

Certification Test Report

Hearth & Home Technologies

Freestanding and Insert Pellet Stoves

Model: Santa Fe/Castile

Prepared for: Hearth & Home Technologies
 1445 North Highway
 Colville, WA 99114

Prepared by: OMNI-Test Laboratories, Inc.
 13327 NE Airport Way
 Portland, OR 97230
 (503) 643-3788

Test Period: 2/18/14 – 2/19/14

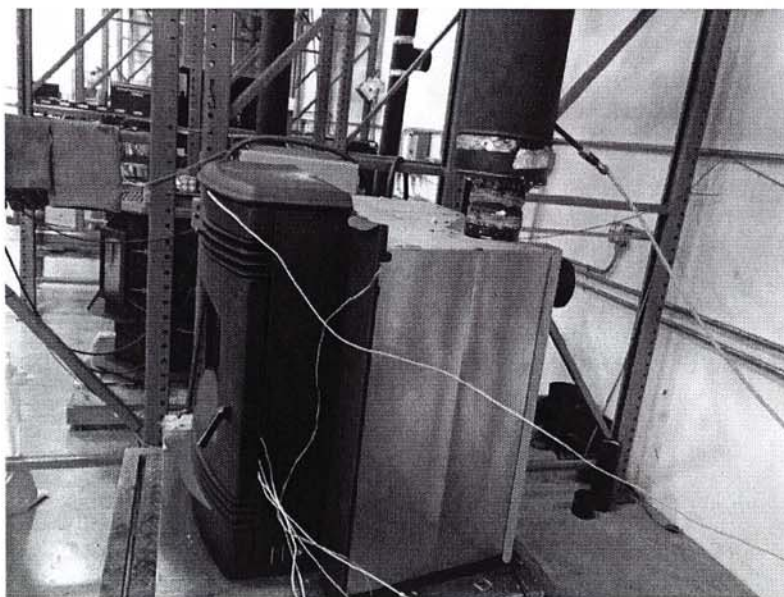
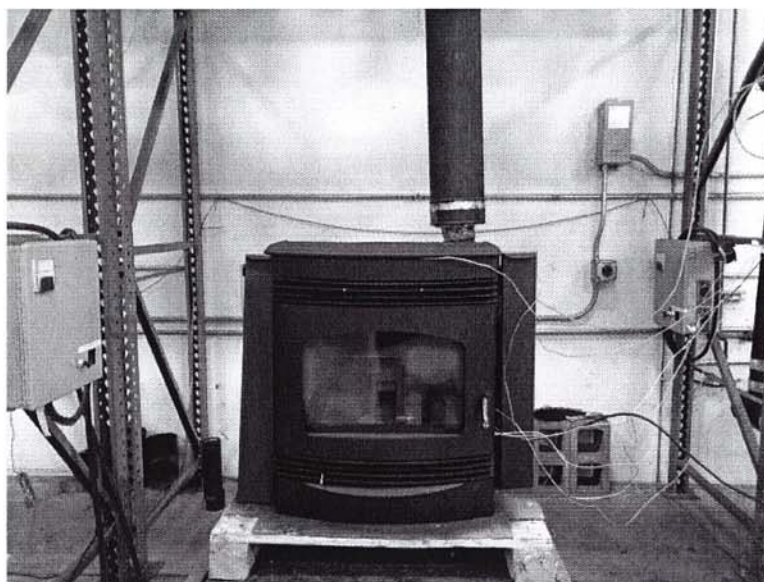
Report Date: March 2014

Report Number: 061-S-77-8.3

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Model: Santa Fe/Castile
Hearth & Home Technologies
1445 North Highway
Colville, WA 99114

Hearth & Home Technologies
Santa Fe/Castile
Test Dates: 2/18/14-2/19/14



Section 4

Test Data by Run

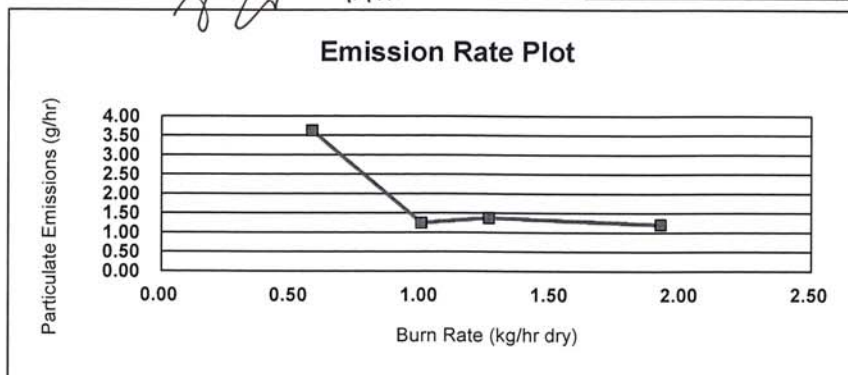
EPA Weighted Average Emissions

EPA Method 28

Client: Hearth & Home
 Stove Model: Santa Fe / Castile
 Test Dates: 2/18/14 - 2/19/14
 Project Number: 061-S-77-8.3
 Tracking Number: 1932
 Signature/Date: *[Signature]* 3/17/14

Status: Final
 Stove Type: Pellet Stove

Weighted Average (g/hr) 1.8
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Run #	2	
Burn Rate (dry kg/hr)	0.58	
Category	1	
Overall Efficiency (%)	78%	
Emissions (g/hr)	3.63	
Cap (g/hr)	15.00	
Weighting Factor	0.380	21.05%
Heat Output (BTU/hr)	8528	

Run #	4	
Burn Rate (dry kg/hr)	1.00	
Category	2	
Overall Efficiency (%)	78%	
Emissions (g/hr)	1.25	
Cap (g/hr)	15.00	
Weighting Factor	0.487	26.99%
Heat Output (BTU/hr)	14703	

Run #	3	
Burn Rate (dry kg/hr)	1.26	
Category	3	
Overall Efficiency (%)	78%	
Emissions (g/hr)	1.38	
Cap (g/hr)	15.00	
Weighting Factor	0.519	28.78%
Heat Output (BTU/hr)	18525	

Run #	1	
Burn Rate (dry kg/hr)	1.92	
Category	4	
Overall Efficiency (%)	78%	
Emissions (g/hr)	1.21	
Cap (g/hr)	18.00	
Weighting Factor	0.418	23.18%
Heat Output (BTU/hr)	28229	

Model: Santa Fe/Castile
Hearth & Home Technologies
1445 North Highway
Colville, WA 99114

