
Innovative Hearth Products, LLC

Project # 18-480

Model: Montecito-B

AKA: Bainbridge (LV/CF/AR) /

WCT6920 / WCT4920 / WRT4920

Type: Wood Fired Heater

August 13, 2019

**ASTM E3053 Standard Test
Method for Determining Particulate
Matter Emissions from Wood
Heaters Using Cordwood Test Fuel
(EPA ALT-125)**

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Affidavit

PFS-TECO was contracted by Innovative Hearth Products, LLC (IHP) to provide testing services for the Montecito-B Wood-Fired Room Heater per ASTM E3053, *Standard Test Method for Determining Particulate Matter Emissions from Wood Heaters Using Cordwood Test Fuel*, which was approved for use under EPA ALT-125. All testing and associated procedures were conducted at IHP's Auburn, WA Laboratory beginning on 6/18/2019 and ending on 6/19/2019. IHP's Auburn Laboratory is located at 1502 14th St NW, Auburn, WA 98001. Testing procedures followed ASTM E3053 with the exception of caveats described in EPA ALT-125. Particulate sampling was performed per ASTM E2515, *Standard Test Method for Determination of Particulate Matter Emissions Collected by a Dilution Tunnel*, with the exception of caveats described in EPA ALT-125. A copy of EPA ALT-125 is included in Appendix A for reference, as required by the approval letter.

PFS-TECO is accredited by the U.S. Environmental Protection Agency for the certification and auditing of wood heaters pursuant to subpart AAA of 40 CFR Part 60, New Source Performance Standards for Residential Wood Heaters and subpart QQQQ of 40 CFR Part 60, Standards of Performance for New Hydronic Heaters and Forced Air Furnaces, Methods 28R, 28WHH, 28 WHH-PTS, and all methods listed in Sections 60.534 and 60.5476. PFS-TECO holds EPA Accreditation Certificate Numbers 4 and 4M (mobile). PFS-TECO is accredited by IAS to ISO 17020:2012 "Criteria for Bodies Performing Inspections", and ISO 17025:2005 "Requirements for Testing Laboratories." PFS-TECO is also accredited by Standards Council of Canada to ISO 17065:2012 "Requirements for Bodies Operating Product Certification Systems."

The following people were associated with the testing, analysis and report writing associated with this project.

Sebastian Button, Laboratory Supervisor

Introduction

Innovative Hearth Products contracted with PFS-TECO to perform EPA certification testing on Montecito-B Wood-Fired Room Heater. All testing was performed at IHP's Auburn Laboratory. Testing was performed by Mr. Sebastian Button.

Notes

- Prior to start of testing, 50 hours of conditioning was performed per ASTM E3053.
- Prior to start of testing, the dilution tunnel was cleaned with a steel brush.
- Front filters were changed on sample train A at one hour for all 3 test runs.
- A total of 3 test runs were performed in accordance with ASTM E3053, no anomalies occurred, no further additional tests were performed, see Run Narrative section for further detail on each run.

Wood Heater Identification and Testing

- Appliance Tested: **Montecito-B**
- Serial Number: **Un-serialized Prototype – PFS Tracking Number 0029**
- Manufacturer: **Innovative Hearth Products, LLC**
- Catalyst: **No**
- Heat exchange blower: **Optional**
- Type: **Wood Stove**
- Style: **Zero Clearance**
- Date Received: **Tuesday, June 18, 2019**
- Testing Period – Start: **Tuesday, June 18, 2019** Finish: **Wednesday, June 19, 2019**
- Test Location: **1502 14th St NW, Auburn, WA 98001**
- Elevation: **≈69 Feet above sea level**
- Test Technician(s): **Sebastian Button**
- Observers: **Winslow Howe of IHP**

Test Procedures and Equipment

All Sampling and analytical procedures were performed by Sebastian Button. All procedures used are directly from ASTM E3053 and ASTM E2515. See the list below for equipment used. See Appendix C submitted with this report for calibration data.

Equipment List:

Equipment ID#	Equipment Description
SN 71712	1000lb floor scale w/digital weight indicator
8001993 IHP Box A	APEX XC-60 Digital Emissions Sampling Box A
8001994 IHP Box B	APEX XC-60 Digital Emissions Sampling Box B
057	California Analytical ZRE CO2/CO/O2 IR ANALYZER
064	Digital Barometer
109A/B	Troemner 100mg/200mg Audit Weights
107	Sartorius Analytical Balance
051	10 lb audit weight
090	Dewalt Tape Measure
095	Anemometer
111	Microtector
115	Delmhorst Wood Moisture Meter
EA0015365	Gas Analyzer Calibration Mid Gas
FF29781	Gas Analyzer Calibration Span Gas

Results

The weighted average emissions rate for the 3 run test series was measured to be **1.9 g/hr** with a Higher Heating Value efficiency of **72.0%**. The average CO emission rate for the 3 tests was **0.9 g/min.** The IHP Montecito-B Wood-Fired Room Heater meets the 2020 cordwood PM emission standard of ≤ 2.5 g/hr per CFR 40 part 60, §60.532 (c).

Detailed individual run data can be found in Appendix A submitted with this report.

Summary Table

	High Fire Test	Low Fire Test	Medium Fire Test
Date	6/18/2019	6/18/2019	6/19/2019
Run Number	1	2	3
PM Emission Rate (g/hr)	4.56	1.32	1.17
Burn Rate (kg/hr)	4.23	1.11	1.51
Heat Output (BTU/hr)	55,597	15,277	20,653
HHV Efficiency (%)	67.4%	73.2%	72.5%
LHV Efficiency (%)	72.4%	78.7%	77.9%
CO Emissions (g/MJ output)	0.48	4.34	2.71
CO Emissions (g/kg dry fuel)	6.41	63.21	39.15
CO Emissions (g/min)	0.47	1.17	0.98
First Hour Emission Rate (g/hr)	4.67	1.01	1.82
Weighting Factor (%)	20%	40%	40%
Weighted particulate emission average of 3 test runs: 1.9 grams per hour.			
Weighted average HHV efficiency of 3 test runs: 72.0%.			
Average CO emission rate for 3 test runs: 0.9 grams per minute			

Test Run Narrative

Run 1

Run 1 was performed on 6/18/2019 as a high fire test run per ASTM E3053. Emissions sampling began from a cold start ignition of kindling and start-up fuel. The test fuel load was loaded 21 minutes into the test. Testing was completed when 90% of the test fuel load was consumed. Total test time was 91 minutes, main test fuel load burn time was 70 min. The particulate emissions rate from kindling ignition to test completion was 4.56 g/hr. The burn rate of the test fuel load was 4.23 kg/hr. The main test load portion of the run had an overall HHV efficiency of 67.4%. The train A front filter was changed at 1 hr. All test results were appropriate and valid. There were no anomalies and all test criteria were met.

Run 2

Run 2 was performed on 6/18/2019 as a low fire test run per ASTM E3053, this test was a continuation of the high fire test described above. The overall test duration was 352 minutes. The burn rate for the test run was 1.11 kg/hr. The particulate emissions rate for the test run was 1.32 g/hr. The run had an overall HHV efficiency of 73.2%. The train A front filter was changed at 1 hr. All test results were appropriate and valid. There were no anomalies and all test criteria were met.

Run 3

Run 3 was performed on 6/19/2019 as a medium fire test run per ASTM E3053. The overall test duration was 265 minutes. The burn rate for the test run was 1.51 kg/hr, therefore the medium fire category requirements were met, less than the mid-point of the high and low burn rates (2.67 kg/hr). The particulate emissions rate for the test run was 1.17 g/hr. The run had an overall HHV efficiency of 72.5%. The train A front filter was changed at 1 hr. There were no anomalies and all criteria were met.

Test Conditions Summary

Testing conditions for all runs fell within allowable specifications of ASTM E3053 and ASTM E2515. A summary of facility conditions, fuel burned, and run times is listed below.

Runs	Ambient (°F)		Relative Humidity (%)		Average Barometric Pressure (In. Hg.)	Preburn Fuel Weight (lbs)	Test Fuel Weight (lbs)	Test Fuel Moisture (%DB)	Test Run Time (Min)
	Pre	Post	Pre	Post					
1	68	76	60.8	45.8	30.25	6.73 ¹	14.99	20.2%	91 ²
2	76	75	45.8	53.6	30.22	14.99	17.41	21.6%	352
3	74	74	49.2	46.1	30.19	15.12	17.67	20.5%	265

¹This is the weight of the kindling and startup fuel

²Total test time was 91 min, high fire test load burn duration was 70 min.

Appliance Operation and Test Settings

The appliance was operated according to procedures as described in the Operations Manual, found in Appendix B submitted with this report. Detailed run information can be found in Appendix A submitted with this report.

Settings & Run Notes

	Pre-Burn Air Setting	Test Run Air Settings
Run 1	N/A – Cold Start Ignition	Air control set to high fire test setting.
Run 2	Air control set to High Fire Setting in accordance with ASTM E3053	Air control set to high fire test setting for first 3 minutes, then slowly closed to low fire test setting at 11 minutes.
Run 3	Air control set to High Fire Setting in accordance with ASTM E3053	Air control set to high fire test setting for first 3 minutes, the set to medium fire test setting.

Appliance Description

Model(s): Montecito-B

Additional Models Discussion: In addition to the Montecito-B, the manufacturer also offers the following models: Bainbridge (LV/CF/AR), WCT6920, WCT4920, WRT4920. These models are identical in firebox construction and air intake/control. The difference between the models are primarily with respect to the design of the fascia around the firebox door. Additionally, the Montecito-B features an arched door design, while 2 of the Bainbridge models (LV/CF) have a rectangular door design. The differences between to all models are not expected to cause to appliance to exceed to required emissions limit.

Appliance Type: Wood-Fired Room Heater

Firebox Volume: 1.45 ft³

Air Introduction System: Primary Air enters the firebox from the front bottom of the appliance and is channeled up the sides on the appliance and down through the air wash, as well as through a pilot air opening in the front of the firebox. Primary air is controlled via a damper arm located below the door which moves in and out (open) to control the “boost air”, when pushed in, the control moves left (open) to right (closed). Secondary air is pulled through fixed openings on the sides of the appliance and channeled in through 4 secondary air tubes. Dimensions on all these features can be found in Appendix D.

Baffles: A pair of mating 6.44” x 23.0” x 1.0” ceramic fiber panels mate together to form a baffle which rests on top of the secondary air tubes.

Refractory Insulation: The firebox is lined with 1” thick firebrick.

Gasketing: The door glass is lined with 1/8” fiberglass gasket, and the door frame seals against the body of the stove with a 7/8” diameter fiberglass rope gasket.

Flue Outlet: 6-inch exhaust outlet located on the top of the appliance.

Catalytic Combustor: N/A

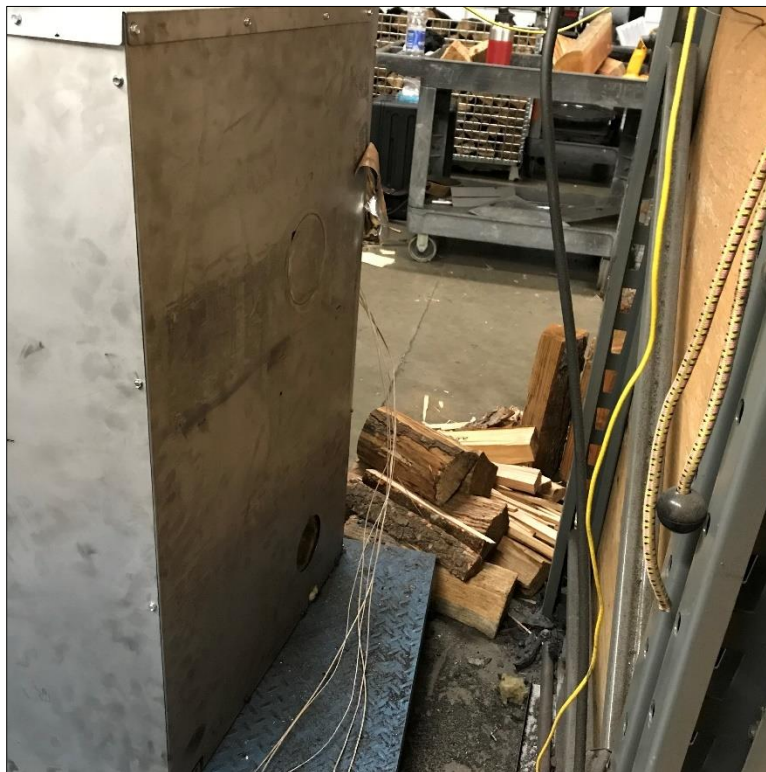
Fan: The Montecito-B is sold standard with a convection fan that attached to the bottom rear of the appliance.

Appliance design drawings can be found in Appendix D submitted with the CBI copy of this report.

Appliance Front



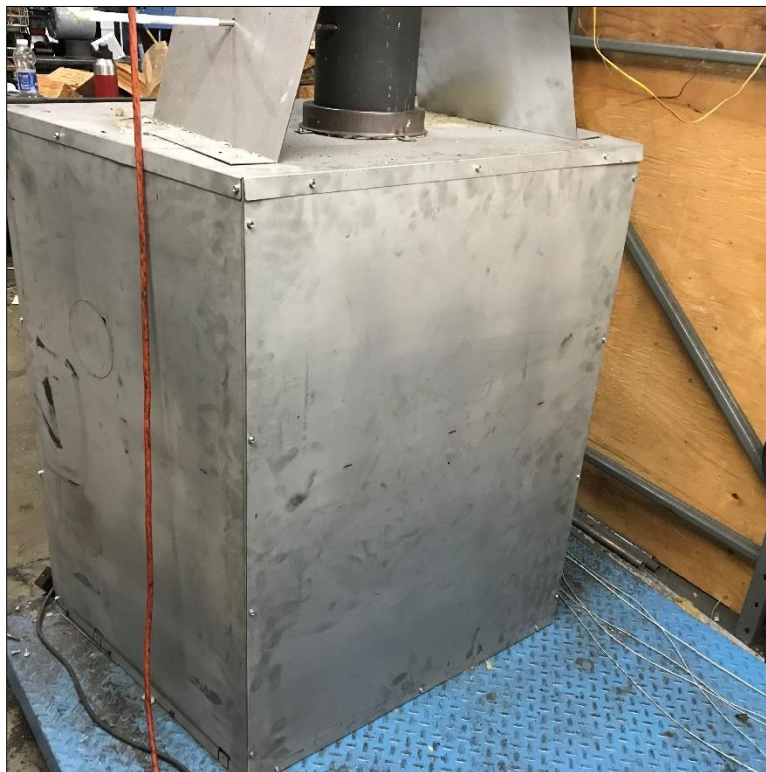
Appliance Left



Appliance Right



Appliance Rear



Test Fuel Properties

Test fuel used was a mix of Doug Fir and Maple cordwood, split and air-dried to the specified moisture content range. Typical fuel loads are pictured below:

Typical Kindling Load



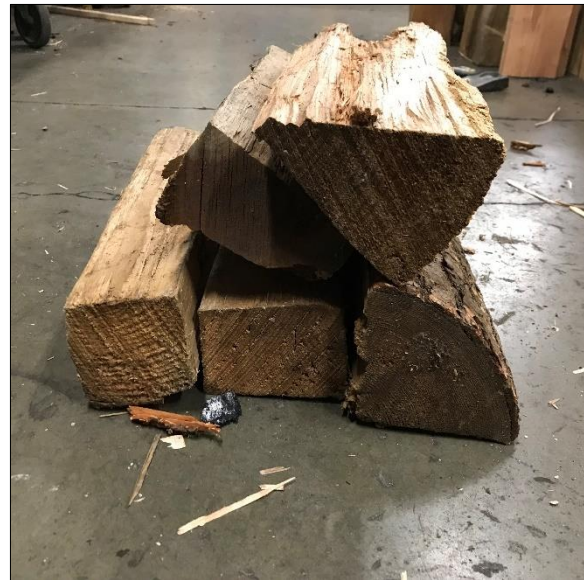
Typical Startup Load



Typical High Fire Load



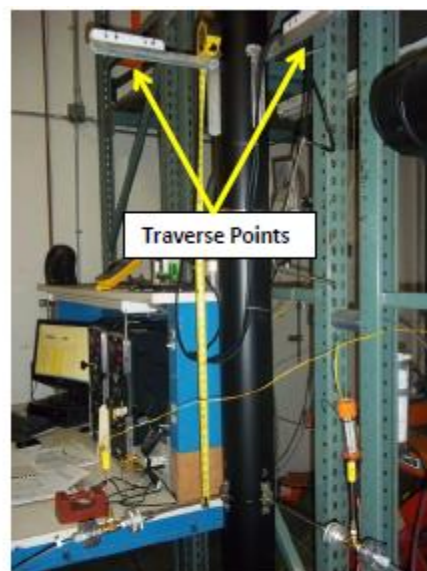
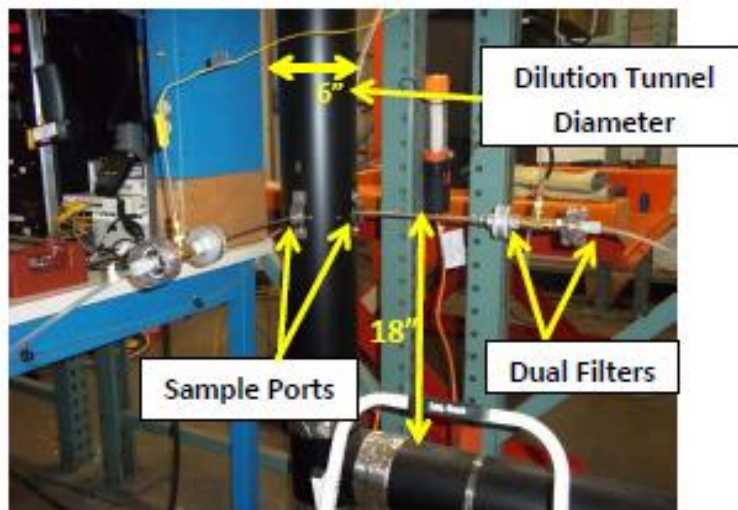
Typical Low Fire Load



Sampling Locations and Descriptions

Sample ports are located 16.5 feet downstream from any disturbances and 1 foot upstream from any disturbances. Flow rate traverse data was collected 12 feet downstream from any disturbances and 5.5 feet upstream from any disturbances. (See below).

Sample Points



Sampling Methods

ASTM E2515 was used in collecting particulate samples. The dilution tunnel is 6 inches in diameter. All sampling conditions per ASTM E2515 were followed. No alternate procedures were used with the exception of caveats described in ALT-125: Pall TX40 Emfab filters were used, filter temperatures were maintained between 80 and 90°F for all tests, filters were weighed in pairs where applicable, and no sampling intervals fell outside of proportional rates of +/- 10%.

Analytical Methods Description

All sample recovery and analysis procedures followed ASTM E2515 procedures. At the end of each test run, filters, O-Rings and probes were removed from their housings, dessicated for a minimum of 24 hours, and then weighed at 6 hour intervals to a constant weight per ASTM E2515-11 Section 10.

Calibration, Quality Control and Assurances

Calibration procedures and results were conducted per EPA Method 28R, ASTM E2515-11 and ASTM E3053. Test method quality control procedures (leak checks, volume meter checks, stratification checks, proportionality results) followed the procedures outlined.

Appliance Sealing and Storage

Upon completion of testing, the appliance was secured with metal strapping and the seal below was applied, the appliance was then returned to the manufacturer's location at: 1502 14th St NW, Auburn, WA 98001, for archival.

Sealing Label

ATTENTION:

THIS SEAL IS NOT TO BE BROKEN WITHOUT PRIOR AUTHORIZATION FROM THE
UNITED STATES ENVIRONMENTAL PROTECTION AGENCY.

THIS APPLIANCE HAS BEEN SEALED INACCORDANCE WITH REQUIREMNTS OF 40CFR
PART 60 SUBPART AAA §60.535 (a)(2)(vii)

REPORT # _____

DATE SEALED _____

MANUFACTURER _____

MODEL # _____

Sealed Unit



List of Appendices

The following appendices have been submitted electronically in conjunction with this report:

Appendix A – Test Run Data, Technician Notes, Sample Analysis, and Alternate Test Method Approval

Appendix B – Labels and Manuals

Appendix C –Equipment Calibration Records

Appendix D – Design Drawings (CBI Report Only)

Appendix E – Manufacturer QAP (CBI Report Only)

WOOD HEATER TESTING SUMMARY

SECTION 1 – Model Identification

Model Name(s)/Number(s)
Manufacturer
Address 1
Address 2
Appliance Category(s) (Free-standing, Insert, etc.)
Usable Firebox Volume - ft³
Catalytic/Non-Cat
Convection Air Fan (No, Standard, Optional)

Montecito-B / Bainbridge (LV/CF/AR) / WCT6920 / WCT4920 / WRT4920
Innovative Hearth Products
1502 14th St NW
Auburn, WA 98001
Free-standing
1.45
Non-Cat
Optional

SECTION 1B – Laboratory Information

Testing Laboratory
Address 1
Address 2
ISO/Accreditation Info
Dates Tested
Test Methods/Standards
Dilution Tunnel Inside Diameter - in.
Filter Diameter - mm
Filter Material

PFS-TECO
11785 SE Hwy 212 Ste 305
Clackamas, OR 97015
ISO 17025
6/18/19 - 6/18/19
ASTM E3053 (ALT-125), ASTM E2515
6.00
47
Pall Type TX40

SECTION 2 – Test Conditions Summary

Test Run #
 Date Tested
 Test Run Category (L, M, H)
 Average Barometric Pressure - in Hg
 Max. Observed Ambient Temp - °F
 Min. Observed Ambient Temp - °F
 Max. Observed Filter Temp - °F
 Test Fuel Load

 Cordwood Fuel Species
 Specific Gravity (from Table 1)
 Higher Heating Value - Btu/lb (from Annex A1)
 Nom. Test Fuel Load Piece Length - in.
 Number of Test Fuel Pieces
 Test Fuel Weight
 Kindling - As Fired lb
 Kindling Wt. - As % of Test Fuel Load
 Kindling Moisture - % DB
 Kindling - kg DB
 SU Fuel - As Fired lb
 SU Fuel Wt. - As % of Test Fuel Load
 SU Fuel Moisture - % DB
 SU Fuel - kg DB
 Test Fuel Load - As Fired lb
 Ave. Test Fuel Load MC % DB
 Test Fuel Load - kg DB
 Test Fuel Loading Density - lb/ft³
 Residual SU Fuel Wt. - As Fired lb
 Residual SU Fuel Wt. - As % of Test Fuel Load
 Test Run Duration - minutes
 Test Run Duration - h
 Run Duration of High Fire Load Only - minutes
 Run Duration of High Fire Load Only - h
 Test Fuel Load Wt. at End of Test - As Fired lb
 Total Fuel Burned - kg DB
 % Test Fuel Load Wt. at End of Test

1	2	3	
6/18/2019	6/18/2019	6/19/2019	
High Fire	Low Fire	Medium Fire	
30.25	30.22	30.19	
77	77	76	
68	70	73	
90	90	89	
Doug Fir/ Maple Mix	Doug Fir/ Maple Mix	Doug Fir/ Maple Mix	
mixed	mixed	mixed	
8561	8553	8561	
16	16	16	
5	5	5	
2.84	N/A	N/A	
19%	N/A	N/A	
10%	N/A	N/A	
1.17	N/A	N/A	
3.89	N/A	N/A	
26%	N/A	N/A	
24%	N/A	N/A	
1.43	N/A	N/A	
14.99	17.41	17.67	
20.2%	21.6%	20.5%	
5.66	6.50	6.65	
10.34	12.01	12.19	
1.50	N/A	N/A	
10%	N/A	N/A	
91	352	265	
1.52	5.87	4.42	
70	N/A	N/A	
1.17	N/A	N/A	
1.6	0	0	
6.85	6.50	6.65	
10.7%	0.0%	0.0%	

SECTION 3 – Test Run Results Summary

Test Run #
Date Tested
Test Run Category
Burn Rate - kg/h DB
Heat Output - Btu/h
Average Dilution Tunnel Flow Rate - dscfm
Average Sample Flow Rates - dscfm
Train 1
Train 2
Total PM Emissions - g
Train 1
Train 2
Average
PM Emission Train Precision - %
PM Emission Train Precision - g/kg
PM Emission Rate - g/h
Total CO Emissions - g
CO Emissions Rate - g/h
Overall Efficiency - CSA B415.1-10
% HHV Basis
% LHV Basis

1	2	3	
6/18/19	6/18/19	6/19/19	
High Fire	Low Fire	Medium Fire	
4.23	1.11	1.51	
55,597	15,277	20,653	
171.12	181.72	181.54	
0.180	0.182	0.181	
0.180	0.182	0.178	
6.55	7.59	4.00	
7.28	7.89	6.31	
6.917	7.737	5.152	
5.3%	1.9%	22.4%	
0.05	0.02	0.17	
4.56	1.32	1.17	
33	410	261	
28	70	59	
67%	73%	72%	
72%	79%	78%	

SECTION 4 - Weighted Average Summary

Test Run Category
Burn Rate - kg/h DB
PM Emission Rate - g/h
CO Emissions Rate - g/h
Overall Efficiency - CSA B415.1-10
% HHV Basis
% LHV Basis
Heat Output - Btu/h
Category Weighting

High Fire	Low Fire	Medium Fire
4.23	1.11	1.51
4.56	1.32	1.17
28.0	70.0	59.1
67%	73%	72%
72%	79%	78%
55600	15300	20700
20%	40%	40%

ASTM E 3053 Weighted Averages

PM Emission Rate - g/h
CO Emissions Rate - g/h (Arithmetic Average)
CO Emissions Rate - g/min (Arithmetic Average)
Overall Efficiency - CSA B415.1-10
% HHV Basis
% LHV Basis
Heat Output Range - Btu/h

1.9
52.3
0.9
72%
77%
15300 to 55600

Conditioning Data

Client: IHP	Job #: 19-480
Model: Montecito	Tracking #: 029
Date(s): 5/2019 - 6/2019	Technician: SJB

Elapsed Time (hrs)	Scale Reading (lbs)	Average: Weight Change (lbs)	337.1	#DIV/0!	N/A
			Flue (°F)	Ambient (°F)	Catalyst Exit (°F)
0	6.0	-	66	-	N/A
1	7.4	1.4	668	-	N/A
2	3.0	-4.4	520	-	N/A
3	16.9	13.9	483	-	N/A
4	8.4	-8.5	399	-	N/A
5	3.9	-4.5	320	-	N/A
6	2.1	-1.8	253	-	N/A
7	1.3	-0.8	217	-	N/A
8	0.5	-0.8	210	-	N/A
9	0.0	-0.5	198	-	N/A
10	18.5	18.5	485	-	N/A
11	10.3	-8.2	388	-	N/A
12	6.0	-4.3	330	-	N/A
13	3.9	-2.1	234	-	N/A
14	2.4	-1.5	217	-	N/A
15	1.5	-0.9	222	-	N/A
16	0.7	-0.8	211	-	N/A
17	0.0	-0.7	200	-	N/A
18	17.7	17.7	529	-	N/A
19	10.7	-7.0	403	-	N/A
20	5.7	-5.0	370	-	N/A
21	2.9	-2.8	296	-	N/A
22	1.9	-1.0	237	-	N/A
23	0.9	-1.0	227	-	N/A
24	0.0	-0.9	216	-	N/A
25	24.8	24.8	661	-	N/A
26	11.7	-13.1	557	-	N/A
27	5.7	-6.0	426	-	N/A
28	3.7	-2.0	325	-	N/A
29	2.3	-1.4	300	-	N/A
30	1.2	-1.1	275	-	N/A
31	0.0	-1.2	260	-	N/A
32	27.8	27.8	340	-	N/A
33	14.6	-13.2	497	-	N/A
34	8.1	-6.5	382	-	N/A
35	5.9	-2.2	307	-	N/A
36	4.7	-1.2	272	-	N/A
37	3.6	-1.1	254	-	N/A
38	2.7	-0.9	238	-	N/A
39	24.5	21.8	398	-	N/A
40	12.8	-11.7	532	-	N/A
41	6.4	-6.4	411	-	N/A
42	3.9	-2.5	294	-	N/A
43	2.8	-1.1	269	-	N/A
44	1.8	-1.0	258	-	N/A
45	0.9	-0.9	252	-	N/A
46	0.0	-0.9	241	-	N/A
47	22.8	22.8	395	-	N/A
48	12.8	-10.0	485	-	N/A
49	6.2	-6.6	418	-	N/A
50	4.1	-2.1	246	-	N/A





UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
RESEARCH TRIANGLE PARK, NC 27711

FEB 28 2018

Mr. Justin White
Hearthstone QHPP, Inc.
#17 Stafford Ave.
Morrisville, VT 05661

OFFICE OF
AIR QUALITY PLANNING
AND STANDARDS

Dear Mr. White,

I am writing in response to your letter dated January 12, 2018, regarding wood heaters manufactured by Hearthstone QHPP, Inc. (Hearthstone). This response, dated February 28, 2018, supercedes our previous response (dated February 26, 2018) to correct an inaccuracy regarding required changes to ASTM E3053-17.

You are requesting to use an alternative test method, using cord wood, as referenced in section 60.532(c) of 40 CFR part 60, Subpart AAA, Standards of Performance for New Residential Wood Heaters (Subpart AAA) to meet the 2020 cord wood alternative compliance option. The 2020 cord wood alternative compliance option states that each affected wood heater manufactured or sold at retail for use in the United States on or after May 15, 2020, must not discharge into the atmosphere any gases that contain particulate matter in excess of 2.5 g/hr. Compliance must be determined by a cord wood test method approved by the Administrator along with the procedures in 40 CFR 60.534. You have requested approval to use the procedures and specifications found in ASTM Method E3053-17, a cord wood test method titled, "Standard Test Method for Determining Particulate Matter Emissions from Wood Heaters using Cordwood Test Fuel," in conjunction with ASTM E2515-11 and Canadian Standards Administration (CSA) Method CSA-B415.1-10, which are specified in 40 CFR 60.534.

We understand that Hearthstone is also requesting that the alternative method proposed above be approved to apply broadly to all wood heaters manufactured by Hearthstone meeting the requirements of Subpart AAA, from the approval date of this request until such time that Subpart AAA is revised or replaced to require a different cord wood certification method, providing all requirements of section 60.533 of Subpart AAA are met.

With the caveats set forth below, we approve your alternative test method request for certifying wood heaters using ASTM E3053-17 in conjunction with section 60.534 of Subpart AAA to meet the 2020 cord wood compliance option until such time that Subpart AAA is revised or replaced to require a different cord wood certification method. We also approve application of this alternative method to all wood heaters manufactured by Hearthstone meeting the requirements of Subpart AAA.

As required in Subpart AAA, section 60.354(d), you or your approved test laboratory must also measure the first hour of particulate matter emissions for each test run using a separate filter in one of the two parallel sampling trains. These results must be reported separately and also included in the total particulate matter emissions per run. Also, as required by Subpart AAA, section 60.534(e), you must have your approved laboratory measure the efficiency, heat output, and carbon monoxide emissions of the tested wood heater using CSA-B415.1-10. For measurement of particulate matter emission concentrations, ASTM 2515-11 must be used.

The following change to ASTM E3053-17 must be followed:

1. Coal bed conditions prior to loading test fuel. The coal bed shall be a level plane without valleys or ridges for all test runs in the high, low, and medium burn rate categories.

The following changes to ASTM E2515-11 must be followed:

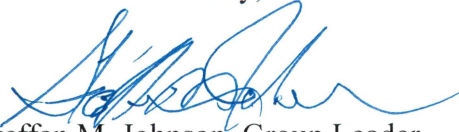
1. The filter temperature must be maintained between 80 and 90 degrees F during testing.
2. Filters must be weighed in pairs to reduce weighing error propagation; see ASTM 2515-11, Section 10.2.1 Analytical Procedure.
3. Sample filters must be Pall TX-40 or equivalent Teflon-coated glass fiber, and of 47 mm, 90 mm, 100 mm, or 110 mm in diameter.
4. Only one point is allowed outside the +/- 10 percent proportionality range per test run.

A copy of this letter must be included in each certification test report where this alternative test method is utilized.

It is reasonable that this alternative test method approval be broadly applicable to all wood heaters subject to the requirements of 40 CFR part 60, Subpart AAA. For this reason, we will post this letter as ALT-125 on our website at <http://www3.epa.gov/ttn/emc/approalt.html> for use by other interested parties. As noted earlier in this letter, this alternative method approval is valid until such time that Subpart AAA is revised or replaced to require a different cord wood certification method, and at such time, this alternative will be reconsidered and possibly withdrawn.

If you have additional questions regarding this approval, please contact Michael Toney of my staff at 919-541-5247 or toney.mike@epa.gov.

Sincerely,



Steffan M. Johnson, Group Leader
Measurement Technology Group

cc: Amanda Aldridge, EPA/OAQPS/OID
Adam Baumgart-Getz, EPA/OAQPS/OID
Rafael Sanchez, EPA/OECA
Michael Toney, EPA/OAQPS/AQAD

Sample Calculations – ASTM E3053 & E2515

Client: IHP
 Model: Montecito
 Run: 1

Equations used to calculate the parameters listed below are described in this appendix. Sample calculations are provided for each equation. The raw data and printout results from a sample run are also provided for comparison to the sample calculations.

M_{Fldb} – Weight of test fuel load, dry basis, lb (kg)

M_{Sfdb} – Weight of start-up fuel, dry basis, lb (kg)

M_{Kdb} - Weight of kindling, dry basis, lb (kg)

M_{FREHdb} - Total weight of all remaining fuel at end of high fire test run, lb (kg)

M_{TFBdb} - Total weight of all fuel burned during high fire test run, lb (kg), dry basis

BR_H – Dry burn rate for high fire test run, from time when test fuel load is added to end of test run, lb/h (kg/h)

M_{TFBdb} - Total weight of fuel burned during low or medium fire test run, lb (kg), dry basis

BR - Dry burn rate for low and medium fire test runs, lb/h (kg/h)

V_s – Average gas velocity in the dilution tunnel, ft/sec

Q_{sd} – Average gas flow rate in dilution tunnel, dscf/hr

$V_{m(std)}$ – Volume of gas sampled, corrected to dry standard conditions, dscf

m_n – Total particulate matter collected, mg

C_s - Concentration of particulate matter in tunnel gas, dry basis, corrected to STP, g/dscf

E_T – Total particulate emissions, g

PR - Proportional rate variation

PM_{RH} - Particulate emission rate for high fire test run, g/hr

PM_{FH} - Particulate emission factor for high fire test run, g/dry kg of fuel burned

PM_R – Particulate emission rate for low or medium fire test run, g/hr

PM_F – Particulate emission factor for low or medium fire test run, g/dry kg of fuel burned

M_{Fldb} – Weight of test fuel load, dry basis, lb (kg)

ASTM E3053 equation (1)

$$M_{Fldb} = \Sigma((M_{FLnwb})(100/(100 + MC_{FLn})))$$

Where,

- M_{FLnwb} = Weight of each test fuel piece, n, in test fuel load per 8.4.1, wet basis, lb (kg)
 MC_{FLn} = Average fuel moisture of test fuel piece, n, in test fuel load, % dry basis
 n = individual test fuel pieces that comprise the test fuel load, as applicable.

Sample Calculation:

n	M _{FLnwb}	MC _{FLn}	(M _{FLnwb})(100/(100 + MC _{FLn}))	
1	2.40	20.2	2.4 (100) / (100+ 20.2)) =	2.00
2	3.25	19.4	3.25 (100) / (100+ 19.4)) =	2.72
3	3.02	19.5	3.02 (100) / (100+ 19.5)) =	2.53
4	3.30	19.3	3.3 (100) / (100+ 19.3)) =	2.77
5	3.02	22.7	3.02 (100) / (100+ 22.7)) =	2.46
6	0.00	NA	N/A	-
7	N/A	N/A	N/A	-
SUM				12.47 lbs
M _{Fldb} =	12.47	lbs		
M _{Fldb} =	5.66	kg		

M_{SUdb} – Weight of start-up fuel, dry basis, lb (kg)

ASTM E3053 equation (2)

$$M_{SUdb} = (M_{SUwb})(100/(100 + MC_{SU}))$$

Where,

M_{SUwb} = Total weight of start-up fuel pieces, wet basis, lb (kg)

MC_{SU} = Average fuel moisture of the piece(s) from which start-up fuel was split, % dry basis

Sample Calculation:

$$M_{SUwb} = 3.89$$

$$MC_{SU} = 23.5$$

$$M_{SUdb} = 3.9 (100/(100 + 23.5))$$

$$M_{SUdb} = \mathbf{3.15 \text{ lbs}}$$

$$= \mathbf{1.43 \text{ kg}}$$

M_{Kdb} - Weight of kindling, dry basis, lb (kg)

ASTM E3053 equation (3)

$$M_{Kdb} = (M_{Kwb}) (100 / (100 + MC_K))$$

Where,

M_{Kwb} = Weight of kindling per 8.5.6, wet basis, lb (kg);

MC_K = Average moisture of kindling (may be assumed 10%), % dry basis.

Sample calculation:

$$M_{Kwb} = 2.84$$

$$MC_K = 10.0$$

$$M_{Kdb} = 2.84 (100 / (100 + 10.0))$$

$$M_{Kdb} = \mathbf{2.58} \text{ lbs}$$

$$= \mathbf{1.17} \text{ kgs}$$

M_{FREHdb} - Total weight of all remaining fuel at end of high fire test run, lb (kg)

ASTM E3053 equation (4)

$$M_{FREHdb} = M_{RSUBdb} + M_{FLEHdb}$$

Where,

M_{RSUBdb} = Weight of residual start-up fuel bed when high fire test load added, lb (kg)M_{FLEHdb} = Weight of unburned portion of test fuel load at the end of the high fire test run, lb (kg)

Sample calculation:

$$M_{RSUBdb} = 1.5$$

$$M_{FLEHdb} = 1.6$$

$$M_{FREHdb} = 1.50 + 1.6$$

$$M_{FREHdb} = \mathbf{3.10} \text{ lbs}$$

$$= \mathbf{1.41} \text{ kg}$$

M_{TFBHdb} - Total weight of all fuel burned during high fire test run, lb (kg), dry basis

ASTM E3053 equation (5)

$$M_{TFBHdb} = M_{Kdb} + M_{SUDb} + M_{FLdb} - M_{FREHdb}$$

Sample Calculation:

$$M_{Kdb} = 2.58$$

$$M_{SUDb} = 3.15$$

$$M_{FLdb} = 12.47$$

$$M_{FREHdb} = 3.10$$

$$M_{TFBHdb} = 2.58 + 3.15 + 12.47 - 3.10$$

$$= \mathbf{15.10} \text{ lbs}$$

$$= \mathbf{6.85} \text{ kg}$$

BR_H – Dry burn rate for high fire test run, from time when test fuel load is added to end of test run, lb/h (kg/h)

ASTM E3053 equation (6)

$$BR_H = 60 (M_{FLdb} - M_{FLEHdb})/\theta_{H1}$$

Where,

θ_{H1} = Total duration of high fire test run, from time when test fuel load is added to end of test run, min.

Sample calculation:

$$\begin{aligned} M_{FLdb} &= 12.47 \\ M_{FLEHdb} &= 1.60 \\ \theta_{H1} &= 70 \end{aligned}$$

$$BR_H = \frac{60 (12.47 - 1.60)}{70}$$

$$\begin{aligned} BR_H &= \mathbf{9.32} \text{ lb/hr} \\ &= \mathbf{4.23} \text{ kg/hr} \end{aligned}$$

M_{TFBdb} - Total weight of fuel burned during low or medium fire test run, lb (kg), dry basis
 ASTM E3053 equation (7)

$$M_{TFBdb} = M_{FLdb} - M_{FREdb}$$

Where,

M_{FLdb} = Total weight of fuel burned during low or medium fire test run, lb (kg), dry basis

M_{FREdb} = Weight of remaining fuel at end of low or medium fire test run, lb (kg)

Sample Calculation:

M_{FLdb} = N/A - Applicable to Low/Medium Fire Tests Only

M_{FREdb} = N/A - Applicable to Low/Medium Fire Tests Only

$$\begin{aligned} M_{TFBdb} &= \text{N/A} - \text{N/A} \\ &= \text{N/A} \quad \text{lbs} \\ &= \text{N/A} \quad \text{kg} \end{aligned}$$

BR - Dry burn rate for low and medium fire test runs, lb/h (kg/h)

ASTM E3053 equation (8)

$$BR = \frac{60 M_{TFBdb}}{\theta}$$

Where,

θ = Total test run duration for low or medium fire test run, min.

Sample Calculation:

M_{TFBdb} = N/A - Applicable to Low/Medium Fire Tests Only

θ = N/A - Applicable to Low/Medium Fire Tests Only

$$BR = \frac{60 \times N/A}{N/A}$$

BR = **N/A** lb/hr

= **N/A** kg/hr

V_s – Average gas velocity in the dilution tunnel, ft/sec

ASTM E2515 equation (9)

$$V_s = F_p \times k_p \times C_p \times (\sqrt{\Delta P})_{avg} \times \sqrt{\frac{T_{s(avg)}}{P_s \times M_s}}$$

Where:

- F_p = Adjustment factor for pitot tube center point reading = $\frac{V_{strav}}{V_{scent}}$, ASTM E2515 Equation (1)
 V_{scent} = Dilution tunnel velocity calculated after the multi-point pitot traverse at the center, ft/sec
 V_{strav} = Dilution tunnel velocity calculated after the multi-point pitot traverse, ft/sec
 k_p = Pitot tube constant, 85.49
 C_p = Pitot tube coefficient: 0.99, unitless
 ΔP^* = Velocity pressure in the dilution tunnel, in H₂O
 T_s = Absolute average gas temperature in the dilution tunnel, °R; (°R = °F + 460)
 P_s = Absolute average gas static pressure in dilution tunnel, = $P_{bar} + P_g$, in Hg
 P_{bar} = Barometric pressure at test site, in. Hg
 P_g = Static pressure of tunnel, in. H₂O; (in Hg = in H₂O/13.6)
 M_s = **The dilution tunnel wet molecular weight; $M_s = 28.78$ assuming a dry weight of 29 lb/lb-mole

Sample calculation:

$$F_p = \frac{16.02}{17.74} = 0.903$$

$$V_s = 0.903 \times 85.49 \times 0.99 \times 0.268 \times \left(\left(\frac{166.0}{30.25} + \frac{460}{-0.30} \right) \times \frac{28.78}{13.6} \right)^{1/2}$$

$$V_s = 17.39 \text{ ft/s}$$

*The ASTM test standard mistakenly has the square root of the average delta p instead of the average of the square root of delta p. The current EPA Method 2 is also incorrect. This was verified by Mike Toney at EPA.

**The ASTM test standard mistakenly identifies M_s as the dry molecular weight. It should be the wet molecular weight as indicated in EPA Method 2.

Q_{sd} – Average gas flow rate in dilution tunnel, dscf/hr

ASTM E2515 equation (3)

$$Q_{sd} = 3600 \times (1 - B_{ws}) \times v_s \times A \times \frac{T_{std}}{T_{s(avg)}} \times \frac{P_s}{P_{std}}$$

Where:

- 3600 = Conversion from seconds to hours (ASTM method uses 60 to convert in minutes)
- B_{ws} = Water vapor in gas stream, proportion by volume; assume 2%
- A = Cross sectional area of dilution tunnel, ft²
- T_{std} = Standard absolute temperature, 528 °R
- P_s = Absolute average gas static pressure in dilution tunnel, = $P_{bar} + P_g$, in Hg
- $T_{s(avg)}$ = Absolute average gas temperature in the dilution tunnel, °R; (°R = °F + 460)
- P_{std} = Standard absolute pressure, 29.92 in Hg

Sample calculation:

$$Q_{sd} = 3600 \times (1 - 0.02) \times 17.39 \times 0.1963 \times \frac{528}{166.0 + 460} \times \frac{30.25 + \frac{-0.30}{13.6}}{29.92}$$

$$Q_{sd} = 10267.2 \text{ dscf/hr}$$

$V_{m(std)}$ – Volume of Gas Sampled Corrected to Dry Standard Conditions, dscf

ASTM E2515 equation (6)

$$V_{m(std)} = K_1 V_m Y \frac{P_{bar} + \frac{\Delta H}{13.6}}{T_m}$$

Where:

K_1	=	17.64 °R/in. Hg
V_m	=	Volume of gas sample measured at the dry gas meter, dcf
Y	=	Dry gas meter calibration factor, dimensionless
P_{bar}	=	Barometric pressure at the testing site, in. Hg
ΔH	=	Average pressure differential across the orifice meter, in. H ₂ O
T_m	=	Absolute average dry gas meter temperature, °R

Sample Calculation:

Using equation for Train 1:

$$V_{m(std)} = 17.64 \times 16.390 \times 1.004 \times \frac{(30.25 + \frac{0.40}{13.6})}{(75.9 + 460)}$$

$$V_{m(std)} = \mathbf{16.400} \text{ dscf}$$

Using equation for Train 2:

$$V_{m(std)} = 17.64 \times 16.391 \times 0.986 \times \frac{(30.25 + \frac{0.42}{13.6})}{(78.3 + 460)}$$

$$V_{m(std)} = \mathbf{16.036} \text{ dscf}$$

Using equation for ambient train:

$$V_{m(std)} = 17.64 \times 0.00 \times 1 \times \frac{(30.25 + \frac{0.00}{13.6})}{(74.5 + 460)}$$

$$V_{m(std)} = \mathbf{0} \text{ dscf}$$

m_n – Total Particulate Matter Collected, mg

ASTM E2515 Equation (12)

$$m_n = m_p + m_f + m_g$$

Where:

 m_p = mass of particulate matter from probe, mg m_f = mass of particulate matter from filters, mg m_g = mass of particulate matter from filter seals, mg

Sample Calculation:

Using equation for Train A (first hour):

$$m_n = 0.0 + 4.9 + 0.0$$

$$m_n = 4.9 \text{ mg}$$

Using equation for Train A (post-first hour):

$$m_n = 0.5 + 0.6 + 0.9$$

$$m_n = 2.0 \text{ mg}$$

Train A aggregate:

$$m_n = 4.9 + 2.0$$

$$m_n = 6.9 \text{ mg}$$

Using equation for Train B:

$$m_n = 0.6 + 3.5 + 3.4$$

$$m_n = 7.5 \text{ mg}$$

C_s - Concentration of particulate matter in tunnel gas, dry basis, corrected to STP, g/dscf
 ASTM E2515 equation (13)

$$C_s = K_2 \times \frac{m_n}{V_{m(\text{std})}}$$

Where:

K ₂	=	Constant, 0.001 g/mg
m _n	=	Total mass of particulate matter collected in the sampling train, mg
V _{m(std)}	=	Volume of gas sampled corrected to dry standard conditions, dscf

Sample calculation:

For Train 1:

$$C_s = 0.001 \times \frac{6.9}{16.40}$$

$$C_s = \mathbf{0.00042} \text{ g/dscf}$$

For Train 2

$$C_s = 0.001 \times \frac{7.5}{16.04}$$

$$C_s = \mathbf{0.00047} \text{ g/dscf}$$

For Ambient Train

$$C_r = 0.001 \times \frac{\quad}{0}$$

$$C_r = \mathbf{0} \text{ g/dscf}$$

E_T – Total Particulate Emissions, g

ASTM E2515 equation (15)

$$E_T = (C_s - C_r) \times Q_{std} \times \theta$$

Where:

C _s	=	Concentration of particulate matter in tunnel gas, g/dscf
C _r	=	Concentration particulate matter room air, g/dscf
Q _{std}	=	Average dilution tunnel gas flow rate, dscf/hr
θ	=	Total time of test run, minutes

Sample calculation:

For Train 1

$$E_T = (0.000421 - 0) \times 10267.2 \times 91 / 60$$

$$E_T = 6.55 \text{ g}$$

For Train 2

$$E_T = (0.000468 - 0) \times 10267.2 \times 91 / 60$$

$$E_T = 7.28 \text{ g}$$

Average

$$E = 6.92 \text{ g}$$

Total emission values shall not differ by more than 7.5% from the total average emissions

7.5% of the average =	0.52
Train 1 difference =	0.37
Train 2 difference =	0.37

PR - Proportional Rate Variation

ASTM E2515 equation (16)

$$PR = \left[\frac{\theta \times V_{mi} \times V_s \times T_m \times T_{si}}{\theta_i \times V_m \times V_{si} \times T_{mi} \times T_s} \right] \times 100$$

Where:

- θ = Total sampling time, min
 θ_i = Length of recording interval, min
 V_{mi} = Volume of gas sample measured by the dry gas meter during the "ith" time interval, dcf
 V_m = Volume of gas sample as measured by dry gas meter, dcf
 V_{si} = Average gas velocity in the dilution tunnel during the "ith" time interval, ft/sec
 V_s = Average gas velocity in the dilution tunnel, ft/sec
 T_{mi} = Absolute average dry gas meter temperature during the "ith" time interval, °R
 T_m = Absolute average dry gas meter temperature, °R
 T_{si} = Absolute average gas temperature in the dilution tunnel during the "ith" time interval, °R
 T_s = Absolute average gas temperature in the dilution tunnel, °R

Sample calculation (for the first 1 minute interval of Train 1):

$$PR = \left(\frac{91 \times 0.166 \times 17.39 \times (84.0 + 460) \times (75.9 + 460)}{1 \times 16.39 \times 16.21 \times (166.0 + 460) \times (70.0 + 460)} \right) \times 100$$

$$PR = 87 \%$$

PM_{RH} - Particulate emission rate for high fire test run, g/hr;

ASTM E3053 equation (9)

$$PM_{RH} = 60(E_{TH}/\theta_{H2})$$

Where,

E_{TH} = Total particulate emissions for high fire test run including kindling and start-up, gθ_{H2} = Total duration of high fire test run, from ignition of kindling to end of test run, min.

Sample Calculation:

$$E_{TH} = 6.92$$

$$\theta_{H2} = 91$$

$$PM_{RH} = 60(6.92 / 91)$$

$$PM_{RH} = 4.56 \text{ g/hr}$$

PM_{FH} - Particulate emission factor for high fire test run, g/dry kg of fuel burned.

ASTM E3053 equation (10)

$$PM_{FH} = E_{TH}/M_{TFBHdb}$$

Sample Calculation:

$$E_{TH} = 6.92$$

$$M_{TFBHdb} = 6.85$$

$$PM_{FH} = 6.92 / 6.85$$

$$= 1.01 \text{ g/kg}$$

PM_R - Particulate emission rate for low or medium fire test runs, g/hr

ASTM E3053 equation (12)

$$PM_R = 60(E_T/\theta)$$

Where,

E_T = Total particulate emissions for low or medium fire test runs from Test Method E2515, g

Sample Calculation:

E_T = N/A - Applicable to Low/Medium Fire Tests Only

θ = N/A - Applicable to Low/Medium Fire Tests Only

$$PM_R = 60(\text{N/A} / \text{N/A})$$

$$PM_{RH} = \text{N/A g/hr}$$

PM_{FH} - Particulate emission factor for high fire test run, g/dry kg of fuel burned.

ASTM E3053 equation (13)

$$PM_F = E_T/M_{TFBdb}$$

Sample Calculation:

E_T = N/A - Applicable to Low/Medium Fire Tests Only

M_{TFBdb} = N/A - Applicable to Low/Medium Fire Tests Only

$$PM_{FH} = \text{N/A} / \text{N/A}$$

$$= \text{N/A g/kg}$$

Montecito/Brentwood Test Setting Recommendations

Start up and Kindling

Combined weight of the startup fuel and kindling should be between 6-7 pounds. The combined load should be placed cross-hatched in the fire box with the north-south running pieces cut so they do not extend beyond the andirons.

To start the load, use a propane torch for 1 minute lighting the top pieces. Close door to the unit once one minute is up.

High Burn

It is recommended that high burn is tested using a mixed load of Douglas fir and Maple. With the Maple comprising no more than 2 pieces of the total load. The load

High burn should be loaded at the bottom of the allowable residual fuel weight. The door should be closed immediately after load.

The Convection air fan may be turned on to its high setting immediately after loading the stove.

Low/Medium Burn

It is recommended that the low/medium burn is tested using a mixed load of Douglas fir and Maple

Low/Medium Burn should be loaded towards the bottom of their respective coal bed weights. The door should be closed immediately after the load

After load primary air control should be set to high and the boost active for 3 minutes. At 3 minutes the boost should be closed and the primary air control set to $\frac{1}{4}$ open. If the test is for low then after 15 minutes or 15% of the load has been burned whichever comes first, shut the primary air control the rest of the way. If the test is for medium then leave the primary air control at $\frac{1}{4}$ open.

The Convection air fan may be turned on to its low setting at the beginning of test after loading.

WOOD STOVE TEST DATA PACKET
ASTM E3053/E2515



Run 1 Data Summary

Client: IHP
Model: Montecito
Job #: 19-480
Tracking #: 029
Test Date: 6/18/2019

Technician Signature

6/27/2019

Date

TEST RESULTS - ASTM E3053 / ASTM E2515

Client: IHP

Model: Montecito

Run #: 1

Job #: 19-480

Tracking #: 029

Technician: SJB

Date: 6/18/2019

Burn Rate (kg/hr):	4.23
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	Ambient Sample	Sample Train A	Sample Train B	1st Hour Filter
Total Sample Volume (ft ³)	0.000	16.390	16.391	10.753
Average Gas Velocity in Dilution Tunnel (ft/sec)	17.39			
Average Gas Flow Rate in Dilution Tunnel (dscf/hr)	10267.2			
Average Gas Meter Temperature (°F)	74.5	75.9	78.3	74.9
Total Sample Volume (dscf)	0.000	16.400	16.036	10.780
Average Tunnel Temperature (°F)	166.0			
Total Time of Test (min)	91			
Total Particulate Catch (mg)	0.0	6.9	7.5	4.9
Particulate Concentration, dry-standard (g/dscf)	0.0000000	0.0004207	0.0004677	0.0004545
Total PM Emissions (g)	0.00	6.55	7.28	4.67
Particulate Emission Rate (g/hr)	0.00	4.32	4.80	4.67
Emissions Factor (g/kg)	-	0.95	1.06	-
Difference from Average Total Particulate Emissions (g)	-	0.37	0.37	-
Difference from Average Emissions Factor (g/kg)	-	0.05	0.05	-

Final Average Results	
Total Particulate Emissions (g)	6.92
Particulate Emission Rate (g/hr)	4.56
Emissions Factor (g/kg)	1.01
HHV Efficiency (%)	67.4%
LHV Efficiency (%)	72.4%
CO Emissions (g/min)	0.47

Quality Checks	Requirement	Observed	Result
Dual Train Precision	Each train within 7.5% of average emissions (in grams), or emission factors within 0.5 g/kg	See Above	OK
Filter Temps	>80 °F, <90 °F	Min: 80 / Max: 90	OK
Face Velocity	< 30 ft/min	10.8	OK
Leakage Rate	Less than 4% of average sample rate	0.002 cfm	OK
Ambient Temp	55-90 °F	Min: 68 / Max: 77	OK
Negative Probe Weight Evaluation	<5% of Total Catch	Probe Catch Not Negative	OK
Pro-Rate Variation	90% of readings between 90-110%; none greater than 120% or less than 80%	See Data Tabs	OK

B415.1 Efficiency Results

Manufacturer: IHP
Model: Montecito
Date: 06/18/19
Run: 1
Control #: 19-480
Test Duration: 70
Output Category: High

Test Results in Accordance with CSA B415.1-09

	HHV Basis	LHV Basis
Overall Efficiency	67.4%	72.4%
Combustion Efficiency	99.5%	99.5%
Heat Transfer Efficiency	67.8%	72.7%

Output Rate (kJ/h)	58,609	55,597	(Btu/h)
Burn Rate (kg/h)	4.37	9.63	(lb/h)
Input (kJ/h)	86,941	82,473	(Btu/h)

Test Load Weight (dry kg)	5.10	11.23	dry lb
MC wet (%)	16.79		
MC dry (%)	20.17		
Particulate (g)	6.92		
CO (g)	33		
Test Duration (h)	1.17		

Emissions	Particulate	CO
g/MJ Output	0.10	0.48
g/kg Dry Fuel	1.36	6.41
g/h	5.93	28.01
g/min	0.10	0.47
lb/MM Btu Output	0.24	1.11

Air/Fuel Ratio (A/F)	11.76
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VERSION:

2.2

12/14/2009

Job #: 19-480

Tracking # 029

Technician: SJB

Date: 6/18/2019

Nominal Loading Density (lbs/ft ³ , wet basis):	10		
Usable Firebox Volume (ft ³):	1.45		
Target Load Weight (lbs)	14.50		
Total Load Weight Range (lbs):	13.80	to	15.20
Core Load Weight Range (lbs):	6.50	to	9.40
Remainder Load Weight Range (lbs):	5.10	to	8.00
Core Load Piece Range (lbs):	2.20	to	3.60
Remainder Load Piece Range (lbs):	1.50	to	8.00
Max Allowable Kindling Weight (lbs):	3.00		
Max Allowable Start-up Fuel Weight (lbs):	4.50		

				Fuel Piece Moisture Readings (%DB)					Dry Weight	
Piece #	Length (in)	Weight (lbs)	Within Spec?	1	2	3	Ave.	Within Spec?	lbs	kg
1	16.00	2.40	In Range	18.9	22.1	19.5	20.2	In Range	2.00	0.91
2	16.00	3.25	In Range	19.1	20.4	18.7	19.4	In Range	2.72	1.23
3	16.00	3.02	In Range	18.7	19.1	20.7	19.5	In Range	2.53	1.15
Core Load Wt. (lbs)		8.67	In Range							

				Fuel Piece Moisture Readings (%DB)						Dry Weight	
Piece #	Length (in)	Weight (lbs)	Within Spec?	1	2	3	Ave.	Within Spec?	lbs	kg	
1	16.00	3.30	In Range	18.9	19.6	19.4	19.3	In Range	2.77	1.25	
2	16.00	3.02	In Range	21.9	23.8	22.4	22.7	In Range	2.46	1.12	
3			NA				NA	NA	NA	NA	
Remainder Load (lbs)		6.32	In Range								

Total Load Weight (lbs):	14.99	In Range	
Core Load % of Total Weight:	58%	In Range	45-65%
Remainder % of Total Weight:	42%	In Range	35-55%
Total Load % of Target Weight:	103%	In Range	95-105%
Actual Fuel Loading Density (lb/ft3):	10.3		
Total Load Average Moisture Content (%DB):	20.2	In Range	19-25%
Total Load Average Moisture Content (%WB):	16.8		
Total Test Load Weight (dry basis):	12.47 lbs		5.66 kg

		Kindling Moisture Readings (%DB)					Dry Weight	
Kindling Weight (lbs)	Within Spec?	1	2	3	Avg.	Within Spec?	lbs	kg
2.84	In Range	10	10	10	10.0	In Range	2.58	1.17

		Start-up Moisture Readings (%DB)					Dry Weight	
Start-up Fuel Wt. (lb)	Within Spec?	1	2	3	Avg.	Within Spec?	lbs	kg
3.89	In Range	24.6	23.1	22.9	23.5	In Range	3.15	1.43

Allowable Residual Start-up Fuel Range (lb):	1.5	to	3.0
Actual Residual Start-up Fuel Weight (lb):	1.5		In Range

High Fire Test Run End Point Range:	1.3	to	1.6	lb
Actual Fuel Load Ending Weight (lb):	1.6 In Range			

Total Weight All Fuel Added:	21.72 lbs, wet basis	Total Weight All Fuel Burned (dry basis):	15.10 lbs
	18.20 lbs, dry basis		6.85 kg
	8.26 kg, dry basis		

DILUTION TUNNEL & MISC. DATA - ASTM E3053 / E2515

Client: IHP
 Model: Montecito
 Run #: 1
 Test Start Time: 9:38
 Test Type: High Fire

Job #: 19-480
 Tracking #: 029
 Technician: SJB
 Date: 6/18/2019

Recording Interval (min): 1
 Total Sampling Time (min): 91
 High Fire Test Load Time (min): 21

Meter Box γ Factor: 1.004 (A)
 Meter Box γ Factor: 0.986 (B)
 Meter Box γ Factor: 1.000 (Ambient)

Induced Draft Check (in. H₂O): 0
 Smoke Capture Check (%): 100%
 Date Flue Pipe Last Cleaned: 6/10/2019

	Pre-Test	Post Test	Avg.
Barometric Pressure (in. Hg)	30.25	30.25	30.25
Relative Humidity (%)	60.8	45.8	
Room Air Velocity (ft/min)	0	0	
Scale Audit (lbs)	10.0	10.0	
Ambient Sample Volume:	0.000 ft ³		

Sample Train Post-Test Leak Checks

(A)	0.002	cfm @	-11	in. Hg
(B)	0.000	cfm @	-16	in. Hg
(Ambient)	0.000	cfm @	0	in. Hg

DILUTION TUNNEL FLOW

Traverse Data		
Point	dP (in H ₂ O)	Temp (°F)
1	0.054	71
2	0.066	71
3	0.064	71
4	0.058	71
5	0.042	71
6	0.070	71
7	0.060	71
8	0.046	71
Center	0.072	71

Dilution Tunnel H₂O: 2.00 percent
 Tunnel Diameter: 6 inches
 Pitot Tube Cp: 0.99 [unitless]
 Dilution Tunnel MW(dry): 29.00 lb/lb-mole
 Dilution Tunnel MW(wet): 28.78 lb/lb-mole
 Tunnel Area: 0.1963 ft²

V_{strav}: 16.02 ft/sec
 V_{scnt}: 17.74 ft/sec
 F_p: 0.903 [ratio]

Initial Tunnel Flow: 183.3 scf/min

Static Pressure: -0.300 in. H₂O

TEST FUEL PROPERTIES

ASTM 3053-17 - Table A1.1 Fuel Properties by Fuel Species

Select Fuel Type	Species	%C	%H	%O	%Ash	MJ/kg	BTU/lb
	Ash, White	49.70	6.90	43.00	0.30	20.75	8927
	Beech	48.70	5.80	44.70	0.60	18.80	8088
	Birch, Sweet	49.80	6.50	43.40	0.30	20.12	8656
	Birch, Yellow	49.80	6.50	43.40	0.30	20.12	8656
	Doug Fir (Coast, Interior West/North)	48.73	6.87	43.90	0.50	19.81	8522
	Doug Fir (Interior South)	48.73	6.87	43.90	0.50	19.81	8522
	Elm, Rock	50.40	6.60	42.30	0.70	20.49	8815
	Elm, Soft	50.40	6.60	42.30	0.70	20.49	8815
	Gum, Red	50.88	6.06	41.57	1.28	19.72	8478
	Larch, Western	50.54	6.36	42.40	0.70	17.58	7558
	Maple, Hard	50.64	6.02	41.74	1.35	19.96	8587
	Maple, Sugar	50.64	6.02	41.74	1.35	19.96	8587
	Oak, Red	49.50	6.62	43.70	0.20	20.20	8690
	Oak, White	50.40	6.59	42.70	0.20	20.50	8819
	Pine, Southern	52.60	7.00	40.10	1.31	22.30	9587
	Pine, Southern Long Leaf	52.60	7.02	40.10	1.30	22.30	9594
X	Doug Fir/Maple Mix	49.92	6.34	42.55	1.03	19.90	8563

WOODSTOVE PREBURN DATA

Client: IHP
Model: Montecito
Run #: 1

Job #: 19-480
Tracking #: 029
Technician: SJB
Date: 6/18/2019

High Fire Test Begins from Cold Start, No Preburn is Performed

BOX A TEST DATA - ASTM E3053 / ASTM E2515

Client: IHP
 Model: Montecito
 Run #: 1

Job #: 19-480
 Tracking #: 029
 Technician: SJB
 Date: 6/18/2019

Elapsed Time (min)	Particulate Sampling Data							Fuel Weight (lb)		Temperature Data (°F)			
	Gas Meter (ft ³)	Sample Rate (cfm)	Dilution Tunnel dP (in H ₂ O)	Orifice dH (in H ₂ O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Scale Reading	Weight Change	Dilution Tunnel	Flue	Filter	Ambient
0	0.000		0.072	0.00	70	-0.68		6.8		71	70	84	68
1	0.166	0.166	0.072	0.42	70	-0.38	87	6.6	-0.2	84	115	83	69
2	0.347	0.181	0.072	0.41	70	0.56	95	6.4	-0.2	82	179	83	69
3	0.526	0.179	0.072	0.41	70	0.42	94	6.3	-0.1	89	254	85	69
4	0.705	0.179	0.072	0.40	70	-0.28	95	6.2	-0.1	97	324	86	69
5	0.882	0.177	0.072	0.40	70	0	95	5.9	-0.3	110	408	87	69
6	1.058	0.176	0.072	0.40	70	0.74	96	5.6	-0.3	129	519	90	69
7	1.233	0.175	0.072	0.39	70	-0.29	97	5.2	-0.4	147	617	90	70
8	1.410	0.177	0.072	0.40	71	0.35	99	4.9	-0.3	162	685	90	70
9	1.586	0.176	0.072	0.39	71	0.06	99	4.5	-0.4	171	711	89	71
10	1.761	0.175	0.072	0.40	71	1.09	99	4.1	-0.4	174	699	89	71
11	1.940	0.179	0.072	0.41	71	1.07	101	3.8	-0.3	175	695	89	72
12	2.130	0.190	0.072	0.41	72	0.34	107	3.6	-0.2	173	682	89	71
13	2.310	0.180	0.072	0.41	72	0.02	101	3.2	-0.4	174	680	89	72
14	2.489	0.179	0.072	0.41	72	0.91	101	2.9	-0.3	175	679	90	72
15	2.669	0.180	0.072	0.41	73	1.04	101	2.7	-0.2	174	675	89	72
16	2.848	0.179	0.072	0.41	73	0.06	100	2.5	-0.2	173	674	90	72
17	3.028	0.180	0.072	0.41	73	0.77	101	2.2	-0.3	172	669	89	72
18	3.208	0.180	0.072	0.41	73	1.05	101	2.1	-0.1	172	672	89	72
19	3.388	0.180	0.072	0.41	73	0.24	101	1.9	-0.2	173	680	89	72
20	3.568	0.180	0.072	0.41	74	0.58	101	1.6	-0.3	172	685	89	73
21	3.748	0.180	0.072	0.41	74	1.18	105	16.6	15	230	663	90	76
22	3.928	0.180	0.072	0.41	75	0.54	101	16.2	-0.4	182	619	89	74
23	4.108	0.180	0.072	0.41	76	-0.14	101	16.0	-0.2	176	650	88	73
24	4.290	0.182	0.072	0.40	75	0	102	15.7	-0.3	175	670	88	74
25	4.469	0.179	0.072	0.41	75	0.07	101	15.5	-0.2	178	679	89	73
26	4.649	0.180	0.072	0.41	75	1.21	101	15.2	-0.3	178	681	90	74
27	4.829	0.180	0.072	0.40	75	0.14	101	15.0	-0.2	178	683	90	74
28	5.007	0.178	0.072	0.40	76	0.98	100	14.7	-0.3	180	692	90	74
29	5.187	0.180	0.072	0.40	76	0.93	101	14.4	-0.3	182	698	89	74
30	5.366	0.179	0.072	0.40	76	1.21	101	14.1	-0.3	182	693	90	74
31	5.545	0.179	0.072	0.40	76	0.3	101	13.9	-0.2	181	690	90	74
32	5.725	0.180	0.072	0.40	76	0.21	101	13.6	-0.3	181	694	90	74

BOX A TEST DATA - ASTM E3053 / ASTM E2515

Client: IHP
 Model: Montecito
 Run #: 1

Job #: 19-480
 Tracking #: 029
 Technician: SJB
 Date: 6/18/2019

Elapsed Time (min)	Particulate Sampling Data							Fuel Weight (lb)		Temperature Data (°F)			
	Gas Meter (ft³)	Sample Rate (cfm)	Dilution Tunnel dP (in H ₂ O)	Orifice dH (in H ₂ O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Scale Reading	Weight Change	Dilution Tunnel	Flue	Filter	Ambient
33	5.904	0.179	0.072	0.40	75	1.07	101	13.4	-0.2	182	695	90	75
34	6.083	0.179	0.072	0.40	76	0.86	101	13.2	-0.2	182	691	90	74
35	6.263	0.180	0.072	0.40	76	0.19	101	12.9	-0.3	180	688	90	74
36	6.442	0.179	0.072	0.40	76	0.35	101	12.7	-0.2	181	684	90	75
37	6.621	0.179	0.072	0.40	76	0.34	100	12.3	-0.4	179	682	90	75
38	6.801	0.180	0.072	0.40	77	0.38	101	12.2	-0.1	179	681	89	75
39	6.981	0.180	0.072	0.40	77	-0.1	101	11.9	-0.3	180	684	89	75
40	7.160	0.179	0.072	0.40	77	0.79	100	11.7	-0.2	181	689	89	75
41	7.339	0.179	0.072	0.40	77	0.52	101	11.5	-0.2	183	692	89	75
42	7.518	0.179	0.072	0.40	77	0.84	101	11.2	-0.3	183	696	89	75
43	7.697	0.179	0.072	0.40	77	0.75	100	10.9	-0.3	182	699	90	75
44	7.876	0.179	0.072	0.40	77	0.8	101	10.6	-0.3	183	701	89	75
45	8.055	0.179	0.072	0.40	77	1.05	101	10.4	-0.2	185	704	89	75
46	8.236	0.181	0.072	0.41	78	1.08	102	10.1	-0.3	186	707	89	75
47	8.418	0.182	0.072	0.41	78	1.34	102	9.9	-0.2	185	708	90	76
48	8.599	0.181	0.072	0.40	78	0.01	102	9.6	-0.3	184	704	90	76
49	8.780	0.181	0.072	0.40	78	0	102	9.4	-0.2	185	703	89	76
50	8.960	0.180	0.072	0.40	78	1.34	101	9.1	-0.3	185	701	89	76
51	9.140	0.180	0.072	0.40	78	0.79	101	8.9	-0.2	185	702	90	76
52	9.320	0.180	0.072	0.40	78	0.59	101	8.7	-0.2	184	700	90	76
53	9.499	0.179	0.072	0.40	78	0.7	100	8.5	-0.2	183	701	90	76
54	9.678	0.179	0.072	0.40	78	-0.01	100	8.2	-0.3	183	700	90	76
55	9.858	0.180	0.072	0.40	78	0.84	101	7.8	-0.4	182	699	90	76
56	10.037	0.179	0.072	0.40	78	0.42	100	7.7	-0.1	182	697	89	76
57	10.216	0.179	0.072	0.40	78	1.42	100	7.5	-0.2	182	697	89	76
58	10.395	0.179	0.072	0.40	78	0.12	100	7.3	-0.2	183	694	89	77
59	10.574	0.179	0.072	0.39	78	0.65	100	7.0	-0.3	180	690	89	76
60	10.753	0.179	0.072	0.40	78	1.27	100	6.9	-0.1	180	686	89	77
61	10.954	0.201	0.072	0.51	78	-0.59	112	6.7	-0.2	179	678	81	77
62	11.139	0.185	0.072	0.40	78	0.02	103	6.5	-0.2	177	671	87	77
63	11.318	0.179	0.072	0.39	78	0.12	100	6.3	-0.2	175	668	88	76
64	11.496	0.178	0.072	0.39	78	0.54	99	6.1	-0.2	175	662	88	77
65	11.675	0.179	0.072	0.39	78	0.28	100	5.9	-0.2	174	651	88	77

BOX A TEST DATA - ASTM E3053 / ASTM E2515

Client: IHP
 Model: Montecito
 Run #: 1

Job #: 19-480
 Tracking #: 029
 Technician: SJB
 Date: 6/18/2019

Elapsed Time (min)	Particulate Sampling Data							Fuel Weight (lb)		Temperature Data (°F)			
	Gas Meter (ft ³)	Sample Rate (cfm)	Dilution Tunnel dP (in H ₂ O)	Orifice dH (in H ₂ O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Scale Reading	Weight Change	Dilution Tunnel	Flue	Filter	Ambient
66	11.852	0.177	0.072	0.39	78	0.11	98	5.8	-0.1	171	643	88	77
67	12.029	0.177	0.072	0.38	78	0.25	98	5.7	-0.1	170	634	88	77
68	12.206	0.177	0.072	0.39	78	-0.11	98	5.4	-0.3	168	625	88	77
69	12.384	0.178	0.072	0.39	78	0.26	98	5.4	0	165	616	87	77
70	12.561	0.177	0.072	0.38	78	-0.21	98	5.2	-0.2	162	607	87	76
71	12.739	0.178	0.072	0.41	78	0.36	98	5.1	-0.1	162	601	87	77
72	12.922	0.183	0.072	0.41	78	0.9	101	5.0	-0.1	160	594	87	77
73	13.105	0.183	0.072	0.41	78	0.33	101	4.9	-0.1	159	589	87	77
74	13.288	0.183	0.072	0.41	78	-0.04	100	4.7	-0.2	157	586	87	76
75	13.471	0.183	0.072	0.41	78	-0.07	100	4.6	-0.1	157	585	87	76
76	13.653	0.182	0.072	0.41	78	-0.31	100	4.5	-0.1	158	584	87	76
77	13.836	0.183	0.072	0.41	78	0.91	100	4.4	-0.1	155	583	87	76
78	14.018	0.182	0.072	0.41	78	-0.32	100	4.3	-0.1	156	581	86	77
79	14.201	0.183	0.072	0.41	78	-0.2	100	4.1	-0.2	155	580	86	76
80	14.383	0.182	0.072	0.41	78	-0.1	100	4.0	-0.1	154	578	86	76
81	14.567	0.184	0.072	0.41	78	-0.03	101	4.0	0	154	571	86	77
82	14.748	0.181	0.072	0.41	78	0.9	99	3.8	-0.2	153	564	86	76
83	14.931	0.183	0.072	0.41	78	0.23	100	3.8	0	151	558	86	76
84	15.113	0.182	0.072	0.41	78	-0.37	99	3.7	-0.1	150	553	86	76
85	15.295	0.182	0.072	0.41	78	0.91	99	3.5	-0.2	148	542	86	76
86	15.477	0.182	0.072	0.41	78	0.3	99	3.5	0	145	534	85	76
87	15.660	0.183	0.072	0.41	78	0.4	100	3.4	-0.1	145	529	85	76
88	15.843	0.183	0.072	0.41	78	0.23	99	3.3	-0.1	144	525	85	76
89	16.025	0.182	0.072	0.41	78	0.27	99	3.2	-0.1	143	522	85	75
90	16.207	0.182	0.072	0.41	78	0.49	99	3.1	-0.1	143	518	85	75
91	16.390	0.183	0.072	0.41	78	1.21	99	3.1	0	143	516	85	76
Avg/Tot	16.390	0.180	0.072	0.40	76	0.43	100			166	622	88	74.5

BOX B TEST DATA - ASTM E3053 / ASTM E2515

Client: IHP
 Model: Montecito
 Run #: 1

Job #: 19-480
 Tracking #: 029
 Technician: SJB
 Date: 6/18/2019

Elapsed Time (min)	Particulate Sampling Data							Flue Gas Data		
	Gas Meter (ft ³)	Sample Rate (cfm)	Orifice dH (in H ₂ O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Filter (°F)	Flue Draft (in H ₂ O)	CO ₂ (%)	CO (%)
0	0.000		0.00	72	1		84	0.000	(0.13)	0.04
1	0.185	0.185	0.43	72	2.35	97	80	-0.020	0.10	(0.02)
2	0.373	0.188	0.42	72	0.76	98	80	-0.040	0.08	0.08
3	0.563	0.190	0.42	72	0.26	100	81	-0.050	0.53	0.14
4	0.755	0.192	0.42	72	1.2	102	82	-0.060	2.77	0.14
5	0.945	0.190	0.42	72	1.82	102	84	-0.070	5.30	0.06
6	1.132	0.187	0.41	72	1	102	86	-0.090	7.16	0.11
7	1.319	0.187	0.43	72	1.93	103	87	-0.090	10.42	0.27
8	1.507	0.188	0.43	72	2.27	105	88	-0.090	12.65	0.62
9	1.694	0.187	0.43	73	2.79	105	89	-0.090	13.68	0.53
10	1.880	0.186	0.42	73	2.66	105	89	-0.090	13.53	0.38
11	2.069	0.189	0.43	73	1.72	107	90	-0.100	12.71	0.34
12	2.257	0.188	0.27	73	6.99	106	89	-0.090	12.54	0.33
13	2.445	0.188	0.43	73	1.07	106	88	-0.090	11.60	0.29
14	2.632	0.187	0.44	73	2.83	106	88	-0.090	11.92	0.12
15	2.817	0.185	0.43	73	2.41	104	88	-0.090	11.94	0.10
16	3.003	0.186	0.44	73	1.34	105	88	-0.080	11.39	0.12
17	3.186	0.183	0.44	74	2.74	103	89	-0.080	11.36	0.14
18	3.368	0.182	0.44	74	2.69	102	89	-0.090	11.10	0.06
19	3.551	0.183	0.43	74	1.23	103	89	-0.090	11.13	0.11
20	3.736	0.185	0.44	74	1.31	104	89	-0.090	11.81	0.10
21	3.926	0.190	0.42	74	2.29	112	90	-0.080	11.58	0.21
22	4.114	0.188	0.43	74	0.62	107	90	-0.080	10.60	0.26
23	4.301	0.187	0.43	75	2.48	105	90	-0.090	6.63	0.33
24	4.489	0.188	0.42	75	2.92	106	88	-0.090	9.48	0.23
25	4.677	0.188	0.43	75	2.13	106	88	-0.080	11.36	0.11
26	4.863	0.186	0.43	75	0.53	105	88	-0.080	11.76	0.09
27	5.049	0.186	0.42	75	2.91	105	88	-0.090	11.76	0.11
28	5.234	0.185	0.43	76	2.78	104	88	-0.080	11.71	0.08
29	5.417	0.183	0.43	76	0.79	103	88	-0.090	12.44	0.07
30	5.601	0.184	0.43	76	2.47	104	88	-0.090	12.72	0.06
31	5.786	0.185	0.42	76	0.93	104	89	-0.090	12.26	0.03

BOX B TEST DATA - ASTM E3053 / ASTM E2515

Client: IHP
 Model: Montecito
 Run #: 1

Job #: 19-480
 Tracking #: 029
 Technician: SJB
 Date: 6/18/2019

Elapsed Time (min)	Particulate Sampling Data							Flue Gas Data		
	Gas Meter (ft ³)	Sample Rate (cfm)	Orifice dH (in H ₂ O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Filter (°F)	Flue Draft (in H ₂ O)	CO ₂ (%)	CO (%)
32	5.969	0.183	0.43	76	2.55	103	89	-0.090	11.97	0.06
33	6.152	0.183	0.43	77	2.78	103	89	-0.080	12.04	0.06
34	6.335	0.183	0.44	77	1.48	103	89	-0.090	12.12	0.02
35	6.518	0.183	0.43	77	1.81	103	89	-0.100	11.92	0.05
36	6.699	0.181	0.43	77	2.52	102	89	-0.080	11.52	0.02
37	6.879	0.180	0.42	77	2.5	101	87	-0.090	11.39	0.01
38	7.060	0.181	0.42	78	1.86	102	87	-0.090	10.97	0.08
39	7.240	0.180	0.43	78	0.8	101	86	-0.080	11.25	0.02
40	7.421	0.181	0.43	78	1.41	102	87	-0.080	11.48	0.01
41	7.600	0.179	0.42	78	2.99	101	87	-0.090	11.50	0.06
42	7.779	0.179	0.42	78	1.74	101	87	-0.090	11.86	0.02
43	7.956	0.177	0.42	78	0.85	100	88	-0.080	11.88	0.04
44	8.135	0.179	0.42	79	2.93	101	88	-0.080	11.90	0.06
45	8.311	0.176	0.41	79	2.98	99	88	-0.090	11.96	0.05
46	8.489	0.178	0.42	79	0.74	100	88	-0.090	12.10	0.08
47	8.665	0.176	0.42	79	1.88	99	88	-0.090	12.41	0.04
48	8.840	0.175	0.42	79	0.73	98	88	-0.080	12.19	0.06
49	9.016	0.176	0.42	79	2.52	99	88	-0.090	12.05	0.07
50	9.191	0.175	0.42	80	1.7	98	88	-0.090	12.49	0.03
51	9.368	0.177	0.42	80	2.03	99	88	-0.090	12.39	0.04
52	9.543	0.175	0.42	80	1.34	98	88	-0.080	12.17	0.07
53	9.717	0.174	0.41	80	2.62	98	88	-0.090	12.47	0.01
54	9.890	0.173	0.42	80	2.9	97	88	-0.080	12.25	0.01
55	10.063	0.173	0.42	80	2.82	97	88	-0.080	12.24	0.02
56	10.237	0.174	0.42	80	2.68	98	88	-0.090	12.37	(0.02)
57	10.411	0.174	0.42	81	2.03	97	88	-0.090	12.27	(0.01)
58	10.582	0.171	0.40	81	0.91	96	88	-0.090	11.97	0.06
59	10.754	0.172	0.42	81	1.23	96	88	-0.090	12.01	(0.01)
60	10.931	0.177	0.40	81	1.47	99	88	-0.080	11.24	0.10
61	11.107	0.176	0.42	81	2.17	98	88	-0.090	11.51	(0.03)
62	11.284	0.177	0.41	81	1.34	99	88	-0.090	11.22	0.01
63	11.461	0.177	0.41	81	3.13	98	88	-0.080	10.79	0.04

