

Certification Test Report

Harman Home Heating Pellet Stove Insert

Model: Accentra 52i

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

Prepared by: OMNI-Test Laboratories, Inc.
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Test Period: November 11-12, 2014

Report Date: January 2015

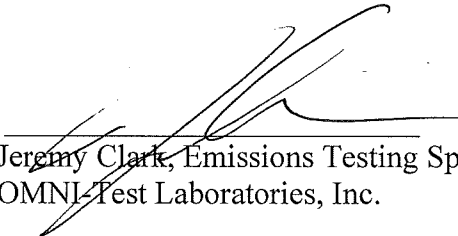
Report Number: 0135PN031E.AD02

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OMNI-Test Laboratories, Inc.

1-23-15
Issue Date

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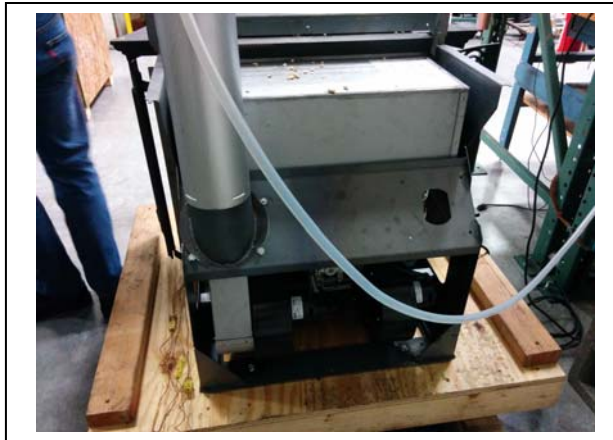
*Model: Accentra 52i
Harman Home Heating
352 Mountain House Road
Halifax, PA 17032*

Section 1

Photographs/Appliance Description/Drawings

Model: Accentra 52i
Harman Home Heating
352 Mountain House Road
Halifax, PA 17032

Harman Home Heating
Accentra 52i
Test Dates: November 11-12, 2014



APPLIANCE DESCRIPTION

Appliance Manufacturer: Harman Home Heating

Pellet Stove Model: Accentra 52i

Type: Air-circulating type, pellet-fired fireplace insert.

PELLET HEATER DESCRIPTION

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

Combustor: N/A.

Internal Baffles: N/A.

Other Features: Large capacity ash drawer.

Flue Outlet: The 4-inch diameter flue outlet is located on the rear-right side 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: Accentra 52i
Harman Home Heating
352 Mountain House Road
Halifax, PA 17032*

Section 4

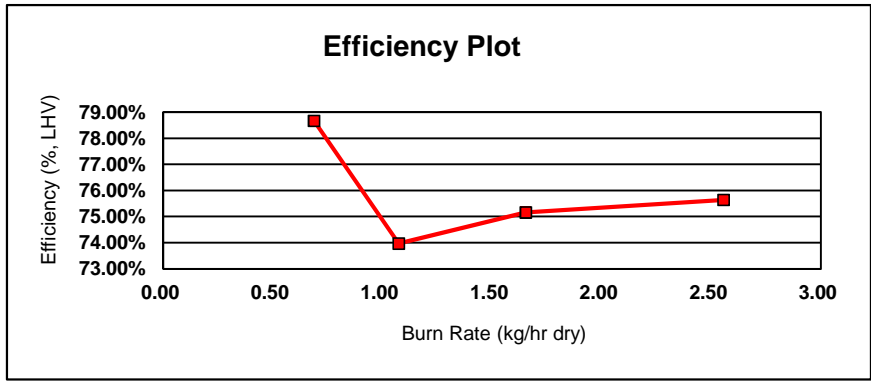
Test Data by Run

Weighted Average HHV Efficiency CSA B415.1-10

Client: Harman
 Stove Model: Accentra 52i
 Test Dates: 11/11/14 - 11/13/14
 Project Number: 0135PN031E.AD02
 Tracking Number: 1996

Status: Final
 Stove Type: Pellet Stove

**Weighted Average
 (% , HHV)
 75.58%**



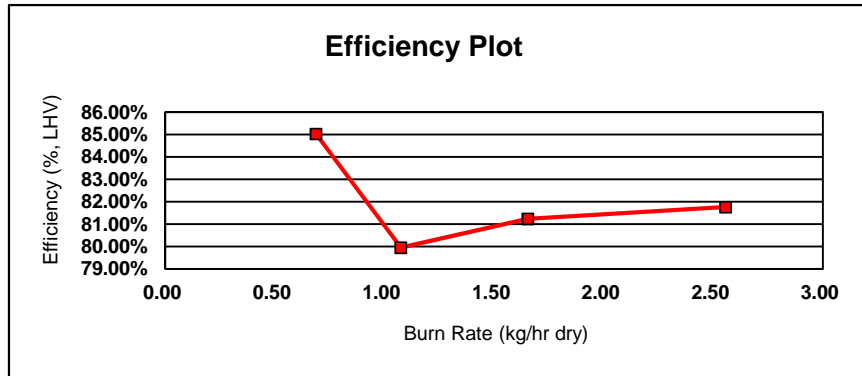
Run #	4		
Burn Rate (dry kg/hr)	0.69		
Category	1		
Efficiency (%)	78.67%		
Weighting Factor	0.428	23.40%	
Run #	3		
Burn Rate (dry kg/hr)	1.07		
Category	2		
Efficiency (%)	73.97%		
Weighting Factor	0.687	37.53%	
Run #	6		
Burn Rate (dry kg/hr)	1.65		
Category	3		
Efficiency (%)	75.16%		
Weighting Factor	0.540	29.50%	
Run #	7		
Burn Rate (dry kg/hr)	2.56		
Category	4		
Efficiency (%)	75.64%		
Weighting Factor	0.175	9.56%	

Weighted Average LHV Efficiency CSA B415.1-10

Client: Harman
 Stove Model: Accentra 52i
 Test Dates: 11/11/14 - 11/13/14
 Project Number: 0135PN031E.AD02
 Tracking Number: 1996

Status: Final
 Stove Type: Pellet Stove

**Weighted Average
(%, LHV)
81.69%**



Run #	4		
Burn Rate (dry kg/hr)	0.69		
Category	1		
Efficiency (%)	85.03%		
Weighting Factor	0.428	23.40%	
Run #	3		
Burn Rate (dry kg/hr)	1.07		
Category	2		
Efficiency (%)	79.95%		
Weighting Factor	0.687	37.53%	
Run #	6		
Burn Rate (dry kg/hr)	1.65		
Category	3		
Efficiency (%)	81.24%		
Weighting Factor	0.540	29.50%	
Run #	7		
Burn Rate (dry kg/hr)	2.56		
Category	4		
Efficiency (%)	81.76%		
Weighting Factor	0.175	9.56%	

*Model: Accentra 52i
Harman Home Heating
352 Mountain House Road
Halifax, PA 17032*

Run 1

Wood Heater Test Data - EPA Method 5G

Manufacturer: Harman
 Model: Accentra 52i
 Project No.: 0135PN031E.AD02
 Tracking No.: 1996
 Run: 1
 Test Date: 11/11/14

Burn Rate	2.66 kg/hr dry
Average Tunnel Temperature	94 degrees Fahrenheit
Average Gas Velocity in Dilution Tunnel - vs	14.0 feet/second
Average Gas Flow Rate in Dilution Tunnel - Qsd	9142.7 dscf/hour
Average Delta p	0.043 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	15.54 cubic feet	15.51 cubic feet	15.56 cubic feet
Average Gas Meter Temperature	77 degrees Fahrenheit	78 degrees Fahrenheit	76 degrees Fahrenheit
Total Sample Volume (Standard Conditions) - Vmstd	15.8 dscf	15.8 dscf	15.8 dscf
Total Particulates - mn		6.8 mg	6.6 mg
Particulate Concentration (dry-standard)	0.00042 grams/dscf	0.00043 grams/dscf	0.00042 grams/dscf
Particulate Emission Rate	3.88 grams/hour	3.94 grams/hour	3.82 grams/hour
Adjusted Emissions	5.61 grams/hour	5.68 grams/hour	5.54 grams/hour
Difference from Average		0.07 grams/hour	0.07 grams/hour
7.5% of the average emission rate	0.42		
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: Accentra 52i
 Tracking No.: 1996
 Project No.: 0135PN03IE.AD02
 Test Date: 11-Nov-14
 Beginning Clock Time: 09:11
 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	0.038	0.046	0.046	0.042	0.040	0.048	0.044	0.038
Initial Temp.	95	95	95	95	95	96	96	96

