

TEST REPORT

Intertek

REPORT NUMBER: 100868597PRT-001
REPORT DATE: September 22, 2012

EVALUATION CENTER
Intertek Testing Services NA Inc.
22887 NE Townsend Way
Fairview Oregon 97024

RENDERED TO

Hearth & Home Technologies
1445 North Hwy
Colville Washington 99114

PRODUCT EVALUATED:
MODEL SUMMIT INSERT WOOD FIRED ROOM HEATER
VOYAGEUR GRANDE

Report of Testing Model Summit Insert Wood fired Room Heater for compliance as an "Affected Facility" with the applicable requirements of the following criteria: EPA Method 28 "Certification and Auditing of Wood Heaters" and EPA Method 5G "Determination of Particulate Matter Emissions from Wood Heaters".

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I. INTRODUCTION

Intertek Testing Services NA (Intertek) has conducted testing for Hearth & Home Technologies, on model Summit Insert Wood Fired Solid Fuel Room Heater, to evaluate all applicable performance requirements included in EPA Method 28 "Certification and auditing of wood heaters" and Method 5G "Determination of particulate matter emissions from wood heaters." Method 5G2 was used to evaluate emission rates from the Summit Insert Wood stove. 5G2 utilizes a Method 5H sample train that extracts samples from a Dilution Tunnel. This method does not require results be corrected to obtain an EPA adjusted emission result.

I.A PURPOSE OF TEST

The test was conducted to determine if the unit is in accordance with U.S EPA requirements under 40 CFR 60 SUBPART AAA, NSPS for Residential Wood Heaters. This evaluation was conducted on September 5, 2012

I.B LABORATORY

The test on the Summit Insert Wood fired Solid Fuel Room Heater was conducted at the client facility located at 1445 North Highway, Colville Washington. The facility elevation is 1635 feet above sea level. Intertek Portland is accredited by the U.S. EPA, Certificate Number 8. The test was conducted by Bruce Davis.

I.C DESCRIPTION OF UNIT

The model Summit Insert Solid Fuel Room Heater is constructed of carbon steel. The firebox inside dimensions is 15.37 inches deep, 11.07 inches high and 20.31 inches wide across the back. The unit has a door located on the front with a viewing glass for loading the fuel. Combustion air is controlled by a handle located on the front of the appliance. A second control located on the front of the appliance activates a timer providing additional air to the lower primary air orifice for a predetermined length of time. This same control can be pushed in and set to allow additional air to the lower primary air orifice bypassing the timer. Secondary air is supplied by a third opening that has no user control.

(See product drawings.)

Proprietary drawings and manufacturing methods are on file at Intertek in Intertek's Portland, OR office.

I.D REPORT ORGANIZATION

This report includes summaries of all data necessary to determine compliance with the regulations. Raw data, calibration records, intermediate calculations, drawings, specifications and other supporting information are contained in appendices to this report.

II. SUMMARIZATION

II.A PRETEST INFORMATION

A sample was submitted to Intertek directly from the client at the Hearth & Home test facility, the sample was not independently selected for testing. The test unit was received at the client facility on September 5, 2012. The unit was inspected upon receipt and found to be in good condition. The unit was set up following the manufacturer's instructions without difficulty.

Following assembly, the unit was placed on the test stand and instrumented with thermocouples in the specified locations. Prior to beginning the emissions tests the unit had been operated in excess of 10 hours during research and development tests conducted by Hearth & Home personnel.

Prior to testing the unit's chimney system and laboratory dilution tunnels was cleaned using standard wire brush chimney cleaning equipment.

II.B INFORMATION LOG

TEST STANDARD

From September 5 through September 7, 2012 the unit was tested for EPA emissions using test method 5G2. A sample train described in EPA method 5H was used to extract a proportionate sample from the dilution tunnel. A heated front filter, four Impingers and a rear filter made up the sample train.

Deviation from Standard Method

No deviations from the standards were performed, however, only the applicable sections from each standard were used during all testing.

II.C SUMMARY OF TEST RESULTS

RUN #1 September 5, 2012: Test fuel was loaded by 44 seconds, the door was open for 60 seconds, and then closed. Primary air control set at 0.040 inches open for entire test. Timed air was pushed at zero minutes and pulled out at 5 minutes. Burn time was 380 minutes with a category 2 burn rate of

0.89 kg/hr. The fan was off for the first 30 minutes then set to high for the remainder of the test.

RUN #2 September 6, 2012: Test fuel was loaded by 45 seconds, the door was open for 80 seconds, and then closed. Primary air control set at full open for entire test. Timed air was pushed at zero minutes and not pulled out. Burn time was 145 minutes with a category 4 burn rate of 2.37 kg/hr. The fan was on high for the entire test.

RUN #3 September 6, 2012: Test fuel was loaded by 42 seconds, the door was open for 55 seconds, and then closed. Primary air control set at full open for entire test. Timed air was pushed in and pulled out at 0 minutes. Burn time was 170 minutes with a category 3 burn rate of 1.96 kg/hr. The fan was off for the first 30 minutes then set to high for the remainder of the test.

RUN #4 September 7, 2012: Test fuel was loaded by 46 seconds, the door was open for 60 seconds, and then closed. Primary air control set at 0.040 inches open for entire test. Timed air was pushed at zero minutes and pulled out at 5 minutes. Burn time was 200 minutes with a category 2 burn rate of 1.78 kg/hr. The fan was off for the first 30 minutes then set to high for the remainder of the test.

RUN #5 September 7, 2012: Test fuel was loaded by 53 seconds, the door was open for 65 seconds, and then closed. Primary air control set at 0.125 inches open for entire test. Timed air was pushed at zero minutes and pulled out at 5 minutes. Burn time was 330 minutes with a category 2 burn rate of 1.04 kg/hr. The fan was off for the first 30 minutes then set to high for the remainder of the test. At 287 no weight loss was observed for a 10 minute time period, fuel door was opened and coals were adjusted. Operation took less than 15 seconds.

II.D SUMMARY OF OTHER DATA

EMISSIONS

Run Number	Test Date	Burn Rate (kg/hr)	Emission Rate (g/hr)	Heating Efficiency* (% HHV)
1	9/5/12	0.89	3.71	72.3
2	9/6/12	2.37	6.71	70.9
3	9/6/12	1.96	2.77	74.1
4	9/7/12	1.78	3.15	72.2
5	9/7/12	1.04	2.24	73.0

*Efficiency determined per CSA B415.1-2010.

WEIGHTED AVERAGE CALCULATION

Test No.	Burn Rate	(E) Average Emission Rate g/hr	Heat Output (Btu/hr)	Probability	(K) Weighting Factor	(KxE)
1	0.89	3.71	10,732	0.2908	0.4016	1.4899
5	1.04	2.24	12,541	0.4016	0.5770	1.2925
4	1.78	3.15	21,454	0.8678	0.5056	1.5926
3	1.96	2.77	23,634	0.9072	0.0852	0.2360
2	2.37	6.71	28,578	0.9530	0.0928	0.6227
Totals:					1.6622	5.2337
Weighted average emission rate:						3.15

TEST FACILITY CONDITIONS

Run	Room Temp. °F before	Room Temp. °F after	Baro. Pres. In. Hg before	Baro. Pres. In. Hg after	Air Vel. Ft/min before	Air Vel. Ft/min after
1	82	79	28.42	28.49	<50	<50
2	78	79	28.60	28.59	<50	<50
3	82	84	28.59	28.57	<50	<50
4	72	83	28.71	28.69	<50	<50
5	84	81	28.63	28.64	<50	<50

DILUTION TUNNEL FLOW RATE MEASUREMENTS AND SAMPLING DATA (5G-2)

Run No.	Burn Time (min)	Velocity (ft/sec)	Volumetric Flow Rate (dscf/min)	Total Temp. (°R)	Volume of Sample	Particulate Catch (mg)
1	380	13.46	137.51	555	206.568	93.27
2	145	14.70	144.12	582	79.228	61.68
3	170	13.24	129.66	582	92.255	32.98
4	200	13.42	134.35	572	109.183	42.87
5	330	12.92	131.61	561	178.409	50.76

GENERAL SUMMARY OF RESULTS

Run No.	Burn Rate (kg/hr)	Change In Surface Temp (°F)	Initial Draft (in/H ₂ O)	Run Time (min)	Average Draft (in/H ₂ O)
1	0.89	75.4	-0.022	380	-0.024
2	2.37	71.0	-0.050	145	-0.054
3	1.96	24.0	-0.032	170	-0.052
4	1.78	53.2	-0.032	200	-0.050
5	1.04	124.8	-0.022	330	-0.031

III. PROCESS DESCRIPTION

III.A TEST SET-UP DESCRIPTON

A standard 6" diameter single wall pipe and insulated chimney system was installed to 15' above floor level. The unit controls were adjusted to achieve the four individual burn rates. Rate of combustion was observed by monitoring fuel weight consumption displayed by a platform scale. All sampling equipment was built and maintained as described in EPA Methods 28 and 5H.

III.B AIR SUPPLY SYSTEM

Combustion air enters the firebox through an opening on the side of the firebox. This air is controlled by a sliding damper, which covers the inlet hole. A second air control at located on the lower right front of the appliance controls both a timer and a boost air control. Pushing the control in opens an additional air source to the lower primary air orifice located in the front of the firebox. Pulling the lever back out activates a timer that automatically closes the opening over a time period of approximately 23 minutes. Both levers are located on the right side of the appliance. All gases exit through the 6" flue

IV. SAMPLING SYSTEMS

IV.A. SAMPLING LOCATIONS

Particulate samples are collected from the vertical sample section of the dilution tunnel. The tunnel has two elbows and two mixing baffles in the system ahead of the sampling section. The sampling section is a continuous section of 6 inch diameter pipe straight over its entire length. Tunnel velocity pressure is determined by a standard Pitot tube located a minimum of 4 feet upstream of the sample location. The dry bulb thermocouple is located six inches downstream from the Pitot tube. Actual tunnel used was verified to meet EPA specifications and is similar to that shown in figure 1.

Stack gas samples are collected from the steel chimney section 8 feet ± 6 inches above the scale platform. Actual gas sample collection train was similar to that shown in figure 2.

