

Certification Test Report

Hearth and Home Technologies

Wood Stove Insert

Model: 2700-I ACC

Prepared for: Hearth and 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: August 5-7, 2009

Report Date: October 2009

Report Number: 061-S-52b-3

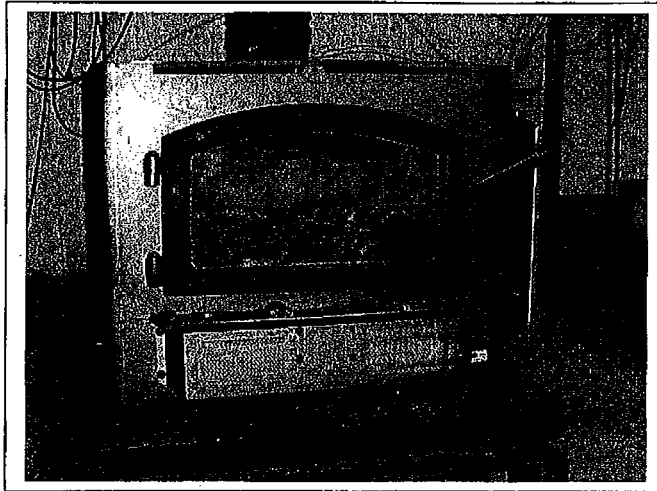
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2700-I ACC

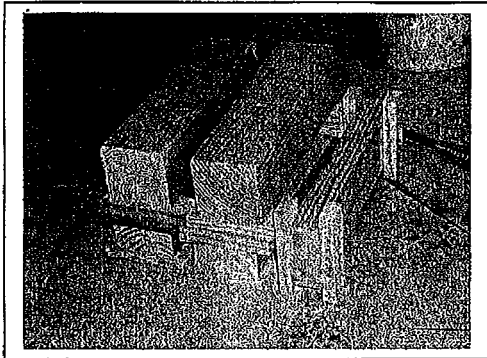
Test Dates: August 5-7, 2009



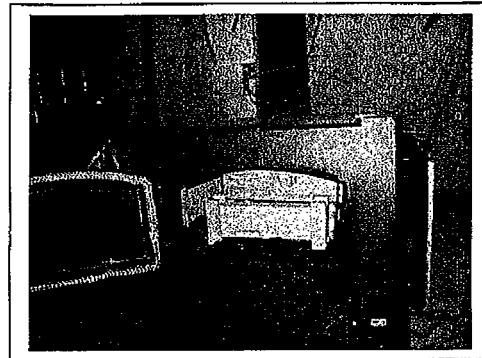
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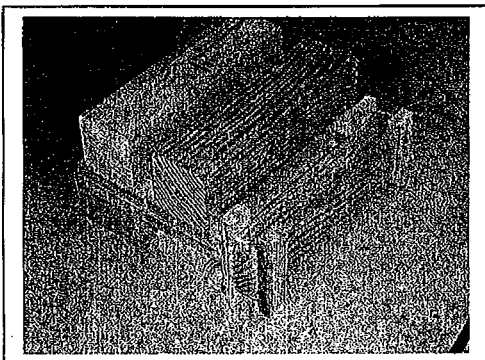
Run 1 – Fuel



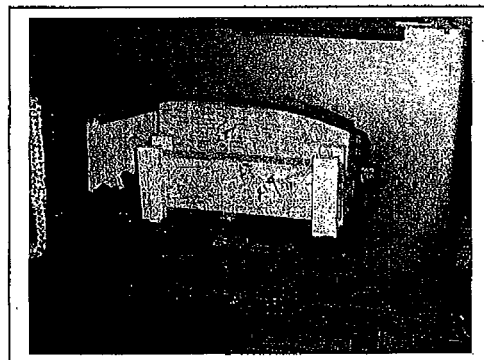
Run 1 – Newly Loaded Stove



Run 2 – Fuel



Run 2 – Newly Loaded Stove



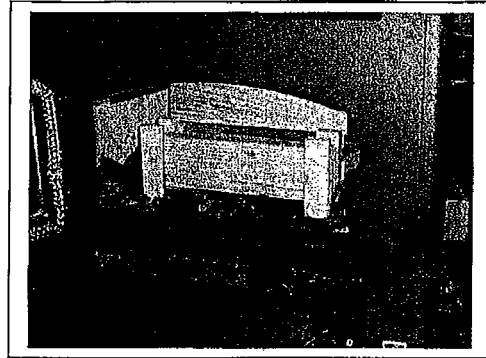
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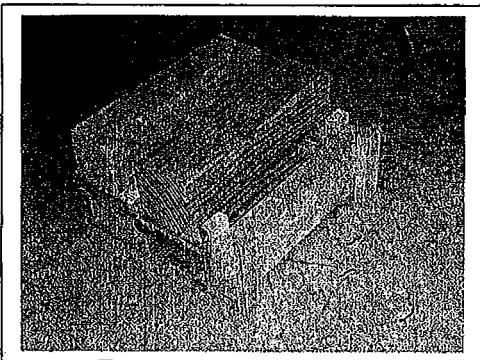
Run 3 – Fuel



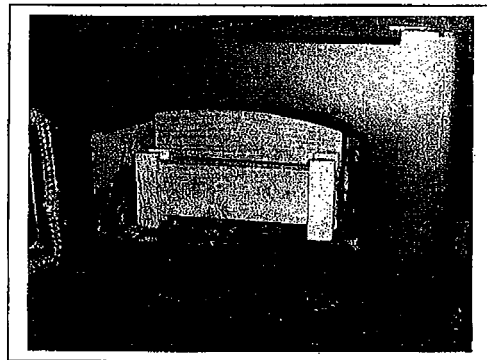
Run 3 – Newly Loaded Stove



Run 4 – Fuel



Run 4 – Newly Loaded Stove



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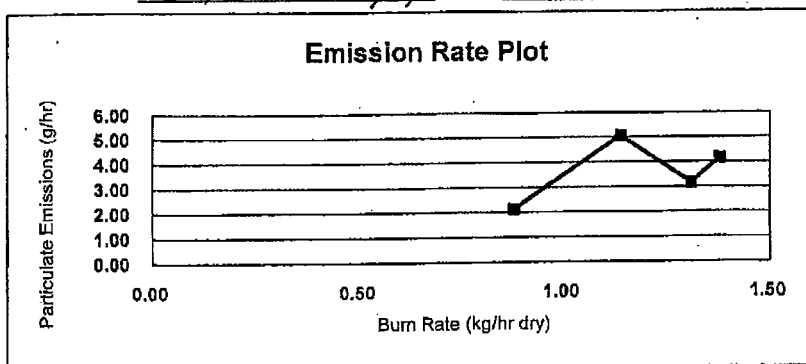
Section 4

Test Data by Run

EPA Weighted Average Emissions EPA Method 28

Client: Hearth N Home Status: Final
 Stove Model: 2700I Stove Type: Non-Catalytic Stove
 Test Dates: August 5, through August 7, 2009
 Project Number: 061-S-52b-3
 Tracking Number: ##### 1464 *et*
 Signature/Date: *B. J. ... 10/2/09*

Weighted Average (g/hr) 3.5



Run #	1	
Burn Rate (dry kg/hr)	0.88	
Category	2	
Overall Efficiency (%)	63%	✓
Emissions (g/hr)	2.12	
Cap (g/hr)	15	
Weighting Factor	0.484	34.65%
Heat Output (BTU/hr)	10450	

Run #	3	
Burn Rate (dry kg/hr)	1.14	
Category	2	<i>mk</i>
Overall Efficiency (%)	63%	
Emissions (g/hr)	5.06	
Cap (g/hr)	15	
Weighting Factor	0.345	24.71%
Heat Output (BTU/hr)	13538	

Run #	4	
Burn Rate (dry kg/hr)	1.31	
Category	3	<i>mt</i>
Overall Efficiency (%)	63%	
Emissions (g/hr)	3.15	
Cap (g/hr)	15	
Weighting Factor	0.195	13.93%
Heat Output (BTU/hr)	15556	

Run #	2	
Burn Rate (dry kg/hr)	1.38	
Category	3	<i>H</i>
Overall Efficiency (%)	63%	
Emissions (g/hr)	4.16	
Cap (g/hr)	15	
Weighting Factor	0.373	26.71%
Heat Output (BTU/hr)	16388	

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Run 1

Wood Heater Calculation Data EPA Method 5H

Run	1
Manufacturer:	Hearth and Home Tech
Model/Tracking No.:	2700ACC
Test Date:	05-Aug-09
Project Number:	061-S-52b-3

