

# Certification Test Report

## Harman Home Heating Freestanding Pellet Stove Model: Absolute 43

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

**Prepared by:** OMNI-Test Laboratories, Inc.  
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**Test Period:** August 12-14, 2014

**Report Date:** October 2014

**Report Number:** 0135PS032E.AD01

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Model: Absolute 43  
Harman Home Heating  
352 Mountain House Road  
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## AUTHORIZED SIGNATORIES

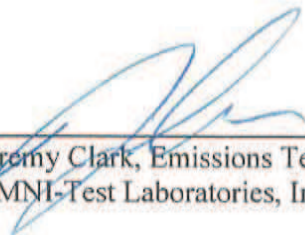
This report has been reviewed and approved by the following authorized signatories:



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# **Section 1**

## **Photographs/Appliance Description/Drawings**

Model: Absolute 43  
Harman Home Heating  
352 Mountain House Road  
Halifax, PA 17032

**Harman Home Heating**  
**Absolute 43**  
**Test Dates:** August 12-14, 2014



## APPLIANCE DESCRIPTION

**Appliance Manufacturer:** Harman Home Heating

**Pellet Stove Model:** Absolute 43

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

## PELLET HEATER DESCRIPTION

**Materials of Construction:** The firebox is constructed of mild steel. The exterior is constructed primarily of cast iron.

**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 knob.

**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: Absolute 43  
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## **Engineering Drawings/Blueprints (K List)**

*Model: Absolute 43  
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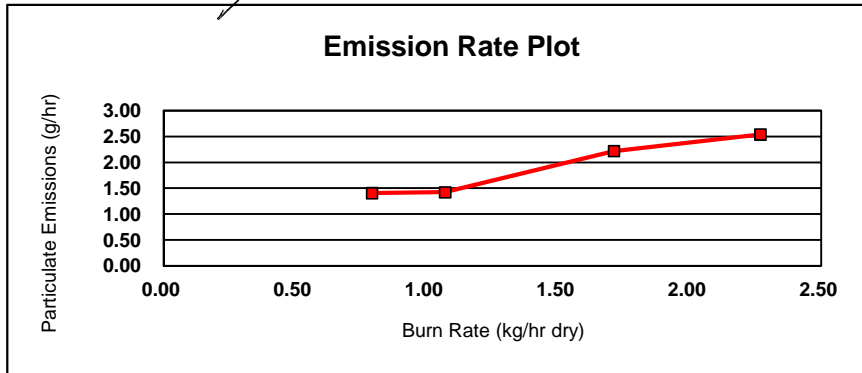
# **Section 4**

## **Test Data by Run**



# EPA Weighted Average Emissions EPA Method 28

Client: Harman	Status: Final
Stove Model: Absolute 43	Stove Type: Pellet Stove
Test Dates: August 12-14, 2014	
Project Number: 0135PS089E,AD01	
Tracking Number: 1981	
Signature/Date:  8/20/14	<b>Weighted Average (g/hr) 1.8</b>



Run #	1	
Burn Rate (dry kg/hr)	0.79	
Category	1	
Overall Efficiency (%)	78%	
Emissions (g/hr)	1.41	
Cap (g/hr)	15.00	
Weighting Factor	0.428	24.78%
Heat Output (BTU/hr)	11846	

Run #	2	
Burn Rate (dry kg/hr)	1.07	
Category	2	
Overall Efficiency (%)	78%	
Emissions (g/hr)	1.42	
Cap (g/hr)	15.00	
Weighting Factor	0.630	36.48%
Heat Output (BTU/hr)	16008	

Run #	3	
Burn Rate (dry kg/hr)	1.71	
Category	3	
Overall Efficiency (%)	78%	
Emissions (g/hr)	2.22	
Cap (g/hr)	18.00	
Weighting Factor	0.513	29.68%
Heat Output (BTU/hr)	25613	

Run #	4	
Burn Rate (dry kg/hr)	2.27	
Category	4	
Overall Efficiency (%)	78%	
Emissions (g/hr)	2.54	
Cap (g/hr)	18.00	
Weighting Factor	0.157	9.06%
Heat Output (BTU/hr)	33937	

*Model: Absolute 43  
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# **Run 1**

## Wood Heater Test Data - EPA Method 5G

Manufacturer: Harman  
 Model: Absolute 43  
 Project No.: 0135PS032E.AD01  
 Tracking No.: 1981  
 Run: 1  
 Test Date: 08/12/14

Burn Rate	<b>0.79 kg/hr dry</b>
Average Tunnel Temperature	99 degrees Fahrenheit
Average Gas Velocity in Dilution Tunnel - vs	13.1 feet/second
Average Gas Flow Rate in Dilution Tunnel - Qsd	8404.1 dscf/hour
Average Delta p	0.037 inches H2O
Average Delta H	0.88 inches H2O
Total Time of Test	120 minutes

	AVERAGE	SAMPLE TRAIN 1	SAMPLE TRAIN 2
Total Sample Volume - Vm	16.58 cubic feet	16.37 cubic feet	16.80 cubic feet
Average Gas Meter Temperature	93 degrees Fahrenheit	93 degrees Fahrenheit	93 degrees Fahrenheit
Total Sample Volume (Standard Conditions) - Vmstd	16.1 dscf	15.8 dscf	16.3 dscf
Total Particulates - mn		1.4 mg	1.4 mg
Particulate Concentration (dry-standard)	0.00009 grams/dscf	0.00009 grams/dscf	0.00009 grams/dscf
Particulate Emission Rate	0.73 grams/hour	0.74 grams/hour	0.72 grams/hour
Adjusted Emissions	<b>1.41 grams/hour</b>	1.43 grams/hour	1.39 grams/hour
Difference from Average		0.02 grams/hour	0.02 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

Signature/Date:  8/20/14

Run: 1  
 Manufacturer: Harman  
 Model: Absolute 43  
 Tracking No.: 1981  
 Project No.: 0135PS032E.AD01  
 Test Date: 12-Aug-14  
 Beginning Clock Time: 10:33  
 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	0.042	0.042	0.034	0.032	0.042	0.042	0.030
Initial Temp.	96	96	96	96	96	96	96	96