IV.B.OPERATIONAL DRAWINGS

IV.B.(1) STACK GAS SAMPLE TRAIN

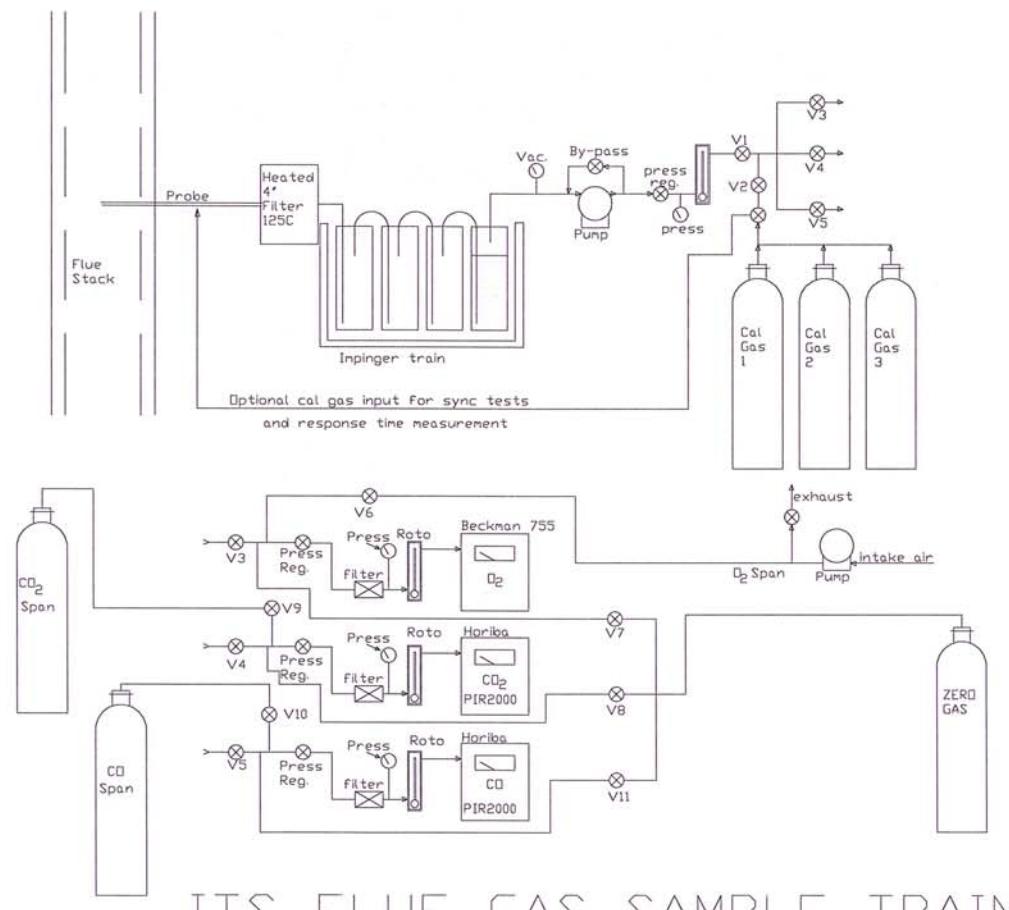
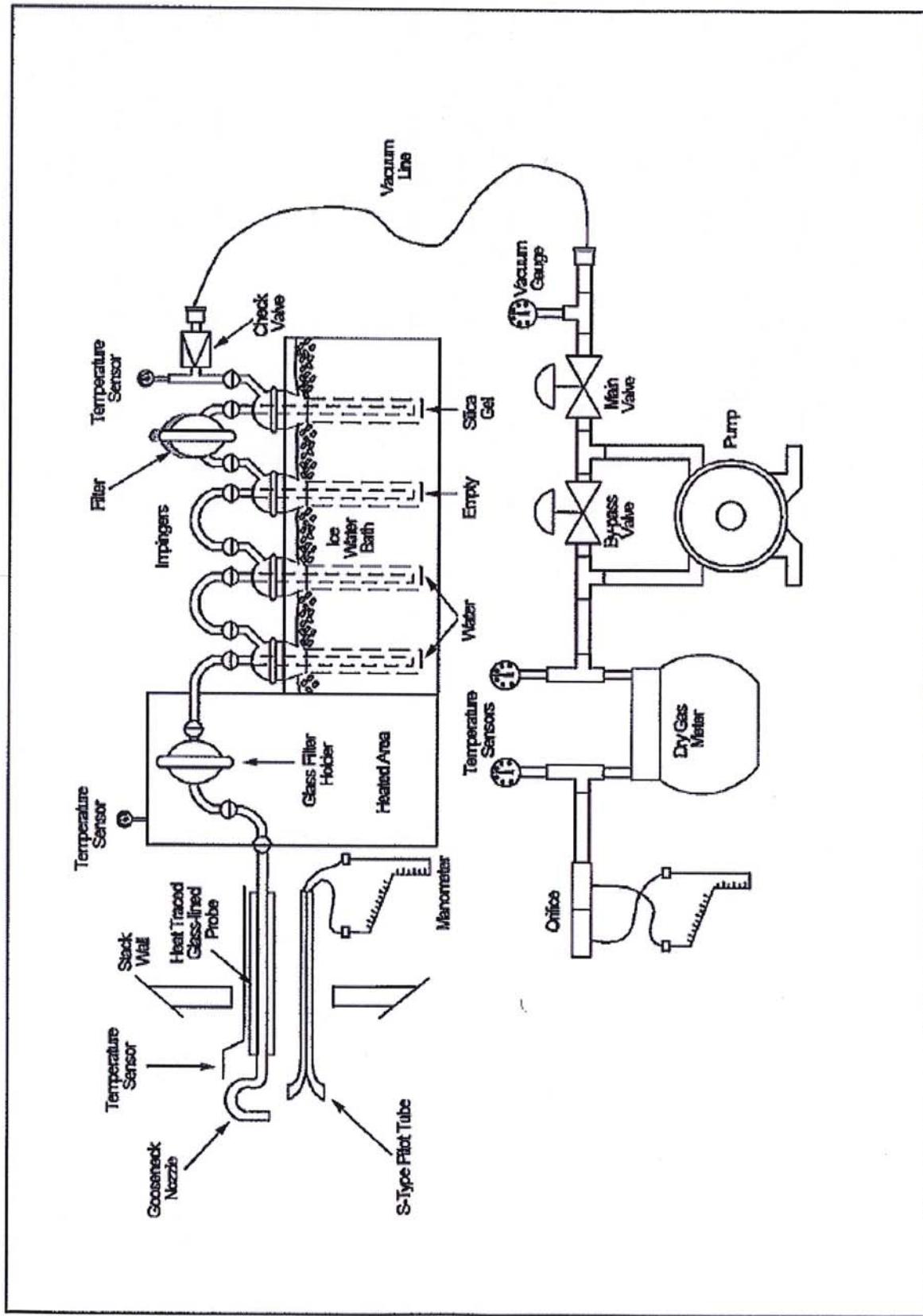


FIGURE 2

IV.B.(2). DILUTION TUNNEL SAMPLE SYSTEMS



V. SAMPLING METHODS

V.A. PARTICULATE SAMPLING

Particulates were sampled in strict accordance with EPA Method 5G-2 and 5H. A 5H sample train was used to extract particulate samples proportionally from a dilution tunnel. A glass probe was inserted into the tunnel and sample was drawn across a heated 110mm filter. After the heated front filter gasses entered a set of four Impingers, a rear 55mm filter was placed between number three and four Impingers. Sample analysis consisted of a front and back half acetone rinse. Impinger water was subjected to a Dichloromethane extraction to separate organics prior to oven drying.

VI. QUALITY ASSURANCE

VI.A. INSTRUMENT CALIBRATION

VI.A. (1) DRY GAS METERS

At the conclusion of each test program the dry gas meters are checked against our standard dry gas meter. Three runs are made on each dry gas meter used during the test program. The average calibration factors obtained are then compared with the six-month calibration factor and, if within 5%, the six-month factor is used to calculate standard volumes. Results of this calibration are contained in Appendix D.

An integral part of the post test calibration procedure is a leak check of the pressure side by plugging the system exhaust and pressurizing the system to 10" W.C. The system is judged to be leak free if it retains the pressure for at least 10 minutes.

The standard dry gas meter is calibrated every 12 months using an accredited calibration agency. All calibration values are verified to be within EPA specifications.

VI.A.(3). GAS ANALYZERS

The continuous analyzers are zeroed and spanned before each test with appropriate gases. A mid-scale multi-component calibration gas is then analyzed (values are recorded). At the conclusion of a test, the instruments are checked again with zero, span and calibration gases (values are recorded only). The drift in each meter is then calculated and must not exceed 5% of the scale used for the test.

At the conclusion of each unit test program, a single-point calibration check is made. This calibration check must meet accuracy requirements of the applicable standards. Consistent deviations between analyzer readings and calibration gas concentrations are used to correct data before computer processing. Data is also corrected for interferences as prescribed by the instrument manufacturer's instructions.

VI.B. TEST METHOD PROCEDURES

VI.B.(1). LEAK CHECK PROCEDURES

Before and after each test, each sample train is tested for leaks. Leakage rates are measured and must not exceed 0.02 CFM or 4% of the sampling rate. Leak checks are performed checking the entire sampling train, not just the dry gas meters. Pre-test and post-test leak checks are conducted with a vacuum of 10 inches of mercury. Vacuum is monitored during each test and the highest vacuum reached is then used for the post test vacuum value. If leakage limits are not met, the test run is rejected. During, these tests the vacuum was typically less than 2 inches of mercury. Thus, leakage rates reported are expected to be much higher than actual leakage during the tests.

VI.B.(2). TUNNEL VELOCITY/FLOW MEASUREMENT

The tunnel velocity is calculated from a center point Pitot tube signal multiplied by an adjustment factor. This factor is determined by a traverse of the tunnel as prescribed in EPA Method 1. Final tunnel velocities and flow rates are calculated from EPA Method 2, Equation 6.9 and 6.10. (Tunnel cross sectional area is the average from both lines of traverse.)

Pitot tubes are cleaned before each test and leak checks are conducted after each test.

VI.B.(3). PM SAMPLING PROPORTIONALITY (5G)

Proportionality was calculated in accordance with EPA Method 5G. The data and results are included in Appendix G.

VII. CONCLUSION

Results of this test show the Summit Insert when operated following guidelines specified in EPA method 28 does meet emissions limits regulating an affected facility in the EPA New Source Performance Standards with a weighted average of 3.15 grams per hour.

VII.A RESULTS AND OBSERVATIONS

The Model Summit Insert Wood fired Solid Fuel Room Heater has been found to be in compliance with the applicable performance and construction requirements of the following criteria: EPA Method 28 "Certification and auditing of wood heaters" and Method 5G Determination of particulate matter emissions from wood heaters."

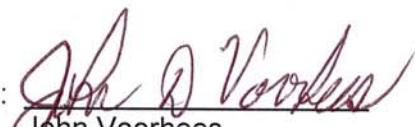
INTERTEK TESTING SERVICES NA

Reported by:


Bruce S Davis

Test Engineer

Reviewed by:


John Voorhees
Operations Manager

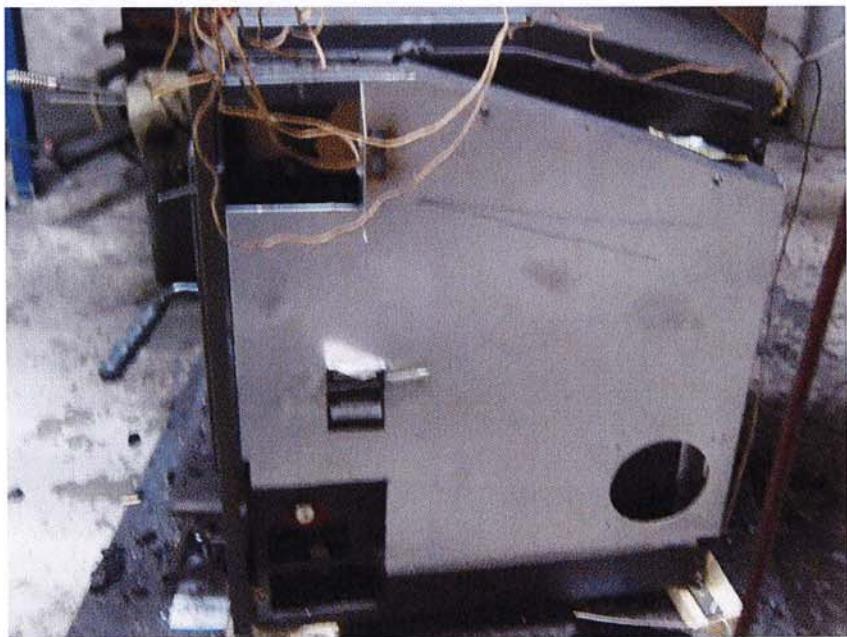
Appendix G

Test Data

**Hearth N Home
Summit Insert
G100868597**



Front View



Side View

EPA NSPS WEIGHTED AVERAGE CALCULATION

V 1.1

8/27/2010

Project Number:	G100868597
Manufacturer:	Hearth N Home
Model:	Summit
Sample ID No:	PRT12082212532-001
Test Dates:	Sept. 5 through Sept. 7, 2012

Type of
Stove: 2
1=cat
2=noncat
3=pellet

Test	Burn	Emission	Heat			(K)				
			No.	Rate	Rate g/hr	(OHE)	(BTU/HR)	Prob.	Factor	(KxE)
1	0.89	3.71	72.30	10731.80	0.2908	0.4016	1.4899	29.04		
5	1.04	2.24	73.00	12540.53	0.4016	0.5770	1.2925	42.12		
4	1.78	3.15	72.20	21463.60	0.8678	0.5056	1.5926	36.50		
3	1.96	2.77	74.10	23634.07	0.9072	0.0852	0.2360	6.31		
2	2.37	6.71	70.90	28577.93	0.9530	0.0928	0.6227	6.58		
				0.00	1.0000	0.0000	0.0000	0.00		
				0.00	1.0000	0.0000	0.0000	0.00		
				0.00	1.0000	0.0000	0.0000	0.00		
				0.00	1.0000	0.0000	0.0000	0.00		

Totals: 1.6622 5.2337 120.55

Weighted average emissions rate:	3.1487
Weighted Average OHE:	72.53



TEST RESULTS
EPA METHOD 5G-3

Project Number: G100868597
Manufacturer: Hearth N Home
Model: Summit
Sample ID Number: PRT12082212532-001
Test Date: 5-Sep-12
Test Run Number: 1

