



# TEST REPORT

**REPORT NUMBER: 101188983PRT-001**  
**REPORT DATE: September 27, 2013**

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

## **RNDERED TO**

Hearth & Home Technologies  
1445 North Hwy  
Colville Washington 99114

**PRODUCT EVALUATED:**  
Explorer II WOOD FIRED ROOM HEATER

Report of Testing Model Explorer II 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 Explorer II 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 Explorer II 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 11, 2013

### I.B LABORATORY

The test on the Explorer II 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 Explorer II Solid Fuel Room Heater fire box is constructed of carbon steel, a cast iron shell is bolted to the exterior.

The firebox inside dimensions is 16.8 inches deep, 12 inches high, and 20.50 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.)

### 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 11, 2013. 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 11 through September 14, 2013 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 11, 2013: Test fuel was loaded by 30 seconds, the door was open for 60 seconds, and then closed. Primary air control fully open until 4:55 minutes then set to 1.125 inches from full closed at 5 minutes. Timed air was activated at zero minutes. Burn time was 370 minutes with a category 2 burn rate of 0.93 kg/hr. The fan was off for the first 30 minutes then set to high for the remainder of the test.

RUN #2 September 12, 2013: Test fuel was loaded by 30 seconds, the door was open for 38 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 115 minutes with a category 4 burn rate of 2.98 kg/hr. The fan was on high for the entire test.

RUN #3 September 12, 2013: Test fuel was loaded by 30 seconds, the door was open for 50 seconds, and then closed. Primary air control was fully open for the entire test. Timed air was activated at zero minutes. Burn time was 200 minutes with a category 3 burn rate of 1.73 kg/hr. The fan was off for the first 30 minutes then set to high for the remainder of the test.

RUN #4 September 13, 2013: Test fuel was loaded by 45 seconds, the door was open for 60 seconds, and then closed. Primary air control fully open until 4:55 minutes then set to 1.40 inches from full closed at 5 minutes. Timed air was activated at zero minutes. Burn time was 290 minutes with a category 2 burn rate of 1.21 kg/hr. The fan was off for the first 30 minutes then set to high for the remainder of the test.

RUN #5 September 14, 2013: Test fuel was loaded by 35 seconds, the door was open for 55 seconds, and then closed. Primary air control fully open until 4:55 minutes then set to 1.20 inches from full closed at 5 minutes. Timed air was activated at zero minutes. Burn time was 280 minutes with a category 2 burn rate of 1.23 kg/hr. The fan was off for the entire test.

## II.D SUMMARY OF OTHER DATA

### EMISSIONS

Run Number	Test Date	Burn Rate (kg/hr)	Emission Rate (g/hr)	Heating Efficiency* (%LHV)	Heating Efficiency* (% HHV)
1	9/11/13	0.93	1.16	79.9	73.9
2	9/12/13	2.98	12.32	72.0	66.7
3	9/12/13	1.73	1.47	77.7	71.9
4	9/13/13	1.21	0.92	78.8	72.9
5	9/14/13	1.23	1.08	77.4	71.6

\*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	0.93	1.16	11,214	0.3168	0.5544	0.6431
4	1.21	0.92	14,590	0.5544	0.5334	0.4907
3	1.73	1.47	20,861	0.8502	0.4296	0.6315
2	2.98	12.32	35,933	0.9840	0.1498	1.8455
<b>Totals:</b>					<b>1.6672</b>	<b>3.6109</b>
<b>Weighted average emission rate:</b>						<b>2.166</b>

Run number 5 was a fan confirmation test and not used in the weighted average.

### 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	81	89	28.58	28.50	<50	<50
2	79	84	28.49	28.50	<50	<50
3	88	86	28.40	28.56	<50	<50
4	78	89	28.34	28.37	<50	<50
5	80	86	28.40	28.45	<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	370	13.40	135.40	563.4	195.594	28.03
2	115	14.69	138.86	601.0	61.137	90.65
3	200	13.84	135.06	582.2	105.915	19.29
4	290	12.91	128.57	568.1	154.015	18.44
5	280	13.23	131.77	569.6	149.913	20.53

### GENERAL SUMMARY OF RESULTS

Run No.	Burn Rate (kg/hr)	Change In Surface Temp (°F)	Initial Draft (in/H <sub>2</sub> O)	Run Time (min)	Average Draft (in/H <sub>2</sub> O)
1	0.93	119.0	-0.028	370	-0.030
2	2.98	62.0	-0.052	115	-0.064
3	1.73	36.0	-0.035	200	-0.052
4	1.21	94.2	-0.030	290	-0.038
5	1.23	42.4	-0.034	280	-0.046

### 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 bottom of the firebox. This air is controlled by a sliding damper, which covers the inlet hole. A second air control 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 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. All gases exit through a 6" flue outlet.

### IV. SAMPLING SYSTEMS

#### IV.A. SAMPLING LOCATIONS

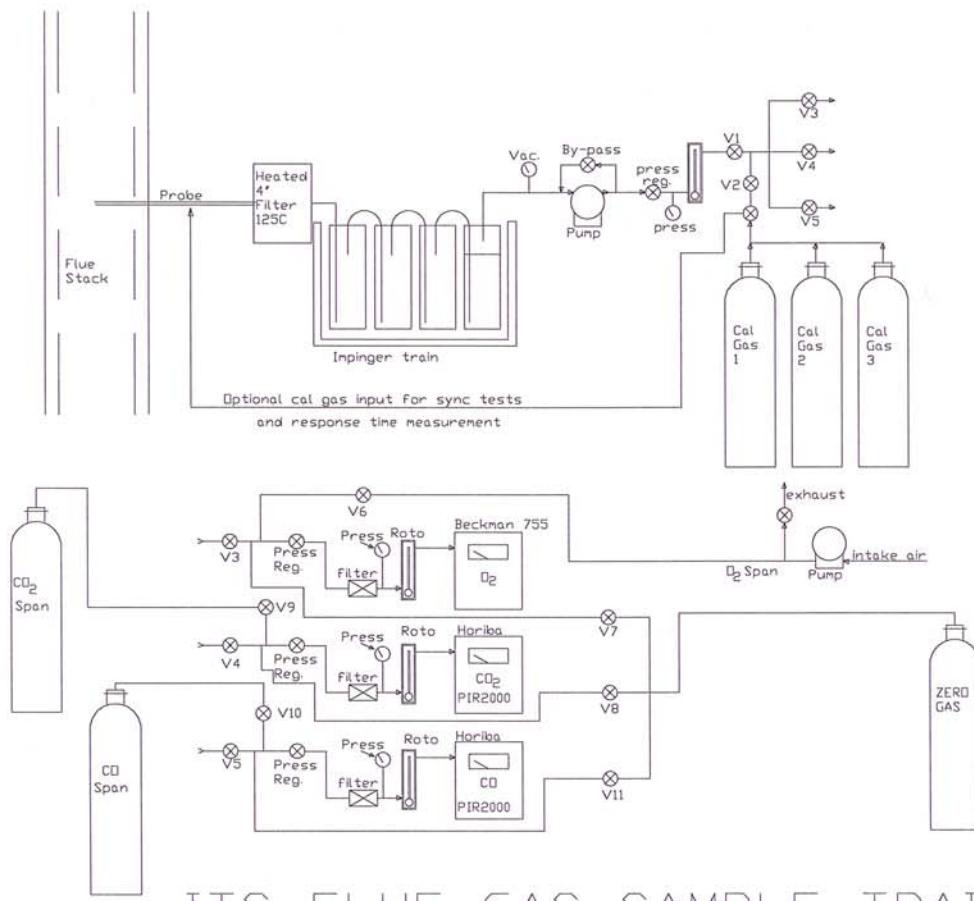
Particulate samples are collected from the vertical sample section of the dilution tunnel. The tunnel has two elbows and two mixing baffles in the system ahead of the sampling section. The sampling section is a continuous section of 6 inch diameter pipe straight over its entire length. Tunnel velocity 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.

Actual gas sample collection train was similar to that shown in figure 2.

An emissions sample train similar to that shown in figure 3 was used; a glass probe was used in place of a heated probe and button hook nozzle.