Run 1

Wood Heater Test Data - EPA Method 5G

Manufacturer: Hearth & Home
 Model: Santa Fe/Castile
 Project No.: 061-S-77-8.3
 Tracking No.: 1932
 Run: 1
 Test Date: 02/18/14

Burn Rate	1.92 kg/hr dry
Average Tunnel Temperature	111 degrees Fahrenheit
Average Gas Velocity in Dilution Tunnel - vs	12.6 feet/second
Average Gas Flow Rate in Dilution Tunnel - Qsd	7902.7 dscf/hour
Average Delta p	0.033 inches H2O
Average Delta H	1.13 inches H2O
Total Time of Test	120 minutes

	AVERAGE	SAMPLE TRAIN 1	SAMPLE TRAIN 2
Total Sample Volume - Vm	19.46 cubic feet	18.29 cubic feet	20.62 cubic feet
Average Gas Meter Temperature	79 degrees Fahrenheit	79 degrees Fahrenheit	79 degrees Fahrenheit
Total Sample Volume (Standard Conditions) - Vmstd	19.4 dscf	18.2 dscf	20.6 dscf
Total Particulates - mn		1.5 mg	1.5 mg
Particulate Concentration (dry-standard)	0.00008 grams/dscf	0.00008 grams/dscf	0.00007 grams/dscf
Particulate Emission Rate	0.61 grams/hour	0.65 grams/hour	0.57 grams/hour
Adjusted Emissions	1.21 grams/hour	1.27 grams/hour	1.15 grams/hour
Difference from Average		0.06 grams/hour	0.06 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

MAN:	Manufacturer:	Hearth & Home
	Model:	Santa Fe/Castle
	Tracking No.:	1932
	Project No.:	061-S-72&3.3
	Test Date:	18-Feb-14
	Beginning Clock Time:	11:40
	Recording Interval:	10 min
	Total Sampling Time:	120 min

Velocity Traverse Data									
	Pt.1	Pt.2	Pt.3	Pt.4	Pt.5	Pt.6	Pt.7	Pt.8	
Initial DP	0.028	0.038	0.046	0.036	0.034	0.024	0.022	0.038	H ₂ O
Initial Temp	108	108	108	108	108	108	108	108	°F

OMNI Equipment Numbers:

185, 209, 335, 336, 410

PM Control Module:	335/336
Dilution Tunnel MW(dry):	29.00 lb/b-mole
Dilution Tunnel MW(wet):	28.56 lb/b-mole
Dilution Tunnel H ₂ O:	4.00 percent
Dilution Tunnel Static:	-0.560 "H ₂ O
Pilot Tube Cp:	0.99
Meter Box Y Factor:	1.015 (1)
Barometric Pressure:	Begin 29.91 Middle 29.86 End 29.82

Signature/Date:	12.63 10/26/14
Tunnel Velocity:	131.2 scfm
Initial Tunnel Flow:	131.7 scfm
Average Tunnel Flow:	0.1963 H ₂
Tunnel Area:	0.001 cfm/Hg
Post-Test Leak Check (1):	0.002 cfm/Hg
Post-Test Leak Check (2):	0.002 cfm/Hg
Fuel Moisture (dry basis %):	6.31
Total Particulate (1):	1.5
Total Particulate (2):	1.5

Elapsed Time	Particulate Sampling Data										Fuel Weight, lb		Wood Heater Temperature Data, °f										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 orF (1)	Meter Vac. In. Hg. (1)	Meter Vac. In. Hg. (2)	Dilution Tunnel Temp. °F	Pro Rate (10%) (1)	Pro Rate (10%) (2)	Scale Reading (2)	Weight Change (2)	Firebox Top	Firebox Bottom	Firebox Back	Firebox Left	Firebox Right	Catalyst Exit	Average Surface	Stack Temp		Filter (1)	Filter (2)	Impinger exit (1)	Impinger exit (2)	Ambient	Drift In. H ₂ O	
0	0.000	0.000			0.70	0.70	71	72	0.17	-0.4	108	0.033				435	583	343	710	452	N/A	504.6	352	69	70	N/A	N/A	69	-0.110	
10	1.439	1.711	0.14	0.17	1.07	1.26	72	72	1.15	1.2	109	0.033	96	101	8.3	441	570	349	698	449	N/A	501.4	350	73	75	N/A	N/A	69	-0.110	
20	2.890	3.438	0.15	0.17	1.07	1.26	74	74	1.16	1.2	110	0.033	97	102	7.5	460	589	366	720	460	N/A	512.0	358	74	76	N/A	N/A	69	-0.111	
30	4.344	5.166	0.15	0.17	1.07	1.26	76	76	1.16	1.2	110	0.033	97	102	6.8	-0.7	458	592	369	721	470	N/A	522.0	358	75	77	N/A	N/A	69	-0.109
40	5.801	6.896	0.15	0.17	1.07	1.25	78	78	1.17	1.2	111	0.033	96	102	6.0	-0.8	472	599	373	741	483	N/A	533.6	362	77	N/A	N/A	69	-0.111	
50	7.263	8.630	0.15	0.17	1.07	1.25	79	79	1.17	1.2	111	0.033	97	102	5.3	-0.7	463	595	372	721	467	N/A	523.6	358	75	78	N/A	N/A	69	-0.110
60	8.807	10.305	0.15	0.17	1.24	1.22	80	80	1.24	1.2	111	0.033	102	98	4.5	-0.8	474	605	377	761	506	N/A	544.6	363	76	78	N/A	N/A	69	-0.111
70	10.384	12.024	0.16	0.17	1.24	1.23	81	81	1.23	1.2	111	0.033	104	100	3.7	-0.8	459	590	367	719	480	N/A	523.0	357	77	78	N/A	N/A	70	-0.112
80	11.965	13.743	0.16	0.17	1.24	1.23	81	81	1.24	1.2	111	0.033	104	100	3.0	-0.7	455	585	366	705	470	N/A	516.2	354	77	78	N/A	N/A	70	-0.110
90	13.545	15.464	0.16	0.17	1.24	1.22	82	82	1.23	1.2	112	0.033	104	100	2.2	-0.8	470	598	372	750	513	N/A	540.6	360	77	78	N/A	N/A	70	-0.111
100	15.125	17.183	0.16	0.17	1.24	1.23	82	82	1.24	1.2	112	0.033	104	100	1.5	-0.7	468	592	370	745	504	N/A	535.8	359	77	78	N/A	N/A	70	-0.111
110	16.707	18.903	0.16	0.17	1.24	1.22	83	83	1.24	1.2	112	0.033	104	100	0.8	-0.7	460	593	375	724	491	N/A	538.6	359	77	78	N/A	N/A	71	-0.111
120	18.289	20.624	0.16	0.17	1.24	1.23	83	83	1.24	1.2	112	0.033	104	100	0.0	-0.8	455	580	362	726	481	N/A	520.8	355	77	78	N/A	N/A	71	-0.109
g/total	18.289	20.624	0.15	0.17	1.13	1.20	78.62	78.69			110.77	0.033	100.65	100.69								16		76.85	N/A	N/A	N/A		-0.110	