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: -0.521 "H2O  
 Pitot Tube Cp: 0.99  
 Meter Box Y Factor: 1.007 (1) 1.014 (2)  
 Barometric Pressure: 29.95 29.94 29.93 29.94 "Hg

Tunnel Velocity: 13.13 ft/sec.  
 Initial Tunnel Flow: 140.1 scfm  
 Average Tunnel Flow: 140.1 scfm  
 Tunnel Area: 0.1963 ft2  
 Post-Test Leak Check (1): 0.000@5 cfm@ "Hg  
 Post-Test Leak Check (2): 0.000@5 cfm@ "Hg  
 Fuel Moisture (dry basis %): 5.98  
 Total Particulate (1): 1.4  
 Total Particulate (2): 1.4

Elapsed Time	Particulate Sampling Data														Fuel Weight, lb		Wood Heater Temperature Data, oF														Stack Draft In. H2O
	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		
0	0.000	0.000			0.62	0.43	85	85	1.26	0.9	96	0.037			3.7		459	276	123	276	327	N/A	292.2	270	81	82	N/A	N/A	83	-0.086	
10	1.364	1.394	0.14	0.14	0.94	0.80	86	86	1.32	1	98	0.037	102	101	3.4	-0.3	463	275	123	288	328		295.4	272	83	83			83	-0.087	
20	2.737	2.799	0.14	0.14	0.93	0.79	88	88	1.32	1	99	0.037	102	102	3.1	-0.3	435	269	124	272	307		281.4	264	84	84			84	-0.085	
30	4.106	4.203	0.14	0.14	0.92	0.79	90	90	1.32	1	99	0.037	102	101	2.8	-0.3	437	272	125	262	310		281.2	264	85	85			84	-0.085	
40	5.473	5.607	0.14	0.14	0.91	0.79	91	91	1.32	1	99	0.037	101	101	2.4	-0.4	438	277	125	266	319		285.0	268	85	85			84	-0.085	
50	6.843	7.010	0.14	0.14	0.91	0.79	93	93	1.34	1	99	0.037	101	101	2.1	-0.3	432	273	126	273	333		287.4	271	85	85			84	-0.086	
60	8.211	8.415	0.14	0.14	0.91	0.79	94	94	1.34	1	100	0.037	101	101	1.8	-0.3	441	274	126	284	328		290.6	271	85	86			85	-0.087	
70	9.578	9.817	0.14	0.14	0.90	0.79	95	95	1.35	1	99	0.037	101	100	1.5	-0.3	439	275	127	280	329		290.0	271	86	86			85	-0.086	
80	10.943	11.219	0.14	0.14	0.90	0.78	95	95	1.35	1	99	0.037	100	100	1.3	-0.2	417	273	128	258	310		277.2	263	86	86			85	-0.085	
90	12.305	12.617	0.14	0.14	0.89	0.78	96	96	1.37	1.1	100	0.037	100	100	0.9	-0.4	444	278	128	294	339		296.6	274	86	86			86	-0.087	
100	13.663	14.014	0.14	0.14	0.89	0.77	97	96	1.37	1.1	101	0.037	100	100	0.6	-0.3	417	275	129	265	317		280.6	266	87	87			86	-0.085	
110	15.018	15.408	0.14	0.14	0.89	0.77	97	97	1.38	1.1	101	0.037	99	100	0.3	-0.3	447	278	130	269	331		291.0	271	87	87			86	-0.086	
120	16.370	16.799	0.14	0.14	0.88	0.76	97	97	1.38	1.1	101	0.037	99	99	0.0	-0.3	433	276	130	270	330		287.8	270	87	87			86	-0.086	
Avg/Total	16.370	16.799	0.14	0.14	0.88	0.76	92.62	92.54			99.31	0.037	100.68	100.68									4		85.15	85.31	#DIV/0!	#DIV/0!		-0.086	

## Run Notes

Client: Harman

Model: Absolute 43

Project #: 0135PS032E.AD01

Tracking #: 1981

Run #: 1 Date: 8/12/2014

Test Crew: J. Clark

OMNI Equipment ID #(s): 1, 2, 3, 128, 131, 132, 185, 209, 283B, 296-T57, 335, 336, 347, 410, 413, 443

### PREBURN

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

PRIMARY:

Temperature : 1.0 (minimum)  
 Feed Rate : 25% (minimum)  
 Room Fan : 10% (minimum)  
 Combustion Fan: 2625 max,  
 2150 min

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
	N/A					

### TEST

TEST FUEL CONFIGURATION SKETCH  
(INDICATE VIEW ANGLE)

N/A - 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)

Same as above

SECONDARY: Auto

TERTIARY: \_\_\_\_\_

FAN: \_\_\_\_\_

Technician signature:

Date: 8/12/14

### Supplemental Data EPA 5G/5H

Client: Harman

Model: Absolute 43

Project #: 0135PS032E.AD01

Tracking #: 1981

Date: 8/12/2014 Run #: 1 Booth: E1

Test Crew: J. Clark Start Time: 10:33 Stop Time: 12:33

OMNI Equipment #(s): 1, 2, 3, 128, 131, 132, 185, 209, 283B, 296-757, 335, 376, 343, 410, 417, 443

Stack Gas Leak Check:

Initial: 6

Final: ∅

Dilution Tunnel Gas Leak Check (5H only):

Initial: N/A

Final: N/A

Calibrations: Span Gas CO<sub>2</sub>: 16.80 O<sub>2</sub>: N/A CO: 4.295 CO<sub>2</sub> (DT): N/A

Mid Gas CO<sub>2</sub>: 9.867 O<sub>2</sub>: N/A CO: 2.493 CO<sub>2</sub> (DT): N/A

Time	Pre Test			Post Test		
	Zero	Span	Mid	Zero	Span	Mid
8:12		8:15	8:17	12:41	12:43	12:45
O <sub>2</sub>	N/A					→
CO <sub>2</sub>	0.00	16.80	10.02	0.00	16.75	9.98
CO	0.000	4.295	2.476	-0.007	4.265	2.453
CO <sub>2</sub> (DT)	N/A					→