## IV.B.OPERATIONAL DRAWINGS

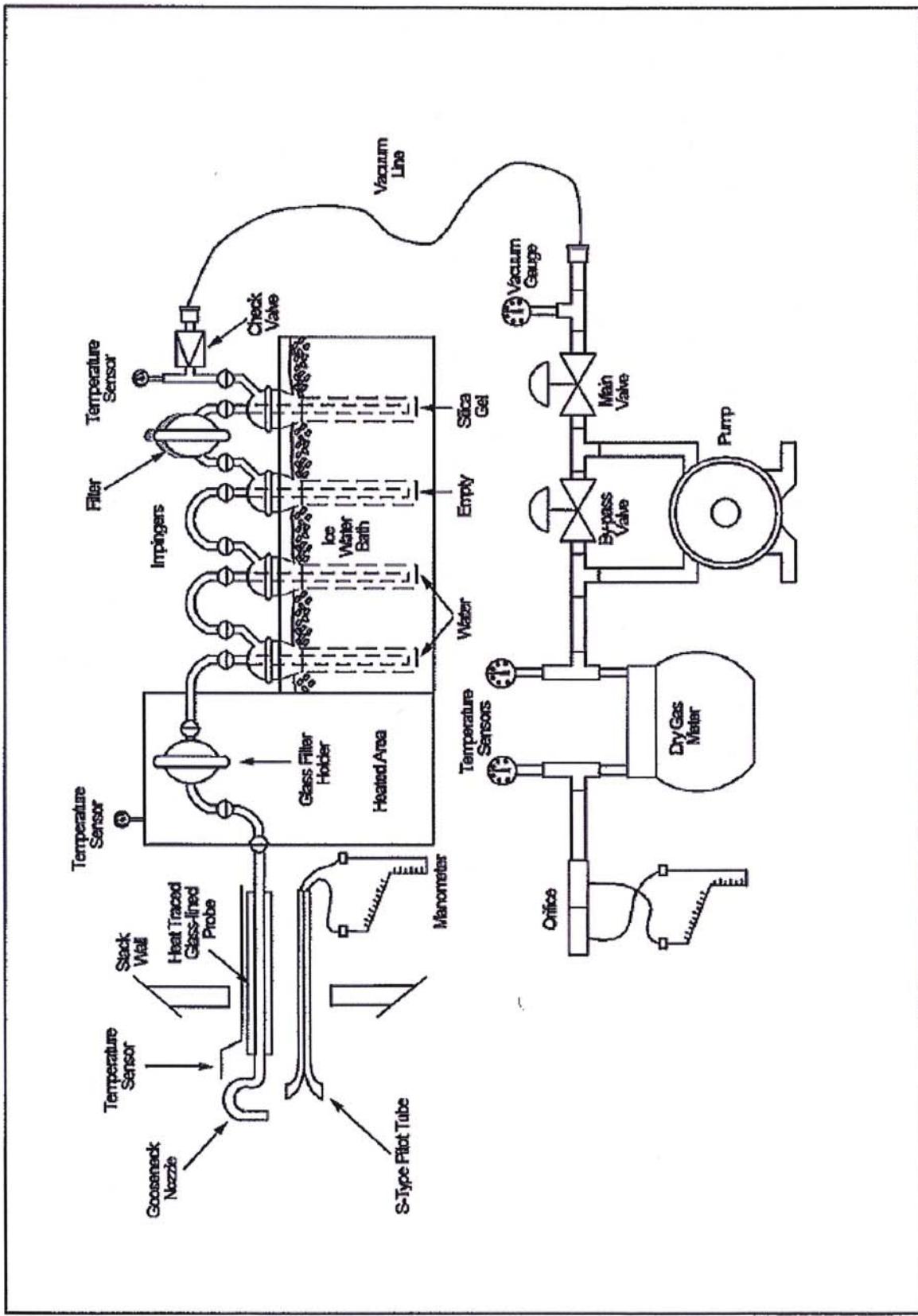
### IV.B.(1) STACK GAS SAMPLE TRAIN



ITS FLUE 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.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 F.

## VII. CONCLUSION

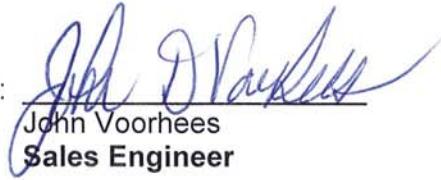
Results of this test show the Explorer II when operated following guidelines specified in EPA method 28 does meet emissions limits regulating an affected facility in the EPA New Source Performance Standards with a weighted average of 2.17 grams per hour.

## VII.A RESULTS AND OBSERVATIONS

The Model Explorer II 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  
Sales Engineer

## **Appendix F**

## **Test Data**

Hearth & Home Technologies  
Explorer II  
G101188983



Explorer II Front View



Explorer II Side view

## EPA NSPS WEIGHTED AVERAGE CALCULATION

Project Number: G101188983  
Manufacturer: Hearth & Home  
Model: Explorer II  
Sample ID No: PRT1307021

V 1.1 8/27/2010

v 1.1

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

2

2=noncat  
3=pellet

Totals: 1.6672 3.6109 120.73

Note: Run 5 fan confirmation is 1.23 kg/hr at 1.07 g/hr

<b>Weighted average emissions rate:</b>	2.1658
<b>Weighted Average OHE:</b>	72.42

Band 2-



TEST RESULTS  
EPA METHOD 5G-3

Project Number: G101188983  
Manufacturer: Hearth & Home  
Model: Explorer II  
Sample ID Number: PRT1307021255  
Test Date: 11-Sep-13  
Test Run Number: 1

Dry Burn-Rate, kg/hr:	<b>0.93</b>
Emission-Rate, g/hr:	<b>1.16</b>
Duration of Test, Minutes	370
<b>Dry Gas Meter Standardization</b>	Train A
Dry Gas Meter Beginning Reading, ft <sup>3</sup>	491.203
Dry Gas Meter Ending Reading, ft <sup>3</sup>	706.657
Barometric Pressure Correction Factor	0.954
Dry Gas Meter Calibration Factors ( $\gamma$ factors)	0.975
Dry Gas Meter Temperature Factors	0.977
Dry Gas Meter Delta-H Correction Factors	1.002
Dry Gas Meter STD Volume Sampled, ft <sup>3</sup>	<b>196.216</b>
<b>Dilution Tunnel Flow / Volume</b>	
Standardized Tunnel Flow, dscfm	<b>135.402</b>
Total Tunnel Volume, scf	<b>50098.557</b>
<b>Emission Calculations</b>	Train A
Sample Ratios (Total Tunnel Volume / Total Sample Volume)	255.323
Sample Particulate Mass, mg	28.0
Total Emissions, grams	7.156
Emission-Rate, g/hr	1.16
Adjusted Emission Rates, g/hr	<b>2.06</b>
<b>Operating Parameters</b>	Train A
Max Filter Temperature, °F	147
Post-Test Leak Check, cfm @ in. Hg vac.	0
Average Firebox Surface Temperature delta-T, °F	119
Maximum Ambient Temperature, °F	89
Minimum Ambient Temperature, °F	80
<b>Fuel Properties</b>	
Wet Fuel Load Weight, lb.	15.20
Dry-Basis Fuel Load Moisture Content, %	20.62
Wet-Basis Fuel Load Moisture Content, %	17.09

PROJECT / TEST INFORMATION	
Project Number:	G101188983
Manufacturer:	Hearth & Home
Model:	Explorer II
Sample ID Number:	PRT1307021255
Test Date:	11-Sep-13
Test Run Number:	1
Date tunnel cleaned:	9/9/2013
Purpose of Test	Certification



Appliance Information		
Appliance Type:	2	1 - Catalytic 2 - Non - Catalytic 3 - Pellet 4 - Hydronic
Firebox Volume, ft³:	2.3	N/A for pellet type
Convection Blower	2	1 - No Fan 2 - Fan Optional 3 - Fan Standard



Test Settings	
Primary Air:	1.125" from full closed
Secondary Air:	Fixed
Control Board:	NA
Blower/Fan:	on high entire pre test
Pre- Burn Activities	
Time	Activity
	At 55 minutes raked coals
Start-Up Procedure	
Loading of fuel, sec. :	Fuel loaded by 30 seconds
Fuel-loading door :	Door closed by 60 seconds
Primary air:	Primary air fully open until 4.55 then set to test setting
Secondary air:	fixed
Control board:	NA
Blower / fan:	Off for the first 30 minutes then turned to high
Other Notes	
Timed air activated at 0 minutes, boost air not used.	

Test Engineer: BobDate: 9/22/13

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

Project Number:	G101188983
Manufacturer:	Hearth & Home
Model:	Explorer II
Sample ID Number:	PRT1307021255
Test Date:	11-Sep-13
Test Run Number:	1

Firebox Volume, ft <sup>3</sup> :	2.3
-----------------------------------	-----

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"		18.8	21.1	18.8
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
Total Weight	0.0	Average, %db	19.6		

Allowable Fuel Load Range: 14.5 to 17.7

TEST FUEL LOAD PROPERTIES					
Eq. ID No.:		Time:	10:00	Temp., °F:	70
Piece No.	Length, In.	Weight, Lb.	Moisture, %, Dry Basis		
1		7.50	21.4	22.4	22.2
2			19.9	21.1	24.5
3		7.70	19.9	19.8	21.0
4			19.2	20.0	21.0
5			19.0	18.8	19.4
6			19.5	20.6	21.4
7					
8					
Totals	7.7	7.5			
% of Weight	51	49			
Total weight, wet, lb.	15.20	Average Moisture, dry	20.62		
Total weight, dry, kg	5.72	Average Moisture, wet	17.09		



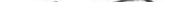
Project Number: G101188983  
Manufacturer: Hearth & Home  
Model: Explorer II  
Sample ID Number: PRT1307021255  
Test Date: 11-Sep-13  
Test Run Number: 1

## EPA Method 28 Pre Burn Data

Coal Bed Range      3.1      to      3.8

Average Firebox Temp, °F      0

Final Coal Bed Wt, lb	3.3
-----------------------	-----

Test Engineer: 

Date: 9/22/13



TEST DATA  
EPA METHOD 5G-3

Project Number:	G101188983
Manufacturer:	Hearth & Home
Model:	Explorer II
Sample ID No:	PRT1307021255
Test Date:	11-Sep-13
Test Run No:	1

Temperature Data

Firebox Temp Start	335.2
Firebox Temp End	216.2
Firebox Delta-T	119.0

Max Filter Temps	
Train A	
147	

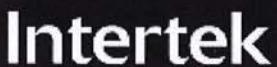
Interval	10	Duration of Test, Min	370
Time			

Temperature Data

Interval	Duration	Room	Dilution Tunnel	Flue Gas	Firebox Top	Firebox Right	Firebox Left	Firebox Back	Firebox Bottom	Catalyst Outlet	Train A Filter	Impinger Exit	Train A DGM
0	0	81	94	186	367	373	337	170	429		147	81	74
1	10	80	125	450	675	329	339	262	418		147	53	74
2	20	80	136	490	829	335	373	281	435		147	53	74
3	30	82	127	435	852	353	409	302	440		147	53	75
4	40	82	117	387	787	369	385	167	430		147	55	75
5	50	83	116	378	781	363	374	156	415		147	55	76
6	60	84	113	337	733	360	379	157	397		147	56	77
7	70	84	110	313	698	370	379	162	380		147	58	77
8	80	84	107	296	665	375	378	167	367		147	59	77
9	90	84	107	292	672	382	378	168	354		147	61	78
10	100	84	104	252	580	384	371	172	342		147	63	78
11	110	87	104	235	538	380	365	175	337		147	64	79
12	120	88	103	219	458	372	362	180	330		147	67	79
13	130	89	103	207	422	369	356	183	326		147	55	79
14	140	85	100	198	398	365	347	183	322		147	51	79
15	150	85	100	191	378	361	338	183	317		147	51	80
16	160	85	99	186	367	355	328	179	313		147	51	80
17	170	86	99	187	363	347	330	172	312		147	52	81
18	180	87	100	182	362	342	328	168	313		147	52	81
19	190	87	100	174	351	335	323	161	314		147	54	81
20	200	88	100	168	345	331	315	154	314		147	53	82
21	210	88	99	164	333	326	302	149	313		147	53	82
22	220	88	99	161	324	320	288	146	311		147	54	82
23	230	89	99	158	318	316	279	143	309		147	54	82
24	240	88	98	154	312	312	271	141	306		147	54	83
25	250	89	99	153	307	308	265	140	302		147	55	83
26	260	89	99	152	299	303	259	139	297		147	54	83
27	270	89	99	152	294	300	254	138	291		147	55	83
28	280	89	98	149	288	296	247	136	283		147	54	84
29	290	89	98	148	284	294	242	135	278		147	54	84
30	300	87	98	144	276	293	234	135	271		147	54	84
31	310	88	97	140	270	291	230	135	266		147	54	84
32	320	88	97	141	266	289	226	134	261		147	54	85
33	330	89	98	141	262	284	222	133	258		147	55	85
34	340	89	97	137	258	280	219	130	255		147	55	85
35	350	89	97	137	253	276	215	127	252		147	57	85
36	360	87	96	134	248	271	211	125	248		147	57	85
37	370	89	97	137	242	265	208	123	243		147	57	85

Test Engineer: B. D.

