

Certification Test Report

Hearth & Home Technologies, Inc.

Pellet Stove Insert

Model: Quadra-Fire CB1200i / Classic Bay 1200i

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

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

Test Period: July 31 – August 7, 2014

Report Date: November 2014

Report Number: 0061PN089E

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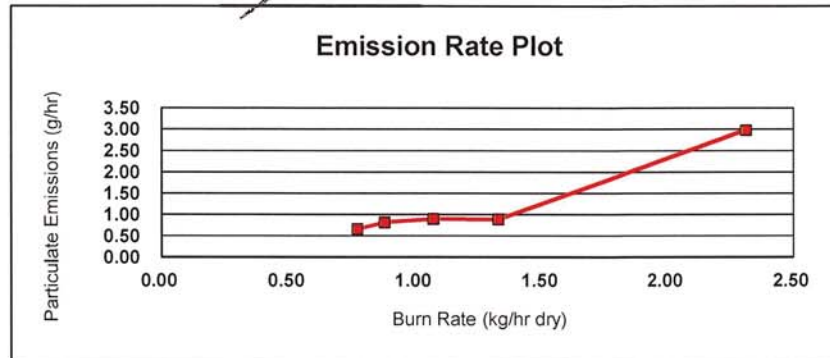


Section 4

Test Data by Run

EPA Weighted Average Emissions EPA Method 28

Client: Hearth & Home Techn Status: Final
 Stove Model: CB 1200i Stove Type: Pellet Stove
 Test Dates: 7/31/14 - 8/7/14
 Project Number: 0061PN089L
 Tracking Number: 1995
 Signature/Date: *[Signature]* 11/24/14

**Weighted Average
(g/hr)
1.3**


Run #	6		Run #	5	
Burn Rate (dry kg/hr)	0.77		Burn Rate (dry kg/hr)	2.31	
Category	1		Category	4	
Overall Efficiency (%)	78%		Overall Efficiency (%)	78%	
Emissions (g/hr)	0.66		Emissions (g/hr)	2.98	
Cap (g/hr)	15.00		Cap (g/hr)	18.00	
Weighting Factor	0.272	15.59%	Weighting Factor	0.366	20.97%
Heat Output (BTU/hr)	11526		Heat Output (BTU/hr)	34577	

Run #	2				
Burn Rate (dry kg/hr)	0.88				
Category	2				
Overall Efficiency (%)	78%				
Emissions (g/hr)	0.82				
Cap (g/hr)	15.00				
Weighting Factor	0.229	13.12%			
Heat Output (BTU/hr)	13127				

Run #	3				
Burn Rate (dry kg/hr)	1.07				
Category	2				
Overall Efficiency (%)	78%				
Emissions (g/hr)	0.90				
Cap (g/hr)	15.00				
Weighting Factor	0.361	20.67%			
Heat Output (BTU/hr)	16008				

Run #	4				
Burn Rate (dry kg/hr)	1.33				
Category	3				
Overall Efficiency (%)	78%				
Emissions (g/hr)	0.89				
Cap (g/hr)	15.00				
Weighting Factor	0.518	29.65%			
Heat Output (BTU/hr)	19850				

Model: CB1200i
Hearth & Home Technologies, Inc.
1445 North Highway
Colville, WA 99114

Run 1

★ Note: Fire went out at ≈ 80 min
elapsed test time. Run invalid.

Run Notes

Client: Hearth and Home TechnologiesModel: CB1200iProject #: 0061PN089ETracking #: 1995Run #: 1 Date: 7/31/2014Test Crew: J. ClarkOMNI Equipment ID #(s): 1, 23, 128, 131, 132, 209, 2838, 185, 296-T57, 335, 336, 343, 410, 417, 443

PREBURN

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

PRIMARY:

Control board setting: 1
Frap : 2" mark
Toggle switch : Low

SECONDARY: AutoTERTIARY: AutoFAN: Auto

PREBURN SETTINGS AND ACTIVITIES

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

TEST

TEST FUEL CONFIGURATION SKETCH
(INDICATE VIEW ANGLE)

N/A pellet fuel

START UP PROCEDURES

BYPASS: N/A
FUEL LOADING: Auto
DOOR: N/A
PRIMARY AIR: Auto

OTHER: N/A

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

PRIMARY:

Same as above

SECONDARY: AutoTERTIARY: AutoFAN: AutoTechnician signature: Date: 7/31/14

Supplemental Data EPA 5G/5H

Client: Hearth and Home Technologies

Model: CB1200i

Project #: 0061PN089E

Tracking #: 1995

Date: 7/31/2014 Run #: 1 Booth: E1

Test Crew: J. Clark Start Time: 9:05 Stop Time: 11:05

OMNI Equipment #(s): 1, 23, 128, 131, 132, 185, 209, 283B, 296-757, 335, 336, 343, 410, 417, 443

Stack Gas Leak Check:

Initial: Ø

Final: N/A

Dilution Tunnel Gas Leak Check (5H only):

Initial: N/A

Final: N/A

Calibrations: Span Gas CO₂: 16.80 O₂: N/A CO: 4.295 CO₂ (DT): N/A
Mid Gas CO₂: 24.9867 O₂: N/A CO: 2.493 CO₂ (DT): N/A

	Pre Test			Post Test		
	Zero	Span	Mid	Zero	Span	Mid
Time	7:50	7:53	7:56	N/A		
O ₂	N/A					
CO ₂	0.00	16.80	10.54	N/A		
CO	0.000	4.295	2.551	N/A		
CO ₂ (DT)	N/A					

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

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

Pitot Tube Leak Test: Initial: Ø Final: J

Stack Diameter (inches): 6"

Induced Draft: Ø

% Smoke Capture: 100%

Flue Pipe Cleaned Prior to First Test in Series:

Date: 7/30/14 Initials: JC

	Initial	Middle	Ending
P _b (in/Hg)	30.13	30.12	N/A
Ambient (°F)	76	77	↓

Tunnel Traverse	
dP (in H ₂ O)	T(°F)
0.028	166
0.036	105
0.040	↓
0.034	↓
0.034	↓
0.042	↓
0.039	↓
0.028	↓
N/A	N/A
↓	↓
Static P:	-0.517

Technician signature: [Signature]

Date: 7/31/14

Model: CB1200i
Hearth & Home Technologies, Inc.
1445 North Highway
Colville, WA 99114

Run 2

Wood Heater Test Data - EPA Method 5G

Manufacturer: Hearth and Home Technologies
 Model: CB1200i
 Project No.: 0061PN089E
 Tracking No.: 1995
 Run: 2
 Test Date: 07/31/14