Dry Burn-Rate, kg/hr:	0.89
Emission-Rate, g/hr:	3.71
Duration of Test, Minutes	380
Dry Gas Meter Standardization	Train A
Dry Gas Meter Beginning Reading, ft ³	605.7
Dry Gas Meter Ending Reading, ft ³	828.042
Barometric Pressure Correction Factor	0.951
Dry Gas Meter Calibration Factors (γ factors)	0.995
Dry Gas Meter Temperature Factors	0.982
Dry Gas Meter Delta-H Correction Factors	1.002
Dry Gas Meter STD Volume Sampled, ft ³	207.163
Dilution Tunnel Flow / Volume	
Standardized Tunnel Flow, dscfm	137.510
Total Tunnel Volume, scf	52253.625
Emission Calculations	Train A
Sample Ratios (Total Tunnel Volume / Total Sample Volume)	252.235
Sample Particulate Mass, mg	93.3
Total Emissions, grams	23.526
Emission-Rate, g/hr	3.71
Adjusted Emission Rates, g/hr	5.41
Operating Parameters	Train A
Max Filter Temperature, °F	235
Post-Test Leak Check, cfm @ in. Hg vac.	0
Average Firebox Surface Temperature delta-T, °F	75.4
Maximum Ambient Temperature, °F	86
Minimum Ambient Temperature, °F	79
Fuel Properties	
Wet Fuel Load Weight, lb.	15.10
Dry-Basis Fuel Load Moisture Content, %	21.84
Wet-Basis Fuel Load Moisture Content, %	17.93

PROJECT / TEST INFORMATION	
Project Number:	G100868597
Manufacturer:	Hearth N Home
Model:	Summit
Sample ID Number:	PRT12082212532-001
Test Date:	5-Sep-12
Test Run Number:	1
Date tunnel cleaned:	9/4/2012
Purpose of Test	Certification



Appliance Information		
Appliance Type:	2	1 - Catalytic 2 - Non - Catalytic 3 - Pellet 4 - Hydronic
Firebox Volume, ft³:	2.35	N/A for pellet type
Convection Blower	3	1 - No Fan 2 - Fan Optional 3 - Fan Standard



Test Settings	
Primary Air:	.040" from full closed
Secondary Air:	fixed
Control Board:	NA
Blower/Fan:	on high
Pre- Burn Activities	
Time	Activity
	At 5 minutes loaded 3 piece preburn fuel.
	At 55 minutes raked coals.
Start-Up Procedure	
Loading of fuel, sec. :	Loaded by 44 seconds
Fuel-loading door :	closed by 1:00 minute
Primary air:	At test setting full 5 minutes
Secondary air:	fixed
Control board:	NA
Blower / fan:	Off for the first 30 minutes then turned to high
Other Notes	
Boost air pushed in at zero minutes, at 4 minutes 55 seconds activated timer by pulling the lever out.	

Test Engineer: B. D.Date: 7/24/12

Intertek**TEST FUEL DATA
EPA METHOD 5G-3**

Project Number:	G100868597
Manufacturer:	Hearth N Home
Model:	Summit
Sample ID Number:	PRT12082212532-001
Test Date:	5-Sep-12
Test Run Number:	1

Firebox Volume, ft ³ :	2.35
-----------------------------------	------

Calibration Reference ID		
Set meter to Species 1		
Set Temperature to 70F	12%	12.0
Set pin setting to 444	22%	22.0

PRE-BURN FUEL PROPERTIES					
Eq. ID No.:		Time:	Temp., °F:		
Piece No.	Length, In.	Weight, Lb.	Moisture, %, Dry Basis		
1	8.00	2.50	23.7	18.6	19.3
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
Total Weight	2.5	Average, %db	20.5		

Allowable Fuel Load Range: 14.9 to 18.0

TEST FUEL LOAD PROPERTIES					
Eq. ID No.:		Time:	9:30	Temp., °F:	65
Piece No.	Length, In.	Weight, Lb.	Moisture, %, Dry Basis		
			2x4	4x4	
1	18.00	7.00		19.8	18.7
2	18.00		8.10	19.5	19.1
3	16.50			23.9	24.5
4	16.50			19.5	24.5
5	16.50			21.9	24.5
6					
7					
8					
Totals		7.0	8.1		
% of Weight		46	54		
Total weight, wet, lb.		15.10		Average Moisture, dry	21.84
Total weight, dry, kg		5.62		Average Moisture, wet	17.93

Test Engineer: BobDate: 9/24/12



Project Number: G100868597
Manufacturer: Hearth N Home
Model: Summit
Sample ID Number: PRT12082212532-001
Test Date: 5-Sep-12
Test Run Number: 1

EPA Method 28
Pre Burn Data

Coal Bed Range 3.1 to 3.7

Average Firebox Temp, °F

Final Coal Bed Wt, lb

Test Engineer: B. B.

Date: 9/24/12



TEST DATA
EPA METHOD 5G-3

Project Number:	G100868597
Manufacturer:	Hearth N Home
Model:	Summit
Sample ID No:	PRT12082212532-001
Test Date:	5-Sep-12
Test Run No:	1

Temperature Data

Firebox Temp Start	291.2
Firebox Temp End	215.8
Firebox Delta-T	75.4

Max Filter Temps	
Train A	
235	

Interval	10	Duration of Test, Min	380
Time			

Temperature Data

Interval	Duration	Room	Dilution Tunnel	Flue Gas	Firebox Top	Firebox Bottom	Firebox Back	Firebox Left	Firebox Right	Catalyst Outlet	Train A Filter	Impinger Exit	Train A DGM
0	0	82	94	176	321	320	231	315	269		235	84	77
1	10	81	93	190	321	371	280	298	263		235	58	76
2	20	80	98	284	472	381	279	269	247		233	62	76
3	30	80	105	364	620	389	287	254	235		234	55	76
4	40	80	107	369	616	313	212	249	229		233	52	76
5	50	80	108	347	573	284	192	241	226		234	51	75
6	60	81	109	327	592	266	190	245	227		234	52	75
7	70	82	108	344	588	252	186	248	234		234	52	75
8	80	82	105	319	553	239	186	243	244		234	52	75
9	90	82	107	309	561	236	187	244	247		234	52	75
10	100	82	106	325	591	230	192	254	249		234	52	75
11	110	83	104	315	627	226	207	280	250		234	52	75
12	120	84	104	299	628	225	222	297	251		234	52	75
13	130	84	100	254	547	224	230	304	256		234	51	75
14	140	84	97	220	430	224	236	306	259		235	51	75
15	150	85	94	200	377	224	237	303	256		234	52	75
16	160	84	94	191	344	224	231	299	253		234	52	75
17	170	84	94	184	324	224	227	293	248		234	53	75
18	180	84	94	179	309	217	223	288	243		234	53	77
19	190	84	94	172	298	218	217	281	237		234	54	77
20	200	84	95	167	288	217	213	277	232		233	54	77
21	210	84	94	163	279	215	209	271	227		234	55	79
22	220	84	93	162	279	212	206	264	221		233	55	79
23	230	84	93	160	277	217	205	260	217		234	55	80
24	240	86	93	156	269	219	203	257	215		234	56	80
25	250	84	92	153	263	217	201	254	213		234	54	80
26	260	84	91	152	261	217	199	252	211		234	55	80
27	270	84	91	150	255	217	196	249	209		234	54	80
28	280	84	90	150	252	215	193	246	208		234	54	80
29	290	83	90	148	249	212	193	246	206		234	54	80
30	300	85	90	147	249	212	194	247	204		234	55	80
31	310	84	90	149	250	214	194	247	201		234	55	80
32	320	83	89	149	251	218	192	247	200		234	55	80
33	330	82	88	147	250	219	190	246	199		234	57	80
34	340	82	87	147	249	220	187	244	198		234	57	80
35	350	81	87	146	247	221	185	244	197		234	57	80
36	360	81	86	146	247	221	185	242	197		234	58	80
37	370	81	85	145	246	221	183	240	197		234	58	80
38	380	79	85	143	244	221	180	239	195		234	58	80

Test Engineer: B. J. D.

Date: 9/24/12



TEST DATA
EPA METHOD 5G-3

Gas Particulate Sampling Data

Project Number: G100868597
Manufacturer: Hearth N Home
Model: Summit
Sample ID Number: PRT12082212532-001
Test Date: 5-Sep-12
Test Run Number: 1

Barometer, In. Hg		RH, %	Sample Box Correction (y) Factors	
Start	28.42		Meter Box (A)	0.995
End	28.49			

Leak Check, cfm @ in Hg	
Train A	

Maximum Vacuum	
Train A	

Time	Particulate Sampling Data										
	Tunnel Delta-P	Train A Delta-H		Flue Draft	Fuel Weight	Weight Loss	Train A Volume		Train A Proportional Rate		Train A Vacuum, In. Hg
0	0.045	1.00		-0.022	15.10	15.10	605.700		100.09		0.00
10	0.045	1.00		-0.027	14.80	0.30	611.550		98.88		0.00
20	0.045	1.00		-0.045	13.90	0.90	617.200		95.93		0.00
30	0.045	1.00		-0.054	12.60	1.30	623.000		99.10		0.00
40	0.045	1.00		-0.052	11.50	1.10	628.700		97.56		0.00
50	0.045	1.00		-0.052	10.40	1.10	634.530		100.06		0.00
60	0.045	1.00		-0.052	9.30	1.10	640.370		100.32		0.00
70	0.045	1.00		-0.050	8.30	1.00	646.480		104.87		0.00
80	0.045	1.00		0.043	7.60	0.70	652.300		99.62		0.00
90	0.045	1.00		-0.043	6.80	0.80	657.705		92.68		0.00
100	0.045	1.00		-0.045	6.00	0.80	663.850		105.28		0.00
110	0.045	1.00		-0.045	5.00	1.00	669.950		104.32		0.00
120	0.045	1.00		-0.043	4.30	0.70	675.520		95.26		0.00
130	0.045	1.00		-0.038	3.80	0.50	681.550		102.76	#DIV/0!	0.00
140	0.045	1.00		-0.032	3.50	0.30	687.070		93.82	#DIV/0!	0.00
150	0.045	1.00		-0.027	3.30	0.20	693.020		100.85	#DIV/0!	0.00
160	0.045	1.00		-0.025	3.00	0.30	699.050		102.21	#DIV/0!	0.00
170	0.045	1.00		-0.022	2.80	0.20	704.740		96.45	#DIV/0!	0.00
180	0.045	1.00		-0.021	2.70	0.10	710.560		98.28	#DIV/0!	0.00
190	0.045	1.00		-0.018	2.50	0.20	716.460		99.63	#DIV/0!	0.00
200	0.045	1.00		-0.018	2.40	0.10	722.380		100.06	#DIV/0!	0.00
210	0.045	1.00		-0.018	2.20	0.20	728.120		96.57	#DIV/0!	0.00
220	0.045	1.00		-0.015	2.10	0.10	734.160		101.53	#DIV/0!	0.00
230	0.045	1.00		-0.015	2.00	0.10	740.050		98.82	#DIV/0!	0.00
240	0.045	1.00		-0.015	1.80	0.20	745.710		94.96	#DIV/0!	0.00
250	0.045	1.00		-0.015	1.70	0.10	751.201		92.04	#DIV/0!	0.00
260	0.045	1.00		-0.015	1.60	0.10	757.580		106.83	#DIV/0!	0.00
270	0.045	1.00		-0.015	1.50	0.10	763.640		101.49	#DIV/0!	0.00
280	0.045	1.00		-0.012	1.30	0.20	769.370		95.88	#DIV/0!	0.00
290	0.045	1.00		-0.012	1.20	0.10	775.340		99.89	#DIV/0!	0.00
300	0.045	1.00		-0.012	1.00	0.20	781.050		95.54	#DIV/0!	0.00
310	0.040	1.00		-0.012	0.90	0.10	787.140		108.08	#DIV/0!	0.00
320	0.040	1.00		-0.012	0.70	0.20	793.000		103.90	#DIV/0!	0.00
330	0.040	1.00		-0.012	0.60	0.10	798.770		102.22	#DIV/0!	0.00
340	0.040	1.00		-0.012	0.50	0.10	804.640		103.89	#DIV/0!	0.00
350	0.040	1.00		-0.012	0.40	0.10	810.570		104.95	#DIV/0!	0.00
360	0.040	1.00		-0.012	0.20	0.20	816.310		101.50	#DIV/0!	0.00
370	0.040	1.00		-0.011	0.10	0.10	822.180		103.70	#DIV/0!	0.00
380	0.040	1.00		-0.011	0.00	0.10	828.042		103.56	#DIV/0!	0.00

Test Engineer: B.D.