Date: 9/27/13



TEST DATA  
EPA METHOD 5G-3

Gas Particulate Sampling Data

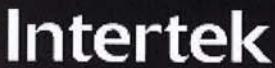
Project Number: G101188983  
Manufacturer: Hearth & Home  
Model: Explorer II  
Sample ID Number: PRT1307021255  
Test Date: 11-Sep-13  
Test Run Number: 1

Barometer, In. Hg		RH, %	Sample Box Correction (y) Factors		
Start	28.58		Meter Box (A)	0.975	
End	28.50				
Duration of Test, Min		370			

Leak Check, cfm @ in Hg	
Train A	0@7

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	0.046	1.00		-0.028	15.20	15.20	491.203		100.02		0.00
10	0.046	1.00		-0.071	14.10	1.10	497.000		102.71		0.00
20	0.046	1.00		-0.075	12.40	1.70	502.560		99.44		0.00
30	0.046	1.00		-0.070	10.20	2.20	508.530		105.76		0.00
40	0.046	1.00		-0.062	8.50	1.70	514.120		98.18		0.00
50	0.046	1.00		-0.062	7.30	1.20	520.020		103.34		0.00
60	0.046	1.00		-0.058	6.60	0.70	525.650		98.17		0.00
70	0.046	1.00		-0.051	5.50	1.10	531.570		102.96		0.00
80	0.046	1.00		-0.050	4.60	0.90	537.730		106.85		0.00
90	0.046	1.00		-0.048	3.90	0.70	543.300		96.44		0.00
100	0.046	1.00		-0.040	3.40	0.50	548.950		97.56		0.00
110	0.046	1.00		-0.035	3.10	0.30	554.750		99.97		0.00
120	0.046	1.00		-0.030	2.90	0.20	560.570		100.22		0.00
130	0.046	1.00		-0.029	2.60	0.30	566.380		100.05		0.00
140	0.046	1.00		-0.028	2.50	0.10	572.200		99.96		0.00
150	0.046	1.00		-0.027	2.30	0.20	578.050		100.29		0.00
160	0.046	1.00		-0.024	2.20	0.10	583.900		100.20		0.00
170	0.046	1.00		-0.026	2.00	0.20	589.740		99.84		0.00
180	0.046	1.00		-0.022	1.80	0.20	595.670		101.47		0.00
190	0.046	1.00		-0.021	1.70	0.10	601.420		98.39		0.00
200	0.046	1.00		-0.020	1.60	0.10	607.380		101.79		0.00
210	0.046	1.00		-0.020	1.50	0.10	613.110		97.78		0.00
220	0.046	1.00		-0.019	1.40	0.10	618.910		98.97		0.00
230	0.046	1.00		-0.018	1.30	0.10	624.700		98.80		0.00
240	0.046	1.00		-0.018	1.10	0.20	630.545		99.47		0.00
250	0.046	1.00		-0.016	1.10	0.00	636.430		100.24		0.00
260	0.046	1.00		-0.016	1.00	0.10	642.140		97.26		0.00
270	0.046	1.00		-0.017	0.90	0.10	647.960		99.13		0.00
280	0.046	1.00		-0.017	0.80	0.10	653.745		98.27		0.00
290	0.046	1.00		-0.016	0.70	0.10	659.675		100.73		0.00
300	0.046	1.00		-0.016	0.60	0.10	665.480		98.61		0.00
310	0.046	1.00		-0.015	0.50	0.10	671.360		99.79		0.00
320	0.046	1.00		-0.013	0.40	0.10	677.350		101.47		0.00
330	0.046	1.00		-0.012	0.30	0.10	683.250		100.04		0.00
340	0.046	1.00		-0.012	0.20	0.10	688.990		97.24		0.00
350	0.046	1.00		-0.010	0.20	0.00	694.950		100.96		0.00
360	0.046	1.00		-0.010	0.10	0.10	700.650		96.47		0.00
370	0.046	1.00		-0.010	0.00	0.10	706.657		101.76		0.00



## Dilution Tunnel Velocity Traverse EPA Method 5G-3

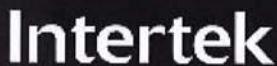
Project Number: G101188983  
Manufacturer: Hearth & Home  
Model: Explorer II  
Sample ID Number: PRT1307021255  
Test Date: 11-Sep-13  
Test Run Number: 1

	Dilution Tunnel		Square Root
	Delta P In. H2O	Temp, °F	
A1	0.0280	94	0.1673
A2	0.0380	94	0.1949
A3	0.0440	94	0.2098
A4	0.0380	94	0.1949
A Center	0.0480	94	0.2191
B1	0.0300	94	0.1732
B2	0.0400	94	0.2000
B3	0.0460	94	0.2145
B4	0.0340	94	0.1844
B Center	0.0460	94	0.2145
Averages	0.0392	94	0.1924

Tunnel Diameter **6.000** inches  
Tunnel Static **-0.324** in. H2O  
Tunnel Area 0.19635 Ft<sup>2</sup>  
Pitot Correction 0.8874 factor  
Baro. Pressure 28.58  
Pitot Factor **0.99** ( 0.99 for standard, 0.84 or Cal. For S-Type )  
Initial Velocity 13.420 Ft/ Sec  
Initial Flow **138.12** Ft<sup>3</sup>/min

Test Engineer: AS

Date: 7/23/13



DILUTION TUNNEL PARTICULATE CALCULATIONS  
EPA Method 5G-3

Project Number: G101188983  
Manufacturer: Hearth & Home  
Model: Explorer II  
Sample ID Number: PRT1307021255  
Test Date: 11-Sep-13  
Test Run Number: 1

Intertek Equipment No.'s 19683, 19684

SAMPLE COMPONENT	REAGENT	FILTER # OR	FINAL, mg	TARE, mg
FRONT FILTER CATCH	FILTER	431	747.8	737.7
REAR FILTER CATCH	FILTER	444	137.2	137.2
RINSE OF PROBE &	ACETONE	50	109123.6	109121.5
RINSE OF IMPINGER SET	WATER	235	106848.2	106842.9
RINSE OF IMPINGER SET	METHANE	150	103002.9	102993.8
RINSE OF FILTER ASSEMBLY & GAS TRAIN -	ACETONE	80	96877.9	96871.3

CONDENSED WATER

IMPINGERS	WEIGHTS		
	FINAL, g	INITIAL, g	NET, g
1	732.7	708.2	24.50
2	697.7	691.6	6.10
3	607.2	603.5	3.70
4	1020	995.7	24.30
	TOTAL:		58.60

Test Engineer: B. D.

Date: 7/23/13



TEST RESULTS  
EPA METHOD 5G-3

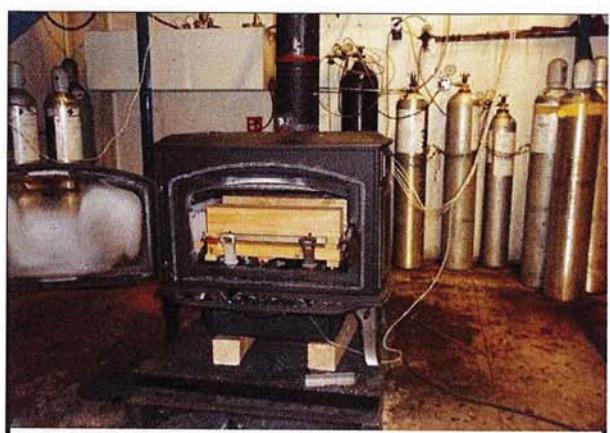
Project Number: G101188983  
Manufacturer: Hearth & Home  
Model: Explorer II  
Sample ID Number: PRT1307021255  
Test Date: 12-Sep-13  
Test Run Number: 2

Dry Burn-Rate, kg/hr:	<b>2.98</b>
Emission-Rate, g/hr:	<b>12.32</b>
Duration of Test, Minutes	115
Dry Gas Meter Standardization	Train A
Dry Gas Meter Beginning Reading, ft <sup>3</sup>	706.902
Dry Gas Meter Ending Reading, ft <sup>3</sup>	773.728
Barometric Pressure Correction Factor	0.952
Dry Gas Meter Calibration Factors (y factors)	0.975
Dry Gas Meter Temperature Factors	0.986
Dry Gas Meter Delta-H Correction Factors	1.002
Dry Gas Meter STD Volume Sampled, ft <sup>3</sup>	<b>61.281</b>
Dilution Tunnel Flow / Volume	
Standardized Tunnel Flow, dscfm	<b>138.860</b>
Total Tunnel Volume, scf	<b>15968.882</b>
Emission Calculations	Train A
Sample Ratios (Total Tunnel Volume / Total Sample Volume)	260.585
Sample Particulate Mass, mg	90.6
Total Emissions, grams	23.621
Emission-Rate, g/hr	12.32
Adjusted Emission Rates, g/hr	<b>14.63</b>
Operating Parameters	Train A
Max Filter Temperature, °F	223
Post-Test Leak Check, cfm @ in. Hg vac.	0
Average Firebox Surface Temperature delta-T, °F	62
Maximum Ambient Temperature, °F	86
Minimum Ambient Temperature, °F	79
Fuel Properties	
Wet Fuel Load Weight, lb.	15.30
Dry-Basis Fuel Load Moisture Content, %	21.60
Wet-Basis Fuel Load Moisture Content, %	17.76