Air Velocity (ft/min): Initial: 250 Final: 250

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

Pitot Tube Leak Test: Initial: ∅ Final: ∅

Stack Diameter (inches): 6"

Induced Draft: ∅

% Smoke Capture: 100%

Flue Pipe Cleaned Prior to First Test in Series:

Date: 8/8/14 Initials: JC

	Initial	Middle	Ending
P <sub>b</sub> (in/Hg)	29.95	29.94	29.93
Ambient (°F)	81	85	86

Tunnel Traverse		
dP (in H <sub>2</sub> O)	T(°F)	
0.030	96	
0.042	↓	
0.042		
0.034		
0.032		
0.042		
0.042		
0.030		
N/A		N/A
↓		↓
Static P:		-0.521

Technician signature: [Signature]

Date: 8/12/14

## Method 28 Preburn Data

Run Data	
Client:	Harman
Model:	Absolute 43
Project Number:	0135PS032E.AD01
Tracking Number:	1981
Coal Bed Range (lb):	N/A (pellet)
Test Run:	1
Date:	8/12/2014
Test Crew:	J. Clark
Equipment:	185, 335, 336

Logged Data			Temperatures (F)								
Elapsed Time (min)	Scale (lb)	Stack Draft (in H <sub>2</sub> O)	Stack	Ambient	FB Top	FB Bottom	FB Back	FB Left	FB Right	Cat. In	Cat. Out
0	37.4	-0.086	265	82	450	274	116	264	313	N/A	N/A
10	37.1	-0.086	265	81	448	276	117	261	310		
20	36.8	-0.085	264	81	444	276	118	258	312		
30	36.4	-0.087	272	82	463	275	119	287	335		
40	36.1	-0.085	262	83	434	273	121	257	306		
50	35.8	-0.086	269	83	459	276	121	280	322		
60	35.5	-0.086	273	83	476	274	123	293	338		
Averages:		-0.086	267.14	82.14	453.43	274.86	119.29	271.43	319.43		

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## **Run 2**



## Wood Heater Test Data - EPA Method 5G

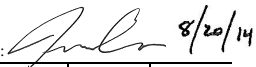
Manufacturer: Harman  
 Model: Absolute 43  
 Project No.: 0135PS032E.AD01  
 Tracking No.: 1981  
 Run: 2  
 Test Date: 08/13/14

Burn Rate	<b>1.07 kg/hr dry</b>
Average Tunnel Temperature	100 degrees Fahrenheit
Average Gas Velocity in Dilution Tunnel - vs	13.1 feet/second
Average Gas Flow Rate in Dilution Tunnel - Qsd	8416.0 dscf/hour
Average Delta p	0.037 inches H2O
Average Delta H	0.91 inches H2O
Total Time of Test	120 minutes

	AVERAGE	SAMPLE TRAIN 1	SAMPLE TRAIN 2
Total Sample Volume - Vm	16.68 cubic feet	16.48 cubic feet	16.87 cubic feet
Average Gas Meter Temperature	86 degrees Fahrenheit	86 degrees Fahrenheit	86 degrees Fahrenheit
Total Sample Volume (Standard Conditions) - Vmstd	16.4 dscf	16.1 dscf	16.7 dscf
Total Particulates - mn		1.4 mg	1.5 mg
Particulate Concentration (dry-standard)	0.00009 grams/dscf	0.00009 grams/dscf	0.00009 grams/dscf
Particulate Emission Rate	0.74 grams/hour	0.73 grams/hour	0.76 grams/hour
Adjusted Emissions	<b>1.42 grams/hour</b>	1.40 grams/hour	1.45 grams/hour
Difference from Average		0.02 grams/hour	0.02 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

Signature/Date:  8/20/14

Run: 2  
 Manufacturer: Harman  
 Model: Absolute 43  
 Tracking No.: 1981  
 Project No.: 0135PS032E.AD01  
 Test Date: 13-Aug-14  
 Beginning Clock Time: 09:08  
 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	0.024	0.040	0.046	0.034	0.032	0.042	0.042	0.034
Initial Temp.	96	96	96	96	96	96	96	96

OMNI Equipment Numbers: OMNI-0001, 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: -0.503 "H2O  
 Pitot Tube Cp: 0.99  
 Meter Box Y Factor: 1.007 (1) 1.014 (2)  
 Barometric Pressure: 30.04 30.04 30.04 Average "Hg

Tunnel Velocity: 13.11 ft/sec.  
 Initial Tunnel Flow: 140.1 scfm  
 Average Tunnel Flow: 140.3 scfm  
 Tunnel Area: 0.1963 ft2  
 Post-Test Leak Check (1): 0.000@5 cfm@"Hg  
 Post-Test Leak Check (2): 0.000@5 cfm@"Hg  
 Fuel Moisture (dry basis %): 5.98  
 Total Particulate (1): 1.4  
 Total Particulate (2): 1.5