OMNI Equipment Numbers: OMNI-0001, OMNI-00023, OMNI-00128, OMNI-00131, OMNI-00132, OMNI-00185, OMNI-00209, OMNI-283B, OMNI-00296-T57, OMNI-00335, OMNI-00336, OMNI-00343, OMNI-00410, OMNI-00417, OMNI-00439

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: -0.462 "H2O
 Pitot Tube Cp: 0.99
 Meter Box Y Factor: 1.024 (1) 1.017 (2)
 Barometric Pressure: 30.18 30.19 30.2 Average

Tunnel Velocity: 14.04 ft/sec.
 Initial Tunnel Flow: 152.1 scfm
 Average Tunnel Flow: 152.4 scfm
 Tunnel Area: 0.1963 ft2
 Post-Test Leak Check (1): 0.009@8.5 cfm@"Hg
 Post-Test Leak Check (2): 0.000@6.5 cfm@"Hg
 Fuel Moisture (dry basis %): 5.63
 Total Particulate (1): 6.8
 Total Particulate (2): 6.6

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			1.38	1.15	71	71	0.33	0.7	95	0.043			12.4		747	517	561	545	562	N/A	586.4	407	69	69	N/A	N/A	71	-0.054	
10	1.283	1.299	0.13	0.13	1.52	1.28	73	72	0.23	0.6	94	0.043	101	102	11.3	-1.1	761	518	570	556	565		594.0	415	71	71			70	-0.057	
20	2.559	2.586	0.13	0.13	1.59	1.30	75	73	0.1	0.6	94	0.043	100	100	10.3	-1	796	514	562	550	560		596.4	415	72	72			71	-0.057	
30	3.861	3.886	0.13	0.13	1.53	1.26	77	75	0.05	0.5	94	0.043	102	101	9.3	-1	793	508	564	532	545		588.4	415	72	72			70	-0.058	
40	5.141	5.179	0.13	0.13	1.48	1.31	78	76	-0.01	0.4	95	0.043	100	100	8.3	-1	840	514	573	554	562		608.6	419	72	72			70	-0.057	
50	6.432	6.486	0.13	0.13	1.55	1.27	79	76	-0.18	0.3	95	0.043	100	102	7.3	-1	831	519	574	554	562		608.0	424	72	72			70	-0.058	
60	7.733	7.781	0.13	0.13	1.58	1.30	80	77	-0.27	0.3	94	0.043	101	100	6.3	-1	790	516	570	559	551		597.2	424	73	72			71	-0.058	
70	9.043	9.083	0.13	0.13	1.54	1.26	80	77	-0.35	0.2	94	0.043	102	101	5.3	-1	795	515	568	556	567		600.2	425	73	72			70	-0.058	
80	10.334	10.365	0.13	0.13	1.49	1.22	80	77	-0.42	0.1	94	0.043	100	99	4.2	-1.1	813	521	577	564	568		608.6	432	73	72			70	-0.060	
90	11.642	11.680	0.13	0.13	1.55	1.29	80	77	-0.54	0	94	0.043	102	102	3.2	-1	816	515	567	551	560		601.8	427	73	72			70	-0.059	
100	12.934	12.978	0.13	0.13	1.51	1.25	80	77	-0.62	-0.1	94	0.043	100	101	2.1	-1.1	840	521	570	561	570		612.4	430	72	72			69	-0.060	
110	14.212	14.259	0.13	0.13	1.48	1.23	80	77	-0.7	-0.1	95	0.043	99	99	1.1	-1	829	527	575	570	573		614.8	435	73	72			70	-0.060	
120	15.514	15.557	0.13	0.13	1.55	1.28	80	78	-0.87	-0.2	95	0.043	101	100	0.0	-1.1	813	528	578	568	581		613.6	433	73	73			70	-0.059	
Avg/Total	15.514	15.557	0.13	0.13	1.52	1.26	77.92	75.62			94.41	0.043	100.65	100.69									27.2		72.15	71.77	#DIV/0!	#DIV/0!		-0.058	

Method 28 Run Sheets

Client: **Harman**

Project Number: **0135PN031E.AD02** Run Number:

Model: **Accentra 52i**

Tracking Number: **1996** Date: 11/11/14

Test Crew: **A. Kravitz, J. Clark**

OMNI Equipment ID numbers: **23, 131, 132, 209, 288, 343, 371, 372, 410, 420, 559**

Pellet Run Notes

Preburn Settings

Target Output (Category):

IV

Target Output (dry kg/hr):

Maximum burn rate

Temp = 7.00

Feed = 5.29

Mode = High

Draft = -00V

Preburn Notes

TIME	NOTES
	N/A

Test Settings

Target Output (Category):

IV

Target Output (dry kg/hr):

Maximum burn rate

Test Notes

TIME	NOTES
	N/A

Technician Signature: _____



Date: 11/4/14

Method 28 Run Sheets

Client: Harman Project Number: 0135PN031E.AD02 Run Number: 1
 Model: Accentra 52i Tracking Number: 1996 Date: 11/11/14
 Test Crew: A. Kravitz, J. Clark
 OMNI Equipment ID numbers: 23, 131, 132, 209, 288, 343, 371, 372, 410, 420, 559, 439, 296-T57

Pellet Supplemental Data

Start Time: 9:11
 Stop Time: 11:11

Booth #: E2

Stack Gas Leak Check:

Initial: ∅ Final: ∅

Sample Train Leak Check:

A: 0.009 @ -8.5"Hg
 B: 0.000 @ -6.5"Hg

Calibrations: Span Gas CO₂: 16.90 O₂: N/A CO: 4.295
 Mid Gas CO₂: 9.87 O₂: N/A CO: 2.493

Time	Pre Test			Post Test		
	Zero	Span	Mid	Zero	Span	Mid
O ₂	N/A	N/A	N/A	N/A	N/A	N/A
CO ₂	0.00	16.80	10.11	0.00	16.82	10.15
CO	0.000	4.295	2.494	0.000	4.300	2.500

Air Velocity (ft/min): Initial: <50 Final: 550
 Scale Audit (lbs): Initial: 10.0 Final: 10.0
 Pitot Tube Leak Test: Initial: ∅ Final: ∅
 Stack Diameter (in): 4
 Induced Draft: ∅
 % Smoke Capture: 100%
 Flue Pipe Cleaned Prior to First Test in Series:
 Date: 11/10/14 Initials: AK

	Initial	Middle	Ending
P _b (in/Hg)	30.18	30.19	30.20
Ambient (°F)	71	70	69

(zero off by 0.002 x 2)

Tunnel Traverse	
dP (in H ₂ O)	T (°F)
0.038 <u>0.042^{sc}</u>	95
0.046 <u>0.050^{sc}</u>	↓
0.046 <u>0.050^{sc}</u>	
0.042 <u>0.046^{sc}</u>	
0.040 <u>0.044^{sc}</u>	↓
0.048 <u>0.052^{sc}</u>	
0.044 <u>0.048^{sc}</u>	↓
0.038 <u>0.042^{sc}</u>	
N/A	N/A
↓	↓
Static P:	-0.462

Technician Signature: [Signature]

Date: 11/11/14

*Model: Accentra 52i
Harman Home Heating
352 Mountain House Road
Halifax, PA 17032*