PROJECT / TEST INFORMATION	
Project Number:	G101188983
Manufacturer:	Hearth & Home
Model:	Explorer II
Sample ID Number:	PRT1307021255
Test Date:	12-Sep-13
Test Run Number:	2
Date tunnel cleaned:	9/9/2013
Purpose of Test	Certification



Appliance Information		
Appliance Type:	2	1 - Catalytic 2 - Non - Catalytic 3 - Pellet 4 - Hydronic
Firebox Volume, ft³:	2.3	N/A for pellet type
Convection Blower	2	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 57 minutes leveled coal bed
Start-Up Procedure	
Loading of fuel, sec. :	Fuel loaded by 30 seconds
Fuel-loading door :	Door closed by 38 seconds
Primary air:	Fully open for full 5 minutes
Secondary air:	Fixed
Control board:	NA
Blower / fan:	On high entire test
Other Notes	
Boost air locked open	

Test Engineer: B.D.Date: 7/27/13

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

Project Number:	G101188983
Manufacturer:	Hearth & Home
Model:	Explorer II
Sample ID Number:	PRT1307021255
Test Date:	12-Sep-13
Test Run Number:	2

Firebox Volume, ft <sup>3</sup> :	2.3
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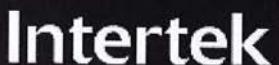
Calibration Reference ID			
Set meter to Species 1			
Set Temperature to 70F		12%	12.0
Set pin setting to 444		22%	22.0

PRE-BURN FUEL PROPERTIES					
Eq. ID No.:		Time:	9:05	Temp., °F:	70
Piece No.	Length, In.	Weight, Lb.	Moisture, %, Dry Basis		
1	4.00		23.0	21.9	23.8
2	4.00	15.20	22.8	24.7	25.8
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
Total Weight	15.2	Average, %db	23.7		

Allowable Fuel Load Range: 14.5 to 17.7

TEST FUEL LOAD PROPERTIES					
Eq. ID No.:		Time:	9:05	Temp., °F:	70
Piece No.	Length, In.	Weight, Lb.		Moisture, %, Dry Basis	
		2x4	4x4		
1			7.10	19.0	20.5
2				20.6	21.7
3		8.20		25.0	23.8
4				18.9	20.1
5				23.8	22.1
6				22.5	20.6
7					
8					
Totals		8.2	7.1		
% of Weight		54	46		
Total weight, wet, lb.		15.30		Average Moisture, dry	21.60
Total weight, dry, kg		5.71		Average Moisture, wet	17.76

Test Engineer: B. D.Date: 9/27/13



Project Number: G101188983  
Manufacturer: Hearth & Home  
Model: Explorer II  
Sample ID Number: PRT1307021255  
Test Date: 12-Sep-13  
Test Run Number: 2

EPA Method 28  
Pre Burn Data

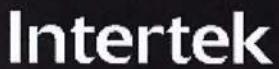
Coal Bed Range      3.1      to      3.8

Average Firebox Temp, °F      0

Final Coal Bed Wt, lb 3.1

Test Engineer: B D

Date: 7/27/13



TEST DATA  
EPA METHOD 5G-3

Project Number:	G101188983
Manufacturer:	Hearth & Home
Model:	Explorer II
Sample ID No:	PRT1307021255
Test Date:	12-Sep-13
Test Run No:	2

Temperature Data

Firebox Temp Start	510.8
Firebox Temp End	448.8
Firebox Delta-T	62.0

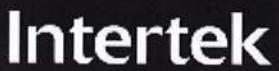
Max Filter Temps	
Train A	
223	

Interval 5 Duration of Test, Min 115

Interval	Duration	Room	Temperature Data										Train A DGM
			Dilution Tunnel	Flue Gas	Firebox Top	Firebox Right	Firebox Left	Firebox Back	Firebox Bottom	Catalyst Outlet	Train A Filter	Impinger Exit	
0	0	79	119	348	635	538	517	240	624		223	81	73
1	5	80	148	506	717	514	474	227	620		190	48	72
2	10	80	163	592	841	471	445	204	613		166	47	73
3	15	80	169	607	888	453	447	192	609		152	45	73
4	20	81	173	606	917	443	456	184	599		149	44	73
5	25	81	172	601	923	445	474	187	584		148	47	73
6	30	82	171	592	933	450	493	194	575		148	47	74
7	35	83	167	575	924	463	521	207	566		148	48	74
8	40	83	163	553	908	473	538	214	563		148	48	74
9	45	84	154	516	852	502	562	227	558		147	48	75
10	50	84	147	476	818	513	564	230	556		148	49	75
11	55	84	138	426	731	541	557	235	547		147	49	75
12	60	85	135	410	689	549	550	239	540		147	49	76
13	65	83	132	396	661	552	541	243	529		147	50	76
14	70	83	130	394	652	550	532	245	519		147	50	76
15	75	84	128	390	640	546	525	245	509		147	50	77
16	80	83	127	381	625	544	521	244	505		147	50	77
17	85	83	124	364	590	542	512	242	497		147	50	77
18	90	83	123	355	563	535	503	237	493		147	50	78
19	95	84	122	352	554	528	497	234	502		147	51	78
20	100	84	121	348	546	522	492	232	515		147	51	78
21	105	84	120	341	540	517	487	229	524		145	52	79
22	110	86	120	336	531	511	482	226	528		135	52	79
23	115	84	119	328	517	503	473	222	529		122	53	79

Test Engineer: B. D.

Date: 9/23/13



TEST DATA  
EPA METHOD 5G-3

Gas Particulate Sampling Data

Project Number: G101188983  
Manufacturer: Hearth & Home  
Model: Explorer II  
Sample ID Number: PRT1307021255  
Test Date: 12-Sep-13  
Test Run Number: 2

Barometer, In. Hg		RH, %	Sample Box Correction (y) Factors	
Start	28.49		Meter Box (A)	0.975
End	28.46			
Duration of Test, Min		115		

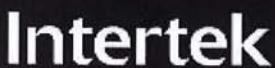
Leak Check, cfm @ in Hg	
Train A	.004@8

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	0.048	1.00		-0.052	15.20	15.20	706.902		100.06		0.00
5	0.048	1.00		-0.080	14.30	0.90	709.830		102.05		0.00
10	0.048	1.00		-0.080	12.50	1.80	712.800		104.58		0.00
15	0.048	1.00		-0.081	10.90	1.60	715.600		99.07		0.00
20	0.048	1.00		-0.080	9.40	1.50	718.520		103.64		0.00
25	0.048	1.00		-0.080	7.90	1.50	721.301		98.63		0.00
30	0.048	1.00		-0.080	6.40	1.50	724.260		104.67		0.00
35	0.048	1.00		-0.079	5.30	1.10	727.130		101.20		0.00
40	0.048	1.00		-0.075	4.30	1.00	730.150		106.14		0.00
45	0.048	1.00		-0.072	3.50	0.80	733.140		104.13		0.00
50	0.048	1.00		-0.068	3.10	0.40	735.850		93.84		0.00
55	0.048	1.00		-0.061	2.70	0.40	738.980		107.58		0.00
60	0.048	1.00		-0.060	2.40	0.30	741.650		91.37		0.00
65	0.048	1.00		-0.058	2.00	0.40	744.720		104.79		0.00
70	0.048	1.00		-0.058	1.70	0.30	747.520		95.41		0.00
75	0.048	1.00		-0.056	1.40	0.30	750.350		96.09		0.00
80	0.048	1.00		-0.055	1.10	0.30	753.270		99.06		0.00
85	0.048	1.00		-0.051	1.00	0.10	756.190		98.81		0.00
90	0.048	1.00		-0.051	0.80	0.20	759.080		97.53		0.00
95	0.048	1.00		-0.050	0.60	0.20	762.020		99.13		0.00
100	0.048	1.00		-0.050	0.40	0.20	764.950		98.71		0.00
105	0.048	1.00		-0.050	0.20	0.20	767.800		95.75		0.00
110	0.048	1.00		-0.050	0.10	0.10	770.780		100.12		0.00
115	0.048	1.00		-0.049	0.00	0.10	773.728		98.96		0.00

Test Engineer: B.D.

Date: 9/23/13



Dilution Tunnel Velocity Traverse  
EPA Method 5G-3

Project Number: G101188983  
Manufacturer: Hearth & Home  
Model: Explorer II  
Sample ID Number: PRT1307021255  
Test Date: 12-Sep-13  
Test Run Number: 2

	Dilution Tunnel		Square Root
	Delta P In. H2O	Temp, °F	
A1	0.0340	125	0.1844
A2	0.0460	125	0.2145
A3	0.0500	125	0.2236
A4	0.0520	124	0.2280
A Center	0.0500	124	0.2236
B1	0.0300	123	0.1732
B2	0.0480	123	0.2191
B3	0.0440	123	0.2098
B4	0.0320	122	0.1789
B Center	0.0480	122	0.2191
Averages	0.0434	123.6	0.2039

Tunnel Diameter **6.000** inches  
Tunnel Static **-0.364** in. H2O  
Tunnel Area 0.19635 Ft<sup>2</sup>  
Pitot Correction 0.9213 factor  
Baro. Pressure 28.49  
Pitot Factor **0.99** ( 0.99 for standard, 0.84 or Cal. For S-Type )  
Initial Velocity 14.625 Ft/ Sec  
Initial Flow **142.44** Ft<sup>3</sup>/min

Test Engineer: B.D.