Burn Rate	0.88 kg/hr dry
Average Tunnel Temperature	111 degrees Fahrenheit
Average Gas Velocity in Dilution Tunnel - vs	12.6 feet/second
Average Gas Flow Rate in Dilution Tunnel - Qsd	7930.8 dscf/hour
Average Delta p	0.033 inches H2O
Average Delta H	0.91 inches H2O
Total Time of Test	120 minutes

	AVERAGE	SAMPLE TRAIN 1	SAMPLE TRAIN 2
Total Sample Volume - Vm	16.94 cubic feet	16.64 cubic feet	17.23 cubic feet
Average Gas Meter Temperature	92 degrees Fahrenheit	92 degrees Fahrenheit	91 degrees Fahrenheit
Total Sample Volume (Standard Conditions) - Vmstd	16.5 dscf	16.2 dscf	16.9 dscf
Total Particulates - mn		0.7 mg	0.9 mg
Particulate Concentration (dry-standard)	0.00005 grams/dscf	0.00004 grams/dscf	0.00005 grams/dscf
Particulate Emission Rate	0.38 grams/hour	0.34 grams/hour	0.42 grams/hour
Adjusted Emissions	0.82 grams/hour	0.75 grams/hour	0.89 grams/hour
Difference from Average		0.07 grams/hour	0.07 grams/hour
7.5% of the average emission rate	0.06		
Weighted Average Emission Rate Limit	4.10 grams/hour		
7.5% of the weighted average emission rate limit	0.31		
Results Are Acceptable			

Wood Heater Test Data - EPA Method 5G

Run:	2
Manufacturer:	Hearth and Home Technologies
Model:	CB12001
Tracking No.:	1995
Project No.:	0001PN089E
Test Date:	31-Jul-14
Beginning Clock Time:	12:23
Recording Interval:	10 min
Total Sampling Time:	120 min

Velocity Traverse Data									
	Pr.1	Pr.2	Pr.3	Pr.4	Pr.5	Pr.6	Pr.7	Pr.8	
Initial dP	0.026	0.038	0.038	0.030	0.030	0.040	0.034	0.030	0.030
Initial Temp.	108	108	108	108	108	108	108	108	108

PM Control Module:	N/A
Dilution Tunnel MW (dry):	29.00 lb-bone
Dilution Tunnel MW (wet):	28.56 lb-bone
Dilution Tunnel H ₂ O:	4.00 percent
Dilution Tunnel Sulfate:	-0.496 %H ₂ O
Prior Tube Cp:	0.99
Meter Box Y Factor:	1.014
Barometric Pressure:	30.10
	30.09
	30.06

Signature/Date:	11/24/14
Tunnel Velocity:	12.59 ft/sec
Initial Tunnel Flow:	132.2 scfm
Average Tunnel Flow:	132.2 scfm
Tunnel Area:	0.1983 ft ²
Post-Test Leak Check (1):	0.0000g-6 cfm@1"Hg
Post-Test Leak Check (2):	0.0000g-5.5 cfm@1"Hg
Fuel Moisture (dry basis %):	5.98
Total Particulate (1):	0.7
Total Particulate (2):	0.9

OMNI Equipment Numbers: OMNI-00001, OMNI-00023, OMNI-00128, OMNI-00131, OMNI-00132, OMNI-00185, OMNI-00209, OMNI-283B, OMNI-00335, OMNI-00336, OMNI-00343, OMNI-00410, OMNI-00417, OMNI-00443

Elapsed Time	Particulate Sampling Data						Fuel Weight, lb	Wood Heater Temperature Data, of						Stack														
	Gas Meter Cubic Feet (1)	Gas Meter Cubic Feet (2)	Sample Rate, cfm (1)	Sample Rate, cfm (2)	Orifice dH (1)	Orifice dH (2)		Meter Vac. In. Hg. (1)	Meter Vac. In. Hg. (2)	Dilution Tunnel dP	Pro. Rate (10%) (1)	Pro. Rate (10%) (2)	Weight Scale Reading		Change	Firebox Top	Firebox Bottom	Firebox Back	Firebox Left	Firebox Right	Catalyst Exit	Average Surface	Stack (1)	Filter (2)	Impinger ext (1)	Impinger ext (2)	Ambient	
0	0.000	0.000			0.60	0.57	85	86	1.27	1	108	0.033	101	101	3.8	-0.3	172	342	93	239	362	241.4	237	80	80	N/A	81	-0.666
10	1.383	1.431	0.14	0.14	0.96	0.84	86	86	1.28	1	109	0.033	101	101	3.8	-0.3	172	342	93	239	361	241.4	253	83	83		82	-0.065
20	2.766	2.861	0.14	0.14	0.95	0.83	87	87	1.27	1	109	0.033	101	101	3.4	-0.4	175	344	94	236	369	243.6	253	85	84		82	-0.066
30	4.148	4.292	0.14	0.14	0.94	0.83	89	89	1.28	1	110	0.033	101	101	3.1	-0.3	174	343	94	237	365	242.6	252	85	85		82	-0.066
40	5.531	5.726	0.14	0.14	0.94	0.84	90	90	1.28	1	110	0.033	100	101	2.8	-0.3	171	340	94	234	369	241.6	249	86	85		82	-0.066
50	6.915	7.162	0.14	0.14	0.94	0.84	92	91	1.29	1	111	0.033	100	101	2.4	-0.4	175	343	95	237	369	243.8	251	86	86		83	-0.065
60	8.302	8.598	0.14	0.14	0.93	0.84	93	92	1.28	1	112	0.033	101	101	2.1	-0.3	180	349	95	243	372	247.8	258	87	86		83	-0.067
70	9.689	10.035	0.14	0.14	0.94	0.84	94	93	1.29	1	112	0.033	101	101	1.7	-0.4	182	356	96	247	380	252.2	264	86	86		83	-0.068
80	11.079	11.475	0.14	0.14	0.93	0.84	95	94	1.28	1	112	0.033	101	101	1.4	-0.3	180	355	96	246	369	249.2	262	85	85		83	-0.067
90	12.468	12.914	0.14	0.14	0.94	0.84	95	95	1.28	1	113	0.033	101	100	1.0	-0.4	183	355	97	248	379	252.4	263	86	85		84	-0.066
100	13.859	14.354	0.14	0.14	0.93	0.83	96	95	1.28	1	113	0.033	101	101	0.7	-0.3	179	356	97	245	376	250.6	258	86	85		84	-0.066
110	15.248	15.794	0.14	0.14	0.93	0.83	96	95	1.29	1	112	0.033	100	100	0.3	-0.4	176	352	97	239	364	245.6	253	86	85		85	-0.065
120	16.638	17.234	0.14	0.14	0.93	0.83	97	96	1.29	1	113	0.033	100	100	0.0	-0.3	178	347	98	238	365	245.2	256	87	86		85	-0.067
Avg/Total	16.638	17.234	0.14	0.14	0.91	0.82	91.92	91.46		111.00	0.033	100.60	100.71								4		85.23	84.69	#DIV/0!	#DIV/0!		-0.066

Run Notes

Client: Hearth and Home TechnologiesModel: CB1200iProject #: 0061PN089ETracking #: 1995Run #: 2 Date: 7/31/2014Test Crew: J. ClarkOMNI Equipment ID #(s): 1, 23, 128, 131, 132, 209, 25838, 185, 296-T57, 335, 336, 343, 410, 417, 443

PREBURN

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

PRIMARY:

Control board : 1
 Frap : 1 1/2 "
 Toggle switch : low
 Based on manufacturer's revised
 suggestions 7/31/14.