Date: 7/24/12

Intertek**Dilution Tunnel Velocity Traverse
EPA Method 5G-3**

Project Number: G100868597

Manufacturer: Hearth N Home

Model: Summit

Sample ID Number: PRT12082212532-001

Test Date: 5-Sep-12

Test Run Number: 1

	Dilution Tunnel		Square Root
	Delta P In. H2O	Temp, °F	
A1	0.0320	95	0.1789
A2	0.0380	95	0.1949
A3	0.0440	95	0.2098
A4	0.0300	95	0.1732
A Center	0.0460	95	0.2145
B1	0.0380	95	0.1949
B2	0.0440	95	0.2098
B3	0.0440	95	0.2098
B4	0.0340	95	0.1844
B Center	0.0440	95	0.2098
Averages	0.0394	95	0.1945

Tunnel Diameter **6.000** inchesTunnel Static **-0.388** in. H2OTunnel Area 0.19635 Ft²

Pitot Correction 0.9167 factor

Baro. Pressure 28.42

Pitot Factor **0.99** (0.99 for standard, 0.84 or Cal. For S-Type)

Initial Velocity 13.617 Ft/ Sec

Initial Flow **139.11** Ft³/minTest Engineer: B.D.Date: 9/14/12



DILUTION TUNNEL PARTICULATE CALCULATIONS
EPA Method 5G-3

Project Number: G100868597

Manufacturer: Hearth N Home

Model: Summit

Sample ID Number: PRT12082212532-001

Test Date: 5-Sep-12

Test Run Number: 1

Intertek Equipment No.'s 19683, 19684

SAMPLE COMPONENT	REAGENT	FILTER # OR	WEIGHTS			
			FINAL, mg	TARE, mg	BLANK, mg/ml	PARTICULATE, mg
FRONT FILTER CATCH	FILTER	411	757.8	743		14.80
REAR FILTER CATCH	FILTER	419	168.9	162.8		6.10
RINSE OF PROBE &	ACETONE	45	103649.3	103646	0.00066	3.27
RINSE OF IMPINGER SET	WATER	225	106778.2	106756.2	0.00066	21.85
RINSE OF IMPINGER SET	METHANE	150	98784.4	98763	0.0047	20.69
RINSE OF FILTER ASSEMBLY & GAS TRAIN -	ACETONE	70	102132.3	102105.7	0.00066	26.55
					TOTAL:	93.27

CONDENSED WATER

IMPINGERS	WEIGHTS		
	FINAL, g	INITIAL, g	NET, g
1	718.1	705.1	13.00
2	686.3	679.5	6.80
3	604.3	602.3	2.00
4	927.2	910.2	17.00
		TOTAL:	38.80

EQUATIONS

FRONT FILTER CATCH	Final, mg - Tare, mg = Particulate, mg
REAR FILTER CATCH	Final, mg - Tare, mg = Particulate, mg
RINSE OF PROBE & FILTER ASSEMBLY - FRONT	(Final, mg - Tare, mg) - (Blank, mg/ml x Volume, ml) = Particulate, mg
RINSE OF IMPINGER SET	(Final, mg - Tare, mg) - (Blank, mg/ml x Volume, ml) = Particulate, mg
RINSE OF FILTER ASSEMBLY & GAS TRAIN - BACK	(Final, mg - Tare, mg) - (Blank, mg/ml x Volume, ml) = Particulate, mg

Test Engineer: B.R.

Date: 7/24/12



TEST RESULTS
EPA METHOD 5G-3

Project Number: G100868597
Manufacturer: Hearth N Home
Model: Summit
Sample ID Number: PRT12082212532-001
Test Date: 6-Sep-12
Test Run Number: 2

Dry Burn-Rate, kg/hr:	2.37
Emission-Rate, g/hr:	6.71
Duration of Test, Minutes	145
Dry Gas Meter Standardization	Train A
Dry Gas Meter Beginning Reading, ft ³	828.3
Dry Gas Meter Ending Reading, ft ³	912.298
Barometric Pressure Correction Factor	0.956
Dry Gas Meter Calibration Factors (y factors)	0.995
Dry Gas Meter Temperature Factors	0.992
Dry Gas Meter Delta-H Correction Factors	1.002
Dry Gas Meter STD Volume Sampled, ft ³	79.471
Dilution Tunnel Flow / Volume	
Standardized Tunnel Flow, dscfm	144.119
Total Tunnel Volume, scf	20897.227
Emission Calculations	Train A
Sample Ratios (Total Tunnel Volume / Total Sample Volume)	262.954
Sample Particulate Mass, mg	61.7
Total Emissions, grams	16.218
Emission-Rate, g/hr	6.71
Adjusted Emission Rates, g/hr	8.84
Operating Parameters	Train A
Max Filter Temperature, °F	235
Post-Test Leak Check, cfm @ in. Hg vac.	0
Average Firebox Surface Temperature delta-T, °F	71
Maximum Ambient Temperature, °F	80
Minimum Ambient Temperature, °F	76
Fuel Properties	
Wet Fuel Load Weight, lb.	15.40
Dry-Basis Fuel Load Moisture Content, %	21.94
Wet-Basis Fuel Load Moisture Content, %	17.99

Run Notes
EPA Methods 28 and 5G-3

PROJECT / TEST INFORMATION	
Project Number:	G100868597
Manufacturer:	Hearth N Home
Model:	Summit
Sample ID Number:	PRT12082212532-001
Test Date:	6-Sep-12
Test Run Number:	2
Date tunnel cleaned:	9/4/2012
Purpose of Test	Certification



Appliance Information		
Appliance Type:	2	1 - Catalytic 2 - Non - Catalytic 3 - Pellet 4 - Hydronic
Firebox Volume, ft³:	2.35	N/A for pellet type
Convection Blower	3	1 - No Fan 2 - Fan Optional 3 - Fan Standard



Test Settings	
Primary Air:	Fully open
Secondary Air:	fixed
Control Board:	
Blower/Fan:	on high
Pre- Burn Activities	
Time	Activity
	Raked coals at 55 minutes
Start-Up Procedure	
Loading of fuel, sec. :	Fuel loaded by 45 seconds
Fuel-loading door :	door closed by 1:20
Primary air:	Fully open
Secondary air:	fixed
Control board:	
Blower / fan:	On high entire test
Other Notes	
Boost air lockeed open for entire test	

Test Engineer: B. D.

Date: 9/24/12

Intertek**TEST FUEL DATA
EPA METHOD 5G-3**

Project Number:	G100868597
Manufacturer:	Hearth N Home
Model:	Summit
Sample ID Number:	PRT12082212532-001
Test Date:	6-Sep-12
Test Run Number:	2

Firebox Volume, ft ³ :	2.35
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Calibration Reference ID		
Set meter to Species 1		
Set Temperature to 70F	12%	12.0
Set pin setting to 444	22%	22.0

PRE-BURN FUEL PROPERTIES					
Eq. ID No.:		Time:	Temp., °F:		
Piece No.	Length, In.	Weight, Lb.	Moisture, %, Dry Basis		
1	96.00		19.5	20.2	20.3
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
Total Weight	0.0	Average, %db	20.0		

Allowable Fuel Load Range: 14.9 to 18.0

TEST FUEL LOAD PROPERTIES					
Eq. ID No.:		Time:	9:05	Temp., °F:	65
Piece No.	Length, In.	Weight, Lb.	Moisture, %, Dry Basis		
1	16.50	7.10	23.7	23.2	24.5
2	16.50		24.5	23.6	24.5
3	16.50		20.3	22.4	19.4
4	18.00		20.2	19.5	18.7
5	18.00		19.1	22.0	23.5
6					
7					
8					
Totals	7.1	8.3			
% of Weight	46	54			
Total weight, wet, lb.	15.40	Average Moisture, dry	21.94		
Total weight, dry, kg	5.73	Average Moisture, wet	17.99		

Test Engineer: Bob J.Date: 9/24/12



Project Number: G100868597
Manufacturer: Hearth N Home
Model: Summit
Sample ID Number: PRT12082212532-001
Test Date: 6-Sep-12
Test Run Number: 2

EPA Method 28 Pre Burn Data

Coal Bed Range 3.1 to 3.8

Average Firebox Temp, °F 437.2

Final Coal Bed Wt, lb 3.1

Test Engineer:

Date: 9/24/12

Intertek**TEST DATA
EPA METHOD 5G-3**

Project Number:	G100868597
Manufacturer:	Hearth N Home
Model:	Summit
Sample ID No:	PRT12082212532-001
Test Date:	6-Sep-12
Test Run No:	2

Temperature Data

Firebox Temp Start	434.8
Firebox Temp End	363.8
Firebox Delta-T	71.0

Max Filter Temps	
Train A	
235	

Interval	5	Duration of Test, Min	145	
Time		Temperature Data		

Interval	Duration	Room	Dilution Tunnel	Flue Gas	Firebox Top	Firebox Bottom	Firebox Back	Firebox Left	Firebox Right	Catalyst Outlet	Train A Filter	Impinger Exit	Train A DGM
0	0	78	121	382	547	454	332	453	388		234	71	69
1	5	76	122	403	546	447	319	440	380		234	44	69
2	10	76	133	511	672	432	291	416	365		234	45	69
3	15	77	140	525	711	421	268	397	349		234	46	70
4	20	77	142	523	730	407	251	385	334		233	47	70
5	25	77	143	522	740	397	242	382	321		234	48	70
6	30	77	142	519	737	389	243	384	314		234	48	70
7	35	78	142	517	752	382	248	393	311		233	49	70
8	40	78	141	515	765	377	263	405	312		235	50	71
9	45	79	140	517	780	371	263	421	315		234	51	70
10	50	78	140	516	791	369	274	435	316		234	51	70
11	55	78	135	492	781	367	294	459	320		234	51	71
12	60	78	129	452	742	362	309	470	324		234	52	72
13	65	78	123	420	680	378	319	477	331		233	51	72
14	70	78	120	404	638	370	323	475	337		234	53	72
15	75	78	119	402	615	317	325	472	342		234	53	72
16	80	79	118	407	616	372	325	472	345		234	53	72
17	85	79	118	404	630	373	325	468	348		234	55	73
18	90	78	115	387	595	374	325	466	350		234	55	73
19	95	78	112	362	547	376	323	462	358		234	55	73
20	100	79	110	349	515	378	322	458	364		234	55	73
21	105	78	109	341	489	380	320	453	371		233	56	74
22	110	79	108	336	471	381	319	447	373		234	56	74
23	115	78	107	333	460	372	316	440	373		233	57	74
24	120	79	107	331	452	383	314	435	373		234	57	74
25	125	79	106	321	436	384	311	428	372		233	57	74
26	130	78	105	318	426	384	308	421	369		234	57	74
27	135	79	104	313	416	383	302	413	366		233	58	75
28	140	80	104	307	405	381	294	404	363		233	58	75
29	145	79	104	303	396	379	288	397	359		233	58	75

Test Engineer: Date: 9/24/12



TEST DATA
EPA METHOD 5G-3

Gas Particulate Sampling Data

Project Number: G100868597
Manufacturer: Hearth N Home
Model: Summit
Sample ID Number: PRT12082212532-001
Test Date: 6-Sep-12
Test Run Number: 2

Barometer, In. Hg	RH, %	Sample Box Correction (y) Factors	
Start	28.60	Meter Box (A)	0.995
End	28.59		