Date: 7/23/13



DILUTION TUNNEL PARTICULATE CALCULATIONS  
EPA Method 5G-3

Project Number: G101188983

Manufacturer: Hearth & Home

Model: Explorer II

Sample ID Number: PRT1307021255

Test Date: 12-Sep-13

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	432	775.3	734.9		40.40
REAR FILTER CATCH	FILTER	441	135.6	135.5		0.10
RINSE OF PROBE &	ACETONE	70	112553.3	112543.2	0.0133	9.17
RINSE OF IMPINGER SET	WATER	240	107241.2	107223.5	0.01	15.30
RINSE OF IMPINGER SET	METHANE	150	96389.2	96379.4	0.0073	8.71
RINSE OF FILTER ASSEMBLY & GAS TRAIN -	ACETONE	130	98781.7	98763	0.0133	16.97
					TOTAL:	90.65

CONDENSED WATER

IMPINGERS	WEIGHTS		
	FINAL, g	INITIAL, g	NET, g
1	724.6	706.5	18.10
2	694.1	690.4	3.70
3	610.4	611	-0.60
4	1036.1	1025.5	10.60
		TOTAL:	31.80

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: BR -

Date: 9/27/13



TEST RESULTS  
EPA METHOD 5G-3

Project Number: G101188983  
Manufacturer: Hearth & Home  
Model: Explorer II  
Sample ID Number: PRT1307021255  
Test Date: 12-Sep-13  
Test Run Number: 3

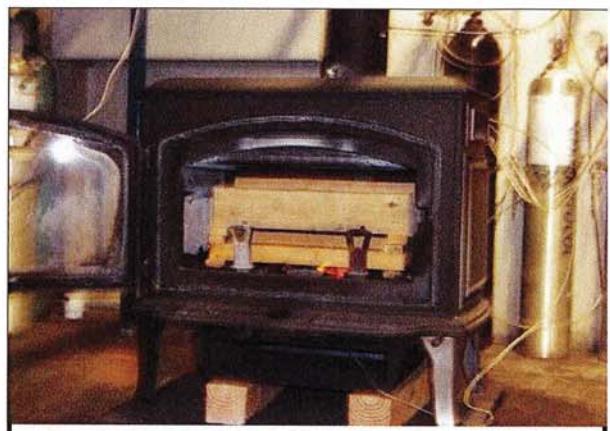
Dry Burn-Rate, kg/hr:	<b>1.73</b>
Emission-Rate, g/hr:	<b>1.47</b>
Duration of Test, Minutes	200
<b>Dry Gas Meter Standardization</b>	Train A
Dry Gas Meter Beginning Reading, ft <sup>3</sup>	774
Dry Gas Meter Ending Reading, ft <sup>3</sup>	891.585
Barometric Pressure Correction Factor	0.952
Dry Gas Meter Calibration Factors (y factors)	0.975
Dry Gas Meter Temperature Factors	0.971
Dry Gas Meter Delta-H Correction Factors	1.002
Dry Gas Meter STD Volume Sampled, ft <sup>3</sup>	<b>106.216</b>
<b>Dilution Tunnel Flow / Volume</b>	
Standardized Tunnel Flow, dscfm	<b>135.062</b>
Total Tunnel Volume, scf	<b>27012.401</b>
<b>Emission Calculations</b>	Train A
Sample Ratios (Total Tunnel Volume / Total Sample Volume)	254.317
Sample Particulate Mass, mg	19.3
Total Emissions, grams	4.906
Emission-Rate, g/hr	1.47
Adjusted Emission Rates, g/hr	<b>2.51</b>
<b>Operating Parameters</b>	Train A
Max Filter Temperature, °F	148
Post-Test Leak Check, cfm @ in. Hg vac.	0
Average Firebox Surface Temperature delta-T, °F	36
Maximum Ambient Temperature, °F	90
Mimimum Ambient Temperature, °F	84
<b>Fuel Properties</b>	
Wet Fuel Load Weight, lb.	15.50
Dry-Basis Fuel Load Moisture Content, %	21.76
Wet-Basis Fuel Load Moisture Content, %	17.87

**Run Notes**  
**EPA Methods 28 and 5G-3**

<b>PROJECT / TEST INFORMATION</b>	
Project Number:	G101188983
Manufacturer:	Hearth & Home
Model:	Explorer II
Sample ID Number:	PRT1307021255
Test Date:	12-Sep-13
Test Run Number:	3
Date tunnel cleaned:	9/9/2013
Purpose of Test	Certification



<b>Appliance Information</b>		
Appliance Type:	2	1 - Catalytic 2 - Non - Catalytic 3 - Pellet 4 - Hydronic
Firebox Volume, ft³:	2.3	N/A for pellet type
Convection Blower	2	1 - No Fan 2 - Fan Optional 3 - Fan Standard



<b>Test Settings</b>	
Primary Air:	Fully open, boost air not used
Secondary Air:	Fixed
Control Board:	NA
Blower/Fan:	On high
<b>Pre- Burn Activities</b>	
Time	Activity
	Coal bed leveled at 65 minutes
<b>Start-Up Procedure</b>	
Loading of fuel, sec. :	Loaded by 30 seconds
Fuel-loading door :	closed by 50 seconds
Primary air:	fully open for the entire test
Secondary air:	fixed
Control board:	NA
Blower / fan:	Off for first 30 then turned to high
<b>Other Notes</b>	
Timed air activated at 0 minutes	

Test Engineer: B. D.

Date: 9/23/13

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

Project Number:	G101188983
Manufacturer:	Hearth & Home
Model:	Explorer II
Sample ID Number:	PRT1307021255
Test Date:	12-Sep-13
Test Run Number:	3

Firebox Volume, ft <sup>3</sup> :	2.3
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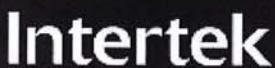
Calibration Reference ID			
Set meter to Species 1			
Set Temperature to 70F		12%	12.0
Set pin setting to 444		22%	22.0

PRE-BURN FUEL PROPERTIES					
Eq. ID No.:		Time:	14:00	Temp., °F:	85
Piece No.	Length, In.	Weight, Lb.	Moisture, %, Dry Basis		
1	24.00		19.3	21.2	23.1
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
Total Weight	0.0	Average, %db	21.2		

Allowable Fuel Load Range: 14.5 to 17.7

TEST FUEL LOAD PROPERTIES					
Eq. ID No.:		Time:	14:00	Temp., °F:	85
Piece No.	Length, In.	Weight, Lb.	Moisture, %, Dry Basis		
1			20.5	21.9	20.3
2			20.5	20.2	21.7
3			22.8	23.1	25.6
4		8.40	23.0	23.1	24.6
5			19.7	21.0	20.5
6		7.10	22.0	19.9	21.2
7					
8					
Totals	8.4	7.1			
% of Weight	54	46			
Total weight, wet, lb.	15.50		Average Moisture, dry	21.76	
Total weight, dry, kg	5.77		Average Moisture, wet	17.87	

Test Engineer: B. D.Date: 9/27/13



Project Number: G101188983  
Manufacturer: Hearth & Home  
Model: Explorer II  
Sample ID Number: PRT1307021255  
Test Date: 12-Sep-13  
Test Run Number: 3

EPA Method 28  
Pre Burn Data

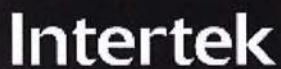
Coal Bed Range 3.1 to 3.8

Average Firebox Temp, °F

Final Coal Bed Wt, lb	3.6
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Test Engineer: B. A.

Date: 9/22/13



TEST DATA  
EPA METHOD 5G-3

Project Number:	G101188983
Manufacturer:	Hearth & Home
Model:	Explorer II
Sample ID No:	PRT1307021255
Test Date:	12-Sep-13
Test Run No:	3

Temperature Data

Firebox Temp Start	359.6
Firebox Temp End	323.6
Firebox Delta-T	36.0

Max Filter Temps	
Train A	
148	

Interval 10 Duration of Test, Min 200

Time		Temperature Data												
Interval	Duration	Room	Dilution Tunnel	Flue Gas	Firebox Top	Firebox Right	Firebox Left	Firebox Back	Firebox Bottom	Catalyst Outlet	Train A Filter	Impinger Exit	Train A DGM	
0	0	88	111	243	420	432	358	183	405		147	91	84	
1	10	88	159	572	735	380	364	280	399		147	46	84	
2	20	89	173	614	890	376	406	298	411		148	48	84	
3	30	90	159	541	940	403	456	298	424		148	50	85	
4	40	89	148	494	895	431	444	189	422		148	51	85	
5	50	88	144	476	875	443	445	190	414		148	51	86	
6	60	88	140	453	850	459	450	200	403		147	51	85	
7	70	88	130	393	762	479	456	210	393		147	54	85	
8	80	87	122	336	654	493	451	214	386		148	55	84	
5	90	87	116	301	557	486	437	215	382		147	55	84	
10	100	87	113	283	519	476	423	215	381		147	56	84	
11	110	86	110	271	485	459	403	208	380		147	57	85	
12	120	87	109	266	464	448	389	206	378		147	57	85	
13	130	86	107	258	448	437	374	203	374		147	56	85	
14	140	85	106	251	439	434	363	199	369		147	56	85	
15	150	85	105	249	430	429	355	196	362		147	56	82	
16	160	85	104	249	423	421	352	192	354		147	56	82	
17	170	85	103	245	415	411	350	189	347		147	55	82	
18	180	85	103	239	404	401	346	185	340		147	56	82	
19	190	84	102	232	395	389	337	179	340		147	56	81	
20	200	86	103	234	390	382	330	174	342		147	56	81	

Test Engineer: B.D.