SECONDARY:

Auto

TERTIARY:

FAN:

PREBURN SETTINGS AND ACTIVITIES

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

TEST

TEST FUEL CONFIGURATION SKETCH
(INDICATE VIEW ANGLE)

N/A - pellets

START UP PROCEDURES

BYPASS: N/A
 FUEL LOADING: Auto
 DOOR: N/A
 PRIMARY AIR: Auto
 OTHER: N/A

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

PRIMARY:

Same as above

SECONDARY:

Auto

TERTIARY:

FAN:

Technician signature: [Signature]Date: 7/31/14

Supplemental Data EPA 5G/5H

Client: Hearth and Home Technologies

Model: CB1200i

Project #: 0061PN089E

Tracking #: 1995

Date: 7/31/2014 Run #: 2 Booth: E1

Test Crew: J. Clark Start Time: 12:23 Stop Time: 14:23

OMNI Equipment #(s): 1, 23, 128, 131, 132, 185, 209, 283B, 296-T57, 335, 336, 43, 410, 417, 443

Stack Gas Leak Check:

Dilution Tunnel Gas Leak Check (5H only):

Initial: Ø

Initial: N/A

Final: Ø

Final: N/A

Calibrations: Span Gas CO₂: 16.80 O₂: N/A CO: 4.295 CO₂ (DT): N/A
Mid Gas CO₂: 9.867 O₂: N/A CO: 2.493 CO₂ (DT): N/A

Time	Pre Test			Post Test		
	Zero	Span	Mid	Zero	Span	Mid
	11:07	11:10	11:16	14:35	14:39	14:43
O ₂	N/A					→
CO ₂	0.00	16.80	10.88	0.46	16.95	10.68
CO	0.000	4.295	2.698	-0.011	4.318	2.685
CO ₂ (DT)	N/A					→

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

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

Pitot Tube Leak Test: Initial: Ø Final: Ø

Stack Diameter (inches): 6"

Induced Draft: Ø

% Smoke Capture: 100%

Flue Pipe Cleaned Prior to First Test in Series:

Date: 7/30/14 Initials: AC

	Initial	Middle	Ending
P _b (in/Hg)	30.10	30.09	30.06
Ambient (°F)	80	83	85

Tunnel Traverse	
dP (in H ₂ O)	T (°F)
0.026	108
0.038	↓
0.038	↓
0.030	↓
0.030	↓
0.040	↓
0.034	↓
0.030	↓
N/A	N/A
↓	↓
Static P:	-0.496

Technician signature: [Signature]

Date: 7/31/14

Model: CB1200i
Hearth & Home Technologies, Inc.
1445 North Highway
Colville, WA 99114

Run 3

Wood Heater Test Data - EPA Method 5G

Manufacturer: Hearth and Home Technologies
 Model: CB1200i
 Project No.: 0061PN089E
 Tracking No.: 1995
 Run: 3
 Test Date: 08/01/14

Burn Rate	1.07 kg/hr dry
Average Tunnel Temperature	109 degrees Fahrenheit
Average Gas Velocity in Dilution Tunnel - vs	13.1 feet/second
Average Gas Flow Rate in Dilution Tunnel - Qsd	8289.3 dscf/hour
Average Delta p	0.036 inches H2O
Average Delta H	0.89 inches H2O
Total Time of Test	120 minutes

	AVERAGE	SAMPLE TRAIN 1	SAMPLE TRAIN 2
Total Sample Volume - Vm	16.78 cubic feet	16.64 cubic feet	16.92 cubic feet
Average Gas Meter Temperature	87 degrees Fahrenheit	87 degrees Fahrenheit	87 degrees Fahrenheit
Total Sample Volume (Standard Conditions) - Vmstd	16.5 dscf	16.3 dscf	16.7 dscf
Total Particulates - mn		0.9 mg	0.8 mg
Particulate Concentration (dry-standard)	0.00005 grams/dscf	0.00006 grams/dscf	0.00005 grams/dscf
Particulate Emission Rate	0.43 grams/hour	0.46 grams/hour	0.40 grams/hour
Adjusted Emissions	0.90 grams/hour	0.95 grams/hour	0.85 grams/hour
Difference from Average		0.05 grams/hour	0.05 grams/hour
7.5% of the average emission rate	0.07		
Weighted Average Emission Rate Limit	4.10 grams/hour		
7.5% of the weighted average emission rate limit	0.31		
Results Are Acceptable			

Wood Heater Test Data - EPA Method 5G

Run:	3
Manufacturer:	Hearth and Home Technologies
Model:	CB12001
Tracking No.:	1995
Project No.:	0061PN089E
Test Date:	01-Aug-14
Beginning Clock Time:	08:56
Recording Interval:	10 min.
Total Sampling Time:	120 min.

Velocity Traverse Data									
	Pt.1	Pt.2	Pt.3	Pt.4	Pt.5	Pt.6	Pt.7	Pt.8	
Initial dp	0.032	0.040	0.040	0.034	0.036	0.040	0.040	0.028	1120
Initial Temp.	110	110	110	110	110	110	110	110	of

OMNI Equipment Numbers: OMNI-00001, OMNI-00023, OMNI-00128, OMNI-00131, OMNI-00132, OMNI-00185, OMNI-00209, OMNI-283B, OMNI-00296-T57, OMNI-00335, OMNI-00343, OMNI-00343, OMNI-00410, OMNI-00417, OMNI-00443

PM Control Module: N/A
 Dilution Tunnel MW(dry): 29.00 lb-boneole
 Dilution Tunnel MW(wet): 28.56 lb-boneole
 Dilution Tunnel H2O: 4.00 percent
 Dilution Tunnel State: -0.515 °H2O
 Prior Tube Cp: 0.99
 Meter Box Y Factor: 1.014
 Barometric Pressure: 30.06 Middle 30.04 End 30.06

