.06	9.39	0.10
51	52	1.2	-0.1	359	75	-0.06	10.67	0.66
52	53	1.1	-0.1	360	76	-0.06	10.44	0.30
53	54	0.9	-0.2	360	76	-0.06	10.33	0.35
54	55	0.8	-0.1	360	76	-0.06	10.01	0.16
55	56	0.6	-0.2	360	75	-0.06	10.66	0.55
56	57	0.5	-0.1	361	75	-0.06	10.80	0.49
57	58	0.4	-0.1	361	75	-0.06	10.34	0.54
58	59	0.2	-0.2	361	76	-0.06	10.45	0.37
59	60	0.1	-0.1	360	76	-0.06	10.80	0.90
60	61	0.0	-0.1	361	76	-0.06	10.32	0.30

Pellet Heater Test Data - ASTM E2779 / ASTM E2515

Run: 2

Manufacturer: Sherwood
 Model: Maxx FS
 Tracking No.: 2284
 Project No.: 0268PF028E
 Test Date: 17-Apr-18

High Burn End Time: 60
 Medium Burn End Time: 181
 Total Sampling Time: 362 min
 Recording Interval: 1 min

Beginning Clock Time: 10:08

Background Sample Volume: 0 cubic feet

Meter Box Y Factor: 0.977 (1) 0.979 (2) 0 (Amb)

Barometric Pressure:			
Begin	Middle	End	Average
30.33	30.31	30.28	30.31 "Hg

PM Control Modules: 335/336
 Dilution Tunnel MW(dry): 29.00 lb/lb-mole
 Dilution Tunnel MW(wet): 28.78 lb/lb-mole
 Dilution Tunnel H₂O: 2.00 percent
 Dilution Tunnel Static: -0.190 "H₂O
 Tunnel Area: 0.19635 ft²
 Pitot Tube Cp: 0.99

Avg. Tunnel Velocity: 13.85 ft/sec.
 Initial Tunnel Flow: 147.2 scfm
 Average Tunnel Flow: 154.8 scfm
 Post-Test Leak Check (1): 0.000 cfm @ -8 in. Hg
 Post-Test Leak Check (2): 0.000 cfm @ -17 in. Hg
 Fuel Moisture (%): 5.910 Dry Basis 5.580 Wet Basis

	Pt.1	Pt.2	Pt.3	Pt.4	Pt.5	Pt.6	Pt.7	Pt.8	Center
Initial dP	0.026	0.040	0.050	0.040	0.036	0.048	0.046	0.032	0.056
Temp.	108	108	108	108	108	108	108	108	108

"H₂O

°F

V_{strav} 13.55 ft/sec V_{scent} 16.16 ft/sec F_p 0.838

Elapsed Time (min)	Particulate Sampling Data												Fuel Weight (lb)		Temperature Data (°F)						Stack Gas Data				
	Gas Meter 1 (ft ³)	Gas Meter 2 (ft ³)	Sample Rate 1 (cfm)	Sample Rate 2 (cfm)	Orifice dH 1 ("H ₂ O)	Meter Temp 1 (°F)	Meter Vacuum 1 ("Hg)	Orifice dH 2 ("H ₂ O)	Meter Temp 2 (°F)	Meter Vacuum 2 ("Hg)	Dilution Tunnel (°F)	Tunnel Center dP	Pro. Rate 1	Pro. Rate 2	Scale Reading	Weight Change	Stack	Filter 1	Dryer 1	Filter 2	Dryer 2	Ambient	Draft ("H ₂ O)	CO ₂ (%)	CO (%)
0	0.000	0.000	0.04	76	-0.02	0.38	76	0.60	108	0.057			19.5		360	72	73	72	72	76	-0.058	10.01	0.400		
1	0.124	0.145	0.12	0.15	0.93	76	1.50	0.98	76	0.90	108	0.057	88	104	19.3	-0.2	360	73	73	73	76	-0.058	10.01	0.210	
2	0.261	0.294	0.14	0.15	0.93	76	1.51	0.97	76	0.90	108	0.059	96	105	19.2	-0.1	359	73	73	73	76	-0.057	9.61	0.130	
3	0.412	0.442	0.15	0.15	1.13	76	1.75	0.97	76	0.90	108	0.054	110	109	19.1	-0.1	359	73	73	74	73	75	-0.057	10.04	0.110
4	0.562	0.590	0.15	0.15	1.12	76	1.76	0.96	76	1.00	108	0.058	106	105	19.0	-0.1	358	74	73	74	73	76	-0.058	10.25	0.430
5	0.711	0.738	0.15	0.15	1.11	76	1.77	0.96	76	1.00	108	0.057	106	106	18.8	-0.2	358	74	73	74	73	75	-0.057	10.24	0.220
6	0.859	0.885	0.15	0.15	1.11	76	1.79	0.94	76	1.00	108	0.057	105	105	18.7	-0.1	358	74	73	74	73	76	-0.058	10.25	0.360
7	1.007	1.032	0.15	0.15	1.10	76	1.79	0.94	76	1.00	108	0.057	105	105	18.6	-0.1	358	74	73	74	73	76	-0.057	9.50	0.140
8	1.155	1.178	0.15	0.15	1.08	76	1.81	0.93	76	1.10	108	0.055	107	106	18.5	-0.1	359	74	73	75	73	76	-0.057	10.16	0.400
9	1.302	1.324	0.15	0.15	1.08	76	1.83	0.93	77	1.10	108	0.056	105	105	18.3	-0.2	359	74	73	75	73	76	-0.057	10.39	0.310
10	1.450	1.471	0.15	0.15	1.13	77	1.92	0.97	77	1.20	108	0.056	106	106	18.2	-0.1	359	75	74	75	73	75	-0.058	10.05	0.140
11	1.600	1.620	0.15	0.15	1.12	77	1.94	0.96	77	1.20	108	0.056	107	107	18.1	-0.1	359	75	74	75	73	75	-0.058	10.80	0.580
12	1.750	1.768	0.15	0.15	1.11	77	1.97	0.95	77	1.20	108	0.056	107	106	17.9	-0.2	360	75	74	75	73	75	-0.058	10.32	0.330
13	1.898	1.915	0.15	0.15	1.10	77	1.99	0.94	77	1.30	108	0.059	103	103	17.8	-0.1	360	75	74	75	73	75	-0.057	10.35	0.350
14	2.044	2.062	0.15	0.15	1.08	77	2.02	0.92	77	1.30	108	0.055	105	107	17.7	-0.1	360	75	74	76	73	75	-0.057	10.73	0.840
15	2.191	2.207	0.15	0.15	1.07	77	2.04	0.92	78	1.30	108	0.057	104	103	17.5	-0.2	360	75	74	76	73	75	-0.058	10.61	0.500
16	2.337	2.352	0.15	0.15	1.06	77	2.05	0.92	78	1.40	108	0.059	102	101	17.4	-0.1	360	76	74	76	73	75	-0.058	10.43	0.410
17	2.486	2.503	0.15	0.15	1.12	78	2.18	1.07	78	1.60	108	0.057	105	107	17.3	-0.1	360	76	74	76	73	75	-0.058	10.32	0.420
18	2.634	2.660	0.15	0.16	1.11	78	2.21	1.05	78	1.70	109	0.056	106	113	17.1	-0.2	361	76	74	76	74	75	-0.058	10.58	0.500
19	2.782	2.815	0.15	0.16	1.10	78	2.23	1.05	78	1.70	108	0.058	104	109	17.0	-0.1	361	76	75	76	74	75	-0.058	10.28	0.250
20	2.930	2.970	0.15	0.16	1.09	78	2.24	1.05	78	1.70	108	0.055	107	112	16.9	-0.1	360	76	75	76	74	75	-0.058	9.95	0.210
21	3.078	3.125	0.15	0.16	1.09	78	2.26	1.04	79	1.70	108	0.057	105	110	16.8	-0.1	360	76	75	77	74	75	-0.058	9.90	0.150
22	3.225	3.278	0.15	0.15	1.08	78	2.27	1.03	79	1.80	108	0.059	102	107	16.6	-0.2	360	76	75	77	74	75	-0.058	10.60	0.410
23	3.371	3.433	0.15	0.16	1.07	79	2.29	1.03	79	1.80	109	0.055	105	112	16.5	-0.1	360	76	75	77	74	75	-0.058	10.43	0.290
24	3.517	3.586	0.15	0.15	1.06	79	2.31	1.03	79	1.80	109	0.057	103	109	16.4	-0.1	360	77	75	77	74	75	-0.058	9.74	0.150
25	3.663	3.739	0.15	0.15	1.06	79	2.31	1.01	79	1.80	108	0.057	103	109	16.3	-0.1	360	77	75	77	74	75	-0.058	10.22	0.330
26	3.809	3.892	0.15	0.15	1.05	79	2.33	1.01	79	1.90	109	0.055	105	111	16.1	-0.2	360	77	76	77	74	75	-0.058	9.66	0.120
27	3.953	4.043	0.14	0.15	1.04	79	2.36	1.00	80	1.90	109	0.055	104	109	16.0	-0.1	359	77	76	77	74	75	-0.058	10.20	0.370
28	4.098	4.195	0.15	0.15	1.03	79	2.38	0.99	80	1.90	108	0.057	102	108	15.9	-0.1	359	77	76	77	75	76	-0.058	9.95	0.190
29	4.242	4.347	0.14	0.15	1.02	79	2.39	0.99	80	2.00	109	0.054	105	111	15.8	-0.1	359	77	76	77	75	76	-0.058	10.21	0.200
30	4.385	4.497	0.14	0.15	1.02	80	2.41	0.98	80	2.00	109	0.055	103	108	15.6	-0.2	360	77	76	77	75	76	-0.058	10.45	0.370
31	4.528	4.647	0.14	0.15	1.01	80	2.43	0.98	80	2.00	109	0.058	100	105	15.5	-0.1	359	77	76	78	75	76	-0.058	10.05	0.260
32	4.670	4.798	0.14	0.15	1.01	80	2.43	0.98	80	2.00	108	0.058	99	106	15.4	-0.1	359	77	76	78	75	75	-0.058	9.35	0.150
33	4.820	4.947	0.15	0.15	1.17	80	2.73	0.98	81	2.00	109	0.054	109	108	15.3	-0.1	359	77	76	78	75	76	-0.058	9.83	0.190
34	4.973	5.096	0.15	0.15	1.15	80	2.76	0.97	81	2.10	108	0.057	108	105	15.1	-0.2	359	77	76	78	75	76	-0.058	10.48	0.400
35	5.126	5.245	0.15	0.15	1.14	80	2.79	0.95	81	2.10	109	0.054	111	108	15.0	-0.1	359	78	77	78	75	76	-0.058	10.43	0.760
36	5.273	5.393	0.15	0.15	1.09	81	2.73	0.94	81	2.10	109	0.057	104	105	14.9	-0.1	359	78	77	78	76	75	-0.058	10.42	0.560
37	5.421	5.541	0.15	0.15	1.07	81	2.75	0.95	81	2.20	109	0.059	102	103	14.7	-0.2	359	78	77	78	76	76	-0.058	10.39	0.360
38	5.569	5.689	0.15	0.15	1.07	81	2.76	0.94	81	2.20	108	0.056	105	106	14.6	-0.1	359	78	77	78	75	76	-0.058	10.44	0.360
39	5.716	5.835	0.15	0.15	1.07	81	2.78	0.94	82	2.20	109	0.05													



Pellet Heater Test Data - ASTM E2779 / ASTM E2515

Run: 2

Manufacturer: Sherwood
 Model: Maxx FS
 Tracking No.: 2284
 Project No.: 0268PF028E
 Test Date: 17-Apr-18

High Burn End Time: 60
 Medium Burn End Time: 181
 Total Sampling Time: 362 min
 Recording Interval: 1 min

Beginning Clock Time: 10:08

Background Sample Volume: 0 cubic feet

PM Control Modules: 335/336

Dilution Tunnel MW(dry): 29.00 lb/lb-mole
 Dilution Tunnel MW(wet): 28.78 lb/lb-mole
 Dilution Tunnel H₂O: 2.00 percent
 Dilution Tunnel Static: -0.190 "H₂O
 Tunnel Area: 0.19635 ft²
 Pitot Tube Cp: 0.99

Avg. Tunnel Velocity: 13.85 ft/sec.
 Initial Tunnel Flow: 147.2 scfm
 Average Tunnel Flow: 154.8 scfm
 Post-Test Leak Check (1): 0.000 cfm @ -8 in. Hg
 Post-Test Leak Check (2): 0.000 cfm @ -17 in. Hg
 Fuel Moisture (%): 5.910 Dry Basis 5.580 Wet Basis

Meter Box Y Factor: 0.977 (1) 0.979 (2) 0 (Amb)

Barometric Pressure:				Begin	Middle	End	Average
				30.33	30.31	30.28	30.31 "Hg

	Pt.1	Pt.2	Pt.3	Pt.4	Pt.5	Pt.6	Pt.7	Pt.8	Center
Initial dP	0.026	0.040	0.050	0.040	0.036	0.048	0.046	0.032	0.056
Temp.	108	108	108	108	108	108	108	108	108

"H₂O

°F

V_{strav} 13.55 ft/sec V_{scent} 16.16 ft/sec F_p 0.838

Elapsed Time (min)	Particulate Sampling Data												Fuel Weight (lb)		Temperature Data (°F)						Stack Gas Data				
	Gas Meter 1 (ft ³)	Gas Meter 2 (ft ³)	Sample Rate 1 (cfm)	Sample Rate 2 (cfm)	Orifice dH 1 ("H ₂ O)	Meter Temp 1 (°F)	Meter Vacuum 1 ("Hg)	Orifice dH 2 ("H ₂ O)	Meter Temp 2 (°F)	Meter Vacuum 2 ("Hg)	Dilution Tunnel (°F)	Tunnel Center dP	Pro. Rate 1	Pro. Rate 2	Scale Reading	Weight Change	Stack	Filter 1	Dryer 1	Filter 2	Dryer 2	Ambient	Draft ("H ₂ O)	CO ₂ (%)	CO (%)
54	7.880	8.034	0.14	0.15	1.01	83	3.18	0.92	83	2.80	110	0.059	98	102	12.6	-0.2	359	78	74	79	67	76	-0.058	10.33	0.530
55	8.022	8.179	0.14	0.15	1.00	83	3.20	0.92	83	2.80	110	0.055	102	104	12.5	-0.1	359	78	74	79	67	76	-0.058	10.67	0.480
56	8.171	8.325	0.15	0.15	1.11	83	3.47	0.92	83	2.80	110	0.056	106	104	12.4	-0.1	360	79	74	79	67	76	-0.058	10.26	0.250
57	8.321	8.470	0.15	0.15	1.10	83	3.48	0.91	84	2.80	110	0.055	107	104	12.2	-0.2	360	79	74	79	67	76	-0.058	10.46	0.450
58	8.470	8.615	0.15	0.15	1.08	83	3.52	0.91	84	2.90	110	0.056	106	103	12.1	-0.1	360	79	74	79	68	76	-0.058	10.47	0.260
59	8.618	8.760	0.15	0.15	1.09	83	3.54	0.91	84	2.90	110	0.057	104	102	12.0	-0.1	360	79	74	79	68	76	-0.058	10.07	0.200
60	8.779	8.904	0.16	0.14	1.61	83	2.04	0.91	84	2.90	110	0.051	120	107	11.9	-0.1	360	78	75	79	68	76	-0.058	10.15	0.220
61	8.927	9.048	0.15	0.14	0.87	83	1.46	0.90	84	2.90	110	0.056	105	102	11.7	-0.2	359	78	74	79	68	77	-0.057	9.96	0.180
62	9.060	9.192	0.13	0.14	0.87	83	1.45	0.90	84	2.90	107	0.056	94	102	11.7	0.0	350	78	74	79	68	77	-0.056	9.69	0.104
63	9.207	9.337	0.15	0.15	1.09	83	1.70	0.98	84	3.10	105	0.056	104	103	11.6	-0.1	341	79	74	79	68	76	-0.055	5.95	0.075
64	9.355	9.488	0.15	0.15	1.09	83	1.70	0.98	84	3.10	105	0.054	106	109	11.6	0.0	334	79	74	79	69	77	-0.054	5.13	0.110
65	9.504	9.639	0.15	0.15	1.09	83	1.71	0.97	84	3.10	104	0.055	106	108	11.5	-0.1	324	79	74	79	69	77	-0.052	5.49	0.161
66	9.653	9.790	0.15	0.15	1.09	84	1.70	0.97	84	3.10	103	0.058	103	105	11.5	0.0	315	79	75	79	69	77	-0.051	5.57	0.043
67	9.802	9.939	0.15	0.15	1.10	84	1.70	0.97	84	3.10	103	0.053	108	108	11.4	-0.1	308	79	75	79	69	77	-0.050	5.36	0.087
68	9.950	10.090	0.15	0.15	1.10	84	1.70	0.98	84	3.10	102	0.056	104	107	11.4	0.0	300	79	75	79	69	77	-0.049	4.67	0.238
69	10.100	10.241	0.15	0.15	1.09	84	1.71	0.98	85	3.10	101	0.054	107	108	11.3	-0.1	296	79	75	79	69	76	-0.049	6.30	0.031
70	10.249	10.391	0.15	0.15	1.09	84	1.71	0.98	85	3.10	101	0.055	106	107	11.2	-0.1	291	79	75	79	69	76	-0.048	5.04	0.082
71	10.398	10.541	0.15	0.15	1.10	84	1.71	0.98	85	3.10	100	0.056	104	106	11.2	0.0	284	79	75	79	70	76	-0.047	3.90	0.243
72	10.547	10.692	0.15	0.15	1.10	84	1.71	0.97	85	3.10	100	0.056	104	106	11.2	0.0	279	79	75	79	70	76	-0.046	4.28	0.143
73	10.697	10.843	0.15	0.15	1.09	84	1.71	0.97	85	3.10	100	0.058	103	104	11.1	-0.1	275	79	75	78	70	76	-0.045	4.93	0.066
74	10.846	10.993	0.15	0.15	1.10	84	1.71	0.98	85	3.10	99	0.055	105	106	11.1	0.0	271	79	75	78	70	76	-0.044	4.57	0.128
75	10.994	11.144	0.15	0.15	1.10	84	1.70	0.97	85	3.10	99	0.054	106	108	11.0	-0.1	267	79	75	79	70	77	-0.044	5.11	0.041
76	11.144	11.295	0.15	0.15	1.09	84	1.71	0.98	85	3.10	98	0.055	106	107	11.0	0.0	263	79	75	78	70	76	-0.043	4.23	0.217
77	11.293	11.445	0.15	0.15	1.09	84	1.71	0.98	85	3.10	98	0.058	102	104	10.9	-0.1	258	78	75	78	70	76	-0.042	4.29	0.150
78	11.442	11.595	0.15	0.15	1.10	84	1.71	0.98	85	3.10	97	0.056	104	105	10.9	0.0	255	78	75	78	71	76	-0.041	4.31	0.083
79	11.591	11.746	0.15	0.15	1.10	84	1.71	0.97	85	3.10	97	0.056	104	106	10.8	-0.1	251	78	75	78	71	77	-0.041	4.20	0.260
80	11.741	11.897	0.15	0.15	1.09	84	1.72	0.97	85	3.10	97	0.058	103	104	10.8	0.0	249	78	75	78	71	76	-0.041	5.57	0.072
81	11.890	12.047	0.15	0.15	1.09	84	1.72	0.98	85	3.10	96	0.055	105	106	10.7	-0.1	247	78	75	78	71	76	-0.041	4.68	0.158
82	12.039	12.198	0.15	0.15	1.10	84	1.71	0.97	85	3.10	96	0.057	103	105	10.7	0.0	245	78	75	78	71	76	-0.040	4.29	0.278
83	12.188	12.349	0.15	0.15	1.09	85	1.71	0.97	85	3.10	96	0.055	105	107	10.7	0.0	243	78	75	78	71	76	-0.040	4.44	0.070
84	12.338	12.500	0.15	0.15	1.09	85	1.71	0.98	85	3.10	96	0.056	105	106	10.6	-0.1	241	78	75	78	71	76	-0.040	4.67	0.208
85	12.486	12.650	0.15	0.15	1.10	85	1.71	0.98	85	3.10	95	0.055	104	106	10.6	0.0	240	78	75	78	71	76	-0.040	4.79	0.057
86	12.636	12.801	0.15	0.15	1.10	85	1.71	0.97	85	3.10	95	0.055	105	107	10.5	-0.1	239	78	75	78	71	76	-0.039	4.36	0.084
87	12.785	12.952	0.15	0.15	1.09	85	1.71	0.97	85	3.10	95	0.057	103	105	10.5	0.0	237	78	75	78	71	76	-0.039	3.65	0.239
88	12.935	13.102	0.15	0.15	1.09	85	1.72	0.98	85	3.10	95	0.058	103	103	10.4	-0.1	236	78	75	78	72	76	-0.039	4.37	0.145
89	13.083	13.253	0.15	0.15	1.09	85	1.72	0.98	86	3.10	95	0.055	104	107	10.4	0.0	236	78	75	78	72	76	-0.039	4.74	0.057
90	13.233	13.404	0.15	0.15	1.10	85	1.71	0.97	86	3.10	95	0.053	107	109	10.3	-0.1	235	78	75	78	72	76	-0.039	5.04	0.045
91	13.382	13.555	0.15	0.15	1.10	85	1.71	0.97	86	3.10	95	0.056	104	106	10.3	0.0	235	78	75	78	72	76	-0.039	4.99	0.039
92	13.531	13.705	0.15	0.15	1.10	85	1.72	0.98	86	3.10	95	0.055	105	106	10.3	0.0	235	78	75	78	72	76	-0.039</		



Pellet Heater Test Data - ASTM E2779 / ASTM E2515

Run: 2

 Manufacturer: Sherwood
 Model: Maxx FS
 Tracking No.: 2284
 Project No.: 0268PF028E
 Test Date: 17-Apr-18

 High Burn End Time: 60
 Medium Burn End Time: 181
 Total Sampling Time: 362 min
 Recording Interval: 1 min

Beginning Clock Time: 10:08

Background Sample Volume: 0 cubic feet

Meter Box Y Factor: 0.977 (1) 0.979 (2) 0 (Amb)

 Barometric Pressure: Begin Middle End Average
 30.33 30.31 30.28 30.31 "Hg

PM Control Modules: 335/336

 Dilution Tunnel MW(dry): 29.00 lb/lb-mole
 Dilution Tunnel MW(wet): 28.78 lb/lb-mole
 Dilution Tunnel H₂O: 2.00 percent
 Dilution Tunnel Static: -0.190 "H₂O
 Tunnel Area: 0.19635 ft²
 Pitot Tube Cp: 0.99

 Avg. Tunnel Velocity: 13.85 ft/sec.
 Initial Tunnel Flow: 147.2 scfm
 Average Tunnel Flow: 154.8 scfm
 Post-Test Leak Check (1): 0.000 cfm @ -8 in. Hg
 Post-Test Leak Check (2): 0.000 cfm @ -17 in. Hg
 Fuel Moisture (%): 5.910 Dry Basis 5.580 Wet Basis

	Pt.1	Pt.2	Pt.3	Pt.4	Pt.5	Pt.6	Pt.7	Pt.8	Center
Initial dP	0.026	0.040	0.050	0.040	0.036	0.048	0.046	0.032	0.056
Temp.	108	108	108	108	108	108	108	108	108

Velocity Traverse Data

V _{strav}	13.55	ft/sec	V _{scent}	16.16	ft/sec	F _p	0.838
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"H₂O
°F