Run 2

Wood Heater Test Data - EPA Method 5G

Manufacturer: Harman
 Model: Accentra 52i
 Project No.: 0135PN031E.AD02
 Tracking No.: 1996
 Run: 2
 Test Date: 11/11/14

Burn Rate	1.63 kg/hr dry
Average Tunnel Temperature	88 degrees Fahrenheit
Average Gas Velocity in Dilution Tunnel - vs	14.0 feet/second
Average Gas Flow Rate in Dilution Tunnel - Qsd	9225.7 dscf/hour
Average Delta p	0.043 inches H2O
Average Delta H	1.53 inches H2O
Total Time of Test	120 minutes

	AVERAGE	SAMPLE TRAIN 1	SAMPLE TRAIN 2
Total Sample Volume - Vm	15.61 cubic feet	15.57 cubic feet	15.64 cubic feet
Average Gas Meter Temperature	77 degrees Fahrenheit	78 degrees Fahrenheit	76 degrees Fahrenheit
Total Sample Volume (Standard Conditions) - Vmstd	15.9 dscf	15.9 dscf	15.9 dscf
Total Particulates - mn		1 mg	1.1 mg
Particulate Concentration (dry-standard)	0.00007 grams/dscf	0.00006 grams/dscf	0.00007 grams/dscf
Particulate Emission Rate	0.61 grams/hour	0.58 grams/hour	0.64 grams/hour
Adjusted Emissions	1.21 grams/hour	1.16 grams/hour	1.25 grams/hour
Difference from Average		0.05 grams/hour	0.05 grams/hour
7.5% of the average emission rate	0.09		
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: Accentra 52i
 Tracking No.: 1996
 Project No.: 0135PN031E.AD02
 Test Date: 11-Nov-14
 Beginning Clock Time: 12:14
 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	0.038	0.048	0.044	0.040	0.046	0.048	0.042	0.038
Initial Temp.	87	87	87	87	87	88	88	88

OMNI Equipment Numbers: OMNI-0001, OMNI-00023, OMNI-00128, OMNI-00131, OMNI-00132,
OMNI-00185, OMNI-00209, OMNI-283B, OMNI-00296-T57, OMNI-00335, OMNI-00336, OMNI-00343,
OMNI-00410, OMNI-00417, OMNI-00439

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: -0.485 "H2O
 Pitot Tube Cp: 0.99
 Meter Box Y Factor: 1.024 (1) 1.017 (2)
 Barometric Pressure: Begin Middle End Average
30.20 30.19 30.18 30.19 "Hg

Tunnel Velocity: 14.00 ft/sec.
 Initial Tunnel Flow: 153.6 scfm
 Average Tunnel Flow: 153.8 scfm
 Tunnel Area: 0.1963 ft2
 Post-Test Leak Check (1): 0.000@5 cfm@"Hg
 Post-Test Leak Check (2): 0.000@3 cfm@"Hg
 Fuel Moisture (dry basis %): 5.63
 Total Particulate (1): 1.0
 Total Particulate (2): 1.1

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			1.50	1.25	75	74	0.34	0.7	87	0.043			7.6		850	391	435	409	405	N/A	498.0	333	68	68	N/A	N/A	68	-0.058	
10	1.273	1.298	0.13	0.13	1.50	1.30	74	73	0.34	0.7	88	0.043	100	101	7.0	-0.6	764	382	432	396	386		472.0	332	70	70			68	-0.058	
20	2.546	2.602	0.13	0.13	1.48	1.29	75	73	0.34	0.7	88	0.043	99	101	6.4	-0.6	819	383	438	393	392		485.0	332	71	70			68	-0.058	
30	3.838	3.904	0.13	0.13	1.53	1.28	77	74	0.3	0.7	88	0.043	101	101	5.7	-0.7	817	383	431	390	389		482.0	331	71	71			68	-0.057	
40	5.140	5.205	0.13	0.13	1.55	1.28	78	75	0.31	0.7	89	0.043	101	101	5.0	-0.7	833	382	439	399	395		489.6	333	71	71			68	-0.057	
50	6.442	6.510	0.13	0.13	1.55	1.29	78	76	0.3	0.7	88	0.043	101	101	4.4	-0.6	857	383	431	398	393		492.4	332	71	71			68	-0.057	
60	7.747	7.814	0.13	0.13	1.56	1.29	79	76	0.3	0.7	88	0.043	101	101	3.7	-0.7	814	382	442	398	394		486.0	332	71	71			68	-0.057	
70	9.052	9.119	0.13	0.13	1.54	1.28	79	76	0.3	0.7	88	0.043	101	101	3.1	-0.6	803	379	431	384	387		476.8	330	71	71			68	-0.057	
80	10.356	10.423	0.13	0.13	1.55	1.28	79	77	0.3	0.7	88	0.043	101	101	2.5	-0.6	799	380	423	391	387		476.0	330	71	71			68	-0.057	
90	11.660	11.729	0.13	0.13	1.55	1.28	79	77	0.3	0.7	87	0.043	101	101	1.9	-0.6	777	373	413	381	378		464.4	325	71	71			68	-0.056	
100	12.964	13.033	0.13	0.13	1.54	1.28	79	77	0.29	0.7	87	0.043	101	100	1.2	-0.7	812	373	427	382	382		475.2	328	71	71			68	-0.057	
110	14.267	14.339	0.13	0.13	1.55	1.28	79	77	0.29	0.7	86	0.043	101	101	0.6	-0.6	757	371	429	391	378		465.2	330	71	71			68	-0.058	
120	15.570	15.644	0.13	0.13	1.54	1.28	79	77	0.3	0.7	87	0.043	101	101	0.0	-0.6	775	369	414	386	379		464.6	326	70	71			67	-0.057	
Avg/Total	15.570	15.644	0.13	0.13	1.53	1.28	77.69	75.54			87.64	0.043	100.73	100.75									33.4		70.62	70.62	#DIV/0!	#DIV/0!		-0.057	

Method 28 Run Sheets

Client: Harman Project Number: 0135PN031E.AD02 Run Number: 2
 Model: Accentra 52i Tracking Number: 1996 Date: 11/11/14
 Test Crew: A. Kravitz, J. Clark
 OMNI Equipment ID numbers: 23, 131, 132, 209, 288, 343, 371, 372, 410, 420, 559

Pellet Run Notes

Preburn Settings

Target Output (Category): III
 Target Output (dry kg/hr): 1.25 - 1.90

Temp = 4.60
 Feed = 3.07
 Mode = High
 Draft = -00V

Preburn Notes


TIME	NOTES
08:00	18.0 lb pellets added

Test Settings

Target Output (Category): III
 Target Output (dry kg/hr): 1.25 - 1.90

Test Notes

TIME	NOTES
	N/A

Technician Signature: 

Date: 11/11/14

Method 28 Run Sheets

Client: Harman Project Number: 0135PN031E.AD02 Run Number: 2
 Model: Accentra 52i Tracking Number: 1996 Date: 11/11/14
 Test Crew: A. Kravitz, J. Clark
 OMNI Equipment ID numbers: 23, 131, 132, 209, 288, 343, 371, 372, 410, 420, 559

Pellet Supplemental Data

Start Time: 12:14
 Stop Time: 14:14

Booth #: E2

Stack Gas Leak Check:

Initial: 0 Final: 0

Sample Train Leak Check:

A: 0.000 @ -5 "Hg
 B: 0.000 @ -3 "Hg

Calibrations: Span Gas CO₂: 16.90 O₂: N/A CO: 4.295
 Mid Gas CO₂: 9.87 O₂: N/A CO: 2.493

Time	Pre Test			Post Test		
	Zero	Span	Mid	Zero	Span	Mid
O ₂	N/A	N/A	N/A	N/A	N/A	N/A
CO ₂	<u>0.00</u>	<u>16.80</u>	<u>10.11</u>	<u>0.00</u>	<u>16.82</u>	<u>10.15</u>
CO	<u>0.000</u>	<u>4.295</u>	<u>2.494</u>	<u>0.000</u>	<u>4.300</u>	<u>2.500</u>