Signature/Dat: 11/24/14
 Tunnel Velocity: 13.13 ft/sec.
 Initial Tunnel Flow: 137.8 scfm
 Average Tunnel Flow: 138.2 scfm
 Tunnel Area: 0.1983 ft²
 Post-Test Leak Check (1): 0.00005 cfm/Hg
 Post-Test Leak Check (2): 0.00005 cfm/Hg
 Fuel Moisture (dry basis %): 5.98
 Total Particulate (1): 0.9
 Total Particulate (2): 0.8

Particulate Sampling Data									
Elapsed Time	Gas Meter Cubic Feet (1)	Gas Meter Cubic Feet (2)	Sample Rate, cfm (1)	Sample Rate, cfm (2)	Orifice dh (1)	Orifice dh (2)	Meter oF (1)	Meter oF (2)	Meter Vac. In. Hg. (1)
0	0.000	0.000			0.17	0.18	82	82	1.26
10	1.380	1.399	0.14	0.14	0.96	0.81	82	83	1.28
20	2.762	2.804	0.14	0.14	0.95	0.81	84	84	1.27
30	4.142	4.209	0.14	0.14	0.95	0.81	85	85	1.27
40	5.526	5.616	0.14	0.14	0.95	0.81	86	86	1.28
50	6.912	7.026	0.14	0.14	0.95	0.81	87	87	1.28
60	8.297	8.437	0.14	0.14	0.95	0.80	88	88	1.28
70	9.686	9.849	0.14	0.14	0.95	0.81	88	88	1.28
80	11.074	11.263	0.14	0.14	0.95	0.81	89	89	1.28
90	12.464	12.677	0.14	0.14	0.95	0.81	89	89	1.28
100	13.855	14.092	0.14	0.14	0.95	0.81	89	89	1.29
110	15.246	15.507	0.14	0.14	0.95	0.81	89	90	1.28
120	16.637	16.922	0.14	0.14	0.95	0.81	90	90	1.29
Avg/Total	16.637	16.922	0.14	0.14	0.89	0.76	86.77	86.92	

Fuel Weight, lb									
	Firbox Top	Firbox Bottom	Firbox Back	Firbox Left	Firbox Right	Catalyst Exit	Average Surface	Stack	Filter (1)
0	190	399	93	279	395	N/A	271.2	281	77
10	194	402	93	280	402		274.2	283	79
20	196	400	94	283	409		276.4	289	80
30	198	412	94	292	419		283.0	291	80
40	200	413	95	292	423		284.6	293	80
50	194	409	95	293	418		279.8	286	80
60	195	409	95	285	417		280.2	288	80
70	192	403	96	281	419		278.2	284	81
80	189	393	96	275	398		270.2	281	80
90	188	394	96	271	411		272.0	278	80
100	191	399	96	274	406		273.2	281	80
110	192	400	97	277	409		275.0	284	81
120	189	395	96	272	404		271.2	282	81
Avg/Total							0		79.85

Wood Heater Temperature Data, of									
	Filter (1)	Filter (2)	Impinger ext (1)	Impinger ext (2)	Ambient	Drift In. H2O	Stack	Filter (1)	Filter (2)
0	77	78	N/A	N/A	78	-0.072	281	77	78
10	79	80			77	-0.073	283	79	80
20	80	80			77	-0.074	289	80	80
30	80	80			77	-0.074	291	80	80
40	80	80			78	-0.074	293	80	80
50	80	80			77	-0.074	286	80	80
60	80	80			78	-0.073	288	80	80
70	81	81			78	-0.072	284	80	81
80	80	80			77	-0.071	281	80	80
90	81	81			78	-0.071	278	80	81
100	81	81			77	-0.072	281	80	81
110	81	81			78	-0.072	284	81	81
120	81	81			78	-0.072	282	81	81
Avg/Total	79.85	80.23	#DIV/0!	#DIV/0!	78	-0.072			

Run Notes

Client: Hearth and Home TechnologiesModel: CB1200iProject #: 0061PN089ETracking #: 1995Run #: 3 Date: 8/1/2014Test Crew: J. ClarkOMNI Equipment ID #(s): 1, 23, 128, 131, 132, 185, 209, 283B, 296-T57, 335, 336, 343, 410, 417, 443PREBURNDESCRIBE OR SKETCH AIR OR THERMOMSTAT SETTINGS BELOW:
(SETTINGS MUST BE ACCURATE AND REPRODUCIBLE)

PRIMARY:

Control board : 2
Frap : 1"
Toggle switch : Low

SECONDARY: Auto

TERTIARY:

FAN:

PREBURN SETTINGS AND ACTIVITIES

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

TESTTEST FUEL CONFIGURATION SKETCH
(INDICATE VIEW ANGLE)

N/A - pellets

START UP PROCEDURES

BYPASS: N/AFUEL LOADING: AutoDOOR: N/APRIMARY AIR: AutoOTHER: N/ADESCRIBE OR SKETCH TEST SETTINGS BELOW:
(SETTINGS MUST BE ACCURATE AND REPRODUCIBLE)

PRIMARY:

Same as above

SECONDARY: Auto

TERTIARY:

FAN:

Technician signature: [Signature] Date: 8/1/14

Supplemental Data EPA 5G/5H

Client: Hearth and Home Technologies

Model: CB1200i

Project #: 0061PN089E

Tracking #: 1995

Date: 7/31/14 Run #: 3 Booth: E1

Test Crew: J. Clark Start Time: 8:56 Stop Time: 10:56

OMNI Equipment #(s): 1, 23, 128, 131, 132, 185, 209, 283B, 296-T57, 335, 336, 343, 410, 417, 443

Stack Gas Leak Check:

Initial: Ø

Final: Ø

Dilution Tunnel Gas Leak Check (5H only):

Initial: N/A

Final: N/A

Calibrations: Span Gas CO₂: 16.80 O₂: N/A CO: 4.295 CO₂ (DT): N/A
Mid Gas CO₂: 9.867 O₂: N/A CO: 2.493 CO₂ (DT): N/A

Time	Pre Test			Post Test		
	Zero	Span	Mid	Zero	Span	Mid
	<u>7:55</u>	<u>7:57</u>	<u>7:59</u>	<u>11:01</u>	<u>11:04</u>	<u>11:07</u>
O ₂	<u>N/A</u>					
CO ₂	<u>0.00</u>	<u>16.80</u>	<u>10.01</u>	<u>-0.01</u>	<u>16.76</u>	<u>10.00</u>
CO	<u>0.000</u>	<u>4.295</u>	<u>2.474</u>	<u>0.001</u>	<u>4.317</u>	<u>2.497</u>
CO ₂ (DT)	<u>N/A</u>					

Air Velocity (ft/min): Initial: 250 Final: 250

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

Pitot Tube Leak Test: Initial: Ø Final: Ø

Stack Diameter (inches): 6"

Induced Draft: Ø

% Smoke Capture: 100%

Flue Pipe Cleaned Prior to First Test in Series:

Date: 7/30/14 Initials: JC

	Initial	Middle	Ending
P _b (in/Hg)	<u>30.06</u>	<u>30.04</u>	<u>30.06</u>
Ambient (°F)	<u>78</u>	<u>77</u>	<u>78</u>

Technician signature: [Signature]

Date: 8/1/14

Tunnel Traverse	
dP (in H ₂ O)	T (°F)
<u>0.032</u>	<u>110</u>
<u>0.040</u>	
<u>0.040</u>	
<u>0.034</u>	
<u>0.036</u>	
<u>0.040</u>	
<u>0.040</u>	
<u>0.028</u>	
<u>N/A</u>	<u>N/A</u>
Static P:	<u>-0.515</u>

Model: CB1200i
Hearth & Home Technologies, Inc.
1445 North Highway
Colville, WA 99114

Run 4

Wood Heater Test Data - EPA Method 5G

Manufacturer: Hearth and Home Technologies
 Model: CB1200i
 Project No.: 0061PN089E
 Tracking No.: 1995
 Run: 4
 Test Date: 08/01/14

Burn Rate	1.33 kg/hr dry
Average Tunnel Temperature	120 degrees Fahrenheit
Average Gas Velocity in Dilution Tunnel - vs	13.2 feet/second
Average Gas Flow Rate in Dilution Tunnel - Qsd	8148.0 dscf/hour
Average Delta p	0.036 inches H2O
Average Delta H	0.90 inches H2O
Total Time of Test	120 minutes

	AVERAGE	SAMPLE TRAIN 1	SAMPLE TRAIN 2
Total Sample Volume - Vm	16.75 cubic feet	16.59 cubic feet	16.91 cubic feet
Average Gas Meter Temperature	92 degrees Fahrenheit	92 degrees Fahrenheit	92 degrees Fahrenheit
Total Sample Volume (Standard Conditions) - Vmstd	16.3 dscf	16.1 dscf	16.5 dscf
Total Particulates - mn		0.7 mg	1 mg
Particulate Concentration (dry-standard)	0.00005 grams/dscf	0.00004 grams/dscf	0.00006 grams/dscf
Particulate Emission Rate	0.42 grams/hour	0.35 grams/hour	0.49 grams/hour
Adjusted Emissions	0.89 grams/hour	0.77 grams/hour	1.01 grams/hour
Difference from Average		0.12 grams/hour	0.12 grams/hour
7.5% of the average emission rate	0.07		
Weighted Average Emission Rate Limit	4.10 grams/hour		
7.5% of the weighted average emission rate limit	0.31		
Results Are Acceptable			

Wood Heater Test Data - EPA Method 5G

Run:	4
Manufacturer:	Hearth and Home Technologies
Model:	CB12001
Tracking No.:	1995
Project No.:	0061PNU099E
Test Date:	01-Aug-14
Beginning Clock Time:	12:29
Recording Interval:	10 min.
Total Sampling Time:	120 min.

Velocity Traverse Data									
	Pr.1	Pr.2	Pr.3	Pr.4	Pr.5	Pr.6	Pr.7	Pr.8	
Initial dP	0.028	0.040	0.040	0.036	0.034	0.042	0.038	0.028	H ₂ O
Initial Temp.	118	118	118	118	118	118	117	117	oF

OMNI Equipment Numbers: OMNI-00001, OMNI-00023, OMNI-00128, OMNI-00131, OMNI-00132, OMNI-00185, OMNI-00209, OMNI-283R, OMNI-00296-757, OMNI-00335, OMNI-00336, OMNI-00343, OMNI-00410, OMNI-00417, OMNI-00443

PM Control Module: N/A
 Dilution Tunnel MW(dry): 29.00 lb/b-nole
 Dilution Tunnel MW(wet): 28.56 lb/b-nole
 Dilution Tunnel H₂O: 4.00 percent
 Dilution Tunnel Sulfate: -0.523 %H₂O
 Prior Tube Cp: 0.99
 Meter Box Y Factor: 1.014
 Barometric Pressure: Begin Middle End Average
 30.03 30.02 30.02 30.02
 Signature: Date: 11/24/14
 Tunnel Velocity: 13.17 ft/sec
 Initial Tunnel Flow: 135.8 scfm
 Average Tunnel Flow: 135.8 scfm
 Tunnel Area: 0.1963 ft²
 Post-Test Leak Check (1): 0.0026g5 cfm/g³Hg
 Post-Test Leak Check (2): 0.0000g5 cfm/g³Hg
 Fuel Moisture (dry basis %): 5.98
 Total Particulate (1): 0.7
 Total Particulate (2): 1.0

Particulate Sampling Data									
Elapsed Time	Gas Meter Cubic Feet (1)	Gas Meter Cubic Feet (2)	Sample Rate, cfm (1)	Sample Rate, cfm (2)	Orifice dH (1)	Orifice dH (2)	Meter oF (1)	Meter oF (2)	Meter Vac. In. Hg. (1)
0	0.000	0.000			0.51	0.58	85	86	1.25
10	1.374	1.403	0.14	0.14	0.95	0.81	86	86	1.28
20	2.755	2.806	0.14	0.14	0.94	0.80	87	87	1.29
30	4.133	4.209	0.14	0.14	0.94	0.80	89	89	1.28
40	5.513	5.613	0.14	0.14	0.94	0.80	90	91	1.29
50	6.894	7.020	0.14	0.14	0.94	0.80	92	92	1.29
60	8.277	8.429	0.14	0.14	0.94	0.80	93	93	1.28
70	9.662	9.839	0.14	0.14	0.93	0.80	94	94	1.29
80	11.046	11.251	0.14	0.14	0.93	0.80	95	94	1.29
90	12.433	12.663	0.14	0.14	0.93	0.80	95	95	1.3
100	13.820	14.077	0.14	0.14	0.93	0.80	96	96	1.29
110	15.206	15.491	0.14	0.14	0.93	0.81	96	96	1.29
120	16.593	16.906	0.14	0.14	0.92	0.81	97	96	1.29
Avg/Total	16.593	16.906	0.14	0.14	0.90	0.79	91.92	91.92	

Fuel Weight, lb									
	Firbox Top	Firbox Bottom	Firbox Back	Firbox Left	Firbox Right	Catalyst Exit	Average Surface	Stack	Drift In. H ₂ O
0	226	436	99	334	453	N/A	309.6	321	81
10	228	450	99	342	465		316.8	322	83
20	224	447	99	337	466		314.6	321	84
30	227	451	100	339	460		315.4	323	86
40	229	456	100	342	465		318.4	324	87
50	231	447	101	327	454		310.0	315	87
60	229	447	101	332	463		314.4	322	88
70	227	449	102	333	462		314.6	321	88
80	234	453	102	338	465		318.4	325	89
90	239	459	102	344	474		323.6	329	89
100	243	466	103	352	483		329.4	333	90
110	244	471	103	354	485		331.4	337	90
120	238	467	104	345	486		328.0	333	90
Avg/Total	238	467	104	345	486		328.0	333	90