BOX B TEST DATA - ASTM E3053 / ASTM E2515

Client: IHP
 Model: Montecito
 Run #: 1

Job #: 19-480
 Tracking #: 029
 Technician: SJB
 Date: 6/18/2019

Elapsed Time (min)	Particulate Sampling Data							Flue Gas Data		
	Gas Meter (ft ³)	Sample Rate (cfm)	Orifice dH (in H ₂ O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Filter (°F)	Flue Draft (in H ₂ O)	CO ₂ (%)	CO (%)
64	11.638	0.177	0.40	81	3.19	98	88	-0.090	10.67	0.07
65	11.814	0.176	0.41	82	1.86	98	88	-0.080	10.35	0.08
66	11.990	0.176	0.40	82	3.24	97	87	-0.090	10.07	0.06
67	12.165	0.175	0.41	82	1.74	97	87	-0.080	9.79	(0.05)
68	12.340	0.175	0.41	82	2.91	97	87	-0.070	9.30	0.03
69	12.514	0.174	0.41	82	1.67	96	87	-0.070	9.12	0.02
70	12.690	0.176	0.41	82	3.33	97	86	-0.090	8.91	(0.02)
71	12.866	0.176	0.43	82	2.24	97	86	-0.080	8.30	0.03
72	13.045	0.179	0.43	82	1.84	98	86	-0.070	8.33	0.01
73	13.223	0.178	0.44	83	1.77	97	86	-0.070	8.48	(0.03)
74	13.400	0.177	0.44	83	1.74	97	86	-0.070	8.39	0.00
75	13.578	0.178	0.44	83	3.19	97	86	-0.070	8.18	0.04
76	13.754	0.176	0.44	83	1.8	96	86	-0.070	8.45	(0.03)
77	13.931	0.177	0.43	83	2.57	97	85	-0.080	8.21	0.06
78	14.108	0.177	0.43	83	1.93	97	85	-0.080	8.17	0.07
79	14.284	0.176	0.43	83	1	96	86	-0.080	8.23	0.03
80	14.459	0.175	0.44	83	3.15	95	86	-0.080	8.62	(0.01)
81	14.635	0.176	0.42	83	3.24	96	86	-0.080	8.48	0.01
82	14.811	0.176	0.43	83	3.13	96	86	-0.080	8.15	0.00
83	14.987	0.176	0.44	83	1.82	96	86	-0.080	7.81	0.00
84	15.163	0.176	0.42	84	2.05	95	85	-0.080	7.51	0.07
85	15.339	0.176	0.44	84	1.86	95	85	-0.070	7.57	0.03
86	15.514	0.175	0.42	84	1.95	95	85	-0.080	7.26	0.09
87	15.689	0.175	0.44	84	2.1	95	85	-0.070	7.14	0.03
88	15.866	0.177	0.43	84	1.48	96	85	-0.070	6.83	0.09
89	16.042	0.176	0.43	84	1.37	95	85	-0.080	7.20	0.04
90	16.215	0.173	0.44	84	1.1	93	85	-0.060	6.91	0.10
91	16.391	0.176	0.43	84	1.54	95	85	-0.080	7.25	0.01
Avg/Tot	16.391	0.180	0.42	78	2.04	100	87	-0.081	9.99	0.08

WOODSTOVE SURFACE TEMPERATURE DATA

Client: IHP

Job #: 19-480

Model: Montecito

Tracking #: 029

Run #: 1

Technician: SJB

Date: 6/18/2019

Elapsed Time (min)	Temperature Data (°F)						
	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
0	69	69	70	69	69	69.2	N/A
1	69	69	70	84	69	72.2	N/A
2	70	70	70	131	69	82.0	N/A
3	70	70	72	191	69	94.4	N/A
4	71	70	75	256	69	108.2	N/A
5	72	71	79	327	69	123.6	N/A
6	74	72	84	466	69	153.0	N/A
7	78	74	92	592	69	181.0	N/A
8	84	77	105	708	70	208.8	N/A
9	92	81	123	763	70	225.8	N/A
10	100	87	144	758	71	232.0	N/A
11	109	95	166	751	72	238.6	N/A
12	117	105	188	752	73	247.0	N/A
13	124	116	208	769	75	258.4	N/A
14	131	124	227	784	76	268.4	N/A
15	136	130	245	792	78	276.2	N/A
16	143	136	263	807	80	285.8	N/A
17	150	141	280	805	83	291.8	N/A
18	160	145	296	800	86	297.4	N/A
19	167	153	311	801	89	304.2	N/A
20	176	163	325	810	92	313.2	N/A
21	184	173	337	810	95	319.8	N/A
22	198	186	326	767	99	315.2	N/A
23	215	202	306	743	102	313.6	N/A
24	230	216	294	736	104	316.0	N/A
25	244	229	288	734	107	320.4	N/A
26	256	242	285	738	109	326.0	N/A
27	267	254	284	736	111	330.4	N/A
28	278	265	285	736	113	335.4	N/A
29	289	276	286	741	116	341.6	N/A
30	299	286	288	745	118	347.2	N/A
31	309	296	289	743	119	351.2	N/A
32	319	305	291	744	121	356.0	N/A
33	328	314	294	747	123	361.2	N/A
34	337	322	295	748	124	365.2	N/A
35	346	331	297	749	126	369.8	N/A
36	355	338	298	749	127	373.4	N/A
37	363	346	299	747	128	376.6	N/A
38	371	353	301	750	130	381.0	N/A
39	379	360	301	756	131	385.4	N/A
40	386	367	303	765	132	390.6	N/A
41	394	374	304	777	133	396.4	N/A
42	400	380	305	789	134	401.6	N/A
43	407	386	308	801	135	407.4	N/A
44	414	393	309	808	136	412.0	N/A
45	420	399	311	818	137	417.0	N/A
46	426	405	313	827	138	421.8	N/A
47	432	411	315	832	139	425.8	N/A

WOODSTOVE SURFACE TEMPERATURE DATA

Client: IHP

Job #: 19-480

Model: Montecito

Tracking #: 029

Run #: 1

Technician: SJB

Date: 6/18/2019

Elapsed Time (min)	Temperature Data (°F)						
	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
48	438	417	317	830	140	428.4	N/A
49	444	423	319	827	141	430.8	N/A
50	450	429	321	826	142	433.6	N/A
51	455	435	322	823	143	435.6	N/A
52	461	441	324	820	144	438.0	N/A
53	467	447	326	818	145	440.6	N/A
54	473	452	328	818	147	443.6	N/A
55	478	458	329	819	148	446.4	N/A
56	484	464	331	821	150	450.0	N/A
57	489	470	332	821	151	452.6	N/A
58	494	476	334	819	153	455.2	N/A
59	500	482	335	817	155	457.8	N/A
60	505	487	336	817	156	460.2	N/A
61	509	493	337	816	158	462.6	N/A
62	514	498	338	810	160	464.0	N/A
63	517	503	338	803	162	464.6	N/A
64	521	508	339	796	165	465.8	N/A
65	525	513	339	787	167	466.2	N/A
66	528	518	339	777	169	466.2	N/A
67	531	523	340	765	171	466.0	N/A
68	534	527	340	753	173	465.4	N/A
69	536	531	340	745	175	465.4	N/A
70	539	534	340	733	176	464.4	N/A
71	540	538	339	719	178	462.8	N/A
72	542	541	339	709	180	462.2	N/A
73	543	543	338	700	182	461.2	N/A
74	545	546	337	694	183	461.0	N/A
75	545	548	337	690	185	461.0	N/A
76	546	550	336	688	186	461.2	N/A
77	547	551	336	684	188	461.2	N/A
78	548	553	336	680	189	461.2	N/A
79	548	554	335	678	191	461.2	N/A
80	549	555	334	674	193	461.0	N/A
81	549	556	335	667	195	460.4	N/A
82	549	557	334	656	197	458.6	N/A
83	549	558	333	647	199	457.2	N/A
84	549	559	333	637	202	456.0	N/A
85	548	559	332	618	205	452.4	N/A
86	548	560	331	601	209	449.8	N/A
87	547	561	330	589	212	447.8	N/A
88	547	561	330	582	216	447.2	N/A
89	545	562	328	583	219	447.4	N/A
90	545	562	328	580	222	447.4	N/A
91	544	562	327	579	226	447.6	N/A
Average	369	361	285	706	137	372	N/A

LAB SAMPLE DATA - ASTM E2515

Client: IHP
 Model: Montecito
 Run #: 1

Job #: 19-480
 Tracking #: 029
 Technician: SJB
 Date: 6/18/2019

	Sample ID	Tare, mg	Total, mg	Final, mg	Catch, mg
Train A Filters - First Hour	T242	86.0	86.0	90.9	4.9
Train A Filters - Remainder	T243	86.4	172.8	173.4	0.6
	T244	86.4			
Train A Probe	4A	116183.8	116183.8	116184.3	0.5
Train A O-Rings	4A	3588.5	3588.5	3589.4	0.9
Train B Filters	T245	85.5	171.5	175.0	3.5
	T246	86.0			
Train B Probe	4B	116366.0	116366.0	116366.6	0.6
Train B O-Rings	4B	3576.3	3576.3	3579.7	3.4
Background Filter			0.0	0.0	

Placed in Dessicator on:	6/21 - 8:30
-----------------------------	-------------

Train A Filters - First Hour	90.8	6/26 7:57	90.9	6/27 7:20				
Train A Filters - Remainder	173.3	6/26 7:57	173.4	6/27 7:21				
Train A Probe	116184.4	6/26 7:57	116184.3	6/27 7:21				
Train A O-Rings	3589.5	6/26 7:58	3589.4	6/27 7:21				
Train B Filters	174.9	6/26 7:58	175.0	6/27 7:22				
Train B Probe	116366.6	6/26 7:58	116366.6	6/27 7:22				
Train B O-Rings	3579.6	6/26 7:58	3579.7	6/27 7:22				
Background Filter								

1st hour Sub-Total, mg:	4.9
Remainder Sub-Total, mg:	2.0
Train 1 Aggregate, mg:	6.9
Train 2 Aggregate, mg:	7.5
Ambient Aggregate, mg:	0.0

ASTM E3053 Wood Heater Run Sheets

Client: IHP Job Number: 19-480 Tracking #: 029
Model: Montecito Run Number: 1 Test Date: 6/18/2019

Wood Heater Run Notes

Pre-Test Notes

Pre-Test Start Time: N/A
Air Control Setting: N/A

Time	Notes
N/A	High fire test begins from cold start per ASTM E3053

Test Notes

Test Burn Start Time: 9:38
Air Control Setting: Full Open

Time	Notes
0 min	Loaded all 6.7 lbs of kindling and start-up into firebox. Lit with propane torch for 60 seconds then closed door. Air set to full open, fan off. @ 1.5 lbs, leveled remaining start-up fuel and loaded high fire test load, turned fan on to high Changed 1-hour filter @3.1 lbs (1.5 lbs of start-up + 1.6 lbs of remaining high fire fuel) End of Test
20 min	
60 min	
91 min	

Test Burn End Time: 11:09

Flue Gas Concentration Measurement

Calibration Gas Values: Span Gas CO₂ (%): 17.00 CO (%): 4.00
Mid Gas CO₂ (%): 9.00 CO (%): 0.500

Calibration Results:

	Pre Test			Post Test		
	Zero	Mid	Span	Zero	Mid	Span
Time	8:56	9:00	9:02	6-19 - 8:05	6-19 - 8:09	6-19 - 8:07
CO ₂	0.00	9.09	17.15	0.00	9.14	17.13
CO	0.000	0.493	3.96	0.000	0.496	3.953

Flue Gas Probe Leak Check: Initial: No Leakage Final: No Leakage

Technician Signature: 

Date: 6/19/2019
Page 1 of 3

ASTM E3053 Wood Heater Run Sheets

Client: IHP
Model: Montecito

Job Number: 19-480
Run Number: 1

Tracking #: 029
Test Date: 6/18/2019

Test Photos



Kindling Fuel Load



Start-up Fuel Load



High Fire Fuel Load



Residual Start-up Fuel Coal Bed

Technician Signature: _____

A handwritten signature in black ink, appearing to be "RL", written over a horizontal line.

Date: 6/19/2019

ASTM E3053 Wood Heater Run Sheets

Client: IHP

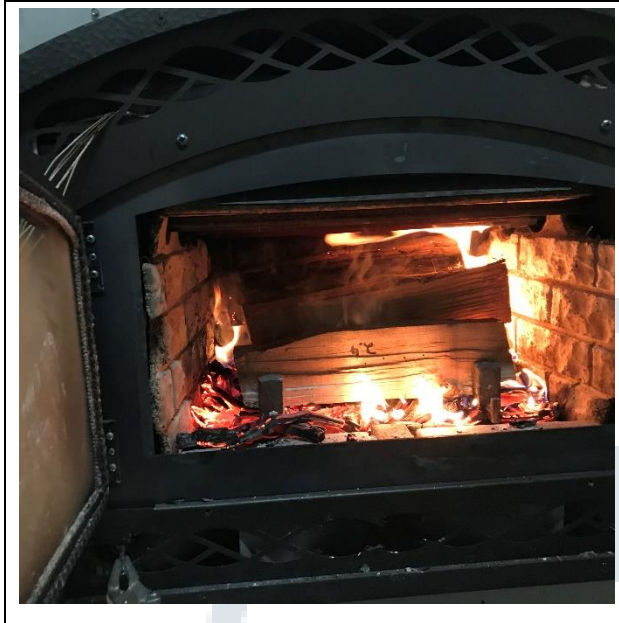
Job Number: 19-480

Tracking #: 029

Model: Montecito

Run Number: 1

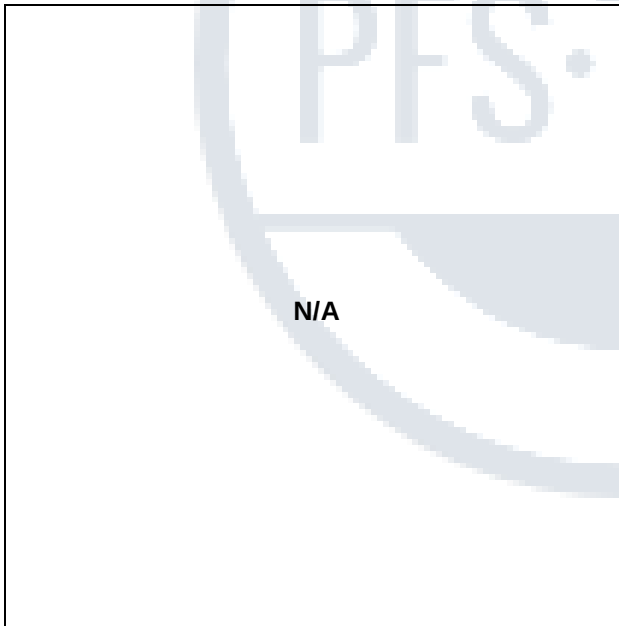
Test Date: 6/18/2019



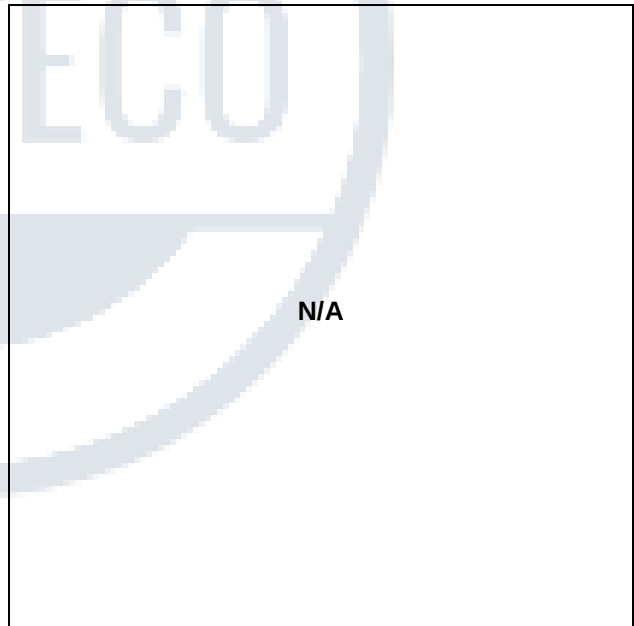
High Fire Fuel Loaded



Residual High Fire Load Coal Bed



Low Fire Fuel Load



Low Fire Fuel Loaded

Technician Signature: _____

A handwritten signature in black ink, appearing to be "JL", written over a horizontal line.

Date: 6/19/2019

WOOD STOVE TEST DATA PACKET
ASTM E3053/E2515



Run 2 Data Summary

Client: IHP
Model: Montecito
Job #: 19-480
Tracking #: 029
Test Date: 6/18/2019

A handwritten signature in dark ink, appearing to be "JL" or similar, written over a horizontal line.

Techician Signature

6/27/2019

Date

TEST RESULTS - ASTM E3053 / ASTM E2515

Client: IHP

Model: Montecito

Run #: 2

Job #: 19-480

Tracking #: 029

Technician: SJB

Date: 6/18/2019

Burn Rate (kg/hr):	1.11
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	Ambient Sample	Sample Train A	Sample Train B	1st Hour Filter
Total Sample Volume (ft ³)	0.000	64.094	63.932	10.823
Average Gas Velocity in Dilution Tunnel (ft/sec)	16.38			
Average Gas Flow Rate in Dilution Tunnel (dscf/hr)	10903.4			
Average Gas Meter Temperature (°F)	74.8	75.8	85.8	76.0
Total Sample Volume (dscf)	0.000	64.084	61.634	10.817
Average Tunnel Temperature (°F)	94.5			
Total Time of Test (min)	352			
Total Particulate Catch (mg)	0.0	7.6	7.6	1.0
Particulate Concentration, dry-standard (g/dscf)	0.0000000	0.0001186	0.0001233	0.0000924
Total PM Emissions (g)	0.00	7.59	7.89	1.01
Particulate Emission Rate (g/hr)	0.00	1.29	1.34	1.01
Emissions Factor (g/kg)	-	1.17	1.21	-
Difference from Average Total Particulate Emissions (g)	-	0.15	0.15	-
Difference from Average Emissions Factor (g/kg)	-	0.02	0.02	-

Final Average Results	
Total Particulate Emissions (g)	7.74
Particulate Emission Rate (g/hr)	1.32
Emissions Factor (g/kg)	1.19
HHV Efficiency (%)	73.2%
LHV Efficiency (%)	78.7%
CO Emissions (g/min)	1.17

Quality Checks	Requirement	Observed	Result
Dual Train Precision	Each train within 7.5% of average emissions (in grams), or emission factors within 0.5 g/kg	See Above	OK
Filter Temps	>80 °F, <90 °F	Min: 80 / Max: 90	OK
Face Velocity	< 30 ft/min	10.2	OK
Leakage Rate	Less than 4% of average sample rate	0.002 cfm	OK
Ambient Temp	55-90 °F	Min: 70 / Max: 77	OK
Negative Probe Weight Evaluation	<5% of Total Catch	Probe Catch Not Negative	OK
Pro-Rate Variation	90% of readings between 90-110%; none greater than 120% or less than 80%	See Data Tabs	OK

B415.1 Efficiency Results

Manufacturer: IHP
Model: Montecito
Date: 06/18/19
Run: 2
Control #: 19-480
Test Duration: 352
Output Category: Low

Test Results in Accordance with CSA B415.1-09

	HHV Basis	LHV Basis
Overall Efficiency	73.2%	78.7%
Combustion Efficiency	95.7%	95.7%
Heat Transfer Efficiency	76.5%	82.2%

Output Rate (kJ/h)	16,105	15,277	(Btu/h)
Burn Rate (kg/h)	1.11	2.44	(lb/h)
Input (kJ/h)	22,005	20,874	(Btu/h)

Test Load Weight (dry kg)	6.49	14.31	dry lb
MC wet (%)	17.75		
MC dry (%)	21.58		
Particulate (g)	7.74		
CO (g)	410		
Test Duration (h)	5.87		

Emissions	Particulate	CO
g/MJ Output	0.08	4.34
g/kg Dry Fuel	1.19	63.21
g/h	1.32	69.96
g/min	0.02	1.17
lb/MM Btu Output	0.19	10.10

Air/Fuel Ratio (A/F)	14.66
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VERSION:

2.2

12/14/2009

HIGH FIRE FUEL LOAD DATA - ASTM E3053

Client: IHP
 Model: Montecito
 Run #: 2

Job #: 19-480
 Tracking #029
 Technician: SJB
 Date: 6/18/2019

Nominal Loading Density (lbs/ft³, wet basis): 10
 Usable Firebox Volume (ft³): 1.45
 Target Load Weight (lbs): 14.50
 Total Load Weight Range (lbs): 13.80 to 15.20
 Core Load Weight Range (lbs): 6.50 to 9.40
 Remainder Load Weight Range (lbs): 5.10 to 8.00
 Core Load Piece Range (lbs): 2.20 to 3.60
 Remainder Load Piece Range (lbs): 1.50 to 8.00
 Max Allowable Kindling Weight (lbs): 3.00
 Max Allowable Start-up Fuel Weight (lbs): 4.50

CORE LOAD DATA

Piece #	Length (in)	Weight (lbs)	Within Spec?	Fuel Piece Moisture Readings (%DB)				Within Spec?	Dry Weight	
				1	2	3	Ave.		lbs	kg
1	16.00	2.40	In Range	18.9	22.1	19.5	20.2	In Range	2.00	0.91
2	16.00	3.25	In Range	19.1	20.4	18.7	19.4	In Range	2.72	1.23
3	16.00	3.02	In Range	18.7	19.1	20.7	19.5	In Range	2.53	1.15
Core Load Wt. (lbs)		8.67	In Range							

REMAINDER LOAD DATA (1 to 3 Pieces)

Piece #	Length (in)	Weight (lbs)	Within Spec?	Fuel Piece Moisture Readings (%DB)				Within Spec?	Dry Weight	
				1	2	3	Ave.		lbs	kg
1	16.00	3.30	In Range	18.9	19.6	19.4	19.3	In Range	2.77	1.25
2	16.00	3.02	In Range	21.9	23.8	22.4	22.7	In Range	2.46	1.12
3			NA				NA	NA	NA	NA
Remainder Load (lbs)		6.32	In Range							

Total Load Weight (lbs): 14.99 In Range
 Core Load % of Total Weight: 58% In Range 45-65%
 Remainder % of Total Weight: 42% In Range 35-55%
 Total Load % of Target Weight: 103% In Range 95-105%
 Actual Fuel Loading Density (lb/ft³): 10.3
 Total Load Average Moisture Content (%DB): 20.2 In Range 19-25%
 Total Load Average Moisture Content (%WB): 16.8
 Total Test Load Weight (dry basis): 12.47 lbs 5.66 kg

KINDLING AND START-UP FUEL

Kindling Weight (lbs)	Within Spec?	Kindling Moisture Readings (%DB)				Within Spec?	Dry Weight	
		1	2	3	Avg.		lbs	kg
2.84	In Range	10	10	10	10.0	In Range	2.58	1.17

Start-up Fuel Wt. (lb)	Within Spec?	Start-up Moisture Readings (%DB)				Within Spec?	Dry Weight	
		1	2	3	Avg.		lbs	kg
3.93	In Range	24.6	23.1	22.9	23.5	In Range	3.18	1.44

TEST FUEL LOADING RANGE

Allowable Residual Start-up Fuel Range (lb): 1.5 to 3.0
 Actual Residual Start-up Fuel Weight (lb): 1.5 In Range

LOW & MEDIUM FIRE FUEL LOAD DATA - ASTM E3053

Client: IHP
 Model: Montecito
 Run #: 2

Job #: 19-480
 Tracking #: 029
 Technician: SJB
 Date: 6/18/2019

Nominal Loading Density (lbs/ft³, wet basis): 12
 Usable Firebox Volume (ft³): 1.45
 Target Load Weight (lbs): 17.40
 Total Load Weight Range (lbs): 16.53 to 18.27
 Core Load Weight Range (lbs): 7.83 to 11.31
 Remainder Load Weight Range (lbs): 6.09 to 9.57
 Core Load Piece Range (lbs): 2.61 to 4.35
 Remainder Load Piece Range (lbs): 1.74 to 5.22

CORE LOAD DATA

Piece #	Length (in)	Weight (lbs)	Within Spec?	Fuel Piece Moisture Readings (%DB)				Within Spec?	Dry Weight	
				1	2	3	Ave.		lbs	kg
1	16.00	3.53	In Range	23.5	23.0	23.6	23.4	In Range	2.86	1.30
2	16.00	3.44	In Range	18.8	19.5	19.4	19.2	In Range	2.89	1.31
3	16.00	3.27	In Range	23.5	16.9	26.1	22.2	In Range	2.68	1.21
Core Load Wt. (lbs)		10.24	In Range							

REMAINDER LOAD DATA (2 to 3 Pieces)

Piece #	Length (in)	Weight (lbs)	Within Spec?	Fuel Piece Moisture Readings (%DB)				Within Spec?	Dry Weight	
				1	2	3	Ave.		lbs	kg
1	16.00	4.37	In Range	21.0	23.8	19.1	21.3	In Range	3.60	1.63
2	16.00	2.80	In Range	22.3	21.5	22.3	22.0	In Range	2.29	1.04
3			NA				NA	NA	NA	NA
Remainder Load (lbs)		7.17	In Range							

Remainder Load Small/Large Piece Weight Ratio: 64% In Range ≤ 67%
 Total Load Weight (lbs): 17.41 In Range
 Core Load % of Total Weight: 59% In Range 45-65%
 Remainder % of Total Weight: 41% In Range 35-55%
 Total Load % of Target Weight: 100% In Range 95-105%
 Actual Fuel Loading Density (lb/ft³): 12.0
 Total Load Average Moisture Content (%DB): 21.6 In Range 19-25%
 Total Load Average Moisture Content (%WB): 17.7
 Total Test Load Weight (dry basis): 14.32 lbs 6.50 kg

TEST FUEL LOADING RANGE

Allowable Charcoal Bed Weight Range (lb): 1.8 to 3.4
 Actual Charcoal Bed Wt. (lb): 1.9 In Range

TEST END POINT

Actual Fuel Load Ending Weight (lb): 0.0 Valid Test (≥90%)

Total Fuel Burned During Test Run:
 17.4 lbs, wet basis
 14.3 lbs, dry basis
 6.50 kg, dry basis

DILUTION TUNNEL & MISC. DATA - ASTM E3053 / E2515

Client: IHP
 Model: Montecito
 Run #: 2
 Test Start Time: 11:15
 Test Type: Low Fire

Job #: 19-480
 Tracking #: 029
 Technician: SJB
 Date: 6/18/2019

Recording Interval (min): 1
 Total Sampling Time (min): 352

Meter Box γ Factor: 1.004 (A)
 Meter Box γ Factor: 0.986 (B)
 Meter Box γ Factor: 1.000 (Ambient)

Induced Draft Check (in. H₂O): 0
 Smoke Capture Check (%): 100%
 Date Flue Pipe Last Cleaned: 6/10/2019

	Pre-Test	Post Test	Avg.
Barometric Pressure (in. Hg)	30.25	30.19	30.22
Relative Humidity (%)	45.8	53.6	
Room Air Velocity (ft/min)	0	0	
Scale Audit (lbs)	10.0	10.0	
Ambient Sample Volume:	0.000 ft ³		

Sample Train Post-Test Leak Checks

(A)	0.002	cfm @	-11	in. Hg
(B)	0.000	cfm @	-18	in. Hg
(Ambient)	0.000	cfm @	0	in. Hg

DILUTION TUNNEL FLOW

Traverse Data		
Point	dP (in H ₂ O)	Temp (°F)
1	0.054	71
2	0.066	71
3	0.064	71
4	0.058	71
5	0.042	71
6	0.070	71
7	0.060	71
8	0.046	71
Center	0.072	71

Dilution Tunnel H₂O: 2.00 percent
 Tunnel Diameter: 6 inches
 Pitot Tube Cp: 0.99 [unitless]
 Dilution Tunnel MW(dry): 29.00 lb/lb-mole
 Dilution Tunnel MW(wet): 28.78 lb/lb-mole
 Tunnel Area: 0.1963 ft²

V_{strav}: 16.02 ft/sec
 V_{scnt}: 17.74 ft/sec
 F_p: 0.903 [ratio]

Initial Tunnel Flow: 183.2 scf/min

Static Pressure: -0.300 in. H₂O

TEST FUEL PROPERTIES

ASTM 3053-17 - Table A1.1 Fuel Properties by Fuel Species

Select Fuel Type	Species	%C	%H	%O	%Ash	MJ/kg	BTU/lb
	Ash, White	49.70	6.90	43.00	0.30	20.75	8927
	Beech	48.70	5.80	44.70	0.60	18.80	8088
	Birch, Sweet	49.80	6.50	43.40	0.30	20.12	8656
	Birch, Yellow	49.80	6.50	43.40	0.30	20.12	8656
	Doug Fir (Coast, Interior West/North)	48.73	6.87	43.90	0.50	19.81	8522
	Doug Fir (Interior South)	48.73	6.87	43.90	0.50	19.81	8522
	Elm, Rock	50.40	6.60	42.30	0.70	20.49	8815
	Elm, Soft	50.40	6.60	42.30	0.70	20.49	8815
	Gum, Red	50.88	6.06	41.57	1.28	19.72	8478
	Larch, Western	50.54	6.36	42.40	0.70	17.58	7558
	Maple, Hard	50.64	6.02	41.74	1.35	19.96	8587
	Maple, Sugar	50.64	6.02	41.74	1.35	19.96	8587
	Oak, Red	49.50	6.62	43.70	0.20	20.20	8690
	Oak, White	50.40	6.59	42.70	0.20	20.50	8819
	Pine, Southern	52.60	7.00	40.10	1.31	22.30	9587
	Pine, Southern Long Leaf	52.60	7.02	40.10	1.30	22.30	9594
X	Doug Fir/Maple Mix	49.59	6.49	42.93	0.88	19.88	8551

WOODSTOVE PREBURN DATA

Client: IHP
Model: Montecito
Run #: 2

Job #: 19-480
Tracking #: 029
Technician: SJB
Date: 6/18/2019

Low Fire performed as a continuation of High Fire Test, see Run 1 test data for details

BOX A TEST DATA - ASTM E3053 / ASTM E2515

Client: IHP
 Model: Montecito
 Run #: 2

Job #: 19-480
 Tracking #: 029
 Technician: SJB
 Date: 6/18/2019

Elapsed Time (min)	Particulate Sampling Data							Fuel Weight (lb)		Temperature Data (°F)			
	Gas Meter (ft³)	Sample Rate (cfm)	Dilution Tunnel dP (in H ₂ O)	Orifice dH (in H ₂ O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Scale Reading	Weight Change	Dilution Tunnel	Flue	Filter	Ambient
0	0.000		0.072	0.00	76	-0.54		17.4		133	461	84	76
1	0.169	0.169	0.072	0.40	76	0.73	97	17.3	-0.1	142	402	83	77
2	0.348	0.179	0.072	0.39	76	0.46	102	17.1	-0.2	141	464	86	76
3	0.527	0.179	0.072	0.39	76	-0.2	104	16.8	-0.3	157	603	87	76
4	0.704	0.177	0.072	0.39	76	-0.19	102	16.5	-0.3	148	608	85	77
5	0.885	0.181	0.072	0.41	76	0.74	104	16.3	-0.2	149	618	85	77
6	1.069	0.184	0.072	0.41	76	0.17	106	16.0	-0.3	150	633	85	77
7	1.251	0.182	0.072	0.40	76	0.28	105	15.8	-0.2	152	645	85	77
8	1.432	0.181	0.072	0.40	76	1.3	104	15.5	-0.3	152	657	85	77
9	1.613	0.181	0.072	0.40	76	0.93	104	15.3	-0.2	153	663	85	77
10	1.793	0.180	0.072	0.40	76	1.07	104	15.0	-0.3	155	669	86	77
11	1.973	0.180	0.072	0.40	76	0.57	103	14.7	-0.3	148	649	84	77
12	2.154	0.181	0.072	0.40	76	0.33	103	14.6	-0.1	131	567	84	77
13	2.334	0.180	0.072	0.40	76	0.2	101	14.4	-0.2	123	522	83	77
14	2.515	0.181	0.072	0.40	76	0.95	102	14.3	-0.1	120	495	83	76
15	2.695	0.180	0.072	0.40	76	0.87	101	14.3	0	116	476	84	76
16	2.876	0.181	0.072	0.39	76	0.16	101	14.0	-0.3	114	463	85	76
17	3.057	0.181	0.072	0.40	76	0.22	101	13.9	-0.1	113	455	86	77
18	3.237	0.180	0.072	0.40	76	-0.06	100	13.8	-0.1	112	449	86	77
19	3.418	0.181	0.072	0.39	76	-0.1	101	13.7	-0.1	111	445	86	76
20	3.598	0.180	0.072	0.40	76	0.44	100	13.7	0	111	442	86	76
21	3.779	0.181	0.072	0.40	76	0.25	101	13.5	-0.2	110	440	85	76
22	3.958	0.179	0.072	0.40	76	-0.15	100	13.2	-0.3	109	438	85	76
23	4.138	0.180	0.072	0.40	76	0.09	100	13.2	0	109	436	85	76
24	4.319	0.181	0.072	0.40	76	0.92	101	13.1	-0.1	108	434	84	76
25	4.499	0.180	0.072	0.40	76	-0.35	100	13.0	-0.1	107	433	84	76
26	4.679	0.180	0.072	0.40	76	0.77	100	12.9	-0.1	107	432	84	76
27	4.860	0.181	0.072	0.40	76	0.3	100	12.8	-0.1	107	431	84	76
28	5.041	0.181	0.072	0.40	76	0.24	100	12.7	-0.1	107	428	84	76
29	5.221	0.180	0.072	0.40	76	0.34	100	12.6	-0.1	107	427	84	77
30	5.403	0.182	0.072	0.40	76	0.32	101	12.5	-0.1	107	426	85	76
31	5.585	0.182	0.072	0.40	76	0.99	101	12.4	-0.1	106	424	86	76
32	5.765	0.180	0.072	0.40	76	-0.3	100	12.2	-0.2	107	423	87	76

BOX A TEST DATA - ASTM E3053 / ASTM E2515

Client: IHP
 Model: Montecito
 Run #: 2

Job #: 19-480
 Tracking #: 029
 Technician: SJB
 Date: 6/18/2019

Elapsed Time (min)	Particulate Sampling Data							Fuel Weight (lb)		Temperature Data (°F)			
	Gas Meter (ft³)	Sample Rate (cfm)	Dilution Tunnel dP (in H ₂ O)	Orifice dH (in H ₂ O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Scale Reading	Weight Change	Dilution Tunnel	Flue	Filter	Ambient
33	5.946	0.181	0.072	0.40	76	0.6	100	12.2	0	106	423	87	76
34	6.126	0.180	0.072	0.40	76	-0.04	100	12.0	-0.2	105	422	88	76
35	6.306	0.180	0.072	0.40	76	0.34	100	11.9	-0.1	105	420	88	76
36	6.487	0.181	0.072	0.40	76	0.14	100	11.8	-0.1	105	419	88	76
37	6.667	0.180	0.072	0.40	76	0.44	100	11.7	-0.1	105	419	87	76
38	6.848	0.181	0.072	0.40	76	0.4	100	11.6	-0.1	105	419	87	76
39	7.027	0.179	0.072	0.40	76	-0.35	99	11.5	-0.1	105	418	87	76
40	7.208	0.181	0.072	0.40	76	0.09	100	11.4	-0.1	104	418	86	76
41	7.390	0.182	0.072	0.40	76	0.75	101	11.3	-0.1	104	416	86	76
42	7.570	0.180	0.072	0.40	76	-0.31	100	11.2	-0.1	104	415	85	76
43	7.750	0.180	0.072	0.40	76	0.49	100	11.1	-0.1	104	414	85	76
44	7.931	0.181	0.072	0.40	76	0.06	100	11.0	-0.1	103	412	85	76
45	8.113	0.182	0.072	0.40	76	1	101	10.9	-0.1	103	413	85	76
46	8.293	0.180	0.072	0.40	76	0.91	100	10.8	-0.1	104	412	84	76
47	8.473	0.180	0.072	0.40	76	1.01	100	10.7	-0.1	103	412	84	76
48	8.655	0.182	0.072	0.40	76	0.22	101	10.6	-0.1	102	411	84	76
49	8.836	0.181	0.072	0.40	76	0.95	100	10.5	-0.1	102	411	84	76
50	9.016	0.180	0.072	0.40	76	0.88	100	10.3	-0.2	103	412	84	76
51	9.198	0.182	0.072	0.40	76	0.42	101	10.3	0	103	412	84	77
52	9.379	0.181	0.072	0.40	76	0.95	100	10.2	-0.1	104	411	84	76
53	9.560	0.181	0.072	0.40	76	0.56	100	10.1	-0.1	103	411	83	76
54	9.741	0.181	0.072	0.40	76	0.85	100	9.9	-0.2	102	410	83	76
55	9.921	0.180	0.072	0.40	76	0.1	100	9.9	0	103	411	83	76
56	10.102	0.181	0.072	0.40	76	0	100	9.8	-0.1	102	411	83	76
57	10.282	0.180	0.072	0.40	76	1.03	99	9.7	-0.1	102	411	84	76
58	10.463	0.181	0.072	0.40	76	0.43	100	9.3	-0.4	103	412	85	77
59	10.643	0.180	0.072	0.40	76	1.25	100	9.4	0.1	103	414	86	76
60	10.823	0.180	0.072	0.40	76	0.82	99	9.4	0	102	415	87	76
61	10.979	0.156	0.072	0.36	76	0.23	86	9.3	-0.1	103	416	87	77
62	11.163	0.184	0.072	0.41	77	-0.17	102	9.2	-0.1	103	416	88	77
63	11.346	0.183	0.072	0.42	77	0.24	101	9.1	-0.1	103	416	88	76
64	11.531	0.185	0.072	0.42	76	-0.07	102	9.0	-0.1	103	417	88	76
65	11.715	0.184	0.072	0.41	77	0.26	102	8.9	-0.1	102	416	88	77

BOX A TEST DATA - ASTM E3053 / ASTM E2515

Client: IHP
 Model: Montecito
 Run #: 2

Job #: 19-480
 Tracking #: 029
 Technician: SJB
 Date: 6/18/2019

Elapsed Time (min)	Particulate Sampling Data							Fuel Weight (lb)		Temperature Data (°F)			
	Gas Meter (ft³)	Sample Rate (cfm)	Dilution Tunnel dP (in H ₂ O)	Orifice dH (in H ₂ O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Scale Reading	Weight Change	Dilution Tunnel	Flue	Filter	Ambient
66	11.899	0.184	0.072	0.42	77	0.06	102	8.7	-0.2	103	418	87	77
67	12.083	0.184	0.072	0.41	77	-0.15	102	8.7	0	102	420	87	76
68	12.267	0.184	0.072	0.42	77	0.61	102	8.6	-0.1	103	420	87	76
69	12.452	0.185	0.072	0.41	77	-0.42	102	8.4	-0.2	103	420	86	76
70	12.636	0.184	0.072	0.41	77	-0.53	102	8.4	0	103	418	86	76
71	12.820	0.184	0.072	0.41	77	0.61	102	8.2	-0.2	103	415	86	76
72	13.003	0.183	0.072	0.41	77	0.06	101	8.2	0	103	411	86	76
73	13.187	0.184	0.072	0.42	76	0.88	102	8.1	-0.1	102	406	85	76
74	13.372	0.185	0.072	0.42	77	0.78	102	8.0	-0.1	102	402	85	76
75	13.555	0.183	0.072	0.41	77	-0.06	101	7.9	-0.1	102	398	85	76
76	13.739	0.184	0.072	0.41	77	0.55	101	7.8	-0.1	101	395	85	76
77	13.923	0.184	0.072	0.41	77	0.25	101	7.8	0	101	394	84	76
78	14.107	0.184	0.072	0.41	77	0.91	101	7.7	-0.1	101	391	84	76
79	14.291	0.184	0.072	0.41	77	0.04	101	7.7	0	100	389	84	76
80	14.475	0.184	0.072	0.42	77	0.8	101	7.6	-0.1	100	388	84	76
81	14.658	0.183	0.072	0.41	77	0.56	101	7.5	-0.1	100	387	83	76
82	14.843	0.185	0.072	0.41	77	-0.02	102	7.4	-0.1	100	386	83	77
83	15.028	0.185	0.072	0.41	77	0.2	102	7.3	-0.1	101	386	83	76
84	15.212	0.184	0.072	0.41	77	-0.07	101	7.3	0	100	385	83	76
85	15.395	0.183	0.072	0.41	77	0.07	101	7.2	-0.1	101	383	83	77
86	15.579	0.184	0.072	0.41	77	-0.36	101	7.1	-0.1	100	382	84	76
87	15.763	0.184	0.072	0.41	77	0.17	101	7.0	-0.1	100	382	85	76
88	15.948	0.185	0.072	0.41	77	0.41	102	6.9	-0.1	101	381	86	76
89	16.132	0.184	0.072	0.41	77	0.9	101	6.9	0	100	379	86	76
90	16.316	0.184	0.072	0.40	77	0.72	101	6.8	-0.1	100	380	87	76
91	16.499	0.183	0.072	0.41	77	-0.03	101	6.8	0	99	379	87	76
92	16.683	0.184	0.072	0.41	77	0.84	101	6.6	-0.2	100	379	88	76
93	16.868	0.185	0.072	0.41	77	0.84	102	6.6	0	100	380	88	76
94	17.052	0.184	0.072	0.41	77	0.77	101	6.5	-0.1	99	379	89	76
95	17.235	0.183	0.072	0.40	77	0.22	101	6.5	0	100	379	89	76
96	17.419	0.184	0.072	0.41	77	0.24	101	6.4	-0.1	100	376	90	76
97	17.603	0.184	0.072	0.40	77	0.71	101	6.3	-0.1	100	376	90	76
98	17.786	0.183	0.072	0.41	77	-0.09	101	6.2	-0.1	99	375	90	76

BOX A TEST DATA - ASTM E3053 / ASTM E2515

Client: IHP
 Model: Montecito
 Run #: 2

Job #: 19-480
 Tracking #: 029
 Technician: SJB
 Date: 6/18/2019

Elapsed Time (min)	Particulate Sampling Data							Fuel Weight (lb)		Temperature Data (°F)			
	Gas Meter (ft³)	Sample Rate (cfm)	Dilution Tunnel dP (in H ₂ O)	Orifice dH (in H ₂ O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Scale Reading	Weight Change	Dilution Tunnel	Flue	Filter	Ambient
99	17.970	0.184	0.072	0.40	77	0.92	101	6.2	0	99	376	90	76
100	18.152	0.182	0.072	0.41	77	-0.03	100	6.1	-0.1	99	378	90	76
101	18.335	0.183	0.072	0.40	77	0.79	101	6.0	-0.1	99	379	90	76
102	18.517	0.182	0.072	0.41	77	0.44	100	5.9	-0.1	99	379	90	76
103	18.700	0.183	0.072	0.40	77	-0.34	101	5.9	0	98	380	90	76
104	18.882	0.182	0.072	0.40	77	0.11	100	5.8	-0.1	99	378	90	76
105	19.065	0.183	0.072	0.40	77	-0.11	101	5.7	-0.1	99	377	89	76
106	19.249	0.184	0.072	0.40	77	0.37	101	5.7	0	98	375	88	76
107	19.433	0.184	0.072	0.40	77	0.91	101	5.7	0	98	374	87	76
108	19.615	0.182	0.072	0.40	77	0.49	100	5.5	-0.2	98	372	87	76
109	19.798	0.183	0.072	0.40	77	0.55	101	5.5	0	98	371	87	77
110	19.980	0.182	0.072	0.40	77	1.02	100	5.4	-0.1	99	370	86	76
111	20.162	0.182	0.072	0.40	77	0.31	100	5.4	0	98	368	86	76
112	20.344	0.182	0.072	0.40	77	0.3	100	5.3	-0.1	98	367	86	76
113	20.526	0.182	0.072	0.40	77	0.18	100	5.2	-0.1	97	366	85	76
114	20.708	0.182	0.072	0.40	77	-0.18	100	5.2	0	98	364	85	76
115	20.889	0.181	0.072	0.40	77	1	99	5.1	-0.1	98	363	85	76
116	21.072	0.183	0.072	0.40	77	0.4	101	5.1	0	97	362	84	76
117	21.253	0.181	0.072	0.40	77	0.3	99	5.0	-0.1	97	361	84	76
118	21.435	0.182	0.072	0.40	77	-0.25	100	4.9	-0.1	98	361	84	76
119	21.617	0.182	0.072	0.40	77	0.97	100	4.9	0	97	360	84	76
120	21.800	0.183	0.072	0.40	77	0.41	101	4.9	0	98	359	84	76
121	21.982	0.182	0.072	0.40	77	-0.27	100	4.8	-0.1	97	357	84	76
122	22.164	0.182	0.072	0.40	77	0.02	100	4.7	-0.1	96	356	84	76
123	22.346	0.182	0.072	0.40	77	0.33	100	4.6	-0.1	97	355	84	76
124	22.527	0.181	0.072	0.40	77	0.38	99	4.6	0	97	354	84	76
125	22.708	0.181	0.072	0.40	77	0.27	99	4.5	-0.1	97	352	85	76
126	22.890	0.182	0.072	0.39	77	0.39	100	4.5	0	97	353	85	76
127	23.072	0.182	0.072	0.40	77	1.01	100	4.4	-0.1	96	353	85	76
128	23.253	0.181	0.072	0.40	77	0	99	4.4	0	97	353	85	76
129	23.434	0.181	0.072	0.40	77	0.32	99	4.3	-0.1	97	352	85	76
130	23.616	0.182	0.072	0.40	77	-0.11	100	4.3	0	97	352	85	76
131	23.797	0.181	0.072	0.40	77	1.08	99	4.2	-0.1	97	349	85	76

BOX A TEST DATA - ASTM E3053 / ASTM E2515

Client: IHP
 Model: Montecito
 Run #: 2

Job #: 19-480
 Tracking #: 029
 Technician: SJB
 Date: 6/18/2019

Elapsed Time (min)	Particulate Sampling Data							Fuel Weight (lb)		Temperature Data (°F)			
	Gas Meter (ft³)	Sample Rate (cfm)	Dilution Tunnel dP (in H ₂ O)	Orifice dH (in H ₂ O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Scale Reading	Weight Change	Dilution Tunnel	Flue	Filter	Ambient
132	23.979	0.182	0.072	0.40	77	0.91	100	4.4	0.2	97	346	85	76
133	24.160	0.181	0.072	0.40	77	0.98	99	4.2	-0.2	97	341	85	77
134	24.341	0.181	0.072	0.40	77	-0.16	99	4.2	0	96	336	85	76
135	24.522	0.181	0.072	0.39	77	0.2	99	4.1	-0.1	96	334	85	76
136	24.704	0.182	0.072	0.40	77	0.45	100	4.1	0	96	328	85	76
137	24.885	0.181	0.072	0.39	77	0.41	99	4.0	-0.1	95	320	85	76
138	25.067	0.182	0.072	0.41	77	0.48	100	4.0	0	95	313	85	76
139	25.251	0.184	0.072	0.40	77	0.37	101	3.9	-0.1	95	305	85	76
140	25.435	0.184	0.072	0.41	77	0.87	101	3.9	0	94	301	85	76
141	25.619	0.184	0.072	0.41	77	0.1	101	4.0	0.1	95	295	85	76
142	25.803	0.184	0.072	0.41	77	-0.46	101	3.9	-0.1	94	291	86	77
143	25.988	0.185	0.072	0.41	77	-0.35	101	3.9	0	94	287	86	76
144	26.172	0.184	0.072	0.41	77	0.02	101	3.8	-0.1	93	284	86	76
145	26.356	0.184	0.072	0.41	77	-0.03	101	3.7	-0.1	94	280	86	76
146	26.544	0.188	0.072	0.41	77	0.34	103	3.8	0.1	93	278	86	76
147	26.729	0.185	0.072	0.41	77	0.9	101	3.7	-0.1	93	275	86	76
148	26.914	0.185	0.072	0.41	77	0.57	101	3.7	0	92	272	86	76
149	27.098	0.184	0.072	0.41	77	0.76	101	3.7	0	93	270	86	76
150	27.282	0.184	0.072	0.41	77	0.36	101	3.7	0	92	269	86	76
151	27.467	0.185	0.072	0.41	77	0.66	101	3.6	-0.1	92	267	86	76
152	27.652	0.185	0.072	0.41	77	-0.02	101	3.6	0	92	265	85	76
153	27.837	0.185	0.072	0.41	77	0.33	101	3.6	0	92	263	85	76
154	28.022	0.185	0.072	0.41	77	0.79	101	3.6	0	92	262	85	76
155	28.208	0.186	0.072	0.41	77	0.73	102	3.5	-0.1	92	261	84	76
156	28.392	0.184	0.072	0.41	77	0.17	101	3.5	0	91	261	84	76
157	28.577	0.185	0.072	0.41	77	0.12	101	3.5	0	91	260	84	75
158	28.763	0.186	0.072	0.41	77	-0.12	102	3.5	0	91	259	84	75
159	28.946	0.183	0.072	0.41	77	0.95	100	3.4	-0.1	91	258	83	75
160	29.131	0.185	0.072	0.41	77	0.24	101	3.3	-0.1	91	257	83	76
161	29.316	0.185	0.072	0.41	77	-0.07	101	3.4	0.1	89	257	83	74
162	29.499	0.183	0.072	0.41	76	0.69	100	3.3	-0.1	88	258	82	73
163	29.685	0.186	0.072	0.41	76	-0.12	102	3.3	0	88	257	82	74
164	29.869	0.184	0.072	0.42	75	0.71	101	3.2	-0.1	88	257	82	73

BOX A TEST DATA - ASTM E3053 / ASTM E2515

Client: IHP
 Model: Montecito
 Run #: 2

Job #: 19-480
 Tracking #: 029
 Technician: SJB
 Date: 6/18/2019

Elapsed Time (min)	Particulate Sampling Data							Fuel Weight (lb)		Temperature Data (°F)			
	Gas Meter (ft³)	Sample Rate (cfm)	Dilution Tunnel dP (in H ₂ O)	Orifice dH (in H ₂ O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Scale Reading	Weight Change	Dilution Tunnel	Flue	Filter	Ambient
165	30.054	0.185	0.072	0.41	75	0.29	101	3.3	0.1	87	256	81	73
166	30.238	0.184	0.072	0.41	75	-0.07	101	3.2	-0.1	87	255	81	72
167	30.423	0.185	0.072	0.41	74	0.19	101	3.2	0	87	254	81	72
168	30.606	0.183	0.072	0.41	74	-0.05	100	3.1	-0.1	86	253	82	73
169	30.791	0.185	0.072	0.41	74	0.75	101	3.1	0	86	252	82	71
170	30.976	0.185	0.072	0.41	73	-0.41	101	3.1	0	86	252	82	72
171	31.160	0.184	0.072	0.41	73	0.19	101	3.1	0	86	252	82	73
172	31.343	0.183	0.072	0.41	73	0.96	100	3.0	-0.1	86	252	82	72
173	31.527	0.184	0.072	0.41	73	0.5	101	3.0	0	85	251	82	71
174	31.711	0.184	0.072	0.41	73	0.71	101	3.0	0	84	251	82	71
175	31.895	0.184	0.072	0.41	73	-0.26	101	2.9	-0.1	84	250	82	71
176	32.079	0.184	0.072	0.41	73	0.22	101	3.0	0.1	84	250	82	71
177	32.263	0.184	0.072	0.41	73	0.26	101	3.0	0	85	250	83	71
178	32.446	0.183	0.072	0.41	72	0.71	100	2.9	-0.1	85	249	83	71
179	32.630	0.184	0.072	0.40	72	-0.4	101	2.9	0	85	249	83	71
180	32.813	0.183	0.072	0.41	72	0.11	100	2.9	0	85	249	83	71
181	32.998	0.185	0.072	0.41	72	0.86	101	2.8	-0.1	84	249	83	71
182	33.181	0.183	0.072	0.41	72	0.73	100	2.7	-0.1	84	248	83	71
183	33.365	0.184	0.072	0.41	72	0.96	101	2.8	0.1	84	247	83	71
184	33.548	0.183	0.072	0.41	72	0.06	100	2.7	-0.1	85	247	83	71
185	33.731	0.183	0.072	0.41	72	-0.2	100	2.8	0.1	85	246	83	71
186	33.914	0.183	0.072	0.41	72	0.42	100	2.7	-0.1	85	246	83	70
187	34.098	0.184	0.072	0.40	72	0.08	101	2.7	0	85	246	83	71
188	34.281	0.183	0.072	0.40	72	0.55	100	2.7	0	85	246	83	71
189	34.464	0.183	0.072	0.40	72	0.46	100	2.6	-0.1	85	245	83	70
190	34.648	0.184	0.072	0.40	72	-0.36	101	2.6	0	85	245	83	70
191	34.830	0.182	0.072	0.40	72	0.21	100	2.6	0	85	244	83	71
192	35.013	0.183	0.072	0.40	72	0.65	100	2.5	-0.1	85	243	83	71
193	35.196	0.183	0.072	0.40	72	0.14	100	2.4	-0.1	84	244	83	71
194	35.375	0.179	0.072	0.41	72	0.14	98	2.5	0.1	84	244	83	71
195	35.557	0.182	0.072	0.40	72	0.81	100	2.5	0	85	243	83	71
196	35.739	0.182	0.072	0.40	72	0.62	100	2.5	0	85	243	83	72
197	35.921	0.182	0.072	0.40	72	0.15	100	2.4	-0.1	86	243	84	72

BOX A TEST DATA - ASTM E3053 / ASTM E2515

Client: IHP
 Model: Montecito
 Run #: 2

Job #: 19-480
 Tracking #: 029
 Technician: SJB
 Date: 6/18/2019

Elapsed Time (min)	Particulate Sampling Data							Fuel Weight (lb)		Temperature Data (°F)			
	Gas Meter (ft³)	Sample Rate (cfm)	Dilution Tunnel dP (in H ₂ O)	Orifice dH (in H ₂ O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Scale Reading	Weight Change	Dilution Tunnel	Flue	Filter	Ambient
198	36.102	0.181	0.072	0.40	72	-0.22	99	2.4	0	86	243	84	72
199	36.281	0.179	0.072	0.40	73	0.01	98	2.3	-0.1	87	244	84	72
200	36.463	0.182	0.072	0.40	73	0.31	100	2.3	0	87	244	84	72
201	36.644	0.181	0.072	0.40	73	-0.12	99	2.3	0	87	244	84	73
202	36.825	0.181	0.072	0.40	73	-0.09	99	2.3	0	87	244	85	73
203	37.006	0.181	0.072	0.40	73	0.76	99	2.3	0	87	245	85	73
204	37.188	0.182	0.072	0.40	74	0.3	100	2.3	0	87	246	85	73
205	37.370	0.182	0.072	0.40	74	0.88	100	2.2	-0.1	87	246	85	73
206	37.551	0.181	0.072	0.40	74	0.05	99	2.2	0	87	247	85	73
207	37.732	0.181	0.072	0.40	74	0.7	99	2.2	0	88	248	85	73
208	37.913	0.181	0.072	0.40	74	-0.01	99	2.1	-0.1	87	249	85	73
209	38.093	0.180	0.072	0.40	74	0.73	99	2.1	0	87	249	85	73
210	38.274	0.181	0.072	0.40	75	0.77	99	2.1	0	87	248	85	74
211	38.455	0.181	0.072	0.40	75	0.05	99	2.0	-0.1	87	247	85	73
212	38.637	0.182	0.072	0.40	75	0.43	100	2.0	0	88	245	85	73
213	38.819	0.182	0.072	0.40	75	0	99	2.1	0.1	87	244	85	74
214	39.000	0.181	0.072	0.40	75	0.79	99	2.0	-0.1	87	244	85	74
215	39.182	0.182	0.072	0.40	75	-0.17	99	2.1	0.1	87	242	85	73
216	39.363	0.181	0.072	0.40	75	0.31	99	2.0	-0.1	87	241	85	74
217	39.544	0.181	0.072	0.39	75	0.09	99	2.0	0	88	240	85	74
218	39.726	0.182	0.072	0.40	75	1.15	100	1.9	-0.1	88	239	85	74
219	39.907	0.181	0.072	0.40	75	1.02	99	2.0	0.1	87	239	86	74
220	40.089	0.182	0.072	0.40	75	0.46	100	1.9	-0.1	88	238	86	74
221	40.270	0.181	0.072	0.40	75	0.59	99	1.9	0	87	237	86	74
222	40.451	0.181	0.072	0.39	75	0	99	1.9	0	87	237	86	74
223	40.633	0.182	0.072	0.40	75	0.74	99	1.8	-0.1	87	236	86	74
224	40.814	0.181	0.072	0.40	75	0.05	99	1.9	0.1	87	236	86	74
225	40.995	0.181	0.072	0.40	75	-0.3	99	1.8	-0.1	87	236	86	74
226	41.176	0.181	0.072	0.40	75	0.95	99	1.8	0	87	234	86	74
227	41.356	0.180	0.072	0.40	75	0.13	98	1.8	0	87	234	86	74
228	41.538	0.182	0.072	0.40	76	0.53	99	1.8	0	87	232	86	74
229	41.719	0.181	0.072	0.40	76	0.4	99	1.8	0	87	232	86	74
230	41.901	0.182	0.072	0.40	76	0.72	99	1.8	0	87	231	86	74

BOX A TEST DATA - ASTM E3053 / ASTM E2515

Client: IHP
 Model: Montecito
 Run #: 2

Job #: 19-480
 Tracking #: 029
 Technician: SJB
 Date: 6/18/2019

Elapsed Time (min)	Particulate Sampling Data							Fuel Weight (lb)		Temperature Data (°F)			
	Gas Meter (ft³)	Sample Rate (cfm)	Dilution Tunnel dP (in H ₂ O)	Orifice dH (in H ₂ O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Scale Reading	Weight Change	Dilution Tunnel	Flue	Filter	Ambient
231	42.081	0.180	0.072	0.40	76	1.25	98	1.7	-0.1	87	230	86	74
232	42.263	0.182	0.072	0.40	76	0.78	99	1.7	0	87	229	86	74
233	42.445	0.182	0.072	0.40	76	0.11	99	1.7	0	87	230	86	74
234	42.627	0.182	0.072	0.40	76	0.93	99	1.7	0	87	229	86	74
235	42.808	0.181	0.072	0.40	76	0.36	99	1.5	-0.2	86	228	86	74
236	42.990	0.182	0.072	0.40	76	0.11	99	1.7	0.2	87	227	86	74
237	43.172	0.182	0.072	0.40	76	-0.31	99	1.7	0	87	227	86	74
238	43.353	0.181	0.072	0.40	76	-0.02	99	1.7	0	87	226	86	74
239	43.536	0.183	0.072	0.40	76	0.93	100	1.6	-0.1	86	226	86	74
240	43.719	0.183	0.072	0.40	76	0.92	100	1.6	0	87	225	86	74
241	43.900	0.181	0.072	0.40	76	0	99	1.5	-0.1	87	225	86	74
242	44.081	0.181	0.072	0.40	76	0.08	99	1.5	0	87	224	86	74
243	44.262	0.181	0.072	0.40	76	-0.02	99	1.6	0.1	86	224	86	74
244	44.444	0.182	0.072	0.40	76	0.71	99	1.5	-0.1	87	224	87	74
245	44.626	0.182	0.072	0.40	76	0.03	99	1.5	0	87	223	87	74
246	44.807	0.181	0.072	0.40	76	0.81	99	1.5	0	86	222	87	74
247	44.989	0.182	0.072	0.40	76	0.76	99	1.5	0	86	221	87	74
248	45.171	0.182	0.072	0.40	76	0.87	99	1.5	0	86	221	87	74
249	45.352	0.181	0.072	0.40	76	0.94	99	1.4	-0.1	86	221	87	74
250	45.534	0.182	0.072	0.40	76	0	99	1.4	0	86	221	87	74
251	45.715	0.181	0.072	0.40	76	0.55	99	1.5	0.1	86	221	87	74
252	45.897	0.182	0.072	0.40	76	0.2	99	1.4	-0.1	86	220	87	74
253	46.079	0.182	0.072	0.40	76	0.48	99	1.4	0	86	219	87	74
254	46.259	0.180	0.072	0.40	76	0.8	98	1.4	0	86	219	87	74
255	46.441	0.182	0.072	0.40	76	0.38	99	1.4	0	86	219	87	74
256	46.623	0.182	0.072	0.40	76	-0.31	99	1.4	0	86	218	87	74
257	46.805	0.182	0.072	0.40	76	0.47	99	1.4	0	86	218	87	74
258	46.986	0.181	0.072	0.40	76	0.85	99	1.4	0	86	218	86	74
259	47.168	0.182	0.072	0.40	76	0.32	99	1.3	-0.1	86	217	86	74
260	47.349	0.181	0.072	0.40	76	0.33	99	1.3	0	86	217	86	74
261	47.531	0.182	0.072	0.40	76	0.27	99	1.3	0	86	218	86	74
262	47.712	0.181	0.072	0.40	76	0.9	99	1.3	0	86	218	86	74
263	47.894	0.182	0.072	0.40	76	0.22	99	1.2	-0.1	86	218	86	74

BOX A TEST DATA - ASTM E3053 / ASTM E2515

Client: IHP
 Model: Montecito
 Run #: 2

Job #: 19-480
 Tracking #: 029
 Technician: SJB
 Date: 6/18/2019

Elapsed Time (min)	Particulate Sampling Data							Fuel Weight (lb)		Temperature Data (°F)			
	Gas Meter (ft³)	Sample Rate (cfm)	Dilution Tunnel dP (in H ₂ O)	Orifice dH (in H ₂ O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Scale Reading	Weight Change	Dilution Tunnel	Flue	Filter	Ambient
264	48.075	0.181	0.072	0.40	76	0.9	99	1.3	0.1	87	218	86	74
265	48.257	0.182	0.072	0.40	76	0.12	99	1.2	-0.1	86	218	85	74
266	48.439	0.182	0.072	0.40	76	0.82	99	1.2	0	86	218	85	74
267	48.621	0.182	0.072	0.40	76	-0.23	99	1.3	0.1	86	218	85	74
268	48.804	0.183	0.072	0.40	76	0.69	100	1.1	-0.2	86	218	85	74
269	48.986	0.182	0.072	0.40	76	-0.09	99	1.2	0.1	86	218	85	74
270	49.169	0.183	0.072	0.40	76	0.56	100	1.2	0	86	218	85	74
271	49.350	0.181	0.072	0.40	76	0.26	99	1.1	-0.1	87	218	85	74
272	49.532	0.182	0.072	0.40	76	0.97	99	1.1	0	86	218	85	74
273	49.713	0.181	0.072	0.40	76	0.06	99	1.2	0.1	87	218	85	74
274	49.895	0.182	0.072	0.40	76	0.98	99	1.1	-0.1	87	218	84	75
275	50.077	0.182	0.072	0.40	76	0.01	99	1.1	0	86	218	85	74
276	50.258	0.181	0.072	0.40	76	0.92	99	1.1	0	86	218	84	74
277	50.440	0.182	0.072	0.40	76	-0.07	99	0.7	-0.4	87	218	84	74
278	50.621	0.181	0.072	0.40	76	-0.32	99	0.9	0.2	86	218	84	74
279	50.802	0.181	0.072	0.40	76	0.86	99	1.0	0.1	86	218	84	74
280	50.984	0.182	0.072	0.40	76	0.93	99	1.0	0	86	217	84	74
281	51.165	0.181	0.072	0.40	76	0.39	99	1.0	0	86	217	84	74
282	51.348	0.183	0.072	0.40	76	0.14	100	1.0	0	86	218	84	74
283	51.530	0.182	0.072	0.40	76	0.23	99	1.0	0	86	219	84	74
284	51.712	0.182	0.072	0.40	76	-0.11	99	0.9	-0.1	86	219	84	74
285	51.894	0.182	0.072	0.40	76	0.09	99	0.9	0	86	218	84	74
286	52.075	0.181	0.072	0.40	76	0.11	99	0.9	0	86	218	84	74
287	52.257	0.182	0.072	0.40	76	-0.03	99	0.9	0	86	218	84	74
288	52.438	0.181	0.072	0.40	76	0.91	99	0.9	0	86	217	84	74
289	52.620	0.182	0.072	0.40	76	0.77	99	0.9	0	86	218	84	74
290	52.801	0.181	0.072	0.40	76	0.43	99	0.8	-0.1	86	219	84	74
291	52.984	0.183	0.072	0.40	76	0.28	100	0.9	0.1	86	218	84	75
292	53.165	0.181	0.072	0.40	76	0.83	99	0.9	0	87	218	84	74
293	53.347	0.182	0.072	0.40	76	0.59	99	0.8	-0.1	87	218	84	74
294	53.529	0.182	0.072	0.40	76	0.27	99	0.7	-0.1	87	219	84	74
295	53.710	0.181	0.072	0.40	76	0.39	99	0.8	0.1	86	219	84	74
296	53.891	0.181	0.072	0.40	76	0.18	99	0.8	0	86	219	84	74

BOX A TEST DATA - ASTM E3053 / ASTM E2515

Client: IHP
 Model: Montecito
 Run #: 2

Job #: 19-480
 Tracking #: 029
 Technician: SJB
 Date: 6/18/2019

Elapsed Time (min)	Particulate Sampling Data							Fuel Weight (lb)		Temperature Data (°F)			
	Gas Meter (ft³)	Sample Rate (cfm)	Dilution Tunnel dP (in H ₂ O)	Orifice dH (in H ₂ O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Scale Reading	Weight Change	Dilution Tunnel	Flue	Filter	Ambient
297	54.073	0.182	0.072	0.40	76	0.15	99	0.8	0	86	219	84	74
298	54.254	0.181	0.072	0.40	76	0.68	99	0.7	-0.1	86	218	84	75
299	54.436	0.182	0.072	0.40	76	0.24	99	0.7	0	86	219	84	75
300	54.618	0.182	0.072	0.40	76	0.48	99	0.7	0	86	218	84	74
301	54.799	0.181	0.072	0.40	76	0.08	99	0.7	0	86	218	84	75
302	54.981	0.182	0.072	0.40	76	0.65	99	0.6	-0.1	86	219	84	74
303	55.163	0.182	0.072	0.40	76	0.03	99	0.7	0.1	87	218	84	74
304	55.345	0.182	0.072	0.40	76	-0.11	99	0.7	0	87	218	84	75
305	55.527	0.182	0.072	0.40	76	0.92	99	0.7	0	87	219	84	74
306	55.709	0.182	0.072	0.40	76	0.99	99	0.6	-0.1	87	219	84	75
307	55.891	0.182	0.072	0.40	76	-0.29	99	0.6	0	87	218	84	75
308	56.074	0.183	0.072	0.40	76	-0.01	100	0.6	0	86	218	84	74
309	56.256	0.182	0.072	0.40	76	0.19	99	0.6	0	86	218	84	74
310	56.437	0.181	0.072	0.40	76	-0.04	99	0.6	0	86	218	84	74
311	56.619	0.182	0.072	0.40	76	-0.02	99	0.5	-0.1	86	218	84	75
312	56.802	0.183	0.072	0.40	76	0.2	100	0.6	0.1	86	217	84	75
313	56.984	0.182	0.072	0.40	76	0.98	99	0.5	-0.1	86	217	84	75
314	57.167	0.183	0.072	0.40	76	0.38	100	0.5	0	86	217	84	75
315	57.349	0.182	0.072	0.40	76	0.23	99	0.5	0	87	216	84	74
316	57.532	0.183	0.072	0.40	76	0.99	100	0.5	0	87	216	84	75
317	57.714	0.182	0.072	0.40	76	0.28	99	0.5	0	86	216	84	74
318	57.896	0.182	0.072	0.40	76	-0.26	99	0.5	0	86	216	84	75
319	58.077	0.181	0.072	0.40	76	1.02	99	0.5	0	87	215	84	74
320	58.259	0.182	0.072	0.40	76	0.16	99	0.3	-0.2	86	216	84	74
321	58.441	0.182	0.072	0.40	76	-0.11	99	0.5	0.2	86	215	84	75
322	58.624	0.183	0.072	0.40	76	0.8	100	0.4	-0.1	86	215	84	74
323	58.805	0.181	0.072	0.40	76	0.32	99	0.4	0	86	215	84	75
324	58.988	0.183	0.072	0.40	76	0.37	100	0.4	0	86	215	84	75
325	59.171	0.183	0.072	0.40	76	0.88	100	0.4	0	86	215	84	75
326	59.354	0.183	0.072	0.40	76	0.24	100	0.4	0	87	216	84	74
327	59.536	0.182	0.072	0.40	76	-0.27	99	0.4	0	86	215	83	75
328	59.718	0.182	0.072	0.40	76	0	99	0.4	0	87	215	83	75
329	59.901	0.183	0.072	0.40	76	0.16	100	0.3	-0.1	86	216	83	75

BOX A TEST DATA - ASTM E3053 / ASTM E2515

Client: IHP
 Model: Montecito
 Run #: 2

Job #: 19-480
 Tracking #: 029
 Technician: SJB
 Date: 6/18/2019

Elapsed Time (min)	Particulate Sampling Data							Fuel Weight (lb)		Temperature Data (°F)			
	Gas Meter (ft³)	Sample Rate (cfm)	Dilution Tunnel dP (in H ₂ O)	Orifice dH (in H ₂ O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Scale Reading	Weight Change	Dilution Tunnel	Flue	Filter	Ambient
330	60.084	0.183	0.072	0.40	76	0.23	100	0.3	0	86	215	83	74
331	60.267	0.183	0.072	0.40	76	0.06	100	0.3	0	86	215	83	74
332	60.449	0.182	0.072	0.40	76	0.12	99	0.3	0	86	214	83	75
333	60.632	0.183	0.072	0.40	76	0.5	100	0.3	0	86	215	83	75
334	60.814	0.182	0.072	0.40	76	0.08	99	0.3	0	86	215	84	75
335	60.996	0.182	0.072	0.40	76	-0.02	99	0.3	0	86	214	84	75
336	61.178	0.182	0.072	0.40	76	-0.13	99	0.3	0	86	214	84	75
337	61.361	0.183	0.072	0.40	76	-0.02	100	0.2	-0.1	86	214	84	75
338	61.543	0.182	0.072	0.40	76	0.1	99	0.2	0	86	215	84	75
339	61.725	0.182	0.072	0.40	76	0.71	99	0.2	0	86	215	83	75
340	61.907	0.182	0.072	0.40	76	0.73	99	0.2	0	86	214	84	75
341	62.090	0.183	0.072	0.40	76	1	100	0.2	0	86	213	84	75
342	62.272	0.182	0.072	0.40	76	0.18	99	0.2	0	86	213	84	75
343	62.454	0.182	0.072	0.40	76	-0.03	99	0.2	0	86	213	83	75
344	62.635	0.181	0.072	0.40	76	0.97	99	0.2	0	86	213	84	75
345	62.818	0.183	0.072	0.40	76	-0.22	100	0.2	0	86	213	83	75
346	63.000	0.182	0.072	0.40	76	0.75	99	0.0	-0.2	86	213	83	75
347	63.183	0.183	0.072	0.40	76	0.27	100	0.1	0.1	86	213	83	75
348	63.365	0.182	0.072	0.40	76	0.95	99	0.1	0	86	213	83	75
349	63.548	0.183	0.072	0.40	76	0.37	100	0.1	0	86	213	83	75
350	63.730	0.182	0.072	0.40	76	0.37	99	0.1	0	86	212	83	75
351	63.912	0.182	0.072	0.40	76	0.74	99	0.1	0	86	212	83	75
352	64.094	0.182	0.072	0.40	76	0.02	99	0.0	-0.1	86	212	83	75
Avg/Tot	64.094	0.182	0.072	0.40	76	0.36	100			94	304	85	74.8

BOX B TEST DATA - ASTM E3053 / ASTM E2515

Client: IHP
 Model: Montecito
 Run #: 2

Job #: 19-480
 Tracking #: 029
 Technician: SJB
 Date: 6/18/2019

Elapsed Time (min)	Particulate Sampling Data							Flue Gas Data		
	Gas Meter (ft ³)	Sample Rate (cfm)	Orifice dH (in H ₂ O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Filter (°F)	Flue Draft (in H ₂ O)	CO ₂ (%)	CO (%)
0	0.000		0.00	84	1		80	0.000	5.12	0.18
1	0.175	0.175	0.42	84	0.15	101	84	-0.060	4.99	0.16
2	0.355	0.180	0.41	84	1.19	104	86	-0.080	2.79	0.48
3	0.537	0.182	0.42	84	1.94	106	88	-0.080	6.40	0.31
4	0.721	0.184	0.41	84	2.39	106	87	-0.090	13.78	0.55
5	0.905	0.184	0.43	84	2.44	107	87	-0.080	13.31	0.17
6	1.090	0.185	0.41	84	2.4	107	87	-0.090	12.87	0.20
7	1.274	0.184	0.43	84	1.24	107	87	-0.090	13.48	0.17
8	1.460	0.186	0.43	84	2.32	108	87	-0.080	13.57	0.20
9	1.646	0.186	0.42	84	1.14	108	87	-0.080	13.74	0.17
10	1.831	0.185	0.42	84	0.48	108	87	-0.090	13.58	0.25
11	2.017	0.186	0.42	84	0.76	108	87	-0.070	13.36	0.28
12	2.202	0.185	0.43	84	2.52	106	85	-0.080	13.75	0.78
13	2.388	0.186	0.43	84	0.89	105	84	-0.070	13.71	0.81
14	2.573	0.185	0.43	84	0.23	105	83	-0.070	12.24	0.51
15	2.758	0.185	0.44	84	1.15	104	83	-0.070	11.72	0.43
16	2.942	0.184	0.42	84	1.35	103	83	-0.080	11.29	0.56
17	3.127	0.185	0.42	84	1.91	104	83	-0.070	11.18	0.55
18	3.311	0.184	0.42	84	2.48	103	83	-0.070	11.46	0.40
19	3.496	0.185	0.42	84	0.92	104	83	-0.060	11.65	0.30
20	3.680	0.184	0.43	84	2.36	103	84	-0.070	12.10	0.23
21	3.865	0.185	0.42	84	0.81	104	84	-0.070	11.88	0.30
22	4.051	0.186	0.42	84	1.54	104	84	-0.070	12.06	0.26
23	4.235	0.184	0.42	84	1.45	103	84	-0.070	12.04	0.26
24	4.417	0.182	0.43	84	2.53	102	84	-0.060	12.09	0.18
25	4.600	0.183	0.42	84	1.55	102	85	-0.070	11.73	0.23
26	4.783	0.183	0.42	84	2.53	102	85	-0.060	11.70	0.21
27	4.964	0.181	0.43	84	0.91	101	85	-0.060	11.92	0.13
28	5.146	0.182	0.41	84	0.86	102	85	-0.070	12.00	0.18
29	5.329	0.183	0.43	84	0.96	102	85	-0.070	12.21	0.13
30	5.512	0.183	0.43	84	2.23	102	85	-0.060	12.05	0.18
31	5.695	0.183	0.43	84	2.46	102	85	-0.060	11.61	0.23

BOX B TEST DATA - ASTM E3053 / ASTM E2515

Client: IHP
 Model: Montecito
 Run #: 2

Job #: 19-480
 Tracking #: 029
 Technician: SJB
 Date: 6/18/2019

Elapsed Time (min)	Particulate Sampling Data							Flue Gas Data		
	Gas Meter (ft ³)	Sample Rate (cfm)	Orifice dH (in H ₂ O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Filter (°F)	Flue Draft (in H ₂ O)	CO ₂ (%)	CO (%)
32	5.879	0.184	0.42	84	1.3	103	86	-0.060	11.54	0.22
33	6.060	0.181	0.42	84	1.2	101	86	-0.070	11.80	0.17
34	6.243	0.183	0.42	85	0.93	102	86	-0.070	11.79	0.15
35	6.425	0.182	0.41	85	0.58	101	86	-0.070	11.56	0.22
36	6.606	0.181	0.43	85	1.28	101	86	-0.060	11.52	0.21
37	6.788	0.182	0.43	85	1.97	101	86	-0.060	11.75	0.19
38	6.972	0.184	0.42	85	0.84	102	86	-0.060	11.47	0.25
39	7.154	0.182	0.43	85	2.15	101	86	-0.050	11.68	0.16
40	7.336	0.182	0.42	85	1.35	101	86	-0.060	11.43	0.22
41	7.518	0.182	0.42	85	1.5	101	85	-0.070	11.69	0.19
42	7.700	0.182	0.43	85	2.46	101	85	-0.060	11.82	0.07
43	7.881	0.181	0.43	85	1.36	101	85	-0.060	11.47	0.18
44	8.063	0.182	0.43	85	1.2	101	85	-0.050	11.59	0.12
45	8.246	0.183	0.41	85	0.77	102	85	-0.070	11.43	0.22
46	8.427	0.181	0.41	85	1.43	101	84	-0.070	11.60	0.17
47	8.609	0.182	0.42	85	1.71	101	84	-0.070	11.74	0.15
48	8.790	0.181	0.42	85	1.57	100	84	-0.060	11.53	0.17
49	8.972	0.182	0.41	85	1.63	101	84	-0.070	11.72	0.12
50	9.154	0.182	0.42	85	1.18	101	84	-0.060	11.67	0.17
51	9.335	0.181	0.43	85	0.55	101	84	-0.060	11.83	0.15
52	9.516	0.181	0.43	85	1.33	101	83	-0.060	11.78	0.16
53	9.697	0.181	0.43	85	1.2	101	83	-0.050	11.98	0.11
54	9.879	0.182	0.43	85	2.45	101	83	-0.050	12.04	0.12
55	10.060	0.181	0.43	85	0.65	101	83	-0.060	12.22	0.09
56	10.240	0.180	0.43	85	1.41	100	83	-0.070	12.17	0.16
57	10.421	0.181	0.42	85	2.72	100	83	-0.070	11.91	0.17
58	10.600	0.179	0.43	85	1.39	99	83	-0.060	12.14	0.11
59	10.780	0.180	0.42	85	0.53	100	83	-0.060	11.82	0.19
60	10.960	0.180	0.43	86	2.06	100	84	-0.070	12.25	0.08
61	11.140	0.180	0.42	86	0.43	100	84	-0.070	12.18	0.11
62	11.320	0.180	0.43	86	2.23	100	85	-0.070	12.34	0.11
63	11.501	0.181	0.42	86	0.68	100	85	-0.070	12.00	0.18

BOX B TEST DATA - ASTM E3053 / ASTM E2515

Client: IHP
 Model: Montecito
 Run #: 2

Job #: 19-480
 Tracking #: 029
 Technician: SJB
 Date: 6/18/2019

Elapsed Time (min)	Particulate Sampling Data							Flue Gas Data		
	Gas Meter (ft ³)	Sample Rate (cfm)	Orifice dH (in H ₂ O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Filter (°F)	Flue Draft (in H ₂ O)	CO ₂ (%)	CO (%)
64	11.682	0.181	0.43	86	2.59	100	85	-0.060	12.05	0.16
65	11.861	0.179	0.43	86	2.25	99	85	-0.050	12.00	0.15
66	12.040	0.179	0.42	86	1.39	99	86	-0.060	11.88	0.21
67	12.220	0.180	0.44	86	2.43	100	86	-0.060	12.25	0.17
68	12.400	0.180	0.42	86	0.94	100	86	-0.070	12.52	0.24
69	12.579	0.179	0.42	86	1.32	99	86	-0.070	12.30	0.33
70	12.759	0.180	0.41	86	1.41	100	86	-0.070	12.26	0.34
71	12.939	0.180	0.43	86	2.48	100	86	-0.060	11.93	0.31
72	13.118	0.179	0.42	86	1.98	99	86	-0.070	11.81	0.11
73	13.298	0.180	0.42	86	1.3	100	86	-0.050	10.85	0.12
74	13.478	0.180	0.43	86	0.95	100	86	-0.050	10.75	0.09
75	13.659	0.181	0.41	86	0.97	100	86	-0.070	10.81	0.14
76	13.838	0.179	0.43	86	0.84	99	86	-0.050	10.50	0.14
77	14.016	0.178	0.43	86	1.2	99	86	-0.060	10.76	0.09
78	14.197	0.181	0.42	86	1.35	100	86	-0.060	10.38	0.15
79	14.376	0.179	0.42	86	1.44	99	86	-0.050	10.43	0.18
80	14.555	0.179	0.43	86	1.92	99	86	-0.060	10.94	0.08
81	14.735	0.180	0.42	86	1.36	100	86	-0.060	10.44	0.20
82	14.914	0.179	0.42	86	1.38	99	86	-0.050	10.53	0.17
83	15.094	0.180	0.43	86	2.38	100	86	-0.060	11.02	0.07
84	15.272	0.178	0.43	86	2.13	98	85	-0.060	10.92	0.10
85	15.452	0.180	0.42	86	1.83	100	85	-0.050	10.58	0.14
86	15.630	0.178	0.41	86	2.15	98	85	-0.060	10.55	0.17
87	15.808	0.178	0.41	86	2.67	98	85	-0.060	10.38	0.21
88	15.986	0.178	0.43	86	2.5	99	86	-0.050	10.43	0.13
89	16.167	0.181	0.41	86	0.44	100	86	-0.060	10.37	0.19
90	16.345	0.178	0.41	86	2.82	98	86	-0.070	10.48	0.17
91	16.524	0.179	0.41	86	0.78	99	86	-0.060	10.42	0.16
92	16.702	0.178	0.41	86	2.12	98	86	-0.070	10.41	0.19
93	16.881	0.179	0.43	86	2.45	99	86	-0.050	10.57	0.11
94	17.059	0.178	0.42	86	1.35	98	86	-0.050	10.69	0.09
95	17.239	0.180	0.41	86	1.79	100	86	-0.060	10.49	0.17