Burn Rate (dry kg/hour) =

0.88

Emission Rate (grams/hour) =

2.12

Note: When using the CO2 tracer-gas method, 1/Qf (by tracer gas) = SI

Elapsed Time (minutes)	Dilution Tunnel Velocity (feet/second actual)	Fo (1.00 to 1.12)	Qf by carbon balance (scf/minute)	Qf by tracer gas (scf/minute)	1/Qf by tracer gas (SI)	Volume Sampled (scf)	SI * Volume Sampled	Proportional Sample Rate	dH new
10	12.5	1.04	0.0	127.9	0.150	0.089	3.084	0.463	100.0
20	12.6	1.02	10.6	126.8	0.106	4.756	0.422	85.4	0.975
30	12.7	1.01	9.7	126.1	0.111	4.219	0.449	101.0	0.923
40	12.6	1.06	14.1	126.9	0.131	4.067	0.454	101.5	0.447
50	12.6	1.01	7.5	126.7	0.131	3.378	0.441	99.0	0.449
60	12.7	1.01	10.0	126.6	0.132	3.220	0.420	95.2	0.435
70	12.7	1.01	5.6	126.5	0.134	3.394	0.449	101.5	0.426
80	12.6	1.02	9.6	126.7	0.136	3.398	0.454	102.1	0.412
90	12.6	1.01	9.0	126.9	0.131	3.410	0.465	104.1	0.448
100	12.6	1.01	5.8	126.9	0.130	3.358	0.438	98.4	0.458
110	12.6	1.02	7.7	127.3	0.149	3.422	0.443	99.5	0.344
120	12.6	1.05	5.1	127.5	0.144	3.062	0.461	103.3	0.387
130	12.5	1.13	1.6	126.0	0.167	3.187	0.459	102.5	0.273
140	12.5	1.16	4.8	126.2	0.180	2.696	0.451	100.7	0.235
150	12.5	1.18	3.6	126.3	0.193	2.696	0.481	108.9	0.205
160	12.5	1.19	4.5	126.5	0.210	2.490	0.481	108.4	0.173
170	12.5	1.19	0.0	126.5	0.243	2.162	0.455	100.6	0.065
180	12.4	1.09	0.0	126.7	0.213	1.231	0.422	93.7	0.169
190	12.4	1.10	3.0	126.7	0.212	1.967	0.419	93.3	0.170
200	12.4	1.11	2.9	126.7	0.222	1.949	0.413	92.4	0.155
210	12.5	1.10	1.4	126.5	0.223	2.188	0.485	108.1	0.154
220	12.5	1.11	1.4	126.5	0.226	2.096	0.453	100.9	0.150
230	12.5	1.13	2.9	126.4	0.222	2.049	0.463	102.9	0.155
240	12.5	1.14	1.4	126.4	0.216	2.025	0.449	99.9	0.160
250	12.5	1.13	3.0	126.4	0.233	2.020	0.440	98.0	0.140
260	12.5	1.15	3.1	126.4	0.238	1.989	0.463	103.0	0.135
270	12.5	1.14	1.6	126.4	0.224	2.031	0.483	107.0	0.152
280	12.5	1.14	1.6	126.3	0.233	1.944	0.436	96.7	0.140
290	12.5	1.15	1.7	126.4	0.236	2.016	0.470	104.3	0.134
300	12.5	1.13	1.7	126.4	0.238	1.958	0.466	103.2	0.134
Averages/Totals	12.5	1.09	4.5	127.8	0.184	2.714	100.7	100.7	0.259

Woodstove Type
Yinc-1=cat, 2=cat, 3=pellet

EPA's Hydrocarbon Constant (%)

Fuel Data
Test Charge (as fired lbs)

Average Moisture (% dry basis)

Average Moisture (% wet basis)

Run Parameters

DGM initial reading (cf)

DGM final reading (cf)

Pb (inches Hg)

Tm (avg of)

dH (avg inches wc)

Vm (scf)

Qf by carbon balance (avg dscf/minute)

Analytical Data

Probe/Front Weat (mg)

Front Filter (mg)

Impinger PM (mg)

Back Filter (mg)

Total Weight (mg)

Emission Results

Cs (g/dscf)

ER (g/hour)

76.15 DM7 EFF.

Final Laboratory Report - Method 5H **Dilution Tunnel Particulate Calculations**

Client Name: Hearth and Home Equipment Numbers: _____ Run No.: 1
 Model: 2700I Date: 08/05/09
 Project No.: 061-S-52b-3
 Tracking No.: 1464

PARTICULATE COMPONENTS

Sample Component	Reagent	Filter # or Volume, ml	Weights			
			Final, mg	Tare, mg	Blank, mg/ml	Particulate, mg
A. Front filter catch	Filter	N108	731.8	627.1		104.7
B. Rear filter catch	Filter	D489	231.8	151.7		80.1
C. Rinse of probe and filter assembly (FRONT)	Acetone	75	105337.8	105265.8	0.0090	71.3
D. Rinse of Impinger Set	Distilled Water	475	144705.1	144553.2	0.0000	151.9
E. Rinse of Impinger Set	Dichloromethane	150	111333.6	111246.7	0.0000	86.9
F. Rinse of filter assembly and gas train (BACK)	Acetone	110	110926.6	110780.5	0.0090	145.1
Total Particulate, mg :						640.0

Component	Equations:
A. Front filter catch	Final (mg) - Tare (mg) = Particulate, mg
B. Rear filter catch	Final (mg) - Tare (mg) = Particulate, mg
C. Rinse of probe and filter assembly (FRONT)	(Final, mg - Tare, mg) - (Blank, mg/ml x Volume, ml) = Particulate, mg
D. Rinse of Impinger Set	(Final, mg - Tare, mg) - (Blank, mg/ml x Volume, ml) = Particulate, mg
E. Rinse of Impinger Set	(Final, mg - Tare, mg) - (Blank, mg/ml x Volume, ml) = Particulate, mg
F. Rinse of filter assembly and gas train (BACK)	(Final, mg - Tare, mg) - (Blank, mg/ml x Volume, ml) = Particulate, mg

CONDENSED WATER

IMPINGERS	Weights		
	Final, g	Initial, g	Net, g
1	768.3	654.5	113.8
2	662.4	652.3	10.1
3	447.9	445.3	2.6
4	830.0	811.4	18.6
TOTAL, g:			145.1

Analyst: BDDate: 7/22/07

FUEL DATA

Client: Hearth N HomeModel: 2700IProject #: 061-S-52b-3Tracking #: 1464Date: 8-5-09Test Crew: B. DAVISRun #: 1

OMNI Equipment ID #: _____

FUEL LOAD PREPARED BY: B. DAVISFUEL: DOUGLAS-FIR SPECIES, UNTREATED, AIR-DRIED, STANDARD GRADE OR BETTER,
DIMENSIONAL LUMBER.

PRE-BURN FUEL

MOISTURE CONTENT (METER -- DRY BASIS)

CALIBRATION: Cal Value (1) = 12% Actual Reading 12
 Cal Value (2) = 22% Actual Reading 22

Piece	Length	Readings	Type
1	<u>24"</u> ft	<u>221</u> <u>222</u> <u>222</u>	<u>2x4</u>
2	_____ ft	_____	_____
3	_____ ft	_____	_____

Length of cut pieces: 3e8" inchesPre-Burn Fuel Average Moisture: 22.17%Time (clock): 10:40 Room Temperature (F): 75 Initials: BD

TEST FUEL

FUEL TYPE AND AMOUNT: 2x4 3 4x4 2
 CALCULATED LOAD WEIGHT: 12.2 ACTUAL LOAD WEIGHT: 5.4 (2x4)
6.4 (4x4)
 FUEL PIECE LENGTH: 13" 11.8 Total

MOISTURE CONTENT (METER -- DRY BASIS)

PIECE	READINGS	TYPE
1	<u>18.7</u> <u>20.9</u> <u>19.3</u>	<u>2x4</u>
2	<u>22.3</u> <u>23.6</u> <u>23.4</u>	<u>2x4</u>
3	<u>18.7</u> <u>23.1</u> <u>21.9</u>	<u>2x4</u>
4	<u>19.1</u> <u>21.1</u> <u>20.8</u>	<u>4x4</u>
5	<u>24.6</u> <u>23.7</u> <u>24.6</u>	<u>4x4</u>
6	_____	_____
7	_____	_____
8	_____	_____
9	_____	_____
10	_____	_____

OVERALL TEST FUEL LOAD MOISTURE AVERAGE: 21.71Time (clock): 10:55 Room Temperature (F): 75 Initials: BDTechnician signature: B. Davis Date: 8-5-09

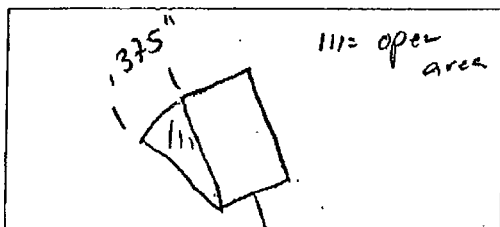
Run Notes

Client: Hearth N HomeModel: 27001Project #: 061-S-52b-3Tracking #: 1464Run #: 1Date: 8/5/09Test Crew: B Davis

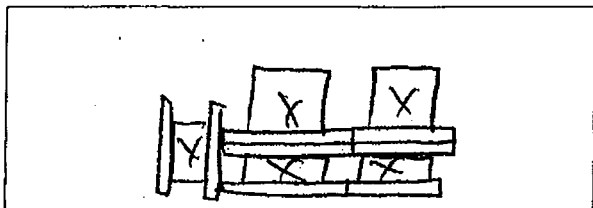
OMNI Equipment ID #(s): _____

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

PRIMARY:

SECONDARY: fixedTERTIARY: NAFAN: on HighPREBURN SETTINGS AND ACTIVITIES

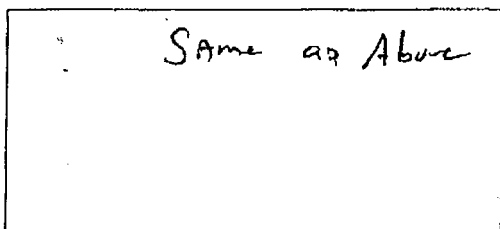
TIME	AIR (THERMO) CHANGES PRIMARY/SECONDARY/TERTIARY	FAN SETTING CHANGE	ADD FUEL + WT.	ADD FUEL - WT.	RAKE COAL	COMMENT
0 55					X	

