

Certification Test Report

Harman Home Heating Freestanding Pellet Stove Model: P61a

Prepared for: Harman Home Heating
352 Mountain House Road
Halifax, PA 17032

Prepared by: OMNI-Test Laboratories, Inc.
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Test Period: July 2-3, 2014

Report Date: October 2014

Report Number: 0135PS022E.AD02

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Section 1

Photographs/Appliance Description/Drawings

Model: P61a
Harman Home Heating
352 Mountain House Road
Halifax, PA 17032

Harman Home Heating
P61a
Test Dates: July 2-3, 2014



APPLIANCE DESCRIPTION

Appliance Manufacturer: Harman Home Heating

Pellet Stove Model: P61a

Type: Freestanding, Air-Circulating Type, Pellet-Fired Room Heater

PELLET HEATER DESCRIPTION

Materials of Construction: The firebox is constructed of mild steel with the exterior being constructed entirely of steel.

Air Introduction System: Air enters the firepot through holes in the firepot. Air is drawn through the pot via a combustion fan.

Combustion Control Mechanisms: Electronically controlled via user selectable control panel.

Combustor: N/A.

Internal Baffles: N/A.

Other Features: Large capacity ash drawer.

Flue Outlet: The 3-inch diameter flue outlet is located in the bottom/rear of the unit.

PELLET HEATER OPERATING INSTRUCTIONS

Specific written instructions: See Section 3 of this report. All markings and instruction materials were reviewed for content prior to printing.

Model: P61a
Harman Home Heating
352 Mountain House Road
Halifax, PA 17032

Section 4

Test Data by Run

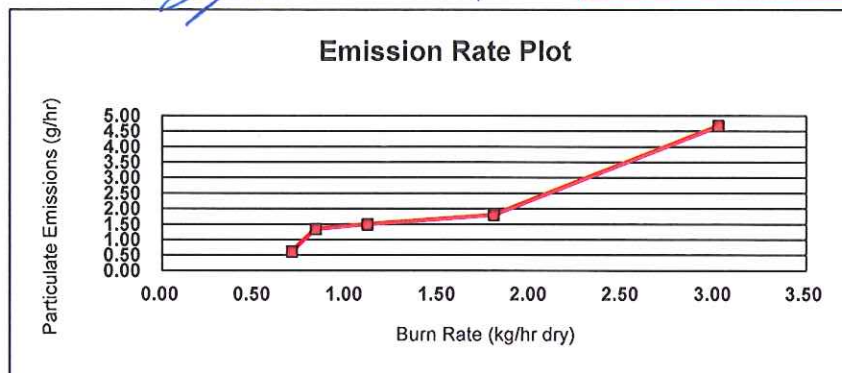
EPA Weighted Average Emissions

EPA Method 28

Client: Harman
 Stove Model: P61a
 Test Dates: 7/2/14 - 7/3/14
 Project Number: 0135PS022E.AD02
 Tracking Number: 1983
 Signature/Date: *[Signature]* 7/10/14

Status: Final
 Stove Type: Pellet Stove

Weighted Average (g/hr) 1.7



Run #	5	
Burn Rate (dry kg/hr)	0.71	
Category	1	
Overall Efficiency (%)	78%	
Emissions (g/hr)	0.62	
Cap (g/hr)	15.00	
Weighting Factor	0.240	13.11%
Heat Output (BTU/hr)	10565	

Run #	4	
Burn Rate (dry kg/hr)	3.02	
Category	4	
Overall Efficiency (%)	78%	
Emissions (g/hr)	4.68	
Cap (g/hr)	18.00	
Weighting Factor	0.129	7.01%
Heat Output (BTU/hr)	45142	

Run #	1	
Burn Rate (dry kg/hr)	0.83	
Category	2	
Overall Efficiency (%)	78%	
Emissions (g/hr)	1.35	
Cap (g/hr)	15.00	
Weighting Factor	0.316	17.23%
Heat Output (BTU/hr)	12486	

Run #	2	
Burn Rate (dry kg/hr)	1.11	
Category	2	
Overall Efficiency (%)	78%	
Emissions (g/hr)	1.50	
Cap (g/hr)	15.00	
Weighting Factor	0.631	34.40%
Heat Output (BTU/hr)	16648	

Run #	3	
Burn Rate (dry kg/hr)	1.80	
Category	3	
Overall Efficiency (%)	78%	
Emissions (g/hr)	1.80	
Cap (g/hr)	18.00	
Weighting Factor	0.518	28.25%
Heat Output (BTU/hr)	26893	

Model: P61a
Harman Home Heating
352 Mountain House Road
Halifax, PA 17032

Run 1

Wood Heater Test Data - EPA Method 5G

Manufacturer: Harman
 Model: P61a
 Project No.: 0135PS022E.AD02
 Tracking No.: 1983
 Run: 1
 Test Date: 07/02/14

Burn Rate	0.83 kg/hr dry
Average Tunnel Temperature	83 degrees Fahrenheit
Average Gas Velocity in Dilution Tunnel - vs	13.1 feet/second
Average Gas Flow Rate in Dilution Tunnel - Qsd	8689.1 dscf/hour
Average Delta p	0.038 inches H2O
Average Delta H	1.51 inches H2O
Total Time of Test	120 minutes

	AVERAGE	SAMPLE TRAIN 1	SAMPLE TRAIN 2
Total Sample Volume - Vm	15.81 cubic feet	15.89 cubic feet	15.73 cubic feet
Average Gas Meter Temperature	79 degrees Fahrenheit	75 degrees Fahrenheit	82 degrees Fahrenheit
Total Sample Volume (Standard Conditions) - Vmstd	15.6 dscf	15.8 dscf	15.4 dscf
Total Particulates - mn		1.3 mg	1.2 mg
Particulate Concentration (dry-standard)	0.00008 grams/dscf	0.00008 grams/dscf	0.00008 grams/dscf
Particulate Emission Rate	0.69 grams/hour	0.71 grams/hour	0.68 grams/hour
Adjusted Emissions	1.35 grams/hour	1.37 grams/hour	1.32 grams/hour
Difference from Average		0.03 grams/hour	0.03 grams/hour
7.5% of the average emission rate	0.10		
Weighted Average Emission Rate Limit	4.10 grams/hour		
7.5% of the weighted average emission rate limit	0.31		
Results Are Acceptable			

Wood Heater Test Data - EPA Method 5G

Run: 1

Manufacturer:	Harman
Model:	P61a
Tracking No.:	1983
Project No.:	0135PS022E.AD02
Test Date:	02-Jul-14
Beginning Clock Time:	10:17
Recording Interval:	10 min.
Total Sampling Time:	120 min.

Velocity Traverse Data								
	Pt.1	Pt.2	Pt.3	Pt.4	Pt.5	Pt.6	Pt.7	Pt.8
Initial dP	0.034	0.042	0.042	0.034	0.038	0.040	0.040	0.034
Initial Temp.	82	82	82	82	82	82	82	82

OMNI Equipment Numbers: OMNI-00001, OMNI-00023, OMNI-00128, OMNI-00131, OMNI-00132, OMNI-00209, OMNI-283B, OMNI-00288, OMNI-00296-T40, OMNI-00343, OMNI-00371, OMNI-00372, OMNI-00410, OMNI-00417

PM Control Module:	N/A
Dilution Tunnel MW(dry):	29.00 lb/lb-mole
Dilution Tunnel MW(wet):	28.56 lb/lb-mole
Dilution Tunnel H2O:	4.00 percent
Dilution Tunnel Static:	-0.311 "H2O
Pitot Tube Cp:	0.99
Meter Box Y Factor:	1.002 (1) 0.999 (2)
Barometric Pressure:	Begin Middle End Average
	30.05 30.04 30.04 30.04 "Hg

Signature/Date:	7/8/14
Tunnel Velocity:	13.13 ft/sec.
Initial Tunnel Flow:	144.8 scfm
Average Tunnel Flow:	144.8 scfm
Tunnel Area:	0.1963 ft2
Post-Test Leak Check (1):	0 cfm@"Hg
Post-Test Leak Check (2):	0 cfm@"Hg
Fuel Moisture (dry basis %):	5.98
Total Particulate (1):	1.3
Total Particulate (2):	1.2