BOX B TEST DATA - ASTM E3053 / ASTM E2515

Client: IHP
 Model: Montecito
 Run #: 2

Job #: 19-480
 Tracking #: 029
 Technician: SJB
 Date: 6/18/2019

Elapsed Time (min)	Particulate Sampling Data							Flue Gas Data		
	Gas Meter (ft ³)	Sample Rate (cfm)	Orifice dH (in H ₂ O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Filter (°F)	Flue Draft (in H ₂ O)	CO ₂ (%)	CO (%)
96	17.418	0.179	0.41	86	1.15	99	86	-0.060	10.51	0.19
97	17.596	0.178	0.41	86	1.43	98	86	-0.070	10.65	0.17
98	17.776	0.180	0.42	86	1.22	99	86	-0.060	10.88	0.12
99	17.954	0.178	0.43	86	1.19	98	86	-0.060	10.74	0.10
100	18.133	0.179	0.43	86	2.44	99	86	-0.050	10.63	0.12
101	18.310	0.177	0.43	86	2.3	98	86	-0.050	10.96	0.09
102	18.490	0.180	0.43	86	2.54	99	86	-0.050	10.94	0.09
103	18.668	0.178	0.42	86	2.72	98	86	-0.060	10.72	0.18
104	18.847	0.179	0.42	86	0.45	99	86	-0.050	10.63	0.19
105	19.026	0.179	0.42	86	1.33	99	86	-0.050	10.46	0.18
106	19.205	0.179	0.43	86	2.49	99	86	-0.050	10.56	0.12
107	19.384	0.179	0.42	86	1.81	99	86	-0.050	10.51	0.13
108	19.562	0.178	0.41	86	0.91	98	85	-0.060	10.12	0.22
109	19.740	0.178	0.43	86	1.21	98	85	-0.050	10.15	0.20
110	19.918	0.178	0.41	86	1.54	98	85	-0.050	9.93	0.26
111	20.097	0.179	0.41	87	1.38	99	85	-0.060	10.15	0.22
112	20.277	0.180	0.42	87	2.55	99	85	-0.050	10.23	0.16
113	20.456	0.179	0.43	87	2.48	99	84	-0.050	9.97	0.21
114	20.634	0.178	0.41	87	1.74	98	84	-0.060	9.95	0.24
115	20.813	0.179	0.41	87	2.14	99	84	-0.060	9.99	0.25
116	20.993	0.180	0.41	87	2.74	99	84	-0.050	9.78	0.25
117	21.170	0.177	0.42	87	0.37	97	84	-0.050	9.80	0.20
118	21.349	0.179	0.42	87	1.41	99	83	-0.050	9.68	0.24
119	21.528	0.179	0.41	87	1.45	99	83	-0.060	9.81	0.23
120	21.707	0.179	0.43	87	1.25	99	83	-0.050	9.94	0.12
121	21.885	0.178	0.42	87	2.42	98	83	-0.060	10.13	0.11
122	22.063	0.178	0.43	87	1.33	98	83	-0.050	9.94	0.13
123	22.242	0.179	0.42	87	2.65	99	83	-0.060	9.98	0.15
124	22.419	0.177	0.42	87	0.39	97	83	-0.050	9.57	0.20
125	22.598	0.179	0.42	87	1.04	99	83	-0.050	9.68	0.21
126	22.776	0.178	0.43	87	2.3	98	83	-0.050	9.71	0.16
127	22.955	0.179	0.43	87	2.58	98	83	-0.060	9.98	0.12

BOX B TEST DATA - ASTM E3053 / ASTM E2515

Client: IHP
 Model: Montecito
 Run #: 2

Job #: 19-480
 Tracking #: 029
 Technician: SJB
 Date: 6/18/2019

Elapsed Time (min)	Particulate Sampling Data							Flue Gas Data		
	Gas Meter (ft ³)	Sample Rate (cfm)	Orifice dH (in H ₂ O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Filter (°F)	Flue Draft (in H ₂ O)	CO ₂ (%)	CO (%)
128	23.133	0.178	0.43	87	2.33	98	83	-0.050	9.72	0.15
129	23.311	0.178	0.43	87	1.13	98	83	-0.050	9.60	0.19
130	23.489	0.178	0.43	87	1.12	98	83	-0.050	9.77	0.14
131	23.668	0.179	0.42	87	1.37	99	83	-0.060	9.73	0.20
132	23.846	0.178	0.42	87	1	98	83	-0.050	9.04	0.22
133	24.024	0.178	0.42	87	2.75	98	83	-0.060	8.55	0.19
134	24.201	0.177	0.43	87	2.05	97	83	-0.050	8.21	0.14
135	24.380	0.179	0.41	87	2.44	98	83	-0.060	7.78	0.31
136	24.559	0.179	0.42	87	1.74	98	83	-0.050	7.89	0.25
137	24.738	0.179	0.41	87	0.79	98	83	-0.050	7.19	0.52
138	24.916	0.178	0.43	87	1.18	98	83	-0.040	6.15	1.16
139	25.095	0.179	0.42	87	2.58	98	83	-0.040	5.71	1.18
140	25.273	0.178	0.42	87	2.13	98	84	-0.040	5.71	1.20
141	25.452	0.179	0.42	87	2.46	98	84	-0.050	6.12	1.12
142	25.628	0.176	0.42	87	1.21	97	84	-0.060	6.11	1.14
143	25.807	0.179	0.42	87	2.58	98	84	-0.050	6.30	1.10
144	25.986	0.179	0.42	87	2.37	98	85	-0.040	5.82	1.19
145	26.164	0.178	0.41	87	1.19	98	85	-0.050	5.89	1.18
146	26.344	0.180	0.42	87	2.57	99	85	-0.040	5.80	1.22
147	26.523	0.179	0.41	87	2.74	98	85	-0.050	6.11	1.15
148	26.700	0.177	0.41	87	0.58	97	85	-0.050	6.20	1.16
149	26.879	0.179	0.42	87	0.93	98	85	-0.050	6.38	1.10
150	27.056	0.177	0.41	87	1.82	97	84	-0.040	5.81	1.23
151	27.236	0.180	0.41	87	2.67	99	84	-0.050	6.31	1.14
152	27.414	0.178	0.42	87	0.84	98	84	-0.050	6.39	1.10
153	27.591	0.177	0.42	87	2.54	97	84	-0.050	6.41	1.12
154	27.769	0.178	0.41	87	0.8	98	83	-0.040	6.01	1.18
155	27.947	0.178	0.41	87	1.47	98	83	-0.050	6.23	1.19
156	28.124	0.177	0.43	87	1.88	97	83	-0.030	6.29	1.14
157	28.302	0.178	0.42	87	1	97	83	-0.040	6.37	1.11
158	28.479	0.177	0.41	87	2.7	97	82	-0.040	6.05	1.20
159	28.656	0.177	0.43	87	1.34	97	82	-0.030	6.13	1.20

BOX B TEST DATA - ASTM E3053 / ASTM E2515

Client: IHP
 Model: Montecito
 Run #: 2

Job #: 19-480
 Tracking #: 029
 Technician: SJB
 Date: 6/18/2019

Elapsed Time (min)	Particulate Sampling Data							Flue Gas Data		
	Gas Meter (ft ³)	Sample Rate (cfm)	Orifice dH (in H ₂ O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Filter (°F)	Flue Draft (in H ₂ O)	CO ₂ (%)	CO (%)
160	28.834	0.178	0.41	87	2.73	97	82	-0.040	6.06	1.26
161	29.012	0.178	0.41	87	1.48	97	82	-0.050	6.12	1.24
162	29.189	0.177	0.42	87	1.17	97	81	-0.040	6.33	1.15
163	29.366	0.177	0.42	87	1.21	97	81	-0.030	6.10	1.17
164	29.545	0.179	0.42	87	2.56	98	81	-0.030	6.27	1.12
165	29.724	0.179	0.41	87	1.22	98	80	-0.040	5.93	1.23
166	29.903	0.179	0.42	87	1.33	98	80	-0.040	6.27	1.12
167	30.081	0.178	0.41	87	1.32	97	81	-0.040	5.94	1.20
168	30.263	0.182	0.43	87	2.2	99	81	-0.050	6.26	1.16
169	30.448	0.185	0.44	87	2.67	101	81	-0.040	6.09	1.16
170	30.632	0.184	0.44	87	1.09	100	81	-0.040	6.21	1.10
171	30.815	0.183	0.44	87	2.74	100	81	-0.040	6.25	1.12
172	31.001	0.186	0.44	86	1.07	102	81	-0.040	6.27	1.11
173	31.185	0.184	0.44	86	1.31	100	81	-0.040	6.24	1.13
174	31.369	0.184	0.43	86	1.53	100	81	-0.040	6.21	1.13
175	31.554	0.185	0.42	86	1.46	101	81	-0.050	6.23	1.17
176	31.737	0.183	0.43	86	1.1	100	82	-0.040	6.32	1.12
177	31.920	0.183	0.42	86	1.87	100	82	-0.050	6.22	1.14
178	32.106	0.186	0.42	86	1.23	101	82	-0.030	5.94	1.20
179	32.291	0.185	0.42	86	2.03	101	82	-0.030	5.96	1.20
180	32.475	0.184	0.41	86	3.05	100	82	-0.040	6.26	1.09
181	32.660	0.185	0.42	86	1.55	101	82	-0.030	6.02	1.16
182	32.843	0.183	0.40	86	1.89	100	82	-0.050	6.01	1.20
183	33.028	0.185	0.41	86	1.67	101	82	-0.040	6.08	1.15
184	33.214	0.186	0.41	86	2.6	101	82	-0.050	6.12	1.17
185	33.402	0.188	0.42	86	2.41	103	82	-0.040	6.14	1.16
186	33.589	0.187	0.41	86	1.89	102	82	-0.040	5.82	1.21
187	33.776	0.187	0.41	85	2.12	102	82	-0.040	6.28	1.13
188	33.963	0.187	0.41	85	1.7	102	82	-0.040	6.09	1.11
189	34.150	0.187	0.41	85	2.07	102	82	-0.040	6.02	1.08
190	34.336	0.186	0.40	85	3.43	102	82	-0.050	5.78	1.17
191	34.522	0.186	0.41	85	1.83	102	82	-0.040	5.97	1.07

BOX B TEST DATA - ASTM E3053 / ASTM E2515

Client: IHP
 Model: Montecito
 Run #: 2

Job #: 19-480
 Tracking #: 029
 Technician: SJB
 Date: 6/18/2019

Elapsed Time (min)	Particulate Sampling Data							Flue Gas Data		
	Gas Meter (ft ³)	Sample Rate (cfm)	Orifice dH (in H ₂ O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Filter (°F)	Flue Draft (in H ₂ O)	CO ₂ (%)	CO (%)
192	34.709	0.187	0.40	85	2.22	102	82	-0.050	5.88	1.09
193	34.896	0.187	0.41	85	2.06	102	82	-0.040	5.98	1.03
194	35.081	0.185	0.43	85	2.14	101	82	-0.040	5.97	1.05
195	35.270	0.189	0.42	85	2.36	103	82	-0.050	5.82	1.12
196	35.460	0.190	0.42	85	3.25	104	83	-0.030	5.77	1.07
197	35.650	0.190	0.41	85	3.79	104	83	-0.030	5.78	1.10
198	35.839	0.189	0.42	85	2.72	103	83	-0.030	5.92	1.02
199	36.025	0.186	0.41	85	2.22	102	83	-0.040	6.05	1.02
200	36.212	0.187	0.42	85	1.49	102	83	-0.050	6.47	0.91
201	36.399	0.187	0.42	85	3.31	102	84	-0.040	6.45	0.85
202	36.587	0.188	0.42	85	2.31	103	84	-0.030	6.36	0.89
203	36.775	0.188	0.41	85	2.3	103	84	-0.040	6.60	0.84
204	36.960	0.185	0.40	85	3.79	101	84	-0.040	6.48	0.84
205	37.145	0.185	0.42	85	2.41	101	84	-0.030	6.54	0.84
206	37.330	0.185	0.42	85	3.6	101	84	-0.030	6.64	0.78
207	37.514	0.184	0.41	85	2.4	101	84	-0.030	6.63	0.76
208	37.700	0.186	0.42	85	3.63	102	84	-0.030	6.73	0.70
209	37.885	0.185	0.41	85	2.1	101	84	-0.040	6.93	0.65
210	38.070	0.185	0.42	85	3.81	101	84	-0.030	6.58	0.67
211	38.254	0.184	0.40	85	2.35	101	84	-0.040	6.02	0.80
212	38.439	0.185	0.42	85	3.57	101	84	-0.030	5.40	1.02
213	38.623	0.184	0.42	85	3.76	101	84	-0.030	5.49	1.02
214	38.807	0.184	0.42	85	1.59	101	84	-0.040	5.61	1.00
215	38.992	0.185	0.42	85	1.49	101	85	-0.040	5.52	1.00
216	39.176	0.184	0.40	85	2.6	101	85	-0.050	5.40	1.03
217	39.360	0.184	0.41	85	3.52	101	85	-0.040	5.63	0.94
218	39.544	0.184	0.42	85	2.43	101	85	-0.040	5.63	0.94
219	39.726	0.182	0.42	85	2.32	100	85	-0.030	5.45	0.95
220	39.908	0.182	0.41	85	3.44	100	85	-0.040	5.73	0.93
221	40.092	0.184	0.41	85	2.56	101	85	-0.030	5.21	1.04
222	40.277	0.185	0.40	85	3.13	101	85	-0.040	5.44	1.02
223	40.461	0.184	0.42	85	2.37	101	85	-0.030	5.57	0.97

BOX B TEST DATA - ASTM E3053 / ASTM E2515

Client: IHP
 Model: Montecito
 Run #: 2

Job #: 19-480
 Tracking #: 029
 Technician: SJB
 Date: 6/18/2019

Elapsed Time (min)	Particulate Sampling Data							Flue Gas Data		
	Gas Meter (ft ³)	Sample Rate (cfm)	Orifice dH (in H ₂ O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Filter (°F)	Flue Draft (in H ₂ O)	CO ₂ (%)	CO (%)
224	40.644	0.183	0.42	85	3.06	100	85	-0.040	5.82	0.91
225	40.826	0.182	0.42	85	2.35	100	85	-0.030	5.51	1.01
226	41.010	0.184	0.41	85	2.71	101	85	-0.040	5.55	1.10
227	41.194	0.184	0.41	85	2.58	101	85	-0.030	5.04	1.24
228	41.377	0.183	0.41	85	2.44	100	85	-0.030	5.06	1.27
229	41.561	0.184	0.40	85	3.77	101	85	-0.040	5.14	1.22
230	41.745	0.184	0.41	85	2.53	101	85	-0.040	5.19	1.11
231	41.929	0.184	0.42	85	3.84	101	85	-0.030	5.12	1.08
232	42.113	0.184	0.41	85	3.84	101	85	-0.030	5.10	1.09
233	42.296	0.183	0.41	85	3.86	100	85	-0.050	5.43	1.05
234	42.478	0.182	0.41	85	2.52	100	85	-0.040	5.42	1.07
235	42.662	0.184	0.41	85	3.77	101	85	-0.040	5.15	1.09
236	42.846	0.184	0.41	85	1.85	101	85	-0.040	5.37	1.01
237	43.030	0.184	0.42	85	2.33	101	85	-0.040	5.46	0.95
238	43.214	0.184	0.42	85	3.7	101	85	-0.030	5.20	1.00
239	43.397	0.183	0.42	85	2.63	100	86	-0.030	5.31	0.96
240	43.581	0.184	0.41	85	2.6	101	86	-0.040	5.30	1.02
241	43.766	0.185	0.42	85	3.69	101	86	-0.030	5.39	0.97
242	43.950	0.184	0.42	85	1.92	101	86	-0.030	5.11	1.03
243	44.135	0.185	0.41	85	3.6	101	86	-0.040	5.45	0.95
244	44.321	0.186	0.42	85	2.45	102	86	-0.030	5.14	1.02
245	44.505	0.184	0.41	85	3.79	101	86	-0.050	5.27	0.99
246	44.690	0.185	0.42	85	3.5	101	86	-0.030	5.37	0.93
247	44.875	0.185	0.42	85	1.97	101	86	-0.030	5.36	0.91
248	45.060	0.185	0.42	85	3.53	101	86	-0.030	5.09	0.96
249	45.244	0.184	0.41	85	2.29	101	86	-0.040	5.34	0.92
250	45.429	0.185	0.41	85	2.9	101	86	-0.030	4.98	1.01
251	45.615	0.186	0.42	85	2.49	102	86	-0.030	5.34	0.89
252	45.802	0.187	0.42	85	3.53	102	86	-0.030	5.38	0.90
253	45.988	0.186	0.41	85	2.78	102	86	-0.040	5.17	0.94
254	46.174	0.186	0.42	85	1.78	102	86	-0.030	5.40	0.87
255	46.361	0.187	0.42	85	2.25	102	86	-0.030	5.44	0.84

BOX B TEST DATA - ASTM E3053 / ASTM E2515

Client: IHP
 Model: Montecito
 Run #: 2

Job #: 19-480
 Tracking #: 029
 Technician: SJB
 Date: 6/18/2019

Elapsed Time (min)	Particulate Sampling Data							Flue Gas Data		
	Gas Meter (ft ³)	Sample Rate (cfm)	Orifice dH (in H ₂ O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Filter (°F)	Flue Draft (in H ₂ O)	CO ₂ (%)	CO (%)
256	46.548	0.187	0.41	85	1.81	102	86	-0.030	5.13	0.94
257	46.736	0.188	0.41	85	3.83	103	86	-0.040	5.16	0.95
258	46.922	0.186	0.41	85	2.3	102	85	-0.040	5.08	0.95
259	47.107	0.185	0.42	85	3.63	101	85	-0.040	5.55	0.82
260	47.293	0.186	0.42	85	2.31	102	85	-0.030	5.28	0.87
261	47.477	0.184	0.41	85	2.1	101	85	-0.040	5.31	0.92
262	47.661	0.184	0.43	85	2.53	101	85	-0.030	5.23	0.93
263	47.845	0.184	0.43	85	3.55	101	85	-0.030	5.27	0.92
264	48.030	0.185	0.41	85	1.7	101	85	-0.040	5.60	0.87
265	48.214	0.184	0.42	85	3.82	101	84	-0.040	5.68	0.84
266	48.396	0.182	0.42	85	2.42	100	84	-0.040	5.71	0.83
267	48.579	0.183	0.41	85	1.87	100	84	-0.030	5.22	0.92
268	48.765	0.186	0.41	85	2.26	102	84	-0.030	5.27	0.92
269	48.948	0.183	0.42	85	2.37	100	84	-0.040	5.65	0.79
270	49.131	0.183	0.43	85	2.66	100	84	-0.030	5.67	0.77
271	49.315	0.184	0.41	85	3.55	101	84	-0.030	5.31	0.87
272	49.499	0.184	0.41	85	2.49	101	84	-0.040	5.74	0.77
273	49.681	0.182	0.42	85	2.39	100	84	-0.030	5.70	0.74
274	49.864	0.183	0.42	85	2.34	100	84	-0.030	5.23	0.84
275	50.047	0.183	0.42	86	3.03	100	84	-0.030	5.68	0.76
276	50.230	0.183	0.41	86	2.44	100	84	-0.040	5.54	0.81
277	50.412	0.182	0.42	86	2.62	99	84	-0.040	5.75	0.75
278	50.592	0.180	0.43	86	2.89	98	83	-0.020	5.45	0.74
279	50.774	0.182	0.43	86	3.38	99	83	-0.030	5.56	0.73
280	50.957	0.183	0.42	86	3.37	100	83	-0.020	5.47	0.76
281	51.139	0.182	0.42	86	3.55	99	83	-0.030	5.38	0.79
282	51.320	0.181	0.41	86	2.39	99	83	-0.030	5.31	0.82
283	51.502	0.182	0.43	86	2.44	99	83	-0.030	5.61	0.70
284	51.684	0.182	0.42	86	2.9	99	83	-0.030	5.40	0.77
285	51.867	0.183	0.41	86	2.17	100	83	-0.040	5.60	0.73
286	52.048	0.181	0.43	86	2.56	99	83	-0.030	5.67	0.71
287	52.230	0.182	0.42	86	2.95	99	83	-0.030	5.13	0.84

BOX B TEST DATA - ASTM E3053 / ASTM E2515

Client: IHP
 Model: Montecito
 Run #: 2

Job #: 19-480
 Tracking #: 029
 Technician: SJB
 Date: 6/18/2019

Elapsed Time (min)	Particulate Sampling Data							Flue Gas Data		
	Gas Meter (ft ³)	Sample Rate (cfm)	Orifice dH (in H ₂ O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Filter (°F)	Flue Draft (in H ₂ O)	CO ₂ (%)	CO (%)
288	52.412	0.182	0.42	86	2.42	99	83	-0.040	5.61	0.71
289	52.593	0.181	0.42	86	2.74	99	83	-0.030	5.22	0.78
290	52.772	0.179	0.41	86	3.08	98	83	-0.040	5.24	0.79
291	52.954	0.182	0.42	86	1.87	99	83	-0.030	5.21	0.75
292	53.135	0.181	0.43	86	1.39	99	83	-0.020	5.45	0.73
293	53.316	0.181	0.42	86	2.27	99	83	-0.030	5.33	0.75
294	53.497	0.181	0.41	86	3.08	99	83	-0.030	5.18	0.78
295	53.680	0.183	0.42	86	3.59	100	83	-0.030	5.34	0.75
296	53.860	0.180	0.41	86	2.38	98	83	-0.040	5.44	0.72
297	54.041	0.181	0.41	86	2.05	99	83	-0.040	5.41	0.75
298	54.221	0.180	0.43	86	2.92	98	83	-0.040	5.58	0.70
299	54.402	0.181	0.42	86	1.44	99	83	-0.030	5.29	0.71
300	54.582	0.180	0.41	86	2.43	98	83	-0.030	5.14	0.76
301	54.763	0.181	0.41	86	1.78	99	83	-0.040	5.21	0.75
302	54.943	0.180	0.41	86	3.75	98	83	-0.030	5.11	0.74
303	55.124	0.181	0.42	86	1.55	99	83	-0.030	5.60	0.63
304	55.305	0.181	0.43	86	2.29	99	83	-0.030	5.58	0.64
305	55.484	0.179	0.43	86	2.71	98	83	-0.030	5.48	0.66
306	55.665	0.181	0.41	86	3.13	99	83	-0.040	5.33	0.75
307	55.845	0.180	0.43	86	3.62	98	83	-0.030	5.65	0.70
308	56.025	0.180	0.43	86	2.81	98	83	-0.030	5.52	0.71
309	56.204	0.179	0.43	86	2.82	98	83	-0.030	5.56	0.71
310	56.385	0.181	0.42	86	3.7	99	83	-0.040	5.58	0.67
311	56.565	0.180	0.43	86	3.31	98	83	-0.020	5.40	0.71
312	56.746	0.181	0.43	86	2.26	99	83	-0.020	5.10	0.71
313	56.927	0.181	0.43	87	1.54	99	83	-0.030	5.17	0.65
314	57.109	0.182	0.43	87	3.3	99	83	-0.020	4.99	0.67
315	57.291	0.182	0.42	87	2.38	99	83	-0.020	5.06	0.66
316	57.471	0.180	0.43	87	3.59	98	83	-0.030	5.12	0.65
317	57.651	0.180	0.42	87	2.33	98	83	-0.030	5.36	0.60
318	57.831	0.180	0.41	87	2.92	98	83	-0.040	5.05	0.69
319	58.011	0.180	0.42	87	2.12	98	83	-0.030	5.39	0.60

BOX B TEST DATA - ASTM E3053 / ASTM E2515

Client: IHP
 Model: Montecito
 Run #: 2

Job #: 19-480
 Tracking #: 029
 Technician: SJB
 Date: 6/18/2019

Elapsed Time (min)	Particulate Sampling Data							Flue Gas Data		
	Gas Meter (ft ³)	Sample Rate (cfm)	Orifice dH (in H ₂ O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Filter (°F)	Flue Draft (in H ₂ O)	CO ₂ (%)	CO (%)
320	58.192	0.181	0.42	87	2.66	99	83	-0.040	5.40	0.65
321	58.371	0.179	0.42	87	2	98	83	-0.040	5.36	0.67
322	58.552	0.181	0.41	87	3.34	99	83	-0.030	5.07	0.74
323	58.732	0.180	0.42	87	1.76	98	83	-0.040	5.48	0.61
324	58.910	0.178	0.43	87	3.12	97	83	-0.020	5.10	0.67
325	59.089	0.179	0.43	87	3.66	98	83	-0.020	5.14	0.67
326	59.268	0.179	0.41	87	2.46	98	83	-0.040	5.23	0.74
327	59.448	0.180	0.43	87	2.29	98	83	-0.030	5.24	0.68
328	59.627	0.179	0.43	87	3.32	98	83	-0.020	5.14	0.68
329	59.808	0.181	0.41	87	3.66	99	83	-0.040	5.16	0.75
330	59.988	0.180	0.41	87	1.71	98	83	-0.040	5.05	0.77
331	60.168	0.180	0.41	87	1.87	98	83	-0.040	5.15	0.75
332	60.347	0.179	0.43	87	3.34	98	83	-0.020	4.94	0.74
333	60.527	0.180	0.43	87	2.38	98	83	-0.020	4.96	0.69
334	60.707	0.180	0.41	87	2.47	98	83	-0.030	4.93	0.75
335	60.887	0.180	0.41	87	3.69	98	83	-0.030	4.86	0.74
336	61.067	0.180	0.42	87	1.83	98	83	-0.030	5.22	0.67
337	61.246	0.179	0.42	87	2.26	98	83	-0.040	5.29	0.67
338	61.425	0.179	0.43	87	3.4	98	83	-0.020	4.88	0.75
339	61.603	0.178	0.41	87	2.85	97	83	-0.040	5.14	0.68
340	61.782	0.179	0.41	87	3.75	98	83	-0.040	4.90	0.75
341	61.963	0.181	0.41	87	2.02	99	83	-0.040	5.12	0.69
342	62.141	0.178	0.43	87	2.59	97	83	-0.040	5.18	0.68
343	62.321	0.180	0.41	87	2.53	98	83	-0.040	5.03	0.73
344	62.500	0.179	0.42	87	2.36	98	83	-0.040	5.21	0.69
345	62.678	0.178	0.42	87	1.65	97	83	-0.020	4.76	0.67
346	62.858	0.180	0.41	87	2.53	98	83	-0.040	4.86	0.70
347	63.036	0.178	0.43	87	2.3	97	83	-0.030	4.99	0.63
348	63.217	0.181	0.43	87	3.4	99	83	-0.030	4.78	0.67
349	63.395	0.178	0.43	87	2.41	97	83	-0.030	4.89	0.64
350	63.574	0.179	0.42	87	3.66	98	83	-0.030	4.98	0.66
351	63.753	0.179	0.43	87	3.11	98	83	-0.020	4.73	0.67

BOX B TEST DATA - ASTM E3053 / ASTM E2515

Client: IHP
 Model: Montecito
 Run #: 2

Job #: 19-480
 Tracking #: 029
 Technician: SJB
 Date: 6/18/2019

	Particulate Sampling Data							Flue Gas Data		
Elapsed Time (min)	Gas Meter (ft ³)	Sample Rate (cfm)	Orifice dH (in H ₂ O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Filter (°F)	Flue Draft (in H ₂ O)	CO ₂ (%)	CO (%)
352	63.932	0.179	0.42	87	1.77	98	83	-0.030	4.53	0.75
Avg/Tot	63.932	0.182	0.42	86	2.14	100	84	-0.046	7.69	0.64

WOODSTOVE SURFACE TEMPERATURE DATA

Client: IHPJob #: 19-480Model: MontecitoTracking #: 029Run #: 2Technician: SJBDate: 6/18/2019

Elapsed Time (min)	Temperature Data (°F)						
	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
0	527	557	325	490	250	429.8	N/A
1	530	556	332	456	256	426.0	N/A
2	533	554	348	486	258	435.8	N/A
3	535	554	361	595	259	460.8	N/A
4	536	552	372	650	261	474.2	N/A
5	537	551	383	690	263	484.8	N/A
6	538	550	391	725	265	493.8	N/A
7	538	550	398	759	267	502.4	N/A
8	539	549	404	786	269	509.4	N/A
9	539	549	409	806	271	514.8	N/A
10	540	550	413	824	273	520.0	N/A
11	541	550	417	839	275	524.4	N/A
12	542	551	420	837	277	525.4	N/A
13	544	552	421	822	278	523.4	N/A
14	545	553	421	804	279	520.4	N/A
15	547	555	420	786	280	517.6	N/A
16	549	555	417	771	281	514.6	N/A
17	551	556	415	763	281	513.2	N/A
18	552	556	413	758	281	512.0	N/A
19	553	557	410	754	280	510.8	N/A
20	554	556	408	752	280	510.0	N/A
21	555	556	406	754	279	510.0	N/A
22	556	556	403	755	279	509.8	N/A
23	556	555	401	755	278	509.0	N/A
24	556	554	399	758	277	508.8	N/A
25	556	553	397	755	276	507.4	N/A
26	556	552	395	757	275	507.0	N/A
27	556	551	393	756	274	506.0	N/A
28	555	550	391	755	273	504.8	N/A
29	555	549	390	752	272	503.6	N/A
30	554	547	388	749	272	502.0	N/A
31	553	546	387	747	271	500.8	N/A
32	553	545	385	747	270	500.0	N/A
33	552	544	383	745	269	498.6	N/A
34	551	543	381	744	268	497.4	N/A
35	550	542	380	743	267	496.4	N/A
36	549	541	379	741	265	495.0	N/A
37	549	540	377	740	264	494.0	N/A
38	548	538	376	740	263	493.0	N/A
39	547	537	375	741	262	492.4	N/A
40	546	536	374	741	261	491.6	N/A
41	545	535	372	743	260	491.0	N/A
42	544	535	371	744	259	490.6	N/A
43	544	534	371	743	258	490.0	N/A
44	543	533	370	742	257	489.0	N/A
45	542	532	369	741	256	488.0	N/A
46	541	531	368	742	255	487.4	N/A
47	541	530	367	742	254	486.8	N/A

WOODSTOVE SURFACE TEMPERATURE DATA

Client: IHPModel: MontecitoRun #: 2Job #: 19-480Tracking #: 029Technician: SJBDate: 6/18/2019

Elapsed Time (min)	Temperature Data (°F)						
	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
48	540	529	366	742	253	486.0	N/A
49	539	528	366	742	252	485.4	N/A
50	538	528	365	745	251	485.4	N/A
51	537	527	364	747	250	485.0	N/A
52	537	526	364	748	249	484.8	N/A
53	536	525	364	749	248	484.4	N/A
54	535	525	364	750	247	484.2	N/A
55	535	524	364	751	246	484.0	N/A
56	534	524	364	753	245	484.0	N/A
57	533	523	365	756	245	484.4	N/A
58	533	522	365	758	244	484.4	N/A
59	532	522	366	761	243	484.8	N/A
60	532	521	366	763	243	485.0	N/A
61	532	521	366	763	242	484.8	N/A
62	531	521	366	765	241	484.8	N/A
63	531	520	367	764	240	484.4	N/A
64	531	520	367	765	240	484.6	N/A
65	531	520	367	767	239	484.8	N/A
66	530	520	368	767	238	484.6	N/A
67	530	519	368	771	237	485.0	N/A
68	530	519	368	776	237	486.0	N/A
69	529	519	369	780	236	486.6	N/A
70	529	519	370	781	235	486.8	N/A
71	529	519	370	776	235	485.8	N/A
72	529	519	370	767	234	483.8	N/A
73	528	519	370	757	233	481.4	N/A
74	528	519	370	750	233	480.0	N/A
75	528	519	369	745	232	478.6	N/A
76	528	518	369	742	232	477.8	N/A
77	527	518	368	738	231	476.4	N/A
78	527	518	368	738	230	476.2	N/A
79	527	518	367	739	230	476.2	N/A
80	526	518	367	739	229	475.8	N/A
81	526	518	367	742	229	476.4	N/A
82	526	517	367	744	228	476.4	N/A
83	525	517	367	744	228	476.2	N/A
84	525	517	367	746	227	476.4	N/A
85	524	516	367	746	227	476.0	N/A
86	523	516	367	745	226	475.4	N/A
87	523	516	368	747	226	476.0	N/A
88	522	515	368	746	226	475.4	N/A
89	522	515	368	745	225	475.0	N/A
90	521	514	368	746	225	474.8	N/A
91	520	514	368	745	224	474.2	N/A
92	520	514	368	745	224	474.2	N/A
93	520	513	368	743	223	473.4	N/A
94	519	513	368	732	223	471.0	N/A
95	518	513	368	726	223	469.6	N/A

WOODSTOVE SURFACE TEMPERATURE DATA

Client: IHPModel: MontecitoRun #: 2Job #: 19-480Tracking #: 029Technician: SJBDate: 6/18/2019

Elapsed Time (min)	Temperature Data (°F)						
	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
96	518	512	368	723	222	468.6	N/A
97	517	512	368	719	222	467.6	N/A
98	517	512	368	718	221	467.2	N/A
99	516	511	368	720	221	467.2	N/A
100	516	511	368	724	221	468.0	N/A
101	515	511	368	727	221	468.4	N/A
102	515	511	368	728	220	468.4	N/A
103	514	511	368	728	220	468.2	N/A
104	514	510	368	726	219	467.4	N/A
105	513	510	368	724	219	466.8	N/A
106	513	510	368	720	219	466.0	N/A
107	513	510	369	716	219	465.4	N/A
108	512	509	369	714	218	464.4	N/A
109	512	509	369	710	218	463.6	N/A
110	512	509	370	708	218	463.4	N/A
111	512	509	370	710	217	463.6	N/A
112	511	509	371	710	217	463.6	N/A
113	511	508	371	711	217	463.6	N/A
114	511	508	372	711	217	463.8	N/A
115	511	508	373	710	217	463.8	N/A
116	510	508	374	707	216	463.0	N/A
117	510	507	374	706	216	462.6	N/A
118	510	507	375	702	216	462.0	N/A
119	510	507	375	701	216	461.8	N/A
120	509	507	376	701	216	461.8	N/A
121	509	507	376	701	215	461.6	N/A
122	509	507	376	696	215	460.6	N/A
123	508	506	377	698	215	460.8	N/A
124	508	506	377	697	215	460.6	N/A
125	508	506	378	696	215	460.6	N/A
126	508	506	378	699	215	461.2	N/A
127	507	506	378	697	215	460.6	N/A
128	507	506	378	697	214	460.4	N/A
129	507	505	378	696	214	460.0	N/A
130	507	505	378	691	214	459.0	N/A
131	506	505	378	690	214	458.6	N/A
132	506	505	377	685	214	457.4	N/A
133	506	505	377	674	214	455.2	N/A
134	506	505	376	663	214	452.8	N/A
135	505	505	375	651	213	449.8	N/A
136	505	505	375	635	213	446.6	N/A
137	504	504	373	604	213	439.6	N/A
138	504	504	372	582	213	435.0	N/A
139	503	504	371	565	213	431.2	N/A
140	503	504	369	550	213	427.8	N/A
141	502	504	367	537	213	424.6	N/A
142	501	503	364	527	213	421.6	N/A
143	500	503	362	517	213	419.0	N/A

WOODSTOVE SURFACE TEMPERATURE DATA

Client: IHPJob #: 19-480Model: MontecitoTracking #: 029Run #: 2Technician: SJBDate: 6/18/2019

Elapsed Time (min)	Temperature Data (°F)						
	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
144	499	503	359	509	213	416.6	N/A
145	498	502	357	501	213	414.2	N/A
146	497	502	354	494	212	411.8	N/A
147	496	501	351	488	212	409.6	N/A
148	495	500	349	482	212	407.6	N/A
149	494	500	346	477	212	405.8	N/A
150	492	499	344	473	212	404.0	N/A
151	491	498	342	468	212	402.2	N/A
152	490	497	339	465	211	400.4	N/A
153	489	496	337	461	211	398.8	N/A
154	488	495	335	458	211	397.4	N/A
155	486	495	333	455	211	396.0	N/A
156	485	494	331	452	211	394.6	N/A
157	484	493	329	450	211	393.4	N/A
158	482	492	328	447	211	392.0	N/A
159	481	491	326	445	211	390.8	N/A
160	480	490	324	443	211	389.6	N/A
161	479	489	322	442	210	388.4	N/A
162	477	488	321	439	210	387.0	N/A
163	476	487	319	438	210	386.0	N/A
164	475	486	318	436	210	385.0	N/A
165	473	484	316	436	209	383.6	N/A
166	472	483	315	434	209	382.6	N/A
167	470	482	314	433	209	381.6	N/A
168	469	481	312	432	209	380.6	N/A
169	467	480	311	431	209	379.6	N/A
170	466	479	310	430	209	378.8	N/A
171	465	478	309	429	209	378.0	N/A
172	463	477	309	428	209	377.2	N/A
173	462	476	308	427	209	376.4	N/A
174	461	475	307	426	209	375.6	N/A
175	460	474	305	425	209	374.6	N/A
176	459	474	305	424	209	374.2	N/A
177	458	473	304	423	208	373.2	N/A
178	456	472	303	423	208	372.4	N/A
179	455	471	302	423	208	371.8	N/A
180	454	470	301	422	208	371.0	N/A
181	452	469	300	421	208	370.0	N/A
182	451	468	300	421	209	369.8	N/A
183	450	467	299	421	209	369.2	N/A
184	449	467	298	420	209	368.6	N/A
185	448	466	298	420	209	368.2	N/A
186	447	465	297	419	209	367.4	N/A
187	446	464	296	418	209	366.6	N/A
188	446	463	296	416	209	366.0	N/A
189	445	462	295	416	209	365.4	N/A
190	444	462	295	414	209	364.8	N/A
191	443	461	294	414	210	364.4	N/A

WOODSTOVE SURFACE TEMPERATURE DATA

Client: IHPJob #: 19-480Model: MontecitoTracking #: 029Run #: 2Technician: SJBDate: 6/18/2019

Elapsed Time (min)	Temperature Data (°F)						
	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
192	442	460	293	413	210	363.6	N/A
193	442	459	293	412	210	363.2	N/A
194	441	458	292	411	210	362.4	N/A
195	440	457	292	410	210	361.8	N/A
196	439	456	292	411	210	361.6	N/A
197	439	456	291	410	211	361.4	N/A
198	438	455	291	411	211	361.2	N/A
199	438	454	291	412	212	361.4	N/A
200	437	453	290	413	212	361.0	N/A
201	437	452	290	413	212	360.8	N/A
202	436	451	290	413	213	360.6	N/A
203	435	450	290	414	213	360.4	N/A
204	435	450	290	415	213	360.6	N/A
205	434	449	290	416	214	360.6	N/A
206	434	448	290	418	214	360.8	N/A
207	434	447	290	422	214	361.4	N/A
208	433	447	291	426	214	362.2	N/A
209	433	446	291	426	215	362.2	N/A
210	432	446	291	424	215	361.6	N/A
211	432	445	292	421	215	361.0	N/A
212	431	444	293	418	215	360.2	N/A
213	431	444	293	416	215	359.8	N/A
214	430	443	294	413	216	359.2	N/A
215	430	443	293	411	216	358.6	N/A
216	429	442	294	409	216	358.0	N/A
217	429	441	293	407	217	357.4	N/A
218	428	441	293	404	217	356.6	N/A
219	428	440	293	404	217	356.4	N/A
220	427	439	292	402	217	355.4	N/A
221	426	439	291	400	217	354.6	N/A
222	426	438	290	399	218	354.2	N/A
223	425	437	290	398	218	353.6	N/A
224	424	437	289	397	218	353.0	N/A
225	423	436	289	395	218	352.2	N/A
226	423	435	288	392	219	351.4	N/A
227	422	434	288	391	219	350.8	N/A
228	421	434	287	389	219	350.0	N/A
229	420	433	286	387	220	349.2	N/A
230	419	432	285	386	220	348.4	N/A
231	418	431	285	385	220	347.8	N/A
232	418	431	284	383	220	347.2	N/A
233	417	430	284	382	221	346.8	N/A
234	416	429	284	381	221	346.2	N/A
235	416	428	283	380	222	345.8	N/A
236	415	427	283	379	222	345.2	N/A
237	414	427	283	378	222	344.8	N/A
238	413	426	282	378	223	344.4	N/A
239	413	425	282	376	223	343.8	N/A

WOODSTOVE SURFACE TEMPERATURE DATA

Client: IHP

Job #: 19-480

Model: Montecito

Tracking #: 029

Run #: 2

Technician: SJB

Date: 6/18/2019

Elapsed Time (min)	Temperature Data (°F)						
	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
240	412	424	282	375	224	343.4	N/A
241	411	423	281	374	224	342.6	N/A
242	410	423	282	374	224	342.6	N/A
243	409	422	282	373	225	342.2	N/A
244	408	421	281	372	225	341.4	N/A
245	407	420	281	371	226	341.0	N/A
246	406	420	281	370	226	340.6	N/A
247	406	419	281	369	227	340.4	N/A
248	405	418	282	367	227	339.8	N/A
249	404	417	282	366	228	339.4	N/A
250	403	416	283	365	228	339.0	N/A
251	402	415	283	364	229	338.6	N/A
252	401	415	283	364	229	338.4	N/A
253	400	414	284	363	230	338.2	N/A
254	400	413	285	362	230	338.0	N/A
255	399	412	285	361	231	337.6	N/A
256	398	412	286	360	231	337.4	N/A
257	397	411	287	359	232	337.2	N/A
258	397	410	287	359	232	337.0	N/A
259	396	409	288	359	233	337.0	N/A
260	395	409	289	357	234	336.8	N/A
261	394	408	290	357	234	336.6	N/A
262	394	407	292	357	235	337.0	N/A
263	393	406	293	356	236	336.8	N/A
264	393	406	294	356	236	337.0	N/A
265	392	405	295	355	237	336.8	N/A
266	391	404	296	355	238	336.8	N/A
267	391	404	298	355	238	337.2	N/A
268	390	403	299	354	239	337.0	N/A
269	390	402	300	354	239	337.0	N/A
270	389	402	301	354	240	337.2	N/A
271	388	401	303	354	241	337.4	N/A
272	388	401	304	354	242	337.8	N/A
273	388	400	305	354	242	337.8	N/A
274	387	399	307	353	243	337.8	N/A
275	387	399	308	353	244	338.2	N/A
276	386	398	309	353	244	338.0	N/A
277	386	398	310	353	245	338.4	N/A
278	385	398	311	353	246	338.6	N/A
279	385	397	313	354	246	339.0	N/A
280	385	397	314	354	247	339.4	N/A
281	384	396	315	354	248	339.4	N/A
282	384	396	316	354	248	339.6	N/A
283	384	395	316	354	249	339.6	N/A
284	383	395	317	354	249	339.6	N/A
285	383	395	317	354	250	339.8	N/A
286	383	394	318	354	251	340.0	N/A
287	382	394	319	354	251	340.0	N/A

WOODSTOVE SURFACE TEMPERATURE DATA

Client: IHP

Job #: 19-480

Model: Montecito

Tracking #: 029

Run #: 2

Technician: SJB

Date: 6/18/2019

Elapsed Time (min)	Temperature Data (°F)						
	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
288	382	394	319	354	252	340.2	N/A
289	382	393	320	354	252	340.2	N/A
290	381	393	321	353	253	340.2	N/A
291	381	393	321	353	253	340.2	N/A
292	381	392	322	353	253	340.2	N/A
293	381	392	322	353	254	340.4	N/A
294	380	392	322	352	254	340.0	N/A
295	380	391	323	352	255	340.2	N/A
296	380	391	323	352	256	340.4	N/A
297	380	391	324	352	256	340.6	N/A
298	380	391	324	352	257	340.8	N/A
299	379	390	324	351	257	340.2	N/A
300	379	390	324	351	258	340.4	N/A
301	379	390	324	351	258	340.4	N/A
302	379	389	325	351	258	340.4	N/A
303	378	389	325	350	259	340.2	N/A
304	378	389	325	350	259	340.2	N/A
305	378	389	325	349	259	340.0	N/A
306	378	388	325	350	260	340.2	N/A
307	377	388	325	351	260	340.2	N/A
308	377	388	325	352	260	340.4	N/A
309	377	388	325	352	261	340.6	N/A
310	377	387	325	352	261	340.4	N/A
311	377	387	325	352	261	340.4	N/A
312	377	387	324	352	262	340.4	N/A
313	376	387	324	351	262	340.0	N/A
314	376	386	324	351	262	339.8	N/A
315	376	386	324	351	262	339.8	N/A
316	376	386	323	350	263	339.6	N/A
317	375	386	323	350	263	339.4	N/A
318	375	385	323	350	263	339.2	N/A
319	375	385	322	349	263	338.8	N/A
320	375	385	322	349	264	339.0	N/A
321	375	384	322	349	264	338.8	N/A
322	374	384	321	349	264	338.4	N/A
323	374	384	321	349	264	338.4	N/A
324	374	384	321	349	264	338.4	N/A
325	373	383	320	348	265	337.8	N/A
326	373	383	320	348	265	337.8	N/A
327	373	382	319	349	265	337.6	N/A
328	373	382	319	348	265	337.4	N/A
329	372	382	318	348	265	337.0	N/A
330	372	381	318	348	265	336.8	N/A
331	372	381	318	347	266	336.8	N/A
332	371	381	317	347	266	336.4	N/A
333	371	381	317	347	266	336.4	N/A
334	371	380	317	346	266	336.0	N/A
335	370	380	316	346	266	335.6	N/A

WOODSTOVE SURFACE TEMPERATURE DATA

Client: IHP
 Model: Montecito
 Run #: 2

Job #: 19-480
 Tracking #: 029
 Technician: SJB
 Date: 6/18/2019

Elapsed Time (min)	Temperature Data (°F)						
	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
336	370	380	316	346	266	335.6	N/A
337	370	379	315	346	266	335.2	N/A
338	370	379	315	346	266	335.2	N/A
339	369	379	314	345	266	334.6	N/A
340	369	378	314	345	266	334.4	N/A
341	369	378	313	345	266	334.2	N/A
342	368	377	313	344	266	333.6	N/A
343	368	377	312	344	266	333.4	N/A
344	368	377	312	344	266	333.4	N/A
345	367	376	311	343	266	332.6	N/A
346	367	376	311	342	267	332.6	N/A
347	367	376	310	342	267	332.4	N/A
348	366	375	310	341	266	331.6	N/A
349	366	375	309	341	266	331.4	N/A
350	365	375	309	340	266	331.0	N/A
351	365	374	308	340	267	330.8	N/A
352	364	374	308	340	267	330.6	N/A
Average	460	466	335	523	236	404	N/A

LAB SAMPLE DATA - ASTM E2515

Client: IHP
 Model: Montecito
 Run #: 2

Job #: 19-480
 Tracking #: 029
 Technician: SJB
 Date: 6/18/2019

	Sample ID	Tare, mg	Total, mg	Final, mg	Catch, mg
Train A Filters - First Hour	T247	85.6	85.6	86.6	1.0
Train A Filters - Remainder	T248	90.9	177.9	182.6	4.7
	T249	87.0			
Train A Probe	5A	116769.3	116769.3	116769.8	0.5
Train A O-Rings	5A	3530.2	3530.2	3531.6	1.4
Train B Filters	T250	87.0	174.3	179.2	4.9
	T251	87.3			
Train B Probe	5B	116876.9	116876.9	116877.7	0.8
Train B O-Rings	5B	3526.9	3526.9	3528.8	1.9
Background Filter			0.0	0.0	

Placed in Dessicator on:	6/21 - 8:30
-----------------------------	-------------

Train A Filters - First Hour	86.5	6/26 7:59	86.6	6/27 7:31				
Train A Filters - Remainder	182.8	6/26 7:59	182.6	6/27 7:31				
Train A Probe	116769.9	6/26 7:59	116769.8	6/27 7:31				
Train A O-Rings	3531.5	6/26 7:59	3531.6	6/27 7:31				
Train B Filters	179.2	6/26 7:59	179.2	6/27 7:32				
Train B Probe	116877.9	6/26 7:59	116877.7	6/27 7:32				
Train B O-Rings	3528.8	6/26 7:59	3528.8	6/27 7:32				
Background Filter								

1st hour Sub-Total, mg:	1.0
Remainder Sub-Total, mg:	6.6
Train 1 Aggregate, mg:	7.6
Train 2 Aggregate, mg:	7.6
Ambient Aggregate, mg:	0.0

ASTM E3053 Wood Heater Run Sheets

Client: IHP Job Number: 19-480 Tracking #: 029
 Model: Montecito Run Number: 2 Test Date: 6/18/2019

Wood Heater Run Notes

Pre-Test Notes

Pre-Test Start Time: 9:38
 Air Control Setting: Full Open

Time	Notes
N/A	This test was run as a continuation of Run 1 High Fire test, see Run 1 Test Notes for details.

Test Notes

Test Burn Start Time: 11:15
 Air Control Setting: Full Closed

Time	Notes
0 min	With 1.9lbs of high fire test fuel remaining, leveled coal beds and loaded low fire test fuel, door closed at 30 seconds, air set to high, fan turned on low. Closed air down to halfway closed Closed air to test setting Changed 1-hour filter End of Test
3 min	
11 min	
60 min	
352 min	

Test Burn End Time: 17:07

Flue Gas Concentration Measurement

Calibration Gas Values: Span Gas CO₂ (%): 17.00 CO (%): 4.00
 Mid Gas CO₂ (%): 9.00 CO (%): 0.500

Calibration Results:

	Pre Test			Post Test		
	Zero	Mid	Span	Zero	Mid	Span
Time	8:56	9:00	9:02	6-19 - 8:05	6-19 - 8:09	6-19 - 8:07
CO ₂	0.00	9.09	17.15	0.00	9.14	17.13
CO	0.000	0.493	3.96	0.000	0.496	3.953

Flue Gas Probe Leak Check: Initial: No Leakage Final: No Leakage

Technician Signature: 

Date: 6/19/2019
Page 1 of 3

ASTM E3053 Wood Heater Run Sheets

Client: IHP
Model: Montecito

Job Number: 19-480
Run Number: 2

Tracking #: 029
Test Date: 6/18/2019

Test Photos



Kindling Fuel Load



Start-up Fuel Load



High Fire Fuel Load



Residual Start-up Fuel Coal Bed

Technician Signature: _____

A handwritten signature in black ink, appearing to be "JL", written over a horizontal line.

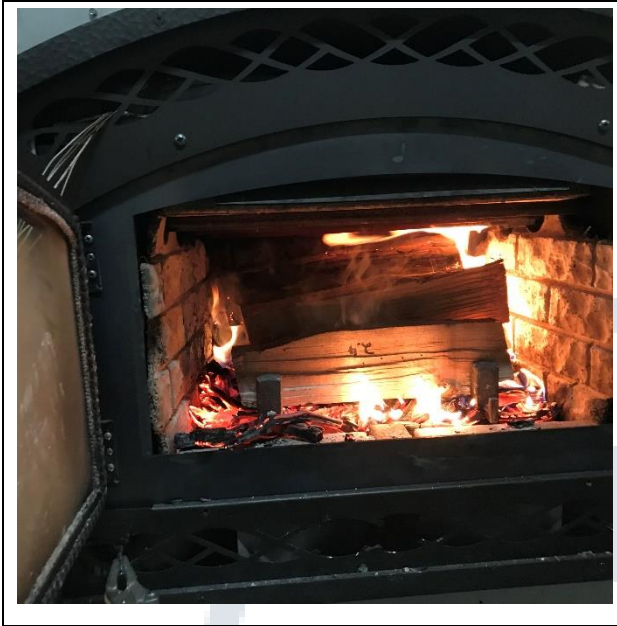
Date: 6/19/2019

ASTM E3053 Wood Heater Run Sheets

Client: IHP
Model: Montecito

Job Number: 19-480
Run Number: 2

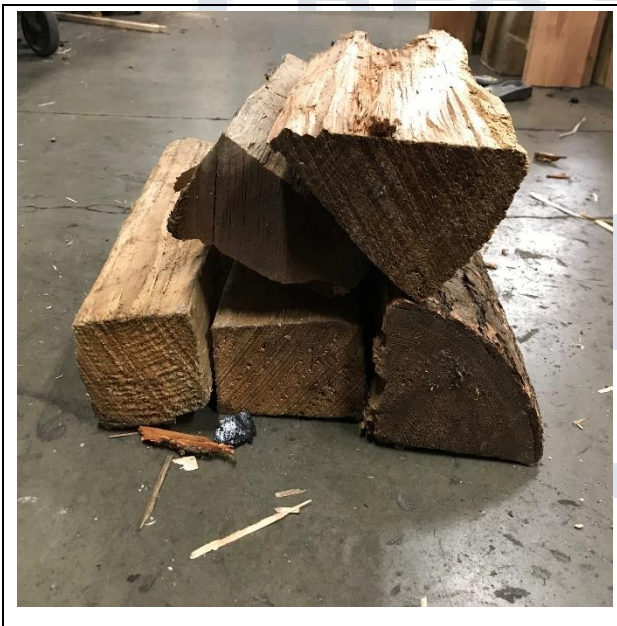
Tracking #: 029
Test Date: 6/18/2019



High Fire Fuel Loaded



Residual High Fire Load Coal Bed



Low Fire Fuel Load



Low Fire Fuel Loaded

Technician Signature: _____

A handwritten signature in black ink, appearing to be "JL", written over a horizontal line.

Date: 6/19/2019

WOOD STOVE TEST DATA PACKET
ASTM E3053/E2515



Run 3 Data Summary

Client: IHP
Model: Montecito
Job #: 19-480
Tracking #: 029
Test Date: 6/19/2019

A handwritten signature in dark ink, appearing to be "JL" or similar, written over a horizontal line.

Techician Signature

6/27/2019

Date

TEST RESULTS - ASTM E3053 / ASTM E2515

Client: IHP

Model: Montecito

Run #: 3

Job #: 19-480

Tracking #: 029

Technician: SJB

Date: 6/19/2019

Burn Rate (kg/hr):	1.51
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	Ambient Sample	Sample Train A	Sample Train B	1st Hour Filter
Total Sample Volume (ft ³)	0.000	48.097	47.247	10.737
Average Gas Velocity in Dilution Tunnel (ft/sec)	16.63			
Average Gas Flow Rate in Dilution Tunnel (dscf/hr)	10892.2			
Average Gas Meter Temperature (°F)	74.3	74.6	82.8	73.4
Total Sample Volume (dscf)	0.000	48.150	45.757	10.772
Average Tunnel Temperature (°F)	103.1			
Total Time of Test (min)	265			
Total Particulate Catch (mg)	0.0	4.0	6.0	1.8
Particulate Concentration, dry-standard (g/dscf)	0.0000000	0.0000831	0.0001311	0.0001671
Total PM Emissions (g)	0.00	4.00	6.31	1.82
Particulate Emission Rate (g/hr)	0.00	0.90	1.43	1.82
Emissions Factor (g/kg)	-	0.60	0.95	-
Difference from Average Total Particulate Emissions (g)	-	1.16	1.16	-
Difference from Average Emissions Factor (g/kg)	-	0.17	0.17	-

Final Average Results	
Total Particulate Emissions (g)	5.15
Particulate Emission Rate (g/hr)	1.17
Emissions Factor (g/kg)	0.77
HHV Efficiency (%)	72.5%
LHV Efficiency (%)	77.9%
CO Emissions (g/min)	0.98

Quality Checks	Requirement	Observed	Result
Dual Train Precision	Each train within 7.5% of average emissions (in grams), or emission factors within 0.5 g/kg	See Above	OK
Filter Temps	>80 °F, <90 °F	Min: 81 / Max: 89	OK
Face Velocity	< 30 ft/min	10.3	OK
Leakage Rate	Less than 4% of average sample rate	0.001 cfm	OK
Ambient Temp	55-90 °F	Min: 73 / Max: 76	OK
Negative Probe Weight Evaluation	<5% of Total Catch	Probe Catch Not Negative	OK
Pro-Rate Variation	90% of readings between 90-110%; none greater than 120% or less than 80%	See Data Tabs	OK

B415.1 Efficiency Results

Manufacturer: IHP
Model: Montecito
Date: 06/19/19
Run: 3
Control #: 19-480
Test Duration: 265
Output Category: Medium

Test Results in Accordance with CSA B415.1-09

	HHV Basis	LHV Basis
Overall Efficiency	72.5%	77.9%
Combustion Efficiency	97.4%	97.4%
Heat Transfer Efficiency	74.4%	79.9%

Output Rate (kJ/h)	21,772	20,653	(Btu/h)
Burn Rate (kg/h)	1.51	3.33	(lb/h)
Input (kJ/h)	30,031	28,487	(Btu/h)

Test Load Weight (dry kg)	6.67	14.69	dry lb
MC wet (%)	17.01		
MC dry (%)	20.49		
Particulate (g)	5.15		
CO (g)	261		
Test Duration (h)	4.42		

Emissions	Particulate	CO
g/MJ Output	0.05	2.71
g/kg Dry Fuel	0.77	39.15
g/h	1.17	59.07
g/min	0.02	0.98
lb/MM Btu Output	0.12	6.31

Air/Fuel Ratio (A/F)	13.90
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VERSION:

2.2

12/14/2009

HIGH FIRE FUEL LOAD DATA - ASTM E3053

Client: IHP
 Model: Montecito
 Run #: 3

Job #: 19-480
 Tracking #029
 Technician: SJB
 Date: 6/19/2019

Nominal Loading Density (lbs/ft³, wet basis): 10
 Usable Firebox Volume (ft³): 1.45
 Target Load Weight (lbs): 14.50
 Total Load Weight Range (lbs): 13.80 to 15.20
 Core Load Weight Range (lbs): 6.50 to 9.40
 Remainder Load Weight Range (lbs): 5.10 to 8.00
 Core Load Piece Range (lbs): 2.20 to 3.60
 Remainder Load Piece Range (lbs): 1.50 to 8.00
 Max Allowable Kindling Weight (lbs): 3.02
 Max Allowable Start-up Fuel Weight (lbs): 4.54

CORE LOAD DATA

Piece #	Length (in)	Weight (lbs)	Within Spec?	Fuel Piece Moisture Readings (%DB)				Within Spec?	Dry Weight	
				1	2	3	Ave.		lbs	kg
1	16.00	2.97	In Range	22.4	23.0	21.2	22.2	In Range	2.43	1.10
2	16.00	2.91	In Range	20.0	18.9	20.7	19.9	In Range	2.43	1.10
3	16.00	3.17	In Range	25.7	19.4	22.6	22.6	In Range	2.59	1.17
Core Load Wt. (lbs)		9.05	In Range							

REMAINDER LOAD DATA (1 to 3 Pieces)

Piece #	Length (in)	Weight (lbs)	Within Spec?	Fuel Piece Moisture Readings (%DB)				Within Spec?	Dry Weight	
				1	2	3	Ave.		lbs	kg
1	16.00	6.07	In Range	19.2	18.9	19.7	19.3	In Range	5.09	2.31
2			NA				NA	NA	NA	NA
3			NA				NA	NA	NA	NA
Remainder Load (lbs)		6.07	In Range							

Total Load Weight (lbs): 15.12 In Range
 Core Load % of Total Weight: 60% In Range 45-65%
 Remainder % of Total Weight: 40% In Range 35-55%
 Total Load % of Target Weight: 104% In Range 95-105%
 Actual Fuel Loading Density (lb/ft³): 10.4
 Total Load Average Moisture Content (%DB): 20.6 In Range 19-25%
 Total Load Average Moisture Content (%WB): 17.1
 Total Test Load Weight (dry basis): 12.53 lbs 5.69 kg

KINDLING AND START-UP FUEL

Kindling Weight (lbs)	Within Spec?	Kindling Moisture Readings (%DB)				Within Spec?	Dry Weight	
		1	2	3	Avg.		lbs	kg
2.99	In Range	10	10	10	10.0	In Range	2.72	1.23

Start-up Fuel Wt. (lb)	Within Spec?	Start-up Moisture Readings (%DB)				Within Spec?	Dry Weight	
		1	2	3	Avg.		lbs	kg
3.70	In Range	25	18.6	22	21.9	In Range	3.04	1.38

TEST FUEL LOADING RANGE

Allowable Residual Start-up Fuel Range (lb): 1.5 to 3.0
 Actual Residual Start-up Fuel Weight (lb): 1.5 In Range

LOW & MEDIUM FIRE FUEL LOAD DATA - ASTM E3053

Client: IHP
 Model: Montecito
 Run #: 3

Job #: 19-480
 Tracking #: 029
 Technician: SJB
 Date: 6/19/2019

Nominal Loading Density (lbs/ft³, wet basis): 12
 Usable Firebox Volume (ft³): 1.45
 Target Load Weight (lbs): 17.40
 Total Load Weight Range (lbs): 16.53 to 18.27
 Core Load Weight Range (lbs): 7.83 to 11.31
 Remainder Load Weight Range (lbs): 6.09 to 9.57
 Core Load Piece Range (lbs): 2.61 to 4.35
 Remainder Load Piece Range (lbs): 1.74 to 5.22

CORE LOAD DATA

Piece #	Length (in)	Weight (lbs)	Within Spec?	Fuel Piece Moisture Readings (%DB)				Within Spec?	Dry Weight	
				1	2	3	Ave.		lbs	kg
1	16.00	3.77	In Range	22.4	20.8	19.6	20.9	In Range	3.12	1.41
2	16.00	3.96	In Range	19.4	21.4	20.7	20.5	In Range	3.29	1.49
3	16.00	3.37	In Range	22.1	23.0	20.9	22.0	In Range	2.76	1.25
Core Load Wt. (lbs)		11.10	In Range							

REMAINDER LOAD DATA (2 to 3 Pieces)

Piece #	Length (in)	Weight (lbs)	Within Spec?	Fuel Piece Moisture Readings (%DB)				Within Spec?	Dry Weight	
				1	2	3	Ave.		lbs	kg
1	16.00	2.01	In Range	19.1	18.9	19.6	19.2	In Range	1.69	0.76
2	16.00	4.56	In Range	20.6	18.7	19.5	19.6	In Range	3.81	1.73
3			NA				NA	NA	NA	NA
Remainder Load (lbs)		6.57	In Range							

Remainder Load Small/Large Piece Weight Ratio: 44% In Range ≤ 67%
 Total Load Weight (lbs): 17.67 In Range
 Core Load % of Total Weight: 63% In Range 45-65%
 Remainder % of Total Weight: 37% In Range 35-55%
 Total Load % of Target Weight: 102% In Range 95-105%
 Actual Fuel Loading Density (lb/ft³): 12.2
 Total Load Average Moisture Content (%DB): 20.5 In Range 19-25%
 Total Load Average Moisture Content (%WB): 17.0
 Total Test Load Weight (dry basis): 14.66 lbs 6.65 kg

TEST FUEL LOADING RANGE

Allowable Charcoal Bed Weight Range (lb): 1.8 to 3.5
 Actual Charcoal Bed Wt. (lb): 1.8 In Range

TEST END POINT

Actual Fuel Load Ending Weight (lb): 0.0 Valid Test (≥90%)

Total Fuel Burned During Test Run:
 17.7 lbs, wet basis
 14.7 lbs, dry basis
 6.65 kg, dry basis

DILUTION TUNNEL & MISC. DATA - ASTM E3053 / E2515

Client: IHP
 Model: Montecito
 Run #: 3
 Test Start Time: 10:12
 Test Type: Medium Fire

Job #: 19-480
 Tracking #: 029
 Technician: SJB
 Date: 6/19/2019

Recording Interval (min): 1
 Total Sampling Time (min): 265

Meter Box γ Factor: 1.004 (A)
 Meter Box γ Factor: 0.986 (B)
 Meter Box γ Factor: 1.000 (Ambient)

Induced Draft Check (in. H₂O): 0
 Smoke Capture Check (%): 100%
 Date Flue Pipe Last Cleaned: 6/10/2019

	Pre-Test	Post Test	Avg.
Barometric Pressure (in. Hg)	30.22	30.16	30.19
Relative Humidity (%)	49.2	46.1	
Room Air Velocity (ft/min)	0	0	
Scale Audit (lbs)	10.0	10.0	
Ambient Sample Volume:	0.000 ft ³		

Sample Train Post-Test Leak Checks

(A)	0.001	cfm @	-11	in. Hg
(B)	0.000	cfm @	-13	in. Hg
(Ambient)	0.000	cfm @	0	in. Hg

DILUTION TUNNEL FLOW

Traverse Data

Point	dP (in H ₂ O)	Temp (°F)
1	0.058	68
2	0.066	68
3	0.054	68
4	0.040	68
5	0.060	68
6	0.072	68
7	0.068	68
8	0.050	68
Center	0.072	68

Dilution Tunnel H₂O: 2.00 percent
 Tunnel Diameter: 6 inches
 Pitot Tube Cp: 0.99 [unitless]
 Dilution Tunnel MW(dry): 29.00 lb/lb-mole
 Dilution Tunnel MW(wet): 28.78 lb/lb-mole
 Tunnel Area: 0.1963 ft²

V_{strav}: 16.10 ft/sec
 V_{scnt}: 17.70 ft/sec
 F_p: 0.909 [ratio]

Initial Tunnel Flow: 185.1 scf/min

Static Pressure: -0.300 in. H₂O

TEST FUEL PROPERTIES

ASTM 3053-17 - Table A1.1 Fuel Properties by Fuel Species

Select Fuel Type	Species	%C	%H	%O	%Ash	MJ/kg	BTU/lb
	Ash, White	49.70	6.90	43.00	0.30	20.75	8927
	Beech	48.70	5.80	44.70	0.60	18.80	8088
	Birch, Sweet	49.80	6.50	43.40	0.30	20.12	8656
	Birch, Yellow	49.80	6.50	43.40	0.30	20.12	8656
	Doug Fir (Coast, Interior West/North)	48.73	6.87	43.90	0.50	19.81	8522
	Doug Fir (Interior South)	48.73	6.87	43.90	0.50	19.81	8522
	Elm, Rock	50.40	6.60	42.30	0.70	20.49	8815
	Elm, Soft	50.40	6.60	42.30	0.70	20.49	8815
	Gum, Red	50.88	6.06	41.57	1.28	19.72	8478
	Larch, Western	50.54	6.36	42.40	0.70	17.58	7558
	Maple, Hard	50.64	6.02	41.74	1.35	19.96	8587
	Maple, Sugar	50.64	6.02	41.74	1.35	19.96	8587
	Oak, Red	49.50	6.62	43.70	0.20	20.20	8690
	Oak, White	50.40	6.59	42.70	0.20	20.50	8819
	Pine, Southern	52.60	7.00	40.10	1.31	22.30	9587
	Pine, Southern Long Leaf	52.60	7.02	40.10	1.30	22.30	9594
X	Doug Fir/Maple Mix	49.85	6.37	42.64	1.00	19.90	8560

WOODSTOVE PREBURN DATA

Client: IHP

Model: Montecito

Run #: 3

Job #: 19-480

Tracking #: 029

Technician: SJB

Date: 6/19/2019

Recording Interval (min): 1
Run Time (min): 112

Elapsed Time (min)	Scale Reading (lbs)	Flue Draft (in H ₂ O)	Temperatures (°F)							
			FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Flue	Ambient
0	6.6	-0.001	69	69	70	68	70	69.2	68	68
1	6.6	-0.034	69	69	70	88	70	73.2	120	68
2	6.5	-0.052	70	69	70	143	70	84.4	207	68
3	6.2	-0.070	70	70	72	315	70	119.4	360	68
4	5.8	-0.076	72	71	77	485	69	154.8	488	68
5	5.5	-0.088	73	73	84	631	69	186.0	580	68
6	5.1	-0.087	76	76	95	738	69	210.8	660	68
7	4.7	-0.097	79	80	110	819	70	231.6	724	68
8	4.3	-0.094	86	85	129	855	70	245.0	755	68
9	4.0	-0.097	94	92	151	839	71	249.4	761	68
10	3.6	-0.098	103	98	174	845	73	258.6	773	68
11	3.3	-0.097	112	105	198	838	74	265.4	762	68
12	3.0	-0.089	119	112	221	832	76	272.0	762	68
13	2.7	-0.099	127	117	243	831	78	279.2	776	69
14	2.4	-0.099	135	123	264	841	81	288.8	776	69
15	2.1	-0.088	143	129	284	849	84	297.8	766	69
16	1.9	-0.094	148	135	302	849	87	304.2	743	69
17	1.6	-0.095	156	144	319	849	90	311.6	727	69
18	1.5	-0.079	166	155	332	849	93	319.0	698	69
19	16.4	-0.087	182	170	316	772	96	307.2	607	69
20	16.3	-0.084	200	186	297	724	99	301.2	601	69
21	16.1	-0.085	216	201	284	687	101	297.8	582	69
22	15.9	-0.077	230	214	276	661	103	296.8	577	69
23	15.8	-0.081	242	227	270	639	105	296.6	572	69
24	15.6	-0.076	253	238	266	607	107	294.2	554	69
25	15.5	-0.073	262	248	263	579	108	292.0	534	69
26	15.4	-0.074	270	257	260	557	110	290.8	521	69
27	15.2	-0.071	277	266	258	537	111	289.8	511	69
28	15.1	-0.069	283	273	255	515	113	287.8	492	69
29	15.1	-0.073	288	279	252	492	114	285.0	468	69
30	15.0	-0.074	292	285	250	470	115	282.4	445	69
31	14.8	-0.069	296	290	247	451	116	280.0	428	69
32	14.7	-0.071	299	294	244	434	116	277.4	420	69
33	14.6	-0.069	302	298	241	427	117	277.0	425	70
34	14.5	-0.073	305	301	238	432	118	278.8	439	70
35	14.4	-0.071	307	303	236	453	118	283.4	467	70
36	14.2	-0.075	309	306	234	503	118	294.0	523	70
37	13.9	-0.085	311	308	233	561	119	306.4	580	70
38	13.7	-0.082	313	311	235	614	119	318.4	627	70
39	13.4	-0.085	316	313	238	646	119	326.4	649	70
40	13.1	-0.091	319	316	242	669	120	333.2	669	70
41	12.8	-0.084	323	320	248	683	121	339.0	680	70
42	12.6	-0.094	327	324	254	704	121	346.0	690	70
43	12.4	-0.094	332	328	261	727	122	354.0	701	70

WOODSTOVE PREBURN DATA

Client: IHP

Model: Montecito

Run #: 3

Job #: 19-480

Tracking #: 029

Technician: SJB

Date: 6/19/2019

 Recording Interval (min): 1
 Run Time (min): 112

Elapsed Time (min)	Scale Reading (lbs)	Flue Draft (in H ₂ O)	Temperatures (°F)							
			FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Flue	Ambient
44	12.0	-0.090	338	333	267	741	123	360.4	708	70
45	11.8	-0.094	343	338	273	755	124	366.6	712	70
46	11.3	-0.090	350	344	280	772	125	374.2	724	70
47	11.1	-0.091	356	350	286	802	126	384.0	751	70
48	10.9	-0.090	364	356	293	823	128	392.8	756	70
49	10.6	-0.097	371	362	300	837	129	399.8	760	70
50	10.3	-0.091	379	369	306	848	131	406.6	761	70
51	10.2	-0.089	387	376	312	857	132	412.8	757	70
52	9.7	-0.096	395	382	318	866	134	419.0	753	70
53	9.5	-0.095	403	389	324	868	135	423.8	748	70
54	9.2	-0.094	411	397	329	863	137	427.4	744	70
55	8.9	-0.094	419	404	335	861	139	431.6	737	70
56	8.7	-0.094	427	411	340	852	140	434.0	729	70
57	8.4	-0.093	435	418	344	843	142	436.4	721	70
58	8.1	-0.087	443	425	348	830	144	438.0	716	70
59	8.0	-0.096	451	432	352	819	145	439.8	708	70
60	7.6	-0.092	458	439	356	844	147	448.8	719	70
61	7.4	-0.088	465	445	360	842	149	452.2	707	70
62	7.2	-0.092	472	452	364	833	151	454.4	693	70
63	6.9	-0.086	479	459	367	815	154	454.8	682	70
64	6.7	-0.090	486	465	368	797	156	454.4	671	70
65	6.5	-0.081	492	472	371	776	158	453.8	659	70
66	6.3	-0.081	497	479	372	758	161	453.4	651	70
67	6.2	-0.087	503	485	373	743	163	453.4	643	70
68	6.0	-0.087	507	492	373	728	166	453.2	636	70
69	5.8	-0.085	512	498	374	716	169	453.8	630	70
70	5.6	-0.080	516	505	374	711	172	455.6	627	70
71	5.5	-0.078	520	511	374	702	175	456.4	622	70
72	5.3	-0.086	524	517	375	694	177	457.4	619	70
73	5.2	-0.082	527	522	375	684	180	457.6	615	70
74	5.1	-0.084	530	528	375	677	183	458.6	611	70
75	4.8	-0.077	533	532	375	671	186	459.4	606	70
76	4.7	-0.082	535	537	375	665	189	460.2	604	70
77	4.6	-0.087	536	542	375	661	192	461.2	600	70
78	4.8	-0.085	539	546	375	656	195	462.2	599	70
79	4.3	-0.082	541	550	375	655	198	463.8	598	70
80	4.2	-0.087	542	553	375	652	200	464.4	597	70
81	4.1	-0.075	544	556	375	652	203	466.0	595	70
82	3.9	-0.084	545	559	375	648	206	466.6	592	70
83	3.8	-0.085	546	562	375	646	209	467.6	589	70
84	3.7	-0.079	547	565	374	640	212	467.6	583	70
85	3.6	-0.082	548	567	374	634	214	467.4	576	70
86	3.5	-0.074	549	569	373	627	217	467.0	572	70
87	3.4	-0.076	549	571	373	622	220	467.0	566	70

WOODSTOVE PREBURN DATA

Client: IHP
 Model: Montecito
 Run #: 3

Job #: 19-480
 Tracking #: 029
 Technician: SJB
 Date: 6/19/2019

Recording Interval (min): 1
 Run Time (min): 112

Elapsed Time (min)	Scale Reading (lbs)	Flue Draft (in H ₂ O)	Temperatures (°F)							
			FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Flue	Ambient
88	3.2	-0.081	550	573	372	615	223	466.6	562	70
89	3.2	-0.072	550	575	371	607	225	465.6	557	70
90	3.1	-0.072	550	576	370	599	228	464.6	552	70
91	3.1	-0.079	550	577	368	592	231	463.6	546	70
92	3.0	-0.081	550	578	367	587	233	463.0	542	70
93	2.9	-0.071	550	579	366	579	236	462.0	535	70
94	2.9	-0.071	549	580	365	573	239	461.2	530	71
95	2.9	-0.073	549	580	364	563	241	459.4	521	71
96	2.8	-0.075	548	580	361	556	243	457.6	516	71
97	2.7	-0.077	547	581	360	548	245	456.2	511	71
98	2.6	-0.068	545	581	358	542	248	454.8	508	71
99	2.5	-0.075	544	581	356	535	250	453.2	501	71
100	2.5	-0.074	543	581	354	528	252	451.6	498	71
101	2.5	-0.069	542	580	353	521	254	450.0	494	71
102	2.3	-0.067	540	580	350	513	256	447.8	489	71
103	2.3	-0.065	538	579	348	508	257	446.0	487	72
104	2.3	-0.074	537	579	346	504	259	445.0	485	72
105	2.2	-0.072	535	578	344	502	261	444.0	484	72
106	2.2	-0.072	534	577	342	501	262	443.2	482	72
107	2.1	-0.067	531	576	340	500	264	442.2	479	72
108	2.1	-0.070	530	574	339	496	265	440.8	476	72
109	2.0	-0.069	527	573	336	493	266	439.0	473	72
110	1.9	-0.070	526	572	335	488	268	437.8	468	72
111	1.9	-0.063	524	570	334	484	270	436.4	464	73
112	1.8	-0.065	522	569	332	480	271	434.8	460	73

BOX A TEST DATA - ASTM E3053 / ASTM E2515

Client: IHP
 Model: Montecito
 Run #: 3

Job #: 19-480
 Tracking #: 029
 Technician: SJB
 Date: 6/19/2019

Elapsed Time (min)	Particulate Sampling Data							Fuel Weight (lb)		Temperature Data (°F)			
	Gas Meter (ft³)	Sample Rate (cfm)	Dilution Tunnel dP (in H ₂ O)	Orifice dH (in H ₂ O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Scale Reading	Weight Change	Dilution Tunnel	Flue	Filter	Ambient
0	0.000		0.072	0.00	73	-0.71		17.7		145	433	83	74
1	0.165	0.165	0.072	0.42	73	-0.64	95	17.5	-0.2	152	367	87	75
2	0.345	0.180	0.072	0.41	73	0.64	103	17.3	-0.2	139	449	87	74
3	0.523	0.178	0.072	0.41	73	-0.43	102	16.9	-0.4	150	569	88	74
4	0.702	0.179	0.072	0.41	73	-0.28	102	16.9	0	137	562	86	74
5	0.880	0.178	0.072	0.40	73	0.16	101	16.7	-0.2	131	553	85	74
6	1.059	0.179	0.072	0.41	73	-0.27	101	16.4	-0.3	129	553	84	74
7	1.237	0.178	0.072	0.40	73	-0.14	100	16.2	-0.2	127	557	84	74
8	1.416	0.179	0.072	0.40	73	0.53	101	16.1	-0.1	127	564	83	74
9	1.593	0.177	0.072	0.40	73	0.11	100	15.8	-0.3	127	566	83	74
10	1.771	0.178	0.072	0.40	73	0.59	100	15.6	-0.2	127	568	84	74
11	1.949	0.178	0.072	0.40	73	-0.11	100	15.4	-0.2	127	570	84	74
12	2.126	0.177	0.072	0.40	73	0.08	100	15.2	-0.2	126	573	84	74
13	2.304	0.178	0.072	0.40	73	0.04	100	15.0	-0.2	127	574	84	74
14	2.481	0.177	0.072	0.40	73	-0.29	100	14.9	-0.1	125	571	84	74
15	2.658	0.177	0.072	0.40	73	0.68	100	14.7	-0.2	125	573	84	74
16	2.835	0.177	0.072	0.40	73	0.59	100	14.5	-0.2	126	572	84	74
17	3.012	0.177	0.072	0.40	73	-0.33	100	14.3	-0.2	126	570	84	75
18	3.188	0.176	0.072	0.40	73	0.71	99	14.1	-0.2	125	572	84	74
19	3.365	0.177	0.072	0.39	73	-0.27	100	14.0	-0.1	125	573	84	75
20	3.541	0.176	0.072	0.39	73	0.43	99	13.8	-0.2	126	574	84	75
21	3.716	0.175	0.072	0.39	73	0.41	99	13.5	-0.3	125	571	84	75
22	3.892	0.176	0.072	0.39	73	-0.17	99	13.4	-0.1	126	571	84	75
23	4.070	0.178	0.072	0.40	73	-0.27	100	12.9	-0.5	126	571	84	74
24	4.248	0.178	0.072	0.40	73	0.24	100	13.1	0.2	125	569	84	75
25	4.426	0.178	0.072	0.40	73	0.63	100	12.9	-0.2	125	569	84	75
26	4.604	0.178	0.072	0.40	73	0.8	100	12.7	-0.2	124	566	84	75
27	4.782	0.178	0.072	0.40	73	0.65	100	12.6	-0.1	123	561	84	74
28	4.960	0.178	0.072	0.40	73	0.93	100	12.3	-0.3	123	561	84	75
29	5.137	0.177	0.072	0.39	73	-0.02	100	12.3	0	124	560	84	75
30	5.314	0.177	0.072	0.40	73	-0.07	100	12.1	-0.2	124	562	84	75
31	5.491	0.177	0.072	0.39	73	0.11	100	11.9	-0.2	124	563	84	75
32	5.671	0.180	0.072	0.41	73	0.86	101	11.7	-0.2	123	564	84	75