@ 171 mV Steered Fuel load due to zero weight loss
TESTTEST FUEL CONFIGURATION SKETCH
(INDICATE VIEW ANGLE)START UP PROCEDURESBYPASS: NAFUEL LOADING: by 50 secondsDOOR: closed by 1:00PRIMARY AIR: At test setting full 5'00

OTHER:

Timed Air pushed at zero minutesDESCRIBE OR SKETCH TEST SETTINGS BELOW:
(SETTINGS MUST BE ACCURATE AND REPRODUCIBLE)

PRIMARY:

SECONDARY: fixedTERTIARY: NA

FAN:

off for 1st 30 minutesTechnician signature: [Signature]Date: 8-5-09

Supplemental Data EPA 5G/5H

Client: Hearth N HomeModel: 2700IProject #: 061-S-52b-3Tracking #: 1464Date: 8-5-09 Run #: 1 Booth: 1Test Crew: B Davis Start Time: 12:20 Stop Time: 17:20

OMNI Equipment #(s): _____

Gas Analyzer Train Leak Check:

Stack:

Dilution Tunnel (Method 5G Only):

Initial: goodInitial: good

Final: _____

Final: _____

Calibrations: Span Gas CO₂: 9.93 O₂: 9.95 CO: 9.7 CO₂(DT): 1.00

	N ₂ Span		N ₂ Span		N ₂ Span	N ₂ Span	N ₂ Span	N ₂ Span
Time	<u>0</u>		<u>12:05</u>					
O ₂	<u>0.0</u>	<u>9.93</u>	<u>0.0</u>	<u>9.9</u>				
CO ₂	<u>0.0</u>	<u>9.95</u>	<u>0.0</u>	<u>9.9</u>				
CO	<u>0.00</u>	<u>9.7</u>	<u>0.00</u>	<u>9.8</u>				
CO ₂ (DT)	<u>0.00</u>	<u>1.99</u>	<u>0.00</u>	<u>1.98</u>				

Stack Diameter (inches): 6"Air Velocity (ft/min): Initial: 2.50 Final: 2.50Scale Audit (lbs): Pretest: 10.0 Post Test: 10.0Induced Draft: 0.0 %Smoke Capture: 100 %Pitot Tube Leak Test: Pre: 0.0 @ 3.0 Post: 0.0 @ 3.0Flue Pipe Cleaned Prior to First Test in Series: Date: 8-3-09 Initials: BD

	Initial	Middle	Ending
Pb (in/Hg)	<u>28.42</u>	<u>28.37</u>	<u>28.32</u>
Room Temp (°F)	<u>80</u>	<u>84</u>	<u>83</u>

Technician signature: BD Date: 8-5-09

*Model: 2700-IACC
Hearth and Home Technologies
1445 North Highway
Colville, WA 99114*

Run 2

Run Number 2

Health and Home Tech	Sample Rate Control Module Number:
Z7000 ACC	Test Meter Y:
stat	Office of:
D81-S-028-3	Pico Tube Co.
96-Aug-09	Average Barometric Pressure:
11:00	Average Fuel Moisture (dry basis %):
5	QIWI Equipment Numbers:
165	

Wood Heater Test Data
EPA Method 5H

322
9,978
8,873
9,69
18,28
2,16

Tunnel Velocity Traverse Date	PL4	PL5
	0.042	0.044
	119	118

Signature: _____ Date: _____

Post-Test Leak Check: _____

Gullion Tunnel					
	Flow	Initial			
			H ₂ O		143.2
			QF		sct/minite
Pt.7				115	
	0.948	0.030			
Pt.6					

6/27/01
D. S. Smith

Initial/Measured Values	
Duration	MMW (Sub-no)
	28.66
	Ambient CO2 (%)
	0.094
	Preliminary Initial Sampling Rate
	(<i>ml/min</i>)
	0.35

Elapsed Time	Particulate Sampling System				Fuel Weight	Snow-Rite-Cat Conditions					Snow Temperatures (°F)				Dilution Tunnel				Laboratory									
	Upr Gas After Reading (g)	Sample Rate (min)	Off-Gas (min)	Proportional Rate (%)		Dry Gas Meter (min)	Single Inlet Temperature (min)	Impinger Exit Temperature (min)	Not Burn Temperature (min)	Sink Reading (min)	Weight Change (min)	Water Pressure (min)	CO2 (%)	CO (%)	Temperature (°F)	Alt to Fuel Reading (ft)	Front Top	Front Bottom		Front Left	Front Right	Average Back (Average Back)	Temperature (°F)	g/Vol Velocity (min)	Pressure (min)	CO2 (%)	Ambient Temperature (°F)	
0	0.000	0.000	0.000	100.0	77	0	60	200	11.5	0.0	0.000	8.8	11.2	0.08	237	9.0	342	183	221	343	289	118	0.043	-0.73	0.910	78		
5	1.873	0.030	0.030	100.0	77	1	64	200	11.2	-0.3	-0.000	14.6	5.8	0.51	282	15.8	385	202	215	370	335	107	0.043	-0.73	0.440	78		
10	3.245	0.014	0.014	100.3	78	1	67	200	10.5	-0.7	-0.042	11.3	8.1	0.50	293	13.1	384	193	200	304	314	106	0.043	-0.73	0.700	81		
15	4.894	0.018	0.018	100.1	78	1	67	200	10.1	-0.4	-0.042	11.7	8.8	0.44	408	11.5	386	190	194	297	309	106	0.043	-0.73	0.760	81		
20	6.815	0.028	0.028	99.8	78	1	67	200	9.5	-0.6	-0.060	7.5	13.1	0.31	472	8.3	386	184	165	287	286	115	0.043	-0.73	0.950	81		
25	8.118	0.037	0.037	101.7	78	1	68	200	8.6	-0.9	-0.049	8.3	11.2	0.20	448	9.8	718	172	179	283	290	118	0.043	-0.73	0.920	80		
30	9.794	0.033	0.033	99.5	78	1	68	200	8.0	-0.6	-0.049	8.4	11.2	0.28	451	9.5	733	178	177	283	282	117	0.043	-0.73	0.910	81		
35	11.471	0.035	0.035	98.9	78	1	69	200	7.6	-0.4	-0.060	8.5	11.1	0.40	446	9.4	701	176	177	287	286	117	0.043	-0.73	0.890	82		
40	13.148	0.033	0.033	100.9	79	1	69	200	7.0	-0.6	-0.081	8.4	14.2	0.35	500	7.7	730	170	178	292	289	115	0.043	-0.73	1.000	82		
45	14.777	0.020	0.020	100.0	80	1	69	200	6.0	-1.0	-0.081	5.6	14.4	0.86	611	7.3	800	185	181	302	307	124	0.043	-0.73	1.140	82		
50	16.376	0.028	0.028	99.0	80	1	69	200	5.0	-1.0	-0.080	7.8	12.7	0.40	476	8.4	782	182	180	341	320	121	0.043	-0.73	1.030	80		
55	18.071	0.039	0.039	100.8	82	1	58	200	4.4	-0.6	-0.048	8.9	11.6	0.37	449	8.2	783	180	190	335	354	119	0.043	-0.73	0.940	81		
60	19.733	0.032	0.032	99.5	82	1	60	200	3.0	-0.5	-0.047	9.2	11.2	0.48	438	8.4	744	180	205	334	345	116	0.043	-0.73	0.940	81		
65	21.412	0.038	0.038	100.5	81	1	61	200	3.3	-0.6	-0.043	8.9	10.8	0.43	430	8.8	728	180	215	341	335	116	0.043	-0.73	0.880	82		
70	23.085	0.037	0.037	97.7	81	1	62	200	3.0	-0.3	-0.040	12.1	8.4	0.39	368	12.0	707	183	228	343	350	113	0.043	-0.73	0.760	82		
75	24.616	0.055	0.055	94.5	82	1	62	200	2.8	-0.4	-0.038	13.3	6.7	0.41	359	14.4	644	148	238	343	371	110	0.043	-0.73	0.620	82		
80	26.847	0.096	0.096	101.2	82	1	62	200	2.4	-0.2	-0.032	14.0	6.0	0.89	329	14.7	608	169	239	347	370	105	0.043	-0.73	0.500	82		
85	28.627	0.098	0.098	101.9	81	1	61	200	2.2	-0.2	-0.060	14.2	5.7	0.93	340	15.1	641	165	242	343	370	105	0.043	-0.73	0.490	82		
90	30.381	0.048	0.048	101.8	82	1	62	200	2.0	-0.2	-0.031	13.8	6.1	0.87	309	14.8	564	167	244	339	365	102	0.043	-0.73	0.480	81		
95	31.978	0.019	0.019	93.3	82	1	61	200	1.7	-0.3	-0.050	16.8	6.2	0.80	316	14.8	538	168	244	335	358	104	0.043	-0.73	0.500	82		
100	33.760	0.030	0.030	93.2	82	1	61	200	1.6	-0.1	-0.026	15.8	4.1	1.25	275	18.1	481	168	240	301	351	101	0.043	-0.73	0.330	81		
105	35.585	0.021	0.021	100.6	83	1	65	200	1.4	-0.2	-0.021	16.7	3.9	1.33	250	18.5	428	163	232	308	344	100	0.043	-0.73	0.280	81		
110	36.607	0.024	0.024	101.6	83	1	68	200	1.3	-0.1	-0.000	16.4	4.1	1.37	221	17.5	412	148	223	320	325	100	0.043	-0.73	0.280	81		
115	38.226	0.084	0.084	102.3	84	1	63	200	1.2	-0.1	-0.021	16.7	3.8	1.38	245	18.7	387	145	218	314	326	99	0.043	-0.73	0.280	82		
120	39.657	0.058	0.058	99.2	83	1	62	200	1.1	-0.1	-0.020	16.7	3.8	1.42	239	18.5	277	140	210	308	319	232	98	0.043	-0.73	0.270	82	
125	41.075	0.084	0.084	102.6	84	1	62	200	0.9	-0.2	-0.020	16.8	3.7	1.43	231	18.7	266	142	208	302	315	264	98	0.043	-0.73	0.260	82	
130	42.614	0.088	0.088	103.3	84	1	64	200	0.9	0.0	-0.016	16.6	3.5	1.37	226	19.8	246	142	202	295	305	258	98	0.043	-0.73	0.250	82	
135	43.878	0.073	0.073	99.8	85	1	64	200	0.8	-0.1	-0.018	16.4	3.2	1.30	216	20.8	234	141	199	289	298	252	97	0.043	-0.73	0.220	83	
140	45.206	0.089	0.089	94.1	84	1	65	200	0.7	-0.1	-0.015	16.4	3.2	1.34	215	20.6	233	140	197	284	293	247	97	0.043	-0.73	0.200	83	
145	46.625	0.090	0.090	91.1	85	1	65	200	0.6	-0.1	-0.013	16.4	3.2	1.32	211	20.7	211	134	186	277	268	241	96	0.043	-0.73	0.220	83	
150	47.808	0.083	0.083	92.1	85	1	65	200	0.5	-0.1	-0.012	16.4	3.2	1.33	208	20.7	205	138	189	272	261	237	98	0.043	-0.73	0.220	83	
155	49.165	0.043	0.043	91.8	86	1	68	200	0.6	0.0	-0.012	16.3	3.2	1.34	200	20.3	208	135	189	267	275	234	98	0.043	-0.73	0.220	83	
160	50.619	0.072	0.072	91.5	87	1	67	200	0.4	-0.1	-0.012	16.3	3.2	1.32	206	18.7	205	137	186	263	277	234	96	0.043	-0.73	0.230	84	
165	51.624	0.091	0.091	103.4	85	1	69	200	0.3	-0.1	-0.012	16.2	3.4	1.21	203	20.1	204	139	197	257	266	230	96	0.043	-0.73	0.220	84	
170	53.024	0.040	0.040	97.4	86	1	68	200	0.2	-0.1	-0.012	16.9	3.7	1.25	205	18.3	209	137	199	258	263	229	96	0.043	-0.73	0.220	84	
175	54.284	0.023	0.023	91.9	105.5	86	1	68	200	0.1	-0.1	-0.011	16.8	3.8	1.20	204	18.9	208	141	203	254	260	229	96	0.043	-0.73	0.220	84
180	55.961	0.023	0.023	91.9	105.4	86	1	67	200	0.1	0.0	-0.010	16.6	4.0	1.28	206	18.4	208	141	209	262	267	231	96	0.043	-0.73	0.260	84
185	56.757	0.021	0.021	80.9	86	1	67	200	0.0	-0.1	-0.010	16.0	3.7	1.19	208	18.5	283	145	214	292	264	232	96	0.043	-0.73	0.260	84	
Total Sampling Time (minutes)	Average Total Sample Volume (g)	Average Sample Rate (min)	Average Proportional Rate (%)	Average Dry Gas Meter (min)	Average Single Inlet Temperature (min)	Average Impinger Exit Temperature (min)	Average Not Burn Temperature (min)	Average Sink Reading (min)	Average Weight Change (min)	Average Water Pressure (min)	Average CO2 (%)	Average CO (%)	Average Temperature (°F)	Average Alt to Fuel Reading (ft)	Average Front Top	Average Front Bottom	Average Front Left	Average Front Right	Average Average Back (Average Back)	Average Temperature (°F)	Average g/Vol Velocity (min)	Average Pressure (min)	Average CO2 (%)	Average Ambient Temperature (°F)				
	58.767	0.007	0.20	100.61	82.0	1.00	84.18	225.97	11.50	-0.31	-0.03	13.41	8.86	316.13	15.02	496.81	183.97	207.21	300.53	313.89	105.42	0.04	-0.73	0.64	81.64			