Elapsed Time (min)	Particulate Sampling Data												Fuel Weight (lb)		Temperature Data (°F)						Stack Gas Data				
	Gas Meter 1 (ft ³)	Gas Meter 2 (ft ³)	Sample Rate 1 (cfm)	Sample Rate 2 (cfm)	Orifice dH 1 ("H ₂ O)	Meter Temp 1 (°F)	Meter Vacuum 1 ("Hg)	Orifice dH 2 ("H ₂ O)	Meter Temp 2 (°F)	Meter Vacuum 2 ("Hg)	Dilution Tunnel (°F)	Tunnel Center dP	Pro. Rate 1	Pro. Rate 2	Scale Reading	Weight Change	Stack	Filter 1	Dryer 1	Filter 2	Dryer 2	Ambient	Draft ("H ₂ O)	CO ₂ (%)	CO (%)
108	15.920	16.097	0.15	0.15	1.09	85	1.71	0.94	86	3.00	94	0.054	106	105	9.6	-0.1	227	78	75	78	72	76	-0.037	4.50	0.104
109	16.069	16.244	0.15	0.15	1.10	85	1.72	0.94	86	3.00	94	0.055	105	104	9.6	0.0	227	78	75	78	72	76	-0.038	4.59	0.138
110	16.217	16.392	0.15	0.15	1.10	85	1.72	0.94	86	3.00	94	0.056	103	103	9.6	0.0	227	78	75	77	72	76	-0.037	4.15	0.186
111	16.367	16.539	0.15	0.15	1.09	85	1.71	0.93	86	3.00	94	0.055	105	104	9.5	-0.1	226	78	75	77	72	76	-0.037	3.75	0.290
112	16.517	16.687	0.15	0.15	1.09	85	1.71	0.93	86	3.00	94	0.055	105	104	9.5	0.0	225	78	75	77	72	75	-0.037	4.47	0.116
113	16.665	16.835	0.15	0.15	1.09	85	1.72	0.93	86	3.00	94	0.055	104	104	9.4	-0.1	226	78	75	77	72	75	-0.037	4.33	0.092
114	16.815	16.983	0.15	0.15	1.09	85	1.71	0.93	86	3.00	94	0.057	104	102	9.4	0.0	227	78	75	77	72	76	-0.037	5.16	0.055
115	16.965	17.129	0.15	0.15	1.09	85	1.71	0.93	86	3.00	94	0.057	104	101	9.3	-0.1	227	78	75	77	72	75	-0.037	3.99	0.189
116	17.113	17.277	0.15	0.15	1.09	86	1.72	0.93	86	3.00	94	0.059	100	101	9.3	0.0	227	78	75	77	72	75	-0.037	4.73	0.087
117	17.262	17.424	0.15	0.15	1.10	86	1.72	0.93	86	3.00	94	0.057	103	102	9.2	-0.1	228	77	75	77	72	75	-0.037	4.72	0.154
118	17.412	17.571	0.15	0.15	1.09	86	1.71	0.93	86	3.00	95	0.054	106	105	9.2	0.0	229	78	75	77	73	75	-0.038	4.90	0.138
119	17.562	17.719	0.15	0.15	1.09	86	1.72	0.93	86	3.00	95	0.055	105	104	9.1	-0.1	229	78	75	77	73	75	-0.037	3.66	0.355
120	17.710	17.867	0.15	0.15	1.10	86	1.72	0.93	86	3.00	95	0.053	106	106	9.1	0.0	229	78	75	77	73	76	-0.038	3.75	0.387
121	17.860	18.015	0.15	0.15	1.09	86	1.72	0.93	86	3.00	95	0.060	101	100	9.0	-0.1	230	78	75	77	73	76	-0.038	5.50	0.031
122	18.010	18.161	0.15	0.15	1.09	86	1.71	0.94	86	3.00	95	0.055	105	103	9.0	0.0	229	78	75	77	73	76	-0.038	4.30	0.102
123	18.158	18.309	0.15	0.15	1.10	86	1.71	0.93	86	3.00	95	0.056	103	103	9.0	0.0	230	78	75	77	73	76	-0.038	4.52	0.180
124	18.307	18.456	0.15	0.15	1.10	86	1.72	0.93	86	3.00	95	0.055	105	104	8.9	-0.1	229	78	75	77	73	76	-0.037	3.67	0.186
125	18.457	18.604	0.15	0.15	1.09	86	1.72	0.93	86	3.00	95	0.057	103	103	8.9	0.0	229	78	75	77	73	75	-0.038	4.19	0.315
126	18.607	18.752	0.15	0.15	1.09	86	1.72	0.93	86	3.10	95	0.055	105	104	8.8	-0.1	229	78	75	77	73	76	-0.038	4.10	0.172
127	18.755	18.899	0.15	0.15	1.10	86	1.72	0.93	86	3.00	95	0.057	102	102	8.8	0.0	229	78	75	77	73	75	-0.038	4.68	0.038
128	18.905	19.047	0.15	0.15	1.09	86	1.72	0.93	86	3.00	95	0.056	104	103	8.7	-0.1	230	78	75	77	73	75	-0.038	4.72	0.040
129	19.055	19.193	0.15	0.15	1.09	86	1.72	0.93	86	3.00	95	0.056	104	102	8.7	0.0	230	78	75	77	73	76	-0.038	4.52	0.180
130	19.203	19.341	0.15	0.15	1.09	86	1.72	0.93	86	3.00	95	0.056	103	103	8.6	-0.1	229	78	75	77	73	76	-0.038	3.57	0.272
131	19.353	19.488	0.15	0.15	1.09	86	1.71	0.93	86	3.00	95	0.053	107	106	8.6	0.0	229	78	75	77	73	75	-0.037	4.42	0.100
132	19.502	19.636	0.15	0.15	1.09	86	1.72	0.93	86	3.00	95	0.056	104	103	8.5	-0.1	229	78	74	77	73	76	-0.038	4.53	0.111
133	19.652	19.784	0.15	0.15	1.09	86	1.72	0.93	86	3.10	95	0.053	107	106	8.5	0.0	230	78	74	77	73	76	-0.038	5.51	0.035
134	19.800	19.931	0.15	0.15	1.09	86	1.72	0.93	86	3.00	95	0.056	103	103	8.4	-0.1	230	78	74	77	73	76	-0.038	3.86	0.106
135	19.950	20.079	0.15	0.15	1.09	86	1.72	0.94	86	3.10	95	0.056	104	103	8.4	0.0	230	78	74	77	73	76	-0.038	4.77	0.167
136	20.100	20.226	0.15	0.15	1.09	86	1.73	0.93	86	3.00	94	0.061	100	98	8.3	-0.1	230	78	74	77	73	75	-0.038	4.53	0.152
137	20.248	20.373	0.15	0.15	1.09	86	1.72	0.93	86	3.10	94	0.059	100	100	8.3	0.0	230	78	74	77	73	76	-0.038	4.00	0.157
138	20.398	20.521	0.15	0.15	1.09	86	1.72	0.93	86	3.10	94	0.058	102	102	8.2	-0.1	229	78	74	77	73	75	-0.038	3.80	0.258
139	20.548	20.668	0.15	0.15	1.09	86	1.73	0.93	86	3.10	94	0.057	103	102	8.2	0.0	229	78	74	77	73	75	-0.039	4.10	0.177
140	20.697	20.816	0.15	0.15	1.10	86	1.72	0.93	86	3.10	93	0.058	102	101	8.1	-0.1	229	78	74	77	73	75	-0.039	4.34	0.151
141	20.845	20.964	0.15	0.15	1.10	86	1.72	0.93	86	3.10	93	0.059	100	101	8.1	0.0	228	78	74	77	73	75	-0.039	3.73	0.257
142	20.995	21.111	0.15	0.15	1.09	86	1.73	0.94	86	3.10	93	0.058	102	101	8.0	-0.1	228	78	74	77	73	75	-0.038	3.76	0.317
143	21.145	21.258	0.15	0.15	1.09	86	1.72	0.93	86	3.10	93	0.056	104	103	8.0	0.0	227	78	74	77	73	75	-0.038	3.86	0.167
144	21.294	21.406	0.15	0.15	1.10	86	1.72	0.93	86	3.10	92	0.061	99	99	8.0	0.0	226	78	74	77	73	75	-0.038	3.76	0.253
145	21.444	21.554	0.15	0.15	1.09	86	1.73	0.93	86	3.10	92	0.060	101	100	7.9	-0.1	225	77	74	77	73	75	-0.038	4.28	0.109
146	21.594	21.702	0.15	0.15	1.09	86	1.73	0.93	86	3.10	92	0.059	101	101	7.9	0.0	2								

Pellet Heater Test Data - ASTM E2779 / ASTM E2515

Run: 2

Manufacturer: Sherwood
 Model: Maxx FS
 Tracking No.: 2284
 Project No.: 0268PF028E
 Test Date: 17-Apr-18

High Burn End Time: 60
 Medium Burn End Time: 181
 Total Sampling Time: 362 min
 Recording Interval: 1 min

Beginning Clock Time: 10:08

Background Sample Volume: 0 cubic feet

Meter Box Y Factor: 0.977 (1) 0.979 (2) 0 (Amb)

Barometric Pressure:				Begin	Middle	End	Average
				30.33	30.31	30.28	30.31 "Hg

PM Control Modules: 335/336
 Dilution Tunnel MW(dry): 29.00 lb/lb-mole
 Dilution Tunnel MW(wet): 28.78 lb/lb-mole
 Dilution Tunnel H₂O: 2.00 percent
 Dilution Tunnel Static: -0.190 "H₂O
 Tunnel Area: 0.19635 ft²
 Pitot Tube Cp: 0.99

Avg. Tunnel Velocity: 13.85 ft/sec.
 Initial Tunnel Flow: 147.2 scfm
 Average Tunnel Flow: 154.8 scfm
 Post-Test Leak Check (1): 0.000 cfm @ -8 in. Hg
 Post-Test Leak Check (2): 0.000 cfm @ -17 in. Hg
 Fuel Moisture (%): 5.910 Dry Basis 5.580 Wet Basis

	Pt.1	Pt.2	Pt.3	Pt.4	Pt.5	Pt.6	Pt.7	Pt.8	Center
Initial dP	0.026	0.040	0.050	0.040	0.036	0.048	0.046	0.032	0.056
Temp.	108	108	108	108	108	108	108	108	108

"H₂O

°F

V_{strav} 13.55 ft/sec V_{scent} 16.16 ft/sec F_p 0.838

Elapsed Time (min)	Particulate Sampling Data												Fuel Weight (lb)		Temperature Data (°F)						Stack Gas Data				
	Gas Meter 1 (ft ³)	Gas Meter 2 (ft ³)	Sample Rate 1 (cfm)	Sample Rate 2 (cfm)	Orifice dH 1 ("H ₂ O)	Meter Temp 1 (°F)	Meter Vacuum 1 ("Hg)	Orifice dH 2 ("H ₂ O)	Meter Temp 2 (°F)	Meter Vacuum 2 ("Hg)	Dilution Tunnel (°F)	Tunnel Center dP	Pro. Rate 1	Pro. Rate 2	Scale Reading	Weight Change	Stack	Filter 1	Dryer 1	Filter 2	Dryer 2	Ambient	Draft ("H ₂ O)	CO ₂ (%)	CO (%)
162	23.986	24.064	0.15	0.15	1.09	85	1.72	0.94	86	3.10	91	0.060	101	100	7.0	-0.1	226	76	74	76	72	74	-0.039	5.34	0.024
163	24.136	24.212	0.15	0.15	1.10	85	1.72	0.93	86	3.10	91	0.061	100	99	7.0	0.0	228	76	74	76	72	74	-0.039	4.94	0.202
164	24.285	24.360	0.15	0.15	1.10	85	1.72	0.93	86	3.10	91	0.060	100	100	6.9	-0.1	228	76	74	76	72	73	-0.039	4.14	0.264
165	24.435	24.508	0.15	0.15	1.10	85	1.72	0.93	86	3.10	91	0.061	100	99	6.9	0.0	228	76	74	76	72	74	-0.039	4.31	0.155
166	24.585	24.656	0.15	0.15	1.10	85	1.73	0.94	86	3.10	91	0.062	99	98	6.8	-0.1	227	76	74	76	72	74	-0.039	3.84	0.256
167	24.734	24.803	0.15	0.15	1.10	85	1.72	0.94	86	3.10	91	0.060	100	99	6.8	0.0	227	76	74	76	72	73	-0.039	4.44	0.073
168	24.884	24.950	0.15	0.15	1.09	85	1.72	0.94	86	3.10	91	0.060	101	99	6.7	-0.1	229	76	74	76	72	74	-0.039	5.33	0.141
169	25.034	25.098	0.15	0.15	1.10	85	1.72	0.94	86	3.10	91	0.063	98	97	6.6	-0.1	229	76	74	76	72	74	-0.039	4.35	0.204
170	25.183	25.246	0.15	0.15	1.10	85	1.72	0.94	86	3.10	91	0.061	99	99	6.6	0.0	229	76	73	76	72	74	-0.039	4.50	0.073
171	25.332	25.394	0.15	0.15	1.10	85	1.72	0.93	86	3.10	91	0.062	98	98	6.5	-0.1	229	76	73	76	72	74	-0.039	4.54	0.058
172	25.482	25.542	0.15	0.15	1.09	85	1.73	0.93	85	3.10	91	0.064	97	97	6.5	0.0	228	76	73	76	72	73	-0.039	4.00	0.252
173	25.632	25.689	0.15	0.15	1.09	85	1.73	0.94	86	3.10	90	0.061	100	98	6.4	-0.1	227	76	73	76	72	73	-0.039	4.55	0.082
174	25.781	25.836	0.15	0.15	1.10	85	1.72	0.94	85	3.10	90	0.062	98	97	6.4	0.0	226	76	73	76	72	74	-0.039	4.57	0.061
175	25.930	25.984	0.15	0.15	1.10	85	1.72	0.94	85	3.10	90	0.061	99	99	6.3	-0.1	225	76	73	75	72	73	-0.038	3.69	0.224
176	26.080	26.132	0.15	0.15	1.09	85	1.73	0.93	85	3.10	90	0.062	99	98	6.3	0.0	225	76	73	75	72	73	-0.039	4.37	0.110
177	26.229	26.280	0.15	0.15	1.10	85	1.72	0.93	85	3.10	90	0.063	97	97	6.2	-0.1	225	76	73	75	72	73	-0.039	4.31	0.114
178	26.379	26.428	0.15	0.15	1.10	85	1.72	0.94	85	3.10	90	0.062	99	98	6.2	0.0	225	76	73	75	72	73	-0.039	4.20	0.118
179	26.529	26.576	0.15	0.15	1.09	85	1.72	0.93	85	3.10	90	0.062	99	98	6.1	-0.1	226	76	73	75	72	73	-0.039	4.56	0.074
180	26.678	26.722	0.15	0.15	1.10	85	1.72	0.94	85	3.10	90	0.060	100	98	6.1	0.0	225	76	73	75	72	74	-0.038	4.15	0.073
181	26.827	26.870	0.15	0.15	1.10	85	1.72	0.93	85	3.10	90	0.061	99	99	6.0	-0.1	224	76	73	75	72	73	-0.038	4.07	0.242
182	26.977	27.018	0.15	0.15	1.09	85	1.73	0.93	85	3.10	87	0.061	99	99	6.0	0.0	218	76	73	75	72	73	-0.037	5.54	0.037
183	27.127	27.166	0.15	0.15	1.10	85	1.72	0.94	85	3.10	86	0.063	98	97	6.0	0.0	212	75	73	75	72	73	-0.037	3.43	0.423
184	27.276	27.314	0.15	0.15	1.10	85	1.72	0.93	85	3.10	85	0.062	98	98	6.0	0.0	208	75	73	75	72	73	-0.036	3.65	0.361
185	27.425	27.462	0.15	0.15	1.10	85	1.72	0.93	85	3.10	84	0.063	97	97	5.9	-0.1	206	75	73	75	72	73	-0.036	3.58	0.087
186	27.575	27.609	0.15	0.15	1.10	85	1.72	0.94	85	3.10	84	0.062	98	97	5.9	0.0	205	75	73	75	72	73	-0.036	3.04	0.204
187	27.724	27.757	0.15	0.15	1.10	84	1.72	0.93	85	3.10	84	0.063	97	97	5.9	0.0	205	75	73	75	72	73	-0.037	3.02	0.226
188	27.874	27.904	0.15	0.15	1.09	84	1.72	0.93	85	3.10	84	0.062	99	97	5.8	-0.1	205	75	73	75	72	73	-0.037	3.58	0.328
189	28.024	28.052	0.15	0.15	1.09	84	1.71	0.93	85	3.10	84	0.064	97	96	5.8	0.0	206	75	73	75	72	73	-0.037	3.43	0.127
190	28.173	28.201	0.15	0.15	1.10	84	1.72	0.93	85	3.10	84	0.064	96	97	5.8	0.0	207	75	73	75	72	73	-0.037	3.50	0.198
191	28.322	28.349	0.15	0.15	1.10	84	1.72	0.93	85	3.10	84	0.064	96	96	5.7	-0.1	208	75	73	75	72	73	-0.037	3.76	0.094
192	28.472	28.496	0.15	0.15	1.09	84	1.72	0.93	85	3.10	84	0.063	98	96	5.7	0.0	209	75	73	75	72	73	-0.038	3.39	0.276
193	28.622	28.643	0.15	0.15	1.09	84	1.72	0.93	85	3.10	84	0.065	96	95	5.7	0.0	210	75	73	75	72	73	-0.037	3.65	0.093
194	28.771	28.791	0.15	0.15	1.10	84	1.72	0.94	85	3.10	84	0.061	99	98	5.6	-0.1	211	75	73	75	72	73	-0.038	2.79	0.542
195	28.920	28.939	0.15	0.15	1.10	84	1.72	0.93	85	3.10	84	0.064	96	96	5.6	0.0	212	75	72	74	71	73	-0.038	3.29	0.267
196	29.070	29.087	0.15	0.15	1.10	84	1.72	0.93	85	3.10	84	0.061	99	98	5.6	0.0	213	75	72	74	71	73	-0.038	2.93	0.232
197	29.219	29.235	0.15	0.15	1.10	84	1.73	0.93	85	3.10	84	0.061	99	98	5.5	-0.1	214	75	72	74	71	73	-0.038	3.42	0.211
198	29.369	29.383	0.15	0.15	1.10	84	1.72	0.94	85	3.10	84	0.062	99	98	5.5	0.0	215	75	72	74	71	73	-0.038	3.14	0.295
199	29.519	29.530	0.15	0.15	1.09	84	1.72	0.94	85	3.10	84	0.062	99	97	5.5	0.0	215	75	72	74	71	73	-0.038	2.97	0.270
200	29.668	29.678	0.15	0.15	1.10	84	1.72	0.94	85	3.10	84	0.063	97	97	5.4	-0.1	217	75	72	74	71	73	-0.039	3.89	0.153
201	29.817	29.826	0.15	0.15	1.10	84	1.72	0.93	85	3.10	84</td														

Pellet Heater Test Data - ASTM E2779 / ASTM E2515

Run: 2
Manufacturer: Sherwood
Model: Maxx FS
Tracking No.: 2284
Project No.: 0268PF028E
Test Date: 17-Apr-18

High Burn End Time: 60
Medium Burn End Time: 181
Total Sampling Time: 362 min
Recording Interval: 1 min

Beginning Clock Time: 10:08**Background Sample Volume:** 0 cubic feet**Meter Box Y Factor:** 0.977 (1) 0.979 (2) 0 (Amb)

Barometric Pressure: Begin Middle End Average
30.33 30.31 30.28 30.31 "Hg

PM Control Modules: 335/336
Dilution Tunnel MW(dry): 29.00 lb/lb-mole
Dilution Tunnel MW(wet): 28.78 lb/lb-mole
Dilution Tunnel H₂O: 2.00 percent
Dilution Tunnel Static: -0.190 "H₂O
Tunnel Area: 0.19635 ft²
Pitot Tube Cp: 0.99

Avg. Tunnel Velocity: 13.85 ft/sec
Initial Tunnel Flow: 147.2 scfm
Average Tunnel Flow: 154.8 scfm
Post-Test Leak Check (1): 0.000 cfm @ -8 in. Hg
Post-Test Leak Check (2): 0.000 cfm @ -17 in. Hg
Fuel Moisture (%): 5.910 Dry Basis 5.580 Wet Basis

Velocity Traverse Data									
	Pt.1	Pt.2	Pt.3	Pt.4	Pt.5	Pt.6	Pt.7	Pt.8	Center
Initial dP	0.026	0.040	0.050	0.040	0.036	0.048	0.046	0.032	0.056
Temp.	108	108	108	108	108	108	108	108	108

"H₂O

°F

Elapsed Time (min)	Particulate Sampling Data												Fuel Weight (lb)		Temperature Data (°F)						Stack Gas Data				
	Gas Meter 1 (ft ³)	Gas Meter 2 (ft ³)	Sample Rate 1 (cfm)	Sample Rate 2 (cfm)	Orifice dH 1 ("H ₂ O)	Meter Temp 1 (°F)	Meter Vacuum 1 ("Hg)	Orifice dH 2 ("H ₂ O)	Meter Temp 2 (°F)	Meter Vacuum 2 ("Hg)	Dilution Tunnel (°F)	Tunnel Center dP	Pro. Rate 1	Pro. Rate 2	Scale Reading	Weight Change	Stack	Filter 1	Dryer 1	Filter 2	Dryer 2	Ambient	Draft ("H ₂ O)	CO ₂ (%)	CO (%)
216	32.060	32.043	0.15	0.15	1.09	84	1.73	0.93	84	3.10	84	0.064	97	96	4.9	0.0	222	74	72	74	71	72	-0.040	3.87	0.179
217	32.209	32.190	0.15	0.15	1.10	84	1.73	0.94	84	3.10	84	0.065	96	95	4.8	-0.1	223	74	72	74	71	72	-0.040	2.86	0.292
218	32.358	32.337	0.15	0.15	1.10	84	1.72	0.93	84	3.10	84	0.062	98	97	4.8	0.0	223	74	72	74	71	72	-0.040	3.30	0.230
219	32.508	32.485	0.15	0.15	1.09	84	1.73	0.93	84	3.10	84	0.062	99	98	4.8	0.0	223	74	71	74	71	72	-0.040	2.40	0.449
220	32.657	32.633	0.15	0.15	1.09	84	1.73	0.93	84	3.10	84	0.064	96	96	4.8	0.0	223	74	71	74	71	72	-0.040	2.75	0.233
221	32.806	32.781	0.15	0.15	1.10	84	1.73	0.93	84	3.10	84	0.064	96	96	4.7	-0.1	223	74	71	74	71	72	-0.040	3.63	0.100
222	32.955	32.929	0.15	0.15	1.09	84	1.72	0.93	84	3.10	85	0.062	98	98	4.7	0.0	224	74	71	74	71	73	-0.041	4.25	0.047
223	33.105	33.076	0.15	0.15	1.10	84	1.72	0.94	84	3.10	84	0.064	97	96	4.6	-0.1	223	74	71	74	71	72	-0.040	3.25	0.166
224	33.254	33.224	0.15	0.15	1.09	84	1.73	0.93	84	3.10	84	0.064	96	96	4.6	0.0	223	74	71	74	71	72	-0.040	2.81	0.278
225	33.403	33.371	0.15	0.15	1.09	84	1.73	0.93	84	3.10	84	0.063	97	96	4.6	0.0	222	74	71	74	71	72	-0.040	2.14	0.542
226	33.553	33.519	0.15	0.15	1.09	84	1.72	0.93	84	3.10	84	0.065	96	95	4.5	-0.1	222	74	71	74	71	72	-0.040	4.12	0.079
227	33.703	33.667	0.15	0.15	1.09	84	1.72	0.93	84	3.10	84	0.064	97	96	4.5	0.0	221	74	71	74	71	72	-0.040	3.37	0.227
228	33.851	33.815	0.15	0.15	1.10	84	1.72	0.93	84	3.10	84	0.065	95	95	4.5	0.0	222	74	71	74	71	72	-0.041	3.17	0.146
229	34.000	33.963	0.15	0.15	1.10	84	1.73	0.93	84	3.10	84	0.063	97	97	4.4	-0.1	222	74	71	74	71	72	-0.041	3.69	0.109
230	34.150	34.109	0.15	0.15	1.10	84	1.73	0.93	84	3.10	84	0.064	97	95	4.4	0.0	225	74	71	74	70	72	-0.041	4.53	0.029
231	34.299	34.257	0.15	0.15	1.10	84	1.73	0.94	84	3.10	84	0.063	97	97	4.3	-0.1	227	74	71	74	70	72	-0.042	3.91	0.154
232	34.448	34.405	0.15	0.15	1.10	84	1.72	0.93	84	3.10	84	0.062	98	98	4.3	0.0	228	74	71	74	70	72	-0.042	4.68	0.157
233	34.598	34.553	0.15	0.15	1.09	84	1.72	0.93	84	3.10	85	0.061	99	99	4.3	0.0	229	74	71	74	70	72	-0.042	3.29	0.246
234	34.747	34.701	0.15	0.15	1.09	84	1.73	0.93	84	3.10	85	0.064	96	96	4.2	-0.1	230	74	71	74	70	73	-0.042	3.82	0.119
235	34.896	34.849	0.15	0.15	1.10	83	1.74	0.93	84	3.10	85	0.064	97	96	4.2	0.0	231	74	71	74	70	72	-0.042	4.13	0.061
236	35.045	34.996	0.15	0.15	1.09	83	1.72	0.94	84	3.10	85	0.062	98	97	4.1	-0.1	232	74	71	74	70	72	-0.043	3.66	0.115
237	35.195	35.143	0.15	0.15	1.10	83	1.73	0.93	84	3.10	85	0.061	100	98	4.1	0.0	233	74	71	74	70	72	-0.043	2.83	0.283
238	35.344	35.291	0.15	0.15	1.10	83	1.74	0.93	84	3.10	85	0.063	97	97	4.1	0.0	232	74	71	74	70	72	-0.043	3.37	0.173
239	35.493	35.439	0.15	0.15	1.10	83	1.73	0.93	84	3.10	85	0.060	100	99	4.0	-0.1	232	74	71	74	70	72	-0.043	2.68	0.269
240	35.643	35.587	0.15	0.15	1.09	83	1.73	0.93	84	3.10	85	0.062	99	98	4.0	0.0	231	74	71	74	70	72	-0.043	2.90	0.269
241	35.792	35.735	0.15	0.15	1.09	83	1.73	0.93	84	3.10	85	0.064	97	96	4.0	0.0	232	74	71	74	70	72	-0.043	3.94	0.083
242	35.941	35.882	0.15	0.15	1.10	83	1.72	0.93	84	3.10	85	0.064	97	96	3.9	-0.1	233	74	71	74	70	72	-0.043	3.60	0.276
243	36.090	36.029	0.15	0.15	1.09	83	1.73	0.93	84	3.10	85	0.064	97	96	3.9	0.0	233	74	71	74	70	72	-0.043	3.45	0.104
244	36.240	36.177	0.15	0.15	1.09	83	1.74	0.94	84	3.10	85	0.065	96	96	3.9	0.0	234	74	71	74	70	72	-0.043	3.65	0.154
245	36.388	36.325	0.15	0.15	1.10	83	1.73	0.93	84	3.10	85	0.063	97	97	3.8	-0.1	233	74	71	74	70	72	-0.043	2.75	0.655
246	36.538	36.473	0.15	0.15	1.10	83	1.74	0.93	84	3.10	85	0.064	97	96	3.8	0.0	234	74	70	74	70	72	-0.043	3.72	0.099
247	36.688	36.620	0.15	0.15	1.09	83	1.73	0.93	84	3.10	85	0.063	98	96	3.7	-0.1	234	74	70	74	70	72	-0.043	2.98	0.465
248	36.837	36.768	0.15	0.15	1.10	83	1.73	0.93	84	3.10	85	0.065	96	96	3.7	0.0	235	74	70	74	70	72	-0.043	4.26	0.035
249	36.985	36.915	0.15	0.15	1.10	83	1.73	0.93	84	3.10	85	0.063	97	96	3.7	0.0	235	74	70	74	70	72	-0.044	4.07	0.118
250	37.135	37.063	0.15	0.15	1.09	83	1.73	0.93	84	3.10	85	0.062	99	98	3.6	-0.1	236	74	70	74	70	72	-0.044	3.77	0.131
251	37.285	37.210	0.15	0.15	1.09	83	1.73	0.93	84	3.10	85	0.064	97	96	3.6	0.0	238	74	70	74	70	72	-0.044	4.24	0.035
252	37.433	37.358	0.15	0.15	1.10	83	1.73	0.93	84	3.10	85	0.060	99	99	3.5	-0.1	238	74	70	74	70	72	-0.044	4.15	0.087
253	37.582	37.506	0.15	0.15	1.09	83	1.73	0.93	84	3.10	85	0.064	97	96	3.5	0.0	239	74	70	74	70	72	-0.044	3.25	0.147
254	37.732	37.654	0.15	0.15	1.09	83	1.73	0.93	84	3.10	85	0.064	97	96	3.5	0.0	238	74	70	74	70	72	-0.044	2.63	0.379
255	37.881	37.801																							