BOX A TEST DATA - ASTM E3053 / ASTM E2515

Client: IHP
 Model: Montecito
 Run #: 3

Job #: 19-480
 Tracking #: 029
 Technician: SJB
 Date: 6/19/2019

Elapsed Time (min)	Particulate Sampling Data							Fuel Weight (lb)		Temperature Data (°F)			
	Gas Meter (ft³)	Sample Rate (cfm)	Dilution Tunnel dP (in H ₂ O)	Orifice dH (in H ₂ O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Scale Reading	Weight Change	Dilution Tunnel	Flue	Filter	Ambient
33	5.853	0.182	0.072	0.42	73	0.81	102	11.5	-0.2	124	566	85	75
34	6.035	0.182	0.072	0.41	74	0.18	102	11.4	-0.1	125	568	85	74
35	6.215	0.180	0.072	0.41	74	0.79	101	11.3	-0.1	125	571	85	75
36	6.398	0.183	0.072	0.41	74	0.15	103	11.0	-0.3	121	552	85	74
37	6.579	0.181	0.072	0.41	74	0.39	101	11.0	0	118	540	84	74
38	6.761	0.182	0.072	0.41	74	0.3	102	10.8	-0.2	118	532	84	74
39	6.942	0.181	0.072	0.41	74	1.02	101	10.7	-0.1	115	526	84	75
40	7.123	0.181	0.072	0.41	74	0.15	101	10.5	-0.2	116	521	84	74
41	7.305	0.182	0.072	0.41	74	0.99	101	10.4	-0.1	115	517	84	75
42	7.485	0.180	0.072	0.41	74	0.3	100	10.3	-0.1	115	518	83	75
43	7.667	0.182	0.072	0.41	74	-0.01	101	10.2	-0.1	115	516	83	75
44	7.847	0.180	0.072	0.41	74	0.26	100	10.0	-0.2	115	515	83	74
45	8.028	0.181	0.072	0.40	74	0.19	101	9.9	-0.1	114	514	83	76
46	8.208	0.180	0.072	0.41	74	0.28	100	9.8	-0.1	113	513	83	75
47	8.390	0.182	0.072	0.41	74	1.04	101	9.6	-0.2	113	512	83	74
48	8.570	0.180	0.072	0.41	74	-0.28	100	9.5	-0.1	113	512	83	75
49	8.750	0.180	0.072	0.41	74	0.8	100	9.4	-0.1	112	512	83	74
50	8.930	0.180	0.072	0.41	74	1.08	100	9.2	-0.2	113	514	83	75
51	9.112	0.182	0.072	0.40	74	1.04	101	9.1	-0.1	113	512	83	75
52	9.293	0.181	0.072	0.41	74	0.42	101	9.0	-0.1	113	512	84	75
53	9.474	0.181	0.072	0.40	74	0.16	101	8.9	-0.1	113	513	84	75
54	9.655	0.181	0.072	0.40	74	-0.12	101	8.8	-0.1	113	516	84	75
55	9.834	0.179	0.072	0.40	74	0.99	100	8.7	-0.1	112	515	84	75
56	10.015	0.181	0.072	0.40	74	0.66	101	8.3	-0.4	113	514	84	75
57	10.195	0.180	0.072	0.41	74	0.86	100	8.4	0.1	113	513	84	75
58	10.376	0.181	0.072	0.40	74	1.37	101	8.3	-0.1	113	514	84	75
59	10.557	0.181	0.072	0.41	74	0.84	101	8.1	-0.2	112	513	84	75
60	10.737	0.180	0.072	0.41	74	0.39	100	8.0	-0.1	113	512	83	75
61	10.903	0.166	0.072	0.44	74	0.82	92	7.9	-0.1	114	520	82	75
62	11.085	0.182	0.072	0.40	74	-0.17	101	7.7	-0.2	114	520	83	75
63	11.265	0.180	0.072	0.40	74	0.44	100	7.6	-0.1	114	517	83	74
64	11.445	0.180	0.072	0.40	74	0.8	100	7.5	-0.1	113	514	84	74
65	11.626	0.181	0.072	0.40	74	-0.46	101	7.3	-0.2	112	511	84	75

BOX A TEST DATA - ASTM E3053 / ASTM E2515

Client: IHP
 Model: Montecito
 Run #: 3

Job #: 19-480
 Tracking #: 029
 Technician: SJB
 Date: 6/19/2019

Elapsed Time (min)	Particulate Sampling Data							Fuel Weight (lb)		Temperature Data (°F)			
	Gas Meter (ft³)	Sample Rate (cfm)	Dilution Tunnel dP (in H ₂ O)	Orifice dH (in H ₂ O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Scale Reading	Weight Change	Dilution Tunnel	Flue	Filter	Ambient
66	11.805	0.179	0.072	0.40	74	0.27	100	7.2	-0.1	113	507	84	75
67	11.984	0.179	0.072	0.40	75	0.46	99	7.1	-0.1	112	505	84	75
68	12.163	0.179	0.072	0.40	75	-0.01	99	7.0	-0.1	112	499	84	75
69	12.344	0.181	0.072	0.40	75	0.9	100	6.9	-0.1	111	496	84	75
70	12.525	0.181	0.072	0.41	75	0.11	100	6.9	0	111	493	84	75
71	12.708	0.183	0.072	0.41	75	0	101	6.8	-0.1	111	491	84	75
72	12.890	0.182	0.072	0.41	75	-0.08	101	6.6	-0.2	111	488	84	75
73	13.073	0.183	0.072	0.41	75	1.05	101	6.6	0	111	487	84	75
74	13.255	0.182	0.072	0.41	75	0.16	101	6.4	-0.2	110	484	83	75
75	13.437	0.182	0.072	0.41	75	0.81	101	6.4	0	110	482	83	75
76	13.619	0.182	0.072	0.41	75	0.77	101	6.3	-0.1	110	480	83	75
77	13.801	0.182	0.072	0.41	75	0.26	101	6.1	-0.2	109	479	83	75
78	13.984	0.183	0.072	0.41	75	-0.19	101	6.1	0	110	479	83	75
79	14.166	0.182	0.072	0.41	75	0.2	101	5.9	-0.2	110	477	84	75
80	14.348	0.182	0.072	0.41	75	0.25	101	5.9	0	110	476	84	75
81	14.529	0.181	0.072	0.41	75	0.81	100	5.8	-0.1	110	474	84	75
82	14.711	0.182	0.072	0.41	75	0.12	101	5.6	-0.2	109	472	84	75
83	14.892	0.181	0.072	0.41	75	0.11	100	5.5	-0.1	109	471	84	75
84	15.074	0.182	0.072	0.41	75	0.85	101	5.5	0	109	471	84	75
85	15.255	0.181	0.072	0.41	75	0.68	100	5.4	-0.1	109	468	84	75
86	15.438	0.183	0.072	0.41	75	0.35	101	5.3	-0.1	109	467	84	75
87	15.620	0.182	0.072	0.41	75	0.15	101	5.2	-0.1	108	465	84	75
88	15.802	0.182	0.072	0.41	75	-0.16	101	5.1	-0.1	108	464	84	75
89	15.983	0.181	0.072	0.41	75	0.08	100	5.0	-0.1	107	462	84	75
90	16.165	0.182	0.072	0.40	75	-0.22	101	5.0	0	108	460	84	75
91	16.346	0.181	0.072	0.41	75	0.88	100	4.9	-0.1	107	460	84	75
92	16.528	0.182	0.072	0.40	75	-0.08	101	4.8	-0.1	107	460	84	75
93	16.709	0.181	0.072	0.40	75	0.84	100	4.7	-0.1	107	458	83	75
94	16.891	0.182	0.072	0.41	75	0.75	100	4.6	-0.1	106	456	83	75
95	17.072	0.181	0.072	0.41	75	0.13	100	4.5	-0.1	107	453	83	75
96	17.255	0.183	0.072	0.40	75	0.7	101	4.5	0	107	452	83	75
97	17.437	0.182	0.072	0.41	75	0.66	101	4.4	-0.1	107	452	83	75
98	17.619	0.182	0.072	0.40	75	0.61	101	4.4	0	107	453	83	75

BOX A TEST DATA - ASTM E3053 / ASTM E2515

Client: IHP
 Model: Montecito
 Run #: 3

Job #: 19-480
 Tracking #: 029
 Technician: SJB
 Date: 6/19/2019

Elapsed Time (min)	Particulate Sampling Data							Fuel Weight (lb)		Temperature Data (°F)			
	Gas Meter (ft³)	Sample Rate (cfm)	Dilution Tunnel dP (in H ₂ O)	Orifice dH (in H ₂ O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Scale Reading	Weight Change	Dilution Tunnel	Flue	Filter	Ambient
99	17.801	0.182	0.072	0.40	75	0.29	100	4.3	-0.1	106	451	83	75
100	17.984	0.183	0.072	0.40	75	0.14	101	4.1	-0.2	106	448	83	74
101	18.166	0.182	0.072	0.40	75	0.91	100	4.1	0	105	446	83	75
102	18.347	0.181	0.072	0.40	75	-0.06	100	4.1	0	105	446	83	74
103	18.529	0.182	0.072	0.41	75	0.92	100	4.0	-0.1	105	442	83	75
104	18.711	0.182	0.072	0.40	75	0.23	100	3.8	-0.2	105	438	83	75
105	18.892	0.181	0.072	0.41	75	0.16	100	3.9	0.1	105	434	83	75
106	19.074	0.182	0.072	0.40	75	0.12	100	3.8	-0.1	104	429	83	75
107	19.255	0.181	0.072	0.41	75	0.21	100	3.8	0	103	426	83	74
108	19.437	0.182	0.072	0.40	75	0.11	100	3.7	-0.1	103	424	83	74
109	19.618	0.181	0.072	0.40	75	0.35	100	3.7	0	104	419	83	74
110	19.801	0.183	0.072	0.40	75	-0.05	101	3.6	-0.1	103	415	83	75
111	19.983	0.182	0.072	0.40	75	0.89	100	3.5	-0.1	103	412	83	75
112	20.165	0.182	0.072	0.40	75	-0.13	100	3.5	0	102	407	83	74
113	20.347	0.182	0.072	0.41	75	0.91	100	3.5	0	101	405	83	75
114	20.529	0.182	0.072	0.40	75	0.2	100	3.3	-0.2	101	403	83	75
115	20.711	0.182	0.072	0.40	75	-0.05	100	3.4	0.1	101	400	83	75
116	20.895	0.184	0.072	0.40	75	0.17	101	3.4	0	102	396	84	75
117	21.078	0.183	0.072	0.40	75	0.75	101	3.3	-0.1	101	394	84	75
118	21.260	0.182	0.072	0.40	75	0.22	100	3.2	-0.1	101	392	84	74
119	21.442	0.182	0.072	0.40	75	0.8	100	3.2	0	101	390	84	74
120	21.624	0.182	0.072	0.41	75	0.93	100	3.2	0	100	388	84	75
121	21.806	0.182	0.072	0.40	75	0.12	100	3.1	-0.1	100	387	84	75
122	21.987	0.181	0.072	0.40	75	0.19	99	3.1	0	100	384	84	74
123	22.170	0.183	0.072	0.40	75	0.95	100	3.0	-0.1	100	383	84	74
124	22.351	0.181	0.072	0.40	75	0.73	99	2.9	-0.1	100	382	84	74
125	22.533	0.182	0.072	0.40	75	0.63	100	2.9	0	99	381	84	74
126	22.715	0.182	0.072	0.40	75	0.91	100	2.9	0	100	379	85	74
127	22.896	0.181	0.072	0.40	75	0.3	99	2.9	0	99	377	85	74
128	23.078	0.182	0.072	0.40	75	-0.03	100	2.8	-0.1	99	376	85	75
129	23.260	0.182	0.072	0.40	75	-0.36	100	2.8	0	99	375	85	74
130	23.441	0.181	0.072	0.41	75	0.22	99	2.7	-0.1	98	372	84	74
131	23.623	0.182	0.072	0.40	75	0.33	100	2.7	0	99	371	85	75

BOX A TEST DATA - ASTM E3053 / ASTM E2515

Client: IHP
 Model: Montecito
 Run #: 3

Job #: 19-480
 Tracking #: 029
 Technician: SJB
 Date: 6/19/2019

Elapsed Time (min)	Particulate Sampling Data							Fuel Weight (lb)		Temperature Data (°F)			
	Gas Meter (ft³)	Sample Rate (cfm)	Dilution Tunnel dP (in H ₂ O)	Orifice dH (in H ₂ O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Scale Reading	Weight Change	Dilution Tunnel	Flue	Filter	Ambient
132	23.805	0.182	0.072	0.41	75	0.91	100	2.7	0	98	370	85	74
133	23.986	0.181	0.072	0.40	75	0.69	99	2.7	0	98	369	85	74
134	24.168	0.182	0.072	0.40	75	0.53	100	2.6	-0.1	98	369	85	74
135	24.350	0.182	0.072	0.40	75	0.03	100	2.5	-0.1	97	367	84	74
136	24.531	0.181	0.072	0.40	75	0.8	99	2.5	0	98	366	84	74
137	24.713	0.182	0.072	0.40	75	0.4	100	2.5	0	97	363	84	74
138	24.895	0.182	0.072	0.40	75	0.96	100	2.4	-0.1	97	362	84	74
139	25.077	0.182	0.072	0.40	75	0.39	100	2.3	-0.1	97	362	84	74
140	25.259	0.182	0.072	0.40	75	0.97	100	2.4	0.1	97	360	84	74
141	25.440	0.181	0.072	0.40	75	-0.18	99	2.3	-0.1	97	358	84	74
142	25.622	0.182	0.072	0.40	75	0.2	100	2.3	0	97	357	84	74
143	25.803	0.181	0.072	0.40	75	0.36	99	2.3	0	97	356	84	74
144	25.984	0.181	0.072	0.40	75	0.83	99	2.3	0	96	355	84	74
145	26.165	0.181	0.072	0.40	75	0.87	99	1.8	-0.5	96	354	84	74
146	26.347	0.182	0.072	0.40	75	0.25	100	2.2	0.4	96	352	84	74
147	26.528	0.181	0.072	0.40	75	-0.07	99	2.1	-0.1	96	352	84	74
148	26.710	0.182	0.072	0.40	75	0.41	100	2.1	0	96	353	84	74
149	26.892	0.182	0.072	0.40	75	0.02	100	2.1	0	96	352	84	74
150	27.073	0.181	0.072	0.40	75	0.32	99	2.0	-0.1	96	350	84	74
151	27.254	0.181	0.072	0.40	75	-0.01	99	2.0	0	96	348	84	74
152	27.438	0.184	0.072	0.40	75	0.11	101	2.0	0	96	345	84	75
153	27.619	0.181	0.072	0.40	75	0.4	99	2.0	0	95	343	84	74
154	27.801	0.182	0.072	0.40	75	0.24	99	2.0	0	95	341	84	74
155	27.982	0.181	0.072	0.40	75	0.28	99	2.0	0	95	339	84	74
156	28.164	0.182	0.072	0.40	75	0.81	99	1.9	-0.1	95	338	84	74
157	28.347	0.183	0.072	0.40	75	0.84	100	1.9	0	95	337	84	74
158	28.528	0.181	0.072	0.40	75	0.24	99	1.9	0	95	337	84	74
159	28.710	0.182	0.072	0.40	75	0.85	99	1.4	-0.5	95	336	84	75
160	28.892	0.182	0.072	0.40	75	0.96	99	1.9	0.5	95	335	84	74
161	29.073	0.181	0.072	0.40	75	0.36	99	1.8	-0.1	95	335	84	74
162	29.255	0.182	0.072	0.40	75	0.95	99	1.8	0	95	334	84	74
163	29.437	0.182	0.072	0.40	75	-0.26	99	1.8	0	94	333	84	74
164	29.619	0.182	0.072	0.40	75	0.41	99	1.8	0	94	333	84	74

BOX A TEST DATA - ASTM E3053 / ASTM E2515

Client: IHP
 Model: Montecito
 Run #: 3

Job #: 19-480
 Tracking #: 029
 Technician: SJB
 Date: 6/19/2019

Elapsed Time (min)	Particulate Sampling Data							Fuel Weight (lb)		Temperature Data (°F)			
	Gas Meter (ft³)	Sample Rate (cfm)	Dilution Tunnel dP (in H ₂ O)	Orifice dH (in H ₂ O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Scale Reading	Weight Change	Dilution Tunnel	Flue	Filter	Ambient
165	29.801	0.182	0.072	0.40	75	0.18	99	1.7	-0.1	94	333	84	74
166	29.982	0.181	0.072	0.40	75	-0.03	99	1.7	0	94	332	84	74
167	30.164	0.182	0.072	0.40	75	-0.03	99	1.7	0	94	330	84	74
168	30.346	0.182	0.072	0.40	75	0.89	99	1.7	0	94	330	84	74
169	30.528	0.182	0.072	0.40	75	0.75	99	1.7	0	94	326	84	74
170	30.709	0.181	0.072	0.41	75	0.9	99	1.7	0	94	326	84	74
171	30.891	0.182	0.072	0.40	75	0.07	99	1.6	-0.1	94	324	84	74
172	31.073	0.182	0.072	0.40	75	0.55	99	1.6	0	93	321	84	74
173	31.255	0.182	0.072	0.40	75	0.93	99	1.6	0	93	321	84	74
174	31.436	0.181	0.072	0.40	75	0.91	99	1.6	0	93	320	84	74
175	31.618	0.182	0.072	0.40	75	0.89	99	1.5	-0.1	93	318	84	74
176	31.799	0.181	0.072	0.40	75	1	99	1.5	0	93	318	84	74
177	31.981	0.182	0.072	0.40	75	0.93	99	1.5	0	93	318	84	74
178	32.163	0.182	0.072	0.40	75	0.96	99	1.5	0	93	315	84	74
179	32.345	0.182	0.072	0.40	75	0.05	99	1.5	0	93	313	84	73
180	32.527	0.182	0.072	0.40	75	0.37	99	1.5	0	93	313	84	74
181	32.709	0.182	0.072	0.40	75	-0.3	99	1.5	0	93	314	84	73
182	32.892	0.183	0.072	0.40	75	0.83	100	1.4	-0.1	93	313	84	74
183	33.074	0.182	0.072	0.40	75	0.35	99	1.4	0	93	311	84	74
184	33.256	0.182	0.072	0.40	75	0.9	99	1.4	0	92	310	84	74
185	33.437	0.181	0.072	0.40	75	0.11	99	1.4	0	93	309	84	74
186	33.620	0.183	0.072	0.40	75	0.37	100	1.4	0	93	308	84	73
187	33.802	0.182	0.072	0.40	75	-0.33	99	1.3	-0.1	92	308	84	74
188	33.984	0.182	0.072	0.40	75	0.92	99	1.3	0	92	307	84	74
189	34.166	0.182	0.072	0.40	75	0.98	99	1.3	0	92	307	84	74
190	34.349	0.183	0.072	0.40	75	0.62	100	1.2	-0.1	92	306	84	74
191	34.530	0.181	0.072	0.40	75	0.63	99	1.2	0	92	305	84	74
192	34.712	0.182	0.072	0.40	75	0.38	99	1.3	0.1	92	305	84	74
193	34.894	0.182	0.072	0.40	75	1.05	99	1.2	-0.1	92	305	84	73
194	35.076	0.182	0.072	0.40	75	-0.03	99	1.2	0	92	304	84	73
195	35.254	0.178	0.072	0.40	75	0.81	97	1.1	-0.1	92	303	84	73
196	35.436	0.182	0.072	0.40	75	0.76	99	1.2	0.1	92	303	84	74
197	35.618	0.182	0.072	0.40	75	-0.19	99	1.1	-0.1	92	303	84	73

BOX A TEST DATA - ASTM E3053 / ASTM E2515

Client: IHP
 Model: Montecito
 Run #: 3

Job #: 19-480
 Tracking #: 029
 Technician: SJB
 Date: 6/19/2019

Elapsed Time (min)	Particulate Sampling Data							Fuel Weight (lb)		Temperature Data (°F)			
	Gas Meter (ft ³)	Sample Rate (cfm)	Dilution Tunnel dP (in H ₂ O)	Orifice dH (in H ₂ O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Scale Reading	Weight Change	Dilution Tunnel	Flue	Filter	Ambient
198	35.799	0.181	0.072	0.40	75	0.15	99	1.1	0	92	302	84	74
199	35.981	0.182	0.072	0.40	75	0.32	99	1.1	0	92	301	84	74
200	36.162	0.181	0.072	0.40	75	0.59	99	1.1	0	92	302	84	74
201	36.344	0.182	0.072	0.40	75	-0.33	99	1.0	-0.1	92	301	84	74
202	36.525	0.181	0.072	0.40	75	-0.4	99	1.1	0.1	93	301	84	74
203	36.709	0.184	0.072	0.41	75	0.73	100	1.0	-0.1	92	300	84	74
204	36.892	0.183	0.072	0.41	75	0.91	100	1.0	0	91	300	84	74
205	37.076	0.184	0.072	0.41	75	-0.08	100	1.0	0	92	299	84	74
206	37.259	0.183	0.072	0.41	75	0.17	100	1.0	0	92	298	84	74
207	37.442	0.183	0.072	0.41	75	0.98	100	1.0	0	92	298	84	74
208	37.626	0.184	0.072	0.40	75	-0.02	100	1.0	0	92	298	85	74
209	37.810	0.184	0.072	0.41	75	0.27	100	0.9	-0.1	92	298	86	74
210	37.995	0.185	0.072	0.41	75	0.76	101	0.9	0	92	298	86	74
211	38.179	0.184	0.072	0.41	75	0.34	100	0.9	0	92	297	87	74
212	38.362	0.183	0.072	0.41	75	0.78	100	0.9	0	92	298	87	73
213	38.546	0.184	0.072	0.41	75	0.11	100	0.9	0	92	298	88	74
214	38.731	0.185	0.072	0.41	75	0.16	101	1.0	0.1	92	298	88	74
215	38.914	0.183	0.072	0.41	75	0.31	100	0.8	-0.2	92	297	88	74
216	39.097	0.183	0.072	0.41	75	0.84	100	0.8	0	92	297	88	74
217	39.281	0.184	0.072	0.41	75	0.8	100	0.8	0	91	296	89	74
218	39.464	0.183	0.072	0.41	75	0.22	100	0.8	0	91	296	89	74
219	39.649	0.185	0.072	0.41	75	0.9	101	0.8	0	91	295	89	74
220	39.832	0.183	0.072	0.41	75	1	100	0.7	-0.1	91	294	89	74
221	40.017	0.185	0.072	0.40	75	0.16	101	0.7	0	91	293	89	74
222	40.200	0.183	0.072	0.41	75	0.34	100	0.7	0	92	293	88	74
223	40.384	0.184	0.072	0.41	75	-0.26	100	0.6	-0.1	92	293	86	74
224	40.567	0.183	0.072	0.41	75	0.33	100	0.6	0	91	293	85	74
225	40.751	0.184	0.072	0.41	75	0.09	100	0.6	0	91	292	85	74
226	40.934	0.183	0.072	0.41	75	0.98	100	0.7	0.1	91	291	84	74
227	41.118	0.184	0.072	0.41	75	-0.06	100	0.7	0	92	290	84	74
228	41.301	0.183	0.072	0.41	75	0.49	100	0.7	0	91	289	84	74
229	41.484	0.183	0.072	0.41	75	-0.03	100	0.6	-0.1	91	288	84	74
230	41.668	0.184	0.072	0.41	75	-0.04	100	0.6	0	91	287	84	74

BOX A TEST DATA - ASTM E3053 / ASTM E2515

Client: IHP
 Model: Montecito
 Run #: 3

Job #: 19-480
 Tracking #: 029
 Technician: SJB
 Date: 6/19/2019

Elapsed Time (min)	Particulate Sampling Data							Fuel Weight (lb)		Temperature Data (°F)			
	Gas Meter (ft³)	Sample Rate (cfm)	Dilution Tunnel dP (in H ₂ O)	Orifice dH (in H ₂ O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Scale Reading	Weight Change	Dilution Tunnel	Flue	Filter	Ambient
231	41.852	0.184	0.072	0.41	75	-0.05	100	0.5	-0.1	91	288	84	74
232	42.036	0.184	0.072	0.41	75	-0.05	100	0.5	0	91	286	84	74
233	42.219	0.183	0.072	0.41	75	0.71	100	0.5	0	91	286	84	74
234	42.403	0.184	0.072	0.41	75	0.97	100	0.5	0	91	285	84	74
235	42.586	0.183	0.072	0.41	75	0.99	100	0.5	0	91	285	84	74
236	42.770	0.184	0.072	0.41	75	-0.28	100	0.5	0	91	284	85	74
237	42.953	0.183	0.072	0.41	75	1	100	0.5	0	91	283	85	74
238	43.136	0.183	0.072	0.41	75	0.86	100	0.5	0	91	283	85	74
239	43.320	0.184	0.072	0.41	75	-0.05	100	0.5	0	91	283	85	74
240	43.502	0.182	0.072	0.41	75	0.98	99	0.5	0	91	282	85	74
241	43.686	0.184	0.072	0.41	75	0.29	100	0.4	-0.1	91	282	85	74
242	43.869	0.183	0.072	0.41	75	0.38	100	0.5	0.1	91	282	85	74
243	44.053	0.184	0.072	0.40	75	-0.04	100	0.4	-0.1	91	281	85	74
244	44.237	0.184	0.072	0.41	75	0.09	100	0.4	0	91	280	85	74
245	44.422	0.185	0.072	0.41	75	0.79	101	0.3	-0.1	91	280	85	74
246	44.606	0.184	0.072	0.41	75	-0.03	100	0.3	0	91	279	85	74
247	44.790	0.184	0.072	0.41	75	1	100	0.3	0	90	278	85	74
248	44.973	0.183	0.072	0.40	75	0.94	100	0.3	0	91	279	85	74
249	45.157	0.184	0.072	0.41	75	1.01	100	0.3	0	91	278	85	74
250	45.341	0.184	0.072	0.41	75	1.03	100	0.3	0	91	278	85	74
251	45.524	0.183	0.072	0.41	75	-0.31	100	0.3	0	91	278	85	74
252	45.707	0.183	0.072	0.41	75	0.03	100	0.3	0	90	277	86	74
253	45.891	0.184	0.072	0.41	75	0.86	100	0.2	-0.1	91	278	86	74
254	46.075	0.184	0.072	0.41	75	0.82	100	0.3	0.1	90	277	86	74
255	46.259	0.184	0.072	0.41	75	1.03	100	0.2	-0.1	91	276	86	74
256	46.443	0.184	0.072	0.41	75	0.72	100	0.2	0	91	275	86	74
257	46.626	0.183	0.072	0.40	75	-0.04	100	0.2	0	90	274	86	74
258	46.811	0.185	0.072	0.41	75	0.32	101	0.2	0	90	274	86	74
259	46.994	0.183	0.072	0.40	75	0.95	100	0.2	0	90	273	86	74
260	47.177	0.183	0.072	0.41	75	0.31	100	0.1	-0.1	90	274	86	74
261	47.361	0.184	0.072	0.41	75	-0.01	100	0.1	0	90	273	86	74
262	47.545	0.184	0.072	0.41	75	-0.39	100	0.1	0	90	272	86	74
263	47.729	0.184	0.072	0.41	75	0.33	100	0.1	0	90	271	86	74

BOX A TEST DATA - ASTM E3053 / ASTM E2515

Client: IHP
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 Run #: 3

Job #: 19-480
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Elapsed Time (min)	Particulate Sampling Data							Fuel Weight (lb)		Temperature Data (°F)			
	Gas Meter (ft ³)	Sample Rate (cfm)	Dilution Tunnel dP (in H ₂ O)	Orifice dH (in H ₂ O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Scale Reading	Weight Change	Dilution Tunnel	Flue	Filter	Ambient
264	47.913	0.184	0.072	0.41	75	0.87	100	0.1	0	90	271	86	74
265	48.097	0.184	0.072	0.41	75	0.04	100	0.0	-0.1	90	271	86	74
Avg/Tot	48.097	0.181	0.072	0.40	75	0.40	100			103	398	84	74.3

BOX B TEST DATA - ASTM E3053 / ASTM E2515

Client: IHP
 Model: Montecito
 Run #: 3

Job #: 19-480
 Tracking #: 029
 Technician: SJB
 Date: 6/19/2019

Elapsed Time (min)	Particulate Sampling Data							Flue Gas Data		
	Gas Meter (ft ³)	Sample Rate (cfm)	Orifice dH (in H ₂ O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Filter (°F)	Flue Draft (in H ₂ O)	CO ₂ (%)	CO (%)
0	0.000		0.00	73	1		82	0.000	2.73	0.18
1	0.182	0.182	0.41	73	0.94	108	86	-0.060	3.54	0.18
2	0.366	0.184	0.44	73	0.06	108	87	-0.070	4.92	0.52
3	0.549	0.183	0.43	73	0.97	109	87	-0.080	8.93	0.33
4	0.733	0.184	0.43	74	0.96	108	85	-0.080	13.05	0.27
5	0.914	0.181	0.42	74	1.09	106	84	-0.080	12.05	0.27
6	1.096	0.182	0.43	74	2.32	106	83	-0.080	12.69	0.46
7	1.276	0.180	0.43	74	1.58	105	83	-0.080	12.83	0.48
8	1.456	0.180	0.43	74	1.04	105	83	-0.080	13.19	0.39
9	1.636	0.180	0.43	74	1.08	105	83	-0.080	13.19	0.41
10	1.814	0.178	0.43	74	1.61	104	83	-0.080	12.96	0.42
11	1.992	0.178	0.42	74	1.99	104	83	-0.080	13.06	0.39
12	2.169	0.177	0.43	74	1.7	103	83	-0.080	13.25	0.31
13	2.346	0.177	0.43	74	1.02	103	83	-0.080	13.28	0.33
14	2.520	0.174	0.43	74	0.33	101	83	-0.080	13.01	0.27
15	2.694	0.174	0.43	75	0.15	101	83	-0.080	12.92	0.22
16	2.868	0.174	0.42	75	1.54	101	84	-0.090	12.91	0.22
17	3.041	0.173	0.42	75	1.17	100	84	-0.080	12.66	0.27
18	3.231	0.190	0.43	75	1.08	110	83	-0.080	12.66	0.23
19	3.423	0.192	0.42	75	1.04	111	83	-0.090	13.07	0.19
20	3.613	0.190	0.42	75	1.1	110	84	-0.080	13.20	0.15
21	3.804	0.191	0.42	76	0.86	111	84	-0.080	12.77	0.15
22	3.993	0.189	0.41	76	0.61	110	84	-0.080	12.72	0.12
23	4.181	0.188	0.41	76	2.49	109	84	-0.090	12.68	0.20
24	4.368	0.187	0.42	76	2.31	108	84	-0.080	12.25	0.21
25	4.556	0.188	0.41	76	2.54	109	84	-0.090	12.29	0.17
26	4.742	0.186	0.41	76	1.27	108	84	-0.090	12.39	0.15
27	4.928	0.186	0.41	77	0.98	107	84	-0.080	12.10	0.15
28	5.114	0.186	0.42	77	1.48	107	83	-0.080	12.26	0.07
29	5.299	0.185	0.41	77	1.38	107	84	-0.080	12.36	0.07
30	5.481	0.182	0.41	77	0.31	105	84	-0.070	12.29	0.07
31	5.664	0.183	0.42	77	2.39	106	84	-0.070	12.57	0.09

BOX B TEST DATA - ASTM E3053 / ASTM E2515

Client: IHP
 Model: Montecito
 Run #: 3

Job #: 19-480
 Tracking #: 029
 Technician: SJB
 Date: 6/19/2019

Elapsed Time (min)	Particulate Sampling Data							Flue Gas Data		
	Gas Meter (ft ³)	Sample Rate (cfm)	Orifice dH (in H ₂ O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Filter (°F)	Flue Draft (in H ₂ O)	CO ₂ (%)	CO (%)
32	5.851	0.187	0.43	77	2.45	108	84	-0.070	12.61	0.15
33	6.035	0.184	0.42	78	2.66	106	84	-0.080	12.52	0.23
34	6.220	0.185	0.42	78	0.33	107	84	-0.070	12.59	0.25
35	6.404	0.184	0.42	78	0.34	106	84	-0.070	12.71	0.20
36	6.587	0.183	0.43	78	1.26	105	84	-0.070	12.71	0.17
37	6.772	0.185	0.42	78	1.11	106	83	-0.080	13.27	0.41
38	6.956	0.184	0.43	78	2.46	105	83	-0.070	12.85	0.28
39	7.139	0.183	0.42	79	1.76	104	83	-0.080	12.66	0.16
40	7.321	0.182	0.43	79	2.54	104	83	-0.070	12.35	0.17
41	7.504	0.183	0.42	79	1.3	104	83	-0.070	12.05	0.23
42	7.685	0.181	0.42	79	2.5	103	83	-0.080	12.35	0.21
43	7.867	0.182	0.42	79	2.55	104	83	-0.080	11.90	0.29
44	8.049	0.182	0.42	79	2.64	104	83	-0.070	12.02	0.30
45	8.232	0.183	0.42	80	1.26	104	82	-0.070	12.31	0.21
46	8.414	0.182	0.41	80	1.4	103	82	-0.080	12.00	0.32
47	8.594	0.180	0.42	80	2.53	102	82	-0.070	12.02	0.30
48	8.777	0.183	0.41	80	0.81	104	82	-0.080	12.38	0.25
49	8.957	0.180	0.44	80	0.99	102	82	-0.070	12.16	0.23
50	9.139	0.182	0.43	80	0.89	103	82	-0.080	12.52	0.19
51	9.321	0.182	0.42	80	0.97	103	82	-0.080	12.51	0.22
52	9.501	0.180	0.42	80	0.44	102	83	-0.070	12.29	0.23
53	9.682	0.181	0.42	81	1.4	103	83	-0.080	12.50	0.24
54	9.864	0.182	0.42	81	1.12	103	83	-0.080	12.60	0.31
55	10.045	0.181	0.42	81	1.62	103	83	-0.070	12.53	0.34
56	10.225	0.180	0.42	81	2.63	102	83	-0.080	12.32	0.29
57	10.404	0.179	0.41	81	1.51	102	83	-0.080	12.13	0.44
58	10.584	0.180	0.42	81	1.46	102	83	-0.080	12.46	0.43
59	10.765	0.181	0.42	81	1.51	103	83	-0.070	12.36	0.37
60	10.946	0.181	0.42	81	2.09	103	83	-0.070	12.56	0.30
61	11.127	0.181	0.41	81	2.83	103	83	-0.080	12.17	0.40
62	11.306	0.179	0.41	81	1.54	102	83	-0.080	13.85	0.48
63	11.486	0.180	0.43	82	0.91	102	83	-0.070	13.45	0.20

BOX B TEST DATA - ASTM E3053 / ASTM E2515

Client: IHP
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 Run #: 3

Job #: 19-480
 Tracking #: 029
 Technician: SJB
 Date: 6/19/2019

Elapsed Time (min)	Particulate Sampling Data							Flue Gas Data		
	Gas Meter (ft ³)	Sample Rate (cfm)	Orifice dH (in H ₂ O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Filter (°F)	Flue Draft (in H ₂ O)	CO ₂ (%)	CO (%)
64	11.666	0.180	0.41	82	1.18	102	83	-0.070	12.42	0.27
65	11.846	0.180	0.42	82	1.43	102	83	-0.070	12.36	0.14
66	12.026	0.180	0.41	82	1.84	102	83	-0.080	12.29	0.11
67	12.205	0.179	0.43	82	2.3	101	83	-0.060	11.74	0.16
68	12.386	0.181	0.42	82	1.12	102	83	-0.070	11.57	0.14
69	12.566	0.180	0.42	82	1.46	102	83	-0.060	11.41	0.13
70	12.746	0.180	0.42	82	2.78	102	83	-0.080	11.72	0.08
71	12.924	0.178	0.43	82	2.61	101	83	-0.070	11.62	0.06
72	13.104	0.180	0.43	82	0.67	102	83	-0.060	11.30	0.11
73	13.283	0.179	0.42	82	1.42	101	83	-0.080	11.56	0.04
74	13.463	0.180	0.42	82	2.8	102	83	-0.070	11.15	0.15
75	13.642	0.179	0.43	82	2.22	101	83	-0.060	11.05	0.13
76	13.823	0.181	0.44	83	1.94	102	83	-0.060	11.27	0.10
77	14.002	0.179	0.42	83	1.48	101	83	-0.060	11.25	0.11
78	14.181	0.179	0.42	83	2.16	101	83	-0.070	11.15	0.16
79	14.359	0.178	0.41	83	1.2	100	83	-0.070	11.23	0.15
80	14.539	0.180	0.43	83	1.55	102	83	-0.060	11.15	0.17
81	14.717	0.178	0.43	83	1.95	100	83	-0.070	11.45	0.13
82	14.895	0.178	0.42	83	2.54	100	83	-0.070	11.04	0.19
83	15.074	0.179	0.42	83	0.6	101	83	-0.060	11.08	0.18
84	15.255	0.181	0.43	83	1.05	102	83	-0.070	11.42	0.08
85	15.433	0.178	0.43	83	1.77	100	83	-0.070	11.30	0.10
86	15.612	0.179	0.42	83	1.54	101	83	-0.070	10.97	0.19
87	15.791	0.179	0.42	83	1.48	101	83	-0.070	10.99	0.15
88	15.971	0.180	0.43	83	1.5	101	83	-0.060	11.18	0.11
89	16.151	0.180	0.41	83	1.58	101	83	-0.080	10.92	0.15
90	16.328	0.177	0.41	83	0.95	100	83	-0.070	10.90	0.14
91	16.507	0.179	0.42	83	1.49	101	83	-0.070	10.85	0.11
92	16.685	0.178	0.41	84	1.62	100	83	-0.080	10.85	0.11
93	16.865	0.180	0.41	84	1.78	101	83	-0.070	10.76	0.16
94	17.042	0.177	0.42	84	2.71	99	83	-0.070	11.04	0.05
95	17.221	0.179	0.43	84	1.35	101	83	-0.070	10.98	0.06

BOX B TEST DATA - ASTM E3053 / ASTM E2515

Client: IHP
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 Run #: 3

Job #: 19-480
 Tracking #: 029
 Technician: SJB
 Date: 6/19/2019

Elapsed Time (min)	Particulate Sampling Data							Flue Gas Data		
	Gas Meter (ft ³)	Sample Rate (cfm)	Orifice dH (in H ₂ O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Filter (°F)	Flue Draft (in H ₂ O)	CO ₂ (%)	CO (%)
96	17.398	0.177	0.43	84	1.99	99	83	-0.060	10.75	0.05
97	17.576	0.178	0.42	84	0.6	100	83	-0.070	10.85	0.05
98	17.754	0.178	0.43	84	1.08	100	83	-0.070	10.78	0.07
99	17.934	0.180	0.42	84	2.12	101	83	-0.080	10.61	0.12
100	18.110	0.176	0.42	84	2.87	99	83	-0.070	10.35	0.12
101	18.288	0.178	0.41	84	0.63	100	83	-0.070	10.22	0.13
102	18.465	0.177	0.43	84	1.43	99	82	-0.070	10.35	0.07
103	18.644	0.179	0.42	84	2.04	100	82	-0.060	9.77	0.14
104	18.822	0.178	0.42	84	2.79	100	82	-0.070	9.89	0.04
105	19.000	0.178	0.43	84	2.4	100	82	-0.060	9.52	0.08
106	19.177	0.177	0.43	84	0.94	99	82	-0.060	9.11	0.18
107	19.355	0.178	0.42	84	1.53	100	82	-0.060	8.96	0.16
108	19.533	0.178	0.42	84	2.77	100	82	-0.060	9.40	0.04
109	19.709	0.176	0.42	84	0.59	99	82	-0.070	9.36	0.10
110	19.888	0.179	0.42	84	0.68	100	82	-0.070	8.68	0.15
111	20.066	0.178	0.42	84	0.82	100	82	-0.070	8.58	0.17
112	20.242	0.176	0.42	84	2.87	98	82	-0.060	8.36	0.20
113	20.420	0.178	0.42	84	2.85	99	82	-0.070	8.51	0.16
114	20.599	0.179	0.43	84	2.54	100	82	-0.050	8.35	0.20
115	20.776	0.177	0.42	84	1.18	99	82	-0.070	8.52	0.15
116	20.954	0.178	0.43	84	2.37	100	82	-0.060	8.60	0.08
117	21.131	0.177	0.44	84	1.22	99	82	-0.060	8.60	0.10
118	21.308	0.177	0.42	84	1.49	99	82	-0.070	8.63	0.12
119	21.485	0.177	0.42	84	2.82	99	82	-0.060	8.21	0.20
120	21.661	0.176	0.43	84	1.3	98	82	-0.060	8.55	0.13
121	21.838	0.177	0.42	84	2.71	99	82	-0.070	8.44	0.15
122	22.015	0.177	0.42	84	1.71	99	82	-0.060	8.22	0.19
123	22.193	0.178	0.44	84	2.51	99	82	-0.050	8.43	0.12
124	22.369	0.176	0.43	84	0.95	98	82	-0.050	8.19	0.19
125	22.548	0.179	0.42	84	0.66	100	82	-0.070	8.45	0.17
126	22.724	0.176	0.42	84	2.78	98	82	-0.060	8.46	0.14
127	22.901	0.177	0.42	84	2.23	99	82	-0.060	8.24	0.17

BOX B TEST DATA - ASTM E3053 / ASTM E2515

Client: IHP
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Job #: 19-480
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 Technician: SJB
 Date: 6/19/2019

Elapsed Time (min)	Particulate Sampling Data							Flue Gas Data		
	Gas Meter (ft ³)	Sample Rate (cfm)	Orifice dH (in H ₂ O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Filter (°F)	Flue Draft (in H ₂ O)	CO ₂ (%)	CO (%)
128	23.080	0.179	0.43	84	2.82	100	82	-0.060	8.28	0.15
129	23.258	0.178	0.41	84	1.61	99	82	-0.060	7.87	0.25
130	23.436	0.178	0.43	84	1.38	99	82	-0.050	7.65	0.25
131	23.612	0.176	0.43	84	1.47	98	82	-0.060	8.20	0.16
132	23.789	0.177	0.43	84	1.4	99	82	-0.060	8.00	0.20
133	23.967	0.178	0.43	85	2.68	99	82	-0.060	8.02	0.19
134	24.143	0.176	0.42	84	0.98	98	82	-0.060	7.91	0.25
135	24.320	0.177	0.43	85	2.07	98	82	-0.050	7.65	0.26
136	24.498	0.178	0.42	85	1.64	99	82	-0.060	7.65	0.29
137	24.676	0.178	0.43	85	1.49	99	82	-0.060	7.89	0.23
138	24.851	0.175	0.42	85	1.52	97	82	-0.050	7.35	0.31
139	25.029	0.178	0.44	85	1.33	99	82	-0.050	7.55	0.27
140	25.207	0.178	0.41	85	1.11	99	82	-0.060	7.60	0.29
141	25.385	0.178	0.42	85	1.03	99	82	-0.050	7.19	0.38
142	25.562	0.177	0.42	85	2.41	98	82	-0.060	7.37	0.38
143	25.740	0.178	0.42	85	2.75	99	82	-0.070	7.57	0.35
144	25.917	0.177	0.43	85	1.36	98	82	-0.050	7.52	0.32
145	26.093	0.176	0.43	85	2.56	98	82	-0.050	7.53	0.34
146	26.272	0.179	0.42	85	2.89	99	82	-0.060	7.34	0.39
147	26.449	0.177	0.42	85	2.86	98	82	-0.060	7.17	0.44
148	26.626	0.177	0.42	85	2.9	98	82	-0.060	7.66	0.32
149	26.803	0.177	0.42	85	1.93	98	82	-0.060	7.54	0.32
150	26.980	0.177	0.43	85	2.11	98	82	-0.040	7.29	0.30
151	27.157	0.177	0.43	85	1.13	98	82	-0.050	7.27	0.30
152	27.333	0.176	0.42	85	0.6	98	82	-0.050	6.73	0.45
153	27.510	0.177	0.43	85	1.57	98	81	-0.060	6.84	0.42
154	27.688	0.178	0.42	85	1.69	99	81	-0.050	6.34	0.53
155	27.864	0.176	0.43	85	0.55	98	81	-0.050	6.65	0.45
156	28.040	0.176	0.42	85	2.69	98	81	-0.060	6.79	0.53
157	28.217	0.177	0.42	85	2.63	98	81	-0.050	6.35	0.60
158	28.393	0.176	0.42	85	2.8	98	81	-0.060	6.78	0.54
159	28.569	0.176	0.41	85	1.47	98	81	-0.060	6.34	0.60

BOX B TEST DATA - ASTM E3053 / ASTM E2515

Client: IHP
 Model: Montecito
 Run #: 3

Job #: 19-480
 Tracking #: 029
 Technician: SJB
 Date: 6/19/2019

Elapsed Time (min)	Particulate Sampling Data							Flue Gas Data		
	Gas Meter (ft ³)	Sample Rate (cfm)	Orifice dH (in H ₂ O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Filter (°F)	Flue Draft (in H ₂ O)	CO ₂ (%)	CO (%)
160	28.746	0.177	0.43	85	1.76	98	81	-0.060	6.77	0.53
161	28.922	0.176	0.41	85	1.29	98	81	-0.060	6.40	0.59
162	29.098	0.176	0.43	85	2.77	98	81	-0.040	6.47	0.59
163	29.273	0.175	0.43	85	1.38	97	81	-0.050	6.61	0.55
164	29.449	0.176	0.43	85	2.75	98	81	-0.040	6.35	0.57
165	29.623	0.174	0.42	85	1.42	96	81	-0.060	6.52	0.56
166	29.799	0.176	0.41	85	2.2	98	81	-0.060	6.20	0.62
167	29.976	0.177	0.43	85	2.49	98	81	-0.050	6.33	0.55
168	30.152	0.176	0.42	85	2.64	98	81	-0.050	6.06	0.69
169	30.327	0.175	0.43	85	2.09	97	81	-0.050	6.35	0.60
170	30.504	0.177	0.42	85	1.21	98	81	-0.060	6.03	0.64
171	30.680	0.176	0.43	85	1.75	98	81	-0.050	5.97	0.68
172	30.856	0.176	0.42	85	2.72	97	81	-0.040	5.49	0.80
173	31.030	0.174	0.42	85	2.64	96	81	-0.040	5.61	0.78
174	31.207	0.177	0.43	85	0.78	98	81	-0.050	5.98	0.70
175	31.383	0.176	0.43	85	1.58	97	81	-0.050	5.90	0.71
176	31.559	0.176	0.42	85	1.94	97	81	-0.050	5.82	0.75
177	31.734	0.175	0.42	85	1.75	97	81	-0.060	5.68	0.78
178	31.911	0.177	0.42	85	2.74	98	81	-0.060	5.83	0.72
179	32.087	0.176	0.42	85	1.46	97	81	-0.040	5.42	0.80
180	32.262	0.175	0.41	85	2.75	97	81	-0.050	5.32	0.85
181	32.439	0.177	0.43	85	0.46	98	81	-0.040	5.43	0.81
182	32.615	0.176	0.43	85	0.69	97	81	-0.040	5.62	0.78
183	32.791	0.176	0.42	85	1.49	97	81	-0.050	5.41	0.83
184	32.966	0.175	0.43	85	0.66	97	81	-0.050	5.77	0.75
185	33.143	0.177	0.43	85	1.02	98	81	-0.050	5.71	0.77
186	33.319	0.176	0.42	85	1.24	97	81	-0.050	5.72	0.78
187	33.496	0.177	0.41	85	2.81	98	81	-0.050	5.31	0.87
188	33.672	0.176	0.42	85	2.77	97	81	-0.050	5.39	0.78
189	33.849	0.177	0.42	85	0.85	98	81	-0.050	5.42	0.79
190	34.024	0.175	0.42	85	2.92	97	81	-0.050	5.30	0.82
191	34.199	0.175	0.42	85	1.59	97	81	-0.050	5.32	0.77

BOX B TEST DATA - ASTM E3053 / ASTM E2515

Client: IHP
 Model: Montecito
 Run #: 3

Job #: 19-480
 Tracking #: 029
 Technician: SJB
 Date: 6/19/2019

Elapsed Time (min)	Particulate Sampling Data							Flue Gas Data		
	Gas Meter (ft ³)	Sample Rate (cfm)	Orifice dH (in H ₂ O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Filter (°F)	Flue Draft (in H ₂ O)	CO ₂ (%)	CO (%)
192	34.377	0.178	0.42	85	1.5	98	81	-0.060	5.63	0.73
193	34.553	0.176	0.41	85	1.83	97	81	-0.060	5.60	0.77
194	34.727	0.174	0.41	85	1.7	96	81	-0.050	5.24	0.82
195	34.904	0.177	0.43	85	2.61	98	81	-0.040	5.37	0.77
196	35.082	0.178	0.42	85	2.84	98	81	-0.050	5.80	0.69
197	35.259	0.177	0.43	85	2.69	98	81	-0.040	5.70	0.71
198	35.436	0.177	0.42	85	0.89	98	81	-0.040	5.35	0.79
199	35.613	0.177	0.44	85	2.66	98	81	-0.040	5.51	0.73
200	35.790	0.177	0.42	85	2.93	98	81	-0.050	5.32	0.81
201	35.967	0.177	0.41	85	1.72	98	81	-0.050	5.25	0.79
202	36.143	0.176	0.42	85	1.85	97	81	-0.040	5.11	0.79
203	36.321	0.178	0.42	85	1.36	98	81	-0.040	5.16	0.77
204	36.496	0.175	0.41	85	2.92	97	81	-0.050	5.37	0.78
205	36.672	0.176	0.42	85	2.79	97	81	-0.050	5.55	0.73
206	36.848	0.176	0.42	85	2.81	97	81	-0.050	5.26	0.79
207	37.025	0.177	0.42	85	1.82	98	81	-0.040	5.16	0.80
208	37.202	0.177	0.42	85	1.99	98	81	-0.060	5.61	0.74
209	37.378	0.176	0.42	85	2.69	97	82	-0.050	5.36	0.78
210	37.555	0.177	0.42	85	2.92	98	82	-0.050	5.32	0.80
211	37.731	0.176	0.41	85	2.63	97	82	-0.050	5.31	0.83
212	37.907	0.176	0.42	85	1.9	97	82	-0.050	5.26	0.82
213	38.084	0.177	0.44	85	1.23	98	82	-0.040	5.57	0.76
214	38.261	0.177	0.43	85	1.67	98	82	-0.040	5.30	0.78
215	38.436	0.175	0.43	85	1.55	97	83	-0.040	5.22	0.81
216	38.613	0.177	0.43	85	1.55	98	83	-0.040	5.47	0.73
217	38.790	0.177	0.42	85	2.91	98	83	-0.050	5.53	0.79
218	38.966	0.176	0.43	85	2.06	97	83	-0.040	5.33	0.76
219	39.142	0.176	0.43	85	2	97	83	-0.040	5.14	0.79
220	39.319	0.177	0.43	85	1.37	98	83	-0.050	5.49	0.75
221	39.495	0.176	0.42	85	1.8	97	83	-0.060	5.38	0.77
222	39.671	0.176	0.42	85	2.86	97	83	-0.040	5.01	0.80
223	39.847	0.176	0.43	85	1.5	97	83	-0.050	5.04	0.84

BOX B TEST DATA - ASTM E3053 / ASTM E2515

Client: IHP
 Model: Montecito
 Run #: 3

Job #: 19-480
 Tracking #: 029
 Technician: SJB
 Date: 6/19/2019

Elapsed Time (min)	Particulate Sampling Data							Flue Gas Data		
	Gas Meter (ft ³)	Sample Rate (cfm)	Orifice dH (in H ₂ O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Filter (°F)	Flue Draft (in H ₂ O)	CO ₂ (%)	CO (%)
224	40.024	0.177	0.43	85	2.72	98	83	-0.040	5.21	0.76
225	40.200	0.176	0.42	85	2.88	97	83	-0.040	5.07	0.80
226	40.375	0.175	0.43	85	2.72	97	83	-0.040	5.20	0.73
227	40.551	0.176	0.43	85	2.75	97	83	-0.050	5.31	0.72
228	40.728	0.177	0.42	85	2.8	98	83	-0.040	4.66	0.80
229	40.903	0.175	0.42	85	2.69	97	83	-0.060	5.04	0.72
230	41.080	0.177	0.42	85	2.17	98	83	-0.050	4.94	0.75
231	41.259	0.179	0.43	85	2.69	99	83	-0.040	4.76	0.76
232	41.435	0.176	0.43	85	2.71	97	83	-0.040	4.92	0.72
233	41.611	0.176	0.41	85	0.67	97	83	-0.050	4.70	0.81
234	41.787	0.176	0.43	85	2.2	97	83	-0.050	5.07	0.72
235	41.964	0.177	0.43	85	1.39	98	83	-0.040	4.98	0.70
236	42.141	0.177	0.43	85	1.4	98	83	-0.040	4.88	0.73
237	42.316	0.175	0.42	85	2.19	97	83	-0.050	4.63	0.82
238	42.492	0.176	0.42	85	2.3	97	83	-0.050	4.95	0.73
239	42.669	0.177	0.42	85	3.03	98	83	-0.050	4.89	0.75
240	42.846	0.177	0.42	85	1.26	98	83	-0.050	4.87	0.76
241	43.021	0.175	0.43	85	0.81	97	83	-0.040	4.82	0.73
242	43.197	0.176	0.43	85	1.37	97	83	-0.040	4.98	0.70
243	43.373	0.176	0.42	85	2.93	97	83	-0.050	5.01	0.73
244	43.550	0.177	0.43	85	1.21	98	83	-0.040	4.60	0.79
245	43.725	0.175	0.41	85	2.83	97	83	-0.050	4.62	0.83
246	43.900	0.175	0.41	85	1.38	97	83	-0.050	4.78	0.81
247	44.076	0.176	0.43	85	2.43	97	83	-0.040	4.62	0.75
248	44.253	0.177	0.42	85	2.91	98	83	-0.050	4.58	0.82
249	44.429	0.176	0.42	85	2.74	97	83	-0.040	4.45	0.81
250	44.605	0.176	0.41	85	2.2	97	83	-0.050	4.51	0.75
251	44.781	0.176	0.42	85	1.58	97	83	-0.050	4.77	0.70
252	44.957	0.176	0.42	85	1.98	97	83	-0.040	4.48	0.72
253	45.134	0.177	0.43	85	1.79	98	83	-0.040	4.63	0.68
254	45.310	0.176	0.42	85	2.84	97	83	-0.050	4.70	0.69
255	45.486	0.176	0.44	85	1.98	97	83	-0.030	4.76	0.65

BOX B TEST DATA - ASTM E3053 / ASTM E2515

Client: IHPJob #: 19-480Model: MontecitoTracking #: 029Run #: 3Technician: SJBDate: 6/19/2019

Elapsed Time (min)	Particulate Sampling Data							Flue Gas Data		
	Gas Meter (ft ³)	Sample Rate (cfm)	Orifice dH (in H ₂ O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Filter (°F)	Flue Draft (in H ₂ O)	CO ₂ (%)	CO (%)
256	45.662	0.176	0.41	85	0.58	97	83	-0.050	4.77	0.68
257	45.838	0.176	0.41	85	2.81	97	83	-0.050	4.46	0.73
258	46.014	0.176	0.42	85	2.64	97	83	-0.050	4.56	0.72
259	46.190	0.176	0.42	85	2.69	97	83	-0.040	4.28	0.78
260	46.366	0.176	0.41	86	2.2	97	83	-0.050	4.49	0.75
261	46.542	0.176	0.42	85	1.13	97	83	-0.040	4.32	0.75
262	46.719	0.177	0.42	86	2.92	98	83	-0.050	4.46	0.73
263	46.895	0.176	0.43	86	2.32	97	83	-0.040	4.46	0.66
264	47.071	0.176	0.43	85	1.57	97	83	-0.040	4.72	0.63
265	47.247	0.176	0.43	86	1.7	97	83	-0.040	4.54	0.63
Avg/Tot	47.247	0.178	0.42	83	1.80	100	82	-0.060	8.36	0.43

WOODSTOVE SURFACE TEMPERATURE DATA

Client: IHP

Job #: 19-480

Model: Montecito

Tracking #: 029

Run #: 3

Technician: SJB

Date: 6/19/2019

Elapsed Time (min)	Temperature Data (°F)						
	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
0	520	565	328	448	277	427.6	N/A
1	519	563	327	412	282	420.6	N/A
2	516	561	325	456	283	428.2	N/A
3	517	559	332	553	285	449.2	N/A
4	519	557	347	610	285	463.6	N/A
5	520	554	360	647	286	473.4	N/A
6	521	552	371	676	289	481.8	N/A
7	520	550	379	699	292	488.0	N/A
8	520	548	386	723	295	494.4	N/A
9	519	547	392	744	298	500.0	N/A
10	518	546	397	761	300	504.4	N/A
11	518	545	401	777	301	508.4	N/A
12	517	544	404	793	302	512.0	N/A
13	517	544	407	806	303	515.4	N/A
14	516	544	411	814	304	517.8	N/A
15	517	544	413	821	304	519.8	N/A
16	517	545	416	828	304	522.0	N/A
17	517	545	418	834	304	523.6	N/A
18	517	546	421	840	304	525.6	N/A
19	518	546	423	845	304	527.2	N/A
20	518	547	425	849	303	528.4	N/A
21	519	548	428	849	303	529.4	N/A
22	520	549	430	852	302	530.6	N/A
23	521	550	432	854	301	531.6	N/A
24	522	551	434	858	300	533.0	N/A
25	522	552	436	860	299	533.8	N/A
26	524	554	437	859	298	534.4	N/A
27	525	555	438	855	297	534.0	N/A
28	526	556	440	851	296	533.8	N/A
29	527	557	441	849	295	533.8	N/A
30	528	558	442	851	294	534.6	N/A
31	530	559	444	853	293	535.8	N/A
32	531	560	445	856	291	536.6	N/A
33	532	561	447	860	290	538.0	N/A
34	534	563	448	864	289	539.6	N/A
35	535	564	449	869	288	541.0	N/A
36	536	565	451	868	287	541.4	N/A
37	538	566	452	867	285	541.6	N/A
38	539	567	453	868	284	542.2	N/A
39	541	568	454	858	283	540.8	N/A
40	542	568	455	854	282	540.2	N/A
41	544	569	455	852	281	540.2	N/A
42	545	570	456	850	280	540.2	N/A
43	546	570	456	851	279	540.4	N/A
44	548	570	457	853	278	541.2	N/A
45	549	570	456	856	277	541.6	N/A
46	550	571	457	859	276	542.6	N/A
47	551	571	457	863	275	543.4	N/A

WOODSTOVE SURFACE TEMPERATURE DATA

Client: IHP

Job #: 19-480

Model: Montecito

Tracking #: 029

Run #: 3

Technician: SJB

Date: 6/19/2019

Elapsed Time (min)	Temperature Data (°F)						
	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
48	552	571	456	859	274	542.4	N/A
49	553	570	457	855	273	541.6	N/A
50	554	570	456	855	272	541.4	N/A
51	554	570	456	856	271	541.4	N/A
52	555	570	456	857	270	541.6	N/A
53	556	570	455	858	269	541.6	N/A
54	556	570	455	860	268	541.8	N/A
55	557	569	456	859	267	541.6	N/A
56	557	569	455	859	266	541.2	N/A
57	558	569	456	860	265	541.6	N/A
58	559	569	456	864	264	542.4	N/A
59	559	569	455	864	264	542.2	N/A
60	559	569	455	863	263	541.8	N/A
61	560	569	456	879	262	545.2	N/A
62	561	569	456	886	261	546.6	N/A
63	561	570	456	883	260	546.0	N/A
64	562	570	456	875	260	544.6	N/A
65	562	571	457	870	259	543.8	N/A
66	563	572	456	866	258	543.0	N/A
67	563	573	456	861	258	542.2	N/A
68	564	573	455	858	257	541.4	N/A
69	564	574	455	853	256	540.4	N/A
70	565	575	454	852	256	540.4	N/A
71	565	576	453	853	255	540.4	N/A
72	566	576	452	852	255	540.2	N/A
73	566	577	451	848	254	539.2	N/A
74	566	578	450	841	254	537.8	N/A
75	567	579	449	835	253	536.6	N/A
76	567	579	448	828	252	534.8	N/A
77	567	580	447	822	252	533.6	N/A
78	567	581	445	816	251	532.0	N/A
79	567	581	444	813	251	531.2	N/A
80	567	582	444	808	250	530.2	N/A
81	567	583	443	803	250	529.2	N/A
82	567	583	443	800	249	528.4	N/A
83	567	584	442	795	249	527.4	N/A
84	567	584	441	792	249	526.6	N/A
85	566	585	441	788	248	525.6	N/A
86	566	585	441	784	248	524.8	N/A
87	566	586	440	783	247	524.4	N/A
88	566	586	441	780	247	524.0	N/A
89	565	587	440	775	247	522.8	N/A
90	565	588	440	773	246	522.4	N/A
91	565	588	440	769	246	521.6	N/A
92	565	589	440	763	246	520.6	N/A
93	564	589	439	757	246	519.0	N/A
94	564	589	439	753	245	518.0	N/A
95	564	590	439	750	245	517.6	N/A

WOODSTOVE SURFACE TEMPERATURE DATA

Client: IHPJob #: 19-480Model: MontecitoTracking #: 029Run #: 3Technician: SJBDate: 6/19/2019

Elapsed Time (min)	Temperature Data (°F)						
	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
96	564	590	439	745	245	516.6	N/A
97	563	591	439	742	245	516.0	N/A
98	563	591	439	740	244	515.4	N/A
99	563	591	438	738	244	514.8	N/A
100	563	591	438	733	244	513.8	N/A
101	563	592	437	729	244	513.0	N/A
102	562	592	437	723	244	511.6	N/A
103	562	592	436	717	243	510.0	N/A
104	562	592	436	710	243	508.6	N/A
105	562	592	436	702	243	507.0	N/A
106	561	591	435	694	243	504.8	N/A
107	561	591	435	687	243	503.4	N/A
108	561	591	434	681	243	502.0	N/A
109	561	591	433	675	243	500.6	N/A
110	560	590	432	668	243	498.6	N/A
111	560	590	431	662	243	497.2	N/A
112	559	589	430	657	243	495.6	N/A
113	559	588	429	650	243	493.8	N/A
114	558	587	428	644	243	492.0	N/A
115	557	587	427	638	243	490.4	N/A
116	557	586	425	633	243	488.8	N/A
117	556	585	424	627	243	487.0	N/A
118	556	585	422	623	243	485.8	N/A
119	555	584	421	619	243	484.4	N/A
120	554	583	419	614	243	482.6	N/A
121	554	583	418	611	243	481.8	N/A
122	553	582	417	607	243	480.4	N/A
123	552	581	416	605	242	479.2	N/A
124	551	580	415	603	242	478.2	N/A
125	550	579	414	600	242	477.0	N/A
126	550	579	413	598	242	476.4	N/A
127	549	578	412	595	242	475.2	N/A
128	548	577	411	592	242	474.0	N/A
129	547	576	410	589	242	472.8	N/A
130	546	575	409	586	242	471.6	N/A
131	545	575	408	583	242	470.6	N/A
132	544	574	408	580	242	469.6	N/A
133	543	573	407	578	242	468.6	N/A
134	542	572	406	575	242	467.4	N/A
135	541	571	406	573	242	466.6	N/A
136	540	570	404	573	242	465.8	N/A
137	539	569	403	571	242	464.8	N/A
138	538	568	402	566	242	463.2	N/A
139	537	567	402	561	241	461.6	N/A
140	536	566	401	558	242	460.6	N/A
141	535	565	399	554	241	458.8	N/A
142	534	564	398	552	241	457.8	N/A
143	533	563	398	549	241	456.8	N/A

WOODSTOVE SURFACE TEMPERATURE DATA

Client: IHP

Job #: 19-480

Model: Montecito

Tracking #: 029

Run #: 3

Technician: SJB

Date: 6/19/2019

Elapsed Time (min)	Temperature Data (°F)						
	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
144	532	562	397	547	241	455.8	N/A
145	531	561	396	544	241	454.6	N/A
146	530	560	395	543	241	453.8	N/A
147	529	559	394	541	241	452.8	N/A
148	528	558	393	539	241	451.8	N/A
149	527	557	392	536	241	450.6	N/A
150	526	556	391	533	241	449.4	N/A
151	525	555	390	531	241	448.4	N/A
152	524	554	389	528	241	447.2	N/A
153	523	554	388	524	241	446.0	N/A
154	522	553	388	521	241	445.0	N/A
155	521	552	387	519	241	444.0	N/A
156	520	552	386	517	241	443.2	N/A
157	518	551	385	515	241	442.0	N/A
158	517	550	385	514	241	441.4	N/A
159	516	550	383	513	241	440.6	N/A
160	515	549	382	511	241	439.6	N/A
161	513	549	381	510	241	438.8	N/A
162	512	548	380	508	241	437.8	N/A
163	511	548	379	506	241	437.0	N/A
164	510	547	377	503	241	435.6	N/A
165	509	547	377	501	241	435.0	N/A
166	507	546	375	499	241	433.6	N/A
167	506	545	374	498	241	432.8	N/A
168	505	545	372	496	241	431.8	N/A
169	504	544	371	492	241	430.4	N/A
170	502	543	370	489	241	429.0	N/A
171	501	543	368	486	240	427.6	N/A
172	500	542	367	484	240	426.6	N/A
173	499	541	366	481	240	425.4	N/A
174	498	540	365	479	240	424.4	N/A
175	497	539	364	477	240	423.4	N/A
176	495	538	362	474	240	421.8	N/A
177	494	537	362	472	240	421.0	N/A
178	493	536	361	470	240	420.0	N/A
179	492	535	359	468	240	418.8	N/A
180	490	534	358	466	240	417.6	N/A
181	489	533	357	464	240	416.6	N/A
182	488	532	356	462	240	415.6	N/A
183	487	530	354	460	240	414.2	N/A
184	485	529	353	459	240	413.2	N/A
185	484	527	352	457	240	412.0	N/A
186	483	526	351	456	240	411.2	N/A
187	482	525	349	456	240	410.4	N/A
188	480	523	348	454	240	409.0	N/A
189	479	522	347	453	240	408.2	N/A
190	478	521	346	452	240	407.4	N/A
191	477	520	345	451	240	406.6	N/A

WOODSTOVE SURFACE TEMPERATURE DATA

Client: IHP

Job #: 19-480

Model: Montecito

Tracking #: 029

Run #: 3

Technician: SJB

Date: 6/19/2019

Elapsed Time (min)	Temperature Data (°F)						
	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
192	475	518	344	449	240	405.2	N/A
193	474	517	343	448	240	404.4	N/A
194	473	515	341	448	240	403.4	N/A
195	472	514	341	448	240	403.0	N/A
196	471	513	340	447	240	402.2	N/A
197	470	511	338	446	240	401.0	N/A
198	468	510	338	445	239	400.0	N/A
199	467	509	337	445	239	399.4	N/A
200	466	507	335	444	239	398.2	N/A
201	465	506	335	443	239	397.6	N/A
202	464	505	334	442	239	396.8	N/A
203	463	503	333	441	239	395.8	N/A
204	462	502	332	440	239	395.0	N/A
205	461	501	331	439	239	394.2	N/A
206	460	500	331	438	239	393.6	N/A
207	459	498	330	437	239	392.6	N/A
208	458	497	329	437	239	392.0	N/A
209	457	496	329	436	239	391.4	N/A
210	456	495	328	436	239	390.8	N/A
211	455	493	327	434	239	389.6	N/A
212	454	492	327	434	239	389.2	N/A
213	453	491	326	433	239	388.4	N/A
214	452	490	326	433	239	388.0	N/A
215	451	489	325	432	239	387.2	N/A
216	450	488	324	432	239	386.6	N/A
217	450	487	324	430	239	386.0	N/A
218	449	486	323	429	239	385.2	N/A
219	448	485	323	429	239	384.8	N/A
220	447	484	323	429	239	384.4	N/A
221	446	483	322	428	239	383.6	N/A
222	445	482	321	427	239	382.8	N/A
223	445	481	321	426	239	382.4	N/A
224	444	480	321	425	239	381.8	N/A
225	443	479	320	424	239	381.0	N/A
226	442	478	320	423	238	380.2	N/A
227	441	477	319	422	239	379.6	N/A
228	441	476	318	419	239	378.6	N/A
229	440	475	318	418	238	377.8	N/A
230	439	474	318	417	239	377.4	N/A
231	438	473	317	415	238	376.2	N/A
232	437	472	317	414	239	375.8	N/A
233	437	471	316	413	239	375.2	N/A
234	436	470	315	412	239	374.4	N/A
235	435	469	315	410	239	373.6	N/A
236	434	468	315	409	239	373.0	N/A
237	433	467	314	408	239	372.2	N/A
238	432	466	313	407	239	371.4	N/A
239	431	466	313	406	239	371.0	N/A

WOODSTOVE SURFACE TEMPERATURE DATA

Client: IHPModel: MontecitoRun #: 3Job #: 19-480Tracking #: 029Technician: SJBDate: 6/19/2019

Elapsed Time (min)	Temperature Data (°F)						
	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
240	430	465	312	404	238	369.8	N/A
241	429	464	311	403	238	369.0	N/A
242	428	463	311	402	238	368.4	N/A
243	427	462	310	402	238	367.8	N/A
244	426	461	310	401	239	367.4	N/A
245	425	460	310	400	239	366.8	N/A
246	424	459	309	399	238	365.8	N/A
247	423	458	309	398	239	365.4	N/A
248	422	457	309	398	239	365.0	N/A
249	421	456	309	396	239	364.2	N/A
250	420	455	308	395	239	363.4	N/A
251	419	454	308	394	239	362.8	N/A
252	418	453	308	393	239	362.2	N/A
253	417	452	307	392	239	361.4	N/A
254	416	451	307	391	239	360.8	N/A
255	416	450	307	390	239	360.4	N/A
256	414	450	307	390	239	360.0	N/A
257	414	449	307	389	239	359.6	N/A
258	413	448	306	388	239	358.8	N/A
259	412	447	306	387	239	358.2	N/A
260	411	446	306	386	239	357.6	N/A
261	410	445	306	385	239	357.0	N/A
262	409	445	305	384	239	356.4	N/A
263	408	444	305	383	239	355.8	N/A
264	407	443	305	382	239	355.2	N/A
265	406	442	305	381	240	354.8	N/A
Average	510	540	389	613	253	461	N/A

LAB SAMPLE DATA - ASTM E2515

Client: IHP
 Model: Montecito
 Run #: 3

Job #: 19-480
 Tracking #: 029
 Technician: SJB
 Date: 6/19/2019

	Sample ID	Tare, mg	Total, mg	Final, mg	Catch, mg
Train A Filters - First Hour	T252	86.8	86.8	88.6	1.8
Train A Filters - Remainder	T253	87.1	174.6	174.1	-0.5
	T254	87.5			
Train A Probe	6A	116545.3	116545.3	116545.5	0.2
Train A O-Rings	6A	3611.2	3611.2	3613.7	2.5
Train B Filters	T255	87.8	175.6	178.6	3.0
	T256	87.8			
Train B Probe	6B	116118.4	116118.4	116118.9	0.5
Train B O-Rings	6B	3387.8	3387.8	3390.3	2.5
Background Filter			0.0	0.0	

**Negative value corrected to zero*

Placed in Dessicator on:	6/21/2019 8:30
-----------------------------	----------------

Train A Filters - First Hour	88.7	6/26 8:00	88.6	6/27 7:39			
Train A Filters - Remainder	174.1	6/26 8:00	174.1	6/27 7:39			
Train A Probe	116545.6	6/26 8:00	116545.5	6/27 7:39			
Train A O-Rings	3613.6	6/26 8:00	3613.7	6/27 7:40			
Train B Filters	178.7	6/26 8:00	178.6	6/27 7:40			
Train B Probe	116118.8	6/26 8:00	116118.9	6/27 7:40			
Train B O-Rings	3390.4	6/26 8:01	3390.3	6/27 7:40			
Background Filter							

1st hour Sub-Total, mg:	1.8
Remainder Sub-Total, mg:	2.2
Train 1 Aggregate, mg:	4.0
Train 2 Aggregate, mg:	6.0
Ambient Aggregate, mg:	0.0

ASTM E3053 Wood Heater Run Sheets

Client: IHP Job Number: 19-480 Tracking #: 029
Model: Montecito Run Number: 3 Test Date: 6/19/2019

Wood Heater Run Notes

Pre-Test Notes

Pre-Test Start Time: 8:18
Air Control Setting: Full Open

Time	Notes
0 min	Loaded all 6.7 lbs of kindling and start-up into firebox. Lit with propane torch for 60 seconds then closed door. Air set to full open, fan off. @1.5 lbs, leveled remaining start-up fuel and loaded high fire test load, turned fan on to high @1.9 lbs of high fire test fuel remaining, leveled coal beds and zeroed scale in preparation of fuel loading
18 min	
112 min	

Test Notes

Test Burn Start Time: 10:12
Air Control Setting: Medium Test Setting

Time	Notes
0 min	Loaded medium fire test fuel, door closed at 40 seconds, air set to high, fan turned on low. Closed air to test setting Changed 1-hour filter End of Test
3 min	
60 min	
265 min	

Test Burn End Time: 14:37

Flue Gas Concentration Measurement

Calibration Gas Values: Span Gas CO₂ (%): 17.00 CO (%): 4.00
Mid Gas CO₂ (%): 9.00 CO (%): 0.500

Calibration Results:

	Pre Test			Post Test		
	Zero	Mid	Span	Zero	Mid	Span
Time	8:05	8:09	8:07	16:30	16:34	16:32
CO ₂	0.00	9.14	17.13	0.08	9.11	17.15
CO	0.000	0.496	3.953	-0.013	0.493	3.978

Flue Gas Probe Leak Check: Initial: No Leakage Final: No Leakage

Technician Signature: 

Date: 6/27/2019
Page 1 of 3

ASTM E3053 Wood Heater Run Sheets

Client: IHP
Model: Montecito

Job Number: 19-480
Run Number: 3

Tracking #: 029
Test Date: 6/19/2019

Test Photos



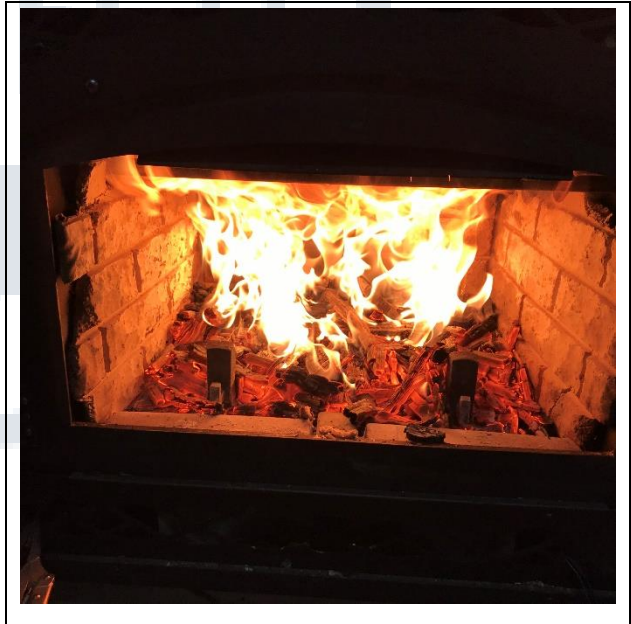
Kindling Fuel Load



Start-up Fuel Load



High Fire Fuel Load



Residual Start-up Fuel Coal Bed

Technician Signature: _____



Date: 6/27/2019

ASTM E3053 Wood Heater Run Sheets

Client: IHP
Model: Montecito

Job Number: 19-480
Run Number: 3

Tracking #: 029
Test Date: 6/19/2019



High Fire Fuel Loaded



Residual High Fire Load Coal Bed



Medium Fire Fuel Load



Medium Fire Fuel Loaded

Technician Signature: _____



Date: 6/27/2019

Sample Pre-Test Tare Sheet: ☐ Probes☒ TX40 Filters☐ O-RingsDate/Time In Desiccator: 4/19 - 16:00Balance ID#: 107Audit Weight ID# / Weight(mg): 109A-100mg

Sample ID	Date/Time	Weight (mg)	Date/Time	Weight (mg)	Date/Time	Weight (mg)	Date/Time	Weight (mg)	Tech. Initials	Project/Run #
T221	4/23 16:00	88.7	4/25-7:00	88.7	-	-	-	-	SB	19-464 #3
T222		88.9		88.7	-	-	-	-	SB	1
T223		89.3		89.3	-	-	-	-	SB	18-449 #1
T224		89.4		89.4	-	-	-	-	SB	
T225		88.6		88.5	-	-	-	-	SB	
T226		88.4		88.3	-	-	-	-	SB	
T227		88.4		88.3	-	-	-	-	SB	
T228		88.9		88.8	-	-	-	-	SB	
T229		89.7		89.6	-	-	-	-	SB	
T230		88.4		88.5	-	-	-	-	SB	18-449 #2
T231		88.4		88.3	-	-	-	-	SB	
T232		88.3		88.4	-	-	-	-	SB	
T233		88.6		88.6	-	-	-	-	SB	
T234		87.5		87.5	-	-	-	-	SB	
T235		87.3		87.4	-	-	-	-	SB	
T236	6/10-7:00	89.1	6/11-7:45	89.1	-	-	-	-	SB	18-449 #3
T237		87.0		87.2	-	-	-	-	SB	
T238		87.5		87.6	-	-	-	-	SB	
T239		88.3		88.3	-	-	-	-	SB	
T240		88.8		88.8	-	-	-	-	SB	
T241		87.6		87.6	-	-	-	-	SB	
T242		85.9		86.0	-	-	-	-	SB	19-480 #1
T243		86.3		86.4	-	-	-	-	SB	
T244		86.6		86.4	-	-	-	-	SB	
T245		85.6		85.5	-	-	-	-	SB	
T246		86.0		86.0	-	-	-	-	SB	
T247		85.8		85.6	-	-	-	-	SB	19-480 #2
T248		90.7		90.9	-	-	-	-	SB	
T249		86.9		87.0	-	-	-	-	SB	
T250		87.2		87.0	-	-	-	-	SB	

ASTM E2515 - Filters

Sample	Weight 1	Weight 2	Weight 3	Weight 4	Initial	Project	Run
T251	87.3	87.3	-	-	SB	19-480	#2
T252	87.0	86.8	-	-	SB	19-480	#3
T253	86.9	87.1	-	-	SB	19-480	#3
T254	87.5	87.5	-	-	SB	19-480	#3
T255	88.0	87.8	-	-	SB	19-480	#3
T256	87.8	87.9	-	-	SB	19-480	#3
T257	87.0	86.9	-	-	SB		
T258	87.5	87.5	-	-	SB		
T259	87.5	87.7	-	-	SB		
T260	87.8	87.9	-	-	SB		
T261	86.9	86.8	-	-	SB		
T262	88.4	88.5	-	-	SB		
T263	88.2	88.2	-	-	SB		
T264	87.9	87.9	-	-	SB		
T265	89.1	89.1	-	-	SB		
T266	89.7	89.6	-	-	SB		
T267	88.4	88.5	-	-	SB		
T268	88.2	88.2	-	-	SB		

Weight 1 Date/Time:

6/14 - 14:00

Weight 2 Date/Time:

6/17 - 8:00

Weight 3 Date/Time:

Weight 4 Date/Time:

Sample	Weight 1	Weight 2	Weight 3	Weight 4	Initial	Project	Run
T269	87.7	87.8	-	-	SB		
T270	88.2	88.2	-	-	SB		
T271	87.7	87.7	-	-	SB		
T272	87.3	87.2	-	-	SB		
T273	87.8	87.8	-	-	SB		
T274	87.1	87.1	-	-	SB		
T275	86.6	86.5	-	-	SB		
T276	86.2	86.2	-	-	SB		
T277	86.8	86.8	-	-	SB		
T278	87.3	87.2	-	-	SB		
T279	87.2	87.1	-	-	SB		
T280	88.0	87.9	-	-	SB		
T281	87.9	88.0	-	-	SB		
T282	86.9	86.9	-	-	SB		
T283	86.9	86.8	-	-	SB		
T284	87.2	87.0	-	-	SB		
T285	87.2	87.2	-	-	SB		
T286	87.6	87.5	-	-	SB		

Weight 1 Date/Time:

6/14 - 14:00

Weight 2 Date/Time:

6/17 - 8:00

Weight 3 Date/Time:

Weight 4 Date/Time:

ASTM E2515 - Probes

Sample	Weight 1	Weight 2	Weight 3	Weight 4	Initial	Project	Run
1A	115630.0	115630.2	-	-	SB	18-449	#1
1B	115903.7	115903.8	-	-	SB		
2A	116240.5	116240.5	-	-	SB	18-449	#2
2B	116330.5	116330.6	-	-	SB		
3A	116078.1	116078.1	-	-	SB	18-449	#3
3B	116340.8	116340.9	-	-	SB		
4A	116183.6	116183.8	-	-	SB	19-480	#1
4B	116365.8	116366.0	-	-	SB		
5A	116769.1	116769.7	116769.1	116769.3	SB	19-480	#2
5B	116876.8	116877.2	116876.8	116876.9	SB		

Weight 1 Date/Time:

6/10 - 7:00

Weight 2 Date/Time:

6/11 - 7:45

Weight 3 Date/Time:

6/13 - 8:30

Weight 4 Date/Time:

6/14 - 7:30

Sample	Weight 1	Weight 2	Weight 3	Weight 4	Initial	Project	Run
6A	116544.8	116545.5	116545.3	-	SB	19-480	#3
6B	116117.9	116118.4	116118.4	-	SB		
7A	116740.8	116741.1	116741.2	-	SB		
7B	117282.4	117289.1	117289.0	-	SB		
8A	116823.4	116824.4	116824.3	-	SB		
8B	116825.8	116826.3	116826.2	-	SB		
9A							
9B							
10A							
10B							

Weight 1 Date/Time:

6/13 - 8:30

Weight 2 Date/Time:

6/14 - 7:30

Weight 3 Date/Time:

6/17 - 7:00

Weight 4 Date/Time:

Sample	Weight 1	Weight 2	Weight 3	Weight 4	Initial	Project	Run
11A							
11B							
12A							
12B							
13A							
13B							
14A							
14B							
15A							
15B							

Weight 1 Date/Time:

Weight 2 Date/Time:

Weight 3 Date/Time:

Weight 4 Date/Time:

ASTM E2515 - O-Rings

Sample	Weight 1	Weight 2	Weight 3	Weight 4	Initial	Project	Run
1A	3562.7	3562.8	-	-	SB	18-449	#1
1B	3551.3	3551.3	-	-	SB		
2A	3548.4	3548.5	-	-	SB	18-449	#2
2B	3566.9	3567.1	-	-	SB		
3A	3575.6	3575.7	-	-	SB	18-449	#3
3B	3564.0	3564.2	-	-	SB		
4A	3588.4	3588.5	-	-	SB	19-480	#1
4B	3576.1	3576.3	-	-	SB		
5A	3530.2	3530.2	-	-	SB	19-480	#2
5B	3526.8	3526.9	-	-	SB		

Weight 1 Date/Time:

6/10 - 7:00

Weight 2 Date/Time:

6/11 - 7:45

Weight 3 Date/Time:

Weight 4 Date/Time:

Sample	Weight 1	Weight 2	Weight 3	Weight 4	Initial	Project	Run
6A	3611.1	3611.2	-	-	SB	19-480	#3
6B	3387.9	3387.8	-	-	SB		
7A	3570.0	3570.1	-	-	SB		
7B	3518.8	3519.0	-	-	SB		
8A	3548.8	3549.0	-	-	SB		
8B	3582.2	3582.3	-	-	SB		
9A							
9B							
10A							
10B							

Weight 1 Date/Time:

6/10 - 7:10

Weight 2 Date/Time:

6/13 - 8:30

Weight 3 Date/Time:

Weight 4 Date/Time:

Sample	Weight 1	Weight 2	Weight 3	Weight 4	Initial	Project	Run
11A							
11B							
12A							
12B							
13A							
13B							
14A							
14B							
15A							
15B							

Weight 1 Date/Time:

Weight 2 Date/Time:

Weight 3 Date/Time:

Weight 4 Date/Time:



Report No. / Rapport n°
14-199

LISTED FACTORY BUILT FIREPLACE
FOYER PRÉFABRIQUE HOMOLOGUÉ

FIREPLACE, ALSO FOR USE IN MANUFACTURED

HOMES WITH SOLID FUEL ONLY

CE FOYER EST ÉGALEMENT CERTIFIÉ POUR

INSTALLATION DANS LES MAISONS MOBILES.

