OMNI-Test Laboratories, Inc.

EPA Standard of Performance for New Residential Wood Heaters

Certification Test Report

Non-Confidential Business Information
(Non-CBI)

Manufacturer: Hearth & Home Technologies, Inc.
Heater Type: Pellet-Fired, Freestanding
Model: P68-C

Prepared for:
Hearth & Home Technologies, Inc.
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Halifax, PA 17032
USA

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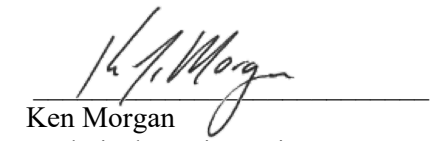
AUTHORIZED SIGNATORIES

This report has been reviewed and approved by the following authorized signatories:

Evaluator:



Ken Morgan
Technical Services Director

February 28, 2024
Issue Date

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1.1 - Summary Tables

Table 1 – Particulate Emissions

	Integrated Total	One-Hour Filter
Emission Rate, g/hr.		
[1]Uncorrected	**1.38**	3.07
[2]Corrected	**1.38**	3.07
Emission Factor, g/kg		
[1]Uncorrected	0.83	0.86
[2]Corrected	0.83	0.86

[1]Uncorrected refers to gravimetric analysis that takes negative filter weights as a negative value in cases where filter residue was transferred to (stuck to) O-ring gaskets to account for the mass transfer.

[2]Corrected refers to gravimetric analysis where negative filter weights are taken as zero, thus reporting a higher value by over-reporting of transferred filter material. The corrected values were added to OMNI's reporting in response to a request by the US EPA.

Table 2 – Efficiency and CO

	Integrated Total	Burn Rate Segment		
		Maximum	Medium	Minimum
Time (minutes)	363	63	120	180
Burn Rate (dry kg/hr)	1.665	3.607	1.528	1.076
Heat Input Rate (BTU/hr, HHV)	31,016	67,207	28,467	20,048
Heat Output Rate (BTU/hr, HHV)	24,612	52,664	22,940	15,756
Efficiency (%, HHV)	79.4%	78.4%	80.6%	78.6%
Efficiency (%, LHV)	85.0%	84.0%	86.3%	84.2%
CO Emission Rate (g/min)	0.20	0.85	0.09	0.07

1.1 - Summary Tables

Table 3 – Test Facility Conditions

	Initial	Middle	Final
Room Temperature (˚F)	74	78	76
Barometric Pressure (in Hg)	30.09	30.04	29.98
Air Velocity (ft/min)	<50	<50	<50
Induced Draft (in H2O)	Φ	Φ	Φ

Table 4 – Heater Configuration

	Pretest	Burn Rate Segment		
		Maximum	Medium	Minimum
Temp Dial	Max (fixed)	Max (fixed)	Max (fixed)	Min (Fixed)
Feed Adj. Dial	47.5 sec	47.5 sec	17.5 sec	12.5 sec
Mode Dial	Max	Max	15° From Min	Min

1.2 - Procedures and Results Summary

TESTING PROCEDURE

The P68-C 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 Energex brand densified wood pellet fuel; this fuel was graded as Premium by the Pellet Fuels Institute and was produced at registered mill # 16012. Particulate emissions were measured using dual sampling trains consisting of two sets of filters (front and back).

A single test run was performed. The unit was installed in accordance with the manufacturer's instructions.

The manufacturer's instructions specified leaving the fan on the maximum dial setting (fixed stop) throughout the run, and operating the preburn and high burn segments at maximum heat dial setting (fixed stop), the medium burn segment also at the maximum heat dial setting but with the mode setting at roughly halfway to maximum, and the low burn segment at the minimum heat dial setting (fixed stop). These settings were used for the test run, as specified. No home user could achieve a lower burn rate than that tested via manipulation of any of these settings.

RESULTS SUMMARY

Proportionality results of the integrated test run, in addition to all other validity criteria, were within specified limits, and no sampling anomalies occurred. All burn rate categories were achieved. Therefore, this test run is considered valid and appropriate.

The results of the integrated test run indicate an average particulate emission rate of 1.38 g/hr. The P68-C results are within the emission limit of 2.0 g/hr for affected appliances manufactured or sold at retail on or after May 15, 2020.

The model P68-C 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 79.5%. The calculated CO emission rate was 0.20 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 - Appliance Description

Appliance Manufacturer: Hearth & Home Technologies, Inc.

Pellet Stove Model: P68-C

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

The P68-C's principle elements include a fuel hopper, s firebox chamber, stainless steel burn pot, and electrical fuel feed, combustion air, and convection air supply systems. The frame of the unit is constructed of mild steel.

Combustion products are routed out of the firebox chamber via a baffle-type heat exchanger through a 3-inch diameter flue outlet located on the rear of the unit. The firebox features a three 9" x 4 ½" firebricks mounted above and behind the firepot.

Fuel is supplied from the hopper to the burn pot via a short screw-type auger, mounted horizontally. 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 a mild steel door, distinct from the cast aluminum front firebox door, which also features a 13 ¾" x 11 ¾" glass panel.

The electrical systems are regulated by several user-operated dials. The user may manually select a heat setting from 1 to 7 (demarcations in °F are also shown). This knob allows users to achieve the maximum and minimum burn rates at its fixed stops – lower or higher burn rates are not possible. The unit can also be controlled by an internal or external thermostat system. Knobs to tune the stove's burn characteristics are also provided.

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.

P68-C – Sealed Test Unit

Appliance Photographs
P68-C
Test Date: 1/14/2018

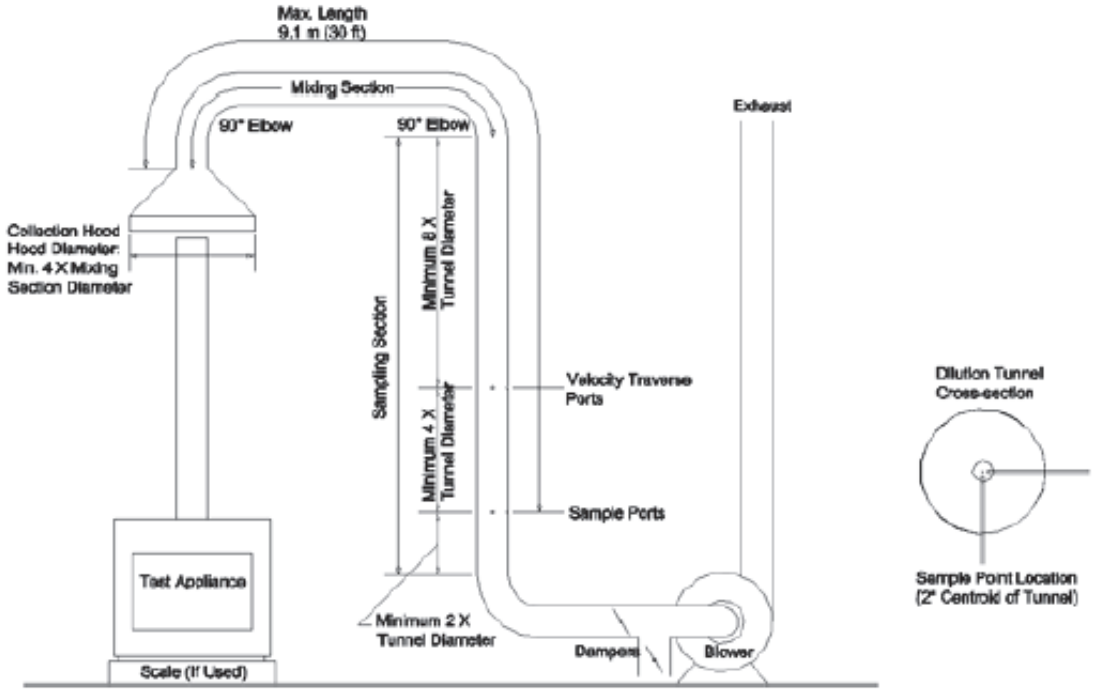
	
P68-C Front	**P68-C Back**

	
P68-C Left	**P68-C Right**

Section 2
Test Data

2.1 Test Data by Run
2.2 Sample Analysis & Tares

Example of ASTM E2515-11 Dilution Tunnel



Prior to testing, sample point and travers point locations are verified to ensure placement is within specifications. Collection hood, tunnel diameter, and mixing section length are also verified to be within specifications.

2.1 - Test Data by Run

Run 1 Notes & Results

P68-C Burn Settings for 1-14-2019

Preset:

55 pounds of Energex Pellets (Do not open hopper during test)

Connect DDM

Set Mode knob to OFF before plugging in stove.

Power supply: Make sure Range Switch is 120V 60Hz. Set to 114V then slowly increase until supply just changes to 115V.

Plug in stove to power supply.

Draft adjust -33V (already set)

High: (Setting when ready to start preburn)

Feed Adjuster: #4.42 (will show 47.5seconds when stove hot)

Temperature knob: Max CW #7, 500F setpoint

Mode knob: Constant Burn max CCW (start pre-burn time now)

Medium<50%:

Feed Adjuster: 17.5 seconds or #1.00

Temperature knob: 500F setpoint or #7

Mode knob: 33mode (screen e), pointer at 2nd "N" in constaNt

Low:

Feed Adjuster: 12.5 seconds or #0.45

Temperature knob: Max CCW #1 285F setpoint

Mode knob: L(Low) (Left of center down, pointing at "C" of Constant Burn)

ASTM E2779 / ASTM E2515 Emissions Results

Manufacturer:	HHT Halifax
Model:	P68-C
Project No.:	0135PS013E.REV002
Tracking No.:	2338
Run:	1
Test Date:	01/14/19

Technician Signature: 

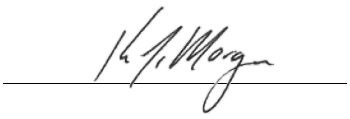
Integrated Test Run	
Particulate Emission Rate	**1.38 g/hr**
Total Particulate Emissions - E_T	8.33 g
Emissisons Factor	0.83 g/kg
CSA B415 Efficiency	**79.5% HHV**

First Hour Emissions	
Particulate Emission Rate	3.07 g/hr
Total Particulate Emissions - E_T	3.07 g
Emissisons Factor	0.86 g/kg

Burn Rate (Composite)	**1.66 kg/hr dry**	
Burn Rate (High)	3.60 kg/hr dry	
Burn Rate (Medium)	1.52 kg/hr dry	42.4% Of High
Burn Rate (Low)	1.07 kg/hr dry	29.8% Of High
Average Tunnel Temperature	93 degrees F	
Avg.Velocity in Dilution Tunnel - v_s	13.37 ft/second	
Avg.Flow Rate in Dilution Tunnel - Q_{sd}	8875.6 dscf/hour	
Average Δp	0.058 inches H20	
Average ΔH	1.34 inches H20	
Total Time of Test	363 minutes	

ASTM E2779 / ASTM E2515 Emissions Results

Manufacturer:	HHT Halifax
Model:	P68-C
Project No.:	0135PS013E.REV002
Tracking No.:	2338
Run:	1
Test Date:	01/14/19

Technician Signature: 

	1st Hour	Sample Train 1	Sample Train 2	Sample	Unit
Total Sample Volume - V_m	9.676	58.716	58.140		ft^3
Average Gas Meter Temperature	77.26	80.61	82.51		°F
Sample Volume (Std. Conditions) - V_{mstd}	9.545	57.563	56.077		dsf^3
				N/A	
Total Particulates - m_n	3.3	8.2	9.4		mg
Particulate Concentration - C_r/C_s	3.457E-04	1.42E-04	1.68E-04		g/dsf^3
Total Particulate Emissions - E_T	3.07	7.65	9.00		g
Particulate Emission Rate	3.07	1.26	1.49		g/hr
Emissisons Factor	0.86	0.76	0.90		g/kg
Delta from Avg. Particulate Emissions		0.68	0.68		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, g/hr	9.13%
		Dual Train Comparison, g/kg	0.14

CSA B415.1 Results - Overall & By Category

Manufacturer: HHT Halifax
Model: P68-C
Date: 01/14/19
Run: 1
Control #: 0135PS013E.REV002
Test Duration: 363

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

	HHV Basis	LHV Basis	
Overall Efficiency	79.5%	85.1%	
Combustion Efficiency	99.5%	99.5%	
Heat Transfer Efficiency	80%	85.5%	
Output Rate (kJ/h)	26,144	24,800	(Btu/h)
Burn Rate (kg/h)	1.66	3.66	(lb/h)
Input (kJ/h)	32,890	31,200	(Btu/h)
Test Load Weight (dry kg)	10.04	22.14	dry lb
MC wet (%)	5.4		
MC dry (%)	5.71		
Particulate (g)	8.33		
CO (g)	74		
Test Duration (h)	6.05		

Emissions	Particulate	CO
g/MJ Output	0.05	0.47
g/kg Dry Fuel	0.83	7.33
g/h	1.38	12.17
lb/MM Btu Output	0.12	1.08

Air/Fuel Ratio (A/F)	19.09

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

	HHV Basis	LHV Basis	
Overall Efficiency	78.5%	84.1%	
Combustion Efficiency	99.2%	99.2%	
Heat Transfer Efficiency	79%	84.7%	
Output Rate (kJ/h)	55,950	53,074	(Btu/h)
Burn Rate (kg/h)	3.60	7.93	(lb/h)
Input (kJ/h)	71,269	67,606	(Btu/h)
Test Load Weight (dry kg)	3.78	8.32	dry lb
MC wet (%)	5.4		
MC dry (%)	5.71		
Particulate (g)	3.30		
CO (g)	54		
Test Duration (h)	1.05		

Emissions	Particulate	CO
g/MJ Output	0.06	0.92
g/kg Dry Fuel	0.87	14.23
g/h	3.14	51.20
lb/MM Btu Output	0.13	2.13

Air/Fuel Ratio (A/F)	11.22

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

	HHV Basis	LHV Basis	
Overall Efficiency	80.7%	99.5%	
Combustion Efficiency	99.5%	86.9%	
Heat Transfer Efficiency	81%	86.9%	
Output Rate (kJ/h)	24,363	23,111	(Btu/h)
Burn Rate (kg/h)	1.52	3.36	(lb/h)
Input (kJ/h)	30,188	28,637	(Btu/h)
Test Load Weight (dry kg)	3.05	6.72	dry lb
MC wet (%)	5.4		
MC dry (%)	5.71		
Particulate (g)	-		
CO (g)	10		
Test Duration (h)	2.00		

Emissions	Particulate	CO
g/MJ Output	-	0.21
g/kg Dry Fuel	-	3.37
g/h	-	5.13
lb/MM Btu Output	-	0.49

Air/Fuel Ratio (A/F)	18.33

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

	HHV Basis	LHV Basis	
Overall Efficiency	78.7%	99.5%	
Combustion Efficiency	99.5%	84.7%	
Heat Transfer Efficiency	79%	84.7%	
Output Rate (kJ/h)	16,738	15,878	(Btu/h)
Burn Rate (kg/h)	1.07	2.37	(lb/h)
Input (kJ/h)	21,259	20,167	(Btu/h)
Test Load Weight (dry kg)	3.22	7.10	dry lb
MC wet (%)	5.4		
MC dry (%)	5.71		
Particulate (g)	-		
CO (g)	12		
Test Duration (h)	3.00		

Emissions	Particulate	CO
g/MJ Output	-	0.24
g/kg Dry Fuel	-	3.77
g/h	-	4.04
lb/MM Btu Output	-	0.56

Air/Fuel Ratio (A/F)	26.17

~~**VERSION:** 2.2 12/14/2009~~ ***Modified to fit this Format***

Pellet Heater Conditioning Data - ASTM E2779

Manufacturer:	HHT Halifax
Model:	P68-C
Tracking No.:	2338
Project No.:	0135PS013E.REV002
Test Date:	12/19/18 - 1/2/19
Operation Category:	Medium

Elapsed Time (hours)	Fuel Weight (lbs)	Stack (°F)
0	70.0	173
1	60.7	458
2	51.6	339
3	47.4	273
4	43.7	252
5	40.8	258
6	38.0	252
7	35.0	260
8	32.4	258
9	29.2	254
10	26.2	254
11	23.3	255
12	20.4	255
13	17.5	254
14	14.5	253
15	11.6	254
16	8.7	260
17	5.8	256
18	2.9	254
19	1.9	124
20	49.3	404
21	39.6	458
22	32.0	282
23	27.8	264
24	24.6	252
25	21.7	253
26	18.7	252
27	15.6	258
28	40.3	208
29	30.6	459
30	21.1	375

Pellet Heater Conditioning Data - ASTM E2779

Manufacturer:	HHT Halifax
Model:	P68-C
Tracking No.:	2338
Project No.:	0135PS013E.REV002
Test Date:	12/19/18 - 1/2/19
Operation Category:	Medium

Elapsed Time (hours)	Fuel Weight (lbs)	Stack (°F)
31	16.9	285
32	13.4	252
33	10.4	255
34	7.6	259
35	60.3	209
36	51.0	458
37	42.9	302
38	38.7	278
39	35.5	257
40	32.5	250
41	29.8	256
42	26.8	252
43	18.1	454
44	7.9	452
45	2.0	197
46	49.7	450
47	41.5	288
48	37.2	254
49	33.8	245
50	30.8	247

Pellet Heater Preburn Data - ASTM E2779

Manufacturer:	HHT Halifax		
Model:	P68-C		
Tracking No.:	2338	PB Length:	60 min
Project No.:	0135PS013E.REV002	Recording Interval:	1 min
Test Date:	1/14/2019		

Averages:	431	73	-0.04	10.01	0.46

Elapsed Time (min)	Scale Reading	Weight Change	Stack (F)	Ambient (F)	Draft ("H2O)	CO2 (%)	CO (%)
0	52.2	-	402	71	-0.03	-	-
1	52.0	-0.2	407	72	-0.03	-	-
2	51.8	-0.2	411	72	-0.04	-	-
3	51.7	-0.1	413	72	-0.04	-	-
4	51.6	-0.1	413	72	-0.04	-	-
5	51.4	-0.2	417	72	-0.04	-	-
6	51.3	-0.1	418	72	-0.04	-	-
7	51.1	-0.2	418	73	-0.04	-	-
8	51.0	-0.1	419	72	-0.04	-	-
9	50.8	-0.2	422	73	-0.04	-	-
10	50.7	-0.1	424	72	-0.04	-	-
11	50.5	-0.2	425	73	-0.04	-	-
12	50.3	-0.2	427	72	-0.04	-	-
13	50.2	-0.1	428	73	-0.04	-	-
14	50.0	-0.2	428	73	-0.04	-	-
15	49.9	-0.1	431	74	-0.04	-	-
16	49.7	-0.2	432	74	-0.04	-	-
17	49.5	-0.2	433	73	-0.04	-	-
18	49.4	-0.1	434	74	-0.04	-	-
19	49.2	-0.2	435	73	-0.04	-	-
20	49.1	-0.1	436	73	-0.04	-	-
21	48.9	-0.2	437	73	-0.04	-	-
22	48.8	-0.1	436	72	-0.04	-	-
23	48.6	-0.2	436	72	-0.04	-	-
24	48.5	-0.1	437	73	-0.04	-	-
25	48.3	-0.2	438	72	-0.04	-	-
26	48.2	-0.1	437	73	-0.04	-	-
27	48.0	-0.2	436	73	-0.04	-	-
28	47.9	-0.1	436	73	-0.04	-	-
29	47.7	-0.2	436	73	-0.04	-	-

Pellet Heater Preburn Data - ASTM E2779

Manufacturer:	HHT Halifax		
Model:	P68-C		
Tracking No.:	2338	PB Length:	60 min
Project No.:	0135PS013E.REV002	Recording Interval:	1 min
Test Date:	1/14/2019		

		Averages:	431	73	-0.04	10.01	0.46
30	47.6	-0.1	437	75	-0.04	-	-
31	47.4	-0.2	438	73	-0.04	-	-
32	47.3	-0.1	439	73	-0.04	-	-
33	47.1	-0.2	439	74	-0.04	11.22	2.69
34	46.9	-0.2	441	73	-0.04	16.80	4.35
35	46.8	-0.1	439	75	-0.04	17.02	4.27
36	46.7	-0.1	439	74	-0.04	0.98	0.09
37	46.5	-0.2	438	74	-0.04	0.12	0.00
38	46.3	-0.2	438	73	-0.04	0.14	0.00
39	46.2	-0.1	439	74	-0.04	11.64	0.26
40	46.0	-0.2	437	74	-0.04	10.55	0.01
41	45.9	-0.1	437	74	-0.04	11.32	0.06
42	45.8	-0.1	436	73	-0.04	11.34	0.15
43	45.6	-0.2	435	74	-0.04	10.15	0.01
44	45.5	-0.1	433	75	-0.04	9.50	0.01
45	45.4	-0.1	431	75	-0.04	9.50	0.01
46	45.2	-0.2	430	75	-0.04	9.95	0.01
47	45.1	-0.1	431	75	-0.04	10.52	0.02
48	45.0	-0.1	431	75	-0.04	10.42	0.05
49	44.8	-0.2	431	74	-0.04	10.98	0.06
50	44.7	-0.1	433	75	-0.04	11.77	0.21
51	44.5	-0.2	435	74	-0.04	10.88	0.09
52	44.4	-0.1	434	74	-0.04	10.81	0.08
53	44.2	-0.2	435	75	-0.04	10.62	0.05
54	44.1	-0.1	435	75	-0.04	10.80	0.15
55	44.0	-0.1	435	74	-0.04	10.62	0.04
56	43.8	-0.2	435	75	-0.04	10.51	0.06
57	43.7	-0.1	434	74	-0.04	10.07	0.02
58	43.5	-0.2	435	74	-0.04	10.62	0.02
59	43.4	-0.1	435	75	-0.04	10.53	0.05
60	43.3	-0.1	435	74	-0.04	10.79	0.04

Pellet Heater Test Data - ASTM E2779 / ASTM E2515

Run: 1

Manufacturer: HHT Halifax
Model: P68-C
Tracking No.: 2338
Project No.: 0135PS013E.REV002
Test Date: 14-Jan-19
Beginning Clock Time: 09:49

High Burn End Time: 63
Medium Burn End Time: 183
Total Sampling Time: 363 min
Recording Interval: 1 min
Background Sample Volume: 0 cubic feet

Meter Box Y Factor: 0.997 (1) 0.985 (2) 0 (Amb)

Barometric Pressure:

Begin	Middle	End	Average
30.09	30.04	29.98	30.04 "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: -0.200 "H_2O
Tunnel Area: 0.1963 ft^2
Pitot Tube Cp: 0.99

Avg. Tunnel Velocity: 13.37 ft/sec.
Intial Tunnel Flow: 145.1 scfm
Average Tunnel Flow: 147.9 scfm
Post-Test Leak Check (1): 0.000 cfm @ 9 in. Hg
Post-Test Leak Check (2): 0.000 cfm @ 11 in. Hg
Fuel Moisture (%): 5.430 Dry Basis 5.150 Wet Basis

Velocity Traverse Data

	Pt.1	Pt.2	Pt.3	Pt.4	Pt.5	Pt.6	Pt.7	Pt.8	Center	
Initial dP	0.030	0.046	0.048	0.036	0.026	0.048	0.050	0.034	0.058	"H2O
Temp:	117	117	117	117	117	117	117	117	117	°F

V_{strav} 13.69 ft/sec V_{scent} 16.64 ft/sec F_p 0.823

	Particulate Sampling Data														Fuel Weight (lb)		Temperature Data (°F)						Stack Gas Data		
Elapsed Time (min)	Gas Meter 1 (ft^3)	Gas Meter 2 (ft^3)	Sample Rate 1 (cfm)	Sample Rate 2 (cfm)	Orifice dH 1 ("H_2O)	Meter Temp 1 (°F)	Meter Vacuum 1 ("Hg)	Orifice dH 2 ("H_2O)	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_2O)	CO_2 (%)	CO (%)
0	0.000	0.000			0.03	73	-0.08	0.04	76	1.10	117	0.058			43.2		435	68	73	75	74	74	-0.040	10.76	0.030
1	0.154	0.151	0.15	0.15	1.38	74	1.99	1.10	76	1.20	117	0.057	99	98	43.1	-0.1	434	68	74	76	74	74	-0.041	10.86	0.080
2	0.316	0.312	0.16	0.16	1.38	74	1.99	1.11	76	1.20	117	0.057	104	105	42.9	-0.2	435	68	74	77	74	74	-0.042	12.00	0.250
3	0.478	0.472	0.16	0.16	1.38	74	1.98	1.11	76	1.20	117	0.058	103	103	42.8	-0.1	436	68	74	77	74	74	-0.041	11.19	0.170
4	0.639	0.632	0.16	0.16	1.38	74	1.99	1.10	76	1.20	117	0.056	104	105	42.7	-0.1	435	68	75	77	74	74	-0.042	10.48	0.070
5	0.801	0.793	0.16	0.16	1.38	74	1.98	1.10	76	1.20	117	0.057	104	105	42.5	-0.2	436	68	75	77	74	75	-0.041	10.68	0.080
6	0.962	0.953	0.16	0.16	1.38	74	1.99	1.10	76	1.20	117	0.058	103	103	42.4	-0.1	435	68	75	77	74	76	-0.041	11.36	0.120
7	1.124	1.113	0.16	0.16	1.37	74	1.98	1.10	76	1.20	116	0.057	104	104	42.2	-0.2	436	68	75	77	74	73	-0.041	10.37	0.020
8	1.285	1.274	0.16	0.16	1.37	74	1.98	1.10	76	1.20	117	0.057	104	105	42.1	-0.1	436	69	75	78	74	73	-0.040	11.10	0.040
9	1.447	1.433	0.16	0.16	1.37	75	1.97	1.10	77	1.20	117	0.056	105	104	42.0	-0.1	437	69	76	78	74	73	-0.041	11.02	0.060
10	1.608	1.593	0.16	0.16	1.36	75	1.97	1.10	77	1.20	117	0.057	103	104	41.8	-0.2	437	69	76	78	74	72	-0.039	11.30	0.050
11	1.769	1.754	0.16	0.16	1.36	75	1.97	1.09	77	1.20	117	0.057	103	104	41.7	-0.1	436	69	76	78	74	72	-0.040	10.70	0.050
12	1.931	1.913	0.16	0.16	1.37	75	1.97	1.09	77	1.20	117	0.057	104	103	41.5	-0.2	436	69	76	78	75	71	-0.040	10.46	0.050
13	2.092	2.073	0.16	0.16	1.37	75	1.97	1.09	77	1.20	117	0.058	102	103	41.4	-0.1	436	68	76	78	75	71	-0.040	10.67	0.030
14	2.253	2.234	0.16	0.16	1.37	75	1.97	1.09	77	1.20	117	0.057	103	104	41.3	-0.1	436	68	77	78	75	72	-0.039	10.90	0.030
15	2.414	2.393	0.16	0.16	1.36	76	1.97	1.08	78	1.20	117	0.057	103	103	41.1	-0.2	435	68	77	78	75	72	-0.040	10.14	0.020
16	2.576	2.553	0.16	0.16	1.36	76	1.96	1.09	78	1.20	117	0.057	104	103	41.0	-0.1	435	68	77	78	75	71	-0.040	10.46	0.030
17	2.737	2.714	0.16	0.16	1.36	76	1.97	1.09	78	1.20	117	0.058	102	103	40.9	-0.1	432	68	77	78	75	71	-0.040	9.76	0.020
18	2.898	2.873	0.16	0.16	1.36	76	1.96	1.08	78	1.20	117	0.057	103	103	40.8	-0.1	432	68	77	78	75	71	-0.039	9.50	0.010
19	3.059	3.033	0.16	0.16	1.36	76	1.96	1.09	78	1.20	117	0.056	104	104	40.6	-0.2	431	68	77	78	75	71	-0.039	9.77	0.010
20	3.221	3.194	0.16	0.16	1.35	76	1.97	1.09	78	1.20	117	0.058	103	103	40.5	-0.1	430	68	78	77	75	71	-0.038	9.97	0.020
21	3.382	3.353	0.16	0.16	1.35	77	1.97	1.08	79	1.20	117	0.056	104	104	40.4	-0.1	432	68	78	77	75	71	-0.039	9.95	0.020
22	3.543	3.512	0.16	0.16	1.37	77	1.97	1.09	79	1.20	117	0.056	104	104	40.2	-0.2	431	68	78	77	75	70	-0.039	10.40	0.050
23	3.704	3.673	0.16	0.16	1.35	77	1.97	1.09	79	1.20	117	0.056	104	105	40.1	-0.1	432	68	78	77	75	71	-0.039	10.09	0.040
24	3.865	3.833	0.16	0.16	1.36	77	1.97	1.08	79	1.20	117	0.056	104	104	39.9	-0.2	434	68	78	77	75	71	-0.040	11.25	0.170
25	4.027	3.992	0.16	0.16	1.36	77	1.97	1.09	79	1.20	117	0.057	104	103	39.8	-0.1	435	68	78	77	75	70	-0.041	11.32	0.130
26	4.188	4.153	0.16	0.16	1.36	77	1.98	1.08	79	1.20	117	0.057	103	104	39.6	-0.2	435	68	78	77	75	71	-0.040	11.63	0.180
27	4.349	4.313	0.16	0.16	1.36	77	1.97	1.08	79	1.20	117	0.057	103	103	39.5	-0.1	435	68	79	77	76	71	-0.040	11.67	0.270
28	4.511	4.473	0.16	0.16	1.35	77	1.97	1.09	80	1.20	117	0.057	104	103	39.4	-0.1	435	68	79	77	76	71	-0.040	10.98	0.060
29	4.672	4.633	0.16	0.16	1.35	78	1.98	1.09	80	1.20	117	0.057	103	103	39.2	-0.2	436	68	79	77	76	71	-0.040	11.36	0.220
30	4.834	4.793	0.16	0.16	1.35	78	1.97	1.08	80	1.20	117	0.057	103	103	39.1	-0.1	436	68	79	77	76	71	-0.039	11.51	0.350
31	4.995	4.953	0.16	0.16	1.35	78	1.98	1.08	80	1.20	118	0.056	104	104	38.9	-0.2	437	68	79	77	76	71	-0.040	10.72	0.100
32	5.156	5.113	0.16	0.16	1.36	78	1.97	1.09	80	1.20	117	0.057	103	103	38.8	-0.1	438	68	79	77	76	71	-0.040	11.09	0.100
33	5.318	5.274	0.16	0.16	1.36	78	1.98	1.08	80	1.20	117	0.058	102	103	38.6	-0.2	437	68	79	77	76	72	-0.040	11.34	0.180
34	5.479	5.433	0.16	0.16	1.37	78	1.97	1.09	80	1.20	117	0.056	104	103	38.5	-0.1	436	68	79	77	76	72	-0.039	10.83	0.090
35	5.641	5.594	0.16	0.16	1.35	78	1.98	1.09	80	1.20	117	0.057	103	104	38.4	-0.1	437	68	79	77	76	73	-0.040	11.07	0.090
36	5.802	5.754	0.16	0.16	1.35	78	1.98	1.08	81	1.20	117	0.057	103	103	38.2	-0.2	436	68	79	77	76	71	-0.039	11.01	0.120
37	5.964	5.914	0.16	0.16	1.35	78	1.98	1.08	81	1.20	117	0.058	102	102	38.1	-0.1	435	68	79	77	76	72	-0.039	10.45	0.110
38	6.125	6.074	0.16	0.16	1.35	78	1.98	1.08	81	1.20	117	0.057	103	103	38.0	-0.1	434	68	79	77	76	72	-0.040	9.84	0.020
39	6.287	6.235	0.16	0.16	1.36	78	1.98	1.08	81	1.20	117	0.058	102	103	37.8	-0.2	434	68	79	77	76	71	-0.040	10.08	0.020
40	6.448	6.394	0.16	0.16	1.36	78	1.98	1.08	81	1.20	117	0.058	102	101	37.7	-0.1	435	68	79	77	76	71	-0.039	10.29	0.050
41	6.609	6.554	0.16	0.16	1.34	79	1.98	1.09	81	1.20	117	0.058	102	102	37.6	-0.1	434	68	80	77	76	71	-0.039	10.43	0.040
42	6.771	6.715	0.16	0.16	1.35	79	1.98	1.08	81	1.20	117	0.056	104	104	37.4	-0.2	433	68	80	77	76	72	-0.039	9.97	0.030
43	6.932	6.875	0.16	0.16	1.35	79	1.98	1.08	81	1.20	117	0.057	103	103	37.3	-0.1	433	68	80	78	76	72	-0.040	9.86	0.020
44	7.094	7.035	0.16	0.16	1.34	79	1.99	1.08	81	1.20	117	0.056	104	104	37.2	-0.1	433	68	80	78	76	72	-0.039	10.28	0.050
45	7.255	7.195	0.16	0.16	1.35	79	1.98	1.08	82	1.20	117	0.056	103	104	37.0	-0.2	434	68	80	78	76	73	-0.040	9.82	0.020
46	7.416	7.355	0.16	0.16	1.35	79	1.99	1.08	82	1.20	117	0.056	103	104	36.9	-0.1	434	68	80	78	77	74	-0.040	10.46	0.040
47	7.578	7.515	0.16	0.16	1.34	79	1.99	1.08	82	1.20	117	0.057	103	103	36.8	-0.1	434	68	80	78	77	73	-0.041	10.76	0.110
48	7.739	7.675	0.16	0.16	1.34	79	1.99	1.08	82	1.20	117	0.057	104	104	36.6	-0.2	435	68	80	78	77	74	-0.041	11.21	0.170

Pellet Heater Test Data - ASTM E2779 / ASTM E2515

Run: 1

Manufacturer: HHT Halifax
Model: P68-C
Tracking No.: 2338
Project No.: 0135PS013E.REV002
Test Date: 14-Jan-19
Beginning Clock Time: 09:49

High Burn End Time: 63
Medium Burn End Time: 183
Total Sampling Time: 363 min
Recording Interval: 1 min
Background Sample Volume: 0 cubic feet

Meter Box Y Factor: 0.997 (1) 0.985 (2) 0 (Amb)

Barometric Pressure:

Begin	Middle	End	Average
30.09	30.04	29.98	30.04 "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: -0.200 "H_2O
Tunnel Area: 0.1963 ft^2
Pitot Tube Cp: 0.99

Avg. Tunnel Velocity: 13.37 ft/sec.
Intial Tunnel Flow: 145.1 scfm
Average Tunnel Flow: 147.9 scfm
Post-Test Leak Check (1): 0.000 cfm @ 9 in. Hg
Post-Test Leak Check (2): 0.000 cfm @ 11 in. Hg
Fuel Moisture (%): 5.430 Dry Basis 5.150 Wet Basis

Velocity Traverse Data

	Pt.1	Pt.2	Pt.3	Pt.4	Pt.5	Pt.6	Pt.7	Pt.8	Center	
Initial dP	0.030	0.046	0.048	0.036	0.026	0.048	0.050	0.034	0.058	"H2O
Temp:	117	117	117	117	117	117	117	117	117	°F

V_{strav} 13.69 ft/sec V_{scent} 16.64 ft/sec F_p 0.823

	Particulate Sampling Data														Fuel Weight (lb)		Temperature Data (°F)						Stack Gas Data		
Elapsed Time (min)	Gas Meter 1 (ft^3)	Gas Meter 2 (ft^3)	Sample Rate 1 (cfm)	Sample Rate 2 (cfm)	Orifice dH 1 ("H_2O)	Meter Temp 1 (°F)	Meter Vacuum 1 ("Hg)	Orifice dH 2 ("H_2O)	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_2O)	CO_2 (%)	CO (%)
49	7.900	7.835	0.16	0.16	1.35	79	2.00	1.08	82	1.20	117	0.056	103	104	36.5	-0.1	435	68	80	78	75	71	-0.041	11.27	0.360
50	8.062	7.995	0.16	0.16	1.34	79	1.99	1.08	82	1.20	117	0.057	103	103	36.3	-0.2	436	69	79	78	74	73	-0.040	11.29	0.380
51	8.223	8.155	0.16	0.16	1.34	80	2.00	1.08	82	1.20	117	0.057	102	103	36.2	-0.1	437	69	79	78	73	72	-0.040	11.13	0.290
52	8.384	8.315	0.16	0.16	1.34	80	2.00	1.08	82	1.20	117	0.057	102	103	36.0	-0.2	438	69	79	78	73	72	-0.041	11.52	0.420
53	8.546	8.475	0.16	0.16	1.36	80	1.99	1.08	82	1.20	117	0.057	103	103	35.9	-0.1	438	69	78	78	72	72	-0.041	11.82	0.690
54	8.707	8.636	0.16	0.16	1.35	80	1.99	1.08	83	1.20	117	0.056	103	104	35.7	-0.2	437	69	78	78	72	73	-0.041	11.33	0.390
55	8.869	8.795	0.16	0.16	1.35	80	2.00	1.08	83	1.20	117	0.056	104	103	35.6	-0.1	437	69	78	78	72	71	-0.040	10.33	0.070
56	9.030	8.955	0.16	0.16	1.34	80	2.00	1.08	83	1.20	117	0.057	102	103	35.4	-0.2	438	69	78	78	72	72	-0.041	10.74	0.130
57	9.192	9.116	0.16	0.16	1.35	80	2.01	1.08	83	1.20	118	0.057	103	103	35.3	-0.1	438	69	78	78	72	72	-0.040	11.45	0.300
58	9.353	9.275	0.16	0.16	1.34	80	2.00	1.07	83	1.20	117	0.057	102	102	35.1	-0.2	439	69	77	79	71	71	-0.041	11.00	0.230
59	9.515	9.435	0.16	0.16	1.35	80	2.01	1.08	83	1.20	117	0.057	103	103	35.0	-0.1	437	69	77	79	71	73	-0.042	11.14	0.230
60	9.676	9.596	0.16	0.16	1.35	80	2.00	1.08	83	1.20	118	0.056	103	104	34.9	-0.1	438	69	77	79	71	73	-0.042	10.38	0.100
61	9.839	9.756	0.16	0.16	1.43	80	1.79	1.08	83	1.20	117	0.055	106	104	34.7	-0.2	438	69	77	79	71	72	-0.041	11.00	0.250
62	10.003	9.915	0.16	0.16	1.43	81	1.79	1.08	83	1.20	118	0.057	104	102	34.6	-0.1	439	69	76	79	71	72	-0.041	11.25	0.210
63	10.168	10.076	0.16	0.16	1.36	81	1.97	1.08	84	1.20	118	0.057	105	103	34.4	-0.2	440	69	77	79	71	73	-0.041	11.17	0.340
64	10.331	10.236	0.16	0.16	1.37	81	1.97	1.07	84	1.20	117	0.057	103	102	34.3	-0.1	440	69	76	79	71	73	-0.042	11.51	0.470
65	10.493	10.396	0.16	0.16	1.37	81	1.96	1.08	84	1.20	117	0.057	103	102	34.2	-0.1	437	69	76	79	71	73	-0.041	10.94	0.140
66	10.655	10.556	0.16	0.16	1.36	81	1.96	1.08	84	1.20	115	0.057	103	102	34.1	-0.1	426	69	76	79	71	72	-0.041	9.77	0.020
67	10.817	10.717	0.16	0.16	1.37	81	1.96	1.07	84	1.20	109	0.057	102	102	34.0	-0.1	398	69	76	79	72	72	-0.042	7.89	0.010
68	10.980	10.876	0.16	0.16	1.37	81	1.97	1.08	84	1.20	106	0.057	102	101	34.0	0.0	377	69	76	78	72	72	-0.040	7.75	0.010
69	11.142	11.037	0.16	0.16	1.37	81	1.96	1.07	84	1.20	103	0.058	101	101	33.9	-0.1	362	69	76	78	72	74	-0.039	7.83	0.020
70	11.305	11.197	0.16	0.16	1.37	81	1.96	1.07	84	1.20	101	0.059	100	99	33.8	-0.1	351	69	75	78	72	74	-0.037	7.08	0.030
71	11.468	11.357	0.16	0.16	1.37	81	1.97	1.07	84	1.20	100	0.057	102	101	33.8	0.0	342	69	75	78	72	74	-0.036	7.16	0.010
72	11.630	11.517	0.16	0.16	1.37	81	1.96	1.08	84	1.20	98	0.059	99	99	33.7	-0.1	334	69	75	78	72	72	-0.036	7.45	0.000
73	11.793	11.678	0.16	0.16	1.37	81	1.96	1.07	84	1.20	98	0.056	103	102	33.6	-0.1	327	69	75	78	72	73	-0.034	6.90	0.010
74	11.956	11.837	0.16	0.16	1.36	81	1.97	1.07	84	1.20	97	0.058	101	99	33.6	0.0	320	69	75	78	72	73	-0.034	6.60	0.010
75	12.119	11.998	0.16	0.16	1.36	82	1.97	1.08	84	1.20	96	0.057	101	101	33.5	-0.1	315	69	75	77	72	72	-0.034	6.86	0.010
76	12.282	12.158	0.16	0.16	1.37	82	1.96	1.07	84	1.20	95	0.058	100	100	33.4	-0.1	309	69	75	77	72	71	-0.033	6.35	0.010
77	12.445	12.318	0.16	0.16	1.36	82	1.97	1.07	84	1.20	94	0.057	101	100	33.4	0.0	304	69	75	77	72	73	-0.033	6.43	0.010
78	12.608	12.478	0.16	0.16	1.36	82	1.97	1.07	84	1.20	94	0.057	101	100	33.3	-0.1	300	69	75	77	72	73	-0.032	6.33	0.010
79	12.771	12.639	0.16	0.16	1.36	82	1.97	1.08	84	1.20	93	0.058	100	100	33.3	0.0	296	69	75	77	72	73	-0.031	6.33	0.020
80	12.934	12.799	0.16	0.16	1.36	82	1.97	1.08	84	1.20	93	0.057	101	100	33.2	-0.1	292	69	75	77	72	73	-0.030	5.57	0.020
81	13.096	12.959	0.16	0.16	1.37	82	1.96	1.07	84	1.20	92	0.059	99	98	33.2	0.0	288	69	75	76	72	73	-0.030	6.14	0.010
82	13.260	13.120	0.16	0.16	1.36	82	1.96	1.07	84	1.20	92	0.057	102	101	33.1	-0.1	285	69	74	76	72	74	-0.030	5.99	0.010
83	13.423	13.280	0.16	0.16	1.37	82	1.96	1.07	84	1.20	91	0.057	101	100	33.1	0.0	282	69	74	76	72	72	-0.030	5.68	0.010
84	13.585	13.440	0.16	0.16	1.37	82	1.97	1.08	84	1.20	91	0.058	99	99	33.0	-0.1	280	69	74	76	72	71	-0.029	6.45	0.000
85	13.748	13.601	0.16	0.16	1.37	82	1.97	1.07	84	1.20	91	0.058	100	100	32.9	-0.1	279	69	74	76	72	71	-0.029	6.42	0.010
86	13.910	13.761	0.16	0.16	1.37	82	1.96	1.07	84	1.20	91	0.057	100	100	32.9	0.0	278	69	74	76	72	72	-0.029	7.38	0.020
87	14.073	13.921	0.16	0.16	1.37	82	1.97	1.08	84	1.20	91	0.059	99	98	32.8	-0.1	276	69	74	76	72	73	-0.029	7.13	0.010
88	14.236	14.082	0.16	0.16	1.37	82	1.97	1.07	84	1.20	90	0.058	100	100	32.8	0.0	275	69	74	75	72	72	-0.028	6.67	0.020
89	14.399	14.242	0.16	0.16	1.36	82	1.97	1.06	84	1.20	90	0.057	101	100	32.7	-0.1	273	69	74	75	72	71	-0.029	6.42	0.020
90	14.562	14.402	0.16	0.16	1.37	82	1.97	1.07	84	1.20	90	0.059	99	98	32.7	0.0	271	69	74	75	72	72	-0.028	6.32	0.010
91	14.725	14.562	0.16	0.16	1.37	82	1.97	1.07	84	1.20	90	0.058	100	99	32.6	-0.1	270	69	73	75	72	73	-0.028	6.22	0.010
92	14.888	14.723	0.16	0.16	1.36	82	1.98	1.07	84	1.20	90	0.057	101	101	32.5	-0.1	269	68	73	75	72	72	-0.028	6.33	0.020
93	15.051	14.882	0.16	0.16	1.36	82	1.97	1.07	84	1.20	90	0.057	101	99	32.5	0.0	268	68	73	75	72	72	-0.028	6.98	0.020
94	15.214	15.042	0.16	0.16	1.36	82	1.97	1.07	84	1.20	90	0.056	102	101	32.4	-0.1	267	69	73	75	71	71	-0.027	6.62	0.010
95	15.378	15.203	0.16	0.16	1.36	82	1.97	1.07	84	1.20	90	0.058	101	100	32.4	0.0	267	68	73	75	71	72	-0.027	6.30	0.010
96	15.541	15.363	0.16	0.16	1.37	82	1.98	1.07	84	1.20	89	0.058	100	99	32.3	-0.1	267	68	73	74	71	71	-0.028	6.34	0.010
97	15.704	15.523	0.16	0.16	1.36	82	1.97	1.07	84	1.20	89	0.057	99	99	32.3	0.0	267	68	73	74	71	71	-0.027	6.84	0.010

Pellet Heater Test Data - ASTM E2779 / ASTM E2515

Run: 1

Manufacturer: HHT Halifax
Model: P68-C
Tracking No.: 2338
Project No.: 0135PS013E.REV002
Test Date: 14-Jan-19
Beginning Clock Time: 09:49

High Burn End Time: 63
Medium Burn End Time: 183
Total Sampling Time: 363 min
Recording Interval: 1 min

Background Sample Volume: 0 cubic feet

Meter Box Y Factor: 0.997 (1) 0.985 (2) 0 (Amb)

Barometric Pressure:

Begin	Middle	End	Average
30.09	30.04	29.98	30.04 "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: -0.200 "H_2O
Tunnel Area: 0.1963 ft^2
Pitot Tube Cp: 0.99

Avg. Tunnel Velocity: 13.37 ft/sec.
Intial Tunnel Flow: 145.1 scfm
Average Tunnel Flow: 147.9 scfm
Post-Test Leak Check (1): 0.000 cfm @ 9 in. Hg
Post-Test Leak Check (2): 0.000 cfm @ 11 in. Hg
Fuel Moisture (%): 5.430 Dry Basis 5.150 Wet Basis

Velocity Traverse Data

	Pt.1	Pt.2	Pt.3	Pt.4	Pt.5	Pt.6	Pt.7	Pt.8	Center	
Initial dP	0.030	0.046	0.048	0.036	0.026	0.048	0.050	0.034	0.058	"H2O
Temp:	117	117	117	117	117	117	117	117	117	°F