Elapsed Time	Particulate Sampling Data														Fuel Weight, lb		Wood Heater Temperature Data, oF																Stack
	Gas Meter Cubic Feet (1)	Gas Meter Cubic Feet (2)	Sample Rate, cfm (1)	Sample Rate, cfm (2)	Orifice dH (1)	Orifice dH (2)	Meter oF (1)	Meter oF (2)	Meter Vac. In. Hg. (1)	Meter Vac. In. Hg. (2)	Dilution Tunnel Temp.	Dilution Tunnel dP	Pro. Rate (10%) (1)	Pro. Rate (10%) (2)	Scale Reading	Weight Change	Firebox Top	Firebox Bottom	Firebox Back	Firebox Left	Firebox Right	Catalyst Exit	Average Surface	Stack	Filter (1)	Filter (2)	Impinger exit (1)	Impinger exit (2)	Ambient	Draft In. H2O			
0	0.000	0.000			0.97	1.01	76	78	0.37	0.8	82	0.038			3.9		184	152	102	335	325	N/A	219.6	170	76	76	N/A	N/A	76	-0.036			
10	1.321	1.301	0.13	0.13	1.57	1.31	75	79	0.33	0.8	82	0.038	100	101	3.6	-0.3	186	153	103	333	330		221.0	172	76	76			76	-0.027			
20	2.642	2.614	0.13	0.13	1.56	1.28	74	80	0.33	0.7	83	0.038	101	101	3.3	-0.3	184	154	104	329	326		219.4	173	76	76			77	-0.027			
30	3.964	3.925	0.13	0.13	1.56	1.30	74	81	0.33	0.7	82	0.038	101	101	3.0	-0.3	183	154	104	329	326		219.2	171	76	76			77	-0.027			
40	5.290	5.238	0.13	0.13	1.56	1.28	74	82	0.32	0.7	82	0.038	101	101	2.6	-0.4	179	153	104	331	326		218.6	171	76	76			76	-0.027			
50	6.614	6.551	0.13	0.13	1.57	1.30	74	83	0.32	0.7	83	0.038	101	101	2.3	-0.3	181	153	104	332	330		220.0	171	76	76			76	-0.027			
60	7.940	7.864	0.13	0.13	1.57	1.28	75	83	0.33	0.7	83	0.038	101	101	2.0	-0.3	179	154	104	331	327		219.0	172	76	76			76	-0.027			
70	9.271	9.176	0.13	0.13	1.56	1.29	75	84	0.32	0.7	83	0.038	101	101	1.7	-0.3	179	154	104	329	323		217.8	171	76	77			77	-0.026			
80	10.601	10.488	0.13	0.13	1.55	1.28	75	84	0.32	0.7	83	0.038	101	101	1.4	-0.3	179	154	104	345	335		223.4	174	77	77			76	-0.027			
90	11.927	11.799	0.13	0.13	1.55	1.28	75	84	0.31	0.7	84	0.038	101	101	1.0	-0.4	186	156	104	342	337		225.0	176	77	77			78	-0.027			
100	13.249	13.111	0.13	0.13	1.55	1.28	75	84	0.3	0.7	84	0.038	101	101	0.7	-0.3	182	156	105	345	340		225.6	178	77	77			78	-0.028			
110	14.570	14.421	0.13	0.13	1.54	1.28	75	85	0.31	0.7	85	0.038	101	100	0.3	-0.4	185	157	105	340	338		225.0	177	77	77			78	-0.028			
120	15.891	15.729	0.13	0.13	1.53	1.27	76	85	0.29	0.7	85	0.038	100	100	0.0	-0.3	182	158	106	337	338		224.2	176	78	78			79	-0.027			
Avg/Total	15.891	15.729	0.13	0.13	1.51	1.26	74.85	82.46			83.15	0.038	100.79	100.71									5		76.46	76.54	#DIV/0!	#DIV/0!		-0.028			

Run Notes

Client: HarmanModel: P61aProject #: 0135PS022E.AD02Tracking #: 1983Run #: 1 Date: 7/2/14Test Crew: J. ClarkOMNI Equipment ID #(s): 1, 23, 128, 131, 132, 209, 283B, 288, 296-T40, 343, 371, 372, 410, 417, 438PREBURNDESCRIBE OR SKETCH AIR OR THERMOMSTAT SETTINGS BELOW:
(SETTINGS MUST BE ACCURATE AND REPRODUCIBLE)

PRIMARY:

Stove Setting: Constant H
 Feed Rate : 0.75
 Temperature : 1.00
 Low Draft Adjustment : -35v

SECONDARY:

Auto

TERTIARY:

FAN:

PREBURN SETTINGS AND ACTIVITIES

TIME	AIR (THERMO) CHANGES PRIMARY/SECONDARY/TERTIARY	FAN SETTING CHANGE	ADD FUEL + WT.	ADD FUEL - WT.	RAKE COAL	COMMENT
	<u>N/A</u>					

TESTTEST FUEL CONFIGURATION SKETCH
(INDICATE VIEW ANGLE)

N/A
Pellets (OKagan Pellet Co
Premium softwood)

START UP PROCEDURES

BYPASS: N/A
 FUEL LOADING: Auto
 DOOR: N/A
 PRIMARY AIR: Auto
 OTHER: N/A

DESCRIBE OR SKETCH TEST SETTINGS BELOW:
(SETTINGS MUST BE ACCURATE AND REPRODUCIBLE)

PRIMARY:

Same as preburn
above

SECONDARY:

Auto

TERTIARY:

FAN:

Technician signature: [Signature]Date: 7/2/14

Supplemental Data EPA 5G/5H

Client: Harman

Model: P61a

Project #: 0135PS022E.AD02

Tracking #: 1983

Date: 7/2/14 Run #: 1 Booth: E2

Test Crew: J. Clark Start Time: 10:17 Stop Time: 12:17

OMNI Equipment #(s): See Run Notes

Stack Gas Leak Check:

Initial: Ø

Final: Ø

Dilution Tunnel Gas Leak Check (5H only):

Initial: N/A

Final: N/A

Calibrations: Span Gas CO₂: 16.83 O₂: 20.95 CO: 4.183 CO₂(DT): N/A
Mid Gas CO₂: 9.87 O₂: 10.47 CO: 2.493 CO₂(DT): N/A

Time	Pre Test			Post Test		
	Zero	Span	Mid	Zero	Span	Mid
O ₂	9:40	9:45	9:54	15:33	15:27	15:35
CO ₂	0.00	20.95	10.71	0.05	20.84	10.73
CO	0.00	16.83	10.04	0.04	16.98	10.00
CO ₂ (DT)	0.000	4.183	2.436	0.003	4.194	2.432
	N/A					→

Air Velocity (ft/min): Initial: <50 Final: <50

Scale Audit (lbs): Initial: 10.0 Final: 10.0

Pitot Tube Leak Test: Initial: Ø Final: Ø

Stack Diameter (inches): 6"

Induced Draft: Ø

% Smoke Capture: 100%

Flue Pipe Cleaned Prior to First Test in Series:

Date: 6/23/14 Initials: JC

	Initial	Middle	Ending
P _b (in/Hg)	30.05	30.04	30.04
Ambient (°F)	76	77	78

Technician signature: [Signature]

Date: 7/2/14

Tunnel Traverse		
dP (in H ₂ O)	T(°F)	
1 <u>0.040</u> ^{dc}	82	.034
2 <u>0.054</u> ^{dc}	82	.042
3 <u>0.050</u> ^{dc}	82	.042
4 <u>0.044</u> ^{dc}	82	.034
5 <u>0.044</u> ^{dc}	82	.038
6 <u>0.052</u> ^{dc}	82	.040
7 <u>0.048</u> ^{dc}	82	.040
8 <u>0.044</u> ^{dc}	82	.034
N/A	N/A	
↓	↓	
Static P:	<u>-0.401</u> ^{dc}	-0.311

Method 28 Preburn Data

Run Data											
Client:	Harman	Test Run:	1								
Model:	P61a	Date:	7/2/2014								
Project Number:	0135PS022E.AD02	Test Crew:	J. Clark								
Tracking Number:	1983	Equipment:	288, 371, 372								
		Coal Bed Range (lb):	N/A (pellet)								
Logged Data											
Temperatures (F)											
Elapsed Time (min)	Scale (lb)	Stack Draft (in H ₂ O)	Stack	Ambient	FB Top	FB Bottom	FB Back	FB Left	FB Right	Cat. In	Cat. Out
0	37.3	0.003	157	76	90	83	80	168	175	N/A	N/A
10	36.9	-0.021	145	76	147	104	83	260	248		
20	36.6	-0.033	157	76	174	118	89	303	296		
30	36.2	-0.035	162	76	189	132	94	323	323		
40	35.9	-0.035	163	77	185	141	98	319	313		
50	35.5	-0.036	166	76	190	146	99	332	325		
60	35.2	-0.036	169	76	188	150	101	329	325		
Averages:		-0.028	159.86	76.14	166.14	124.86	92.00	290.57	286.43		



 7/8/14

Model: P61a
Harman Home Heating
352 Mountain House Road
Halifax, PA 17032

Run 2

Wood Heater Test Data - EPA Method 5G

Manufacturer: Harman
 Model: P61a
 Project No.: 0135PS022E.AD02
 Tracking No.: 1983
 Run: 2
 Test Date: 07/02/14

Burn Rate	1.11 kg/hr dry
Average Tunnel Temperature	106 degrees Fahrenheit
Average Gas Velocity in Dilution Tunnel - vs	13.0 feet/second
Average Gas Flow Rate in Dilution Tunnel - Qsd	8227.9 dscf/hour
Average Delta p	0.036 inches H2O
Average Delta H	1.56 inches H2O
Total Time of Test	120 minutes