Wood Heater Temperature Data, oF									
	Filter (1)	Filter (2)	Impinger ext (1)	Impinger ext (2)	Ambient	Stack	Drift In. H ₂ O		
0	79	80	N/A	N/A	81	81	-0.078		
10	83	83			81	81	-0.077		
20	84	85			82	82	-0.077		
30	86	86			83	83	-0.076		
40	87	87			83	83	-0.075		
50	87	87			84	84	-0.074		
60	88	88			84	84	-0.075		
70	88	88			85	85	-0.076		
80	89	89			85	85	-0.076		
90	89	89			86	86	-0.077		
100	90	90			86	86	-0.077		
110	90	90			85	85	-0.077		
120	90	90			85	85	-0.077		
Avg/Total	86.92	87.00	#DIV/0!	#DIV/0!		18			

Run Notes

Client: Hearth and Home TechnologiesModel: CB1200iProject #: 0061PN089ETracking #: 1995Run #: 4 Date: 8/1/2014Test Crew: J. ClarkOMNI Equipment ID #(s): 1, 23, 128, 131, 132, 185, 209, 2838, 296-T57, 335, 336, 343, 410, 417, 443PREBURNDESCRIBE OR SKETCH AIR OR THERMOMSTAT SETTINGS BELOW:
(SETTINGS MUST BE ACCURATE AND REPRODUCIBLE)

PRIMARY:

Control board: 2
Frap : fully open
Toggle switch : Low

SECONDARY:

Auto

TERTIARY:

FAN:

PREBURN SETTINGS AND ACTIVITIES

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

TESTTEST FUEL CONFIGURATION SKETCH
(INDICATE VIEW ANGLE)

N/A - pellets

START UP PROCEDURES

BYPASS: N/A
FUEL LOADING: Auto
DOOR: N/A
PRIMARY AIR: Auto
OTHER: N/A

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

PRIMARY:

Same as above

SECONDARY:

Auto

TERTIARY:

FAN:

Technician signature: [Signature]Date: 8/1/14

Supplemental Data EPA 5G/5H

Client: Hearth and Home Technologies

Model: CB1200i

Project #: 0061PN089E

Tracking #: 1995

Date: 8/1/2014

Run #: 4

Booth: E1

Test Crew: J. Clark

Start Time: 12:29

Stop Time: 14:29

OMNI Equipment #(s): 1, 23, 128, 131, 132, 185, 209, 2838, 296-T57, 335, 336, 343, 410, 417, 443

Stack Gas Leak Check:

Initial: Ø

Final: Ø

Dilution Tunnel Gas Leak Check (5H only):

Initial: N/A

Final: N/A

Calibrations: Span Gas CO₂: 16.80 O₂: N/A CO: 4.295 CO₂(DT): N/A

Mid Gas CO₂: 9.867 O₂: N/A CO: 2.493 CO₂(DT): N/A

Time	Pre Test			Post Test		
	Zero	Span	Mid	Zero	Span	Mid
	11:10	11:12	11:15	14:35	14:33	14:31
O ₂	N/A					
CO ₂	0.00	16.80	10.01	0.00	16.74	9.90
CO	0.000	4.295	2.476	-0.005	4.253	2.428
CO ₂ (DT)	N/A					

Air Velocity (ft/min): Initial: 250 Final: 250

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

Pitot Tube Leak Test: Initial: Ø Final: Ø

Stack Diameter (inches): 6"

Induced Draft: Ø

% Smoke Capture: 100%

Flue Pipe Cleaned Prior to First Test in Series:

Date: 7/20/14 Initials: JC

	Initial	Middle	Ending
P _b (in/Hg)	30.03	30.02	30.02
Ambient (°F)	81	85	86

Technician signature: [Signature]

Date: 8/1/14

Tunnel Traverse	
dP (in H ₂ O)	T(°F)
0.028	118
0.040	
0.040	
0.036	
0.034	
0.042	
0.038	117
0.028	117
N/A	N/A
Static P:	-0.523

Model: CB1200i
Hearth & Home Technologies, Inc.
1445 North Highway
Colville, WA 99114

Run 5

Wood Heater Test Data - EPA Method 5G

Manufacturer: Hearth and Home Technologies
 Model: CB1200i
 Project No.: 0061PN089E
 Tracking No.: 1995
 Run: 5
 Test Date: 08/04/14

Burn Rate	2.31 kg/hr dry
Average Tunnel Temperature	139 degrees Fahrenheit
Average Gas Velocity in Dilution Tunnel - vs	13.5 feet/second
Average Gas Flow Rate in Dilution Tunnel - Qsd	8106.2 dscf/hour
Average Delta p	0.037 inches H2O
Average Delta H	0.91 inches H2O
Total Time of Test	120 minutes

	AVERAGE	SAMPLE TRAIN 1	SAMPLE TRAIN 2
Total Sample Volume - Vm	16.75 cubic feet	16.59 cubic feet	16.90 cubic feet
Average Gas Meter Temperature	91 degrees Fahrenheit	90 degrees Fahrenheit	91 degrees Fahrenheit
Total Sample Volume (Standard Conditions) - Vmstd	16.3 dscf	16.1 dscf	16.5 dscf
Total Particulates - mn		3.5 mg	3.8 mg
Particulate Concentration (dry-standard)	0.00022 grams/dscf	0.00022 grams/dscf	0.00023 grams/dscf
Particulate Emission Rate	1.81 grams/hour	1.76 grams/hour	1.87 grams/hour
Adjusted Emissions	2.98 grams/hour	2.91 grams/hour	3.05 grams/hour
Difference from Average		0.07 grams/hour	0.07 grams/hour
7.5% of the average emission rate	0.22		
Weighted Average Emission Rate Limit	4.10 grams/hour		
7.5% of the weighted average emission rate limit	0.31		
Results Are Acceptable			

Wood Heater Test Data - EPA Method 5G

Run:	5
Manufacturer:	Hearth and Home Technologies
Model:	CB12000
Tracking No.:	1995
Project No.:	0061PN089E
Test Date:	04-Aug-14
Beginning Check Time:	09:35
Recording Interval:	10 min.
Total Sampling Time:	120 min.