COMBUSTIBLES SOLIDES SEULEMENT.

astria
FIREPLACES®

Manufactured by / Fabriqué par:
INNOVATIVE HEARTH PRODUCTS
1502 14th St. NW
Auburn, WA 98001 USA

Serial No.
Numéro de série

Model / Modèle: Bainbridge™ LV/CF/AR

Certification test emission value 1.9 g/hr per 2020 standard
Valeur d'émission du test d'homologation 1,9 g/h selon la norme 2020

Conforms to / Conforme au : UL STD 127
Certified to / Certifié au : ULC STD S610

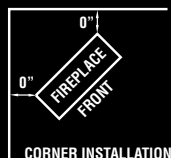
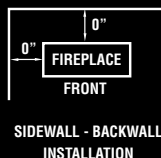
CLEARANCES TO COMBUSTIBLES:

SIDE WALL (FROM DOOR EDGE)	24 in. (610 mm)
MANTEL (ABOVE FIREPLACE'S BASE)	45 in. (1372 mm)
BACK WALL (FROM SPACERS)	0 in. (0 mm)
ABOVE THE FIREPLACE (FROM THE BASE OF THE FIREPLACE)	6 ft. 8 in. (2032 mm)
CHIMNEY	2 in. (51 mm)

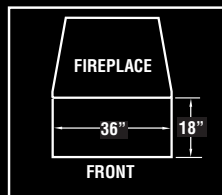
DÉGAGEMENTS AUX COMBUSTIBLES:

MUR LATÉRAL (DE L'OUVREURE DE LA PORTE)	24 po. (610 mm)
LINTEAU (AU-DESSUS DE LA BASE DU FOYER)	45 po. (1372 mm)
MUR ARRIÈRE ET CÔTÉ DU FOYER (DES ESPACEURS)	0 po. (0 mm)
AU-DESSUS DU FOYER (À PARTIR DE LA BASE DU FOYER)	6 pi. 8 po. (2032 mm)
CHEMINÉE	2 po. (51 mm)

INSTALL WITH MINIMUM CLEARANCES TO WALL
AS SHOWN IN INCHES.



FLOOR PROTECTOR MINIMUM DISTANCE
FROM OPENING IN INCHES



HEARTH EXTENSION MATERIAL :

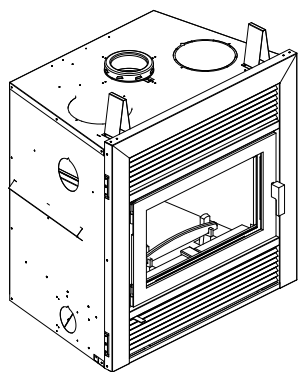
- 3/8" THICKNESS NON COMBUSTIBLE MATERIAL
- OR EQUIVALENT

U.S. ENVIRONMENTAL PROTECTION AGENCY
Certified to comply with 2020 particulate emission
standards using crib wood.

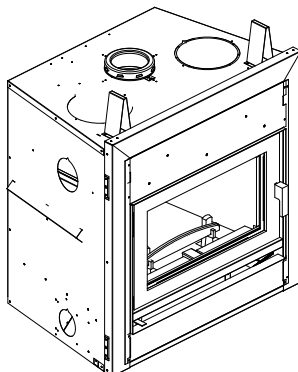
DATE OF MFG. 1 2 3 4 5 6 7 8 9 10 11 12

2019-20-21-22-23-24-25

- USE WOOD FUEL ONLY
- NON COMBUSTIBLE HEARTH EXTENSION MUST BE INSTALLED AT FRONT OF UNIT EXTENDING 18 in. (457 mm) AT FRONT AND 36 in. (914 mm) WIDE MINIMUM.
- THIS FIREPLACE HAS NOT BEEN TESTED WITH UNVENTED GAS LOG SET. TO REDUCE RISK OF FIRE OR INJURY DO NOT INSTALL AN UNVENTED GAS LOG SET INTO THE FIREPLACE.
- ELECTRICAL RATING: 120 V, 60 Hz
- CHIMNEY TYPE: USE ONLY WITH LISTED 6 in. DIAMETER CHIMNEY, CERTIFIED MODEL ASHT+, S-2100+, HT6000+, HT6103+ OR AC.
- CAN BE CONNECTED TO A MASONRY CHIMNEY AS DESCRIBED IN THE INSTALLATION INSTRUCTIONS.
- COMPONENTS USED WITH THE FIREPLACE MUST BE LISTED. SEE LIST IN THE INSTALLATION INSTRUCTIONS.
- REPLACE GLASS WITH CERAMIC GLASS 5 mm THICK.
- FOR SAFE OPERATION INSTALL IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS.
- CAUTION: COMBUSTION AIR OPENING MUST NOT BE OBSTRUCTED.
- DO NOT OVERFIRE THE FIREPLACE.
- OPERATE THE FIREPLACE WITH DOOR FULLY OPEN OR FULLY CLOSED ONLY.
- DO NOT USE A FIREPLACE INSERT OR OTHER PRODUCTS NOT SPECIFIED FOR USE WITH THIS PRODUCT
- CONTACT YOUR LOCAL BUILDING OR FIRE OFFICIALS ABOUT RESTRICTIONS AND INSTALLATION INSPECTIONS IN YOUR AREA.
- CONTACTEZ LES RESPONSABLES DE VOTRE REGION A PROPOS DES RESTRICTIONS ET INSPECTIONS D'INSTALLATION.
- SEE IHP INSTALLATION AND OPERATING INSTRUCTIONS FOR THIS MODEL.
- INSTALL AND USE ONLY IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS AND LOCAL BUILDING CODES.
- SPECIAL METHODS ARE REQUIRED WHEN PASSING THROUGH A WALL OR CEILING. SEE INSTRUCTIONS AND BUILDING CODES.
- PREVENT CREOSOTE FIRE: INSPECT CHIMNEY CONNECTOR AND CHIMNEY FLUE MONTHLY AND CLEAN IF NECESSARY.
- DO NOT OVERFIRE. IF DOME OR CHIMNEY CONNECTOR GLOWS YOU ARE OVERFIRING.
- KEEP FURNISHINGS AND OTHER COMBUSTIBLE MATERIALS A CONSIDERABLE DISTANCE AWAY FROM APPLIANCE.
- MAINTENIR LES MEUBLES ET AUTRES OBJETS À UNE DISTANCE SÉCURITAIRE DU FOYER.
- THIS WOOD HEATER NEEDS PERIODIC INSPECTION AND REPAIR FOR PROPER OPERATION. CONSULT THE OWNER'S MANUAL FOR FURTHER INFORMATION. IT IS AGAINST FEDERAL REGULATIONS TO OPERATE THIS WOOD HEATER IN A MANNER INCONSISTENT WITH THE OPERATING INSTRUCTIONS IN THE OWNER'S MANUAL.
- CET APPAREIL DE CHAUFFAGE AU BOIS DOIT ÊTRE INSPECTÉ ET ENTRETENU PÉRIODIQUEMENT POUR FONCTIONNER CORRECTEMENT. VOIR LE MANUEL DU PROPRIÉTAIRE POUR PLUS D'INFORMATION. L'UTILISATION DE CET APPAREIL DE CHAUFFAGE AU BOIS DE MANIÈRE INCOMPATIBLE AVEC LES INSTRUCTIONS DU MANUEL DU PROPRIÉTAIRE CONSTITUE UNE INFRACTION AUX RÉGULATIONS FÉDÉRALES.
- POUR USAGE AVEC LE BOIS SEULEMENT
- UN TABLIER NON COMBUSTIBLE DOIT ÊTRE INSTALLÉ À L'AVANT DU FOYER. DIMENSION MINIMALE DE 18 po. (457 mm) PAR 36 po. (914 mm) DE LARGE.
- CE FOYER N'EST PAS HOMOLOGUÉ POUR ÊTRE UTILISÉ AVEC UN ENSEMBLE DE BÛCHES À GAZ SANS CONDUIT D'ÉVACUATION. AFIN DE RÉDUIRE LES RISQUES D'INCENDIE OU DE BLESSURES, N'INSTALLEZ PAS DE BÛCHES À GAZ SANS CONDUIT D'ÉVACUATION À L'INTÉRIEUR DE CE FOYER.
- ALIMENTATION ÉLECTRIQUE: 120V, 60 Hz
- UTILISER SEULEMENT AVEC UNE CHEMINÉE 6 po. (150 mm) DE DIAMÈTRE, MODÈLE ASHT+, S2100+, HT6000+, HT6103+ OU AC HOMOLOGUÉE.
- PEUT ÊTRE RACCORDÉ SUR UNE CHEMINÉE DE MAÇONNERIE TEL QUE DÉCRIT DANS LE MANUEL D'INSTALLATION.
- LES COMPOSANTES UTILISÉES AVEC LE FOYER DOIVENT ÊTRE HOMOLOGUÉES. VOIR LA LISTE DANS LE MANUEL D'INSTALLATION.
- REMPLACER LA VITRE AVEC UN VERRE CÉRAMIQUE DE 5mm D'ÉPAISSEUR.
- POUR UNE UTILISATION SÉCURITAIRE, INSTALLER CONFORMÉMENT AUX DIRECTIVES DU FABRICANT.
- ATTENTION: NE PAS OBSTRUER LES ARRIVÉES D'AIR COMBURANT.
- NE PAS FAIRE SURCHAUFFER LE FOYER.
- LA PORTE DU FOYER DOIT DEMEURER TOTALEMENT OUVERTE OU TOTALEMENT FERMÉE LORSQUE LE FOYER FONCTIONNE.
- NE PAS UTILISER DE POÊLE ENCASTRABLE OU D'AUTRES PRODUITS NON SPÉCIFIÉS COMME ÉTANT UTILISABLES AVEC CE PRODUIT.



Shown with louver kit installed



Shown with clean face kit installed

A French manual is available upon request. Order P/N 901019-02.

Ce manuel d'installation est disponible en français, simplement en faire la demande. Numéro de la pièce 901019-02.

THIS UNIT REQUIRES THE INSTALLATION OF A FINISHING KIT. SEE "PARTS REQUIRED" SECTION FOR DETAILS

**Fireplace, Also For Use In
Manufactured Homes With Solid Fuel Only.**



⚠ WARNING

- Hot! Do not touch! The glass and surfaces of this appliance will be hot during operation and will retain heat for a while after shutting off the appliance. Severe burns may result.
- Carefully supervise children in the same room as appliance.



- If small children are present in the home, it is recommended that this appliance be fitted with an adjustable safety gate or barrier screen.



Listed to standards:
ULC-S610 & UL-127
Report # 14-199
EPA Cert. No. 537

INSTALLATION AND OPERATION INSTRUCTIONS

Bainbridge™

EPA Wood-Burning Fireplaces
P/N 901019-00 REV. NC 08/2019

MODEL

Bainbridge LV Bainbridge CF Bainbridge AR

This installation manual will enable you to obtain a safe, efficient and dependable installation of your fireplace system. Please read and understand these instructions before beginning your installation.

Do not alter or modify the fireplace or its components under any circumstances. Any modification or alteration of the fireplace system, including but not limited to the fireplace, chimney components and accessories, may void the warranty, listings and approvals of this system and could result in an unsafe and potentially dangerous installation.

IHP wood-burning fireplaces are designed for use as a supplemental heater. They are not intended for continuous use as a primary heat source.

**SAVE THESE INSTRUCTIONS
FOR FUTURE REFERENCE**

⚠ WARNING

- The fireplace cannot be operated without a door. Consult your dealer to select the correct door.
- Important! To assure proper alignment of glass doors: Install this fireplace in a square and plumb condition, using shims as necessary at sides and/or bottom.
- Install the fireplace only as described in these instructions.

⚠ WARNING

This product can expose you to chemicals including Carbon Black, which is known to the State of California to cause cancer, and Carbon Monoxide, which is known to the State of California to cause birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov



CONGRATULATIONS!

When you purchased your new fireplace, you joined the ranks of thousands of individuals whose answer to their home heating needs reflects their concern for aesthetics, efficiency and our environment. We extend our continued support to help you achieve the maximum benefit and enjoyment available from your new fireplace.

Thank you for selecting a IHP fireplace as the answer to your home supplemental heating needs.

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THE FIREPLACE INTRODUCTION

The Bainbridge™ wood-burning fireplace is an energy efficient, heat circulating, closed combustion fireplace. You will receive a lifetime of comfort and enjoyment from your fireplace provided it is installed, maintained and operated properly.

- Please read these instructions and retain this manual for future reference.
- Before beginning the fireplace installation, consult the local authorities to obtain your building permit and check your local building codes. Install the fireplace only as described in these instructions and using only IHP components.
- This fireplace has been tested for CAN/ULC S610-M87 and ANSI/UL 127 under report number 307-4084. It has also been tested for EPA 40 C.F.R Part 60, section 60.532(b). Certificate number 537.
- The Bainbridge™ fireplace is NOT intended for use with a gas log set. Do not use a fireplace insert or any other product with this fireplace unless it is specified by IHP for use with this appliance. Failure to follow these instructions will void the certification and the warranty of the fireplace and may result in an unsafe installation.
- These appliances are designed to provide supplemental heat to the immediate area only. Therefore, it is advisable to have an alternate heat source when installed in a dwelling.

PARTS REQUIRED

Fireplace Model

• 6" diameter chimney - United States

Model IHP Snap-Pak, including:

- Chimney lengths
- Elbows (*where necessary*)
- Associated components as per these installation instructions

• 6" diameter chimney - Canada

Models ASHT® & S2100 manufacture by Security Chimneys® or DuraTech Canada (DTC) manufactured by DuraVent only, including:

- Chimney lengths
- Elbows (*where necessary*)
- Associated components as per these installation instructions & instructions provided by the venting manufacturer

Fireplace Model Bainbridge™

• Finishing Kit - Required * (Order Separately)

- Louver kit

***SEE "INSTALLING THE FINISHING KITS" SECTION FOR THE ASSEMBLY OF THE FINISHING KITS.**

- **Black steel door - Required**
(included w/fireplace)
- **Outside air kit - Required**
(included w/fireplace)
- **Blower kit with thermo-disc (V2)**
(included w/fireplace)

OPTIONAL EQUIPMENT

- **Additional Equipment (optional)**
 - Forced Air Kit
 - Heatflow Convection Kit

OPERATING THE FIREPLACE

Fuel - USE SOLID NATURAL WOOD FUEL ONLY. This appliance is designed to burn dry seasoned natural wood only (see **Page 6** for a list of prohibited fuels). Failure to burn proper fuels only will void the certification and the warranty of the appliance. Hardwoods are preferred to softwoods since the energy content of wood is relative to its density. Hardwoods will result in a longer burning fire and less frequent refueling. A moisture content of 15% to 20% (seasoned) is recommended. Wood that has been cut and split and let to dry under a cover for a period of one year will usually meet that criteria. The required drying time will vary depending on the climate. Wood that is packed tight together will take longer to dry. Seasoned wood is darker in color than wet wood and will have visible cracks in the grain on the ends. Excessively wet wood will be difficult to burn and will result in lower efficiency, increased creosoting and deposits on the glass and in the chimney. Excessively dry wood will burn well but will also have higher emissions and shorter burning time.

DO NOT OVERFIRE THIS HEATER

Attempts to achieve heat output rates that exceed heater design specifications can result in permanent damage to the heater.

FIRST FIRES

Before using the fireplace make sure to remove the plastic wrapping and EPA label on plated door. Remove any glue residue left by the label using mild soap.

The first five or six fires should be small fires of short duration (about 30 to 60 minutes). This will help cure the refractory bricks. During the first few fires of this appliance there may be some odor and smoke due to the curing of the paint, dust accumulation and burning off of lubricants used in the manufacturing process. It may set off a smoke alarm located in the same room. For this reason the room should be well ventilated for the first few fires.

IMPORTANT! GENERAL SAFETY PRECAUTIONS. READ AND UNDERSTAND THESE SAFETY RULES BEFORE YOUR FIRST FIRE.

! WARNING

The Bainbridge™ fireplace must be installed with an outside air kit intake, which is included with the fireplace

! WARNING

THE FIREPLACE MUST BE OPERATED WITH THE DOORS FULLY OPENED OR DOORS FULLY CLOSED. IF THE DOORS ARE LEFT PARTLY OPENED, GAS AND FLAME MAY BE DRAWN OUT OF THE FIREPLACE OPENING, CREATING RISKS OF BOTH FIRE AND SMOKE. IF THE UNIT IS OPERATED WITH THE DOORS FULLY OPENED, THE FIRE SCREEN MUST BE USED.

! WARNING

NEVER use gasoline, gasoline-type lantern fuel, kerosene, charcoal lighter fluid, naphtha, engine oil or similar liquids to start or “freshen up” a fire in this fireplace. Keep any flammable liquids a safe distance from the fireplace at all times.

! WARNING

THIS FIREPLACE HAS NOT BEEN TESTED WITH AN UNVENTED GAS OR A FIREPLACE INSERT. TO REDUCE RISK OF FIRE OR INJURY, DO NOT INSTALL AN UNVENTED GAS LOG SET OR FIREPLACE INSERT OR OTHER PRODUCTS NOT SPECIFIED FOR USE WITH THIS FIREPLACE.

! WARNING

Never leave your fireplace unattended while it is burning.

! WARNING

To avoid the risk of damaging fireplace materials and increasing the risk of fire, do not use the fireplace to cook or warm food.

! WARNING

Use care when selecting window treatments for windows located near the fireplace. Avoid using combustible flowing window treatments such as curtains on nearby windows that are of sufficient length to be blown in front of an open flame when the window is opened. Keep any combustible furniture, materials or decorative pillows at least 48" (1219 mm) from the front fireplace opening.

! WARNING

Never modify or alter your fireplace system in any way. To do so may create a potential fire hazard and void the limited warranty, listings and approvals of this system.

! IMPORTANT

When burning wood, use SOLID NATURAL DRY WELL-SEASONED WOOD ONLY. Hardwoods are recommended (softwoods tend to burn very quickly).

- DO NOT burn treated wood, charcoal, coal, trash, cardboard, driftwood, woods dipped in tar, Christmas tree greens, pitch, pine tar, creosote, chemical chimney cleaners, flame colorants, polystyrene packaging, wood products with synthetic binders (i.e. plywood). Plywood, lumber and other misc. materials can produce abnormally high temperatures, sputtering and smoking fires and may contain hazardous chemicals to treat insects and fungus.

- Burning unapproved fuels can produce excessive temperatures, beyond the design capabilities of the fireplace and may produce excess sparks or may contain hazardous chemicals. Burning unapproved fuels can result in a chimney fire, a house fire, personal injury, death or loss of property.

! WARNING

Never leave children unattended when there is a fire burning in the fireplace.

! WARNING

Always ensure that the air inlet to the fireplace is free from debris and any other obstructions that can block the entrance of air.

! IMPORTANT

WHEN INSTALLED IN A MOBILE OR MANUFACTURED HOME:

- Mobile or manufactured home installations must be installed in accordance with the requirements of the Department of Housing and Urban Development (HUD) “Mobile Home Construction and Safety standards” for US or Canada Mortgage and Housing Corporation (CMHC) for Canada.

- The fireplace must be fastened to the floor by unfolding and screwing the small tabs on both sides at the bottom of the fireplace.

- It is necessary to have access openings, for inspection purpose only, into built-in enclosures surrounding the fireplace installation. Such openings to require a household tool for access.

- The vapor barrier of the mobile home shall be as close as possible of the location where the chimney assembly penetrates the ceiling and roof structure with no interference to the required clearance to combustible material.

- When the mobile or manufactured home has a flat roof, the Attic Radiation Shield must be installed from below going through the roof (See *Figures 22b and 22d*).

- **Warning:** Do not install in a sleeping room.

- **Caution:** The structural integrity of the manufactured home floor, wall, and ceiling/roof must be maintained.

! WARNING

Neither the manufacturer nor the seller warrants “smoke free” operation nor are we responsible for inadequate system draft caused by mechanical systems, general construction conditions, inadequate chimney heights, adverse wind conditions and/or unusual environmental factors or conditions beyond our control.

WARNING

Be careful adding wood fuel to the fire or handling fireplace tools such as shovels, tongs or pokers.

WARNING

The bottom refractory can be cracked by excessive abuse such as tossing heavy logs onto the grate or gouging with fireplace tools. Exercise caution when adding wood to your fireplace.

Building a Fire (starting and maintaining a fire)

To start a fire, place several crumpled up balls of newspaper in the firebox. Place small dry pieces of kindling on top of the paper, criss-crossing the kindling so that there are air spaces in between. Keep the fuel far back enough so that air can get underneath. Open the air controls fully and light the newspaper. Once the newspaper and the kindling is well ignited, close the door. Once the kindling fire is well established, cord wood can be added (see *Primary Air Combustion Control* section for proper operation of the air controls).

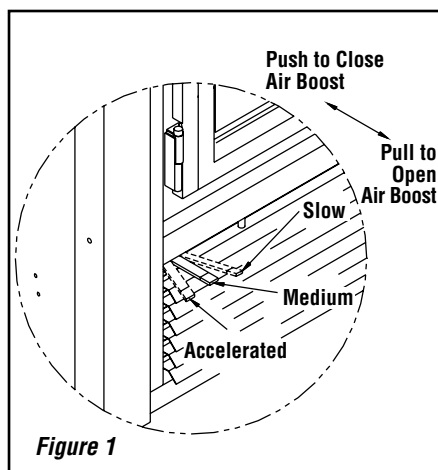
The unit will burn best with 2-3 pieces of cord wood spaced 1 to 2 inches apart and allowing air to get under the fuel. Criss-crossing or arranging the fuel so that air can get underneath, will help the fire to get started easily. The unit should be operated with the air control fully open long enough to get the cord wood well ignited.

COMBUSTION CONTROLS

- This wood heater has a manufacturer-set minimum low burn rate that must not be altered. It is against federal regulations to alter this setting or otherwise operate this wood heater in a manner inconsistent with operating instructions in this manual.
- U.S. ENVIRONMENTAL PROTECTION AGENCY Certified to comply with 2020 particulate emission standards using cord wood.

Primary Air and Air Boost Controls

There is no flue damper in the Bainbridge™ wood burning fireplace. As is common with air tight stoves, the combustion air control sets the flow of air entering the firebox. This allows for a more precise control of the fire. The combustion air control is located below the door on the left side. The main source of air (primary air) entering the firebox can be diminished by moving the air combustion control from left to right. The primary air is fully opened when the air control is completely moved to the left. The air control device can also be used to add an extra boost of air especially during fire start up and reloading of the unit.



Pulling the air combustion control will induce an air boost at the base of the fire allowing an easier fire start up. When the fire is well established, the control can be pushed in to shut down the air boost allowing for a longer burn time. The combustion air control should be in the closed position (primary air and air boost) when the fireplace is not in use. This will minimize air leakage up the chimney. The combustion air control should be opened before opening the door to minimize the possibility of back draft coming into the room.

Accelerated Combustion

The maximum heat output for the Bainbridge™ fireplace is achieved by burning with the door closed and the combustion air opened and pulled out. By this method, the Bainbridge™ fireplace can produce up to 55,000 BTU of heat per hour. However, it will be necessary to reload with wood every one or two hours. This is the least efficient method of burning the Bainbridge™ fireplace.

Use caution when firing with the combustion air control wide open. Only burn cord wood in this manner. Small dry pieces of softwood and construction scraps will burn very intensely using this method and may damage the firebox.

Medium Combustion

This is the recommended mode of operating the Bainbridge™ fireplace and should be the one normally used since it will deposit the least amount of creosote on the glass and in the chimney. The combustion air control must be 3/4 closed and pushed in to close the air boost. The precise setting will depend on many factors, including chimney length and the moisture content of the wood.

For instance, a long chimney will necessitate closing the damper more. To obtain the proper combustion, close the damper completely, then open it about 1/4" to 1/2". Three medium size pieces of wood should be burning on a bed of hot coals. The heat output will be approximately 30,000 BTU per hour and the loading time will be about every 3-4 hours. Softwoods may be burned using this method but the time will be substantially reduced.

Slow Combustion

When the air combustion control is completely closed, the fireplace is in a slow combustion phase. If the hearth is hot enough, slow combustion will not extinguish the fire, but there will be a noticeable change in the flame pattern. The flames will be slow and may appear dirty if the wood is too wet (moisture content of 20% and more). Do not allow the wood to burn without flame, since this will produce excessive creosote in the unit.

Creosote may accumulate on the glass door. This method of burning should be used only after operating the Bainbridge™ fireplace with the air control opened to produce a hot fire for about an hour or at medium pace for at least three (3) hours. Slow combustion can be used at night in order to reduce the heat output and to prolong the burn. The loading time will be between 6-8 hours.

REFUELING FOR BEST PERFORMANCE

The Bainbridge™ fireplace will operate best if attention is given to operating the unit with the damper fully opened after refueling in order to bring the firebox and the chimney system up to their optimum operating temperature. Combustion efficiency is relative to firebox temperature. A temperature of 500° C (932° F) and up, with a visible flame, in the upper part of the firebox indicates a maximum efficiency. To obtain this temperature, the fireplace must be operated with the primary air and air boost controls fully opened during 10 to 20 minutes after reloading, depending on the heat and on the moisture content of the wood.

Once you have reached the desired temperature, the air boost can be closed and the primary air set to a medium setting. You know you have reached the desired temperature when, closing the primary air control, you can see a flame at the top of the firebox. The benefit of this technique will be cleaner glass, less creosoting, greater efficiency and the most pleasing fire for your enjoyment.

SMOKING – CAUSES AND TROUBLESHOOTING

To reduce the likelihood of smoking when opening the door, set the combustion air controls to the left before opening the door. Your fireplace has been designed and tested to provide smoke free operation. Occasionally, there may be a small amount of smoking upon lighting the fire, until the chimney heats up but this should not continue. If the fireplace continues to smoke it is probably for one of the following reasons:

- A. Negative pressure in the house** - As the fire burns, air goes up the chimney. This air must be replaced through leakage into the house or through the outside air duct. When operating the Bainbridge™ fireplace, open a nearby window temporarily to check if there is adequate replacement air supply.
- B. Fans operating (e.g.: range hood)** - These fans draw air out of the house and may actually cause a negative pressure in the house. Turn off all fans and open a nearby window to determine if this is the cause of the problem.
- C. Wetwood** - Wet or tarred wood will smoulder and smoke instead of burn properly. Your dealer can help you determine if you have properly seasoned wood for burning.
- D. Dirty or blocked chimney** - Check to make sure the chimney is clear and clean. If dirty call a certified chimney sweep or use a properly sized chimney brush to clean.
- E. Chimney not long enough** - The minimum chimney height is twelve (12) feet (3.7 m) not including the fireplace height. The chimney must extend at least three (3) feet (915 mm) above its point of contact with the roof and at least two (2) feet (610 mm) higher than any roof or wall within ten (10) feet (3 m) of it. When installed with offsets, the minimum chimney height is fifteen (15) feet (4.6 m). Additional height will increase draft and will decrease the tendency to smoke.
- F. Poor chimney draft** - With no fire, there should be sufficient draft to exhaust cigarette smoke introduced under the baffle. Chimneys installed against an outside wall without protection may generate back draft problems which will cause start-up problems. To prevent this, open a nearby window, roll up a piece of paper and light it. Then, hold it in the upper part of the firebox to warm up the chimney. Wait until the draft is sufficient, then start the fire.

IMPORTANT CAUTIONS

- A. Do not block the hot air vents to the fireplace as this will cause the fireplace to overheat.**
- B. Never use gasoline, gasoline-type lantern fuel, kerosene, charcoal lighter fluid, or similar liquids to start or 'freshen up' a fire in this fireplace. Keep all such liquids well away from the fireplace while it is in use.**
- C. Do not burn coal. The sulphur in coal will corrode the firebox and chimney.**
- D. Keep combustible materials at least 48" (1.2 m) away from the front of the fireplace opening.**
- E. Never leave children unattended when there is a fire burning in the fireplace.**
- F. Do not use the fireplace as an incinerator to burn paper, cardboard or construction material such as pressed wood, plywood or lumber. Use only untreated wood. Wood protectors, metallic paper, coal, plastic, waste, beach wood, Christmas tree, sulphur and/or oil will damage the fireplace.**

G. Do not burn driftwood which has been in the ocean or salt water. The salt will corrode the firebox and chimney.

H. Do not burn wood in the area in front of the grate.

I. Do not allow the wood to smoulder or burn without flame, since this will produce excessive creosote in the unit as well as increased particulate emissions.

J. Blower for forced air kit operating - Make sure that the blower is at the "off" position when you open the fireplace door for reloading.

Smoke Detectors Recommended

Since there are always several potential sources of fire in any home, we recommend installing smoke detectors. If possible, install the smoke detector in a hallway adjacent to the room (to reduce the possibility of occasional false activation from the heat produced by these appliances). If your local code requires a smoke detector be installed within the same room, you must follow the requirements of your local code. Check with your local building department for requirements in your area.

Carbon Monoxide Monitor Recommended

Carbon Monoxide Poisoning: Early signs of carbon monoxide poisoning are similar to the flu with headaches, dizziness and/or nausea. If you have these signs, obtain fresh air immediately. Some people are more affected by carbon monoxide than others, including pregnant women, people with heart or lung disease or anemia, those under the influence of alcohol, and those at high altitudes.

It is against federal regulations to operate wood heaters in a manner inconsistent with operating instructions in the manual.

MAINTAINING YOUR FIREPLACE

Have your product inspected at least once a year by a qualified service technician to ensure gaskets, air tubes, baffles, and venting are in good repair to ensure proper performance. Have degraded items replaced by a qualified service technician.

This wood heater needs periodic inspection and repair for proper operation. Consult the owner's manual for further information. It is against federal regulations to operate this wood heater in a manner inconsistent with the operating in this manual.

Creosote - Formation and Need for Removal
When wood is burned slowly, it produces tar and other organic vapors, which combine with expelled moisture to form creosote. The creosote vapors condense in the relatively cool chimney flue of a slow-burning fire. As a result, creosote residue accumulates on the flue lining. When ignited this creosote makes an extremely hot fire.

The chimney shall be inspected at least twice a year during the heating season to determine when a creosote buildup has occurred.

When creosote has accumulated it shall be removed to reduce the risk of a chimney fire.

When the creosote accumulation is large, a creosote fire in the chimney can damage the chimney and overheat the surrounding wood framing. Creosote formation in a chimney can be minimized by making sure there is always visible flame burning, avoid smouldering fires and by proper refuelling techniques.

Chimney Maintenance

Regular chimney inspection and maintenance combined with proper operation will prevent chimney fires. Keep your chimney clean. Do not allow more than 1/16" (1.6 mm) creosote build up in your chimney. The amount of creosote will depend on variables such as frequency of use and type of fire. We recommend that you:

- A. Initially inspect the chimney system weekly.**
From this, you will learn how often it will be necessary to clean your chimney.
- B. Have your chimney cleaned by a qualified chimney sweep.** If you wish to clean it yourself, we recommend using a stiff plastic or non-metallic brush. If a metal brush is used, its size should be slightly smaller than the flue to avoid damaging the chimney. Do not use a brush that will scratch the stainless steel interior of the chimney.
- C. Do not expect chemical cleaners to keep your chimney clean.** The rain cap can be removed for inspection and/or cleaning of the chimney.

Caution: It is necessary to remove the baffle from the top of the firebox before cleaning the chimney. See "Top Baffle Removal Prior To Chimney Sweep."

Dealing With a Chimney Fire

Regular chimney maintenance and inspection can prevent chimney fires. If you have a chimney fire, follow these steps:

1. Close the fireplace door and the combustion air controls.
2. Alert your family of the possible danger.
3. If you require assistance, alert your fire department.
4. If possible, use a dry chemical fire extinguisher, baking soda or sand to control the fire. Do not use water as it may cause a dangerous steam explosion.
5. Check outside to ensure that sparks and hot embers coming out of the chimney are not igniting the roof.
6. Do not use the fireplace again until your chimney and fireplace have been inspected by a qualified chimney sweep or a Fire Department Inspector.

Achieving Clean Burns

Check the exhaust in about 15 to 20 minutes (see below). Large amounts of smoke indicate an improper burn setting (either too high or too low). Adjust and recheck in 5 to 10 minutes.

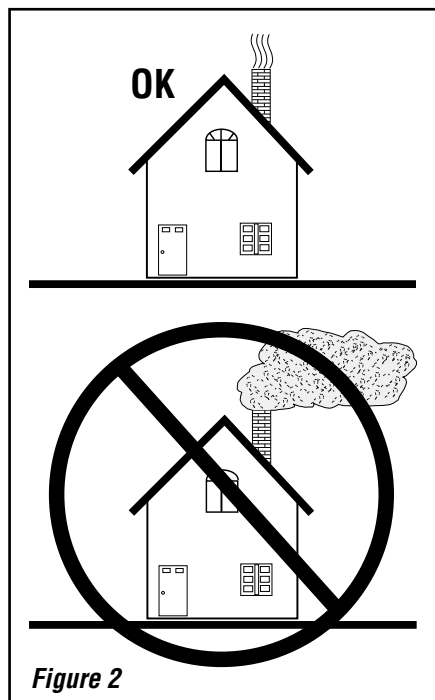


Figure 2

FUEL

What does “Well-Seasoned” mean?

When a tree is cut down, the wood is green, full of sap and moisture. This moisture content can exceed 80%, which must be reduced to less than 20%. Wood properly seasoned is then capable of generating the heat the stove was designed to provide.

Green wood does not burn easily. Attempting to burn green wood often results in a lot of smoke and very little fire. Time is the most important factor in seasoning wood. Ideally the moisture content should be reduced to 11-20%. **NOTE:**

The use of a firewood moisture meter is recommended to ensure the firewood contains less than 20% moisture.

Seasoning Guide

Softwoods - 6 months to 18 months

Hardwoods - 12 months to 24 months

Logs that are 5" diameter across or larger should be split in half, three pieces if over 8 inches, and four pieces when over a foot across. If a tree has been dead for 2 - 4 years it still needs to be cut, split, and seasoned for 6 to 24 months depending on the wood.

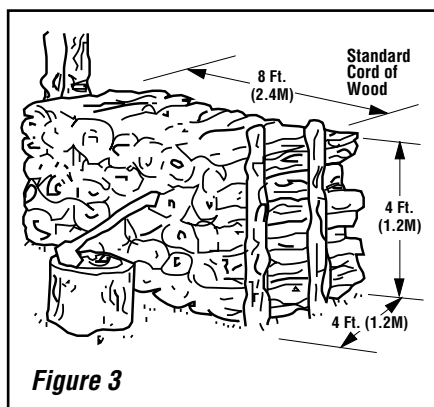


Figure 3

Prohibited Fuels

This heater is designed to burn natural wood only. Higher efficiencies and lower emissions generally result when burning air dried seasoned hardwoods, as compared to softwoods or to green or freshly cut hardwoods. **DO NOT BURN:**

- Garbage;
- Lawn clippings or yard waste;
- Materials containing rubber, including tires;
- Materials containing plastic;
- Waste petroleum products, paints or paint thinners, or asphalt products;
- Materials containing asbestos;
- Construction or demolition debris;
- Railroad ties or pressure-treated wood;
- Manure or animal remains;
- Salt water driftwood or other previously salt water saturated materials;
- Unseasoned wood;
- Christmas tree branches;
- Paper products, colored paper, cardboard, plywood, or particleboard;
- gasoline;
- naphtha;
- engine oil;
- flammable liquids;
- solvents;
- grease; or
- coal

The prohibition against burning these materials does not prohibit the use of fire starters made from paper, cardboard, saw dust, wax and similar substances for the purpose of starting a fire in an affected wood heater.

Burning these materials may result in release of toxic fumes or render the heater ineffective and cause smoke. Intense firing with these materials may overheat the fireplace, causing damage to the unit, a fire or even possibly igniting a chimney fire if the chimney is creosoted. Burning unapproved fuel, resulting in excessive pollutants being emitted, may be prohibited and subject to a fine or other penalty by the authority having jurisdiction in your area.

Top Baffle Removal Prior to Cleaning The Chimney

Before starting to clean your chimney, we recommend that you remove the top baffle to avoid creosote dust collection at the top of the baffle. Follow these steps to set the top baffle out of the way:

1. Remove the side refractory holder. They are located at the top of the refractory.
2. Lift the front baffle.
3. Slide the back baffle under the front baffle. You now have access to the chimney.

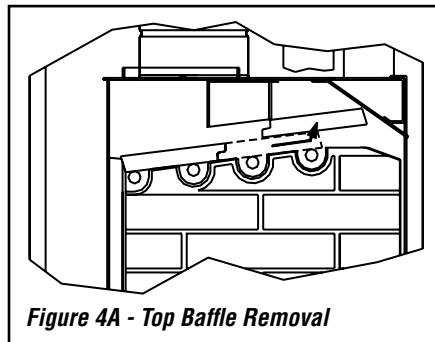


Figure 4A - Top Baffle Removal

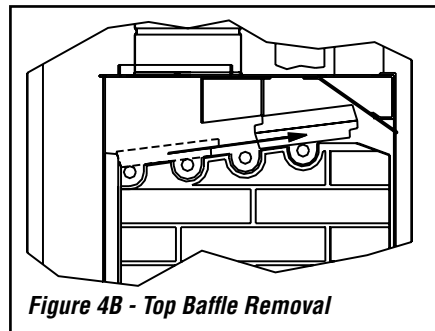


Figure 4B - Top Baffle Removal

Finish Door Casing Care

Use a glass cleaner and a soft cloth to polish the casing. Do not use abrasives such as steel wool, steel pads or an abrasive polish for they may scratch the casing's finish.

DISPOSING OF ASHES

Whenever ashes get 3 to 4 inches deep in your firebox, and when the fire has burned down and cooled, remove excess ashes. Leave an ash bed approximately 1 inch deep on the firebox bottom to help maintain a hot charcoal bed.

Remove ashes only when the fire is out and the ashes are cold (24 to 48 hours after the fire is out).

Do not leave the ashes in the house as they give off carbon monoxide and other toxic gases.

WARNING

Disposal of Ashes: Ashes should be placed in a steel container with a tight fitting lid and moved outdoors immediately. The closed container of ashes should be placed on a non-combustible floor or on the ground well away from all combustible materials, pending final disposal. If the ashes are disposed of by burial in soil or otherwise locally dispersed, they should be retained in the closed container until all cinders have thoroughly cooled.

REFRACTORY REPLACEMENT

The intense heat of the fire will normally cause hairline cracks in the refractory. These cracks can be minimized by proper curing as described in "First Fires". They will not normally diminish the effectiveness of the refractory. If large cracks develop, then the refractory should be replaced. To replace the refractory bricks, follow these steps:

1. Remove the front refractories
2. Remove the bottom refractory
3. Remove the left side refractory
4. Remove the right side refractory
5. Remove the back refractory
6. Remove the front ceramic baffle
7. Remove the rear ceramic baffle

To install the new refractories, follow the above steps in reverse.

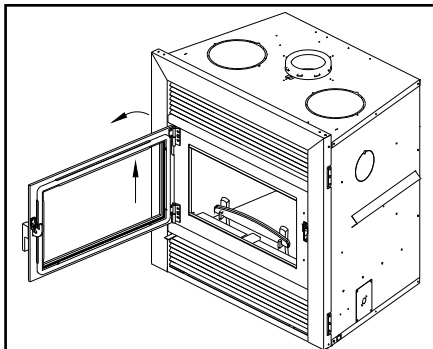


Figure 5 - Door Removal

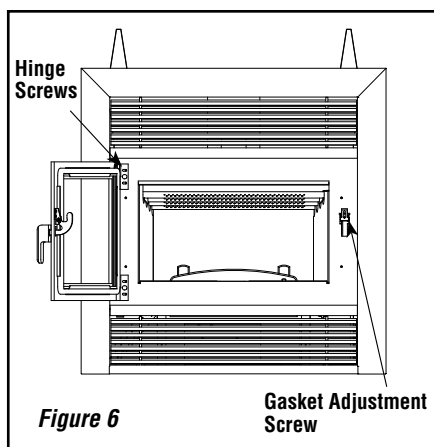


Figure 6

Gasket Adjustment Screw

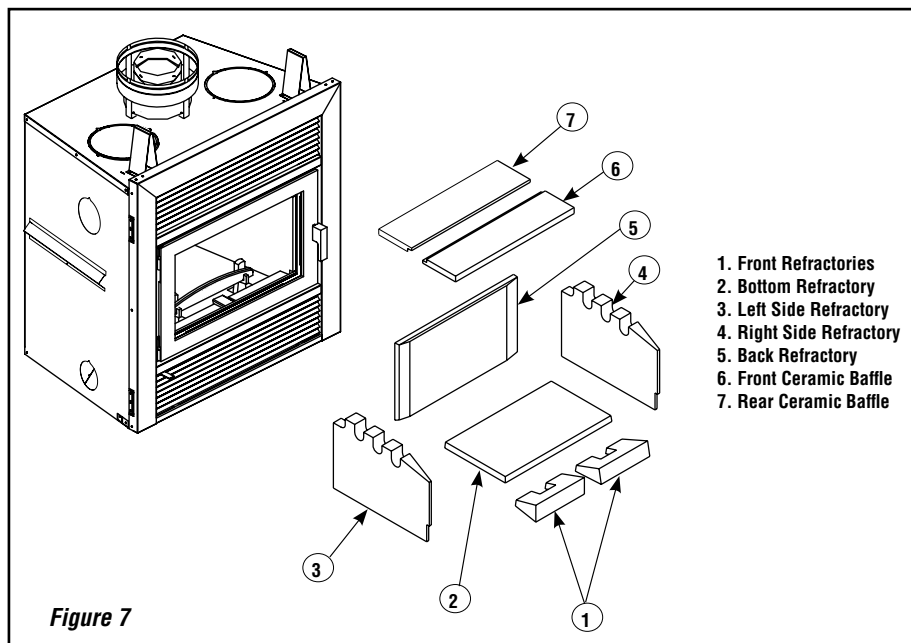


Figure 7

DOOR INSTALLATION

The door must be installed only when the installation of the Bainbridge™ fireplace is completed. All you have to do is fit the male part of the hinge, already on the door, to the female part, which is on the fireplace. To remove the door, simply pull the door up from the hinges (see **Figure 5**). The door adjustment has been set at the factory. If the fit is still not perfect, you can adjust the door using the hinge screws.

DOOR ADJUSTMENT

The door may need to be adjusted to be completely airtight. The gaskets' air-tightness can be adjusted using the adjustment screw located on the right side of the fireplace facade (An Allen key #1/8 – not supplied - will be necessary for this adjustment).

Checking Door Seal

A one-inch strip of paper may be used to perform a test of the integrity of the door seal. Close the door on the paper in at least eight points. It is normal to feel only a slight amount of friction. The door gasket does not need to be "tight" in all areas, since a small amount of leakage is not hazardous or detrimental to the performance of your fireplace.

WARNING

- Use only a IHP glass doors, specifically designed for the Bainbridge™ fireplace.
- The fireplace cannot be operated without door. Consult your dealer to select the correct replacement door.
- Important! To assure proper alignment of glass doors: Install this fireplace in a square and plumb condition, using shims as necessary at sides and/or bottom.

Framing, Facing And Mantel

The construction of the framing, facing, and mantel must be in accordance with the standards and the following illustrations (**Figures 8, 9 and 10**):

- A. Frame the fireplace using 2" x 3" or heavier lumber.
- B. **WARNING: Combustible materials cannot be used in the space directly above the fireplace, except for the studs above the facade that support the facing and mantel. This area must remain empty for a height of 6'8" (2,032 mm) measured from the base of the appliance.**
- C. Frame the fireplace with vertical studs at the sides of the fireplace running from floor to ceiling (see **Figure 10**). If combustible facing is to be used, position the studs back, from the front edge of the fireplace (a space that is the thickness of the facing material, so that the facing can be installed flush with the fireplace facing). Frame headers between the vertical studs only as follows:
 - Place 2" x 3" or 2" x 4" headers, only along the upper part of the front, side and back faces (some codes may require a 2" x 6" on an outside bearing wall). Do not put wood or any combustible material within the area above the fireplace except on the front facing.
 - Place headers only as required to support the facing and mantel.
- D. **WARNING: The fireplace must not be in contact with any insulation or loose filling material. Cover the insulation with Drywall panels around the fireplace.**

Hearth Extension Requirements

The Bainbridge™ fireplace may be installed directly on a combustible floor. The supplied safety metal strip must be positioned as follows: One half under the front of the fireplace and the other half must extend on the floor over which the hearth extension will be built (see **Figure 9**).

* The safety metal strip must cover the entire width of the fireplace

The combustible floor in front of the fireplace must be covered with a non-combustible material (tile, marble, stone, etc). See **Figures 8 and 9**.

COLD CLIMATE INSTALLATIONS

Climates where temperatures will fall below 32° F (0° C).

The heating performance of the appliance will vary depending upon the level of insulation, house design, how the appliance is operated, etc.

If this fireplace is being installed in a cold climate, it is especially important to seal all cracks around the fireplace and wherever cold air could enter the room with noncombustible material.

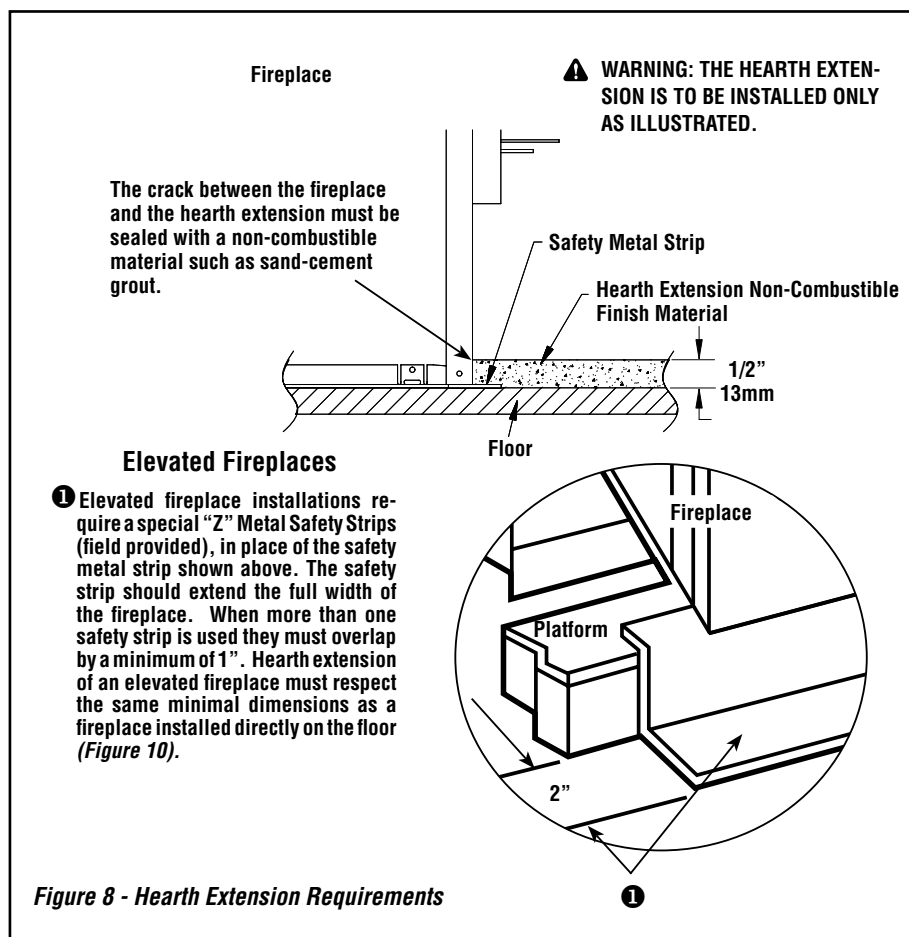


Figure 8 - Hearth Extension Requirements

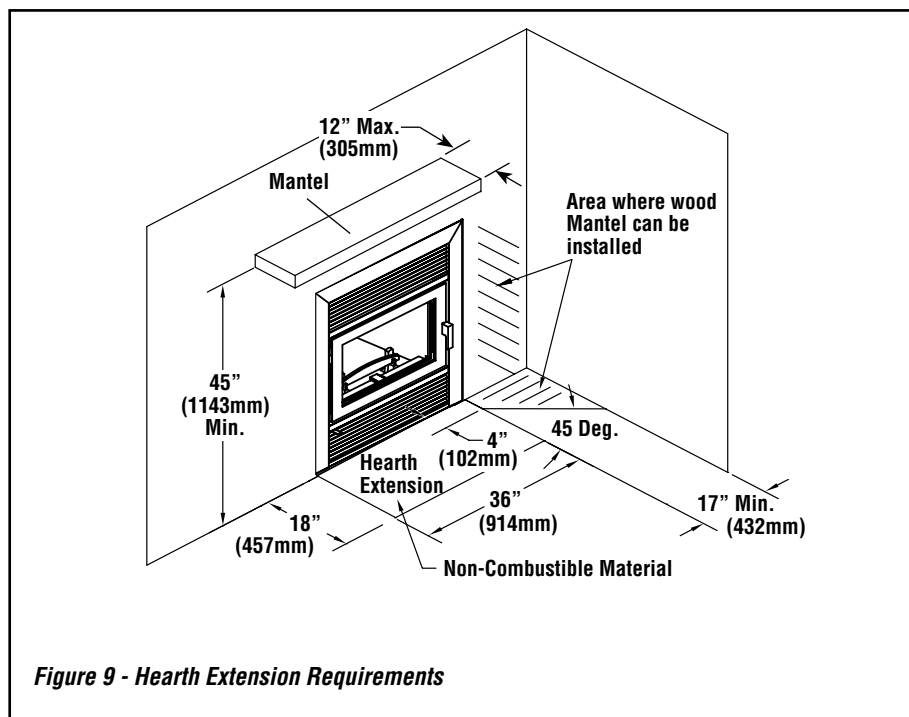


Figure 9 - Hearth Extension Requirements

Also, the outside air inlet duct should be wrapped with noncombustible insulation to minimize the formation of condensation. Do not place insulation materials directly against the chimney sections. We recommend that you use the insulated wall radiation shield since it will maintain the home's thermal barrier. AC chimney is NOT recommended in very cold climates (in areas with temperatures below 32°F (0°C)).

GLASS CARE

Glass Replacement

The glass used for the Bainbridge™ fireplace is a high temperature ceramic glass (1,400° F / 760° C). If the glass breaks, it must be replaced with an identical ceramic glass. Tempered glass or ordinary glass will not withstand the high temperatures of the Bainbridge™ fireplace. Replacement glass should be purchased from a IHP dealer (see “Replacement Parts”, **Page 22**). **DO NOT OPERATE THE UNIT WITH CRACKED OR BROKEN GLASS.**

Glass Cleaning

The Bainbridge™ fireplace is designed to keep the glass clean under normal operating conditions. If the Bainbridge™ fireplace is operated continuously with the combustion air controls closed, the glass will tend to get dirty unless the fuel, firebox and glass are maintained at hot temperatures (see “Refueling For Best Performance”). To clean the glass, there are a number of specially designed cleaners. Your authorized IHP dealer can recommend a suitable cleaner which is available in your area. Regular household glass cleaners will not clean creosote. Do not use abrasives such as steel pads, steel wool or oven cleaner as they will scratch the glass.

DO NOT USE CHEMICAL GLASS CLEANERS ON PAINTED SURFACES AS IT MAY CAUSE THE PAINT TO PEEL.

CAUTION: DO NOT ALLOW WINDOW CLEANER TO GET IN CONTACT WITH DOOR GASKET OR PAINT ON FACADE OR DOOR. ONCE CLOSED, CONTACT OF GLASS CLEANER WITH THE FIREPLACE FACADE CAN PROVOKE PAINT PEELING OFF.

Gasket Replacement

Remove the door from the unit (see **Page 7**) and lay it on a clean unabrasive surface. To replace the gasket, first remove all of the old gasket and gasket cement. Make sure that the surface is totally clean before applying new cement (a high temperature silicone caulking rated at 500° F [260° C] is suitable) or adhesion problems may result. Apply gasket cement to the gasket channel and install the new gasket. This replacement part is available from your IHP dealer in the following dimensions:

Gasket	Length*	Dimensions	Part No.
Around Glass	69 (1753)	5/16" dia. (8)	SR1823H
On Door Frame	73 (1854)	5/8 dia. (15.9)	SR1823G

Table 1 * Inches (millimeters)

FIREPLACE INSTALLATION

Locating The Bainbridge™ Fireplace

The best location to install your fireplace is determined by considering the location of windows, doors, and the traffic flow in the room where the fireplace is located, allowing space in front of the unit for the hearth extension and the mantel, and taking into consideration the location of the hot air ducts (optional), outside air kit and chimney.

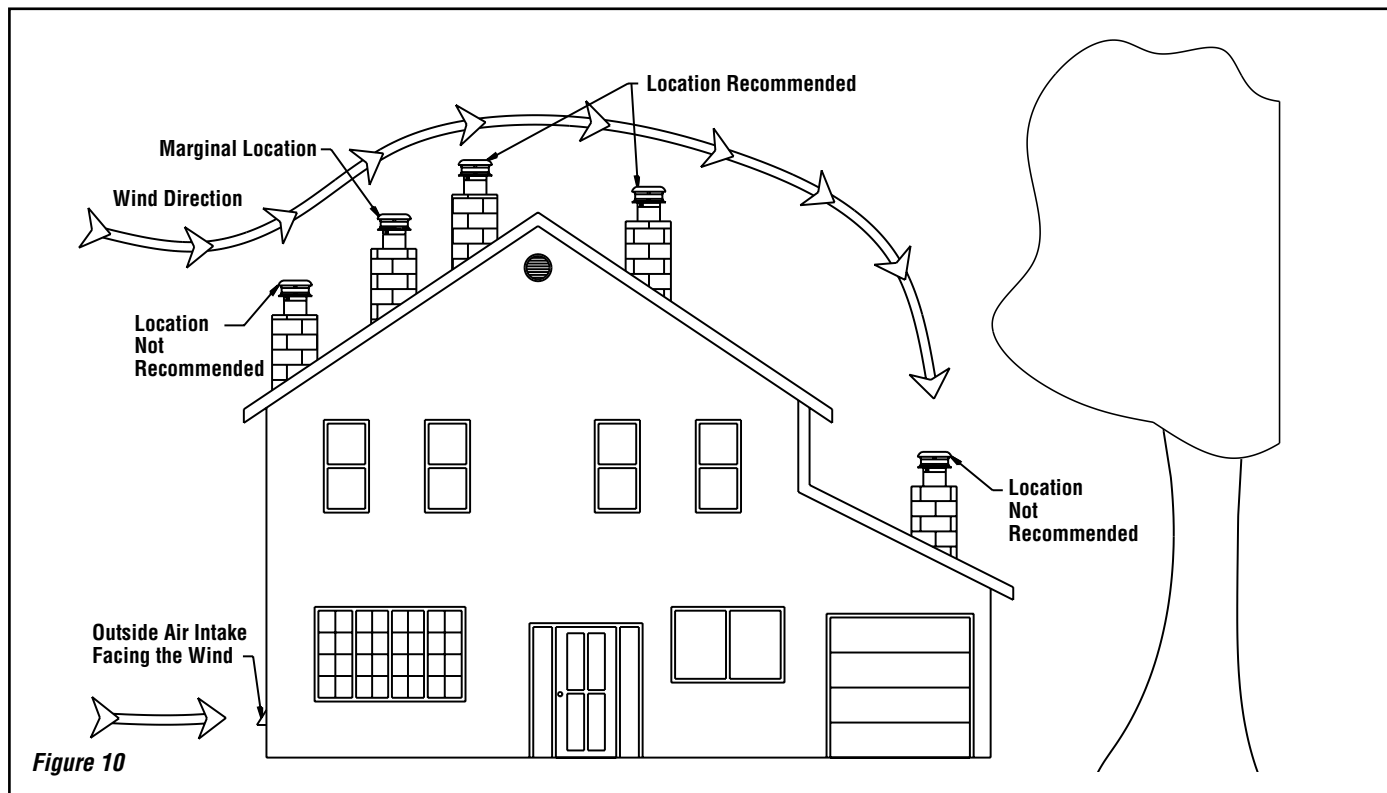
If possible, you should choose a location where the chimney will pass through the house without cutting floor or roof joists (see fireplace dimensions **Page 10**).

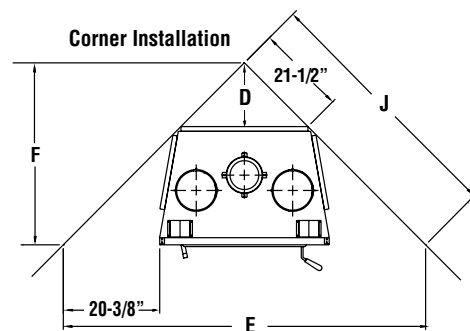
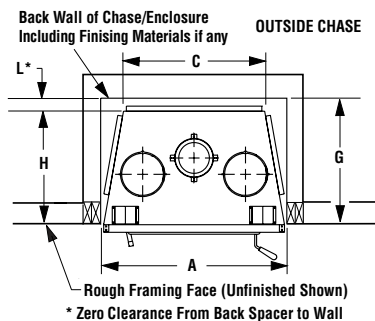
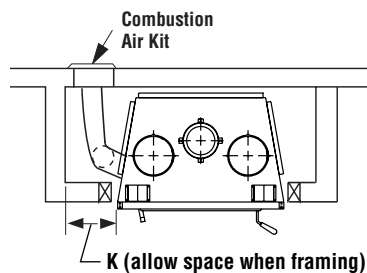
Usually, no additional floor support is needed for the fireplace. The adequacy of the floor can be checked by first estimating the weight of the fireplace system. Weights are given on **Page 22**. Note the floor construction and consult your local building code to determine if additional support is needed.

The Bainbridge™ fireplace may be installed directly on the floor or on a raised base (for proper guidelines, refer to “Hearth Extension Requirements”) and a minimum of 6'8" (2 m) measured from the base of the appliance to the ceiling is required.

When selecting the location, the chimney outlet position and the direction of the wind are important factor affecting the chimney performance. To allow a maximum draft and to reduce wind turbulence, the chimney must:

- Penetrate the highest part of the roof.
- Be installed as far as possible of roof offsets, trees or any other obstructions that may cause wind turbulence and back drafts in the chimney.
- The least amount of offsets (elbows) possible. **NOTE: A maximum of 2 offsets is allowed.**

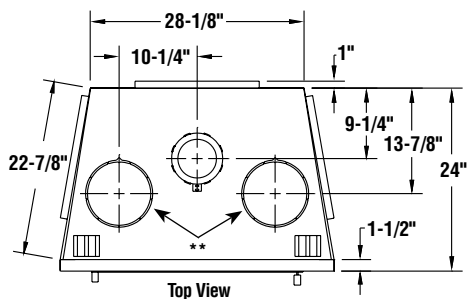
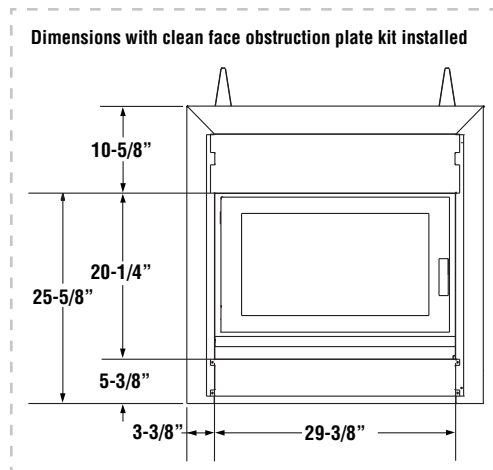
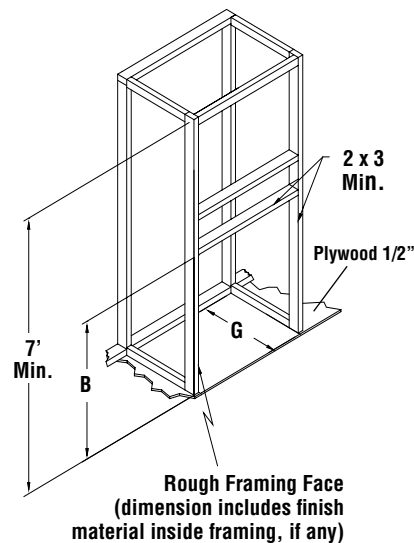
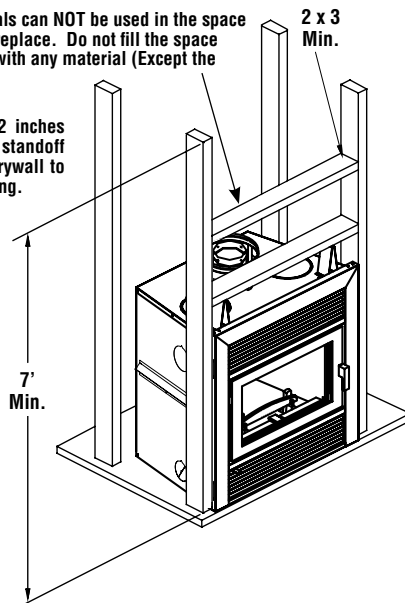




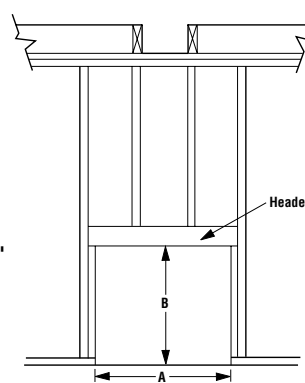
FRAMING DIMENSIONS		
A	36-1/4"	921 mm
B	40-3/4"	1035 mm
C	28-1/8"	714 mm
D	13-1/4"	337 mm
E	76-3/4"	1950 mm
F	38-3/8"	975 mm
G	*25"	635 mm
H	24-1/2"	622 mm
J	54-1/4"	1378 mm
K	8"	203 mm
L	1"	25 mm

Combustible materials can NOT be used in the space directly above the fireplace. Do not fill the space above the fireplace with any material (Except the wood framing)

* Total depth is 25-1/2 inches including the back standoff minus 1/2 inch for drywall to be flush with the facing.



**Heatflo Vent Outlets



NOTES

Diagrams, illustrations and photographs are not to scale – consult installation instructions. Product designs, materials, dimensions, specifications, colors and prices are subject to change or discontinuance without notice.

All framing dimensions calculated for 1/2" dry wall at the fireplace face. If sheathing the chase or finishing with other thickness materials, calculations will need to be made.

* The fireplace must not be in contact with any insulation or loose filling material. Cover the insulation with Drywall panels around the fireplace.

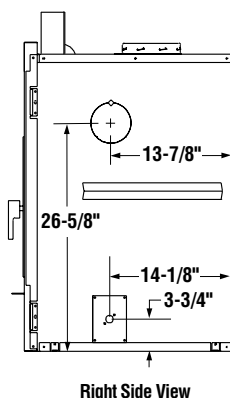
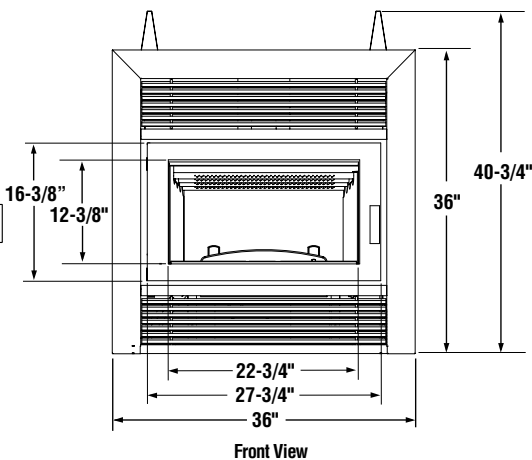
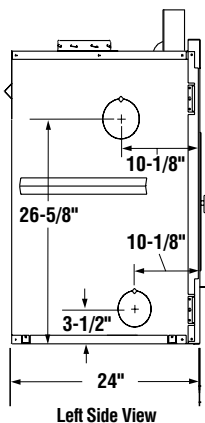
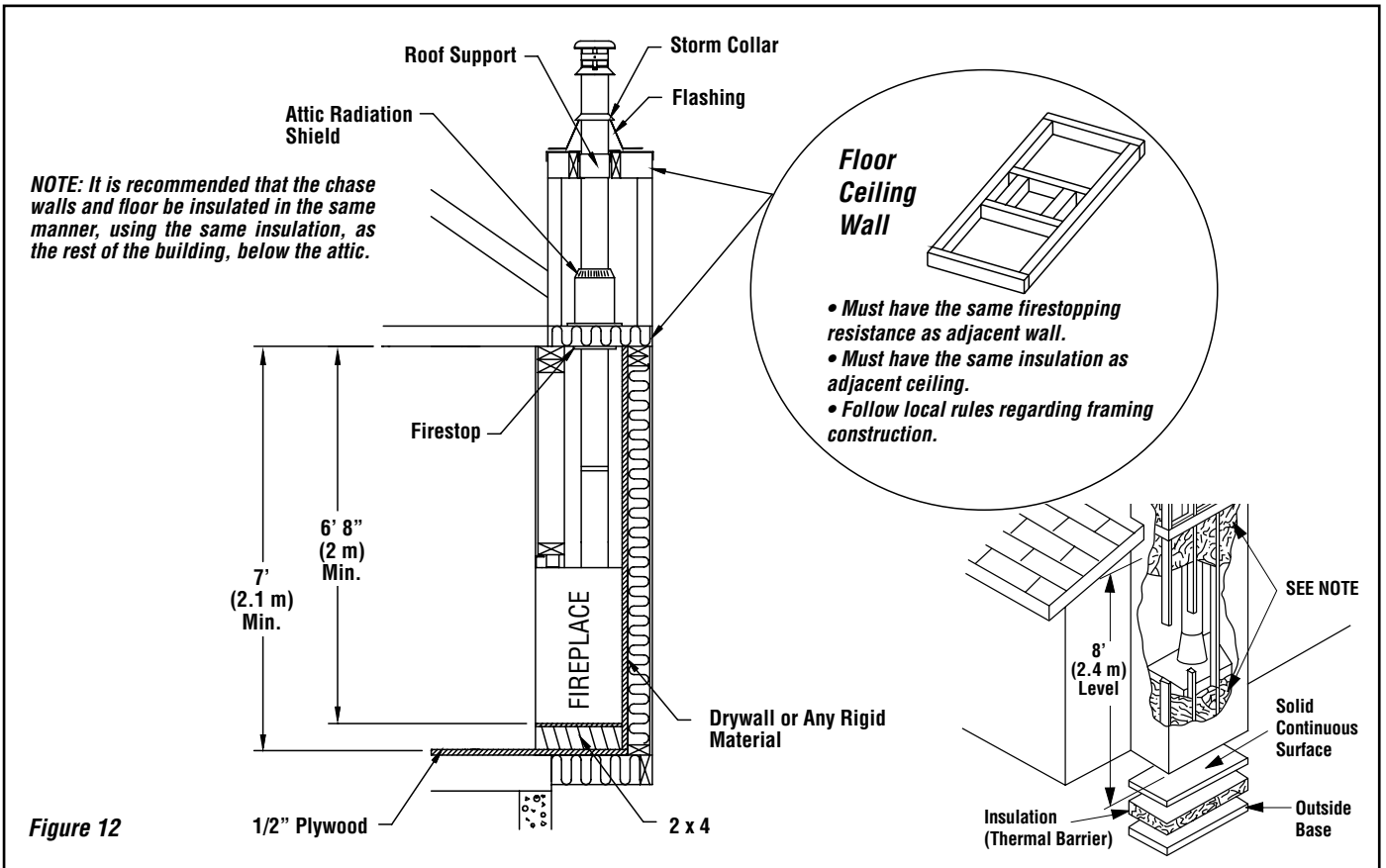


Figure 11 - Fireplace and Framing Dimensions

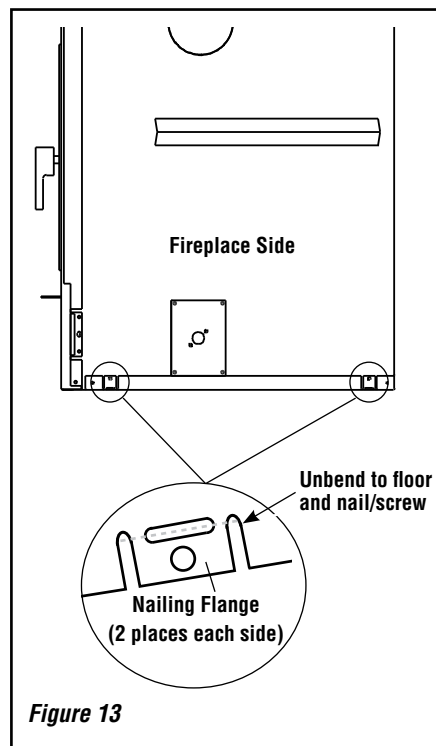
NOTE: DIAGRAMS & ILLUSTRATIONS ARE NOT TO SCALE.

Insulated Chase Construction



Nailing Flanges

Four nailing flanges are provided to secure the fireplace to the floor (see **Figure 13**). Bend the nailing flanges down so that each flange is flush with the floor, then using nails or screws, secure the fireplace to the floor (2 places each side). The heads of the screws or nails must be large enough to completely cover the holes in the nailing flanges.



Facing

The facing installation method depends on your finishing kit choice.

1. **Facing with the louver kit** - The 2x3 framing must offset to the back by a distance equivalent to the thickness of your facing material so the surface of the facing be aligned with the fireplace face. Combustible materials must be aligned with the fireplace face and can not overlay on the fireplace front (black steel face of the fireplace) (see **Figures 14 and 15A**).

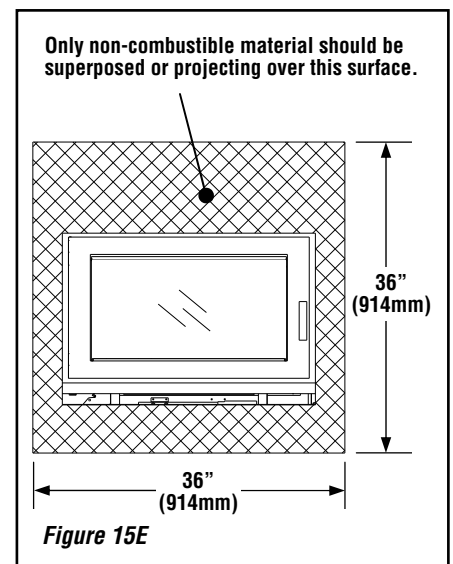
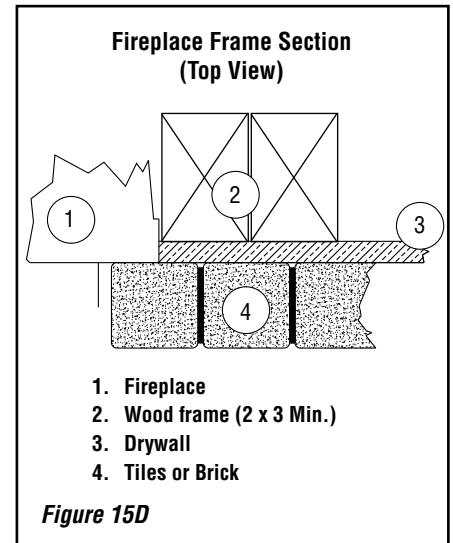
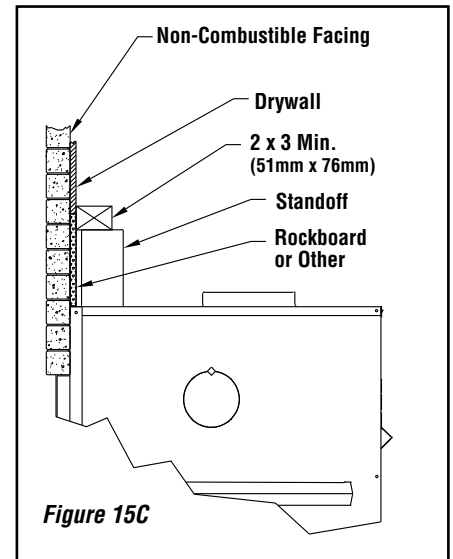
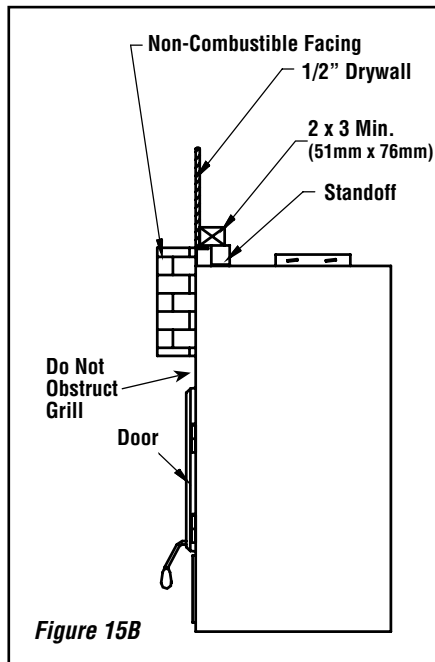
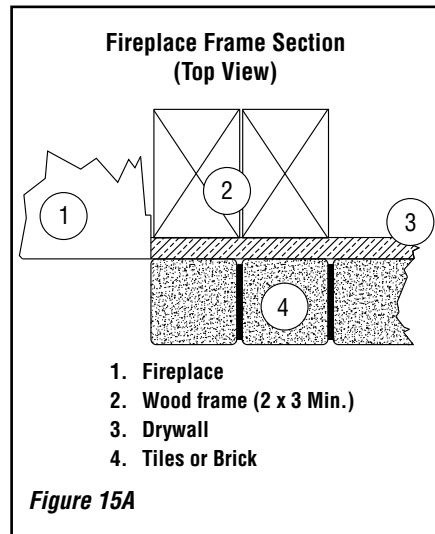
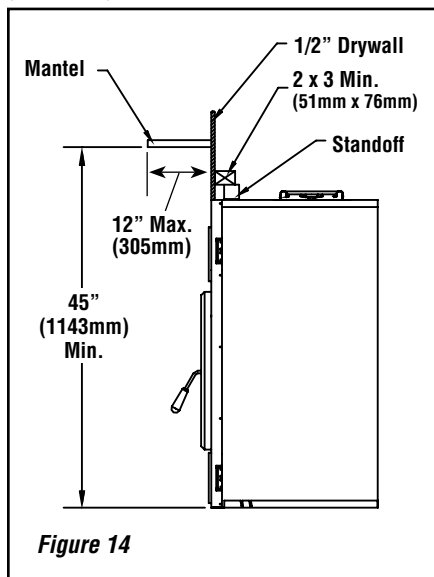
NOTE: Non-combustible materials like brick, stone or ceramic tiles may be overlayed on the fireplace front (see **Figure 15B**).

2. **Facing with the clean face kit - Must be used in conjunction with a heatflo kit.** The 2x3 framing must offset to the back by a distance equivalent to the thickness of the drywall.

Combustible materials must be installed to be aligned with the fireplace front and can not overlay on the fireplace front (black steel face of the fireplace) (see **Figures 15B and 15C**). Non-combustible materials such as brick, stone or ceramic tile can project in front of and onto the fireplace facing up to the tiling flange on the clean face kit (**Figure 15E**).

Mantel

The mantel must be installed at least 45" (1143mm) above the base of the fireplace (**Figure 14**).



FIREPLACE BLOWER

The fireplace comes equipped with a heat activated blower. It is located in the bottom of the fireplace, towards the back. It uses 120V and must be connected to the main electrical circuit by a qualified electrician. For connection, use the electrical box supplied with the unit located on the bottom right corner of the fireplace.

If you wish to adjust the blower speed, the variable speed control (VRUW) provided must be installed in line with the wiring. Again, use a qualified electrician for installation.

If the blower requires servicing,

- 1- Remove the doors and decorative facade.
- 2- Remove the screw located below the blower motor that holds it to the back of fireplace.
- 3- Pull the blower out of the unit through the square hole located in the front bottom right corner.