V_{strav} 13.69 ft/sec V_{scent} 16.64 ft/sec F_p 0.823

	Particulate Sampling Data														Fuel Weight (lb)		Temperature Data (°F)						Stack Gas Data		
Elapsed Time (min)	Gas Meter 1 (ft^3)	Gas Meter 2 (ft^3)	Sample Rate 1 (cfm)	Sample Rate 2 (cfm)	Orifice dH 1 ("H_2O)	Meter Temp 1 (°F)	Meter Vacuum 1 ("Hg)	Orifice dH 2 ("H_2O)	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_2O)	CO_2 (%)	CO (%)
98	15.867	15.684	0.16	0.16	1.37	82	1.97	1.07	84	1.20	89	0.058	100	100	32.2	-0.1	267	68	73	74	71	71	-0.027	6.74	0.020
99	16.030	15.843	0.16	0.16	1.37	82	1.98	1.07	84	1.20	89	0.058	100	98	32.1	-0.1	267	68	72	74	71	70	-0.027	6.73	0.010
100	16.193	16.003	0.16	0.16	1.36	82	1.97	1.07	84	1.20	89	0.058	100	99	32.1	0.0	266	68	72	74	71	71	-0.027	6.60	0.010
101	16.355	16.164	0.16	0.16	1.37	82	1.98	1.07	84	1.20	89	0.057	100	100	32.0	-0.1	266	68	72	74	71	72	-0.028	7.12	0.030
102	16.518	16.324	0.16	0.16	1.37	82	1.98	1.07	84	1.20	89	0.057	101	100	31.9	-0.1	265	68	72	74	71	71	-0.027	6.97	0.020
103	16.680	16.484	0.16	0.16	1.37	82	1.98	1.07	84	1.20	89	0.058	99	99	31.9	0.0	264	68	72	74	71	72	-0.027	6.81	0.040
104	16.843	16.644	0.16	0.16	1.37	82	1.98	1.07	84	1.20	89	0.058	100	99	31.8	-0.1	264	68	72	74	71	71	-0.026	6.49	0.050
105	17.006	16.804	0.16	0.16	1.37	82	1.97	1.07	84	1.20	89	0.058	100	99	31.8	0.0	263	68	72	74	71	71	-0.027	6.56	0.020
106	17.169	16.964	0.16	0.16	1.37	82	1.97	1.07	84	1.20	89	0.059	99	98	31.7	-0.1	262	68	72	74	71	71	-0.027	6.68	0.010
107	17.332	17.124	0.16	0.16	1.37	82	1.99	1.06	84	1.20	89	0.058	100	99	31.7	0.0	262	68	72	74	71	72	-0.027	6.32	0.020
108	17.495	17.283	0.16	0.16	1.36	82	1.98	1.07	84	1.20	89	0.059	99	98	31.6	-0.1	261	68	72	74	71	70	-0.026	5.92	0.020
109	17.658	17.444	0.16	0.16	1.36	82	1.99	1.07	84	1.20	89	0.057	101	100	31.6	0.0	261	68	71	74	71	72	-0.027	5.91	0.020
110	17.821	17.604	0.16	0.16	1.36	82	1.98	1.06	84	1.20	88	0.059	99	98	31.5	-0.1	261	68	71	74	71	72	-0.026	6.64	0.010
111	17.984	17.763	0.16	0.16	1.37	82	1.99	1.07	84	1.20	89	0.059	99	98	31.4	-0.1	260	68	71	74	71	72	-0.027	6.64	0.010
112	18.147	17.923	0.16	0.16	1.36	82	1.98	1.06	84	1.20	88	0.057	101	100	31.4	0.0	260	68	71	74	71	72	-0.026	6.40	0.010
113	18.310	18.084	0.16	0.16	1.35	82	1.99	1.06	84	1.20	89	0.058	100	100	31.3	-0.1	260	68	71	74	71	71	-0.026	6.09	0.020
114	18.473	18.243	0.16	0.16	1.36	82	1.99	1.07	84	1.20	88	0.059	99	97	31.3	0.0	261	68	71	74	71	71	-0.026	6.83	0.020
115	18.635	18.403	0.16	0.16	1.36	82	1.99	1.06	84	1.20	88	0.059	98	98	31.2	-0.1	260	68	71	74	71	70	-0.026	6.81	0.020
116	18.798	18.564	0.16	0.16	1.36	82	1.99	1.06	84	1.20	88	0.057	101	100	31.2	0.0	259	68	71	73	71	71	-0.027	6.45	0.020
117	18.961	18.722	0.16	0.16	1.37	82	1.98	1.06	84	1.20	88	0.058	100	98	31.1	-0.1	259	68	71	73	71	70	-0.026	6.27	0.010
118	19.124	18.882	0.16	0.16	1.36	82	1.99	1.07	84	1.20	88	0.059	99	98	31.1	0.0	258	68	71	73	71	70	-0.027	6.19	0.010
119	19.286	19.043	0.16	0.16	1.36	82	1.98	1.06	84	1.20	88	0.058	99	99	31.0	-0.1	259	68	71	73	71	70	-0.026	6.64	0.010
120	19.448	19.201	0.16	0.16	1.37	82	1.99	1.06	84	1.20	88	0.057	100	98	30.9	-0.1	259	68	70	73	71	70	-0.026	7.04	0.010
121	19.611	19.361	0.16	0.16	1.36	82	1.99	1.06	84	1.20	88	0.057	101	100	30.9	0.0	259	68	70	73	71	71	-0.026	6.55	0.010
122	19.773	19.521	0.16	0.16	1.37	82	1.99	1.06	84	1.20	88	0.057	100	100	30.8	-0.1	258	68	70	73	71	71	-0.026	6.70	0.020
123	19.936	19.681	0.16	0.16	1.36	82	1.99	1.06	84	1.20	88	0.057	101	100	30.8	0.0	258	68	70	73	70	71	-0.026	6.18	0.010
124	20.099	19.840	0.16	0.16	1.36	82	2.00	1.06	84	1.20	88	0.059	99	97	30.7	-0.1	258	68	70	73	70	71	-0.026	6.16	0.010
125	20.261	20.000	0.16	0.16	1.36	82	1.99	1.06	84	1.20	88	0.057	100	100	30.7	0.0	257	68	70	73	70	71	-0.026	6.46	0.010
126	20.424	20.159	0.16	0.16	1.36	82	1.99	1.06	84	1.20	88	0.057	101	99	30.6	-0.1	257	68	70	73	70	71	-0.026	6.14	0.010
127	20.586	20.318	0.16	0.16	1.36	82	2.00	1.06	84	1.20	88	0.058	99	98	30.5	-0.1	257	68	70	73	70	72	-0.026	6.44	0.000
128	20.749	20.478	0.16	0.16	1.36	82	2.00	1.06	84	1.20	88	0.058	100	99	30.5	0.0	258	68	70	73	70	72	-0.026	6.70	0.010
129	20.912	20.638	0.16	0.16	1.36	82	2.00	1.06	84	1.20	88	0.057	101	100	30.4	-0.1	258	68	70	73	70	72	-0.026	7.03	0.010
130	21.074	20.797	0.16	0.16	1.35	82	1.99	1.06	84	1.20	88	0.057	100	99	30.4	0.0	258	68	70	73	70	72	-0.026	6.64	0.010
131	21.237	20.957	0.16	0.16	1.36	82	2.00	1.05	84	1.20	88	0.059	99	98	30.3	-0.1	258	68	70	73	70	71	-0.026	7.30	0.010
132	21.399	21.116	0.16	0.16	1.36	82	2.00	1.06	83	1.20	88	0.059	98	98	30.2	-0.1	258	68	69	73	70	71	-0.026	6.69	0.020
133	21.562	21.276	0.16	0.16	1.35	82	2.00	1.06	84	1.20	88	0.058	100	99	30.2	0.0	258	68	69	73	70	71	-0.026	6.71	0.010
134	21.725	21.435	0.16	0.16	1.36	82	2.00	1.05	84	1.20	88	0.058	100	98	30.1	-0.1	258	68	69	73	70	72	-0.026	6.86	0.010
135	21.887	21.594	0.16	0.16	1.35	82	2.00	1.06	84	1.20	88	0.056	101	100	30.1	0.0	258	68	69	73	70	71	-0.026	6.63	0.010
136	22.050	21.754	0.16	0.16	1.34	82	2.00	1.06	83	1.20	88	0.058	100	99	30.0	-0.1	257	68	69	73	70	71	-0.026	6.29	0.030
137	22.212	21.913	0.16	0.16	1.35	82	1.99	1.06	83	1.20	88	0.056	101	100	30.0	0.0	257	68	69	73	70	71	-0.026	6.59	0.010
138	22.375	22.072	0.16	0.16	1.35	82	2.00	1.06	83	1.20	88	0.057	101	99	29.9	-0.1	257	68	69	73	70	71	-0.026	6.54	0.010
139	22.537	22.232	0.16	0.16	1.36	82	2.00	1.06	83	1.20	88	0.058	99	99	29.9	0.0	256	68	69	73	70	72	-0.026	6.38	0.000
140	22.700	22.391	0.16	0.16	1.35	82	2.00	1.06	83	1.20	88	0.058	100	98	29.8	-0.1	256	68	69	73	70	72	-0.026	6.14	0.000
141	22.862	22.550	0.16	0.16	1.36	82	2.01	1.05	83	1.20	88	0.058	99	98	29.7	-0.1	256	68	69	73	70	71	-0.025	6.30	0.000
142	23.024	22.710	0.16	0.16	1.35	82	2.00	1.06	83	1.20	88	0.057	100	100	29.7	0.0	255	68	69	73	70	71	-0.026	6.26	0.000
143	23.186	22.868	0.16	0.16	1.35	82	2.01	1.06	83	1.20	88	0.057	100	99	29.6	-0.1	255	68	69	73	70	72	-0.026	6.03	0.000
144	23.348	23.027	0.16	0.16	1.36	82	2.01	1.05	83	1.20	88	0.057	100	99	29.6	0.0	255	68	69	73	70	71	-0.025	6.29	0.000
145	23.511	23.187	0.16	0.16	1.36	82	2.00	1.06	83	1.20	88	0.058	100	99	29.5	-0.1	255	68	69	73	70	70	-0.026	6.38	0.010
146	23.673	23.346	0.16	0.16	1.36	82	2.00	1.06	83	1.20	88	0.057	100	99	29.5	0.0	255	68	69	73	70	70	-0.025	6.71	0.010

Pellet Heater Test Data - ASTM E2779 / ASTM E2515

Run: 1

Manufacturer: HHT Halifax
Model: P68-C
Tracking No.: 2338
Project No.: 0135PS013E.REV002
Test Date: 14-Jan-19
Beginning Clock Time: 09:49

High Burn End Time: 63
Medium Burn End Time: 183
Total Sampling Time: 363 min
Recording Interval: 1 min

Background Sample Volume: 0 cubic feet

Meter Box Y Factor: 0.997 (1) 0.985 (2) 0 (Amb)

Barometric Pressure:

Begin	Middle	End	Average
30.09	30.04	29.98	30.04 "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: -0.200 "H_2O
Tunnel Area: 0.1963 ft^2
Pitot Tube Cp: 0.99

Avg. Tunnel Velocity: 13.37 ft/sec.
Intial Tunnel Flow: 145.1 scfm
Average Tunnel Flow: 147.9 scfm
Post-Test Leak Check (1): 0.000 cfm @ 9 in. Hg
Post-Test Leak Check (2): 0.000 cfm @ 11 in. Hg
Fuel Moisture (%): 5.430 Dry Basis 5.150 Wet Basis

Velocity Traverse Data

	Pt.1	Pt.2	Pt.3	Pt.4	Pt.5	Pt.6	Pt.7	Pt.8	Center	
Initial dP	0.030	0.046	0.048	0.036	0.026	0.048	0.050	0.034	0.058	"H2O
Temp:	117	117	117	117	117	117	117	117	117	°F

V_{strav} 13.69 ft/sec V_{scent} 16.64 ft/sec F_p 0.823

	Particulate Sampling Data														Fuel Weight (lb)		Temperature Data (°F)						Stack Gas Data		
Elapsed Time (min)	Gas Meter 1 (ft^3)	Gas Meter 2 (ft^3)	Sample Rate 1 (cfm)	Sample Rate 2 (cfm)	Orifice dH 1 ("H_2O)	Meter Temp 1 (°F)	Meter Vacuum 1 ("Hg)	Orifice dH 2 ("H_2O)	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_2O)	CO_2 (%)	CO (%)
147	23.835	23.505	0.16	0.16	1.36	82	2.01	1.05	83	1.20	88	0.058	99	98	29.4	-0.1	254	68	69	73	70	70	-0.026	6.20	0.010
148	23.997	23.664	0.16	0.16	1.35	82	2.01	1.05	83	1.20	88	0.058	99	98	29.4	0.0	254	68	69	73	70	71	-0.026	5.78	0.030
149	24.159	23.823	0.16	0.16	1.36	82	2.01	1.06	83	1.20	88	0.058	99	98	29.3	-0.1	254	68	69	73	70	71	-0.025	6.20	0.020
150	24.322	23.983	0.16	0.16	1.36	82	2.01	1.05	83	1.20	88	0.058	100	99	29.2	-0.1	254	68	69	73	70	70	-0.025	6.39	0.010
151	24.484	24.142	0.16	0.16	1.36	82	2.00	1.05	83	1.20	88	0.058	99	98	29.2	0.0	254	68	68	73	70	71	-0.026	6.12	0.010
152	24.646	24.300	0.16	0.16	1.36	82	2.02	1.06	83	1.20	88	0.058	99	98	29.1	-0.1	253	68	68	73	70	70	-0.025	6.29	0.010
153	24.808	24.460	0.16	0.16	1.35	82	2.01	1.05	83	1.20	88	0.058	99	99	29.1	0.0	254	68	68	73	70	70	-0.026	6.27	0.000
154	24.971	24.619	0.16	0.16	1.36	82	2.02	1.05	83	1.20	88	0.057	101	99	29.0	-0.1	254	68	68	73	70	71	-0.025	6.65	0.010
155	25.133	24.778	0.16	0.16	1.35	82	2.02	1.05	83	1.20	88	0.058	99	98	29.0	0.0	253	68	68	73	70	70	-0.026	6.45	0.000
156	25.295	24.937	0.16	0.16	1.35	82	2.02	1.05	83	1.30	88	0.057	100	99	28.9	-0.1	253	68	68	73	70	70	-0.026	6.34	0.010
157	25.457	25.095	0.16	0.16	1.35	82	2.01	1.05	83	1.20	88	0.056	101	100	28.8	-0.1	253	68	68	73	70	71	-0.025	6.46	0.010
158	25.620	25.255	0.16	0.16	1.35	81	2.02	1.05	83	1.30	88	0.057	101	100	28.8	0.0	254	68	68	73	70	70	-0.026	6.26	0.010
159	25.782	25.413	0.16	0.16	1.35	81	2.01	1.05	83	1.30	88	0.058	99	98	28.7	-0.1	254	68	68	73	70	70	-0.027	6.38	0.010
160	25.944	25.573	0.16	0.16	1.35	82	2.02	1.05	83	1.20	88	0.059	98	98	28.7	0.0	254	68	68	73	70	70	-0.026	6.04	0.010
161	26.106	25.732	0.16	0.16	1.35	82	2.02	1.05	83	1.30	88	0.059	98	98	28.6	-0.1	254	68	68	73	70	70	-0.027	6.55	0.000
162	26.268	25.890	0.16	0.16	1.35	81	2.02	1.05	83	1.30	88	0.058	99	98	28.6	0.0	255	68	68	73	69	70	-0.026	6.78	0.010
163	26.430	26.049	0.16	0.16	1.35	81	2.03	1.05	83	1.20	88	0.057	100	99	28.5	-0.1	254	68	68	73	70	71	-0.026	6.31	0.000
164	26.592	26.208	0.16	0.16	1.35	81	2.02	1.05	83	1.30	88	0.058	99	98	28.5	0.0	253	68	68	73	70	70	-0.026	6.18	0.000
165	26.754	26.367	0.16	0.16	1.34	81	2.03	1.05	83	1.20	88	0.058	99	98	28.4	-0.1	253	68	68	73	69	70	-0.026	5.85	0.010
166	26.916	26.526	0.16	0.16	1.35	82	2.03	1.04	83	1.30	88	0.058	99	98	28.3	-0.1	253	68	68	73	69	71	-0.025	6.27	0.000
167	27.078	26.684	0.16	0.16	1.35	82	2.03	1.05	83	1.30	88	0.057	100	99	28.3	0.0	253	68	68	73	69	71	-0.026	6.11	0.000
168	27.240	26.843	0.16	0.16	1.34	81	2.03	1.05	83	1.30	88	0.058	99	98	28.2	-0.1	253	68	68	73	69	71	-0.026	6.34	0.010
169	27.402	27.002	0.16	0.16	1.34	81	2.03	1.05	83	1.30	87	0.057	100	99	28.2	0.0	253	68	68	73	69	71	-0.026	6.45	0.020
170	27.564	27.161	0.16	0.16	1.34	81	2.03	1.05	83	1.20	87	0.058	99	98	28.1	-0.1	253	68	68	73	69	71	-0.026	6.28	0.010
171	27.726	27.319	0.16	0.16	1.34	81	2.02	1.05	83	1.30	87	0.058	99	98	28.1	0.0	253	68	68	73	69	70	-0.026	6.65	0.020
172	27.888	27.478	0.16	0.16	1.35	81	2.03	1.04	83	1.30	87	0.058	99	98	28.0	-0.1	252	68	68	73	69	70	-0.026	6.31	0.010
173	28.050	27.636	0.16	0.16	1.34	81	2.02	1.05	83	1.30	87	0.058	99	98	27.9	-0.1	252	68	68	73	69	70	-0.026	6.34	0.010
174	28.212	27.796	0.16	0.16	1.34	81	2.03	1.05	83	1.30	88	0.058	99	99	27.9	0.0	252	68	68	73	69	70	-0.026	6.49	0.030
175	28.373	27.954	0.16	0.16	1.34	81	2.04	1.05	83	1.30	88	0.057	100	99	27.8	-0.1	253	68	68	73	69	71	-0.026	6.89	0.040
176	28.535	28.112	0.16	0.16	1.35	81	2.03	1.05	83	1.30	88	0.058	99	98	27.8	0.0	252	68	68	73	69	71	-0.026	6.44	0.030
177	28.697	28.272	0.16	0.16	1.35	81	2.04	1.05	83	1.30	88	0.058	99	99	27.7	-0.1	252	68	67	73	69	70	-0.025	6.31	0.030
178	28.859	28.429	0.16	0.16	1.34	81	2.04	1.05	83	1.30	88	0.058	99	97	27.6	-0.1	253	68	67	73	69	70	-0.026	6.22	0.020
179	29.020	28.589	0.16	0.16	1.33	81	2.03	1.09	83	1.30	88	0.058	99	99	27.6	0.0	253	68	67	73	69	70	-0.025	6.61	0.030
180	29.182	28.751	0.16	0.16	1.34	81	2.04	1.09	83	1.30	88	0.058	99	100	27.5	-0.1	253	68	67	73	69	71	-0.026	6.70	0.010
181	29.344	28.912	0.16	0.16	1.34	81	2.04	1.08	83	1.30	88	0.059	98	99	27.5	0.0	253	68	67	73	69	70	-0.025	6.70	0.010
182	29.506	29.073	0.16	0.16	1.34	81	2.04	1.08	83	1.30	88	0.057	100	101	27.4	-0.1	253	68	67	73	69	70	-0.025	6.94	0.010
183	29.667	29.236	0.16	0.16	1.35	81	2.04	1.08	83	1.30	88	0.058	99	101	27.3	-0.1	253	68	67	73	69	71	-0.025	6.70	0.020
184	29.829	29.397	0.16	0.16	1.35	81	2.04	1.08	83	1.30	88	0.058	99	100	27.3	0.0	253	68	67	73	69	71	-0.025	6.77	0.010
185	29.990	29.558	0.16	0.16	1.34	81	2.05	1.08	83	1.30	88	0.059	98	99	27.2	-0.1	254	68	67	73	69	71	-0.026	6.83	0.040
186	30.152	29.719	0.16	0.16	1.35	81	2.04	1.08	83	1.30	88	0.058	99	100	27.2	0.0	256	68	67	73	69	70	-0.026	6.58	0.050
187	30.314	29.881	0.16	0.16	1.35	81	2.03	1.08	83	1.30	88	0.058	99	100	27.1	-0.1	257	68	67	73	69	71	-0.026	6.57	0.040
188	30.475	30.042	0.16	0.16	1.35	81	2.04	1.08	83	1.30	88	0.058	99	100	27.1	0.0	258	68	67	73	69	71	-0.026	5.78	0.030
189	30.637	30.203	0.16	0.16	1.34	81	2.04	1.09	83	1.30	88	0.057	100	101	27.0	-0.1	258	68	67	73	69	71	-0.026	5.62	0.050
190	30.799	30.365	0.16	0.16	1.33	81	2.04	1.08	83	1.30	88	0.059	98	99	27.0	0.0	257	68	67	73	69	71	-0.026	5.10	0.030
191	30.960	30.526	0.16	0.16	1.34	81	2.04	1.08	83	1.30	88	0.059	98	99	27.0	0.0	256	68	67	73	69	72	-0.026	4.79	0.020
192	31.122	30.687	0.16	0.16	1.34	81	2.04	1.08	83	1.30	88	0.058	99	100	26.9	-0.1	256	68	67	73	69	70	-0.026	4.08	0.010
193	31.283	30.849	0.16	0.16	1.34	81	2.05	1.08	83	1.30	88	0.056	100	102	26.9	0.0	254	68	67	73	69	70	-0.026	4.20	0.010
194	31.445	31.010	0.16	0.16	1.34	81	2.04	1.08	83	1.30	88	0.058	99	100	26.8	-0.1	253	68	67	73	69	70	-0.025	3.90	0.030
195	31.606	31.172	0.16	0.16	1.34	81	2.05	1.08	83	1.30	87	0.058	100	100	26.8	0.0	251	68	67	73	69	70	-0.025	3.96	0.010

Pellet Heater Test Data - ASTM E2779 / ASTM E2515

Run: 1

Manufacturer: HHT Halifax
Model: P68-C
Tracking No.: 2338
Project No.: 0135PS013E.REV002
Test Date: 14-Jan-19
Beginning Clock Time: 09:49

High Burn End Time: 63
Medium Burn End Time: 183
Total Sampling Time: 363 min
Recording Interval: 1 min

Background Sample Volume: 0 cubic feet

Meter Box Y Factor: 0.997 (1) 0.985 (2) 0 (Amb)

Barometric Pressure:

Begin	Middle	End	Average
30.09	30.04	29.98	30.04 "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: -0.200 "H_2O
Tunnel Area: 0.1963 ft^2
Pitot Tube Cp: 0.99

Avg. Tunnel Velocity: 13.37 ft/sec.
Intial Tunnel Flow: 145.1 scfm
Average Tunnel Flow: 147.9 scfm
Post-Test Leak Check (1): 0.000 cfm @ 9 in. Hg
Post-Test Leak Check (2): 0.000 cfm @ 11 in. Hg
Fuel Moisture (%): 5.430 Dry Basis 5.150 Wet Basis

Velocity Traverse Data

	Pt.1	Pt.2	Pt.3	Pt.4	Pt.5	Pt.6	Pt.7	Pt.8	Center	
Initial dP	0.030	0.046	0.048	0.036	0.026	0.048	0.050	0.034	0.058	"H2O
Temp:	117	117	117	117	117	117	117	117	117	°F

V_{strav} 13.69 ft/sec V_{scent} 16.64 ft/sec F_p 0.823

	Particulate Sampling Data														Fuel Weight (lb)		Temperature Data (°F)						Stack Gas Data		
Elapsed Time (min)	Gas Meter 1 (ft^3)	Gas Meter 2 (ft^3)	Sample Rate 1 (cfm)	Sample Rate 2 (cfm)	Orifice dH 1 ("H_2O)	Meter Temp 1 (°F)	Meter Vacuum 1 ("Hg)	Orifice dH 2 ("H_2O)	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_2O)	CO_2 (%)	CO (%)
196	31.768	31.332	0.16	0.16	1.34	81	2.05	1.08	83	1.30	87	0.057	100	100	26.8	0.0	249	68	67	73	69	71	-0.025	3.79	0.010
197	31.929	31.493	0.16	0.16	1.33	81	2.04	1.08	83	1.30	87	0.058	99	100	26.8	0.0	246	68	67	73	69	70	-0.024	3.28	0.040
198	32.091	31.655	0.16	0.16	1.33	81	2.04	1.08	83	1.30	87	0.057	100	101	26.7	-0.1	244	68	67	73	69	71	-0.024	3.01	0.050
199	32.252	31.816	0.16	0.16	1.34	81	2.04	1.08	83	1.30	87	0.058	99	100	26.7	0.0	243	68	67	73	69	70	-0.023	3.04	0.040
200	32.414	31.977	0.16	0.16	1.34	81	2.05	1.08	83	1.30	87	0.057	100	100	26.7	0.0	241	68	67	73	69	70	-0.023	3.29	0.030
201	32.575	32.138	0.16	0.16	1.34	81	2.04	1.08	83	1.30	87	0.058	99	100	26.6	-0.1	240	68	67	73	69	70	-0.023	3.35	0.030
202	32.737	32.299	0.16	0.16	1.34	81	2.04	1.07	83	1.30	87	0.058	99	100	26.6	0.0	239	68	67	73	69	71	-0.023	3.52	0.040
203	32.898	32.460	0.16	0.16	1.34	81	2.05	1.08	83	1.30	86	0.058	99	99	26.6	0.0	238	68	67	73	69	70	-0.023	3.78	0.040
204	33.059	32.621	0.16	0.16	1.33	81	2.05	1.08	83	1.30	86	0.058	99	99	26.5	-0.1	237	68	67	73	69	71	-0.023	3.98	0.030
205	33.221	32.783	0.16	0.16	1.34	81	2.04	1.08	83	1.30	86	0.058	99	100	26.5	0.0	237	68	67	73	69	71	-0.023	3.92	0.020
206	33.382	32.943	0.16	0.16	1.33	81	2.05	1.07	83	1.30	86	0.058	99	99	26.4	-0.1	237	68	67	72	69	71	-0.023	4.21	0.030
207	33.544	33.104	0.16	0.16	1.34	81	2.05	1.08	83	1.30	86	0.057	100	100	26.4	0.0	237	68	67	72	69	71	-0.023	4.07	0.010
208	33.705	33.266	0.16	0.16	1.34	81	2.06	1.07	83	1.30	86	0.059	98	99	26.4	0.0	236	68	67	72	69	70	-0.022	4.22	0.020
209	33.866	33.427	0.16	0.16	1.34	81	2.05	1.07	83	1.30	86	0.057	99	100	26.3	-0.1	236	68	67	72	69	70	-0.023	4.27	0.020
210	34.028	33.587	0.16	0.16	1.33	81	2.05	1.08	83	1.30	86	0.058	99	99	26.3	0.0	235	68	67	72	69	70	-0.023	4.13	0.010
211	34.189	33.748	0.16	0.16	1.33	81	2.05	1.08	83	1.30	86	0.058	99	99	26.3	0.0	235	68	66	72	69	71	-0.023	4.13	0.010
212	34.350	33.910	0.16	0.16	1.33	81	2.06	1.08	83	1.30	86	0.057	99	101	26.2	-0.1	235	68	66	72	69	70	-0.023	4.34	0.020
213	34.511	34.070	0.16	0.16	1.33	81	2.06	1.07	83	1.30	86	0.058	99	99	26.2	0.0	236	68	66	72	69	70	-0.023	4.64	0.020
214	34.672	34.230	0.16	0.16	1.33	81	2.05	1.07	83	1.30	86	0.059	98	98	26.1	-0.1	236	68	66	72	69	70	-0.022	4.69	0.010
215	34.834	34.392	0.16	0.16	1.33	81	2.05	1.07	83	1.30	86	0.057	100	101	26.1	0.0	236	68	66	72	69	70	-0.023	4.49	0.010
216	34.995	34.552	0.16	0.16	1.34	81	2.05	1.07	83	1.30	86	0.059	98	98	26.0	-0.1	236	68	66	72	69	70	-0.023	4.78	0.010
217	35.156	34.712	0.16	0.16	1.33	81	2.06	1.08	83	1.30	86	0.057	99	100	26.0	0.0	236	68	66	72	69	70	-0.023	4.78	0.020
218	35.317	34.873	0.16	0.16	1.33	81	2.06	1.08	83	1.30	86	0.058	99	99	26.0	0.0	237	68	66	72	69	70	-0.022	4.36	0.010
219	35.478	35.034	0.16	0.16	1.33	81	2.06	1.07	83	1.30	86	0.058	99	99	25.9	-0.1	237	68	66	72	69	70	-0.023	4.61	0.020
220	35.639	35.195	0.16	0.16	1.33	81	2.06	1.07	83	1.30	86	0.056	100	101	25.9	0.0	237	68	66	72	69	70	-0.024	4.67	0.010
221	35.800	35.355	0.16	0.16	1.33	81	2.06	1.07	83	1.30	86	0.057	99	100	25.8	-0.1	238	68	66	72	69	70	-0.023	4.64	0.020
222	35.961	35.517	0.16	0.16	1.33	81	2.06	1.07	83	1.30	86	0.058	99	100	25.8	0.0	238	68	66	72	69	70	-0.023	4.82	0.030
223	36.122	35.677	0.16	0.16	1.33	81	2.07	1.07	83	1.30	86	0.058	99	99	25.7	-0.1	238	68	66	72	69	70	-0.023	4.94	0.020
224	36.283	35.837	0.16	0.16	1.34	81	2.06	1.08	83	1.30	86	0.059	98	98	25.7	0.0	238	68	66	72	69	70	-0.023	4.86	0.020
225	36.444	35.998	0.16	0.16	1.34	81	2.06	1.07	83	1.30	86	0.057	99	100	25.7	0.0	238	68	66	72	69	71	-0.023	4.91	0.010
226	36.605	36.159	0.16	0.16	1.33	81	2.06	1.07	83	1.30	86	0.058	99	99	25.6	-0.1	238	68	66	72	68	70	-0.023	4.59	0.010
227	36.766	36.319	0.16	0.16	1.33	81	2.06	1.08	83	1.30	86	0.058	99	99	25.6	0.0	239	68	66	72	69	70	-0.023	4.42	0.010
228	36.927	36.480	0.16	0.16	1.33	81	2.07	1.07	83	1.30	86	0.058	99	99	25.5	-0.1	238	68	66	72	69	70	-0.023	4.65	0.010
229	37.088	36.640	0.16	0.16	1.34	81	2.07	1.07	83	1.30	86	0.058	99	99	25.5	0.0	239	68	66	72	68	70	-0.023	4.77	0.010
230	37.249	36.801	0.16	0.16	1.33	81	2.06	1.07	83	1.30	86	0.058	99	99	25.4	-0.1	239	68	66	72	68	70	-0.023	5.14	0.010
231	37.410	36.961	0.16	0.16	1.33	81	2.07	1.07	83	1.30	86	0.058	99	99	25.4	0.0	239	68	66	72	68	70	-0.024	5.04	0.000
232	37.571	37.122	0.16	0.16	1.33	81	2.07	1.07	83	1.30	86	0.058	99	99	25.4	0.0	240	68	66	72	68	70	-0.023	4.87	0.010
233	37.732	37.282	0.16	0.16	1.33	81	2.06	1.07	83	1.30	86	0.058	99	99	25.3	-0.1	240	68	66	72	68	70	-0.023	4.90	0.000
234	37.893	37.442	0.16	0.16	1.34	81	2.07	1.07	83	1.30	86	0.058	99	99	25.3	0.0	240	68	66	72	68	70	-0.023	5.03	0.000
235	38.053	37.603	0.16	0.16	1.33	81	2.07	1.07	83	1.30	86	0.058	98	99	25.2	-0.1	240	68	66	72	68	69	-0.023	5.08	0.000
236	38.214	37.763	0.16	0.16	1.33	81	2.06	1.07	83	1.30	86	0.056	100	101	25.2	0.0	240	68	66	72	68	70	-0.023	4.95	0.010
237	38.375	37.923	0.16	0.16	1.33	81	2.06	1.07	83	1.30	86	0.058	99	99	25.1	-0.1	239	68	66	72	68	70	-0.023	4.80	0.010
238	38.536	38.084	0.16	0.16	1.33	81	2.07	1.06	83	1.30	86	0.058	99	99	25.1	0.0	240	68	66	72	68	70	-0.023	4.74	0.010
239	38.697	38.244	0.16	0.16	1.33	81	2.08	1.06	83	1.30	86	0.058	99	99	25.0	-0.1	241	68	66	72	68	69	-0.024	5.26	0.010
240	38.858	38.404	0.16	0.16	1.34	81	2.08	1.07	83	1.30	86	0.057	99	100	25.0	0.0	242	68	66	72	68	71	-0.023	4.81	0.010
241	39.019	38.565	0.16	0.16	1.33	81	2.08	1.07	83	1.30	86	0.056	100	101	24.9	-0.1	242	68	66	72	68	70	-0.024	5.10	0.000
242	39.180	38.725	0.16	0.16	1.33	81	2.07	1.07	83	1.30	86	0.058	99	99	24.9	0.0	243	68	66	72	68	70	-0.024	5.06	0.010
243	39.341	38.884	0.16	0.16	1.33	81	2.08	1.07	83	1.30	86	0.058	99	98	24.9	0.0	243	68	66	72	68	70	-0.024	4.82	0.030
244	39.502	39.045	0.16	0.16	1.33	81	2.07	1.07	83	1.30	86	0.058	99	99	24.8	-0.1	242	68	66	72	68	70	-0.024	4.36	0.030

Pellet Heater Test Data - ASTM E2779 / ASTM E2515

Run: 1

Manufacturer: HHT Halifax
Model: P68-C
Tracking No.: 2338
Project No.: 0135PS013E.REV002
Test Date: 14-Jan-19
Beginning Clock Time: 09:49

High Burn End Time: 63
Medium Burn End Time: 183
Total Sampling Time: 363 min
Recording Interval: 1 min
Background Sample Volume: 0 cubic feet

Meter Box Y Factor: 0.997 (1) 0.985 (2) 0 (Amb)

Barometric Pressure:

Begin	Middle	End	Average
30.09	30.04	29.98	30.04 "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: -0.200 "H_2O
Tunnel Area: 0.1963 ft^2
Pitot Tube Cp: 0.99

Avg. Tunnel Velocity: 13.37 ft/sec.
Intial Tunnel Flow: 145.1 scfm
Average Tunnel Flow: 147.9 scfm
Post-Test Leak Check (1): 0.000 cfm @ 9 in. Hg
Post-Test Leak Check (2): 0.000 cfm @ 11 in. Hg
Fuel Moisture (%): 5.430 Dry Basis 5.150 Wet Basis

Velocity Traverse Data

	Pt.1	Pt.2	Pt.3	Pt.4	Pt.5	Pt.6	Pt.7	Pt.8	Center	
Initial dP	0.030	0.046	0.048	0.036	0.026	0.048	0.050	0.034	0.058	"H2O
Temp:	117	117	117	117	117	117	117	117	117	°F

V_{strav} 13.69 ft/sec V_{scent} 16.64 ft/sec F_p 0.823

	Particulate Sampling Data														Fuel Weight (lb)		Temperature Data (°F)						Stack Gas Data		
Elapsed Time (min)	Gas Meter 1 (ft^3)	Gas Meter 2 (ft^3)	Sample Rate 1 (cfm)	Sample Rate 2 (cfm)	Orifice dH 1 ("H_2O)	Meter Temp 1 (°F)	Meter Vacuum 1 ("Hg)	Orifice dH 2 ("H_2O)	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_2O)	CO_2 (%)	CO (%)
245	39.662	39.205	0.16	0.16	1.33	81	2.07	1.06	83	1.30	87	0.058	98	99	24.8	0.0	242	68	66	72	68	70	-0.023	4.24	0.030
246	39.823	39.365	0.16	0.16	1.33	81	2.08	1.07	83	1.30	87	0.058	99	99	24.8	0.0	240	68	66	72	68	70	-0.023	3.92	0.030
247	39.983	39.525	0.16	0.16	1.32	81	2.08	1.07	83	1.30	86	0.058	98	99	24.7	-0.1	239	68	66	72	68	71	-0.023	3.90	0.010
248	40.144	39.686	0.16	0.16	1.32	81	2.07	1.06	83	1.30	86	0.058	99	99	24.7	0.0	238	68	66	72	68	70	-0.023	3.52	0.030
249	40.305	39.845	0.16	0.16	1.32	81	2.08	1.06	83	1.30	86	0.057	99	99	24.6	-0.1	238	68	66	72	68	71	-0.023	3.91	0.030
250	40.465	40.005	0.16	0.16	1.32	81	2.08	1.06	83	1.30	86	0.057	99	100	24.6	0.0	237	68	66	72	68	70	-0.023	4.23	0.020
251	40.626	40.166	0.16	0.16	1.32	81	2.08	1.06	83	1.30	86	0.056	100	101	24.6	0.0	237	68	66	72	68	70	-0.023	4.00	0.010
252	40.786	40.326	0.16	0.16	1.32	81	2.08	1.06	83	1.30	86	0.057	99	100	24.5	-0.1	237	68	66	72	68	70	-0.023	4.35	0.010
253	40.947	40.485	0.16	0.16	1.32	81	2.07	1.06	83	1.30	86	0.057	99	99	24.5	0.0	236	68	66	72	68	70	-0.023	4.21	0.010
254	41.107	40.646	0.16	0.16	1.32	81	2.08	1.06	83	1.30	86	0.057	99	100	24.5	0.0	237	68	66	72	68	70	-0.022	4.25	0.010
255	41.268	40.806	0.16	0.16	1.32	81	2.07	1.06	83	1.30	86	0.058	99	99	24.4	-0.1	236	68	66	72	68	70	-0.023	4.45	0.010
256	41.428	40.965	0.16	0.16	1.32	81	2.08	1.06	83	1.30	86	0.057	99	99	24.4	0.0	236	68	66	72	68	70	-0.023	4.34	0.010
257	41.589	41.126	0.16	0.16	1.33	81	2.08	1.06	83	1.30	86	0.057	99	100	24.3	-0.1	235	68	65	72	68	70	-0.023	4.46	0.000
258	41.749	41.285	0.16	0.16	1.33	81	2.09	1.06	83	1.30	86	0.058	98	98	24.3	0.0	235	68	65	72	68	70	-0.023	4.58	0.010
259	41.910	41.445	0.16	0.16	1.32	81	2.08	1.06	83	1.30	86	0.057	99	100	24.3	0.0	235	68	65	72	68	69	-0.023	4.26	0.010
260	42.071	41.606	0.16	0.16	1.33	81	2.08	1.06	83	1.30	86	0.058	99	99	24.2	-0.1	235	68	65	72	68	70	-0.023	4.46	0.010
261	42.231	41.765	0.16	0.16	1.32	81	2.09	1.06	83	1.30	86	0.059	97	97	24.2	0.0	236	68	65	72	68	69	-0.023	4.53	0.010
262	42.391	41.925	0.16	0.16	1.32	81	2.09	1.06	83	1.30	86	0.057	99	100	24.1	-0.1	236	68	65	72	68	70	-0.023	5.11	0.010
263	42.552	42.085	0.16	0.16	1.33	81	2.08	1.06	83	1.30	86	0.058	99	99	24.1	0.0	237	68	65	72	68	70	-0.023	4.80	0.000
264	42.713	42.244	0.16	0.16	1.33	81	2.08	1.05	83	1.30	86	0.058	99	98	24.0	-0.1	237	68	65	72	68	71	-0.023	5.02	0.010
265	42.873	42.404	0.16	0.16	1.33	81	2.08	1.06	83	1.30	86	0.057	99	100	24.0	0.0	237	68	65	72	68	70	-0.023	4.88	0.000
266	43.034	42.564	0.16	0.16	1.32	81	2.09	1.06	83	1.30	86	0.059	98	98	23.9	-0.1	238	68	65	72	68	70	-0.023	4.89	0.010
267	43.194	42.724	0.16	0.16	1.33	81	2.08	1.06	83	1.40	86	0.058	98	99	23.9	0.0	239	68	65	72	68	70	-0.024	4.88	0.010
268	43.354	42.883	0.16	0.16	1.32	81	2.08	1.06	83	1.40	86	0.058	98	98	23.8	-0.1	239	68	65	72	68	71	-0.023	4.93	0.010
269	43.515	43.044	0.16	0.16	1.31	81	2.09	1.05	83	1.30	86	0.057	99	100	23.8	0.0	240	68	65	72	68	71	-0.024	5.08	0.010
270	43.675	43.202	0.16	0.16	1.32	81	2.10	1.06	83	1.30	86	0.058	98	98	23.8	0.0	239	68	65	72	68	70	-0.023	4.84	0.010
271	43.835	43.362	0.16	0.16	1.32	81	2.09	1.06	83	1.40	86	0.057	99	100	23.7	-0.1	239	68	65	72	68	70	-0.023	4.74	0.010
272	43.995	43.522	0.16	0.16	1.32	81	2.09	1.05	83	1.40	86	0.059	97	98	23.7	0.0	239	68	65	72	68	70	-0.023	4.79	0.010
273	44.155	43.681	0.16	0.16	1.32	81	2.10	1.06	83	1.30	86	0.058	98	98	23.6	-0.1	239	68	65	72	68	70	-0.023	4.78	0.010
274	44.316	43.841	0.16	0.16	1.32	81	2.10	1.06	83	1.40	86	0.058	99	99	23.6	0.0	240	68	65	72	68	70	-0.023	5.00	0.010
275	44.476	44.001	0.16	0.16	1.32	81	2.09	1.05	83	1.30	86	0.058	98	99	23.5	-0.1	240	68	65	72	68	71	-0.023	5.03	0.010
276	44.636	44.160	0.16	0.16	1.32	81	2.09	1.06	83	1.30	86	0.057	99	99	23.5	0.0	240	68	65	72	68	70	-0.023	4.86	0.010
277	44.796	44.320	0.16	0.16	1.32	81	2.10	1.05	83	1.40	86	0.058	98	99	23.4	-0.1	241	68	65	72	68	70	-0.024	4.85	0.010
278	44.956	44.479	0.16	0.16	1.32	81	2.10	1.06	83	1.40	86	0.057	99	99	23.4	0.0	241	68	65	72	68	71	-0.023	5.01	0.010
279	45.117	44.638	0.16	0.16	1.32	81	2.10	1.06	83	1.40	86	0.059	98	97	23.4	0.0	240	68	65	72	68	70	-0.023	4.73	0.010
280	45.277	44.799	0.16	0.16	1.32	81	2.10	1.05	83	1.40	86	0.057	99	100	23.3	-0.1	239	68	65	72	68	70	-0.023	4.16	0.020
281	45.437	44.958	0.16	0.16	1.32	81	2.09	1.05	83	1.40	86	0.059	97	97	23.3	0.0	239	68	65	72	68	70	-0.023	4.04	0.020
282	45.597	45.117	0.16	0.16	1.32	81	2.10	1.05	83	1.30	86	0.058	98	98	23.3	0.0	237	68	65	72	68	69	-0.023	3.99	0.030
283	45.758	45.277	0.16	0.16	1.32	81	2.10	1.06	83	1.40	86	0.057	99	100	23.2	-0.1	237	68	65	72	68	70	-0.023	3.73	0.040
284	45.918	45.435	0.16	0.16	1.31	81	2.10	1.05	83	1.40	86	0.057	99	98	23.2	0.0	237	68	65	72	68	70	-0.023	4.09	0.020
285	46.078	45.595	0.16	0.16	1.32	81	2.10	1.05	83	1.40	86	0.058	98	99	23.2	0.0	236	68	65	72	68	70	-0.023	4.32	0.020
286	46.238	45.755	0.16	0.16	1.31	81	2.10	1.05	83	1.40	86	0.057	99	100	23.1	-0.1	236	68	65	72	68	70	-0.022	4.25	0.010
287	46.398	45.914	0.16	0.16	1.31	81	2.10	1.05	83	1.40	86	0.058	98	98	23.1	0.0	235	68	65	72	68	70	-0.023	4.29	0.020
288	46.558	46.073	0.16	0.16	1.31	81	2.10	1.06	83	1.40	86	0.058	98	98	23.0	-0.1	236	68	65	72	68	70	-0.023	4.50	0.010
289	46.718	46.233	0.16	0.16	1.31	81	2.11	1.05	83	1.40	86	0.057	99	100	23.0	0.0	235	68	65	72	68	69	-0.023	4.86	0.010
290	46.878	46.391	0.16	0.16	1.31	81	2.11	1.05	83	1.40	86	0.058	98	98	22.9	-0.1	236	68	65	72	68	69	-0.023	4.67	0.000
291	47.038	46.551	0.16	0.16	1.32	81	2.11	1.05	83	1.40	86	0.059	97	98	22.9	0.0	236	68	65	72	68	69	-0.023	4.60	0.000
292	47.198	46.710	0.16	0.16	1.31	81	2.10	1.05	83	1.40	86	0.058	98	98	22.9	0.0	236	68	65	72	68	69	-0.023	4.79	0.000
293	47.358	46.869	0.16	0.16	1.32	81	2.10	1.05	83	1.40	86	0.057	97	97	22.8	-0.1	236	68	65	72	68	70	-0.022	4.56	0.000

Pellet Heater Test Data - ASTM E2779 / ASTM E2515

Run: 1

Manufacturer: HHT Halifax
Model: P68-C
Tracking No.: 2338
Project No.: 0135PS013E.REV002
Test Date: 14-Jan-19
Beginning Clock Time: 09:49

High Burn End Time: 63
Medium Burn End Time: 183
Total Sampling Time: 363 min
Recording Interval: 1 min

Background Sample Volume: 0 cubic feet

Meter Box Y Factor: 0.997 (1) 0.985 (2) 0 (Amb)

Barometric Pressure:

Begin	Middle	End	Average
30.09	30.04	29.98	30.04 "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: -0.200 "H_2O
Tunnel Area: 0.1963 ft^2
Pitot Tube Cp: 0.99

Avg. Tunnel Velocity: 13.37 ft/sec.
Intial Tunnel Flow: 145.1 scfm
Average Tunnel Flow: 147.9 scfm
Post-Test Leak Check (1): 0.000 cfm @ 9 in. Hg
Post-Test Leak Check (2): 0.000 cfm @ 11 in. Hg
Fuel Moisture (%): 5.430 Dry Basis 5.150 Wet Basis

Velocity Traverse Data

	Pt.1	Pt.2	Pt.3	Pt.4	Pt.5	Pt.6	Pt.7	Pt.8	Center	
Initial dP	0.030	0.046	0.048	0.036	0.026	0.048	0.050	0.034	0.058	"H2O
Temp:	117	117	117	117	117	117	117	117	117	°F