Air Velocity (ft/min): Initial: 450 Final: 450
 Scale Audit (lbs): Initial: 10.0 Final: 10.0
 Pitot Tube Leak Test: Initial: 0 Final: 0
 Stack Diameter (in): 4
 Induced Draft: 0
 % Smoke Capture: 100%

Flue Pipe Cleaned Prior to First Test in Series:

Date: 11/10/14 Initials: JK

	Initial	Middle	Ending
P _b (in/Hg)	<u>30.20</u>	<u>30.19</u>	<u>30.18</u>
Ambient (°F)	<u>69</u>	<u>68</u>	<u>68</u>

(Zero off by 0.001 x 2)

Tunnel Traverse	
dP (in H ₂ O)	T (°F)
<u>0.038</u>	<u>040</u> in <u>87</u>
<u>0.048</u>	<u>050</u> in
<u>0.044</u>	<u>046</u> in
<u>0.040</u>	<u>042</u> in
<u>0.046</u>	<u>048</u> in
<u>0.048</u>	<u>050</u> in <u>88</u>
<u>0.042</u>	<u>044</u> in
<u>0.038</u>	<u>040</u> in
	N/A
	N/A
	N/A
	N/A
Static P:	<u>-0.485</u>

Technician Signature: _____

Date: 11/11/14

*Model: Accentra 52i
Harman Home Heating
352 Mountain House Road
Halifax, PA 17032*

Run 3

OMNI-Test Laboratories, Inc.

Manufacturer: Harman
Model: Accentra 52i
Date: 11/11/14
Run: 3
Control #: 1996
Test Duration: 120
Output Category: II

Technicians: J. Clark

Test Results in Accordance with CSA B415.1-09

	HHV Basis	LHV Basis
Overall Efficiency	74.0%	79.9%
Combustion Efficiency	99.5%	99.5%
Heat Transfer Efficiency	74%	80.4%

Output Rate (kJ/h)	15,735	14,926	(Btu/h)
Burn Rate (kg/h)	1.07	2.37	(lb/h)
Input (kJ/h)	21,272	20,179	(Btu/h)

Test Load Weight (dry kg)	2.15	4.73	dry lb
MC wet (%)	5.332814325		
MC dry (%)	5.63		
Particulate (g)	0		
CO (g)	0		
Test Duration (h)	2.00		

Emissions	Particulate	CO
g/MJ Output	0.00	0.00
g/kg Dry Fuel	0.00	0.00
g/h	0.00	0.00
lb/MM Btu Output	0.00	0.00

Air/Fuel Ratio (A/F)	24.16
-----------------------------	-------

VERSION: 2.3 3/23/2010

* Note: Tunnel velocity out of spec per MSG. *
Category II test redone as Run 5

OMNI-Test Laboratories, Inc.

Method 28 Run Sheets (T velocity = 174.0 lsecfm)

Client: Harman

Project Number: 0135PN031E.AD02

Run Number: 3

Model: Accentra 52i

Tracking Number: 1996

Date: 11/11/14

Test Crew: A. Kravitz, J. Clark

OMNI Equipment ID numbers: 23, 131, 132, 209, 288, 343, 371, 372, 410, 420, 559

Pellet Run Notes

Preburn Settings

Target Output (Category):

II

Target Output (dry kg/hr):

0.80 - 1.25

Temp = 1.79

Feed = 1.61

Mode = High

Draft = -20v

Preburn Notes

TIME	NOTES
	N/A

Test Settings

Target Output (Category):

II

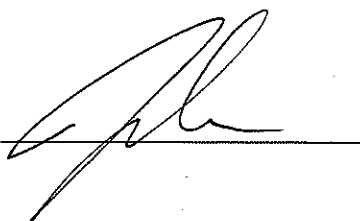
Target Output (dry kg/hr):

0.80 - 1.25

Test Notes

TIME	NOTES
	N/A

Technician Signature: _____



Date: 11/11/14

Method 28 Run Sheets

Client: Harman Project Number: 0135PN031E.AD02 Run Number: 3
 Model: Accentra 52i Tracking Number: 1996 Date: 11/11/14
 Test Crew: A. Kravitz, J. Clark
 OMNI Equipment ID numbers: 23, 131, 132, 209, 288, 343, 371, 372, 410, 420, 559

Pellet Supplemental Data

Start Time: 15:22 Booth #: E2
 Stop Time: 17:22

Stack Gas Leak Check:

Initial: ∅ Final: ∅

Sample Train Leak Check:

A: 0.000 @ 3.5"Hg
 B: 0.000 @ 2.5"Hg

Calibrations: Span Gas CO₂: 16.90 O₂: N/A CO: 4.295
 Mid Gas CO₂: 9.87 O₂: N/A CO: 2.493

Time	Pre Test			Post Test		
	Zero	Span	Mid	Zero	Span	Mid
	<u>14:31</u>	<u>14:33</u>	<u>14:35</u>	<u>17:24</u>	<u>17:26</u>	<u>17:28</u>
O ₂	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>
CO ₂	<u>0.00</u>	<u>16.80</u>	<u>10.10</u>	<u>0.09</u>	<u>16.89</u>	<u>10.21</u>
CO	<u>0.000</u>	<u>4.295</u>	<u>2.495</u>	<u>-0.007</u>	<u>4.289</u>	<u>2.488</u>

Air Velocity (ft/min): Initial: <50 Final: <50
 Scale Audit (lbs): Initial: 10.0 Final: 10.0
 Pitot Tube Leak Test: Initial: ∅ Final: ∅
 Stack Diameter (in): 4
 Induced Draft: ∅
 % Smoke Capture: 100

Flue Pipe Cleaned Prior to First Test in Series:

Date: 11/10/14 Initials: JK

	Initial	Middle	Ending
P _b (in/Hg)	<u>30.20</u>	<u>30.21</u>	<u>30.22</u>
Ambient (°F)	<u>66</u>	<u>66</u>	<u>65</u>

Tunnel Traverse		
dP (in H ₂ O)	T(°F)	
<u>0.046</u>	<u>80</u>	
<u>0.062</u>	↓	
<u>0.062</u>		
<u>0.050</u>		
<u>0.052</u>		
<u>0.064</u>		
<u>0.060</u>		
<u>0.038</u>		
<u>N/A</u>		<u>N/A</u>
↓		↓
↓		↓
Static P:	<u>-0.620</u>	

Technician Signature: _____

Date: _____

*Model: Accentra 52i
Harman Home Heating
352 Mountain House Road
Halifax, PA 17032*

Run 4

Wood Heater Test Data - EPA Method 5G

Manufacturer: Harman
 Model: Accentra 52i
 Project No.: 0135PN031E.AD02
 Tracking No.: 1996
 Run: 4
 Test Date: 11/12/14

Burn Rate	0.69 kg/hr dry
Average Tunnel Temperature	75 degrees Fahrenheit
Average Gas Velocity in Dilution Tunnel - vs	13.0 feet/second
Average Gas Flow Rate in Dilution Tunnel - Qsd	8814.2 dscf/hour
Average Delta p	0.038 inches H2O
Average Delta H	1.50 inches H2O
Total Time of Test	120 minutes

	AVERAGE	SAMPLE TRAIN 1	SAMPLE TRAIN 2
Total Sample Volume - Vm	15.59 cubic feet	15.48 cubic feet	15.69 cubic feet
Average Gas Meter Temperature	75 degrees Fahrenheit	75 degrees Fahrenheit	74 degrees Fahrenheit
Total Sample Volume (Standard Conditions) - Vmstd	16.0 dscf	15.9 dscf	16.0 dscf
Total Particulates - mn		0.9 mg	0.9 mg
Particulate Concentration (dry-standard)	0.00006 grams/dscf	0.00006 grams/dscf	0.00006 grams/dscf
Particulate Emission Rate	0.50 grams/hour	0.50 grams/hour	0.50 grams/hour
Adjusted Emissions	1.02 grams/hour	1.02 grams/hour	1.02 grams/hour
Difference from Average		0.00 grams/hour	0.00 grams/hour
7.5% of the average emission rate	0.08		
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: Accentra 52i
 Tracking No.: 1996
 Project No.: 0135PN03IE.AD02
 Test Date: 12-Nov-14
 Beginning Clock Time: 08:56
 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	0.032	0.042	0.040	0.032	0.038	0.042	0.044	0.036
Initial Temp.	75	75	75	75	75	75	75	75