OUTSIDE AIR KIT

It is mandatory to install an outside air connection to The wood burning fireplace. The following components are required and are included with the fireplace:

- Outside air kit (includes 4 inch flex that goes up to ten (10) feet long)
- 4" Adaptor for fireplace connection

The outside air assembly must be installed according to the following requirements:

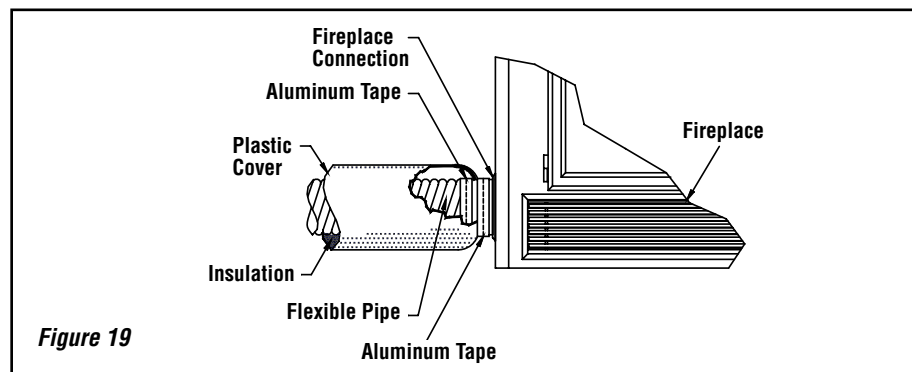
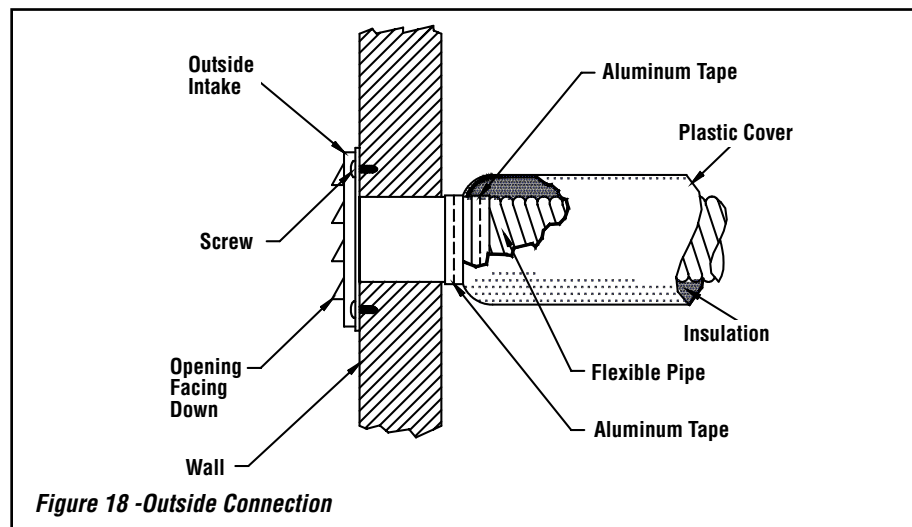
Outside Air Installation

The outside air assembly may be installed according to the following requirements:

- A) Duct length should be kept to a minimum. The maximum length of a 4" interior diameter (100 mm) insulated flexible duct is twenty (20) feet (6.1 m). (See note below).
- B) The air intake register must not be installed more than ten (10) feet (3050 mm) above the base of the fireplace.
- C) The fresh air must come from outside the house. The air intake must not draw air from the attic, basement or garage.
- D) The air intake should be installed where it is not likely to be blocked by snow or exposed to extreme wind and away from automobile exhaust fumes, gas meters and other vents.
- E) The duct and register may be installed above or below floor level.

Make a 4-1/4" (110 mm) hole in the outside wall of the house at the chosen location. From outside, place the outside air register in the hole (open side down) and fasten the register to the wall with screws as shown (see **Figure 18**). Slip the pipe into the insulated sleeve. Place the insulated pipe over the register tube and over the fireplace's outside air connector (see **Figure 19**). At each end, carefully pull back the insulation and plastic cover exposing the flexible pipe. Using the aluminium tape provided, wrap the tape around the joint between the flexible pipe and the air inlets. Carefully push the insulation and plastic cover back over the pipe. Using aluminium tape, fasten the plastic cover in place.

NOTE: We recommend not to exceed twenty (20) feet of 4" flexible pipe. If you require a longer length we recommend that you use a 5" diameter flexible pipe for the complete run up to thirty (30) feet and a 6" diameter pipe for a run of up to forty (40) feet.



HEATFLOW CONVECTION KIT INSTALLATION

The wood burning fireplace is approved for use with a Heatflow Convection Kit (hot air ducting system).

KIT CONTENTS (See *Figure 20*):

The Ducted Flex Kit must use both hot air outlets and includes:

- 2 ea. Wall Thimble Assembly (item #1)
- 2 ea. Duct Adaptor (item #2)
- 2 ea. Duct Ring (item #3)
- 8 ea. #6-18 X 2 Drywall Screw (item #4)
- 22 ea. #10-16 X 3/4" Hex-Unslotted Drive Zinc Finish Self-Drilling Screw (item #5)
- 2 ea. 2 Ply 8" Dia. X 10' Aluminum Flex with R4 Insulated Sleeve (item #6)
- 2 ea. Grill, White (item #7)
- 4 ea. #6-18 X 1-1/2 White Oval Head Zinc Plated Phillips Screws (item #8)
- 1 ea. Instruction Sheet

EPA Fireplace - HeatFlo Convection Kit

Cat. No.	Model	Description
F3790	EPA-HEATFLO-KIT	EPA Heatflo Conv. Kit
<i>Table 2</i>		

TOOLS NEEDED:

5/16" hex driver and no. 2 Phillips screwdriver

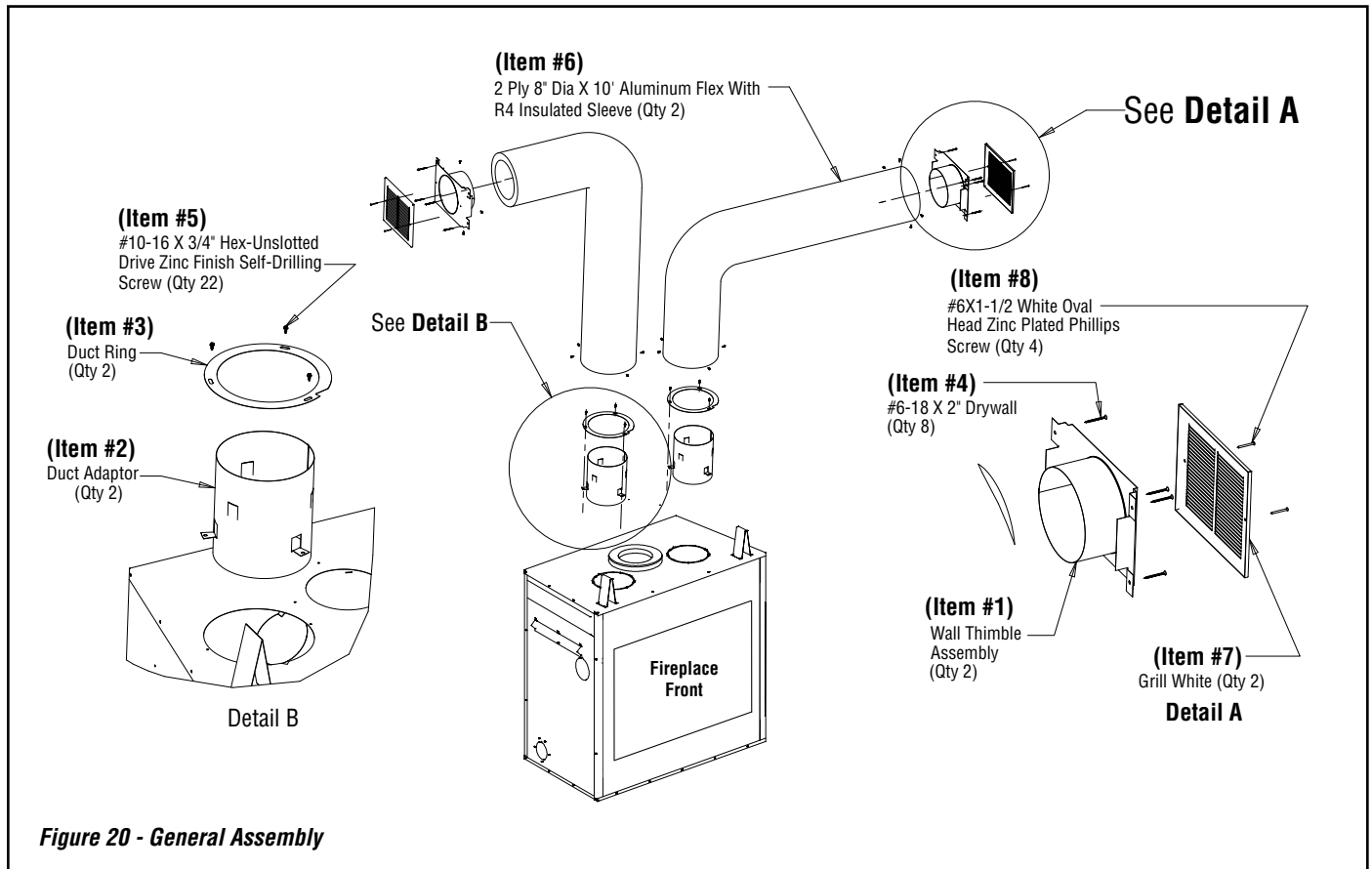
GENERAL INFORMATION

If you encounter any problems, need clarification of these instructions or are not qualified to properly install this kit, contact your local distributor or dealer.

Read this instruction sheet in its entirety before beginning the installation.

ALL WARNINGS AND PRECAUTIONS IN THE INSTALLATION AND OPERATION MANUAL PROVIDED WITH THE APPLIANCE APPLY TO THESE INSTRUCTIONS.

TURN OFF THE APPLIANCE AND ALLOW IT TO COMPLETELY COOL BEFORE PROCEEDING.



HEATFLOW CONVECTION KIT INSTALLATION (continued)

INSTALLATION INSTRUCTIONS:

For approved installations, the ducted flex kit must meet the following requirements:

Minimum height: 68" (1.7m)

The height of the louver must be measured from the base of the fireplace to the center point of the louver.

Minimum Ceiling and Side Wall Clearances: 11" (280mm)

Louver ceiling and side wall clearance must be measured from the bottom of the ceiling or from the side wall to middle point of the louver.

Maximum Length: 10' [3.1m] (See Figure 21)

It is recommended that the ducted flex kit duct system be installed in the following order:

1. Plan and frame fireplace and outlet locations prior to ducted flex kit installation.
2. Remove the two 8" diameter cutouts on top of the fireplace. Then, cut the insulation in order to obtain two 8" diameter openings and remove the insulation.
3. On the duct adaptor, bend the appropriate tabs down so that the bottom of the adaptor is just below the bottom of the insulation.
4. Align the collar slots with the holes in the adaptor; fasten the collar and the adaptor to the top of the fireplace using 3 of the sheet metal screws provided. The collar will fit loosely around the openings (see Figure 22).

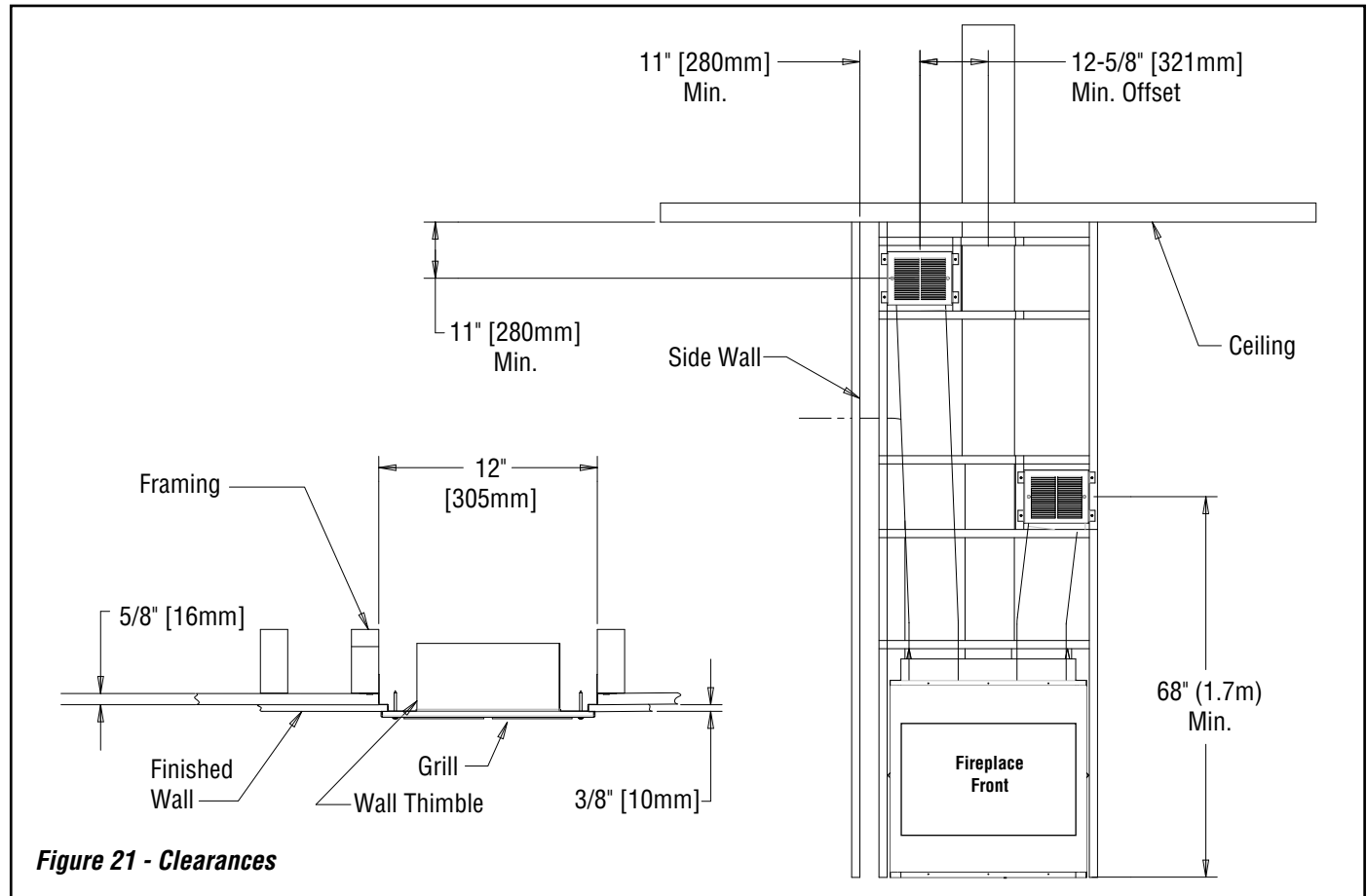


Figure 21 - Clearances

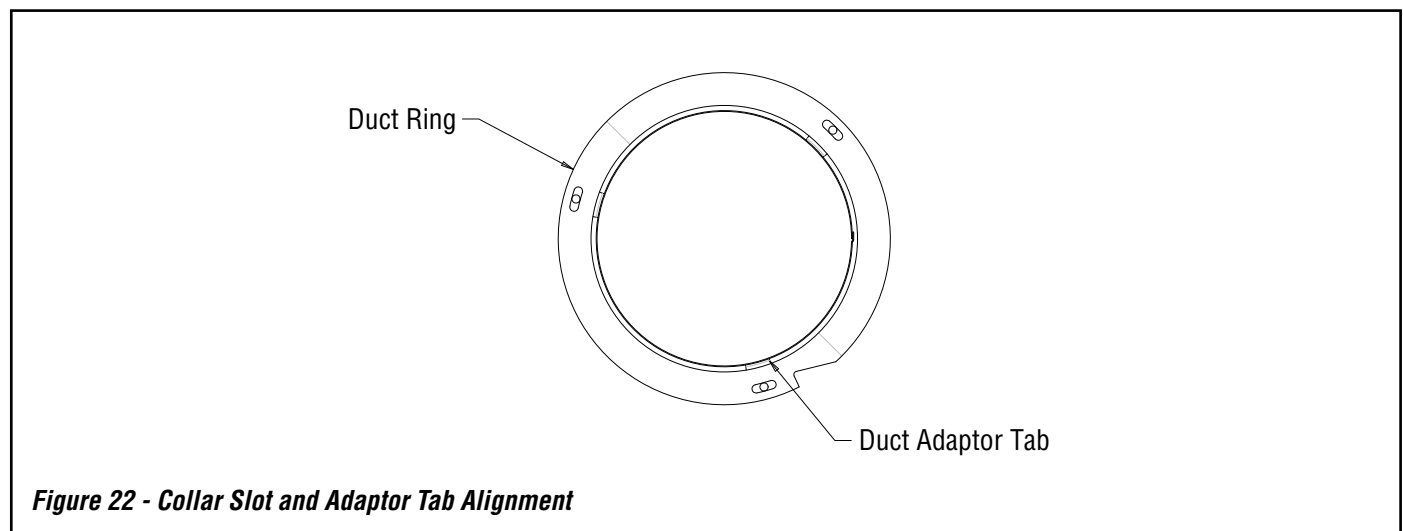
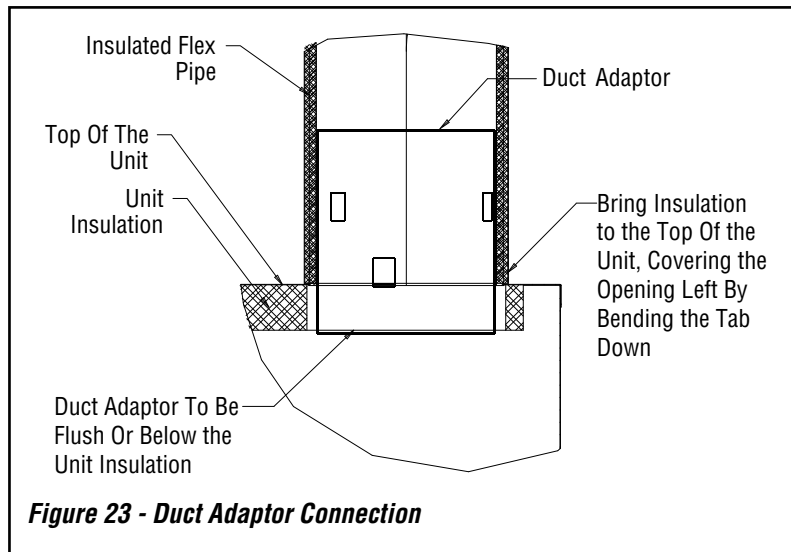


Figure 22 - Collar Slot and Adaptor Tab Alignment

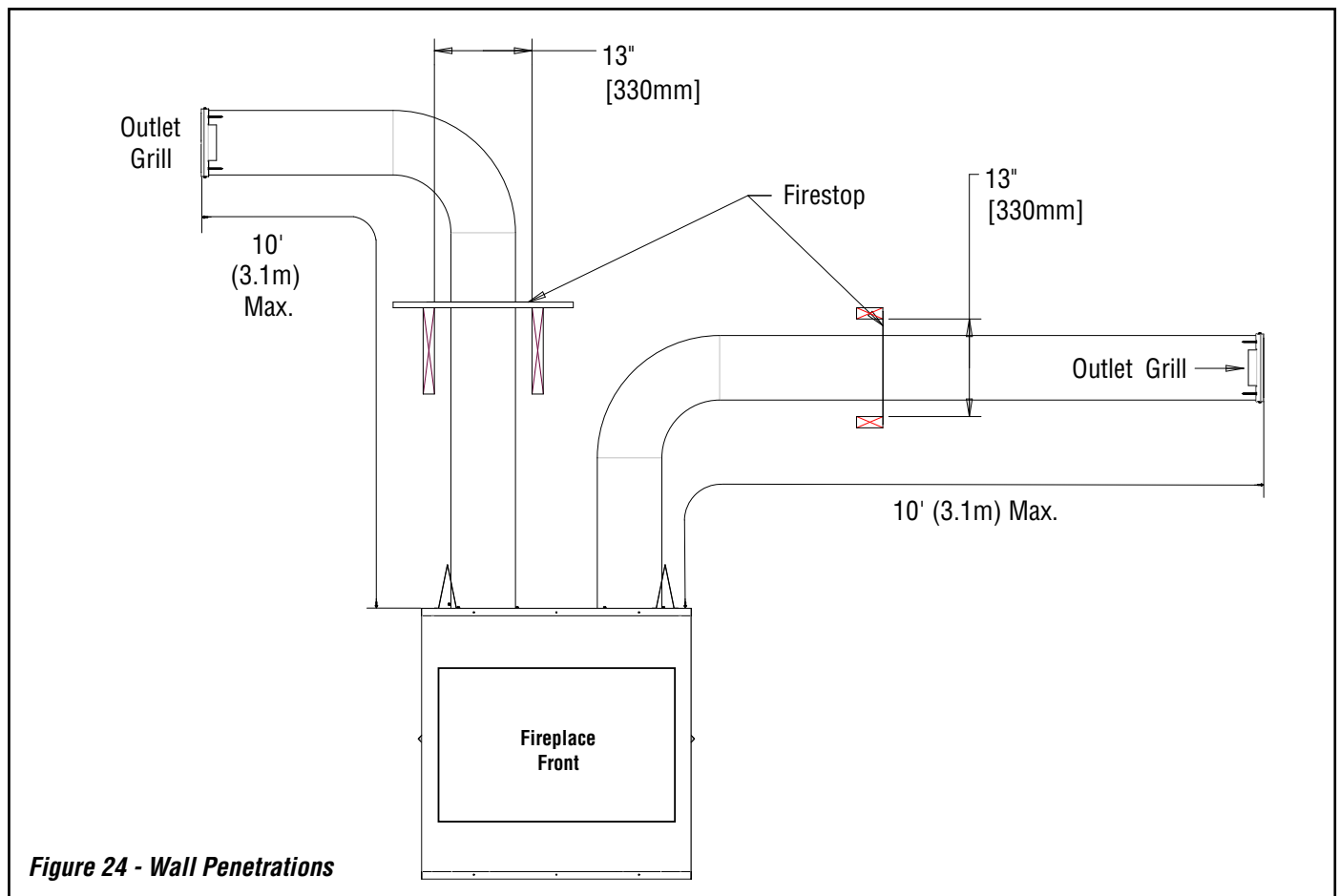
HEATFLOW CONVECTION KIT INSTALLATION (continued)

5. Fit the wall thimble onto the flex-pipe, prior to the wall thimble installation, and fasten together using 4 sheet metal screws. Measure from top of fireplace to planned outlet location and trim the flex-pipe if necessary.
6. Install the wall thimble to the outlet framing using 4 of the supplied wood screws and run the flex pipe to fireplace.
7. Attach the bottom of the flex-pipe to the duct adaptor on the unit and secure using 4 of the supplied sheet metal screws. Bring the outside insulation and sleeve down to the top of the unit, ensuring that the openings in the duct adaptor, (left by bending the adaptor tabs down) are fully covered (see **Figure 23**).



INSTALLATION NOTES:

- When framing for the outlet grill: The minimum height from the bottom of the unit to the center of the outlet is 68" (1.7m) with the minimum distance from the center of outlet to the ceiling and for the center of the outlet to a side wall of 11" (279mm).
- Do not connect the hot air ducts to a central heating system.
- Use only IHP grills and components as described in this manual.
- Ensure that the flex insulation and sheathing do not touch the flue pipe.
- Never allow the pipe to pitch downwards. Never route the piping downwards.
- The hot air outlet grills must be installed with the louvers pointing downwards.
- The hot air outlets can be installed in the same room as the fireplace, or one or both of the outlets can be installed in adjacent or upper rooms. Installing the ducts at different elevations will tend to exhaust more heat out of the higher outlet
- When traversing a combustible wall or floor, a firestop (not provided) must be installed at the wall or floor penetration. Maintaining a minimum 1" (25mm) clearance between the ducts and any combustible material, the hole size must be 13" X 13" (330mm X 330mm) (see **Figure 24**).
- Install to local codes and regulations.



NOTE: DIAGRAMS & ILLUSTRATIONS ARE NOT TO SCALE.

THE CHIMNEY SYSTEM (UNITED STATES & CANADA)

Chimney Installation Notes

1. The IHP fireplace model Bainbridge™ may be installed only with IHP 6" Snap-Pak chimney in the United States or Security Chimney models ASHT & S2100 or DuraVent model DuraTech Canada (DTC) in Canada. The 6" & 7" Security systems are approved in Canada with the use of an adaptor.
2. If possible, install an interior chimney as it will provide better performance. In areas with continuous temperatures below -18° C (0° F), the use of an exterior chimney increases the likelihood of operating problems such as low draft, high rate of creosoting, and poor start-up characteristics. Exterior chimneys are also prone to down-draft with dry and flow reversal. Installations-which are located on lower floors in the house-such as in a basement, in combination with an outside chimney, are especially prone to flow reversal.
3. A chimney venting a fireplace shall not vent any other appliance.
4. The minimum chimney height is twelve (12) feet (3.7 m). To compensate for altitude, add 18" (450 mm) to the chimney for every 2,000 feet (600 m) above sea level.
5. **All chimney installations must include at least one support.** Reducing the amount of chimney weight on the fireplace will help avoid the noise created when the fireplace expands. This can be achieved by having the chimney supported by the supports. The maximum chimney length that can be supported by the fireplace is nine (9) feet (2.75 m).
6. The chimney must extend at least three (3) feet (915 mm) above its point of contact with the roof and at least two (2) feet (610 mm) higher than any wall, roof or building within ten (10) feet (3m) of it.
7. If the chimney extends higher than five (5) feet (1,500 mm) above its point of contact with the roof, it must be secured using a roof brace.
8. A rain cap must be installed on top of the chimney. Failure to install a rain cap may cause corrosion problems.
9. Cut and frame square holes in all floors, ceilings, and roof that the chimney will go through to provide a 2" (50 mm) clearance between the chimney and any combustible materials. Do not fill this 2" space with insulation or any other combustible material.
10. Portions of the chimney which may extend through accessible spaces must be enclosed to avoid contact with combustible materials or damage to the chimney.
11. When offsets are used, the pipe may not penetrate a ceiling or floor unless it is running vertical (no 30° offsets).

NOTE: 2" clearance to combustibles around chimney components required.

NOTE: Blown or fill type insulation materials must not be in contact with the fireplace or in the enclosure frame as described in "Enclosure" section.

NOTE: Local codes may not require firestopping at the ceiling levels for outside chase installations. However, it is recommended for safety and the reduction of heat loss.

UNITED STATES ONLY CHIMNEY INSTALLATION INSTRUCTIONS USING IHP SNAP PAK (SP)

UNITED STATES APPROVED VENTING SYSTEMS:

- 6" diameter chimney:** Model IHP Snap-Pak, including:
- Chimney lengths
 - Elbows (*where necessary*)
 - Associated components as per these installation instructions

INSTALLATION THROUGH FLAT CEILING(S)

- Using framing lumber equal to ceiling joist size, frame ceiling opening as shown in **Figure 25** and **Table 3**.

Chimney Flue Diameter	
	6"
A	12-7/16"
B	12-7/16"

Table 3

If the area above the ceiling is an attic, go to step 5.

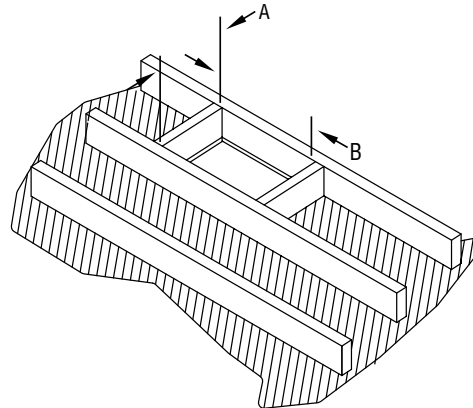
- Install SNAP-PAK chimney sections starting at the top of the appliance. Leave the first section loose until the installation is complete to allow the chimney to be rotated, easing the installation of any offsets if they are used. Secure subsequent sections by pushing together until stop-locked (see **Figure 26**).
- If IHP Elbows are to be used because the chimney is to be offset, refer to "Installation of Elbows" section. Directly above the Center of the flue in the ceiling support, mark the ceiling. A plumb bob is normally used to find the center. Cut an opening in the ceiling using **Figure 25** and **Table 3**.
- At each ceiling penetration, a firestop (SPFS) is required. Insert the SPFS into the joist area prepared in **Figure 25**.

NOTE: When the chimney extends between floors-which can be occupied-the chimney must be enclosed to prevent contact. As previously noted, 2" minimum clearance to combustibles is to be maintained at all times.

- The first chimney section through the joist area into attic is to be approximately two (2) feet. If the pipe sections in the attic are not enclosed, an insulation shield (SPIS) must be installed. Lower the insulation shield (SPIS) over the SP pipe until the SPIS flange is resting on the joist. Secure the SPIS in place by nailing the flange to the joist. See **Figure 27**. If the section within the attic area is to be chase enclosed, the SPIS is not required.

WARNING: Do not place any type of insulation in the required clearance spaces surrounding the chimney.

- Continue the chimney to the roof. See "Flashing Installation" and "Termination" sections.



Framing lumber of equal size to the joist should be used.

Figure 25

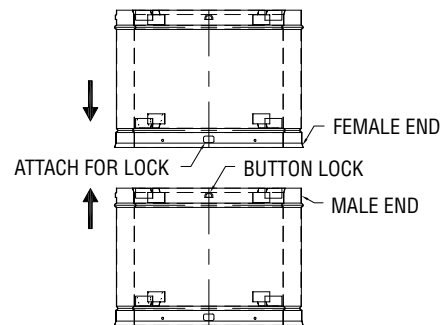


Figure 26

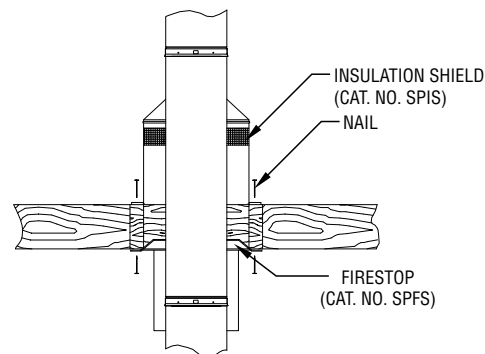


Figure 27

INSTALLATION THROUGH A SIDE WALL

1. It is recommended that exterior mounted chimneys be enclosed below the roof line in geographical areas experiencing sustained low ambient temperatures to help reduce or limit condensation, creosote buildup and poor draft.
2. Locate the area where the chimney section is to penetrate the vertical wall studs. Cut and frame an opening so that the flue is centered between the vertical wall studs. Frame opening per **Figure 28** and **Table 4**.

Chimney Flue Diameter	
	6"
A	12-7/16"
B	13"

Table 4

3. A 2-piece wall firestop (SPWF) must be installed in the framed opening from outside. The stainless portion is first installed from the outside of the opening. Push the remaining half through the opening from the inside until the plate is flush with stud. Use four (4) # 10 x 2-1/2" wood screws to attach opening (see **Figure 29**). Seal the outside plate with RTV sealant or similar.

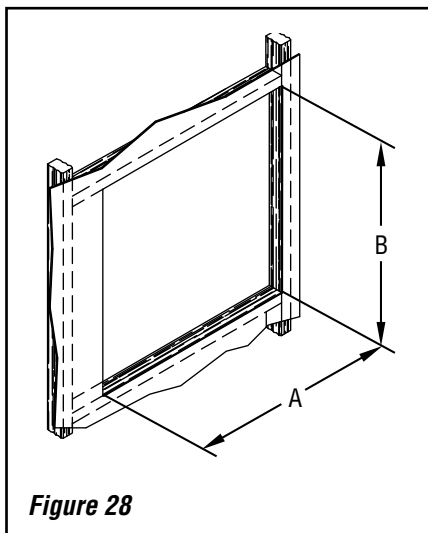


Figure 28

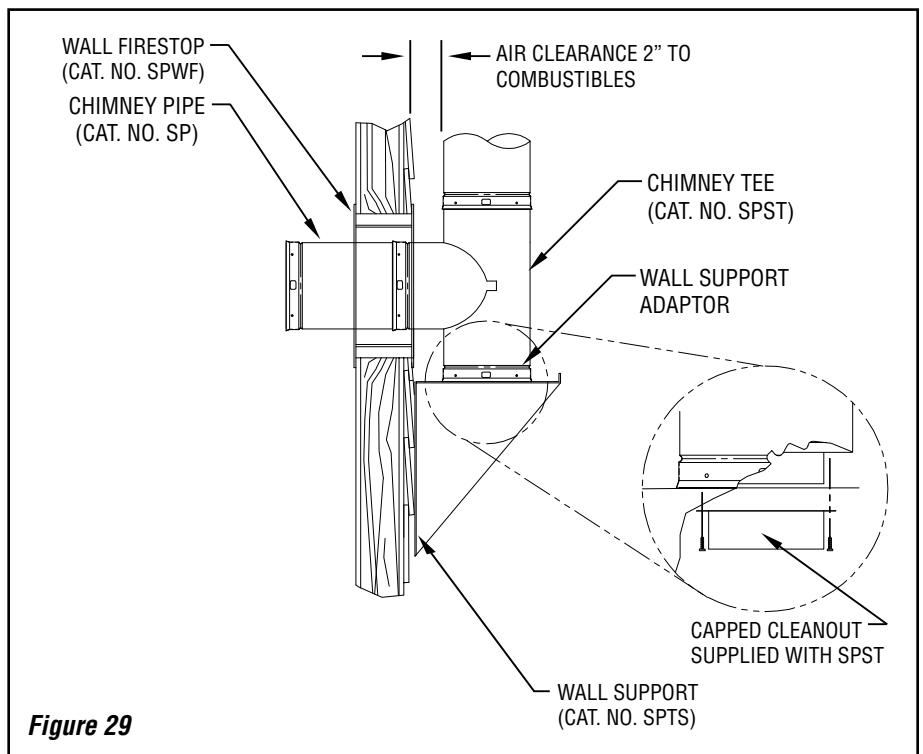


Figure 29

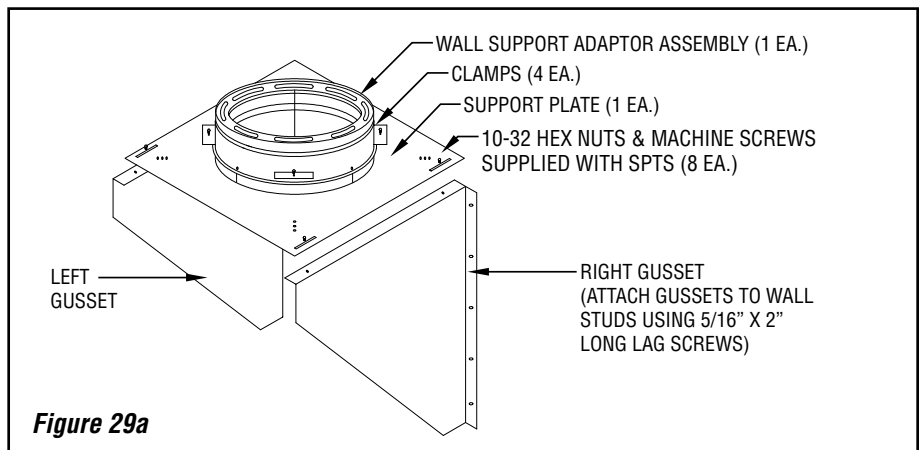


Figure 29a

4. Remove the wall support adaptor pieces from the SPTS box and attach the adaptor to the bottom of the tee by inserting it into the bottom of the tee and push to lock.
5. Push the side portion of the tee into the opening in the wall firestop.
6. Assemble the right and left gussets to the support plate using the hardware provided.
7. Attach wall support plate to wall support adaptor using 4 clamps provided. Do not tighten. (See **Figure 29a**).
8. Align the wall support with the wall and secure it to the wall studs using 5/16" x 2" lag screws (not provided). **DO NOT SECURE TO SIDING**. For masonry walls, use 5/16" x 2" masonry lag bolts.
9. Install the tee cap to the bottom of the wall support adaptor with a minimum of two (2) #10 x 1/2" sheet metal screws.
10. Position the tee and the adaptor on wall support to maintain 2" clearance to combustibles. AT THIS POINT TIGHTEN CLAMPS.
11. Slide IHP chimney pipe into top of tee. Align male and female ends. Push down on pipe sections until locked. As sections are added, it will be necessary to secure them to the outside wall with bands (SPWB) at eight foot intervals and 2" from combustibles. Wall Bands (SPWB) are secured to the chimney by placing band around the chimney and tightening clamping bolt. The assembly is anchored to the wall studs (not the siding) with 5/8" x 2" lag bolts. To complete the chimney installation, see "Flashing Installation" and "Termination" sections.

NOTE: DIAGRAMS & ILLUSTRATIONS ARE NOT TO SCALE.

ELBOW INSTALLATION

1. IHP provides a 15° (SPSE15) and 30° (SPSE30) Elbow to allow chimneys to avoid framing members or roof peaks. A maximum of 30° from the vertical is allowed, and a total of four elbows (two pair) for each chimney installation. Maintain 2" clearance to combustibles.
2. Attach the elbow(s) to the chimney pipe or other support part and push to lock. Using the offset chart, add chimney sections between the elbows. A support band (SPSB) is required at the upper elbow of the pair to support the load, as shown in **Figure 30**. Attach the upper elbow to bring the chimney back to vertical.

Offset combinations: see **Table 5** and illustration, **Figure 31**.

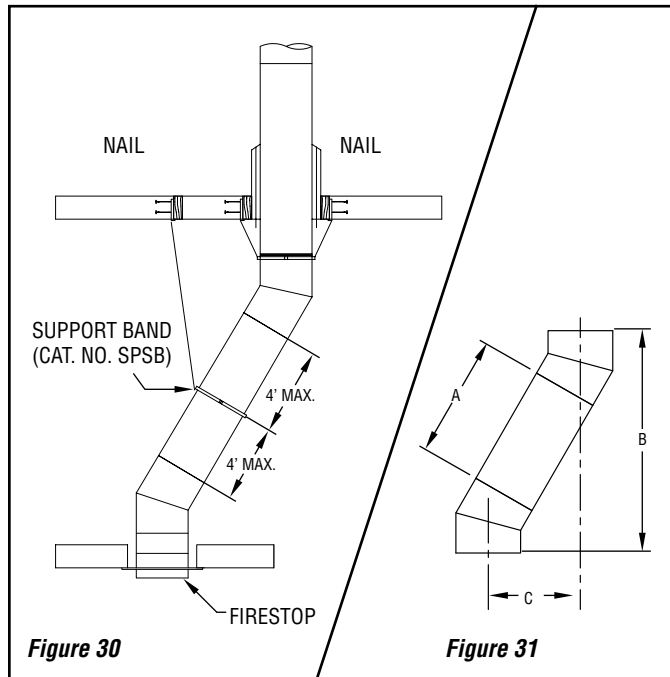


Figure 30

Figure 31

6" DIAMETER CENTER LINE OFFSET TABLE					
A		15° Angle		30° Angle	
Length	No. Pcs.	B	C	B	C
0	0	18-7/16"	2-1/4"	20-3/16"	5"
6"	1	22-13/16"	3-3/8"	24-1/16"	7-1/4"
12"	1	28-5/8"	4-15/16"	29-1/4"	10-1/4"
18"	1	34-3/8"	6-1/2"	34-7/16"	13-1/4"
24"	1	40-3/16"	8-1/16"	39-5/8"	16-1/4"
30"	2	44-1/2"	9-1/4"	43-1/2"	18-1/2"
36"	1	51-3/4"	11-3/16"	50-1/16"	22-1/4"
42"	2	56-1/8"	12-3/8"	53-15/16"	24-1/2"
48"*	1	63-3/8"	14-1/4"	60-7/16"	28-1/4"
54"*	2	67-3/4"	15-7/16"	64-3/8"	30-1/2"
60"*	2	73-1/2"	17"	69-1/2"	33-1/2"
66"*	2	79-11/16"	18-1/2"	74-3/4"	36-1/2"
72"*	2	85-1/2"	20-1/16"	79-15/16"	39-1/2"
78"*	3	89-7/16"	21-1/4"	83-13/16"	41-3/4"
84"*	2	96-11/16"	23-3/16"	90-5/16"	45-1/2"
90"*	3	102-3/8"	24-3/8"	94-3/16"	47-1/2"
96"*	2	108-1/4"	26-5/16"	100-11/16"	51-1/2"

Table 5

FLASHING INSTALLATION

1. Continue the SP chimney to the roof. Cut the roof opening, centered over the chimney. A 2 inch-airspace around the chimney is required as it penetrates the roof. The size of hole in the roof will vary depending on the roof pitch.
 2. Install the next SP chimney section through the roof. See **Figure 32**.
- NOTE:** If your roof is already shingled, be sure to slide the upper edge under the shingles to prevent leakage.
3. Install a bead of caulk around the pipe at the top edge of the flashing. Wrap the storm collar around the pipe and imbed the edge in the caulk to prevent leakage around the pipe.
 4. Continue to install pipe sections until the proper termination height is reached. See termination section.

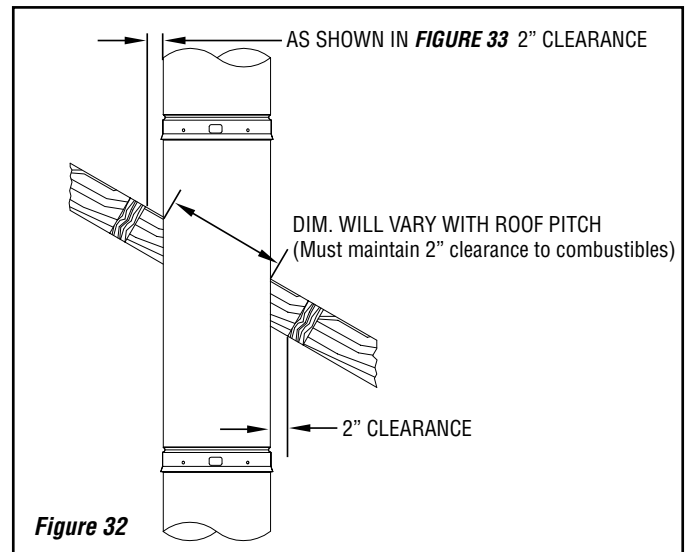


Figure 32

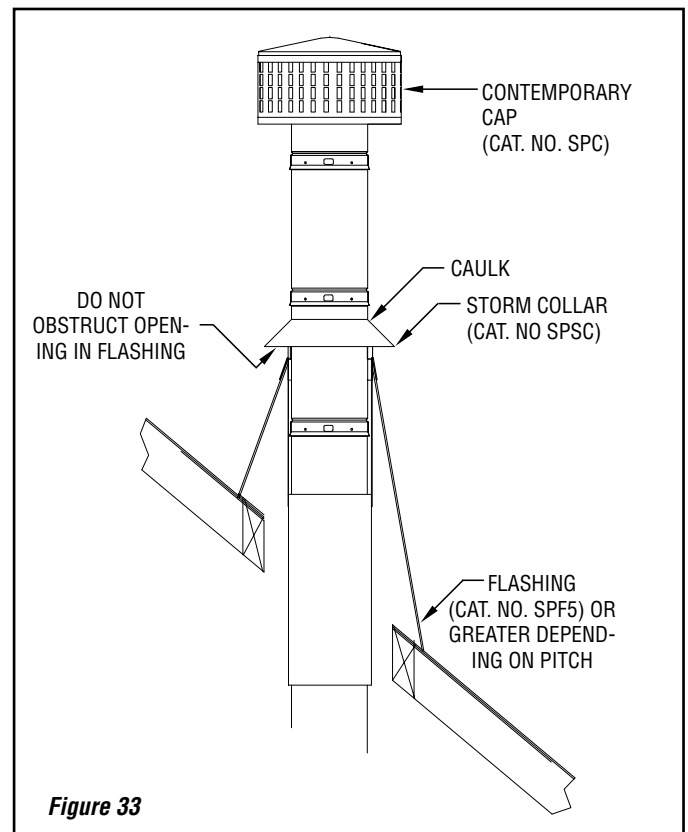


Figure 33

TERMINATION

Many building codes specify a minimum chimney heights above the roof top. These specifications are summarized in what is known as the "Ten Foot Rule". This rule states:

If the horizontal distance from the side of the chimney to the peak of the roof is 10 feet or less, the top of the chimney must be at least 2 feet above the peak of the roof, but never less than 3 feet in overall height above the highest point where it passes through the roof (**Figure 34**).

If the horizontal distance from the side of the chimney to the peak of the roof is more than 10 feet, a chimney height reference point is established on the surface of the roof a distance of 10 feet from the side of the chimney in a horizontal plane. The top of the chimney must be at least 2 feet above this reference point, but never less than 3 feet in height above the highest point where it passes through the roof (**Figure 35**).

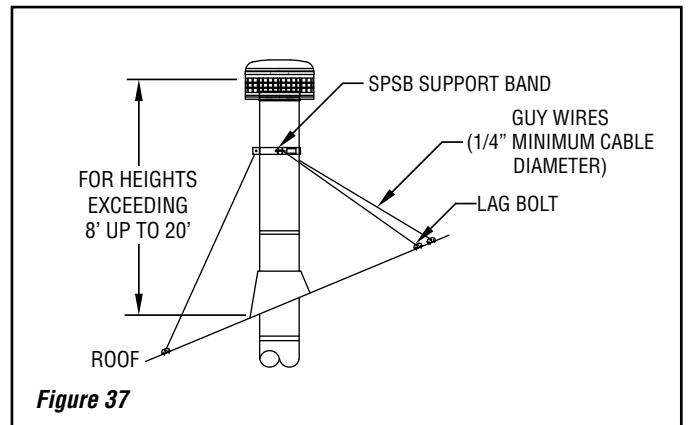
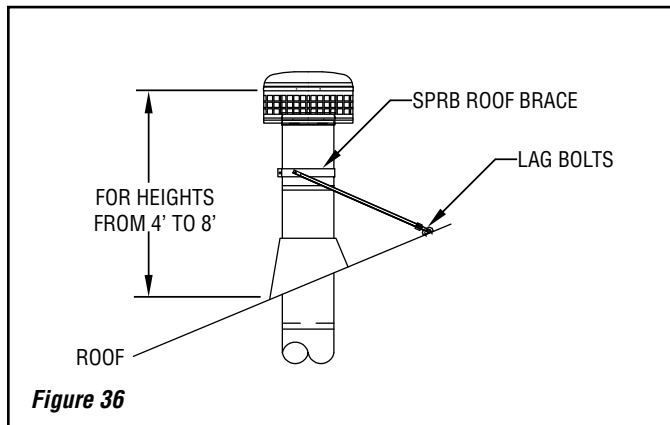
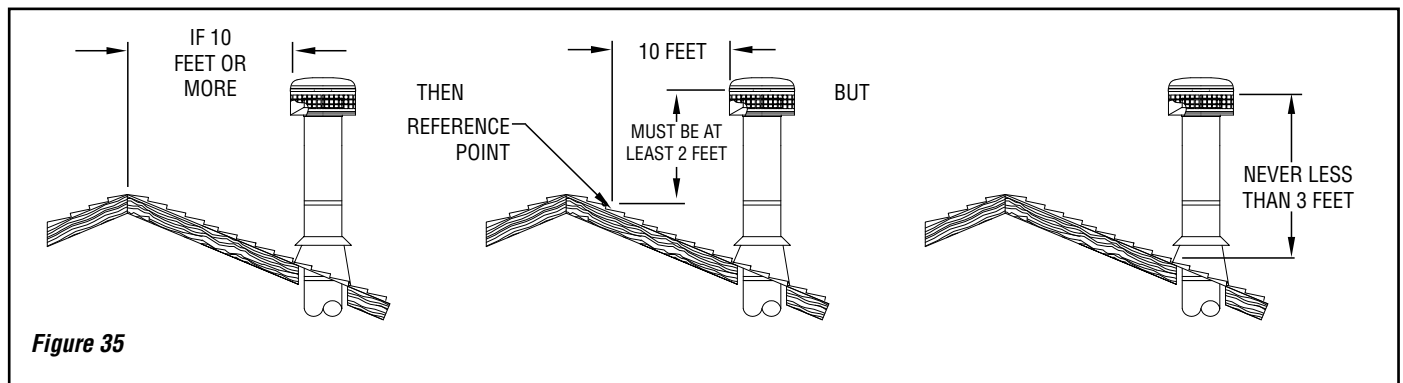
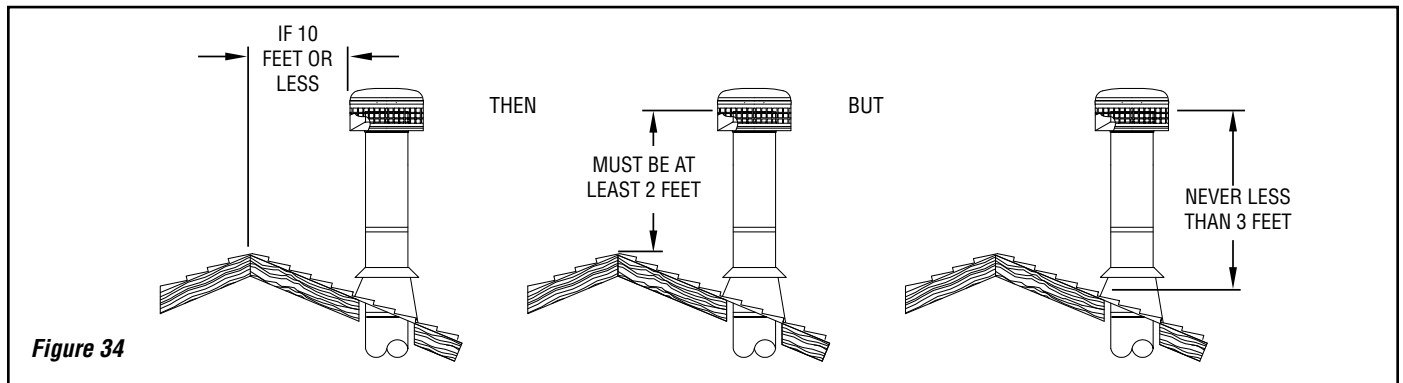
These chimney heights are necessary in the interest of safety and do not ensure smoke free operation. Trees, buildings, adjoining roof lines, adverse wind conditions-etc., may create a need for a taller chimney, should smoking occur.

Additional support is required above the roof if the chimney height exceeds four (4) feet.

Select the proper support for your application-using either a roof brace (**Figure 36**), or a support band with guy wires (**Figure 37**)

SP ROOF BRACE INSTALLATION

1. Assemble the attachment support band (SPSB) around the chimney, and clamp it in place at the desired height using the nut and bolt provided.
2. Loosely attach the support legs to the bolts on the attachment band using hardware provided.
3. Position the support legs as shown in **Figure 36**. The length of the support legs can be adjusted by loosening the bolt on the leg clamp.
4. Secure legs to roof using screws provided. Seal screw holes to prevent roof leaks.
5. Tighten all hardware.



CANADA ONLY

CHIMNEY INSTALLATION

INSTRUCTIONS USING SECURITY CHIMNEYS ASHT

CANADA APPROVED VENTING SYSTEMS:

6" diameter chimney - Canada

Models ASHT® & S2100 manufacture by Security Chimneys® or DuraTech Canada (DTC) manufactured by DuraVent only, including:

- Chimney lengths
- Elbows (*where necessary*)
- Associated components as per these installation instructions and instructions provided by the venting Manufacturer

Reference the installation instructions provided by venting manufacturer.

CHIMNEY ADAPTOR-CANADA ONLY

The fireplace is normally supplied with a chimney adaptor suitable for use with IHP SnapPak venting. In Canada, the use of Security Chimneys ASHT adaptor is required (Security part number 6IHP1* or 6IHP2**).

* One inch wall

** Two inch wall

Chimney Adaptor - Canada only

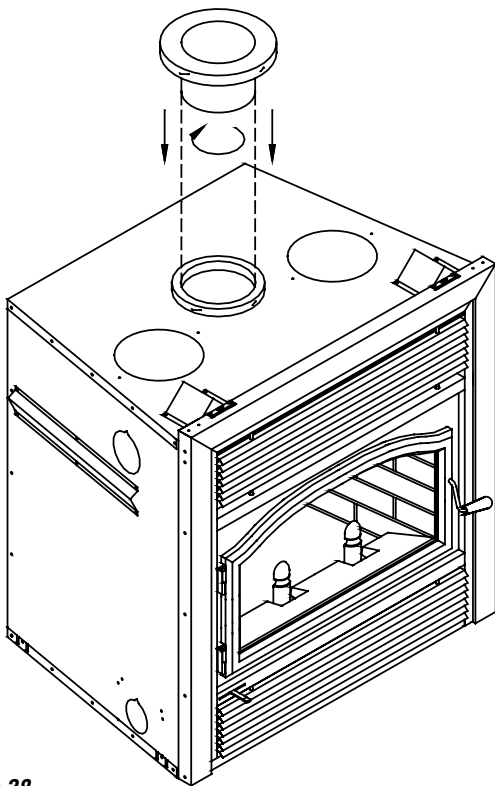


Figure 38

CHIMNEY CHASE AND MULTIPLE TERMINATIONS

For the purpose of this manual, a chimney chase is considered a part of the chimney system rather than part of a building. The termination must be placed a minimum of 18" (460 mm) above the chase.

For installations where more than one chimney is located in the same chase or within the same area, we suggest that their terminations be separated by at least 16" (410 mm) horizontally, and 18" (460 mm) vertically. This separation is to prevent smoke migrating from one chimney to another (see **Figure 39**).

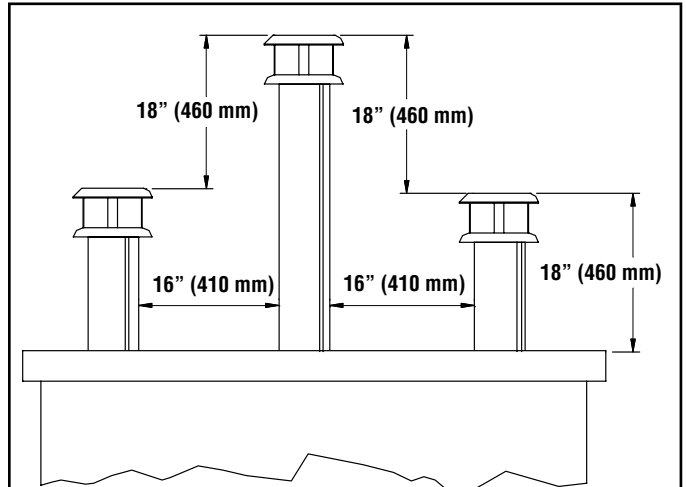


Figure 39

INSTALLATION INSTRUCTIONS FOR MASONRY APPLICATIONS FOR BOTH UNITED STATES AND CANADA

WARNING: Before starting the installation, the masonry chimney must be inspected by a qualified chimney sweep.

The following requirements must be followed:

1. The chimney must be absolutely clear of any soot residue or creosote. Check for cracks, loose or missing bricks that could inhibit correct installation of the liner.
2. The clearance to combustible must be a minimum of 1" between the outside of the masonry and any wood framing or loose insulation.
3. The chimney must be built in accordance with the current building code.
4. No other appliance can be connected to the same chimney.
5. The clearances to combustible for these fireplace connectors are 2" on the side and bottom and 16" at the top.
6. The connector parts are not necessary if the connection between the insulated length and the stainless steel liner is done within the masonry chimney.

Installation:

Rigid stainless liner or stainless flex must be used and listed to UL-1777 for US applications and ULC-S635 for existing masonry or ULC-S640M for new masonry applications in Canada. The steel rigid or flex liner must be rated at 2100° F (1100° C).

Follow these steps:

1. Position the fireplace in its location. Temporarily install the 30° insulated elbow on the top of the fireplace and, using a level, mark with an oval the location where the flue liner will enter the masonry chimney.
2. In the middle of the oval, drill a hole in the masonry chimney at 30°.
3. Increase the size of the hole until a 30° liner elbow can be easily slipped through.
4. Slide the liner down from the top of the masonry chimney until you reach the hole level.
5. Slip through the hole a 30° liner elbow and connect it to the liner.
6. Add a small liner section to the other end of the liner elbow which will allow the liner to extend at least 12" (measured at the top of the liner) from the masonry chimney.
7. Seal the opening around the liner with high temperature refractory cement.
8. The next steps must be done in the following order:

See typical installation illustrated below (Figure 40).

- A. Select the insulated pipe length that will fit between the 30° insulated elbow on top of the appliance and the exposed liner so that it will slide at least 2" over the liner section (You may need to cut the liner for a better fit).
- B. Take that section and attach the pipe to the insulated liner connector and slide it over the liner. Make sure you have enough opening to be able to install the elbow without difficulty.
- C. Install the 30° elbow on the fireplace.
- D. Slide the length section back down on the elbow and twist lock the two together.
- E. Pull the cover down over the length and install the insulation pad over the liner; be careful to cover the liner completely.
- F. Slide back the cover over the insulation and fix it in place using the 3 metal screws supplied.

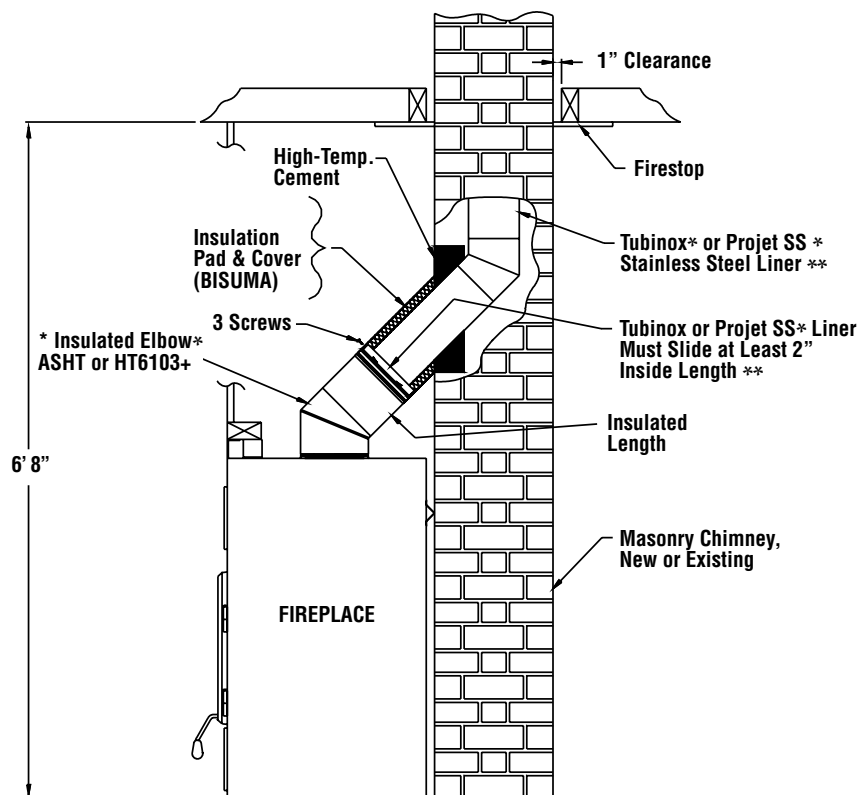


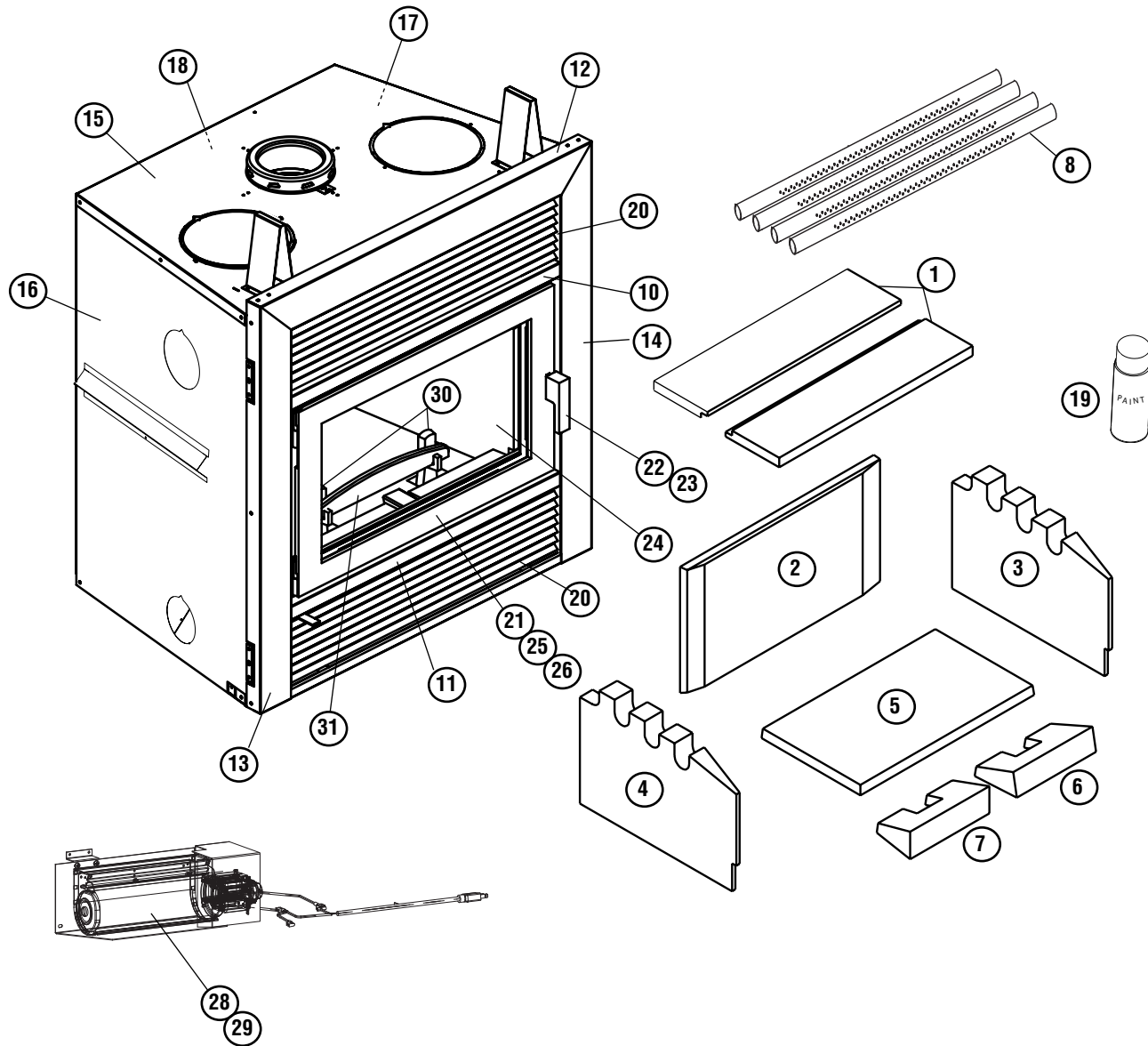
Figure 40

OPTIONAL INSTALLATION ACCESSORIES

Installation Accessories	
Description	Cat./Part No.
Finishing Kits (Required - Order Separately)	
Louver kit	LOUVRECF
OR	
Clean face kit (Requires HeatFlo Kit, F3790)	CAPPINGCF
Outside Air Kit (Required - included w/fireplace)	
Outside Air Coupler to connect outside air UZI to fireplace, UZIAD	UZIAD
Outside Air Ducting - includes 4" insulated flex x 10' long, UZI	UZI
EPA Fireplace - HeatFlo Convection Kit	
EPA Heatflo Conv. Kit, EPA-HEATFLO-KIT	F3790

Fireplace Kits	
Description	Cat./Part No.
Blower motor speed control (wall mount), VRUW	VRUW
Central Forced Air Kit Accessories ❶	
Central Forced Air Kit, Central forced air kit including: blower (BISZY), flex adaptor (BISAF), 2 clamps, variable speed control (VRUW), thermo-disk (VTU), fan to flexible pipe adaptor (BISAVF), back draft damper (BISBD), aluminium tape, BISFWK-1	BISFWK-1
Flexible pipe 5" I.D. x 15 ft. Long, 5FLEX15	5FLEX15
Flexible pipe 5" I.D. x 30 ft. Long, 5FLEX25	5FLEX25
Heating and cooling thermostat, 24V, HCTW	HCTW

REPLACEMENT PARTS - BAINBRIDGE™



REPLACEMENT PARTS - BAINBRIDGE™

Bainbridge™		
Item #	Description	Cat./Part No.
1	Baffle refractory (2 pieces)	PR-IS02205
2	Back refractory	PR-SR2996
3	Right side refractory	PR-SR2997D
4	Left side refractory	PR-SR2997G
5	Bottom refractory	PR-SR2201
6	Front refractory, right side - ash lip	PR-SR2202D
7	Front refractory, left side - ash lip	PR-SR2202G
8	Secondary air tube	PR-SR2271
9	Bracket, secondary air tube lock	PR-SR2214
10	Facing:	
11	Top trim	PR-SR3033
12	Bottom trim	PR-SR3020
13	Top frame	PR-SR2995
14	Left side frame	PR-SR2994G
14	Right side frame	PR-SR2994D
15	Fireplace top	PR-SR2500
16	Fireplace left side	PR-SR2502
17	Fireplace right side	PR-SR2503
18	Fireplace back	PR-SR2499
19	Touch-up paint, aerosol, black metallic SBMB6309	H8159
20	Louvers, upper and lower (set of 2)	LOUVREC
21	Complete door	PR-SR3003LV
22	Wooden door handle	PR-SR2856
23	Door handle rod and lock	PR-SR2855
24	Ceramic glass panel	PR-SR3004
25	Gasket, door, 77-3/4" (3/4" dia.)	PR-SR18230
26	Gasket, glass, 74" (3/16" x 1")	PR-SR1685J
27	Hinge assembly, fireplace and door	PR-SR1933
28	Blower (heat activated on/off, pre-wired), V2	F3270
29	Snap Disc, Blower	VTU
30	Andiron (2)	PR-SR2324
31	Cast iron log retainer bar	PR-SR2323
---	Blower 250 CFM for central forced air kit, BISZY	BISZY
---	Blower variable speed control with decorative wall plate for (BISZY), VRUW	VRUW
---	Thermo-disk, on/off blower control (for BISZY), VTU	VTU
---	Blower to flexible pipe adaptor, BISAVF	BISAVF
---	Backdraft damper, BISBD	BISBD
---	Fireplace to Flex adaptor and 2 clamps, BISAF	BISAF
---	Bainbridge Metal Fab Collar and Sleeve	F4188

SPECIFICATIONS

Cat. No.	Model
H8295	Bainbridge™

Model	Emission Rate	Heat Output	Efficiency (B415.1-10)
Bainbridge™	1.9 g/hr	15,300-55,600 btu/hr	77%

Product Reference Information	
Weight	385 lbs
Height	36"
Width	36"
Depth	24-1/2"
Firebox W x H x D - measured in front	22" x 11-3/4" x 12"
Chimney weight ASHT (6" dia)	6.25 lb per linear foot
Chimney weight AC (6" dia)	3.25 lb per linear foot

CLEARANCE TO COMBUSTIBLES

The following clearances meet the minimum requirements for a safe installation:

Side wall: 24" (610 mm) measured from the fireplace side.

Ceiling: 6' 8" (2,032 mm) measured from the base of the fireplace.

Fireplace enclosure:

Bottom: 0"

Side: 0" to standoff

Back: 0" to standoff

Top: Do not fill the space above the fireplace with any material (Except the wood framing. See **Page 10, Figure 9**).

Chimney: 2" (50 mm)

Mantel: 45" (1143 mm) measured from the base of the fireplace.

Contact an IHP dealer to obtain any of these parts. Never use substitute materials not approved by IHP. Use of non-approved parts can result in poor performance and safety hazards.

SECURITY CHIMNEYS® AND DURAVENT® - PARTS AND COMPONENTS LISTS

The components listed below must be ordered from Security Chimneys® or DuraVent®. Contact your Security Chimneys or DuraVent Distributor or Dealer for ordering information.

Security Chimneys®
2125 Monterey, Laval, Quebec
Canada, H7L 3T6
securitychimneys.com

450-973-9999
1-800-361-4909 (USA)
1-800-667-3387 (Canada)

M&G DuraVent
877 Cotting Court, Vacaville,
California, 95688
duravent.com

1-800-835-4429

Secure Temp ASHT 1" High Temp. Insulated Stainless Steel Chimney 6" I.D. and 8" O.D., Double-Wall Stainless Steel, Listed to CAN/ULC-S604, UL-103HT and CAN/ULC S629

Description	Part/Cat. No.
Lengths and Misc. Chimney Components	
8" length, 6" Dia.	6L8
12" length, 6" Dia.	6L12
18" length, 6" Dia.	6L18
24" length, 6" Dia.	6L24
36" length, 6" Dia.	6L36
48" length, 6" Dia.	6L48
Adjustable Length 12", 6" Dia.	6LA
15° elbow, 6" Dia.	6E15
30° elbow, 6" Dia.	6E30
Rain Termination Cap, 6" Dia.	6CC
Spark Arrester Screen (universal spark arrester band)	PE
Wall Band	BM
Supports	
Offset Support	SO
Roof Support	ST
Roof Brace	BS2
Firestops	
Firestop	6BF
Radiation Shield	6RS
Insulated Attic Radiation Shield	6RSA2
Insulated Wall Radiation Shield	6RSM
Insulated Wall Radiation Shield, 30°	6RSMI30
Uninsulated Wall Radiation Shield, 30°	6RSM30
Attic Radiation Shield	ACRSA
Roof Flashings	
Flat Roof Flashing	6FR
1/12 - 7/12 (5° - 30°)	6FAR
8/12 - 12/12 (30° - 45°)	6FBR
Storm Collar	6FC

DuraTech DTC 1" High Temp. Insulated Stainless Steel Chimney 6" I.D. and 8" O.D., Double-Wall Stainless Steel, Listed to CAN/ULC-S604, UL-103HT and CAN/ULC S629

Description	Part/Cat. No.
Lengths and Misc. Chimney Components	
8" length, 6" Dia.	6DTC-08SS
12" length, 6" Dia.	6DTC-12SS
18" length, 6" Dia.	6DTC-18SS
24" length, 6" Dia.	6DTC-24SS
36" length, 6" Dia.	6DTC-36SS
48" length, 6" Dia.	6DTC-48SS
Adjustable Length 12", 6" Dia.	6DTC-12TASS
15° elbow, 6" Dia.	6DTC-E15SS
30° elbow, 6" Dia.	6DTC-E30SS
Rain Termination Cap, 6" Dia.	6DTC-VC
Spark Arrester Screen (universal spark arrester band)	DTC-SA
Wall Band	DTC-WSU
Supports	
Offset Support	DTC-RESU
Roof Support	DTC-RS
Roof Brace	DTC-XRB
Firestops	
Firestop	6DTC-FS
Radiation Shield	6DTC-FRS
Insulated Attic Radiation Shield	6DTC-ISI
Insulated Wall Radiation Shield	6DTC-WTI
Insulated Wall Radiation Shield, 30°	6DTC-WRSI30
Uninsulated Wall Radiation Shield, 30°	6DTC-WRSI45
Attic Radiation Shield	6DTC-ISIA
Roof Flashings	
Flat Roof Flashing	6DTC-FF
1/12 - 7/12 (5° - 30°)	6DTC-F7
8/12 - 12/12 (30° - 45°)	6DTC-F12
Storm Collar	6DTC-SC



Report No. / Rapport n°
14-199

LISTED FACTORY BUILT FIREPLACE FOYER PRÉFABRIQUE HOMOLOGUÉ

FIREPLACE, ALSO FOR USE IN MANUFACTURED

HOMES WITH SOLID FUEL ONLY

CE FOYER EST ÉGALEMENT CERTIFIÉ POUR

INSTALLATION DANS LES MAISONS MOBILES.

COMBUSTIBLES SOLIDES SEULEMENT.



Manufactured by / Fabriqué par:
INNOVATIVE HEARTH PRODUCTS

1502 14th St. NW
Auburn, WA 98001 USA

Serial No.

Numéro de série

Model / Modèle: Bainbridge™ LV/CF/AR

Conforms to / Conforme au : UL STD 127
Certified to / Certifié au : ULC STD S610

Certification test emission value 1.9 g/hr per 2020 standard

Valeur d'émission du test d'homologation 1,9 g/h selon la norme 2020

CLEARANCES TO COMBUSTIBLES:

SIDE WALL (FROM DOOR EDGE)	24 in. (610 mm)	MUR LATÉRAL (DE L'OUVERTURE DE LA PORTE)	24 po. (610 mm)
MANTEL (ABOVE FIREPLACE'S BASE)	48 in. (1372 mm)	LINTEAU (AU-DESSUS DE LA BASE DU FOYER)	48 po. (1372 mm)
BACK WALL (FROM SPACERS)	0 in. (0 mm)	MUR ARRIÈRE ET CÔTÉ DU FOYER (DES ESPACEURS)	0 po. (0 mm)
ABOVE THE FIREPLACE (FROM THE BASE OF THE FIREPLACE)	6 ft. 8 in. (2032 mm)	AU-DESSUS DU FOYER (À PARTIR DE LA BASE DU FOYER)	6 pi. 8 po. (2032 mm)
CHIMNEY	2 in. (51 mm)	CHEMINÉE	2 po. (51 mm)

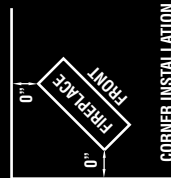
DÉGAGEMENTS AUX COMBUSTIBLES:

MUR LATÉRAL (DE L'OUVERTURE DE LA PORTE)	24 po. (610 mm)
LINTEAU (AU-DESSUS DE LA BASE DU FOYER)	48 po. (1372 mm)
MUR ARRIÈRE ET CÔTÉ DU FOYER (DES ESPACEURS)	0 po. (0 mm)
AU-DESSUS DU FOYER (À PARTIR DE LA BASE DU FOYER)	6 pi. 8 po. (2032 mm)
CHEMINÉE	2 po. (51 mm)

INSTALL WITH MINIMUM CLEARANCES TO WALL
AS SHOWN IN INCHES.

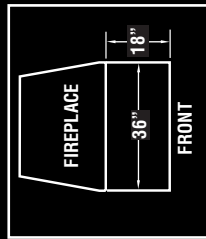


SIDEWALL - BACKWALL
INSTALLATION



CORNER
INSTALLATION

FLOOR PROTECTOR MINIMUM DISTANCE
FROM OPENING IN INCHES



HEARTH EXTENSION MATERIAL :
3/8" THICKNESS NON COMBUSTIBLE
MATERIAL
OR EQUIVALENT

U.S. ENVIRONMENTAL PROTECTION AGENCY
Certified to comply with 2020 particulate emission
standards using crib wood.

DATE OF MFG. 1 2 3 4 5 6 7 8 9 10 11 12

2019-20-21-22-23-24-25

P/N 901017-00, REV. 0, 08/2019

USE WOOD FUEL ONLY

- NON COMBUSTIBLE HEARTH EXTENSION MUST BE INSTALLED AT FRONT OF UNIT EXTENDING 18 in. (457 mm) AT FRONT AND 36 in. (914 mm) WIDE MINIMUM.
- THIS FIREPLACE HAS NOT BEEN TESTED WITH UNVENTED GAS LOG SET. TO REDUCE RISK OF FIRE OR INJURY DO NOT INSTALL AN UNVENTED GAS LOG SET INTO THE FIREPLACE.
- ELECTRICAL RATING: 120 V, 60 Hz
- CHIMNEY TYPE: USE ONLY WITH LISTED 6 in. DIAMETER CHIMNEY, CERTIFIED MODEL ASHT+ S-2100+, HT6000+, HT6103+ OR AC.
- CAN BE CONNECTED TO A MASONRY CHIMNEY AS DESCRIBED IN THE INSTALLATION INSTRUCTIONS.
- COMPONENTS USED WITH THE FIREPLACE MUST BE LISTED. SEE LIST IN THE INSTALLATION INSTRUCTIONS.
- REPLACE GLASS WITH CERAMIC GLASS 5 mm THICK.
- FOR SAFE OPERATION INSTALL IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS.
- CAUTION: COMBUSTION AIR OPENING MUST NOT BE OBSTRUCTED.
- DO NOT OVERFIRE THE FIREPLACE.
- OPERATE THE FIREPLACE WITH DOOR FULLY OPEN OR FULLY CLOSED ONLY.
- DO NOT USE A FIREPLACE INSERT OR OTHER PRODUCTS NOT SPECIFIED FOR USE WITH THIS PRODUCT
- CONTACT YOUR LOCAL BUILDING OR FIRE OFFICIALS ABOUT RESTRICTIONS AND INSTALLATION INSPECTIONS IN YOUR AREA.

- POUR USAGE AVEC LE BOIS SEULEMENT
- UN TABLIER NON COMBUSTIBLE DOIT ÊTRE INSTALLÉ À L'AVANT DU FOYER. DIMENSION MINIMALE DE 18 po. (457 mm) PAR 36 po. (914 mm) DE LARGE.
- CE FOYER N'EST PAS HOMOLOGUÉ POUR ÊTRE UTILISÉ AVEC UN ENSEMBLE DE Bûches à gaz SANS CONDUIT D'ÉVACUATION. AFIN DE RÉDUIRE LES RISQUES D'INCENDIE OU DE BLESSURES, N'INSTALLEZ PAS DE Bûches à gaz SANS CONDUIT D'ÉVACUATION À L'INTÉRIEUR DE CE FOYER.
- ALIMENTATION ÉLECTRIQUE: 120V, 60 Hz
- UTILISER SEULEMENT AVEC UNE CHEMINÉE 6 po. (150 mm) DE DIAMÈTRE, MODÈLE ASHT+, S2100+, HT6000+, HT6103+ OU AC HOMOLOGUÉE.
- PEUT ÊTRE RACCORDÉ SUR UNE CHEMINÉE DE MAÇONNERIE TEL QUE DÉCRIT DANS LE MANUEL D'INSTALLATION.
- LES COMPOSANTES UTILISÉES AVEC LE FOYER DOIVENT ÊTRE HOMOLOGUÉES. VOIR LA LISTE DANS LE MANUEL D'INSTALLATION.
- REMPLACER LA VITRE AVEC UN VERRE CÉRAMIQUE DE 5mm D'ÉPAISSEUR.
- POUR UNE UTILISATION SÉCURITAIRE, INSTALLER CONFORMÉMENT AUX DIRECTIVES DU FABRICANT.
- ATTENTION: NE PAS OBSTRUER LES ARRIVÉES D'AIR COMBURANT.
- NE PAS FAIRE SURCHAUFFER LE FOYER.
- LA PORTE DU FOYER DOIT DEMEURER TOTALEMENT OUVERTE OU TOTALEMENT FERMÉE LORSQUE LE FOYER FONCTIONNE.
- NE PAS UTILISER DE POÊLE ENCASTRABLE OU D'AUTRES PRODUITS NON SPÉCIFIÉS COMME ÉTANT UTILISABLES AVEC CE PRODUIT.
- CONTACTEZ VOS FONCTIONNAIRES LOCAUX À PROPOS DES RESTRICTIONS ET INSPECTIONS D'INSTALLATION.
- VOIR LE MANUEL D'INSTALLATION POUR PLUS D'INFORMATION.
- L'UTILISATION DE CET APPAREIL DE CHAUFFAGE AU BOIS DE MANIÈRE INCOMPATIBLE AVEC LES INSTRUCTIONS DU MANUEL DU PROPRIÉTAIRE CONSTITUE UNE INFRACTION AUX RÉGULATIONS FÉDÉRALES.

NOTES

[illegible]

Innovative Hearth Products

Astria® Brand EPA Wood Burning Fireplace

Limited Lifetime Warranty

THE WARRANTY

Innovative Hearth Products ("IHP") Limited Lifetime Warranty warrants your Astria® Brand EPA Wood Burning Fireplace ("Product") to be free from defects in materials and workmanship at the time of manufacture. The Product body, firebox and ceramic glass carry the Limited Lifetime Warranty. Ceramic glass carries the Limited Lifetime Warranty against thermal breakage only. After installation, if covered components manufactured by IHP are found to be defective in materials or workmanship during the Limited Lifetime Warranty period and while the Product remains at the site of the original installation, IHP will, at its option, repair or replace the covered components. If repair or replacement is not commercially practical, IHP will, at its option, refund the purchase price or wholesale price of the IHP product, whichever is applicable. IHP will also pay IHP prevailing labor rates, as determined in its sole discretion, incurred in repairing or replacing such components for up to five years. THERE ARE EXCLUSIONS AND LIMITATIONS to this Limited Lifetime Warranty as described herein.

COVERAGE COMMENCEMENT DATE

Warranty coverage begins on the date of purchase. In the case of new home construction, warranty coverage begins on the date of first occupancy of the dwelling or six months after the sale of the Product by an independent IHP dealer/distributor, whichever occurs earlier. The warranty shall commence no later than 24 months following the date of product shipment from IHP, regardless of the installation or occupancy date.

EXCLUSIONS AND LIMITATIONS

This Limited Lifetime Warranty applies only if the Product is installed in the United States or Canada and only if operated and maintained in accordance with the printed instructions accompanying the Product and in compliance with all applicable installation and building codes and good trade practices.