Pellet Heater Test Data - ASTM E2779 / ASTM E2515

Run: 2

Manufacturer: Sherwood
 Model: Maxx FS
 Tracking No.: 2284
 Project No.: 0268PF028E
 Test Date: 17-Apr-18

High Burn End Time: 60
 Medium Burn End Time: 181
 Total Sampling Time: 362 min
 Recording Interval: 1 min

Beginning Clock Time: 10:08

Background Sample Volume: 0 cubic feet

Meter Box Y Factor: 0.977 (1) 0.979 (2) 0 (Amb)

Barometric Pressure:				Begin	Middle	End	Average
	30.33	30.31	30.28	30.31	"Hg		

PM Control Modules: 335/336
 Dilution Tunnel MW(dry): 29.00 lb/lb-mole
 Dilution Tunnel MW(wet): 28.78 lb/lb-mole
 Dilution Tunnel H₂O: 2.00 percent
 Dilution Tunnel Static: -0.190 "H₂O
 Tunnel Area: 0.19635 ft²
 Pitot Tube Cp: 0.99

Avg. Tunnel Velocity: 13.85 ft/sec.
 Initial Tunnel Flow: 147.2 scfm
 Average Tunnel Flow: 154.8 scfm
 Post-Test Leak Check (1): 0.000 cfm @ -8 in. Hg
 Post-Test Leak Check (2): 0.000 cfm @ -17 in. Hg
 Fuel Moisture (%): 5.910 Dry Basis 5.580 Wet Basis

Velocity Traverse Data									
	Pt.1	Pt.2	Pt.3	Pt.4	Pt.5	Pt.6	Pt.7	Pt.8	Center
Initial dP	0.026	0.040	0.050	0.040	0.036	0.048	0.046	0.032	0.056
Temp.	108	108	108	108	108	108	108	108	108

"H₂O

°F

V_{strav} 13.55 ft/sec V_{scent} 16.16 ft/sec F_p 0.838

Elapsed Time (min)	Particulate Sampling Data												Fuel Weight (lb)		Temperature Data (°F)						Stack Gas Data				
	Gas Meter 1 (ft ³)	Gas Meter 2 (ft ³)	Sample Rate 1 (cfm)	Sample Rate 2 (cfm)	Orifice dH 1 ("H ₂ O)	Meter Temp 1 (°F)	Meter Vacuum 1 ("Hg)	Orifice dH 2 ("H ₂ O)	Meter Temp 2 (°F)	Meter Vacuum 2 ("Hg)	Dilution Tunnel (°F)	Tunnel Center dP	Pro. Rate 1	Pro. Rate 2	Scale Reading	Weight Change	Stack	Filter 1	Dryer 1	Filter 2	Dryer 2	Ambient	Draft ("H ₂ O)	CO ₂ (%)	CO (%)
270	40.117	40.014	0.15	0.15	1.10	83	1.73	0.93	84	3.10	85	0.064	96	96	2.9	0.0	238	74	70	74	70	72	-0.044	3.16	0.148
271	40.267	40.162	0.15	0.15	1.09	83	1.73	0.93	84	3.10	85	0.063	98	97	2.9	0.0	237	74	70	74	70	72	-0.044	2.67	0.228
272	40.416	40.310	0.15	0.15	1.10	83	1.74	0.93	84	3.10	85	0.065	96	96	2.9	0.0	236	74	70	74	70	72	-0.044	2.88	0.199
273	40.564	40.458	0.15	0.15	1.09	83	1.74	0.93	84	3.10	85	0.064	96	96	2.8	-0.1	237	74	70	74	70	72	-0.044	3.93	0.086
274	40.714	40.605	0.15	0.15	1.09	83	1.73	0.93	84	3.10	85	0.063	98	96	2.8	0.0	236	74	70	74	70	72	-0.043	3.43	0.113
275	40.863	40.752	0.15	0.15	1.09	83	1.73	0.93	84	3.10	85	0.061	99	98	2.8	0.0	236	74	70	74	70	72	-0.044	3.71	0.092
276	41.013	40.900	0.15	0.15	1.10	83	1.73	0.93	84	3.10	85	0.063	98	97	2.7	-0.1	236	74	70	74	70	72	-0.043	3.62	0.100
277	41.161	41.048	0.15	0.15	1.10	83	1.73	0.93	84	3.10	85	0.065	95	96	2.7	0.0	236	74	70	74	70	72	-0.043	3.80	0.136
278	41.310	41.195	0.15	0.15	1.09	83	1.74	0.93	84	3.10	85	0.065	96	95	2.6	-0.1	236	74	70	74	70	72	-0.043	3.00	0.279
279	41.459	41.343	0.15	0.15	1.09	83	1.74	0.93	84	3.10	85	0.065	96	96	2.6	0.0	237	74	70	74	70	72	-0.043	3.39	0.216
280	41.608	41.491	0.15	0.15	1.10	83	1.73	0.93	84	3.10	85	0.062	98	98	2.6	0.0	237	74	70	74	70	72	-0.043	3.40	0.133
281	41.757	41.638	0.15	0.15	1.10	83	1.73	0.93	84	3.10	85	0.064	97	96	2.5	-0.1	237	74	70	74	70	72	-0.043	3.82	0.066
282	41.906	41.785	0.15	0.15	1.09	83	1.74	0.93	84	3.10	85	0.065	96	95	2.5	0.0	238	74	70	74	70	72	-0.043	3.71	0.115
283	42.056	41.932	0.15	0.15	1.09	83	1.74	0.93	84	3.10	85	0.062	99	97	2.5	0.0	237	74	70	74	70	72	-0.043	3.00	0.256
284	42.204	42.080	0.15	0.15	1.10	83	1.74	0.93	84	3.10	85	0.063	97	97	2.4	-0.1	237	74	70	74	70	72	-0.042	3.54	0.068
285	42.353	42.228	0.15	0.15	1.09	83	1.74	0.93	83	3.10	85	0.063	97	97	2.4	0.0	237	74	70	73	69	72	-0.042	2.53	0.406
286	42.503	42.376	0.15	0.15	1.09	83	1.73	0.93	83	3.10	85	0.064	97	96	2.4	0.0	237	74	70	73	69	72	-0.043	2.99	0.223
287	42.652	42.523	0.15	0.15	1.10	83	1.74	0.93	83	3.10	85	0.064	97	96	2.3	-0.1	238	74	70	73	69	72	-0.043	3.56	0.107
288	42.800	42.670	0.15	0.15	1.10	83	1.74	0.93	84	3.10	86	0.064	96	96	2.3	0.0	239	74	70	74	70	72	-0.043	3.44	0.080
289	42.950	42.818	0.15	0.15	1.09	83	1.74	0.94	83	3.10	86	0.064	97	97	2.3	0.0	240	74	70	74	69	72	-0.043	3.27	0.272
290	43.099	42.966	0.15	0.15	1.10	83	1.74	0.93	83	3.10	86	0.064	97	97	2.2	-0.1	240	74	70	73	69	72	-0.043	3.41	0.301
291	43.247	43.113	0.15	0.15	1.09	83	1.74	0.93	83	3.10	86	0.065	95	95	2.2	0.0	240	74	69	74	69	72	-0.043	3.26	0.470
292	43.397	43.261	0.15	0.15	1.09	83	1.74	0.93	83	3.10	86	0.064	97	97	2.2	0.0	241	74	70	73	69	72	-0.043	2.71	0.482
293	43.546	43.409	0.15	0.15	1.09	83	1.73	0.93	83	3.10	85	0.064	97	96	2.1	-0.1	239	74	70	74	69	72	-0.043	3.42	0.126
294	43.695	43.556	0.15	0.15	1.10	83	1.74	0.93	83	3.10	85	0.062	98	97	2.1	0.0	239	74	69	74	69	72	-0.043	3.17	0.305
295	43.843	43.703	0.15	0.15	1.10	83	1.73	0.93	83	3.10	85	0.062	97	97	2.1	0.0	239	74	70	74	69	72	-0.043	3.18	0.255
296	43.993	43.851	0.15	0.15	1.09	83	1.74	0.93	83	3.10	86	0.065	97	96	2.0	-0.1	239	74	69	73	69	72	-0.043	2.97	0.348
297	44.142	43.998	0.15	0.15	1.10	83	1.73	0.93	83	3.10	86	0.063	97	97	2.0	0.0	240	74	69	73	69	72	-0.043	3.07	0.241
298	44.291	44.146	0.15	0.15	1.09	83	1.73	0.93	83	3.10	86	0.066	95	95	2.0	0.0	239	74	69	73	69	72	-0.043	2.77	0.326
299	44.440	44.294	0.15	0.15	1.09	83	1.74	0.93	83	3.10	86	0.065	96	96	2.0	0.0	239	74	69	73	69	72	-0.043	2.57	0.302
300	44.589	44.442	0.15	0.15	1.09	83	1.74	0.93	83	3.10	86	0.065	96	96	1.9	-0.1	238	74	69	73	69	72	-0.043	2.90	0.225
301	44.739	44.588	0.15	0.15	1.09	83	1.74	0.93	83	3.10	86	0.063	98	96	1.9	0.0	238	74	69	73	69	72	-0.043	2.94	0.195
302	44.887	44.736	0.15	0.15	1.09	83	1.74	0.93	83	3.10	86	0.063	97	97	1.9	0.0	237	74	69	73	69	72	-0.043	2.87	0.346
303	45.036	44.883	0.15	0.15	1.09	83	1.73	0.93	83	3.10	86	0.063	97	97	1.9	0.0	237	74	69	73	69	72	-0.043	2.71	0.283
304	45.185	45.031	0.15	0.15	1.09	83	1.73	0.93	83	3.10	85	0.064	97	96	1.8	-0.1	235	74	69	73	69	72	-0.042	2.92	0.164
305	45.334	45.179	0.15	0.15	1.10	83	1.73	0.92	83	3.10	85	0.064	97	96	1.8	0.0	235	74	69	73	69	72	-0.042	2.89	0.174
306	45.482	45.327	0.15	0.15	1.10	83	1.74	0.93	83	3.10	85	0.061	98	99	1.7	-0.1	235	74	69	73	69	72	-0.042	3.76	0.078
307	45.632	45.474	0.15	0.15	1.09	83	1.74	0.93	83	3.10	85	0.064	97	96	1.7	0.0	236	74	69	73	69	72	-0.042	3.84	0.237
308	45.781	45.621	0.15	0.15	1.09	83	1.74	0.93	83	3.10	85	0.064	97	96	1.7	0.0	237	74	69	73	69				

Pellet Heater Test Data - ASTM E2779 / ASTM E2515

Run: **2**

Manufacturer: **Sherwood**
 Model: **Maxx FS**
 Tracking No.: **2284**
 Project No.: **0268PF028E**
 Test Date: **17-Apr-18**

High Burn End Time: **60**
 Medium Burn End Time: **181**
 Total Sampling Time: **362** min
 Recording Interval: **1** min

Beginning Clock Time: **10:08**Background Sample Volume: **0** cubic feetMeter Box Y Factor: **0.977** (1) **0.979** (2) **0** (Amb)Barometric Pressure: Begin **30.33** Middle **30.31** End **30.28** Average **30.31** "Hg

PM Control Modules: **335/336**
 Dilution Tunnel MW(dry): **29.00** lb/lb-mole
 Dilution Tunnel MW(wet): **28.78** lb/lb-mole
 Dilution Tunnel H₂O: **2.00** percent
 Dilution Tunnel Static: **-0.190** "H₂O
 Tunnel Area: **0.19635** ft²
 Pitot Tube Cp: **0.99**

Avg. Tunnel Velocity: **13.85** ft/sec.
 Initial Tunnel Flow: **147.2** scfm
 Average Tunnel Flow: **154.8** scfm
 Post-Test Leak Check (1): **0.000** cfm @ **-8** in. Hg
 Post-Test Leak Check (2): **0.000** cfm @ **-17** in. Hg
 Fuel Moisture (%): **5.910** Dry Basis **5.580** Wet Basis

	Pt.1	Pt.2	Pt.3	Pt.4	Pt.5	Pt.6	Pt.7	Pt.8	Center
Initial dP	0.026	0.040	0.050	0.040	0.036	0.048	0.046	0.032	0.056
Temp.	108								

"H₂O

°F

V_{strav} **13.55** ft/sec V_{scent} **16.16** ft/sec F_p **0.838**

Elapsed Time (min)	Particulate Sampling Data												Fuel Weight (lb)		Temperature Data (°F)						Stack Gas Data				
	Gas Meter 1 (ft ³)	Gas Meter 2 (ft ³)	Sample Rate 1 (cfm)	Sample Rate 2 (cfm)	Orifice dH 1 ("H ₂ O)	Meter Temp 1 (°F)	Meter Vacuum 1 ("Hg)	Orifice dH 2 ("H ₂ O)	Meter Temp 2 (°F)	Meter Vacuum 2 ("Hg)	Dilution Tunnel (°F)	Tunnel Center dP	Pro. Rate 1	Pro. Rate 2	Scale Reading	Weight Change	Stack	Filter 1	Dryer 1	Filter 2	Dryer 2	Ambient	Draft ("H ₂ O)	CO ₂ (%)	CO (%)
324	48.162	47.980	0.15	0.15	1.09	83	1.74	0.93	83	3.10	86	0.062	98	98	1.2	0.0	237	73	69	73	69	72	-0.043	3.87	0.218
325	48.311	48.127	0.15	0.15	1.09	83	1.74	0.92	83	3.10	86	0.063	97	97	1.1	-0.1	237	73	69	73	69	72	-0.043	3.08	0.274
326	48.461	48.275	0.15	0.15	1.09	83	1.74	0.93	83	3.10	86	0.063	98	97	1.1	0.0	237	73	69	73	69	72	-0.043	3.60	0.072
327	48.609	48.423	0.15	0.15	1.10	83	1.75	0.93	83	3.10	86	0.063	97	97	1.1	0.0	237	74	69	73	69	72	-0.043	3.46	0.211
328	48.757	48.569	0.15	0.15	1.09	83	1.75	0.93	83	3.10	86	0.065	95	94	1.1	0.0	237	74	69	73	69	72	-0.043	2.90	0.265
329	48.907	48.717	0.15	0.15	1.09	83	1.74	0.93	83	3.10	86	0.065	97	96	1.0	-0.1	237	74	69	74	69	72	-0.043	2.81	0.347
330	49.056	48.864	0.15	0.15	1.09	83	1.74	0.93	83	3.10	86	0.062	98	97	1.0	0.0	237	74	69	74	69	72	-0.043	3.50	0.077
331	49.204	49.012	0.15	0.15	1.09	83	1.74	0.93	83	3.10	86	0.064	96	97	1.0	0.0	237	74	69	74	69	72	-0.043	3.23	0.249
332	49.353	49.160	0.15	0.15	1.09	83	1.74	0.92	83	3.10	86	0.063	97	97	0.9	-0.1	237	74	69	73	69	72	-0.043	3.34	0.158
333	49.502	49.307	0.15	0.15	1.08	83	1.74	0.93	83	3.10	86	0.065	96	95	0.9	0.0	237	74	69	74	69	72	-0.043	2.92	0.265
334	49.651	49.454	0.15	0.15	1.09	83	1.74	0.93	83	3.10	85	0.065	96	95	0.9	0.0	236	74	69	74	69	72	-0.043	3.60	0.096
335	49.799	49.601	0.15	0.15	1.09	83	1.75	0.93	83	3.10	85	0.064	96	96	0.8	-0.1	236	74	69	73	69	72	-0.042	2.91	0.359
336	49.948	49.748	0.15	0.15	1.08	83	1.74	0.93	83	3.10	85	0.066	95	94	0.8	0.0	235	74	69	73	69	72	-0.043	3.10	0.150
337	50.098	49.896	0.15	0.15	1.09	83	1.74	0.93	83	3.10	85	0.064	97	96	0.8	0.0	235	74	69	73	69	72	-0.042	3.04	0.195
338	50.246	50.043	0.15	0.15	1.09	83	1.74	0.93	83	3.10	85	0.062	97	97	0.8	0.0	235	74	69	73	69	72	-0.042	3.22	0.297
339	50.394	50.191	0.15	0.15	1.09	83	1.74	0.92	83	3.10	85	0.063	97	97	0.7	-0.1	234	74	69	73	69	72	-0.042	2.68	0.233
340	50.543	50.339	0.15	0.15	1.09	83	1.74	0.93	83	3.10	85	0.064	97	96	0.7	0.0	233	74	69	73	69	72	-0.042	5.20	0.025
341	50.692	50.486	0.15	0.15	1.09	83	1.74	0.93	83	3.10	85	0.063	97	97	0.6	-0.1	233	74	69	73	69	72	-0.042	3.52	0.184
342	50.841	50.632	0.15	0.15	1.09	83	1.73	0.93	83	3.10	85	0.064	97	95	0.6	0.0	233	74	69	73	69	72	-0.042	3.76	0.111
343	50.989	50.780	0.15	0.15	1.09	83	1.74	0.93	83	3.10	85	0.062	97	98	0.6	0.0	233	74	69	74	69	72	-0.042	3.69	0.167
344	51.138	50.927	0.15	0.15	1.08	83	1.74	0.93	83	3.10	85	0.063	97	97	0.5	-0.1	233	74	69	74	69	72	-0.042	3.92	0.037
345	51.287	51.075	0.15	0.15	1.09	83	1.74	0.92	83	3.10	85	0.064	97	96	0.5	0.0	233	74	69	73	69	72	-0.042	3.05	0.164
346	51.435	51.223	0.15	0.15	1.09	83	1.74	0.93	83	3.10	85	0.064	96	96	0.5	0.0	233	74	69	73	69	72	-0.042	3.64	0.147
347	51.584	51.370	0.15	0.15	1.09	83	1.75	0.93	83	3.10	85	0.062	98	97	0.5	0.0	233	74	69	74	69	72	-0.042	3.27	0.130
348	51.733	51.517	0.15	0.15	1.08	83	1.74	0.93	83	3.10	85	0.064	97	96	0.4	-0.1	232	74	69	73	69	72	-0.042	3.08	0.224
349	51.882	51.664	0.15	0.15	1.08	83	1.74	0.93	83	3.10	85	0.065	96	95	0.4	0.0	232	74	69	74	69	72	-0.042	3.10	0.176
350	52.030	51.811	0.15	0.15	1.08	83	1.74	0.93	83	3.10	85	0.063	97	97	0.4	0.0	232	74	69	73	69	72	-0.042	2.99	0.097
351	52.179	51.959	0.15	0.15	1.09	83	1.74	0.93	83	3.10	85	0.064	97	96	0.3	-0.1	232	74	69	74	69	72	-0.042	2.88	0.245
352	52.328	52.106	0.15	0.15	1.08	83	1.74	0.92	83	3.10	85	0.066	95	94	0.3	0.0	233	74	69	74	69	72	-0.042	4.11	0.025
353	52.477	52.254	0.15	0.15	1.08	83	1.74	0.93	83	3.10	85	0.064	97	96	0.3	0.0	233	74	69	74	69	72	-0.042	3.53	0.097
354	52.625	52.402	0.15	0.15	1.09	83	1.74	0.92	83	3.10	85	0.064	96	96	0.3	0.0	233	74	69	73	69	72	-0.042	2.97	0.160
355	52.774	52.548	0.15	0.15	1.09	83	1.74	0.93	83	3.10	85	0.063	97	96	0.2	-0.1	233	74	69	73	69	72	-0.042	3.16	0.088
356	52.923	52.695	0.15	0.15	1.09	83	1.75	0.93	83	3.10	85	0.063	97	97	0.2	0.0	233	74	69	74	69	72	-0.042	2.95	0.083
357	53.071	52.843	0.15	0.15	1.09	83	1.74	0.93	83	3.10	85	0.063	97	97	0.2	0.0	233	74	69	74	69	72	-0.042	2.80	0.200
358	53.220	52.990	0.15	0.15	1.09	83	1.74	0.93	83	3.10	85	0.065	96	95	0.1	-0.1	233	74	69	74	69	72	-0.042	3.00	0.380
359	53.368	53.138	0.15	0.15	1.09	83	1.74	0.92	83	3.10	85	0.064	96	96	0.1	0.0	233	74	69	74	69	73	-0.042	3.37	0.091
360	53.518	53.285	0.15	0.15	1.09	83	1.74	0.93	83	3.10	85	0.064	97	96	0.1	0.0	233	74	69	74	69	72	-0.042	3.61	0.153
361	53.666	53.433	0.15	0.15	1.09	83	1.75	0.92	83	3.10	85	0.065	95	96	0.0	-0.1	233	74	69	74	69	72	-0.042	3.52	0.101

Pellet Heater Certification Run Sheets

Client: Sherwood Project Number: 0268 PFOZ8E Run Number: 2
 Model: maxx Tracking Number: 2284 Date: 4/17/18
 Test Crew: A. Kravitz
 OMNI Equipment ID numbers: 335/336

ASTM E2779 Run Notes**Air Control Settings**High Burn Rate Target: 100%Settings: 5 (max)

Additional Settings
Notes:

Trim slideunchanged from
run 1Medium Burn Rate Target: <50%Settings: 2 (ft)Low Burn Rate Target: MinimumSettings: 1 (min)Pellet Moisture Content: 5.5% w/bPellet Specifications: 111 03208Pellet Analysis Notes: TPT W208 - 140 - v1**Preburn Notes**

Time	Notes
	<u>-None-</u>

Test Notes

Time	Notes
60:00	Replaced filter A
61:00	Adjusted to med.
181:00	Adjusted to low
361:00	Test End

Technician Signature: A. KravitzDate: 4/17/18

Pellet Heater Certification Run Sheets

Client: Sherwood Project Number: 6268PF028E Run Number: 2
 Model: Maxx Tracking Number: 2224 Date: 4/17/18
 Test Crew: A. Knut
 OMNI Equipment ID numbers: 132, 410, 494, 185, 209, 559

ASTM E2515 Sampling Information

Test Location: E1 Test Start Time: 10:08
 Span Gas Concentrations: 11.03 / 5.000 / 901

Test Run Validation Checks		Pre Test	Post Test
Zero Stack Gas Leakage		✓	✓
Zero Pitot Line Leakage		✓	✓
Zero Induced Draft		✓	
100% Smoke Capture		✓	

Test Run Validation Measurements		Pre Test		Post Test	
Scale Audit (lbs)		10.0		10.0	
CO ₂ % (Zero/Span)	0.00	9.999	-0.02	16.00	
CO % (Zero/Span)	0.000	16.04	-0.001	4.995	
CO ppm (Zero/Span)	0	889	-1	810	
Sample A Leakage (cfm@"Hg)		0	0 @ -8		
Sample B Leakage (cfm@"Hg)		0	0 @ -17		
Room Air Velocity (ft/min)		<50	<50		
Barometric Pressure (" Hg)		30.33	30.28		
Relative Humidity (%)		34.1	40.2		
Tunnel Static (in. H ₂ O)		-19	-19		

Last Cleaning Dates

Flue Pipe	<u>4/13</u>
Dilution Tunnel	<u>4/13</u>
Sample Dryers	<u>4/13</u>

Dilution Tunnel Traverse

Traverse Point	1	2	Center	3	4	5	6	Center	7	8
Δp (" H ₂ O)	0.026	0.040	0.050	0.050	0.040	0.036	0.048	0.056	0.046	0.032
T (°F)	108									

Technician Signature: AJDate: 4/17/18

2.2 - Sample Analysis & Tares

Analysis Worksheets
Tared Filter, Probe, and O-Ring Data
Pellet Fuel Label
Pellet Fuel Analysis Report

Pellet Heater Lab Data - ASTM E2779 / ASTM E2515

Manufacturer: Sherwood
 Model: Maxx FS
 Tracking No.: 2284
 Project No.: 0268PF028E
 Run #: 2
 Date: 4/17/18

Equipment Numbers: 283A, 592, 637

Technician Signature: 

TRAIN 1 (First Hour emissions)

Sample Component	Reagent	Filter, Probe or Dish #	Weights		
			Tare, mg	Final, mg	Particulate, mg
A. Front filter catch	Filter	D486	112.5	119.6	7.1
B. Rear filter catch	Filter				0.0
C. Probe catch*	Probe				0.0
D. Filter seals catch*	Seals				0.0

1 st hour Sub-Total, mg:	7.1
-------------------------------------	-----

TRAIN 1 (Remainder of Test)

Sample Component	Reagent	Filter, Probe or Dish #	Weights		
			Tare, mg	Final, mg	Particulate, mg
A. Front filter catch	Filter	D487	112.6	115.4	2.8
B. Rear filter catch	Filter	D488	111.7	110.9	-0.8
C. Probe catch*	Probe	36	114884.6	114884.7	0.1
D. Filter seals catch*	Seals	R600	3349.3	3350.4	1.1

Remainder Sub-Total, mg:	3.2
--------------------------	-----

Train 1 Aggregate, mg:	10.3
------------------------	------

TRAIN 2

Sample Component	Reagent	Filter, Probe or Dish #	Weights		
			Tare, mg	Final, mg	Particulate, mg
A. Front filter catch	Filter	D489	113	123.5	10.5
B. Rear filter catch	Filter	D490	112.1	111.7	-0.4
C. Probe catch*	Probe	37	114465.6	114465.5	0.0
D. Filter seals catch*	Seals	R601	3362.8	3363.2	0.4

Train 2 Aggregate, mg:	10.5
------------------------	------

AMBIENT

Sample Component	Reagent	Filter # or Probe #	Weights		
			Tare, mg	Final, mg	Particulate, mg
A. Front filter catch*	Filter		0	0.0	0.0

Ambient Aggregate, mg:	0.0
------------------------	-----

*Particulate catch that results in a negative number, is assumed to be zero for probes and seals, negative numbers for filters are assumed to be included in O-ring seal weights.