Leak Check, cfm @ in Hg	
Train A	

Maximum Vacuum	
Train A	
	0.00

Time	Particulate Sampling Data										
	Tunnel Delta-P	Train A Delta-H		Flue Draft	Fuel Weight	Weight Loss	Train A Volume		Train A Proportional Rate		Train A Vacuum, In. Hg
0	0.050	1.00		-0.050	15.40	15.40	828.300		99.98		0.00
5	0.050	1.00		-0.070	14.70	0.70	831.430		108.69		0.00
10	0.050	1.00		-0.072	13.70	1.00	834.120		94.29		0.00
15	0.050	1.00		-0.072	12.50	1.20	836.860		96.43		0.00
20	0.050	1.00		-0.072	11.60	0.90	839.770		102.58		0.00
25	0.050	1.00		-0.072	10.50	1.10	842.580		99.14		0.00
30	0.050	1.00		-0.071	9.20	1.30	845.480		102.23		0.00
35	0.050	1.00		-0.072	8.10	1.10	848.380		102.23		0.00
40	0.050	1.00		-0.072	7.10	1.00	851.200		99.14		0.00
45	0.050	1.00		-0.072	5.90	1.20	854.200		105.58		0.00
50	0.050	1.00		-0.071	5.10	0.80	856.980		97.83		0.00
55	0.050	1.00		-0.069	4.30	0.80	859.910		102.49		0.00
60	0.050	1.00		-0.062	3.80	0.50	862.750		98.65		0.00
65	0.050	1.00		0.060	3.40	0.40	865.770		104.37	#DIV/0!	0.00
70	0.050	1.00		-0.057	3.00	0.40	868.550		95.83	#DIV/0!	0.00
75	0.050	1.00		-0.057	2.60	0.40	871.600		105.05	#DIV/0!	0.00
80	0.050	1.00		-0.057	2.30	0.30	874.450		98.07	#DIV/0!	0.00
85	0.050	1.00		-0.057	1.90	0.40	877.195		94.28	#DIV/0!	0.00
90	0.050	1.00		-0.053	1.70	0.20	880.260		105.00	#DIV/0!	0.00
95	0.050	1.00		-0.051	1.50	0.20	883.050		95.33	#DIV/0!	0.00
100	0.050	1.00		-0.050	1.30	0.20	885.930		98.23	#DIV/0!	0.00
105	0.050	1.00		-0.048	1.10	0.20	888.880		100.34	#DIV/0!	0.00
110	0.050	1.00		-0.048	1.00	0.10	891.870		101.61	#DIV/0!	0.00
115	0.050	1.00		-0.042	0.80	0.20	894.840		100.85	#DIV/0!	0.00
120	0.050	1.00		-0.042	0.70	0.10	897.640		95.07	#DIV/0!	0.00
125	0.050	1.00		-0.043	0.50	0.20	900.590		100.08	#DIV/0!	0.00
130	0.050	1.00		-0.042	0.40	0.10	903.480		97.96	#DIV/0!	0.00
135	0.050	1.00		-0.041	0.20	0.20	906.550		103.77	#DIV/0!	0.00
140	0.050	1.00		-0.041	0.10	0.10	909.440		97.69	#DIV/0!	0.00
145	0.050	1.00		-0.040	0.00	0.10	912.298		96.60	#DIV/0!	0.00

Test Engineer: B6D

Date: 9/24/12

Intertek**Dilution Tunnel Velocity Traverse
EPA Method 5G-3**

Project Number: G100868597
Manufacturer: Hearth N Home
Model: Summit
Sample ID Number: PRT12082212532-001
Test Date: 6-Sep-12
Test Run Number: 2

	Dilution Tunnel		Square Root
	Delta P In. H2O	Temp, °F	
A1	0.0360	134	0.1897
A2	0.0440	134	0.2098
A3	0.0520	134	0.2280
A4	0.0400	133	0.2000
A Center	0.0500	133	0.2236
B1	0.0400	133	0.2000
B2	0.0460	133	0.2145
B3	0.0480	132	0.2191
B4	0.0340	132	0.1844
B Center	0.0500	132	0.2236
Averages	0.044	133	0.2057

Tunnel Diameter **6.000** inches
Tunnel Static **-0.410** in. H2O
Tunnel Area 0.19635 Ft²
Pitot Correction 0.9199 factor
Baro. Pressure 28.60
Pitot Factor **0.99** (0.99 for standard, 0.84 or Cal. For S-Type)
Initial Velocity 14.841 Ft/ Sec
Initial Flow **142.79** Ft³/min

Test Engineer: BDDate: 7/24/12



DILUTION TUNNEL PARTICULATE CALCULATIONS
EPA Method 5G-3

Project Number: G100868597
Manufacturer: Hearth N Home
Model: Summit
Sample ID Number: PRT12082212532-001
Test Date: 6-Sep-12
Test Run Number: 2

Intertek Equipment No.'s 19683, 19684

SAMPLE COMPONENT	REAGENT	FILTER # OR	WEIGHTS			
			FINAL, mg	TARE, mg	BLANK, mg/ml	PARTICULATE, mg
FRONT FILTER CATCH	FILTER	412	762.1	745.4		16.70
REAR FILTER CATCH	FILTER	420	165.9	164.8		1.10
RINSE OF PROBE &	ACETONE	45	96396.8	96391.2	0.00066	5.57
RINSE OF IMPINGER SET	WATER	220	95096.7	95088.6	0.00066	7.95
RINSE OF IMPINGER SET	METHANE	150	107990.4	107981.9	0.0047	7.80
RINSE OF FILTER ASSEMBLY & GAS TRAIN -	ACETONE	65	106950.9	106928.3	0.00066	22.56
					TOTAL:	61.68

CONDENSED WATER

IMPINGERS	WEIGHTS		
	FINAL, g	INITIAL, g	NET, g
1	712	706.2	5.80
2	692.5	680	12.50
3	607.4	602	5.40
4	957.7	935.1	22.60
		TOTAL:	46.30

EQUATIONS

FRONT FILTER CATCH	Final, mg - Tare, mg = Particulate, mg
REAR FILTER CATCH	Final, mg - Tare, mg = Particulate, mg
RINSE OF PROBE & FILTER ASSEMBLY - FRONT	(Final, mg - Tare, mg) - (Blank, mg/ml x Volume, ml) = Particulate, mg
RINSE OF IMPINGER SET	(Final, mg - Tare, mg) - (Blank, mg/ml x Volume, ml) = Particulate, mg
RINSE OF FILTER ASSEMBLY & GAS TRAIN - BACK	(Final, mg - Tare, mg) - (Blank, mg/ml x Volume, ml) = Particulate, mg

Test Engineer: B.D.

Date: 9/24/12

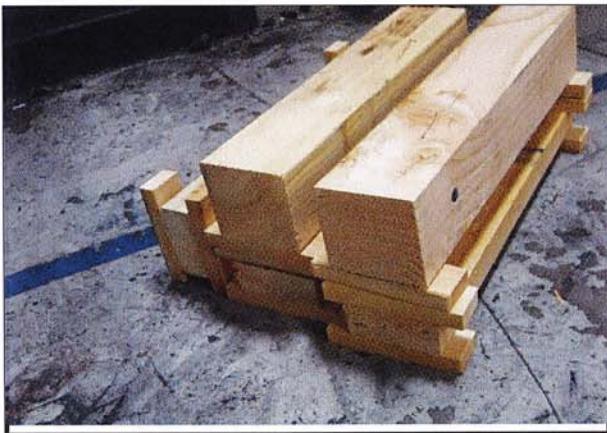


TEST RESULTS
EPA METHOD 5G-3

Project Number: G100868597
Manufacturer: Hearth N Home
Model: Summit
Sample ID Number: PRT12082212532-001
Test Date: 6-Sep-12
Test Run Number: 3

Dry Burn-Rate, kg/hr:	1.96
Emission-Rate, g/hr:	2.77
Duration of Test, Minutes	170
Dry Gas Meter Standardization	Train A
Dry Gas Meter Beginning Reading, ft ³	919.7
Dry Gas Meter Ending Reading, ft ³	1018.557
Barometric Pressure Correction Factor	0.955
Dry Gas Meter Calibration Factors (y factors)	0.995
Dry Gas Meter Temperature Factors	0.982
Dry Gas Meter Delta-H Correction Factors	1.002
Dry Gas Meter STD Volume Sampled, ft ³	92.514
Dilution Tunnel Flow / Volume	
Standardized Tunnel Flow, dscfm	129.657
Total Tunnel Volume, scf	22041.650
Emission Calculations	Train A
Sample Ratios (Total Tunnel Volume / Total Sample Volume)	238.252
Sample Particulate Mass, mg	33.0
Total Emissions, grams	7.857
Emission-Rate, g/hr	2.77
Adjusted Emission Rates, g/hr	4.24
Operating Parameters	Train A
Max Filter Temperature, °F	235
Post-Test Leak Check, cfm @ in. Hg vac.	0
Average Firebox Surface Temperature delta-T, °F	24
Maximum Ambient Temperature, °F	86
Minimum Ambient Temperature, °F	82
Fuel Properties	
Wet Fuel Load Weight, lb.	15.10
Dry-Basis Fuel Load Moisture Content, %	23.61
Wet-Basis Fuel Load Moisture Content, %	19.10

PROJECT / TEST INFORMATION	
Project Number:	G100868597
Manufacturer:	Hearth N Home
Model:	Summit
Sample ID Number:	PRT12082212532-001
Test Date:	6-Sep-12
Test Run Number:	3
Date tunnel cleaned:	9/4/2012
Purpose of Test	Certification



Appliance Information		
Appliance Type:	2	1 - Catalytic 2 - Non - Catalytic 3 - Pellet 4 - Hydronic
Firebox Volume, ft³:	2.35	N/A for pellet type
Convection Blower	3	1 - No Fan 2 - Fan Optional 3 - Fan Standard



Test Settings	
Primary Air:	Fully open
Secondary Air:	Fixed
Control Board:	NA
Blower/Fan:	On high
Pre- Burn Activities	
Time	Activity
	At 40 minutes raked coals
Start-Up Procedure	
Loading of fuel, sec. :	Loaded by 42 seconds
Fuel-loading door :	closed by 55 seconds
Primary air:	fully open for entire test
Secondary air:	fixed
Control board:	NA
Blower / fan:	Off for first 30 minutes then turned to high
Other Notes	
Boost air was pulled out to activate timer a zero minutes. No other adjustments were made to the boost air.	

Test Engineer: BodDate: 9/24/12

Intertek**TEST FUEL DATA
EPA METHOD 5G-3**

Project Number:	G100868597
Manufacturer:	Hearth N Home
Model:	Summit
Sample ID Number:	PRT12082212532-001
Test Date:	6-Sep-12
Test Run Number:	3

Firebox Volume, ft ³ :	2.35
-----------------------------------	------

Calibration Reference ID			
Set meter to Species 1			
Set Temperature to 70F		12%	12.0
Set pin setting to 444		22%	22.0

PRE-BURN FUEL PROPERTIES					
Eq. ID No.:		Time:	14:40	Temp., °F:	70
Piece No.	Length, In.	Weight, Lb.	Moisture, %, Dry Basis		
1	24.00	2.60	20.0	20.6	22.7
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
Total Weight	2.6	Average, %db	21.1		
Allowable Fuel Load Range: 14.9 to 18.0					
TEST FUEL LOAD PROPERTIES					
Eq. ID No.:		Time:	14:35	Temp., °F:	70
Piece No.	Length, In.	Weight, Lb.	Moisture, %, Dry Basis		
		2x4 4x4			
1	16.50	6.90	22.7	21.7	23.8
2	16.50		23.8	22.7	23.7
3	16.50		23.8	23.8	23.8
4	18.00		24.6	22.3	24.7
5	18.00		24.8	24.2	23.8
6					
7					
8					
Totals	6.9	8.2			
% of Weight	46	54			
Total weight, wet, lb.	15.10		Average Moisture, dry	23.61	
Total weight, dry, kg	5.54		Average Moisture, wet	19.10	

Test Engineer: BobDate: 9/24/12



Project Number: G100868597
Manufacturer: Hearth N Home
Model: Summit
Sample ID Number: PRT12082212532-001
Test Date: 6-Sep-12
Test Run Number: 3

EPA Method 28
Pre Burn Data

Coal Bed Range 3.1 to 3.7

Average Firebox Temp, °F 0

Final Coal Bed Wt, lb

Test Engineer: B2

Date: 9/24/12



TEST DATA
EPA METHOD 5G-3

Project Number:	G100868597
Manufacturer:	Hearth N Home
Model:	Summit
Sample ID No:	PRT12082212532-001
Test Date:	6-Sep-12
Test Run No:	3

Temperature Data

Firebox Temp Start	353
Firebox Temp End	329
Firebox Delta-T	24.0

Max Filter Temps	
Train A	
235	

Interval	10	Duration of Test, Min	170
Time			

Temperature Data

Interval	Duration	Room	Dilution Tunnel	Flue Gas	Firebox Top	Firebox Bottom	Firebox Back	Firebox Left	Firebox Right	Catalyst Outlet	Train A Filter	Impinger Exit	Train A DGM
0	0	82	104	241	347	402	272	410	334		235	86	78
1	10	83	127	456	566	462	326	366	312		235	55	78
2	20	83	148	544	804	578	343	349	298		235	58	78
3	30	86	147	536	845	460	355	378	379		235	59	78
4	40	85	146	508	803	402	291	409	305		235	60	78
5	50	85	141	483	768	375	282	449	308		235	55	78
6	60	84	140	487	771	360	290	472	307		235	52	78
7	70	85	134	444	727	351	305	477	306		235	52	78
8	80	84	126	397	633	345	315	472	310		235	52	78
9	90	83	118	350	548	342	310	464	317		235	53	78
10	100	83	114	328	487	341	303	455	320		234	52	77
11	110	82	109	303	442	341	297	442	319		235	52	77
12	120	82	108	293	413	340	292	428	318		234	52	77
13	130	85	110	290	396	337	289	414	322		234	53	77
14	140	85	109	281	380	333	282	400	238		234	54	77
15	150	85	108	274	367	332	275	390	333		234	54	77
16	160	86	108	270	357	331	273	383	336		234	54	77
17	170	84	107	263	347	329	269	373	327		234	54	77

Test Engineer: B.D.