Run Notes

Client: Hearth & Home
 Model: Santa Fe / Castile
 Project #: 061-S-77-8.3
 Tracking #: 1932

Run #: 1 Date: 2/18/14

Test Crew: A. Krawitz

OMNI Equipment ID #(s): 335, 336

PREBURN

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

PRIMARY:

Control Board @ 7
 FRAP @ Full open
 Toggle switch @ High

SECONDARY: NA

TERTIARY: NA

FAN: Auto

PREBURN SETTINGS AND ACTIVITIES

TIME	AIR (THERMO) CHANGES PRIMARY/SECONDARY/TERTIARY	FAN SETTING CHANGE	ADD FUEL + WT.	ADD FUEL - WT.	RAKE COAL	COMMENT
48:00			5.4			

TEST

TEST FUEL CONFIGURATION SKETCH
 (INDICATE VIEW ANGLE)

Pellets

START UP PROCEDURES

BYPASS: NA
 FUEL LOADING: NA
 DOOR: NA
 PRIMARY AIR: NA

OTHER: NA

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

PRIMARY:

Control Board @ 7
 FRAP @ Full open
 Toggle switch @ High

SECONDARY: NA

TERTIARY: NA

FAN: Auto

Technician signature: A. Krawitz

Date: 2/18/14

Supplemental Data EPA 5G/5H

Client: Hearth & Home

Model: Santa Fe / Castile

Project #: 061-S-77-8.3

Tracking #: 1932

Date: 2/18/14

Run #: 1

Booth: E1

Test Crew: A. Kravitz

Start Time: 11:40

Stop Time: 13:46

OMNI Equipment #(s): 132, 185, 282, 335, 336, 410, 378, 420, 209

Stack Gas Leak Check:

Initial: 0

Final: 0

Dilution Tunnel Gas Leak Check (5H only):

Initial: NA

Final: NA

Calibrations: Span Gas CO₂: 16.75 O₂: NA CO: 4.34 CO₂ (DT): NA

Mid Gas CO₂: 10.02 O₂: NA CO: 2.533 CO₂ (DT): NA

A: .001
B: .002

Time
O ₂
CO ₂
CO
CO ₂ (DT)

Pre Test		
Zero	Span	Mid
10:43	10:45	10:48
NA		
-0.00	16.75	9.96
0.00	4.34	2.543
NA		

Post Test		
Zero	Span	Mid
1:46	1:48	1:47
NA		
-0.07	16.65	9.91
-0.008	4.304	2.518
NA		

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 (inches): 6

Induced Draft: 0

% Smoke Capture: 100

Flue Pipe Cleaned Prior to First Test in Series:

Date: 2/17 Initials: AK

	Initial	Middle	Ending
P _b (in/Hg)	29.91	29.86	29.82
Ambient (°F)	61	70	71

Technician signature: [Signature]

Date: 2/24/14

Tunnel Traverse	
dP (in H ₂ O)	T (°F)
.028	108
.038	108
.046	108
.036	108
.024	108
.034	108
.022	108
.038	108
NA	NA
Static P:	-.56

Method 28 Preburn Data

Run Data											
Client:	Hearth & Home	Test Run:	1								
Model:	Santa Fe / Castile	Date:	2/18/2004								
Project Number:	061-S-77-8.3	Test Crew:	A. Kravitz								
Tracking Number:	1932	Equipment:	335, 336, 185								
		Coal Bed Range (lb):	N/A (pellet)								
Logged Data											
Temperatures (F)											
Elapsed Time (min)	Scale (lb)	Stack Draft (in H ₂ O)	Stack	Ambient	FB Top	FB Bottom	FB Back	FB Left	FB Right	Cat. In	Cat. Out
0	14.9	-0.111	342	67	420	543	318	677	419		
10	14.1	-0.11	353	67	446	592	347	708	453		
20	13.3	-0.109	351	68	432	588	346	680	441		
30	12.5	-0.109	352	68	439	585	347	701	450		
40	11.8	-0.11	347	68	424	573	338	676	435		
50	16.5	-0.11	341	69	414	563	327	675	422		
60	15.8	-0.11	349	69	426	576	343	673	438		
Averages:		-0.110	347.86	68.00	428.71	574.29	338.00	684.29	436.86		

Alo 2/24/14

Model: Santa Fe/Castile
Hearth & Home Technologies
1445 North Highway
Colville, WA 99114

Run 2

Wood Heater Test Data - EPA Method 5G

Manufacturer: Hearth & Home
 Model: Santa Fe/Castile
 Project No.: 061-S-77-8.3
 Tracking No.: 1932
 Run: 2
 Test Date: 02/18/14

Burn Rate	0.58 kg/hr dry
Average Tunnel Temperature	89 degrees Fahrenheit
Average Gas Velocity in Dilution Tunnel - vs	12.9 feet/second
Average Gas Flow Rate in Dilution Tunnel - Qsd	8414.5 dscf/hour
Average Delta p	0.036 inches H2O
Average Delta H	1.35 inches H2O
Total Time of Test	120 minutes

	AVERAGE	SAMPLE TRAIN 1	SAMPLE TRAIN 2
Total Sample Volume - Vm	20.43 cubic feet	20.20 cubic feet	20.67 cubic feet
Average Gas Meter Temperature	80 degrees Fahrenheit	80 degrees Fahrenheit	79 degrees Fahrenheit
Total Sample Volume (Standard Conditions) - Vmstd	20.4 dscf	20.1 dscf	20.7 dscf
Total Particulates - mn		5.8 mg	5.3 mg
Particulate Concentration (dry-standard)	0.00027 grams/dscf	0.00029 grams/dscf	0.00026 grams/dscf
Particulate Emission Rate	2.30 grams/hour	2.43 grams/hour	2.16 grams/hour
Adjusted Emissions	3.63 grams/hour	3.81 grams/hour	3.45 grams/hour
Difference from Average		0.18 grams/hour	0.18 grams/hour
7.5% of the average emission rate	0.27		
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

Job: 2 Manufacturer: Hearth & Home
 Model: Santa Fe/Chester
 Tracking No.: 1932
 Project No.: 061-S-77-8.3
 Test Date: 18-Feb-14
 Beginning Clock Time: 14:41
 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	0.040	0.040	0.026	0.036	0.040	0.040	H ₂ O
Initial Temp	94	94	94	94	94	94	94	94	°F