Component	Equations:
A. Front filter catch	Final (mg) - Tare (mg) = Particulate, mg
B. Rear filter catch	Final (mg) - Tare (mg) = Particulate, mg
C. Probe catch	Final (mg) - Tare (mg) = Particulate, mg

Pellet Heater Certification Run Sheets

Client: Shekwood Project Number: 0268PF028E Run Number: 2
 Model: Maxxx Tracking Number: _____ Date: 4/17/18
 Test Crew: A. Kravitz
 OMNI Equipment ID numbers: 2834, 592, 637

ASTM E2515 Lab Sheet

Assembled By:

A. Kravitz

Date/Time in Desiccator1:

4/17/18 11:30

Weighing #1	Weighing #2	Weighing #3	Weighing #4	Weighing #5
Date: <u>4/19/18</u>	Date: <u>5/16/18</u>	Date: _____	Date: _____	Date: _____
Time: <u>11:00</u>	Time: <u>09:00</u>	Time: _____	Time: _____	Time: _____
R/H %: <u>11.3</u>	R/H %: <u>18.3</u>	R/H %: _____	R/H %: _____	R/H %: _____
Temp (F): <u>75.0</u>	Temp (F): <u>76.4</u>	Temp (F): _____	Temp (F): _____	Temp (F): _____
Audit 1: <u>200.1</u>	Audit 1: <u>200.0</u>	Audit 1: _____	Audit 1: _____	Audit 1: _____
Audit 2: <u>200.1</u>	Audit 2: <u>200.0</u>	Audit 2: _____	Audit 2: _____	Audit 2: _____
Audit 3: <u>99998.0</u>	Audit 3: <u>99997.9</u>	Audit 3: _____	Audit 3: _____	Audit 3: _____
Initials: <u>A</u>	Initials: <u>A</u>	Initials: _____	Initials: _____	Initials: _____

Train	Item	ID #	Tare (mg)	Weight (mg)				
A	Front Filter (60 min)	D486	112.5	119.7	119.6			
A	Front Filter (Remainder)	D487	112.6	115.6	115.4			
A	Rear Filter	D488	111.7	110.9	110.9			
A	Probe	36	114884.6	114884.8	114884.7			
A	O-Ring Set	R600	3349.3	3350.6	3350.4			
B	Front Filter	D489	113.0	123.6	123.5			
B	Rear Filter	D490	112.1	111.8	111.7			
B	Probe	37	114465.6	114465.5	114465.5			
B	O-Ring Set	R601	3362.8	3363.94	3363.2			
BG	Filter							

Technician Signature: A. KravitzDate: 5/10/18 E

Tare Sheet: Probes 47mm Filters 100mm Filters O-Ring Pair

Date/time Placed in Dessicator: 7/8/14 0800

Thermohygrometer ID #: cmwj-00592

Prepared By: B Davis

Analytical Balance ID #: *Omega-00632*

Audit Weight ID #/Mass: OMNI 002134 / 5

ID #	Date: 4/9/18	Date: 4/10/18	Date:	Date:	Date Used	Project Number	Run No.
	Time: 0840	Time: 10:03	Time:	Time:			
R598	3265.5	3265.7	-	-	4/16/18	0268PF028E	1
R599	1150.6	1150.6	-	-			
R600	3349.1	3349.3	-	-	4/17/18	0268PF028E	2
R601	3362.6	3362.8	-	-			
R602	2215.1	2215.4	-	-			

Final Technician Signature: 
Control No. P-SFDP-0001.xls, Effective date: 9/9/2015

Date: 8/14/18

Evaluator signature: 

Tare Sheet: Probes__ 47mm Filters 100mm Filters__ O-Ring Pair__

Date/time Placed in Dessicator: 3/21/18 1458

Prepared By: B Davis

Analytical Balance ID #: Omni-02637

Thermohygrometer ID #: Omni-a0592

Audit Weight ID #/Mass: Omni-0287A / 200 mg

ID #	Date: 3/21/18 Time: 0909 1515	Date: 3/23/18 Time: 0828	Date: Time: RH %: T (°F): Audit:	Date: Time: RH %: T (°F): Audit:	Date Used	Project Number	Run No.

D481	113.6	113.4	-		4/16/18	0268PF028E	1
D482	112.9	112.9	-				
D483	112.6	112.6	-				
D484	112.2	112.3	-				
D485	113.3	113.1	-				
D486	112.3	112.5	-		4/17/18		2
D487	112.7	112.6	-				
D488	111.6	111.7	-				
D489	112.9	113.0	-				
D490	112.1	112.1	-				
Initials:	Bn	Initials:	M	Initials:	Initials:		

Final Technician Signature: B. Davis

Control No. P-SDFP-0001.xls, Effective date: 9/9/2015

Date: 3/23/18

Evaluator signature: J. M. D.

Tare Sheet: Probes 47mm Filters 100mm Filters O-Ring Pair

Date/time Placed in Dessicator: 3/5/18 0840

Thermohygrometer ID #: Omni-00592

Prepared By: B Davis

Analytical Balance ID #: Omni-00637

Audit Weight ID #/Mass: Omni-0223A 100g

ID #	3/6/18		3/7/18		Date Used	Project Number	Run No.
	Date:	Time:	Date:	Time:			
	<u>3/6/18</u>	<u>0856 0854</u>	<u>3/7/18</u>	<u>0856</u>			
	<u>0930</u>		<u>0836</u>				
	<u>9.4</u>		<u>10.4</u>				
	<u>66.4</u>		<u>67.8</u>				
	<u>Audit: 99.99%</u>		<u>Audit: 99998.1</u>				

33	<u>113943.9</u>	<u>113943.8</u>			<u>4/16/18</u>	<u>0268 PFD28E</u>	<u>1</u>
35	<u>114327.0</u>	<u>114327.1</u>			<u>1</u>	<u>↓</u>	<u>↓</u>
36	<u>114884.8</u>	<u>114884.6</u>			<u>4/17/18</u>	<u>0268 PFD28E</u>	<u>2</u>
37	<u>114465.4</u>	<u>114465.6</u>			<u>1</u>	<u>↓</u>	<u>↓</u>
38	<u>114150.9</u>	<u>114151.0</u>			<u>Not used</u>		

Initials: BD

Initials: BD

Initials: BD

Initials: BD

Date: 3/18/18

Final Technician Signature: B Davis

Control No. P-SFDP-0001.xls, Effective date: 9/9/2015

Evaluator signature: Alma

CLEAN • EF



PFI GRADED FUEL

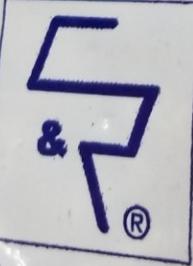
PFI Densified Fuel Grade: Premium
Mill Registration # 03208
Grade Requirements:

Bulk Density:	40–48 lbs/ft ³
Diameter:	.230-.285 in/5.84–7.25 mm
Durability:	>96.5
Fines:	≤0.50%
Ash Content (as received):	≤1% >1.5 in.
Length:	≤1% >1.5 in.
Moisture:	≤8.0%
Chlorides:	≤300 ppm

Manufacturers Guaranteed Analysis:

Type of Material:	Softwood
Additives:	None
Minimum Higher Heating Value (as received):	8000 BTU/lb.

Other Manufacturers Guarantees:



For more information, please visit the PFI website at www.pelletheat.org.



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

Report No: USR:W218-0140-01
Issue No: 1

Analytical Test Report

Client:	OMNI-TEST LABORATORIES INC. 13327 NE Airport Way Portland, OR 97230
Attention:	Finance Department
PO No:	180165

Signed: *Stephen Sundeen*
Stephen Sundeen
Chemistry Laboratory Manager
Date of Issue: 2/27/2018
THIS DOCUMENT SHALL NOT BE REPRODUCED EXCEPT IN FULL

Sample Details

Sample Log No:	W218-0140-01	Sample Date:	
Sample Designation:	03208-2018	Sample Time:	
Sample Recognized As:	Wood Pellets	Arrival Date:	2/13/2018

Test Results

	METHOD	UNITS	MOISTURE FREE	AS RECEIVED
Moisture Total	ASTM E871	wt. %		5.58
Ash	ASTM D1102	wt. %	0.34	0.32
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		0.015
Net Cal. Value at Const. Pressure	ISO 1928	GJ/tonne	19.20	17.99
Net Cal. Value at Const. Pressure	ISO 1928	J/g	19197	17989
Gross Cal. Value at Const. Vol.	ASTM E711	J/g	20523	19377
Gross Cal. Value at Const. Vol.	ASTM E711	Btu/lb	8824	8331
Carbon	ASTM D5373	wt. %	50.70	47.87
Hydrogen*	ASTM D5373	wt. %	6.09	5.75
Nitrogen	ASTM D5373	wt. %	< 0.20	< 0.19
Oxygen*	ASTM D3176	wt. %	> 42.66	> 40.27

*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
Diameter, Average	TPT CH-P-05	inch
Stated Bag Weight	TPT CH-P-01	lbs
Actual Bag Weight	TPT CH-P-01	lbs

Comments

Section 3

Laboratory Quality Assurance

- 3.1 - Quality Assurance/Quality Control**
- 3.2 - Calibration Data**
- 3.3 - Example Calculations**

3.1 - Quality Assurance/Quality Control

OMNI follows the guidelines of ISO/IEC 17025, “General Requirements for the Competence of Testing and Calibration Laboratories,” and the quality assurance/quality control (QA/QC) procedures found in *OMNI*’s Quality Assurance Manual.

OMNI’s scope of accreditation includes, but is not limited to, the following:

- ANSI (American National Standards Institute) for certification of product to safety standards.
- To perform product safety testing by the International Accreditation Service, Inc. (formerly ICBO ES) under accreditation as a testing laboratory designated TL-130.
- To perform product safety testing as a “Certification Organization” by the Standards Council of Canada (SCC).
- Serving as a testing laboratory for the certification of wood heaters by the U.S. Environmental Protection Agency.

This report is issued within the scope of *OMNI*’s accreditation. Accreditation certificates are available upon request.

The manufacturing facilities and quality control system for the production of the Maxx-1 at Sherwood Industries were evaluated to determine if sufficient to maintain conformance with *OMNI*’s requirements for product certification. *OMNI* has concluded that the manufacturing facilities, processes, and quality control system are adequate to produce the appliance congruous with the standards and model codes to which it was evaluated.

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3.2 - Calibration Data

Equipment for ASTM E2515, ASTM E2779, & EPA Method 28R

ID #	Lab Name/Purpose	Log Name	Attachment Type
132	10 lb Weight	Weight Standard, 10 lb.	Calibration Certificate
185	Platform Scale	Weight Indicator, Model WI-127	Calibration Certificate
209	Barometer	Barometer – Princo	Equipment Record
283A	Audit Weights	Troemner 21pc Msas Set	Calibration Certificate
335	Sample Box / Dry Gas Meter	Apex Automated Emissions Sampling Box	Calibration Log
336	Sample Box / Dry Gas Meter	Apex Automated Emissions Sampling Box	Calibration Log
410	Microtector	Dwyer Microtector	Calibration Certificate
559	Vaneometer	Dwyer Vaneometer	Equipment Record
592	Thermohygrometer	Omega Digital Thermohygrometer	Calibration Log
594	Combustion Gas Analyzer	CAI Gas Analyzer	See Run Sheet
637	Milligram Balance	Analytical Balance - Mettler - Toledo	Calibration Certificate

SCALE WEIGHT CALIBRATION DATA SHEET

Weight to be calibrated: 10 pounds

ID Number: OMNI-00132

Standard Calibration Weight: 10 pounds

ID Number: OMNI-00255

Scale Used: MTW-150K

ID Number: OMNI-00353

Date: 2/23/2018 By: B. Davis

Standard Weight (A) (Lb.)	Weight Verified (B) (Lb.)	Difference (A - B)	% Error
10.0	10.0	0.0	0

*Acceptable tolerance is 1%.

This calibration is traceable to NIST using calibrated standard weights.

Technician signature:  Date: 2/23/18



Established 1974

QUALITY CONTROL SERVICES

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



OMNI-Test Laboratories, Inc.
 13327 NE Airport Way
 Portland, OR 97230

Report Number: OMNE0321676171004

A2LA ACCREDITED CERTIFICATE OF CALIBRATION WITH DATA

INSTRUMENT INFORMATION

Item	Make	Model	Serial Number	Customer ID	Location
Scale	Weigh-Tronix	WI-127 1000x0.1lb	21676	185	Lab
Units	Readability	SOP	Cal Date	Last Cal Date	Cal Due Date
lbs	0.1	QC033	10/4/17	10/11/16	10/2018

FUNCTIONAL CHECKS

SHIFT TEST	LINEARITY	REPEATABILITY	ENVIRONMENTAL CONDITIONS
Test Wt: 500	Tol: HB44	Test Wt: 200	Tol: 0.2
As-Found: Pass: <input checked="" type="checkbox"/> Fail: <input type="checkbox"/>	As-Found: Pass: <input checked="" type="checkbox"/> Fail: <input type="checkbox"/>	As-Found: Pass: <input checked="" type="checkbox"/> Fail: <input type="checkbox"/>	<input type="checkbox"/> Good <input checked="" type="checkbox"/> Fair <input type="checkbox"/> Poor
As-Left: Pass: <input checked="" type="checkbox"/> Fail: <input type="checkbox"/>	As-Left: Pass: <input checked="" type="checkbox"/> Fail: <input type="checkbox"/>	As-Left: Pass: <input checked="" type="checkbox"/> Fail: <input type="checkbox"/>	Temperature: 21.0°C

CALIBRATION DATA

Standard	As-Found	As-Left	Expanded Uncertainty
1000	1000.0	1000.0	0.12
700	700.0	700.0	0.12
500	500.0	500.0	0.08
200	200.0	200.0	0.08
100	100.0	100.0	0.05
50	50.0	50.0	0.05

CALIBRATION STANDARDS

Item	Make	Model	Serial Number	Cal Date	Cal Due Date	NIST ID
Avoirdupois Cast W	Rice Lake	25 and 50lb	PWO990-CA	11/4/15	11/2017	20152112

Permanent Information Concerning this Equipment:

Comments/Information Concerning this Calibration

Report prepared/reviewed by:

Date: 10-4-17

Technician: D.Oudeans

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

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

OMNI 00209

Instruction Booklet

for use with

PRINCO

Fortin type mercurial

Barometers

Manufactured by

PRINCO INSTRUMENTS, INC.
1020 Industrial Blvd.
Southampton, Pa. 18966-4095
U.S.A.

Phone: 215 355-1500
Fax: 215 355-7766

453
National
Weather
Service
Type

469
NOVA™
Economy
Model

JJ Calibrations, Inc.

Manufacturer: Troemner Inc.
Model: 1mg-100g (Class F)
Nomenclature: Mass Set, 21 Pcs.
Serial: 47883

Certificate #: 543402
Date: 09Oct2013
Technician: 34
Inspection Interval: 60 Months

Thermal Metering System Calibration

Y Factor

Manufacturer: APEX
 Model: XC-60-EP
 Serial Number: 606001
 OMNI Tracking No.: OMNI-00335
 Calibrated Orifice: Yes

Average Gas Meter y Factor	0.977
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Orifice Meter dH@	N/A
--------------------------	------------

Calibration Date: 01/17/18
 Calibrated by: B. Davis
 Calibration Frequency: Six months
 Next Calibration Due: 7/18/2018
 Instrument Range: 1.000 cfm
 Standard Temp.: 68 oF
 Standard Press.: 29.92 "Hg
 Barometric Press., Pb: 29.94 "Hg
 Signature/Date: B. Davis 1/18/2018


1/19/2018

Calibration Parameters	Run 1	Run 2	Run 3
Reference Meter Pressure ("H ₂ O), Pr	<u>0.00</u>	<u>0.00</u>	<u>0.00</u>
DGM Pressure ("H ₂ O), Pd	<u>2.30</u>	<u>1.38</u>	<u>1.00</u>
Initial Reference Meter	<u>198.1</u>	<u>203.7</u>	<u>214.2</u>
Final Reference Meter	<u>203.602</u>	<u>208.8</u>	<u>222.5</u>
Initial DGM	<u>0</u>	<u>0</u>	<u>0</u>
Final DGM	<u>5.65</u>	<u>5.298</u>	<u>8.67</u>
Temp. Ref. Meter (°F), Tr	<u>68.1</u>	<u>68.1</u>	<u>68.0</u>
Temperature DGM (°F), Td	<u>77.0</u>	<u>78.0</u>	<u>80.0</u>
Time (min)	<u>26.5</u>	<u>31.8</u>	<u>43.5</u>
Net Volume Ref. Meter, Vr	<u>5.502</u>	<u>5.100</u>	<u>8.300</u>
Net Volume DGM, Vd	<u>5.65</u>	<u>5.298</u>	<u>8.67</u>
Gas Meter y Factor =	0.982	0.975	0.974
Gas Meter y Factor Deviation (from avg.)	0.005	0.002	0.003
Orifice dH@	N/A	N/A	N/A
Orifice dH@ Deviation (from avg.)	N/A	N/A	N/A

where:

- Deviation = |Average value for all runs - current run value|
- $y = [Vr \times (y \text{ factor (ref)}) \times (Pb + (Pr/13.6)) \times (Td + 460)] / [Vd \times (Pb + (Pd/13.6)) \times (Tr + 460)]$
- $dH@ = 0.0317 \times Pd / (Pb \times (Td + 460)) \times [(Tr + 460) \times \text{time}]^2 / Vr$

* Reference calibration is traceable to NIST through NIST Test # 40674, Kimble ASTM E1272, or NIST traceable laboratory

** Equations come from EPA Method 5

The uncertainty of measurement is ±0.14 ft³/min. This is based on the reference standard having a TAR (Test Accuracy Ratio) of at least 4:1.

Previous Calibration Comparision			
Date	<u>7/18/2017</u>	Acceptable Deviation (5%)	Deviation
y Factor	<u>0.981</u>	0.04905	0.004
Acceptance	Acceptable		

Current Calibration	
Acceptable y Deviation	0.020
Maximum y Deviation	0.005
Acceptable dH@ Deviation	N/A
Maximum dH@ Deviation	N/A
Acceptance	Acceptable

Reference Standard *		
Standard Calibrator	Model S/N	Standard Test Meter
	<u>OMNI-00001</u>	
	Calib. Date	<u>30-Oct-17</u>
	Calib. Value	<u>0.9977</u> y factor (ref)

DIFFERENTIAL PRESSURE GAUGE CALIBRATION DATA SHEET

Instrument to be calibrated: Pressure Transducer

Maximum Range: 0-2" WC ID Number: OMNI-00335

Calibration Instrument: Digital Manometer ID Number: OMNI-00395

Date: 1/17/2018 By: B. Davis

This form is to be used only in conjunction with Standard Procedure C-SPC.

Range of Calibration Point ("WC)	Digital Manometer Input ("WC)	Pressure Gauge Response ("WC)	Difference (Input - Response)	% Error of Full Span*
0-20% Max. Range 0 - 0.4	0.08	0.067	0.013	0.65
20-40% Max. Range 0.4 - 0.8	0.64	0.638	0.002	0.10
40-60% Max. Range 0.8 – 1.2	1.00	1.012	0.012	0.60
60-80% Max. Range 1.2 – 1.6	1.40	1.432	0.032	1.6
80-100% Max. Range 1.6 – 2.0	1.85	1.895	0.045	2.25

*Acceptable tolerance is 4%.

The uncertainty of measurement is ± 0.4 " WC. This is based on the reference standard having a TAR (Test Accuracy Ratio) of at least 4:1.

Technician signature:  Date: 1/18/2018

Reviewed by:  Date: 1/19/2018

**Temperature Calibration
EPA Method 28R, ASTM 2515**

BOOTH:	TEMPERATURE MONITOR TYPE:				EQUIPMENT NUMBER:		
E1	National Instruments Logger				00335, 00336		
REFERENCE METER EQUIPMENT NUMBER: 00373			Calibration Due Date: 7/17/18				
CALIBRATION PERFORMED BY:			DATE:	AMBIENT TEMPERATURE:	BAROMETRIC PRESSURE:		
B. Davis			1/17/2018	68	29.87		
Input Temperature (F)	Ambient	Meter A	Meter B	Filter A	Filter B	Tunnel	FB Interior
			Meter B	Filter A	Filter B	Tunnel	
0	1	0	0	1	0	0	0
100	101	100	100	100	100	100	100
300	300	300	300	300	300	300	299
500	500	500	500	500	500	500	499
700	700	700	700	700	700	700	699
1000	1000	1000	1000	1000	1000	1000	1000

Input (F)	FB Top	FB Bottom	FB Back	FB Left	FB Right	Imp A	Imp B	Cat	Stack
0	0	0	0	-1	-1	0	0	0	0
100	100	100	100	99	99	100	100	100	100
300	300	299	299	299	299	300	300	300	299
500	499	499	499	499	499	500	500	500	500
700	699	699	699	699	699	700	700	700	700
1000	1000	999	1000	1000	999	1000	1000	1000	1000

1500

1500

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1999

Technician signature: B.D. Date: 1/17/2018Reviewed By: G.L. Date: 1/19/2018

Thermal Metering System Calibration

Y Factor

Manufacturer: APEX
 Model: XC-60-EP
 Serial Number: 606002
 OMNI Tracking No.: OMNI-00336
 Calibrated Orifice: Yes

Average Gas Meter y Factor	0.979
-----------------------------------	--------------

Orifice Meter dH@	N/A
--------------------------	------------

Calibration Date: 01/17/18
 Calibrated by: B. Davis
 Calibration Frequency: Six months
 Next Calibration Due: 1/18/2018
 Instrument Range: 1.000 cfm
 Standard Temp.: 68 oF
 Standard Press.: 29.92 "Hg
 Barometric Press., Pb: 29.94 "Hg
 Signature/Date: B. Davis 1/17/2018

1/19/2017

Calibration Parameters	Run 1	Run 2	Run 3
Reference Meter Pressure ("H ₂ O), Pr	<u>0.00</u>	<u>0.00</u>	<u>0.00</u>
DGM Pressure ("H ₂ O), Pd	<u>1.95</u>	<u>1.20</u>	<u>0.80</u>
Initial Reference Meter	<u>223.4</u>	<u>231.9</u>	<u>238</u>
Final Reference Meter	<u>231.7</u>	<u>237.9</u>	<u>243.503</u>
Initial DGM	<u>0</u>	<u>0</u>	<u>0</u>
Final DGM	<u>8.517</u>	<u>6.215</u>	<u>5.713</u>
Temp. Ref. Meter (°F), Tr	<u>68.0</u>	<u>69.1</u>	<u>68.6</u>
Temperature DGM (°F), Td	<u>76.0</u>	<u>78.0</u>	<u>79.0</u>
Time (min)	<u>39.8</u>	<u>36.5</u>	<u>37.0</u>
Net Volume Ref. Meter, Vr	<u>8.300</u>	<u>6.000</u>	<u>5.503</u>
Net Volume DGM, Vd	<u>8.517</u>	<u>6.215</u>	<u>5.713</u>
Gas Meter y Factor =	0.982	0.977	0.978
Gas Meter y Factor Deviation (from avg.)	0.003	0.002	0.001
Orifice dH@	N/A	N/A	N/A
Orifice dH@ Deviation (from avg.)	N/A	N/A	N/A

where:

- Deviation = |Average value for all runs - current run value|
- $y = [Vr \times (y \text{ factor (ref)}) \times (Pb + (Pr/13.6)) \times (Td + 460)] / [Vd \times (Pb + (Pd/13.6)) \times (Tr + 460)]$
- $dH@ = 0.0317 \times Pd / (Pb \times (Td + 460)) \times [(Tr + 460) \times \text{time}]^2 / Vr$

* Reference calibration is traceable to NIST through NIST Test # 40674, Kimble ASTM E1272, or NIST traceable laboratory

** Equations come from EPA Method 5

The uncertainty of measurement is ±0.14 ft³/min. This is based on the reference standard having a TAR (Test Accuracy Ratio) of at least 4:1.

Previous Calibration Comparision

Date	7/18/2017	Acceptable Deviation (5%)	Deviation
y Factor	0.984	0.0492	0.005
Acceptance	Acceptable		

Current Calibration

Acceptable y Deviation	0.020
Maximum y Deviation	0.003
Acceptable dH@ Deviation	N/A
Maximum dH@ Deviation	N/A
Acceptance	Acceptable

Reference Standard *

Standard Calibrator	Model	Standard Test Meter
S/N	OMNI-00001	
Calib. Date	30-Oct-17	
Calib. Value	0.9977	y factor (ref)

DIFFERENTIAL PRESSURE GAUGE CALIBRATION DATA SHEET

Instrument to be calibrated: Pressure Transducer

Maximum Range: 0-2" WC ID Number: OMNI-00336

Calibration Instrument: Digital Manometer ID Number: OMNI-00395

Date: 1/17/2018 By: B. Davis

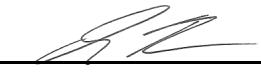
This form is to be used only in conjunction with Standard Procedure C-SPC.