Date: 9/24/12



TEST DATA
EPA METHOD 5G-3

Gas Particulate Sampling Data

Project Number: G100868597
Manufacturer: Hearth N Home
Model: Summit
Sample ID Number: PRT12082212532-001
Test Date: 6-Sep-12
Test Run Number: 3

Barometer, In. Hg		RH, %	Sample Box Correction (y) Factors	
Start	28.59		Meter Box (A)	0.995
End	28.57			
Duration of Test, Min		170		

Leak Check, cfm @ in Hg	
Train A	

Maximum Vacuum	
Train A	0.00

Time	Particulate Sampling Data										
	Tunnel Delta-P	Train A Delta-H		Flue Draft	Fuel Weight	Weight Loss	Train A Volume		Train A Proportional Rate		Train A Vacuum, In. Hg
0	0.042	1.00		-0.032	15.10	15.10	919.700		100.07		0.00
10	0.042	1.00		-0.068	14.20	0.90	925.600		101.76		0.00
20	0.042	1.00		-0.072	12.00	2.20	931.130		97.07		0.00
30	0.042	1.00		-0.072	9.70	2.30	937.130		105.23		0.00
40	0.042	1.00		-0.068	7.80	1.90	942.730		98.13		0.00
50	0.042	1.00		-0.067	6.20	1.60	948.540		101.39		0.00
60	0.042	1.00		-0.065	4.60	1.60	954.330		100.96		0.00
70	0.042	1.00		-0.058	3.50	1.10	960.180		101.49		0.00
80	0.042	1.00		-0.052	2.70	0.80	966.080		101.67		0.00
90	0.042	1.00		-0.047	2.20	0.50	971.980		100.97		0.00
100	0.042	1.00		-0.044	1.90	0.30	977.650		96.88		0.00
110	0.042	1.00		-0.042	1.60	0.30	983.550		100.37		0.00
120	0.042	1.00		-0.040	1.30	0.30	989.420		99.77		0.00
130	0.042	1.00		-0.040	1.00	0.30	995.130		97.22	#DIV/0!	0.00
140	0.042	1.00		-0.038	0.70	0.30	1001.080		101.22	#DIV/0!	0.00
150	0.042	1.00		-0.037	0.50	0.20	1006.880		98.58	#DIV/0!	0.00
160	0.042	1.00		-0.035	0.30	0.20	1012.680		98.58	#DIV/0!	0.00
170	0.042	1.00		-0.034	0.00	0.30	1018.557		99.80	#DIV/0!	0.00

Test Engineer: B.D.

Date: 9/24/12

Intertek**Dilution Tunnel Velocity Traverse
EPA Method 5G-3**

Project Number: G100868597

Manufacturer: Hearth N Home

Model: Summit

Sample ID Number: PRT12082212532-001

Test Date: 6-Sep-12

Test Run Number: 3

	Dilution Tunnel		Square Root
	Delta P In. H2O	Temp, °F	
A1	0.0260	106	0.1612
A2	0.0360	106	0.1897
A3	0.0420	106	0.2049
A4	0.0340	106	0.1844
A Center	0.0420	106	0.2049
B1	0.0280	106	0.1673
B2	0.0400	106	0.2000
B3	0.0380	106	0.1949
B4	0.0320	106	0.1789
B Center	0.0420	106	0.2049
Averages	0.036	106	0.1852

Tunnel Diameter **6.000** inchesTunnel Static **-0.370** in. H2OTunnel Area 0.19635 Ft²

Pitot Correction 0.9036 factor

Baro. Pressure 28.59

Pitot Factor **0.99** (0.99 for standard, 0.84 or Cal. For S-Type)

Initial Velocity 13.055 Ft/ Sec

Initial Flow **131.56** Ft³/minTest Engineer: JohnDate: 9/24/12



DILUTION TUNNEL PARTICULATE CALCULATIONS
EPA Method 5G-3

Project Number: G100868597

Manufacturer: Hearth N Home

Model: Summit

Sample ID Number: PRT12082212532-001

Test Date: 6-Sep-12

Test Run Number: 3

Intertek Equipment No.'s 19683, 19684

SAMPLE COMPONENT	REAGENT	FILTER # OR	WEIGHTS			
			FINAL, mg	TARE, mg	BLANK, mg/ml	PARTICULATE, mg
FRONT FILTER CATCH	FILTER	413	750.2	743		7.20
REAR FILTER CATCH	FILTER	421	164.1	163		1.10
RINSE OF PROBE &	ACETONE	45	100595.3	100593	0.00066	2.27
RINSE OF IMPINGER SET	WATER	225	98805.8	98798.7	0.00066	6.95
RINSE OF IMPINGER SET	METHANE	150	100165.6	100159.7	0.0047	5.20
RINSE OF FILTER ASSEMBLY & GAS TRAIN -	ACETONE	60	99203.9	99193.6	0.00066	10.26
					TOTAL:	32.98

CONDENSED WATER

IMPINGERS	WEIGHTS		
	FINAL, g	INITIAL, g	NET, g
1	719.9	710	9.90
2	687.9	681.5	6.40
3	606.3	603.4	2.90
4	935.6	925.8	9.80
		TOTAL:	29.00

EQUATIONS

FRONT FILTER CATCH	Final, mg - Tare, mg = Particulate, mg
REAR FILTER CATCH	Final, mg - Tare, mg = Particulate, mg
RINSE OF PROBE & FILTER ASSEMBLY - FRONT	(Final, mg - Tare, mg) - (Blank, mg/ml x Volume, ml) = Particulate, mg
RINSE OF IMPINGER SET	(Final, mg - Tare, mg) - (Blank, mg/ml x Volume, ml) = Particulate, mg
RINSE OF FILTER ASSEMBLY & GAS TRAIN - BACK	(Final, mg - Tare, mg) - (Blank, mg/ml x Volume, ml) = Particulate, mg

Test Engineer: BD

Date: 9/27/12



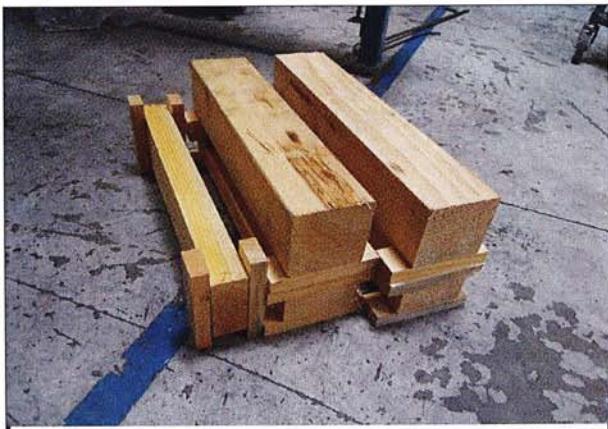
TEST RESULTS
EPA METHOD 5G-3

Project Number: G100868597
Manufacturer: Hearth N Home
Model: Summit
Sample ID Number: PRT12082212532-001
Test Date: 7-Sep-12
Test Run Number: 4

Dry Burn-Rate, kg/hr:	1.78
Emission-Rate, g/hr:	3.15
Duration of Test, Minutes	200
Dry Gas Meter Standardization	Train A
Dry Gas Meter Beginning Reading, ft ³	18.8
Dry Gas Meter Ending Reading, ft ³	133.557
Barometric Pressure Correction Factor	0.959
Dry Gas Meter Calibration Factors (y factors)	0.995
Dry Gas Meter Temperature Factors	0.998
Dry Gas Meter Delta-H Correction Factors	1.002
Dry Gas Meter STD Volume Sampled, ft ³	109.550
Dilution Tunnel Flow / Volume	
Standardized Tunnel Flow, dscfm	134.354
Total Tunnel Volume, scf	26870.798
Emission Calculations	Train A
Sample Ratios (Total Tunnel Volume / Total Sample Volume)	245.284
Sample Particulate Mass, mg	42.9
Total Emissions, grams	10.515
Emission-Rate, g/hr	3.15
Adjusted Emission Rates, g/hr	4.72
Operating Parameters	Train A
Max Filter Temperature, °F	235
Post-Test Leak Check, cfm @ in. Hg vac.	0
Average Firebox Surface Temperature delta-T, °F	53.2
Maximum Ambient Temperature, °F	83
Minimum Ambient Temperature, °F	72
Fuel Properties	
Wet Fuel Load Weight, lb.	15.90
Dry-Basis Fuel Load Moisture Content, %	21.37
Wet-Basis Fuel Load Moisture Content, %	17.61

Run Notes
EPA Methods 28 and 5G-3

PROJECT / TEST INFORMATION	
Project Number:	G100868597
Manufacturer:	Hearth N Home
Model:	Summit
Sample ID Number:	PRT12082212532-001
Test Date:	7-Sep-12
Test Run Number:	4
Date tunnel cleaned:	9/4/2012
Purpose of Test	Certification



Appliance Information		
Appliance Type:	2	1 - Catalytic 2 - Non - Catalytic 3 - Pellet 4 - Hydronic
Firebox Volume, ft³:	2.35	N/A for pellet type
Convection Blower	3	1 - No Fan 2 - Fan Optional 3 - Fan Standard



Test Settings	
Primary Air:	1 inch from full closed
Secondary Air:	
Control Board:	
Blower/Fan:	
Pre- Burn Activities	
Time	Activity
	At 38 minutes raked coals
Start-Up Procedure	
Loading of fuel, sec. :	
Fuel-loading door :	
Primary air:	
Secondary air:	
Control board:	
Blower / fan:	
Other Notes	

Test Engineer: B.D.