Elapsed Time	Particulate Sampling Data														Fuel Weight, lb		Wood Heater Temperature Data, oF														Stack Draft In. H2O
	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		
0	0.000	0.000			0.67	0.44	78	78	1.34	0.9	96	0.037			5.0		375	295	101	257	280	N/A	261.6	287	75	75	N/A	N/A	76	-0.088	
10	1.367	1.389	0.14	0.14	0.95	0.80	79	79	1.37	1	97	0.037	101	101	4.5	-0.5	385	299	102	264	289		267.8	292	77	77			76	-0.089	
20	2.740	2.793	0.14	0.14	0.94	0.80	81	81	1.37	1	98	0.037	102	101	4.1	-0.4	393	303	104	269	298		273.4	297	78	78			76	-0.090	
30	4.112	4.197	0.14	0.14	0.94	0.81	83	83	1.38	1	99	0.037	101	101	3.6	-0.5	393	304	105	264	296		272.4	296	78	79			77	-0.089	
40	5.484	5.602	0.14	0.14	0.94	0.80	84	84	1.38	1	100	0.037	101	101	3.2	-0.4	394	304	107	264	293		272.4	296	79	79			78	-0.089	
50	6.857	7.008	0.14	0.14	0.94	0.81	86	86	1.38	1	100	0.037	101	101	2.8	-0.4	366	299	107	252	282		261.2	288	80	80			78	-0.087	
60	8.232	8.417	0.14	0.14	0.93	0.80	87	87	1.38	1	100	0.037	101	101	2.4	-0.4	371	299	108	260	296		266.8	293	80	80			78	-0.088	
70	9.607	9.826	0.14	0.14	0.92	0.80	88	88	1.39	1	100	0.037	101	101	2.0	-0.4	370	299	108	256	285		263.6	289	80	81			79	-0.087	
80	10.982	11.236	0.14	0.14	0.92	0.80	89	89	1.39	1	100	0.037	100	100	1.6	-0.4	377	300	109	254	293		266.6	291	81	81			79	-0.087	
90	12.357	12.645	0.14	0.14	0.92	0.80	90	89	1.4	1	101	0.037	100	101	1.2	-0.4	374	298	109	252	292		265.0	290	81	81			79	-0.087	
100	13.731	14.054	0.14	0.14	0.92	0.80	90	90	1.4	1	101	0.037	100	100	0.8	-0.4	375	300	109	263	305		270.4	296	81	81			79	-0.089	
110	15.104	15.464	0.14	0.14	0.93	0.79	91	90	1.4	1	102	0.037	100	100	0.4	-0.4	390	306	110	271	306		276.6	301	81	81			79	-0.089	
120	16.479	16.874	0.14	0.14	0.93	0.80	91	91	1.4	1	101	0.037	100	100	0.0	-0.4	372	303	111	258	288		266.4	292	82	82			80	-0.089	
Avg/Total	16.479	16.874	0.14	0.14	0.91	0.77	85.92	85.77			99.62	0.037	100.68	100.68									5		79.46	79.62	#DIV/0!	#DIV/0!		-0.088	

## Run Notes

Client: Harman

Model: Absolute 43

Project #: 0135PS032E.AD01

Tracking #: 1981

Run #: 2 Date: 8/13/2014

Test Crew: J. Clark

OMNI Equipment ID #(s): 1, 23, 128, 131, 132, 185, 209, 2838, 296-757, 335, 336, 343, 410, 417, 443

### PREBURN

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

PRIMARY:

Temperature : 3.0  
 Feed Rate : 31 %  
 Ram Fan : 100 %  
 Combustion Fan : 3050 maximum  
 2600 minimum

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
/	N/A					

### TEST

TEST FUEL CONFIGURATION SKETCH  
(INDICATE VIEW ANGLE)

N/A

START UP PROCEDURES

BYPASS: N/A

FUEL LOADING: Auto

DOOR: N/A

PRIMARY AIR: Aut

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: 8/13/14

### Supplemental Data EPA 5G/5H

Client: Harman

Model: Absolute 43 Project #: 0135PS032E.AD01 Tracking #: 1981

Date: ~~8/12/2014~~ 8/13/2014 Run #: 2 Booth: E1

Test Crew: J. Clark Start Time: 9:08 Stop Time: 11:08

OMNI Equipment #(s): 1, 2, 3, 12, 8, 13, 132, 185, 209, 283B, 296-T57, 335, 336, 343, 410, 417, 443

Stack Gas Leak Check:

Dilution Tunnel Gas Leak Check (5H only):

Initial: ∅

Initial: N/A

Final: ∅

Final: N/A

Calibrations: Span Gas CO<sub>2</sub>: 16.80 O<sub>2</sub>: N/A CO: 4.295 CO<sub>2</sub>(DT): N/A  
Mid Gas CO<sub>2</sub>: 9.867 O<sub>2</sub>: N/A CO: 2.493 CO<sub>2</sub>(DT): N/A

	Pre Test			Post Test		
	Zero	Span	Mid	Zero	Span	Mid
Time	8:12	8:14	8:16	11:15	11:17	11:19
O <sub>2</sub>	N/A					
CO <sub>2</sub>	0.00	16.80	10.07	0.00	16.78	10.04
CO	0.000	4.295	2.482	-0.005	4.204	2.462
CO <sub>2</sub> (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: ∅ Final: ∅

Stack Diameter (inches): 6"

Induced Draft: ∅

% Smoke Capture: 100%

Flue Pipe Cleaned Prior to First Test in Series:

Date: 8/8/14 Initials: JL

	Initial	Middle	Ending
P <sub>b</sub> (in/Hg)	30.04	30.04	30.04
Ambient (°F)	75	78	79

Tunnel Traverse	
dP (in H <sub>2</sub> O)	T(°F)
.024	96
.040	96
.046	96
.034	96
.032	96
.042	96
.042	96
.034	96
N/A	N/A
↓	↓
Static P:	-0.503

Technician signature: [Signature]

Date: 8/13/14

## Method 28 Preburn Data

Run Data	
Client:	Harman
Model:	Absolute 43
Project Number:	0135PS032E.AD01
Tracking Number:	1981
Coal Bed Range (lb):	N/A (pellet)
Test Run:	2
Date:	8/13/2014
Test Crew:	J. Clark
Equipment:	185, 335, 336

Logged Data			Temperatures (F)								
Elapsed Time (min)	Scale (lb)	Stack Draft (in H <sub>2</sub> O)	Stack	Ambient	FB Top	FB Bottom	FB Back	FB Left	FB Right	Cat. In	Cat. Out
0	30.9	-0.084	257	74	355	214	79	242	256	N/A	N/A
10	30.4	-0.089	284	74	391	271	86	264	283		
20	30	-0.087	282	75	373	283	91	252	273		
30	29.6	-0.088	281	75	363	284	95	244	273		
40	29.2	-0.087	282	75	358	286	97	255	276		
50	28.8	-0.088	288	75	377	292	99	261	285		
60	28.4	-0.089	287	76	377	296	101	259	279		
Averages:		-0.087	280.14	74.86	370.57	275.14	92.57	253.86	275.00		

*Model: Absolute 43  
Harman Home Heating  
352 Mountain House Road  
Halifax, PA 17032*