V_{strav} 13.69 ft/sec V_{scent} 16.64 ft/sec F_p 0.823

	Particulate Sampling Data														Fuel Weight (lb)		Temperature Data (°F)						Stack Gas Data		
Elapsed Time (min)	Gas Meter 1 (ft^3)	Gas Meter 2 (ft^3)	Sample Rate 1 (cfm)	Sample Rate 2 (cfm)	Orifice dH 1 ("H_2O)	Meter Temp 1 (°F)	Meter Vacuum 1 ("Hg)	Orifice dH 2 ("H_2O)	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_2O)	CO_2 (%)	CO (%)
294	47.518	47.029	0.16	0.16	1.32	81	2.11	1.05	83	1.40	86	0.057	99	100	22.8	0.0	235	68	65	72	68	69	-0.023	4.58	0.000
295	47.677	47.187	0.16	0.16	1.32	81	2.11	1.05	83	1.40	86	0.058	97	98	22.7	-0.1	235	68	65	72	68	70	-0.023	4.56	0.010
296	47.837	47.347	0.16	0.16	1.31	81	2.10	1.05	83	1.40	86	0.058	98	99	22.7	0.0	235	68	65	72	68	70	-0.023	4.51	0.000
297	47.998	47.506	0.16	0.16	1.32	81	2.10	1.05	83	1.40	86	0.057	99	99	22.7	0.0	235	68	65	72	68	69	-0.023	4.48	0.000
298	48.158	47.665	0.16	0.16	1.31	81	2.10	1.05	83	1.40	86	0.058	98	98	22.6	-0.1	235	68	65	72	68	70	-0.022	4.34	0.000
299	48.318	47.824	0.16	0.16	1.31	81	2.11	1.05	83	1.40	86	0.057	99	99	22.6	0.0	235	68	65	72	68	69	-0.023	4.60	0.000
300	48.478	47.983	0.16	0.16	1.32	81	2.11	1.05	83	1.40	86	0.057	99	99	22.5	-0.1	235	68	65	72	68	70	-0.023	4.42	0.000
301	48.638	48.142	0.16	0.16	1.31	81	2.11	1.05	83	1.40	86	0.058	98	98	22.5	0.0	235	68	65	72	68	70	-0.023	4.60	0.000
302	48.797	48.301	0.16	0.16	1.31	81	2.12	1.05	83	1.40	86	0.058	97	98	22.4	-0.1	236	68	65	72	68	70	-0.023	4.93	0.010
303	48.957	48.460	0.16	0.16	1.30	81	2.11	1.05	83	1.40	86	0.057	99	99	22.4	0.0	236	68	65	72	68	71	-0.023	5.04	0.010
304	49.116	48.619	0.16	0.16	1.31	81	2.11	1.05	83	1.40	86	0.057	98	99	22.4	0.0	236	68	65	72	68	70	-0.023	4.54	0.000
305	49.276	48.779	0.16	0.16	1.31	81	2.11	1.05	83	1.40	86	0.058	98	99	22.3	-0.1	237	68	65	72	68	70	-0.024	4.76	0.000
306	49.436	48.937	0.16	0.16	1.31	81	2.11	1.05	83	1.40	86	0.059	97	97	22.3	0.0	238	68	65	72	68	70	-0.023	5.13	0.000
307	49.595	49.095	0.16	0.16	1.32	81	2.11	1.05	83	1.40	86	0.058	97	98	22.2	-0.1	238	68	65	72	68	70	-0.023	5.13	0.010
308	49.755	49.255	0.16	0.16	1.31	81	2.12	1.05	83	1.40	86	0.059	97	98	22.2	0.0	237	68	65	72	68	70	-0.023	5.03	0.010
309	49.915	49.413	0.16	0.16	1.30	81	2.11	1.04	83	1.40	86	0.057	99	98	22.1	-0.1	237	68	65	72	68	71	-0.023	4.70	0.010
310	50.075	49.572	0.16	0.16	1.31	81	2.11	1.05	83	1.40	86	0.058	98	98	22.1	0.0	238	68	65	72	68	70	-0.023	4.81	0.010
311	50.235	49.731	0.16	0.16	1.31	81	2.11	1.04	83	1.40	86	0.059	97	97	22.0	-0.1	238	68	65	72	68	70	-0.024	4.87	0.000
312	50.394	49.890	0.16	0.16	1.31	81	2.11	1.05	83	1.40	86	0.057	98	99	22.0	0.0	238	68	65	72	68	69	-0.024	4.78	0.000
313	50.554	50.049	0.16	0.16	1.31	81	2.12	1.05	83	1.40	86	0.059	97	97	21.9	-0.1	239	68	65	72	68	70	-0.023	5.10	0.010
314	50.714	50.207	0.16	0.16	1.30	81	2.12	1.05	83	1.40	86	0.058	98	98	21.9	0.0	239	68	65	72	68	70	-0.024	5.26	0.010
315	50.873	50.366	0.16	0.16	1.30	81	2.11	1.05	83	1.40	86	0.059	96	97	21.9	0.0	239	68	65	72	68	70	-0.024	4.97	0.010
316	51.032	50.525	0.16	0.16	1.31	81	2.12	1.05	83	1.40	86	0.060	96	97	21.8	-0.1	238	68	65	72	68	70	-0.023	4.65	0.010
317	51.192	50.683	0.16	0.16	1.30	81	2.12	1.05	83	1.40	85	0.057	99	98	21.8	0.0	237	68	65	72	68	68	-0.025	4.30	0.020
318	51.351	50.843	0.16	0.16	1.31	81	2.11	1.05	83	1.40	84	0.059	96	98	21.7	-0.1	237	68	65	72	68	67	-0.024	4.57	0.010
319	51.511	51.002	0.16	0.16	1.31	81	2.11	1.04	83	1.40	84	0.059	97	97	21.7	0.0	236	68	65	72	68	68	-0.024	4.74	0.000
320	51.674	51.162	0.16	0.16	1.39	81	2.21	1.10	83	1.40	84	0.059	99	98	21.7	0.0	236	68	65	72	68	68	-0.023	4.58	0.000
321	51.838	51.324	0.16	0.16	1.38	81	2.22	1.10	83	1.40	84	0.059	99	99	21.6	-0.1	235	68	65	72	68	68	-0.024	4.80	0.000
322	52.002	51.488	0.16	0.16	1.38	81	2.22	1.10	82	1.40	85	0.059	99	101	21.6	0.0	236	68	65	71	68	68	-0.023	4.98	0.000
323	52.167	51.650	0.16	0.16	1.38	81	2.21	1.09	82	1.40	85	0.059	100	99	21.5	-0.1	236	68	65	71	68	68	-0.023	5.07	0.000
324	52.331	51.813	0.16	0.16	1.38	81	2.22	1.10	82	1.40	85	0.057	101	102	21.5	0.0	236	68	65	71	68	68	-0.024	4.97	0.000
325	52.496	51.975	0.16	0.16	1.39	81	2.22	1.10	82	1.40	85	0.058	101	100	21.4	-0.1	236	68	65	71	68	69	-0.023	4.95	0.000
326	52.659	52.138	0.16	0.16	1.39	81	2.22	1.10	82	1.40	85	0.058	100	101	21.4	0.0	236	68	65	71	68	69	-0.023	4.72	0.000
327	52.823	52.302	0.16	0.16	1.39	81	2.21	1.10	82	1.40	85	0.059	99	101	21.3	-0.1	236	68	65	71	68	68	-0.024	4.90	0.000
328	52.987	52.463	0.16	0.16	1.39	81	2.21	1.09	82	1.40	85	0.057	101	100	21.3	0.0	236	68	65	71	68	69	-0.023	4.47	0.000
329	53.151	52.626	0.16	0.16	1.39	81	2.22	1.10	82	1.40	85	0.057	101	102	21.3	0.0	235	68	65	71	68	69	-0.023	4.64	0.000
330	53.315	52.788	0.16	0.16	1.38	81	2.23	1.10	82	1.40	85	0.059	99	99	21.2	-0.1	235	68	65	71	68	69	-0.023	4.49	0.000
331	53.479	52.952	0.16	0.16	1.39	81	2.23	1.10	82	1.40	85	0.057	101	102	21.2	0.0	235	68	65	71	68	69	-0.024	4.75	0.000
332	53.644	53.114	0.16	0.16	1.38	81	2.22	1.09	82	1.40	85	0.058	101	100	21.1	-0.1	235	68	65	71	68	69	-0.023	4.99	0.000
333	53.808	53.276	0.16	0.16	1.38	81	2.23	1.10	82	1.40	85	0.057	101	101	21.1	0.0	236	68	65	71	68	69	-0.023	4.88	0.000
334	53.972	53.439	0.16	0.16	1.38	81	2.23	1.10	82	1.40	85	0.059	99	100	21.0	-0.1	236	68	65	71	68	69	-0.023	5.10	0.000
335	54.136	53.602	0.16	0.16	1.38	81	2.23	1.10	82	1.40	85	0.057	101	102	21.0	0.0	236	68	65	71	68	69	-0.023	4.91	0.010
336	54.299	53.764	0.16	0.16	1.39	81	2.23	1.10	82	1.40	85	0.058	100	100	21.0	0.0	237	68	65	71	68	69	-0.023	4.94	0.010
337	54.463	53.926	0.16	0.16	1.38	81	2.22	1.09	82	1.40	85	0.057	101	101	20.9	-0.1	238	68	65	71	68	69	-0.023	4.95	0.010
338	54.627	54.088	0.16	0.16	1.38	81	2.23	1.10	82	1.40	86	0.059	100	99	20.9	0.0	238	68	65	71	68	69	-0.024	4.81	0.000
339	54.790	54.251	0.16	0.16	1.38	81	2.22	1.10	82	1.40	86	0.059	99	100	20.8	-0.1	238	68	65	71	68	70	-0.024	5.08	0.000
340	54.954	54.414	0.16	0.16	1.38	81	2.23	1.10	82	1.40	86	0.058	100	101	20.8	0.0	238	68	65	72	68	70	-0.023	5.11	0.020
341	55.118	54.576	0.16	0.16	1.37	81	2.23	1.09	82	1.40	86	0.058	100	100	20.7	-0.1	239	68	65	72	68	69	-0.023	4.86	0.030
342	55.283	54.738	0.16	0.16	1.38	81	2.23	1.09	82	1.40	86	0.059	100	100	20.7	0.0	239	68	65	72	68	69	-0.024	5.06	0.010

Pellet Heater Test Data - ASTM E2779 / ASTM E2515

Run: 1

Manufacturer: HHT Halifax
Model: P68-C
Tracking No.: 2338
Project No.: 0135PS013E.REV002
Test Date: 14-Jan-19
Beginning Clock Time: 09:49

High Burn End Time: 63
Medium Burn End Time: 183
Total Sampling Time: 363 min
Recording Interval: 1 min
Background Sample Volume: 0 cubic feet

Meter Box Y Factor: 0.997 (1) 0.985 (2) 0 (Amb)

Barometric Pressure:

Begin	Middle	End	Average
30.09	30.04	29.98	30.04 "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: -0.200 "H_2O
Tunnel Area: 0.1963 ft^2
Pitot Tube Cp: 0.99

Avg. Tunnel Velocity: 13.37 ft/sec.
Intial Tunnel Flow: 145.1 scfm
Average Tunnel Flow: 147.9 scfm
Post-Test Leak Check (1): 0.000 cfm @ 9 in. Hg
Post-Test Leak Check (2): 0.000 cfm @ 11 in. Hg
Fuel Moisture (%): 5.430 Dry Basis 5.150 Wet Basis

Velocity Traverse Data

	Pt.1	Pt.2	Pt.3	Pt.4	Pt.5	Pt.6	Pt.7	Pt.8	Center	
Initial dP	0.030	0.046	0.048	0.036	0.026	0.048	0.050	0.034	0.058	"H2O
Temp:	117	117	117	117	117	117	117	117	117	°F

V_{strav} 13.69 ft/sec V_{scent} 16.64 ft/sec F_p 0.823

	Particulate Sampling Data														Fuel Weight (lb)		Temperature Data (°F)						Stack Gas Data		
Elapsed Time (min)	Gas Meter 1 (ft^3)	Gas Meter 2 (ft^3)	Sample Rate 1 (cfm)	Sample Rate 2 (cfm)	Orifice dH 1 ("H_2O)	Meter Temp 1 (°F)	Meter Vacuum 1 ("Hg)	Orifice dH 2 ("H_2O)	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_2O)	CO_2 (%)	CO (%)
343	55.446	54.900	0.16	0.16	1.37	81	2.23	1.09	82	1.40	86	0.058	100	100	20.6	-0.1	240	68	65	72	68	69	-0.024	5.10	0.050
344	55.610	55.063	0.16	0.16	1.38	81	2.23	1.09	82	1.40	86	0.057	101	102	20.6	0.0	239	68	65	72	68	69	-0.024	5.22	0.050
345	55.774	55.225	0.16	0.16	1.37	81	2.24	1.09	82	1.40	86	0.057	101	101	20.6	0.0	240	68	65	72	68	69	-0.023	5.17	0.010
346	55.937	55.387	0.16	0.16	1.39	81	2.23	1.09	82	1.40	86	0.058	100	100	20.5	-0.1	240	68	65	72	68	69	-0.024	4.95	0.020
347	56.100	55.549	0.16	0.16	1.38	81	2.23	1.09	82	1.40	86	0.058	100	100	20.5	0.0	240	68	65	72	68	69	-0.024	4.91	0.020
348	56.264	55.711	0.16	0.16	1.38	81	2.23	1.09	82	1.40	86	0.058	100	100	20.4	-0.1	241	68	65	72	67	69	-0.024	4.86	0.040
349	56.428	55.874	0.16	0.16	1.38	81	2.23	1.09	82	1.40	86	0.057	101	102	20.4	0.0	241	68	65	72	68	69	-0.024	5.00	0.060
350	56.591	56.035	0.16	0.16	1.38	81	2.23	1.09	82	1.40	86	0.059	99	99	20.3	-0.1	241	68	65	72	68	69	-0.024	4.95	0.010
351	56.755	56.197	0.16	0.16	1.38	81	2.23	1.09	82	1.40	86	0.057	101	101	20.3	0.0	240	68	65	72	68	69	-0.023	4.67	0.010
352	56.918	56.359	0.16	0.16	1.37	81	2.23	1.09	82	1.40	86	0.058	100	100	20.3	0.0	240	68	65	72	68	69	-0.024	4.58	0.020
353	57.082	56.522	0.16	0.16	1.37	81	2.23	1.09	82	1.40	86	0.057	101	102	20.2	-0.1	240	68	65	72	68	69	-0.024	4.43	0.020
354	57.246	56.683	0.16	0.16	1.37	81	2.23	1.09	82	1.40	86	0.058	100	100	20.2	0.0	239	68	65	72	67	69	-0.024	4.51	0.030
355	57.409	56.845	0.16	0.16	1.37	81	2.23	1.09	82	1.40	86	0.059	99	99	20.1	-0.1	238	68	65	72	67	70	-0.024	4.29	0.060
356	57.573	57.007	0.16	0.16	1.39	81	2.24	1.10	82	1.50	86	0.059	100	99	20.1	0.0	238	68	65	72	68	69	-0.023	4.54	0.040
357	57.736	57.169	0.16	0.16	1.38	81	2.25	1.09	82	1.40	86	0.058	100	100	20.0	-0.1	238	68	65	72	68	70	-0.024	4.50	0.060
358	57.899	57.331	0.16	0.16	1.38	81	2.23	1.09	82	1.50	85	0.059	99	99	20.0	0.0	237	68	65	72	68	69	-0.024	4.49	0.040
359	58.062	57.492	0.16	0.16	1.38	81	2.24	1.09	82	1.40	85	0.058	100	100	20.0	0.0	237	68	65	72	68	68	-0.024	4.28	0.040
360	58.226	57.654	0.16	0.16	1.38	81	2.24	1.09	82	1.50	85	0.059	99	99	19.9	-0.1	237	68	65	72	68	68	-0.024	4.74	0.030
361	58.389	57.817	0.16	0.16	1.37	81	2.24	1.09	82	1.40	85	0.059	99	100	19.9	0.0	237	68	65	71	68	68	-0.023	4.81	0.010
362	58.553	57.978	0.16	0.16	1.37	81	2.25	1.09	82	1.40	85	0.058	100	100	19.8	-0.1	237	68	65	71	68	68	-0.023	4.88	0.010
363	58.716	58.140	0.16	0.16	1.37	81	2.25	1.09	82	1.40	85	0.060	98	99	19.8	0.0	237	68	65	71	68	68	-0.024	5.01	0.010
Avg/Tot	58.716	58.140	0.16	0.16	1.34	81	2.05	1.07	83	1.28	93	0.06	100	100			284	68	69	74	70	71	-0.028	6.38	0.036

Pellet Heater Lab Data - ASTM E2779 / ASTM E2515

Manufacturer:	HHT Halifax	Equipment Numbers:	283A, 592, 637
Model:	P68-C		
Tracking No.:	2338		
Project No.:	0135PS013E.REV002		
Run #:	1	Technician Signature:	
Date:	1/14/19		

TRAIN 1 (First Hour emissions)

Sample Component	Reagent	Filter, Probe or Seal #	Mass Readings Tare, mg	Final, mg	Particulate, mg
A. Front filter catch	Filter	D638	121.3	124.6	3.3
B. Rear filter catch	Filter				0.0
C. Probe catch*	Probe				0.0
D. Filter seals catch*	Seals				0.0
				1st hour Sub-Total, mg:	3.3

TRAIN 1 (Remainder of Test)

Sample Component	Reagent	Filter, Probe or Seal #	Mass Readings Tare, mg	Final, mg	Particulate, mg
A. Front filter catch	Filter	D643	122.0	247.1	125.1
B. Rear filter catch	Filter	D640	121.1		-121.1
C. Probe catch*	Probe	13	114322.1	114322.2	0.1
D. Filter seals catch*	Seals	R709	3413.9	3414.7	0.8
				Remainder Sub-Total, mg:	4.9
				Train 1 Aggregate, mg:	8.2

TRAIN 2

Sample Component	Reagent	Filter, Probe or Seal #	Mass Readings Tare, mg	Final, mg	Particulate, mg
A. Front filter catch	Filter	D641	121.1	251.4	130.3
B. Rear filter catch	Filter	D642	121.5		-121.5
C. Probe catch*	Probe	15.0	114341.7	114341.8	0.1
D. Filter seals catch*	Seals	R710	3347.4	3347.9	0.5
				Train 2 Aggregate, mg:	9.4

AMBIENT

Sample Component	Reagent	Filter, Probe or Seal #	Mass Readings Tare, mg	Final, mg	Particulate, mg
A. Front filter catch*	Filter				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.

OMNI-Test Laboratories, Inc.

Pellet Heater Certification Run Sheets

Client: **HHT Halifax** Project Number: **0135PS013E.REV002** Run Number: **1**

Model: **P68-C** Tracking Number: 2378 Date: **1/14/19**

Test Crew: **Aaron Kravitz**

OMNI Equipment ID numbers: **132, 185, 283A, 335, 336, 229, 592, 637, 650**

ASTM E2779 Run Notes

Air Control Settings

High Burn Rate Target: 100%

Settings: Temp = 7.0

Feed Limit = 47.5

Mode = Max

Medium Burn Rate Target: <50%

Settings: Temp = 7.0

Feed Limit = 47.5

Mode = Med Low

Low Burn Rate Target: Minimum

Settings: Temp = 1.0

Feed Limit = 12.5

Mode = Low

Additional Settings Notes:

None

Pellet Moisture Content: 5.15% WB

Pellet Specifications: Energex Premium Mill 16012

Pellet Analysis Notes: W218-0922-01

Preburn Notes

Time	Notes
30:00	Begin logging scale
42:00	PB End

Test Notes

Time	Notes
60:00	Swapped Filter 1
63:00	Changed to Med
183:00	Changed to Low
383:00	Test End

Technician Signature: _____ Date: 1/14/19

OMNI-Test Laboratories, Inc.

Pellet Heater Certification Run Sheets

Client: **HHT Halifax** Project Number: **0135PS013E.REV002** Run Number: **1**

Model: **P68-C** Tracking Number: 2238 Date: **1/14/19**

Test Crew: **Aaron Kravitz**

OMNI Equipment ID numbers: **132, 185, 283A, 335, 336, 229, 592, 637, 650**

ASTM E2515 Sampling Information

Test Location: OMNI E1 Clock Time @ ET=0: 9:50

Span Gas Concentrations: **CO_2(%):** 17.03 **CO(%):** 4.290 **CO(ppm):** 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	17.05	0.00	16.93
CO % (Zero/Span)	0.000	4.296	-0.091	4.271
CO ppm (Zero/Span)	0	901		893
Sample A Leakage (cfm @"Hg)	0		0 @ 9"	
Sample B Leakage (cfm @"Hg)	0		0 @ 11"	
Room Air Velocity (ft/min)	<50		<50	
Barometric Pressure ("Hg)	30.09		29.98	
Relative Humidity (%)	40%		24%	
Tunnel Static ("H_2O)	-0.20		-0.20	

Last Cleaning Dates

Flue Pipe	1/10/19
Dilution Tunnel	1/10/19
Sample Dryers	1/10/19

Dilution Tunnel Traverse

Traverse Point	1	2	Center	3	4	5	6	7	8
Δp ("H_2O)	0.038	0.041	0.058	0.048	0.036	0.026	0.048	0.050	0.034
T (°F)	117	117	117	117	117	→	→	→	→

Technician Signature: _____ Date: 1/15/19

2.2 - Sample Analysis & Tares

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

OMNI-Test Laboratories, Inc.

Pellet Heater Certification Run Sheets

Client: **HHT Halifax** Project Number: **0135PS013E.REV002** Run Number: **1**

Model: **P68-C** Tracking Number: 2338 Date: **1/14/19**

Test Crew: **Aaron Kravitz**

OMNI Equipment ID numbers: **132, 185, 283A, 335, 336, 229, 592, 637, 650**

ASTM E2515 Lab Sheet

Assembled By: A. Kravitz

Date/Time in Desiccator: 1/17/18 16:30

	Weighing #1	Weighing #2	Weighing #3	Weighing #4
Date:	1/11/19	1/13/19	1/21/19	
Time:	13:00	16:00	900	
R/H %:	10.1	13.8	17.6	
Temp (F):	71.9	71.4	70.5	
Audit 1:	200.0	200.0	-	
Audit 2:	2000.3	2000.7	2000.2	
Audit 3:	99997.9	99997.8	-	
Initials:				

Train	Item	ID #	Tare (mg)	Weight (mg)	Weight (mg)	Weight (mg)	Weight (mg)
A	Front Filter (60 min)	D638	121.3	124.6	124.6	-	
A	Front Filter (Remainder)	D643 ~~D634~~	121.5 ~~120.6~~	247.2	247.1	-	
A	Rear Filter	D640	121.1				
A	Probe	13	114322.1	114322.3	114322.2	-	
A	O-Ring Set	R704	3413.9	3415.1	3414.7	3414.6	
B	Front Filter	D641	121.1	251.5	251.4	-	
B	Rear Filter	D642	121.5				
B	Probe	15	114341.7	114342.0	114341.8	-	
B	O-Ring Set	R710	3347.4	3348.4	3348.1	3347.9	
BG	Filter						

Technician Signature: _____ Date: 1/21/19

Tare Sheet: (check one) **Probes**____ **47mm Filters** ✓ **100mm Filters**____ **O-Ring Pair**____

Prepared By: B DAUS Balance ID #: OMNI-00637 Thermohygrometer ID #: OMNI-00592 Audit Weight ID #/Mass: OMNI-002E2-A / 200.0

Placed in Dessicator: Date: 12/13/18 Time: 10.20 ID #	Date: 12/14/18 Time: 1040 RH %: 10.7 T (°F): 67.4 Audit: 200.0	Date: 12/17/18 Time: 12:20 RH %: 13.2 T (°F): 66.9 Audit: 200.0	Date: Time: RH %: T (°F): Audit:	Date: Time: RH %: T (°F): Audit:	Date Used	Project Number	Run No.
D638	121.2	121.3			1/14/19	0135PS013E.R2	1
D639	120.7	120.6			X	X	X
D640	121.0	121.1					
D641	121.1	121.1					
D642	121.6	121.5					
D643	121.5	121.5					
	Initials: DR	Initials: DR	Initials:	Initials:			

Final Technician Signature: [signature] Date: 12/17/18 Evaluator signature: [signature]

Tare Sheet: (check one) **Probes**_____ **47mm Filters**_____ **100mm Filters**_____ **O-Ring Pair** ✓

Prepared By: B Davis Balance ID #: Omni-00637 Thermohygrometer ID #: Omni 00592 Audit Weight ID #/Mass: Omni-00283A / 5g

Placed in Dessicator: Date: 12/10/18 Time: 0910 ID #	Date: 12/13/18 Time: 1013 RH %: 11.1 T (°F): 67.4 Audit: 4 999.9	Date: 12/14/18 Time: 0926 RH %: 11.2 T (°F): 66.4 Audit: 5000.0	Date: 12/17/18 Time: 0850 RH %: 10.8 T (°F): 65.2 Audit: 5000.0	Date: Time: RH %: T (°F): Audit:	Date Used	Project Number	Run No.
R709	3413.6	3413.9	3413.9		1/14/19	01355R01E.R2	1
R710	3547.3	3547.6	3347.4		1	1	1
	Initials: BD	Initials: BD	Initials: BD	Initials:			

Final Technician Signature: _____ Date: 12/17/18 Evaluator signature: _____

Tare Sheet: (check one) **Probes** ✓ **47mm Filters**____ **100mm Filters**____ **O-Ring Pair**____

Prepared By: A. Urwin Balance ID #: 637 Thermohygrometer ID #: Sq2 Audit Weight ID #/Mass: 283 A / 100 g

Placed in Dessicator: Date: 1/8/19 Time: 1200 ID #	Date: 1/11/19 Time: 230 RH %: 9.4 T (°F): 71.7 Audit: 99997.8	Date: 1/14/19 Time: 0910 RH %: 12.1 T (°F): 70.4 Audit: 99997.8	Date: 1/15/19 Time: 0930 RH %: 13.8 T (°F): 70.6 Audit: 99997.8	Date: 1/16/19 Time: 1025 RH %: 14.4 T (°F): 71.0 Audit: 99997.8	Date Used	Project Number	Run No.
13	114321.9	114322.1	←		1/14/19	0135PSDBER2	1
15	114341.9	114341.7	←		↓	↓	↓
	Initials: AU	Initials: BR	Initials: BR	Initials: BC			

Final Technician Signature: _____ Date: 1/22/19 Evaluator signature: _____

Control No. P-SFDP-0002.xls, Effective date: 2/1/2017

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

Analytical Test Report

Report No: USR:W219-0086-01
Issue No: 1

Client: Hearth & Home Technologies
352 Mountain House Road
Halifax, PA
Attention: Corie Podschelnec

PO No:

Signed: Katy Jahr
Katy Jahr
Chemistry Lab Supervisor
Date of Issue: 1/24/2019

Sample Details

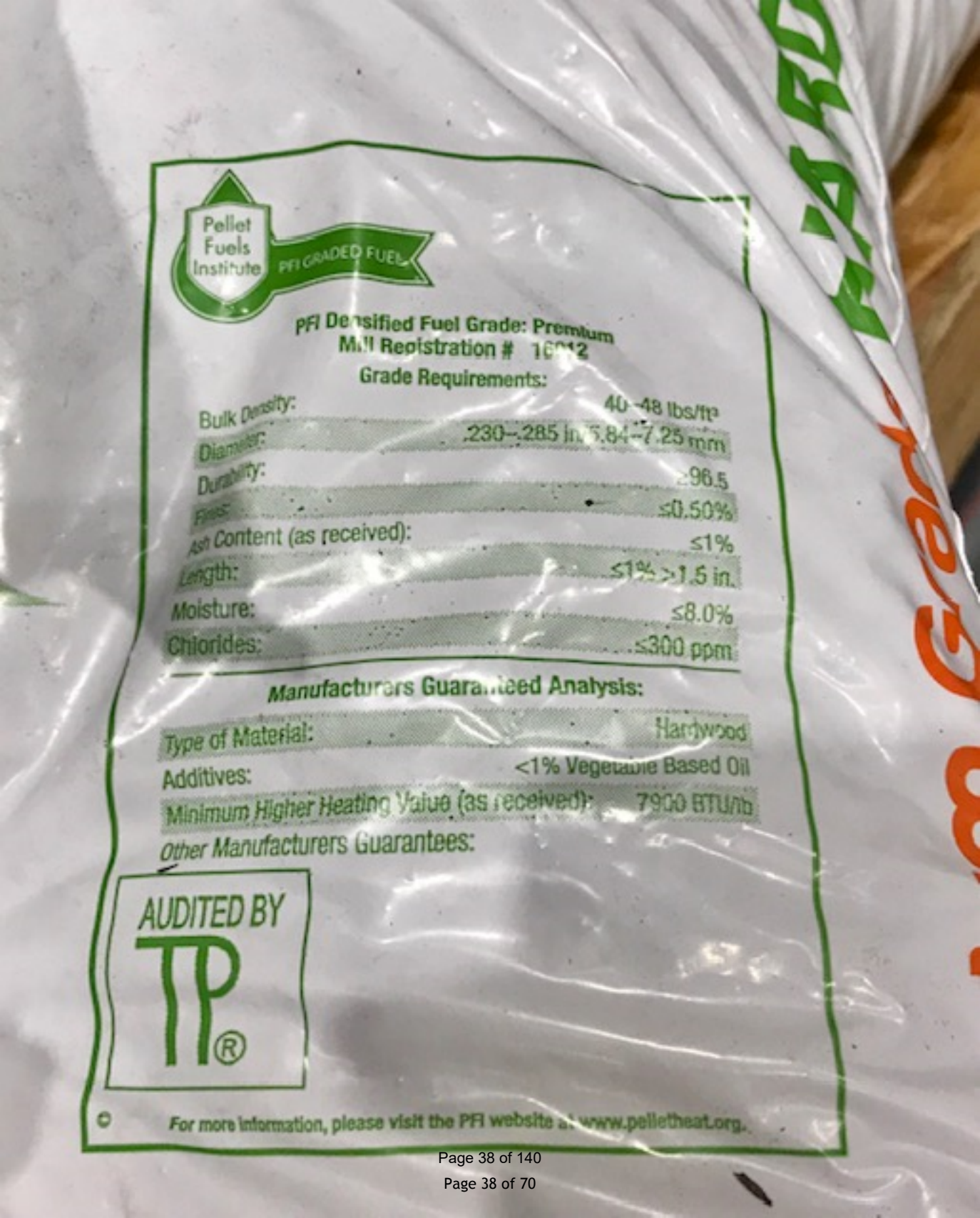
Sample Log No:	W219-0086-01	**Sample Date:**	
Sample Designation:	40 Lb Pellet Bag	**Sample Time:**	
Sample Recognized As:	Wood Pellets	**Arrival Date:**	1/22/2019

Test Results

	METHOD	UNITS	MOISTURE FREE		AS RECEIVED
Moisture Total	ASTM E871	wt. %			5.40
Ash	ASTM D1102	wt. %	0.63		0.60
Volatile Matter	ASTM D3175	wt. %			
Fixed Carbon by Difference	ASTM D3172	wt. %			
Sulfur	ASTM D4239	wt. %	0.010		0.010
SO_2	Calculated	lb/mmbtu			0.024
Net Cal. Value at Const. Pressure	ISO 1928	GJ/tonne			
Net Cal. Value at Const. Pressure	ISO 1928	J/g			
Gross Cal. Value at Const. Vol.	ASTM E711	J/g	19812		18742
Gross Cal. Value at Const. Vol.	ASTM E711	Btu/lb	8518		8058
Carbon	ASTM D5373	wt. %			
Hydrogen*	ASTM D5373	wt. %			
Nitrogen	ASTM D5373	wt. %			
Oxygen*	ASTM D3176	wt. %			
Chlorine	ASTM D6721	mg/kg	44		42
Fluorine	ASTM D3761	mg/kg			
Mercury	ASTM D6722	mg/kg			
Bulk Density	ASTM E873	lbs/ft^3			45.32
Fines (Less than 1/8")	TPT CH-P-06	wt.%			0.19
Durability Index	Kansas State	PDI			98.7
Sample Above 1.50"	TPT CH-P-06	wt.%			0.0
Maximum Length (Single Pellet)	TPT CH-P-06	inch			1.316
Diameter, Range	TPT CH-P-05	inch	0.256	to	0.263
Diameter, Average	TPT CH-P-05	inch			0.259
Stated Bag Weight	TPT CH-P-01	lbs			40.0
Actual Bag Weight	TPT CH-P-01	lbs			40.4

*Note: As received values do not include hydrogen and oxygen in the total moisture.

Comments


Pellet Fuels Institute
PFI GRADED FUEL
PFI Densified Fuel Grade: Premium
Mill Registration # 16012
Grade Requirements:
Bulk Density: 40-48 lbs/ft³
Diameter: .230-.285 in. 5.84-7.25 mm
Durability: ≥96.5
Fines: ≤0.50%
Ash Content (as received): ≤1%
Length: ≤1% >1.5 in.
Moisture: ≤8.0%
Chlorides: ≤300 ppm
Manufacturers Guaranteed Analysis:
Type of Material: Hardwood
Additives: <1% Vegetable Based Oil
Minimum Higher Heating Value (as received): 7900 BTU/lb
Other Manufacturers Guarantees:
AUDITED BY TP®
For more information, please visit the PFI website at www.pelletheat.org.

Section 3
Laboratory Quality Assurance

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:

- 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 P68-C at Hearth & Home Technologies, Inc. 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.

3.2 - Calibration Data

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

ID #	Lab Name/Purpose	Log Name	Attachment Type
131	Audit Weight	500mg Weight	Calibration Certificate
132	10 lb Weight	Weight Standard, 10 lb.	Calibration Log
185	1000lb Scale	Weight Indicator, Model WI-127	Calibration Certificate
283A	Audit Weight Set	Troemer weight 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
*650	Barometer/Hygrometer	Digital Barometer	Calibration Certificate

*The barometer used was outside the bi-annual (6 month) required calibration interval. The subsequent calibration certificate indicating that the barometer was received by the calibration laboratory has been included in this section.

Certificate of Calibration

Certificate Number: **698278**

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: **190231**
Order Date: 04/04/2019
Authorized By: **N/A**

Property #: OMNI-00650
User: **N/A**
Department: **N/A**
Make: Control Company
Model: 6530
Serial #: 181062211
Description: Thermohygrometer / Barometer
Procedure: 403406
Accuracy: ±3%RH, ±.4°C(0.8°F), ±4mbar(0.12inHg)

Calibrated on: 04/18/2019
*Recommended Due: 04/18/2020
Environment: **22** °C **53** % RH
* As Received: Within Tolerance
* As Returned: Within Tolerance
Action Taken: Calibrated
Technician: **146**

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

Std ID	Manufacturer	Model	Nomenclature	Due Date	Trace ID
847A	Fluke	RPM4	Reference Pressure Monitor	11/21/2019	688957
644A	Thunder Scientific	1200	Two Pressure Humidity Generator	07/30/2019	674006

Measurement Data

Parameter / Measurement Description	Range Unit	Reference	Min	Max	kError	UUT	Uncertainty
Before/After							Accredited = ✓
Humidity							
	%	13.0	10	16	1	14 %	5.8E-01 ✓
	%	50.0	47	53	2	48 %	5.8E-01 ✓
	%	80.0	77	83	3	77 %	5.8E-01 ✓
Temperature							
	°C	20.00	19.6	20.4	0.4	19.6 °C	8.1E-02 ✓
	°C	35.00	34.6	35.4	0.4	34.6 °C	8.1E-02 ✓
	°C	50.00	49.6	50.4	0.2	49.8 °C	8.1E-02 ✓
Barometer							
	29 inHg	29.6210	29.501	29.741	0.009	29.630 inHg	8.1E-02 ✓

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 04/19/2019 Rev # 15

Inspector

Certificate of Calibration

Certificate Number: **547339**

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

ACCREDITED
0723.01
Calibration

PO: OTL-13-035
Order Date: 11/19/2013
Authorized By: N/A

Property #: OMNI-00131
User: N/A
Department: N/A
Make: Ohaus
Model: 500mg
Serial #: 27503
Description: Mass
Procedure: DCN 500901
Accuracy: CLASS F (±0.72mg)

Calibrated on: 12/02/2013
*Recommended Due: 12/02/2018
Environment: 20 °C 34 % RH
As Received: Within Tolerance
As Returned: Within Tolerance
Action Taken: Calibrated
Technician: 34

Remarks: * Any number of factors may cause the calibration item to drift out of calibration before the recommended interval has expired

Refer to attachment for measurement results.

Standards Used

Std ID	Manufacturer	Model	Nomenclature	Due Date	Trace ID
432A	Sartorius	C-44	Microbalance 5.1g	03/11/2014	517747
723A	Rice Lake	1mg-200g (Class O)	Mass Set	09/05/2014	540048

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 12/06/2013 Rev # 14

Inspector

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

A2LA ACCREDITED
CERTIFICATE #1550.01

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

Report Number: OMNE0321676181002

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	10/2/18	10/4/17	10/2019

FUNCTIONAL CHECKS

SHIFT TEST	LINEARITY	REPEATABILITY	ENVIRONMENTAL CONDITIONS
Test Wt: 500 Tol: 0.5	Test Wt: HB44 Tol: HB44	Test Wt: 200 Tol: 0.2	☐ Good ☑ Fair ☐ Poor
As-Found: Pass:☑ Fail:☐	As-Found: Pass:☑ Fail:☐	As-Found: Pass:☑ Fail:☐	Temperature: 20.2°C
As-Left: Pass:☑ Fail:☐	As-Left: Pass:☑ Fail:☐	As-Left: Pass:☑ Fail:☐	

CALIBRATION DATA

Standard	As-Found	As-Left	Expanded Uncertainty
1000	999.8	999.8	0.12
700	699.8	699.8	0.12
500	499.9	499.9	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	11/24/17	11/2019	20172265

Permanent Information Concerning this Equipment:

Comments/Information Concerning this Calibration

10/2/2018 - Relative Humidity = 61.0 %

Report prepared/reviewed by: D **Date:** 10.2.18 **Technician:** D.Oudeans

Signature: D. Oudeans

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.

Certificate of Calibration

Certificate Number: **685888**

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: **180188**
Order Date: 10/09/2018
Authorized By: **N/A**

Property #: OMNI-00283A
User: N/A
Department: N/A
Make: Troemner Inc
Model: 1mg-100g (Class F)
Serial #: 47883
Description: Mass Set, 21pc
Procedure: DCN 500901
Accuracy: Class F

Calibrated on: 10/26/2018
*Recommended Due: 10/26/2023
Environment: **20** °C **57** % RH
* As Received: Within Tolerance
* As Returned: Within Tolerance
Action Taken: Calibrated
Technician: **139**

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.

This set meets Class F specifications.
Received and returned eight (8) masses in a black case secured by a rubber band.

Standards Used

Std ID	Manufacturer	Model	Nomenclature	Due Date	Trace ID
723A	Rice Lake	1mg-200g (Class 0)	Mass Set,	03/23/2019	668240
800A	Sartorius	MSA225W100DI	Analytical Balance	12/11/2018	663857

Measurement Data

Parameter / Measurement Description	Range Unit	Reference	Min	Max	[k]Error	UUT	Uncertainty Accredited = ✓
Before/After							
Mass							
Dot	200 mg	200.00030	199.4603	200.5403	0.0500	200.0503 mg	6.2E-01 ✓
	1 g	1.00000880	0.9991088	1.0009088	0.0000000	1.0000088 g	1E-03 ✓
	2 g	2.00001470	1.9989147	2.0011147	0.0003250	2.0003397 g	1.3E-03 ✓
	5 g	5.00000840	4.9985084	5.0015084	0.0000400	4.9999684 g	1.7E-03 ✓
	10 g	10.0000100	9.998010	10.002010	0.000245	9.999765 g	2.3E-03 ✓
Dot	20 g	20.0000140	19.996014	20.004014	0.000990	20.001004 g	4.6E-03 ✓
	50 g	49.9999660	49.989966	50.009966	0.000595	49.999371 g	1.1E-02 ✓
	100 g	100.000000	99.98000	100.02000	0.00194	99.99806 g	2.3E-02 ✓

Reviewer

3 Issued 10/29/2018 Rev # 15

Inspector

Thermal Metering System Calibration
Y Factor

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

Previous Calibration Comparision

Date	1/17/2018	Acceptable Deviation (5%)	Deviation
y Factor	0.977	0.04885	0.009
Acceptance	Acceptable		

Current Calibration

Acceptable y Deviation	0.020
Maximum y Deviation	0.008
Acceptable dH@ Deviation	N/A
Maximum dH@ Deviation	N/A
Acceptance	Acceptable

Average Gas Meter y Factor	Orifice Meter dH@
0.986	N/A

Calibration Date:	07/17/18	
Calibrated by:	B. Davis	
Calibration Frequency:	Six months	
Next Calibration Due:	1/17/2019	
Instrument Range:	1.000	cfm
Standard Temp.:	68	oF
Standard Press.:	29.92	"Hg
Barometric Press., Pb:	30.12	"Hg
Signature/Date:		7/18/2018

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

Calibration Parameters	Run 1	Run 2	Run 3
Reference Meter Pressure ("H2O), Pr	0.00	0.00	0.00
DGM Pressure ("H2O), Pd	2.00	1.38	1.00
Initial Reference Meter	609.1	615.5	620.8
Final Reference Meter	615.4	620.7	626.7
Initial DGM	0	0	0
Final DGM	6.292	5.245	5.995
Temp. Ref. Meter (°F), Tr	92.0	93.0	91.0
Temperature DGM (°F), Td	92.0	93.0	91.0
Time (min)			
Net Volume Ref. Meter, Vr	6.300	5.200	5.900
Net Volume DGM, Vd	6.292	5.245	5.995
Gas Meter y Factor =	**0.994**	**0.986**	**0.979**
Gas Meter y Factor Deviation (from avg.)	0.008	0.001	0.007
Orifice dH@	**N/A**	**N/A**	**N/A**
Orifice dH@ Deviation (from avg.)	N/A	N/A	N/A

where:

1. Deviation = |Average value for all runs - current run value|

** 2. y = [Vr x (y factor (ref)) x (Pb + (Pr/ 13.6)) x (Td + 460)]/ [Vd x (Pb + (Pd / 13.6)) x (Tr + 460)]

** 3. dH@ = 0.0317 x Pd / (Pb (Td + 460)) x [(Tr + 460) x time) / Vr]^2

* 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 ft^3/min. This is based on the reference standard having a TAR (Test Accuracy Ratio) of at least 4:1.

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: 7/18/2018 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	0.183	0.183	0.0	0.0
20-40% Max. Range 0.4 - 0.8	0.705	0.704	0.001	0.05
40-60% Max. Range 0.8 – 1.2	1.019	1.016	0.003	0.15
60-80% Max. Range 1.2 – 1.6	1.394	1.391	0.003	0.15
80-100% Max. Range 1.6 – 2.0	1.980	1.978	0.002	0.10

*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: 7/18/18

Reviewed by: _____ Date: 7/20/18

Temperature Calibration
EPA Method 28R, ASTM 2515

Booth:	Temperature Monitor Type:	Equipment Number:
Mobile	National Instruments Logger	00335, 00336

Reference Meter Equipment Number: 00373	Calibration Due Date: 8/02/17

Calibration Performed By:	Date:	Ambient Temperature:	Barometric Pressure:
B. Davis	7/17/18	76	30.12

Input Temperature (F)	Ambient	Meter A	Meter B	Filter A	Filter B	Tunnel	FB Interior
0	0	1	1	1	1	0	0
100	100	101	101	100	100	100	100
300	300	300	300	300	300	300	300
500	500	501	500	500	500	500	500
700	700	700	700	700	700	700	700
1000	1000	1001	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	0	0	1	1	1	0
100	100	100	100	100	100	101	101	101	100
300	300	300	300	300	300	300	300	300	300
500	500	500	500	500	500	500	500	500	500
700	700	700	700	700	700	700	700	700	700
1000	1000	1000	1000	1000	1000	1000	1000	1000	1000

1500
2000

1500
2000

Technician signature: _____ Date: 7/17/18

Reviewed By: _____ Date: 7/20/18

Thermal Metering System Calibration
Y Factor

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

Average Gas Meter y Factor	Orifice Meter dH@
0.985	N/A

Calibration Date:	07/17/18	
Calibrated by:	B. Davis	
Calibration Frequency:	Six months	
Next Calibration Due:	1/17/2019	
Instrument Range:	1.000	cfm
Standard Temp.:	68	oF
Standard Press.:	29.92	"Hg
Barometric Press., Pb:	30.12	"Hg
Signature/Date:		1/17/2018

Previous Calibration Comparision

Date	1/17/2018	Acceptable Deviation (5%)	Deviation
y Factor	0.979	0.04895	0.006
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)

Calibration Parameters	Run 1	Run 2	Run 3
Reference Meter Pressure ("H2O), Pr	0.00	0.00	0.00
DGM Pressure ("H2O), Pd	1.91	1.20	0.80
Initial Reference Meter	572.4	577.5	582.9
Final Reference Meter	577.4	582.604	588.1
Initial DGM	0	0	0
Final DGM	5.061	5.245	5.34
Temp. Ref. Meter (°F), Tr	86.0	86.0	78.0
Temperature DGM (°F), Td	90.0	95.0	86.0
Time (min)	23.5	30.0	37.8
Net Volume Ref. Meter, Vr	5.000	5.104	5.200
Net Volume DGM, Vd	5.061	5.245	5.34
Gas Meter y Factor =	**0.988**	**0.984**	**0.984**
Gas Meter y Factor Deviation (from avg.)	0.003	0.001	0.001
Orifice dH@	**N/A**	**N/A**	**N/A**
Orifice dH@ Deviation (from avg.)	N/A	N/A	N/A

where:

1. Deviation = |Average value for all runs - current run value|
** 2. y = [Vr x (y factor (ref)) x (Pb + (Pr/ 13.6)) x (Td + 460)]/ [Vd x (Pb + (Pd / 13.6)) x (Tr + 460)]
** 3. dH@ = 0.0317 x Pd / (Pb (Td + 460)) x [(Tr + 460) x time) / Vr]^2

* 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 ft^3/min. This is based on the reference standard having a TAR (Test Accuracy Ratio) of at least 4:1.

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: 7/18/18 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	0.045	0.041	0.003	0.20
20-40% Max. Range 0.4 - 0.8	0.446	0.447	0.001	0.05
40-60% Max. Range 0.8 – 1.2	0.900	0.901	0.001	0.05
60-80% Max. Range 1.2 – 1.6	1.589	1.592	0.003	0.20
80-100% Max. Range 1.6 – 2.0	1.902	1.908	0.006	0.30

*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: 7/18/18

Reviewed by: _____ Date: 7/20/18

Temperature Calibration
EPA Method 28R, ASTM 2515

Booth:	Temperature Monitor Type:	Equipment Number:
Mobile	National Instruments Logger	00335, 00336

Reference Meter Equipment Number: 00373	Calibration Due Date: 8/02/17

Calibration Performed By:	Date:	Ambient Temperature:	Barometric Pressure:
B. Davis	7/17/18	76	30.12

Input Temperature (F)	Ambient	Meter A	Meter B	Filter A	Filter B	Tunnel	FB Interior
0	0	1	1	1	1	0	0
100	100	101	101	100	100	100	100
300	300	300	300	300	300	300	300
500	500	501	500	500	500	500	500
700	700	700	700	700	700	700	700
1000	1000	1001	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	0	0	1	1	1	0
100	100	100	100	100	100	101	101	101	100
300	300	300	300	300	300	300	300	300	300
500	500	500	500	500	500	500	500	500	500
700	700	700	700	700	700	700	700	700	700
1000	1000	1000	1000	1000	1000	1000	1000	1000	1000

1500
2000

1500
2000

Technician signature: _____ Date: 7/17/18

Reviewed By: _____ Date: 7/20/18

Calibration Service Record			
Date	**By**	**Results**	**Date of next Calibration**
7/12/2018	B. Davis	Installed a new Vane as per manufacturer's instructions.	1/12/2019

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 ± 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: [signature]

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%.

Certificate of Calibration

Certificate Number: **681844**

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

OnSite

0723.01
Calibration

PO: **180176**
Order Date: **08/07/2018**
Authorized By: **N/A**

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: **08/07/2018**
*Recommended Due: **02/07/2019**
Environment: **22** °C **38** % RH
* As Received: **Out of Tolerance**
* As Returned: **Within Tolerance**
Action Taken: **Adjusted**
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.

Balance went into over range at max capacity. Adjusted balance to bring all points back into tolerance.