This warranty is non-transferable and extends to the original owner only. The Product must be purchased through a listed supplier of IHP and proof of purchase must be provided. The Product body and firebox carry the Limited Lifetime Warranty from the date of installation. Vent components, trim components and paint are excluded from this Limited Lifetime Warranty. The following do not carry a Limited Lifetime Warranty but are warranted as follows:

Cast Iron Heat Exchanger – Replacement for five years from the date of installation

Cast iron parts – Replacement for one year from the date of installation

Catalyst – Carries a separate warranty. Refer to the warranty certificate provided for that part

Electrical components – Repair or replacement for one year from date of installation

Gaskets – Replacement for one year from the date of installation.

Gold & nickel plating – Replacement for two years from date of installation. Excludes tarnishing

Refractory & screens – Replacement for two years from date of installation. Excludes hairline cracks

Removable air tubes – Repair or replacement for seven years from date of installation. IHP prevailing labor rates for years one through five.

Labor coverage – Prevailing IHP labor rates apply for the warranty period of the component, unless otherwise noted

Parts not otherwise listed carry a 90 day warranty from the date of installation.

Whenever practicable, IHP will provide replacement parts, if available, for a period of 10 years from the last date of manufacture of the Product.

IHP will not be responsible for: (a) damages caused by normal wear and tear, accident, riot, fire, flood or acts of God; (b) damages caused by abuse, negligence, misuse, or unauthorized alteration or repair of the Product affecting its stability or performance. (The Product must be subject to normal use with approved fuels listed in the Operation Manual provided with the product. Fuel products with abnormal burning characteristics, including but not limited to fuel such as driftwood, coal or plywood and wood products using a binder may burn at excessive temperatures and may cause damage to the Product or may cause it to function improperly; IHP stoves, inserts and high efficiency EPA fireplaces are approved for burning dry seasoned wood only.); (c) damages caused by failing to provide proper maintenance and service in accordance with the instructions provided with the Product; (d) damages, repairs or inefficiency resulting from faulty installation or application of the Product.

Coverage of this Limited Lifetime Warranty is conditional upon the appliance being operated without the use of grates, irons or any other method to elevate the fire.

IHP is not responsible for inadequate system draft caused by air conditioning and heating systems, mechanical ventilation systems, or general construction conditions which may generate negative air pressure in the room in which the appliance is installed. Additionally IHP assumes no responsibility for smoking conditions caused by inadequate chimney height, adjoining trees or buildings, adverse wind conditions or unusual environmental factors and conditions. Certain IHP Products are listed for use with Security Chimneys International, Ltd. chimney systems only. Use of chimney components other than that specified in the Product manual will void the Product warranty.

This Limited Lifetime Warranty covers only parts and labor as provided herein. In no case shall IHP be responsible for materials, components or construction which are not manufactured or supplied by IHP or for the labor necessary to install, repair or remove such materials, components or construction. Additional utility bills incurred due to any malfunction or defect in equipment are not covered by this Limited Lifetime Warranty. All replacement or repair components will be shipped F.O.B. from the nearest stocking IHP factory.

LIMITATION ON LIABILITY

It is expressly agreed and understood that IHP's sole obligation and the purchaser's exclusive remedy under this warranty, under any other warranty, expressed or implied, or in contract, tort or otherwise, shall be limited to replacement, repair, or refund, as specified herein.

In no event shall IHP be liable for any incidental or consequential damages caused by defects in the Product, whether such damage occurs or is discovered before or after replacement or repair, and whether such damage is caused by IHP's negligence. IHP has not made and does not make any representation or warranty of fitness for a particular use or purpose, and there is no implied condition of fitness for a particular use or purpose.

IHP makes no expressed warranties except as stated in this Limited Lifetime Warranty. The duration of any implied warranty is limited to the duration of this expressed warranty.

No one is authorized to change this Limited Lifetime Warranty or to create for IHP any other obligation or liability in connection with the Product. Some states and provinces do not allow the exclusion or limitation of incidental or consequential damages, so the above limitations or exclusions may not apply to you. The provisions of this Limited Lifetime Warranty are in addition to and not a modification of or subtraction from any statutory warranties and other rights and remedies provided by law.

INVESTIGATION OF CLAIMS AGAINST WARRANTY

IHP reserves the right to investigate any and all claims against this Limited Lifetime Warranty and to decide, in its sole discretion, upon the method of settlement.

To receive the benefits and advantages described in this Limited Lifetime Warranty, the appliance must be installed and repaired by a licensed contractor approved by IHP.

Contact IHP at the address provided herein to obtain a listing of approved dealers/distributors. **IHP shall in no event be responsible for any warranty work done by a contractor that is not approved without first obtaining IHP's prior written consent.**

HOW TO REGISTER A CLAIM AGAINST WARRANTY

In order for any claim under this warranty to be valid, you must contact the IHP dealer/distributor from which you purchased the product. If you cannot locate the dealer/distributor, then you must notify IHP in writing. IHP must be notified of the claimed defect in writing within 90 days of the date of failure. Notices should be directed to the IHP Warranty Department at 1769 East Lawrence Street; Russellville, AL 35654 or visit our website at WWW.ASTRIA.US.COM.

WARRANTY

Your fireplace is covered by a limited warranty. Please read the warranty to be familiar with its coverage.

Retain this manual. File it with your other documents for future reference.

PRODUCT REFERENCE INFORMATION

We recommend that you record the following important information about your fireplace. Please contact your IHP dealer for any questions or concerns.

REPLACEMENT PARTS

See **Pages 24-25** for a complete replacement parts list. Use only parts supplied from the manufacturer.

Normally, all parts should be ordered through your IHP distributor or dealer. Parts will be shipped at prevailing prices at time of order.

When ordering repair parts, always give the following information:

1. The model number of the appliance.
2. The serial number of the appliance.
3. The part number.
4. The description of the part.
5. The quantity required.
6. The installation date of the appliance.

If you encounter any problems or have any questions concerning the installation or application of this system, please contact your dealer.

IHP
1769 East Lawrence Street
Russellville, AL 35654
Visit us at Astria.us.com

Model Number _____
Serial Number _____
Date Installed _____
Dealer's Name _____
Dealer's Phone Number _____



Innovative Hearth Products (IHP) reserves the right to make changes at any time, without notice, in design, materials, specifications, and prices, and also to discontinue colors, styles, and products. Consult your local distributor for fireplace code information.





LISTED FACTORY BUILT FIREPLACE
FOYER PRÉFABRIQUE HOMOLOGUÉ



FIREPLACE, ALSO FOR USE IN MANUFACTURED

HOMES WITH SOLID FUEL ONLY

**CE FOYER EST ÉGALEMENT CERTIFIÉ POUR
INSTALLATION DANS LES MAISONS MOBILES.
COMBUSTIBLES SOLIDES SEULEMENT.**

Manufactured by / Fabriqué par:
INNOVATIVE HEARTH PRODUCTS
1502 14th St. NW
Auburn, WA 98001 USA

Serial No.
Numéro de série



Conforms to / Conforme au : UL STD 127
Certified to / Certifié au : ULC STD S610

Model / Modèle: Montecito™-B

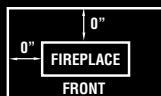
Certification test emission value 1.9 g/hr per 2020 standard
Valeur d'émission du test d'homologation 1,9 g/h selon la norme 2020

CLEARANCES TO COMBUSTIBLES:

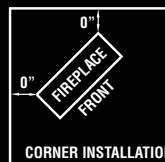
DÉGAGEMENTS AUX COMBUSTIBLES:

SIDE WALL (FROM DOOR EDGE)	24 in. (610 mm)	MUR LATÉRAL (DE L'OUVERTURE DE LA PORTE)	24 po. (610 mm)
MANTEL (ABOVE FIREPLACE'S BASE)	42 in. (1067 mm)	LINTEAU (AU-DESSUS DE LA BASE DU FOYER)	42 po. (1067 mm)
BACK WALL (FROM SPACERS)	0 in. (0 mm)	MUR ARRIÈRE ET CÔTÉ DU FOYER (DES ESPACEURS)	0 po. (0 mm)
ABOVE THE FIREPLACE (FROM THE BASE OF THE FIREPLACE)	6 ft. 8 in. (2032 mm)	AU-DESSUS DU FOYER (À PARTIR DE LA BASE DU FOYER)	6 pi. 8 po. (2032 mm)
CHIMNEY	2 in. (51 mm)	CHEMINÉE	2 po. (51 mm)

INSTALL WITH MINIMUM CLEARANCES TO WALL
AS SHOWN IN INCHES.

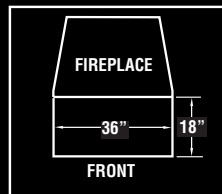


SIDEWALL - BACKWALL
INSTALLATION



CORNER INSTALLATION

FLOOR PROTECTOR MINIMUM DISTANCE
FROM OPENING IN INCHES



HEARTH EXTENSION MATERIAL :

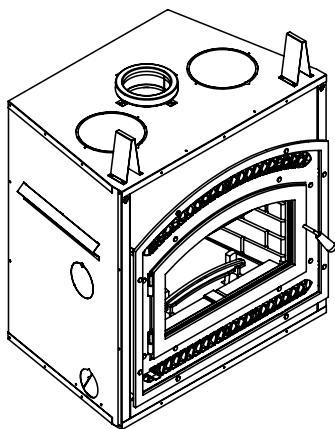
- 3/8" THICKNESS NON COMBUSTIBLE MATERIAL
- OR EQUIVALENT

U.S. ENVIRONMENTAL PROTECTION AGENCY
Certified to comply with 2020 particulate emission
standards using crib wood.

DATE OF MFG. 1 2 3 4 5 6 7 8 9 10 11 12

2019-20-21-22-23-24-25

- USE WOOD FUEL ONLY
- NON COMBUSTIBLE HEARTH EXTENSION MUST BE INSTALLED AT FRONT OF UNIT EXTENDING 18 in. (457 mm) AT FRONT AND 36 in. (914 mm) WIDE MINIMUM.
- THIS FIREPLACE HAS NOT BEEN TESTED WITH UNVENTED GAS LOG SET. TO REDUCE RISK OF FIRE OR INJURY DO NOT INSTALL AN UNVENTED GAS LOG SET INTO THE FIREPLACE.
- ELECTRICAL RATING: 120 V, 60 Hz
- CHIMNEY TYPE: USE ONLY WITH LISTED 6 in. DIAMETER CHIMNEY, CERTIFIED MODEL ASHT+, S-2100+, HT6000+, HT6103+ OR AC.
- CAN BE CONNECTED TO A MASONRY CHIMNEY AS DESCRIBED IN THE INSTALLATION INSTRUCTIONS.
- COMPONENTS USED WITH THE FIREPLACE MUST BE LISTED. SEE LIST IN THE INSTALLATION INSTRUCTIONS.
- REPLACE GLASS WITH CERAMIC GLASS 5 mm THICK.
- FOR SAFE OPERATION INSTALL IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS.
- CAUTION: COMBUSTION AIR OPENING MUST NOT BE OBSTRUCTED.
- DO NOT OVERFIRE THE FIREPLACE.
- OPERATE THE FIREPLACE WITH DOOR FULLY OPEN OR FULLY CLOSED ONLY.
- DO NOT USE A FIREPLACE INSERT OR OTHER PRODUCTS NOT SPECIFIED FOR USE WITH THIS PRODUCT
- CONTACT YOUR LOCAL BUILDING OR FIRE OFFICIALS ABOUT RESTRICTIONS AND INSTALLATION INSPECTIONS IN YOUR AREA.
- CONTACTEZ LES RESPONSABLES DE VOTRE RÉGION A PROPOS DES RESTRICTIONS ET INSPECTIONS D'INSTALLATION.
- SEE IHP INSTALLATION AND OPERATING INSTRUCTIONS FOR THIS MODEL.
- INSTALL AND USE ONLY IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS AND LOCAL BUILDING CODES.
- SPECIAL METHODS ARE REQUIRED WHEN PASSING THROUGH A WALL OR CEILING. SEE INSTRUCTIONS AND BUILDING CODES.
- PREVENT CREOSOTE FIRE: INSPECT CHIMNEY CONNECTOR AND CHIMNEY FLUE MONTHLY AND CLEAN IF NECESSARY.
- DO NOT OVERFIRE. IF DOME OR CHIMNEY CONNECTOR GLOWS YOU ARE OVERFIRING.
- KEEP FURNISHINGS AND OTHER COMBUSTIBLE MATERIALS A CONSIDERABLE DISTANCE AWAY FROM APPLIANCE.
- MAINTENIR LES MEUBLES ET AUTRES OBJETS À UNE DISTANCE SÉCURITAIRE DU FOYER.
- THIS WOOD HEATER NEEDS PERIODIC INSPECTION AND REPAIR FOR PROPER OPERATION. CONSULT THE OWNER'S MANUAL FOR FURTHER INFORMATION. IT IS AGAINST FEDERAL REGULATIONS TO OPERATE THIS WOOD HEATER IN A MANNER INCONSISTENT WITH THE OPERATING INSTRUCTIONS IN THE OWNER'S MANUAL.
- CET APPAREIL DE CHAUFFAGE AU BOIS DOIT ÊTRE INSPECTÉ ET ENTRETENU PÉRIODIQUEMENT POUR FONCTIONNER CORRECTEMENT. VOIR LE MANUEL DU PROPRIÉTAIRE POUR PLUS D'INFORMATION. L'UTILISATION DE CET APPAREIL DE CHAUFFAGE AU BOIS DE MANIÈRE INCOMPATIBLE AVEC LES INSTRUCTIONS DU MANUEL DU PROPRIÉTAIRE CONSTITUE UNE INFRACTION AUX RÉGULATIONS FÉDÉRALES.
- POUR UNE UTILISATION SÉCURITAIRE, INSTALLER CONFORMÉMENT AUX DIRECTIVES DU FABRICANT.
- ATTENTION: NE PAS OBSTRUER LES ARRIVÉES D'AIR COMBURANT.
- NE PAS FAIRE SURCHAUFFER LE FOYER.
- LA PORTE DU FOYER DOIT DEMEURER TOTALEMENT OUVERTE OU TOTALEMENT FERMÉE LORSQUE LE FOYER FONCTIONNE.
- NE PAS UTILISER DE POÊLE ENCASTRABLE OU D'AUTRES PRODUITS NON SPÉCIFIÉS COMME ÉTANT UTILISABLES AVEC CE PRODUIT.
- POUR UNE UTILISATION SÉCURITAIRE, INSTALLER CONFORMÉMENT À L'AVANT DU FOYER. DIMENSION MINIMALE DE 18 po. (457 mm) PAR 36 po. (914 mm) DE LARGE.
- CE FOYER N'EST PAS HOMOLOGUÉ POUR ÊTRE UTILISÉ AVEC UN ENSEMBLE DE BÛCHES À GAZ SANS CONDUIT D'ÉVACUATION. AFIN DE RÉDUIRE LES RISQUES D'INCENDIE OU DE BLESSURES, N'INSTALLEZ PAS DE BÛCHES À GAZ SANS CONDUIT D'ÉVACUATION À L'INTÉRIEUR DE CE FOYER.
- ALIMENTATION ÉLECTRIQUE: 120V, 60 Hz
- UTILISER SEULEMENT AVEC UNE CHEMINÉE 6 po. (150 mm) DE DIAMÈTRE, MODÈLE ASHT+, S2100+, HT6000+, HT6103+ OU AC HOMOLOGUÉE.
- PEUT ÊTRE RACCORDÉ SUR UNE CHEMINÉE DE MAÇONNERIE TEL QUE DÉCRIT DANS LE MANUEL D'INSTALLATION.
- LES COMPOSANTES UTILISÉES AVEC LE FOYER DOIVENT ÊTRE HOMOLOGUÉES. VOIR LA LISTE DANS LE MANUEL D'INSTALLATION.
- REMPLACER LA VITRE AVEC UN VERRE CÉRAMIQUE DE 5 mm D'ÉPAISSEUR.



SAVE THESE INSTRUCTIONS FOR FUTURE REFERENCE

A French manual is available upon request. Order P/N 901020-02.

Ce manuel d'installation est disponible en français, simplement en faire la demande. Numéro de la pièce 901020-02.

**Fireplace, also for use in mobile or
manufactured homes with solid fuel only.**



WARNING

- Hot! Do not touch! The glass and surfaces of this appliance will be hot during operation and will retain heat for a while after shutting off the appliance. Severe burns may result.
- Carefully supervise children in the same room as appliance.
- If small children are present in the home, it is recommended that this appliance be fitted with an adjustable safety gate or barrier screen.



Listed to standards:
ULC-S610 and UL-127
Report # 14-199
EPA Cert. No. 537

INSTALLATION AND OPERATION INSTRUCTIONS

MONTECITO-B

EPA Wood-Burning Fireplace
P/N 901020-00 REV. NC 08/2019

MODEL

MONTECITO-B

This installation manual will enable you to obtain a safe, efficient and dependable installation of your fireplace system. Please read and understand these instructions before beginning your installation.

Do not alter or modify the fireplace or its components under any circumstances. Any modification or alteration of the fireplace system, including but not limited to the fireplace, chimney components and accessories, may void the warranty, listings and approvals of this system and could result in an unsafe and potentially dangerous installation.

IHP wood-burning fireplaces are designed for use as a supplemental heater. They are not intended for continuous use as a primary heat source.



WARNING

- The fireplace cannot be operated without a door. Consult your dealer to select the correct replacement door.
- The fireplace is equipped with a blower, electrical connection must be made prior to fireplace installation
- Important! To assure proper alignment of glass doors: Install this fireplace in a square and plumb condition, using shims as necessary at sides and/or bottom.
- Install the fireplace only as described in these instructions.



WARNING

This product can expose you to chemicals including Carbon Black, which is known to the State of California to cause cancer, and Carbon Monoxide, which is known to the State of California to cause birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov



CONGRATULATIONS!

When you purchased your new fireplace, you joined the ranks of thousands of individuals whose answer to their home heating needs reflects their concern for aesthetics, efficiency and our environment. We extend our continued support to help you achieve the maximum benefit and enjoyment available from your new fireplace.

Thank you for selecting a IHP fireplace as the answer to your home supplemental heating needs.

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THE FIREPLACE INTRODUCTION

The MONTECITO-B wood-burning fireplace is an energy efficient, heat circulating, closed combustion fireplace. You will receive a lifetime of comfort and enjoyment from your fireplace provided it is installed, maintained and operated properly.

- Please read these instructions and retain this manual for future reference.
- Before beginning the fireplace installation, consult the local authorities to obtain your building permit and check your local building codes. Install the fireplace only as described in these instructions and using only IHP components.
- This fireplace has been tested for CAN/ULC S610-M87 and ANSI/UL 127 under report number 307-4084. It has also been tested for EPA 40 C.F.R Part 60, section 60.532(b). Certificate number 537.
- The MONTECITO-B fireplace is NOT intended for use with a gas log set. Do not use a fireplace insert or any other product with this fireplace unless it is specified by IHP for use with this appliance. Failure to follow these instructions will void the certification and the warranty of the fireplace and may result in an unsafe installation.
- These appliances are designed to provide supplemental heat to the immediate area only. Therefore, it is advisable to have an alternate heat source when installed in a dwelling.

PARTS REQUIRED

Fireplace Model

- **6" diameter chimney - United States**
Model IHP Snap-Pak, including:
 - Chimney lengths
 - Elbows (*where necessary*)
 - Associated components as per these installation instructions
- **6" diameter chimney - Canada**
Models ASHT® & S2100 manufacture by Security Chimneys® or DuraTech Canada (DTC) manufactured by DuraVent only, including:
 - Chimney lengths
 - Elbows (*where necessary*)
 - Associated components as per these installation instructions & instructions provided by the venting manufacturer
- **Decorative Door** - Required
(Order Separately - See **Page 21**)
- **Front Facade kit** - Required
(Order Separately - See **Page 21**)
- **UZY5 Blower Kit** (included in the fireplace).
- **VRUW Blower Speed Control** (included)
- **Outside Air Kit** (Included w/Fireplace)

OPTIONAL EQUIPMENT

- **Additional Equipment (optional)**
 - Forced Air Kit
 - Heatflow Convection Kit

OPERATING THE FIREPLACE

Fuel - USE SOLID NATURAL WOOD FUEL ONLY. This appliance is designed to burn dry seasoned natural wood only (see **Page 6** for a list of prohibited fuels). Failure to burn proper fuels only will void the certification and the warranty of the appliance. Hardwoods are preferred to softwoods since the energy content of wood is relative to its density. Hardwoods will result in a longer burning fire and less frequent refueling. A moisture content of 15% to 20% (seasoned) is recommended. Wood that has been cut and split and let to dry under a cover for a period of one year will usually meet that criteria. The required drying time will vary depending on the climate. Wood that is packed tight together will take longer to dry. Seasoned wood is darker in color than wet wood and will have visible cracks in the grain on the ends. Excessively wet wood will be difficult to burn and will result in lower efficiency, increased creosoting and deposits on the glass and in the chimney. Excessively dry wood will burn well but will also have higher emissions and shorter burning time.

DO NOT OVERFIRE THIS HEATER

Attempts to achieve heat output rates that exceed heater design specifications can result in permanent damage to the heater.

FIRST FIRES

Before using the fireplace make sure to remove the plastic wrapping and EPA label on plated door. Remove any glue residue left by the label using mild soap.

The first five or six fires should be small fires of short duration (about 30 to 60 minutes). This will help cure the refractory bricks. During the first few fires of this appliance there may be some odor and smoke due to the curing of the paint, dust accumulation and burning off of lubricants used in the manufacturing process. It may set off a smoke alarm located in the same room. For this reason the room should be well ventilated for the first few fires.

IMPORTANT! GENERAL SAFETY PRECAUTIONS. READ AND UNDERSTAND THESE SAFETY RULES BEFORE YOUR FIRST FIRE.

! WARNING

The MONTECITO-B fireplace must be installed with an outside air kit intake, which is included with the fireplace

! WARNING

THE FIREPLACE MUST BE OPERATED WITH THE DOORS FULLY OPENED OR DOORS FULLY CLOSED. IF THE DOORS ARE LEFT PARTLY OPENED, GAS AND FLAME MAY BE DRAWN OUT OF THE FIREPLACE OPENING, CREATING RISKS OF BOTH FIRE AND SMOKE. IF THE UNIT IS OPERATED WITH THE DOORS FULLY OPENED, THE FIRE SCREEN MUST BE USED.

! WARNING

NEVER use gasoline, gasoline-type lantern fuel, kerosene, charcoal lighter fluid, naphtha, engine oil or similar liquids to start or "freshen up" a fire in this fireplace. Keep any flammable liquids a safe distance from the fireplace at all times.

! WARNING

THIS FIREPLACE HAS NOT BEEN TESTED WITH AN UNVENTED GAS OR A FIREPLACE INSERT. TO REDUCE RISK OF FIRE OR INJURY, DO NOT INSTALL AN UNVENTED GAS LOG SET OR FIREPLACE INSERT OR OTHER PRODUCTS NOT SPECIFIED FOR USE WITH THIS FIREPLACE.

! WARNING

Never leave your fireplace unattended while it is burning.

! WARNING

To avoid the risk of damaging fireplace materials and increasing the risk of fire, do not use the fireplace to cook or warm food.

! WARNING

Use care when selecting window treatments for windows located near the fireplace. Avoid using combustible flowing window treatments such as curtains on nearby windows that are of sufficient length to be blown in front of an open flame when the window is opened. Keep any combustible furniture, materials or decorative pillows at least 48" (1219 mm) from the front fireplace opening.

! WARNING

Never modify or alter your fireplace system in any way. To do so may create a potential fire hazard and void the limited warranty, listings and approvals of this system.

! IMPORTANT

When burning wood, use SOLID NATURAL DRY WELL-SEASONED WOOD ONLY. Hardwoods are recommended (softwoods tend to burn very quickly).

- DO NOT burn treated wood, charcoal, coal, trash, cardboard, driftwood, woods dipped in tar, Christmas tree greens, pitch, pine tar, creosote, chemical chimney cleaners, flame colorants, polystyrene packaging, wood products with synthetic binders (i.e. plywood). Plywood, lumber and other misc. materials can produce abnormally high temperatures, sputtering and smoking fires and may contain hazardous chemicals to treat insects and fungus.

- Burning unapproved fuels can produce excessive temperatures, beyond the design capabilities of the fireplace and may produce excess sparks or may contain hazardous chemicals. Burning unapproved fuels can result in a chimney fire, a house fire, personal injury, death or loss of property.

! WARNING

Never leave children unattended when there is a fire burning in the fireplace.

! WARNING

Always ensure that the air inlet to the fireplace is free from debris and any other obstructions that can block the entrance of air.

! IMPORTANT

WHEN INSTALLED IN A MOBILE OR MANUFACTURED HOME:

- Mobile or manufactured home installations must be installed in accordance with the requirements of the Department of Housing and Urban Development (HUD) "Mobile Home Construction and Safety standards" for US or Canada Mortgage and Housing Corporation (CMHC) for Canada.

- The fireplace must be fastened to the floor by unfolding and screwing the small tabs on both sides at the bottom of the fireplace.

- It is necessary to have access openings, for inspection purpose only, into built-in enclosures surrounding the fireplace installation. Such openings to require a household tool for access.

- The vapor barrier of the mobile home shall be as close as possible of the location where the chimney assembly penetrates the ceiling and roof structure with no interference to the required clearance to combustible material.

- When the mobile or manufactured home has a flat roof, the Attic Radiation Shield must be installed from below going through the roof (See *Figures 22b and 22d*).

- **Warning:** Do not install in a sleeping room.

- **Caution:** The structural integrity of the manufactured home floor, wall, and ceiling/roof must be maintained.

! WARNING

Neither the manufacturer nor the seller warrants "smoke free" operation nor are we responsible for inadequate system draft caused by mechanical systems, general construction conditions, inadequate chimney heights, adverse wind conditions and/or unusual environmental factors or conditions beyond our control.

⚠ WARNING

Be careful adding wood fuel to the fire or handling fireplace tools such as shovels, tongs or pokers.

⚠ WARNING

The bottom refractory can be cracked by excessive abuse such as tossing heavy logs onto the grate or gouging with fireplace tools. Exercise caution when adding wood to your fireplace.

Building a Fire (starting and maintaining a fire)

To start a fire, place several crumpled up balls of newspaper in the firebox. Place small dry pieces of kindling on top of the paper, criss-crossing the kindling so that there are air spaces in between. Keep the fuel far back enough so that air can get underneath. Open the air controls fully and light the newspaper. Once the newspaper and the kindling is well ignited, close the door. Once the kindling fire is well established, cord wood can be added (see *Primary Air Combustion Control* section for proper operation of the air controls).

The unit will burn best with 2-3 pieces of cord wood spaced 1 to 2 inches apart and allowing air to get under the fuel. Criss-crossing or arranging the fuel so that air can get underneath, will help the fire to get started easily. The unit should be operated with the air control fully open long enough to get the cord wood well ignited.

COMBUSTION CONTROLS

- This wood heater has a manufacturer-set minimum low burn rate that must not be altered. It is against federal regulations to alter this setting or otherwise operate this wood heater in a manner inconsistent with operating instructions in this manual.
- U.S. ENVIRONMENTAL PROTECTION AGENCY Certified to comply with 2020 particulate emission standards using cord wood.

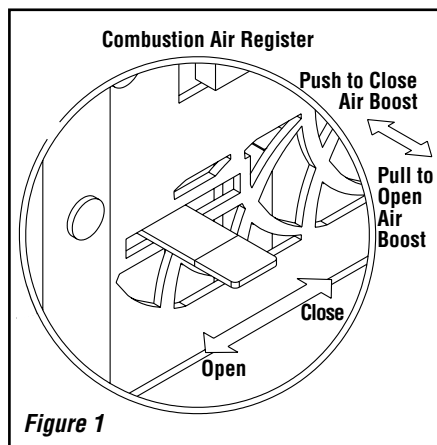


Figure 1

Primary Air and Air Boost Controls

There is no flue damper in the MONTECITO-B wood burning fireplace. As is common with air tight stoves, the combustion air control sets the flow of air entering the firebox. This allows for a more precise control of the fire. The combustion air control is located below the door on the left side. The main source of air (primary air) entering the firebox can be diminished by moving the air combustion control from left to right. The primary air is fully opened when the air control is completely moved to the left. The air control device can also be used to add an extra boost of air especially during fire start up and reloading of the unit.

Pulling the air combustion control will induce an air boost at the base of the fire allowing an easier fire start up. When the fire is well established, the control can be pushed in to shut down the air boost allowing for a longer burn time. The combustion air control should be in the closed position (primary air and air boost) when the fireplace is not in use. This will minimize air leakage up the chimney. The combustion air control should be opened before opening the door to minimize the possibility of back draft coming into the room.

Accelerated Combustion

The maximum heat output for the MONTECITO-B fireplace is achieved by burning with the door closed and the combustion air opened and pulled out. By this method, the MONTECITO-B fireplace can produce up to 55,000 BTU of heat per hour. However, it will be necessary to reload with wood every one or two hours. This is the least efficient method of burning the MONTECITO-B fireplace.

Use caution when firing with the combustion air control wide open. Only burn cord wood in this manner. Small dry pieces of softwood and construction scraps will burn very intensely using this method and may damage the firebox.

Medium Combustion

This is the recommended mode of operating the MONTECITO-B fireplace and should be the one normally used since it will deposit the least amount of creosote on the glass and in the chimney. The combustion air control must be 3/4 closed and pushed in to close the air boost. The precise setting will depend on many factors, including chimney length and the moisture content of the wood.

For instance, a long chimney will necessitate closing the damper more. To obtain the proper combustion, close the damper completely, then open it about 1/4" to 1/2". Three medium size pieces of wood should be burning on a bed of hot coals. The heat output will be approximately 30,000 BTU per hour and the loading time will be about every 3-4 hours. Softwoods may be burned using this method but the time will be substantially reduced.

Slow Combustion

When the air combustion control is completely closed, the fireplace is in a slow combustion phase. If the hearth is hot enough, slow combustion will not extinguish the fire, but there will be a noticeable change in the flame pattern. The flames will be slow and may appear dirty if the wood is too wet (moisture content of 20% and more). Do not allow the wood to burn without flame, since this will produce excessive creosote in the unit.

Creosote may accumulate on the glass door. This method of burning should be used only after operating the MONTECITO-B fireplace with the air control opened to produce a hot fire for about an hour or at medium pace for at least three (3) hours. Slow combustion can be used at night in order to reduce the heat output and to prolong the burn. The loading time will be between 6-8 hours.

REFUELING FOR BEST PERFORMANCE

The MONTECITO-B fireplace will operate best if attention is given to operating the unit with the damper fully opened after refueling in order to bring the firebox and the chimney system up to their optimum operating temperature. Combustion efficiency is relative to firebox temperature. A temperature of 500° C (932° F) and up, with a visible flame, in the upper part of the firebox indicates a maximum efficiency. To obtain this temperature, the fireplace must be operated with the primary air and air boost controls fully opened during 10 to 20 minutes after reloading, depending on the heat and on the moisture content of the wood.

Once you have reached the desired temperature, the air boost can be closed and the primary air set to a medium setting. You know you have reached the desired temperature when, closing the primary air control, you can see a flame at the top of the firebox. The benefit of this technique will be cleaner glass, less creosoting, greater efficiency and the most pleasing fire for your enjoyment.

SMOKING – CAUSES AND TROUBLESHOOTING

To reduce the likelihood of smoking when opening the door, set the combustion air controls to the left before opening the door. Your fireplace has been designed and tested to provide smoke free operation. Occasionally, there may be a small amount of smoking upon lighting the fire, until the chimney heats up but this should not continue. If the fireplace continues to smoke it is probably for one of the following reasons:

- A. Negative pressure in the house** - As the fire burns, air goes up the chimney. This air must be replaced through leakage into the house or through the outside air duct. When operating the MONTECITO-B fireplace, open a nearby window temporarily to check if there is adequate replacement air supply.
- B. Fans operating (e.g.: range hood)** - These fans draw air out of the house and may actually cause a negative pressure in the house. Turn off all fans and open a nearby window to determine if this is the cause of the problem.
- C. Wetwood** - Wet or tarred wood will smoulder and smoke instead of burn properly. Your dealer can help you determine if you have properly seasoned wood for burning.
- D. Dirty or blocked chimney** - Check to make sure the chimney is clear and clean. If dirty call a certified chimney sweep or use a properly sized chimney brush to clean.
- E. Chimney not long enough** - The minimum chimney height is twelve (12) feet (3.7 m) not including the fireplace height. The chimney must extend at least three (3) feet (915 mm) above its point of contact with the roof and at least two (2) feet (610 mm) higher than any roof or wall within ten (10) feet (3 m) of it. When installed with offsets, the minimum chimney height is fifteen (15) feet (4.6 m). Additional height will increase draft and will decrease the tendency to smoke.
- F. Poor chimney draft** - With no fire, there should be sufficient draft to exhaust cigarette smoke introduced under the baffle. Chimneys installed against an outside wall without protection may generate back draft problems which will cause start-up problems. To prevent this, open a nearby window, roll up a piece of paper and light it. Then, hold it in the upper part of the firebox to warm up the chimney. Wait until the draft is sufficient, then start the fire.

IMPORTANT CAUTIONS

- A. Do not block the hot air vents to the fireplace as this will cause the fireplace to overheat.**
- B. Never use gasoline, gasoline-type lantern fuel, kerosene, charcoal lighter fluid, or similar liquids to start or 'freshen up' a fire in this fireplace. Keep all such liquids well away from the fireplace while it is in use.**
- C. Do not burn coal. The sulphur in coal will corrode the firebox and chimney.**
- D. Keep combustible materials at least 48" (1.2 m) away from the front of the fireplace opening.**
- E. Never leave children unattended when there is a fire burning in the fireplace.**
- F. Do not use the fireplace as an incinerator to burn paper, cardboard or construction material such as pressed wood, plywood or lumber. Use only untreated wood. Wood protectors, metallic paper, coal, plastic, waste, beach wood, Christmas tree, sulphur and/or oil will damage the fireplace.**

G. Do not burn driftwood which has been in the ocean or salt water. The salt will corrode the firebox and chimney.

H. Do not burn wood in the area in front of the grate.

I. Do not allow the wood to smoulder or burn without flame, since this will produce excessive creosote in the unit as well as increased particulate emissions.

J. Blower for forced air kit operating - Make sure that the blower is at the "off" position when you open the fireplace door for reloading.

Smoke Detectors Recommended

Since there are always several potential sources of fire in any home, we recommend installing smoke detectors. If possible, install the smoke detector in a hallway adjacent to the room (to reduce the possibility of occasional false activation from the heat produced by these appliances). If your local code requires a smoke detector be installed within the same room, you must follow the requirements of your local code. Check with your local building department for requirements in your area.

Carbon Monoxide Monitor Recommended

Carbon Monoxide Poisoning: Early signs of carbon monoxide poisoning are similar to the flu with headaches, dizziness and/or nausea. If you have these signs, obtain fresh air immediately. Some people are more affected by carbon monoxide than others, including pregnant women, people with heart or lung disease or anemia, those under the influence of alcohol, and those at high altitudes.

It is against federal regulations to operate wood heaters in a manner inconsistent with operating instructions in the manual.

MAINTAINING YOUR FIREPLACE

Have your product inspected at least once a year by a qualified service technician to ensure gaskets, air tubes, baffles, and venting are in good repair to ensure proper performance. Have degraded items replaced by a qualified service technician.

This wood heater needs periodic inspection and repair for proper operation. Consult the owner's manual for further information. It is against federal regulations to operate this wood heater in a manner inconsistent with the operating in this manual.

Creosote - Formation and Need for Removal
When wood is burned slowly, it produces tar and other organic vapors, which combine with expelled moisture to form creosote. The creosote vapors condense in the relatively cool chimney flue of a slow-burning fire. As a result, creosote residue accumulates on the flue lining. When ignited this creosote makes an extremely hot fire.

The chimney shall be inspected at least twice a year during the heating season to determine when a creosote buildup has occurred.

When creosote has accumulated it shall be removed to reduce the risk of a chimney fire.

When the creosote accumulation is large, a creosote fire in the chimney can damage the chimney and overheat the surrounding wood framing. Creosote formation in a chimney can be minimized by making sure there is always visible flame burning, avoid smouldering fires and by proper refuelling techniques.

Chimney Maintenance

Regular chimney inspection and maintenance combined with proper operation will prevent chimney fires. Keep your chimney clean. Do not allow more than 1/16" (1.6 mm) creosote build up in your chimney. The amount of creosote will depend on variables such as frequency of use and type of fire. We recommend that you:

- A. Initially inspect the chimney system weekly.**
From this, you will learn how often it will be necessary to clean your chimney.
- B. Have your chimney cleaned by a qualified chimney sweep.** If you wish to clean it yourself, we recommend using a stiff plastic or non-metallic brush. If a metal brush is used, its size should be slightly smaller than the flue to avoid damaging the chimney. Do not use a brush that will scratch the stainless steel interior of the chimney.
- C. Do not expect chemical cleaners to keep your chimney clean.** The rain cap can be removed for inspection and/or cleaning of the chimney.

Caution: It is necessary to remove the baffle from the top of the firebox before cleaning the chimney. See "Top Baffle Removal Prior To Chimney Sweep."

Dealing With a Chimney Fire

Regular chimney maintenance and inspection can prevent chimney fires. If you have a chimney fire, follow these steps:

1. Close the fireplace door and the combustion air controls.
2. Alert your family of the possible danger.
3. If you require assistance, alert your fire department.
4. If possible, use a dry chemical fire extinguisher, baking soda or sand to control the fire. Do not use water as it may cause a dangerous steam explosion.
5. Check outside to ensure that sparks and hot embers coming out of the chimney are not igniting the roof.
6. Do not use the fireplace again until your chimney and fireplace have been inspected by a qualified chimney sweep or a Fire Department Inspector.

Achieving Clean Burns

Check the exhaust in about 15 to 20 minutes (see below). Large amounts of smoke indicate an improper burn setting (either too high or too low). Adjust and recheck in 5 to 10 minutes.

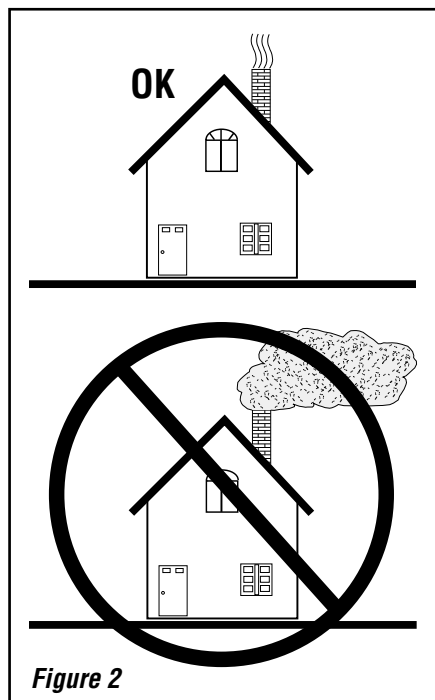


Figure 2

FUEL

What does “Well-Seasoned” mean?

When a tree is cut down, the wood is green, full of sap and moisture. This moisture content can exceed 80%, which must be reduced to less than 20%. Wood properly seasoned is then capable of generating the heat the stove was designed to provide.

Green wood does not burn easily. Attempting to burn green wood often results in a lot of smoke and very little fire. Time is the most important factor in seasoning wood. Ideally the moisture content should be reduced to 11-20%. **NOTE:**

The use of a firewood moisture meter is recommended to ensure the firewood contains less than 20% moisture.

Seasoning Guide

Softwoods - 6 months to 18 months

Hardwoods - 12 months to 24 months

Logs that are 5" diameter across or larger should be split in half, three pieces if over 8 inches, and four pieces when over a foot across. If a tree has been dead for 2 - 4 years it still needs to be cut, split, and seasoned for 6 to 24 months depending on the wood.

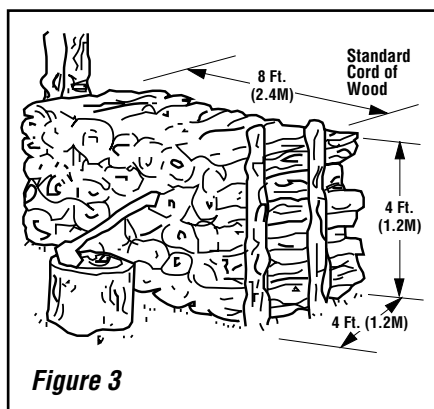


Figure 3

Prohibited Fuels

This heater is designed to burn natural wood only. Higher efficiencies and lower emissions generally result when burning air dried seasoned hardwoods, as compared to softwoods or to green or freshly cut hardwoods. **DO NOT BURN:**

- Garbage;
- Lawn clippings or yard waste;
- Materials containing rubber, including tires;
- Materials containing plastic;
- Waste petroleum products, paints or paint thinners, or asphalt products;
- Materials containing asbestos;
- Construction or demolition debris;
- Railroad ties or pressure-treated wood;
- Manure or animal remains;
- Salt water driftwood or other previously salt water saturated materials;
- Unseasoned wood;
- Christmas tree branches;
- Paper products, colored paper, cardboard, plywood, or particleboard;
- gasoline;
- naphtha;
- engine oil;
- flammable liquids;
- solvents;
- grease; or
- coal

The prohibition against burning these materials does not prohibit the use of fire starters made from paper, cardboard, saw dust, wax and similar substances for the purpose of starting a fire in an affected wood heater.

Burning these materials may result in release of toxic fumes or render the heater ineffective and cause smoke. Intense firing with these materials may overheat the fireplace, causing damage to the unit, a fire or even possibly igniting a chimney fire if the chimney is creosoted. Burning unapproved fuel, resulting in excessive pollutants being emitted, may be prohibited and subject to a fine or other penalty by the authority having jurisdiction in your area.

Top Baffle Removal Prior to Cleaning The Chimney

Before starting to clean your chimney, we recommend that you remove the top baffle to avoid creosote dust collection at the top of the baffle. Follow these steps to set the top baffle out of the way:

1. Remove the side refractory holder. They are located at the top of the refractory.
2. Lift the front baffle.
3. Slide the back baffle under the front baffle. You now have access to the chimney.

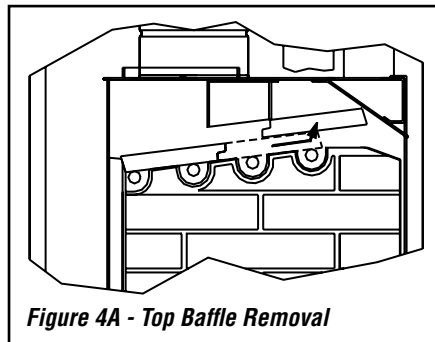


Figure 4A - Top Baffle Removal

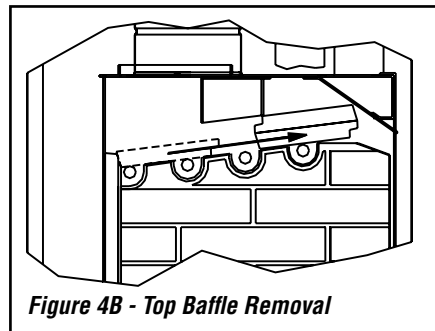


Figure 4B - Top Baffle Removal

Finish Door Casing Care

Use a glass cleaner and a soft cloth to polish the casing. Do not use abrasives such as steel wool, steel pads or an abrasive polish for they may scratch the casing's finish.

DISPOSING OF ASHES

Whenever ashes get 3 to 4 inches deep in your firebox, and when the fire has burned down and cooled, remove excess ashes. Leave an ash bed approximately 1 inch deep on the firebox bottom to help maintain a hot charcoal bed.

Remove ashes only when the fire is out and the ashes are cold (24 to 48 hours after the fire is out).

Do not leave the ashes in the house as they give off carbon monoxide and other toxic gases.

! WARNING

Disposal of Ashes: Ashes should be placed in a steel container with a tight fitting lid and moved outdoors immediately. The closed container of ashes should be placed on a non-combustible floor or on the ground well away from all combustible materials, pending final disposal. If the ashes are disposed of by burial in soil or otherwise locally dispersed, they should be retained in the closed container until all cinders have thoroughly cooled.

REFRACTORY REPLACEMENT

The intense heat of the fire will normally cause hairline cracks in the refractory. These cracks can be minimized by proper curing as described in "First Fires". They will not normally diminish the effectiveness of the refractory. If large cracks develop, then the refractory should be replaced. To replace the refractory bricks, follow these steps:

1. Remove the front refractories
2. Remove the bottom refractory
3. Remove the left side refractory
4. Remove the right side refractory
5. Remove the back refractory
6. Remove the front ceramic baffle
7. Remove the rear ceramic baffle

To install the new refractories, follow the above steps in reverse.

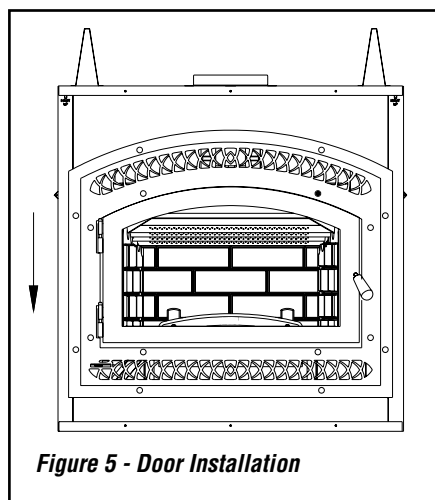
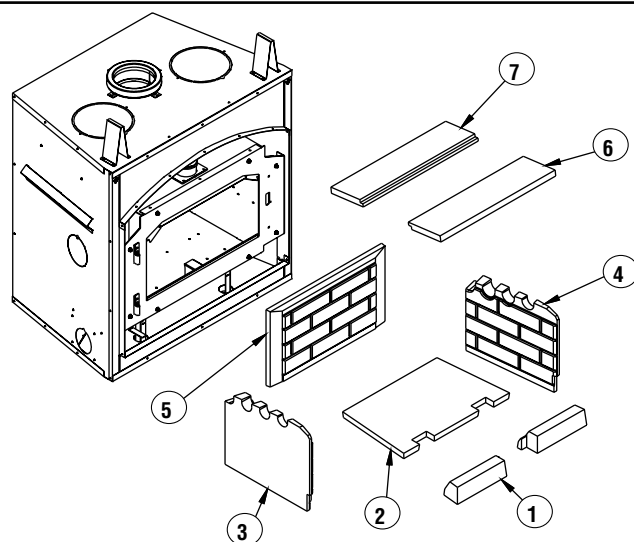


Figure 5 - Door Installation

1. Front Refractories
2. Bottom Refractory
3. Left Side Refractory
4. Right Side Refractory
5. Back Refractory
6. Front Ceramic Baffle
7. Rear Ceramic Baffle

Figure 6



DOOR INSTALLATION

The door must be installed only when the installation of the MONTECITO-B fireplace is completed. All you have to do is fit the male part of the hinge, already on the door, to the female part, which is on the fireplace. To remove the door, simply pull the door up from the hinges (see **Figure 5**). The door adjustment has been set at the factory. If the fit is still not perfect, you can adjust the door using the hinge screws.

DOOR ADJUSTMENT

The door may need to be adjusted to be completely airtight. The gaskets' air-tightness can be adjusted using the adjustment screw located on the right side of the fireplace facade (An Allen key #1/8 – not supplied - will be necessary for this adjustment).

Checking Door Seal

A one-inch strip of paper may be used to perform a test of the integrity of the door seal. Close the door on the paper in at least eight points. It is normal to feel only a slight amount of friction. The door gasket does not need to be "tight" in all areas, since a small amount of leakage is not hazardous or detrimental to the performance of your fireplace.

! WARNING

- Use only a IHP glass doors, specifically designed for the MONTECITO-B fireplace.
- The fireplace cannot be operated without door. Consult your dealer to select the correct replacement door.
- Important! To assure proper alignment of glass doors: Install this fireplace in a square and plumb condition, using shims as necessary at sides and/or bottom.

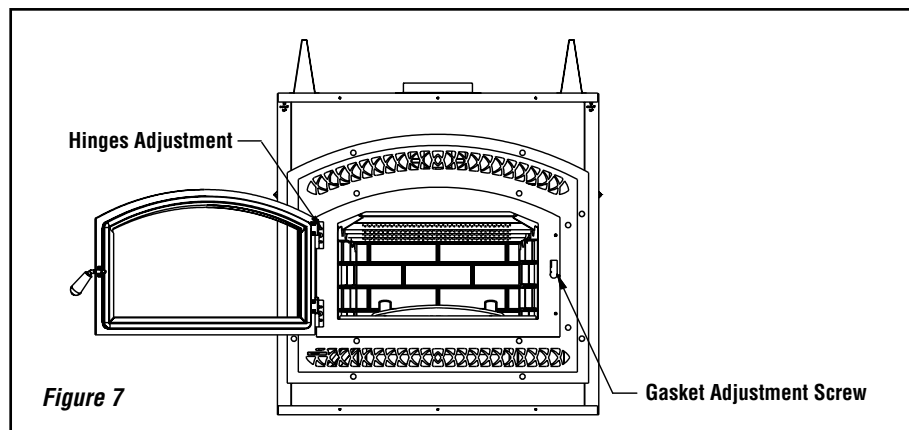


Figure 7

Facade Installation

Install the Facade per instructions provided in Facade Kit (ordered separately - see **Page 20**).

Framing, Facing And Mantel

The construction of the framing, facing, and mantel must be in accordance with the standards and the following illustrations (**Figures 8 and 9**):

- A. Frame the fireplace using 2" x 3" or heavier lumber.
- B. **WARNING: Combustible materials cannot be used in the space directly above the fireplace, except for the studs above the facade that support the facing and mantel. This area must remain empty for a height of 6'8" (2,032 mm) measured from the base of the appliance.**
- C. Frame the fireplace with vertical studs at the sides of the fireplace running from floor to ceiling (see **Figure 8**). If combustible facing is to be used, position the studs back, from the front edge of the fireplace (a space that is the thickness of the facing material, so that the facing can be installed flush with the fireplace facing). Frame headers between the vertical studs only as follows:
 - Place 2" x 3" or 2" x 4" headers, only along the upper part of the front, side and back faces (some codes may require a 2" x 6" on an outside bearing wall). Do not put wood or any combustible material within the area above the fireplace except on the front facing.
 - Place headers only as required to support the facing and mantel.
- D. **WARNING: The fireplace must not be in contact with any insulation or loose filling material. Cover the insulation with drywall panels around the fireplace.**

Hearth Extension Requirements

The MONTECITO-B™ fireplace may be installed directly on a combustible floor. The supplied safety metal strip must be positioned as follows: One half under the front of the fireplace and the other half must extend on the floor over which the hearth extension will be built (see **Figure 8**).

* The safety metal strip must cover the entire width of the fireplace.

The combustible floor in front of the fireplace must be covered with a non-combustible material (tile, marble, stone, etc). See **Figure 9**.

COLD CLIMATE INSTALLATIONS

Climates where temperatures will fall below 32° F (0° C).

The heating performance of the appliance will vary depending upon the level of insulation, house design, how the appliance is operated, etc.

If this fireplace is being installed in a cold climate, it is especially important to seal all cracks around the fireplace and wherever cold air could enter the room with noncombustible material.

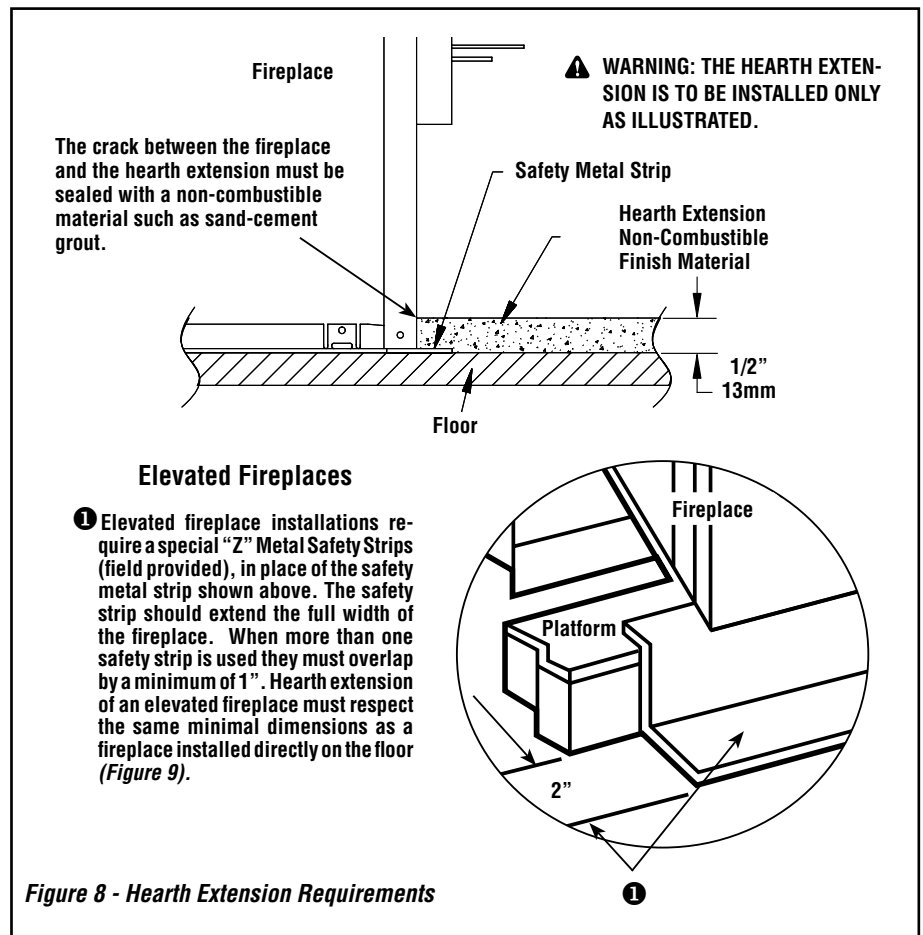


Figure 8 - Hearth Extension Requirements

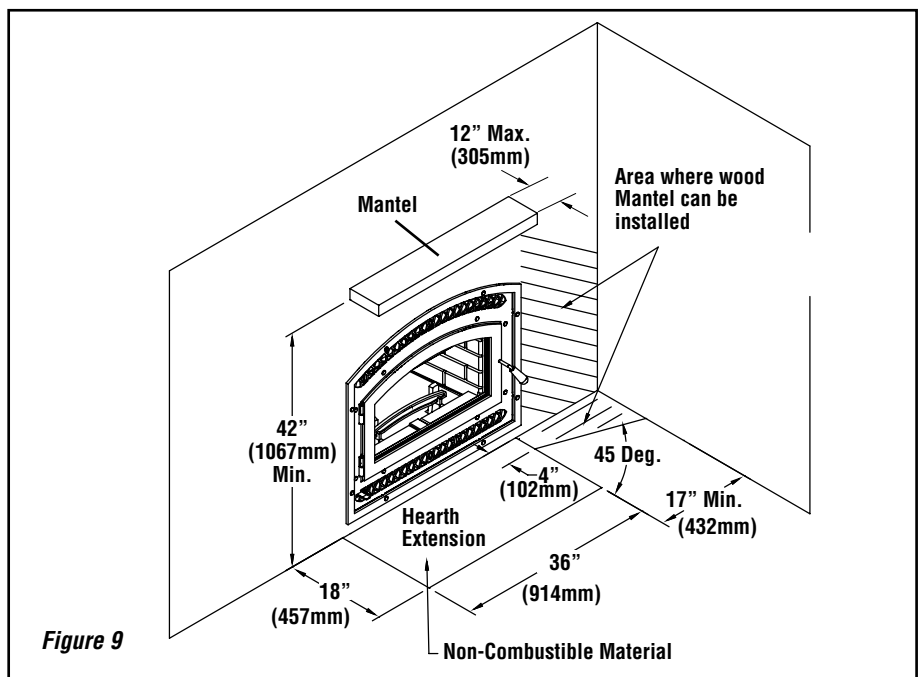


Figure 9

Also, the outside air inlet duct should be wrapped with noncombustible insulation to minimize the formation of condensation. Do not place insulation materials directly against the chimney sections. We recommend that you use the insulated wall radiation shield since it will maintain the home's thermal barrier. AC chimney is NOT recommended in very cold climates (in areas with temperatures below 32°F (0°C)).

GLASS CARE

Glass Replacement

The glass used for the MONTECITO-B fireplace is a high temperature ceramic glass (1,400° F / 760° C). If the glass breaks, it must be replaced with an identical ceramic glass. Tempered glass or ordinary glass will not withstand the high temperatures of the MONTECITO-B fireplace. Replacement glass should be purchased from a IHP dealer (see "Replacement Parts", **Page 21**). **DO NOT OPERATE THE UNIT WITH CRACKED OR BROKEN GLASS.**

Glass Cleaning

The MONTECITO-B fireplace is designed to keep the glass clean under normal operating conditions. If the MONTECITO-B fireplace is operated continuously with the combustion air controls closed, the glass will tend to get dirty unless the fuel, firebox and glass are maintained at hot temperatures (see "Refueling For Best Performance"). To clean the glass, there are a number of specially designed cleaners. Your authorized IHP dealer can recommend a suitable cleaner which is available in your area. Regular household glass cleaners will not clean creosote. Do not use abrasives such as steel pads, steel wool or oven cleaner as they will scratch the glass.

DO NOT USE CHEMICAL GLASS CLEANERS ON PAINTED SURFACES AS IT MAY CAUSE THE PAINT TO PEEL.

CAUTION: DO NOT ALLOW WINDOW CLEANER TO GET IN CONTACT WITH DOOR GASKET OR PAINT ON FACADE OR DOOR. ONCE CLOSED, CONTACT OF GLASS CLEANER WITH THE FIREPLACE FACADE CAN PROVOKE PAINT PEELING OFF.

Gasket Replacement

Remove the door from the unit (see **Page 7**) and lay it on a clean unabrasive surface. To replace the gasket, first remove all of the old gasket and gasket cement. Make sure that the surface is totally clean before applying new cement (a high temperature silicone caulking rated at 500° F [260° C], is suitable) or adhesion problems may result. Apply gasket cement to the gasket channel and install the new gasket. This replacement part is available from your IHP dealer in the following dimensions:

Gasket	Length	Dimensions	Part No.
Steel Door			
Around Glass	69 (1753)	1 x 3/16 (25 x 4.8)	PR-SR1685D
On Door Frame	73 (1854)	5/8 dia. (15.9)	PR-SR1823G
Cast Door			
Around Glass	69 (1753)	1 x 5/16 (25 x 4.8)	PR-SR1823H
On Door Frame	73 (1854)	5/8 dia. (15.9)	PR-SR1823G

Table 1 Inches (millimeters)

FIREPLACE INSTALLATION

Locating The MONTECITO-B Fireplace

The best location to install your fireplace is determined by considering the location of windows, doors, and the traffic flow in the room where the fireplace is located, allowing space in front of the unit for the hearth extension and the mantel, and taking into consideration the location of the hot air ducts (optional), outside air kit and chimney.

If possible, you should choose a location where the chimney will pass through the house without cutting floor or roof joists (see fireplace dimensions **Page 10**).

Usually, no additional floor support is needed for the fireplace. The adequacy of the floor can be checked by first estimating the weight of the fireplace system. Weights are given on **Page 21**. Note the floor construction and consult your local building code to determine if additional support is needed.

The MONTECITO-B fireplace may be installed directly on the floor or on a raised base (for proper guidelines, refer to "Hearth Extension Requirements") and a minimum of 6'8" (2 m) measured from the base of the appliance to the ceiling is required.

When selecting the location, the chimney outlet position and the direction of the wind are important factor affecting the chimney performance. To allow a maximum draft and to reduce wind turbulence, the chimney must:

- Penetrate the highest part of the roof.
- Be installed as far as possible of roof offsets, trees or any other obstructions that may cause wind turbulence and back drafts in the chimney.
- The least amount of offsets (elbows) possible. **NOTE: A maximum of 2 offsets is allowed.**

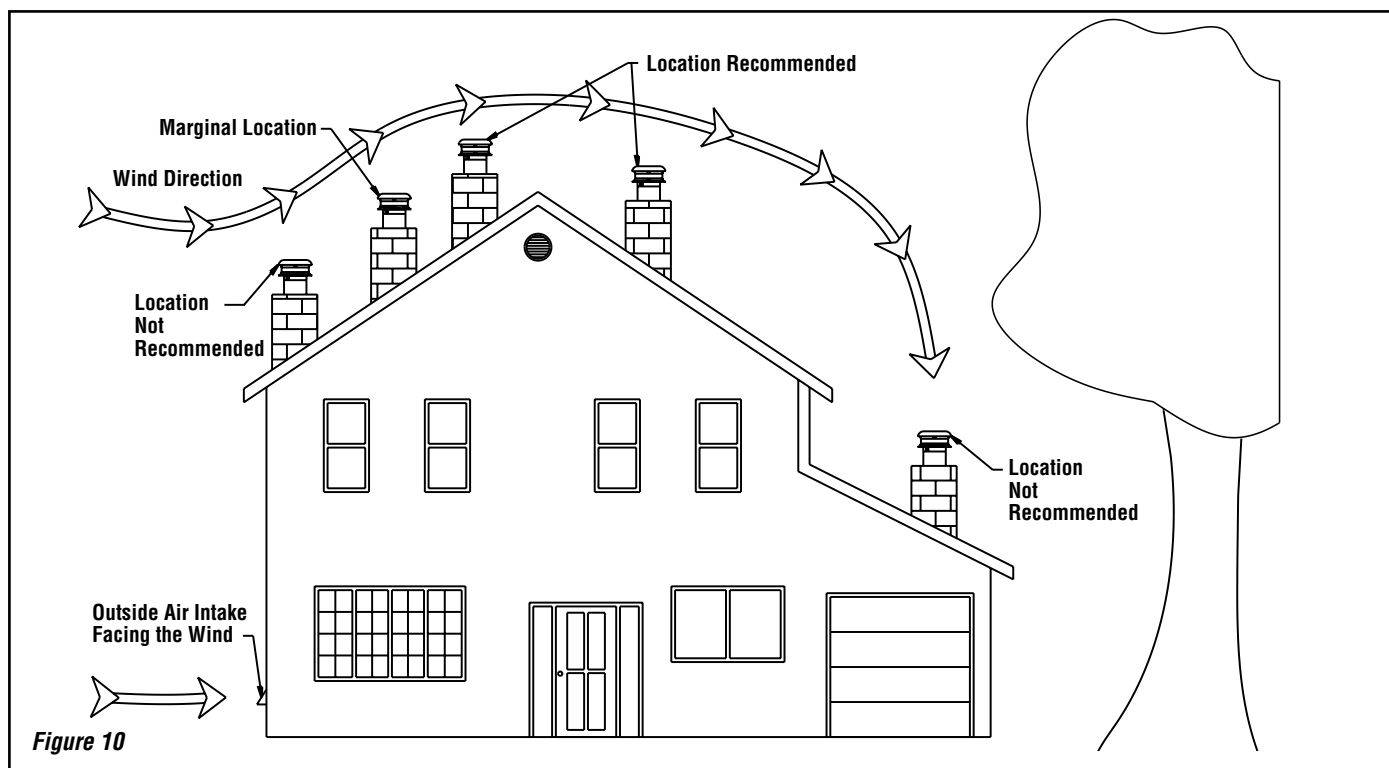
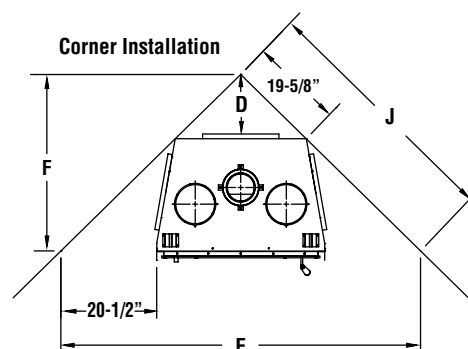
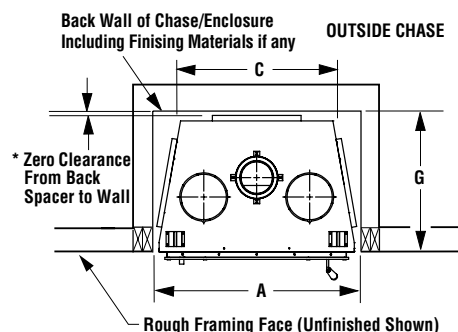
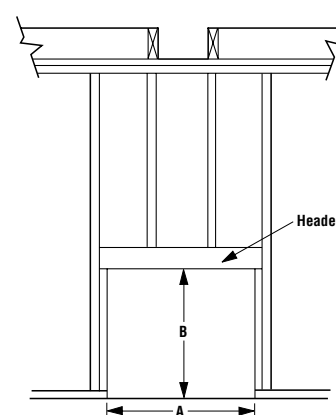
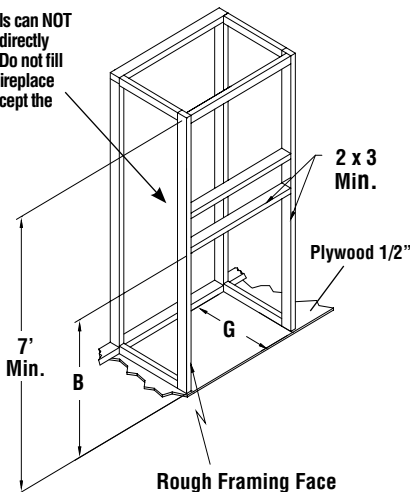


Figure 10

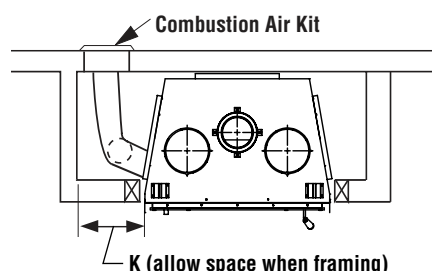
FRAMING DIMENSIONS Fireplace Opening Width		
A	36-1/4"	921 mm
B	42"	1067 mm
C	30-1/8"	765 mm
D	13-1/2"	343 mm
E	77"	1956 mm
F	37-1/2"	953 mm
G	*24-1/2"	603 mm
J	53-3/4"	1365 mm
K	8"	203 mm
L	1"	25 mm



Combustible materials can NOT be used in the space directly above the fireplace. Do not fill the space above the fireplace with any material (Except the wood framing)



* Total depth is 25 inches (635mm) including the back standoff minus 1/2 inch (13mm) for drywall to be flush with the facing.



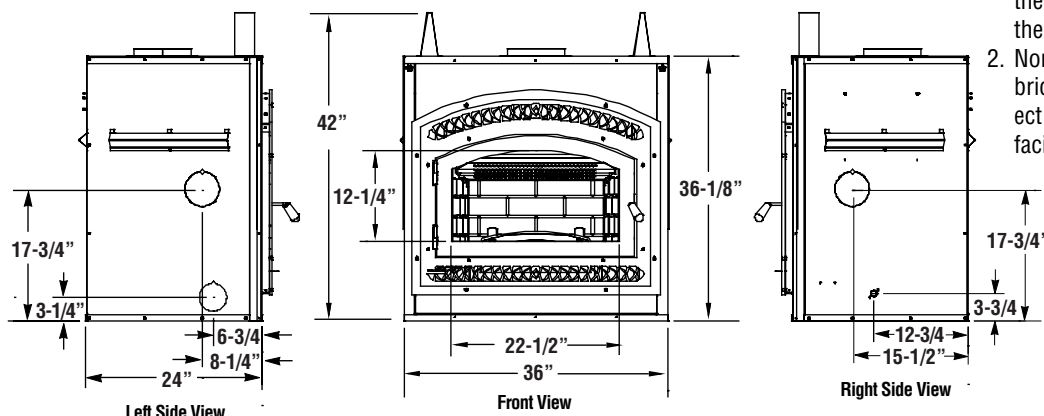
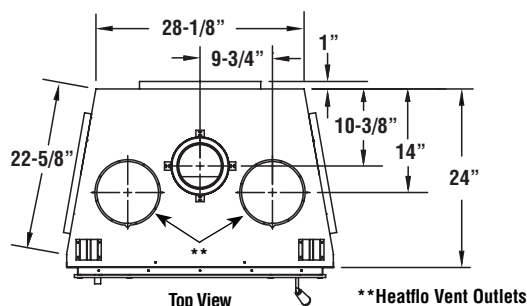
Rough Framing Face (dimension includes finish material inside framing, if any)

Facing

IMPORTANT

The facade must be removable once installed. The facade is designed to overlap any facing material installed on the front of the fireplace. If thicker material is installed, use the facade as a template and make sure it can be easily removed for servicing.

Notes
Diagrams, illustrations and photographs are not to scale – consult installation instructions. Product designs, materials, dimensions, specifications, colors and prices are subject to change or discontinuance without notice.
All framing dimensions calculated for 1/2" dry wall at the fireplace face. If sheathing the chase or finishing with other thickness materials, calculations will need to be made.
* The fireplace must not be in contact with any insulation or loose filling material. Cover the insulation with Drywall panels around the fireplace.



1. Combustible material must be installed flush with the fireplace. It may not project in front of and on the fireplace (i.e. the steel facade of the fireplace) (Figure 16).
2. Non-combustible materials such as brick, stone or ceramic tile may project in front of and onto the fireplace facing (Figure 17).

Figure 11 - Framing Dimensions

INSULATED CHASE CONSTRUCTION

NOTE: It is recommended that the chase walls and floor be insulated in the same manner, using the same insulation, as the rest of the building, below the attic.

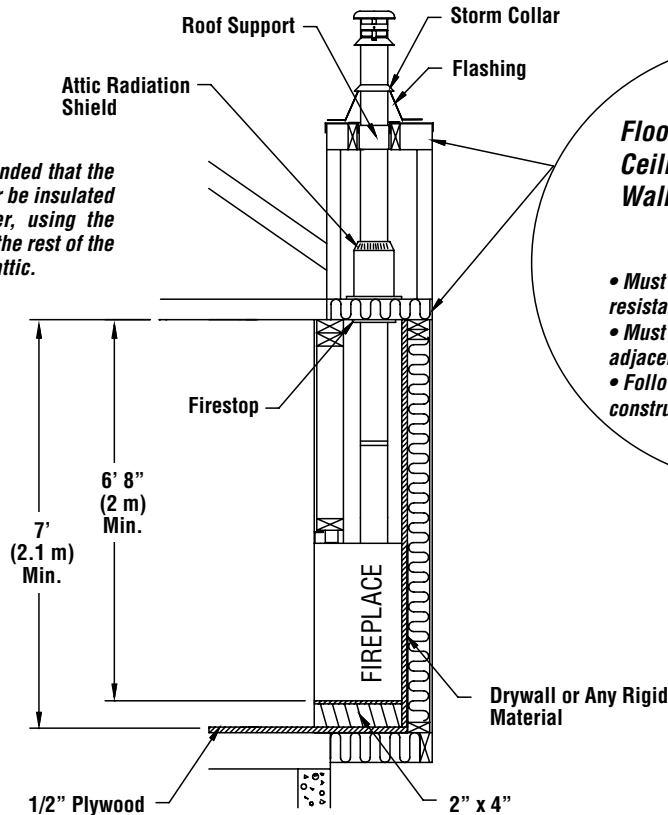
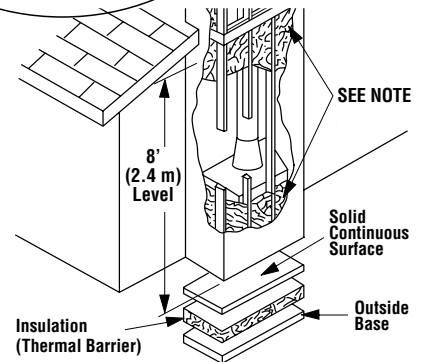


Figure 12

Floor Ceiling Wall

- Must have the same firestopping resistance as adjacent wall.
- Must have the same insulation as adjacent ceiling.
- Follow local rules regarding framing construction.



Nailing Flanges

Four nailing flanges are provided to secure the fireplace to the floor (see Figure 13). Bend the nailing flanges down so that each flange is flush with the floor, then using nails or screws, secure the fireplace to the floor (2 places each side). The heads of the screws or nails must be large enough to completely cover the holes in the nailing flanges.

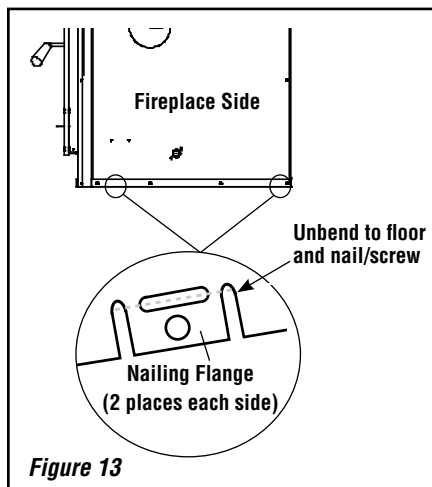


Figure 13

Mantel and Facing

The mantel must be installed at least 42" (1067 mm) above the base of the fireplace (Figure 15).

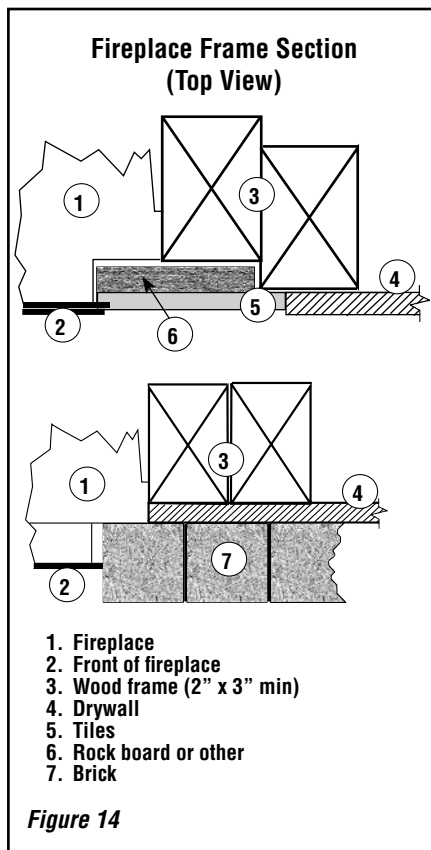


Figure 14

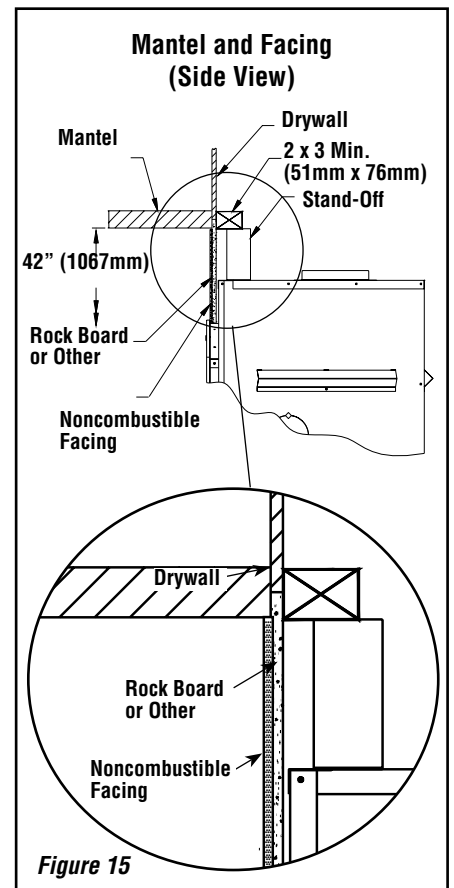
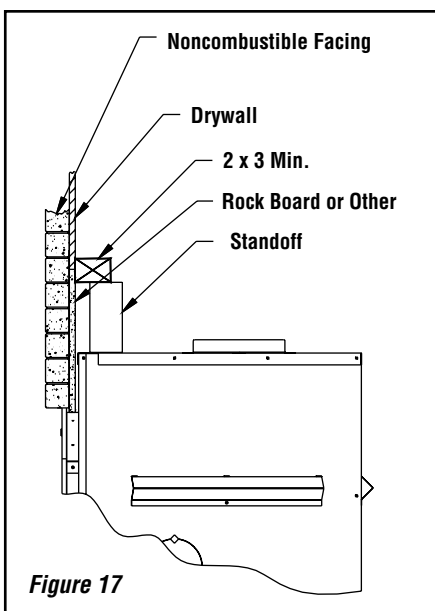
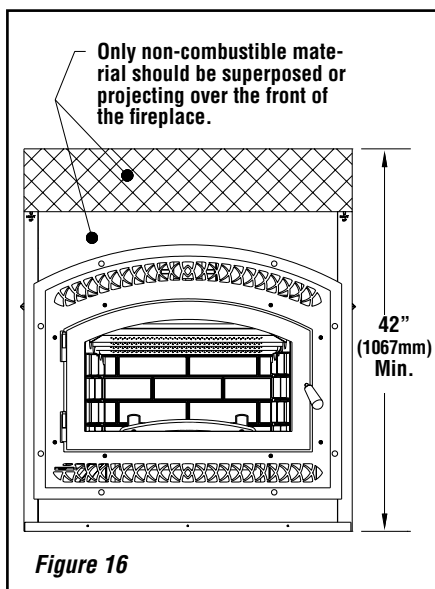


Figure 15



FIREPLACE BLOWER

The fireplace comes equipped with a heat activated blower. It is located in the bottom of the fireplace, towards the back. It uses 120V and must be connected to the main electrical circuit by a qualified electrician. For connection, use the electrical box supplied with the unit located on the bottom right corner of the fireplace.

If you wish to adjust the blower speed, the variable speed control (VRUW) provided must be installed in line with the wiring. Again, use a qualified electrician for installation.

If the blower requires servicing,

- 1- Remove the doors and decorative facade.
- 2- Remove the screw located below the blower motor that holds it to the back of fireplace.
- 3- Pull the blower out of the unit through the square hole located in the front bottom right corner.

OUTSIDE AIR KIT

It is mandatory to install an outside air connection to the MONTECITO-B wood burning fireplace. The following components are required and are included with the fireplace:

- Outside air kit (includes 4 inch flex that goes up to ten (10) feet long)
- 4" Adaptor for fireplace connection

The outside air assembly must be installed according to the following requirements:

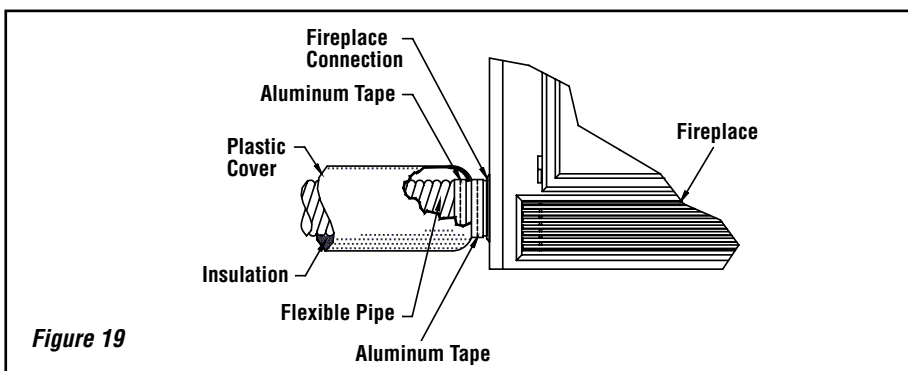
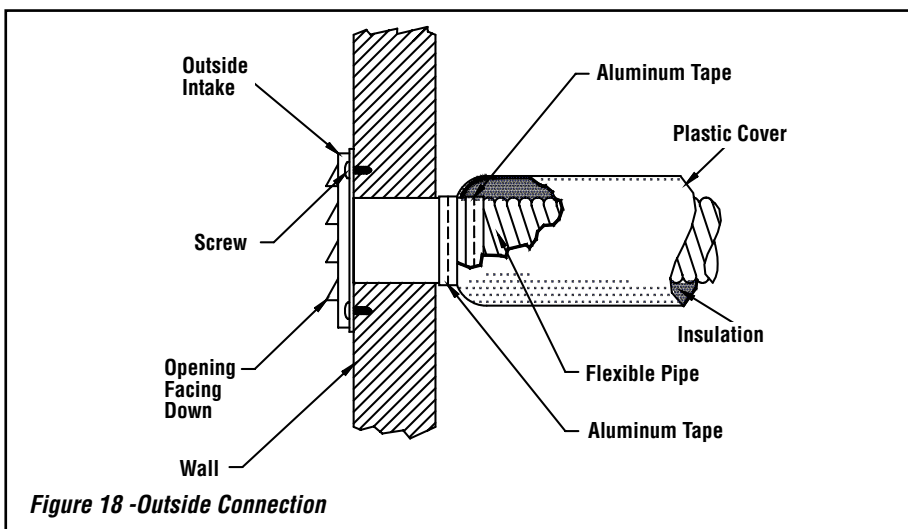
Outside Air Installation

The outside air assembly may be installed according to the following requirements:

- A) Duct length should be kept to a minimum. The maximum length of a 4" interior diameter (100 mm) insulated flexible duct is twenty (20) feet (6.1 m). (See note below).
- B) The air intake register must not be installed more than ten (10) feet (3050 mm) above the base of the fireplace.
- C) The fresh air must come from outside the house. The air intake must not draw air from the attic, basement or garage.
- D) The air intake should be installed where it is not likely to be blocked by snow or exposed to extreme wind and away from automobile exhaust fumes, gas meters and other vents.
- E) The duct and register may be installed above or below floor level.