OMNI Equipment Numbers: OMNI-0001, OMNI-00023, OMNI-00128, OMNI-00131, OMNI-00132, OMNI-00185, OMNI-00209, OMNI-283B, OMNI-00296-T57, OMNI-00335, OMNI-00336, OMNI-00343, OMNI-00410, OMNI-00417, OMNI-00439

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: -0.387 "H2O
 Pitot Tube Cp: 0.99
 Meter Box Y Factor: 1.024 (1) 1.017 (2)
 Barometric Pressure: Begin Middle End Average
30.27 30.27 30.27 30.27 "Hg

Tunnel Velocity: 13.03 ft/sec.
 Initial Tunnel Flow: 146.7 scfm
 Average Tunnel Flow: 146.9 scfm
 Tunnel Area: 0.1963 ft2
 Post-Test Leak Check (1): 0.000@-5 cfm@"Hg
 Post-Test Leak Check (2): 0.000@-3 cfm@"Hg
 Fuel Moisture (dry basis %): 5.63
 Total Particulate (1): 0.9
 Total Particulate (2): 0.9

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			1.18	0.66	67	67	0.35	0.8	75	0.038			3.2		396	226	218	235	244	N/A	263.8	197	66	66	N/A	N/A	65	-0.036	
10	1.275	1.304	0.13	0.13	1.53	1.33	68	68	0.35	0.7	74	0.038	101	101	2.9	-0.3	380	223	214	227	238		256.4	192	66	67			66	-0.034	
20	2.560	2.616	0.13	0.13	1.52	1.31	71	70	0.34	0.7	75	0.038	101	102	2.7	-0.2	395	223	220	235	243		263.2	197	67	67			65	-0.035	
30	3.845	3.923	0.13	0.13	1.53	1.29	73	72	0.35	0.7	75	0.038	101	101	2.4	-0.3	383	224	213	234	238		258.4	194	67	67			66	-0.035	
40	5.131	5.231	0.13	0.13	1.51	1.30	75	73	0.34	0.7	75	0.038	100	101	2.1	-0.3	401	223	221	234	240		263.8	195	67	67			66	-0.035	
50	6.416	6.540	0.13	0.13	1.52	1.30	76	74	0.33	0.7	75	0.038	100	101	1.8	-0.3	385	223	219	227	235		257.8	194	67	68			66	-0.035	
60	7.702	7.849	0.13	0.13	1.50	1.29	77	75	0.33	0.7	75	0.038	100	101	1.6	-0.2	417	222	227	227	236		265.8	194	67	68			66	-0.035	
70	8.987	9.157	0.13	0.13	1.51	1.29	78	76	0.32	0.7	76	0.038	100	100	1.2	-0.4	401	221	227	222	235		261.2	195	68	68			66	-0.035	
80	10.284	10.465	0.13	0.13	1.55	1.29	78	76	0.3	0.7	76	0.038	101	100	1.0	-0.2	404	220	228	220	229		260.2	195	68	68			66	-0.035	
90	11.587	11.772	0.13	0.13	1.55	1.28	79	77	0.29	0.7	76	0.038	101	100	0.7	-0.3	396	218	230	219	227		258.0	193	68	68			67	-0.035	
100	12.887	13.080	0.13	0.13	1.54	1.28	79	77	0.3	0.7	75	0.038	101	100	0.5	-0.2	400	218	229	224	226		259.4	195	68	68			66	-0.035	
110	14.188	14.385	0.13	0.13	1.54	1.28	79	77	0.3	0.7	75	0.038	101	100	0.2	-0.3	403	218	225	224	227		259.4	195	68	68			66	-0.035	
120	15.485	15.688	0.13	0.13	1.53	1.28	79	77	0.28	0.7	76	0.038	101	100	0.0	-0.2	432	219	235	226	229		268.2	198	68	68			66	-0.036	
Avg/Total	15.485	15.688	0.13	0.13	1.50	1.24	75.31	73.77			75.23	0.038	100.64	100.67									4.4		67.31	67.54	#DIV/0!	#DIV/0!		-0.035	

OMNI-Test Laboratories, Inc.

Manufacturer: Harman
Model: Accentra 52i
Date: 11/12/14
Run: 4
Control #: 1996
Test Duration: 120
Output Category: 1

Technicians: J. Clark

Test Results in Accordance with CSA B415.1-09

	HHV Basis	LHV Basis
Overall Efficiency	78.7%	85.0%
Combustion Efficiency	99.5%	99.5%
Heat Transfer Efficiency	79%	85.5%

Output Rate (kJ/h)	10,710	10,160	(Btu/h)
Burn Rate (kg/h)	0.69	1.51	(lb/h)
Input (kJ/h)	13,614	12,915	(Btu/h)

Test Load Weight (dry kg)	1.37	3.03	dry lb
MC wet (%)	5.332814325		
MC dry (%)	5.63		
Particulate (g)	0		
CO (g)	0		
Test Duration (h)	2.00		

Emissions	Particulate	CO
g/MJ Output	0.00	0.00
g/kg Dry Fuel	0.00	0.00
g/h	0.00	0.00
lb/MM Btu Output	0.00	0.00

Air/Fuel Ratio (A/F)	26.28
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VERSION: 2.3 3/23/2010

VERSION: 2.3 3/23/2010

Manufacturer: Harman
 Model: Accentra 52i
 Date: 11/12/2014
 Run: 4
 Control #: 1996
 Test Duration: 120
 Output Category: I

Appliance Type: Pellet (Cat, Non-Cat, Pellet)

Temp. Units F (F or C)
 Weight Units lb (kg or lb)

Default Fuel Values

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

Wood Moisture (% wet): 5.33
 Load Weight (lb wet): 3.20
 Burn Rate (dry kg/h): 0.69
 Total Particulate Emissions: g

Fuel Data

	D. Fir
HHV	19810 kJ/kg
%C	48.73
%H	6.87
%O	43.9
%Ash	0.5

Note 1: For other fuels, use the heating value and fuel composition determined by analysis of fuel sample in accordance with Clause 9.2.

Note 2: In cases where the "Fuel Weight Remaining" is the same for three or more readings in a row, a "divide by zero error" will occur in the calculation sheet. In such cases, adjust the weight values by interpolation between the first occurrence and the next reading showing a decrease in weight.

Elapsed Time (min)	Fuel Weight Remaining (lb)	Averages			#DIV/0!	Flue Gas Temp. (°F)	Room Temp
		CO	CO ₂	O ₂			
0	3.20	0.00	3.85		194.92	65.92	
10	2.90	0.00	3.85		192.0	66.0	
20	2.70	0.00	3.90		197.0	65.0	
30	2.40	0.00	3.80		194.0	66.0	
40	2.10	0.00	3.80		195.0	66.0	
50	1.80	0.00	4.00		194.0	66.0	
60	1.60	0.00	4.00		194.0	66.0	
70	1.20	0.00	3.70		195.0	66.0	
80	1.00	0.00	3.80		195.0	66.0	
90	0.70	0.00	4.00		193.0	67.0	
100	0.50	0.00	3.80		195.0	66.0	
110	0.20	0.00	4.10		195.0	66.0	
120	0.00	0.00	3.90		198.0	66.0	

Method 28 Run Sheets

Client: **Harman** Project Number: **0135PN031E.AD02** Run Number: **4**
Model: **Accentra 52i** Tracking Number: **1996** Date: **11/12/14**
Test Crew: **A. Kravitz, J. Clark**
OMNI Equipment ID numbers: **23, 131, 132, 209, 288, 343, 371, 372, 410, 420, 559**