Standards Used

Std ID	Manufacturer	Model	Nomenclature	Due Date	Trace ID
256A	Rice Lake	W0133K	Mass Set,	05/30/2019	660578

Measurement Data

Parameter / Measurement Description	Range Unit	Reference	Min	Max	%Error	UUT	Uncertainty
Before							Accredited = ✓
Force							
	g	10.00000	9.9995	10.0005	0.0004	10.0004 g	5.7E-04 ✓
	g	30.00000	29.9995	30.0005	0.0004	30.0004 g	5.7E-04 ✓
	g	60.00000	59.9995	60.0005	0.0004	60.0004 g	5.7E-04 ✓
	g	90.00000	89.9995	90.0005	0.0005	90.0005 g	5.7E-04 ✓
	g	120.00000	119.9995	120.0005	120.0000	0.0000 g	5.7E-04 ✓
After		Reference	Min	Max	%Error		Accredited = ✓
	g	10.00000	9.9995	10.0005	0.0000	10.0000 g	5.7E-04 ✓
	g	30.00000	29.9995	30.0005	0.0001	29.9999 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	0.0002	89.9998 g	5.7E-04 ✓
	g	120.00000	119.9995	120.0005	0.0002	119.9998 g	5.7E-04 ✓

Reviewer

3 Issued 08/09/2018 Rev # 15

Inspector

Calibration complies with ISO/IEC 17025, ANSI/NCSL Z540-1, and 9001

ACCREDITED
A2LA Certificate No. 1750.01
Calibration

Cert. No.: 6530-9263396

Traceable® Certificate of Calibration for Digital Barometer

Manufactured for and distributed by : Control Company "Drawer 58307,Houston,TX,77258,USA"

Instrument Identification:

Model: 6530, S/N: 181062211 Manufacturer: Control Company

Standards/Equipment:

Description	Serial Number	Due Date	NIST Traceable Reference
Digital Barometer	D4540001	09 Oct 2018	1000415948
Digital Thermometer	130070752	02 Mar 2018	4000-8360837
Chilled Mirror Hygrometer	44654/2H3737	02 Nov 2019	15478
Climate Chamber	W613.0046		

Certificate Information:

Technician: 57 Procedure: CAL-31 Cal Date: 26 Feb 2018 Cal Due Date: 26 Feb 2020

Test Conditions: 54.9%RH 22.83°C 1023mBar

Calibration Data: (New Instrument)

Unit(s)	Nominal	As Found	In Tol	Nominal	As Left	In Tol	Min	Max	±U	TUR
%RH	N.A.	N.A.		51.21	52	Y	49	55	0.74	>4:1
°C	N.A.	N.A.		24.55	24.3	Y	24.15	24.96	0.051	>4:1
mb/hPa	N.A.	N.A.		1010.30	1010	Y	1007	1015	0.62	>4:1
mb/hPa	N.A.	N.A.		806.75	806	Y	803	811	0.62	>4:1
mb/hPa	N.A.	N.A.		908.50	908	Y	905	913	0.62	>4:1

This certificate indicates Traceability to standards provided by (NIST) National Institute of Standards and Technology and/or a National Standards Laboratory.

A Test Uncertainty Ratio of at least 4:1 is maintained unless otherwise stated and is calculated using the expanded measurement uncertainty. Uncertainty evaluation includes the instrument under test and is calculated in accordance with the ISO "Guide to the Expression of Uncertainty in Measurement : (GUM). The uncertainty represents an expanded uncertainty using a coverage factor k=2 to approximate a 95% confidence level. In tolerance conditions are based on test results falling within specified limits with no reduction by the uncertainty of the measurement. The results contained herein relate only to the item calibrated. This certificate shall not be reproduced except in full, without written approval of Control Company.

Nominal=Standard's Reading; As Left=Instrument's Reading; In Tol=In Tolerance; Min/Max=Acceptance Range; ± U=Expanded Measurement Uncertainty; TUR=Test Uncertainty Ratio; Accuracy=±(Max-Min)/2; Min=As Left Nominal(Rounded) – Tolerance; Max= As Left Nominal(Rounded) + Tolerance;

Nicol Rodriguez, Quality Manager

Aaron Judice, Technical Manager

Maintaining Accuracy:

In our opinion once calibrated your Digital Barometer should maintain its accuracy. There is no exact way to determine how long calibration will be maintained. Digital Barometer change little, if any at all, but can be affected by aging, temperature, shock, and contamination.

Recalibration:

For factory calibration and re-certification traceable to National Institute of Standards and Technology contact Control Company.

CONTROL COMPANY 12554 Galveston RD Suite B230 Webster TX USA 77598
Phone 281 482-1714 Fax 281 482-9448 sales@control3.com www.control3.com

3.3 - Example Calculations

Equations and Sample Calculations – ASTM E2779 & E2515

Manufacturer:	HHT Halifax
Model:	P68-C
Run:	1
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 in the dilution tunnel, ft/sec

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

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

m_n – Total Particulate Matter Collected, mg

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

E_T – Total Particulate Emissions, g

PR - Proportional Rate Variation

PM_R – Average particulate emissions for full integrated test run, g/hr

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

Equations and Sample Calculations – ASTM E2779 & E2515

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:

	5.15	%
M_{Swb} =	43.2	lbs
M_{Ewb} =	19.8	lbs
0.4536 =	Converstion factor from lbs to kg	

M_{Bdb} = [(43.2 x 0.4536) - (19.8 x 0.4536)] (100/(100 + 5.15)

M_{Bdb} = **10.1** kg

Equations and Sample Calculations – ASTM E2779 & E2515

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

ASTM E2779 equation (2)

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

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 = 5.15 %

M_{SSiwb} = 34.4 lbs

M_{ESiwb} = 27.3 lbs

0.4536 = Converstion factor from lbs to kg

M_{BSidb} = [(34.4 x 0.4536) - (27.3 x 0.4536)] (100/(100 + 5)

M_{BSidb} = **3.1** kg

Equations and Sample Calculations – ASTM E2779 & E2515

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} = 10.09 kg

θ = 363 min

$$BR = \frac{60 \times 10.1}{363}$$

BR = **1.67** kg/hr

Equations and Sample Calculations – ASTM E2779 & E2515

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} = 3.06 kg

θ = 120 min

$$BR = \frac{60 \times 3.06}{120}$$

BR = **1.53** kg/hr

Equations and Sample Calculations – ASTM E2779 & E2515

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

ASTM E2515 equations (9)

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

Where:

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

V_{scent} = Dilution tunnel velocity calculated after the multi-point pitot traverse at the center, ft/sec

V_{strav} = Dilution tunnel velocity calculated after the multi-point pitot traverse, ft/sec

k_p = Pitot tube constant, 85.49

C_p = Pitot tube coefficient: 0.99, unitless

ΔP^* = Velocity pressure in the dilution tunnel, in H_2O

T_s = Absolute average gas temperature in the dilution tunnel, °R; (°R = °F + 460)

P_s = Absolute average gas static pressure in diltuion tunnel, = P_{bar} + P_g , in Hg

P_{bar} = Barometric pressure at test site, in. Hg

P_g = Static pressure of tunnel, in. H_20; (in Hg = in H_20/13.6)

M_s = **The dilution tunnel wet molecular weight; M_s = 28.78 assuming a dry weight of 29 lb/lb-mole

Sample calculation:

$$Fp = \frac{13.69}{16.64} = 0.823$$

$$V_s = 0.823 \times 85.49 \times 0.99 \times 0.240 \times \left(\frac{92.9 + 460}{\left(30.04 + \frac{-0.20}{13.6} \right) \times 28.78} \right)^{1/2}$$

V_s = **13.37** ft/s

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

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

Equations and Sample Calculations – ASTM E2779 & E2515

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

ASTM E2515 equation (3)

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

Where:

3600	=	Conversion from seconds to hours (ASTM method uses 60 to convert in minutes)
B_{ws}	=	Water vapor in gas stream, proportion by volume; assume 2%
A	=	Cross sectional area of dilution tunnel, ft^2
T_{std}	=	Standard absolute temperature, 528 °R
P_s	=	Absolute average gas static pressure in diltuion 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:

$$Q_{sd} = 3600 \times (1 - 0.02) \times 13.37 \times 0.1963 \times \frac{528}{92.9 + 460} \times \frac{30.04 + \frac{-0.20}{13.6}}{29.92}$$

Q_{sd} = **8875.6** dscf/hr

Equations and Sample Calculations – ASTM E2779 & E2515

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

ASTM E2515 equation (6)

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

Where:

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

Sample Calculation:

Using equation for Train 1:

$$V_{m(std)} = 17.64 \times 58.716 \times 0.997 \times \frac{\left(30.04 + \frac{1.34}{13.6}\right)}{(80.6 + 460)}$$

$V_{m(std)}$ = **57.563** dscf

Using equation for Train 2:

$$V_{m(std)} = 17.64 \times 58.140 \times 0.985 \times \frac{\left(30.04 + \frac{1.07}{13.6}\right)}{(82.5 + 460)}$$

$V_{m(std)}$ = **56.077** dscf

Using equation for ambient train:

$$V_{m(std)} = 17.64 \times 0.00 \times 0 \times \frac{\left(\underline{30.04} + \frac{0.00}{13.6}\right)}{(70.7 + 460)}$$

$V_{m(std)}$ = **0.000** dscf

Equations and Sample Calculations – ASTM E2779 & E2515

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 + 3.3 + 0.0

m_n = 3.3 mg

Using equation for Train 1 (remainder):

m_n = 0.1 + 4.0 + 0.8

m_n = 4.9 mg

Train 1 Aggregate = **8.2** mg

Using equation for Train 2:

m_n = 0.1 + 8.8 + 0.5

m_n = **9.4** mg

Equations and Sample Calculations – ASTM E2779 & E2515

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

ASTM E2515 equation (13)

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

Where:

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

Sample calculation:

For Train 1:

$$C_s = 0.001 \times \frac{8.2}{57.56}$$

$C_s =$ **1.42E-04** g/dscf

For Train 2

$$C_s = 0.001 \times \frac{9.4}{56.08}$$

$C_s =$ **1.68E-04** g/dscf

For Ambient Train

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

$C_r =$ **0.000000** g/dscf

Equations and Sample Calculations – ASTM E2779 & E2515

E_T – Total Particulate Emissions, g

ASTM E2515 equation (15)

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

Where:

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

Sample calculation:

For Train 1

E_T = (0.000142 - 0.000000) x 8875.6 x 363 /60

E_T = 7.65 g

For Train 2

E_T = (0.000168 - 0.000000) x 8875.6 x 363 /60

E_T = 9.00 g

Average

E = 8.33 g

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

7.5% of the average =	0.62
Train 1 difference =	0.68
Train 2 difference =	0.68

Equations and Sample Calculations – ASTM E2779 & E2515

PR - Proportional Rate Variation

ASTM E2515 equation (16)

$$PR = \left[\frac{\theta \times V_{mi} \times V_s \times T_m \times T_{si}}{\theta_i \times V_m \times V_{si} \times T_{mi} \times T_s} \right] \times 100$$

Where:

θ = Total sampling time, min

θ_i = Length of recording interval, min

V_{mi} = Volume of gas sample measured by the dry gas meter during the “ith” time interval, dcf

V_m = Volume of gas sample as measured by dry gas meter, dcf

V_{si} = Average gas velocity in the dilution tunnel during the "ith" time interval, ft/sec

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

T_{mi} = Absolute average dry gas meter temperature during the "ith" time interval, ^oR

T_m = Absolute average dry gas meter temperature, ^oR

T_{si} = Absolute average gas temperature in the dilution tunnel during the "ith" time interval, ^oR

T_s = Absolute average gas temperature in the dilution tunnel, ^oR

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

$$PR = \left(\frac{363 \times 0.154 \times 13.37 \times (117.0 + 460) \times (80.6 + 460)}{1 \times 58.716 \times 13.58 \times (92.9 + 460) \times (74.0 + 460)} \right) \times 100$$

PR = 99 %

Equations and Sample Calculations – ASTM E2779 & E2515

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 = Tota particulate emissions, grams

θ = Total length of full intergrated test run, min

Sample Calculation:

E_T (Dual train average) = 8.33 g

θ = 363 min

$PM_R = 60$ x (8.33 / 363)

PM_R = **1.38** g/hr

Equations and Sample Calculations – ASTM E2779 & E2515

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 = Tota particulate emissions, grams

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

Sample Calculation:

E_T (Dual train average) = 8.33 g

M_{Bdb} = 10.09 kg

PM_F = 8.33 / ###)

PM_F = **0.82** g/kg

Appendix A – Labeling & Owner's Manual

Report #/ Rapport # 0135PS013E
Tested to / Testé à: ASTM E 1509-04,
ULC-S627-00, ASTM E 2515-11, ASTM E 2779-10

MODEL / MODÈLE: "P68-C"
Room Heater Pellet Fuel-Burning Type
SUITABLE FOR MOBILE-HOME INSTALLATION
This pellet burning appliance has been tested and listed for use in
Manufactured Homes In accordance with OAR 814-23-900 through 814-23-909

HARMAN®
Made in U.S.A. of US and imported parts. / Fabriqué aux États-Unis-d'Amérique par des pièces d'origine américaine et pièces importées.

Serial No.
N° de série: **HF**

BARCODE LABEL

Room Heater, Pellet Fuel-Burning Type, Also For Use In Mobile Homes. (UM) 84-HUD
"PREVENT HOUSE FIRES" Install and use only in accordance with manufactures installation and operation instructions.
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.
Contact local building or fire officials about restrictions and installation inspection in your area.
WARNING: FOR MANUFACTURED HOMES: Do not install appliance in a sleeping room. An outside combustion air inlet must be provided. The structural integrity of the manufactured home floor, ceiling and walls must be maintained.
Refer to manufacturer's instructions and local codes for precautions required for passing chimney through a combustible wall or ceiling. Inspect and clean exhaust venting system frequently in accordance with manufacturer's instructions.
Use a 3" or 4" diameter type "L" or "PL" venting system.
Do not connect this unit to a chimney flue servicing another appliance.
Do not obstruct the space beneath the heater.
FOR USE WITH PELLETIZED WOOD FUEL ONLY.
Input Rating Max: 8 lb. fuel/hr
EPA Certified Emissions: 1.4 g/hr
U.S. Electrical Rating: 115 VAC, 60 Hz, Start 4.3 AMPS, Run 3.2 AMPS
Fuel Type: Wood Pellet.
Route power cord away from unit.
OPERATE ONLY WITH DOORS CLOSED
DANGER: Risk of Electrical Shock. Disconnect Power Before Servicing Unit.
For Further Instruction, Refer To Installation and Owner's Manual.
Replace glass only with 5mm mirrored ceramic available from your dealer.
DO NOT REMOVE THIS LABEL / NE PAS ENLEVER CETTE ÉTIQUETTE

MINIMUM CLEARANCES TO COMBUSTIBLES/ DISTANCES DE SECURITE PAR RAPPORT AUX MATERIAUX COMBUSTIBLES:

	Without Side Shields / Sans Écrans Latéraux	With Side Shields / Avec Écrans Latéraux
Back Wall / Entre Mur Arrière	2"/ 51mm	2"/ 51mm
Side Wall / Entre Paroi Latér	20"/ 508mm	14"/ 355mm

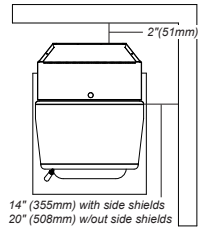
CORNER INSTALLATION / EN ANGLE

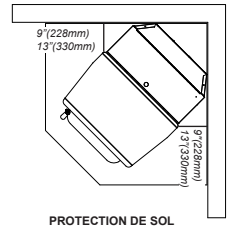
Walls to Appliance / Entre Murs et appareil	13"/330mm	9"/228mm

FLOOR PROTECTION / Protection Du Plancher

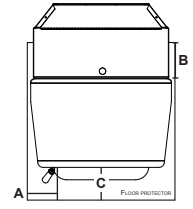
		USA	Canada
Sides/Côtés	(A)	6"	200mm
Back/Arrière	(B)	6"	200mm
Front/Avant	(C)	6"	450mm

Floor Protection Must Be a Non-Combustible Material. Must Also be Place Under Any Horizontal Flue Connector, Extending 2" or 51mm Beyond the Pipe Measurement.
Pour protéger le plancher, il faut sous le pêole un matériau. Qui doit aussi être placé sous les parties horizontales du tuyau de raccord à la cheminée et s'étendre à 51mm ø 2 po. au-delà de la mesure du tuyau.





PROTECTION DE SOL
FLOOR PROTECTION



Chauffe-chambre, Pellet à combustibles Type, également pour les maisons mobiles. (UM) 84-HUD
"EMPÊCHER MAISON INCENDIES" Installer et utiliser uniquement en conformité avec les instructions du fabricant d'installation et d'exploitation.
Ce poêle à bois doit inspection périodique et la réparation pour un fonctionnement correct. Consultez le manuel du propriétaire pour plus d'informations. Ce est contre les règlements fédéraux pour faire fonctionner ce poêle à bois d'une manière incompatible avec les instructions d'utilisation dans le manuel du propriétaire. Contactez le service des incendies à propos des restrictions et l'inspection d'installation dans votre région.
AVERTISSEMENT: POUR MAISONS PRÉFABRIQUÉES: Ne pas installer l'appareil dans une chambre à coucher. Une entrée d'air de combustion à l'extérieur doit être fournie. L'intégrité structurale de la maison étage, plafond et murs fabriqués doit être maintenue.
Reportez-vous aux instructions du fabricant et les codes locaux pour les précautions nécessaires pour faire passer la cheminée à travers un mur ou un plafond combustible. Inspectez et nettoyez système d'évacuation souvent en conformité avec les instructions du fabricant.
Utilisez un "ou 4" Type de diamètre «L» 3 ou le système de ventilation "PL".
Ne pas connecter cet appareil à un conduit de cheminée desservant un autre appareil.
Ne pas obstruer l'espace sous le chauffe-eau.
À UTILISER AVEC LA GRANULE DE BOIS SEULEMENT.
Entrée Max Note: £ 8 carburant / h
Émissions certifiés EPA: 1,4 g / h
US Note électrique: 115 VAC, 60 Hz, Start 4,3 AMPS, Run 3,2 AMPS
Type de carburant: granulés de bois.
Route cordon électrique de l'appareil.
Fonctionner uniquement avec les portes fermées
DANGER: Risque de choc électrique. Débranchez l'alimentation avant l'Unité des services.
Pour de plus amples instructions, reportez-vous à l'installation et le manuel du propriétaire.
Remplacer le verre seulement avec 5mm miroir en céramique disponibles chez votre revendeur.
Ne ENLEVEZ PAS CETTE ÉTIQUETTE / NE PAS CETTE ÉTIQUETTE enlever

US ENVIRONMENTAL PROTECTION AGENCY
Certified to comply with 2020 particulate emission standards.
Certifié conforme aux normes 2020 d'émission de particules.

Date of Manufacture / Date de fabrication:

2019	2020	2021	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
■	■	■	■	■	■	■	■	■	■	■	■	■	■	■

Manufactured by / Fabriqué par: Hearth and Home Technologies 352 Mountain House Road, Halifax PA 17032

P.N. 8390-068_R1

LABEL TICKET			
ECO:	89880	**LABEL SIZE:**	4.375" x 10.75"
PART # / REV:	8390-068	**ADHESIVE:**	
ORIGINATOR:	Spidlet	**MATERIAL:**	24 Gauge Aluminum
DATE:	01/23/19	**INK:**	Black Background
HEARTH&HOME technologies® The Hearth Experts™ 352 Mountain House Road Halifax, PA 17032		(4) Corners = R.062	

Owner's Manual
Care and Operation

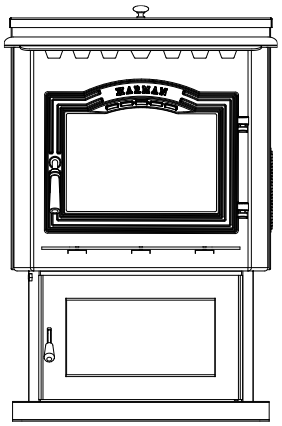
INSTALLER: Leave this manual with party responsible for use and operation.
OWNER: Retain this manual for future reference.
Contact your local dealer with questions on installation, operation or service.

NOTICE: SAVE THESE INSTRUCTIONS

HARMAN®

BUILT TO A STANDARD, NOT A PRICE

Model(s):
P43-C, P61-C & P68-C
Freestanding Pellet Stove



Pellet Fuels Institute

NFI NATIONAL FIREPLACE INSTITUTE A CERTIFICATION AGENCY

EM C US

⚠ CAUTION

Check building codes prior to installation.
- Installation MUST comply with local, regional, state and national codes and regulations.
- Contact local building or fire officials about restrictions and installation inspection requirements in your area.

NOTE

To obtain a French translation of this manual, please contact your dealer or visit www.harmanstoves.com

Pour obtenir une traduction française de ce manuel, s'il vous plaît contacter votre revendeur ou visitez www.harmanstoves.com

⚠ WARNING

Please read this entire manual before installation and use of this pellet fuel-burning room heater.
Failure to follow these instructions could result in property damage, bodily injury or even death.

- Do not store or use gasoline or other flammable vapors and liquids in the vicinity of this or any other appliance.
- Do not overfire - If any external part starts to glow, you are overfiring. Reduce feed rate. Overfiring will void your warranty.
- Comply with all minimum clearances to combustibles as specified. Failure to comply may cause house fire.

⚠ WARNING

HOT SURFACES!

Glass and other surfaces are hot during operation AND cool down.

Hot glass will cause burns.
- Do not touch glass until it is cooled
- NEVER allow children to touch glass
- Keep children away
- CAREFULLY SUPERVISE children in same room as stove.
- Alert children and adults to hazards of high temperatures.
  High temperatures may ignite clothing or other flammable materials.
- Keep clothing, furniture, draperies and other flammable materials away.

1 Welcome

Read this manual before operating this appliance.
Please retain this Owner's Manual for future reference.
Read the Installation Manual before making any installation or finishing changes.

A. Congratulations

Congratulations on selecting a Harman® Freestanding Pellet Stove. The Harman® P-Series pellet stove you have selected is designed to provide the utmost in safety, reliability, and efficiency.

As the owner of a new pellet stove, you'll want to read and carefully follow all of the instructions contained in this owner's manual. Pay special attention to all cautions and warnings.

This owner's manual should be retained for future reference. We suggest that you keep it with your other important documents and product manuals.

Your new Harman® P-Series Freestanding Pellet Stove will give you years of durable use and trouble-free enjoyment. Welcome to the Harman® family!

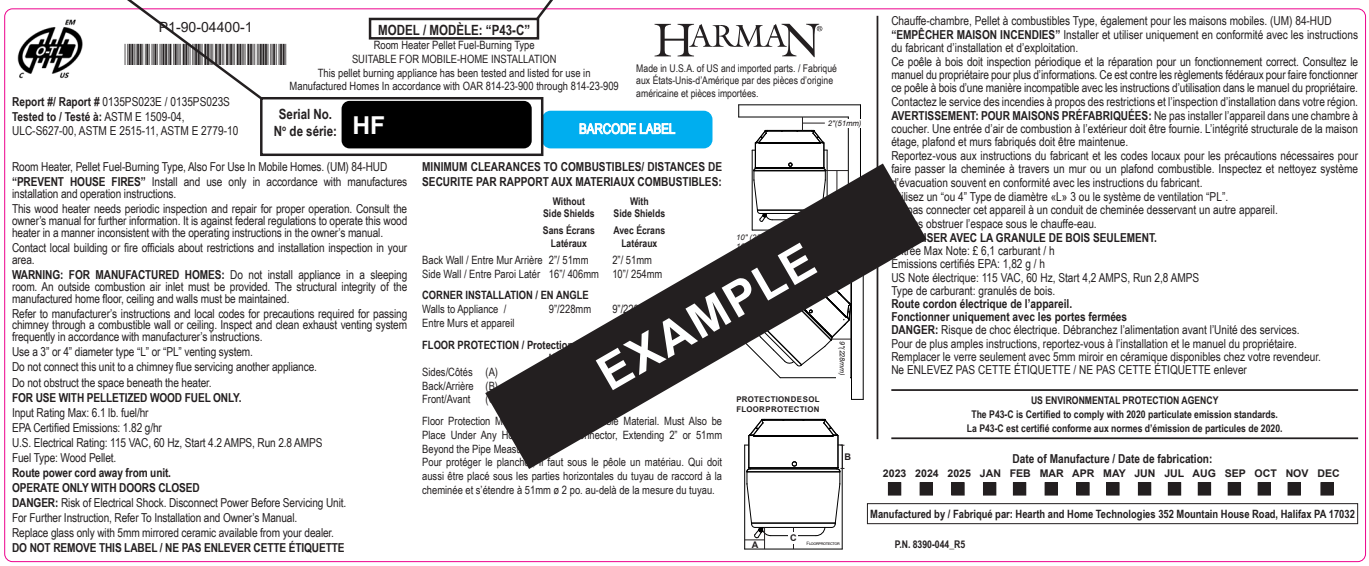
Note: Cast iron is an artisan crafted material, which is made the same way today as nearly 2000 years ago. Due to the intrinsic primitive nature of the casting process, part to part variation is normal and adds to the character of a hand built cast iron appliance

Listing Label Information/Location

The model information regarding your specific stove can be found on the rating plate usually located in the control area of the stove.

Serial Number

Model Name



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➔ = Contains updated information

⚠ Safety Alert Key:

- ***DANGER!*** *Indicates a hazardous situation which, if not avoided will result in death or serious injury.*
- ***WARNING!*** *Indicates a hazardous situation which, if not avoided could result in death or serious injury.*
- ***CAUTION!*** *Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.*
- ***NOTICE:*** *Used to address practices not related to personal injury.*

2 Product Specific and Important Safety Information

A. Appliance Certification

MODEL:	P43-C Pellet Stove
LABORATORY:	OMNI Test Laboratories, Inc
REPORT NO.	0135PS023E / 0135PS023S
TYPE:	Pellet Fueled/Supplementary For Residential Use
STANDARD(s):	ASTM E 1509-04, ULC-S627-00, ASTM E 2515-11, ASTM E 2779-10

MODEL:	P61-C Pellet Stove
LABORATORY:	OMNI Test Laboratories, Inc
REPORT NO.	0135PS022E / 0135PS022S
TYPE:	Pellet Fueled/Supplementary For Residential Use
STANDARD(s):	ASTM E 1509-04, ULC-S627-00, ASTM E 2515-11, ASTM E 2779-10

MODEL:	P68-C Pellet Stove
LABORATORY:	OMNI Test Laboratories, Inc
REPORT NO.	0135PS013E / 0135PS013S
TYPE:	Pellet Fueled/Supplementary For Residential Use
STANDARD(s):	ASTM E 1509-04, ULC-S627-00, ASTM E 2515-11, ASTM E 2779-10

NOTE: This installation must conform with local codes. In the absence of local codes you must comply with the **ASTM E1509-2004, ULC-S627-00, ULC/ORD-C-1482-M1990, (UM) 84-HUD**

The P43-C, P61-C and P68-C is Certified to comply with 2020 particulate emission standards.

B. Mobile Home Approved

This appliance is approved for mobile home installations when not installed in a sleeping room and when an outside combustion air inlet is provided.

The structural integrity of the mobile home floor, ceiling, and walls must be maintained. The appliance must be properly grounded to the frame of the mobile home and use only listed pellet vent, Class “PL” connector pipe.

A Harman® Outside Air Kit must be installed in a mobile home installation.

WARNING

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

DO NOT INSTALL IN SLEEPING ROOM.

C. Glass Specifications

This appliance is equipped with 5mm mirrored ceramic glass. Replace glass only with 5mm ceramic glass. Please contact your dealer for replacement glass.

D. Electrical Rating

120 VAC, 60 Hz, Start 4.2 Amps, Run 2.8 Amps

NOTE: Some generator or battery back-up systems may not be compatible with the micro-processor electronics on this appliance. Please consult the power supply manufacturer for compatible systems.

E. California

WARNING

This product and the fuels used to operate this product (wood), and the products of combustion of such fuels, can expose you to chemicals including carbon black, which is known to the State of California to cause cancer, and carbon monoxide, which is know to the State of California to cause birth defects or other reproductive harm. For more information go to: www.P65Warnings.ca.gov

F. BTU & Efficiency Specifications

➔ **P43-C Freestanding Pellet Stove:**

EPA Certification Number:	165-18
EPA Certified Emissions:	1.82 g/hr
***LHV Tested Efficiency:**	82.7%
****HHV Tested Efficiency:**	76.7%
*****EPA BTU Output:**	18,780 - 33,250
******BTU Input:**	23,900 - 45,200
Vent Size:	3 Inch
Hopper Capacity:	50 lbs
Fuel	Wood Pellet

P61-C Freestanding Pellet Stove:

EPA Certification Number:	177-19
EPA Certified Emissions:	1.5 g/hr
***LHV Tested Efficiency:**	85%
****HHV Tested Efficiency:**	79%
*****EPA BTU Output:**	17,100 - 46,800
******BTU Input:**	21,400 - 60,700
Vent Size:	3 Inch
Hopper Capacity:	72 lbs
Fuel	Wood Pellet

P68-C Freestanding Pellet Stove:

EPA Certification Number:	178-19
EPA Certified Emissions:	1.4 g/hr
***LHV Tested Efficiency:**	85%
****HHV Tested Efficiency:**	79.5%
*****EPA BTU Output:**	15,900 - 53,100
******BTU Input:**	20,200 - 67,600
Vent Size:	3 Inch
Hopper Capacity:	76 lbs
Fuel	Wood Pellet

** Weighted average LHV efficiency using data collected during EPA emissions test.*

***Weighted average HHV efficiency using data collected during EPA emissions test.*

****A range of BTU outputs based on EPA Default Efficiency and the burn rates from the low and high EPA tests.*

*****Based on the maximum feed rate per hour multiplied by approximately 8,600 BTU's which is the average BTU's from a pound of pellets.*

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

BTU output will vary, depending on the brand of fuel you use in your appliance. Consult your Harman® dealer for best results.

WARNING! Risk of Fire! *Hearth & Home Technologies disclaims any responsibility for, and the warranty and agency listing will be voided by the below actions.*

DO NOT:

- *Install or operate damaged appliance*
- *Modify appliance*
- *Install other than as instructed by Hearth & Home Technologies*
- *Operate the appliance without fully assembling all components*
- *Overfire*
- *Install any component not approved by Hearth & Home Technologies*
- *Install parts or components not Listed or approved.*
- *Disable safety switches*

Improper installation, adjustment, alteration, service or maintenance can cause injury or property damage.

For assistance or additional information, consult a qualified installer, service agency or your dealer.

NOTE: Hearth & Home Technologies, manufacturer of this appliance, reserves the right to alter its products, their specifications and/or price without notice.

3 General Information

A. Appliance Safety

WARNING! DO NOT operate stove before reading and understanding operating instructions. Failure to operate stove according to operating instructions could cause fire or injury.

⚠ WARNING

HOT SURFACES!
Glass and other surfaces are hot during operation AND cool down.

Hot glass will cause burns.
- **DO NOT** touch glass until it is cooled
- NEVER allow children to touch glass
- Keep children away

- CAREFULLY SUPERVISE children in same room as stove.
- Alert children and adults to hazards of high temperatures.

High temperatures may ignite clothing or other flammable materials.
- Keep clothing, furniture, draperies and other flammable materials away.

If you expect that small children or vulnerable adults may come into contact with this appliance, the following precautions are recommended:

- Install a physical barrier such as:
  - A decorative fire screen.
  - Adjustable safety gate.
- Install a switch lock or a wall/remote control with child protection lockout feature.
- Keep remote controls out of reach of children.
- Never leave children alone near a hot stove, whether operating or cooling down.
- Teach children to NEVER touch the stove.
- Consider not using the stove when children will be present.
- Use only specified components as replacement parts. Other components may not allow your stove to operate as it was intended.

Contact your dealer for more information, or visit: www.hpba.org/safety-information.

To prevent unintended operation when not using your stove for an extended period of time (summer months, vacations, trips, etc):

- Unplug stove from receptacle.

Connect the power cord to a 120 VAC, 60 Hz grounded receptacle. (A surge protector is recommended to protect the circuit board.) Be sure the polarity of the outlet the stove is plugged into is correct.

⚠ WARNING

THIS WOOD HEATER HAS A MANUFACTURER-SET MINIMUM LOW BURN RATE THAT MUST NOT BE ALTERED. IT IS AGAINST FEDERAL REGULATIONS TO ALTER THIS SETTING OR OTHERWISE OPERATE THIS WOOD HEATER IN A MANNER INCONSISTENT WITH OPERATING INSTRUCTIONS IN THIS MANUAL.

B. Clear Space

WARNING! RISK OF FIRE! *Do NOT place combustible objects in front or to the sides of the appliance. High temperatures may ignite clothing, furniture or draperies.*

Mantel: Avoid placing candles and other heat-sensitive objects on mantel or hearth. Heat may damage these objects.

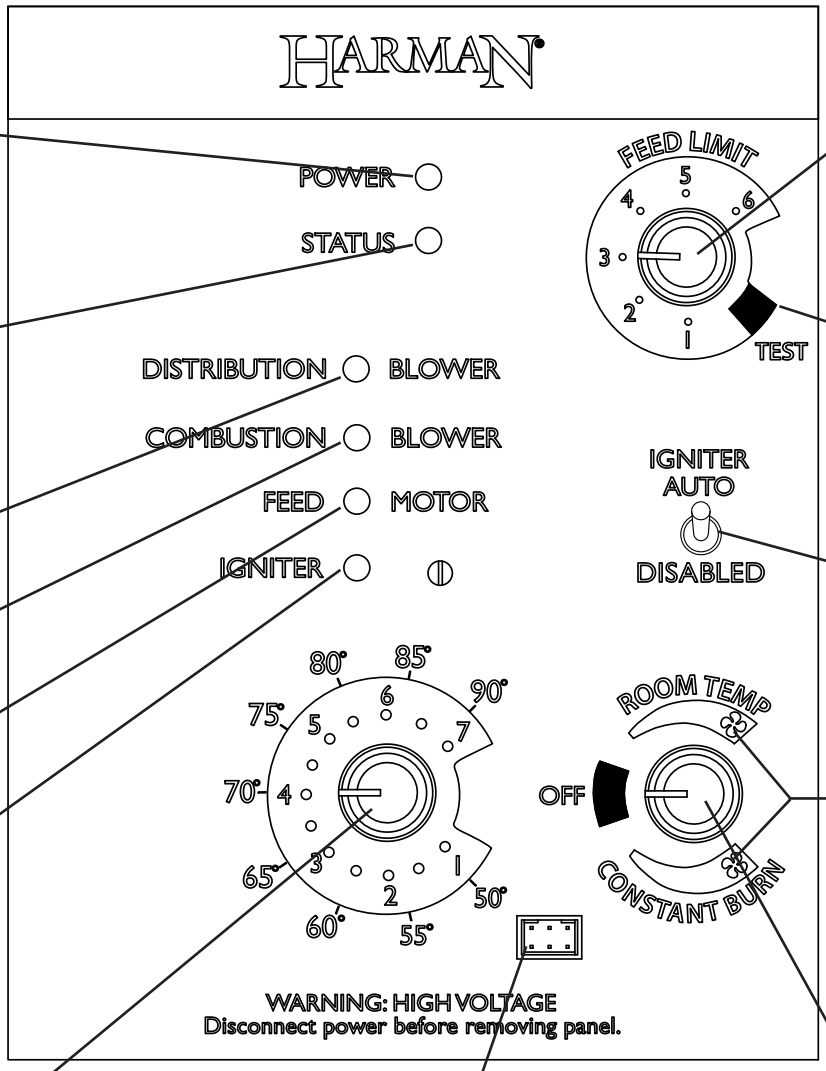
NOTICE: *Clearances may only be reduced by means approved by the regulatory authority having jurisdiction.*

WARNING! RISK OF FIRE! *Keep combustible materials, gasoline and other flammable vapors and liquids clear of appliance.*

- *Do **NOT** store flammable materials in the appliance's vicinity.*
- *Do **NOT** use gasoline, lantern fuel, kerosene, charcoal lighter fluid or similar liquids to start or "freshen up" a fire in this heater.*

Keep all such liquids well away from the heater while it is in use as combustible materials may ignite.

C. Control Explanation



Power Light
Indicates power to the control.

Status Light
Will be lit in either stove or room temp mode when pointer is not within off position band except after normal shut down. Blinks to indicate errors listed below.

Indicates power to distribution blower.

Indicates power to combustion blower

Indicates power to the feed motor.

Indicates igniter is on.

Feed limit
Sets the maximum feed rate

Test
Runs all motors at full speed for one minute to check operation. Afterwards the control will simulate a minimum burn with the combustion blower remaining on low.

Igniter switch
Set to appropriate Start-Up mode.

Distribution Blower speed adjustment range.
L = low
H = high

Temp dial
Allows you to adjust the room temperature setting, in Room Temp Mode, using the outer scale marked in degrees Fahrenheit. It also allows you to adjust the constant burn setting, while in Constant burn Mode, using the inner scale marked from 1 to 7.

Dealer Diagnostic Port
For dealer maintenance only. Requires special DDM monitor supplied to Harman® Dealers exclusively.

Mode Selector
Allows you to choose between Room Temp Mode, Constant burn Mode, or OFF. Also allows you to vary the distribution blower speed by turning the knob to the high or low side of each mode.

D. Fuel Specifications

Fuel and Fuel Storage

Pellet fuel quality can fluctuate from manufacturer to manufacturer, and even from bag to bag.

Hearth & Home Technologies recommends using only fuel that is certified by the Pellet Fuels Institute (PFI).

Fuel Material

- Made from sawdust and/or other wood by-products
- Source material typically determines ash content

Higher Ash Content Material

- Hardwoods with high mineral content
- Bark and leaves as source material
- “Standard” grade pellets

Lower Ash Content Material

- Softwood; pine, fir, etc.
- Materials with lower mineral content
- “Premium” grade pellets

CAUTION! Do not burn fuel that contains an additive.

- May cause hopper fire
- Damage to product may result

Read the list of ingredients on the packaging.

Clinkers

Minerals and other non-combustible materials, like sand, will turn into a hard glass-like substance when heated.

Trees from different areas will vary in mineral content. For this reason, some fuels will produce more clinkers than others.

Moisture

Always burn dry fuel. Burning fuel with high moisture content takes energy to dry and tends to cool the appliance thus, robbing heat from your home. Damp pellet fuel could turn back into sawdust which does not flow properly through the feed system.

Size

- Pellets are either 1/4 inch or 5/16 inch (6-8mm) in diameter
- Length should be no more than 1-1/2 inches (38mm)
- Pellet length can vary from lot to lot from the same manufacturer.

Performance

- Higher ash content requires more frequent maintenance.
- “Premium” grade pellets will produce the highest heat output.
- Burning pellets longer than 1-1/2 inches (38mm) can cause inconsistent feeding and/or ignition.

We recommend that you buy fuel in multi-ton lots whenever possible. However, we do recommend trying different brands prior to purchasing multi-ton lots, to ensure your satisfaction.

CAUTION! *Tested and approved for use with wood pellets ONLY. Burning of any other fuel will void your warranty.*

Storage

- Wood pellets should be left in their original sealed bag until ready to use, to prevent moisture.
- Do not store fuel within the specified clearance areas, or in a location that will interfere with routine cleaning and maintenance procedures.

⚠ CAUTION

Tested and approved for use with wood pellets ONLY. Burning of any other fuel will void your warranty.

NOTICE

Hearth & Home Technologies is not responsible for stove performance or extra maintenance required as a result of using fuel with higher ash or mineral content.

E. General Operating Information

1. Room Sensor Calls For Heat

The appliance is like most modern furnaces; when the room sensor calls for heat, your appliance will automatically light and deliver heat.

When the room is up to temperature and the room sensor is satisfied, the appliance will shut down.

2. Heat Output Controls

The appliance will turn on and off as the room sensor demands. When the room sensor calls for heat, the appliance will always start up on High. After burning approximately 7-10 minutes, the appliance will then burn at the rate at which it was originally set. If the appliance is set at one of the lower settings, it will run quieter but take longer to heat up an area than if it were set at a higher burn rate.

Regardless of the burn rate, when the area is warm enough to satisfy the room sensor, the appliance will shut off.

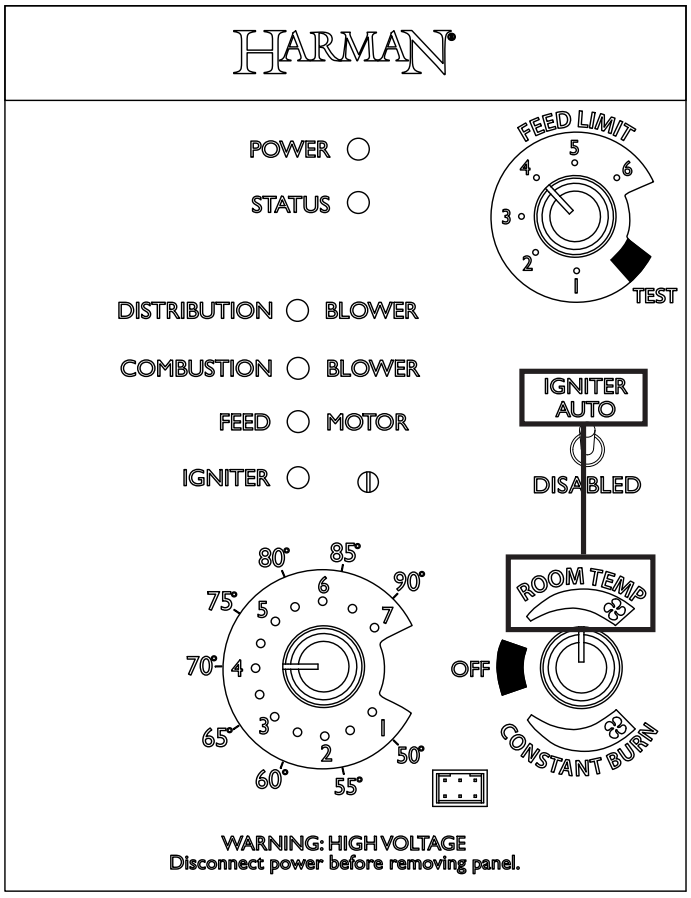


Figure 3.1

⚠ WARNING

Fire Hazard

Keep combustible materials, gasoline and other flammable vapors and liquids clear of appliance.

- Do **NOT** store flammable materials in the appliance's vicinity.
- **NEVER USE GASOLINE, GASOLINE-TYPE LANTERN FUEL, KEROSENE, CHARCOAL LIGHTER FLUID, OR SIMILAR LIQUIDS TO START OR "FRESHEN UP" A FIRE IN THIS HEATER. KEEP ALL SUCH LIQUIDS WELL AWAY FROM THE HEATER WHILE IT IS IN USE.**
- **DO NOT BURN GARBAGE OR FLAMMABLE FLUIDS SUCH AS GASOLINE, NAPHTHA OR ENGINE OIL.**
- **DO NOT USE CHEMICALS OF FLUIDS TO START THE FIRE.**
- Combustible materials may ignite.

4 Operating Instructions

A. Starting Your First Fire

1. A room sensor is required for proper operation of this appliance in “Room Temp” mode. At this time, fill the hopper with pellets, insure the control is set to “OFF”. Figure 4.1. Plug the power cord into a properly grounded, nearby outlet.
2. Once power is present, the unit it will run through a quick diagnostics test to insure the control is operating properly. This is normal.
3. For your first fire it may be necessary to purge the auger system by putting the feed limit knob to “Test” prior to starting the unit. Figure 4.2. This insures that plenty of fuel enters the burn pot for proper ignition.
4. Flip toggle switch to desired mode “Auto or Disabled”. Figure 4.3. Set feed limit knob to desired setting and turn mode dial to “Room Temp” or “Constant burn” Figure 4.4. **Note:** Feed rate of #4 is a good starting point. Adjustments may need to be made depending on fuel quality and/or heat output desired.
5. The fuel feed system and the igniter should now be on.
6. Once the appliance has ignited, let it burn for approximately 7-10 minutes. After this time, the igniter light should turn off and the unit should begin to operate per the settings at the control.

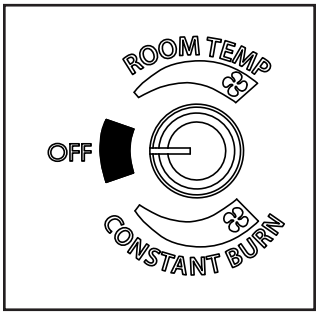


Figure 4.1

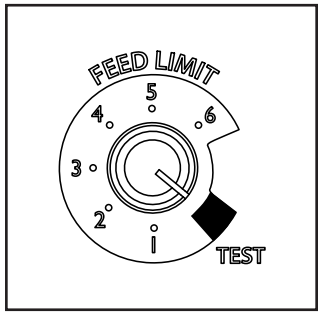


Figure 4.2

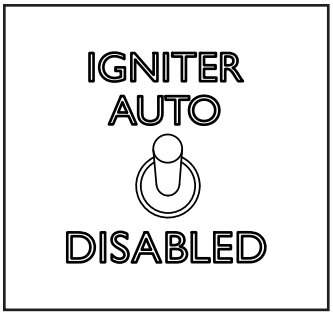


Figure 4.3

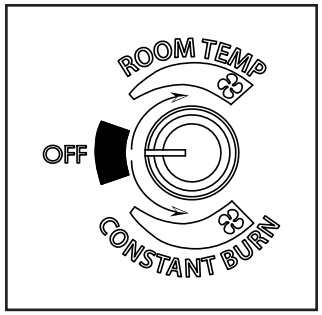


Figure 4.4

B. Fire Characteristics

A properly adjusted fire has a medium active flame pattern that extends out of the burn pot approximately 6 inches (152mm).

C. Feed Limit Instructions

The Feed Limit control is factory set at #4, and should be adequate for most fuels.

However, if the flame height is too high or too low, you will need to adjust the Feed Limit. Wait until the appliance has been burning for 15 minutes before making your adjustments and allow 15 minutes for feed adjustment to take effect.

⚠ CAUTION

Odors and vapors released during initial operation.

- Curing of high temperature paint.
- Open windows for air circulation.

Odors may be irritating to sensitive individuals.

D. Ignition Cycles

1. At the beginning of each ignition cycle, it is normal to see some smoke in the firebox. The smoke will stop once the fire starts.
2. The distribution blower will automatically turn on after your appliance has reached the set temperature.

   This blower transfers heat from your appliance into the room, and will continue to run in “constant burn” mode at the set speed you have the control knob at. In “room temp” mode however, the blower will turn on and off in accordance to what temperature the room sensor is reading. When the room sensor is satisfied the blower will shut down until the room sensor sees a demand for heat.
3. Occasionally the appliance may run out of fuel and shut itself down. When this happens, the unit will need to be turned to the off position and restarted.

   If needed, follow the instructions in Section A “Starting Your First Fire”.

⚠ WARNING

Fire Risk

Do NOT operate appliance:

- With appliance door open.
- Burnpot floor open.
- Cleaning slide plates open.

Do NOT store fuel:

- Closer than required clearances to combustibles to appliance
- Within space required for loading or ash removal.

E. Automatic Ignition

Adjust Feed Limit. If this is your first fire or you are trying different pellets, set the feed limit to #4, Figure 4.5 This is a conservative number and will probably need to be increased. After you know a Feed Limit setting that works well, use that setting. Remember, if your feed rate is too high you may waste fuel.

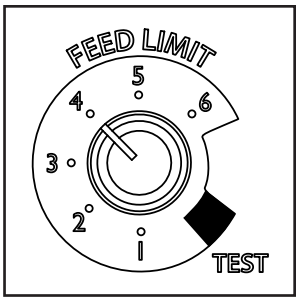


Figure 4.5

Setting the feed limit # for maximum burn: With the unit burning in “AUTO”, turn to “Constant Burn” and put the fan on “H”. Set the Temperature Dial to #7. Allow the unit to burn for about 30 minutes and check ash on front of burn pot. Figure 4.6. If the ash line is larger than 1”, turn the feed limit from #4 to #5. Allow another 30 minutes of burn time and check again. If, at #6 setting, a 1” or less ash bed is not obtainable, it is not a problem. The 1” ash bed is only at maximum burn rate and during normal operation, the ash bed will be larger.

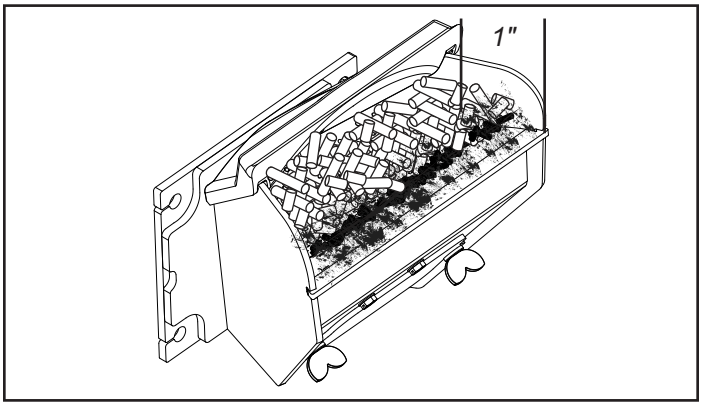


Figure 4.6

Note: The firebox low pressure switch will not allow the auger motor or the igniter element to operate if the view door is open.