## **Run 3**

## Wood Heater Test Data - EPA Method 5G

Manufacturer: Harman  
 Model: Absolute 43  
 Project No.: 0135PS032E.AD01  
 Tracking No.: 1981  
 Run: 3  
 Test Date: 08/13/14

Burn Rate	<b>1.71 kg/hr dry</b>
Average Tunnel Temperature	114 degrees Fahrenheit
Average Gas Velocity in Dilution Tunnel - vs	13.1 feet/second
Average Gas Flow Rate in Dilution Tunnel - Qsd	8195.8 dscf/hour
Average Delta p	0.036 inches H2O
Average Delta H	0.89 inches H2O
Total Time of Test	120 minutes

	AVERAGE	SAMPLE TRAIN 1	SAMPLE TRAIN 2
Total Sample Volume - Vm	16.57 cubic feet	16.37 cubic feet	16.78 cubic feet
Average Gas Meter Temperature	92 degrees Fahrenheit	92 degrees Fahrenheit	92 degrees Fahrenheit
Total Sample Volume (Standard Conditions) - Vmstd	16.1 dscf	15.9 dscf	16.4 dscf
Total Particulates - mn		2.4 mg	2.6 mg
Particulate Concentration (dry-standard)	0.00015 grams/dscf	0.00015 grams/dscf	0.00016 grams/dscf
Particulate Emission Rate	1.27 grams/hour	1.24 grams/hour	1.30 grams/hour
Adjusted Emissions	<b>2.22 grams/hour</b>	2.17 grams/hour	2.26 grams/hour
Difference from Average		0.04 grams/hour	0.04 grams/hour
7.5% of the average emission rate	0.17		
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: Absolute 43  
 Tracking No.: 1981  
 Project No.: 0135PS032E.AD01  
 Test Date: 13-Aug-14  
 Beginning Clock Time: 12:29  
 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	0.038	0.036	0.030	0.044	0.040	0.030
Initial Temp.	114	114	114	114	114	114	114	114

OMNI Equipment Numbers: OMNI-0001, 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: -0.496 "H2O  
 Pitot Tube Cp: 0.99  
 Meter Box Y Factor: 1.007 (1) 1.014 (2)  
 Barometric Pressure: Begin Middle End Average  
30.05 30.05 30.05 30.05 "Hg

Signature/Date: [Signature] 8/20/14  
 Tunnel Velocity: 13.10 ft/sec.  
 Initial Tunnel Flow: 136.3 scfm  
 Average Tunnel Flow: 136.6 scfm  
 Tunnel Area: 0.1963 ft2  
 Post-Test Leak Check (1): 0.000@5 cfm@"Hg  
 Post-Test Leak Check (2): 0.000@5 cfm@"Hg  
 Fuel Moisture (dry basis %): 5.98  
 Total Particulate (1): 2.4  
 Total Particulate (2): 2.6

Elapsed Time	Particulate Sampling Data														Fuel Weight, lb		Wood Heater Temperature Data, oF														Stack Draft In. H2O
	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		
0	0.000	0.000			0.68	0.43	87	88	1.35	1	114	0.036			8.0		579	414	131	434	443	N/A	400.2	383	81	81	N/A	N/A	81	-0.098	
10	1.383	1.401	0.14	0.14	0.95	0.81	87	88	1.37	1	113	0.036	103	102	7.3	-0.7	562	412	132	415	435		391.2	379	84	84			82	-0.097	
20	2.762	2.808	0.14	0.14	0.93	0.80	88	89	1.37	1	113	0.036	103	102	6.7	-0.6	554	413	133	417	428		389.0	380	85	85			83	-0.098	
30	4.136	4.212	0.14	0.14	0.93	0.79	90	90	1.39	1	114	0.036	102	102	6.0	-0.7	553	411	133	419	427		388.6	381	86	86			83	-0.098	
40	5.507	5.615	0.14	0.14	0.92	0.79	91	91	1.39	1	114	0.036	101	101	5.4	-0.6	547	411	134	429	429		390.0	381	86	86			83	-0.098	
50	6.874	7.018	0.14	0.14	0.91	0.79	92	92	1.4	1	114	0.036	101	101	4.7	-0.7	563	413	135	431	438		396.0	385	86	86			83	-0.098	
60	8.240	8.418	0.14	0.14	0.91	0.79	93	93	1.4	1	114	0.036	101	101	4.0	-0.7	562	413	136	430	439		396.0	384	87	87			83	-0.098	
70	9.601	9.816	0.14	0.14	0.90	0.78	94	94	1.41	1.1	114	0.036	100	100	3.4	-0.6	573	417	136	435	448		401.8	386	87	87			83	-0.098	
80	10.959	11.211	0.14	0.14	0.90	0.78	94	94	1.42	1.1	115	0.036	100	100	2.7	-0.7	565	419	136	440	450		402.0	388	85	85			82	-0.099	
90	12.317	12.606	0.14	0.14	0.89	0.78	95	94	1.43	1.1	115	0.036	100	100	2.0	-0.7	575	418	137	430	442		400.4	387	83	83			83	-0.099	
100	13.671	13.999	0.14	0.14	0.89	0.78	95	95	1.43	1.1	114	0.036	99	100	1.4	-0.6	553	413	136	432	431		393.0	383	82	83			83	-0.098	
110	15.022	15.390	0.14	0.14	0.88	0.77	95	95	1.44	1.1	116	0.036	99	100	0.7	-0.7	569	420	136	438	446		401.8	388	82	83			83	-0.098	
120	16.369	16.779	0.13	0.14	0.88	0.77	95	95	1.44	1.1	115	0.036	99	100	0.0	-0.7	561	418	136	435	443		398.6	386	83	83			83	-0.099	
Avg/Total	16.369	16.779	0.14	0.14	0.89	0.76	92.00	92.15			114.23	0.036	100.70	100.71									2		84.38	84.54	#DIV/0!	#DIV/0!		-0.098	