Wood Heater Calculation Data EPA Method 5H

Run	2	Burn Rate (dry kg/hour) =	1.38
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Manufacturer: Hearth and Home Tech

Model/Tracking No.: 27001 ACC

Test Date: 06-Aug-09

Project Number: 001-S-52b-3

Emission Rate (grams/hour) =	4.16
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Note: When using the CO2 tracer-gas method, 1/Q1 (by tracer gas) = S1

Elapsed Time (minutes)	Dilution Tunnel Velocity (feet/second actual)	Fo (1.00 to 1.12)	Q1 by tracer gas (scfm)	1/Q1 by tracer gas (S1)	Volume Sampled (scf)	S = Volume Sampled (scf)	Proportional Sample Rate	dh new
5	14.6	1.04	145.2	11.4	0.088	1.522	100.0	0.316
10	14.7	1.03	145.3	10.7	0.094	1.522	100.0	0.322
15	14.7	1.02	146.1	12.1	0.083	1.443	100.1	0.408
20	14.8	1.01	145.2	10.0	0.100	1.617	99.8	0.276
25	14.8	1.01	145.1	11.5	0.087	1.393	101.7	0.369
30	14.8	1.01	144.9	11.4	0.089	1.521	98.5	0.360
35	14.8	1.02	144.9	11.2	0.089	1.523	98.9	0.350
40	14.9	1.01	144.7	10.8	0.093	1.520	100.9	0.324
45	14.9	1.03	144.1	11.1	0.090	1.449	100.0	0.342
50	14.9	1.02	144.4	11.4	0.088	1.474	99.0	0.358
55	14.9	1.02	144.7	11.3	0.088	1.533	100.6	0.355
60	14.9	1.02	144.8	11.2	0.089	1.486	98.6	0.349
65	14.8	1.02	145.0	11.6	0.086	1.513	100.5	0.374
70	14.8	1.02	145.4	12.3	0.081	1.520	97.7	0.416
75	14.8	1.03	145.6	12.8	0.078	1.446	100.2	0.455
80	14.7	1.07	146.2	11.9	0.084	1.739	101.2	0.383
85	14.7	1.07	146.5	11.5	0.087	1.614	101.0	0.369
90	14.7	1.08	146.7	10.8	0.093	1.575	101.8	0.322
95	14.7	1.05	146.6	11.8	0.085	1.439	99.4	0.385
100	14.6	1.12	147.0	10.7	0.093	1.624	102.5	0.317
105	14.6	1.13	147.1	9.4	0.107	1.447	100.6	0.242
110	14.6	1.13	147.1	9.3	0.108	1.279	101.6	0.237
115	14.6	1.13	147.2	9.6	0.104	1.276	102.3	0.255
120	14.6	1.14	147.2	9.2	0.108	1.285	99.2	0.235
125	14.6	1.14	147.4	9.1	0.110	1.275	102.5	0.228
130	14.6	1.14	147.4	9.2	0.109	1.292	105.3	0.233
135	14.6	1.14	147.5	9.1	0.110	1.225	98.8	0.230
140	14.6	1.15	147.5	8.7	0.115	1.207	98.0	0.207
145	14.6	1.15	147.6	8.7	0.115	1.257	107.2	0.207
150	14.6	1.15	147.6	8.7	0.115	1.177	100.3	0.207
155	14.6	1.14	147.6	8.4	0.119	1.090	93.2	0.194
160	14.6	1.14	147.6	8.3	0.120	1.220	107.3	0.182
165	14.6	1.14	147.6	8.2	0.123	1.166	103.4	0.183
170	14.6	1.13	147.6	7.9	0.127	1.075	97.4	0.171
175	14.6	1.12	147.6	8.2	0.121	1.128	105.5	0.187
180	14.6	1.12	147.6	8.4	0.119	1.180	105.4	0.185
185	14.6	1.12	147.6	8.7	0.115	1.036	90.9	0.208
Averages/Totals	14.7	1.08	146.4	10.2	0.100	1.383	100.6	0.281

Woodstove Type	2
Yr>Y=cal.2=mcst, 3=pellet	1.32
EPA's Hydrocarbon Constant (%)	

Fuel Data	11.5
Test Charge (as fired lbs)	22.16
Average Moisture (% dry basis)	18.14
Average Moisture (% wet basis)	

Run Parameters	0.000
DGM initial reading (cf)	55.757
DGM final reading (cf)	28.28
Pr (inches Hg)	82.00
Tm (avg df)	0.29
dh (avg inches wc)	51.150
Vm (scf)	7.88
Q1 by carbon balance (avg dscf/minute)	

Analytical Data	80.9
Probe/Front Wash (mg)	81.0
Front Filter (mg)	245.6
Impinger PM (mg)	82.7
Back Filter (mg)	459.2
Total Weight (mg)	
Ca (g/dscf)	0.0086
ER (g/hour)	4.16

Q17 E288 = 7.0.5

Final Laboratory Report - Method 5H Dilution Tunnel Particulate Calculations

Client Name: Hearth and Home Equipment Numbers: _____ Run No.: 2
 Model: 2700I Date: 08/06/09
 Project No.: 061-S-52b-3
 Tracking No.: 1464