Pellet Run Notes

Preburn Settings

Target Output (Category): I
Target Output (dry kg/hr): 40.80

Preburn Notes

TIME	NOTES
	N/A

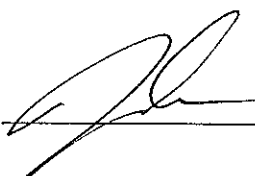
Test Settings

Target Output (Category): I
Target Output (dry kg/hr): 40.80

Test Notes

TIME	NOTES
	N/A

Technician Signature: _____



Date: _____

11/12/14

Method 28 Run Sheets

Client: Harman Project Number: 0135PN031E.AD02 Run Number: 4
 Model: Accentra 521 Tracking Number: 1996 Date: 11/12/14
 Test Crew: A. Kravitz, J. Clark
 OMNI Equipment ID numbers: 23, 131, 132, 209, 288, 343, 371, 372, 410, 420, 559

Pellet Supplemental Data

Start Time: 8:56 Booth #: E2
 Stop Time: 10:56

Stack Gas Leak Check:

Initial: ∅ Final: ∅

Sample Train Leak Check:

A: 0.000 @ -5 "Hg
 B: 0.000 @ -3 "Hg

Calibrations: Span Gas CO₂: 16.90 O₂: N/A CO: 4.295
 Mid Gas CO₂: 9.87 O₂: N/A CO: 2.493

Time	Pre Test			Post Test		
	Zero	Span	Mid	Zero	Span	Mid
	<u>8:11</u>	<u>8:13</u>	<u>8:15</u>	<u>11:10</u>	<u>11:12</u>	<u>11:14</u>
O ₂	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>
CO ₂	<u>0.00</u>	<u>16.80</u>	<u>10.16</u>	<u>0.09</u>	<u>16.79</u>	<u>10.18</u>
CO	<u>0.000</u>	<u>4.295</u>	<u>2.501</u>	<u>0.000</u>	<u>4.270</u>	<u>2.488</u>

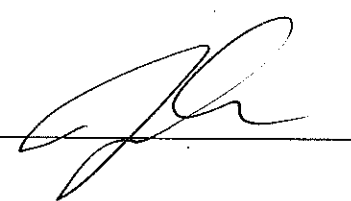
Air Velocity (ft/min): Initial: <50 Final: <50
 Scale Audit (lbs): Initial: 10.0 Final: 10.0
 Pitot Tube Leak Test: Initial: ∅ Final: ∅
 Stack Diameter (in): 4
 Induced Draft: ∅
 % Smoke Capture: 100

Flue Pipe Cleaned Prior to First Test in Series:

Date: 11/10/14 Initials: SK

	Initial	Middle	Ending
P _b (in/Hg)	<u>30.27</u>	<u>30.26</u>	<u>30.26</u>
Ambient (°F)	<u>65</u>	<u>66</u>	<u>66</u>

Tunnel Traverse	
dP (in H ₂ O)	T(°F)
<u>.037</u> <u>.062</u>	75 ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓
<u>.042</u> <u>.064</u>	
<u>.040</u> <u>.066</u>	
<u>.032</u> <u>.052</u>	
<u>.038</u>	
<u>.042</u>	
<u>.044</u>	
<u>.036</u>	
<u>N/A</u>	
<u>N/A</u>	
Static P:	<u>-0.383</u>

Technician Signature: 

Date: 11/12/14 Page 357 of 377
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*Model: Accentra 52i
Harman Home Heating
352 Mountain House Road
Halifax, PA 17032*

Run 5

Wood Heater Test Data - EPA Method 5G

Manufacturer: Harman
 Model: Accentra 52i
 Project No.: 0135PN031E.AD02
 Tracking No.: 1996
 Run: 5
 Test Date: 11/12/14

Burn Rate	1.07 kg/hr dry
Average Tunnel Temperature	83 degrees Fahrenheit
Average Gas Velocity in Dilution Tunnel - vs	13.0 feet/second
Average Gas Flow Rate in Dilution Tunnel - Qsd	8641.5 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	15.87 cubic feet	15.75 cubic feet
Average Gas Meter Temperature	75 degrees Fahrenheit	76 degrees Fahrenheit	74 degrees Fahrenheit
Total Sample Volume (Standard Conditions) - Vmstd	16.1 dscf	16.2 dscf	16.0 dscf
Total Particulates - mn		0.5 mg	0.9 mg
Particulate Concentration (dry-standard)	0.00004 grams/dscf	0.00003 grams/dscf	0.00006 grams/dscf
Particulate Emission Rate	0.38 grams/hour	0.27 grams/hour	0.49 grams/hour
Adjusted Emissions	0.80 grams/hour	0.61 grams/hour	1.00 grams/hour
Difference from Average		0.20 grams/hour	0.20 grams/hour
7.5% of the average emission rate	0.06		
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: Accentra 52i
 Tracking No.: 1996
 Project No.: 0135PN03IE.AD02
 Test Date: 12-Nov-14
 Beginning Clock Time: _____
 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	0.040	0.032	0.036	0.040	0.042	0.034
Initial Temp.	77	77	77	77	76	76	76	76

OMNI Equipment Numbers: OMNI-0001, OMNI-00023, OMNI-00128, OMNI-00131, OMNI-00132, OMNI-00185, OMNI-00209, OMNI-283B, OMNI-00296-T57, OMNI-00335, OMNI-00336, OMNI-00343, OMNI-00410, OMNI-00417, OMNI-00439

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: -0.409 "H2O
 Pitot Tube Cp: 0.99
 Meter Box Y Factor: 1.024 (1) 1.017 (2)
 Barometric Pressure: 30.14 30.12 30.1 Average

Tunnel Velocity: 13.03 ft/sec.
 Initial Tunnel Flow: 144.8 scfm
 Average Tunnel Flow: 144.0 scfm
 Tunnel Area: 0.1963 ft2
 Post-Test Leak Check (1): 0.000@-5 cfm@"Hg
 Post-Test Leak Check (2): 0.000@-3 cfm@"Hg
 Fuel Moisture (dry basis %): 5.63
 Total Particulate (1): 0.5
 Total Particulate (2): 0.9

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			0.77	0.62	68	68	0.43	0.8	77	0.038			5.0		473	280	257	286	288	N/A	316.8	274	67	66	N/A	N/A	64	-0.061	
10	1.324	1.309	0.13	0.13	1.60	1.32	69	68	0.39	0.8	81	0.038	102	101	4.6	-0.4	484	276	253	279	288		316.0	267	67	67			64	-0.058	
20	2.647	2.624	0.13	0.13	1.59	1.31	71	70	0.38	0.8	83	0.038	102	102	4.2	-0.4	483	276	263	279	292		318.6	266	68	68			65	-0.058	
30	3.969	3.936	0.13	0.13	1.59	1.30	74	72	0.39	0.7	84	0.038	101	101	3.8	-0.4	475	276	259	278	286		314.8	268	68	69			66	-0.057	
40	5.293	5.247	0.13	0.13	1.59	1.31	75	74	0.37	0.7	84	0.038	101	101	3.4	-0.4	484	275	270	284	284		319.4	269	69	69			66	-0.056	
50	6.616	6.560	0.13	0.13	1.57	1.30	77	75	0.38	0.7	84	0.038	101	101	3.0	-0.4	496	276	270	281	289		322.4	269	69	70			66	-0.057	
60	7.940	7.874	0.13	0.13	1.58	1.30	78	76	0.38	0.7	84	0.038	101	101	2.6	-0.4	467	276	266	283	287		315.8	268	70	70			67	-0.056	
70	9.263	9.188	0.13	0.13	1.56	1.28	78	76	0.37	0.7	85	0.038	101	101	2.1	-0.5	505	276	276	292	300		329.8	273	70	70			67	-0.058	
80	10.586	10.501	0.13	0.13	1.57	1.28	79	77	0.37	0.7	85	0.038	100	100	1.7	-0.4	484	279	268	293	302		325.2	272	70	71			67	-0.056	
90	11.908	11.815	0.13	0.13	1.57	1.28	79	77	0.37	0.7	85	0.038	100	101	1.3	-0.4	499	281	272	296	307		331.0	274	70	71			67	-0.057	
100	13.230	13.127	0.13	0.13	1.57	1.29	80	78	0.37	0.7	84	0.038	100	100	0.9	-0.4	507	283	278	298	302		333.6	274	70	71			67	-0.057	
110	14.551	14.441	0.13	0.13	1.57	1.29	80	77	0.36	0.7	83	0.038	100	100	0.4	-0.5	508	282	274	296	308		333.6	275	70	70			66	-0.057	
120	15.874	15.754	0.13	0.13	1.56	1.28	79	77	0.36	0.7	83	0.038	100	100	0.0	-0.4	485	280	270	299	299		326.6	271	69	70			65	-0.057	
Avg/Total	15.874	15.754	0.13	0.13	1.51	1.24	75.92	74.23			83.19	0.038	100.70	100.72									9.8		69.00	69.38	#DIV/0!	#DIV/0!		-0.057	