OMNI Equipment Numbers:

185, 209, 335, 336, 410

PM Control Module: 335/336
 Dilution Tunnel MW(dry): 29.00 lb/b-mole
 Dilution Tunnel MW(wet): 28.56 lb/b-mole
 Dilution Tunnel H₂O: 4.00 percent
 Dilution Tunnel Sulfate: -0.500 *H₂O
 P101 Tube Cp: 0.99
 Meter Box Y Factor: 1.015 (1)
 Barometric Pressure: 29.82 29.85 29.88 *Hg

Signature/Date: ADP 3/17/14
 Tunnel Velocity: 12.94 ft/sec
 Initial Tunnel Flow: 139.2 scfm
 Average Tunnel Flow: 140.2 scfm
 Tunnel Area: 0.1963 ft²
 Post-Test Leak Check (1): 0.004 cfm/Hg
 Post-Test Leak Check (2): 0.002 cfm/Hg
 Fuel Moisture (dry basis %): 6.31
 Total Particulate (1): 5.8
 Total Particulate (2): 5.3

Elapsed Time	Particulate Sampling Data										Fuel Weight, lb										Wood Heater Temperature Data, °F										Stack	
	Gas Meter Cubic Feet (1)	Gas Meter Cubic Feet (2)	Sample Rate, cfm (1)	Sample Rate, cfm (2)	Orifice dh1 (in)	Orifice dh2 (in)	Meter orifice (1)	Meter orifice (2)	Meter Vac. In. Hg. (1)	Meter Vac. In. Hg. (2)	Dilution Tunnel Temp. (1)	Dilution Tunnel Temp. (2)	Dilution Tunnel dp (in)	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			0.70	0.70	78	79	1.2	-0.3	94	94	0.036	101	101	2.7		227	221	169	286	165	N/A	213.6	158	71	71	N/A	N/A	69	-0.092	
10	1.683	1.723	0.17	0.17	1.41	1.24	78	78	1.29	1.1	92	92	0.036	101	101	2.4	-0.3	239	238	180	299	175	N/A	226.2	206	72	73	N/A	N/A	69	-0.092	
20	3.363	3.446	0.17	0.17	1.41	1.23	78	78	1.29	1.1	91	91	0.036	101	101	2.2	-0.2	233	230	176	296	173	N/A	221.6	204	72	73	N/A	N/A	69	-0.093	
30	5.042	5.165	0.17	0.17	1.41	1.23	79	79	1.29	1.1	88	88	0.036	101	101	2.0	-0.2	211	220	166	262	158	N/A	203.4	189	72	73	N/A	N/A	69	-0.090	
40	6.723	6.884	0.17	0.17	1.41	1.23	80	79	1.29	1.2	89	89	0.036	101	101	1.7	-0.3	223	215	168	283	165	N/A	210.8	196	72	72	N/A	N/A	68	-0.090	
50	8.405	8.606	0.17	0.17	1.41	1.23	80	80	1.28	1.2	89	89	0.036	101	101	1.5	-0.2	221	218	168	278	161	N/A	209.2	194	71	72	N/A	N/A	68	-0.093	
60	10.089	10.329	0.17	0.17	1.41	1.23	81	80	1.3	1.2	89	89	0.036	101	101	1.2	-0.3	217	221	168	273	163	N/A	208.4	194	71	72	N/A	N/A	68	-0.092	
70	11.772	12.051	0.17	0.17	1.40	1.22	81	80	1.29	1.2	89	89	0.036	101	101	1.0	-0.2	220	219	167	277	164	N/A	209.4	196	71	72	N/A	N/A	68	-0.092	
80	13.457	13.774	0.17	0.17	1.41	1.23	81	80	1.3	1.2	90	90	0.036	101	101	0.7	-0.3	231	230	175	287	170	N/A	218.6	201	71	72	N/A	N/A	68	-0.094	
90	15.142	15.497	0.17	0.17	1.40	1.23	81	80	1.29	1.2	88	88	0.036	101	101	0.5	-0.2	216	213	164	267	158	N/A	203.6	191	71	72	N/A	N/A	68	-0.091	
100	16.826	17.220	0.17	0.17	1.40	1.23	81	80	1.29	1.2	88	88	0.036	101	101	0.3	-0.2	211	212	165	259	162	N/A	201.8	190	71	72	N/A	N/A	67	-0.091	
110	18.511	18.945	0.17	0.17	1.42	1.23	81	80	1.29	1.2	85	85	0.036	100	100	0.1	-0.2	177	194	147	216	144	N/A	175.6	157	70	72	N/A	N/A	68	-0.085	
120	20.197	20.668	0.17	0.17	1.42	1.23	81	80	1.29	1.2	80	80	0.036	100	100	0.0	-0.1	167	154	128	201	118	N/A	153.6	151	70	71	N/A	N/A	67	-0.084	
g/Total	20.197	20.668	0.17	0.17	1.35	1.19	80.00	79.46			88.62	88.62	0.036	100.70	100.72									60		71.15	72.08	N/A	N/A		-0.091	

Run Notes

Client: Hearth & HomeModel: Santa Fe / CastileProject #: 061-S-77-8.3Tracking #: 1932Run #: 2Date: 2/18/14Test Crew: A. KrawitzOMNI Equipment ID #(s): 335, 336

PREBURN

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

PRIMARY:

Control Board @ 7
FRAP @ Mid-throw
Toggle Switch @ Low

SECONDARY: NATERTIARY: NAFAN: Auto

PREBURN SETTINGS AND ACTIVITIES

TIME	AIR (THERMO) CHANGES PRIMARY/SECONDARY/TERTIARY	FAN SETTING CHANGE	ADD FUEL + WT.	ADD FUEL - WT.	RAKE COAL	COMMENT
	<u>None</u>					

TEST

TEST FUEL CONFIGURATION SKETCH
(INDICATE VIEW ANGLE)

Pellets

START UP PROCEDURES

BYPASS: NAFUEL LOADING: NADOOR: NAPRIMARY AIR: NAOTHER: NADESCRIBE OR SKETCH TEST SETTINGS BELOW:
(SETTINGS MUST BE ACCURATE AND REPRODUCIBLE)

PRIMARY:

Control Board @ 7
FRAP @ Mid-throw
Toggle Switch @ Low

SECONDARY: NATERTIARY: NAFAN: AutoTechnician signature: A. KrawitzDate: 2/18/14

Supplemental Data EPA 5G/5H

Client: Hearth & Home

Model: Santa Fe / Castile

Project #: 061-S-77-8.3

Tracking #: 1932

Date: 2/18/14

Run #: 2

Booth: E1

Test Crew: A. Kravitz

Start Time: 14:41

Stop Time: 16:41

OMNI Equipment #(s): 132, 185, 282, 335, 336, 410, 417, 420, 209

Stack Gas Leak Check:

Initial: 0

Final: 0

Dilution Tunnel Gas Leak Check (5H only):

Initial: NA

Final: NA

Calibrations: Span Gas CO₂: 16.25 O₂: NA CO: 4.340 CO₂ (DT): NA

Mid Gas CO₂: 10.02 O₂: NA CO: 2.533 CO₂ (DT): NA

Time
O ₂
CO ₂
CO
CO ₂ (DT)

Pre Test		
Zero	Span	Mid
1:46	1:48	1:47
NA		
-0.07	16.65	4.21
-0.008	4.364	2.519
NA		

Post Test		
Zero	Span	Mid
4:45	4:42	4:44
NA		
-0.04	16.68	4.28
2.004	4.314	2.536
NA		

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 (inches): 6

Induced Draft: 0

% Smoke Capture: 100

Flue Pipe Cleaned Prior to First Test in Series:

Date: 2/17 Initials: AK

	Initial	Middle	Ending
P _b (in/Hg)	29.82	29.85	29.88
Ambient (°F)	68	67	66

Tunnel Traverse	
dP (in H ₂ O)	T (°F)
.030	24
.038	
.040	
.040	
.026	
.036	
.040	
.040	
NA	NA
Static P:	-.56

Technician signature: AK

Date: 2/18/14

Method 28 Preburn Data

Run Data		Hearth & Home		Test Run:	
Client:		Santa Fe / Castile		2	
Model:		061-S-77-8.3		2/18/2004	
Project Number:		1932		A. Kravitz	
Tracking Number:		N/A (pellet)		335, 336, 185	

Logged Data		Temperatures (F)									
Elapsed Time (min)	Scale (lb)	Stack Draft (in H ₂ O)	Stack	Ambient	FB Top	FB Bottom	FB Back	FB Left	FB Right	Cat. In	Cat. Out
0	8.1	-0.111	357	71	461	585	365	733	493		
10	7.8	-0.101	284	71	343	426	302	458	296		
20	7.6	-0.095	235	71	275	303	223	360	215		
30	7.3	-0.094	214	71	243	263	194	310	190		
40	7.1	-0.093	208	70	236	245	184	298	180		
50	6.8	-0.093	204	70	230	238	179	291	177		
60	6.6	-0.091	197	69	227	221	169	286	165		
Averages:		-0.097	242.71	70.43	287.86	325.86	230.86	390.86	245.14		

 2/24/14

Model: Santa Fe/Castile
Hearth & Home Technologies
1445 North Highway
Colville, WA 99114

Run 3

Wood Heater Test Data - EPA Method 5G

Manufacturer: Hearth & Home
 Model: Santa Fe/Castile
 Project No.: 061-S-77-8.3
 Tracking No.: 1932
 Run: 3
 Test Date: 02/19/14

Burn Rate	1.26 kg/hr dry
Average Tunnel Temperature	101 degrees Fahrenheit
Average Gas Velocity in Dilution Tunnel - vs	13.2 feet/second
Average Gas Flow Rate in Dilution Tunnel - Qsd	8520.0 dscf/hour
Average Delta p	0.038 inches H2O
Average Delta H	1.39 inches H2O
Total Time of Test	120 minutes

	AVERAGE	SAMPLE TRAIN 1	SAMPLE TRAIN 2
Total Sample Volume - Vm	20.43 cubic feet	20.20 cubic feet	20.65 cubic feet
Average Gas Meter Temperature	77 degrees Fahrenheit	77 degrees Fahrenheit	77 degrees Fahrenheit
Total Sample Volume (Standard Conditions) - Vmstd	20.7 dscf	20.4 dscf	21.0 dscf
Total Particulates - mn		1.6 mg	1.9 mg
Particulate Concentration (dry-standard)	0.00008 grams/dscf	0.00008 grams/dscf	0.00009 grams/dscf
Particulate Emission Rate	0.72 grams/hour	0.67 grams/hour	0.77 grams/hour
Adjusted Emissions	1.38 grams/hour	1.30 grams/hour	1.47 grams/hour
Difference from Average		0.08 grams/hour	0.08 grams/hour
7.5% of the average emission rate	0.10		
Weighted Average Emission Rate Limit	4.10 grams/hour		
7.5% of the weighted average emission rate limit	0.31		
Results Are Acceptable			

Wood Heater Test Data - EPA Method 5G

Unit:	3	Manufacturer:	Hearth & Home
		Model:	Santa Fe/Casible
		Tracking No.:	1932
		Project No.:	061-S-77&3
		Test Date:	19-Feb-14
		Beginning Clock Time:	09:40
		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	0.026	0.040	0.044	0.038	0.044	0.028	0.044	0.036	
Initial Temp	96	96	96	97	97	97	97	97	

OMNI Equipment Numbers:

185, 209, 335, 336, 410

PM Control Module: 335/336
 Dilution Tunnel MW(dry): 29.00 lb/b-mole
 Dilution Tunnel MW(wet): 28.56 lb/b-mole
 Dilution Tunnel H₂O: 4.00 percent
 Dilution Tunnel Static: -0.590 "H₂O
 Pilot Tube Cp: 0.99
 Meter Box Y Factor: 1.015 (1)
 Barometric Pressure: 30.20

Signature/Date: *Asa Kelly*
 Tunnel Velocity: 13.22 ft/sec
 Initial Tunnel Flow: 141.9 scfm
 Average Tunnel Flow: 142.0 scfm
 Tunnel Area: 0.1963 ft²
 Post-Test Leak Check (1): 0.006 cfm/Hg
 Post-Test Leak Check (2): 0.001 cfm/Hg
 Fuel Moisture (dry basis %): 1.0
 Total Particulate (1): 1.0
 Total Particulate (2): 1.9