Range of Calibration Point ("WC)	Digital Manometer Input ("WC)	Pressure Gauge Response ("WC)	Difference (Input - Response)	% Error of Full Span*
0-20% Max. Range 0 - 0.4	0.35	0.362	0.012	0.6
20-40% Max. Range 0.4 - 0.8	0.65	0.672	0.022	1.1
40-60% Max. Range 0.8 – 1.2	1.00	1.024	0.024	1.2
60-80% Max. Range 1.2 – 1.6	1.30	1.340	0.040	2.0
80-100% Max. Range 1.6 – 2.0	1.70	1.749	0.049	2.45

*Acceptable tolerance is 4%.

The uncertainty of measurement is ± 0.4 " WC. This is based on the reference standard having a TAR (Test Accuracy Ratio) of at least 4:1.

Technician signature:  Date: 1/18/2018

Reviewed by:  Date: 1/19/2018

**Temperature Calibration
EPA Method 28R, ASTM 2515**

BOOTH:	TEMPERATURE MONITOR TYPE:				EQUIPMENT NUMBER:		
E1	National Instruments Logger				00335, 00336		
REFERENCE METER EQUIPMENT NUMBER: 00373			Calibration Due Date: 7/17/18				
CALIBRATION PERFORMED BY:		DATE:	AMBIENT TEMPERATURE:	BAROMETRIC PRESSURE:			
B. Davis		1/17/2018	68	29.87			
Input Temperature (F)	Ambient	Meter A					FB Interior
			Meter B	Filter A	Filter B	Tunnel	
0	1	0	0	1	0	0	0
100	101	100	100	100	100	100	100
300	300	300	300	300	300	300	299
500	500	500	500	500	500	500	499
700	700	700	700	700	700	700	699
1000	1000	1000	1000	1000	1000	1000	1000

Input (F)	FB Top	FB Bottom	FB Back	FB Left	FB Right	Imp A	Imp B	Cat	Stack
0	0	0	0	-1	-1	0	0	0	0
100	100	100	100	99	99	100	100	100	100
300	300	299	299	299	299	300	300	300	299
500	499	499	499	499	499	500	500	500	500
700	699	699	699	699	699	700	700	700	700
1000	1000	999	1000	1000	999	1000	1000	1000	1000

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1500

2000

1999

Technician signature: B.D. Date: 1/17/2018Reviewed By: G.L. Date: 1/19/2018

Certificate of Calibration

Certificate Number: 659360



JJ Calibrations, Inc.

7007 SE Lake Rd

Portland, OR 97267-2105

Phone 503.786.3005

FAX 503.786.2994

Omni-Test Laboratories
13327 NE Airport Way
Portland, OR 97230



0723.01
Calibration

PO: 170149

Order Date: 09/22/2017

Authorized By: N/A

Property #: OMNI-00410

User: N/A

Department: N/A

Make: Dwyer

Model: 1430

Serial #: OMNI-00410

Description: Microtector

Procedure: SEND TO VENDOR

Accuracy: ±0.00025" WC

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.

Limited Calibration (est.2016) - Calibrated micrometer head only.

Standards Used

Std ID	Manufacturer	Model	Nomenclature	Due Date	Trace ID
541A	Select	E8FED2	8 Piece Gage Block Set	12/14/2017	635720
103A	Brown & Sharpe	598-81-14	Gage Block Set, 81 pc.	03/16/2019	643452
368A	Rutland	2225-7081	81 Piece Gage Block Set	06/01/2018	649394

Parameter

Measurement Data

Measurement Description	Range Unit	Reference	Min	Max	*Error	UUT	Uncertainty	Accredited = ✓
Before/After								
Length	Inch	0.1300	0.129	0.131	0.000	0.130 Inch	1.1E-03	✓
	Inch	0.3850	0.384	0.386	0.000	0.385 Inch	1.1E-03	✓
	Inch	0.6150	0.614	0.616	0.000	0.615 Inch	1.1E-03	✓
	Inch	0.8700	0.869	0.871	0.000	0.870 Inch	1.1E-03	✓
	Inch	1.0000	0.999	1.001	0.000	1.000 Inch	1.1E-03	✓

JJ Calibrations, Inc. certifies that this instrument has been calibrated in accordance with the JJ Calibrations Quality Assurance Manual with the stated procedure using standards that are traceable to the National Institute of Standards and Technology (NIST), or other National Measurement Institutes (NMI's), or by using natural physical constants, intrinsic standards or ratio calibration techniques. The quality system and this certificate are in compliance with ANSI/NCSL Z540-1-1994, ISO/IEC 17025-2005, 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 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 prior written consent of JJ Calibrations, Inc.

JJ Calibrations, Inc. quality system has been assessed and accredited to ISO/IEC 17025:2005.

Reviewer

3 Issued 10/13/2017 Rev #15

Inspector

Calibration Record

Vaneometer Air Velocity Meter OMNI-00559

VWR Temperature Hygrometer Calibration Procedure and Data Sheet

Frequency: Every Two Years

Step 1: Locate NIST traceable standard.

Step 2: Place unit to be calibrated, tracking No. OMNI-00592, inside OMNI desiccate box on the same shelf with the NIST traceable standard.

Step 3: After a period of not less than four hours record the temperature and humidity of both units in the spaces provide below.

Step 4: If the unit to be calibrated matches the NIST standard within $\pm 4\%$, it is acceptable. If not, the unit needs to be sent to a repair company or replaced.

Verification Data:

Date: 1/8/2018 Technician: B Davis

Time in desiccate: 0910 Recording time: 1335

NIST Standard Temperature: 28.3 °F NIST Standard Humidity: 74.5

Test Unit Temperature Reading: 25.4 °F Test Unit Humidity Reading: 74.3

Test unit OMNI-00592 is X or was not within acceptable limits.

Technician Signature: B Davis

Comments: Full scale of omni-00592 is 90% RH, with a difference of 2.9 this gives a error percentage of 3.22 %. This value is within the allowable 4%.

OMNI Track #	OMNI-00594
--------------	------------

Equipment Name/Description	CAI ZRE-4 Gas Analyzer
----------------------------	------------------------

Equipment S/N:	N5F0112
----------------	---------

Comments	CO2, O2, and dual range CO gas analyzer.
----------	--

Status	Active, calibrate prior to use.
--------	---------------------------------

Part #	ZRE-4
--------	-------

Reference Standard:	<input type="checkbox"/> YES	<input checked="" type="checkbox"/> X	<input type="checkbox"/> NO	(Check 'X' for answer)
---------------------	------------------------------	---------------------------------------	-----------------------------	------------------------

Location of Equipment:	Portable gas cart.
------------------------	--------------------

Calibration Vendor	OMNI in house
--------------------	---------------

Type of Calibration	Calibrate Prior to use.
---------------------	-------------------------

Calibration Period (Months)	N/A
-----------------------------	-----

Date of Last Calibration	N/A
--------------------------	-----

Date of Next Calibration	N/A
--------------------------	-----

Do the following:

- 1) Complete Calibration documentation
- 2) Complete top half of this form
- 3) Attach appropriate calibration forms and save in following location
\\omni-serv\Test Equipment\Equipment\OMNI-XXXXX - Equipment Name
- 4) Repopulate database with updated information
- 5) Print, laminate and adhere calibration tag to equipment

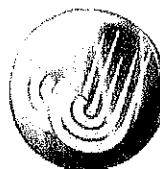
Verify before use OMNI-00594 Gas Analyzer

Verify before use OMNI-00594 Gas Analyzer

Certificate of Calibration

Certificate Number: **668066**

Omni-Test Laboratories
13327 NE Airport Way
Portland, OR 97230



JJ Calibrations, Inc.
7007 SE Lake Rd
Portland, OR 97267-2105
Phone 503.786.3005
FAX 503.786.2994

OnSite

PO: **180161**
Order Date: **02/06/2018**
Authorized By: **N/A**



Calibration

Property #: **OMNI-00637**
User: **N/A**
Department: **N/A**
Make: **Mettler Toledo**
Model: **MS104TS/00**
Serial #: **B729400181**
Description: **Analytical Scale, 120g**
Procedure: **DCN 500887**
Accuracy: **±0.0005g**

Calibrated on: **02/06/2018**
*Recommended Due: **08/06/2018**
Environment: **20 °C 53 % RH**
* As Received: **Within Tolerance**
* As Returned: **Within Tolerance**
Action Taken: **Calibrated**
Technician: **111**

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.

Standards Used					
<u>Std ID</u>	<u>Manufacturer</u>	<u>Model</u>	<u>Nomenclature</u>	<u>Due Date</u>	<u>Trace ID</u>
503A	Rice Lake	1mg-200g (Class 0)	Mass Set,	04/20/2018	642578

Parameter	Measurement Description	Measurement Data				UUT	Uncertainty		
		Range	Unit	Reference	Min	Max			
Before/After									
Force									
		g		10.00000	9.9995	10.0005	0.0001	10.0001 g	5.7E-04 ✓
		g		30.00000	29.9995	30.0005	0.0003	30.0003 g	5.7E-04 ✓
		g		60.00000	59.9995	60.0005	0.0001	60.0001 g	5.7E-04 ✓
		g		90.00000	89.9995	90.0005	0.0001	89.9999 g	5.7E-04 ✓
		g		120.00000	119.9995	120.0005	0.0002	119.9998 g	5.7E-04 ✓

JJ Calibrations, Inc. certifies that this instrument has been calibrated in accordance with the JJ Calibrations Quality Assurance Manual with the stated procedure using standards that are traceable to the National Institute of Standards and Technology (NIST), or other National Measurement Institutes (NMIs), or by using natural physical constants, intrinsic standards or ratio calibration techniques. The quality system and this certificate are in compliance with ANSI/NCSL Z540-1-1994, ISO/IEC 17025-2005, 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 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 prior written consent of JJ Calibrations, Inc.

JJ Calibrations, Inc. quality system has been assessed and accredited to ISO/IEC 17025:2005.

Reviewer

3 Issued

Rev #15

Inspector

3.3 - Example Calculations

Equations and Sample Calculations – ASTM E2779 & E2515

Manufacturer: Sherwood
Model: Maxx FS
Run: 2
Category: Integrated

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 Dry burn rate, kg/hr

Q_{sd} – Average gas flow r ϵ Total particulate matter collected, mg

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

m_n – Total Particulate Ma Average dilution tunnel gas velocity, ft/sec

C_s - Concentration of part Particulate concentration, g/dscf

E_T – Total Particulate Err Dilution tunnel gas flow rate, dscf/min

PR - Proportional Rate V ϵ Particulate emission rate, lbs/hr

PM_R – Average particulat Total particulate emissions, grams

PM_F – Average particulati Average fuel load moisture content, %

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:

5.58 %

M_{Swb} = 19.5 lbs

M_{Ewb} = 0.0 lbs

0.4536 = Conversion factor from lbs to kg

$$M_{Bdb} = [(19.5 \times 0.4536) - (0.0 \times 0.4536)] (100/(100 + 5.58))$$

$$M_{Bdb} = \mathbf{8.378 \text{ kg}}$$

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):

$$FM = 5.58 \text{ \%}$$

$$M_{SSiwb} = 11.9 \text{ lbs}$$

$$M_{ESiwb} = 6.0 \text{ lbs}$$

0.4536 = Conversion factor from lbs to kg

$$M_{BSidb} = [(11.9 \times 0.4536) - (6.0 \times 0.4536)] (100/(100 + 6))$$

$$M_{BSidb} = 2.53 \text{ kg}$$

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 intergrated test run, min

Sample Calculation:

$$M_{Bdb} = 8.38 \text{ kg}$$

$$\theta = 362 \text{ min}$$

$$BR = \frac{60 \times 8.38}{362}$$

$$BR = 1.39 \text{ kg/hr}$$

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,

θ_{Si} = Total length of test run segment *i*, min

Sample Calculation (from medium burn rate segment):

$$M_{BSidb} = 2.53 \text{ kg}$$

$$\theta = 121 \text{ min}$$

$$BR = \frac{60 \times 2.53}{121}$$

$$BR = 1.26 \text{ kg/hr}$$

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:

$$F_p = \text{Adjustment factor for center of tunnel pitot tube placement, } F_p = \frac{V_{strav}}{V_{scent}}, \text{ ASTM E2515 Equation (1)}$$

V_{scent} = Dilution tunnel velocity calculated after the multi-point pitot traverse at the center, ft/secV_{strav} = Dilution tunnel velocity calculated after the multi-point pitot traverse, ft/seck_p = Pitot tube constant, 85.49C_p = Pitot tube coefficient: 0.99, unitlessΔP* = Velocity pressure in the dilution tunnel, in H₂OT_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 HgP_{bar} = Barometric pressure at test site, in. HgP_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:

$$F_p = \frac{13.55}{16.16} = 0.838$$

$$V_s = 0.838 \times 85.49 \times 0.99 \times 0.245 \times \left(\left(\frac{\frac{92.1}{30.31} + \frac{460}{13.6}}{-0.19} \right) \times 28.78 \right)^{1/2}$$

$$V_s = \mathbf{13.85 \text{ ft/s}}$$

*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, ft²
 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:

$$Q_{sd} = 3600 \times (1 - 0.02) \times 13.85 \times 0.196 \times \frac{\frac{528}{92.1 + 460} \times \frac{30.3 + \frac{-0.19}{13.6}}{29.92}}$$

$$Q_{sd} = 9288.1 \text{ dscf/hr}$$

$V_{m(\text{std})}$ – Volume of Gas Sampled Corrected to Dry Standard Conditions, dscf

ASTM E2515 equation (6)

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

Where:

$$K_1 = 17.64 \text{ } ^\circ\text{R/in. Hg}$$

$$V_m = \text{Volume of gas sample measured at the dry gas meter, dcf}$$

$$Y = \text{Dry gas meter calibration factor, dimensionless}$$

$$P_{\text{bar}} = \text{Barometric pressure at the testing site, in. Hg}$$

$$\Delta H = \text{Average pressure differential across the orifice meter, in. H}_2\text{O}$$

$$T_m = \text{Absolute average dry gas meter temperature, } ^\circ\text{R}$$

Sample Calculation:

Using equation for Train 1:

$$V_{m(\text{std})} = 17.64 \times 53.814 \times 0.977 \times \frac{\left(30.31 + \frac{1.09}{13.6} \right)}{\left(83.3 + 460 \right)}$$

$$V_{m(\text{std})} = \mathbf{51.873} \text{ dscf}$$

Using equation for Train 2:

$$V_{m(\text{std})} = 17.64 \times 53.580 \times 0.979 \times \frac{\left(30.31 + \frac{0.94}{13.6} \right)}{\left(83.7 + 460 \right)}$$

$$V_{m(\text{std})} = \mathbf{51.693} \text{ dscf}$$

Using equation for ambient train:

$$V_{m(\text{std})} = 17.64 \times 0.00 \times 0 \times \frac{\left(30.31 + \frac{0.00}{13.6} \right)}{\left(73.8 + 460 \right)}$$

$$V_{m(\text{std})} = \mathbf{0.000} \text{ dscf}$$

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 1 (first hour):

$$m_n = 0.0 + 7.1 + 0.0$$

$$m_n = 7.1 \text{ mg}$$

Using equation for Train 1 (remainder):

$$m_n = 0.1 + 2.0 + 1.1$$

$$m_n = 3.2 \text{ mg}$$

Train 1 Aggregate = **10.3 mg**

Using equation for Train 2:

$$m_n = 0.0 + 10.1 + 0.4$$

$$m_n = \mathbf{10.5 \text{ mg}}$$

**C_s - Concentration of particulate matter in tunnel gas, dry basis, corrected to standard conditions, g/dsc
ASTM E2515 equation (13)**

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

Where:

K₂ = Constant, 0.001 g/mg

m_n = Total mass of particulate matter collected in the sampling train, mg

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

Sample calculation:

For Train 1:

$$C_s = 0.001 \times \frac{10.3}{51.87}$$

$$C_s = \mathbf{0.00020} \text{ g/dscf}$$

For Train 2

$$C_s = 0.001 \times \frac{10.5}{51.69}$$

$$C_s = \mathbf{0.00020} \text{ g/dscf}$$

For Ambient Train

$$C_r = 0.001 \times \frac{0.0}{0.00}$$

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

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 1

$$E_T = (\underline{0.000199} - 0.000000) \times \underline{9288.1} \times \underline{362} /60$$
$$E_T = \underline{11.13} \text{ g}$$

For Train 2

$$E_T = (\underline{0.000203} - 0.000000) \times \underline{9288.1} \times \underline{362} /60$$
$$E_T = \underline{11.38} \text{ g}$$

Average

$$E = \underline{11.25} \text{ g}$$

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

$$7.5\% \text{ of the average} = \underline{0.84}$$

$$\text{Train 1 difference} = \underline{0.13}$$

$$\text{Train 2 difference} = \underline{0.13}$$

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 1):

$$PR = \left(\frac{362 \times 0.124 \times 13.85 \times (108.0 + 460) \times (83.3 + 460)}{1 \times 53.81 \times 13.67 \times (92.1 + 460) \times (76.0 + 460)} \right) \times 100$$

$$PR = \underline{88} \text{ \%}$$

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:

$$E_T (\text{Dual train average}) = 11.25 \text{ g}$$

$$\theta = 362 \text{ min}$$

$$PM_R = 60 \times (11.25 / 362)$$

$$PM_R = 1.87 \text{ g/hr}$$

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:

$$E_T (\text{Dual train average}) = 11.25 \text{ g}$$

$$M_{Bdb} = 8.38 \text{ kg}$$

$$PM_F = 11.25 / 8.38)$$

$$PM_F = 1.34 \text{ g/kg}$$

*Sherwood Industries, Ltd
Models: Maxx-1
Report Number:0261PF028E*

Appendix A – Labeling & Owner's Manual

WH-

Serial No. / No. De Sérié:

Model / Modèle: MAXX-1 **DO NOT REMOVE THIS LABEL / NE RETIREZ PAS CETTE ÉTIQUETTE**MAXX-M

Listed Room Heater, Pelletized Fuel Type (Appareil de chauffage à granules certifié)

Input rating using: Wood Pellets/Corn - 63,000BTU (18.5KW*hr)

(Le chauffage avec: Boulettes de bois/maïs - 63,000BTU (18.5KW*hr))

Suitable For Mobile Home Installation (Accepté pour l'installation dans une maison mobile, test)

Tested to (Testée selon): ASTM E1509-12 & ULC S627-00

This pellet appliance has been tested and listed for use in manufactured homes in accordance with Oregon Administrative 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 code and manufacturer's instructions for precautions required for passing a chimney through a combustible wall or ceiling. ELECTRICAL RATING: 120 Volts, 60Hz, 4.2 Amps. Route Cord Away From Heater.

For use with pelletized solid fuels - wood, corn, wheat, barley, & grass only. Operate only with viewing door and ash removal door closed. Only replace glass with ceramic glass. Components required for installation 3in/75mm or 4in/100mm listed PL vent complete with components. Inspect and clean exhaust venting system frequently.

Cet appareil a été testé et certifié pour utilisation dans les maisons mobiles en accord avec les "Règles Administratives de l'Oregon 814-23-900 à 814-23-909". Installez et utilisez cet appareil seulement selon les instructions d'installation et d'opération du fabricant. Contactez les autorités locales de votre quartier concernant les restrictions et les inspections d'installation. Consultez les codes de bâtiment locaux et les instructions du fabricant pour les précautions à prendre lorsque une cheminée doit être installée au travers un mur ou un plafond combustible. CLASSEMENT ÉLECTRIQUE : 120 Volts, 60 Hz, 4.2 Amps. Placez le câble électrique loin de la chaleur.

Utilisation avec granules - le bois, le maïs, le blé, l'orge, & l'herbe seulement. Utiliser seulement lorsque les portes avant et la porte du réceptacle de cendre sont fermées. Si une ou des vitres devaient être remplacées, utilisez seulement du verre céramique. Les composantes requises pour l'installation sont un événement PL certifié de 3in/75mm ou 4in/100mm avec ses composantes. Inspectez et nettoyez le circuit de mise à l'air libre d'échappement fréquemment.

DATE OF MANUFACTURE / DATE DE FABRICATION:

J F M A M J J A S O N D 2018 2019 2020

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 1.865g/hr.

Installed as a freestanding stove - conventional or mobile home - Model FS. Minimum Clearances to Combustible Material / Espace de dégagement requis pour le modèle FS, qu'il soit encastré, sur pied ou dans une maison mobile: Sidewall to Unit / Du mur de côté à l'appareil:

A. 12 in. / 300 mm

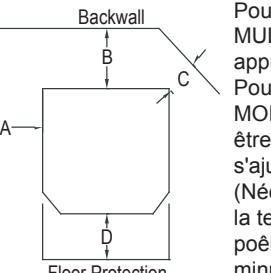
Backwall to Unit / Du mur de derrière à l'appareil:

B. 4 in. / 100 mm

Corner to Unit / Du coin à l'appareil:

C. 4 in. / 100 mm

The unit can be installed on a hard, stable combustible surface. The unit must be installed using the provided leveling legs and floor protector. L'unité peut être installée sur un dur, la surface combustible stable l'unité doit être installée en utilisant les jambes et le protecteur de mise à niveau fournis de plancher.

**CAUTION:**

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

**ATTENTION:**

L'APPAREIL EST CHAUD LORSQU'IL FONCTIONNE. NE PAS TOUCHER. GARDER LES ENFANTS, LES VÊTEMENTS ET LES MEUBLES ÉLOIGNÉS DE L'APPAREIL EN MARCHE. UN CONTACT AVEC CELUI-CI POURRAIT RÉSULTER EN DES BRÛLURES. Veuillez VOIR LA PLAQUE DU FABRICANT ET LES INSTRUCTIONS.

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



0268PF028E



Intertek

16625

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

To Start Stove: Select fuel type mode; PELLET for all grades of wood pellets & MULTIFUEL for all other fuels. Press the ON / OFF button. If the auger needs to be primed, press the FEED TRIM button.

To Operate Stove: MANUAL MODE: When a fire has been established the stove settings are adjustable. / HIGH/LOW MODE: (Requires a thermostat) When the thermostat calls for heat the stove settings are adjustable. When the thermostat contacts open, the HEAT LEVEL and Fans will drop down to the LOW setting until the thermostat contacts close again. / AUTO/OFF MODE: (Requires a thermostat) When the thermostat contacts close, the unit will light automatically. Once up to temperature the stove settings are adjustable. When the thermostat contacts open, the stove will drop down to the LOW settings for 30 minutes. If within the 30 min the thermostat contacts close, the HEAT LEVEL will return to previous MANUAL setting or if the thermostat contacts remain open the stove begin its shutdown routine and it will restart when the thermostat closes.

To Turn Off Stove: MANUAL and HI / LOW mode: Press the ON / OFF button

AUTO / OFF mode: Turn the thermostat down or off.

Pour démarrer le poêle: Choisir le mode pour le carburant ; PELLET pour tous degrés de boulettes de bois & MULTIFUEL pour tous autres carburants. Appuyer sur le bouton "ON/OFF". Si le Auger nécessite d'être amorcé, appuyer sur le bouton FEED TRIM.

Pour faire fonctionner le poêle : MODE MANUEL : Lorsque le feu est bien établi, les réglages peuvent être ajustés. / MODE "HIGH/LOW" : (Nécessite un thermostat) Lorsque le thermostat requière de la chaleur, les réglages peuvent être ajustés. Lorsque les contacts du thermostat ouvrent, le réglage du niveau de chaleur et les ventilateurs s'ajusteront au réglage " bas " jusqu'à ce que les contacts du thermostat se referment. / MODE "AUTO/OFF" : (Nécessite un thermostat) Lorsque les contacts du thermostat ferment, le poêle s'allumera automatiquement. Lorsque la température adéquate est atteinte, les réglages peuvent être ajustés. Lorsque les contacts du thermostat ouvrent, le poêle s'ajustera aux réglages "LOW" pendant 30 minutes. Si les contacts du thermostat sont fermés pendant ces 30 minutes, le réglage de niveau de chaleur retournera en réglages "MANUEL" ou si les contacts du thermostat restent ouverts, le poêle entamera le processus d'arrêt et il voulra redémarrer lorsque les contacts du thermostat refermer. Pour éteindre le poêle : MODE MANUEL ET " HIGH/LOW " : Appuyer sur le bouton "ON/OFF". MODE "AUTO / OFF" : Régler le thermostat à la baisse ou éteignez le.



WARRANTY REGISTRATION
enviro.com/warranty

MAXX-1

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.

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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).



INTRODUCTION

*** This manual is designed for the home owner in conjunction with the technical manual. ***

RATING LABEL LOCATION:

The rating label is located on the inside of the hopper.

PELLET QUALITY:

Pellet quality is important, please read the following:

Your Enviro pellet stove has been designed to burn ¼" (6mm) dia wood pellets only. DO NOT use this appliance as an incinerator. DO NOT use unsuitable and non recommended fuels, including liquid fuels 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.

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 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.

FILLING FUEL HOPPER: Open lid on top of unit, check hopper for foreign objects, empty the bag into the hopper, **DO NOT OVER FILL**, and ensure hopper lid closes completely.

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

WARNING: Parts of the appliance, especially the external surfaces, will be hot to touch when in operation so use due care.

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.

SAFETY WARNINGS & RECOMMENDATIONS

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. All national and local regulations and shall be complied with when operating this appliance.

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

Warning: 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 devise 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. Extinguish the fire in the burn pot liner with a cup of water and close the door. 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.