Igniter Switch to "AUTO" (up position)

Make sure the unit is plugged into a properly grounded, 120 VAC, 60 Hz electrical source. The power light should be the only light lit.

Note: Be sure there is no fuel or other combustibles in the ash pan prior to lighting.

1. Turn Mode Selector to "OFF".
2. Fill hopper with pellets.
3. Clean burn pot with scraper, if necessary.
4. If starting after an empty hopper, turn Feed Limit to "TEST" (for one 60 second cycle). This will flow pellets into the auger tube and also allow you to check the motors for operation.

NOTE: The auger motor will not operate with the view door open.

5. Turn Feed Limit to #4.
6. Flip the Igniter Switch up into the "AUTO" position.
7. Turn the Temperature Dial to the desired room temperature.
8. Turn Mode Selector to Room Temperature or Constant Burn mode.
9. Fill hopper with pellets and remove ashes as required. Keep the hopper lid and firebox doors closed while in operation. Maintain door seals in good condition. Failure to do so will affect operation of the appliance and may permit escape of smoke or gases into the living space causing smoke detectors to sound.

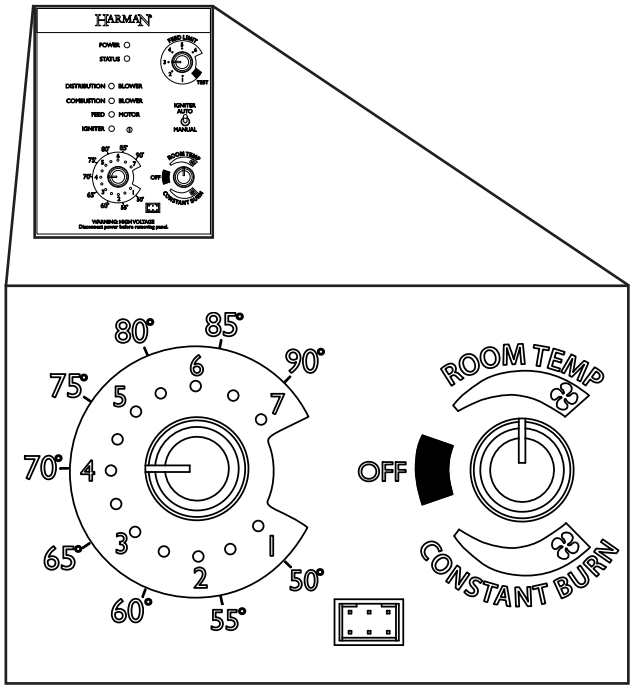
⚠ WARNING

BURNING GARBAGE, USE OF IMPROPER FUELS, FIRESTARTERS OR ALTERING THE STOVE FOR HIGHER HEAT OUTPUT MAY CAUSE DAMAGE TO THE STOVE AND COULD RESULT IN A HOUSE FIRE. USE ONLY APPROVED FUELS AND FOLLOW ONLY THESE OPERATION GUIDELINES.

⚠ WARNING

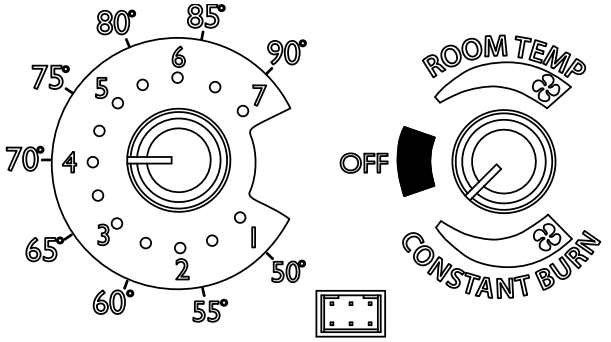
NEVER USE GASOLINE, GASOLINE-TYPE LANTERN FUEL, KEROSENE, CHARCOAL LIGHTER FLUID, OR SIMILAR LIQUIDS TO START OR 'FRESHEN UP' A FIRE IN THIS HEATER. KEEP ALL SUCH LIQUIDS WELL AWAY FROM THE HEATER, WHILE IN USE.

E. Automatic Ignition (Continued)

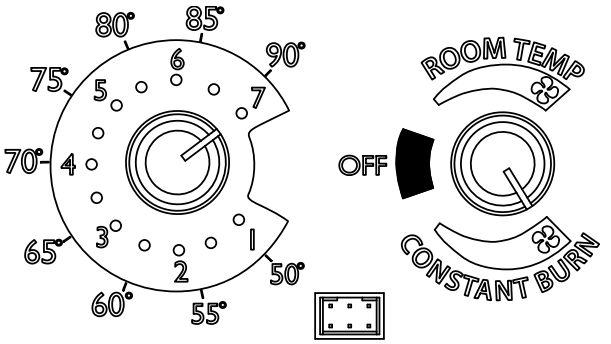


Room Temperature Mode: *This setting will produce a room temperature of 70 degrees with the distribution blower at medium speed.*

Constant burn Mode



This setting will produce medium heat with the distribution blower on "low".



This setting will produce continuous maximum heat output with the distribution blower at full speed.

The P-Series Pellet Stove is more than just automatic ignition, it is also automatic temperature control. The automatic system will allow the fire size to be adjusted to match the heating needs and even put the fire out if necessary. If heat is needed after the fire is out, the P-Series Pellet Stove will automatically re-ignite and adjust the fire size to match the heating need. The totally automatic room sensor mode is recommended because of its efficiency. The unit can be switched between "AUTO" and "DISABLED" at any time during operation.

Igniter switch to "AUTO"

Room Temperature Mode

In "Room Temp Mode" heat output is controlled automatically by the Room Sensing Probe. When the Room Sensing Probe calls for heat, the stove will increase output. When the Room Sensing Probe is getting close to the set temperature, the stove will begin to level off output and keep the fire burning at just the right temperature to maintain that setting.

High output is determined by the Feed Limit setting. This setting, generally on #4, can be increased if higher burn rates are necessary (Figure 4.6). The unit's maximum burn rate should not create less than 1" of ash on the burn pot front edge (Figure 4.7). Overfeeding is not a safety concern, but fuel may be wasted if unburned pellets fall into the ash pan.

In "Room Temp Mode" a constant fuel consumption rate is sacrificed for exact room temperature. Therefore, as it gets colder more pellets will be burned automatically.

The distribution blower speed will vary according to the position of the mode selector pointer, and fire size.

Igniter switch to "AUTO"

Constant Burn Mode

This allows for automatic ignition upon start-up only. The unit can then be set at any desired setting. The heat output and fuel consumption will remain constant regardless of room temperature. The unit's maximum feed rate should not create less than 1" of ash on the burn pot front edge. Figure 4.7.

The unit's low burn or maintenance setting is as low as it will go. It will not go out unless it runs out of fuel or is turned off.

Shut-Down Procedure

To kill the fire or stop burning the stove, turn the Mode Selector to "OFF". This will cause the fire to diminish and burn out. When the fire burns out and the stove cools down everything will stop.

If you pull the plug to shut down the stove, all motors will stop. This may cause incomplete combustion and smoke in the firebox. If the load door is opened, the smoke may escape.

The best way to shut down the stove is simply let it run out of pellets, then the stove will shut down automatically.

5 Maintenance & Service

When properly maintained, your stove will give you many years of trouble-free service. **Contact your dealer** to answer questions regarding proper operation, trouble-shooting and service for your appliance. Visit www.harmanstoves.com to find a dealer. We recommend annual service by a qualified service technician.

Note: Do not use a household vacuum to clean the stove. We recommend that you use a shop vacuum that is equipped with a fine dust filter called a HEPA filter or a vacuum specially made for fly ash and soot. USING A VACUUM WHICH IS NOT EQUIPPED WITH A FINE DUST FILTER WILL BLOW FLY ASH AND SOOT OUT INTO THE ROOM.

NOTE: THE STOVE MUST BE COMPLETELY OUT BEFORE YOU VACUUM THE STOVE. LIVE PELLET EMBERS, IF SUCKED INTO THE VACUUM, WILL LIGHT THE VACUUM ON FIRE AND MAY ULTIMATELY CAUSE A HOUSE FIRE.

A. Proper Shutdown Procedure

⚠ CAUTION

Shock and Smoke Hazard

- Turn unit to the off position, let appliance completely cool and combustion blower must be off. Now you can unplug appliance before servicing.
- Smoke spillage into room can occur if appliance is not cool before unplugging.
- Risk of shock if appliance not unplugged before servicing appliance.

Follow the detailed instructions found in this section for each step listed in the chart below.

B. General Maintenance

Types of Fuel

The type of fuel you are burning will dictate how often you have to clean your burnpot.

If the fuel you are burning has a high dirt or ash content , it may be necessary to clean the burnpot more than once a day.

Dirty fuel will cause clinkers to form in the burnpot. A clinker is formed when dirt, ash or a non-burnable substance is heated to 2000°F (1093°C) and becomes glass-like.

C. Quick Reference Maintenance Chart

Frequency	Cleaning Procedure	Safety Measures	Tips
Daily	Scrape Burn pot	Wear flame resistant gloves[3]	Vigorous, strong scraping specifically near neck of burn pot. Scrape every time you add pellets or at least every 3 bags of fuel.[2]
Weekly	Empty Ash Pan	Wear protective gloves.[1] Put ashes into a steel non-combustible container with tight fitting lid outside.	Unit does not need to be turned off. Reduce to low burn during removal.
	Clean the Glass	Stove must be turned off and cold.	
Monthly	Scrape & Vacuum Heat Exchanger	Stove must be turned off and cold.	Use provided scraper. Scrape back and sides of firebox.
	Brush & vacuum the distribution fan	Stove must be turned off, cold and unplugged from power supply.	Use provided paint brush. This should be done approximately every 25 bags.[2]
	Inspect Hopper lid gasket for damage		Replace gasketing if frays, tears or other visible damage to gasket. This should be done approximately every 50 bags.[2]
	Clean Igniter	Stove must be turned off, cold and unplugged from power supply. Wear protective gloves.[1] Put ashes into a steel non-combustible container with tight fitting lid outside.	Use provided paint brush. Vacuum loose ash from around igniter and inside burn pot.
Stove MUST be turned off, cold and unplugged from power supply for Yearly Cleaning.			
Yearly[4]	Brush & vacuum the combustion fan and venting/exhaust path	Wear protective gloves.[1] Put ashes into a steel non-combustible container with tight fitting lid outside.	Use provided paint brush to brush fan blades. *Use flue brush to clean venting being careful not to damage the ESP.[2]
	Inspect door gasket		Replace gasketing if frays, tears or other visible damage to gasket.
	Brush & vacuum venting system	Wear protective gloves.[1] Put ashes into a steel non-combustible container with tight fitting lid outside.	

* A flue brush of appropriate size and length may need to be purchased for proper maintenance.

1. Protective gloves will help prevent skin abrasion while working on steel surfaces.
2. Frequency of cleaning depends largely on fuel type. Lower quality pellets require most frequent cleaning.
3. Flame resistant gloves will help protect your skin from potential contact with heat or flames.
4. Yearly cleaning is also known as a Total Clean. This requires completing all the Daily, Weekly, Monthly and Yearly maintenance mentioned. This should be done before you begin burning the unit each heating season.

D. Glass Maintenance

The glass used in your stove is manufactured to exact standards to withstand the high heat of the fire, but like all glass, it must be treated with common sense and care. Never slam the door shut or strike the glass with a heavy object. If the glass is broken or damaged, do not operate the stove until it has been replaced.

Glass - Replacement

If the stove's glass is cracked or broken, you must replace it before operating your stove. Remove pieces carefully. Replace glass only with Harman® replacement glass; **do not use substitutes.**

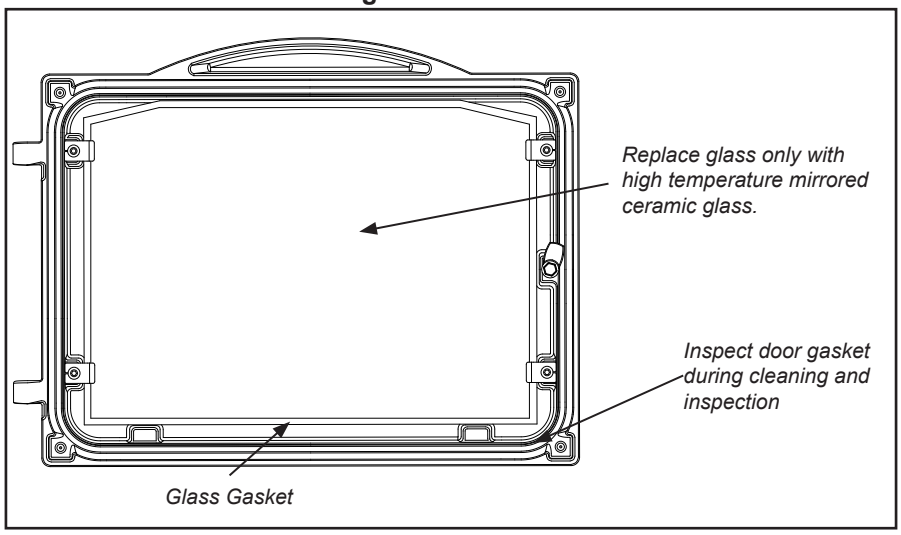
Carefully remove damaged glass, gasket material, and hold down clips (set aside).

Install the self adhesive 1/4"" gasket material around the front face of the glass. Set the glass panel and gasket gently onto the door. Install the hold down clips and tighten with bolts.

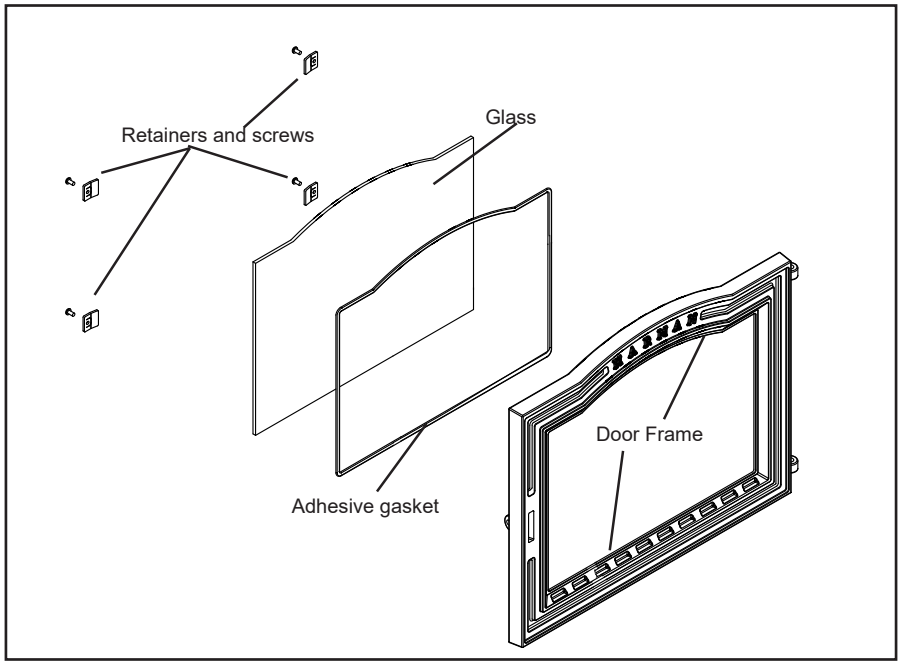
Glass - Cleaning

Sometimes it will be necessary to clean accumulated ash from the glass surface; allowing this ash to remain on the glass for long periods can result in "etching" due to the acidity of the ash. Never clean the glass while it is hot, and **do not** use abrasive substances. Wash the surface with cool water, and rinse thoroughly. You may wish to use a non-abrasive cleaner specifically designed for use on stove glass. In any case, dry thoroughly before relighting your stove.

P43-C & P61-C Freestanding Pellet Stove



P68-C Freestanding Pellet Stove



E. Burnpot Maintenance

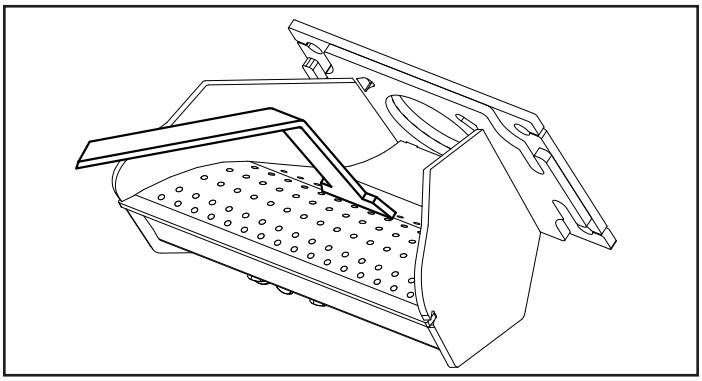


Figure 5.1

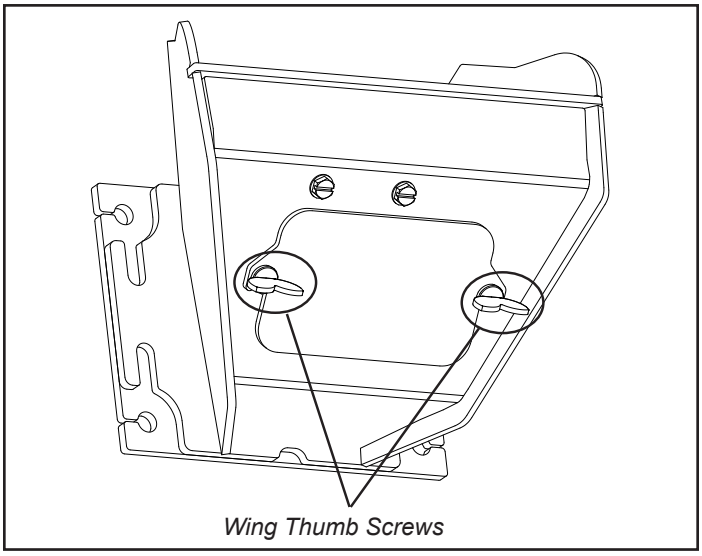


Figure 5.2

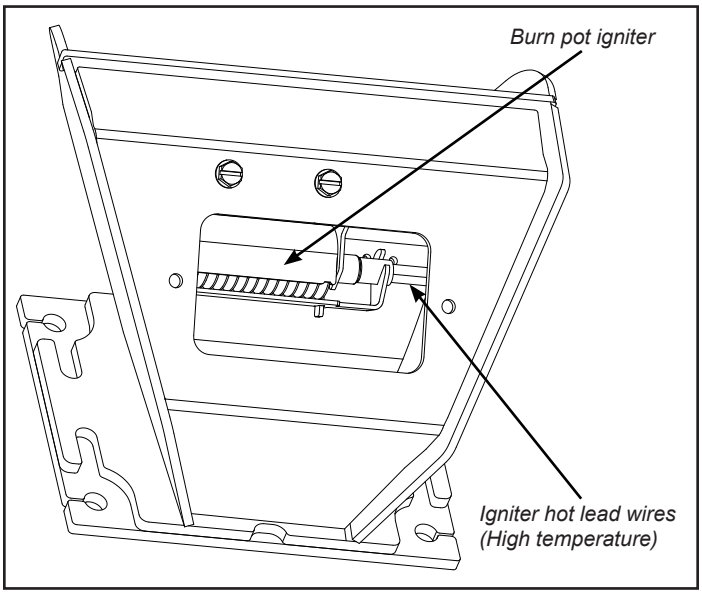


Figure 5.3 - View from below through the ash pan opening.

Whenever adding fuel, take the opportunity to clean the burn pot. **(Weekly at minimum)**

- Scrape the top holed surface and sides of the burn pot down to auger tube Figure 5.1. It is not necessary to completely remove all material from the burn pot. The excess will be pushed out during the next use.
- With the fire out and burn pot cold, use the supplied allen wrench to remove any build-up that may have accumulated in the holes of the burn pot grate. Simply push the allen wrench down through each hole ensuring it is clear of any build-up paying attention not to damage the igniter element in the process.

Monthly, or after each ton of fuel burned:

- Loosen the (2) wing thumb screws on the lower front angle of the burn pot. Figure 5.2
- Lift off the clean-out cover to open the bottom clean-out chamber. Figure 5.3

⚠ DANGER

Disconnect the power to the unit before removing cover.

- Clean ash buildup from inside the chamber while cover is off. Use the scraper to tap on the top front edge of the burn pot. This will help knock pieces of ash, loosened by the scraping process, down through the holes. It also helps knock scale off of the igniter element.

Figure 5.3

The igniter is made to be removable for service by insulated male/female wire connectors. These connections between the hot leads (the wires inside the burn pot) and the cold leads (the wires from the control board) are always pulled to the inside rear of the feeder body. **(Not coiled inside the burn pot.)**

It is very important that these connections are to the inside rear of the feeder body. Also, the extra wire of the igniter wire service loop must be pulled out through the rear of the feeder and tied up so that it will not be damaged by any moving parts.

Note: The hot lead/cold lead connection must always be pulled to the rear of the feeder body before operation.

⚠ WARNING

Use caution when cleaning burn pot clean-out chamber. Do not damage the high temperature igniter wires.

F. Combustion Blower Chamber

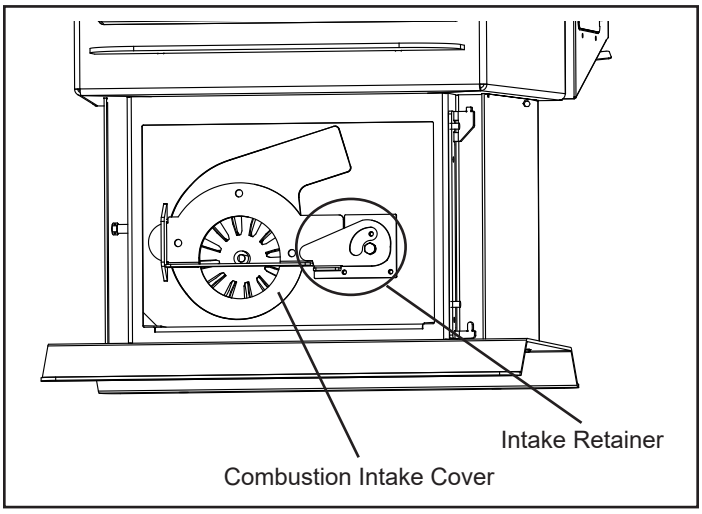


Figure 5.4

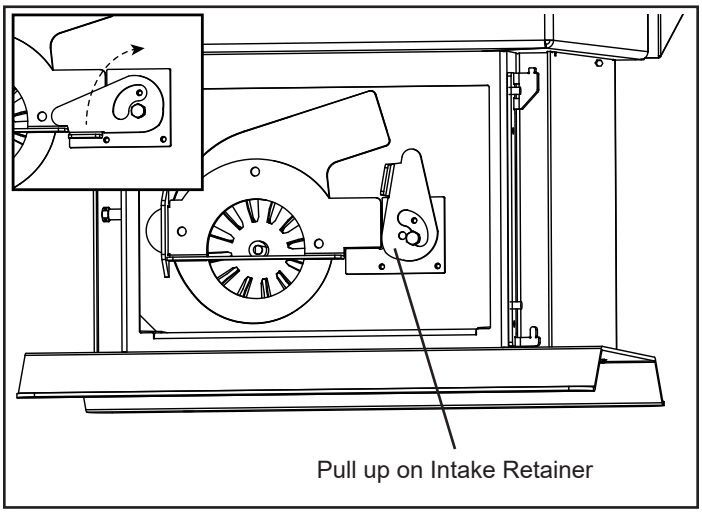


Figure 5.5

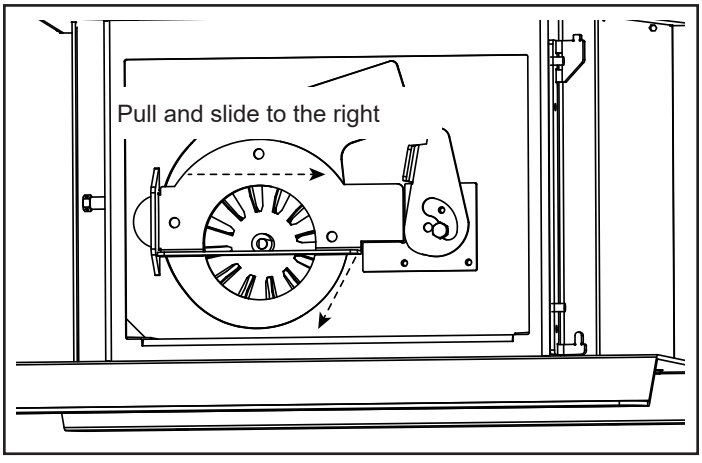


Figure 5.6

Monthly Cleaning- continued:

There is a combustion intake cover located behind the ash pan that must be removed to properly clean the combustion blower fan blade. Figure 5.4. In order to remove the combustion intake cover you must pull up on the intake retainer. Figure 5.5. This will allow the combustion intake cover to be removed. To remove the combustion intake cover pull towards the front of the unit while sliding to the right. Figure 5.6.

Now that the combustion intake cover is removed you can remove any flyash or debris that has collected around combustion blower fan blade and areas around it.

The exhaust passage may need cleaned as well. Keep in mind the ESP Sensor is located just inside the exhaust passage Figure 5.7. Be sure not to damage the ESP Sensor while cleaning this area.

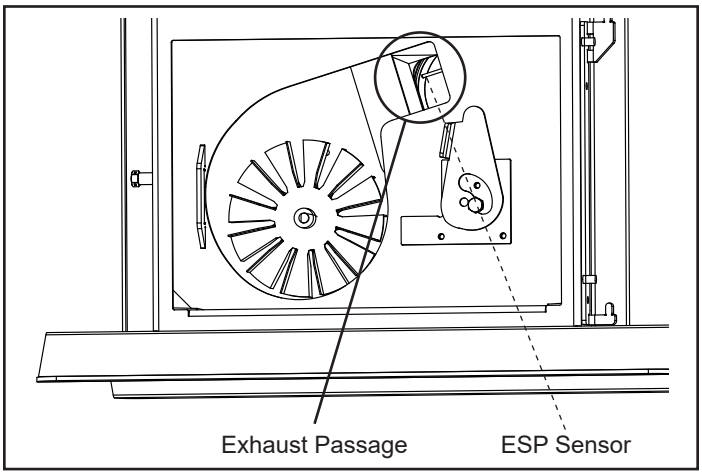


Figure 5.7

G. Pellet Feeder Chamber

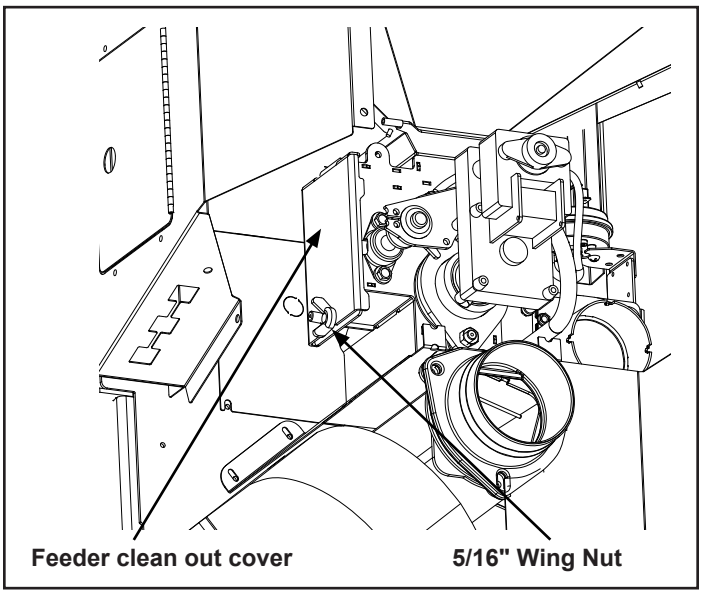


Figure 5.8

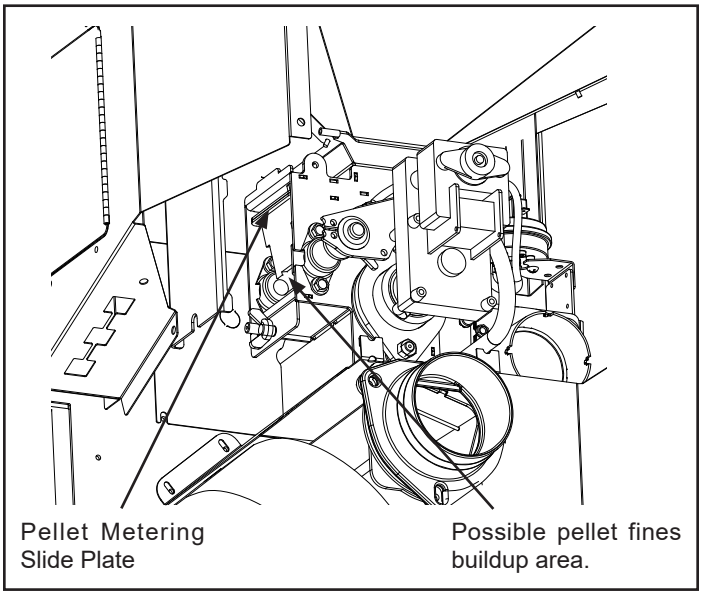


Figure 5.9

Feeder Chamber

This chamber may get a buildup of fines from the feeder mechanism movement. This area should be checked and cleaned at least once a year.

To remove the feeder cover:

- Loosen the 5/16" wing nut. Figure 5.8.
- Lift up and slide the cover off of the threaded stud.
- Inspect and clean the inner chamber if necessary Figure 5.9.
- Reinstall the cover making certain it is seated properly on the feeder body and tighten as tightly as you can by hand.

NOTE: Views are shown with the rear motor covers removed.

6 Troubleshooting and Frequently Asked Questions

A. Error Code Description

Status light error messages:

2 Blinks: Indicates an open feed circuit, typically from pressure switch or hopper switch. Blink status automatically clears when feed circuit is complete. Does not blink if door/ hopper is opened when stove is off.

3 Blinks: Indicates that the ESP (Exhaust Sensing Probe) has failed, has a broken connection, or has gone out of range too many times. This requires a manual reset*.

4 Blinks: Can occur only in Room Temp Mode and indicates Room Sensing Probe failed or not installed. If a Room Sensing Probe is then installed, the status light will automatically reset.

NOTE: Unit will not start in "AUTO" with this status error.

5 Blinks (In Igniter Auto. Mode Only): Indicates that the unit has failed to light within the 36 minute start cycle. To reset - Turn Mode Selector to "OFF", then turn to either mode again.)

6 Blinks : Indicates that the control has calculated poor or incomplete combustion occurring for more than 25 minutes.

A six blink status may be set if the stove is allowed to run out of pellets. To reset, turn mode selector to "OFF" then back on to the desired mode. If the unit was not out of pellets, see Troubleshooting section for more details.

* **Manual reset**- disconnect power cord for a few seconds and reconnect. If error still occurs call your Dealer.

B. Frequently Asked Questions

ISSUES	SOLUTIONS
1. Metallic noise.	1. Noise is caused by metal expanding and contracting as it heats up and cools down, similar to the sound produced by a furnace or heating duct. This noise does not affect the operation or longevity of your appliance.
2. White ash buildup on glass.	2. This is normal. Clean the glass using any non-abrasive glass cleaner.
3. Glass has buildup of black soot	3. Excessive build-up of ash. See solution #4. The lower burn settings will produce more ash, the higher burn settings produce less. The more it burns on low the more frequent cleaning of the glass is required.
4. Glass has turned dirty.	4. Excessive build up of ash. The lower burn settings will produce more ash, the higher burn settings produce less. The more it burns on low the more frequent cleaning of the glass is required.
5. Fire has tall flames with black tails and is lazy.	5. The feed rate needs to be reduced or the burnpot needs cleaning. Heat exchanger or exhaust blower needs cleaning.
6. Smoky start-up or puffs of smoke from the airwash.	6. Either the burnpot is dirty or there is too much fuel at start-up and not enough air.
7. Large flame at start-up.	7. This is normal. Flame will settle down once the fire is established.

Contact your dealer for additional information regarding operation and troubleshooting. Visit www.harmanstoves.com to find dealer.

C. Troubleshooting

With proper installation, operation, and maintenance your appliance will provide years of trouble-free service. If you do experience a problem, this troubleshooting guide will assist a qualified service person in the diagnosis of a problem and the corrective action to be taken. This troubleshooting guide can only be used by a qualified service technician.

STOVE DOES NOT FEED

1. No fuel in hopper.
2. Firebox draft may be too low for sensing switch in feeder circuit to operate. **Check for closed doors**, loose or missing gasket on doors or hopper lid.
3. Feed motor will not run until the ESP control senses a certain temperature. Maybe you did not put enough fuel or starting gel in the burn pot before manually lighting the fire.
4. Restriction in the hopper or feeder. Remove all fuel and examine. Clear the obstruction.
5. Feed motor has failed.

PARTIALLY BURNED PELLETS

1. Feed rate too high.
2. Poor air to fuel mixture. (Check burn pot clean-out cover and air intake).
3. Burn pot or heat exchanger tubes may need to be cleaned.
4. Combination of all the above.
5. #6 status blink: A 6 blink control board status indication is caused by poor or incomplete combustion. The circuit board has the ability to track the combustion through feed settings and ESP temperatures. When the control board has calculated poor or incomplete combustion, it will shut down the unit as a safety feature. (Poor or incomplete combustion is a contributor of creosote which may cause a chimney fire)

A 6 blink status may be caused by several things:

1. Blocked or partially blocked flue.
2. Blocked or partially blocked inlet air.
   a. Backdraft damper on the inlet pipe may be stuck closed.
   b. If outside air is installed, the inlet cover may be blocked.
3. The air chamber under the burnpot may be filled with fines and small bits of ash.
4. The holes in the burnpot may be getting filled with ash or carbon buildup.
5. Combustion blower fan blades may need cleaned.
6. Fuel restrictions as noted above.

SMOKE SMELL

Follow venting manufacturer's recommendations for sealing pipe joints.The exhaust vent is the only part of the system that is under positive pressure.

FIRE HAS GONE OUT- Check for status light.

1. No fuel in hopper.
2. Draft is too low, blocked flue.
3. Something is restricting fuel flow.
4. Hopper lid not closed properly.
5. Feed motor or combustion blower has failed.

SMOKE IS VISIBLE COMING OUT OF VENT

1. Air-fuel ratio is too rich.
   a. Feed rate too high.
   b. Draft too low caused by a gasket leak.

LOW HEAT OUTPUT

1. Feed rate too low
2. Draft too low because of gasket leak.
3. Poor quality or damp pellets
4. Combination of 1 and 2.

HELPFUL HINTS

1. Cleaning Burn Pot

Whenever your stove is not burning, take the opportunity to scrape the burn pot to remove carbon buildup. A vacuum cleaner is handy to remove the residue. Be sure the stove is cold if you use a vacuum.

Carbon buildup can be scraped loose with the fire burning using the special tool provided with your stove. Scrape the floor and sides of the burn pot. The carbon will be pushed out by the incoming fuel. Always wear gloves to do this.

2. Removing Ashes

Turn the Temp Dial to number 1 approximately 30 minutes before removing ashes. This will result in a cooler stove and ash pan.

Maximum Feed Limit settings are not needed in most cases. Operating in the normal range (#4) is recommended when maximum heat output is not required. The ESP probe prevents the stove from being over-fired.

Keep the stove free of dust and dirt.

Fuel

The P-Series Pellet Stove is approved for burning any grade of pelletized bio-mass fuel.

It should be noted, however, that higher ash content will require more frequent ash removal, scraping of the burn pot, and may provide less BTU's per pound.

The moisture content of pellets must not exceed 8%. Higher moisture will rob BTU's and may not burn properly.

Fuel should **not** be stored within the stove installation clearances or within the space required for cleaning and ash removal.

7 Reference Material

A. Safety Reminders

When operating your Harman® P-Series Pellet Stove, respect basic safety standards. Read these instructions carefully before you attempt to operate the P-Series Pellet Stove. Failure to do so may result in damage to property or personal injury and may void the product warranty.

CAUTION: This appliance must be vented to the outside.

Due to high temperatures, this stove should be placed out of traffic and away from furniture and draperies.

Children and adults should be alerted to the hazards of high surface temperatures and should stay away to avoid burn to skin and/or clothing.

Young children should be carefully supervised when they are in the same room as the stove.

Clothing and other flammable materials should not be placed on or near this stove.

Installation and repair of this stove should be done by a qualified service person. The appliance should be inspected before use and at least annually by a qualified service person. More frequent cleaning will be required. It is imperative that control compartments and circulating air passageways of this stove be kept clean.

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

Soot and fly ash: Formation and need for removal. The products of combustion contain small particles of fly ash. The fly ash will collect in the exhaust venting system and will restrict the flow of the flue gases. Pellet fuels have different ash contents depending on what type of wood has been used to make the pellets. **We recommend to clean the system after approximately 1 ton of pellets have been burned and judge from that how often the stove should be cleaned, remember if you change pellets it may change how often you have to clean your stove.**

With any hearth appliance, installation of smoke detectors/ Carbon Monoxide detectors is recommended on every level of the home.

When burning wood slowly, the potential exists for creosote to form. The venting system should be inspected periodically throughout the heating season to determine if a creosote buildup has occurred. If a significant layer of creosote has accumulated (3mm or more), it should be removed to reduce the risk of a chimney fire. If a fire occurs, call the fire department, shut down the stove, and evacuate the residence. Before using the appliance, have the venting system thoroughly inspected and replace any damaged components.

⚠ WARNING

MOBILE/MANUFACTURED HOME GUIDELINES DO NOT ALLOW INSTALLATION IN A SLEEPING ROOM.

⚠ CAUTION

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

⚠ CAUTION

THE STOVE IS HOT WHILE IN OPERATION.

KEEP CHILDREN, CLOTHING AND FURNITURE AWAY. CONTACT MAY CAUSE SKIN BURNS.

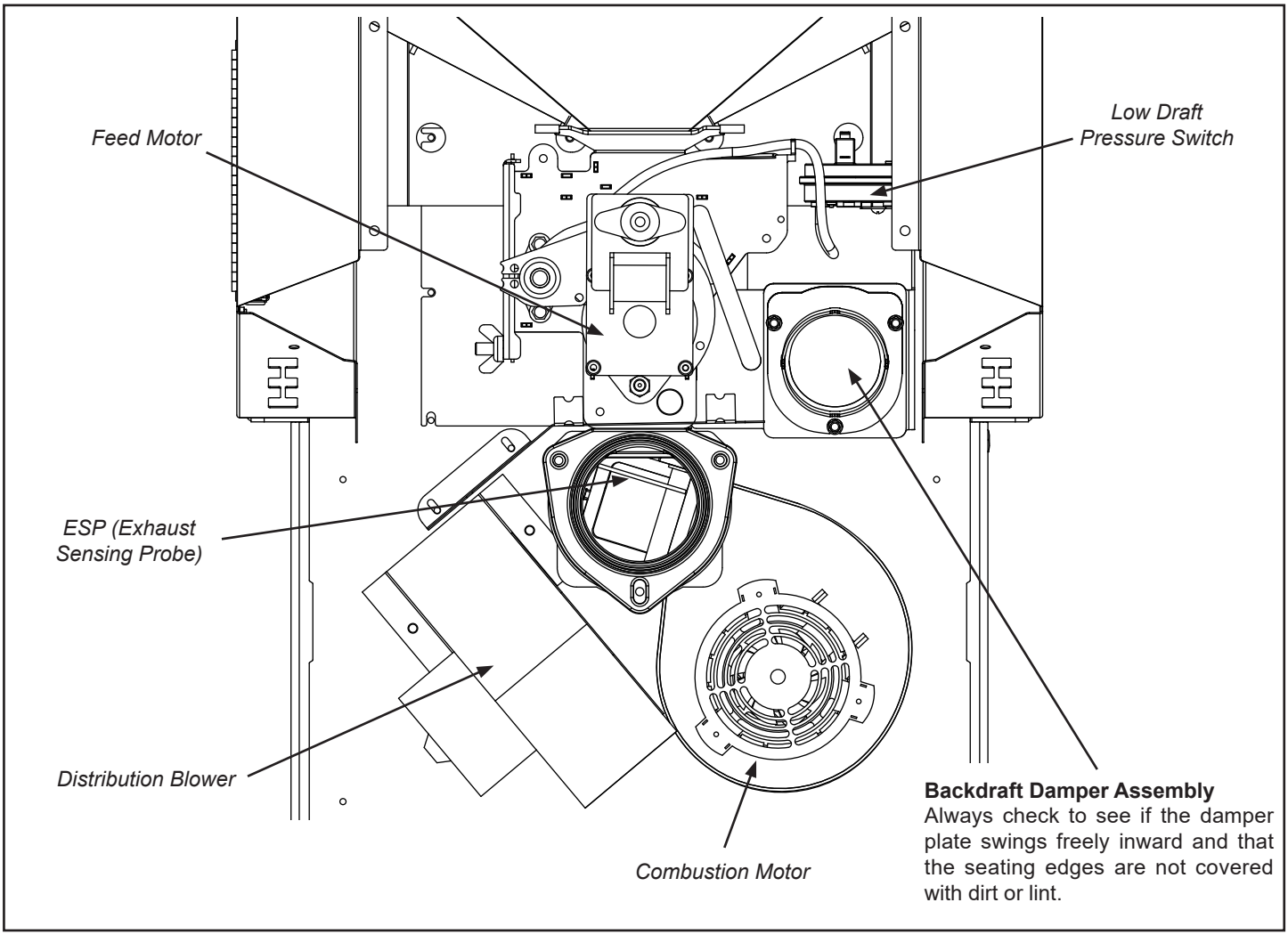
⚠ WARNING

KEEP COMBUSTIBLE MATERIALS SUCH AS GRASS, LEAVES, ETC. AT LEAST 3 FEET AWAY FROM THE POINT DIRECTLY UNDER THE VENT TERMINATION.

⚠ WARNING

USE OF IMPROPER FUELS, FIRESTARTERS OR ALTERING THE STOVE FOR HIGHER HEAT OUTPUT MAY CAUSE DAMAGE TO THE STOVE AND COULD RESULT IN A HOUSE FIRE. USE ONLY APPROVED FUELS AND OPERATION GUIDELINES

B. Motor and Component Location



P-Series Pellet Stove Safety Devices

The **Control Board/ESP** combination is responsible for all high limit safety control. There are 2 high limits, one normal operation high limit and one backup high limit. The control has an automatic diagnostic circuit that continuously monitors the ESP and Room Sensor for faults. If a fault should occur, the control sends a status alert and at the same time the unit goes down to minimum feed/ minimum burn as a safety condition.

The **Low Draft Pressure Switch** is a differential pressure switch that monitors the negative pressure (Draft) in the firebox. If the draft becomes too low for proper combustion, the switch opens, cutting power to the feed motor and the igniter circuits. This switch is connected into the AC (high voltage) wiring.

C. Loss of Power

Harman pellet burning appliances rely on a combustion blower to remove exhaust from the firebox. A power failure will cause the combustion blower to stop running, which may lead to exhaust see page into the room. Vertical rise in the venting system can help create natural draft, which may reduce the likelihood of exhaust leakage into the home.

Installation of a low-cost uninterruptible power supply (UPS) or battery backup system can help ensure the units shuts down without any minor smoke leakage into the home. Harman recommends the installation of one of these two systems for areas prone to power outages.

There is one Harman® approved UPS option for your appliance:

Uninterruptible Power Supply UPS battery back-ups are available online or at computer and office equipment stores. Your Harman® appliance with Rev E or later software available beginning in November 2010 may be plugged directly into a Harman® approved UPS:

- **TrippLite model INTERNET750U** is tested and approved. Other brands or models may not be compatible.

When power is lost, a fully charged UPS will power a safe, combustion blower only shut-down. Your appliance will pulse the blower every few seconds to clear exhaust until the fire is out. **NOTE: The UPS provides safe shut-down only. It is not intended for continued operation.**

- A Inverter/Charger connects to a 12 volt deep cycle battery that will run your appliance for up to eight (8) hours. It includes a trickle charge feature that keeps your battery charged when power is available. **NOTE:** If the power is out for longer than battery life, smoke leakage may still occur unless your stove has been safely shut down.

For an approved Inverter/Charger refer to www.harmanstoves.com.

Your appliance will recognize when power is restored. What happens depends on ESP temperature and whether it is equipped with automatic ignition:

- **In "Automatic" Mode**, units equipped with automatic ignition will respond to the set point and ESP temperature and resume normal operation.
- **In "Idle" Mode**, or for units without automatic ignition:
  - If the ESP is cool, the appliance will remain shut down.
  - If the fire is out and the ESP is still warm, the feeder may restart. Since the fire is out, the ESP temperature will not rise. The unit will then shut-down, and may flash a six-blink status error. (See ESP error codes)
  - If the fire is still burning, it will resume normal operation.

Contact your dealer if you have questions about UPS compatibility with your appliance.

IMPORTANT! : UPS or Battery Backup cannot prevent smoke leakage from an improperly maintained unit. Keep the venting system clean and free from obstructions and maintain all gaskets to keep an airtight seal.

⚠ WARNING

Use only Harman® approved battery back-up devices. Other products may not operate properly, can create unsafe conditions or damage your appliance.

⚠ CAUTION

Always keep appliance doors and hopper lid closed and latched during operation and during power failures to minimize risk of smoke or burn-back.

D. Emergency Manual Ignition

Harman® pellet stoves and inserts should be lit using the automatic ignition system. This is the safest and most reliable way for igniting the unit. In the event the automatic igniter is not functioning, the steps below may be followed to manually light the stove or insert in the "Constant Burn" mode. Manual lighting is for emergency purposes only, and the igniter should be repaired or replaced as soon as practical.

⚠ WARNING

Only use firestarter commercially marketed for pellet stoves and inserts, including wax coated wood chips, pellet starter gel and pellet igniter blocks. Use of any other type of firestarter is prohibited.

To avoid serious injury or death read and follow manufacturer's warning and instructions for use of firestarter. Use of firestarter is only permitted when performing a cold start.

Never attempt to manually light a stove or insert that has been operated recently and is not at room temperature. If automatic ignition was attempted, be sure to give the stove or insert at least 30 minutes or longer to cool to room temperature.

Be sure that the stove or insert is in the "Igniter - Disabled" mode of operation.

Once all the precautions have been taken, follow these steps:

1. Turn the Mode Selector to "OFF".
2. Fill burn pot with pellets, only half way. (Do Not Over Fill).
3. Add firestarter to pellets following manufacturer's instructions.
4. Light pellet gel with a match, and close the door, turn Mode Selector to Constant Burn. Operation will begin when the fire reaches the proper temperature.