Velocity Traverse Data									
	Pt.1	Pt.2	Pt.3	Pt.4	Pt.5	Pt.6	Pt.7	Pt.8	
Initial dP	0.032	0.040	0.040	0.034	0.034	0.040	0.038	0.034	"H2O
Initial Temp.	135	135	134	134	135	135	135	135	°F

OMNI Equipment Numbers: OMNI-00001, OMNI-00023, OMNI-00128, OMNI-00131, OMNI-00132, OMNI-00185, OMNI-00209, OMNI-283B, OMNI-00335, OMNI-00336, OMNI-00343, OMNI-00410, OMNI-00417, OMNI-00443

PM Control Module:	N/A
Dilution Tunnel MW (dry):	29.00 lb lb-mole
Dilution Tunnel MW (wet):	28.56 lb lb-mole
Dilution Tunnel H2O:	4.00 percent
Dilution Tunnel Sulfate:	-0.517 "H2O
Pilot Tube Cp:	0.99
Meter Box Y Factor:	1.014
Barometric Pressure:	Begin Middle End Average
	30.02 30.02 30.02 30.02 "Hg
	Total Particulate (1): 3.5
	Total Particulate (2): 3.8

Signature/Date:		11/24/14
Tunnel Velocity:	13.52 f/sec.	
Initial Tunnel Flow:	135.4 scfm	
Average Tunnel Flow:	135.1 scfm	
Tunnel Area:	0.1963 ft ²	
Post-Test Leak Check (1):	0.0009±5 cfm/Hg	
Post-Test Leak Check (2):	0.0009±5 cfm/Hg	
Fuel Moisture (dry basis %):	5.98	
Total Particulate (1):	3.5	
Total Particulate (2):	3.8	

Particulate Sampling Data									
Elapsed Time	Gas Meter Cubic Feet (1)	Gas Meter Cubic Feet (2)	Sample Rate, cfm (1)	Sample Rate, cfm (2)	Orifice dH (1)	Orifice dH (2)	Meter oF (1)	Meter oF (2)	Meter Vac. In. Hg. (1)
0	0.000	0.000	0.14	0.14	0.60	0.60	82	84	1.25
10	1.267	1.390	0.14	0.14	0.95	0.80	83	84	1.29
20	2.743	2.790	0.14	0.14	0.94	0.80	85	86	1.29
30	4.119	4.195	0.14	0.14	0.94	0.80	87	88	1.29
40	5.499	5.601	0.14	0.14	0.94	0.81	89	90	1.29
50	6.882	7.011	0.14	0.14	0.94	0.81	91	91	1.29
60	8.267	8.422	0.14	0.14	0.94	0.81	92	93	1.29
70	9.653	9.854	0.14	0.14	0.94	0.81	93	94	1.3
80	11.041	11.248	0.14	0.14	0.93	0.81	93	94	1.3
90	12.429	12.662	0.14	0.14	0.94	0.81	94	95	1.3
100	13.818	14.076	0.14	0.14	0.93	0.80	95	95	1.3
110	15.205	15.489	0.14	0.14	0.94	0.80	95	96	1.3
120	16.593	16.900	0.14	0.14	0.93	0.80	96	96	1.29
Avg/Total	16.593	16.900	0.14	0.14	0.91	0.79	90.38	91.15	

Fuel Weight, lb									
Fuel Weight, lb	Scale Reading	Change	Fuel Weight, lb	Scale Reading	Change	Fuel Weight, lb	Scale Reading	Change	Fuel Weight, lb
0	10.8		10.8			10.8			10.8
10	9.8	-1	9.8			9.8			9.8
20	8.9	-0.9	8.9			8.9			8.9
30	8.0	-0.9	8.0			8.0			8.0
40	7.1	-0.9	7.1			7.1			7.1
50	6.3	-0.8	6.3			6.3			6.3
60	5.4	-0.9	5.4			5.4			5.4
70	4.5	-0.9	4.5			4.5			4.5
80	3.6	-0.9	3.6			3.6			3.6
90	2.8	-0.8	2.8			2.8			2.8
100	1.9	-0.9	1.9			1.9			1.9
110	1.0	-0.9	1.0			1.0			1.0
120	0.0	-1	0.0			0.0			0.0
Avg/Total	100.67		100.67			100.67			100.67

Wood Heater Temperature Data, °F									
Wood Heater Temperature Data, °F	Firebox Top	Firebox Bottom	Firebox Back	Firebox Left	Firebox Right	Caulpot Exit	Average Surface	Stack	Filter (1)
0	269	549	100	437	633	N/A	397.6	396	79
10	274	556	101	444	637		402.4	400	83
20	281	559	102	447	641		406.0	401	85
30	272	556	103	438	640		401.8	398	85
40	272	554	103	439	646		402.8	398	85
50	274	554	104	444	636		402.4	399	85
60	271	552	104	441	628		399.2	397	85
70	280	550	104	452	651		407.4	403	85
80	273	552	105	447	624		400.2	399	85
90	278	551	105	453	643		406.0	403	86
100	281	554	105	455	645		408.0	406	86
110	284	556	106	464	637		409.4	407	87
120	279	554	106	458	639		407.2	405	88
Avg/Total							10		84.92

Stack									
Stack	Filter (1)	Filter (2)	Impinger exit (1)	Impinger exit (2)	Ambient	Draft In. H2O			
0	79	79	N/A	N/A	82	-0.078			
10	83	83			82	-0.077			
20	85	85			83	-0.077			
30	85	86			82	-0.077			
40	85	86			84	-0.077			
50	85	86			84	-0.077			
60	85	86			83	-0.077			
70	85	86			84	-0.077			
80	85	85			84	-0.077			
90	86	85			84	-0.076			
100	86	84			85	-0.077			
110	87	85			85	-0.078			
120	88	86			85	-0.078			
Avg/Total	84.77	84.77	#DIV/0!	#DIV/0!		-0.077			

Run Notes

Client: Hearth and Home TechnologiesModel: CB1200iProject #: 0061PN089ETracking #: 1995Run #: 5Date: 8/4/2014Test Crew: J. ClarkOMNI Equipment ID #(s): 1, 23, 128, 131, 132, 185, 209, 283B, 296-T57, 335, 336, 343, 410, 417, 443

PREBURN

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

PRIMARY:

Control board: 2
Fmp: fully open
Toggle switch: High

SECONDARY: Auto

TERTIARY:

FAN:

PREBURN SETTINGS AND ACTIVITIES

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

TEST

TEST FUEL CONFIGURATION SKETCH
(INDICATE VIEW ANGLE)

N/A - pellets

START UP PROCEDURES

BYPASS: N/A
 FUEL LOADING: Auto
 DOOR: N/A
 PRIMARY AIR: Auto
 OTHER: N/A

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

PRIMARY:

Same as above

SECONDARY: Auto

TERTIARY:

FAN:

Technician signature: [Signature]Date: 8/4/14

Supplemental Data EPA 5G/5H

Client: Hearth and Home Technologies

Model: CB1200j

Project #: 0061PN089E

Tracking #: 1995

Date: 8/4/2014 Run #: 5 Booth: E1

Test Crew: J. Clark Start Time: 9:35 Stop Time: 11:35

OMNI Equipment #(s): 123, 128, 131, 132, 185, 209, 283B, 296-T57, 335, 336, 343, 410, 417, 443

Stack Gas Leak Check:

Initial: Ø

Final: Ø

Dilution Tunnel Gas Leak Check (5H only):

Initial: N/A

Final: N/A

Calibrations: Span Gas CO₂: 16.80 O₂: N/A CO: 4.295 CO₂(DT): N/A
Mid Gas CO₂: 9.867 O₂: N/A CO: 2.493 CO₂(DT): N/A

Time	Pre Test			Post Test		
	Zero	Span	Mid	Zero	Span	Mid
	8:32	8:34	8:37	11:35	11:37	11:40
O ₂	N/A					
CO ₂	0.00	16.80	10.05	0.01	16.76	10.03
CO	0.000	4.295	2.480	-0.008	4.270	2.465
CO ₂ (DT)	N/A					

Air Velocity (ft/min): Initial: 250 Final: 250

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

Pitot Tube Leak Test: Initial: Ø Final: Ø

Stack Diameter (inches): 6"

Induced Draft: Ø

% Smoke Capture: 100%

Flue Pipe Cleaned Prior to First Test in Series:

Date: 7/30/14 Initials: JC

	Initial	Middle	Ending
P _b (in/Hg)	30.02	30.02	30.02
Ambient (°F)	81	83	86

Technician signature: [Signature]

Date: 8/4/14

Tunnel Traverse	
dP (in H ₂ O)	T(°F)
0.032	135
0.040	135
0.040	134
0.034	134
0.034	135
0.040	
0.038	
0.034	
N/A	N/A
Static P:	-0.517

Model: CB1200i
Hearth & Home Technologies, Inc.
1445 North Highway
Colville, WA 99114

Run 6

Wood Heater Test Data - EPA Method 5G

Manufacturer: Hearth and Home Technologies
 Model: CB1200i
 Project No.: 0061PN089E
 Tracking No.: 1995
 Run: 6
 Test Date: 08/07/14

Burn Rate	0.77 kg/hr dry
Average Tunnel Temperature	107 degrees Fahrenheit
Average Gas Velocity in Dilution Tunnel - vs	13.9 feet/second
Average Gas Flow Rate in Dilution Tunnel - Qsd	8845.9 dscf/hour
Average Delta p	0.041 inches H2O
Average Delta H	0.93 inches H2O
Total Time of Test	120 minutes

	AVERAGE	SAMPLE TRAIN 1	SAMPLE TRAIN 2
Total Sample Volume - Vm	16.77 cubic feet	16.62 cubic feet	16.93 cubic feet
Average Gas Meter Temperature	87 degrees Fahrenheit	87 degrees Fahrenheit	87 degrees Fahrenheit
Total Sample Volume (Standard Conditions) - Vmstd	16.5 dscf	16.3 dscf	16.7 dscf
Total Particulates - mn		0.6 mg	0.5 mg
Particulate Concentration (dry-standard)	0.00003 grams/dscf	0.00004 grams/dscf	0.00003 grams/dscf
Particulate Emission Rate	0.29 grams/hour	0.33 grams/hour	0.26 grams/hour
Adjusted Emissions	0.66 grams/hour	0.72 grams/hour	0.60 grams/hour
Difference from Average		0.06 grams/hour	0.06 grams/hour
7.5% of the average emission rate	0.05		
Weighted Average Emission Rate Limit	4.10 grams/hour		
7.5% of the weighted average emission rate limit	0.31		
Results Are Acceptable			

Run Notes

Client: Hearth and Home TechnologiesModel: CB1200iProject #: 0061PN089ETracking #: 1995Run #: 6 Date: 8/4/2014^{SC} 8/7/2014Test Crew: J. ClarkOMNI Equipment ID #(s): 1,23,128,131,132,185,209,283B,296-757,335,376,343,410,417,443

PREBURN

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

PRIMARY:

Control board: 1 Frap: 2" mark Toggle switch: Low

SECONDARY: AutoTERTIARY: ↓FAN: ↓

PREBURN SETTINGS AND ACTIVITIES

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

TEST

TEST FUEL CONFIGURATION SKETCH
(INDICATE VIEW ANGLE)

N/A - pellets

START UP PROCEDURES

BYPASS: N/AFUEL LOADING: AutoDOOR: N/APRIMARY AIR: AutoOTHER: N/ADESCRIBE OR SKETCH TEST SETTINGS BELOW:
(SETTINGS MUST BE ACCURATE AND REPRODUCIBLE)

PRIMARY:

Same as above

SECONDARY: AutoTERTIARY: ↓FAN: ↓Technician signature: [Signature]Date: 8/7/14

Supplemental Data EPA 5G/5H

Client: Hearth and Home Technologies

Model: CB1200i

Project #: 0061PN089E

Tracking #: 1995

Date: 8/7/2014 Run #: 6 Booth: E1

Test Crew: Clark Start Time: 12:27 Stop Time: 14:27

OMNI Equipment #(s): 1, 23, 128, 131, 132, 185, 209, 283B, 296-757, 335, 336, 343, 410, 417, 443

Stack Gas Leak Check:

Initial: Ø

Final: Ø

Dilution Tunnel Gas Leak Check (5H only):

Initial: N/A

Final: N/A

Calibrations: Span Gas CO₂: 16.80 O₂: N/A CO: 4.295 CO₂(DT): N/A

Mid Gas CO₂: 9.867 O₂: N/A CO: 2.493 CO₂(DT): N/A

Time	Pre Test			Post Test		
	Zero	Span	Mid	Zero	Span	Mid
	12:10	12:13	12:16	14:29	14:33	14:35
O ₂	N/A					
CO ₂	0.00	16.80	10.09	0.01	16.76	10.04
CO	0.000	4.295	2.484	-0.009	4.258	2.457
CO ₂ (DT)	N/A					

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

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

Pitot Tube Leak Test: Initial: Ø Final: Ø

Stack Diameter (inches): 6"

Induced Draft: Ø

% Smoke Capture: 100%

Flue Pipe Cleaned Prior to First Test in Series:

Date: 7/30/14 Initials: AC

	Initial	Middle	Ending
P _b (in/Hg)	30.15	30.15	30.12
Ambient (°F)	78	79	80

Technician signature: [Signature]

Date: 8/7/14

Tunnel Traverse	
dP (in H ₂ O)	T(°F)
.034	107
.038	107
.046	107
.042	107
.040	107
.046	107
.044	107
.038	107
N/A	N/A
↓	↓
Static P:	-0.501