	AVERAGE	SAMPLE TRAIN 1	SAMPLE TRAIN 2
Total Sample Volume - Vm	16.00 cubic feet	16.28 cubic feet	15.71 cubic feet
Average Gas Meter Temperature	83 degrees Fahrenheit	79 degrees Fahrenheit	87 degrees Fahrenheit
Total Sample Volume (Standard Conditions) - Vmstd	15.7 dscf	16.1 dscf	15.3 dscf
Total Particulates - mn		1.3 mg	1.7 mg
Particulate Concentration (dry-standard)	0.00010 grams/dscf	0.00008 grams/dscf	0.00011 grams/dscf
Particulate Emission Rate	0.79 grams/hour	0.66 grams/hour	0.92 grams/hour
Adjusted Emissions	1.50 grams/hour	1.30 grams/hour	1.69 grams/hour
Difference from Average		0.20 grams/hour	0.20 grams/hour
7.5% of the average emission rate	0.11		
Weighted Average Emission Rate Limit	4.10 grams/hour		
7.5% of the weighted average emission rate limit	0.31		
Results Are Acceptable			

Wood Heater Test Data - EPA Method 5G

Run: 2

Manufacturer: Harman

Model: P61a

Tracking No.: 1983

Project No.: 0135PS022E.AD02

Test Date: 02-Jul-14

Beginning Clock Time: 13:26

Recording Interval: 10 min.

Total Sampling Time: 120 min.

Velocity Traverse Data								
	Pt.1	Pt.2	Pt.3	Pt.4	Pt.5	Pt.6	Pt.7	Pt.8
Initial dP	0.028	0.040	0.038	0.036	0.032	0.040	0.036	0.034
Initial Temp.	104	104	104	104	104	104	104	104

OMNI Equipment Numbers: OMNI-00001, OMNI-00023, OMNI-00128, OMNI-00131, OMNI-00132, OMNI-00209, OMNI-283B, OMNI-00288, OMNI-00296-T40, OMNI-00343, OMNI-00371, OMNI-00372, OMNI-00410, OMNI-00417

PM Control Module: N/A

Dilution Tunnel MW(dry): 29.00 lb/lb-mole

Dilution Tunnel MW(wet): 28.56 lb/lb-mole

Dilution Tunnel H2O: 4.00 percent

Dilution Tunnel Static: -0.340 "H2O

Pitot Tube Cp: 0.99

Meter Box Y Factor: 1.002 (1) 0.999 (2)

Barometric Pressure: Begin Middle End Average

30.04 30.04 30.01 30.03 "Hg

Signature/Date: 7/8/14

Tunnel Velocity: 12.96 ft/sec.

Initial Tunnel Flow: 137.1 scfm

Average Tunnel Flow: 137.1 scfm

Tunnel Area: 0.1963 ft2

Post-Test Leak Check (1): 0.000@7 cfm@"Hg

Post-Test Leak Check (2): 0.000@5 cfm@"Hg

Fuel Moisture (dry basis %): 5.98

Total Particulate (1): 1.3

Total Particulate (2): 1.7

Elapsed Time	Particulate Sampling Data														Fuel Weight, lb		Wood Heater Temperature Data, oF																Stack
	Gas Meter Cubic Feet (1)	Gas Meter Cubic Feet (2)	Sample Rate, cfm (1)	Sample Rate, cfm (2)	Orifice dH (1)	Orifice dH (2)	Meter oF (1)	Meter oF (2)	Meter Vac. In. Hg. (1)	Meter Vac. In. Hg. (2)	Dilution Tunnel Temp.	Dilution Tunnel dP	Pro. Rate (10%) (1)	Pro. Rate (10%) (2)	Scale Reading	Weight Change	Firebox Top	Firebox Bottom	Firebox Back	Firebox Left	Firebox Right	Catalyst Exit	Average Surface	Stack	Filter (1)	Filter (2)	Impinger exit (1)	Impinger exit (2)	Ambient	Draft In. H2O			
0	0.000	0.000			0.82	0.54	78	83	0.38	0.8	104	0.036			5.2		181	188	107	336	344	N/A	231.2	250	78	78	N/A	N/A	80	-0.007			
10	1.344	1.310	0.13	0.13	1.63	1.29	78	83	0.37	0.7	103	0.036	100	101	4.7	-0.5	180	189	108	338	351		233.2	252	80	80			80	-0.007			
20	2.692	2.621	0.13	0.13	1.62	1.28	78	84	0.37	0.7	103	0.036	100	101	4.3	-0.4	178	190	109	333	350		232.0	251	81	81			80	-0.006			
30	4.046	3.928	0.14	0.13	1.62	1.28	78	85	0.37	0.7	104	0.036	101	101	3.9	-0.4	181	192	110	342	358		236.6	256	82	82			80	-0.009			
40	5.403	5.236	0.14	0.13	1.62	1.27	78	86	0.37	0.7	104	0.036	101	101	3.5	-0.4	180	193	111	337	352		234.6	253	82	82			81	-0.008			
50	6.760	6.544	0.14	0.13	1.62	1.28	78	87	0.37	0.7	104	0.036	101	101	3.0	-0.5	179	193	112	340	353		235.4	254	82	83			80	-0.007			
60	8.119	7.854	0.14	0.13	1.62	1.27	79	87	0.37	0.7	105	0.036	101	101	2.6	-0.4	177	193	112	338	355		235.0	255	83	83			80	-0.006			
70	9.479	9.163	0.14	0.13	1.61	1.27	80	88	0.37	0.7	106	0.036	101	101	2.2	-0.4	181	194	112	339	360		237.2	256	84	84			80	-0.008			
80	10.838	10.471	0.14	0.13	1.61	1.27	80	89	0.37	0.7	106	0.036	101	100	1.7	-0.5	182	195	113	343	361		238.8	258	84	84			80	-0.009			
90	12.198	11.779	0.14	0.13	1.62	1.27	81	90	0.38	0.6	108	0.036	101	100	1.3	-0.4	184	196	113	353	362		241.6	261	84	84			80	-0.008			
100	13.560	13.090	0.14	0.13	1.61	1.27	81	90	0.37	0.6	109	0.036	101	101	0.8	-0.5	185	197	114	349	372		243.4	262	85	85			80	-0.008			
110	14.922	14.400	0.14	0.13	1.61	1.27	81	90	0.37	0.6	108	0.036	101	101	0.4	-0.4	182	197	114	342	354		237.8	257	85	85			81	-0.007			
120	16.283	15.710	0.14	0.13	1.61	1.27	82	91	0.38	0.6	109	0.036	101	100	0.0	-0.4	182	197	114	343	359		239.0	258	85	85			81	-0.007			
Avg/Total	16.283	15.710	0.14	0.13	1.56	1.22	79.38	87.15			105.62	0.036	100.76	100.72									8		82.69	82.77	#DIV/0!	#DIV/0!		-0.007			

Run Notes

Client: HarmanModel: P61aProject #: 0135PS022E.AD02Tracking #: 1983Run #: 2 Date: 7/2/14Test Crew: J. ClarkOMNI Equipment ID #(s): 1, 23, 128, 131, 132, 209, 283B, 288, 296-T40, 343, 371, 372, 410, 417, 438PREBURNDESCRIBE OR SKETCH AIR OR THERMOMSTAT SETTINGS BELOW:
(SETTINGS MUST BE ACCURATE AND REPRODUCIBLE)

PRIMARY:

Stove Setting: Constant H
 Feed Rate: 1.38
 Temperature: 2.40
 Low Draft Adjustment: -∞v
 Category II

SECONDARY: Auto

TERTIARY:

FAN:

PREBURN SETTINGS AND ACTIVITIES

TIME	AIR (THERMO) CHANGES PRIMARY/SECONDARY/TERTIARY	FAN SETTING CHANGE	ADD FUEL + WT.	ADD FUEL - WT.	RAKE COAL	COMMENT
	<u>N/A</u>					

TESTTEST FUEL CONFIGURATION SKETCH
(INDICATE VIEW ANGLE)

N/A
Okagan Pellet Co.
Premium softwood pellets

START UP PROCEDURES

BYPASS: N/AFUEL LOADING: AutoDOOR: N/APRIMARY AIR: AutoOTHER: N/ADESCRIBE OR SKETCH TEST SETTINGS BELOW:
(SETTINGS MUST BE ACCURATE AND REPRODUCIBLE)

PRIMARY:

Same as above

SECONDARY: Auto

TERTIARY:

FAN:

Technician signature: [Signature] Date: 7/2/14

Supplemental Data EPA 5G/5H

Client: Harman

Model: P61a

Project #: 0135PS022E.AD02

Tracking #: 1983

Date: 7/2/14 Run #: 2 Booth: E2

Test Crew: J. Clark Start Time: 13:26 Stop Time: 15:26

OMNI Equipment #(s): See Run Notes

Stack Gas Leak Check:

Initial: Ø

Final: Ø

Dilution Tunnel Gas Leak Check (5H only):