E. Service Parts

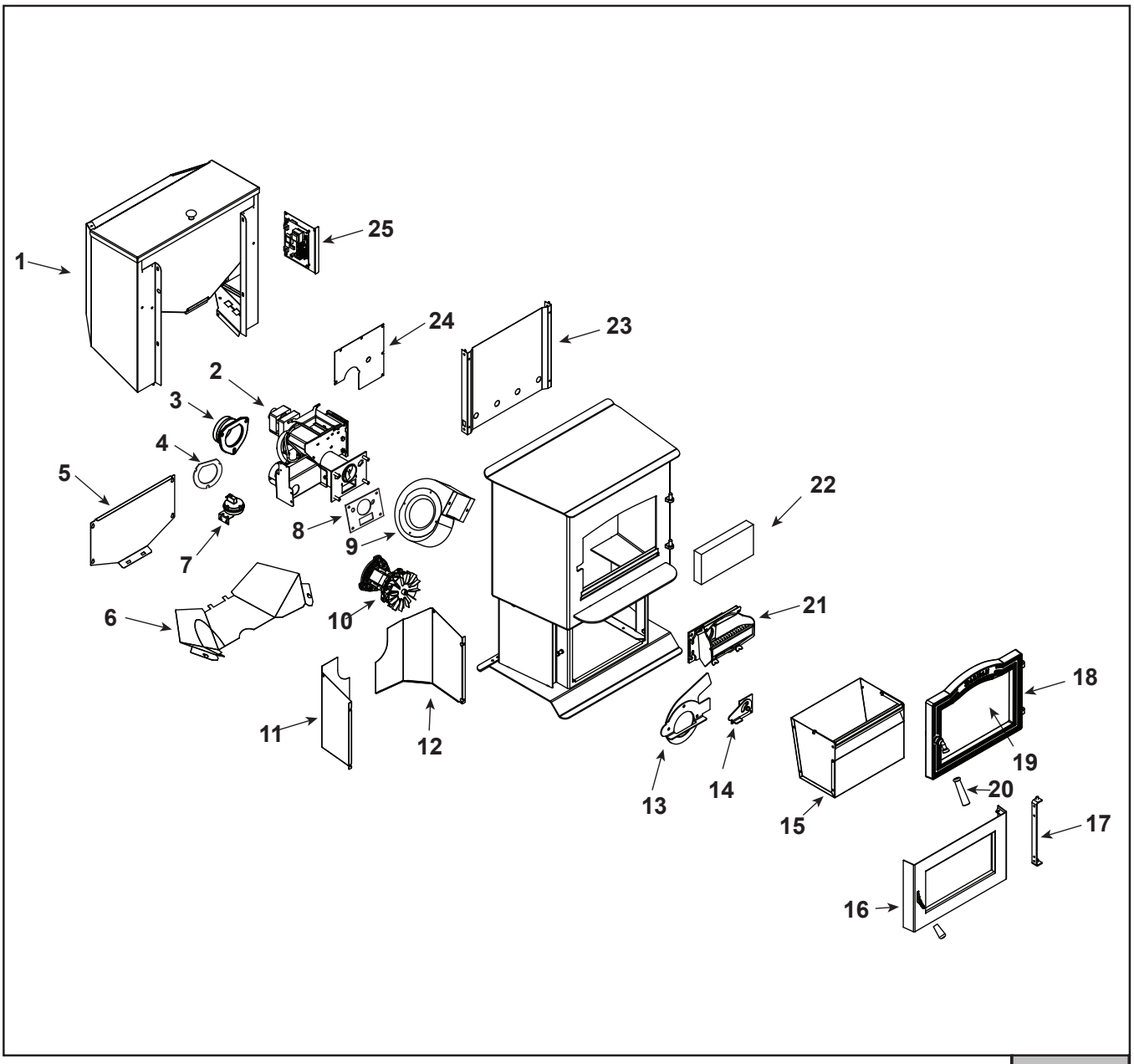
HARMAN®
BUILT TO A STANDARD, NOT A PRICE

Service Parts

P43-C Pellet

Steel Pellet Stove
1-90-04400-1 (Black)

Beginning Manufacturing Date: March 2019
Ending Manufacturing Date: Active



IMPORTANT: THIS IS DATED INFORMATION. Parts must be ordered from a dealer or distributor. **Hearth and Home Technologies does not sell directly to consumers.** Provide model number and serial number when requesting service parts from your dealer or distributor.

ITEM	Description	COMMENTS	PART NUMBER	Stocked at Depot
1	Hopper Assembly		1-10-04300	Y
	Hopper Knob		1-00-02000-1	
	Hopper Latch Assembly	Pre HF2372946	1-00-773901	
		Post HF2372946	SRV8000-050	
	Hopper Lid w/Hinge, Knob		1-10-773900	

Additional service parts on following page.

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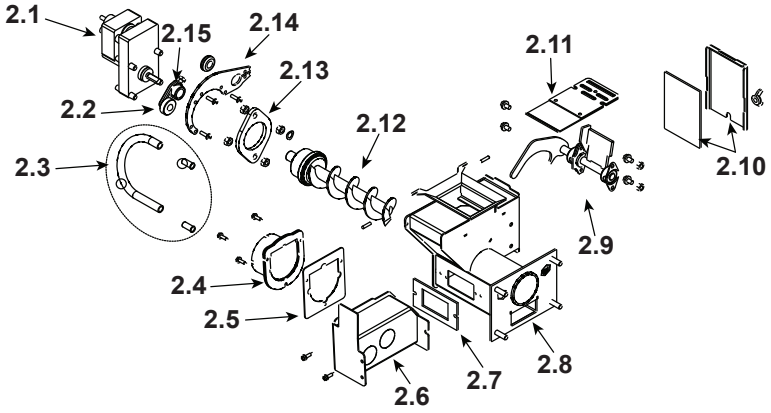
#2 Feeder Assembly



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ITEM	Description	COMMENTS	PART NUMBER	Stocked at Depot
2	Feeder Assembly		1-10-09535A	
2.1	Pellet Feeder Gear Motor, 4RPM		3-20-60906	Y
2.2	UL Feeder Cam Bearing		3-31-3014	Y
2.3	Feeder Crossover Kit		1-00-67900	Y
	9MM Silicone Tube	5 Ft	1-00-511427	Y
2.4	Pellet Air Intake Assembly		1-10-06810A	
2.5	Gasket Feeder Air Intake	Pkg of 6	3-44-72224-6	Y
2.6	UL Feeder Air Intake		1-10-72222	
2.7	Gasket Ultra Air Intake	Pkg of 10	3-44-677160-10	Y
2.8	Ultra Feeder Weldment		1-10-724132	Y
2.9	UL Feeder Pusher Arm		1-10-677187W	Y
2.10	Gasket, UL Feeder		1-00-677122	Y
2.11	Slide Plate Assembly		1-10-677121A	Y
2.12	UL Feeder Auger Assembly		3-50-00565	Y
2.13	Bearing Flange w/Hardware		1-00-04035	Y
2.14	UL Feeder Gear Motor Bracket w/Grommet		1-00-247406	Y
2.15	UL Feeder Cam Block		3-00-677154	Y
	Hopper Switch Feeder Fitting	Pkg of 2	1-00-142818	Y
	Motor Bracket Grommet	Pkg of 12	3-31-2761-12	
	Pillow Block	Pkg of 4	3-31-3614087-4	Y
	Silicone Tubing, 1/8”	5 Ft	1-00-5113574	Y
3	Flue Tail Pipe		3-00-247237	Y
4	Gasket Set, Burn Pot & Tailpipe	Pkg of 5 Sets	1-00-07381	Y
5	Auger Motor Cover		2-00-773843P	Y
6	Auger Motor Shield		2-00-773815P	Y
7	Differential Switch		3-20-6866	Y
8	Gasket Set, Burn Pot & Tailpipe	Pkg of 5 Sets	1-00-07381	Y

Additional service parts on following page.

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ITEM	Description	COMMENTS	PART NUMBER	Stocked at Depot
9	Distribution Blower		3-21-33647	**Y**
10	Combustion Blower	Fan blades not included	3-21-08639	**Y**
	Combustion Blower Mounting Screws (Pkg of 100)	Commonly required for Combustion Blower replacement	1-00-53483208	
	Fan Blade, 5” Double Paddle (Combustion Blower)		3-20-502221	**Y**
11	Rear Cover Left		2-00-773828-1P	**Y**
12	Rear Cover Right		2-00-773828-2P	**Y**
13	Comb Intake Weldment		1-10-08516S	**Y**
14	Retainer Assembly		1-10-08533S	**Y**
15	Ash Pan		1-10-7738108A	**Y**
16	Ash Door Assembly		1-10-773904A	
	Wood Handle		1600663	
17	Bolt on Hinge		2-00-06968B	
18	Cast Door Frame		4-00-06800P	
	Cast Door w/Glass		1-10-06800M	
	Pin, Slick (Pkg of 2)	Post #HF2371860	1-00-110	
19	Glass Panel w/Gasket		1-00-950133647	**Y**
20	Door Handle Assembly		1-00-453001	**Y**
	Contains: Handle, 6 mm Washer, SHCS, handle, Elbow, Paw (Cast), SSS, Bhcs.			
	Wooden Handle w/Hardware, Load Door		1-00-00247	**Y**
	Wave Washer	Pkg of 10	SRV3-31-453013	
21	Burn Pot Weldment		1-10-00675	**Y**
	Flame Guide		3-00-03000	**Y**
	Clean Out Cover	2 Sets	1-00-06623	**Y**
	Thumb Screw	Pkg of 10	3-31-782108-10	**Y**
22	Fire Brick 4-1/2 x 9 x 1-1/4”	Pkg of 7	1-00-900450125	**Y**
	Firebrick, Full Skid	414 Pcs	3-40-900450-414	
23	Hopper Heat Shield		2-00-773854B	
24	Feeder Cover		2-00-773826L	
25	Circuit Board w/Knobs & Shafts		1-00-05886	**Y**
	Control Board Label		3-90-07766	
	Circuit Board Plate, Studded w/label		1-10-08327	
	Knob, Contol Board/D-Shaft	25 Sets	1-00-015605	**Y**
	Arrow Burn Pot Scraper	Pkg of 10	2-00-773850-10	
	Cradle Assembly			
	Igniter Holder, Cradle, & Flat Bottom		1-00-777907	**Y**
	Diagnostic Display Module		3-20-05401	**Y**
	DDM Replacement Cable		1-00-05402	

Additional service parts on following page.

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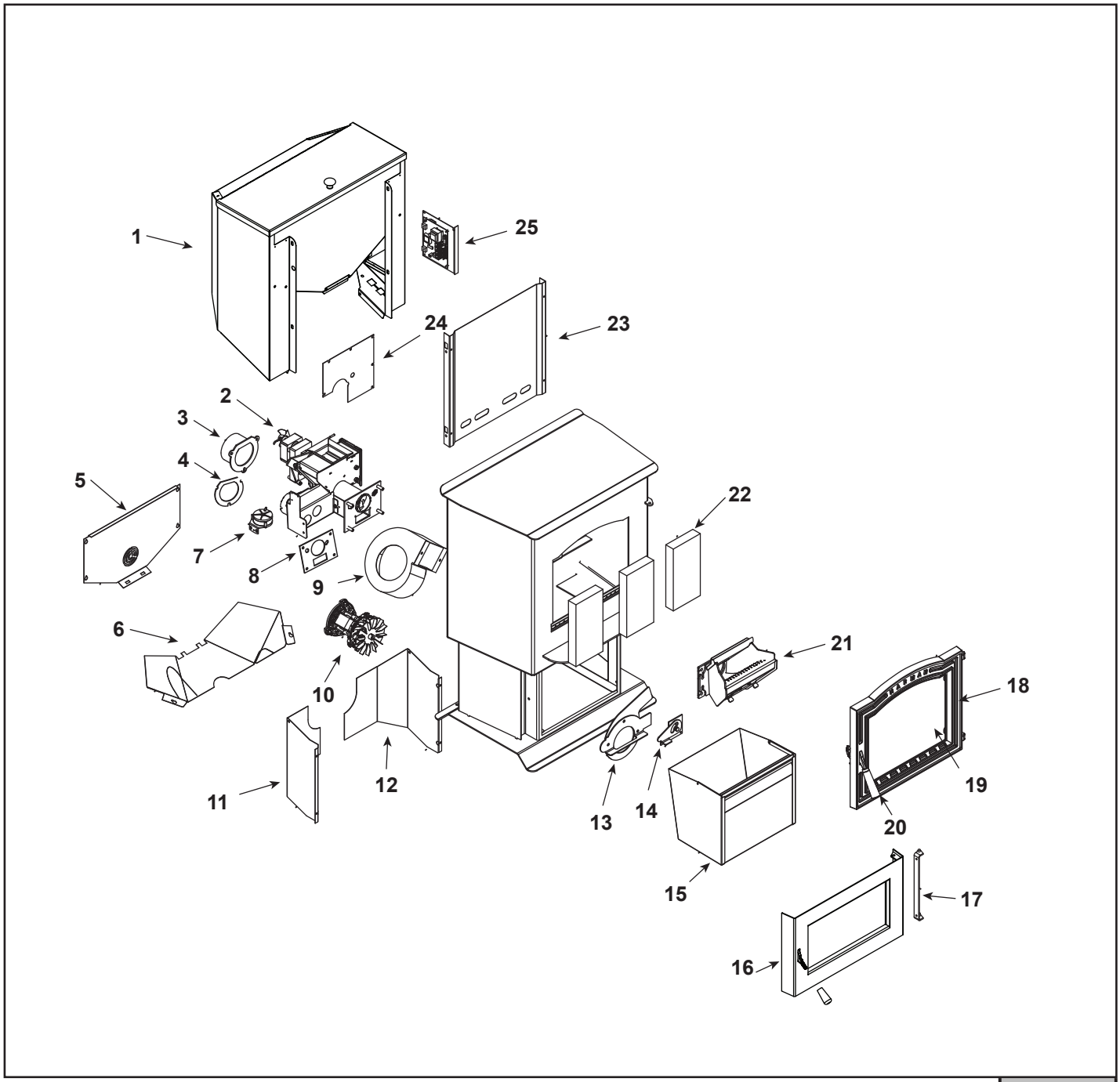
ITEM	Description	COMMENTS	PART NUMBER	Stocked at Depot
	Door Hinge w/pin, Cast	Pre #HF2371860	3-00-773813	
	Draft Meter Assembly		1-00-00637	Y
	Draft Meter Bolt and Tube		1-00-04004	
	Fuse, 5 Amp Ceramic	Pkg of 5	1-00-05237	Y
	Gasket, 1/4” Rope Black W/PSA (Glass)	15 Ft	1-00-2312	Y
	Gasket, 3/8” Rope White LD (Ash or Load Door)	15 Ft	1-00-1203589	Y
	Gasket Set, Burn Pot & Tailpipe	Pkg of 5 Sets	1-00-07381	Y
	Gasket, Hopper Lid		1-00-00248	Y
	Gasket, Hopper Throat		3-44-677185	Y
	Gasket, Burn Pot		3-44-237639	Y
	Glass Clip	Pkg of 4	1-00-249140	Y
	Igniter		3-20-677200	Y
		Pkg of 10	1-00-677200	Y
	Label, Caution & Danger	10 ea	1-00-200408541	
	Manual Pack		SRV1-00-00680	
	Outside Air Termination Cap		1-10-09542	
	Power Cord		3-20-39685	Y
	Room Sensor		3-20-00906	Y
	Tinnerman 10-24	Pkg of 25	SRV3-31-00177	
	Thermister Probe (ESP Probe)		3-20-00844	Y
	Thermostat Extension		3-20-00607	Y
	Touch up Paint, Black		3-42-19905	
	Wiring Harness		3-20-08727	Y
	LeafDoor Trim	Brushed Stainless	3-43-06802-7	
		No longer available	3-43-06802-8	
	Modern Door trim	Brushed Stainless	3-43-06839-7	
	Ash Lip Trim	Brushed Stainless	3-43-08400-7	
		Bright Nickel	3-43-08400-8	
	Tile Frame	Brushed Stainless	3-43-06729-7	
		No longer available	3-43-06729-8	
	Spring Clips (Required for installation of Tile Frame)	Pkg of 20	3-31-232547-20	



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ITEM	Description	COMMENTS	PART NUMBER	Stocked at Depot
1	Hopper Assembly		1-10-05803	Y
	Hopper Knob		1-00-02000-1	
	Hopper Latch Assembly	Pre HF2402759	1-00-773901	
		Post HF2402759	SRV8000-050	

Additional service parts on following page.

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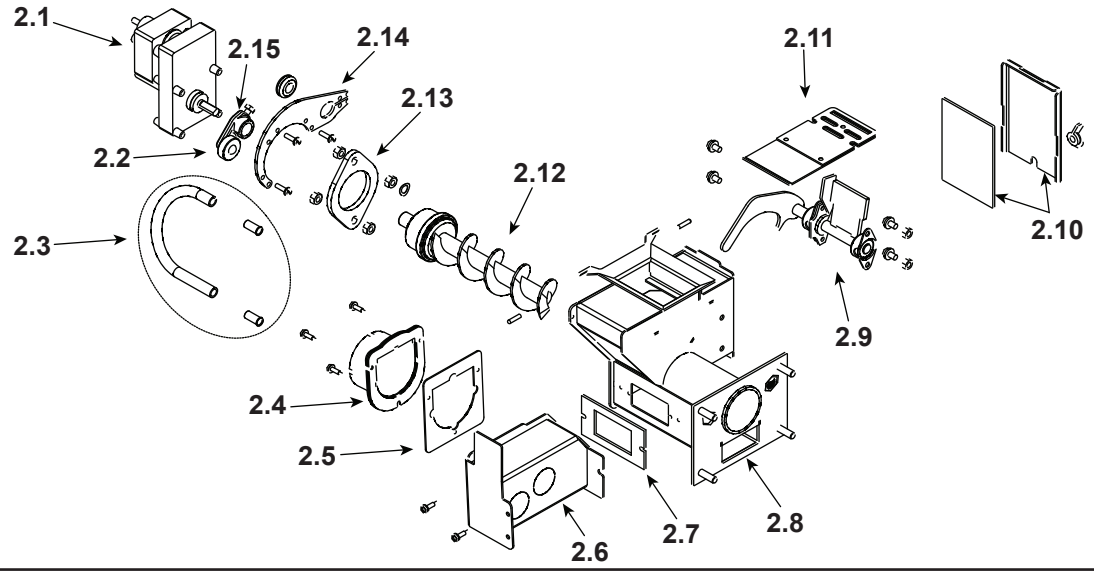
#2 Feeder Assembly



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ITEM	Description	COMMENTS	PART NUMBER	Stocked at Depot
2	Feeder Assembly	Post 008085803	1-10-09684A	
2.1	Pellet Feeder Gear Motor, 4RPM		3-20-60906	Y
2.2	UL Feeder Cam		3-31-3014	Y
2.3	Feeder Air Crossover Kit		1-00-67900	Y
	9MM Silicone Tube	5 Ft	1-00-511427	Y
2.4	Pellet Air Intake Assembly		1-10-06810A	
2.5	Gasket Feeder Air Intake	Pkg of 6	3-44-72224-6	Y
2.6	UL Feeder Air Intake		1-10-72228	
2.7	Gasket Ultra Air Intake	Pkg of 10	3-44-677160-10	Y
2.8	Ultra Feeder Weldment		1-10-724132	Y
2.9	UL Feeder Pusher Arm		1-10-677188W	Y
2.10	Gasket, UL Feeder Cover		1-00-677122	Y
2.11	Slide Plate Assembly		1-10-677121A	Y
2.12	UL Feeder Auger Assembly		3-50-00565	Y
2.13	Pellet Feeder Bearing Retainer w/Hardware	Pkg of 2	1-00-04035	Y
2.14	UL Feeder Gear Motor Bracket w/Grommet		1-00-247406	Y
2.15	UL Feeder Cam Block		3-00-677154	Y
	Gasket, Hopper Throat		3-44-677185	Y
	Hopper Switch Feeder Fitting	Pkg of 2	1-00-142818	Y
	Motor Bracket Grommet	Pkg of 12	3-31-2761-12	
	Pillow Block	Pkg of 4	3-31-3614087-4	Y
	Silicone Tubing, 1/8”	5 Ft	1-00-5113574	Y

Additional service parts on following page.

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ITEM	Description	COMMENTS	PART NUMBER	Stocked at Depot
3	Flue Tail Pipe		3-00-247237	**Y**
4	Gasket Set, Burn Pot & Tailpipe	Pkg of 5 Sets	1-00-07381	**Y**
5	Auger Motor Cover		2-00-06470P	**Y**
6	Auger Motor Shield		2-00-06467P	**Y**
7	Differential Switch		3-20-6866	**Y**
8	Gasket Set, Burn Pot & Tailpipe	Pkg of 5 Sets	1-00-07381	**Y**
9	Distribution Blower		3-21-33647	**Y**
10	Combustion Motor	Fan blades not included	3-21-08639	**Y**
	Combustion Blower Grommets & Spacers	Pkg of 25	1-00-960026	
	Combustion Blower Mounting Screws (Pkg of 100)	Commonly required for Combustion Blower replacement	1-00-53483208	
	Fan Blade, 5” Double Paddle (Combustion Blower)		3-20-502221	**Y**
11	Rear Cover Left		2-00-06468-1P	**Y**
12	Rear Cover Right		2-00-06468-2P	**Y**
13	Comb Intake Weldment		1-10-08516S	**Y**
14	Retainer Assembly		1-10-08533S	**Y**
15	Ash Pan		1-10-05800	**Y**
16	Ash Door Assembly		1-10-06798A	
	Wood Handle		1600663	
17	Bolt on Hinge		2-00-06968B	
18	Cast Door Frame		4-00-06800P	
	Cast Door w/Glass		1-10-06800M	
	Pin, Slick (Pkg of 2)	Post #HF2402358	1-00-110	
19	Glass Panel w/Gasket		1-00-950133647	**Y**
	Glass Clip w/Hardware (Pkg of 4)		1-00-249140	
20	Door Handle Assembly		1-00-453001	**Y**
	Contains: Wooden Handle, Wave Washer, SHCS, Cast Handle, , SSS, Bhcs, Cast Pawl			
	Paw Bolt	**No longer available**	4-31-06393	
	Wooden Handle w/Hardware, Load Door	2 Sets	1-00-00247	**Y**
	Wave Washer	Pkg of 10	SRV3-31-453013	
21	Burn Pot Weldment		1-10-05802	**Y**
	Flame Guide		3-00-08534	**Y**
	Clean Out Cover	2 Sets	1-00-06623	**Y**
	Thumb Screw	Pkg of 10	3-31-782108-10	**Y**
22	Fire Brick 4-1/2 x 9 x 1-1/4”	Pkg of 7	1-00-900450125	**Y**
	Fire Brick , Full Skid	414 Pcs	3-40-900450-414	
23	Hopper Heat Shield		2-00-06471B	
24	Feeder Cover		2-00-773826L	

Additional service parts on following page.

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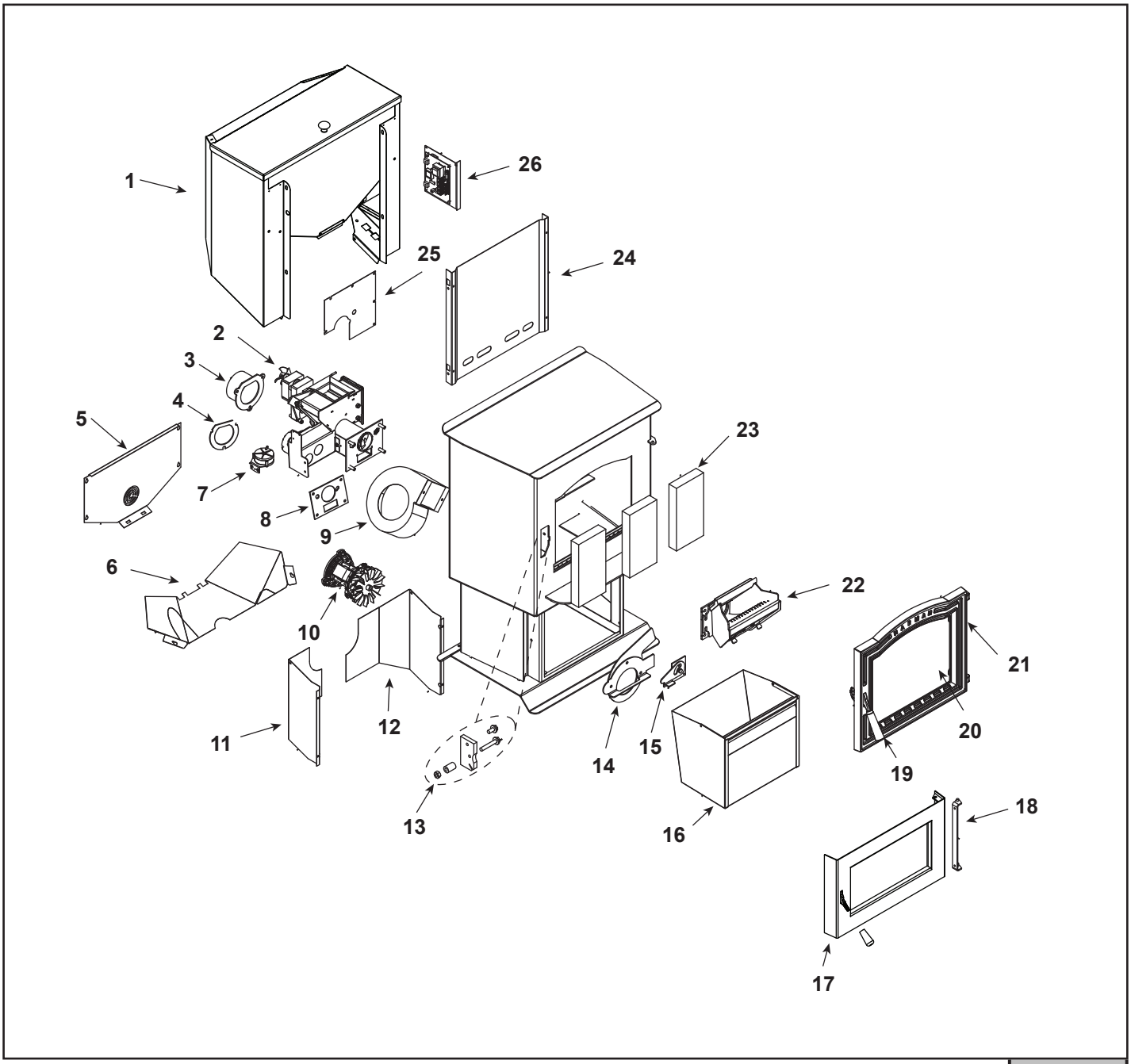
ITEM	Description	COMMENTS	PART NUMBER	Stocked at Depot
25	Circuit Board w/Knobs & Shafts		1-00-05886	Y
	Circuit Board Plate, Studded w/label		1-10-08327	
	Control Panel Label		3-90-07766	
	Knob, Contol Board/D-Shaft	25 Sets	1-00-015605	Y
	Arrow Burn Pot Scraper	Pkg of 10	2-00-773850-10	
	Cast Weld on Door Hinge (Qty 2 req)	Pre #HF2402358	3-00-773813	
	Cradle Assembly (Igniter Holder, Cradle, & flat Bottom)		1-00-777907	Y
	Diagnostic Display Module		3-20-05401	Y
	DDM Replacement Cable		1-00-05402	
	Draft Meter Assembly		1-00-00637	Y
	Draft Meter Bolt and Tube		1-00-04004	
	Fuse, 5 Amp Ceramic	Pkg of 5	1-00-05237	Y
	Gasket, 1/4” Rope Black W/PSA (Glass)	15 Ft	1-00-2312	Y
	Gasket, 3/8” Rope White LD (Ash or Load Door)	15 Ft	1-00-1203589	Y
	Gasket Set, Burn Pot & Tailpipe	Pkg of 5 Sets	1-00-07381	Y
	Gasket, Hopper Lid		1-00-00248	Y
	Hopper Lid w/Hinge, Knob		1-10-06493	
	Igniter		3-20-677200	Y
		Pkg of 10	1-00-677200	Y
	Labels, Caution & Danger	10 ea	1-00-200408541	
	Manual Pack		SRV1-00-00680	
	Outside Air Termination Cap		1-10-09542	
	Power Cord		3-20-39685	Y
	Room Sensor		3-20-00906	Y
	Tinnerman 10-24	Pkg of 25	SRV3-31-00177	
	Thermostat Extension		3-20-00607	Y
	Thermister Probe (ESP Probe)		3-20-00844	Y
	Touch up Paint, Black, 12 oz Can		3-42-19905	
	Wiring Harness		3-20-08727	Y
	Leaf Door Trim	Brushed Stainless	3-43-06802-7	
		No longer available	3-43-06802-8	
	Modern Door Trim	Brushed Stainless	3-43-06839-7	
	Ash Lip Trim	Brushed Stainless	3-43-08400-7	
		Bright Nickel	3-43-08400-8	
	Tile Frame	Brushed Stainless	3-43-06729-7	
		No longer available	3-43-06729-8	
	Spring Clips (Required for installation of Tile Frame)	Pkg of 20	3-31-232547-20	



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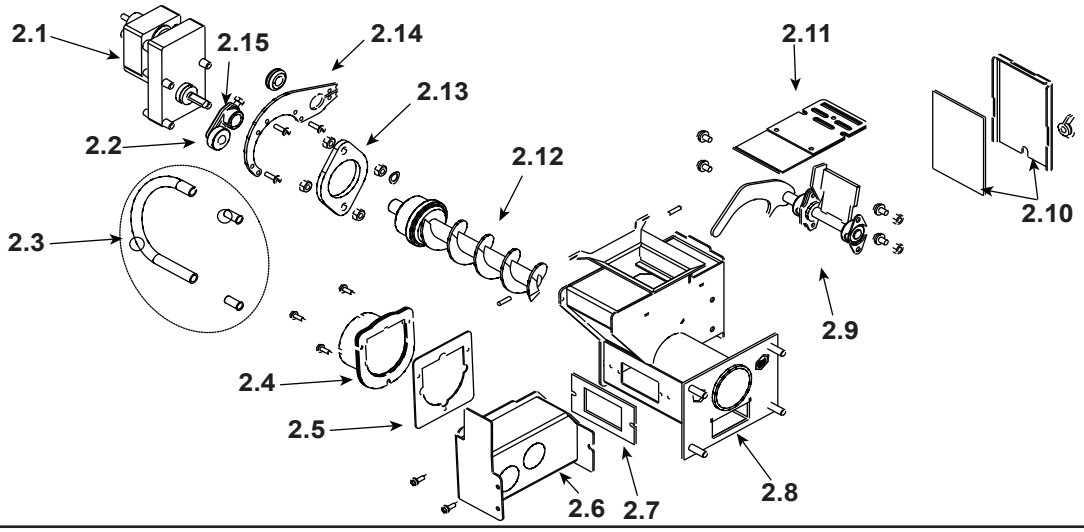
ITEM	Description	COMMENTS	PART NUMBER	Stocked at Depot
1	Hopper Assembly		1-10-00688	Y
	Hopper Latch Assembly	Pre HF2424081	1-00-773901	
		Post HF2424081	SRV8000-050	
	Hopper Knob		1-00-02000-1	

Additional service parts on following page.

11/23

#2 Feeder Assembly



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ITEM	Description	COMMENTS	PART NUMBER	Stocked at Depot
2	Feeder Assembly	Post 008280309	1-10-07906A	
2.1	Pellet Feeder Gear Motor, 6RPM		3-20-09302	**Y**
	Gear Motor Fan Blade	Pkg of 3	3-20-09302-3	**Y**
2.2	UL Feeder Cam		3-31-3014	**Y**
2.3	Feeder Air Crossover Kit		1-00-67900	**Y**
	9MM Silicone Tube	5 Ft	1-00-511427	**Y**
2.4	Pellet Air Intake Assembly		1-10-06810A	
2.5	Gasket Feeder Air Intake	Pkg of 6	3-44-72224-6	**Y**
2.6	UL Feeder Air Intake		1-10-72228	
2.7	Gasket Ultra Air Intake	Pkg of 10	3-44-677160-10	**Y**
2.8	Ultra Feeder Weldment		1-10-724132	**Y**
2.9	UL Feeder Pusher Arm		1-10-677187W	**Y**
2.10	Gasket, UL Feeder Cover		1-00-677122	**Y**
2.11	Slide Plate Assembly		1-10-677121A	**Y**
2.12	UL Feeder Auger Assembly		3-50-00565	**Y**
2.13	Bearing Flange w/Hardware		1-00-04035	**Y**
2.14	UL Feeder Gear Motor Bracket w/Grommet		1-00-247406	**Y**
2.15	UL Feeder Cam Block		3-00-677154	**Y**
	Gasket, Hopper Throat		3-44-677185	**Y**
	Hopper Switch Feeder Fitting	Pkg of 2	1-00-142818	**Y**
	Motor Bracket Grommet	Pkg of 12	3-31-2761-12	
	Pillow Block	Pkg of 4	3-31-3614087-4	**Y**
	Silicone Tubing, 1/8”	5 Ft	1-00-5113574	**Y**

Additional service parts on following page.

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ITEM	Description	COMMENTS	PART NUMBER	Stocked at Depot
3	Flue Tail Pipe		3-00-247237	Y
4	Gasket Set, Burn Pot & Tailpipe	Pkg of 5 Sets	1-00-07381	Y
5	Auger Motor Cover		2-00-06470P	Y
6	Auger Motor Shield		2-00-06467P	Y
7	Differential Switch		3-20-6866	Y
8	Gasket Set, Burn Pot & Tailpipe	Pkg of 5 Sets	1-00-07381	Y
9	Distribution Blower		3-21-33647	Y
10	Combustion Blower	Fan blades not included	3-21-08639	Y
	Combustion Blower Grommets & Spacers	Pkg of 25	1-00-960026	
	Combustion Blower Mounting Screws (Pkg of 100)	Commonly required for Combustion Blower replacement	1-00-53483208	
	Fan Blade, 5” Double Paddle (Combustion Blower)		3-20-502221	Y
11	Rear Cover Left		2-00-06468-1P	Y
12	Rear Cover Right		2-00-06468-2P	Y
13	Door Latch Assembly Contains: Latch Adjustment, SHCS(1/4-20 X 1), Lock Nut (1/4 X 20), Jam Nut (HX Jam 1/4-20Z) Steel Bushing,		1-00-06713	Y
14	Comb Intake Weldment		1-10-08516S	Y
15	Retainer Assembly		1-10-08533S	Y
16	Ash Pan		1-10-05800	Y
17	Ash Door Assembly		1-10-06798A	
	Wood Knob		1600663	
18	Bolt on Hinge		2-00-06968B	
19	Cast Door Frame		3-00-06718P	
	Slick Pins, 1 pair		1-00-110	Y
20	Glass Panel w/Gasket		1-00-00688	Y
	Glass Clip w/Hardware	Pkg of 4	1-00-249140	Y
21	Door Handle Assembly Contains: Handle, 6 mm Washer, SHCS, handle, Dowel, Plunger, SSS, Bhcs		1-00-249119	Y
	Ball Plunger	Pkg of 3	3-31-5500-3	
	Front Door Latch		3-00-249119P	Y
	Latch Ball Spring Bracket		2-00-06714	
	Wooden Handle , Load Door	Pkg of 2	1-00-00247	Y
22	Burn Pot Weldment		1-10-06723	Y
	Flame Guide		3-00-03000	Y
	Clean Out Cover	2 Sets	1-00-06623	Y
	Thumb Screw	Pkg of 10	3-31-782108-10	Y
23	Fire Brick 4-1/2 x 9 x 1-1/4”	Pkg of 7	1-00-900450125	Y
	Fire Brick , Full Skid	414 Pcs	3-40-900450-414	

Additional service parts on following page.

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ITEM	Description	COMMENTS	PART NUMBER	Stocked at Depot
24	Hopper Heat Shield		2-00-06715B	
25	Feeder Opening Cover		2-00-773826L	
26	Circuit Board w/Knobs & Shafts		1-00-05886	Y
	Circuit Board Plate-Studded w/label		1-10-08327	
	Control Panel Label		3-90-07766	
	Knob, Contol Board/D-Shaft	25 Sets	1-00-015605	Y
	Arrow Burn Pot Scraper	Pkg of 10	2-00-773850-10	
	Cradle Assembly			
	Igniter Holder, Cradle, & Flat Bottom		1-00-777907	Y
	Diagnostic Display Module		3-20-05401	Y
	DDM Replacement Cable		1-00-05402	
	Draft Meter Assembly		1-00-00637	Y
	Draft Meter Bolt and Tube		1-00-04004	
	Fuse, 5 Amp Ceramic	Pkg of 5	1-00-05237	Y
	Gasket, 1/4” Rope Black W/PSA (Glass)	15 Ft	1-00-2312	Y
	Gasket, 3/8” Rope White LD (Ash or Load Door)	15 Ft	1-00-1203589	Y
	Gasket Set, Burn Pot & Tailpipe	Pkg of 5 Sets	1-00-07381	Y
	Gasket, Burn Pot		3-44-237639	Y
	Gasket, Hopper Lid		1-00-00248	Y
	Hopper Lid w/Hinge, Knob		1-10-06493	
	Igniter		3-20-677200	Y
		Pkg of 10	1-00-677200	Y
	Labels, Caution & Danger	10 ea	1-00-200408541	
	Load Door Hinge		2-00-06707L	
	Manual Pack		SRV1-00-00680	
	Outside Air Termination Cap		1-10-09542	
	Room Sensor		3-20-00906	Y
	Power Cord		3-20-39685	Y
	Tinnerman 10-24	Pkg of 25	SRV3-31-00177	
	Thermister Probe (ESP Probe)		3-20-00844	Y
	Thermostat Extension		3-20-00607	Y
	Touch up Paint, Black, 12 oz Can		3-42-19905	
	Wiring Harness		3-20-08727	Y

Additional service parts on following page.

IMPORTANT: THIS IS DATED INFORMATION. Parts must be ordered from a dealer or distributor. **Hearth and Home Technologies does not sell directly to consumers.** Provide model number and serial number when requesting service parts from your dealer or distributor.

ITEM	Description	COMMENTS	PART NUMBER	Stocked at Depot
	Leaf Door Trim	Brushed Stainless	3-43-06717-7	
		No longer available	3-43-06717-8	
	Modern Door Trim	Brushed Stainless	3-43-06797-7	
	Ash Lip Trim	Brushed Stainless	3-43-08400-7	
		Bright Nickel	3-43-08400-8	
	Tile Frame	Brushed Stainless	3-43-06729-7	
		No longer available	3-43-06729-8	
	Spring Clips (Required for the installation of Tile Frame)	Pkg of 20	3-31-232547-20	

G. Warranty Policy

Hearth & Home Technologies LLC

LIMITED LIFETIME WARRANTY

Hearth & Home Technologies LLC ("HHT") extends the following warranty for HHT gas, wood, pellet and electric hearth appliances (each a "Product" and collectively, the "Product(s)") and certain component parts set forth in the table below ("Component Part(s)") that are purchased from a HHT authorized dealer or distributor.

WARRANTY COVERAGE:

HHT warrants that the Products and their Component Parts will be free from defects in materials and workmanship for the applicable period of Warranty coverage set forth in the table below ("Warranty Period"). If a Product or Component Parts are found to be defective in materials or workmanship during the applicable Warranty Period, HHT will, at its option, repair the applicable Component Part(s), replace the applicable Component Part(s), or refund the purchase price of the applicable Product(s). The maximum amount recoverable under this Warranty is limited to the purchase price of the Product. This Warranty is transferable from the original purchaser to subsequent owners, but the Warranty Period will not be extended in duration or expanded in coverage for any such transfer. This Warranty is subject to conditions, exclusions, and limitations as described below.

WARRANTY PERIOD:

Warranty coverage begins at the date of installation. In the case of new home constructions, Warranty coverage begins on the date of first occupancy of the dwelling or six months after the sale of the Product(s) by an independent, authorized HHT dealer or distributor, whichever occurs earlier. However, the Warranty coverage shall commence no later than 24 months following the date of Product shipment from HHT, regardless of the installation or occupancy date.

The term "Lifetime" in the table below is defined as: 20 years from the beginning date of warranty coverage for gas appliances, 10 years from the beginning date of warranty coverage for wood and pellet appliances, and 5 years from the beginning of warranty coverage for standalone gas log sets. These time periods reflect the minimum expected useful lives of the designated Component Parts under normal operating conditions.

Warranty Period		**HHT Manufactured Appliances and Venting**					
Component Parts	Labor	Gas	Pellet	Wood	Electric	Venting	Component Parts Covered by this Warranty
1 Year		X	X	X		X	All parts including handles, external enameled components and other material except as covered by Warranty Conditions, Warranty Exclusions, and Warranty Limitations listed
2 Years					X		All parts except as covered by Warranty Conditions, Warranty Exclusions, and Warranty Limitations listed
2 years			X	X			Igniters, Auger Motors, Electronic Components, and Glass
		X					Electrical components limited to modules, remotes/wall switches, valves, pilots, blowers, junction boxes, wire harnesses, transformers and lights (excluding light bulbs)
		X		X			Molded Refractory Panels, Glass Liners
3 years			X				Firepots, burnpots, mechanical feeders/auger assemblies
5 years		X					Burners and logs for standalone gas log sets (Vented and Vent Free gas log sets not sold as components of the fireplace or stove)
5 years	1 year	X					Vent Free Burners and Vent Free Log components of HHT manufactured fireplaces or stoves
			X	X			Castings, Medallions and Baffles
6 years	3 years			X			Catalysts
7 years	3 years		X	X			Manifold tubes, HHT Chimney and Terminations
10 years	1 year	X					Burners, logs and refractory components of HHT manufactured fireplaces or stoves
Limited Lifetime	3 years	X	X	X			Firebox and heat exchanger, FlexBurn® System (engine, inner cover, access cover and fireback)
1 Year	None	X	X	X	X	X	All purchased replacement parts

WARRANTY CONDITIONS:

- Because HHT cannot control the quality of any Products sold by unauthorized sellers, this Warranty only covers Products that are purchased through an HHT authorized dealer or distributor unless otherwise prohibited by law; a list of HHT authorized dealers is available on the HHT branded websites.
- This Warranty is only valid while the applicable Product remains at the site of original installation.
- This Warranty is only valid in the country in which the HHT authorized dealer or distributor that sold the applicable Product is authorized to sell applicable Product.
- Contact your installing distributor or dealer for Warranty service. If the installing dealer or distributor is unable to provide necessary parts, contact the nearest HHT authorized dealer or supplier. Additional service fees may apply if you are seeking Warranty service from a dealer other than the dealer from whom you originally purchased the applicable Product.
- No HHT consumer should bear cost of warranty service or costs incurred while servicing warranty claims (i.e., travel, gas, or mileage) when the service is performed within the terms of this Warranty. Check with your dealer or distributor in advance for any costs to you when arranging a warranty call. Travel and shipping charges for parts are not covered by this Warranty.

WARRANTY EXCLUSIONS:

This Warranty does not cover the following:

- Changes in surface finishes as a result of normal use. As a heating appliance, some changes in color of interior and exterior surface finishes may occur. This is not a flaw and is not covered under the Warranty.
- Damage to printed, plated, or enameled surfaces caused by fingerprints, accidents, misuse, scratches, melted items or other external sources and residues left on the plated surfaces from the use of abrasive cleaners or polishes.
- Repair or replacement of parts that are subject to normal wear and tear during the Warranty Period are not covered. These parts include: paint, wood and pellet gaskets, firebricks, grates, flame guides, batteries and the discoloration of glass.
- Minor expansion, contraction, or movement of certain parts causing noise. These conditions are normal and complaints related to this noise are not covered by this Warranty.
- Damages resulting from: (1) failure to install, operate, or maintain the applicable Product in accordance with the installation instructions, operating instructions, and listing agent identification label furnished with the applicable Product; (2) failure to install the applicable Product in accordance with local building codes; (3) shipping or improper handling; (4) improper operation, abuse, misuse, continued operation with damaged, corroded or failed components, accident, or improperly/incorrectly performed repairs; (5) environmental conditions, inadequate ventilation, negative pressure, or drafting caused by tightly sealed constructions, insufficient make-up air supply, or handling devices such as exhaust fans or forced air furnaces or other such causes; (6) use of fuels other than those specified in the operation instructions; (7) installation or use of components not supplied with the applicable Product or any other components not expressly authorized and approved by HHT; (8) modification of the appliance not expressly authorized and approved by HHT in writing; and/or (9) interruptions or fluctuations of electrical power supply to the applicable Product.
- Non-HHT venting components, hearth connections or other accessories used in conjunction with the applicable Product.
- Any part of a pre-existing fireplace system in which an insert or a decorative gas applicable Product is installed.
- HHT's obligation under this Warranty does not extend to the Product's capability to heat the desired space. Information is provided to assist the consumer and the dealer in selecting the proper Product for the application. Consideration must be given to the Product location and configuration, environmental conditions, insulation and air tightness of the structure.

This warranty is void if:

- The applicable Product has been over-fired, operated in atmospheres contaminated by chlorine, fluorine, or other damaging chemicals. Over-firing can be identified by, but not limited to, warped plates or tubes, deformation/warping of interior cast iron structure or components, rust colored cast iron, bubbling, cracking and discoloration of steel or enamel finishes.
- The applicable Product is subjected to prolonged periods of dampness or condensation.
- There is any damage to the applicable Product due to water or weather damage which is the result of, but not limited to, improper chimney or venting installation.

LIMITATIONS OF REMEDIES AND LIABILITY:

- **EXCEPT TO THE EXTENT PROVIDED BY LAW, HHT MAKES NO EXPRESS WARRANTIES OTHER THAN THE WARRANTY SPECIFIED HEREIN. The owner's exclusive remedy and HHT's sole obligation under this Warranty or in contract, tort or otherwise, shall be limited to replacement of the Component Part(s), repair of the Component Part(s), or refund of the original purchase price of the applicable Product(s), as specified above; provided, however, that (i) if HHT is unable to provide replacement of the Component Part(s) and repair of the Component Part(s) is not commercially practicable or cannot be timely made, or (ii) the customer is willing to accept a refund of the purchase price of the applicable Product(s), HHT may discharge all such obligations by refunding the purchase price of the applicable Product. In no event will HHT be liable for any incidental or consequential damages caused by defects in the applicable Product. Some States do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you. This Warranty gives you specific legal rights and you may also have other rights which vary from State to State. THE DURATION OF ANY IMPLIED WARRANTY IS LIMITED TO DURATION OF THE EXPRESSED WARRANTY SPECIFIED ABOVE FOR THE APPLICABLE PRODUCT. Some States do not allow limitations on how long an implied warranty lasts, so the above limitation may not apply to you.**

F. Contact Information

352 Mountain House Road, Halifax, PA 17032
www.harmanstoves.com

Please contact your Harman® dealer with any questions or concerns.
For the location of your nearest Harman® dealer,
please visit www.harmanstoves.com.

- NOTES -

_____

_____

_____

_____

_____

_____

_____

_____

_____

NOTICE

DO NOT DISCARD THIS MANUAL

- Important operating and maintenance instructions included.
- Read, understand and follow these instructions for safe installation and operation.
- Leave this manual with party responsible for use and operation.

Installation Manual

Installation and Appliance Setup

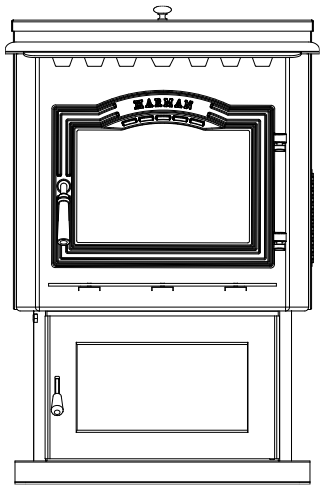
INSTALLER: Leave this manual with party responsible for use and operation.
OWNER: Retain this manual for future reference.

NOTICE: SAVE THESE INSTRUCTIONS

HARMAN®

BUILT TO A STANDARD, NOT A PRICE

Model(s):
P43-C, P61-C & P68-C
Freestanding Pellet Stove



Pellet Fuels Institute

NATIONAL FIREPLACE INSTITUTE
A CERTIFICATION AGENCY

⚠ CAUTION

Check building codes prior to installation.

- Installation MUST comply with local, regional, state and national codes and regulations.
- Contact local building or fire officials about restrictions and installation inspection requirements in your area.

NOTE

To obtain a French translation of this manual, please contact your dealer or visit www.harmanstoves.com

Pour obtenir une traduction française de ce manuel, s'il vous plaît contacter votre revendeur ou visitez www.harmanstoves.com

⚠ WARNING

Please read this entire manual before installation and use of this pellet fuel-burning room heater.
Failure to follow these instructions could result in property damage, bodily injury or even death.

- Do not store or use gasoline or other flammable vapors and liquids in the vicinity of this or any other appliance.
- Do not overfire - If any external part starts to glow, you are overfiring. Reduce feed rate. Overfiring will void your warranty.
- Comply with all minimum clearances to combustibles as specified. Failure to comply may cause house fire.