Method 28 Run Sheets

Client: Harman Project Number: 0135PN031E.AD02 Run Number: 5
 Model: Accentra 52i Tracking Number: 1996 Date: 11/12/14
 Test Crew: A. Kravitz, J. Clark
 OMNI Equipment ID numbers: 23, 131, 132, 209, 288, 343, 371, 372, 410, 420, 559

Pellet Run Notes

Preburn Settings

Target Output (Category): II
 Target Output (dry kg/hr): 0.80 - 1.25

Temp = 1.79
 Feed = 1.61
 Mode = High
 Draft = -20v

Preburn Notes

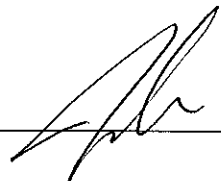
TIME	NOTES
	N/A

Test Settings

Target Output (Category): II
 Target Output (dry kg/hr): 0.80 - 1.25

Test Notes

TIME	NOTES
	N/A

Technician Signature: 

Date: 11/12/14

Method 28 Run Sheets

Client: Harman Project Number: 0135PN031E.AD02 Run Number: 5
 Model: Accentra 52i Tracking Number: 1996 Date: 11/12/14
 Test Crew: A. Kravitz, J. Clark
 OMNI Equipment ID numbers: 23, 131, 132, 209, 288, 343, 371, 372, 410, 420, 559

Pellet Supplemental Data

Start Time: 21:47 Booth #: E2
 Stop Time: 23:47

Stack Gas Leak Check:

Initial: N/A Final: N/A

Sample Train Leak Check:

A: 0.000 @ -5 "Hg
 B: 0.000 @ -3.5 "Hg

Calibrations: Span Gas CO₂: 16.90 O₂: N/A CO: 4.295
 Mid Gas CO₂: 9.87 O₂: N/A CO: 2.493

Time	Pre Test			Post Test		
	Zero	Span	Mid	Zero	Span	Mid
	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>
O ₂	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>
CO ₂	↓	↓	↓	↓	↓	↓
CO	↓	↓	↓	↓	↓	↓

Air Velocity (ft/min): Initial: 250 Final: 250
 Scale Audit (lbs): Initial: 10.0 Final: 10.0
 Pitot Tube Leak Test: Initial: 0 Final: 0
 Stack Diameter (in): 4
 Induced Draft: 0
 % Smoke Capture: 100

Flue Pipe Cleaned Prior to First Test in Series:

Date: 11/10/14 Initials: XC

	Initial	Middle	Ending
P _b (in/Hg)	<u>30.14</u>	<u>30.12</u>	<u>30.10</u>
Ambient (°F)	<u>65</u>	<u>67</u>	<u>66</u>

Tunnel Traverse	
dP (in H ₂ O)	T (°F)
<u>0.036</u>	<u>77</u>
<u>0.040</u>	↓
<u>0.040</u>	↓
<u>0.032</u>	↓
<u>0.036</u>	<u>76</u>
<u>0.040</u>	↓
<u>0.042</u>	↓
<u>0.034</u>	↓
<u>N/A</u>	<u>N/A</u>
↓	↓
↓	↓
Static P:	<u>-0.409</u>

Technician Signature: 

Date: 11/12/14

*Model: Accentra 52i
Harman Home Heating
352 Mountain House Road
Halifax, PA 17032*

Run 6

OMNI-Test Laboratories, Inc.

Manufacturer: Harman
Model: Accentra 52i
Date: 11/12/14
Run: 6
Control #: 1996
Test Duration: 120
Output Category: III

Technicians: J. Clark

Test Results in Accordance with CSA B415.1-09

	HHV Basis	LHV Basis
Overall Efficiency	75.2%	81.2%
Combustion Efficiency	99.5%	99.5%
Heat Transfer Efficiency	76%	81.6%

Output Rate (kJ/h)	24,623	23,357	(Btu/h)
Burn Rate (kg/h)	1.65	3.64	(lb/h)
Input (kJ/h)	32,759	31,076	(Btu/h)

Test Load Weight (dry kg)	3.31	7.29	dry lb
MC wet (%)	5.332814325		
MC dry (%)	5.63		
Particulate (g)	0		
CO (g)	20		
Test Duration (h)	2.00		

Emissions	Particulate	CO
g/MJ Output	0.00	0.40
g/kg Dry Fuel	0.00	6.01
g/h	0.00	9.93
lb/MM Btu Output	0.00	0.94

Air/Fuel Ratio (A/F)	15.97
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VERSION: 2.3 3/23/2010

VERSION: 2.3 3/23/2010

Manufacturer: Harman
 Model: Accentra 52i
 Date: 11/12/2014
 Run: 6
 Control #: 1996
 Test Duration: 120
 Output Category: III

Appliance Type: Pellet (Cat, Non-Cat, Pellet)

Temp. Units: F (F or C)
 Weight Units: lb (kg or lb)

Default Fuel Values

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

Wood Moisture (% wet): 5.33
 Load Weight (lb wet): 7.70
 Burn Rate (dry kg/h): 1.65
 Total Particulate Emissions: g

Fuel Data

	D. Fir
HHV	19810 kJ/kg
%C	48.73
%H	6.87
%O	43.9
%Ash	0.5

Note 1: For other fuels, use the heating value and fuel composition determined by analysis of fuel sample in accordance with Clause 9.2.

Averages 0.03 6.81 #DIV/0! 337.54 64.08
 Temp. (°F)

Note 2: In cases where the "Fuel Weight Remaining" is the same for three or more readings in a row, a "divide by zero error" will occur in the calculation sheet. In such cases, adjust the weight values by interpolation between the first occurrence and the next reading showing a decrease in weight.

Elapsed Time (min)	Fuel Weight Remaining (lb)	Flue Gas Composition (%)			Flue Gas Temp	Room Temp
		CO	CO ₂	O ₂		
0	7.70	0.04	6.85		299.0	65.0
10	7.10	0.05	6.94		329.0	65.0
20	6.40	0.03	6.97		337.0	65.0
30	5.80	0.04	7.51		341.0	64.0
40	5.10	0.03	6.75		340.0	64.0
50	4.50	0.03	6.42		341.0	64.0
60	3.80	0.04	6.52		345.0	64.0
70	3.20	0.02	5.88		341.0	64.0
80	2.60	0.03	7.13		342.0	64.0
90	1.90	0.05	6.67		343.0	64.0
100	1.30	0.02	6.31		344.0	64.0
110	0.60	0.03	6.53		342.0	63.0
120	0.00	0.04	8.02		344.0	63.0

*Model: Accentra 52i
Harman Home Heating
352 Mountain House Road
Halifax, PA 17032*

Run 7

OMNI-Test Laboratories, Inc.