Initial: N/A

Final: N/A

Calibrations: Span Gas CO₂: 16.83 O₂: 20.95 CO: 4.183 CO₂(DT): N/A
Mid Gas CO₂: 9.87 O₂: 10.47 CO: 2.493 CO₂(DT): N/A

Time	Pre Test			Post Test		
	Zero	Span	Mid	Zero	Span	Mid
	9:40	9:45	9:54	15:33	15:27	15:35
O ₂	0.00	20.95	10.71	0.05	20.84	10.73
CO ₂	0.00	16.83	10.04	0.04	16.98	10.00
CO	0.000	4.183	2.436	0.003	4.194	2.432
CO ₂ (DT)	N/A					

Air Velocity (ft/min): Initial: 450 Final: 450

Scale Audit (lbs): Initial: 10.0 Final: 10.0

Pitot Tube Leak Test: Initial: Ø Final: Ø

Stack Diameter (inches): 6"

Induced Draft: Ø

% Smoke Capture: 100%

Flue Pipe Cleaned Prior to First Test in Series:

Date: 6/23/14 Initials: JC

	Initial	Middle	Ending
P _b (in/Hg)	30.04	30.04	30.01
Ambient (°F)	80	81	81

Technician signature: [Signature]

Date: 7/2/14

Tunnel Traverse	
dP (in H ₂ O)	T(°F)
1 .028	104
2 .040	104
3 .038	104
4 .036	104
5 .032	104
6 .040	104
7 .036	104
8 .034	104
N/A	N/A
↓	↓
Static P:	- .34

Method 28 Preburn Data

Run Data											
Client:	Harman	Test Run:	2								
Model:	P61a	Date:	7/2/2014								
Project Number:	0135PS022E.AD02	Test Crew:	J. Clark								
Tracking Number:	1983	Equipment:	288, 371, 372								
		Coal Bed Range (lb):	N/A (pellet)								
Logged Data											
Temperatures (F)											
Elapsed Time (min)	Scale (lb)	Stack Draft (in H ₂ O)	Stack	Ambient	FB Top	FB Bottom	FB Back	FB Left	FB Right	Cat. In	Cat. Out
0	30.8	-0.007	243	78	183	161	106	368	365	N/A	N/A
10	30.4	-0.007	251	79	174	177	105	348	345		
20	30	-0.006	250	79	172	182	104	338	343		
30	29.6	-0.007	250	79	173	183	102	342	337		
40	29.1	-0.007	251	80	178	186	104	340	346		
50	28.7	-0.008	254	79	181	188	106	347	353		
60	28.2	-0.006	251	80	181	188	107	337	345		
Averages:		-0.007	250.00	79.14	177.43	180.71	104.86	345.71	347.71		



 7/8/14

Model: P61a
Harman Home Heating
352 Mountain House Road
Halifax, PA 17032

Run 3

Wood Heater Test Data - EPA Method 5G

Manufacturer: Harman
 Model: P61a
 Project No.: 0135PS022E.AD02
 Tracking No.: 1983
 Run: 3
 Test Date: 07/03/14

Burn Rate	1.80 kg/hr dry
Average Tunnel Temperature	112 degrees Fahrenheit
Average Gas Velocity in Dilution Tunnel - vs	12.7 feet/second
Average Gas Flow Rate in Dilution Tunnel - Qsd	8028.1 dscf/hour
Average Delta p	0.034 inches H2O
Average Delta H	1.56 inches H2O
Total Time of Test	120 minutes

	AVERAGE	SAMPLE TRAIN 1	SAMPLE TRAIN 2
Total Sample Volume - Vm	15.95 cubic feet	16.13 cubic feet	15.77 cubic feet
Average Gas Meter Temperature	79 degrees Fahrenheit	74 degrees Fahrenheit	83 degrees Fahrenheit
Total Sample Volume (Standard Conditions) - Vmstd	15.8 dscf	16.2 dscf	15.5 dscf
Total Particulates - mn		2 mg	1.9 mg
Particulate Concentration (dry-standard)	0.00012 grams/dscf	0.00012 grams/dscf	0.00012 grams/dscf
Particulate Emission Rate	0.99 grams/hour	0.99 grams/hour	0.98 grams/hour
Adjusted Emissions	1.80 grams/hour	1.81 grams/hour	1.80 grams/hour
Difference from Average		0.01 grams/hour	0.01 grams/hour
7.5% of the average emission rate	0.14		
Weighted Average Emission Rate Limit	4.10 grams/hour		
7.5% of the weighted average emission rate limit	0.31		
Results Are Acceptable			

Wood Heater Test Data - EPA Method 5G

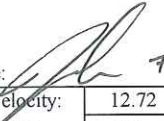
Run: 3

Manufacturer: Harman
Model: P61a
Tracking No.: 1983
Project No.: 0135PS022E.AD02
Test Date: 03-Jul-14
Beginning Clock Time: 08:46
Recording Interval: 10 min.
Total Sampling Time: 120 min.

Velocity Traverse Data								
	Pt.1	Pt.2	Pt.3	Pt.4	Pt.5	Pt.6	Pt.7	Pt.8
Initial dP	0.030	0.038	0.036	0.034	0.032	0.036	0.036	0.030
Initial Temp.	112	112	112	112	112	112	112	112

OMNI Equipment Numbers: OMNI-00001, OMNI-00023, OMNI-00128, OMNI-00131, OMNI-00132,
OMNI-00209, OMNI-283B, OMNI-00288, OMNI-00296-T40, OMNI-00343, OMNI-00371, OMNI-00372,
OMNI-00410, OMNI-00417

PM Control Module: N/A
Dilution Tunnel MW(dry): 29.00 lb/lb-mole
Dilution Tunnel MW(wet): 28.56 lb/lb-mole
Dilution Tunnel H2O: 4.00 percent
Dilution Tunnel Static: -0.301 "H2O
Pitot Tube Cp: 0.99
Meter Box Y Factor: 1.002 (1) 0.999 (2)
Barometric Pressure: Begin Middle End Average
30.15 30.16 30.17 30.16 "Hg

Signature/Date:  7/8/14
Tunnel Velocity: 12.72 ft/sec.
Initial Tunnel Flow: 133.6 scfm
Average Tunnel Flow: 133.8 scfm
Tunnel Area: 0.1963 ft2
Post-Test Leak Check (1): 0.000@7 cfm@"Hg
Post-Test Leak Check (2): 0.000@5 cfm@"Hg
Fuel Moisture (dry basis %): 5.98
Total Particulate (1): 2.0
Total Particulate (2): 1.9

Elapsed Time	Particulate Sampling Data														Fuel Weight, lb		Wood Heater Temperature Data, oF																Stack
	Gas Meter Cubic Feet (1)	Gas Meter Cubic Feet (2)	Sample Rate, cfm (1)	Sample Rate, cfm (2)	Orifice dH (1)	Orifice dH (2)	Meter oF (1)	Meter oF (2)	Meter Vac. In. Hg. (1)	Meter Vac. In. Hg. (2)	Dilution Tunnel Temp.	Dilution Tunnel dP	Pro. Rate (10%) (1)	Pro. Rate (10%) (2)	Scale Reading	Weight Change	Firebox Top	Firebox Bottom	Firebox Back	Firebox Left	Firebox Right	Catalyst Exit	Average Surface	Stack	Filter (1)	Filter (2)	Impinger exit (1)	Impinger exit (2)	Ambient	Draft In. H2O			
0	0.000	0.000			0.89	0.50	76	79	0.38	0.8	112	0.034			8.4		255	232	105	474	487	N/A	310.6	325	76	76	N/A	N/A	75	-0.023			
10	1.336	1.312	0.13	0.13	1.63	1.31	75	79	0.35	0.7	113	0.034	100	101	7.6	-0.8	260	238	106	485	510		319.8	328	79	79			75	-0.023			
20	2.673	2.625	0.13	0.13	1.62	1.30	75	81	0.35	0.7	114	0.034	100	101	6.9	-0.7	256	241	111	486	509		320.6	328	80	80			75	-0.023			
30	4.011	3.936	0.13	0.13	1.61	1.29	74	82	0.35	0.7	112	0.034	100	101	6.2	-0.7	256	243	114	490	488		318.2	329	81	81			76	-0.024			
40	5.350	5.249	0.13	0.13	1.61	1.30	74	83	0.35	0.7	111	0.034	100	101	5.5	-0.7	254	242	116	482	473		313.4	326	80	81			76	-0.024			
50	6.691	6.562	0.13	0.13	1.61	1.29	73	84	0.35	0.6	111	0.034	101	100	4.8	-0.7	250	243	118	485	481		315.4	327	80	81			77	-0.024			
60	8.036	7.876	0.13	0.13	1.61	1.29	74	84	0.35	0.6	110	0.034	101	100	4.2	-0.6	251	241	120	486	476		314.8	327	80	80			76	-0.024			
70	9.386	9.191	0.14	0.13	1.61	1.29	74	84	0.36	0.6	111	0.034	101	101	3.5	-0.7	258	241	121	493	478		318.2	329	80	80			78	-0.024			
80	10.737	10.506	0.14	0.13	1.61	1.29	73	84	0.36	0.7	111	0.034	101	101	2.8	-0.7	254	242	121	490	489		319.2	329	79	80			77	-0.024			
90	12.087	11.822	0.14	0.13	1.61	1.30	74	84	0.35	0.6	111	0.034	101	101	2.1	-0.7	254	243	122	487	503		321.8	331	79	81			77	-0.024			
100	13.438	13.137	0.14	0.13	1.61	1.29	74	85	0.35	0.6	111	0.034	101	100	1.4	-0.7	261	246	123	480	480		318.0	328	79	81			77	-0.024			
110	14.785	14.452	0.13	0.13	1.61	1.29	74	85	0.34	0.6	111	0.034	101	100	0.7	-0.7	256	246	123	495	492		322.4	332	79	81			77	-0.025			
120	16.129	15.768	0.13	0.13	1.61	1.29	74	85	0.35	0.6	112	0.034	101	101	0.0	-0.7	256	247	124	495	499		324.2	332	80	81			78	-0.025			
Avg/Total	16.129	15.768	0.13	0.13	1.56	1.23	74.15	83.00			111.54	0.034	100.79	100.70									14		79.38	80.15	#DIV/0!	#DIV/0!		-0.024			