OPERATION: The door and ash drawer must be kept closed when the unit is in operation 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. **Unit hot while in operation. Keep children, clothing and furniture away. Contact may cause skin burns.**

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

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 CORDWOOD IS PROHIBITED BY LAW. Do not burn garbage or flammable fluids such as gasoline, naptha or engine oil.**

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 surface, 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 thoroughly cooled.

SAFETY WARNINGS & RECOMMENDATIONS

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 (3.6 Amps), 60 hertz electrical outlet and also must be accessible. 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 432 watts.

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.

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.

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.

Be sure to maintain the structural integrity of your home when passing a vent through walls, ceilings, or roofs, and all construction meets local building codes. 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 existing construction doesn't meet load capacity, suitable measures (e.g. load distributing plate) must 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: This unit uses large quantities of air for combustion; outside Fresh Air connection is **strongly** recommended. 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).

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.

EMISSIONS AND EFFICIENCIES

EMISSIONS AND EFFICIENCY - MAXX:

This manual describes the installation and operation of the Enviro Maxx 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 16,588-63,386 Btu/hr.

Efficiency: 77.4% HHV



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

DIMENSIONS & SPECIFICATIONS:

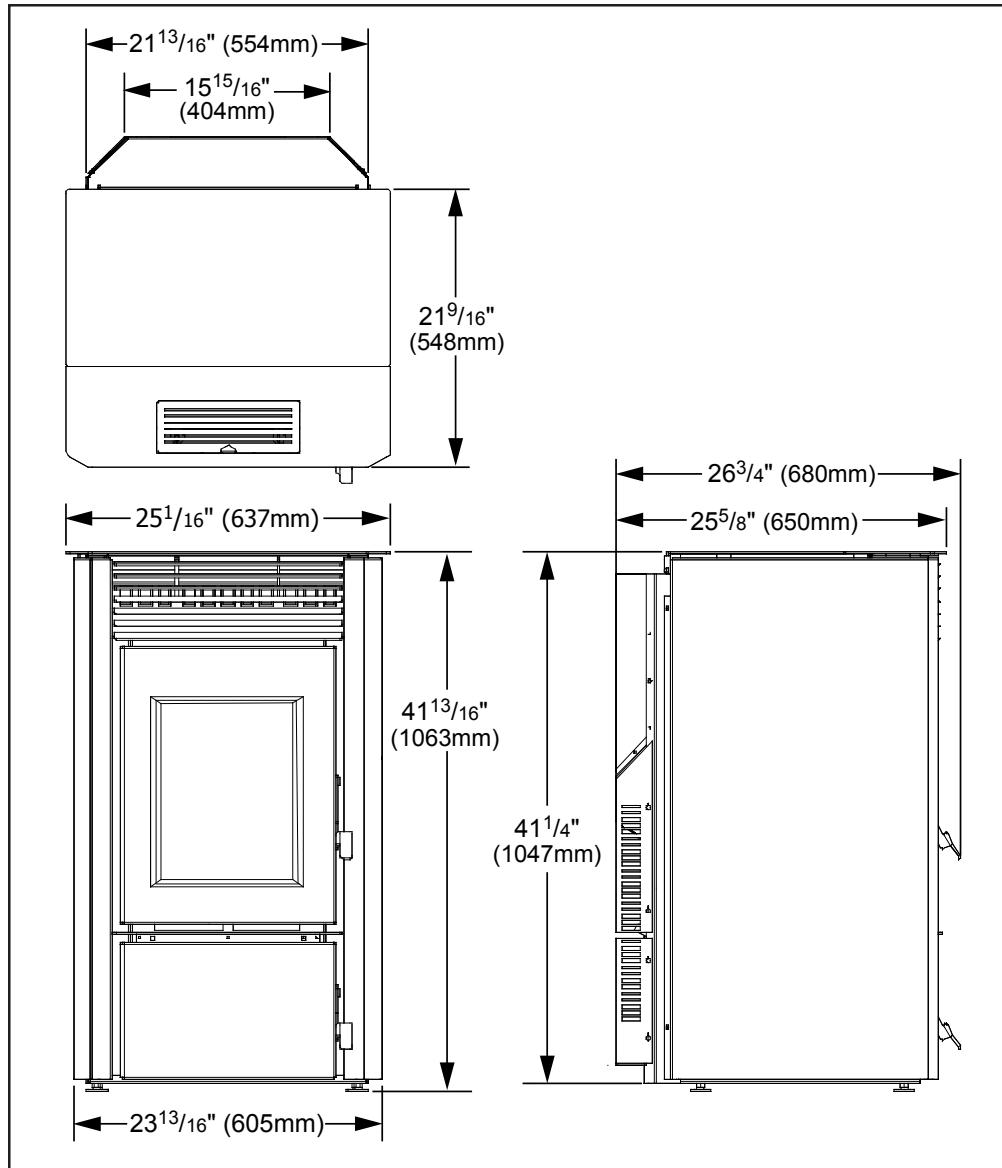


Figure 1: Dimensions of Maxx.

Table 1: Maxx Specifications.

Testing Standard	Frequency	Voltage
ASTM 1509-04	60 Hz	110 - 120 V
Fuel type	Current	Max Power
wood pellets - 6mm (1/4") dia.	3.6 Amps	432 Watts
Description	Hopper Capacity	Consumption on Low
Residential Wood Pellet Heater	up to 130 lb (59 Kg)	1.7 lb/hr (0.77 Kg/hr)*
	Weight (with full hopper)	Consumption on High
	455 lb (206 Kg)	7.6 - 8.3 lb/hr (3.45-3.76 Kg/hr)*

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

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. HEAT LEVEL ADJUSTMENT BUTTONS:** When pressed, will change the heat level setting of the unit up or down.
- 8. HEAT OUTPUT INDICATOR:** Shows the present heat output setting.

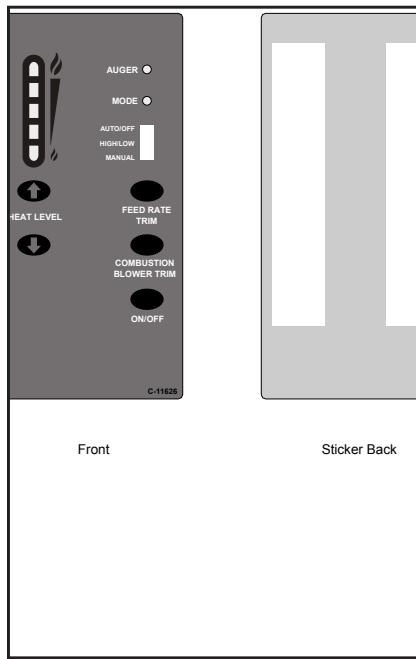


Figure 3: Circuit Board Control Panel Decal.

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 pressed 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.

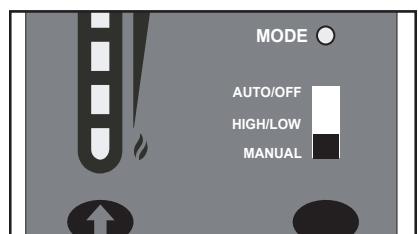


Figure 4: Thermostat Switch in MANUAL position.

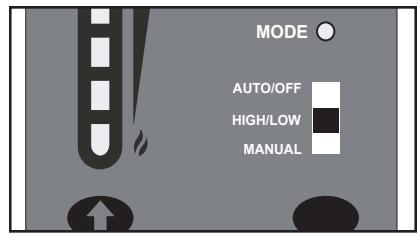


Figure 5: Thermostat Switch in HIGH/LOW position.

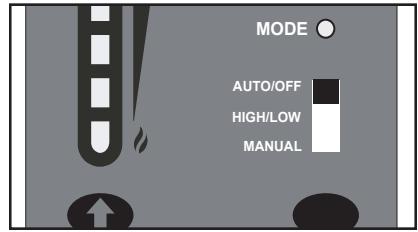


Figure 6: Thermostat Switch in ON/OFF position.

DO NOT unplug unit while Combustion fan is operating.

This may lead to smoke escaping from the stove.

OPERATING INSTRUCTIONS

SLIDER/DAMPER SET-UP:

THE SLIDER / DAMPER MUST BE SET AT TIME OF INSTALLATION. A Qualified Service Technician or Installer must set the Slider Damper. This is used to regulate the airflow through the pellet stove. Following these steps will minimize visible emissions.

If the fire should happen to go out and the heat output indicator has been set on the lowest setting, the Slider Damper should be pushed in slightly, decreasing the air in the firebox.

If, after long periods of burning, the fire builds up and overflows the burn pot or there is a build up of clinkers, this would be a sign that the pellet quality is poor, this requires more primary air, the slider damper must be pulled out to compensate. Pulling the slider damper out gives the fire more air.

The easiest way to make sure that an efficient flame is achieved is to understand the characteristics of the fire.

- A tall, lazy flame with dark orange tips requires more air – Open slider (pull out) slightly.



Figure 7: Efficient Flame.

- A short, brisk flame, like a blowtorch, has too much air – Close slider (push in) slightly.
- If the flame is in the middle

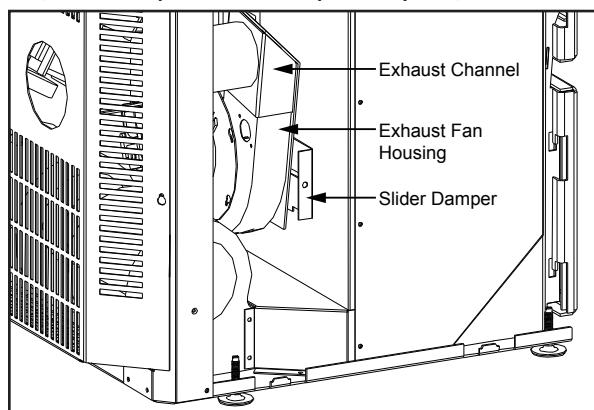


Figure 6: Slider/Damper Plate in Unit.

of these two characteristics with a bright yellow/orange, active flame with no black tips then the air is set for proper operation, refer to Figure 7.

The combustion exhaust blower is a variable speed blower controlled by the heat output button. This blower will decrease the vacuum pressure inside the stove, adjusting the air to fuel ratio.

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 ash build-up).

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 builds up on all settings, the slider damper rod should be pulled out in small increments to give the unit more air.
2. 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).
3. 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.
4. 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).
5. 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. 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.

Check the Burn Pot Liner DAILY	
Weekly	Bi-annually or 2 Tons of Fuel
Burn Pot and Liner - Empty	Exhaust Vent
Heat Exchanger Tubes	Fresh Air Intake Tube
Ash Box	Blower Mechanisms
Door Glass	Heat Exchanger Tubes
Inside Firebox	Behind Firebox Liners
Ash Pan and Door Gaskets	All Hinges
Door Latch	Post Season Clean-up

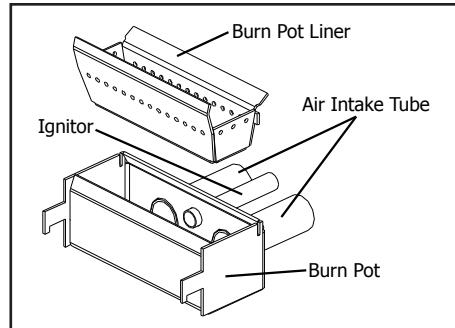


Figure 8: Maxx Burn pot and Liner

TOOLS REQUIRED TO CLEAN UNIT:

Torx T-20 Screwdriver, $\frac{1}{4}$ ", $\frac{5}{16}$ ", $\frac{3}{8}$ ", & $\frac{7}{16}$ " wrench and/or socket, Ash Pan Tool, Brush, Soft Cloth, and Vacuum with fine filter bag

BURNER POT AND LINER (Checked Daily/Emptied Weekly)

To remove the burn pot and burn pot liner, open the door using the door handle provided (located on the right-hand side of the stove). Swing the door open. Lift the liner from the burn pot. Lift the burn pot from the firebox by gently lifting up the front of the burn pot, then sliding the assembly from the air intake tube and the ignitor cartridge.

This is the 'pot' where the pellets are burned. When the unit is cold, remove the burn-pot liner from the stove. Using a metal scrapper, remove material that has accumulated or is clogging the liner's holes. Then dispose of the scrapped 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; 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 or the stove may need cleaning. Check the stove for ash build up (clean if required) and adjust the slider / damper to produce the proper clean combustion.

HEAT EXCHANGER TUBES (Weekly)

There are two (2) sets of exchanger tube scrapers; the handles are located under the top grill (trivet). Lift the grill and move the handles all the way 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.

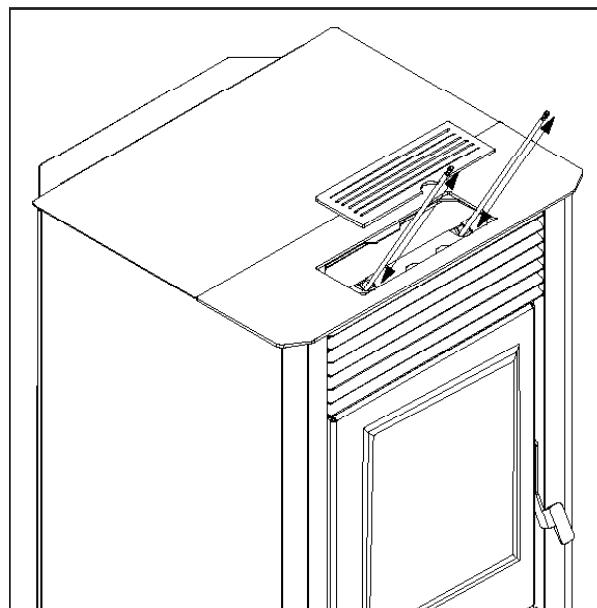


Figure 9: Maxx Burn Heat Exchanger Cleaning.

ROUTINE CLEANING AND MAINTENANCE

DOOR GLASS CLEANING (Weekly)

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.

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 wipe down the outside and inside of the glass.

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.

ASH BOX (Weekly)

IMPORTANT: The unit must be OFF while the ash pan is removed.

The ash box is located behind the lower door (see Figure 10). To remove the ash box, lift the latch on the right, open the ash box door, and lift it 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.

Insert the ash box fully and close ash box door.

DO NOT PLACE UNBURNED OR RAW PELLET FUEL IN ASH PAN.

EXHAUST PASSAGES (Biannually)

- Open the firebox door by lifting the handle.
- Remove the burn pot and burn pot liner; clean both.
- Using a $\frac{3}{8}$ " socket, remove the two (2) bolts that hold the firebox liner in place. Vacuum the firebox and firebox liner thoroughly.
- Open the ash box door; remove the ash box and cleanout the cavity.
- Clean out the transition box to the combustion blower (located behind the ash box)
- Lubricate all screws with penetrating oil.
- Re-install the ash box, firebox liner, burn pot, and burn pot liner
- Close the firebox and ash pan doors and secure.

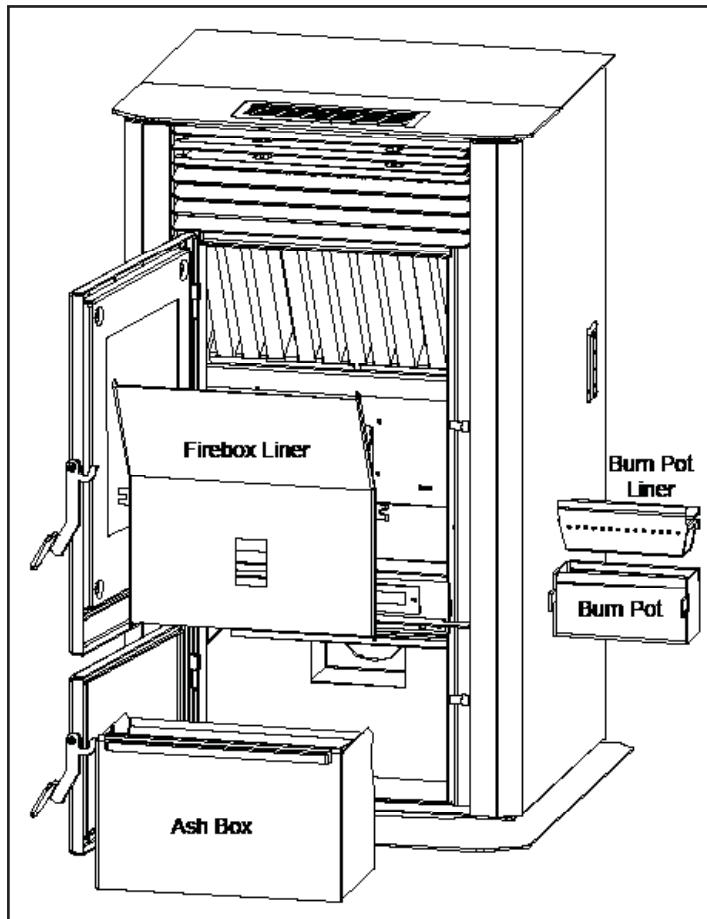


Figure 10: Maxx Exhaust Passages.

EXHAUST VENT (Biannually)

ROUTINE CLEANING AND MAINTENANCE

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.

FRESH AIR INTAKE (Biannually)

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

BLOWER MECHANISMS (Annually)

Unplug the stove then open the right and left side panels to access the two blowers. Remove the two (2) T-20 Torx screws on the back of each panel. Pull the bottom of the panel out then slide the top of the panel down off the tab. Vacuum all dust from motors. The blower motors' has sealed bearings, DO NOT lubricate this motor. Check gaskets and replace if needed.

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 cleaned and serviced as stated above.

CLEANING PAINTED SURFACES

Please clean painted surfaces with a soft damp cloth.

FIREBOX LINER

The paint on the Firebox Liner may peel. This is due to extreme conditions applied to the paint and is in no way covered by warranty.

DOOR GLASS REPLACEMENT

It is recommended that your dealer replace the glass if broken. The door glass is made of high temperature PYRO CERAMIC. To replace the glass, unscrew and remove the four (4) retainer nuts $\frac{7}{16}$ " socket. Remove the two (2) T-20 screws holding the inner door to the glass retainer. Remove the glass and any broken pieces. High temperature fiberglass tape should be used around the glass in the same location as the original fiberglass. Insert the glass into the retainer, screw the inner door to the retainer, install inner door assembly into outer door and gently tighten nuts. The use of substitute materials is prohibited: Glass (9" x 13" [229mm x 330mm]); EF-061.

INSTALLATION

DECIDING WHERE TO LOCATE YOUR PELLET APPLIANCE:

1. Do not install the stove in a bedroom or room where people sleep in.
2. Locate the stove in a large and open room that is centrally located in the house. This will optimize heat circulation.
3. Check clearances to combustibles and for the least amount of interference to house framing, plumbing, wiring, etc.
4. You can vent the stove with approved pipe through an exterior wall behind the unit or pass it through the ceiling and roof. The stove can connect to an existing masonry or metal chimney (must be lined if the chimney is over 6" (15 cm) diameter, or over 28 inches² (180 cm²) cross sectional area).
5. This unit must not be installed directly onto carpet. If it is to be installed on a carpeted area, a solid surface (wood, metal or approved hearth pad) must be installed between the unit and the carpet.
6. This unit uses large quantities of air for combustion; outside Fresh Air connection is **strongly recommended**. Fresh Air **must** be connected to all units installed in Mobile and "Air Tight Homes" (R2000) or where required by local codes.
7. Do not obtain combustion air from an attic, garage or any unventilated space. Combustion air may be obtained from a ventilated crawlspace.
8. The power cord is 8 feet (2.43 m) long and may require a grounded extension cord to reach the nearest electrical outlet.

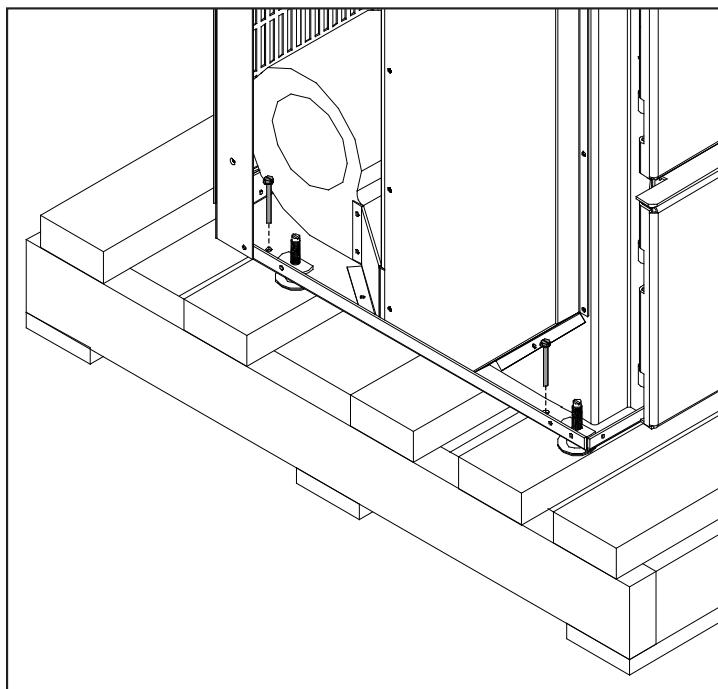


Figure 3: Screws to take out to remove stove from pallet.

REMOVING PELLET STOVE FROM PALLET:

1. Remove the right and left hand cabinet sides. Partially back out the two (2) T-20 Torx screws on the back of the each panel and the two (2) located on the front inside edge below the louvers and ash shelf. Pull the panel forward then remove.
2. Remove the two (2) wood screws from each side that are holding the bottom of the stove to the pallet.
3. Re-install the side panels.

INSTALLATION

CLEARANCES TO COMBUSTIBLES:

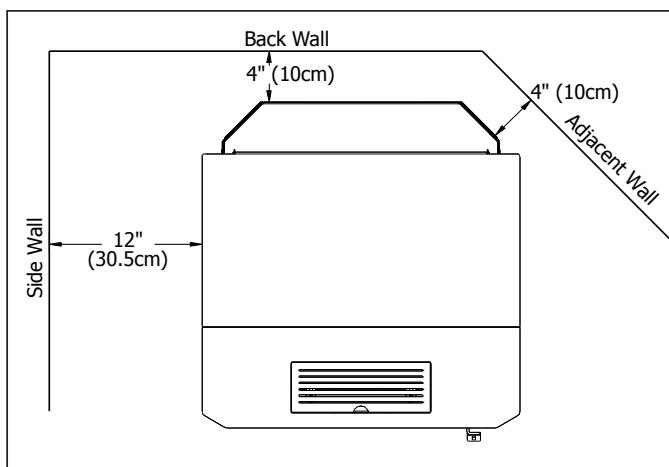


Figure 4: Maxx Clearance to Combustibles.

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

Side wall to unit	12 inches	(30.5 cm)
Back wall to unit	4 inches	(10 cm)
Corner to unit	4 inches	(10 cm)
Ceiling height	84 inches	(213.4 cm)

HEARTH SHIELD INSTALLATION:

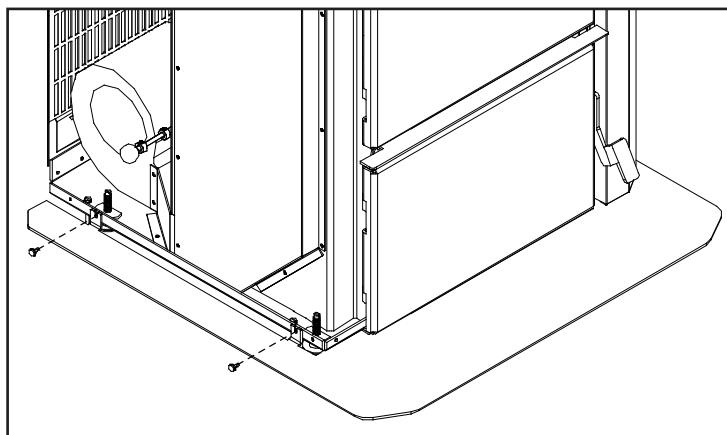


Figure 5: Maxx Hearth Shield Installation.

1. Remove the right and left hand cabinet sides. Partially back out the two (2) T-20 Torx screws on the back of each panel and the two (2) located on the front inside edge below the louvers and ash shelf. Pull the panel forward then remove.
2. Slide the hearth shield into place.
3. Secure the shield to the unit with two (2) screws on each side (see Figure 4).
4. Re-install the side panels.

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.

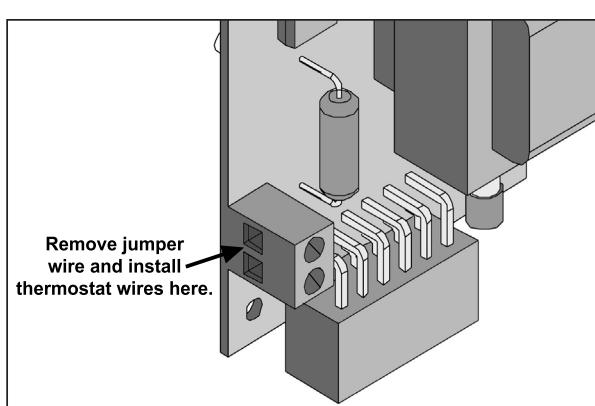


Figure 6: Thermostat wire placement.

2. Install a 12 or 24 Volt Thermostat using an 18 x 2 gauge wire from the unit to the thermostat.

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. If the heating load is not great enough when the stove is on low, the high limit switch will turn the stove off and the switch will have to be manually reset. To reset the high limit switch, remove the right cabinet side. The switch is found behind the control panel. Avoid setting off the high limit switch.

INSTALLATION

VENT TERMINATION REQUIREMENTS:

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

Table 2: Use in conjunction with Figure 7 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.

- 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.