PARTICULATE COMPONENTS

Sample Component	Reagent	Filter # or Volume, ml	Weights			
			Final, mg	Tare, mg	Blank, mg/ml	Particulate, mg
A. Front filter catch	Filter	N109	716.1	635.1		81.0
B. Rear filter catch	Filter	D490	214.4	151.7		62.7
C. Rinse of probe and filter assembly (FRONT)	Acetone	60	107558.4	107497.0	0.0090	60.9
D. Rinse of Impinger Set	Distilled Water	400	122918.3	122843.5	0.0000	74.8
E. Rinse of Impinger Set	Dichloromethane	150	94858.1	94801.9	0.0000	56.2
F. Rinse of filter assembly and gas train (BACK)	Acetone	100	107530.2	107414.7	0.0090	114.6
Total Particulate, mg :						450.2

Component	Equations:
A. Front filter catch	Final (mg) - Tare (mg) = Particulate, mg
B. Rear filter catch	Final (mg) - Tare (mg) = Particulate, mg
C. Rinse of probe and filter assembly (FRONT)	(Final, mg - Tare, mg) - (Blank, mg/ml x Volume, ml) = Particulate, mg
D. Rinse of Impinger Set	(Final, mg - Tare, mg) - (Blank, mg/ml x Volume, ml) = Particulate, mg
E. Rinse of Impinger Set	(Final, mg - Tare, mg) - (Blank, mg/ml x Volume, ml) = Particulate, mg
F. Rinse of filter assembly and gas train (BACK)	(Final, mg - Tare, mg) - (Blank, mg/ml x Volume, ml) = Particulate, mg

CONDENSED WATER

IMPINGERS	Weights		
	Final, g	Initial, g	Net, g
1	732.4	656.8	75.6
2	653.7	650.0	3.7
3	447.5	445.9	1.6
4	860.2	848.3	11.9
TOTAL, g:			92.8

Analyst: BOJDate: 9/25/09

Run Notes

Client: Hearth N HomeModel: 2700IProject #: 061-S-52b-3Tracking #: 1464Run #: 2Date: 8/6/09Test Crew: B Davis

OMNI Equipment ID #(s): _____

PREBURN

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

PRIMARY:

fully open

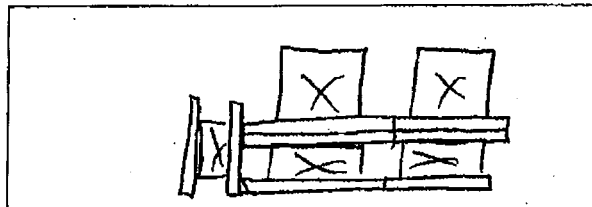
Timed Air Locked open

SECONDARY: FixedTERTIARY: N/AFAN: on High

PREBURN SETTINGS AND ACTIVITIES

TIME	AIR (THERMO) CHANGES PRIMARY/SECONDARY/TERTIARY	FAN SETTING CHANGE	ADD FUEL + WT.	ADD FUEL - WT.	RAKE COAL	COMMENT
<u>103</u>	<u>Test setting</u>				<u>x</u>	

TEST

TEST FUEL CONFIGURATION SKETCH
(INDICATE VIEW ANGLE)

START UP PROCEDURES

BYPASS: N/AFUEL LOADING by 55 sec.DOOR: closed by 1:00PRIMARY AIR: AT Test setting Full 5:00OTHER: Timed Air Locked openDESCRIBE OR SKETCH TEST SETTINGS BELOW:
(SETTINGS MUST BE ACCURATE AND REPRODUCIBLE)

PRIMARY:

Same as Above

SECONDARY: fixedTERTIARY: N/AFAN: On entire test TimeTechnician signature: B DavisDate: 9/21/09

4-17 OF 4-34

STOVE TEMPERATURE - ST DATA - METHOD 5G

Page 1 of 1

Client/Model: Heath N Home 2700L Project #: 061-S-526-3 Tracking #: 1464

Date: 8/6/09 Test Crew: BR Davis Run #: 2

OMNI Equipment ID #:

Preburn ☒		Coal Bed:		Data:		0 = ☒		Range: 2.3 - 2.8		Actual:	
Test		[]		[]		[]		[]		Coal Bed: 2.8	
Time	Fuel Weight	Delta Weight	Stack Draft	Ambient	Top	Bottom	Back	Left	Right	Flue	Catalyst
0	14.0	1.5	-0.30	74	547	410	530	389	434	283	NA
10	12.5	1.5	-0.50	79	503	240	349	362	407	404	
20	10.3	2.2	-0.57	80	752	222	281	350	386	506	
30	7.9	2.4	-0.51	80	787	198	256	356	376	499	
40	5.3	2.2	-0.50	81	813	194	254	372	377	482	
50	4.1	1.2	-0.42	79	783	192	260	384	385	421	
60	3.7	0.4	-0.37	81	652	200	264	384	398	331	
70	3.5	0.2	-0.28	80	527	207	258	371	400	295	
80	3.3	0.2	-0.27	79	449	199	247	359	390	267	
90	3.1	0.2	-0.25	78	410	189	231	339	365	257	
100	2.9	0.2	-0.22	78	392	196	223	328	349	250	
10340	2.8	0.1	-0.22	79	390	187	222	326	345	242	
20											
30											
40											
50											
60											
70											
80											
90											
AVG											

Technician signature: BR Davis Date: 8/6/09

FUEL DATA

Client: Hearth N HomeModel: 2700IProject #: 061-S-52b-3 Tracking #: 1464Date: 8/6/09 Test Crew: B. DAVIS Run #: 2

OMNI Equipment ID #: _____

FUEL LOAD PREPARED BY: B. DAVISFUEL: DOUGLAS-FIR SPECIES, UNTREATED, AIR-DRIED, STANDARD GRADE OR BETTER,
DIMENSIONAL LUMBER.

PRE-BURN FUEL

MOISTURE CONTENT (METER -- DRY BASIS)

CALIBRATION: Cal Value (1) = 12% Actual Reading 12
 Cal Value (2) = 22% Actual Reading 22

Piece	Length	Readings	Type
1	<u>23.1</u> ft	<u>18.2</u> <u>19.5</u>	<u>2x4</u>
2	_____ ft	_____	_____
3	_____ ft	_____	_____

Length of cut pieces: 4x15 inchesPre-Burn Fuel Average Moisture: 20.27%Time (clock): 0830 Room Temperature (F): 70 Initials: BD

TEST FUEL

FUEL TYPE AND AMOUNT: 2x4 3 4x4 2
 CALCULATED LOAD WEIGHT: 12.2 ACTUAL LOAD WEIGHT: 5.1 (2x4)
6.4 (4x4)
 FUEL PIECE LENGTH: 13" 11.5 Total

MOISTURE CONTENT (METER -- DRY BASIS)

PIECE	READINGS	TYPE
1	<u>22.6</u> <u>24.2</u> <u>17.9</u>	<u>4x4</u>
2	<u>22.0</u> <u>24.5</u> <u>23.1</u>	<u>4x4</u>
3	<u>19.4</u> <u>18.8</u> <u>19.2</u>	<u>2x4</u>
4	<u>24.1</u> <u>23.6</u> <u>23.6</u>	<u>2x4</u>
5	<u>22.0</u> <u>23.6</u> <u>23.8</u>	<u>2x4</u>
6	_____	_____
7	_____	_____
8	_____	_____
9	_____	_____
10	_____	_____

OVERALL TEST FUEL LOAD MOISTURE AVERAGE: 22.16Time (clock): 0835 Room Temperature (F): 70 Initials: BDTechnician signature: B. Davis Date: 8/6/09

Supplemental Data EPA 5G/5H

Client: Hearth N HomeModel: 2700IProject #: 061-S-52b-3Tracking #: 1464Date: 8/6/09 Run #: 2 Booth: 1Test Crew: B. Davis Start Time: 11:00 Stop Time: 19:05

OMNI Equipment #(s): _____

Gas Analyzer Train Leak Check:

Stack:

Dilution Tunnel (Method 5G Only):

Initial: goodInitial: goodFinal: goodFinal: goodCalibrations: Span Gas CO₂: 9.93 O₂: 9.95 CO: 9.7 CO₂(DT): 1.00

Time	N ₂ Span		N ₂ Span		N ₂ Span	N ₂ Span	N ₂ Span	N ₂ Span
	<u>0</u>		<u>EOT</u>					
O ₂	<u>0.0</u>	<u>9.8</u>	<u>0.0</u>	<u>9.9</u>				
CO ₂	<u>0.0</u>	<u>9.9</u>	<u>-0.2</u>	<u>9.9</u>				
CO	<u>0.00</u>	<u>.97</u>	<u>.02</u>	<u>.94</u>				
CO ₂ (DT)	<u>0.00</u>	<u>0.99</u>	<u>0.00</u>	<u>1.02</u>				

Stack Diameter (inches): 6Air Velocity (ft/min): Initial: < 50 Final: < 50Scale Audit (lbs): Pretest: 10.0 Post Test: 10.0Induced Draft: 0.0 %Smoke Capture: 100 %Pitot Tube Leak Test: Pre: 0.0 e 3.0 Post: 0.0 e 3.2Flue Pipe Cleaned Prior to First Test in Series: Date: 8/3/09 Initials: BH

	Initial	Middle	Ending
Pb (in/Hg)	<u>28.32</u>	<u>28.27</u>	<u>28.25</u>
Room Temp (°F)	<u>78</u>	<u>81</u>	<u>84</u>

Technician signature: B. Davis Date: 9/21/09

*Model: 2700-IACC
Hearth and Home Technologies
1445 North Highway
Colville, WA 99114*