Run Notes

Client: HarmanModel: P61aProject #: 0135PS022E.AD02Tracking #: 1983Run #: 3 Date: 7/3/2014Test Crew: J. ClarkOMNI Equipment ID #(s): 1, 23, 128, 131, 132, 209, 283B, 288, 296-T40, 343, 371, 372, 410, 413, 438

PREBURN

DESCRIBE OR SKETCH AIR OR THERMOMSTAT SETTINGS BELOW:
(SETTINGS MUST BE ACCURATE AND REPRODUCIBLE)

PRIMARY:

Stove Setting: Constant H
 Feed Rate: 2.71
 Temperature: 4.18 ~~4.18~~
 Low Draft Adjustment: -00 v
 Category III

SECONDARY:

TERTIARY:

FAN:

PREBURN SETTINGS AND ACTIVITIES

TIME	AIR (THERMO) CHANGES PRIMARY/SECONDARY/TERTIARY	FAN SETTING CHANGE	ADD FUEL + WT.	ADD FUEL - WT.	RAKE COAL	COMMENT
	<u>N/A</u>					

TEST

TEST FUEL CONFIGURATION SKETCH
(INDICATE VIEW ANGLE)

N/A
Okagan Premium Softwood pellets

START UP PROCEDURES

BYPASS: N/A
 FUEL LOADING: Auto
 DOOR: N/A
 PRIMARY AIR: Auto
 OTHER: N/A

DESCRIBE OR SKETCH TEST SETTINGS BELOW:
(SETTINGS MUST BE ACCURATE AND REPRODUCIBLE)

PRIMARY:

Same as above

SECONDARY:

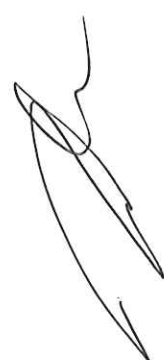
TERTIARY:

FAN:

Technician signature: [Signature]Date: 7/3/2014

Method 28 Preburn Data

Run Data		Client: Harman		Test Run: 3							
Model: P61a		Date: 7/3/2014		Test Crew: J. Clark							
Project Number: 0135PS022E.AD02		Equipment: 288, 371, 372									
Tracking Number: 1983		Coal Bed Range (lb): N/A (pellet)									
Logged Data											
		Temperatures (F)									
Elapsed Time (min)	Scale (lb)	Stack Draft (in H ₂ O)	Stack	Ambient	FB Top	FB Bottom	FB Back	FB Left	FB Right	Cat. In	Cat. Out
0	22.4	0.053	79	77	78	78	79	78	78	N/A	N/A
10	21.8	0	212	75	124	92	79	280	290		
20	21.1	-0.012	269	75	197	148	90	391	399		
30	20.4	-0.017	298	74	230	186	102	439	452		
40	19.7	-0.021	311	75	241	209	108	459	481		
50	19	-0.02	313	75	243	223	111	455	483		
60	18.4	-0.022	315	76	246	228	113	466	470		
70	17.6	-0.023	320	75	254	231	114	473	479		
Averages:		-0.008	264.63	75.25	201.63	174.38	99.50	380.13	391.50		


 7/8/14

Model: P61a
Harman Home Heating
352 Mountain House Road
Halifax, PA 17032

Run 4

Wood Heater Test Data - EPA Method 5G

Manufacturer: Harman
 Model: P61a
 Project No.: 0135PS022E.AD02
 Tracking No.: 1983
 Run: 4
 Test Date: 07/03/14

Burn Rate	3.02 kg/hr dry
Average Tunnel Temperature	121 degrees Fahrenheit
Average Gas Velocity in Dilution Tunnel - vs	13.5 feet/second
Average Gas Flow Rate in Dilution Tunnel - Qsd	8389.0 dscf/hour
Average Delta p	0.038 inches H2O
Average Delta H	1.33 inches H2O
Total Time of Test	120 minutes

	AVERAGE	SAMPLE TRAIN 1	SAMPLE TRAIN 2
Total Sample Volume - Vm	14.85 cubic feet	15.03 cubic feet	14.67 cubic feet
Average Gas Meter Temperature	81 degrees Fahrenheit	76 degrees Fahrenheit	86 degrees Fahrenheit
Total Sample Volume (Standard Conditions) - Vmstd	14.7 dscf	15.0 dscf	14.3 dscf
Total Particulates - mn		5.5 mg	5.4 mg
Particulate Concentration (dry-standard)	0.00037 grams/dscf	0.00037 grams/dscf	0.00038 grams/dscf
Particulate Emission Rate	3.12 grams/hour	3.07 grams/hour	3.16 grams/hour
Adjusted Emissions	4.68 grams/hour	4.62 grams/hour	4.73 grams/hour
Difference from Average		0.05 grams/hour	0.05 grams/hour
7.5% of the average emission rate	0.35		
Weighted Average Emission Rate Limit	4.10 grams/hour		
7.5% of the weighted average emission rate limit	0.31		
Results Are Acceptable			

Wood Heater Test Data - EPA Method 5G

Run: 4

Manufacturer: Harman
Model: P61a
Tracking No.: 1983
Project No.: 0135PS022E.AD02
Test Date: 03-Jul-14
Beginning Clock Time: 11:50
Recording Interval: 10 min.
Total Sampling Time: 120 min.

Velocity Traverse Data								
	Pt.1	Pt.2	Pt.3	Pt.4	Pt.5	Pt.6	Pt.7	Pt.8
Initial dP	0.034	0.042	0.042	0.034	0.034	0.040	0.040	0.036
Initial Temp.	120	120	120	120	120	120	120	120

OMNI Equipment Numbers: OMNI-00001, OMNI-00023, OMNI-00128, OMNI-00131, OMNI-00132,
OMNI-00209, OMNI-283B, OMNI-00288, OMNI-00296-T40, OMNI-00343, OMNI-00371, OMNI-00372,
OMNI-00410, OMNI-00417

PM Control Module: N/A
Dilution Tunnel MW(dry): 29.00 lb/lb-mole
Dilution Tunnel MW(wet): 28.56 lb/lb-mole
Dilution Tunnel H2O: 4.00 percent
Dilution Tunnel Static: -0.342 "H2O
Pitot Tube Cp: 0.99
Meter Box Y Factor: 1.002 (1) 0.999 (2)
Barometric Pressure: Begin Middle End Average

Signature/Date: 7/8/14
Tunnel Velocity: 13.51 ft/sec.
Initial Tunnel Flow: 139.8 scfm
Average Tunnel Flow: 139.8 scfm
Tunnel Area: 0.1963 ft2
Post-Test Leak Check (1): 0.000@7 cfm@"Hg
Post-Test Leak Check (2): 0.000@5 cfm@"Hg
Fuel Moisture (dry basis %): 5.98
Total Particulate (1): 5.5
Total Particulate (2): 5.4