Date: 9/24/12

Intertek**TEST FUEL DATA
EPA METHOD 5G-3**

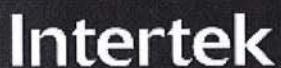
Project Number:	G100868597
Manufacturer:	Hearth N Home
Model:	Summit
Sample ID Number:	PRT12082212532-001
Test Date:	7-Sep-12
Test Run Number:	4

Firebox Volume, ft ³ :	2.35
-----------------------------------	------

Calibration Reference ID		
Set meter to Species 1		
Set Temperature to 70F	12%	12.0
Set pin setting to 444	22%	22.0

PRE-BURN FUEL PROPERTIES					
Eq. ID No.:		Time:	Temp., °F:		
Piece No.	Length, In.	Weight, Lb.	Moisture, %, Dry Basis		
1	24.00	2.50	20.2	20.1	20.8
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
Total Weight	2.5	Average, %db	20.4		
Allowable Fuel Load Range: 14.9 to 18.0					
TEST FUEL LOAD PROPERTIES					
Eq. ID No.:		Time:	8:05	Temp., °F:	65
Piece No.	Length, In.	Weight, Lb.	Moisture, %, Dry Basis		
		2x4	4x4		
1	16.50	6.50		21.0	20.8
2	16.50		9.40	21.5	21.1
3	16.50			24.5	18.5
4	18.00			24.5	22.7
5	18.00			19.4	18.9
6					
7					
8					
Totals	6.5	9.4			
% of Weight	41	59			
Total weight, wet, lb.	15.90	Average Moisture, dry	21.37		
Total weight, dry, kg	5.94	Average Moisture, wet	17.61		

Test Engineer: B.D.Date: 9/24/12



TEST DATA
EPA METHOD 5G-3

Project Number:	G100868597
Manufacturer:	Hearth N Home
Model:	Summit
Sample ID No:	PRT12082212532-001
Test Date:	7-Sep-12
Test Run No:	4

Temperature Data

Firebox Temp Start	329.2
Firebox Temp End	276
Firebox Delta-T	53.2

Max Filter Temps	
Train A	
235	

Interval	10	Duration of Test, Min	200
Time			

Temperature Data

Interval	Duration	Room	Dilution Tunnel	Flue Gas	Firebox Top	Firebox Bottom	Firebox Back	Firebox Left	Firebox Right	Catalyst Outlet	Train A Filter	Impinger Exit	Train A DGM
0	0	72	90	241	333	363	239	391	320		235	69	64
1	10	73	111	497	514	404	283	339	294		233	40	64
2	20	73	138	600	813	405	310	317	279		234	41	65
3	30	73	143	605	895	429	344	343	280		234	42	66
4	40	75	130	524	787	236	272	416	281		234	42	67
5	50	79	132	518	777	324	273	442	286		234	46	67
6	60	80	127	474	729	311	278	461	295		234	47	68
7	70	83	122	437	661	305	287	461	304		233	47	68
8	80	81	116	391	580	304	289	453	309		234	50	68
9	90	81	114	394	555	300	286	442	310		234	50	69
10	100	82	113	391	558	300	283	434	314		234	51	69
11	110	81	108	339	492	295	275	422	314		234	51	69
12	120	81	105	309	429	295	273	409	314		233	53	70
13	130	81	103	293	395	292	263	401	314		234	54	71
14	140	82	101	280	372	287	255	395	310		234	55	71
15	150	82	100	269	355	287	248	387	304		234	56	71
16	160	82	99	261	334	276	243	378	297		234	56	72
17	170	82	99	258	322	274	238	366	292		234	59	73
18	180	82	99	251	311	278	233	357	286		234	60	73
19	190	83	99	246	301	267	226	346	278		234	61	74
20	200	83	99	224	293	260	220	335	272		234	61	74

Test Engineer: B.D.

Date: 9/24/12



TEST DATA
EPA METHOD 5G-3

Gas Particulate Sampling Data

Project Number: G100868597
Manufacturer: Hearth N Home
Model: Summit
Sample ID Number: PRT12082212532-001
Test Date: 7-Sep-12
Test Run Number: 4

Barometer, In. Hg		RH, %	Sample Box Correction (y) Factors	
Start	28.71		Meter Box (A)	0.995
End	28.69			
Duration of Test, Min		200		

Leak Check, cfm @ in Hg	
Train A	

Maximum Vacuum	
Train A	

Time	Particulate Sampling Data										
	Tunnel Delta-P	Train A Delta-H		Flue Draft	Fuel Weight	Weight Loss	Train A Volume		Train A Proportional Rate		Train A Vacuum, In. Hg
0	0.043	1.00		-0.032	15.90	15.90	18.800		100.07		0.00
10	0.043	1.00		-0.070	14.80	1.10	24.610		102.23		0.00
20	0.043	1.00		-0.078	12.60	2.20	30.130		99.21		0.00
30	0.043	1.00		-0.078	10.70	1.90	35.750		101.23		0.00
40	0.043	1.00		-0.070	8.30	2.40	41.590		103.86		0.00
50	0.043	1.00		-0.072	6.70	1.60	47.150		99.05		0.00
60	0.043	1.00		-0.067	5.20	1.50	52.980		103.22		0.00
70	0.043	1.00		-0.062	4.20	1.00	58.800		102.61		0.00
80	0.043	1.00		-0.057	3.50	0.70	64.370		97.69		0.00
90	0.043	1.00		-0.053	2.90	0.60	70.130		100.66		0.00
100	0.043	1.00		-0.054	2.30	0.60	75.780		98.65		0.00
110	0.043	1.00		-0.047	1.90	0.40	81.550		100.30		0.00
120	0.043	1.00		-0.043	1.60	0.30	87.420		101.58		0.00
130	0.043	1.00		-0.038	1.40	0.20	93.050		97.07	#DIV/0!	0.00
140	0.043	1.00		-0.038	1.10	0.30	98.780		98.62	#DIV/0!	0.00
150	0.043	1.00		-0.034	0.90	0.20	104.620		100.42	#DIV/0!	0.00
160	0.043	1.00		-0.032	0.70	0.20	110.270		96.89	#DIV/0!	0.00
170	0.043	1.00		-0.031	0.50	0.20	116.110		99.96	#DIV/0!	0.00
180	0.043	1.00		-0.031	0.30	0.20	121.950		99.96	#DIV/0!	0.00
190	0.043	1.00		-0.030	0.10	0.20	127.670		97.72	#DIV/0!	0.00
200	0.043	1.00		-0.030	0.00	0.10	133.557		100.57	#DIV/0!	0.00

Test Engineer: B.D.

Date: 9/24/12



Dilution Tunnel Velocity Traverse
EPA Method 5G-3

Project Number: G100868597
Manufacturer: Hearth N Home
Model: Summit
Sample ID Number: PRT12082212532-001
Test Date: 7-Sep-12
Test Run Number: 4

	Dilution Tunnel		Square Root
	Delta P In. H2O	Temp, °F	
A1	0.0320	91	0.1789
A2	0.0400	91	0.2000
A3	0.0460	91	0.2145
A4	0.0340	91	0.1844
A Center	0.0420	91	0.2049
B1	0.0260	91	0.1612
B2	0.0420	91	0.2049
B3	0.0380	91	0.1949
B4	0.0320	91	0.1789
B Center	0.0440	91	0.2098
Averages	0.0376	91	0.1897

Tunnel Diameter **6.000** inches
Tunnel Static **-0.370** in. H2O
Tunnel Area 0.19635 Ft²
Pitot Correction 0.9150 factor
Baro. Pressure 28.71
Pitot Factor **0.99** (0.99 for standard, 0.84 or Cal. For S-Type)
Initial Velocity 13.170 Ft/ Sec
Initial Flow **136.90** Ft³/min

Test Engineer: BD

Date: 9/24/12



DILUTION TUNNEL PARTICULATE CALCULATIONS
EPA Method 5G-3

Project Number: G100868597
Manufacturer: Hearth N Home
Model: Summit
Sample ID Number: PRT12082212532-001
Test Date: 7-Sep-12
Test Run Number: 4

Intertek Equipment No.'s 19683, 19684

SAMPLE COMPONENT	REAGENT	FILTER # OR	WEIGHTS		
			FINAL, mg	TARE, mg	BLANK, mg/ml
FRONT FILTER CATCH	FILTER	414	747.6	738.7	8.90
REAR FILTER CATCH	FILTER	422	166.3	164.6	1.70
RINSE OF PROBE &	ACETONE	50	108421.7	108417.2	0.00066
RINSE OF IMPINGER SET	WATER	220	97917.6	97904.1	0.00066
RINSE OF IMPINGER SET	METHANE	150	109126.6	109121.8	0.0047
RINSE OF FILTER ASSEMBLY & GAS TRAIN -	ACETONE	70	103005.9	102995.5	0.00066
					TOTAL: 42.87

CONDENSED WATER

IMPINGERS	WEIGHTS		
	FINAL, g	INITIAL, g	NET, g
1	717.7	705.3	12.40
2	691.6	682.4	9.20
3	605.4	604	1.40
4	990.1	969.9	20.20
		TOTAL:	43.20

EQUATIONS

FRONT FILTER CATCH	Final, mg - Tare, mg = Particulate, mg
REAR FILTER CATCH	Final, mg - Tare, mg = Particulate, mg
RINSE OF PROBE & FILTER ASSEMBLY - FRONT	(Final, mg - Tare, mg) - (Blank, mg/ml x Volume, ml) = Particulate, mg
RINSE OF IMPINGER SET	(Final, mg - Tare, mg) - (Blank, mg/ml x Volume, ml) = Particulate, mg
RINSE OF FILTER ASSEMBLY & GAS TRAIN - BACK	(Final, mg - Tare, mg) - (Blank, mg/ml x Volume, ml) = Particulate, mg

Test Engineer: B.D.

Date: 9/24/12

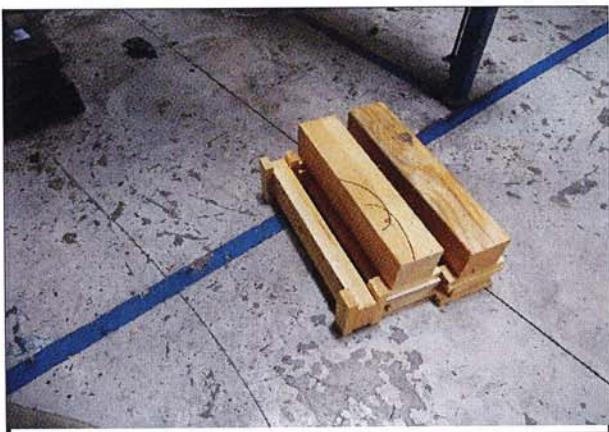


TEST RESULTS
EPA METHOD 5G-3

Project Number: G100868597
Manufacturer: Hearth N Home
Model: Summit
Sample ID Number: PRT12082212532-001
Test Date: 7-Sep-12
Test Run Number: 5

Dry Burn-Rate, kg/hr:	1.04
Emission-Rate, g/hr:	2.24
Duration of Test, Minutes	330
Dry Gas Meter Standardization	Train A
Dry Gas Meter Beginning Reading, ft ³	133.6
Dry Gas Meter Ending Reading, ft ³	324.415
Barometric Pressure Correction Factor	0.957
Dry Gas Meter Calibration Factors (y factors)	0.995
Dry Gas Meter Temperature Factors	0.982
Dry Gas Meter Delta-H Correction Factors	1.002
Dry Gas Meter STD Volume Sampled, ft ³	178.934
Dilution Tunnel Flow / Volume	131.610
Total Tunnel Volume, scf	43431.282
Emission Calculations	Train A
Sample Ratios (Total Tunnel Volume / Total Sample Volume)	242.722
Sample Particulate Mass, mg	50.8
Total Emissions, grams	12.320
Emission-Rate, g/hr	2.24
Adjusted Emission Rates, g/hr	3.55
Operating Parameters	Train A
Max Filter Temperature, °F	235
Post-Test Leak Check, cfm @ in. Hg vac.	0
Average Firebox Surface Temperature delta-T, °F	124.8
Maximum Ambient Temperature, °F	86
Minimum Ambient Temperature, °F	80
Fuel Properties	15.30
Wet Fuel Load Weight, lb.	21.56
Dry-Basis Fuel Load Moisture Content, %	17.74
Wet-Basis Fuel Load Moisture Content, %	

PROJECT / TEST INFORMATION	
Project Number:	G100868597
Manufacturer:	Hearth N Home
Model:	Summit
Sample ID Number:	PRT12082212532-001
Test Date:	7-Sep-12
Test Run Number:	5
Date tunnel cleaned:	9/4/2012
Purpose of Test	Certification



Appliance Information		
Appliance Type:	2	1 - Catalytic 2 - Non - Catalytic 3 - Pellet 4 - Hydronic
Firebox Volume, ft³:	2.35	N/A for pellet type
Convection Blower	3	1 - No Fan 2 - Fan Optional 3 - Fan Standard



Test Settings	
Primary Air:	.125" from full closed
Secondary Air:	fixed
Control Board:	NA
Blower/Fan:	On high
Pre- Burn Activities	
Time	Activity
	raked coal bed at 55 minutes
Start-Up Procedure	
Loading of fuel, sec. :	Loaded by 53 seconds
Fuel-loading door :	Door closed by 65 seconds
Primary air:	
Secondary air:	air set at .125" for entire test
Control board:	NA
Blower / fan:	Off for the first 30 minutes then turned to high.
Other Notes	
Timer activated at 5 minutes. Lever was pushed in at 0 minutes.	
At 287 there had been no weight drop in 10 minutes. Raked coals to front of firebox, took less than 15 seconds.	