Run 3

Wood Heater Calculation Data EPA Method 5H

Run	3
Manufacturer	Heath and Home Tech
Model/Tracing No.	27001 ACC
Test Date	06-Aug-09
Project Number	081-S-55b-3

Burn Rate (dry kg/hour) = 1.14

Emission Rate (grams/hour) = 5.06

Note: When using the CO2 tracer-gas method, 1/Qr (by tracer gas) = Si

Elapsed Time (minutes)	Dilution Tunnel Velocity (feet/second actual)	F ₀ (1.00 to 1.12)	Q _r by carbon balance (scf/minute)	Q _r by tracer gas (scf/minute)	1/Q _r by tracer gas (Si) (scf)	Volume Sampled (dscf)	Si - Volume Sampled (dscf)	Proportional Sample Rate	dH new
10	13.1	1.03	128.6	13.1	0.076	3.094	0.310	100.0	0.850
20	13.2	1.02	128.5	11.9	0.086	4.094	0.312	100.3	0.505
30	13.2	1.01	128.7	10.7	0.093	3.556	0.307	99.3	0.431
40	13.2	1.01	128.7	11.3	0.088	3.370	0.315	101.3	0.484
50	13.1	1.03	128.6	12.8	0.078	3.515	0.310	99.8	0.615
60	13.1	1.05	130.0	11.8	0.085	4.001	0.313	100.7	0.521
70	13.0	1.08	130.7	11.5	0.087	3.706	0.315	101.1	0.498
80	13.0	1.06	130.5	12.0	0.083	3.488	0.304	97.8	0.544
90	13.1	1.03	130.2	12.2	0.082	3.659	0.305	98.3	0.552
100	13.1	1.02	130.0	12.4	0.081	3.912	0.321	103.2	0.581
110	13.0	1.06	130.5	11.5	0.087	3.731	0.301	97.1	0.500
120	13.0	1.05	130.9	10.6	0.095	3.670	0.319	102.7	0.423
130	13.0	1.05	131.3	10.1	0.099	3.642	0.345	108.9	0.366
140	12.9	1.05	131.7	10.0	0.100	3.130	0.310	99.0	0.376
150	12.9	1.06	131.8	9.1	0.110	3.176	0.319	101.7	0.316
160	12.9	1.07	132.1	10.1	0.099	2.856	0.313	99.8	0.385
170	12.9	1.07	132.4	10.0	0.100	3.111	0.309	98.6	0.392
180	12.9	1.09	132.4	10.0	0.100	3.167	0.316	100.8	0.378
190	12.9	1.08	132.4	9.5	0.105	3.172	0.319	101.5	0.343
200	12.8	1.08	132.5	9.2	0.108	3.044	0.321	102.1	0.325
210	12.8	1.09	132.6	8.3	0.107	2.916	0.316	100.5	0.333
220	12.8	1.10	132.5	10.1	0.099	2.970	0.318	101.0	0.390
Averages/Totals	13.0	1.06	130.9	10.8	0.094	3.408	100.7	100.7	0.451

Woodstove Type	Yinc-1-cat,2-mcat, 3-pellet
EPA's Hydrocarbon Constant (%)	1.32
Fuel Data	
Test Charge (as fired lbs)	11.2
Average Moisture (% dry basis)	21.55
Average Moisture (% wet basis)	17.73
Run Parameters	
DGM initial reading (cf)	0.000
DGM final reading (cf)	83.506
Pb (inches Hg)	28.13
Tm (avg of)	81.00
dH (avg inches wc)	0.45
Vm (scf)	75.017
Q _r by carbon balance (avg dscf/minute)	7.10
Analytical Data	
Probe/Front Vial (mg)	113.1
Front Filter (mg)	149.0
Impinger PM (mg)	469.4
Back Filter (mg)	158.8
Total Weight (mg)	890.3
Emission Results	
Cs (g/dscf)	0.0119
ER (g/hour)	5.06

OMT ER % 70.54

Run Number 3

Wood Heater Test Data EPA Method 5H

372

Heater and Home Test

Manufacturer:

Stove Model, Tracking Number:

Stove Type (e.g., wood, pellet):

Project Number:

Test Date:

Test Start Time:

Heating Interval (minutes):

Total Sampling Time (minutes):

Sample Rate Control Module Number:

Test Meter Y:

Office d-CP:

Plot Date CP:

Average Barocycle Pressure:

Average Fuel Moisture (dry basis %):

CHME Equipment Number:

27020 ACC

not

01-S-523-3

06-Aug-20

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Final Laboratory Report - Method 5H Dilution Tunnel Particulate Calculations

Client Name: Hearth and Home Equipment Numbers: _____ Run No.: 3
 Model: 27001 Date: 08/06/09
 Project No.: 061-S-52b-3
 Tracking No.: 1464

PARTICULATE COMPONENTS

Sample Component	Reagent	Filter # or Volume, ml	Weights			
			Final, mg	Tare, mg	Blank, mg/ml	Particulate, mg
A. Front filter catch	Filter	N110	785.7	636.7		149.0
B. Rear filter catch	Filter	D491	311.1	152.3		158.8
C. Rinse of probe and filter assembly (FRONT)	Acetone	80	103830.7	103716.9	0.0090	113.1
D. Rinse of Impinger Set	Distilled Water	350	175473.4	175271.0	0.0000	202.4
E. Rinse of Impinger Set	Dichloromethane	150	104958.3	104880.5	0.0000	77.8
F. Rinse of filter assembly and gas train (BACK)	Acetone	120	108274.4	108084.1	0.0090	189.2
Total Particulate, mg :						890.3

Component	Equations:
A. Front filter catch	Final (mg) - Tare (mg) = Particulate, mg
B. Rear filter catch	Final (mg) - Tare (mg) = Particulate, mg
C. Rinse of probe and filter assembly (FRONT)	(Final, mg - Tare, mg) - (Blank, mg/ml x Volume, ml) = Particulate, mg
D. Rinse of Impinger Set	(Final, mg - Tare, mg) - (Blank, mg/ml x Volume, ml) = Particulate, mg
E. Rinse of Impinger Set	(Final, mg - Tare, mg) - (Blank, mg/ml x Volume, ml) = Particulate, mg
F. Rinse of filter assembly and gas train (BACK)	(Final, mg - Tare, mg) - (Blank, mg/ml x Volume, ml) = Particulate, mg

CONDENSED WATER

IMPINGERS	Weights		
	Final, g	Initial, g	Net, g
1	761.2	657.1	104.1
2	681.9	652.5	29.4
3	448.5	446.6	1.9
4	875.4	856.7	18.7
TOTAL, g:			154.1

Analyst: BLODate: 9/24/09

STOVE TEMPERATURE TEST DATA - METHOD 5G

Page 1 of 1

Client/Model: Hawthorne 2700T Project #: 061-576-3 Tracking #: 1964

Date: 8-8-09 Test Crew: B Davis Run #: 3

OMNI Equipment ID #: _____

Preburn ☒		Coal Bed:		Actual:							
Test ☐		Data: 0 = 0		Coal Bed: 2.8							
		Range: 2.3 - 2.8									
		TEMPERATURES (oF)									
Time	Fuel Weight	Delta Weight	Stack Draft	Ambient	Top	Bottom	Back	Left	Right	Flue	Catalyst
0	5.8	—	-0.32	87	732	473	533	464	484	338	
10	4.8	1.0	-0.40	89	720	291	386	438	465	357	
20	4.3	0.5	-0.32	88	637	228	321	395	429	332	
30	3.7	0.6	-0.40	88	640	208	287	369	401	361	
40	3.0	0.7	-0.30	87	652	191	268	354	386	321	
50	3.0	0.0	-0.21	88	462	182	252	347	373	244	
60	2.8	0.2	-0.17	86	396	176	237	334	355	222	
70											
80											
90											
00											
10											
20											
30											
40											
50											
60											
70											
80											
90											
AVG											

Technician signature: B Davis Date: 8/6/09

FUEL DATA

Client: Hearth N HomeModel: 2700IProject #: 061-S-52b-3Tracking #: 1464Date: 8-7-09Test Crew: B DavisRun #: 3

OMNI Equipment ID #:

FUEL LOAD PREPARED BY: B DavisFUEL: DOUGLAS-FIR SPECIES, UNTREATED, AIR-DRIED, STANDARD GRADE OR BETTER,
DIMENSIONAL LUMBER.