Elapsed Time	Particulate Sampling Data														Fuel Weight, lb		Wood Heater Temperature Data, oF																Stack
	Gas Meter Cubic Feet (1)	Gas Meter Cubic Feet (2)	Sample Rate, cfm (1)	Sample Rate, cfm (2)	Orifice dH (1)	Orifice dH (2)	Meter oF (1)	Meter oF (2)	Meter Vac. In. Hg. (1)	Meter Vac. In. Hg. (2)	Dilution Tunnel Temp.	Dilution Tunnel dP	Pro. Rate (10%) (1)	Pro. Rate (10%) (2)	Scale Reading	Weight Change	Firebox Top	Firebox Bottom	Firebox Back	Firebox Left	Firebox Right	Catalyst Exit	Average Surface	Stack	Filter (1)	Filter (2)	Impinger exit (1)	Impinger exit (2)	Ambient	Draft In. H2O			
0	0.000	0.000			0.64	0.03	75	82	0.39	0.7	120	0.038			14.1		460	325	146	727	698	N/A	471.2	406	77	78	N/A	N/A	81	-0.047			
10	1.333	1.310	0.13	0.13	1.57	1.28	75	82	0.31	0.6	121	0.038	107	109	12.9	-1.2	459	327	148	741	691		473.2	405	81	81			81	-0.039			
20	2.648	2.602	0.13	0.13	1.52	1.24	75	83	0.27	0.6	121	0.038	106	107	11.7	-1.2	465	328	148	736	693		474.0	405	82	82			82	-0.038			
30	3.944	3.874	0.13	0.13	1.49	1.21	75	85	0.23	0.5	121	0.038	104	105	10.5	-1.2	472	328	150	735	694		475.8	405	82	83			83	-0.039			
40	5.225	5.130	0.13	0.13	1.45	1.17	75	86	0.19	0.5	121	0.038	103	104	9.3	-1.2	464	326	149	729	691		471.8	404	82	83			81	-0.039			
50	6.493	6.365	0.13	0.12	1.41	1.13	75	86	0.14	0.5	121	0.038	102	102	8.1	-1.2	482	328	149	722	720		480.2	406	83	84			80	-0.039			
60	7.745	7.587	0.13	0.12	1.39	1.12	75	87	0.12	0.4	122	0.038	101	101	6.9	-1.2	472	329	150	717	718		477.2	407	82	83			83	-0.039			
70	8.986	8.799	0.12	0.12	1.37	1.09	76	87	0.08	0.4	122	0.038	100	100	5.8	-1.1	470	328	149	735	720		480.4	407	83	84			83	-0.039			
80	10.214	9.995	0.12	0.12	1.33	1.07	76	88	0.06	0.4	121	0.038	99	98	4.6	-1.2	463	328	147	713	711		472.4	405	83	84			82	-0.039			
90	11.429	11.177	0.12	0.12	1.31	1.05	76	88	0.03	0.3	122	0.038	98	97	3.5	-1.1	459	328	148	712	699		469.2	403	83	84			81	-0.038			
100	12.638	12.352	0.12	0.12	1.29	1.04	76	88	0.01	0.3	122	0.038	97	97	2.3	-1.2	447	325	146	720	704		468.4	404	83	84			82	-0.038			
110	13.839	13.518	0.12	0.12	1.28	1.02	76	88	-0.01	0.3	121	0.038	97	96	1.2	-1.1	458	326	147	713	721		473.0	406	83	84			81	-0.039			
120	15.028	14.671	0.12	0.12	1.26	0.99	77	88	-0.05	0.2	120	0.038	95	95	0.0	-1.2	466	324	147	730	725		478.4	404	83	84			82	-0.040			
Avg/Total	15.028	14.671	0.13	0.12	1.33	1.03	75.54	86.00			121.15	0.038	100.77	100.73									7		82.08	82.92	#DIV/0!	#DIV/0!		-0.039			

Run Notes

Client: HarmanModel: P61aProject #: 0135PS022E.AD02Tracking #: 1983Run #: 4 Date: 7/3/2014Test Crew: J. ClarkOMNI Equipment ID #(s): 1, 23, 128, 131, 132, 209, 283B, 288, 296-740, 343, 371, 372, 410, 413, 438

PREBURN

DESCRIBE OR SKETCH AIR OR THERMOMSTAT SETTINGS BELOW:
(SETTINGS MUST BE ACCURATE AND REPRODUCIBLE)

PRIMARY:

Stove Setting: Constant H
 Feed Rate : 6.00
 Temperature : 7.00
 Low Draft Adjustment : -00 v
 Category IV

SECONDARY: AutoTERTIARY: ↓FAN: ↓

PREBURN SETTINGS AND ACTIVITIES

TIME	AIR (THERMO) CHANGES PRIMARY/SECONDARY/TERTIARY	FAN SETTING CHANGE	ADD FUEL + WT.	ADD FUEL - WT.	RAKE COAL	COMMENT
	<u>N/A</u>					

TEST

TEST FUEL CONFIGURATION SKETCH
(INDICATE VIEW ANGLE)

N/A
Okagan Premium Softwood pellets

START UP PROCEDURES

BYPASS: N/AFUEL LOADING: AutoDOOR: N/APRIMARY AIR: AutoOTHER: N/ADESCRIBE OR SKETCH TEST SETTINGS BELOW:
(SETTINGS MUST BE ACCURATE AND REPRODUCIBLE)

PRIMARY:

Same as above

SECONDARY: AutoTERTIARY: ↓FAN: ↓Technician signature: [Signature] Date: 7/3/14

Supplemental Data EPA 5G/5H

Client: Harman

Model: P61a

Project #: 0135PS022E.AD02

Tracking #: 1983

Date: 7/3/14 Run #: 4 Booth: E2

Test Crew: J. Clark Start Time: 11:50 Stop Time: 13:50

OMNI Equipment #(s): See Run Notes

Stack Gas Leak Check:

Initial: Ø

Final: Ø

Dilution Tunnel Gas Leak Check (5H only):

Initial: N/A

Final: N/A

Calibrations: Span Gas CO₂: 16.83 O₂: 20.95 CO: 4.183 CO₂(DT): N/A
Mid Gas CO₂: 9.87 O₂: 10.47 CO: 2.493 CO₂(DT): N/A

	Pre Test			Post Test		
	Zero	Span	Mid	Zero	Span	Mid
Time	<u>10:59</u>	<u>11:01</u>	<u>11:04</u>	<u>13:53</u>	<u>13:59</u>	<u>14:05</u>
O ₂	<u>0.00</u>	<u>20.95</u>	<u>10.77</u>	<u>0.00</u>	<u>20.95</u>	<u>10.81</u>
CO ₂	<u>0.00</u>	<u>16.83</u>	<u>9.97</u>	<u>0.00</u>	<u>16.80</u>	<u>9.99</u>
CO	<u>0.000</u>	<u>4.183</u>	<u>2.424</u>	<u>0.000</u>	<u>4.156</u>	<u>2.419</u>
CO ₂ (DT)	<u>N/A</u>					<u>→</u>

Air Velocity (ft/min): Initial: <50 Final: <50

Scale Audit (lbs): Initial: 10.0 Final: 10.0

Pitot Tube Leak Test: Initial: Ø Final: Ø

Stack Diameter (inches): 6"

Induced Draft: Ø

% Smoke Capture: 100%

Flue Pipe Cleaned Prior to First Test in Series:

Date: 6/23/14 Initials: JK

	Initial	Middle	Ending
P _b (in/Hg)	<u>30.17</u>	<u>30.17</u>	<u>30.15</u>
Ambient (°F)	<u>80</u>	<u>83</u>	<u>82</u>

Technician signature: [Signature]

Date: 7/3/14

Tunnel Traverse		
	dP (in H ₂ O)	T(°F)
1	<u>.034</u>	<u>120</u>
2	<u>.042</u>	↓
3	<u>.042</u>	
4	<u>.034</u>	
5	<u>.034</u>	
6	<u>.040</u>	
7	<u>.040</u>	
8	<u>.036</u>	
	<u>N/A</u>	<u>N/A</u>
	↓	↓
Static P:	<u>-0.342</u>	

Method 28 Preburn Data

Run Data											
Client:	Harman	Test Run:	4								
Model:	P61a	Date:	7/3/2014								
Project Number:	0135PS022E.AD02	Test Crew:	J. Clark								
Tracking Number:	1983	Equipment:	288, 371, 372								
				Coal Bed Range (lb): N/A (pellet)							
Logged Data											
Temperatures (F)											
Elapsed Time (min)	Scale (lb)	Stack Draft (in H ₂ O)	Stack	Ambient	FB Top	FB Bottom	FB Back	FB Left	FB Right	Cat. In	Cat. Out
0	49.4	-0.024	328	77	253	246	124	485	485	N/A	N/A
10	48.6	-0.027	346	78	277	248	124	551	542		
20	47.4	-0.033	382	80	380	270	128	661	664		
30	46.2	-0.046	396	80	429	295	133	694	698		
40	45.1	-0.046	399	80	441	309	139	714	673		
50	43.9	-0.047	405	81	461	317	143	727	697		
60	42.7	-0.046	407	80	459	325	145	727	697		
Averages:		-0.038	380.43	79.43	385.71	287.14	133.71	651.29	636.57		



 7/8/14

Model: P61a
Harman Home Heating
352 Mountain House Road
Halifax, PA 17032

Run 5

Wood Heater Test Data - EPA Method 5G

Manufacturer: Harman
 Model: P61a
 Project No.: 0135PS022E.AD02
 Tracking No.: 1983
 Run: 5
 Test Date: 07/07/14