## Run Notes

Client: Harman  
 Model: Absolute 43  
 Project #: 0135PS032E.AD01  
 Tracking #: 1981  
 Run #: 3 Date: 8/13/2014  
 Test Crew: J. Clark  
 OMNI Equipment ID #(s): 1, 23, 128, 131, 132, 185, 209, 2838, 296-757, 335, 336, 343, 410, 417, 443

### PREBURN

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

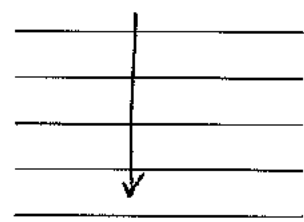
PRIMARY:

Temperature : 6.0  
 Fuel Rate : 54%  
 Ram Fan : 100%  
 Combustion Fan: 3050 maximum  
 2600 minimum

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
—	N/A					

### TEST

TEST FUEL CONFIGURATION SKETCH  
 (INDICATE VIEW ANGLE)

N/A

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)

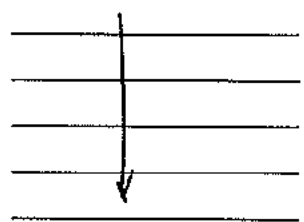
PRIMARY:

Same as above

SECONDARY: Auto

TERTIARY: \_\_\_\_\_

FAN: \_\_\_\_\_



Technician signature: [Signature] Date: 8/13/14

### Supplemental Data EPA 5G/5H

Client: Harman

Model: Absolute 43

Project #: 0135PS032E.AD01

Tracking #: 1981

Date: 8/13/2014

Run #: 3

Booth: E1

Test Crew: J. Clark

Start Time: 12:29

Stop Time: 14:29

OMNI Equipment #(s): 122, 128, 131, 132, 185, 209, 283B, 296 - 757, 335, 336, 343, 410, 417, 443

Stack Gas Leak Check:

Initial: ∅

Final: ∅

Dilution Tunnel Gas Leak Check (5H only):

Initial: N/A

Final: N/A

Calibrations: Span Gas CO<sub>2</sub>: 16.80 O<sub>2</sub>: N/A CO: 4.295 CO<sub>2</sub>(DT): N/A  
 Mid Gas CO<sub>2</sub>: 9.867 O<sub>2</sub>: N/A CO: 2.493 CO<sub>2</sub>(DT): N/A

Time	Pre Test			Post Test		
	Zero	Span	Mid	Zero	Span	Mid
Time	11:23	11:25	11:27	14:33	14:35	14:37
O <sub>2</sub>	N/A					
CO <sub>2</sub>	0.00	16.80	10.01	-0.01	16.72	9.95
CO	0.000	4.295	2.477	-0.020	4.242	2.440
CO <sub>2</sub> (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: ∅ Final: ∅

Stack Diameter (inches): 6"

Induced Draft: ∅

% Smoke Capture: 100%

Flue Pipe Cleaned Prior to First Test in Series:

Date: 8/8/14 Initials: JC

	Initial	Middle	Ending
P <sub>b</sub> (in/Hg)	30.05	30.05	30.05
Ambient (°F)	82	82	83

Tunnel Traverse	
dP (in H <sub>2</sub> O)	T(°F)
.030	114
.038	114
.038	114
.036	114
.030	114
.044	114
.040	114
.030	114
N/A	N/A
↓	↓
Static P:	-0.496

Technician signature: [Signature]

Date: 8/13/14

## Method 28 Preburn Data

Run Data	
Client:	Harman
Model:	Absolute 43
Project Number:	0135PS032E.AD01
Tracking Number:	1981
Coal Bed Range (lb):	N/A (pellet)
Test Run:	3
Date:	8/13/2014
Test Crew:	J. Clark
Equipment:	185, 335, 336

Logged Data			Temperatures (F)								
Elapsed Time (min)	Scale (lb)	Stack Draft (in H <sub>2</sub> O)	Stack	Ambient	FB Top	FB Bottom	FB Back	FB Left	FB Right	Cat. In	Cat. Out
0	22.8	-0.093	335	80	478	331	111	356	385	N/A	N/A
10	22.2	-0.096	359	80	532	372	115	398	415		
20	21.5	-0.097	365	80	535	390	119	392	408		
30	20.9	-0.097	374	81	552	400	123	429	433		
40	20.2	-0.097	377	81	549	407	125	422	431		
50	19.6	-0.097	373	81	543	407	128	403	426		
60	18.9	-0.097	378	82	563	410	129	419	437		
70	18.2	-0.098	383	82	580	413	131	434	449		
Averages:		-0.097	368.00	80.88	541.50	391.25	122.63	406.63	423.00		

*Model: Absolute 43  
Harman Home Heating  
352 Mountain House Road  
Halifax, PA 17032*

## **Run 4**

## Wood Heater Test Data - EPA Method 5G

Manufacturer: Harman  
 Model: Absolute 43  
 Project No.: 0135PS032E.AD01  
 Tracking No.: 1981  
 Run: 4  
 Test Date: 08/14/14

Burn Rate	<b>2.27 kg/hr dry</b>
Average Tunnel Temperature	116 degrees Fahrenheit
Average Gas Velocity in Dilution Tunnel - vs	13.1 feet/second
Average Gas Flow Rate in Dilution Tunnel - Qsd	8188.3 dscf/hour
Average Delta p	0.036 inches H2O
Average Delta H	0.89 inches H2O
Total Time of Test	120 minutes

	AVERAGE	SAMPLE TRAIN 1	SAMPLE TRAIN 2
Total Sample Volume - Vm	16.46 cubic feet	16.26 cubic feet	16.66 cubic feet
Average Gas Meter Temperature	88 degrees Fahrenheit	88 degrees Fahrenheit	88 degrees Fahrenheit
Total Sample Volume (Standard Conditions) - Vmstd	16.2 dscf	15.9 dscf	16.4 dscf
Total Particulates - mn		2.8 mg	3.1 mg
Particulate Concentration (dry-standard)	0.00018 grams/dscf	0.00018 grams/dscf	0.00019 grams/dscf
Particulate Emission Rate	1.49 grams/hour	1.44 grams/hour	1.55 grams/hour
Adjusted Emissions	<b>2.54 grams/hour</b>	2.47 grams/hour	2.62 grams/hour
Difference from Average		0.07 grams/hour	0.07 grams/hour
7.5% of the average emission rate	0.19		
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: Absolute 43  
 Tracking No.: 1981  
 Project No.: 0135PS032E.AD01  
 Test Date: 14-Aug-14  
 Beginning Clock Time: 08:59  
 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	0.040	0.042	0.034	0.032	0.042	0.038	0.028
Initial Temp.	115	115	115	115	115	115	115	115