Test Engineer: B.D.Date: 9/24/12

Intertek**TEST FUEL DATA
EPA METHOD 5G-3**

Project Number:	G100868597
Manufacturer:	Hearth N Home
Model:	Summit
Sample ID Number:	PRT12082212532-001
Test Date:	7-Sep-12
Test Run Number:	5

Firebox Volume, ft ³ :	2.35
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Calibration Reference ID		
Set meter to Species 1		
Set Temperature to 70F	12%	12.0
Set pin setting to 444	22%	22.0

PRE-BURN FUEL PROPERTIES					
Eq. ID No.:		Time:	14:30	Temp., °F:	70
Piece No.	Length, In.	Weight, Lb.	Moisture, %, Dry Basis		
1	24.00	2.60	21.1	21.1	21.9
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
Total Weight	2.6	Average, %db	21.4		

Allowable Fuel Load Range: 14.9 to 18.0

TEST FUEL LOAD PROPERTIES					
Eq. ID No.:		Time:	14:30	Temp., °F:	70
Piece No.	Length, In.	Weight, Lb.	Moisture, %, Dry Basis		
1	16.50	6.60	23.4	22.5	22.5
2	16.50	8.70	22.3	22.6	22.5
3	16.50		22.7	18.9	21.7
4	18.00		21.5	21.0	21.4
5	18.00		19.0	18.6	22.8
6					
7					
8					
Totals	6.6	8.7			
% of Weight	43	57			
Total weight, wet, lb.	15.30		Average Moisture, dry	21.56	
Total weight, dry, kg	5.71		Average Moisture, wet	17.74	

Test Engineer: Date: 9/24/12



Project Number: G100868597
Manufacturer: Hearth N Home
Model: Summit
Sample ID Number: PRT12082212532-001
Test Date: 7-Sep-12
Test Run Number: 5

EPA Method 28 Pre Burn Data

Coal Bed Range 3.1 to 3.8

Average Firebox Temp, °F

Final Coal Bed Wt, lb	3.4
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Test Engineer: B.D. -

Date: 9/24/12

Intertek**TEST DATA
EPA METHOD 5G-3**

Project Number:	G100868597
Manufacturer:	Hearth N Home
Model:	Summit
Sample ID No:	PRT12082212532-001
Test Date:	7-Sep-12
Test Run No:	5

Temperature Data

Firebox Temp Start	331.6
Firebox Temp End	206.8
Firebox Delta-T	124.8

Max Filter Temps	
Train A	
235	

Interval	10	Duration of Test, Min		Temperature Data									
Time		Room	Dilution Tunnel	Flue Gas	Firebox Top	Firebox Bottom	Firebox Back	Firebox Left	Firebox Right	Catalyst Outlet	Train A Filter	Impinger Exit	Train A DGM
0	0	84	98	194	335	407	247	362	307		235	83	76
1	10	82	98	238	383	470	300	329	295		234	48	76
2	20	83	112	416	650	465	310	303	277		235	48	77
3	30	84	120	444	801	454	329	302	268		235	56	77
4	40	83	118	410	735	358	251	309	264		235	58	77
5	50	84	114	375	691	326	323	316	261		235	59	77
6	60	84	112	383	656	239	218	320	256		235	60	77
7	70	84	114	405	672	280	208	311	254		235	61	77
8	80	84	114	397	671	257	208	309	256		235	61	77
9	90	85	113	384	676	254	216	312	257		235	61	77
10	100	84	110	353	671	251	227	321	259		235	60	78
11	110	84	109	320	600	245	237	327	261		234	60	78
12	120	84	107	294	547	241	241	328	262		234	49	78
13	130	84	102	244	417	238	245	322	261		234	49	78
14	140	83	101	234	402	237	246	320	261		235	47	78
15	150	86	102	223	376	234	245	320	262		235	48	78
16	160	84	99	215	354	234	240	316	259		235	48	78
17	170	84	99	213	340	237	234	311	258		235	49	78
18	180	84	98	211	334	235	229	307	257		225	50	78
19	190	85	99	212	332	232	225	303	257		225	45	77
20	200	86	98	207	328	235	221	302	255		225	48	78
21	210	85	97	206	323	239	215	300	253		234	50	78
22	220	85	96	197	313	237	209	296	252		234	51	78
23	230	85	96	192	303	236	204	290	249		234	51	78
24	240	85	95	193	296	238	199	284	246		235	51	78
25	250	85	95	191	291	237	195	276	243		235	51	78
26	260	84	94	182	282	227	192	270	240		234	51	78
27	270	82	92	175	267	226	185	262	232		234	51	78
28	280	82	91	165	252	223	179	254	225		234	51	78
29	290	81	93	168	236	214	174	246	216		234	51	78
30	300	80	87	160	240	215	171	235	206		235	51	78
31	310	80	87	161	246	217	168	227	200		235	51	77
32	320	81	87	158	244	219	167	224	198		234	51	77
33	330	81	88	153	236	216	166	222	194		234	51	76

Test Engineer: B. J. DeLoachDate: 7/24/12



TEST DATA
EPA METHOD 5G-3

Gas Particulate Sampling Data

Project Number:	G100868597
Manufacturer:	Hearth N Home
Model:	Summit
Sample ID Number:	PRT12082212532-001
Test Date:	7-Sep-12
Test Run Number:	5

Barometer, In. Hg	RH, %	Sample Box Correction (y) Factors
Start	28.63	Meter Box (A) 0.995
End	28.64	

Leak Check, cfm @ in Hg	
Train A	

Maximum Vacuum	
Train A	

Time	Particulate Sampling Data										
	Tunnel Delta-P	Train A Delta-H		Flue Draft	Fuel Weight	Weight Loss	Train A Volume		Train A Proportional Rate		Train A Vacuum, In. Hg
0	0.042	1.00		-0.022	15.30	15.30	133.600		100.00		0.00
10	0.042	1.00		-0.032	14.70	0.60	139.280		98.24		0.00
20	0.042	1.00		-0.057	13.40	1.30	145.040		100.68		0.00
30	0.042	1.00		-0.061	11.70	1.70	150.930		103.67		0.00
40	0.042	1.00		-0.057	10.20	1.50	156.700		101.39		0.00
50	0.042	1.00		-0.052	9.00	1.20	162.350		98.93		0.00
60	0.042	1.00		-0.052	8.10	0.90	168.070		99.98		0.00
70	0.042	1.00		-0.052	7.00	1.10	173.970		103.31		0.00
80	0.042	1.00		-0.052	6.10	0.90	179.650		99.46		0.00
90	0.042	1.00		-0.051	5.20	0.90	185.400		100.60		0.00
100	0.042	1.00		-0.049	4.30	0.90	191.230		101.54		0.00
110	0.042	1.00		-0.042	3.70	0.60	196.580		93.10		0.00
120	0.042	1.00		-0.037	3.30	0.40	202.689		106.12		0.00
130	0.042	1.00		-0.033	3.00	0.30	208.260		96.34	#DIV/0!	0.00
140	0.042	1.00		-0.027	2.80	0.20	214.330		104.88	#DIV/0!	0.00
150	0.042	1.00		-0.025	2.60	0.20	220.020		98.40	#DIV/0!	0.00
160	0.042	1.00		-0.023	2.40	0.20	226.110		105.04	#DIV/0!	0.00
170	0.042	1.00		-0.022	2.20	0.20	231.620		95.04	#DIV/0!	0.00
180	0.042	1.00		-0.022	2.00	0.20	237.340		98.57	#DIV/0!	0.00
190	0.042	1.00		-0.022	1.80	0.20	243.340		103.68	#DIV/0!	0.00
200	0.042	1.00		-0.022	1.60	0.20	248.980		97.19	#DIV/0!	0.00
210	0.042	1.00		-0.022	1.50	0.10	254.750		99.34	#DIV/0!	0.00
220	0.042	1.00		-0.021	1.30	0.20	260.570		100.11	#DIV/0!	0.00
230	0.042	1.00		-0.020	1.10	0.20	266.380		99.94	#DIV/0!	0.00
240	0.042	1.00		-0.020	1.00	0.10	272.220		100.37	#DIV/0!	0.00
250	0.042	1.00		-0.020	0.90	0.10	277.980		98.99	#DIV/0!	0.00
260	0.042	1.00		-0.020	0.70	0.20	283.770		99.42	#DIV/0!	0.00
270	0.042	1.00		-0.020	0.60	0.10	289.950		105.92	#DIV/0!	0.00
280	0.042	1.00		-0.020	0.50	0.10	295.550		95.89	#DIV/0!	0.00
290	0.042	1.00		-0.018	0.40	0.10	301.530		102.59	#DIV/0!	0.00
300	0.042	1.00		-0.015	0.30	0.10	307.250		97.59	#DIV/0!	0.00
310	0.042	1.00		-0.015	0.20	0.10	312.880		96.24	#DIV/0!	0.00
320	0.042	1.00		-0.017	0.10	0.10	318.570		97.26	#DIV/0!	0.00
330	0.042	1.00		-0.017	0.00	0.10	324.415		100.19	#DIV/0!	0.00

Test Engineer: B.R.D.

Date: 9/24/12



Dilution Tunnel Velocity Traverse
EPA Method 5G-3

Project Number: G100868597
Manufacturer: Hearth N Home
Model: Summit
Sample ID Number: PRT12082212532-001
Test Date: 7-Sep-12
Test Run Number: 5

	Dilution Tunnel		Square Root
	Delta P In. H2O	Temp, °F	
A1	0.0280	96	0.1673
A2	0.0320	96	0.1789
A3	0.0420	96	0.2049
A4	0.0260	96	0.1612
A Center	0.0420	96	0.2049
B1	0.0360	96	0.1897
B2	0.0420	96	0.2049
B3	0.0400	96	0.2000
B4	0.0280	96	0.1673
B Center	0.0420	96	0.2049
Averages	0.0358	96	0.1843

Tunnel Diameter **6.000** inches
Tunnel Static **-0.354** in. H2O
Tunnel Area 0.19635 Ft²
Pitot Correction 0.8993 factor
Baro. Pressure 28.63
Pitot Factor **0.99** (0.99 for standard, 0.84 or Cal. For S-Type)
Initial Velocity 12.868 Ft/ Sec
Initial Flow **132.20** Ft³/min

Test Engineer: B.D.

Date: 9/24/12



DILUTION TUNNEL PARTICULATE CALCULATIONS
EPA Method 5G-3

Project Number: G100868597

Manufacturer: Hearth N Home

Model: Summit

Sample ID Number: PRT12082212532-001

Test Date: 7-Sep-12

Test Run Number: 5

Intertek Equipment No.'s 19683, 19684

SAMPLE COMPONENT	REAGENT	FILTER # OR	WEIGHTS			
			FINAL, mg	TARE, mg	BLANK, mg/ml	PARTICULATE, mg
FRONT FILTER CATCH	FILTER	415	748.8	739.5		9.30
REAR FILTER CATCH	FILTER	423	131.8	129.3		2.50
RINSE OF PROBE &	ACETONE	50	110223.7	110221.5	0.00066	2.17
RINSE OF IMPINGER SET	WATER	230	107617.8	107606.4	0.00066	11.25
RINSE OF IMPINGER SET	METHANE	150	100636.7	100627.7	0.0047	8.30
RINSE OF FILTER ASSEMBLY & GAS TRAIN -	ACETONE	80	108654	108636.7	0.00066	17.25
					TOTAL:	50.76

CONDENSED WATER

IMPINGERS	WEIGHTS		
	FINAL, g	INITIAL, g	NET, g
1	714.6	708.5	6.10
2	696.3	680.6	15.70
3	606.5	604.4	2.10
4	1003.5	990.1	13.40
		TOTAL:	37.30

EQUATIONS

FRONT FILTER CATCH	Final, mg - Tare, mg = Particulate, mg
REAR FILTER CATCH	Final, mg - Tare, mg = Particulate, mg
RINSE OF PROBE & FILTER ASSEMBLY - FRONT	(Final, mg - Tare, mg) - (Blank, mg/ml x Volume, ml) = Particulate, mg
RINSE OF IMPINGER SET	(Final, mg - Tare, mg) - (Blank, mg/ml x Volume, ml) = Particulate, mg
RINSE OF FILTER ASSEMBLY & GAS TRAIN - BACK	(Final, mg - Tare, mg) - (Blank, mg/ml x Volume, ml) = Particulate, mg

Test Engineer: B.D.

Date: 7/24/12