Elapsed Time	Particulate Sampling Data										Fuel Weight, lb										Wood Heater Temperature Data, of										Stack	
	Gas Meter Cubic Feet (1)	Gas Meter Cubic Feet (2)	Sample Rate, cfm (1)	Sample Rate, cfm (2)	Orifice dH(1)	Orifice dH(2)	Meter oF (1)	Meter oF (2)	Meter Vac. In. Hg (1)	Meter Vac. In. Hg (2)	Dilution Tunnel Temp.	Dilution Tunnel dP	Pro. Rate (10%) (1)	Pro. Rate (10%) (2)	Scale Reading	Weight Change	Firebox Top	Firebox Bottom	Firebox Back	Firebox Left	Firebox Right	Catalyst Exit	Average Surface	Stack (1)	Filter (1)	Impinger exit (1)	Impinger exit (2)	Ambient	Draft In. H ₂ O			
0	0.000	0.000	0.17	0.17	1.45	1.26	70	70	1.25	-0.4	97	0.038	101	101	5.9	0.000	298	351	220	450	285	N/A	320.8	266	69	68	N/A	N/A	68	-0.103		
10	1.670	1.707	0.17	0.17	1.45	1.26	71	71	1.29	-0.4	103	0.038	101	101	5.4	-0.5	309	370	230	462	301	N/A	334.4	273	73	73	N/A	N/A	69	-0.102		
20	3.344	3.419	0.17	0.17	1.45	1.25	73	73	1.29	-0.5	103	0.038	101	101	4.9	-0.5	296	365	225	445	288	N/A	323.8	267	74	74	N/A	N/A	69	-0.103		
30	5.018	5.133	0.17	0.17	1.44	1.25	75	75	1.29	-0.5	102	0.038	101	101	4.4	-0.5	301	377	231	445	281	N/A	327.0	268	75	75	N/A	N/A	69	-0.103		
40	6.696	6.850	0.17	0.17	1.44	1.25	77	77	1.29	-0.5	101	0.038	101	101	3.9	-0.5	308	377	233	467	290	N/A	335.0	274	75	75	N/A	N/A	69	-0.103		
50	8.379	8.571	0.17	0.17	1.44	1.26	78	78	1.3	-0.5	101	0.038	101	101	3.4	-0.5	307	384	235	455	286	N/A	333.4	271	74	75	N/A	N/A	69	-0.105		
60	10.064	10.294	0.17	0.17	1.45	1.26	79	79	1.29	-0.5	100	0.038	101	101	2.9	-0.5	308	376	234	462	288	N/A	333.6	273	74	74	N/A	N/A	68	-0.105		
70	11.752	12.018	0.17	0.17	1.45	1.26	80	80	1.3	-0.5	102	0.038	101	101	2.4	-0.5	334	390	246	508	302	N/A	356.0	286	74	74	N/A	N/A	68	-0.106		
80	13.441	13.743	0.17	0.17	1.45	1.26	80	80	1.3	-0.5	100	0.038	101	100	1.9	-0.5	306	375	233	462	279	N/A	331.0	270	74	74	N/A	N/A	68	-0.104		
90	15.131	15.469	0.17	0.17	1.44	1.25	81	80	1.3	-0.4	100	0.038	100	100	1.5	-0.4	301	375	232	443	277	N/A	325.6	268	74	74	N/A	N/A	68	-0.104		
100	16.822	17.195	0.17	0.17	1.44	1.25	81	80	1.3	-0.5	101	0.038	101	101	1.0	-0.5	313	380	236	463	288	N/A	336.0	275	74	74	N/A	N/A	68	-0.103		
110	18.512	18.922	0.17	0.17	1.45	1.25	81	80	1.31	-0.5	99	0.038	100	100	0.5	-0.5	292	360	220	435	275	N/A	316.4	264	74	74	N/A	N/A	67	-0.104		
120	20.203	20.648	0.17	0.17	1.45	1.26	81	80	1.3	-0.5	99	0.038	100	100	0.0	-0.5	300	357	222	448	270	N/A	319.4	266	74	74	N/A	N/A	68	-0.105		
g/total	20.203	20.648	0.17	0.17	1.39	1.21	77.46	77.15			100.59	0.038	100.68	100.69									1		73.69	73.69	N/A	N/A		-0.104		

Run Notes

Client: Hearth & HomeModel: Santa Fe / CastileProject #: 061-S-77-8.3Tracking #: 1932Run #: 3 Date: 2/19/14Test Crew: A. KravitzOMNI Equipment ID #(s): 335, 336PREBURNDESCRIBE OR SKETCH AIR OR THERMOMETER SETTINGS BELOW:
(SETTINGS MUST BE ACCURATE AND REPRODUCIBLE)

PRIMARY:

Control Board @ 6
FRAP @ Closed
Toggle Switch @ High

SECONDARY: N/ATERTIARY: NAFAN: AutoPREBURN SETTINGS AND ACTIVITIES

TIME	AIR (THERMO) CHANGES PRIMARY/SECONDARY/TERTIARY	FAN SETTING CHANGE	ADD FUEL + WT.	ADD FUEL - WT.	RAKE COAL	COMMENT
	<u>None</u>					

TESTTEST FUEL CONFIGURATION SKETCH
(INDICATE VIEW ANGLE)

Pellets

START UP PROCEDURES

BYPASS: NAFUEL LOADING: NADOOR: NAPRIMARY AIR: NAOTHER: NADESCRIBE OR SKETCH TEST SETTINGS BELOW:
(SETTINGS MUST BE ACCURATE AND REPRODUCIBLE)

PRIMARY:

Control Board @ 6
FRAP @ Closed
Toggle Switch @ High

SECONDARY: NATERTIARY: NAFAN: AutoTechnician signature: [Signature]Date: 2/19/14

Supplemental Data EPA 5G/5H

Client: Hearth & Home

Model: Santa Fe / Castile

Project #: 061-S-77-8.3

Tracking #: 1932

Date: 2/12/17

Run #: 3

Booth: E1

Test Crew: A. Krawitz

Start Time: 940

Stop Time: 1140

OMNI Equipment #(s): 132, 185, 282, 335, 336, 410, 378, 420, 209

Stack Gas Leak Check:

Dilution Tunnel Gas Leak Check (5H only):

Initial: Ø

Initial: NA

Final: Ø

Final: NA

Calibrations: Span Gas CO₂: 16.75 O₂: NA CO: 4.340 CO₂ (DT): NA

Mid Gas CO₂: 10.02 O₂: NA CO: 2.533 CO₂ (DT): NA

A: .000
B: .001

Time
O ₂
CO ₂
CO
CO ₂ (DT)

Pre Test		
Zero	Span	Mid
839	840	841
NA		
0.00	16.75	10.17
0.000	4.340	2.557
NA		

Post Test		
Zero	Span	Mid
1144	1145	1145
NA		
0.01	16.79	10.16
0.004	4.355	2.558
NA		

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

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

Pitot Tube Leak Test: Initial: Ø Final: Ø

Stack Diameter (inches): 6

Induced Draft: Ø

% Smoke Capture: 100

Flue Pipe Cleaned Prior to First Test in Series:

Date: 2/17 Initials: AK

	Initial	Middle	Ending
P _b (in/Hg)	30.20	30.23	30.26
Ambient (°F)	68	68	67

Tunnel Traverse	
dP (in H ₂ O)	T (°F)
.026	16
.040	↓
.044	↓
.038	27
.028	↓
.044	↓
.044	↓
.036	↓
NA	NA
↓	↓
↓	↓
Static P:	-.59

Technician signature: AK

Date: 2/12/17

Method 28 Preburn Data

Run Data		Client: <u>Hearth & Home</u>		Test Run: <u>3</u>							
Model: <u>Santa Fe / Castile</u>		Date: <u>2/19/2004</u>									
Project Number: <u>061-S-77-8.3</u>		Test Crew: <u>A. Kravitz</u>									
Tracking Number: <u>1932</u>		Equipment: <u>335, 336, 185</u>									
Coal Bed Range (lb): <u>N/A (pellet)</u>											
Logged Data											
Temperatures (F)											
Elapsed Time (min)	Scale (lb)	Stack Draft (in H ₂ O)	Stack	Ambient	FB Top	FB Bottom	FB Back	FB Left	FB Right	Cat. In	Cat. Out
0	20.6	-0.077	76	65	78	76	71	81	70		
10	20	-0.102	241	65	292	225	180	351	208		
20	19.6	-0.101	235	65	255	286	183	368	226		
30	19.1	-0.104	256	66	285	333	208	424	260		
40	18.6	-0.103	249	67	274	329	206	402	254		
50	18.1	-0.102	252	68	276	339	210	409	260		
60	17.6	-0.101	264	68	296	349	219	446	282		
Averages:		-0.099	224.71	66.29	250.86	276.71	182.43	354.43	222.86		

ALB 2/24/14

Model: Santa Fe/Castile
Hearth & Home Technologies
1445 North Highway
Colville, WA 99114

Run 4

Wood Heater Test Data - EPA Method 5G

Manufacturer: Hearth & Home
 Model: Santa Fe/Castile
 Project No.: 061-S-77-8.3
 Tracking No.: 1932
 Run: 4
 Test Date: 02/19/14

Burn Rate	1.00 kg/hr dry
Average Tunnel Temperature	96 degrees Fahrenheit
Average Gas Velocity in Dilution Tunnel - vs	13.2 feet/second
Average Gas Flow Rate in Dilution Tunnel - Qsd	8560.0 dscf/hour
Average Delta p	0.038 inches H2O
Average Delta H	1.40 inches H2O
Total Time of Test	120 minutes

	AVERAGE	SAMPLE TRAIN 1	SAMPLE TRAIN 2
Total Sample Volume - Vm	20.52 cubic feet	20.34 cubic feet	20.70 cubic feet
Average Gas Meter Temperature	78 degrees Fahrenheit	78 degrees Fahrenheit	78 degrees Fahrenheit
Total Sample Volume (Standard Conditions) - Vmstd	20.8 dscf	20.6 dscf	21.0 dscf
Total Particulates - mn		1.6 mg	1.5 mg
Particulate Concentration (dry-standard)	0.00007 grams/dscf	0.00008 grams/dscf	0.00007 grams/dscf
Particulate Emission Rate	0.64 grams/hour	0.67 grams/hour	0.61 grams/hour
Adjusted Emissions	1.25 grams/hour	1.30 grams/hour	1.21 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

MR: 4	Manufacturer: Hearth & Home
	Model: Santa Fe/Castle
	Tracking No.: 1932
	Project No.: 061-S-72&3
	Test Date: 19-Feb-14
	Beginning Clock Time: 12:43
	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	0.026	0.040	0.044	0.038	0.044	0.028	0.044	0.036	"H2O
Initial Temp	96	96	96	97	97	97	97	97	°F

OMNI Equipment Numbers:

185, 209, 335, 336, 410

Signature/Date: <i>ADD 2/24/14</i>	Tunnel Velocity: 13.15 ft/sec
PM Control Module: 335/336	Initial Tunnel Flow: 142.0 scfm
Dilution Tunnel MW(dry): 29.00 lb/lb-mole	Average Tunnel Flow: 142.7 scfm
Dilution Tunnel MW(wet): 28.56 lb/lb-mole	Tunnel Area: 0.1963 ft ²
Dilution Tunnel H2O: -4.00 percent	Post-Test Leak Check (1): 0.008 cfm/Hg
Dilution Tunnel Static: -0.590 "H2O	Post-Test Leak Check (2): 0.004 cfm/Hg
Pilot Tube Cp: 0.99	Fuel Moisture (dry basis %): 6.31
Meter Box Y Factor: 1.015 (1)	Total Particulate (1): 1.6
Barometric Pressure: 30.26 "Hg	Total Particulate (2): 1.5
	End: 30.27 "Hg
	Average: 30.26 "Hg