⚠ WARNING

HOT SURFACES!

Glass and other surfaces are hot during operation AND cool down.

Hot glass will cause burns.

- Do not touch glass until it is cooled
- NEVER allow children to touch glass
- Keep children away
- CAREFULLY SUPERVISE children in same room as stove.
- Alert children and adults to hazards of high temperatures.
  High temperatures may ignite clothing or other flammable materials.
- Keep clothing, furniture, draperies and other flammable materials away.

⚠ Safety Alert Key:

- ***DANGER!*** Indicates a hazardous situation which, if not avoided will result in death or serious injury.
- ***WARNING!*** Indicates a hazardous situation which, if not avoided could result in death or serious injury.
- ***CAUTION!*** Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.
- ***NOTICE:*** Indicates practices which may cause damage to the stove or to property.

TABLE OF CONTENTS

➔ = Contains updated information

Installation Standard Work Checklist

ATTENTION INSTALLER:

Follow this Standard Work Checklist

This standard work checklist is to be used by the installer in conjunction with, not instead of, the instructions contained in this installation manual.

Customer: _____
Lot/Address: _____
_____
Model: _____

Date Installed: _____
Location of Stove: _____
Installer: _____
Dealer/Distributer Ph # _____
Serial Number: _____

WARNING! Risk of Fire or Explosion! Failure to install appliance to these instructions can lead to a fire or explosion.

Appliance Install Section 3	**YES**	**IF NO, WHY?**
Required non-combustible floor protection	☐	_____
Verified clearances to combustible.	☐	_____
Unit is Leveled and secured.	☐	_____
Venting/Chimney Section 4		
Venting Configuration complies to vent diagrams.	☐	_____
Venting installed, sealed and secured in place with proper clearances.	☐	_____
Exterior wall/roof flashing installed and sealed	☐	_____
Terminations installed and sealed.	☐	_____
Electrical Section 1		
120 VAC unswitched power provided to the appliance.	☐	_____
Check outlet with multi-meter for proper voltage. (115-120 VAC)	☐	_____
Record voltage reading: _____		
Appliance Setup Section 5		
All packaging and protective materials are removed	☐	_____
Accessories installed properly	☐	_____
Manual bag and all it's contents are removed from inside the appliance and given to party responsible for use and operation	☐	_____
Started appliance and verified that all motors and blowers operate as they should.	☐	_____
Checked draft using a Manometer. Record readings: _____	☐	_____
During operation, verify that the hopper lid switch (If applicable) and pressure switch are working properly by briefly opening the hopper lid and main door and verifying that the feed motor is interrupted.	☐	_____

Hearth and Home Technologies recommends the following:
Photographing the installation and copying this checklist for your file.
This checklist remain visible at all times on the appliance until the installation is complete.

Comments: Further description of the issues, who is responsible (Installer/Builder/Other Trades, etc.) and corrective action needed _____

_____

_____

Comments communicated to party responsible_____ by _____ on _____
(Builder / Gen Contractor) (Installer) (Date)

04/23

1 Product Specific and Important Safety Information

A. Appliance Certification

MODEL:	P43-C Pellet Stove
LABORATORY:	OMNI Test Laboratories, Inc
REPORT NO.	0135PS023E / 0135PS023S
TYPE:	Pellet Fueled/Supplementary For Residential Use
STANDARD(s):	ASTM E 1509-04, ULC-S627-00, ASTM E 2515-11, ASTM E 2779-10

MODEL:	P61-C Pellet Stove
LABORATORY:	OMNI Test Laboratories, Inc
REPORT NO.	0135PS022E / 0135PS022S
TYPE:	Pellet Fueled/Supplementary For Residential Use
STANDARD(s):	ASTM E 1509-04, ULC-S627-00, ASTM E 2515-11, ASTM E 2779-10

MODEL:	P68-C Pellet Stove
LABORATORY:	OMNI Test Laboratories, Inc
REPORT NO.	0135PS013E / 0135PS013S
TYPE:	Pellet Fueled/Supplementary For Residential Use
STANDARD(s):	ASTM E 1509-04, ULC-S627-00, ASTM E 2515-11, ASTM E 2779-10

NOTE: This installation must conform with local codes. In the absence of local codes you must comply with the **ASTM E1509-2004, ULC-S627-00, ULC/ORD-C-1482-M1990, (UM) 84-HUD**

The P43-C, P61-C and P68-C is Certified to comply with 2020 particulate emission standards.

B. Glass Specifications

This appliance is equipped with 5mm mirrored ceramic glass. Replace glass only with 5mm ceramic glass. Please contact your dealer for replacement glass.

C. Mobile Home Approved

This appliance is approved for mobile home installations when not installed in a sleeping room and when an outside combustion air inlet is provided.

The structural integrity of the mobile home floor, ceiling, and walls must be maintained. The appliance must be properly grounded to the frame of the mobile home and use only listed pellet vent, Class “PL” connector pipe.

A Harman® Outside Air Kit must be installed in a mobile home installation.

⚠ WARNING

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

DO NOT INSTALL IN SLEEPING ROOM.

D. California Safety Information

⚠ WARNING

This product and the fuels used to operate this product (wood), and the products of combustion of such fuels, can expose you to chemicals including carbon black, which is known to the State of California to cause cancer, and carbon monoxide, which is know to the State of California to cause birth defects or other reproductive harm. For more information go to: www.P65Warnings.ca.gov

E. BTU & Efficiency Specifications

➔ **P43-C Freestanding Pellet Stove:**

EPA Certification Number:	165-18
EPA Certified Emissions:	1.82 g/hr
***LHV Tested Efficiency:**	82.7%
****HHV Tested Efficiency:**	76.7%
*****EPA BTU Output:**	18,780 - 33,250
******BTU Input:**	23,900 - 45,200
Vent Size:	3 Inch
Hopper Capacity:	50 lbs
Fuel	Wood Pellet

P61-C Freestanding Pellet Stove:

EPA Certification Number:	177-19
EPA Certified Emissions:	1.5 g/hr
***LHV Tested Efficiency:**	85%
****HHV Tested Efficiency:**	79%
*****EPA BTU Output:**	17,100 - 46,800
******BTU Input:**	21,400 - 60,700
Vent Size:	3 Inch
Hopper Capacity:	72 lbs
Fuel	Wood Pellet

P68-C Freestanding Pellet Stove:

EPA Certification Number:	178-19
EPA Certified Emissions:	1.4 g/hr
***LHV Tested Efficiency:**	85%
****HHV Tested Efficiency:**	79.5%
*****EPA BTU Output:**	15,900 - 53,100
******BTU Input:**	20,200 - 67,600
Vent Size:	3 Inch
Hopper Capacity:	76 lbs
Fuel	Wood Pellet

** Weighted average LHV efficiency using data collected during EPA emissions test.*

***Weighted average HHV efficiency using data collected during EPA emissions test.*

****A range of BTU outputs based on EPA Default Efficiency and the burn rates from the low and high EPA tests.*

*****Based on the maximum feed rate per hour multiplied by approximately 8,600 BTU's which is the average BTU's from a pound of pellets.*

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

F. Non-Combustible Materials Specification

Material which will not ignite and burn. Such materials are those consisting entirely of steel, iron, brick, tile, concrete, slate, glass or plasters, or any combination thereof.

Materials that are reported as passing **ASTM E 136, Standard Test Method for Behavior of Materials in a Vertical Tube Furnace at 750° C** and **UL763** shall be considered non-combustible materials.

G. Combustible Materials Specification

Materials made of or surfaced with wood, compressed paper, plant fibers, plastics, or other material that can ignite and burn, whether flame proofed or not, or plastered or un-plastered shall be considered combustible materials.

H. Electrical Codes

120 VAC, 60 Hz, Start 4.2 Amps, Run 2.8 Amps

NOTE: Some generator or battery back-up systems may not be compatible with the micro-processor electronics on this appliance. Please consult the power supply manufacturer for compatible systems.

***WARNING! Risk of Fire!** Hearth & Home Technologies disclaims any responsibility for, and the warranty and agency listing will be voided by the below actions.*

DO NOT:

- *Install or operate damaged appliance*
- *Modify appliance*
- *Install other than as instructed by Hearth & Home Technologies*
- *Operate the appliance without fully assembling all components*
- *Overfire*
- *Install any component not approved by Hearth & Home Technologies*
- *Install parts or components not Listed or approved.*
- *Disable safety switches*

Improper installation, adjustment, alteration, service or maintenance can cause injury or property damage.

For assistance or additional information, consult a qualified installer, service agency or your dealer.

NOTE: Hearth & Home Technologies, manufacturer of this appliance, reserves the right to alter its products, their specifications and/or price without notice.

2 Getting Started

A. Design and Installation Considerations

1. Appliance Location

NOTICE: *Check building codes prior to installation.*

- Installation MUST comply with local, regional, state and national codes and regulations.
- Consult insurance carrier, local building inspector, fire officials or authorities having jurisdiction over restrictions, installation inspection and permits.

It is a good idea to plan your installation on paper, using exact measurements for clearances and floor protection, before actually beginning the installation

Consideration must be given to:

- Safety, convenience, traffic flow
- Placement of the chimney and chimney connector.
- If you are not using an existing chimney, place the appliance where there will be a clear passage for a factory-built listed chimney through the ceiling and roof.
- Installing an optional outside air kit would affect the location of the vent termination.

Since pellet exhaust can contain ash, soot or sparks, you must consider the location of:

- Windows
- Air Intakes
- Air Conditioner
- Overhang, soffits, porch roofs, adjacent walls
- Landscaping, vegetation

When locating vent and venting termination, vent above roof line when possible.

Warning! Risk of Fire *Damaged parts could impair safe operation. Do NOT install damaged, incomplete or substitute components.*

NOTICE: *Locating the appliance in a location of considerable air movement can cause intermittent smoke spillage from appliance. Do not locate appliance near:*

- *Frequently open doors*
- *Central heat outlets or returns*

Installation and service of this appliance should be performed by qualified personnel. Hearth & Home Technologies recommends HHT Factory Trained or NFI certified professionals.

hearthED FACTORY TRAINING Fuel Your Fire

NFI NATIONAL FIREPLACE INSTITUTE® A CERTIFICATION AGENCY

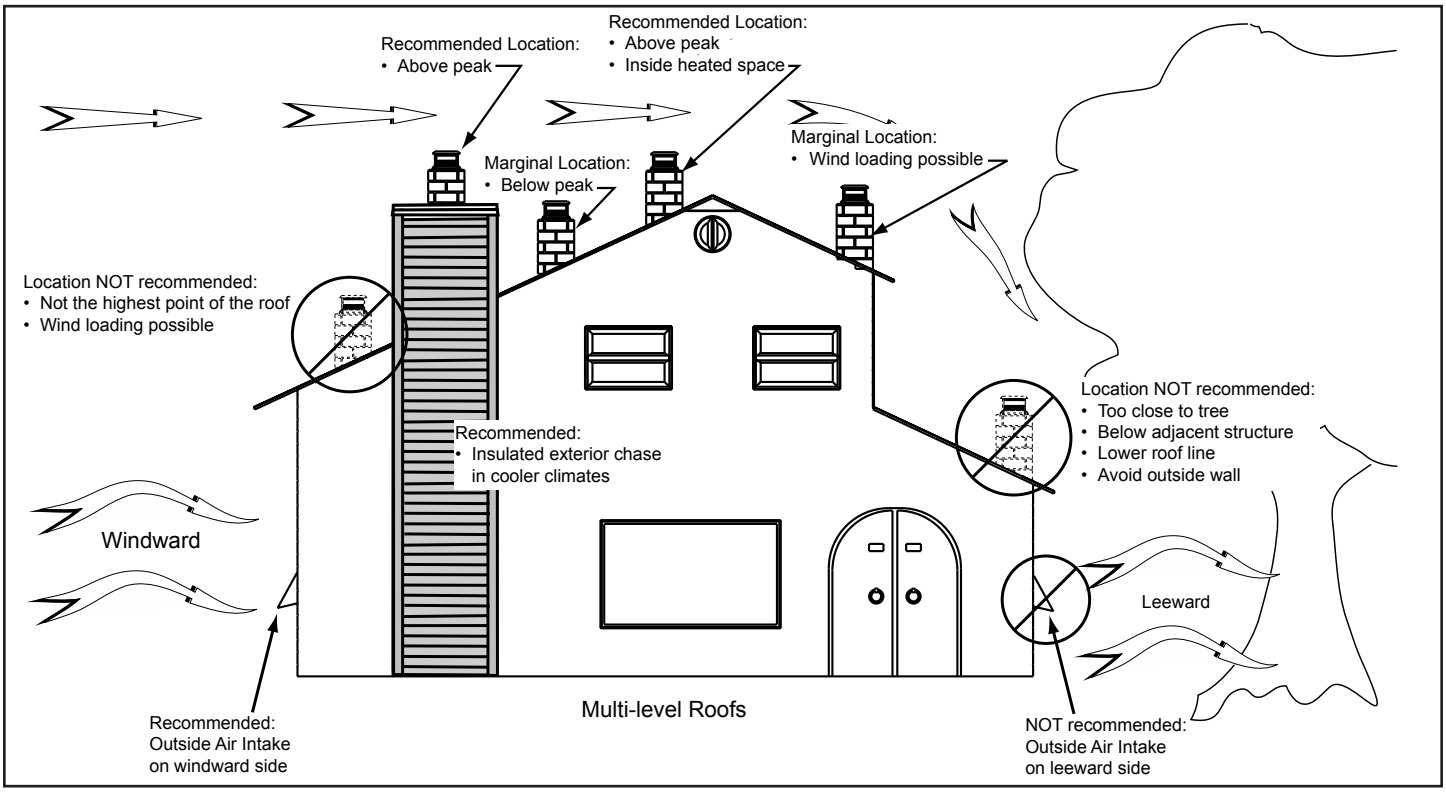


Figure 2.1

B. Tools And Supplies Needed

Tools and building supplies normally required for installation, unless installing into an existing masonry fireplace:

Reciprocating Saw	Gloves
Hammer	Safety Glasses
Phillips Screwdriver	Electric Drill & Bits
Tape Measure	
Level	<u>May also need:</u>
Non-Combustible Sealant Material	Vent Support Straps
	Venting Paint

C. Inspect Appliance and Components

- Carefully remove the appliance and components from the packaging.
- The vent system components and decorative doors and fronts may be shipped in separate packages.
- Report to your dealer any parts damaged in shipment, particularly the condition of the glass.
- **Read all of the instructions before starting the installation. Follow these instructions carefully during the installation to ensure maximum safety and benefit.**

⚠ WARNING

RISK OF FIRE OR EXPLOSION! Damaged parts could impair safe operation. DO NOT i*nstall damaged, incomplete or substitute components. Keep appliance dry.*

Hearth & Home Technologies disclaims any responsibility for, and the warranty will be voided by the following actions:

- Installation and use of any damaged appliance or vent system component.
- Modification of the appliance or vent system.
- Installation other than as instructed by Hearth & Home Technologies.
- Installation and/or use of any component part not approved by Hearth & Home Technologies.

Any such action may cause a fire hazard.

⚠ WARNING

Risk of Fire, Explosion or Electric Shock! DO NOT use this appliance if any part has been under water. Call a qualified service technician to inspect the appliance and to replace any part of the control system which has been under water.

INSTALL EXHAUST VENT AT CLEARANCES SPECIFIED BY THE MANUFACTURER.

Most pellet vent pipe requires a minimum of 1" of clearance to combustible materials although some can be installed at 1" clearance.

Follow these instructions along with all local codes regarding installation of this appliance.

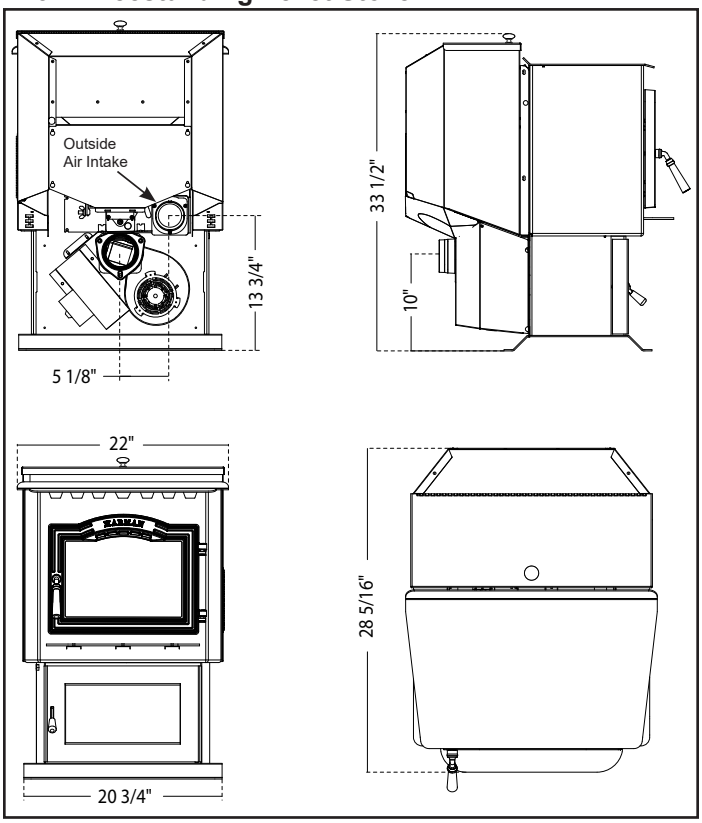
Do **NOT** use makeshift compromises when installing this appliance, serious consequences may result.

3 Clearances

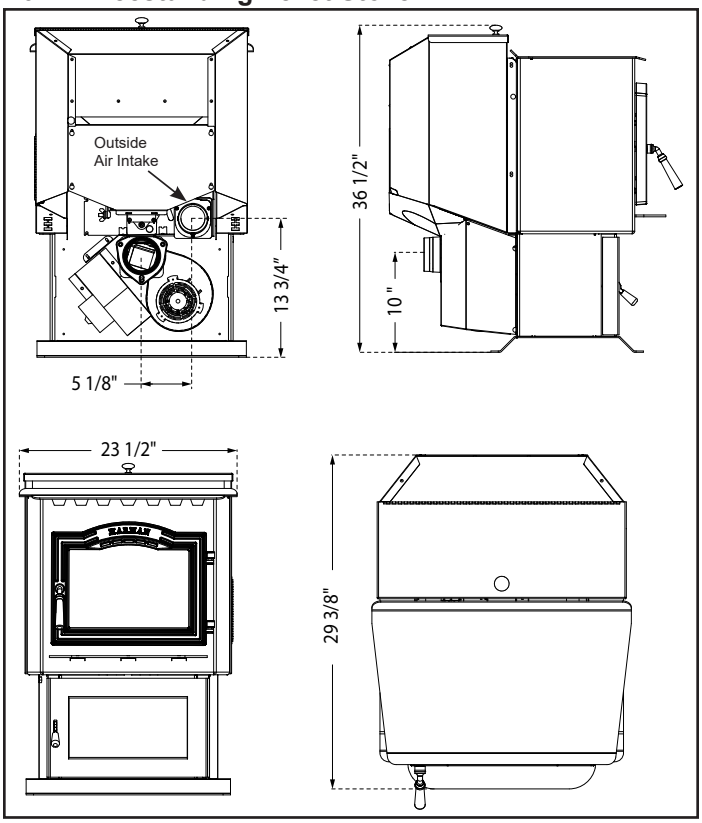
A. Appliance Dimension Diagram

Dimensions are actual appliance dimensions. Use for reference only.

P43-C Freestanding Pellet Stove



P61-C Freestanding Pellet Stove



P68-C Freestanding Pellet Stove

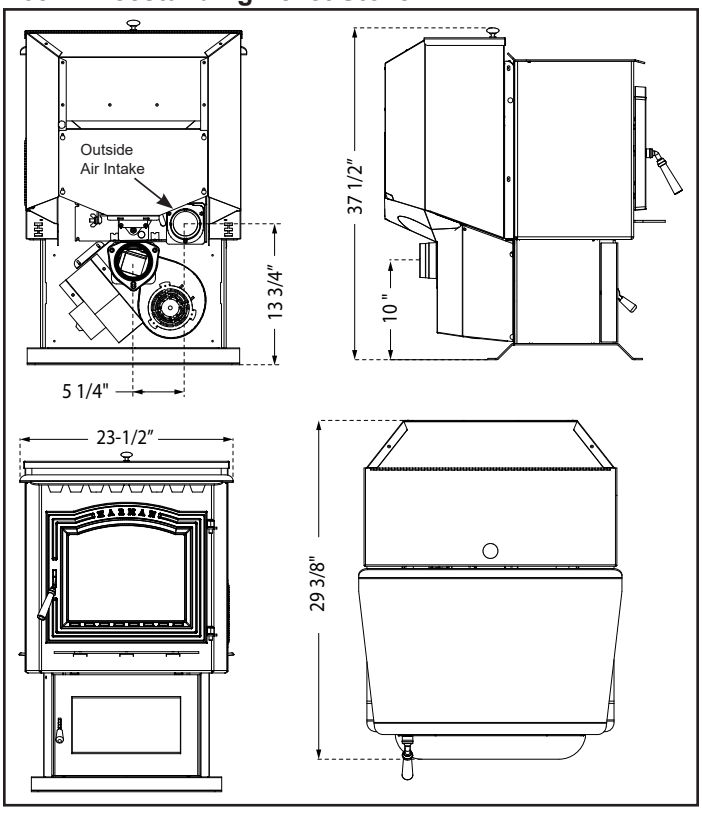


Figure 3.1

B. Clearances to Combustibles

When selecting a location for the appliance it is important to consider the required clearances to walls, Figure 3.2.

⚠ WARNING

RISK OF FIRE OR BURNS! Provide adequate clearance around air openings and for service access. *Due to high temperatures, the appliance should be located out of traffic and away from furniture and draperies.*

⚠ CAUTION

THIS APPLIANCE MUST BE VENTED TO THE OUTSIDE.

NOTICE: *Illustrations reflect typical installations and are FOR DESIGN PURPOSES ONLY. Actual installation may vary due to individual design preference.*

Place the stove away from combustible walls at least as far as shown in Figure 3.2. Please note the difference in side wall clearance with and without side shields.

Note that the clearances shown are minimum for safety but do not leave much room for access when cleaning or servicing. Please take this into account when placing the stove.

Due to high temperatures, the stove should be placed out of traffic and away from furniture and draperies.

Children and adults should be alerted to the hazards of high surface temperatures and should stay away to avoid burns to skin and/or clothing.

Young children should be carefully supervised when they are in the same room as the stove.

Clothing and other flammable materials should not be placed on or near this unit.

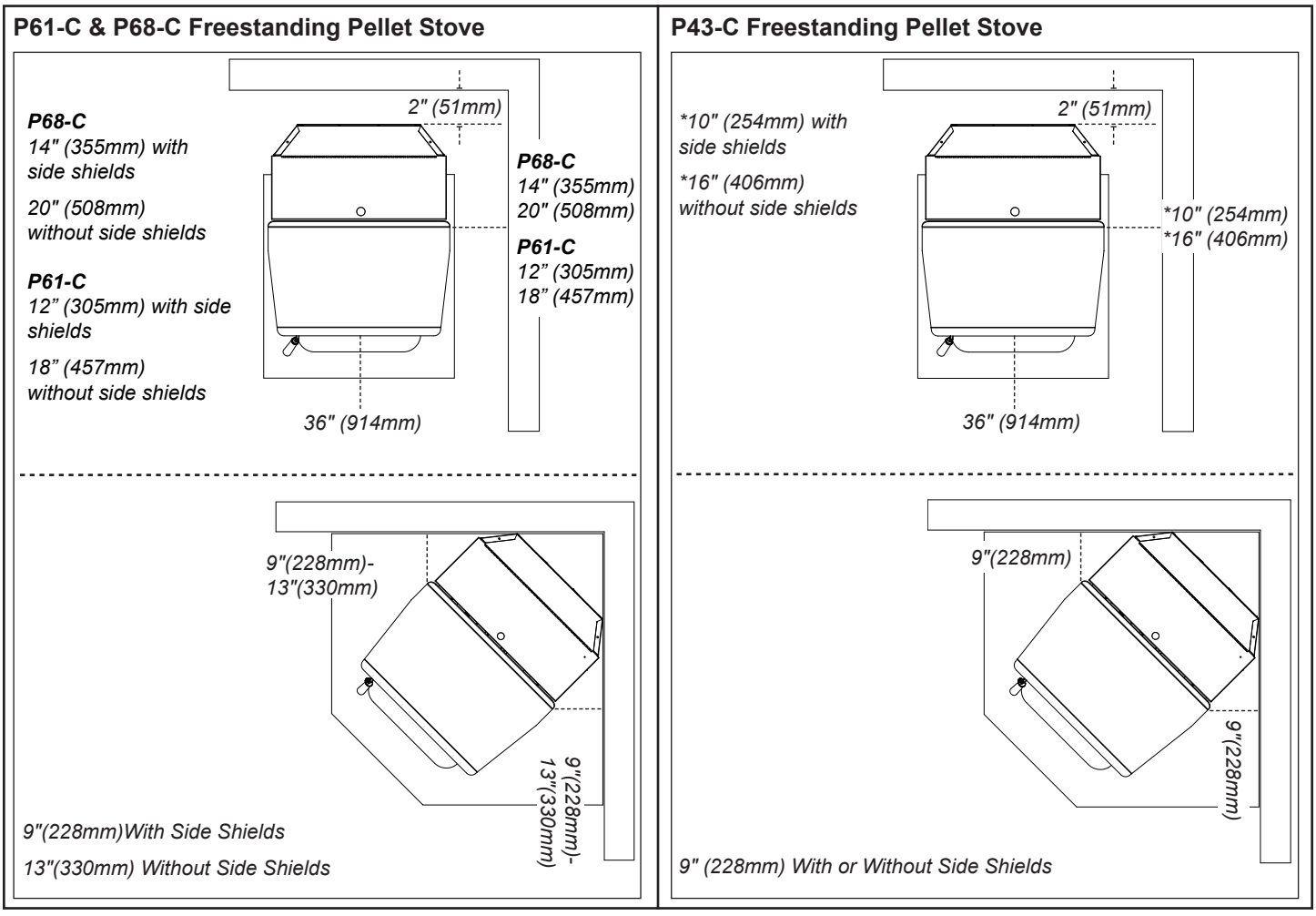


Figure 3.2

C. Floor Protection

CAUTION

Hearth and Home Technologies does not recommend adhesive based vinyl flooring due to thermal expansion. Floating-style flooring (LVP - luxury vinyl plank or LVT – luxury vinyl tile) can be used, but it will reach temperatures up to 110 °F in a room with ambient temperature of 70 °F. Consult flooring specifications to ensure compatibility.

HHT recommends wood stoves and inserts have 29 inches of alternative flooring in front of the stove before using LVP/LVT regardless if they sit flush on the floor or are elevated on a raised hearth.

For all other flooring, continue to follow clearance to combustible requirements in the installation manual.

***NOTICE:** Clearances that do not meet the minimum guidelines could result in damage or buckling to the vinyl flooring and is done at the installer's risk.*

Parallel Installation:
Place the stove on a noncombustible type floor or floor protector that extends a minimum of 6 inches (152mm) to the front of the load door opening, 6 inches (152mm) to the sides of the door opening, and 6 inches to the rear.
The P-Series does not require R value floor protection.
The minimum floor protector material is 20 gauge sheet metal. Other floor protector materials that can be used include Type I hearth pads, ceramic tile, stone, brick, etc. Figure 3.3
*Floor protection dimensions for the front and sides are measured from the appliance door opening and the rear is measured by the pedistal base rear edge.
P43-C - Minimum size rectangular floor protection is 25-7/16" Wide by 26-3/4" Deep (646mm X 680mm).
P61-C - Minimum size rectangular floor protection is 25-1/8" Wide by 27-3/4" Deep (638mm X 705mm).
P68-C - Minimum size rectangular floor protection is 25-3/16" Wide by 27-3/4" Deep (640mm X 705mm).
Venting:
US - Follow PL vent manufacturers recommendations when configuring vent pipe installation.
Canada - Must extend 2" (51mm) beyond each side of any horizontal flue pipe.

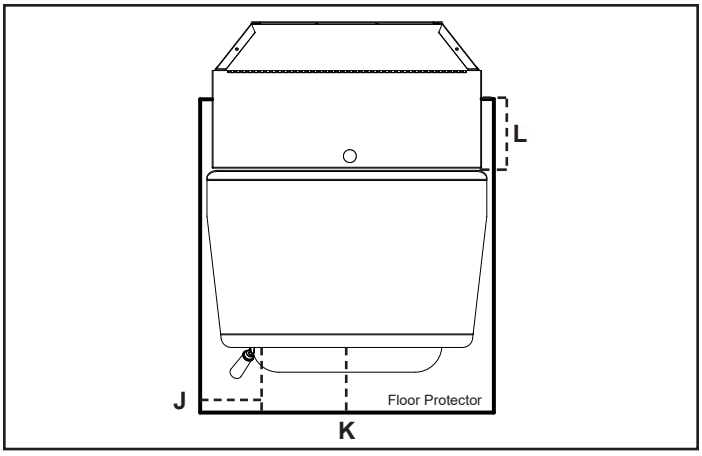


Figure 3.3

Floor Protection Requirements		US	Canada
J	Sides	6"	152mm
K	Front	6"	152mm
L	Rear	6"	152mm

Corner Installation:
Minimum size floor protection for a corner installation hearth pad is:

P43-C - Minimum size floor protection is 25-7/16" Wide by 26-3/4" Deep (646mm X 680mm).

P61-C - Minimum size floor protection is 25-1/8" Wide by 27-3/4" Deep (638mm X 705mm).

P68-C - Minimum size floor protection is 25-3/16" Wide by 27-3/4" Deep (640mm X 705mm).

Note: Floor protector <u>WILL NOT</u> touch the wall using minimum clearances.

If corner floor protection is desired to touch the wall, the floor protection will need to be at least 40" x 40" (1016mm x 1016mm). ***Note: This will allow the floor protection to touch the wall as shown. Figure 3.4***.

Alternate floor protector dimension may be used as long as they satisfy the measurement requirements shown below.

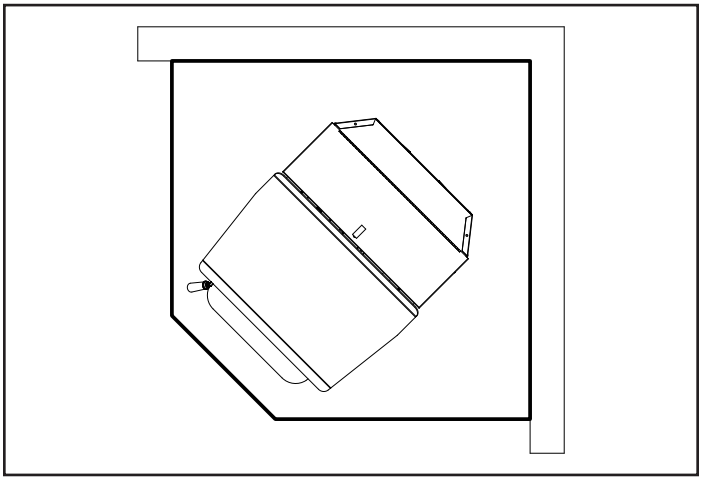


Figure 3.4

D. Mobile Home Installation

When installing this unit in a mobile home, several requirements must be followed:

1. The unit must be bolted to the floor. This can be done using an appropriate fastener for the application.
2. The unit must also be connected to outside air. See "Termination Location and Vent Information" Section D.
3. Floor protection and clearances must be followed as shown.
4. The appliance must be properly grounded to the frame of the mobile home using a minimum of 8 AWG copper solid or stranded, insulated or bare wire or equivalent.

4 Termination Location and Vent Information

A. Vent Termination Minimum Clearances

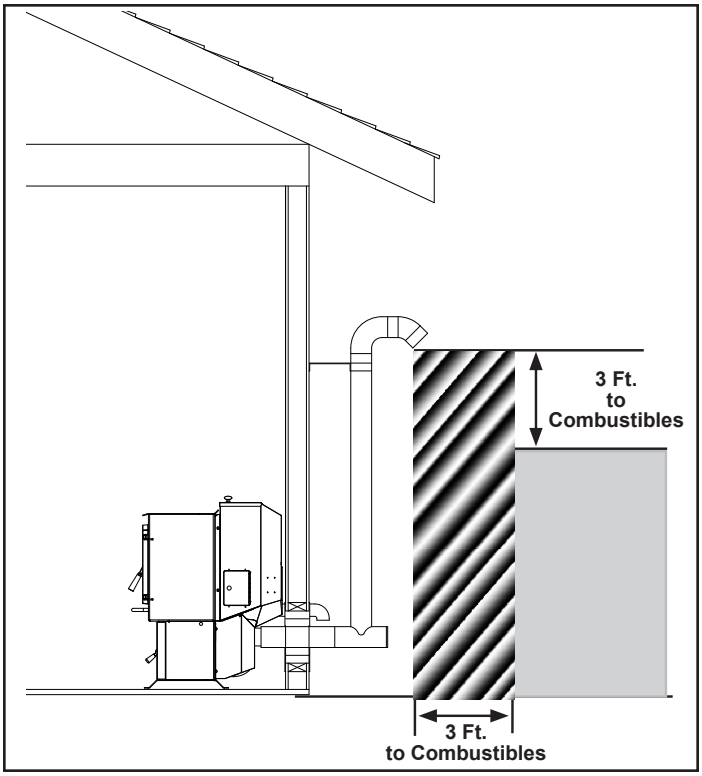


Figure 4.1

Note: Follow venting manufacturer's recommendations for sealing pipe joints.

#1 Preferred method (Figure 4.1)

This method provides excellent venting for normal operation and allows the stove to be installed closest to the wall. Two inches from the wall is safe; however, four inches allows better access to remove the rear panel. The vertical portion of the vent should be three to five feet high. This vertical section will help provide natural draft in the event of a power failure.

Do not place joints within wall pass-through.

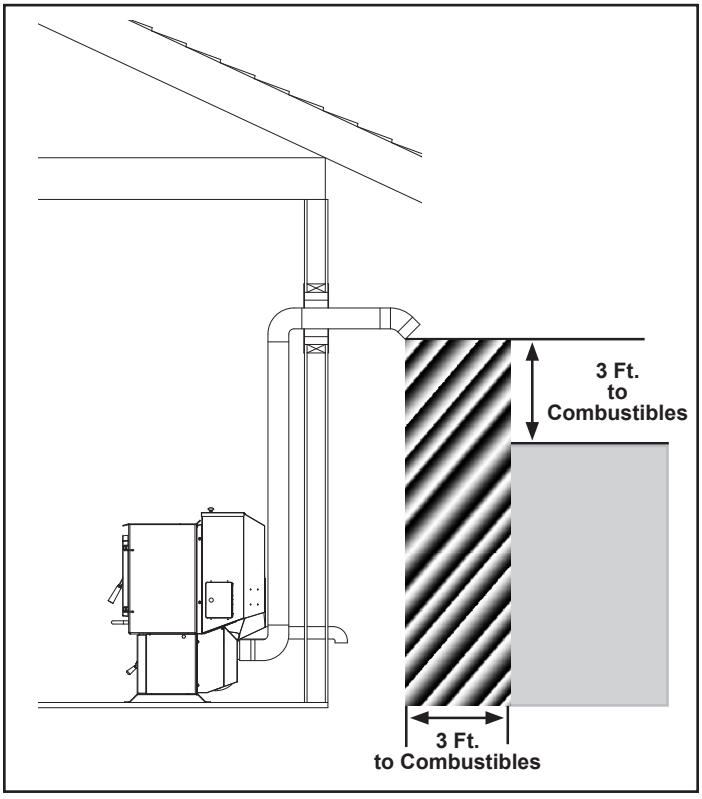


Figure 4.2

#2 Preferred method (Figure 4.2)

This method also provides excellent venting for normal operation but requires the stove to be installed farther from the wall. The vertical portion of the vent should be three to five feet high and at least 1" from a combustible wall. This vertical section will provide natural draft in the event of a power failure.

If the stove is installed below grade be sure the vent t*ermination is at least 12" above grade. The outlet must also be 1 foot from the house/building.*

Do not place joints within wall pass-through.

⚠ CAUTION

Keep combustible materials (such as grass, leaves, etc.) at least 3 feet away from the flue outlet on the outside of the building.

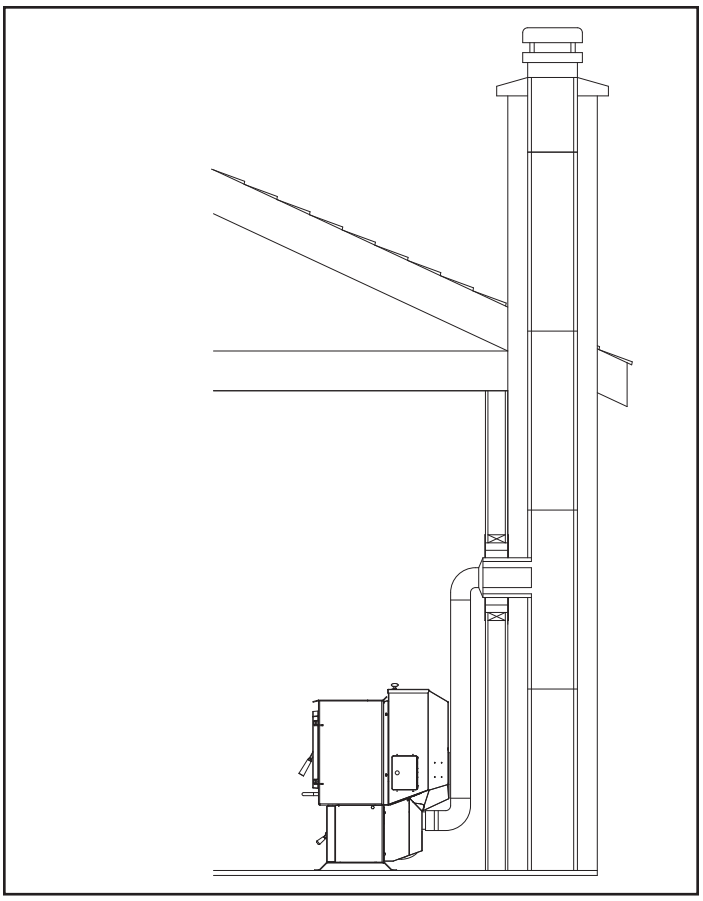


Figure 4.3

#3 Installing into an existing chimney (Figure 4.3)

This method provides excellent venting for normal operation. This method also provides natural draft in the event of a power failure. If the chimney condition is questionable* you may want to install a liner as in method #7.

In some places in the US and Canada it is required that the vent pipe extend all the way to the top of the chimney.

*The chimney should be inspected and cleaned before installing your stove. If you discover that the chimney does not have a clay tile liner or has cracks or flaking of the tile liner you will need to install a stainless steel liner within the chimney. In most cases the inside diameter of this liner should be 4". Either flexible or rigid liner may be used for this purpose. Refer to Method 6 & 7.

Be sure to design the venting so that it can be easily cleaned.

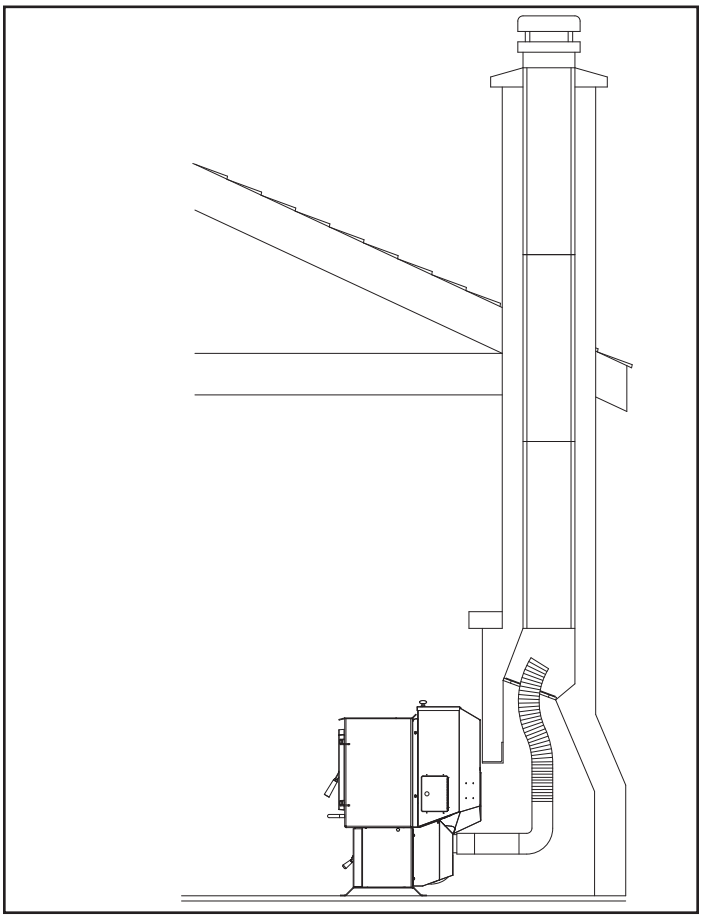


Figure 4.4

#4 Installing into an existing fireplace chimney (Figure 4.4)

This method provides excellent venting for normal operation. This method also provides natural draft in the event of a power failure. If the chimney condition is questionable* you may want to install a liner as in method #6.

In some places in the US and Canada it is required that the vent pipe extend all the way to the top of the chimney.

*The chimney should be inspected and cleaned before installing your stove. If you discover that the chimney does not have a clay tile liner or has cracks or flaking of the tile liner you will need to install a stainless steel liner within the chimney. In most cases the inside diameter of this liner should be 4". Either flexible or rigid liner may be used for this purpose. Refer to Method 5 & 6.

The chimney should be sealed at the damper using a steel plate. Kaowool, mineral wool or an equivalent non-combustible insulation is recommended to be installed on top of the sealing plate to reduce the possibility of condensation. The connector pipe should extend through the smoke chamber to the base or into the first flue tile.

Be sure to design the venting so that it can be easily cleaned.

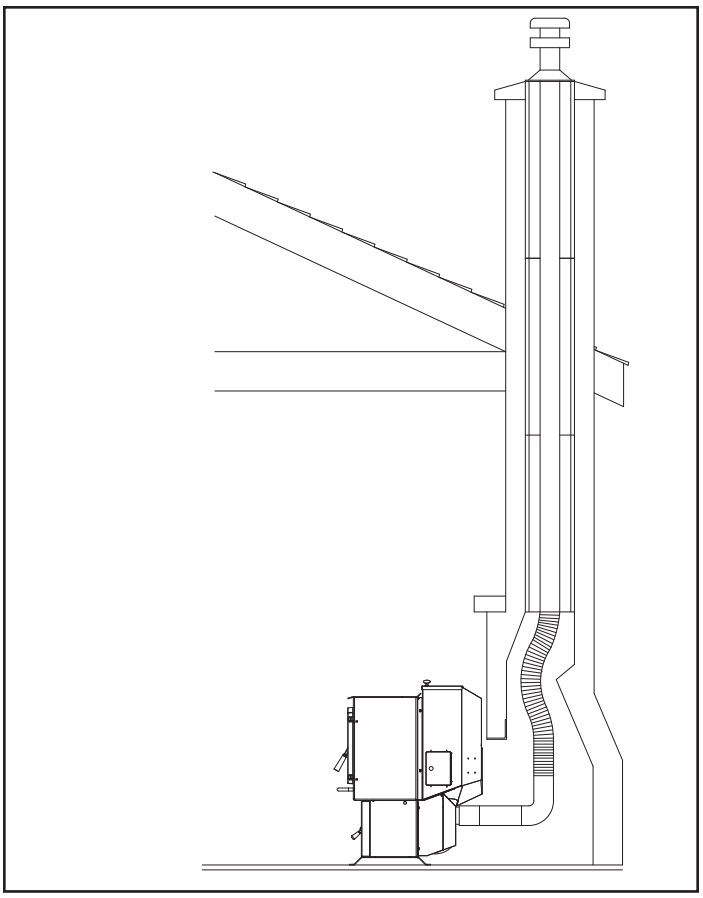


Figure 4.5

#5 Installing into an existing fireplace chimney (Figure 4.5) w/Full Liner

This method provides excellent venting for normal operation. This method also provides natural draft in the event of a power failure.

In some places in the US and Canada it is required that the vent pipe extend all the way to the top of the chimney. The pipe or liner inside the chimney should be 4" diameter.

In this method a cap should also be installed on the chimney to keep out rain. Be sure to use approved pellet vent pipe fittings. Pipe size should be increased to 4" using this method.

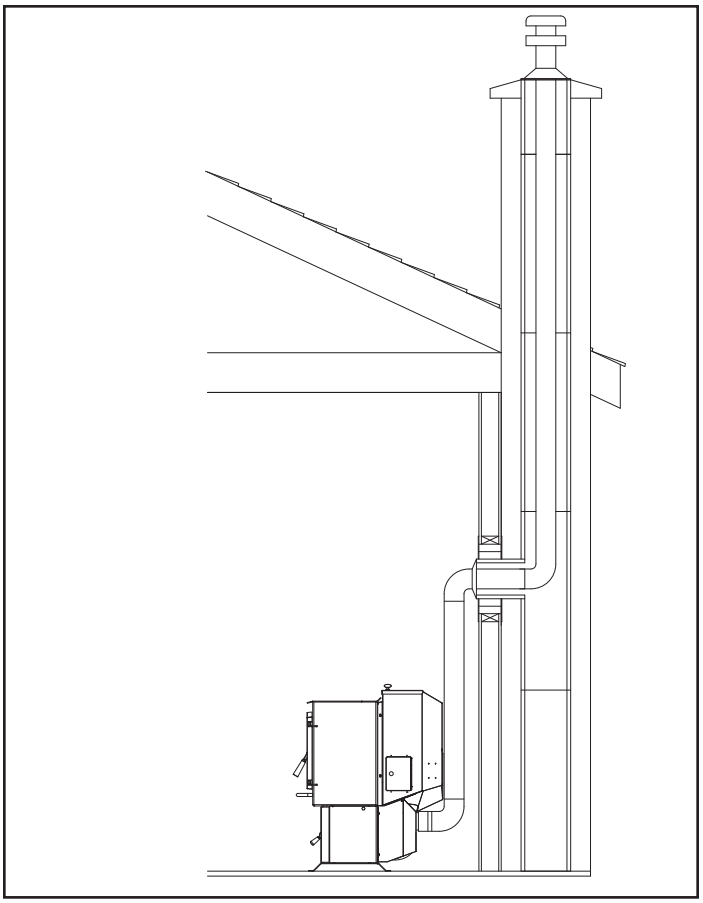


Figure 4.6

#6 Installing into an existing chimney (Figure 4.6) w/Full liner

This method provides excellent venting for normal operation. This method also provides natural draft in the event of a power failure.

In some places in the US and Canada it is required that the vent pipe extend all the way to the top of the chimney. The pipe or liner inside the chimney should be 4" diameter.

In this method a cap should also be installed on the chimney to keep out rain.