PRE-BURN FUEL

MOISTURE CONTENT (METER -- DRY BASIS)

CALIBRATION: Cal Value (1) = 12% Actual Reading 12
 Cal Value (2) = 22% Actual Reading 22

Piece	Length	Readings	Type
1	<u>24' ft</u>	<u>24.4</u> <u>25.3</u> <u>22.7</u>	<u>2x4</u>
2	<u>ft</u>		
3	<u>ft</u>		

Length of cut pieces: 3 @ 8' inchesPre-Burn Fuel Average Moisture: 24.20%Time (clock): 1600 Room Temperature (F): 80 Initials: BA

TEST FUEL

FUEL TYPE AND AMOUNT: 2x4 3 4x4 2
 CALCULATED LOAD WEIGHT: 12.2 ACTUAL LOAD WEIGHT: 5.0 (2x4)
6.2 (4x4)
 FUEL PIECE LENGTH: 13" 11.2 Total

MOISTURE CONTENT (METER -- DRY BASIS)

PIECE	READINGS	TYPE
1	<u>18.6</u> <u>21.5</u> <u>22.3</u>	<u>4x4</u>
2	<u>20.2</u> <u>22.3</u> <u>20.3</u>	<u>4x4</u>
3	<u>21.0</u> <u>23.7</u> <u>21.9</u>	<u>2x4</u>
4	<u>24.7</u> <u>21.1</u> <u>25.2</u>	<u>2x4</u>
5	<u>21.3</u> <u>20.2</u> <u>18.7</u>	
6		
7		
8		
9		
10		

OVERALL TEST FUEL LOAD MOISTURE AVERAGE: 21.55Time (clock): 1605 Room Temperature (F): 80 Initials: BATechnician signature: B Davis Date: 8/6/09

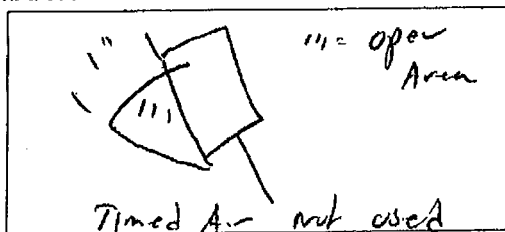
Run Notes

Client: Hearth N HomeModel: 2700IProject #: 061-S-52b-3Tracking #: 1464Run #: 3Date: 8-6-09Test Crew: B Davis

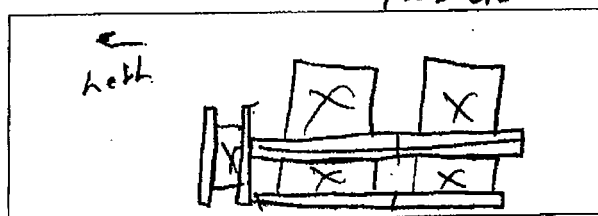
OMNI Equipment ID #(s): _____

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

PRIMARY:

SECONDARY: fixedTERTIARY: NAFAN: on HighPREBURN SETTINGS AND ACTIVITIES

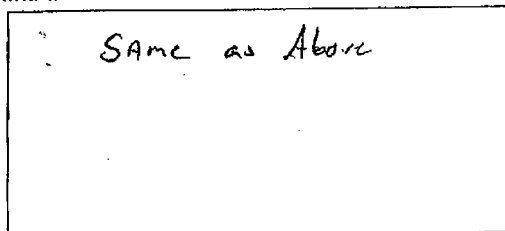
TIME	AIR (THERMO) CHANGES PRIMARY/SECONDARY/TERTIARY	FAN SETTING CHANGE	ADD FUEL + WT.	ADD FUEL - WT.	RAKE COAL	COMMENT
0	Test setting					
56					x	→

TESTTEST FUEL CONFIGURATION SKETCH
(INDICATE VIEW ANGLE)START UP PROCEDURESBYPASS: NAFUEL LOADING: By 60 secondsDOOR: closed by 65 secondsPRIMARY AIR: At test setting till 5:00

OTHER:

Timed Air pushed @ 0 minutesDESCRIBE OR SKETCH TEST SETTINGS BELOW:
(SETTINGS MUST BE ACCURATE AND REPRODUCIBLE)

PRIMARY:

SECONDARY: fixedTERTIARY: NA

FAN:

off for first 30 min
Then turned to HighTechnician signature: B DavisDate: 8/6/09

4-25 OF 4-34

Page 1 of 1

Supplemental Data EPA 5G/5H

Client: Hearth N HomeModel: 2700IProject #: 061-S-52b-3Tracking #: 1464Date: 8/7/09Run #: 3Booth: 1Test Crew: B. DavisStart Time: 17:53 Stop Time: 21:33

OMNI Equipment #(s): _____

Gas Analyzer Train Leak Check:

Stack:

Dilution Tunnel (Method 5G Only):

Initial: goodInitial: goodFinal: goodFinal: goodCalibrations: Span Gas CO₂: 9.93 O₂: 9.95 CO: .97 CO₂(DT): 1.00

	N ₂ Span		N ₂ Span		N ₂ Span	N ₂ Span	N ₂ Span	N ₂ Span
Time	<u>Ø</u>		<u>EOT</u>					
O ₂	<u>0.0</u>	<u>9.9</u>	<u>0.0</u>	<u>9.9</u>				
CO ₂	<u>0.0</u>	<u>9.9</u>	<u>0.0</u>	<u>9.9</u>				
CO	<u>0.00</u>	<u>.97</u>	<u>0.00</u>	<u>.97</u>				
CO ₂ (DT)	<u>0.00</u>	<u>1.00</u>	<u>1.02</u>	<u>1.01</u>				

Stack Diameter (inches): 6"Air Velocity (ft/min): Initial: 250 Final: 250Scale Audit (lbs): Pretest: 10.0 Post Test: 10.0Induced Draft: 0.0 %Smoke Capture: 100%Pitot Tube Leak Test: Pre: 0.0 @ 3.0 Post: 0.0 @ 3.0Flue Pipe Cleaned Prior to First Test in Series: Date: 8-3-09 Initials: B. Davis

	Initial	Middle	Ending
Pb (in/Hg)	<u>28.00</u>	<u>28.15</u>	<u>28.23</u>
Room Temp (°F)	<u>85</u>	<u>79</u>	<u>78</u>

Technician signature: B. Davis Date: 8-6-09

*Model: 2700-I ACC
Hearth and Home Technologies
1445 North Highway
Colville, WA 99114*

Run 4

Wood Heater Calculation Data EPA Method 5H

Run	4
Manufacturer:	Hearth and Home Tech
Model/Tracking No.:	27001 ACC
Test Date:	07-Aug-09
Project Number:	061-S-533-3

Burn Rate (dry kg/hour) =

1.31

Emission Rate (grams/hour) =

3.15

Note: When using the CO2 tracer-gas method, 1/Qr (by tracer gas) = S

Elapsed Time (minutes)	Dilution Tunnel Velocity (feet/second actual)	Fo (1.00 to 1.12)	Qr by carbon balance (scf/minute)	Qr by tracer gas (scf/minute)	1/Qr by tracer gas (S) (dscf)	Volume Sampled (dscf)	S = Volume Sampled	Proportional Sample Rate	dH new
10	14.5	1.02	5.9	11.5	0.086	3.002	0.259	100.0	0.314
20	14.6	1.01	13.3	11.9	0.073	3.591	0.250	100.2	0.385
30	14.7	1.02	12.4	11.9	0.084	3.150	0.254	101.1	0.382
40	14.7	1.02	13.2	10.9	0.092	3.070	0.258	99.2	0.319
50	14.7	1.01	11.9	13.2	0.075	2.553	0.252	100.6	0.473
60	14.7	1.02	15.7	12.8	0.078	3.430	0.259	99.4	0.442
70	14.7	1.02	12.6	12.9	0.077	3.377	0.264	101.1	0.446
80	14.6	1.06	11.7	12.9	0.077	3.285	0.265	98.0	0.448
90	14.5	1.05	7.3	11.6	0.086	3.332	0.258	99.1	0.351
100	14.5	1.04	7.3	11.5	0.087	3.075	0.255	101.8	0.353
110	14.4	1.10	5.8	10.6	0.094	2.952	0.257	99.8	0.302
120	14.4	1.13	4.3	10.1	0.099	2.897	0.273	104.4	0.271
130	14.4	1.12	2.1	10.1	0.099	2.800	0.278	105.9	0.271
140	14.4	1.12	2.0	10.3	0.097	2.823	0.261	106.6	0.283
150	14.4	1.14	4.0	9.3	0.107	2.595	0.252	95.7	0.232
160	14.4	1.12	2.0	9.2	0.108	2.438	0.262	99.6	0.227
170	14.4	1.15	4.5	9.1	0.110	2.003	0.261	99.2	0.220
180	14.3	1.17	2.3	8.2	0.122	2.430	0.268	101.9	0.180
190	14.3	1.11	1.9	8.6	0.118	2.223	0.271	102.8	0.198
200	14.3	1.11	3.8	6.1	0.124	2.408	0.290	105.9	0.175
Average/Totals	14.5	1.08	7.2	10.3	0.094	2.905	0.260	101.1	0.324

Woodstove Type

Yhox1=cat,2=coal,3=pellet
EPA's Hydrocarbon Constant (%)

2
1.32

Fuel Data

Test Charge (as fired lbs)
Average Moisture (% dry basis)
Average Moisture (% wet basis)

11.8
22.25
18.20

Run Parameters

DGM initial reading (cf)
DGM final reading (cf)
Pb (inches Hg)
Tm (avg of)
dh (avg inches wet)
Vm (scf)
Qr by carbon balance (avg dscf/minute)

0.000
64.247
28.31
80.90
0.33
59.083
7.18

Analytical Data

Probe/Front Wash (mg)
Front Filter (mg)
Impinger PM (mg)
Back Filter (mg)
Total Weight (mg)

56.2
72.4
231.4
63.9
423.9

Emission Results

Cs (g/dscf)
ER (g/hour)

0.0073
3.15

8.8-11.7 = 1.87 LWD

Final Laboratory Report - Method 5H Dilution Tunnel Particulate Calculations

Client Name: Hearth and Home Equipment Numbers: _____ Run No.: 4
 Model: 2700I Date: 08/07/09
 Project No.: 061-S-52b-3
 Tracking No.: 1464