Elapsed Time	Particulate Sampling Data										Fuel Weight, lb										Wood Heater Temperature Data, °F										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 off (1)	Meter on (2)	Meter Vac. In. Hg. (1)	Meter Vac. In. Hg. (2)	Dilution Tunnel Temp. °F	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 (1)	Filter (1)	Filter (2)	Impinger exit (1)	Impinger exit (2)	Ambient	Draft In H ₂ O		
0	0.000	0.000			0.70	0.70	76	76	0.18	-0.4	97	0.038	101	(2)	4.7		275	308	205	386	233	N/A	281.4	243	68	68	N/A	N/A	67	-0.102	
10	1.606	1.722	0.17	0.17	1.47	1.26	75	75	1.29	1.1	96	0.038	101	101	4.3	-0.4	284	313	211	386	242	N/A	290.6	250	71	71	N/A	N/A	67	-0.102	
20	3.389	3.446	0.17	0.17	1.46	1.26	76	76	1.28	1.1	96	0.038	101	101	3.9	-0.4	273	305	203	388	234	N/A	280.6	243	72	72	N/A	N/A	67	-0.099	
30	5.080	5.167	0.17	0.17	1.45	1.26	77	76	1.28	1.2	97	0.038	101	101	3.5	-0.4	286	326	214	396	249	N/A	294.2	252	72	72	N/A	N/A	67	-0.101	
40	6.771	6.890	0.17	0.17	1.45	1.25	78	77	1.29	1.2	96	0.038	101	101	3.1	-0.4	274	309	205	384	233	N/A	281.0	242	72	72	N/A	N/A	67	-0.101	
50	8.462	8.613	0.17	0.17	1.46	1.26	78	78	1.29	1.2	97	0.038	101	101	2.7	-0.4	280	314	208	392	241	N/A	287.0	246	72	72	N/A	N/A	67	-0.100	
60	10.157	10.339	0.17	0.17	1.45	1.25	79	79	1.28	1.2	96	0.038	101	101	2.3	-0.4	282	311	209	396	244	N/A	288.4	249	72	72	N/A	N/A	67	-0.102	
70	11.852	12.065	0.17	0.17	1.46	1.25	79	79	1.29	1.2	94	0.038	100	100	2.0	-0.3	264	295	197	374	223	N/A	270.6	235	72	72	N/A	N/A	67	-0.101	
80	13.549	13.792	0.17	0.17	1.45	1.26	79	79	1.29	1.2	97	0.038	101	101	1.5	-0.5	290	324	216	410	262	N/A	300.4	255	72	72	N/A	N/A	67	-0.102	
90	15.247	15.519	0.17	0.17	1.46	1.26	79	79	1.3	1.2	97	0.038	101	101	1.1	-0.4	281	313	210	398	249	N/A	290.2	249	72	73	N/A	N/A	67	-0.101	
100	16.944	17.246	0.17	0.17	1.46	1.26	80	79	1.29	1.2	96	0.038	101	101	0.8	-0.3	268	299	200	367	233	N/A	273.4	240	72	72	N/A	N/A	67	-0.100	
110	18.642	18.972	0.17	0.17	1.46	1.25	80	79	1.28	1.2	94	0.038	100	100	0.4	-0.4	255	278	189	355	222	N/A	259.8	232	72	72	N/A	N/A	67	-0.099	
120	20.341	20.699	0.17	0.17	1.45	1.26	80	79	1.29	1.2	95	0.038	101	101	0.0	-0.4	263	290	197	369	234	N/A	270.6	239	72	72	N/A	N/A	67	-0.101	
gTotal	20.341	20.699	0.17	0.17	1.40	1.21	78.15	77.77			95.97	0.038	100.73	100.74									11		71.69	N/A	N/A	N/A		-0.101	

Run Notes

Client: Hearth & HomeModel: Santa Fe / CastileProject #: 061-S-77-8.3Tracking #: 1932Run #: 4Date: 2/19/14Test Crew: A. KravitzOMNI Equipment ID #(s): 335, 336PREBURNDESCRIBE OR SKETCH AIR OR THERMOMSTAT SETTINGS BELOW:
(SETTINGS MUST BE ACCURATE AND REPRODUCIBLE)

PRIMARY:

Control Board @ 6
FRAP @ Mid-throw
Toggle switch @ Medium

SECONDARY: NATERTIARY: NAFAN: AutoPREBURN SETTINGS AND ACTIVITIES

TIME	AIR (THERMO) CHANGES PRIMARY/SECONDARY/TERTIARY	FAN SETTING CHANGE	ADD FUEL + WT.	ADD FUEL - WT.	RAKE COAL	COMMENT
	None					

TESTTEST FUEL CONFIGURATION SKETCH
(INDICATE VIEW ANGLE)

Pellets

START UP PROCEDURES

BYPASS: NAFUEL LOADING: NADOOR: NAPRIMARY AIR: NAOTHER: NADESCRIBE OR SKETCH TEST SETTINGS BELOW:
(SETTINGS MUST BE ACCURATE AND REPRODUCIBLE)

PRIMARY:

Control Board @ 6
FRAP @ Mid-throw
Toggle switch @ Medium

SECONDARY: NATERTIARY: NAFAN: AutoTechnician signature: A. KravitzDate: 2/19/14

Supplemental Data EPA 5G/5H

Client: Hearth & Home

Model: Santa Fe / Castile

Project #: 061-S-77-8.3

Tracking #: 1932

Date: 2/19/14 Run #: 4 Booth: E1

Test Crew: A. Kravitz Start Time: 12:43 Stop Time: 14:43

OMNI Equipment #(s): 132, 185, 282, 335, 336, 410, 338, 420, 209

Stack Gas Leak Check:

Dilution Tunnel Gas Leak Check (5H only):

Initial: Ø

Initial: NA

Final: Ø

Final: NA

Calibrations: Span Gas CO₂: 16.75 O₂: NA CO: 4.340 CO₂ (DT): NA

Mid Gas CO₂: 1002 O₂: NA CO: 2.533 CO₂ (DT): NA

A: .008
B: .004

Time
O ₂
CO ₂
CO
CO ₂ (DT)

Pre Test		
Zero	Span	Mid
1144	1145	1145
NA		
0.01	16.79	10.16
0.004	4.355	2.558
NA		

Post Test		
Zero	Span	Mid
1446	1448	1447
NA		
0.01	16.78	10.14
0.012	4.359	2.564
NA		

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

Scale Audit (lbs): Initial: 16.0 Final: 16.0

Pitot Tube Leak Test: Initial: Ø Final: Ø

Stack Diameter (inches): 6

Induced Draft: Ø

% Smoke Capture: 100

Flue Pipe Cleaned Prior to First Test in Series:

Date: 2/17 Initials: AK

	Initial	Middle	Ending
P _b (in/Hg)	30.26	30.26	30.27
Ambient (°F)	67	67	67

Tunnel Traverse	
dP (in H ₂ O)	T(°F)
.026	96
.046	↓
.044	↓
.038	97
.028	↓
.044	↓
.044	↓
.036	↓
NA	NA
↓	↓
↓	↓
Static P:	-.59

Technician signature: AK

Date: 2/19/14

Method 28 Preburn Data

Run Data		Hearth & Home		Test Run:	
Client:		Santa Fe / Castile		4	
Model:		061-S-77-8.3		Date: 2/19/2004	
Project Number:		1932		Test Crew: A. Kravitz	
Tracking Number:		Coal Bed Range (lb):		Equipment: 335, 336, 185	
		N/A (pellet)			

Logged Data		Temperatures (F)									
Elapsed Time (min)	Scale (lb)	Stack Draft (in H ₂ O)	Stack	Ambient	FB Top	FB Bottom	FB Back	FB Left	FB Right	Cat. In	Cat. Out
0	11.6	-0.104	267	68	303	364	225	446	272		
10	11.2	-0.102	257	68	292	349	226	412	259		
20	10.8	-0.102	242	68	269	319	208	374	238		
30	10.4	-0.101	246	68	276	314	211	402	246		
40	10	-0.102	254	68	288	335	220	406	260		
50	9.8	-0.1	243	68	272	309	207	382	234		
60	9.4	-0.101	242	67	275	309	205	386	233		
Averages:		-0.102	250.14	67.86	282.14	328.43	214.57	401.14	248.86		

AKC 2/24/14