Manufacturer: Harman
Model: Accentra 52i
Date: 11/13/14
Run: 7
Control #: 1996
Test Duration: 120
Output Category: IV

Technicians: J. Clark

Test Results in Accordance with CSA B415.1-09

	HHV Basis	LHV Basis
Overall Efficiency	75.6%	81.8%
Combustion Efficiency	96.5%	96.5%
Heat Transfer Efficiency	78%	84.7%

Output Rate (kJ/h)	38,296	36,328	(Btu/h)
Burn Rate (kg/h)	2.56	5.63	(lb/h)
Input (kJ/h)	50,628	48,026	(Btu/h)

Test Load Weight (dry kg)	5.11	11.27	dry lb
MC wet (%)	5.332814325		
MC dry (%)	5.63		
Particulate (g)	0		
CO (g)	256		
Test Duration (h)	2.00		

Emissions	Particulate	CO
g/MJ Output	0.00	3.35
g/kg Dry Fuel	0.00	50.13
g/h	0.00	128.11
lb/MM Btu Output	0.00	7.77

Air/Fuel Ratio (A/F)	9.71
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VERSION: 2.3 3/23/2010

Method 28 Run Sheets

Client: Harman Project Number: 0135PN031E.AD02 Run Number: 7
 Model: Accentra 52i Tracking Number: 1996 Date: 11/13/14
 Test Crew: A. Kravitz, J. Clark
 OMNI Equipment ID numbers: 23, 131, 132, 209, 288, 343, 371, 372, 410, 420, 559

Pellet Supplemental Data

Category IV

Start Time: 02:15

Booth #: E2

Temp = 7.00

Stop Time: 04:15

Feed = 5.29

Mode = High

Stack Gas Leak Check:

Sample Train Leak Check:

Draft = -00v

Initial: ∅ Final: ∅

A: N/A @ N/A"Hg

B: N/A @ N/A"Hg

Calibrations: Span Gas CO₂: 16.90 O₂: N/A CO: 4.295
 Mid Gas CO₂: 9.87 O₂: N/A CO: 2.493

Time	Pre Test			Post Test		
	Zero	Span	Mid	Zero	Span	Mid
O ₂	N/A	N/A	N/A	N/A	N/A	N/A
CO ₂	0.00	16.80	10.23	0.65	17.24	10.72
CO	0.000	4.295	2.515	0.047	4.326	2.551

Air Velocity (ft/min): Initial: N/A Final: N/A

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

Pitot Tube Leak Test: Initial: N/A Final: N/A

Stack Diameter (in): 4

Induced Draft: ∅


% Smoke Capture: 100

Flue Pipe Cleaned Prior to First Test in Series:

Date: N/A Initials: N/A

	Initial	Middle	Ending
P _b (in/Hg)	30.06	30.05	30.04
Ambient (°F)	64	64	64

Tunnel Traverse	
dP (in H ₂ O)	T(°F)
N/A	N/A
Static P:	

Technician Signature: 

Date: 11/13/14

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 Accentra 52i. The Accentra 52i is a pellet-fired fireplace insert 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 November 10th, 2014. It was assigned and labeled with *OMNI* ID #1996. *OMNI* representatives Aaron Kravitz and Jeremy Clark conducted the certification testing and completed all testing by November 12th, 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 Accentra 52i 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 5G3 sampling train consisting of two sets of filters (front and back). The weighted average emissions of four test runs indicate a particulate emission rate of 1.46 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). Emissions for each of the individual test runs did not exceed the cap. The Accentra 52i 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.

One test run (Run 3) was omitted from the weighted average because the average tunnel velocity during the test exceeded the specifications of Method 5G thus invalidating the run. This test was repeated as Run 5 using the same stove settings.

Overall efficiency was tested in accordance with CSA standard B415.1-10, Performance Testing of Solid-Fuel-Burning Heating Appliances. Due to an issue with the combustion gas analyzer, some emissions test runs were repeated at the same stove settings to gather efficiency data. Test runs successfully tested under CSA B415.1-10 were Runs 3, 4, 6, and 7. These runs indicate a weighted average Higher Heating Value efficiency of 75.58% and Lower Heating Value efficiency of 81.69%.

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 1.1.1 – Particulate Emissions Results

Run	Burn Rate (kg/hr dry)	Method 5G Emissions (g/hr)
1	2.66	5.61
2	1.63	1.21
4	0.69	1.02
5	1.07	0.80
Weighted particulate emission average of four test runs: 1.46 g/hr		

Table 1.1.1 – Efficiency Results

Run	Burn Rate (kg/hr dry)	CSA B415 Efficiency (%, HHV)	CSA B415 Efficiency (%, LHV)
3	1.07	73.97	79.95
4	0.69	78.67	85.03
6	1.65	75.16	81.24
7	2.56	75.64	81.76
Weighted Average		75.58	81.69

Table 1.2 – Test Facility Conditions

Run	Room Temperature (°F)		Barometric Pressure (Hg)		Air Velocity (ft/min)	
	Before	After	Before	After	Before	After
1	71	70	30.18	30.20	<50	<50
2	68	67	30.20	30.18	<50	<50
3	66	65	30.20	30.22	<50	<50
4	65	66	30.27	30.27	<50	<50
5	64	65	30.14	30.10	<50	<50
6	65	63	30.10	30.06	<50	<50
7	64	64	30.06	30.04	<50	<50

Table 1.3.1 – Fuel Measurement Summary – PRETEST

Run	Beginning Fuel Weight (lbs)	Ending Fuel Weight (lbs)
1	36.9	31.0
2	17.4	31.9
3	33.0	30.6
4	25.3	23.2
5	12.8	10.4
6	N/A	N/A
7	N/A	N/A

Table 1.3.2 – Fuel Measurement Summary – TEST

Run	Consumed Fuel Weight (lbs)	Fuel Moisture Content (Dry basis - %)
1	12.4	5.63
2	7.6	5.63
3	5.0	5.63
4	3.2	5.63
5	5.0	5.63
6	7.7	5.63
7	11.9	5.63

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	14.04	152.4	94
2	120	14.00	153.8	88
4	120	13.03	146.9	75
5	120	13.03	144.0	83

Note: These measurements are not used by CSA B415.1-10.

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	586.4	613.6	27.2
2	498.0	464.6	33.4
4	263.8	268.2	4.4
5	316.8	326.6	9.8

a. All temperatures are in °F.

b. Represents the difference between beginning and ending average surface temperature.

Note: These measurements are not used by CSA B415.1-10.

Table 1.6 – Pretest and Test Configurations, Emissions Runs

Run	Stove Temperature Control	Feed Adjuster	Temperature Control	Low Draft	Time (min)
1	7.00	5.29	Stove High	-00V	70+120
2	4.60	3.07	Stove High	-00V	60+120
4	1.00	0.58	Stove High	-37V	60+120
5	1.79	1.61	Stove High	-20V	60+120

Table 1.7 – Pretest and Test Configurations, Efficiency Runs

Run	Stove Temperature Control	Feed Adjuster	Temperature Control	Low Draft	Time (min)
3	1.79	1.61	Stove High	-20V	60+120
4	1.00	0.58	Stove High	-37V	60+120
6	4.60	3.07	Stove High	-00V	60+120
7	7.00	5.29	Stove High	-00V	70+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	2.66	0	-0.058	120
2	1.63	0	-0.057	120
3	1.07	0	-0.047	120
4	0.69	0	-0.035	120
5	1.07	0	-0.057	120
6	1.65	0	N/A	120
7	2.56	0	N/A	120

TEST RESULTS AND DISCUSSION

A total of five emissions test runs were conducted in the following categories: one in the <0.80 kg/hr dry category, 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. One test run was invalidated for emissions testing due to excessive tunnel air velocity, however since CSA B415.1-10 does not use dilution tunnel measurements this run was deemed valid for efficiency testing.

The weighted particulate emission rate was measured to be 1.46 g/hr.

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

A total of four efficiency 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 average Higher Heating Value efficiency was measured to be 75.58%.

The weighted average Lower Heating Value efficiency was measured to be 81.69%.