OMNI Equipment Numbers: OMNI-0001, 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: -0.512 "H2O  
 Pitot Tube Cp: 0.99  
 Meter Box Y Factor: 1.007 (1) 1.014 (2)  
 Barometric Pressure: 30.10 30.1 30.09 Average "Hg

Signature/Date: [Signature] 8/20/14  
 Tunnel Velocity: 13.11 ft/sec.  
 Initial Tunnel Flow: 136.2 scfm  
 Average Tunnel Flow: 136.5 scfm  
 Tunnel Area: 0.1963 ft2  
 Post-Test Leak Check (1): 0.000@5 cfm@"Hg  
 Post-Test Leak Check (2): 0.000@5 cfm@"Hg  
 Fuel Moisture (dry basis %): 5.98  
 Total Particulate (1): 2.8  
 Total Particulate (2): 3.1

Elapsed Time	Particulate Sampling Data														Fuel Weight, lb		Wood Heater Temperature Data, oF														Stack Draft In. H2O
	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		
0	0.000	0.000			0.69	0.43	82	82	1.34	1	115	0.036			10.6		666	478	135	498	478	N/A	451.0	421	77	77	N/A	N/A	78	-0.102	
10	1.372	1.395	0.14	0.14	0.95	0.81	82	83	1.38	1	115	0.036	103	102	9.7	-0.9	721	479	137	569	547		490.6	433	80	81			78	-0.104	
20	2.743	2.796	0.14	0.14	0.94	0.80	84	84	1.39	1	115	0.036	103	102	8.8	-0.9	730	483	141	568	544		493.2	435	82	82			78	-0.104	
30	4.110	4.195	0.14	0.14	0.93	0.80	86	86	1.4	1	114	0.036	102	102	7.9	-0.9	728	486	144	561	542		492.2	434	82	83			78	-0.104	
40	5.472	5.592	0.14	0.14	0.92	0.80	87	87	1.4	1	115	0.036	101	102	7.0	-0.9	723	487	147	564	538		491.8	435	83	83			79	-0.103	
50	6.834	6.987	0.14	0.14	0.91	0.79	88	88	1.42	1	115	0.036	101	101	6.1	-0.9	718	487	148	553	525		486.2	432	83	84			79	-0.103	
60	8.194	8.382	0.14	0.14	0.91	0.79	89	89	1.42	1	116	0.036	101	101	5.2	-0.9	733	486	150	575	554		499.6	436	82	83			80	-0.104	
70	9.550	9.773	0.14	0.14	0.90	0.78	90	90	1.44	1	117	0.036	101	101	4.3	-0.9	719	486	151	568	555		495.8	433	83	84			80	-0.103	
80	10.902	11.159	0.14	0.14	0.90	0.78	91	91	1.45	1.1	117	0.036	100	100	3.4	-0.9	724	488	152	575	548		497.4	434	83	84			80	-0.103	
90	12.250	12.543	0.13	0.14	0.88	0.77	91	91	1.45	1.1	118	0.036	100	100	2.6	-0.8	717	488	153	566	536		492.0	432	83	84			80	-0.103	
100	13.591	13.920	0.13	0.14	0.88	0.76	91	92	1.47	1.1	118	0.036	99	99	1.7	-0.9	711	490	153	584	550		497.6	435	84	84			80	-0.103	
110	14.927	15.293	0.13	0.14	0.87	0.75	92	92	1.48	1.1	117	0.036	99	99	0.8	-0.9	699	487	154	561	540		488.2	431	84	85			80	-0.102	
120	16.257	16.660	0.13	0.14	0.86	0.75	92	92	1.48	1.1	118	0.036	98	99	0.0	-0.8	718	493	155	583	547		499.2	437	84	85			80	-0.104	
Avg/Total	16.257	16.660	0.14	0.14	0.89	0.75	88.08	88.23			116.15	0.036	100.69	100.69									48		82.31	83.00	#DIV/0!	#DIV/0!		-0.103	

## Run Notes

Client: Harman

Model: Absolute 43

Project #: 0135PS032E.AD01

Tracking #: 1981

Run #: 4 Date: 8/14/2014

Test Crew: J. Clark

OMNI Equipment ID #(s): 1, 23, 128, 131, 132, 185, 209, 283B, 296-T57, 335, 336, 343, 410, 417, 443

### PREBURN

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

PRIMARY:

Temperature : 7.0  
Feed Rate : 75%  
Room Fan : 100%  
Combustion Fan: 3050 maximum  
2600 minimum

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
—	N/A					

### TEST

TEST FUEL CONFIGURATION SKETCH  
(INDICATE VIEW ANGLE)

N/A

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: 8/14/14

### Supplemental Data EPA 5G/5H

Client: Harman

Model: Absolute 43

Project #: 0135PS032E,AD01

Tracking #: 1981

Date: 8/14/2014

Run #: 4

Booth: E1

Test Crew: S. Clark

Start Time: 8:59

Stop Time: 10:59

OMNI Equipment #(s): 123, 128, 131, 132, 185, 209, 283B, 296-T57, 335, 336, 343, 410, 417, 443

Stack Gas Leak Check:

Initial: ∅

Final: ∅

Dilution Tunnel Gas Leak Check (5H only):

Initial: N/A

Final: N/A

Calibrations: Span Gas CO<sub>2</sub>: 16.80 O<sub>2</sub>: N/A CO: 4.295 CO<sub>2</sub>(DT): N/A  
Mid Gas CO<sub>2</sub>: 9.867 O<sub>2</sub>: N/A CO: 2.493 CO<sub>2</sub>(DT): N/A