Date: 9/23/13



TEST DATA  
EPA METHOD 5G-3

Gas Particulate Sampling Data

Project Number: G101188983  
Manufacturer: Hearth & Home  
Model: Explorer II  
Sample ID Number: PRT1307021255  
Test Date: 12-Sep-13  
Test Run Number: 3

Barometer, In. Hg		RH, %	Sample Box Correction (y) Factors	
Start	28.40		Meter Box (A)	0.975
End	28.56			
Duration of Test, Min		200		

Leak Check, cfm @ in Hg	
Train A	0.0@6

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	0.048	1.00		-0.035	15.50	15.50	774.000		100.01		0.00
10	0.048	1.00		-0.080	13.90	1.60	779.800		101.66		0.00
20	0.048	1.00		-0.080	11.70	2.20	785.880		107.77		0.00
30	0.048	1.00		-0.075	8.90	2.80	791.570		99.55		0.00
40	0.048	1.00		-0.072	7.00	1.90	797.350		100.22		0.00
50	0.048	1.00		-0.070	5.50	1.50	803.280		102.30		0.00
60	0.048	1.00		-0.068	4.00	1.50	809.150		101.11		0.00
70	0.048	1.00		-0.061	3.10	0.90	815.120		101.97		0.00
80	0.048	1.00		-0.061	2.60	0.50	820.840		97.22		0.00
90	0.048	1.00		-0.049	2.30	0.30	826.910		102.63		0.00
100	0.048	1.00		-0.045	2.00	0.30	832.680		97.31		0.00
110	0.048	1.00		-0.041	1.80	0.20	838.720		101.41		0.00
120	0.048	1.00		-0.040	1.60	0.20	844.370		94.78		0.00
130	0.048	1.00		-0.040	1.40	0.20	850.370		100.47		0.00
140	0.048	1.00		-0.040	1.20	0.20	856.270		98.71		0.00
150	0.048	1.00		-0.040	1.00	0.20	862.270		100.85		0.00
160	0.048	1.00		-0.040	0.70	0.30	868.040		96.90		0.00
170	0.048	1.00		-0.040	0.50	0.20	874.270		104.53		0.00
180	0.048	1.00		-0.038	0.30	0.20	879.940		95.13		0.00
190	0.048	1.00		-0.037	0.20	0.10	885.770		97.91		0.00
200	0.048	1.00		-0.035	0.00	0.20	891.585		97.75		0.00

Test Engineer: B. D.

Date: 7/23/13

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

Project Number: G101188983  
Manufacturer: Hearth & Home  
Model: Explorer II  
Sample ID Number: PRT1307021255  
Test Date: 12-Sep-13  
Test Run Number: 3

	Dilution Tunnel		Square Root
	Delta P In. H2O	Temp, °F	
A1	0.0240	110	0.1549
A2	0.0440	110	0.2098
A3	0.0440	110	0.2098
A4	0.0300	110	0.1732
A Center	0.0480	110	0.2191
B1	0.0340	110	0.1844
B2	0.0420	110	0.2049
B3	0.0480	110	0.2191
B4	0.0360	110	0.1897
B Center	0.0480	110	0.2191
Averages	0.0398	110	0.1932

Tunnel Diameter **6.000** inches  
Tunnel Static **-0.360** in. H2O  
Tunnel Area 0.19635 Ft<sup>2</sup>  
Pitot Correction 0.8819 factor  
Baro. Pressure 28.40  
Pitot Factor **0.99** ( 0.99 for standard, 0.84 or Cal. For S-Type )  
Initial Velocity 13.716 Ft/ Sec  
Initial Flow **136.34** Ft<sup>3</sup>/min

Test Engineer: B.D.

Date: 7/22/13



DILUTION TUNNEL PARTICULATE CALCULATIONS  
EPA Method 5G-3

Project Number: G101188983  
Manufacturer: Hearth & Home  
Model: Explorer II  
Sample ID Number: PRT1307021255  
Test Date: 12-Sep-13  
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	433	744.8	734.3		10.50
REAR FILTER CATCH	FILTER	445	126.2	126.4		-0.20
RINSE OF PROBE &	ACETONE	55	97963.4	97959.2	0.0133	3.47
RINSE OF IMPINGER SET	WATER	235	108420.6	108417.7	0.01	0.55
RINSE OF IMPINGER SET	METHANE	150	94737.4	94734	0.0073	2.30
RINSE OF FILTER ASSEMBLY & GAS TRAIN -	ACETONE	70	101927.2	101923.6	0.0133	2.67
					TOTAL:	19.29

CONDENSED WATER

IMPINGERS	WEIGHTS		
	FINAL, g	INITIAL, g	NET, g
1	722.2	702.6	19.60
2	698.1	691.9	6.20
3	613.1	611.2	1.90
4	1058	1036.1	21.90
		TOTAL:	49.60

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: BDA

Date: 7/27/13



TEST RESULTS  
EPA METHOD 5G-3

Project Number: G101188983  
Manufacturer: Hearth & Home  
Model: Explorer II  
Sample ID Number: PRT1307021255  
Test Date: 13-Sep-13  
Test Run Number: 4

Dry Burn-Rate, kg/hr:	<b>1.21</b>
Emission-Rate, g/hr:	<b>0.92</b>
Duration of Test, Minutes	290
<b>Dry Gas Meter Standardization</b>	Train A
Dry Gas Meter Beginning Reading, ft <sup>3</sup>	891.8
Dry Gas Meter Ending Reading, ft <sup>3</sup>	1061.772
Barometric Pressure Correction Factor	0.948
Dry Gas Meter Calibration Factors (y factors)	0.975
Dry Gas Meter Temperature Factors	0.981
Dry Gas Meter Delta-H Correction Factors	1.002
Dry Gas Meter STD Volume Sampled, ft <sup>3</sup>	<b>154.514</b>
<b>Dilution Tunnel Flow / Volume</b>	
Standardized Tunnel Flow, dscfm	<b>128.565</b>
Total Tunnel Volume, scf	<b>37283.955</b>
<b>Emission Calculations</b>	Train A
Sample Ratios (Total Tunnel Volume / Total Sample Volume)	241.298
Sample Particulate Mass, mg	18.4
Total Emissions, grams	4.450
Emission-Rate, g/hr	0.92
Adjusted Emission Rates, g/hr	<b>1.70</b>
<b>Operating Parameters</b>	Train A
Max Filter Temperature, °F	147
Post-Test Leak Check, cfm @ in. Hg vac.	0
Average Firebox Surface Temperature delta-T, °F	94.2
Maximum Ambient Temperature, °F	89
Minimum Ambient Temperature, °F	78
<b>Fuel Properties</b>	
Wet Fuel Load Weight, lb.	15.70
Dry-Basis Fuel Load Moisture Content, %	21.38
Wet-Basis Fuel Load Moisture Content, %	17.62

**Run Notes**  
**EPA Methods 28 and 5G-3**

PROJECT / TEST INFORMATION	
Project Number:	G101188983
Manufacturer:	Hearth & Home
Model:	Explorer II
Sample ID Number:	PRT1307021255
Test Date:	13-Sep-13
Test Run Number:	4
Date tunnel cleaned:	9/9/2013
Purpose of Test	Certification



Appliance Information		
Appliance Type:	2	1 - Catalytic 2 - Non - Catalytic 3 - Pellet 4 - Hydronic
Firebox Volume, ft³:	2.3	N/A for pellet type
Convection Blower	2	1 - No Fan 2 - Fan Optional 3 - Fan Standard



Test Settings	
Primary Air:	Primary air set at 1.40" from full closed
Secondary Air:	Fixed
Control Board:	NA
Blower/Fan:	On high
Pre- Burn Activities	
Time	Activity
Start-Up Procedure	
Loading of fuel, sec. :	Fuel loaded by 45 seconds
Fuel-loading door :	Door closed by 60 seconds
Primary air:	Fully open until 4:45 then set to test setting by 5 minutes
Secondary air:	Fixed
Control board:	NA
Blower / fan:	Off for the first 30 minutes then turned to high
Other Notes	
Timed air activated at 0 minutes.	

Test Engineer: B.D.

Date: 9/12/13

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

Project Number:	G101188983
Manufacturer:	Hearth & Home
Model:	Explorer II
Sample ID Number:	PRT1307021255
Test Date:	13-Sep-13
Test Run Number:	4

Firebox Volume, ft <sup>3</sup> :	2.3
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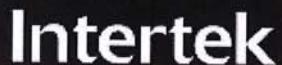
Calibration Reference ID			
Set meter to Species 1			
Set Temperature to 70F		12%	12.0
Set pin setting to 444		22%	22.0

PRE-BURN FUEL PROPERTIES					
Eq. ID No.:		Time:	Temp., °F:		
Piece No.	Length, In.	Weight, Lb.	Moisture, %, Dry Basis		
1	24.00		18.6	23.8	19.3
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
Total Weight	0.0	Average, %db	20.6		

Allowable Fuel Load Range: 14.5 to 17.7

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		8.50		24.7	24.4
2				20.5	18.9
3				18.6	19.3
4				24.3	25.6
5		7.20		22.4	19.8
6				21.0	19.3
7					
8					
Totals	8.5	7.2			
% of Weight	54	46			
Total weight, wet, lb.	15.70		Average Moisture, dry	21.38	
Total weight, dry, kg	5.87		Average Moisture, wet	17.62	

Test Engineer: BODDate: 9/22/13



Project Number: G101188983  
Manufacturer: Hearth & Home  
Model: Explorer II  
Sample ID Number: PRT1307021255  
Test Date: 13-Sep-13  
Test Run Number: 4

EPA Method 28  
Pre Burn Data

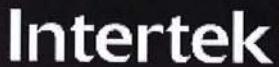
Coal Bed Range      3.2      to      3.9

Average Firebox Temp, °F

Final Coal Bed Wt, lb	3.2
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Test Engineer: BOD -

Date: 9/23/13



TEST DATA  
EPA METHOD 5G-3

Project Number:	G101188983
Manufacturer:	Hearth & Home
Model:	Explorer II
Sample ID No:	PRT1307021255
Test Date:	13-Sep-13
Test Run No:	4

Temperature Data

Firebox Temp Start	345.6
Firebox Temp End	251.4
Firebox Delta-T	94.2

Max Filter Temps	
Train A	
147	

Interval	10	Duration of Test, Min	290
Time			

Temperature Data

Interval	Duration	Room	Dilution Tunnel	Flue Gas	Firebox Top	Firebox Right	Firebox Left	Firebox Back	Firebox Bottom	Catalyst Outlet	Train A Filter	Impinger Exit	Train A DGM
0	0	78	93	189	382	396	333	171	446		147	76	72
1	10	79	126	465	630	350	337	266	425		147	51	72
2	20	79	147	555	849	342	398	294	427		147	51	73
3	30	79	133	471	865	367	431	231	426		147	52	73
4	40	80	129	437	831	380	422	231	420		147	53	74
5	50	81	125	419	818	390	421	176	409		147	54	75
6	60	82	123	406	806	401	422	171	395		147	55	75
7	70	82	120	388	792	414	429	176	384		147	56	76
8	80	83	117	361	760	425	429	182	375		147	56	76
9	90	82	109	284	618	430	414	189	368		147	59	77
10	100	84	104	253	524	425	396	189	366		147	61	78
11	110	84	103	239	470	415	379	188	365		147	62	78
12	120	85	102	231	434	404	368	187	359		147	63	78
13	130	85	102	223	413	395	359	186	353		147	64	78
14	140	85	101	217	399	388	351	186	346		147	65	78
15	150	86	101	212	386	380	343	185	340		147	66	79
16	160	86	101	213	384	376	340	182	335		147	67	79
17	170	88	101	206	380	374	330	174	335		147	56	79
18	180	88	101	200	371	368	319	169	337		147	55	79
19	190	89	101	195	363	364	311	166	338		147	55	79
20	200	89	101	189	350	358	300	163	338		147	56	80
21	210	89	101	183	339	352	290	159	336		147	56	80
22	220	89	101	180	330	345	281	155	333		147	57	80
23	230	89	101	178	324	341	271	152	329		147	58	81
24	240	89	101	177	320	339	264	150	326		147	58	81
25	250	86	99	173	313	336	256	148	323		147	58	81
26	260	87	100	168	305	332	249	146	322		147	58	82
27	270	87	100	166	297	324	242	143	316		147	58	82
28	280	87	99	161	288	318	235	141	311		147	59	82
29	290	89	100	158	278	312	226	138	303		147	59	83

Test Engineer: B.D.