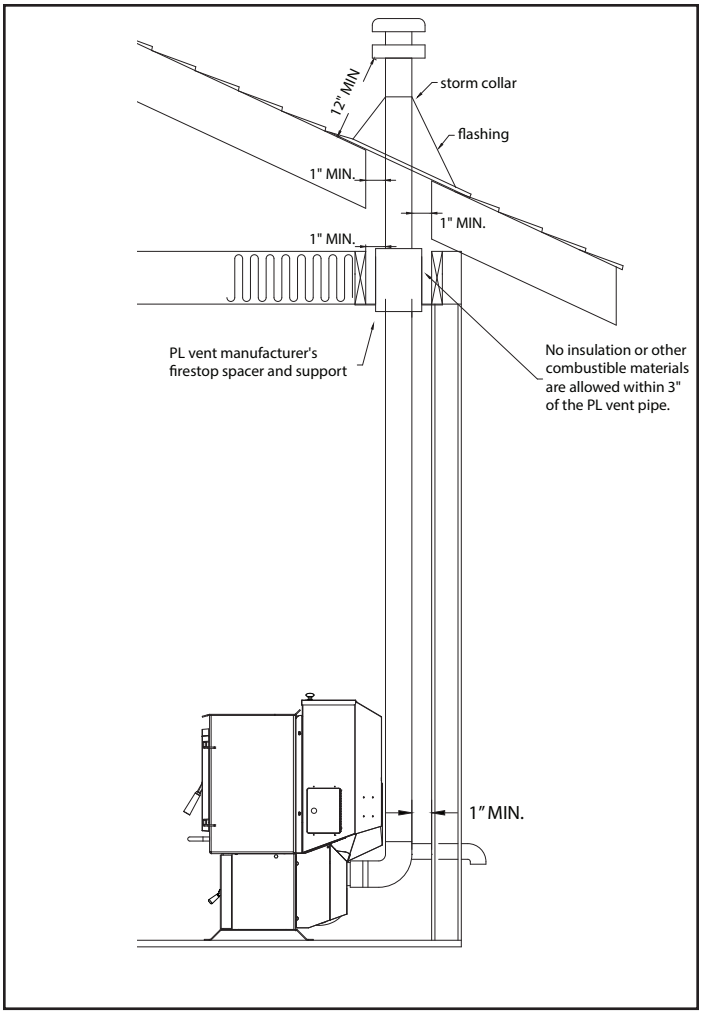


Figure 4.7

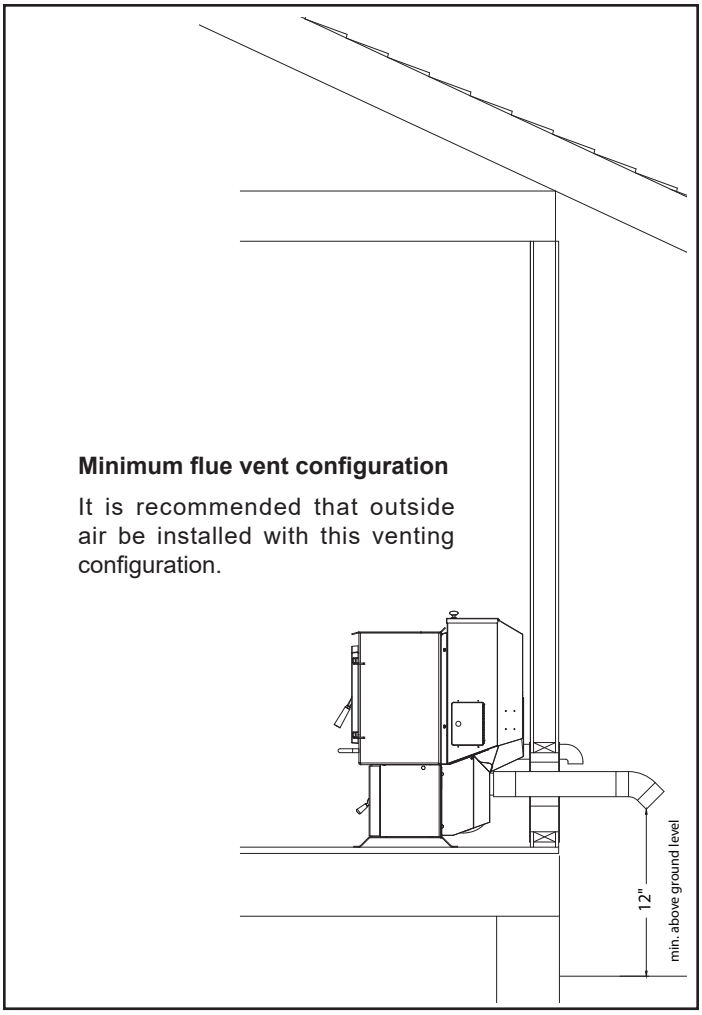


Figure 4.8

#7 Installing through the ceiling

Through the ceiling vent, follow PL vent manufacturers recommendations when using wall and ceiling pass through.

Do not place joints within wall pass-through.

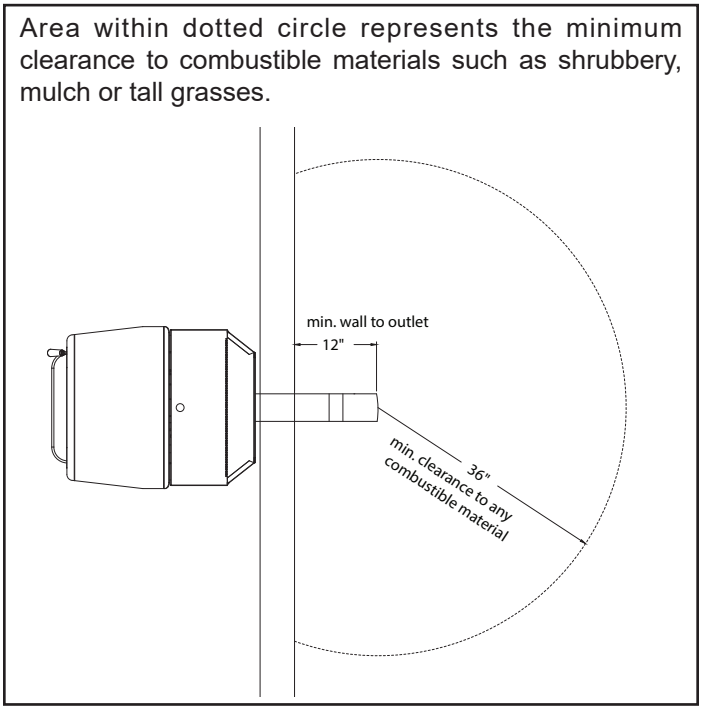


Figure 4.9

B. Chimney Diagram

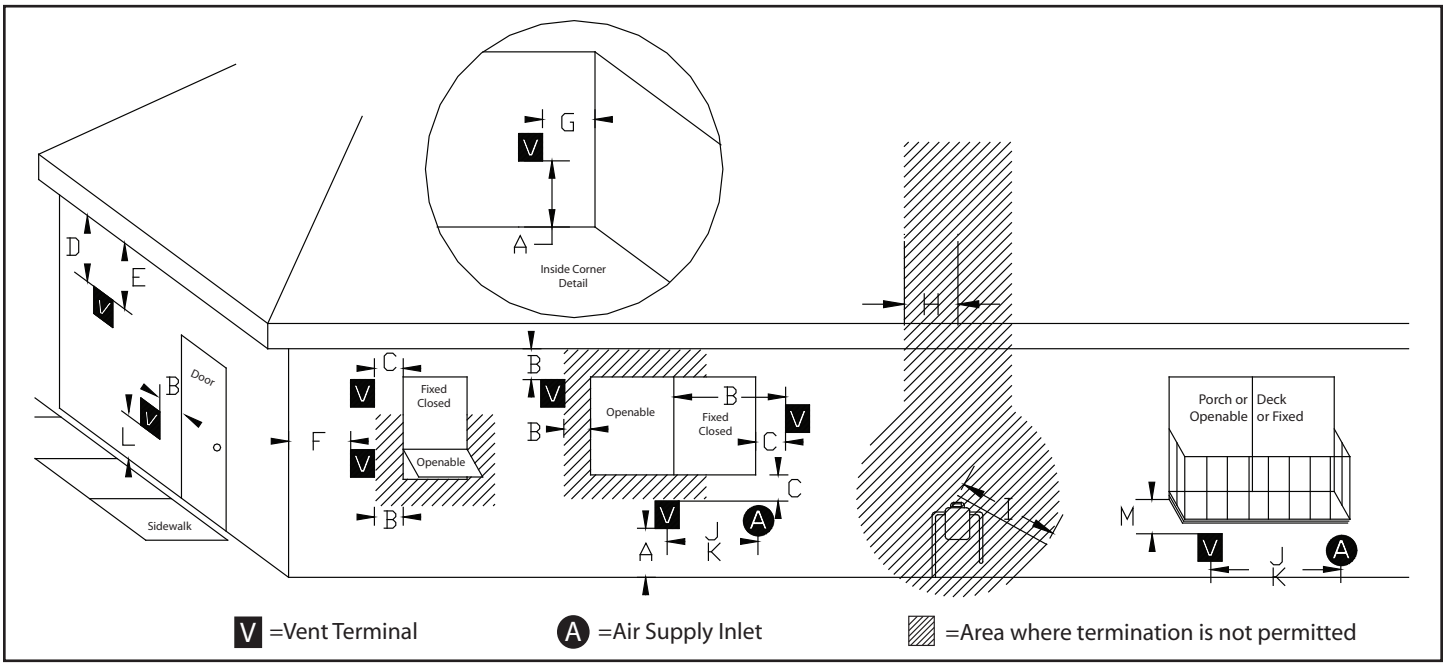


Figure 4.10

Requirements for Terminating the Venting

- **Venting terminals must not be recessed into a wall or siding.**
- **Only PL vent pipe wall pass-through and fire stops should be used when venting through combustible materials.**
- **Always take into consideration the effect the prevailing wind direction or other wind currents will cause with flyash and /or smoke when placing the termination.**

In addition, the following must be observed:

A. The clearance above grade must be a minimum of 12".

B. The clearance to a window or door that may be opened must be a minimum of 48" to the side and 48" below the window/door, and 12" above the window/door. (**with outside air installed, 12" to side and below**)

C. A 12" clearance to a permanently closed window is recommended to prevent condensation on the window.

D. The vertical clearance to a ventilated soffit located above the terminal within a horizontal distance of 2 feet (60 cm) from the center-line of the terminal must be a minimum of 18".

E. The clearance to an unventilated soffit must be a minimum of 12".

F. The clearance to an outside corner is 11" from center of pipe.

G. The clearance to an inside corner is 12".

H. A vent must not be installed within 3 feet (90 cm) above a gas meter/regulator assembly when measured from the horizontal center-line of the regulator.

I. The clearance to service regulator vent outlet must be a minimum of 6 feet.

J. The clearance to a non-mechanical air supply inlet to the building or the combustion air inlet to any other appliance must be a minimum of 48".

K. The clearance to a mechanical air supply inlet must be a minimum of 10 feet. (**with outside air installed, 6 feet**)

L. The clearance above a paved sidewalk or a paved driveway located on public property must be a minimum of 7 feet.

M. The clearance under a veranda, porch, deck or balcony must be a minimum of 12 inches. **(B. also)**

Note: The clearance to vegetation and other exterior combustibles such as mulch is 36" as measured from the center of the outlet or cap. This 36" radius continues to grade.

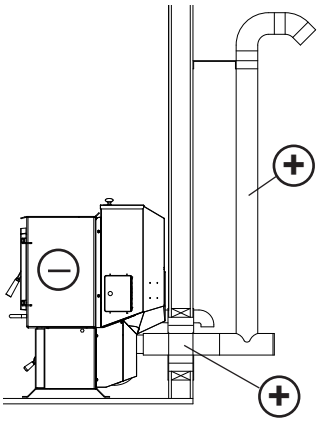
Certain Canadian and or Local codes or regulations may require different clearances.

A vent shall not terminate directly above a side-walk or paved driveway which is located between two single family dwellings and serves both dwellings.

Only permitted if veranda, porch, deck, or balcony is fully open on a minimum of 2 sides beneath the floor.

See NFPA 211 for more installation clearance reductions when using outside air. Where passage through a wall, or partition of combustible construction is desired, the installation shall conform to CAN/CSA-B365. (if in Canada)

C. Venting & Use of Elbows



⊕ = *Positive static pressure*
⊖ = *Negative static pressure*

Figure 4.11

Harman pellet stoves depend on a combustion fan to pull air through the unit for combustion. The venting system restricts the ability of the combustion fan to move the required amount of air through the unit. A system with too much resistance will result in incomplete combustion, more frequent required cleaning and poor unit performance. It is always best to choose a location for the appliance that will result in a venting system with the shortest equivalent vent length (EVL).

It is best to have your venting system designed by a Harman authorized dealer before you finalize your purchase of an appliance.

***Equivalent Vent Length:* The equivalent vent length for common pellet vent components are:**

- 90° Elbows or Tee: 5 EVL Units
- 45° elbow: 3 EVL Units
- Vertical Pipe or Liner: ½ EVL Unit
- Horizontal Pipe or liner: 1 EVL Unit

The total allowable equivalent vent length is:

- 20 EVL for 3” pellet vent pipe or liner
- 30 EVL for 4” pellet vent pipe or liner

Due to the potential for fly ash accumulation in horizontal venting sections, the maximum permissible horizontal venting length is:

- 4 ft. for 3” & 4” pellet vent pipe.

Example: First Floor Installation

A unit is to be installed using 3” Pellet Pipe with 3 feet of horizontal pipe, a Tee, 10 feet of vertical pipe, a 90° elbow and a termination cap.

The equivalent vent length is:

3 ft. of Horizontal Pipe (1 x 3 EVL)	= 3 EVL
90° Elbow or Tee (1 x EVL)	= 5 EVL
10 ft. of Vertical Pipe (10 x .5 EVL)	= 5 EVL
90° Elbow or Tee (1 x EVL)	= 5 EVL
Termination Cap	= 0 EVL
Equivalent Vent Length	= 18 EVL

In the example system detailed above, the EVL was 138 which is less than the maximum of 20 EVL for 3” pellet vent pipe, thus this is a satisfactory venting configuration.

Example: Connection to Masonry Chimney

A unit is to be installed using 3” Pellet Pipe with 2 feet of horizontal pipe, a Tee, 4 feet of vertical pipe, an elbow, a Tee, 21 feet of vertical liner, and a termination cap.

The equivalent vent length is:

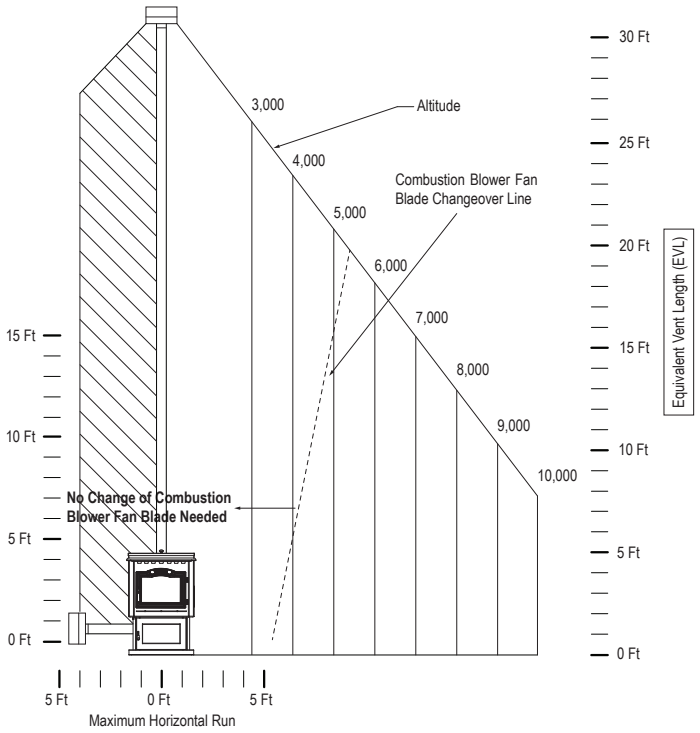
2 ft. of Horizontal Pipe (1 x 2 EVL)	= 2 EVL
90° Tee (1 x 5 EVL)	= 5 EVL
4 ft. of Vertical Pipe (4 x .5 EVL)	= 2 EVL
90° Elbow (1 x 5 EVL)	= 5 EVL
90° Tee (1 x 5 EVL)	= 5 EVL
21 ft. of Vertical Liner (21 x .5 EVL)	= 10.5 EVL
Termination Cap	= 0 EVL
Equivalent Vent Length	= 29.5 EVL

In the example system detailed above, the EVL was 29.5 which exceeds the maximum of 20 ft. for 3” pellet vent pipe, thus 3” vent pipe should not be used in this installation. However, since 4” pipe can support an EVL up to 30, the use of 4” pipe would create a satisfactory installation.

C. Venting & Use of Elbows *continued*

Note: When the amount of vertical pellet vent pipe in the system exceeds 15 feet, 4” pellet vent pipe should be used.

Note: Equivalent Venting Length decreases as altitude increases.



Example:

A unit with an EVL of 13, is to be installed at an altitude of 3,000 feet above sea level.

From the chart to the left, at 3,000 feet of altitude, the maximum permissible equivalent venting length is 26 feet. Therefore this would be an acceptable installation with no need to change the combustion blower fan.

However, if the same unit (EVL 13)was to be installed an altitude of 9,000 feet above sea level, the installation would no longer be acceptable and the equivalent vent length of the pipe would have to be reduced for proper unit operation.

- Long runs of flex or PL vent pipe installed directly vertical from the flue stub may require more frequent cleaning due to fly ash falling off inside and collecting directly above the combustion blower outlet.
- 4" stainless steel flex vent piping is only allowed for use in masonry fireplaces and chimneys or factory built wood-burning fireplaces with Class A metal chimneys.
- All pellet vent pipe must be secured together either by means provided by pipe manufacturer or by 3 screws at each joint.
- Use only the specified venting components. Use of any other components will void the product warranty and may pose a hazard.
- Do Not Install a Flue Damper In The Exhaust Venting System of This Appliance.
- DO NOT CONNECT THIS UNIT TO A CHIMNEY FLUE SERVING ANOTHER APPLIANCE.
- **NOTE:** Simpson DuraVent PelletVent Pro Harman®Adapter Part #3PVP-ADHB and PelletVent Pro Harman®Adapter Increaser Part #3PVPX4ADHB are highly recommended to be installed on the starter collar to insure a proper pipe connection to the unit.
- **INSTALL VENT AT CLEARANCES SPECIFIED BY THE VENT MANUFACTURER**
- Use silicone to create an effective vapor barrier at the location where the chimney or outside air ducting passes through to the exterior of the structure

D. Outside Air

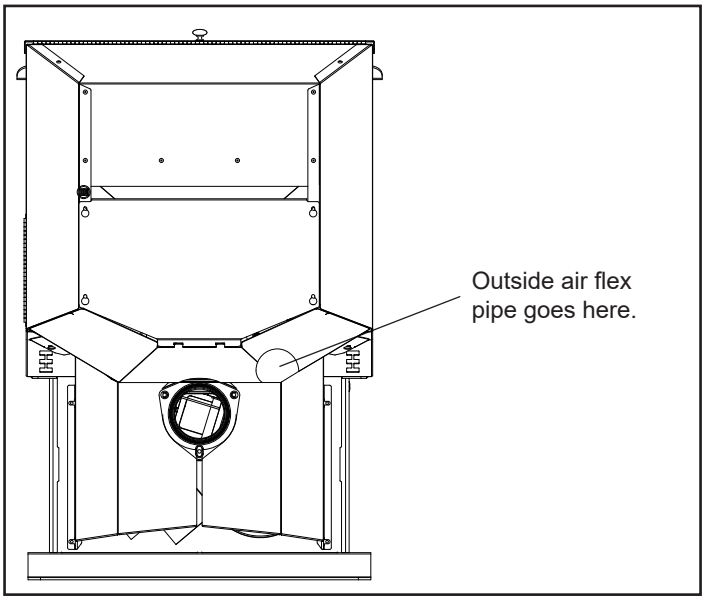


Figure 4.12

Termination Cap
part# 1-10-09542

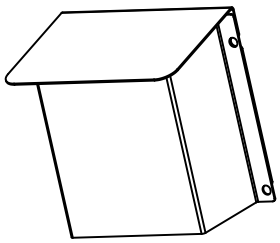


Figure 4.13

Direct Vent Wall Pass-through Kit
(Part #1-00-677177)

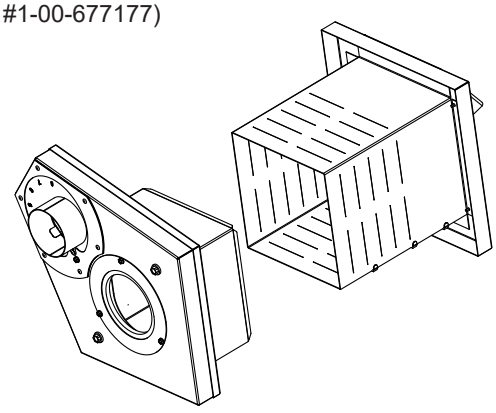


Figure 4.14

Outside Air:
Hearth & Home Technologies recommend attaching outside air in all installations, especially lower level and main floor locations.

Per national building codes, consideration must be given to combustion air supply to all combustion appliances. Failure to supply adequate combustion air for all appliance demands, may lead to back-drafting of those and other appliances.

When the appliance is side-wall vented: The air intake is best located on the same exterior wall as the exhaust vent outlet and located lower on the wall than the exhaust vent outlet.

When the appliance is roof vented: The air intake is best located on the exterior wall oriented towards the prevailing wind direction during the heating season.

The outside air connection will supply the demands of the pellet appliance, but consideration must be given to the total house demand. House demand may consume some air needed for the stove, especially during a power failure. It may be necessary to add additional ventilation to the space in which the pellet appliance is located. Consult with your local HVAC professional to determine the ventilation demands for your house.

To install outside air use 3". non-combustible flex pipe Figure 4.13. There is a break-away hole on the rear panel of the P-Series stove which must be removed before connecting the flex pipe. Figure 4.12. The pipe should be run outside and terminate to the side or below the vent pipe outlet so the flue outlet is more than 12" from the inlet cover. The Termination Cap should be used to keep birds, rodents, etc. out of the pipe Figure 4.13.

You may choose to use the optional Direct Vent Wall Pass-through Kit which incorporates the venting pass-through and outside air inlet into one component. Figure 4.14.

Use silicone to create an effective vapor barrier at the location where the chimney or outside air ducting passes through to the exterior of the structure.

E. Locating Your Appliance & Chimney

Location of the appliance and chimney will affect performance.

- Install through the warm airspace enclosed by the building envelope. This helps to produce more draft, especially during lighting and die-down of the fire.
- Penetrate the highest part of the roof. This minimizes the effects of wind loading.
- Locate termination cap away from trees, adjacent structures, uneven roof lines and other obstructions.
- Minimize the use of chimney offsets.
- Consider the appliance location relative to floor and ceiling and attic joists.

⚠ CAUTION

- DO NOT CONNECT THIS UNIT TO A CHIMNEY FLUE SERVICING ANOTHER APPLIANCE.
- DO NOT CONNECT TO ANY AIR DISTRIBUTION DUCT OR SYSTEM.

May allow flue gases to enter the house

F. Draft

Draft is the pressure difference needed to vent appliances successfully. When an appliance is drafting successfully, all combustion by products are exiting the home through the chimney.

Considerations for successful draft include:

- Preventing negative pressure
- Location of appliance and chimney

To measure the draft or negative pressure on your appliance use a magnahelic or a digital pressure gauge capable of reading 0 - 1 inches of water column (W.C.).

The appliance should be running on high for at least 15 minutes for the test.

With the stove running on high you should have a negative pressure equal to or greater than the number given in the chart below. If you have a lower reading than you find on the chart, your appliance does not have adequate draft to burn the fuel properly.

Minimum Vacuum Requirements:	**.35 - .55**

Prior to installing the flue pipe, connect a draft meter. (The draft meter must have a minimum range of 0 - .5”) Record the first reading. Connect flue pipe to stove and be sure all doors and windows in the home are closed. Record the second draft reading _____. If the second reading is more than .05” lower than the first reading, check for possible restrictions or the need for outside air. For more information on the draft test procedure, refer to Page 21

G. Negative Pressure

⚠ WARNING

Risk of Asphyxiation! *Negative pressure can cause spillage of combustion fumes and soot.*

Negative pressure results from the imbalance of air available for the appliance to operate properly. It can be strongest in lower levels of the house.

Causes include:

- Exhaust fans (kitchen, bath, etc.)
- Range hoods
- Combustion air requirements for furnaces, water heaters and other combustion appliances
- Clothes dryers
- Location of return-air vents to furnace or air conditioning
- Imbalances of the HVAC air handling system
- Upper level air leaks such as:
  - Recessed lighting
  - Attic hatch
  - Duct leaks

To minimize the effects of negative air pressure:

- Install the outside air kit with the intake facing prevailing winds during the heating season
- Ensure adequate outdoor air for all combustion appliances and exhaust equipment
- Ensure furnace and air conditioning return vents are not located in the immediate vicinity of the appliance
- Avoid installing the appliance near doors, walkways or small isolated spaces
- Recessed lighting should be a “sealed can” design
- Attic hatches weather stripped or sealed
- Attic mounted duct work and air handler joints and seams taped or sealed

NOTICE: *Hearth & Home Technologies assumes no responsibility for the improper performance of the chimney system caused by:*

- *Inadequate draft due to environmental conditions*
- *Downdrafts*
- *Tight sealing construction of the structure*
- *Mechanical exhausting devices*

H. Avoiding Smoke and Odors

Negative Pressure, Shut-down, and Power Failure:

T**o reduce the probability of back-drafting or burn-back in the pellet burning appliance during power failure or shut-down conditions, the stove must be able to draft naturally** without exhaust blower operation. Negative pressure in the house will resist this natural draft if not accounted for in the pellet appliance installation.

Heat rises in the house and leaks out at upper levels. This air must be replaced with cold air from outdoors, which flows into lower levels of the house. Vents and chimneys into basements and lower levels of the house can become the conduit for air supply, and reverse under these conditions.

Outside Air

An outside air kit is recommended in all installations. The Outside Air Kit must be ordered separately.

Per national building codes, consideration must be given to combustion air supply to all combustion appliances. Failure to supply adequate combustion air for all appliance demands may lead to back drafting of those and other appliances.

When the appliance is roof vented (strongly recommended):

The air intake is best located on the exterior wall oriented towards the prevailing wind direction during the heating season.

When the appliance is side-wall vented:

The air intake is best located on the same exterior wall as the exhaust vent outlet and located lower on the wall than the exhaust vent outlet.

The outside air supply kit can supply most of the demands of the pellet appliance, but consideration must be given to the total house demand.

House demand may consume the air needed for the appliance. It may be necessary to add additional ventilation to the space in which the pellet appliance is located.

Consult with your local HVAC professional to determine the ventilation demands for your house.

Vent Pipe

Be sure to use approved pellet vent pipe wall and ceiling pass- through fittings to go through combustible walls and ceilings. Be sure to use a starting collar to attach the venting system to the stove. The starting collar must be secured to the flue stub with at least three screws, and sealed with high temp silicone caulking.

4” stainless steel flex vent piping is only allowed for use in masonry fireplaces and chimneys or factory built wood burning fireplaces with class A metal chimneys.

Pellet venting pipe (also known as Type L vent) is constructed of two layers with air space between the layers. This air space acts as an insulator and reduces the outside surface temperature to allow a clearance to combustibles of only 1 inch. The sections of pipe lock together to form an air tight seal in most cases. Follow venting manufacturer’s recommendations for sealing pipe joints.

Where passing through an exterior wall or roof, be sure to use the appropriate pass-through device providing an adequate vapor barrier. Venting manufacturers generally provide these pass-through devices.

Vent Configurations:

To reduce probability of reverse drafting during shut-down conditions, Hearth & Home Technologies strongly recommends:

- Installing the pellet vent with a minimum vertical run of five feet, preferably terminating above the roof line.
- Installing the outside air intake at least four feet below the vent termination.

To prevent soot damage to exterior walls of the house and to prevent re-entry of soot or ash into the house:

- Maintain specified clearances to windows, doors, and air inlets, including air conditioners.
- Vents should not be placed below ventilated soffits. Run the vent above the roof.
- Avoid venting into alcove locations.
- Vents should not terminate under overhangs, decks or onto covered porches.
- Maintain minimum clearance of 12 inches from the vent termination to the exterior wall. If you see deposits developing on the wall, you may need to extend this distance to accommodate your installation conditions.

Hearth & Home Technologies assumes no responsibility for, nor does the warranty extend to, smoke damage caused by reverse drafting of pellet appliances under shut-down or power failure conditions.

I. Fire Safety

To provide reasonable fire safety, the following should be given serious consideration:

- Install at least one smoke detector and CO detector on each floor of your home.
- Locate smoke detector away from the heating appliance and close to the sleeping areas.
- Follow the smoke detector manufacturer's placement and installation instructions and maintain regularly.
- Conveniently locate a Class A fire extinguisher to contend with small fires.
- In the event of a hopper fire:
  - Evacuate the house immediately.
  - Notify fire department.

⚠ WARNING

Fire Risk.
Hearth & Home Technologies disclaims any responsibility for, and the warranty will be voided by the following actions:

- Installation and use of any damaged appliance.
- Modification of the appliance.
- Installation other than as instructed by Hearth & Home Technologies.
- Installation and/or use of any component part not approved by Hearth & Home Technologies.
- Operating appliance without fully assembling all components.
- Do NOT Overfire.

Or any such action that may cause a fire hazard.

⚠ WARNING

THIS WOOD HEATER HAS A MANUFACTURER-SET MINIMUM LOW BURN RATE THAT MUST NOT BE ALTERED. IT IS AGAINST FEDERAL REGULATIONS TO ALTER THIS SETTING OR OTHERWISE OPERATE THIS WOOD HEATER IN A MANNER INCONSISTENT WITH OPERATING INSTRUCTIONS IN THIS MANUAL.

J. Inspect Appliance & Components

- Remove appliance and components from packaging and inspect for damage.
- Report to your dealer any parts damaged in shipment.
- **Read all the instructions before starting the installation. Follow these instructions carefully during the installation to ensure maximum safety and benefit.**

⚠ WARNING

Inspect appliance and components for damage. Damaged parts may impair safe operation.

- Do NOT install damaged components.
- Do NOT install incomplete components.
- Do NOT install substitute components.

Report damaged parts to dealer.

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

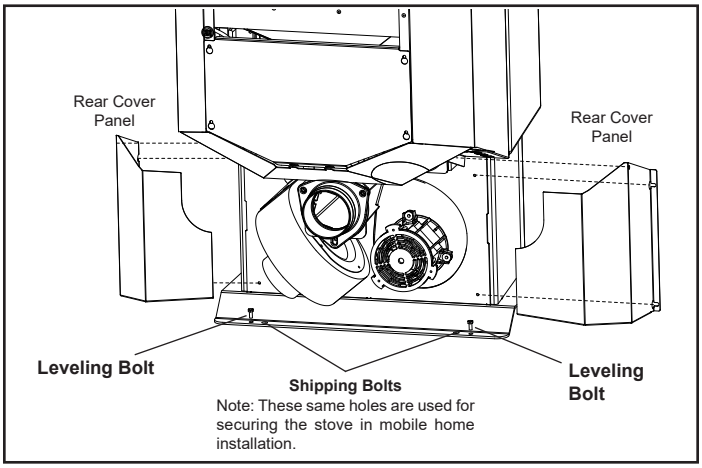


Figure 5.1

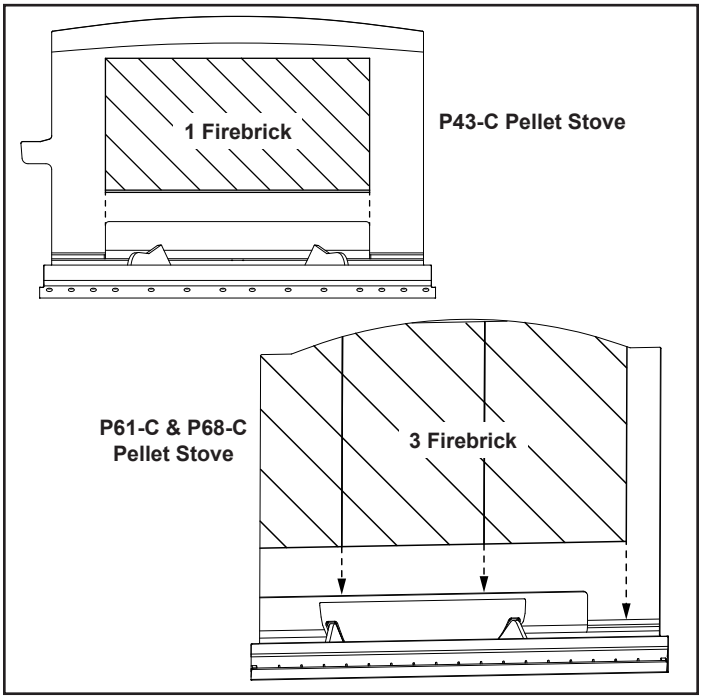


Figure 5.2

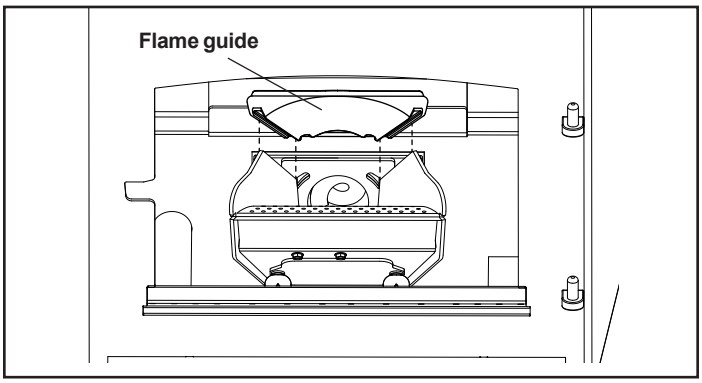


Figure 5.3

A. Unpacking

The P-Series is bolted (1/4 x 1" hex head bolts) to the skid to prevent movement during shipping.

To free the stove from the skid you must remove the hold-down bolts in the rear of the pedestal base using a 7/16” socket or wrench. Figure 5.1.

B. Removing Rear Cover Panels

The rear cover panels are secured to the stove with three screws each. Two of the screws need only be loosened, not removed, to remove the panels. It is recommended that the rear covers are installed using a 5/16” socket, wrench or nut driver after the unit is in place and the vent pipe is installed, to prevent contact with hot or moving parts.

If needed, install the (2) 5/16-18 X 3/4” leveling bolts located in the hardware kit. Figure 5.1.

C. Firebrick

The P43-C Pellet Stove has a single (1) firebrick that gets installed horizontally on the angle bracket above the burnpot. The P61-C and P68-C have three (3) firebrick that get installed vertically on the angle bracket. Figure 5.2.

D. Flame Guide

Install the cast iron flame guide on top of the burn pot. Make sure that the flame guide is fully seated on the vertical sides of the burn pot and that the back of the guide rests against the body of the stove. Figure 5.3.

E. Room Sensor Installation

The room sensor is a small temperature sensor on the end of a 60" wire. This sensor is installed much like a standard wall thermostat. There is a remote room sensor port on the rear of the unit for easy external connection. Use standard 18-2 thermostat wire to extend the sensor to the desired location (50' maximum). The room sensor should be installed in the location where you want to control the temperature.

NOTE: Distances of more than 25 feet from the unit or in another room are not recommended. The room sensor is essential for the P-Series excellent efficiency.

NOTE: It is recommended that the room sensor be installed, even if only installed on the rear of the unit as a return air sensor.

F. Low Draft Voltage Adjustment

These units are pre-tested at the factory with exactly 120 VAC, 60 Hz. They are checked and adjusted for firebox tightness, gasket leakage, motor operation and igniter operation. The P-Series is then factory set at a mid-point adjustment and in most cases will not need any adjustments.

NOTE: The factory low draft setting may not be correct for the unit's permanent installation conditions.

The control board on the P-Series is equipped with a low draft adjustment port located on the control face just to the right of the igniter light. Figure 5.4. This voltage adjustment is provided to allow the unit to be adjusted for the household voltage where the unit is going to be in permanent operation. **NOTE: The line voltage varies from area to area and often home to home.**

The low draft voltage should be adjusted to achieve the most efficient burn on low burn or "maintenance". This voltage adjustment allows the installer to change the low voltage set point approximately 10 volts. This adjustment should be done by the installer during set up because a draft meter reading is **required** to insure proper set up.

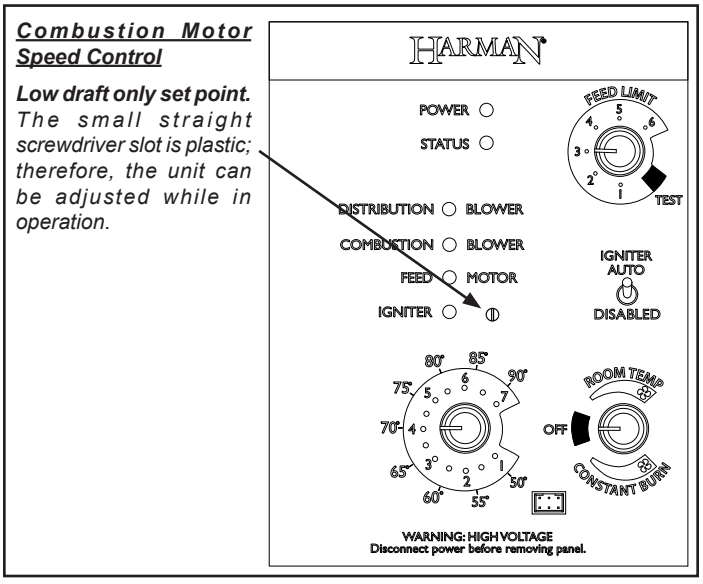


Figure 5.4

If the unit is not adjusted properly, it does not cause a safety concern. If the unit is adjusted too high, only efficiency is lost. If the unit is adjusted too low, the low draft pressure switch will not allow the feed motor or the igniter to operate.

A simple draft test should be performed after completing the flue pipe installation. To record the results for future reference:

1. Plug unit into a 120 VAC, 60 HZ outlet.
2. Close the hopper lid, front view door, and the ash pan door. Neither pellets or a fire are required for this test.
3. With the mode selector in the "OFF" position, turn the feed adjuster to "TEST".
4. Record the high draft_____in W.C. (Normal is -.50 to -.60) The control will be on the High Draft for a total of 2 minutes.
5. After 1 minute, the combustion motor will go down to low draft and the distribution blower will go on high. Allow approximately 15 seconds to pass for the combustion motor to slow before checking the low draft.
6. If the low draft is between -.35 and -.45, record the reading _____ in W.C. If the reading is higher, slowly turn the set screw counter-clockwise until the draft lowers. If the reading is lower, very slowly turn the set screw clockwise until the draft increases.

NOTE: In some cases, the draft may not go as low as -.35 to -.45 even with the set screw completely counter-clockwise. Ideally, you should just set it as low as possible.

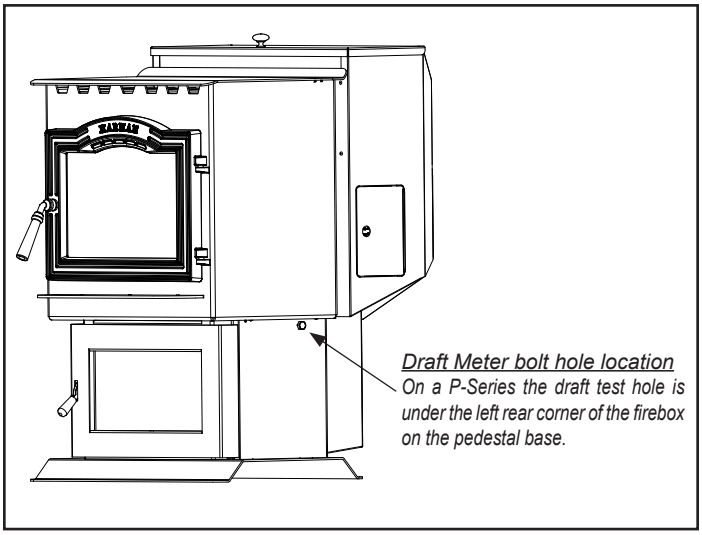


Figure 5.5

Connect the power cord to a 120 VAC, 60 Hz grounded receptacle. (A surge protector is recommended to protect the circuit board.) Also be sure that the polarity of the outlet that the stove is plugged into is correct.

6 Reference Material

A. Safety Reminders

When installing and operating your Harman® P-Series, respect basic safety standards. Read these instructions carefully before you attempt to install or operate the P-Series. Failure to do so may result in damage to property or personal injury and may void the product warranty.

Consult with your local building code agency and insurance representative before you begin your installation to ensure compliance with local codes, including the need for permits and follow-up inspections.

⚠ CAUTION

This appliance must be vented to the outside.

Due to high temperatures, this stove should be placed out of traffic and away from furniture and draperies.

Children and adults should be alerted to the hazards of high surface temperatures and should stay away to avoid burn to skin and/or clothing.

Young children should be carefully supervised when they are in the same room as the stove.

Clothing and other flammable materials should not be placed on or near this stove.

Installation and repair of this stove should be done by a qualified service person. The appliance should be inspected before use and at least annually by a qualified service person. More frequent cleaning may be required. It is imperative that control compartments, burners, and circulating air passageways of this stove be kept clean.

⚠ CAUTION

WHEN THIS ROOM HEATER IS NOT PROPERLY INSTALLED, A HOUSE FIRE MAY RESULT. TO REDUCE THE RISK OF FIRE, FOLLOW THE INSTALLATION INSTRUCTIONS. CONTACT LOCAL BUILDING OR FIRE OFFICIALS ABOUT RESTRICTIONS AND INSTALLATION INSPECTION REQUIREMENTS IN YOUR AREA.

⚠ CAUTION

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

⚠ CAUTION

THE STOVE IS HOT WHILE IN OPERATION.

KEEP CHILDREN, CLOTHING AND FURNITURE AWAY. CONTACT MAY CAUSE SKIN BURNS.

⚠ WARNING

MOBILE/MANUFACTURED HOME GUIDELINES DO NOT ALLOW INSTALLATION IN A SLEEPING ROOM.

⚠ WARNING

KEEP COMBUSTIBLE MATERIALS SUCH AS GRASS, LEAVES, ETC. AT LEAST 3 FEET AWAY FROM THE POINT DIRECTLY UNDER THE VENT TERMINATION.

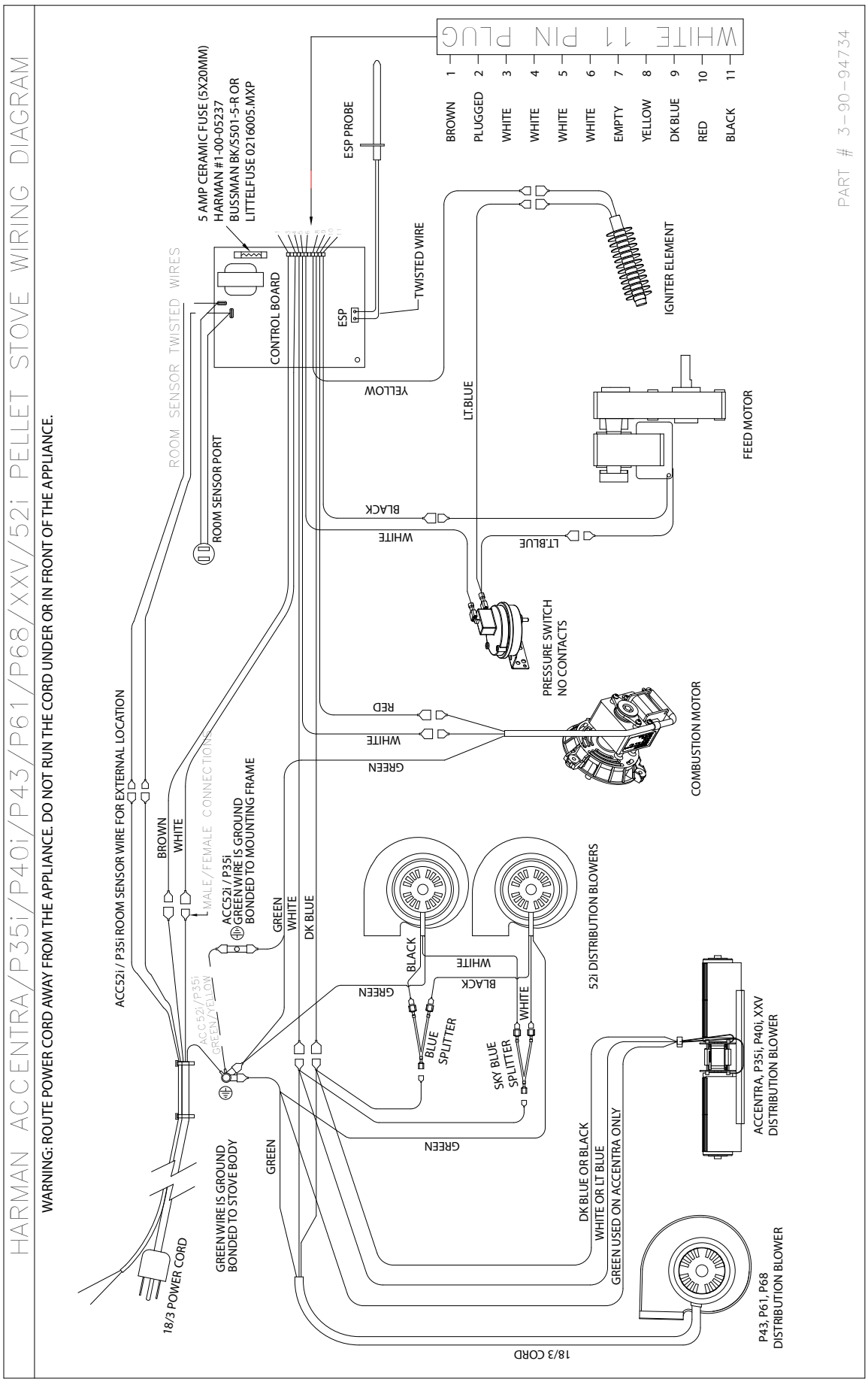
⚠ WARNING

USE OF IMPROPER FUELS, FIRESTARTERS OR ALTERING THE STOVE FOR HIGHER HEAT OUTPUT MAY CAUSE DAMAGE TO THE STOVE AND COULD RESULT IN A HOUSE FIRE. USE ONLY APPROVED FUELS AND OPERATION GUIDELINES

⚠ WARNING

BURNING COLORED PAPER, CARDBOARD, SOLVENTS, TRASH AND GARBAGE OR ALTERING THE STOVE FOR HIGHER HEAT OUTPUT MAY CAUSE DAMAGE TO THE STOVE AND COULD RESULT IN A HOUSE FIRE. USE ONLY APPROVED FUELS AND FOLLOW ONLY THESE OPERATION GUIDELINES.

B. Wiring Diagram



HARMAN®

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Please contact your Harman® dealer with any questions or concerns.
For the location of your nearest Harman® dealer,
please visit www.harmanstoves.com.

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Appendix B – Revision History

Date	Project No.	Tech. & Evaluator	Report Sect.	Summary of Changes
January, 2004	135-S-13-3	P. Tiegs R. Sparwasser	ALL	First Issue of Report
August, 2014	0135PS013E.AD03	K. Morgan	ALL	Tested to 2015 requirements
(No Report)	0135PS013E.REV001	K. Morgan	ALL	Changes to gasketing material
1/23/2019	0135PS013E.REV002	A._Kravitz	ALL	Re-tested to 2020 requirements
2/13/2019	0135PS013E.REV002 Edition 001	A._Kravitz	ALL	Updated pellet fuel moisture content used and Btu input values
2/28/2024	0135PS013E.REV002 Edition 002	Ken Morgan	2 Page 11	Dilution Tunnel Schematic and tunnel used added to report.
			Page 7	Updated Run Summary to address all anomalies and run validity.
			Table 1, Page 5	Uncorrected/Corrected Emission Values added.
			Page 15	Added Train Precision values to Emission Results.
			Page 74	Added revised manual now including topic about smoke and CO monitors.
			Page 114	Added Installation Manual and reviewed adequacy of venting and draft requirements as related to pellet stoves.
			Pages 41 and 42	Supplemental Barometer calibration certificate has been added