Time	Pre Test			Post Test		
	Zero	Span	Mid	Zero	Span	Mid
8:23		8:25	8:27	11:07	11:09	11:11
O <sub>2</sub>	N/A					
CO <sub>2</sub>	0.00	16.80	10.06	0.01	16.80	10.07
CO	0.000	4.295	2.481	0.008	4.292	2.490
CO <sub>2</sub> (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: ∅ Final: ∅

Stack Diameter (inches): 6"

Induced Draft: ∅

% Smoke Capture: 100%

Flue Pipe Cleaned Prior to First Test in Series:

Date: 8/8/14 Initials: SC

	Initial	Middle	Ending
P <sub>b</sub> (in/Hg)	30.10	30.10	30.09
Ambient (°F)	77	79	80

Tunnel Traverse		
dP (in H <sub>2</sub> O)	T(°F)	
0.030	115	
0.040	↓	
0.042		
0.034		
0.032		
0.042		
0.038		
0.028		
N/A		N/A
↓		↓
Static P:		-0.512

Technician signature: 

Date: 8/14/14



## Method 28 Preburn Data

Run Data	
Client:	Harman
Model:	Absolute 43
Project Number:	0135PS032E.AD01
Tracking Number:	1981
Coal Bed Range (lb):	N/A (pellet)
Test Run:	4
Date:	8/14/2014
Test Crew:	J. Clark
Equipment:	185, 335, 336

Logged Data			Temperatures (F)								
Elapsed Time (min)	Scale (lb)	Stack Draft (in H <sub>2</sub> O)	Stack	Ambient	FB Top	FB Bottom	FB Back	FB Left	FB Right	Cat. In	Cat. Out
0	29.7	-0.076	204	77	293	141	80	221	227	N/A	N/A
10	28.9	-0.096	360	77	578	323	86	420	418		
20	28	-0.1	407	77	668	417	100	496	477		
30	27.1	-0.102	419	77	695	457	112	520	494		
40	26.2	-0.103	426	77	703	472	122	534	509		
50	25.3	-0.103	426	77	700	475	128	546	511		
60	24.4	-0.103	429	78	710	480	133	551	525		
Averages:		-0.098	381.57	77.14	621.00	395.00	108.71	469.71	451.57		

# **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 Absolute 43. The Absolute 43 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 August 8, 2014. It was assigned and labeled with *OMNI* ID #1981. *OMNI* representative Jeremy Clark conducted the certification testing and completed all testing by August 14, 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 Absolute 43 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 four test runs indicate a particulate emission rate of 1.8 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). There were no deviations from any of the test methods used. Emissions for each of the individual test runs did not exceed the cap. The Absolute 43 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**

<b>Run</b>	<b>Burn Rate (kg/hr dry)</b>	<b>Method 5G Emissions (g/hr)</b>
1	0.79	1.41
2	1.07	1.42
3	1.71	2.22
4	2.27	2.54
Weighted particulate emission average of four test runs: 1.8 g/hr		

**Table 1.2 – Test Facility Conditions**

<b>Run</b>	<b>Room Temperature (°F)</b>		<b>Barometric Pressure (Hg)</b>		<b>Air Velocity (ft/min)</b>	
	<b>Before</b>	<b>After</b>	<b>Before</b>	<b>After</b>	<b>Before</b>	<b>After</b>
1	81	86	29.95	29.93	<50	<50
2	75	79	30.04	30.04	<50	<50
3	82	83	30.05	30.05	<50	<50
4	77	80	30.10	30.09	<50	<50

**Table 1.3.1 – Fuel Measurement Summary – PRETEST**

<b>Run</b>	<b>Beginning Fuel Weight (lbs)</b>	<b>Ending Fuel Weight (lbs)</b>
1	37.4	35.5
2	30.9	28.4
3	22.8	18.2
4	29.7	24.4

**Table 1.3.2 – Fuel Measurement Summary – TEST**

<b>Run</b>	<b>Consumed Fuel Weight (lbs)</b>	<b>Fuel Moisture Content (Dry basis - %)</b>
1	3.7	5.98
2	5.0	5.98
3	8.0	5.98
4	10.6	5.98

**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	140.1	99.3
2	120	13.11	140.3	99.6
3	120	13.10	136.6	114.2
4	120	13.11	136.5	116.2

**Table 1.5 - Heater Operation Data (Average Temperature Data)**

Run	Beginning Surface Temperature Average <sup>a</sup>	Ending Surface Temperature Average <sup>a</sup>	Surface Delta T <sup>b</sup>
1	292.2	287.8	4.4
2	261.6	266.4	4.8
3	400.2	398.6	1.6
4	451.0	499.2	48.2

a. All temperatures are in °F.  
 b. Represents the difference between beginning and ending average surface temperature.

**Table 1.6 – Pretest Configuration**

Run	Temperature Control	Feed Rate	Room Fan	Combustion Fan	Time (min)
1	1.0	25 %	10 %	2150 – 2625 RPM	60
2	3.0	31 %	100 %	2600 – 3050 RPM	60
3	6.0	54 %	100 %	2600 – 3050 RPM	70
4	7.0	75 %	100 %	2600 – 3050 RPM	60

**Table 1.7 – Test Configuration**

Run	Temperature Control	Feed Rate	Room Fan	Combustion Fan	Time (min)
1	1.0	25 %	10 %	2150 – 2625 RPM	120
2	3.0	31 %	100 %	2600 – 3050 RPM	120
3	6.0	54 %	100 %	2600 – 3050 RPM	120
4	7.0	75 %	100 %	2600 – 3050 RPM	120

**Table 1.8 – Run Data**

Run	Average Dry Burn Rate (kg/hr)	Initial (Induced) Draft (in H <sub>2</sub> O)	Average Draft (in H <sub>2</sub> O)	Run Time (min)
1	0.79	0	-0.086	120
2	1.07	0	-0.088	120
3	1.71	0	-0.098	120
4	2.27	0	-0.103	120

## **TEST RESULTS AND DISCUSSION**

A total of four test runs were conducted in the following categories: one in the <0.80 kg/hr dry category, one 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 1.8 g/hr.

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