Date: 7/27/13



TEST DATA  
EPA METHOD 5G-3

Gas Particulate Sampling Data

Project Number: G101188983  
Manufacturer: Hearth & Home  
Model: Explorer II  
Sample ID Number: PRT1307021255  
Test Date: 13-Sep-13  
Test Run Number: 4

Barometer, In. Hg		RH, %	Sample Box Correction (y) Factors	
Start	28.34		Meter Box (A)	0.975
End	28.37			
Duration of Test, Min		290		

Leak Check, cfm @ in Hg	
Train A	0.0@4"

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	0.040	1.00		-0.030	15.70	15.70	891.800	100.03		0.00
10	0.040	1.00		-0.078	14.50	1.20	897.650	102.55		0.00
20	0.040	1.00		-0.079	12.60	1.90	903.350	101.50		0.00
30	0.040	1.00		-0.071	9.90	2.70	909.140	101.91		0.00
40	0.040	1.00		-0.067	8.20	1.70	914.940	101.55		0.00
50	0.040	1.00		-0.066	6.70	1.50	920.780	101.71		0.00
60	0.040	1.00		-0.063	5.60	1.10	926.620	101.54		0.00
70	0.040	1.00		-0.060	4.40	1.20	932.470	101.26		0.00
80	0.040	1.00		-0.055	3.50	0.90	938.430	102.90		0.00
90	0.040	1.00		-0.044	3.10	0.40	944.240	99.43		0.00
100	0.040	1.00		-0.040	2.80	0.30	950.180	101.01		0.00
110	0.040	1.00		-0.038	2.60	0.20	956.030	99.40		0.00
120	0.040	1.00		-0.031	2.40	0.20	961.870	99.14		0.00
130	0.040	1.00		-0.031	2.20	0.20	967.730	99.48		0.00
140	0.040	1.00		-0.031	2.10	0.10	973.580	99.22		0.00
150	0.040	1.00		-0.030	1.90	0.20	979.450	99.37		0.00
160	0.040	1.00		-0.030	1.70	0.20	985.330	99.54		0.00
170	0.040	1.00		-0.029	1.50	0.20	991.180	99.04		0.00
180	0.040	1.00		-0.027	1.40	0.10	997.095	100.14		0.00
190	0.040	1.00		-0.025	1.20	0.20	1002.950	99.12		0.00
200	0.040	1.00		-0.025	1.10	0.10	1008.840	99.53		0.00
210	0.040	1.00		-0.025	0.90	0.20	1014.740	99.70		0.00
220	0.040	1.00		-0.021	0.80	0.10	1020.620	99.36		0.00
230	0.040	1.00		-0.021	0.70	0.10	1026.495	99.09		0.00
240	0.040	1.00		-0.020	0.60	0.10	1032.380	99.26		0.00
250	0.040	1.00		-0.020	0.40	0.20	1038.350	100.51		0.00
260	0.040	1.00		-0.019	0.30	0.10	1044.220	98.74		0.00
270	0.040	1.00		-0.019	0.20	0.10	1050.070	98.40		0.00
280	0.040	1.00		-0.019	0.10	0.10	1055.920	98.31		0.00
290	0.040	1.00		-0.018	0.00	0.10	1061.772	98.25		0.00

Test Engineer: B. D.

Date: 7/23/10



Dilution Tunnel Velocity Traverse  
EPA Method 5G-3

Project Number: G101188983  
Manufacturer: Hearth & Home  
Model: Explorer II  
Sample ID Number: PRT1307021255  
Test Date: 13-Sep-13  
Test Run Number: 4

	Dilution Tunnel		Square Root
	Delta P In. H2O	Temp, °F	
A1	0.0300	92	0.1732
A2	0.0380	92	0.1949
A3	0.0420	92	0.2049
A4	0.0340	92	0.1844
A Center	0.0440	92	0.2098
B1	0.0280	92	0.1673
B2	0.0400	92	0.2000
B3	0.0400	92	0.2000
B4	0.0280	92	0.1673
B Center	0.0400	92	0.2000
Averages	0.0364	92	0.1865

Tunnel Diameter **6.000** inches  
Tunnel Static **-0.296** in. H2O  
Tunnel Area 0.19635 Ft<sup>2</sup>  
Pitot Correction 0.9104 factor  
Baro. Pressure 28.34  
Pitot Factor **0.99** ( 0.99 for standard, 0.84 or Cal. For S-Type )  
Initial Velocity 13.045 Ft/ Sec  
Initial Flow **133.62** Ft<sup>3</sup>/min

Test Engineer: BD

Date: 9/23/13



DILUTION TUNNEL PARTICULATE CALCULATIONS  
EPA Method 5G-3

Project Number: G101188983  
Manufacturer: Hearth & Home  
Model: Explorer II  
Sample ID Number: PRT1307021255  
Test Date: 13-Sep-13  
Test Run Number: 4

Intertek Equipment No.'s 19683, 19684

SAMPLE COMPONENT	REAGENT	FILTER # OR	FINAL, mg	TARE, mg
FRONT FILTER CATCH	FILTER	434	744	734.2
REAR FILTER CATCH	FILTER	446	128.6	128.8
RINSE OF PROBE &	ACETONE	55	108990.4	108988.1
RINSE OF IMPINGER SET	WATER	240	106074	106070.4
RINSE OF IMPINGER SET	METHANE	150	108541.2	108536
RINSE OF FILTER ASSEMBLY & GAS TRAIN -	ACETONE	70	104984.6	104981.7

CONDENSED WATER

IMPINGERS	WEIGHTS		
	FINAL, g	INITIAL, g	NET, g
1	729.8	702.6	27.20
2	698.3	691.7	6.60
3	614.1	610.7	3.40
4	1020	990	30.00
	TOTAL:		67.20

Test Engineer: B.D.

Date: 9/27/13



TEST RESULTS  
EPA METHOD 5G-3

Project Number: G101188983  
Manufacturer: Hearth & Home  
Model: Explorer II  
Sample ID Number: PRT1307021255  
Test Date: 14-Sep-13  
Test Run Number: 5

Dry Burn-Rate, kg/hr:	<b>1.23</b>
Emission-Rate, g/hr:	<b>1.08</b>
Duration of Test, Minutes	280
<b>Dry Gas Meter Standardization</b>	Train A
Dry Gas Meter Beginning Reading, ft <sup>3</sup>	62
Dry Gas Meter Ending Reading, ft <sup>3</sup>	226.22
Barometric Pressure Correction Factor	0.950
Dry Gas Meter Calibration Factors (y factors)	0.975
Dry Gas Meter Temperature Factors	0.986
Dry Gas Meter Delta-H Correction Factors	1.002
Dry Gas Meter STD Volume Sampled, ft <sup>3</sup>	<b>150.357</b>
<b>Dilution Tunnel Flow / Volume</b>	
Standardized Tunnel Flow, dscfm	<b>131.767</b>
Total Tunnel Volume, scf	<b>36894.642</b>
<b>Emission Calculations</b>	Train A
Sample Ratios (Total Tunnel Volume / Total Sample Volume)	245.380
Sample Particulate Mass, mg	20.5
Total Emissions, grams	5.037
Emission-Rate, g/hr	1.08
Adjusted Emission Rates, g/hr	<b>1.94</b>
<b>Operating Parameters</b>	Train A
Max Filter Temperature, °F	147
Post-Test Leak Check, cfm @ in. Hg vac.	0
Average Firebox Surface Temperature delta-T, °F	42.4
Maximum Ambient Temperature, °F	86
Minimum Ambient Temperature, °F	79
<b>Fuel Properties</b>	
Wet Fuel Load Weight, lb.	15.40
Dry-Basis Fuel Load Moisture Content, %	21.71
Wet-Basis Fuel Load Moisture Content, %	17.83

**Run Notes**  
**EPA Methods 28 and 5G-3**

PROJECT / TEST INFORMATION	
Project Number:	G101188983
Manufacturer:	Hearth & Home
Model:	Explorer II
Sample ID Number:	PRT1307021255
Test Date:	14-Sep-13
Test Run Number:	5
Date tunnel cleaned:	9/9/2013
Purpose of Test	Certification



Appliance Information		
Appliance Type:	2	1 - Catalytic 2 - Non - Catalytic 3 - Pellet 4 - Hydronic
Firebox Volume, ft³:	2.3	N/A for pellet type
Convection Blower	2	1 - No Fan 2 - Fan Optional 3 - Fan Standard



Test Settings	
Primary Air:	1.20" from full closed
Secondary Air:	Fixed
Control Board:	NA
Blower/Fan:	Off for entire test, Fan confirmation test
Pre- Burn Activities	
Time	Activity At 50 minutes leveled coal bed.
Start-Up Procedure	
Loading of fuel, sec. :	Loaded by 35 seconds
Fuel-loading door :	Closed by 55 seconds
Primary air:	fully open until 4:55 then set to test setting by 5 minutes
Secondary air:	Fixed
Control board:	NA
Blower / fan:	Off for the entire test
Other Notes	
Timed air activated at 0 minutes	