Burn Rate	0.71 kg/hr dry
Average Tunnel Temperature	90 degrees Fahrenheit
Average Gas Velocity in Dilution Tunnel - vs	13.0 feet/second
Average Gas Flow Rate in Dilution Tunnel - Qsd	8485.6 dscf/hour
Average Delta p	0.037 inches H2O
Average Delta H	1.52 inches H2O
Total Time of Test	120 minutes

	AVERAGE	SAMPLE TRAIN 1	SAMPLE TRAIN 2
Total Sample Volume - Vm	16.00 cubic feet	16.16 cubic feet	15.84 cubic feet
Average Gas Meter Temperature	85 degrees Fahrenheit	81 degrees Fahrenheit	88 degrees Fahrenheit
Total Sample Volume (Standard Conditions) - Vmstd	15.6 dscf	15.9 dscf	15.3 dscf
Total Particulates - mn		0.5 mg	0.5 mg
Particulate Concentration (dry-standard)	0.00003 grams/dscf	0.00003 grams/dscf	0.00003 grams/dscf
Particulate Emission Rate	0.27 grams/hour	0.27 grams/hour	0.28 grams/hour
Adjusted Emissions	0.62 grams/hour	0.61 grams/hour	0.63 grams/hour
Difference from Average		0.01 grams/hour	0.01 grams/hour
7.5% of the average emission rate	0.05		
Weighted Average Emission Rate Limit	4.10 grams/hour		
7.5% of the weighted average emission rate limit	0.31		
Results Are Acceptable			

Wood Heater Test Data - EPA Method 5G

Run:	5
Manufacturer:	Harman
Model:	P61a
Tracking No.:	1983
Project No.:	0135PS022E.AD02
Test Date:	07-Jul-14
Beginning Clock Time:	12:55
Recording Interval:	10 min.
Total Sampling Time:	120 min.

Velocity Traverse Data								
	Pt.1	Pt.2	Pt.3	Pt.4	Pt.5	Pt.6	Pt.7	Pt.8
Initial dP	0.036	0.040	0.038	0.036	0.028	0.038	0.040	0.038
Initial Temp.	88	88	88	88	88	88	88	88

OMNI Equipment Numbers: OMNI-00001, OMNI-00023, OMNI-00128, OMNI-00131, OMNI-00132, OMNI-00209, OMNI-283B, OMNI-00288, OMNI-00296-T40, OMNI-00343, OMNI-00371, OMNI-00372, OMNI-00410, OMNI-00417

PM Control Module:	N/A
Dilution Tunnel MW(dry):	29.00 lb/lb-mole
Dilution Tunnel MW(wet):	28.56 lb/lb-mole
Dilution Tunnel H2O:	4.00 percent
Dilution Tunnel Static:	-0.310 "H2O
Pitot Tube Cp:	0.99
Meter Box Y Factor:	1.002 (1) 0.999 (2)
Barometric Pressure:	Begin Middle End Average
	30.00 29.98 29.97 29.98 "Hg

Signature/Date:		7/10/14
Tunnel Velocity:	13.00	ft/sec.
Initial Tunnel Flow:	141.5	scfm
Average Tunnel Flow:	141.4	scfm
Tunnel Area:	0.1963	ft2
Post-Test Leak Check (1):	0.000@7.5	cfm@"Hg
Post-Test Leak Check (2):	0.000@5	cfm@"Hg
Fuel Moisture (dry basis %):	5.98	
Total Particulate (1):	0.5	
Total Particulate (2):	0.5	

Elapsed Time	Particulate Sampling Data														Fuel Weight, lb		Wood Heater Temperature Data, oF																Stack
	Gas Meter Cubic Feet (1)	Gas Meter Cubic Feet (2)	Sample Rate, cfm (1)	Sample Rate, cfm (2)	Orifice dH (1)	Orifice dH (2)	Meter oF (1)	Meter oF (2)	Meter Vac. In. Hg. (1)	Meter Vac. In. Hg. (2)	Dilution Tunnel Temp.	Dilution Tunnel dP	Pro. Rate (10%) (1)	Pro. Rate (10%) (2)	Scale Reading	Weight Change	Firebox Top	Firebox Bottom	Firebox Back	Firebox Left	Firebox Right	Catalyst Exit	Average Surface	Stack	Filter (1)	Filter (2)	Impinger exit (1)	Impinger exit (2)	Ambient	Draft In. H2O			
0	0.000	0.000			0.51	0.69	80	81	0.46	0.7	88	0.037			3.3		174	151	104	300	297	N/A	205.2	170	79	79	N/A	N/A	80	-0.038			
10	1.338	1.314	0.13	0.13	1.62	1.31	80	82	0.37	0.7	88	0.037	100	101	3.1	-0.2	171	152	105	296	293		203.4	169	81	80			81	-0.026			
20	2.678	2.635	0.13	0.13	1.61	1.30	80	85	0.37	0.7	89	0.037	100	101	2.8	-0.3	175	153	105	313	308		210.8	174	81	81			81	-0.027			
30	4.021	3.953	0.13	0.13	1.60	1.28	80	86	0.36	0.6	89	0.037	101	101	2.5	-0.3	176	155	106	306	304		209.4	174	81	81			81	-0.027			
40	5.369	5.274	0.13	0.13	1.61	1.30	80	88	0.36	0.6	89	0.037	101	101	2.3	-0.2	170	155	106	298	295		204.8	172	82	82			81	-0.026			
50	6.709	6.587	0.13	0.13	1.61	1.29	81	89	0.36	0.6	90	0.037	100	100	2.0	-0.3	170	155	106	302	297		206.0	173	82	82			82	-0.027			
60	8.059	7.907	0.14	0.13	1.60	1.29	81	90	0.36	0.6	90	0.037	101	101	1.7	-0.3	170	155	106	297	291		203.8	173	82	82			82	-0.026			
70	9.408	9.226	0.13	0.13	1.60	1.28	82	90	0.35	0.6	90	0.037	101	100	1.4	-0.3	169	154	106	296	293		203.6	172	83	83			82	-0.026			
80	10.758	10.547	0.14	0.13	1.61	1.28	82	91	0.36	0.6	90	0.037	101	100	1.2	-0.2	173	155	106	306	301		208.2	175	83	83			82	-0.026			
90	12.107	11.867	0.13	0.13	1.61	1.29	82	91	0.36	0.6	90	0.037	101	100	0.9	-0.3	175	156	107	313	307		211.6	176	83	83			83	-0.027			
100	13.459	13.190	0.14	0.13	1.61	1.29	82	91	0.36	0.6	90	0.037	101	101	0.6	-0.3	176	157	108	314	308		212.6	176	83	83			83	-0.027			
110	14.814	14.516	0.14	0.13	1.60	1.29	82	92	0.35	0.6	91	0.037	101	101	0.3	-0.3	177	158	109	316	308		213.6	177	83	83			83	-0.027			
120	16.165	15.837	0.14	0.13	1.61	1.29	83	92	0.36	0.6	92	0.037	101	100	0.0	-0.3	174	159	109	315	308		213.0	178	84	84			84	-0.027			
Avg/Total	16.165	15.837	0.13	0.13	1.52	1.24	81.15	88.31			89.69	0.037	100.76	100.67									8		82.08	82.00	#DIV/0!	#DIV/0!		-0.027			

Run Notes

Client: HarmanModel: P61aProject #: 0135PS022E.AD02Tracking #: 1983Run #: 5 Date: 7/7/2014Test Crew: J. ClarkOMNI Equipment ID #(s): 123, 128, 131, 132, 209, 283B, 288, 296, 240, 343, 371, 372, 410, 417, 438PREBURNDESCRIBE OR SKETCH AIR OR THERMOMSTAT SETTINGS BELOW:
(SETTINGS MUST BE ACCURATE AND REPRODUCIBLE)

PRIMARY:

Stove setting: Constant H
 Feed Rate: 0.50 ~~0.50~~ 0.51
 Temperature: 1.00
 Low Draft Adjustment: -35v
 Category: I

SECONDARY:

Auto

TERTIARY:

FAN:

PREBURN SETTINGS AND ACTIVITIES

TIME	AIR (THERMO) CHANGES PRIMARY/SECONDARY/TERTIARY	FAN SETTING CHANGE	ADD FUEL + WT.	ADD FUEL - WT.	RAKE COAL	COMMENT
	<u>N/A</u>					

TESTTEST FUEL CONFIGURATION SKETCH
(INDICATE VIEW ANGLE)

N/A
Okegan Premium Softwood pellets

START UP PROCEDURES

BYPASS: N/A
 FUEL LOADING: Auto
 DOOR: N/A
 PRIMARY AIR: Auto
 OTHER: N/A

DESCRIBE OR SKETCH TEST SETTINGS BELOW:
(SETTINGS MUST BE ACCURATE AND REPRODUCIBLE)

PRIMARY:

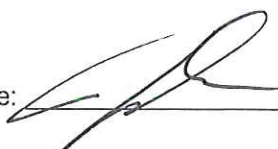
Same as above

SECONDARY:

Auto

TERTIARY:

FAN:

Technician signature: Date: 7/7/14

Supplemental Data EPA 5G/5H

Client: Harman

Model: P61a

Project #: 0135PS022E.AD02

Tracking #: 1983

Date: 7/7/2014 Run #: 5 Booth: E2

Test Crew: J. Clark Start Time: 12:55 Stop Time: 14:55

OMNI Equipment #(s): See Run Notes

Stack Gas Leak Check:

Initial: Ø

Final: Ø

Dilution Tunnel Gas Leak Check (5H only):

Initial: N/A

Final: N/A

Calibrations: Span Gas CO₂: 16.83 O₂: 20.95 CO: 4.183 CO₂ (DT): N/A
Mid Gas CO₂: 9.87 O₂: 10.47 CO: 2.493 CO₂ (DT): N/A

Time	Pre Test			Post Test		
	Zero	Span	Mid	Zero	Span	Mid
	12:00	12:05	12:09	15:07	15:00	15:05
O ₂	0.00	20.95	10.76	0.08	20.81	10.68
CO ₂	0.00	16.83	9.95	0.06	16.88	9.91
CO	0.000	4.183	2.420	0.001	4.185	2.386
CO ₂ (DT)	N/A					

Air Velocity (ft/min): Initial: 450 Final: 450

Scale Audit (lbs): Initial: 10.0 Final: 10.0

Pitot Tube Leak Test: Initial: Ø Final: Ø

Stack Diameter (inches): 6"

Induced Draft: Ø

% Smoke Capture: 100%

Flue Pipe Cleaned Prior to First Test in Series:

Date: 6/23/14 Initials: SC

	Initial	Middle	Ending
P _b (in/Hg)	30.00	29.98	29.97
Ambient (°F)	80	82	83

Technician signature: [Signature]

Date: 7/7/14

Tunnel Traverse	
dP (in H ₂ O)	T(°F)
1 0.036	88
2 0.040	88
3 0.038	88
4 0.036	88
5 0.028	88
6 0.038	88
7 0.040	88
8 0.038	88
N/A	N/A
↓	↓
Static P:	-0.310

Method 28 Preburn Data

Run Data											
Client:	Harman	Test Run:	5								
Model:	P61a	Date:	7/7/2014								
Project Number:	0135PS022E,AD02	Test Crew:	J. Clark								
Tracking Number:	1983	Equipment:	288, 371, 372								
		Coal Bed Range (lb):	N/A (pellet)								
Logged Data											
Temperatures (F)											
Elapsed Time (min)	Scale (lb)	Stack Draft (in H ₂ O)	Stack	Ambient	FB Top	FB Bottom	FB Back	FB Left	FB Right	Cat. In	Cat. Out
0	26.1	0.048	82	77	79	79	79	80	80	N/A	N/A
10	25.6	-0.019	144	78	122	93	81	222	215		
20	25.4	-0.036	144	78	156	110	88	270	256		
30	25	-0.039	157	79	171	123	95	295	286		
40	24.7	-0.041	165	79	178	136	100	311	303		
50	24.4	-0.041	167	80	173	144	102	300	293		
60	24.1	-0.041	169	80	173	148	104	302	296		
70	23.8	-0.041	170	80	175	151	104	300	297		
Averages:		-0.026	149.75	78.88	153.38	123.00	94.13	260.00	253.25		



 7/8/14

Model: P61a
Harman Home Heating
352 Mountain House Road
Halifax, PA 17032

Section 5

Sampling Procedures and Test Results

INTRODUCTION

Harman Home Heating retained OMNI-Test Laboratories, Inc. (*OMNI*) to perform U.S. Environmental Protection Agency (EPA) certification testing on the P61a. The P61a is a freestanding, pellet-fired room heater.

The testing was performed at *OMNI*'s testing facility in Portland, Oregon. The altitude of the laboratory is 30 feet above sea level. The unit was received in good condition and logged in at the *OMNI*'s testing facility on June 30th, 2014. It was assigned and labeled with *OMNI* ID #1983. *OMNI* representative Jeremy Clark conducted the certification testing and completed all testing by July 3rd, 2014. A testing contract, including provisions for Random Compliance Audit (RCA) testing, has been signed by Matthew Troutman of Harman Home Heating and is on file at *OMNI*.

The P61a was tested in accordance with the U.S. EPA 40 CFR Part 60, Subpart AAA – Standard of Performance for Residential Wood Heaters (Appendix A, Methods 28 and 5G). Particulate emissions were measured using a Method 5G sampling train consisting of two filters (front and back). The weighted average emissions of the five test runs indicate a particulate emission rate of 1.7 g/hr. Test runs were conducted in each of four burn rate categories (<0.80 kg/hr; 0.80-1.25 kg/hr; 1.25-1.90 kg/hr; and maximum). A fifth test run (Run 5) was conducted because the initial attempt at a Category 1 burn rate (Run 1) resulted in a burn rate of 0.83 dry kg/hr. Run 5 successfully achieved a burn rate less than 0.80 dry kg/hr. Emissions for each of the individual test runs did not exceed the cap. The P61a results are within the emission limit of 7.5 g/hr for non-catalytic affected facilities manufactured on or after July 1, 1990, or sold at retail on or after July 1, 1992.

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

Table 1.1 – Particulate Emissions

Run	Burn Rate (kg/hr dry)	Method 5G Emissions (g/hr)
1	0.83	1.35
2	1.11	1.50
3	1.80	1.80
4	3.02	4.68
5	0.71	0.62
Weighted particulate emission average of five test runs: 1.7 g/hr		

Table 1.2 – Test Facility Conditions

Run	Room Temperature (°F)		Barometric Pressure (Hg)		Air Velocity (ft/min)	
	Before	After	Before	After	Before	After
1	76	78	30.05	30.04	<50	<50
2	80	81	30.04	30.01	<50	<50
3	75	78	30.15	30.17	<50	<50
4	81	82	30.17	30.15	<50	<50
5	80	84	30.00	29.97	<50	<50

Table 1.3.1 – Fuel Measurement Summary – PRETEST

Run	Beginning Fuel Weight (lbs)	Ending Fuel Weight (lbs)
1	37.3	35.2
2	30.8	28.2
3	22.4	17.6
4	49.4	42.7
5	26.1	23.8

Table 1.3.2 – Fuel Measurement Summary – TEST

Run	Beginning Fuel Weight (lbs)	Fuel Moisture Content (Dry basis - %)	Ending Fuel Weight (lbs)
1	3.9	5.98	0.0
2	5.2	5.98	0.0
3	8.4	5.98	0.0
4	14.1	5.98	0.0
5	3.3	5.98	0.0

Table 1.4 – Dilution Tunnel Gas Measurements and Sampling Data Summary

Run	Length of Test (min)	Average Dilution Tunnel Gas Measurements		
		Velocity (ft/sec)	Flow Rate (dscf/min)	Temperature (°F)
1	120	13.13	144.8	83.15
2	120	12.96	137.1	105.62
3	120	12.72	133.8	111.54
4	120	13.51	139.8	121.15
5	120	13.00	141.4	89.69

Table 1.5 - Heater Operation Data (Average Temperature Data)

Run	Beginning Surface Temperature Average ^a	Ending Surface Temperature Average ^a	Surface Delta T ^b
1	219.6	224.2	4.6
2	231.2	239.0	7.8
3	310.6	324.2	13.6
4	471.2	478.4	7.2
5	205.2	213.0	7.8
a. All temperatures are in °F.			
b. Represents the difference between beginning and ending average surface temperature.			

Table 1.6 – Pretest Configuration

Run	Stove Temperature Control	Feed Adjuster	Temperature Control	Time (min)
1	Constant H	0.75	1.00	60
2	Constant H	1.38	2.40	60
3	Constant H	2.71	4.19	70
4	Constant H	6.00	7.00	60
5	Constant H	0.51	1.00	70

Table 1.7 – Test Configuration

Run	Stove Temperature Control	Feed Adjuster	Temperature Control	Time (min)
1	Constant H	0.75	1.00	120
2	Constant H	1.38	2.40	120
3	Constant H	2.71	4.19	120
4	Constant H	6.00	7.00	120
5	Constant H	0.51	1.00	120

Table 1.8 – Run Data

Run	Average Dry Burn Rate (kg/hr)	Initial (Induced) Draft (in H ₂ O)	Average Draft (in H ₂ O)	Run Time (min)
1	0.83	0	-0.028	120
2	1.11	0	-0.007	120
3	1.80	0	-0.024	120
4	3.02	0	-0.039	120
5	0.71	0	-0.027	120

TEST RESULTS AND DISCUSSION

A total of five test runs were conducted in the following categories: two in the 0.80 to 1.25 kg/hr dry category, one in the 1.25 to 1.90 kg/hr dry category, and one at maximum.

The weighted particulate emission rate was measured to be 1.7 g/hr.

The proportionality results for all five test runs were acceptable. Quality check results for each test run are presented in Section 2 of this report.