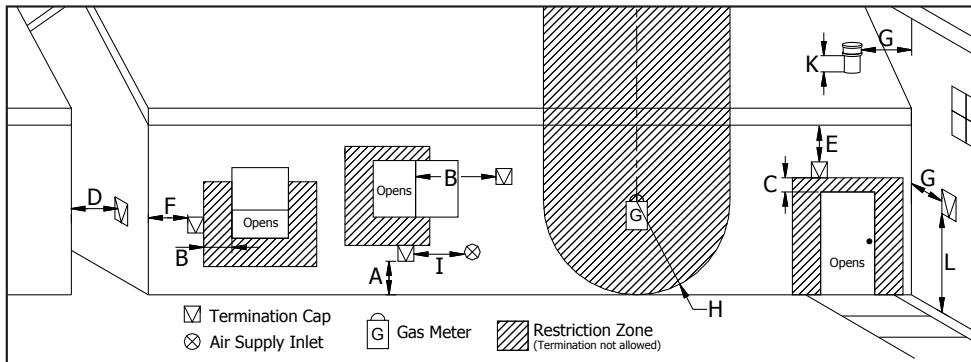


Figure 7: Use in conjunction with Table 2 for allowable exterior vent termination locations.

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

This Heater must have adequate air for proper combustion in the room that it is installed.

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.

The inlet to the intake must be below and a minimum of 12" (30cm) away from the unit exhaust outlet.

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

When connecting to an outside fresh air source, do not use plastic or combustible pipe. A 3" minimum (76 mm) ID (inside diameter) steel, aluminum or copper pipe or ducting 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.

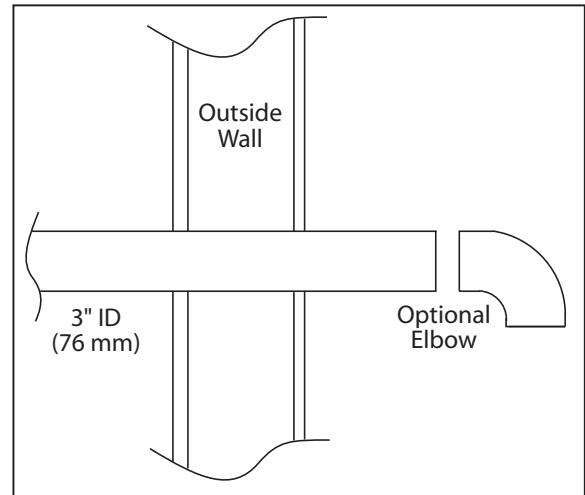


Figure 8: Outside Air Connection.

EXHAUST AND FRESH AIR INTAKE LOCATIONS:

This unit uses a 4" exhaust vent.

EXHAUST:

Base of unit to center of flue

min. $14\frac{3}{16}$ " (361 mm)

Center of unit to center of flue

$4\frac{3}{16}$ " (107 mm)

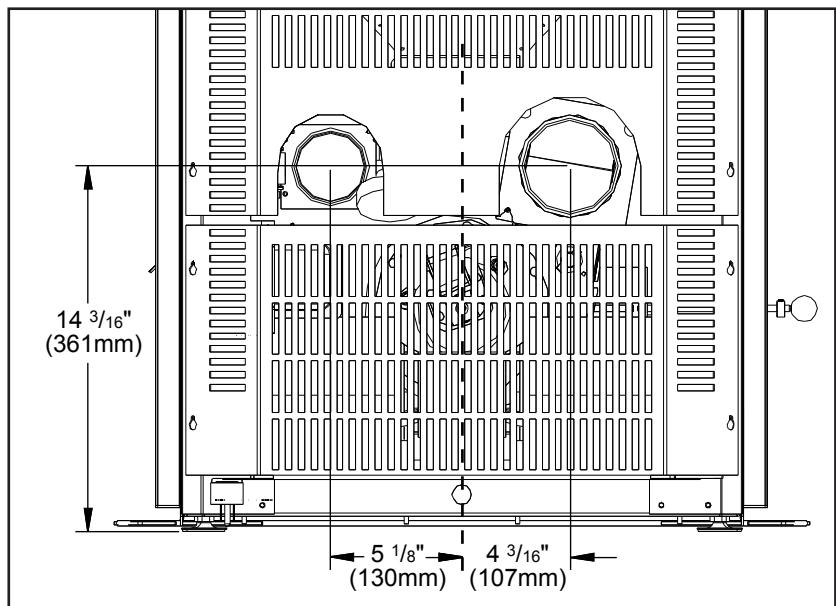


Figure 9: Maxx Inlet and Outlet Location.

FRESH AIR INTAKE.

Base of unit to center of intake

min. $14\frac{3}{16}$ " (361 mm)

Center of unit to center of intake

$5\frac{1}{8}$ " (130 mm)

INSTALLATION

MOBILE HOME INSTALLATION:

- Secure the heater to the floor using the four (4) 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.

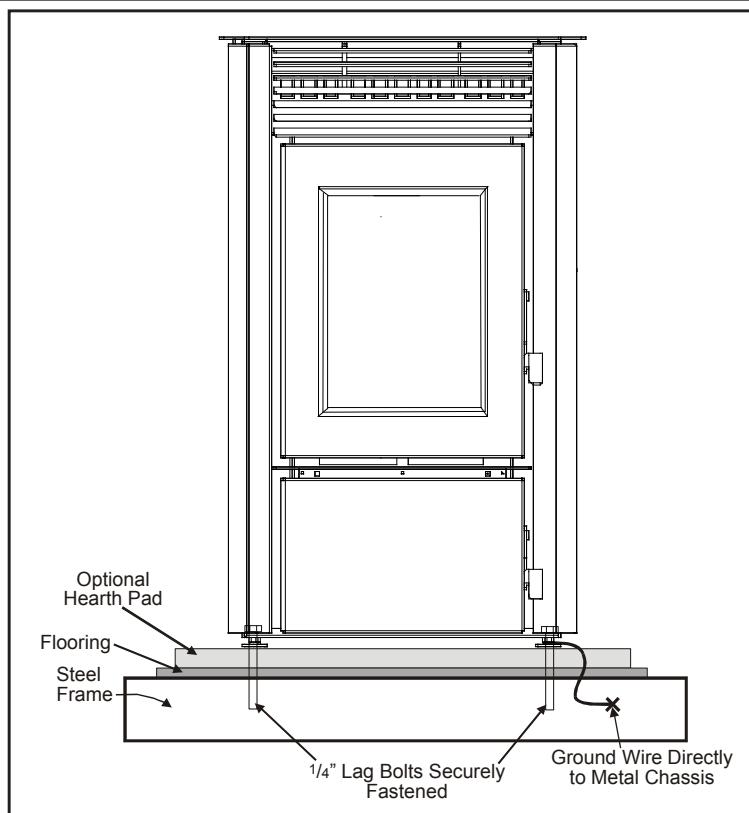


Figure 10: Mobile home installation.

CORNER THROUGH WALL INSTALLATION:

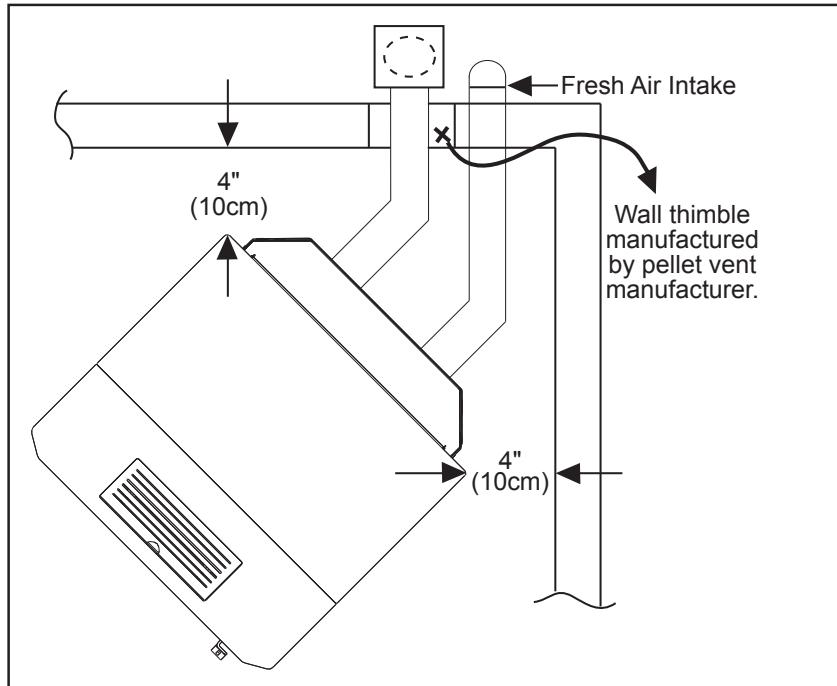


Figure 11: Corner Installation.

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 must conform to CAN/CSA-B365 Installation Code for Solid-Fuel-Burning Appliances and Equipment and with all local regulations, including those referring to regional and national. Only use venting of L or PL type with an inside diameter of 4 inches (100 mm).

1. 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.
2. 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.
3. Install the wall thimble as per the instructions written on the thimble. Maintain an effective vapour barrier in accordance with local building codes.
4. Install a length of vent pipe into the wall thimble. Try not to have joints inside the thimble. The pipe should install easily into the thimble.
5. Connect the exhaust vent pipe to the exhaust pipe on the stove. Seal the connection with high temperature silicone.
6. Install the fresh air intake (see OUTSIDE FRESH AIR CONNECTION).
7. 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.

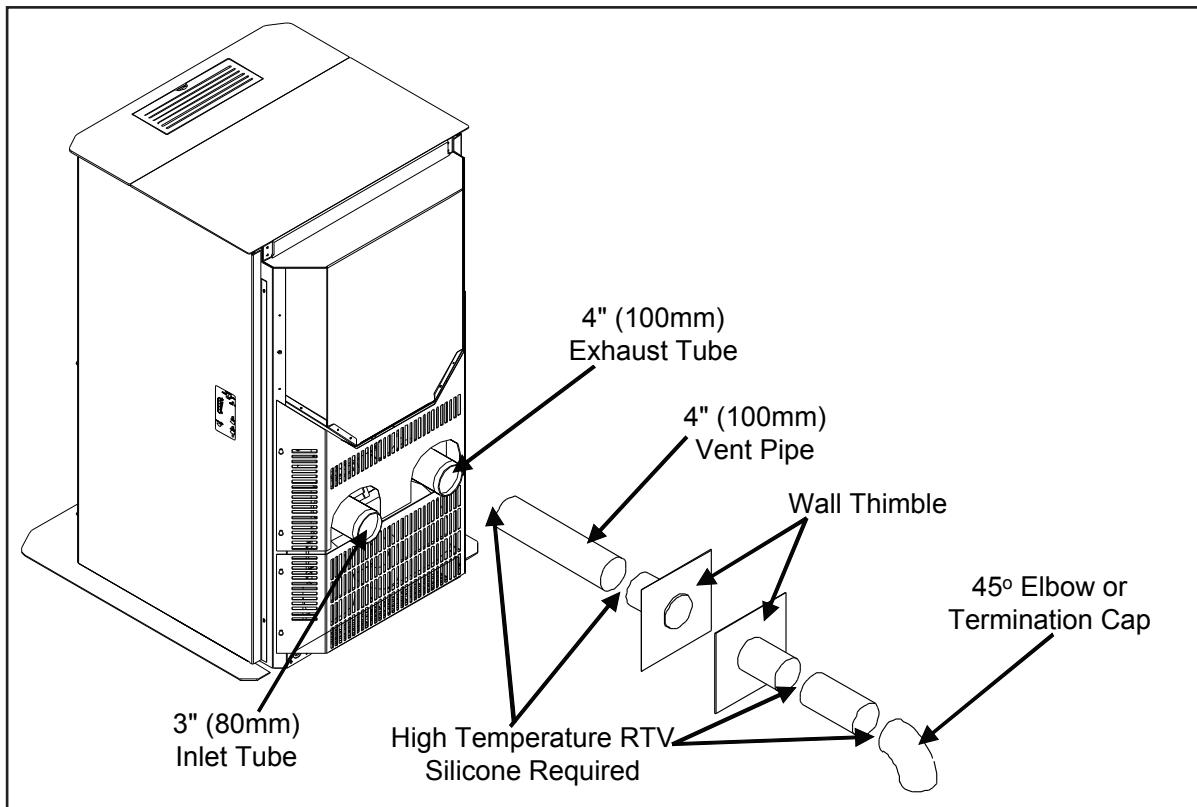


Figure 12: Straight through wall Installation.

INSTALLATION

8. The pipe must extend at least 12" (30 cm) away from the building. If necessary, bring another length of pipe 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.
9. 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**.

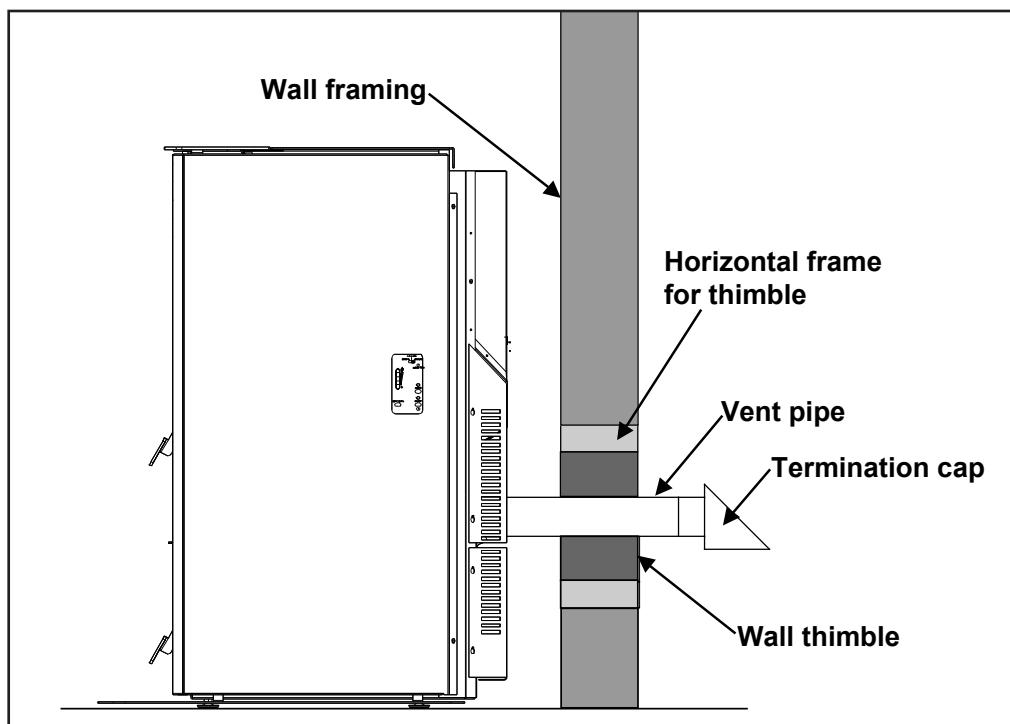


Figure 13: Straight through Wall Installation - Side View.

INSTALLATION

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

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

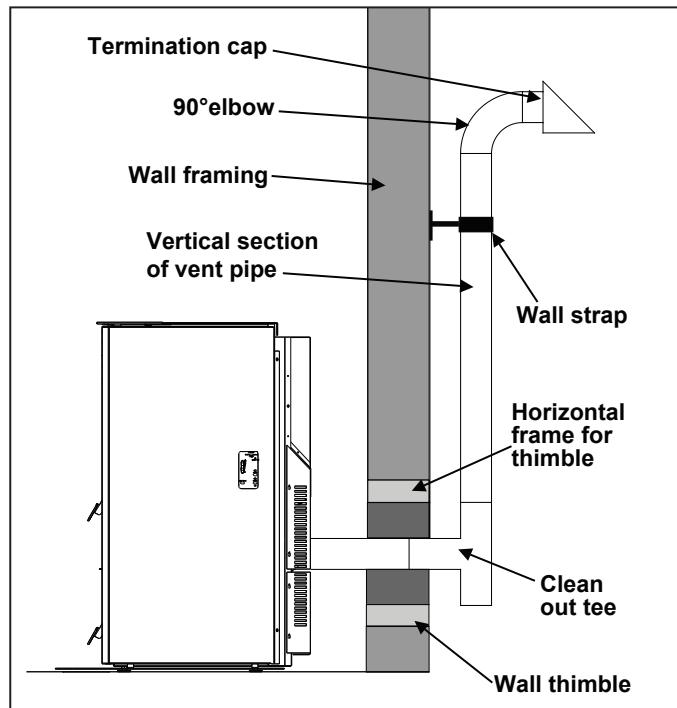


Figure 14: Venting horizontally with rise.

THROUGH CONCRETE WALL WITH VERTICAL RISE INSTALLATIONS:

Installation to use if there is a concrete or retaining wall in line with exhaust vent on pellet stove.

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

The termination must be 12 inches (30 cm) from the outside wall and 12 inches (30 cm) above the ground.

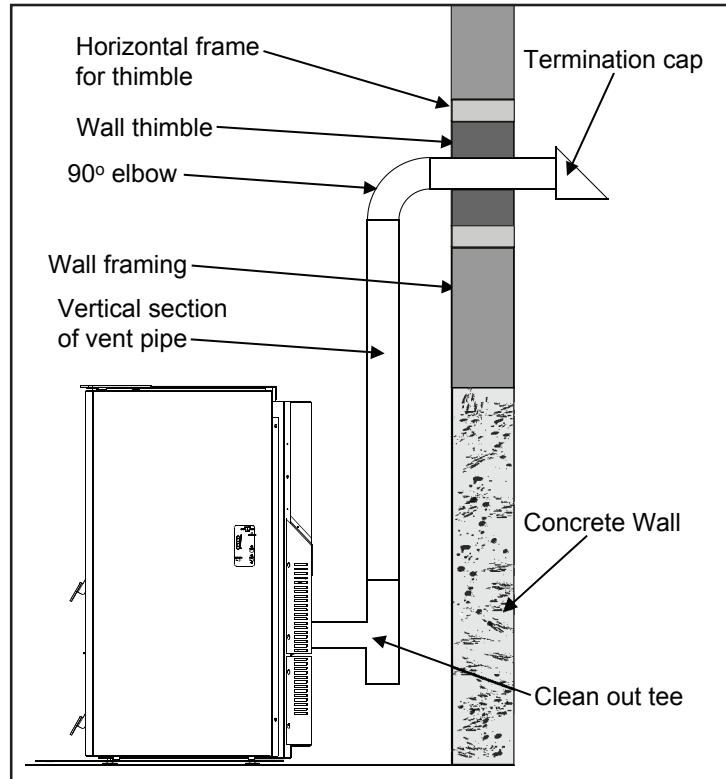


Figure 15: Venting with concrete wall behind unit .

INSTALLATION

OUTSIDE VERTICAL INSTALLATIONS:

To accomplish an outside vertical pipe installation, follow the "HORIZONTAL EXHAUST THROUGH WALL INSTALLATIONS" 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" (61 cm) above the roof.

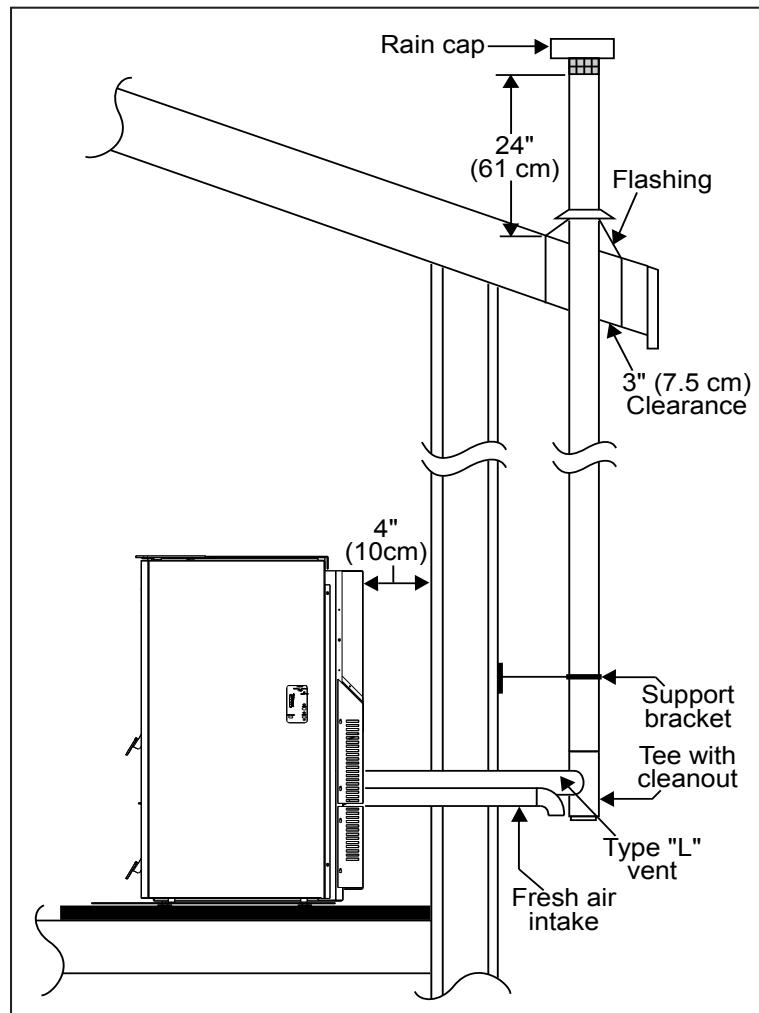


Figure 16: Outside Vertical Installation.

INSTALLATION

INSIDE VERTICAL INSTALLATIONS:

1. Place the unit on the hearth pad if a hearth pad is to be used (or on solid material if installed on a carpeted surface) and space the unit in a manner so when the pellet vent is installed vertically, it will be 3" (7.6 cm) away from a combustible wall.
2. Install the tee with clean out.
3. 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" (7.6 cm) distance to combustibles and keep attic insulation away from the vent pipe. Maintain an effective vapor barrier. Follow the Vent manufacturer's instructions.
4. Finally, extend the pellet vent to go through the roof flashing.
5. Ensure that the rain cap is approximately 24" (60 cm) above the roof.
6. Install the fresh air system.

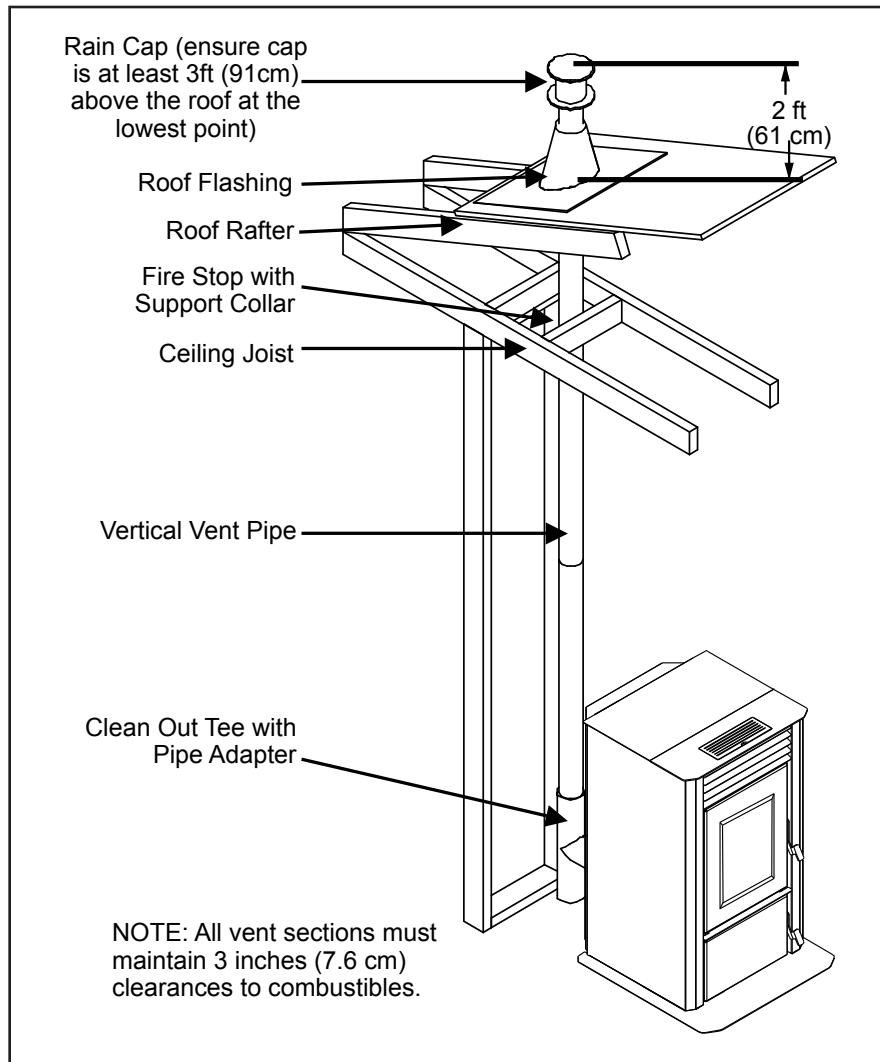


Figure 17: Inside Vertical Installation.