Test Engineer: BOD

Date: 9/13/13

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

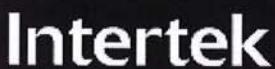
Project Number:	G101188983
Manufacturer:	Hearth & Home
Model:	Explorer II
Sample ID Number:	PRT1307021255
Test Date:	14-Sep-13
Test Run Number:	5

Firebox Volume, ft <sup>3</sup> :	2.3
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Calibration Reference ID		
Set meter to Species 1	12%	12.0
Set Temperature to 70F	22%	22.0
Set pin setting to 444		

PRE-BURN FUEL PROPERTIES					
Eq. ID No.:		Time:	9:15	Temp., °F:	70
Piece No.	Length, In.	Weight, Lb.	Moisture, %, Dry Basis		
1	24.00	2.60	23.8	24.3	24.4
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
Total Weight	2.6	Average, %db	24.2		
Allowable Fuel Load Range: 14.5 to 17.7					
TEST FUEL LOAD PROPERTIES					
Eq. ID No.:		Time:	9:15	Temp., °F:	70
Piece No.	Length, In.	Weight, Lb.	Moisture, %, Dry Basis		
		2x4      4x4			
1	16.50	8.10	20.6	25.2	24.6
2			21.9	23.8	22.7
3			22.4	24.2	24.9
4			18.6	20.2	19.2
5		7.30	20.6	20.5	20.2
6			21.2	19.5	20.4
7					
8					
Totals	8.1	7.3			
% of Weight	53	47			
Total weight, wet, lb.	15.40	Average Moisture, dry	21.71		
Total weight, dry, kg	5.74	Average Moisture, wet	17.83		

Test Engineer: BDRDate: 9/27/13



Project Number: G101188983  
Manufacturer: Hearth & Home  
Model: Explorer II  
Sample ID Number: PRT1307021255  
Test Date: 14-Sep-13  
Test Run Number: 5

## EPA Method 28 Pre Burn Data

Coal Bed Range      3.1      to      3.8

Average Firebox Temp, °F 408.6

Final Coal Bed Wt, lb

Test Engineer: B.D.

Date: 9/27/13



TEST DATA  
EPA METHOD 5G-3

Project Number:	G101188983
Manufacturer:	Hearth & Home
Model:	Explorer II
Sample ID No:	PRT1307021255
Test Date:	14-Sep-13
Test Run No:	5

Temperature Data

Firebox Temp Start	406.2
Firebox Temp End	363.8
Firebox Delta-T	42.4

Max Filter Temps	
Train A	
147	

Interval	10	Duration of Test, Min	280
Time			

Temperature Data

Interval	Duration	Room	Dilution Tunnel	Flue Gas	Firebox Top	Firebox Right	Firebox Left	Firebox Back	Firebox Bottom	Catalyst Outlet	Train A Filter	Impinger Exit	Train A DGM	
0	0	80	95	213	450	384	406	393	398		147	78	74	
1	10	79	132	491	724	354	386	368	379		147	47	74	
2	20	79	146	542	854	347	420	351	390		147	48	74	
3	30	80	135	472	888	367	452	359	401		147	49	75	
4	40	80	125	424	870	382	460	370	402		147	50	75	
5	50	81	124	412	870	387	461	381	396		147	50	75	
6	60	81	122	406	869	398	474	398	388		147	51	76	
7	70	82	117	381	843	415	489	419	378		147	51	77	
8	80	82	114	354	792	424	490	438	372		147	53	77	
9	90	82	109	314	680	432	493	467	368		147	54	78	
10	100	82	107	297	626	436	495	484	365		147	55	78	
11	110	83	105	282	578	439	494	490	363		147	55	78	
12	120	85	105	268	543	440	486	490	364		147	57	75	
13	130	85	104	257	522	438	478	487	363		147	56	75	
14	140	86	104	255	504	435	469	482	362		147	55	75	
15	150	85	103	247	487	431	460	476	360		147	60	75	
16	160	85	103	242	472	425	450	469	356		147	62	76	
17	170	83	102	243	468	420	446	464	353		147	62	76	
18	180	84	102	239	461	409	441	456	350		147	64	76	
19	190	83	101	230	456	403	438	449	350		147	65	75	
20	200	84	101	226	453	396	433	438	352		147	55	75	
21	210	83	101	224	441	389	425	427	351		147	55	75	
22	220	84	102	222	432	382	414	416	345		147	54	75	
23	230	85	103	222	428	379	409	411	341		147	54	75	
24	240	85	103	218	420	375	403	404	335		147	55	75	
25	250	85	103	216	414	372	397	397	329		147	55	75	
26	260	86	103	212	403	368	389	389	324		147	56	75	
27	270	86	103	211	397	364	381	383	319		147	56	75	
28	280	86	103	212	397	357	376	374	315		147	56	75	

Test Engineer: B.D.

Date: 7/23/13



TEST DATA  
EPA METHOD 5G-3

Gas Particulate Sampling Data

Project Number: G101188983  
Manufacturer: Hearth & Home  
Model: Explorer II  
Sample ID Number: PRT1307021255  
Test Date: 14-Sep-13  
Test Run Number: 5

Barometer, In. Hg		RH, %	Sample Box Correction (y) Factors		
Start	28.40		Meter Box (A)	0.975	
End	28.45				
Duration of Test, Min			280		

Leak Check, cfm @ in Hg	
Train A	.008@7

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		-0.034	15.40	15.40	62.000		100.03		0.00
10	0.042	1.00		-0.080	13.70	1.70	67.820		101.46		0.00
20	0.042	1.00		-0.080	11.90	1.80	73.640		102.65		0.00
30	0.042	1.00		-0.074	9.50	2.40	79.510		102.39		0.00
40	0.042	1.00		-0.070	8.00	1.50	85.170		97.90		0.00
50	0.042	1.00		-0.069	6.60	1.40	90.970		100.23		0.00
60	0.042	1.00		-0.064	5.40	1.20	96.840		101.08		0.00
70	0.042	1.00		-0.060	4.40	1.00	102.910		103.88		0.00
80	0.042	1.00		-0.057	3.70	0.70	108.610		97.29		0.00
90	0.042	1.00		-0.050	3.20	0.50	114.500		99.91		0.00
100	0.042	1.00		-0.048	2.80	0.40	120.330		98.72		0.00
110	0.042	1.00		-0.045	2.60	0.20	126.240		99.90		0.00
120	0.042	1.00		-0.042	2.30	0.30	132.050		98.76		0.00
130	0.042	1.00		-0.040	2.10	0.20	137.970		100.54		0.00
140	0.042	1.00		-0.040	2.00	0.10	143.840		99.69		0.00
150	0.042	1.00		-0.040	1.80	0.20	149.720		99.77		0.00
160	0.042	1.00		-0.040	1.70	0.10	155.640		100.26		0.00
170	0.042	1.00		-0.039	1.50	0.20	161.820		104.57		0.00
180	0.042	1.00		-0.036	1.40	0.10	167.680		99.16		0.00
190	0.042	1.00		-0.035	1.20	0.20	173.250		94.34		0.00
200	0.042	1.00		-0.035	1.10	0.10	179.201		100.80		0.00
210	0.042	1.00		-0.035	0.90	0.20	185.150		100.76		0.00
220	0.042	1.00		-0.032	0.80	0.10	191.080		100.53		0.00
230	0.042	1.00		-0.032	0.60	0.20	196.850		97.91		0.00
240	0.042	1.00		-0.031	0.40	0.20	202.820		101.30		0.00
250	0.042	1.00		-0.031	0.30	0.10	208.810		101.64		0.00
260	0.042	1.00		-0.030	0.20	0.10	214.470		96.04		0.00
270	0.042	1.00		-0.030	0.10	0.10	220.350		99.77		0.00
280	0.042	1.00		-0.030	0.00	0.10	226.220		99.60		0.00

Test Engineer: BOD

Date: 9/27/13

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

Project Number: G101188983

Manufacturer: Hearth &amp; Home

Model: Explorer II

Sample ID Number: PRT1307021255

Test Date: 14-Sep-13

Test Run Number: 5

	Dilution Tunnel		Square Root
	Delta P In. H2O	Temp, °F	
A1	0.0280	98	0.1673
A2	0.0380	98	0.1949
A3	0.0380	98	0.1949
A4	0.0300	98	0.1732
A Center	0.0420	98	0.2049
B1	0.0300	98	0.1732
B2	0.0400	98	0.2000
B3	0.0420	98	0.2049
B4	0.0340	98	0.1844
B Center	0.0420	98	0.2049
Averages	0.0364	98	0.1866

Tunnel Diameter **6.000** inchesTunnel Static **-0.302** in. H2OTunnel Area 0.19635 Ft<sup>2</sup>

Pitot Correction 0.9106 factor

Baro. Pressure 28.40

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

Initial Velocity 13.105 Ft/ Sec

Initial Flow **133.07** Ft<sup>3</sup>/minTest Engineer: BDDate: 9/22/13



DILUTION TUNNEL PARTICULATE CALCULATIONS  
EPA Method 5G-3

Project Number: G101188983  
Manufacturer: Hearth & Home  
Model: Explorer II  
Sample ID Number: PRT1307021255  
Test Date: 14-Sep-13  
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	436	751.6	741.4		10.20
REAR FILTER CATCH	FILTER	447	135.8	136.2		-0.40
RINSE OF PROBE &	ACETONE	50	102270.4	102267.2	0.0133	2.53
RINSE OF IMPINGER SET	WATER	235	99042.8	99039.5	0.01	0.95
RINSE OF IMPINGER SET	METHANE	150	97943.6	97938.4	0.0073	4.11
RINSE OF FILTER ASSEMBLY & GAS TRAIN -	ACETONE	80	98325.8	98321.6	0.0133	3.14
					TOTAL:	20.53

CONDENSED WATER

IMPINGERS	WEIGHTS		
	FINAL, g	INITIAL, g	NET, g
1	730.4	704.2	26.20
2	694.7	690.5	4.20
3	611.8	611.1	0.70
4	973.7	945.2	28.50
		TOTAL:	59.60

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: 7/23/13