PARTICULATE COMPONENTS

Sample Component	Reagent	Filter # or Volume, ml	Weights			
			Final, mg	Tare, mg	Blank, mg/ml	Particulate, mg
A. Front filter catch	Filter	N281	705.8	633.4		72.4
B. Rear filter catch	Filter	D492	215.3	151.4		63.9
C. Rinse of probe and filter assembly (FRONT)	Acetone	70	116254.0	116197.2	0.0090	56.2
D. Rinse of Impinger Set	Distilled Water	350	143654.7	143565.5	0.0000	89.2
E. Rinse of Impinger Set	Dichloromethane	150	92589.0	92535.2	0.0000	53.8
F. Rinse of filter assembly and gas train (BACK)	Acetone	180	102256.0	102166.0	0.0090	88.4
Total Particulate, mg :						423.9

Component	Equations:
A. Front filter catch	Final (mg) - Tare (mg) = Particulate, mg
B. Rear filter catch	Final (mg) - Tare (mg) = Particulate, mg
C. Rinse of probe and filter assembly (FRONT)	(Final, mg - Tare, mg) - (Blank, mg/ml x Volume, ml) = Particulate, mg
D. Rinse of Impinger Set	(Final, mg - Tare, mg) - (Blank, mg/ml x Volume, ml) = Particulate, mg
E. Rinse of Impinger Set	(Final, mg - Tare, mg) - (Blank, mg/ml x Volume, ml) = Particulate, mg
F. Rinse of filter assembly and gas train (BACK)	(Final, mg - Tare, mg) - (Blank, mg/ml x Volume, ml) = Particulate, mg

CONDENSED WATER

IMPINGERS	Weights		
	Final, g	Initial, g	Net, g
1	747.1	656.4	90.7
2	655.9	648.0	7.9
3	447.5	446.6	0.9
4	884.2	872.4	11.8
	TOTAL, g:		111.3

Analyst: BDODate: 9/24/09

STOVE TEMPERATURE TEST DATA - METHOD 5G

Page 1 of 1

Client/Model: Hemlock Home 2700 I Project #: 061-S-576-3 Tracking #: 1464

Date: 8/7/09 Test Crew: BAV.S Run #: 4

OMNI Equipment ID #: _____

Preburn Test		Fuel		Delta Weight		Stack Draft		Coal Bed:		Range: 2.4-2.9		Actual: Coal Bed: 2.8			
		Weight		Weight		Draft		Ambient	Top	Bottom	Back	Left	Right	Flue	Catalyst
Time	0	6.4		1.1		-0.40		72	831	442	535	455	471	343	WA
	10	5.3		0.5		-0.42		73	731	252	370	434	468	341	
	20	4.8		0.6		-0.38		74	622	213	307	402	438	318	
	30	4.2		0.6		-0.38		74	658	194	271	378	412	340	
	40	3.7		0.5		-0.30		76	530	182	253	358	375	259	
	50	3.6		0.1		-0.20		76	409	174	234	341	377	227	
	60	2.9		0.7		-0.20		76	376	173	223	325	367	212	
	66.70	2.8		0.1		-0.18		76	338	175	216	318	355	207	
	80														
	90														
	00														
	10														
	20														
	30														
	40														
	50														
	60														
	70														
	80														
	90														
AVG															

Technician signature: BAV.S Date: 8/7/09

FUEL DATA

Client: Hearth N HomeModel: 2700IProject #: 061-S-52b-3 Tracking #: 1464Date: 8/7/09 Test Crew: B. Davis Run #: 4

OMNI Equipment ID #: _____

FUEL LOAD PREPARED BY: B. DavisFUEL: DOUGLAS-FIR SPECIES, UNTREATED, AIR-DRIED, STANDARD GRADE OR BETTER, .
DIMENSIONAL LUMBER.

PRE-BURN FUEL					
MOISTURE CONTENT (METER --- DRY BASIS)					
CALIBRATION:		Cal Value (1) = 12%	Actual Reading	<u>12</u>	
		Cal Value (2) = 22%	Actual Reading	<u>22</u>	
Piece	Length		Readings		Type
1	<u>24"</u> ft	<u>22.3</u>	<u>23.8</u>	<u>173</u>	<u>201</u>
2	_____ ft	_____	_____	_____	_____
3	_____ ft	_____	_____	_____	_____
Length of cut pieces: <u>3e8"</u> inches		Pre-Burn Fuel Average Moisture: <u>21.13</u> %			
Time (clock): <u>0920</u>		Room Temperature (F): <u>70</u>		Initials: <u>B. Davis</u>	

TEST FUEL				
FUEL TYPE AND AMOUNT:		2 x 4 <u>3</u>	4 x 4 <u>2</u>	
CALCULATED LOAD WEIGHT: <u>12.2</u>		ACTUAL LOAD WEIGHT:		<u>4.8</u> (2 x 4)
				<u>7.0</u> (4 x 4)
FUEL PIECE LENGTH: <u>13</u>				<u>11.8</u> Total
MOISTURE CONTENT (METER -- DRY BASIS)				
PIECE	READINGS			TYPE
1	<u>23.3</u>	<u>23.8</u>	<u>22.1</u>	<u>4x4</u>
2	<u>20.5</u>	<u>20.8</u>	<u>20.2</u>	<u>4x4</u>
3	<u>24.7</u>	<u>26.5</u>	<u>2</u>	<u>2x4</u> Bn
4	<u>23.3</u>	<u>24.7</u>	<u>23.3</u>	<u>2x4</u>
5	<u>18.7</u>	<u>22.1</u>	<u>18.9</u>	<u>2x4</u>
6	<u>24.5</u>	<u>23.8</u>	<u>23.8</u>	
7	_____	_____	_____	_____
8	_____	_____	_____	_____
9	_____	_____	_____	_____
10	_____	_____	_____	_____
OVERALL TEST FUEL LOAD MOISTURE AVERAGE: <u>22.25</u>				
Time (clock): <u>0930</u>		Room Temperature (F): <u>70</u>		Initials: <u>B. Davis</u>

Technician signature: B. Davis Date: 8/7/09

Run Notes

Client: Hearth N HomeModel: 27001Project #: 061-S-52b-3Tracking #: 1464Run #: 4 Date: 8/7/09Test Crew: B. Davis

OMNI Equipment ID #(s): _____

PREBURN

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

PRIMARY:

Air control fully open

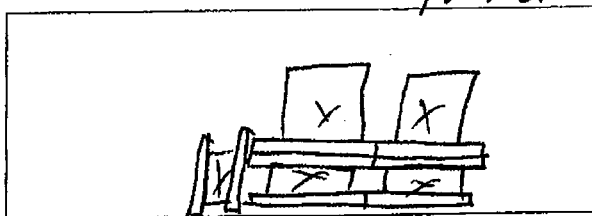
Timed Air released

SECONDARY: FixedTERTIARY: NAFAN: on High

PREBURN SETTINGS AND ACTIVITIES

TIME	AIR (THERMO) CHANGES PRIMARY/SECONDARY/TERTIARY	FAN SETTING CHANGE	ADD FUEL + WT.	ADD FUEL - WT.	RAKE COAL	COMMENT
0	Test setting			0.5 lb		
51						
61					X	

TEST

TEST FUEL CONFIGURATION SKETCH
(INDICATE VIEW ANGLE)

START UP PROCEDURES

BYPASS: NAFUEL LOADING: By 50 sec.DOOR: closed by 1:00PRIMARY AIR: at test setting pull 5:00OTHER: Timed Air pushed at zero minutesDESCRIBE OR SKETCH TEST SETTINGS BELOW:
(SETTINGS MUST BE ACCURATE AND REPRODUCIBLE)

PRIMARY:

upper control fully open

Timed Air pushed @ zero minutes and ran normally

SECONDARY: FixedTERTIARY: NAFAN: off for first 30 minTechnician signature: B. DavisDate: 9/24/09

4-33 OF 4-34

Supplemental Data EPA 5G/5H

Client: Hearth N HomeModel: 2700IProject #: 061-S-52b-3Tracking #: 1464Date: 8/7/09 Run #: 4 Booth: 1Test Crew: BOWEN Start Time: 11:11 Stop Time: 14:31

OMNI Equipment #(s): _____

Gas Analyzer Train Leak Check:

Stack:

Initial: goodFinal: good

Dilution Tunnel (Method 5G Only):

Initial: goodFinal: goodCalibrations: Span Gas CO₂: 9.93 O₂: 9.95 CO: .97 CO₂(DT): 1.00

	N ₂ Span		N ₂ Span		N ₂ Span	N ₂ Span	N ₂ Span	N ₂ Span
Time	<u>0</u>		<u>EOT</u>					
O ₂	<u>0.0</u>	<u>10.0</u>	<u>0.0</u>	<u>9.9</u>				
CO ₂	<u>0.0</u>	<u>10.0</u>	<u>0.0</u>	<u>10.0</u>				
CO	<u>0.00</u>	<u>.97</u>	<u>0.00</u>	<u>.98</u>				
CO ₂ (DT)	<u>0.00</u>	<u>.99</u>	<u>0.01</u>	<u>1.00</u>				

Stack Diameter (inches): 6"Air Velocity (ft/min): Initial: 250 Final: 250Scale Audit (lbs): Pretest: 10.0 Post Test: 10.0Induced Draft: 0.0 %Smoke Capture: 100%Pitot Tube Leak Test: Pre: 0.0 Post: 0.0Flue Pipe Cleaned Prior to First Test in Series: Date: 8-3-09 Initials: BZ

	Initial	Middle	Ending
Pb.(in/Hg)	<u>28.31</u>	<u>28.31</u>	<u>28.31</u>
Room Temp (°F)	<u>77</u>	<u>81</u>	<u>81</u>

Technician signature: BOWEN Date: 9/21/09