INSTALLATION

HEARTH MOUNT INSTALLATION:

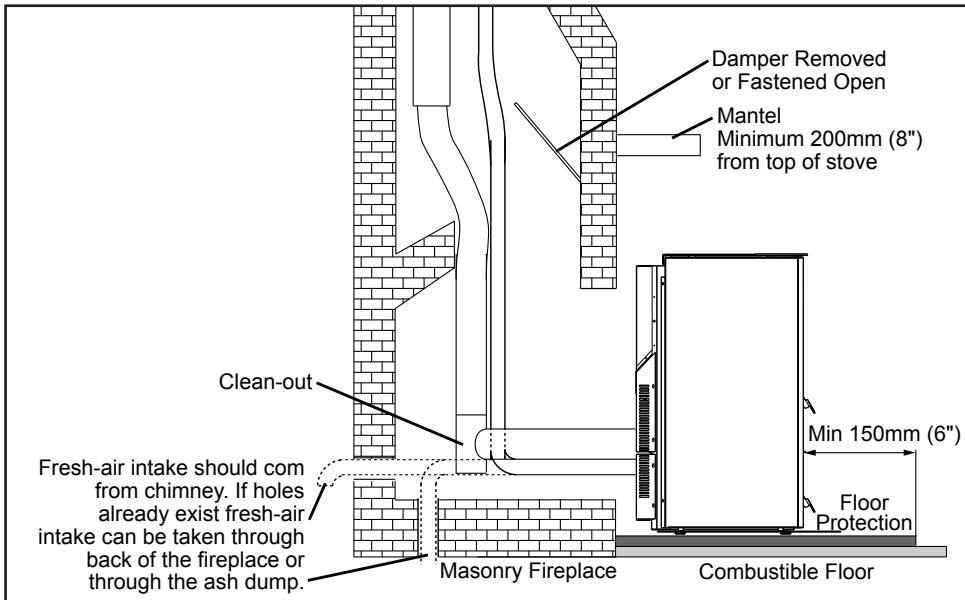


Figure 18: Hearth Mount - Side View.

1. Lock fireplace damper in the open position.
2. Install flexible stainless steel liner or listed pellet vent to the top of the chimney.
3. Install a sealing plate at the top of the chimney.
4. Connect a rain cap and flex adapter to the chimney liner/pipe.
5. Connect a clean-out tee or a 90° elbow to the liner/pipe.
6. Install tee onto stove.

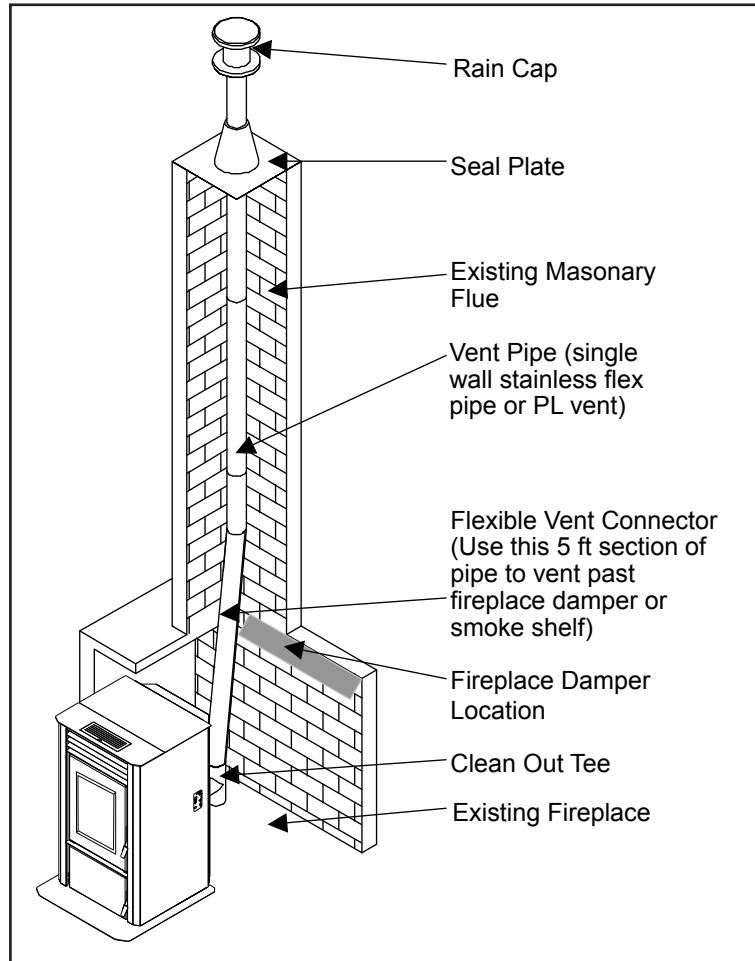


Figure 19: Hearth Mount - Over View.

INSTALLATION

INITIAL SLIDER/DAMPER SET-UP:

This is used to regulate the airflow through the pellet stove. The slider damper should be set by a trained technician using magnehelic.

1. To install the optional slider damper rod remove the left cabinet side panel. Partially back out the two (2) T-20 Torx screws on the back of the each panel and the two (2) located on the front inside edge below the louvers and ash shelf. Pull the panel forward then remove and locate the slider damper plate.
2. Install the $7/16''$ (11mm) nut onto the slider damper rod, thread it all the way onto the rod.
3. Slide rod through the hole in the slider damper plate and install the $7/16''$ (11mm) clinching nut onto the rod. Leave nut a little loose to help it line up when the cabinet is re-installed.
4. Re-install the cabinet side.
5. Mark the rod at either end of range in which the unit runs correctly and has a good flame pattern. Pull the rod out until the flame becomes a short, brisk flame, like a blowtorch; push the rod in a little and mark it. The next mark its the most important and is set with a magnehelic.

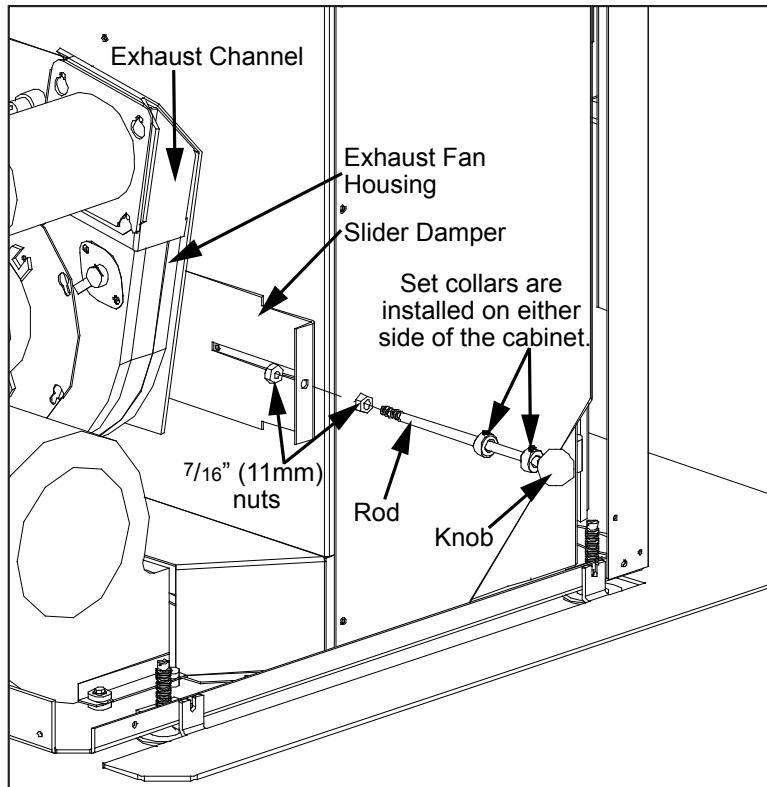


Figure 20: Slider/Damper Plate & Rod in Unit.

IMPORTANT: Taking a reading of vacuum pressure inside the firebox with a magnehelic gauge should be used to set the slider for best combustion. The slider damper should be set only on a hot stove (operating for thirty (30) minutes or more) by using a Magnahelic Pressure Gauge to measuring the pressure in the firebox. **The best settings are a reading of approximately 0.14 - 0.15 inches of water column (34.8 - 37.3 Pa) on the high fire setting. Some fuels may require higher or lower settings.** The reading can be taken from the $1/8''$ (3 mm) hole located on the front of the unit below the ash shelf on the right hand side.

6. Remove the cabinet side
7. Install a set collar $1/2''$ (12mm) in from the inner mark from step #5
8. Re-install the cabinet side.
9. Install a set collar on the outside of the outer mark from step #5
10. Install the black knob on the end of the rod. Check slider damper for smooth operation.



Figure 21: Efficient Flame.

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 # 3 on Heat output bar flashing.
5. Auger light flashes but auger motor does not turn at all
6. The 200 °F (93 °C) high limit temperature sensor has tripped.
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.
- ✓ Ensure the burn pot liner is correctly placed in the burn pot
- ✓ Check the Heat Level Indicator. - If the # 3 light is flashing (unit may be out of fuel)
- ✓ Check the Door and Ash Pan door - THEY MUST BE CLOSED TIGHT.
- ✓ See section 8 "The pellets will not light".
- ✓ 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 may cause the vacuum switch to open or 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 if unable to achieve proper damper setting).**
- ✓ 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. See section "3. The Exhaust Blower will not function normally."

TROUBLESHOOTING

- ✓ Poor Quality Fuel – Insufficient energy in the fuel to produce enough heat to keep the stove burning
- ✓ 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 access panels; check all connections against the wiring diagram.
- ✓ Check the Exhaust Blower voltage across the blower motor wires (>=115V on #5 setting and >= 75V on #1 setting). – Replace the Circuit Board if the Voltage reading is less than 75 V. with a line voltage of >115 V AC..
- ✓ Clean all exhaust passages and venting.

4. Light # 3 on Heat output bar flashing

- (The Exhaust Temp. Switch contacts have opened.)
- ✓ Stove ran out of fuel - check fuel level in the hopper
 - ✓ 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.
 - ✓ See sections #2 "Stove will not operate when hot", #3 "The Exhaust motor will not function normally" and #5 "Auger light flashes....turn at all." for more suggestions.

✓ 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.

- ✓ Check the Door and Ash Pan door - THEY MUST BE CLOSED TIGHT.
- ✓ 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**
- ✓ Auger stopped running. Pinch, break or blockage in Vacuum Hose - Check hose for pinch points or damage, replace or re-route as required. Blow out Vacuum Hose
- ✓ Damage to wires between Circuit Board and Vacuum Switch and Auger Motor - Inspect wires and connectors
- ✓ Vacuum Switch failure - Bypass the vacuum switch, if this corrects the problem check for above problems before replacing the Vacuum Switch.
- ✓ Blocked exhaust / venting system - Have stove and venting cleaned and inspected.
- ✓ Check Vacuum levels at the Vacuum Switch, with a Magnahelic Gauge (readings must be above .07" W.C. on low fire).

6. The 200 °F (93 °C) high limit temperature sensor has tripped.

- ✓ Reset sensor and determine cause – was it Convection Blower failure or Circuit board control problems.
- ✓ Check the fuse on the circuit board.

TROUBLESHOOTING

7. The convection blower will not function normally.

- ✓ Clean all grill openings at the back and below unit .
- ✓ Check the Voltage across the blower wires, It should adjust with the heat output settings. 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.

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.
- ✓ Check position of the Thermostat slide switch on the Circuit Board.
- ✓ 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.

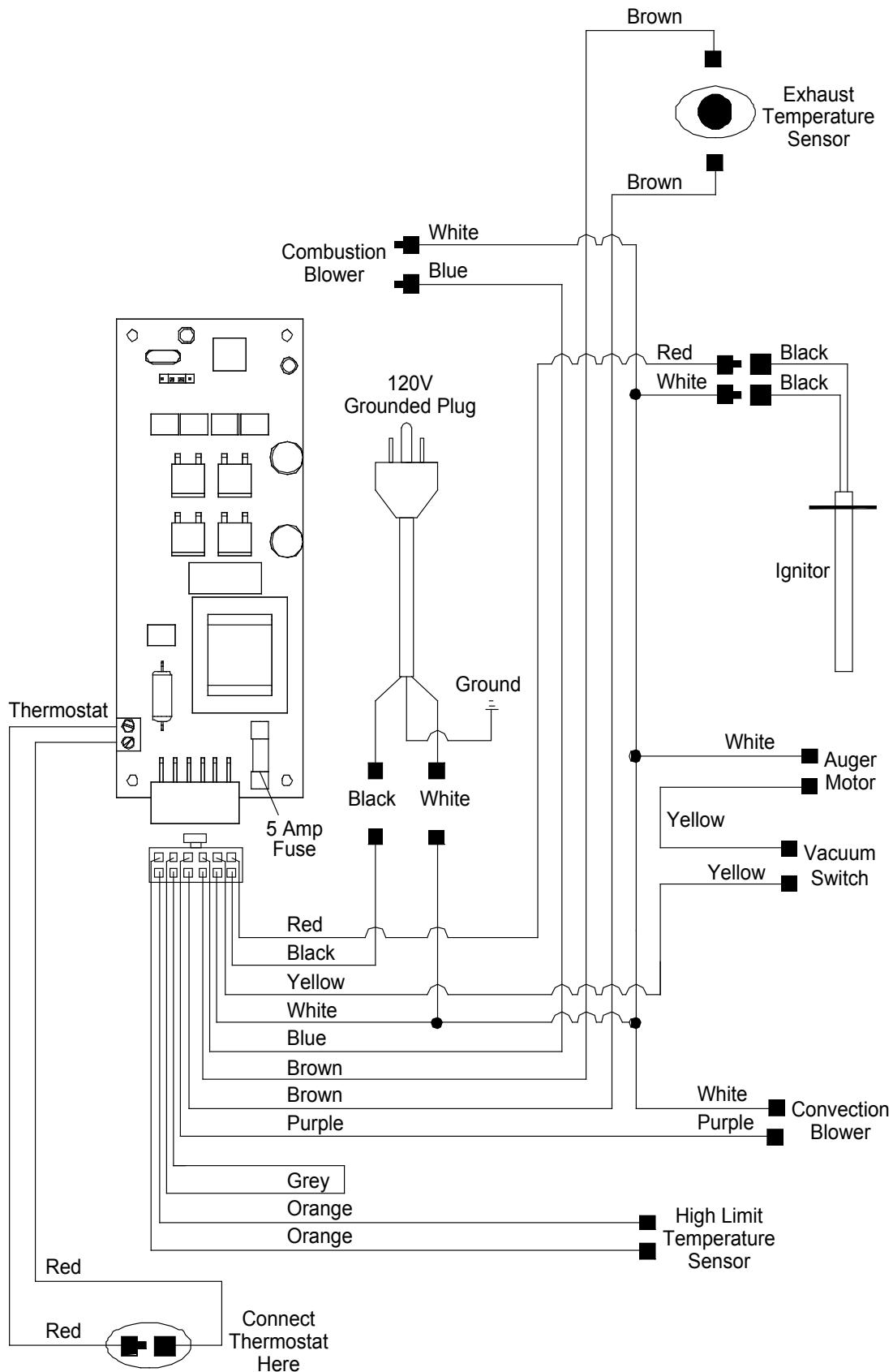
If the stove goes out and leaves fresh unburned pellets or cigarette-like ashes in the burn pot liner, the fire is going out before the stove shuts off.

- ✓ Check to see that the Slider / Damper is in the correct position.
- ✓ Turn the Heat Level up slightly (poor quality pellets will require slightly higher settings).
- ✓ Set the auger trim till the #1 and #5 lights are illuminated.

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.
- ✓ 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 #	Description	Part #
1	120°F (49°C) Ceramic Fan Temp Sensor	EC-001
2	IEC Power Cord (115V)	EC-043
	Window Channel Tape - 6ft (1.8m)	EC-058
3	High Limit Temp Sensor 200°F (93°C) Manual Reset	EF-016
	Silicone Hose	EF-018
4	Slider Damper Rod with Knob	EF-050
5	Glass - Large (9" x 13" [229mm x 330mm])	EF-061
6	1" Knob	EF-068
7	Shoulder Bolt, Roller, & Nut (Set of 2)	EF-124
	Pellet Stove Cleaning Brush	EF-156
	Ash Pan Gasket - 10ft (3.0m)	EF-208
	Door Gasket ¾" Firm Round X 80" - 7ft (2.1m)	EF4i-056
8	Auger Brass Bushings (Set Of 2)	EF4i-065
9	IEC Power Cord Inlet Socket	50-713
10	Circuit Board 5 Amp Fuse 115V (Set of 2)	50-833
11	5/8" ID Auger Collar with Screw	50-968
13	Slider Damper Set Collar Kit	50-1068
14	Auger With Paddles	50-1161
	Burn Pot Scraper Tool	50-1254
15	Leveling Legs 1½" (Set of 4)	50-1342
16	Vacuum Switch Low Pressure	50-1390
	Auger Tube Cover	50-1410
17	4" Exhaust - Starter Tube Gasket	50-1913
	Control Panel Decal	50-1482
	Maxx Domestic Owners Manual	50-1531
	Maxx Domestic Technical Manual	50-1532
	600 Watts Backup System	50-1547
18	Auger Stops (Clear Rubber)	50-1559
20	Maxx Door - Large Glass	50-1632
21	Hopper Lid Hinge - Left	50-1633
22	Hopper Lid Hinge - Right	50-1634

PARTS LIST

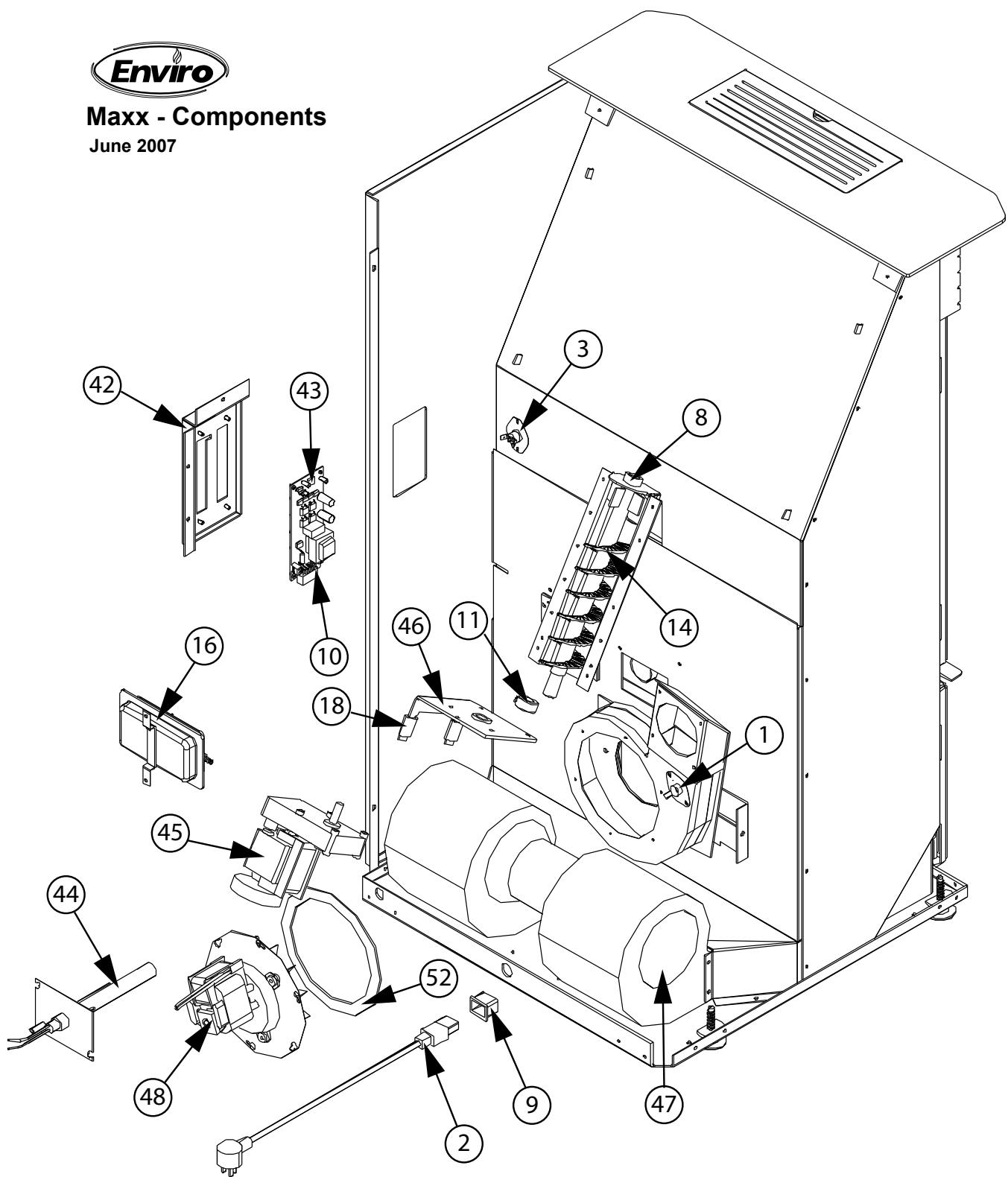
Reference #	Description	Part #
23	Hopper Lid	50-1635
24	Trivet	50-1636
25	Top Front with Mount	50-1637
26	Heat Exchanger Rod	50-1638
27	Back Grill - Top	50-1639
28	Back Grill - Bottom	50-1640
29	Cabinet Side - Left	50-1641
30	Cabinet Side - Right	50-1642
31	Louver Assembly	50-1643
32	Slider Damper Plate	50-1644
33	Firebox Baffle	50-1645
34	Ash Pan	50-1646
35	Ash Pan Cover	50-1647
37	Glass Retainer - Large	50-1649
39	Inner Door - Large (No Glass)	50-1651
40	Door Handle - Upper	50-1652
41	Door Handle - Lower	50-1653
	Circuit Board Decal	50-1930
42	Control Panel with Decal	50-1931
43	Circuit Board with Thermostat Switch - 115V	50-1929
44	Ignitor Assembly	50-1656
45	Auger Motor - 3rpm 120V	50-1657
46	Auger Plate And Bushing (Assembly)	50-1658
47	Convection Blower	50-1659
48	Combustion Blower (Assembly)	50-1660
49	Burn Pot	50-1661
50	Burn Pot Liner	50-1662
51	4" Exhaust - Starter Tube with Flange; 5" Long	50-1914
52	Combustion Blower Motor Mounting Gasket	50-1664
53	Hearth Shield	50-1665
	Circuit Board Wiring Harness	50-1666

PARTS DIAGRAM - COMPONENTS

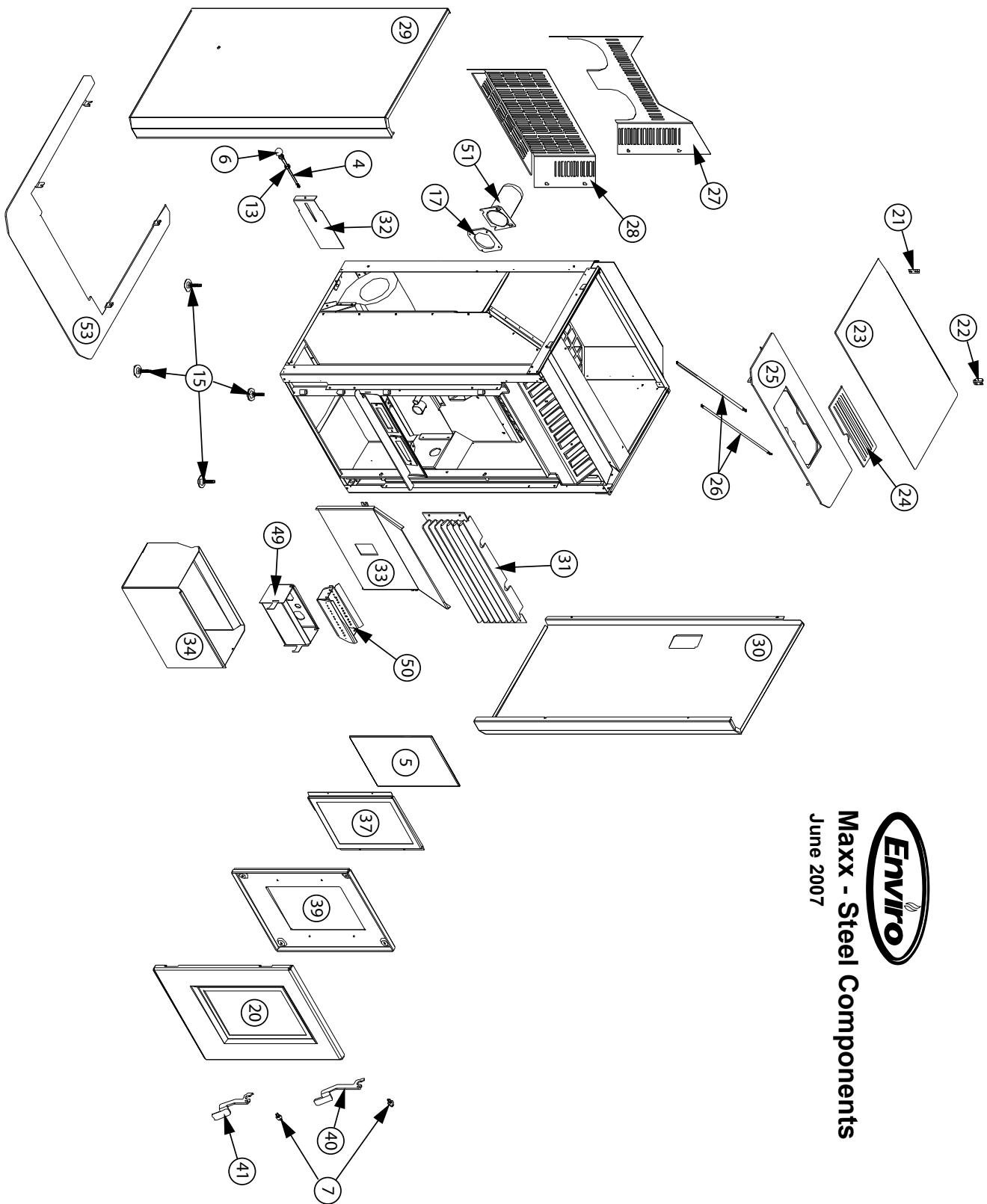


Maxx - Components

June 2007



PARTS DIAGRAM - STEEL



Maxx - Steel Components
June 2007



NOTES



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 warranted 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: _____

MANUFACTURED BY:
SHERWOOD INDUSTRIES LTD.
6782 OLDFIELD RD. SAANICHTON, BC, CANADA V8M 2A3
www.enviro.com
May 3, 2018
C-15414