Make a 4-1/4" (110 mm) hole in the outside wall of the house at the chosen location. From outside, place the outside air register in the hole (open side down) and fasten the register to the wall with screws as shown (see **Figure 18**). Slip the pipe into the insulated sleeve. Place the insulated pipe over the register tube and over the fireplace's outside air connector (see **Figure 19**). At each end, carefully pull back the insulation and plastic cover exposing the flexible pipe. Using the aluminium tape provided, wrap the tape around the joint between the flexible pipe and the air inlets. Carefully push the insulation and plastic cover back over the pipe. Using aluminium tape, fasten the plastic cover in place.

NOTE: We recommend not to exceed twenty (20) feet of 4" flexible pipe. If you require a longer length we recommend that you use a 5" diameter flexible pipe for the complete run up to thirty (30) feet and a 6" diameter pipe for a run of up to forty (40) feet.



NOTE: DIAGRAMS & ILLUSTRATIONS ARE NOT TO SCALE.

HEATFLOW CONVECTION KIT INSTALLATION

The MONTECITO-B wood burning fireplace is approved for use with a Heatflow Convection Kit (hot air ducting system).

KIT CONTENTS (See *Figure 20*):

The Ducted Flex Kit must use both hot air outlets and includes:

- 2 ea. Wall Thimble Assembly (item #1)
- 2 ea. Duct Adaptor (item #2)
- 2 ea. Duct Ring (item #3)
- 8 ea. #6-18 X 2 Drywall Screw (item #4)
- 22 ea. #10-16 X 3/4" Hex-Unslotted Drive Zinc Finish Self-Drilling Screw (item #5)
- 2 ea. 2 Ply 8" Dia. X 10' Aluminum Flex with R4 Insulated Sleeve (item #6)
- 2 ea. Grill, White (item #7)
- 4 ea. #6-18 X 1-1/2 White Oval Head Zinc Plated Phillips Screws (item #8)
- 1 ea. Instruction Sheet

EPA Fireplace - HeatFlo Convection Kit

Cat. No.	Model	Description
F3790	EPA-HEATFLO-KIT	EPA Heatflo Conv. Kit

Table 2

TOOLS NEEDED:

5/16" hex driver and no. 2 Phillips screwdriver

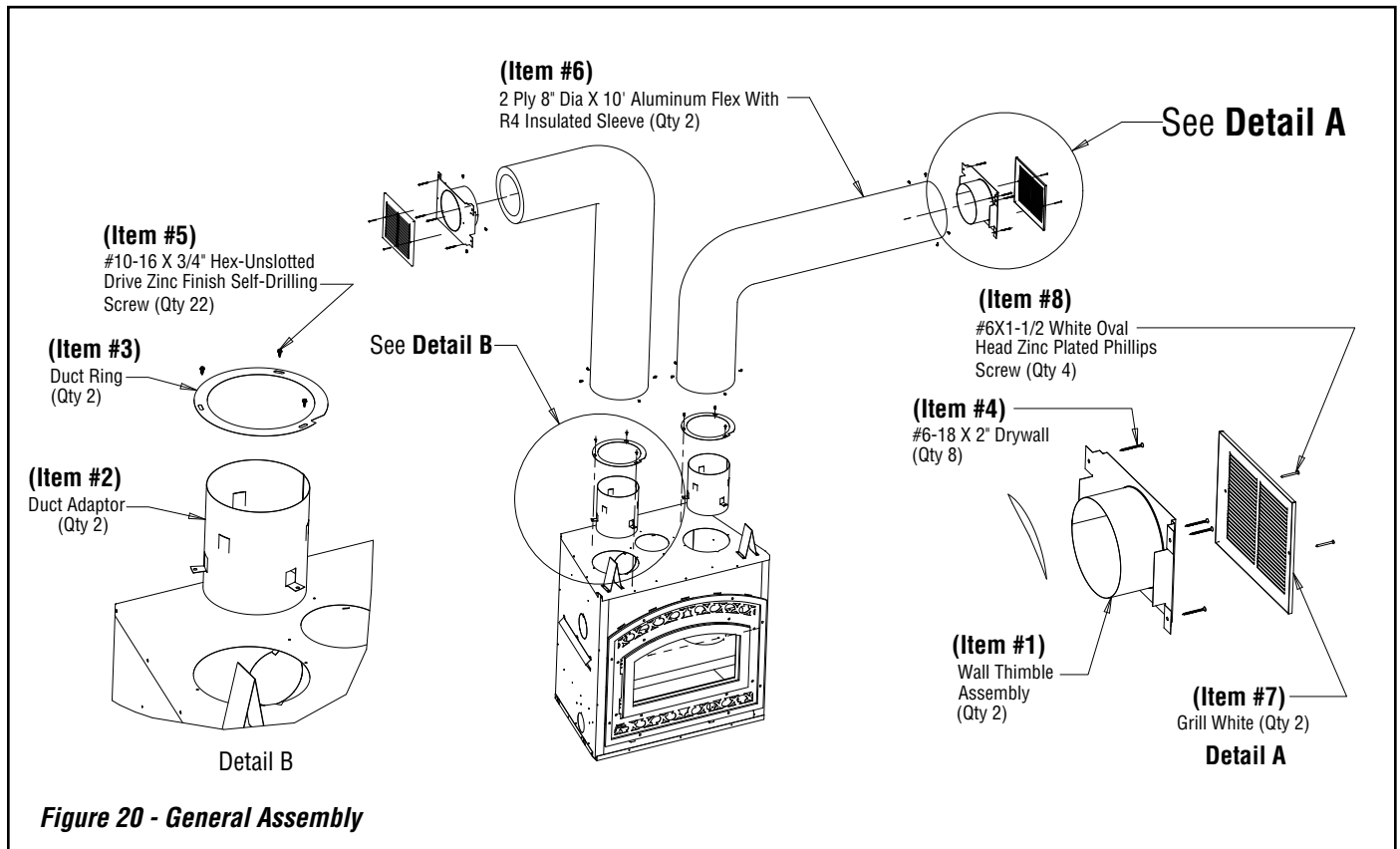
GENERAL INFORMATION

If you encounter any problems, need clarification of these instructions or are not qualified to properly install this kit, contact your local distributor or dealer.

Read this instruction sheet in its entirety before beginning the installation.

ALL WARNINGS AND PRECAUTIONS IN THE INSTALLATION AND OPERATION MANUAL PROVIDED WITH THE APPLIANCE APPLY TO THESE INSTRUCTIONS.

TURN OFF THE APPLIANCE AND ALLOW IT TO COMPLETELY COOL BEFORE PROCEEDING.



HEATFLOW CONVECTION KIT INSTALLATION (continued)

INSTALLATION INSTRUCTIONS:

For approved installations, the ducted flex kit must meet the following requirements:

Minimum height: 68" (1.7m)

The height of the louver must be measured from the base of the fireplace to the center point of the louver.

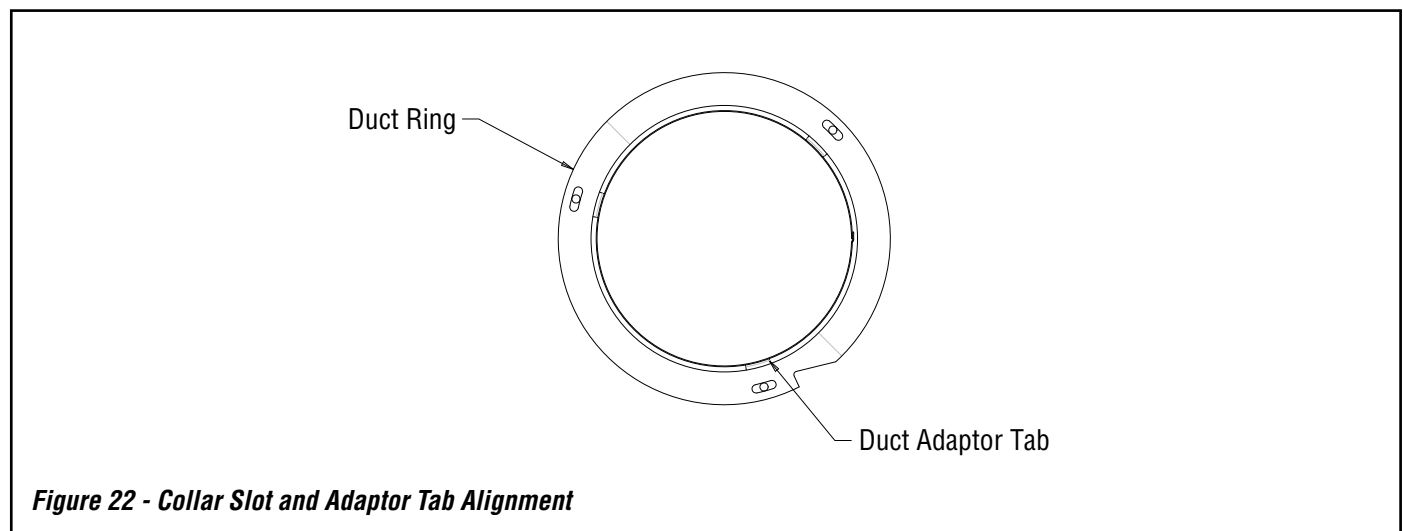
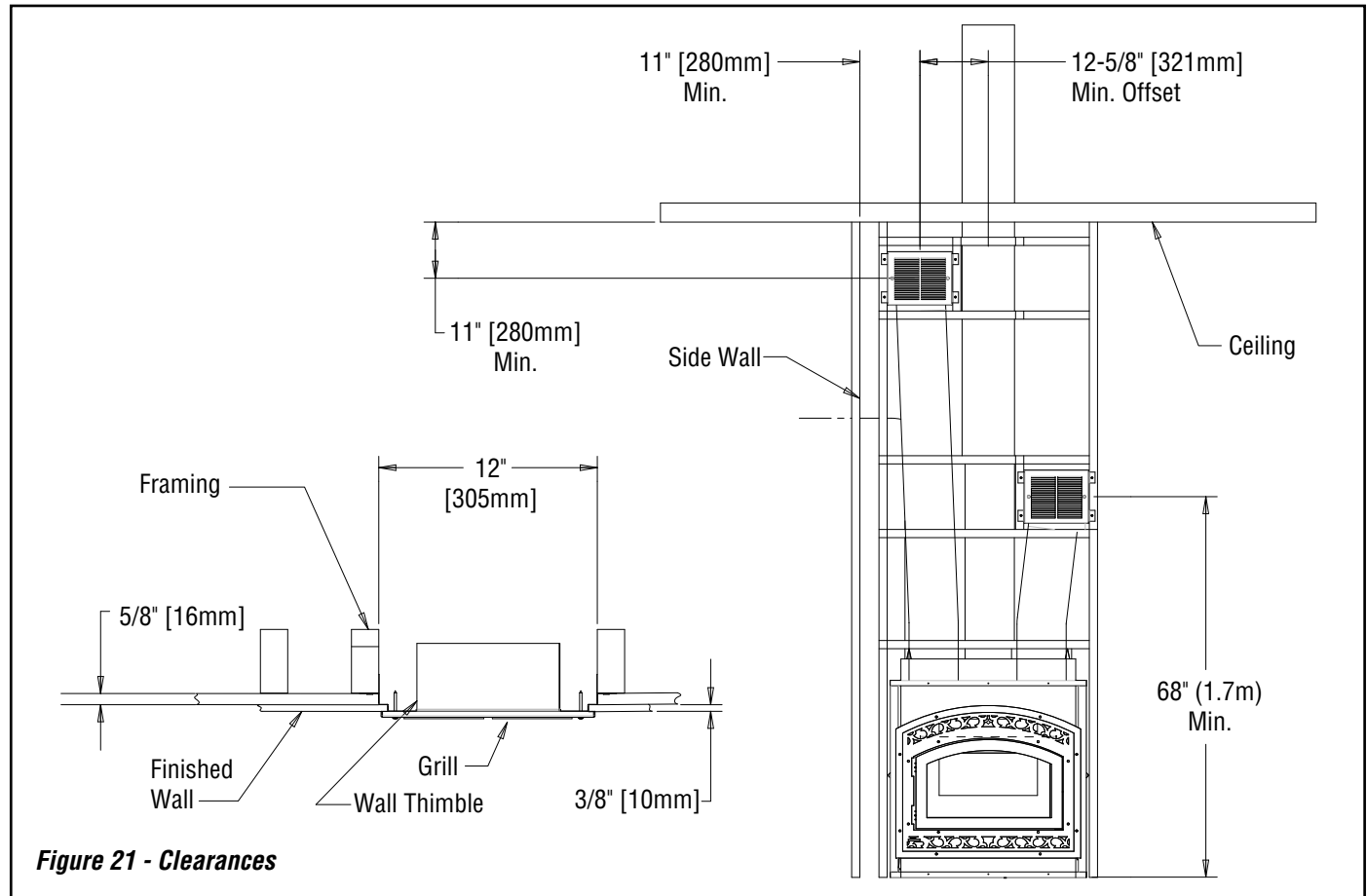
Minimum Ceiling and Side Wall Clearances: 11" (280mm)

Louver ceiling and side wall clearance must be measured from the bottom of the ceiling or from the side wall to middle point of the louver.

Maximum Length: 10' [3.1m] (See Figure 21)

It is recommended that the ducted flex kit duct system be installed in the following order:

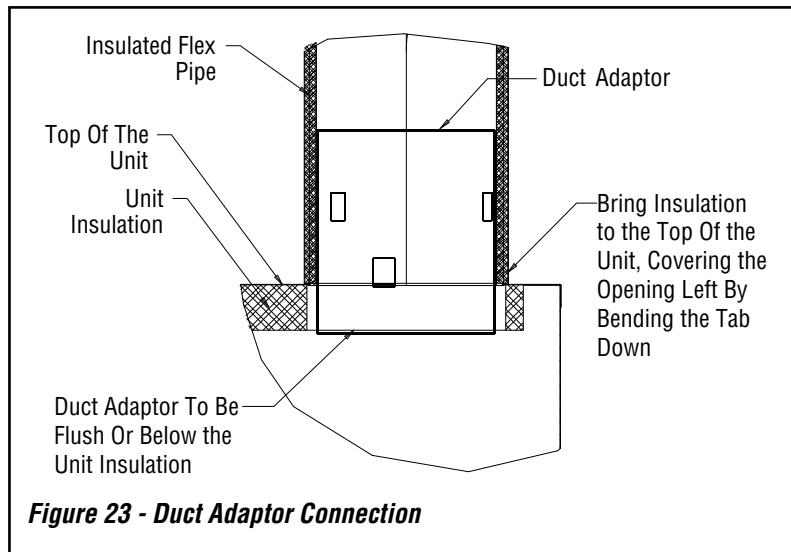
1. Plan and frame fireplace and outlet locations prior to ducted flex kit installation.
2. Remove the two 8" diameter cutouts on top of the fireplace. Then, cut the insulation in order to obtain two 8" diameter openings and remove the insulation.
3. On the duct adaptor, bend the appropriate tabs down so that the bottom of the adaptor is just below the bottom of the insulation.
4. Align the collar slots with the holes in the adaptor; fasten the collar and the adaptor to the top of the fireplace using 3 of the sheet metal screws provided. The collar will fit loosely around the openings (see Figure 22).



NOTE: DIAGRAMS & ILLUSTRATIONS ARE NOT TO SCALE.

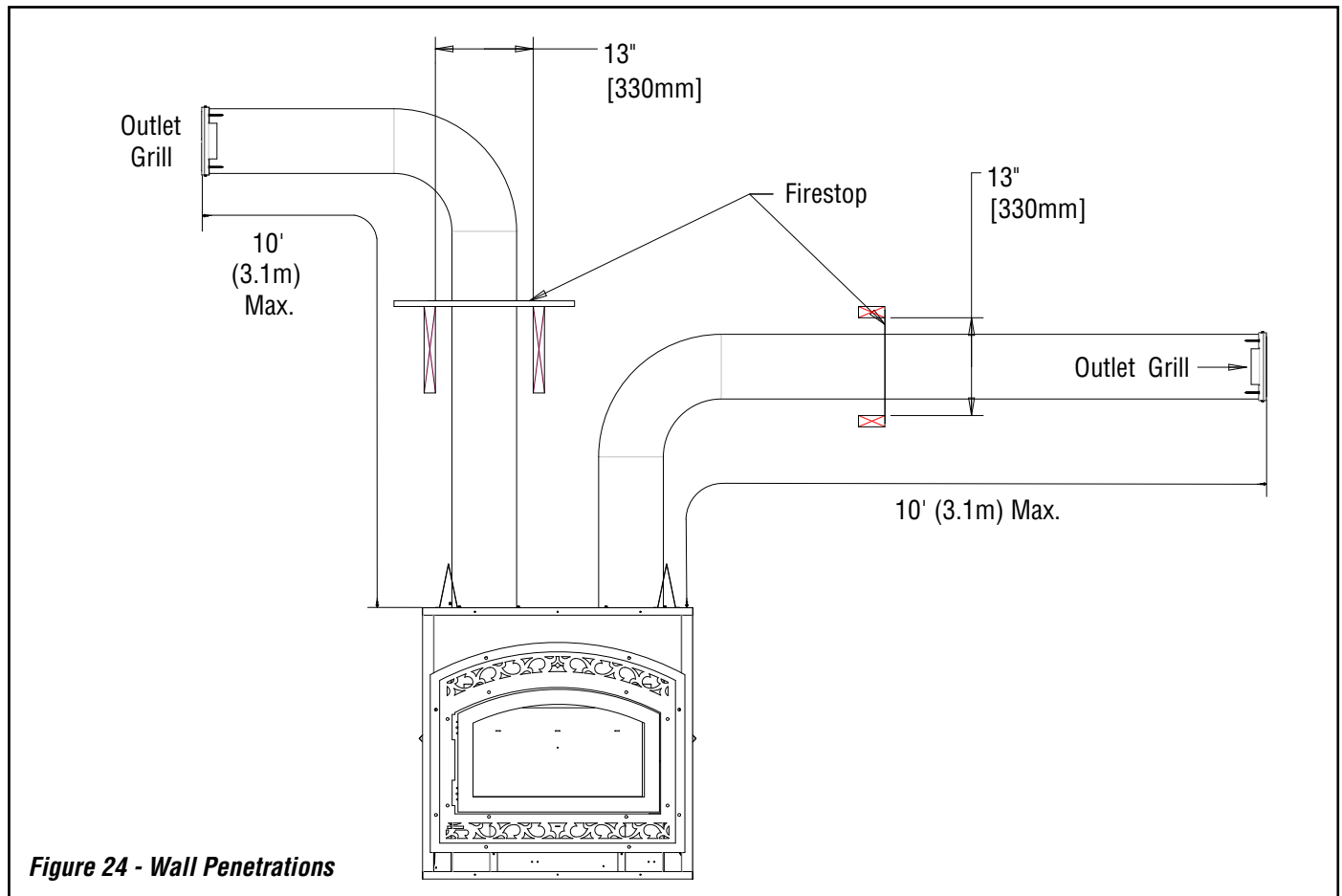
HEATFLOW CONVECTION KIT INSTALLATION (continued)

5. Fit the wall thimble onto the flex-pipe, prior to the wall thimble installation, and fasten together using 4 sheet metal screws. Measure from top of fireplace to planned outlet location and trim the flex-pipe if necessary.
6. Install the wall thimble to the outlet framing using 4 of the supplied wood screws and run the flex pipe to fireplace.
7. Attach the bottom of the flex-pipe to the duct adaptor on the unit and secure using 4 of the supplied sheet metal screws. Bring the outside insulation and sleeve down to the top of the unit, ensuring that the openings in the duct adaptor, (left by bending the adaptor tabs down) are fully covered (see **Figure 23**).



INSTALLATION NOTES:

- When framing for the outlet grill: The minimum height from the bottom of the unit to the center of the outlet is 68" (1.7m) with the minimum distance from the center of outlet to the ceiling and for the center of the outlet to a side wall of 11" (279mm).
- Do not connect the hot air ducts to a central heating system.
- Use only IHP grills and components as described in this manual.
- Ensure that the flex insulation and sheathing do not touch the flue pipe.
- Never allow the pipe to pitch downwards. Never route the piping downwards.
- The hot air outlet grills must be installed with the louvers pointing downwards.
- The hot air outlets can be installed in the same room as the fireplace, or one or both of the outlets can be installed in adjacent or upper rooms. Installing the ducts at different elevations will tend to exhaust more heat out of the higher outlet.
- When traversing a combustible wall or floor, a firestop (not provided) must be installed at the wall or floor penetration. Maintaining a minimum 1" (25mm) clearance between the ducts and any combustible material, the hole size must be 13" X 13" (330mm X 330mm) (see **Figure 24**).
- Install to local codes and regulations.



NOTE: DIAGRAMS & ILLUSTRATIONS ARE NOT TO SCALE.

THE CHIMNEY SYSTEM (UNITED STATES & CANADA)

Chimney Installation Notes

1. The IHP fireplace model MONTECITO-B may be installed only with IHP 6" Snap-Pak chimney in the United States or Security Chimney models ASHT & S2100 or DuraVent model DuraTech Canada (DTC) in Canada. The 6" & 7" Security systems are approved in Canada with the use of an adaptor.
2. If possible, install an interior chimney as it will provide better performance. In areas with continuous temperatures below -18° C (0° F), the use of an exterior chimney increases the likelihood of operating problems such as low draft, high rate of creosoting, and poor start-up characteristics. Exterior chimneys are also prone to down-draft with dry and flow reversal. Installations-which are located on lower floors in the house-such as in a basement, in combination with an outside chimney, are especially prone to flow reversal.
3. A chimney venting a fireplace shall not vent any other appliance.
4. The minimum chimney height is twelve (12) feet (3.7 m). To compensate for altitude, add 18" (450 mm) to the chimney for every 2,000 feet (600 m) above sea level.
5. **All chimney installations must include at least one support.** Reducing the amount of chimney weight on the fireplace will help avoid the noise created when the fireplace expands. This can be achieved by having the chimney supported by the supports. The maximum chimney length that can be supported by the fireplace is nine (9) feet (2.75 m).
6. The chimney must extend at least three (3) feet (915 mm) above its point of contact with the roof and at least two (2) feet (610 mm) higher than any wall, roof or building within ten (10) feet (3m) of it.
7. If the chimney extends higher than five (5) feet (1,500 mm) above its point of contact with the roof, it must be secured using a roof brace.
8. A rain cap must be installed on top of the chimney. Failure to install a rain cap may cause corrosion problems.
9. Cut and frame square holes in all floors, ceilings, and roof that the chimney will go through to provide a 2" (50 mm) clearance between the chimney and any combustible materials. Do not fill this 2" space with insulation or any other combustible material.
10. Portions of the chimney which may extend through accessible spaces must be enclosed to avoid contact with combustible materials or damage to the chimney.
11. When offsets are used, the pipe may not penetrate a ceiling or floor unless it is running vertical (no 30° offsets).

NOTE: 2" clearance to combustibles around chimney components required.

NOTE: Blown or fill type insulation materials must not be in contact with the fireplace or in the enclosure frame as described in "Enclosure" section.

NOTE: Local codes may not require firestopping at the ceiling levels for outside chase installations. However, it is recommended for safety and the reduction of heat loss.

UNITED STATES ONLY CHIMNEY INSTALLATION INSTRUCTIONS USING IHP SNAP PAK (SP)

UNITED STATES APPROVED VENTING SYSTEMS:

- 6" diameter chimney:** Model IHP Snap-Pak, including:
- Chimney lengths
 - Elbows (*where necessary*)
 - Associated components as per these installation instructions

INSTALLATION THROUGH FLAT CEILING(S)

- Using framing lumber equal to ceiling joist size, frame ceiling opening as shown in **Figure 25** and **Table 3**.

Chimney Flue Diameter	
	6"
A	12-7/16"
B	12-7/16"

Table 3

If the area above the ceiling is an attic, go to step 5.

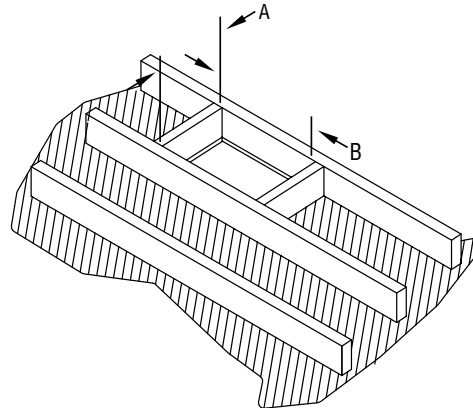
- Install SNAP-PAK chimney sections starting at the top of the appliance. Leave the first section loose until the installation is complete to allow the chimney to be rotated, easing the installation of any offsets if they are used. Secure subsequent sections by pushing together until stop-locked (see **Figure 26**).
- If IHP Elbows are to be used because the chimney is to be offset, refer to "Installation of Elbows" section. Directly above the Center of the flue in the ceiling support, mark the ceiling. A plumb bob is normally used to find the center. Cut an opening in the ceiling using **Figure 25** and **Table 3**.
- At each ceiling penetration, a firestop (SPFS) is required. Insert the SPFS into the joist area prepared in **Figure 25**.

NOTE: When the chimney extends between floors-which can be occupied-the chimney must be enclosed to prevent contact. As previously noted, 2" minimum clearance to combustibles is to be maintained at all times.

- The first chimney section through the joist area into attic is to be approximately two (2) feet. If the pipe sections in the attic are not enclosed, an insulation shield (SPIS) must be installed. Lower the insulation shield (SPIS) over the SP pipe until the SPIS flange is resting on the joist. Secure the SPIS in place by nailing the flange to the joist. See **Figure 27**. If the section within the attic area is to be chase enclosed, the SPIS is not required.

WARNING: Do not place any type of insulation in the required clearance spaces surrounding the chimney.

- Continue the chimney to the roof. See "Flashing Installation" and "Termination" sections.



Framing lumber of equal size to the joist should be used.

Figure 25

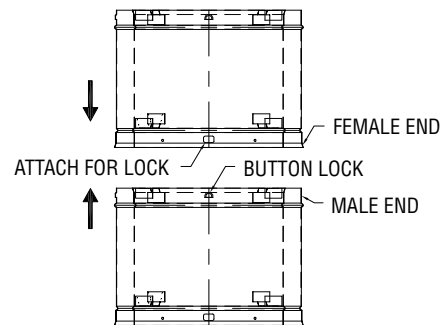


Figure 26

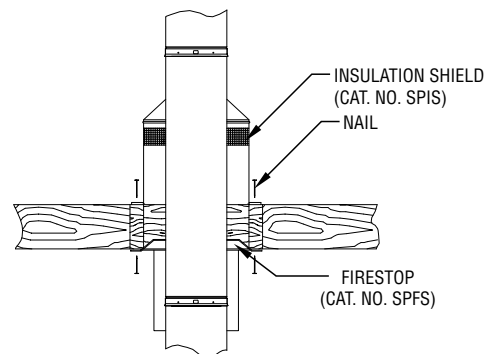


Figure 27

INSTALLATION THROUGH A SIDE WALL

1. It is recommended that exterior mounted chimneys be enclosed below the roof line in geographical areas experiencing sustained low ambient temperatures to help reduce or limit condensation, creosote buildup and poor draft.
2. Locate the area where the chimney section is to penetrate the vertical wall studs. Cut and frame an opening so that the flue is centered between the vertical wall studs. Frame opening per **Figure 28** and **Table 4**.

Chimney Flue Diameter	
	6"
A	12-7/16"
B	13"

Table 4

3. A 2-piece wall firestop (SPWF) must be installed in the framed opening from outside. The stainless portion is first installed from the outside of the opening. Push the remaining half through the opening from the inside until the plate is flush with stud. Use four (4) # 10 x 2-1/2" wood screws to attach opening (see **Figure 29**). Seal the outside plate with RTV sealant or similar.

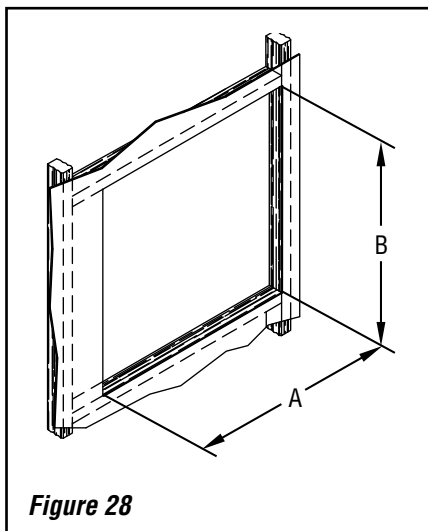


Figure 28

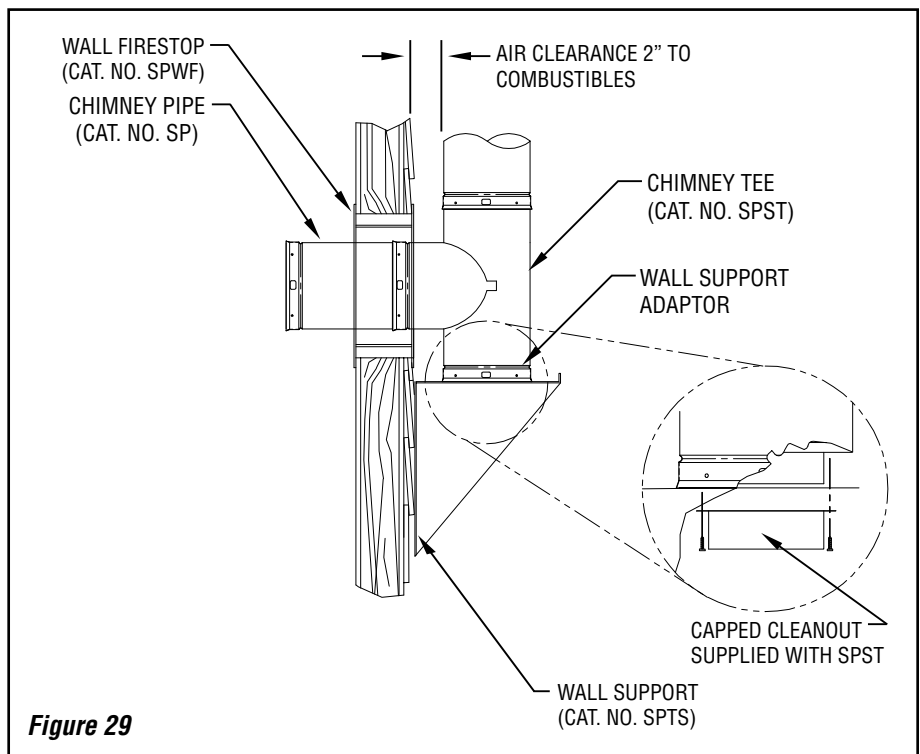


Figure 29

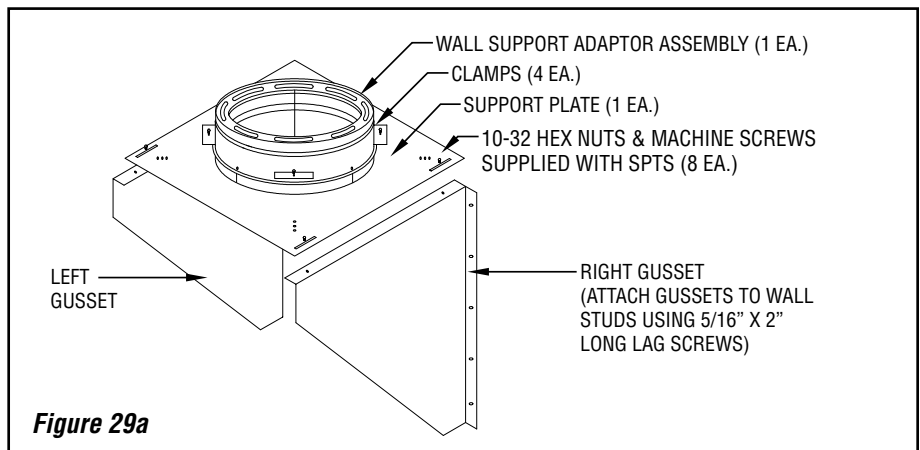


Figure 29a

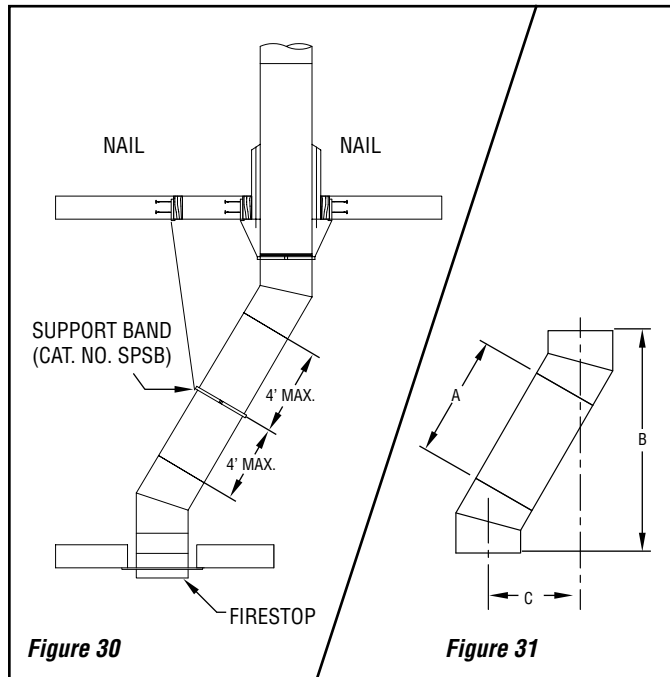
4. Remove the wall support adaptor pieces from the SPTS box and attach the adaptor to the bottom of the tee by inserting it into the bottom of the tee and push to lock.
5. Push the side portion of the tee into the opening in the wall firestop.
6. Assemble the right and left gussets to the support plate using the hardware provided.
7. Attach wall support plate to wall support adaptor using 4 clamps provided. Do not tighten. (See **Figure 29a**).
8. Align the wall support with the wall and secure it to the wall studs using 5/16" x 2" lag screws (not provided). **DO NOT SECURE TO SIDING**. For masonry walls, use 5/16" x 2" masonry lag bolts.
9. Install the tee cap to the bottom of the wall support adaptor with a minimum of two (2) #10 x 1/2" sheet metal screws.
10. Position the tee and the adaptor on wall support to maintain 2" clearance to combustibles. AT THIS POINT TIGHTEN CLAMPS.
11. Slide IHP chimney pipe into top of tee. Align male and female ends. Push down on pipe sections until locked. As sections are added, it will be necessary to secure them to the outside wall with bands (SPWB) at eight foot intervals and 2" from combustibles. Wall Bands (SPWB) are secured to the chimney by placing band around the chimney and tightening clamping bolt. The assembly is anchored to the wall studs (not the siding) with 5/8" x 2" lag bolts. To complete the chimney installation, see "Flashing Installation" and "Termination" sections.

NOTE: DIAGRAMS & ILLUSTRATIONS ARE NOT TO SCALE.

ELBOW INSTALLATION

1. IHP provides a 15° (SPSE15) and 30° (SPSE30) Elbow to allow chimneys to avoid framing members or roof peaks. A maximum of 30° from the vertical is allowed, and a total of four elbows (two pair) for each chimney installation. Maintain 2" clearance to combustibles.
2. Attach the elbow(s) to the chimney pipe or other support part and push to lock. Using the offset chart, add chimney sections between the elbows. A support band (SPSB) is required at the upper elbow of the pair to support the load, as shown in **Figure 30**. Attach the upper elbow to bring the chimney back to vertical.

Offset combinations: see **Table 5** and illustration, **Figure 31**.



6" DIAMETER CENTER LINE OFFSET TABLE					
A		15° Angle		30° Angle	
Length	No. Pcs.	B	C	B	C
0	0	18-7/16"	2-1/4"	20-3/16"	5"
6"	1	22-13/16"	3-3/8"	24-1/16"	7-1/4"
12"	1	28-5/8"	4-15/16"	29-1/4"	10-1/4"
18"	1	34-3/8"	6-1/2"	34-7/16"	13-1/4"
24"	1	40-3/16"	8-1/16"	39-5/8"	16-1/4"
30"	2	44-1/2"	9-1/4"	43-1/2"	18-1/2"
36"	1	51-3/4"	11-3/16"	50-1/16"	22-1/4"
42"	2	56-1/8"	12-3/8"	53-15/16"	24-1/2"
48"*	1	63-3/8"	14-1/4"	60-7/16"	28-1/4"
54"*	2	67-3/4"	15-7/16"	64-3/8"	30-1/2"
60"*	2	73-1/2"	17"	69-1/2"	33-1/2"
66"*	2	79-11/16"	18-1/2"	74-3/4"	36-1/2"
72"*	2	85-1/2"	20-1/16"	79-15/16"	39-1/2"
78"*	3	89-7/16"	21-1/4"	83-13/16"	41-3/4"
84"*	2	96-11/16"	23-3/16"	90-5/16"	45-1/2"
90"*	3	102-3/8"	24-3/8"	94-3/16"	47-1/2"
96"*	2	108-1/4"	26-5/16"	100-11/16"	51-1/2"

Table 5

FLASHING INSTALLATION

1. Continue the SP chimney to the roof. Cut the roof opening, centered over the chimney. A 2 inch-airspace around the chimney is required as it penetrates the roof. The size of hole in the roof will vary depending on the roof pitch.
 2. Install the next SP chimney section through the roof. See **Figure 32**.
- NOTE:** If your roof is already shingled, be sure to slide the upper edge under the shingles to prevent leakage.
3. Install a bead of caulk around the pipe at the top edge of the flashing. Wrap the storm collar around the pipe and imbed the edge in the caulk to prevent leakage around the pipe.
 4. Continue to install pipe sections until the proper termination height is reached. See termination section.

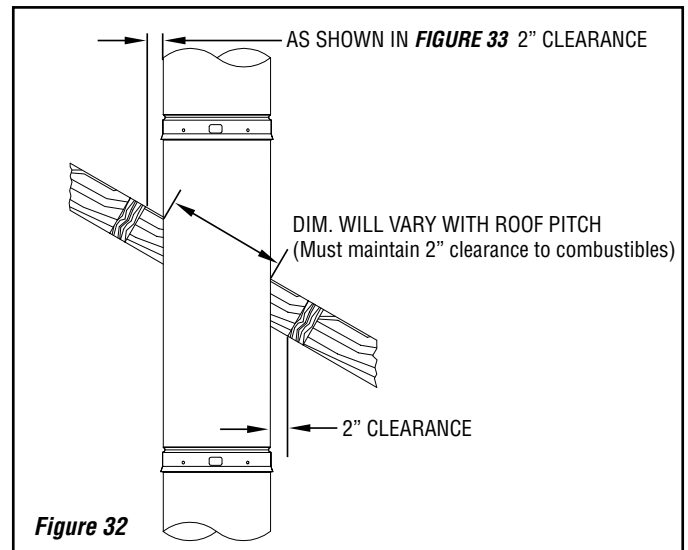


Figure 32

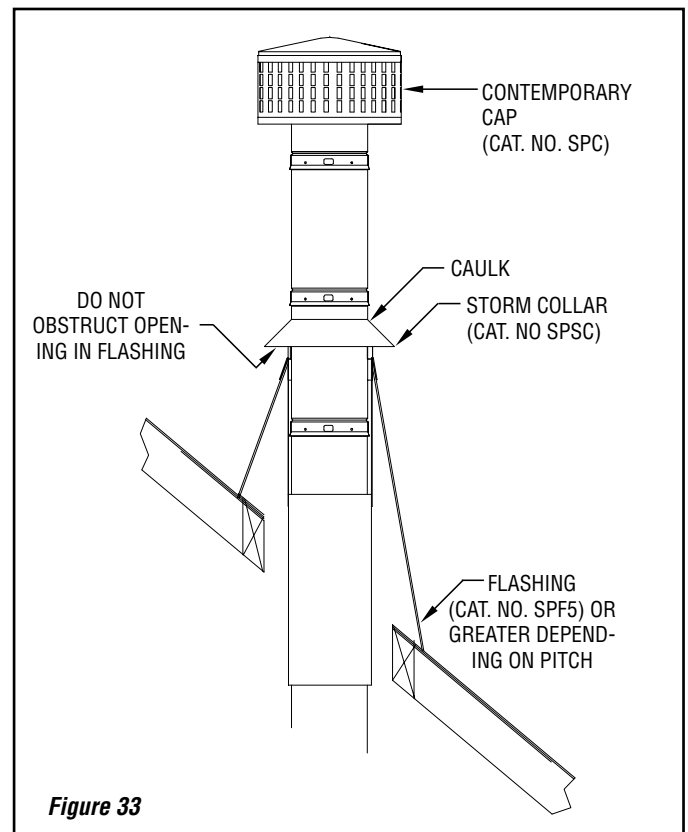


Figure 33

TERMINATION

Many building codes specify a minimum chimney heights above the roof top. These specifications are summarized in what is known as the "Ten Foot Rule". This rule states:

If the horizontal distance from the side of the chimney to the peak of the roof is 10 feet or less, the top of the chimney must be at least 2 feet above the peak of the roof, but never less than 3 feet in overall height above the highest point where it passes through the roof (**Figure 34**).

If the horizontal distance from the side of the chimney to the peak of the roof is more than 10 feet, a chimney height reference point is established on the surface of the roof a distance of 10 feet from the side of the chimney in a horizontal plane. The top of the chimney must be at least 2 feet above this reference point, but never less than 3 feet in height above the highest point where it passes through the roof (**Figure 35**).

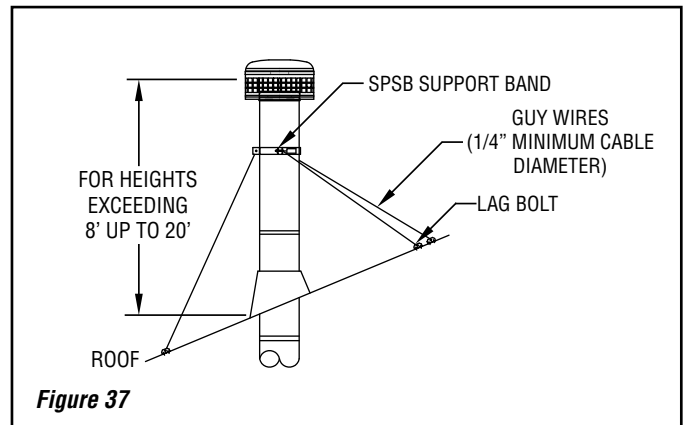
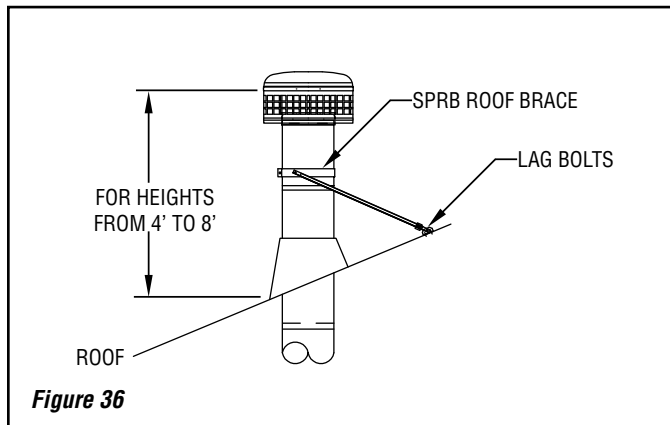
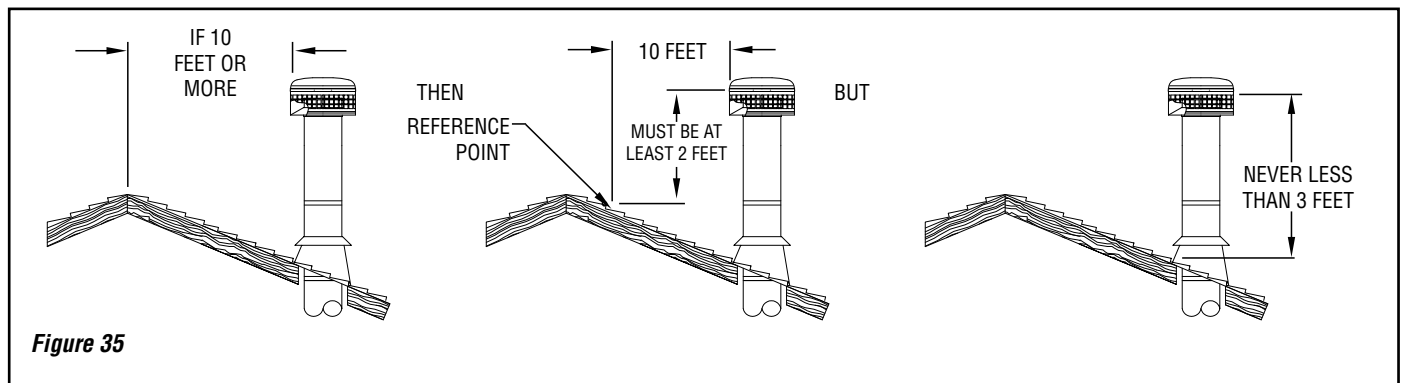
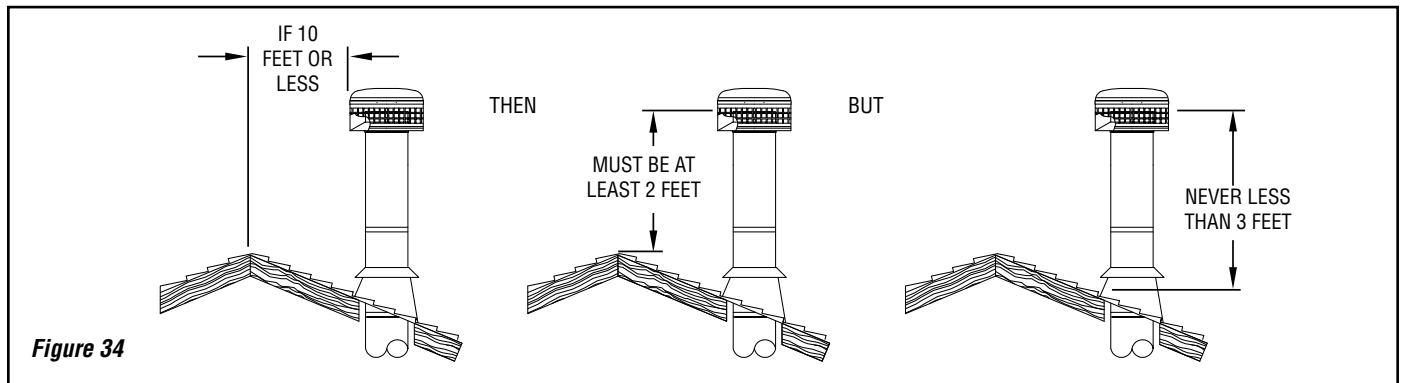
These chimney heights are necessary in the interest of safety and do not ensure smoke free operation. Trees, buildings, adjoining roof lines, adverse wind conditions-etc., may create a need for a taller chimney, should smoking occur.

Additional support is required above the roof if the chimney height exceeds four (4) feet.

Select the proper support for your application-using either a roof brace (**Figure 36**), or a support band with guy wires (**Figure 37**)

SP ROOF BRACE INSTALLATION

1. Assemble the attachment support band (SPSB) around the chimney, and clamp it in place at the desired height using the nut and bolt provided.
2. Loosely attach the support legs to the bolts on the attachment band using hardware provided.
3. Position the support legs as shown in **Figure 36**. The length of the support legs can be adjusted by loosening the bolt on the leg clamp.
4. Secure legs to roof using screws provided. Seal screw holes to prevent roof leaks.
5. Tighten all hardware.



NOTE: DIAGRAMS & ILLUSTRATIONS ARE NOT TO SCALE.

CANADA ONLY

CHIMNEY INSTALLATION

INSTRUCTIONS USING SECURITY CHIMNEYS ASHT

CANADA APPROVED VENTING SYSTEMS:

6" diameter chimney - Canada

Models ASHT® & S2100 manufacture by Security Chimneys® or DuraTech Canada (DTC) manufactured by DuraVent only, including:

- Chimney lengths
- Elbows (*where necessary*)
- Associated components as per these installation instructions and instructions provided by the venting Manufacturer

Reference the installation instructions provided by venting manufacturer.

CHIMNEY ADAPTOR-CANADA ONLY

The fireplace is normally supplied with a chimney adaptor suitable for use with IHP SnapPak venting. In Canada, the use of Security Chimneys ASHT adaptor is required (Security part number 6IHP1* or 6IHP2**).

* One inch wall

** Two inch wall

Chimney Adaptor - Canada only

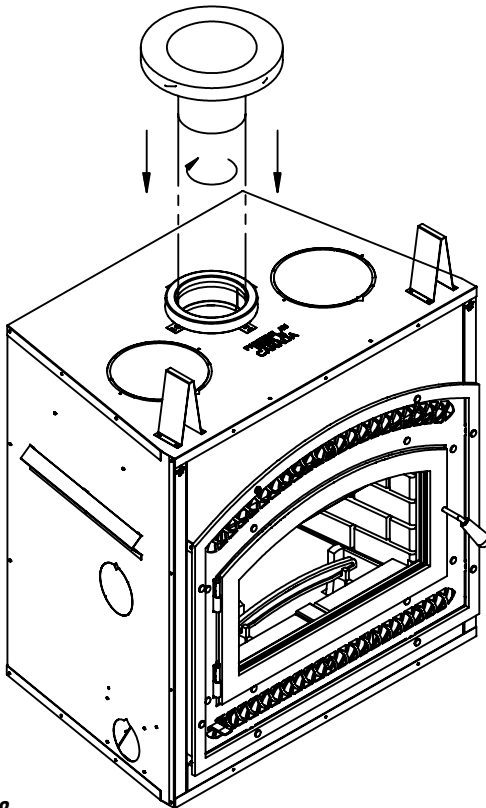


Figure 38

CHIMNEY CHASE AND MULTIPLE TERMINATIONS

For the purpose of this manual, a chimney chase is considered a part of the chimney system rather than part of a building. The termination must be placed a minimum of 18" (460 mm) above the chase.

For installations where more than one chimney is located in the same chase or within the same area, we suggest that their terminations be separated by at least 16" (410 mm) horizontally, and 18" (460 mm) vertically. This separation is to prevent smoke migrating from one chimney to another (see **Figure 39**).

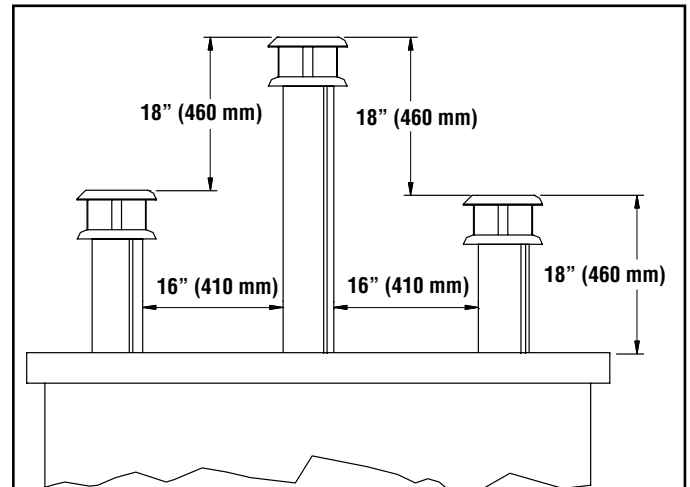


Figure 39

INSTALLATION INSTRUCTIONS FOR MASONRY APPLICATIONS FOR BOTH UNITED STATES AND CANADA

WARNING: Before starting the installation, the masonry chimney must be inspected by a qualified chimney sweep.

The following requirements must be followed:

1. The chimney must be absolutely clear of any soot residue or creosote. Check for cracks, loose or missing bricks that could inhibit correct installation of the liner.
2. The clearance to combustibles must be a minimum of 1" between the outside of the masonry and any wood framing or loose insulation.
3. The chimney must be built in accordance with the current building code.
4. No other appliance can be connected to the same chimney.
5. The clearances to combustibles for these fireplace connectors are 2" on the side and bottom and 16" at the top.
6. The connector parts are not necessary if the connection between the insulated length and the stainless steel liner is done within the masonry chimney.

Installation:

Rigid stainless liner or stainless flex must be used and listed to UL-1777 for US applications and ULC-S635 for existing masonry or ULC-S640M for new masonry applications in Canada. The steel rigid or flex liner must be rated at 2100° F (1100° C).

Follow these steps:

1. Position the fireplace in its location. Temporarily install the 30° insulated elbow on the top of the fireplace and, using a level, mark with an oval the location where the flue liner will enter the masonry chimney.
2. In the middle of the oval, drill a hole in the masonry chimney at 30°.
3. Increase the size of the hole until a 30° liner elbow can be easily slipped through.
4. Slide the liner down from the top of the masonry chimney until you reach the hole level.
5. Slip through the hole a 30° liner elbow and connect it to the liner.
6. Add a small liner section to the other end of the liner elbow which will allow the liner to extend at least 12" (measured at the top of the liner) from the masonry chimney.
7. Seal the opening around the liner with high temperature refractory cement.
8. The next steps must be done in the following order:

See typical installation illustrated below (Figure 40).

- A. Select the insulated pipe length that will fit between the 30° insulated elbow on top of the appliance and the exposed liner so that it will slide at least 2" over the liner section (You may need to cut the liner for a better fit).
- B. Take that section and attach the pipe to the insulated liner connector and slide it over the liner. Make sure you have enough opening to be able to install the elbow without difficulty.
- C. Install the 30° elbow on the fireplace.
- D. Slide the length section back down on the elbow and twist lock the two together.
- E. Pull the cover down over the length and install the insulation pad over the liner; be careful to cover the liner completely.
- F. Slide back the cover over the insulation and fix it in place using the 3 metal screws supplied.

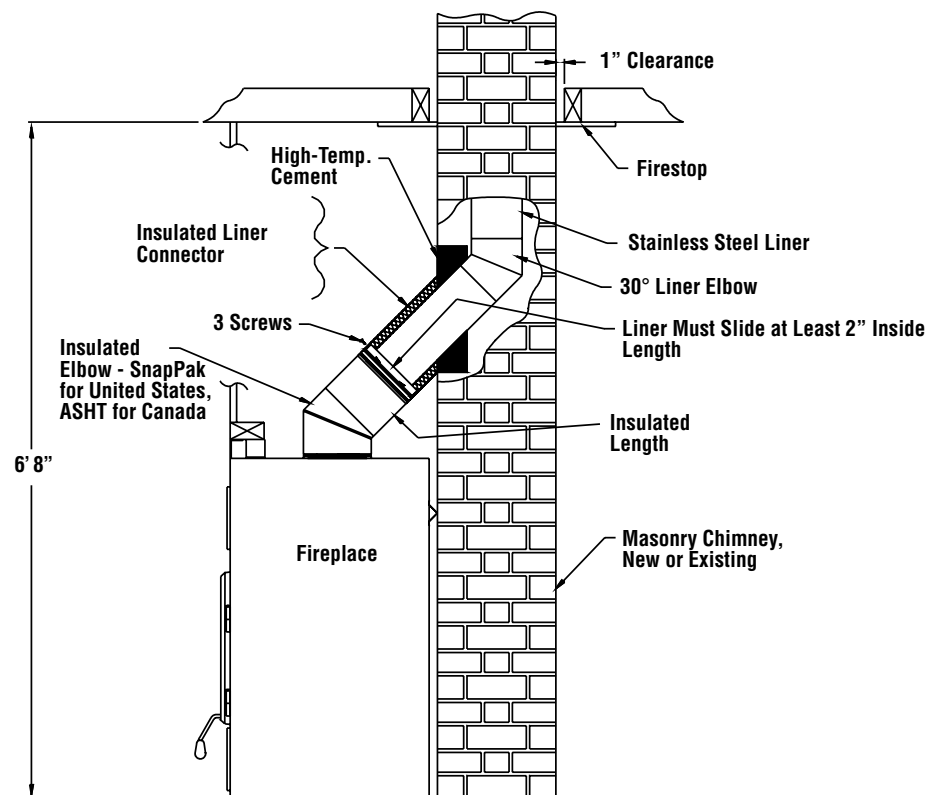


Figure 40

OPTIONAL INSTALLATION ACCESSORIES

Installation Accessories	
Description	Cat./ Part No.
Facades (Required - Order Separately)	
MONTECITO-B Facade Black, MFBK	F2320
MONTECITO-B Facade Hammered Steel, MONT-FAC-HMRD	F3609
Doors (Required - Order Separately)	
MONTECITO-B Door, Black, MCBK	F1857
MONTECITO-B Door, Hammered Steel, MONT-DOOR-HMRD	F3610
Cast Iron Door, Black, BWBK	F1859
Outside Air Kit (included with fireplace)	
Outside Air Coupler To Connect Outside Air (UZI) To Fire-place, UZIAD	UZIAD
Outside Air Ducting - includes 4" insulated flex x 10' long, UZI	UZI
EPA Fireplace - HeatFlo Convection Kit	
EPA Heatflo Conv. Kit, EPA-HEATFLO-KIT	F3790

Fireplace Kits	
Description	Cat./ Part No.
Central Forced Air Kit Accessories	
Central Forced Air Kit, Central forced air kit including: blower (BISZY), flex adaptor (BISAF), 2 clamps, variable speed control (VRUW), thermo-disk (VTU), fan to flexible pipe adaptor (BISAVF), back draft damper (BISBD), aluminium tape, BISFWK-1	BISFWK-1
Flexible pipe 5" I.D. x 15 ft. Long, 5FLEX15	5FLEX15
Flexible pipe 5" I.D. x 30 ft. Long, 5FLEX25	5FLEX25
Heating and cooling thermostat, 24V, HCTW	HCTW

REPLACEMENT PARTS LIST

MONTECITO-B Replacement Parts	
Description	Part/Cat. No.
Blower (heat activated on/off pre-wired), UZY5	UZY5
Blower motor speed control (wall mount), VRUW	VRUW
Snap Disc, Blower	VTU
Baffle refractory (2 pieces)	PR-IS02205
Back refractory	PR-SR2618
Right side refractory	PR-SR2619D
Left side refractory	PR-SR2619G
Bottom refractory	PR-SR2201
Front refractory, right side	PR-SR2202D
Front refractory, left side	PR-SR2202G
Door handle	PR-SR1787
Hinge Assembly, Fireplace and Door	PR-SR2395TCE
Decorative Screw Caps, Black (2)	PR-SACMEFBK
Decorative Screw Caps, Brushed Nickel (2)	PR-SACMEFBN
Ceramic glass panel	PR-SR2222-1
Secondary air tube	PR-SR2271
Cast-iron Log Retainer Supports - Grate (2)	PR-SR2324
Cast Iron Log Retainer Bar	PR-SR2323
Gasket Kit, Glass, 69" (1 x 5/16") (steel and cast doors)	PR-SR1823H
Gasket Kit, Steel Door Frame, 73" (5/8" dia.)	PR-SR1685D
Gasket Kit, Cast Door Frame, 73" (5/8" dia.)	PR-SR1823G
Touch-up Paint, Aerosol, Black Metallic SBMB6309	H8159
Touch-up Paint, Charcoal (for hammered steel facade)	PR-P6201
Coupler, Outside Air (connects UZI to fireplace)	UZIAD
Coupler for AC Chimney (connects ACZI to fireplace)	H3274
Blower 250 CFM for central forced air kit, BISZY	BISZY
Blower variable speed control with decorative wall plate for (BISZY), VRUW	VRUW
Thermo-disk, on/off blower control (for BISZY), VTU	VTU
Blower to flexible pipe adaptor, BISAVF	BISAVF
Backdraft damper, BISBD	BISBD
Fireplace to Flex adaptor and 2 clamps, BISAF	BISAF
MONTECITO-B Metal Fab Collar and Sleeve	F4189

Contact an IHP dealer to obtain any of these parts. Never use substitute materials not approved by IHP. Use of non-approved parts can result in poor performance and safety hazards.

SPECIFICATIONS

Cat. No.	Model
TBD	MONTECITO-B

Model	Emission Rate	Heat Output	Efficiency (B415.1-10)
MONTECITO-B	1.9 g/hr	15,300-55,600 btu/hr	77%

Product Reference Information	
Weight	300 lbs
Height	36"
Width	36"
Depth	24-1/2"
Firebox W x H x D - measured in front	22" x 11-3/4" x 12"
Chimney Weight ASHT (6" dia)	6.25 lb per linear foot
Chimney Weight AC (6" dia.)	3.25 lb per linear foot
Chimney weight S-2100+ (6" dia.)	10.8 lb per linear foot

CLEARANCE TO COMBUSTIBLES

The following clearances meet the minimum requirements for a safe installation;

Side wall: 17" (324 mm) measured from the fireplace side

Ceiling: 6' 8" (2,032 mm) measured from the base of the fireplace

Fireplace enclosure:

Bottom: 0"

Side: 0" to standoff

Back: 0" to standoff

Top: Do not fill the space above the fireplace with any material (Except the wood framing. See **Page 10, Figure 11**)

Chimney: 2" (50 mm)

Mantel: 42" (1067 mm) measured from the base of the fireplace.

SECURITY CHIMNEYS® AND DURAVENT® - PARTS AND COMPONENTS LISTS

The components listed below must be ordered from Security Chimneys® or DuraVent®. Contact your Security Chimneys or DuraVent Distributor or Dealer for ordering information.

Security Chimneys®
2125 Monterey, Laval, Quebec
Canada, H7L 3T6
securitychimneys.com

450-973-9999
1-800-361-4909 (USA)
1-800-667-3387 (Canada)

M&G DuraVent
877 Cotting Court, Vacaville,
California, 95688
duravent.com

1-800-835-4429

Secure Temp ASHT 1" High Temp. Insulated Stainless Steel Chimney <i>6" I.D. and 8" O.D., Double-Wall Stainless Steel, Listed to CAN/ULC-S604, UL-103HT and CAN/ULC S629</i>	
Description	Part/Cat. No.
Lengths and Misc. Chimney Components	
8" length, 6" Dia.	6L8
12" length, 6" Dia.	6L12
18" length, 6" Dia.	6L18
24" length, 6" Dia.	6L24
36" length, 6" Dia.	6L36
48" length, 6" Dia.	6L48
Adjustable Length 12", 6" Dia.	6LA
15° elbow, 6" Dia.	6E15
30° elbow, 6" Dia.	6E30
Rain Termination Cap, 6" Dia.	6CC
Spark Arrester Screen (universal spark arrester band)	PE
Wall Band	BM
Supports	
Offset Support	SO
Roof Support	ST
Roof Brace	BS2
Firestops	
Firestop	6BF
Radiation Shield	6RS
Insulated Attic Radiation Shield	6RSA2
Insulated Wall Radiation Shield	6RSM
Insulated Wall Radiation Shield, 30°	6RSMI30
Uninsulated Wall Radiation Shield, 30°	6RSM30
Attic Radiation Shield	ACRSA
Roof Flashings	
Flat Roof Flashing	6FR
1/12 - 7/12 (5° - 30°)	6FAR
8/12 - 12/12 (30° - 45°)	6FBR
Storm Collar	6FC

DuraTech DTC 1" High Temp. Insulated Stainless Steel Chimney <i>6" I.D. and 8" O.D., Double-Wall Stainless Steel, Listed to CAN/ULC-S604, UL-103HT and CAN/ULC S629</i>	
Description	Part/Cat. No.
Lengths and Misc. Chimney Components	
8" length, 6" Dia.	6DTC-08SS
12" length, 6" Dia.	6DTC-12SS
18" length, 6" Dia.	6DTC-18SS
24" length, 6" Dia.	6DTC-24SS
36" length, 6" Dia.	6DTC-36SS
48" length, 6" Dia.	6DTC-48SS
Adjustable Length 12", 6" Dia.	6DTC-12TASS
15° elbow, 6" Dia.	6DTC-E15SS
30° elbow, 6" Dia.	6DTC-E30SS
Rain Termination Cap, 6" Dia.	6DTC-VC
Spark Arrester Screen (universal spark arrester band)	DTC-SA
Wall Band	DTC-WSU
Supports	
Offset Support	DTC-RESU
Roof Support	DTC-RS
Roof Brace	DTC-XRB
Firestops	
Firestop	6DTC-FS
Radiation Shield	6DTC-FRS
Insulated Attic Radiation Shield	6DTC-ISI
Insulated Wall Radiation Shield	6DTC-WTI
Insulated Wall Radiation Shield, 30°	6DTC-WRSI30
Uninsulated Wall Radiation Shield, 30°	6DTC-WRSI45
Attic Radiation Shield	6DTC-ISIA
Roof Flashings	
Flat Roof Flashing	6DTC-FF
1/12 - 7/12 (5° - 30°)	6DTC-F7
8/12 - 12/12 (30° - 45°)	6DTC-F12
Storm Collar	6DTC-SC



Report No. / Rapport n°
14-199

LISTED FACTORY BUILT FIREPLACE FOYER PRÉFABRIQUE HOMOLOGUÉ

FIREPLACE, ALSO FOR USE IN MANUFACTURED HOMES WITH SOLID FUEL ONLY

CE FOYER EST ÉGALEMENT CERTIFIÉ POUR
INSTALLATION DANS LES MAISONS MOBILES.
COMBUSTIBLES SOLIDES SEULEMENT.

Serial No.

Numéro de série

Model / Modèle: Montecito™-B

Certification test emission value 1.9 g/hr per 2020 standard

Valeur d'émission du test d'homologation 1,9 g/h selon la norme 2020

astria
FIREPLACES®

Manufactured by / Fabriqué par:
INNOVATIVE HEARTH PRODUCTS
1502 14th St. NW
Auburn, WA 98001 USA

Conforms to / Conforme au : UL STD 127
Certified to / Certifié au : ULC STD S610

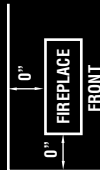
CLEARANCES TO COMBUSTIBLES:

SIDE WALL (FROM DOOR EDGE) 24 in. (610 mm)
MANTEL (ABOVE FIREPLACE'S BASE) 42 in. (1067 mm)
BACK WALL (FROM SPACERS) 0 in. (0 mm)
ABOVE THE FIREPLACE (FROM THE BASE OF THE FIREPLACE) 6 ft. 8 in. (2032 mm)
CHIMNEY 2 in. (51 mm)

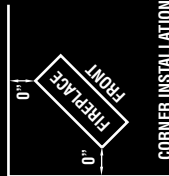
DÉGAGEMENTS AUX COMBUSTIBLES:

MUR LATÉRAL (DE L'OUVERTURE DE LA PORTE) 24 po. (610 mm)
LINTEAU (AU-DESSUS DE LA BASE DU FOYER) 42 po. (1067 mm)
MUR ARRIÈRE ET CÔTÉ DU FOYER (DES ESPACEURS) 0 po. (0 mm)
AU-DESSUS DU FOYER (À PARTIR DE LA BASE DU FOYER) 6 pi. 8 po. (2032 mm)
CHEMINÉE 2 po. (51 mm)

INSTALL WITH MINIMUM CLEARANCES TO WALL
AS SHOWN IN INCHES.

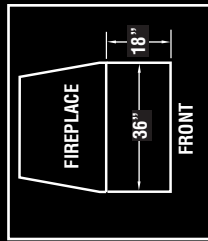


SIDEWALL - BACKWALL
INSTALLATION



CORNER INSTALLATION

FLOOR PROTECTOR MINIMUM DISTANCE
FROM OPENING IN INCHES



HEARTH EXTENSION MATERIAL :
- 3/8" THICKNESS NON COMBUSTIBLE
MATERIAL
- OR EQUIVALENT

U.S. ENVIRONMENTAL PROTECTION AGENCY
Certified to comply with 2020 particulate emission
standards using crib wood.

DATE OF MFG. 1 2 3 4 5 6 7 8 9 10 11 12

2019-20-21-22-23-24-25

P/N 901018-00, REV. 0, 08/2019

USE WOOD FUEL ONLY

- NON COMBUSTIBLE HEARTH EXTENSION MUST BE INSTALLED AT FRONT OF UNIT EXTENDING 18 in. (457 mm) AT FRONT AND 36 in. (914 mm) WIDE MINIMUM.
- THIS FIREPLACE HAS NOT BEEN TESTED WITH UNVENTED GAS LOG SET. TO REDUCE RISK OF FIRE OR INJURY DO NOT INSTALL AN UNVENTED GAS LOG SET INTO THE FIREPLACE.
- ELECTRICAL RATING: 120 V, 60 Hz
- CHIMNEY TYPE: USE ONLY WITH LISTED 6 in. DIAMETER CHIMNEY, CERTIFIED MODEL ASHT+, S-2100+, HT6000+, HT6103+ OR AC.
- CAN BE CONNECTED TO A MASONRY CHIMNEY AS DESCRIBED IN THE INSTALLATION INSTRUCTIONS.
- COMPONENTS USED WITH THE FIREPLACE MUST BE LISTED. SEE LIST IN THE INSTALLATION INSTRUCTIONS.
- REPLACE GLASS WITH CERAMIC GLASS 5mm THICK.
- FOR SAFE OPERATION, INSTALL IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS.
- CAUTION: COMBUSTION AIR OPENING MUST NOT BE OBSTRUCTED.
- DO NOT OVERFIRE THE FIREPLACE.
- OPERATE THE FIREPLACE WITH DOOR FULLY OPEN OR FULLY CLOSED ONLY.
- DO NOT USE A REPLACEMENT OR OTHER PRODUCTS NOT SPECIFIED FOR USE WITH THIS PRODUCT
- CONTACT YOUR LOCAL BUILDING OR FIRE OFFICIALS ABOUT RESTRICTIONS AND INSTALLATION INSPECTIONS IN YOUR AREA.

- POUR USAGE AVEC LE BOIS SEULEMENT
- UN TABLIER NON COMBUSTIBLE DOIT ÊTRE INSTALLÉ À L'AVANT DU FOYER. DIMENSION MINIMALE DE 18 po. (457 mm) PAR 36 po. (914 mm) DE LARGE.
- CE FOYER N'EST PAS HOMOLOGUÉ POUR ÊTRE UTILISÉ AVEC UN ENSEMBLE DE BûCHES À GAZ SANS CONDUIT D'ÉVACUATION. AFIN DE RÉDUIRE LES RISQUES D'INCENDIE OU DE BLESSURES, N'INSTALLEZ PAS DE BûCHES À GAZ SANS CONDUIT D'ÉVACUATION À L'INTÉRIEUR DE CE FOYER.
- ALIMENTATION ÉLECTRIQUE: 120V, 60 Hz
- UTILISER SEULEMENT AVEC UNE CHEMINÉE 6 po. (150 mm) DE DIAMÈTRE. MODÈLE ASHT+, S2100+, HT6000+, HT6103+ OU AC HOMOLOGUÉE.
- PEUT ÊTRE RACCORDÉ SUR UNE CHEMINÉE DE MAÇONNERIE TEL QUE DÉCRIT DANS LE MANUEL D'INSTALLATION.
- LES COMPOSANTES UTILISÉES AVEC LE FOYER DOIVENT ÊTRE HOMOLOGUÉES. VOIR LA LISTE DANS LE MANUEL D'INSTALLATION.
- REMPLACER LA VITRE AVEC UN VERRE CÉRAMIQUE DE 5mm D'ÉPAISSEUR.
- POUR UNE UTILISATION SÉCURITAIRE, INSTALLER CONFORMÉMENT AUX DIRECTIVES DU FABRICANT.
- ATTENTION - NE PAS OBSTRUER LES ARRIVÉES D'AIR COMBURANT.
- NE PAS FAIRE SURCHAUFFER LE FOYER.
- LA PORTE DU FOYER DOIT DEMEURER TOTALEMENT OUVERTE OU TOTALEMENT FERMÉE LORSQUE LE FOYER FONCTIONNE.
- NE PAS UTILISER DE POÊLE ENCASTRABLE OU D'AUTRES PRODUITS NON SPÉCIFIÉS COMME ÉTANT UTILISABLES AVEC CE PRODUIT.
- CONTACTER VOS FONCTIONNAIRES LOCAUX À PROPOS DES RESTRICTIONS ET INSPECTIONS D'INSTALLATION.
- VOIR LE MANUEL D'INSTALLATION POUR PLUS D'INFORMATION.
- L'UTILISATION DE CET APPAREIL DE CHAUFFAGE AU BOIS DE MANIÈRE INCOMPATIBLE AVEC LES INSTRUCTIONS DU MANUEL DU PROPRIÉTAIRE CONSTITUE UNE INFRACTION AUX RÉGULATIONS FÉDÉRALES.

- CONTACTEZ LES RESPONSABLES DE VOTRE RÉGION À PROPOS DES RESTRICTIONS ET INSPECTIONS D'INSTALLATION.
- SEE IHP INSTALLATION AND OPERATING INSTRUCTIONS FOR THIS MODEL.
- INSTALL AND USE ONLY IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS AND LOCAL BUILDING CODES.
- SPECIAL METHODS ARE REQUIRED WHEN PASSING THROUGH A WALL OR CEILING. SEE INSTRUCTIONS AND BUILDING CODES.
- PREVENT CREOSOTE FIRE: INSPECT CHIMNEY CONNECTOR AND CHIMNEY FLUE MONTHLY AND CLEAN IF NECESSARY.
- DO NOT OVERFIRE: IF DOME OR CHIMNEY CONNECTOR GLOWS YOU ARE OVERFIRING.
- KEEP FURNISHINGS AND OTHER COMBUSTIBLE MATERIALS A CONSIDERABLE DISTANCE AWAY FROM APPLIANCE.
- MAINTENIR LES MEUBLES ET AUTRES OBJETS À UNE DISTANCE SÉCURITAIRE DU FOYER.
- THIS WOOD HEATER NEEDS PERIODIC INSPECTION AND REPAIR FOR PROPER OPERATION. CONSULT THE OWNER'S MANUAL FOR FURTHER INFORMATION. IT IS AGAINST FEDERAL REGULATIONS TO OPERATE THIS WOOD HEATER IN A MANNER INCONSISTENT WITH THE OPERATING INSTRUCTIONS IN THE OWNER'S MANUAL.
- CET APPAREIL DE CHAUFFAGE AU BOIS DOIT ÊTRE INSPECTÉ ET ENTRETENU PÉRIODIQUEMENT POUR FONCTIONNER CORRECTEMENT. VOIR LE MANUEL DU PROPRIÉTAIRE POUR PLUS D'INFORMATION. L'UTILISATION DE CET APPAREIL DE CHAUFFAGE AU BOIS DE MANIÈRE INCOMPATIBLE AVEC LES INSTRUCTIONS DU MANUEL DU PROPRIÉTAIRE CONSTITUE UNE INFRACTION AUX RÉGULATIONS FÉDÉRALES.

Innovative Hearth Products

Astria® Brand EPA Wood Burning Fireplace

Limited Lifetime Warranty

THE WARRANTY

Innovative Hearth Products ("IHP") Limited Lifetime Warranty warrants your Astria® Brand EPA Wood Burning Fireplace ("Product") to be free from defects in materials and workmanship at the time of manufacture. The Product body, firebox and ceramic glass carry the Limited Lifetime Warranty. Ceramic glass carries the Limited Lifetime Warranty against thermal breakage only. After installation, if covered components manufactured by IHP are found to be defective in materials or workmanship during the Limited Lifetime Warranty period and while the Product remains at the site of the original installation, IHP will, at its option, repair or replace the covered components. If repair or replacement is not commercially practical, IHP will, at its option, refund the purchase price or wholesale price of the IHP product, whichever is applicable. IHP will also pay IHP prevailing labor rates, as determined in its sole discretion, incurred in repairing or replacing such components for up to five years. THERE ARE EXCLUSIONS AND LIMITATIONS to this Limited Lifetime Warranty as described herein.

COVERAGE COMMENCEMENT DATE

Warranty coverage begins on the date of purchase. In the case of new home construction, warranty coverage begins on the date of first occupancy of the dwelling or six months after the sale of the Product by an independent IHP dealer/distributor, whichever occurs earlier. The warranty shall commence no later than 24 months following the date of product shipment from IHP, regardless of the installation or occupancy date.

EXCLUSIONS AND LIMITATIONS

This Limited Lifetime Warranty applies only if the Product is installed in the United States or Canada and only if operated and maintained in accordance with the printed instructions accompanying the Product and in compliance with all applicable installation and building codes and good trade practices.

This warranty is non-transferable and extends to the original owner only. The Product must be purchased through a listed supplier of IHP and proof of purchase must be provided. The Product body and firebox carry the Limited Lifetime Warranty from the date of installation. Vent components, trim components and paint are excluded from this Limited Lifetime Warranty. The following do not carry a Limited Lifetime Warranty but are warranted as follows:

Cast Iron Heat Exchanger – Replacement for five years from the date of installation

Cast iron parts – Replacement for one year from the date of installation

Catalyst – Carries a separate warranty. Refer to the warranty certificate provided for that part

Electrical components – Repair or replacement for one year from date of installation

Gaskets – Replacement for one year from the date of installation.

Gold & nickel plating – Replacement for two years from date of installation. Excludes tarnishing

Refractory & screens – Replacement for two years from date of installation. Excludes hairline cracks

Removable air tubes – Repair or replacement for seven years from date of installation. IHP prevailing labor rates for years one through five.

Labor coverage – Prevailing IHP labor rates apply for the warranty period of the component, unless otherwise noted

Parts not otherwise listed carry a 90 day warranty from the date of installation.

Whenever practicable, IHP will provide replacement parts, if available, for a period of 10 years from the last date of manufacture of the Product.

IHP will not be responsible for: (a) damages caused by normal wear and tear, accident, riot, fire, flood or acts of God; (b) damages caused by abuse, negligence, misuse, or unauthorized alteration or repair of the Product affecting its stability or performance. (The Product must be subject to normal use with approved fuels listed in the Operation Manual provided with the product. Fuel products with abnormal burning characteristics, including but not limited to fuel such as driftwood, coal or plywood and wood products using a binder may burn at excessive temperatures and may cause damage to the Product or may cause it to function improperly; IHP stoves, inserts and high efficiency EPA fireplaces are approved for burning dry seasoned wood only.); (c) damages caused by failing to provide proper maintenance and service in accordance with the instructions provided with the Product; (d) damages, repairs or inefficiency resulting from faulty installation or application of the Product.

Coverage of this Limited Lifetime Warranty is conditional upon the appliance being operated without the use of grates, irons or any other method to elevate the fire.

IHP is not responsible for inadequate system draft caused by air conditioning and heating systems, mechanical ventilation systems, or general construction conditions which may generate negative air pressure in the room in which the appliance is installed. Additionally IHP assumes no responsibility for smoking conditions caused by inadequate chimney height, adjoining trees or buildings, adverse wind conditions or unusual environmental factors and conditions. Certain IHP Products are listed for use with Security Chimneys International, Ltd. chimney systems only. Use of chimney components other than that specified in the Product manual will void the Product warranty.

This Limited Lifetime Warranty covers only parts and labor as provided herein. In no case shall IHP be responsible for materials, components or construction which are not manufactured or supplied by IHP or for the labor necessary to install, repair or remove such materials, components or construction. Additional utility bills incurred due to any malfunction or defect in equipment are not covered by this Limited Lifetime Warranty. All replacement or repair components will be shipped F.O.B. from the nearest stocking IHP factory.

LIMITATION ON LIABILITY

It is expressly agreed and understood that IHP's sole obligation and the purchaser's exclusive remedy under this warranty, under any other warranty, expressed or implied, or in contract, tort or otherwise, shall be limited to replacement, repair, or refund, as specified herein.

In no event shall IHP be liable for any incidental or consequential damages caused by defects in the Product, whether such damage occurs or is discovered before or after replacement or repair, and whether such damage is caused by IHP's negligence. IHP has not made and does not make any representation or warranty of fitness for a particular use or purpose, and there is no implied condition of fitness for a particular use or purpose.

IHP makes no expressed warranties except as stated in this Limited Lifetime Warranty. The duration of any implied warranty is limited to the duration of this expressed warranty.

No one is authorized to change this Limited Lifetime Warranty or to create for IHP any other obligation or liability in connection with the Product. Some states and provinces do not allow the exclusion or limitation of incidental or consequential damages, so the above limitations or exclusions may not apply to you. The provisions of this Limited Lifetime Warranty are in addition to and not a modification of or subtraction from any statutory warranties and other rights and remedies provided by law.

INVESTIGATION OF CLAIMS AGAINST WARRANTY

IHP reserves the right to investigate any and all claims against this Limited Lifetime Warranty and to decide, in its sole discretion, upon the method of settlement.

To receive the benefits and advantages described in this Limited Lifetime Warranty, the appliance must be installed and repaired by a licensed contractor approved by IHP.

Contact IHP at the address provided herein to obtain a listing of approved dealers/distributors. **IHP shall in no event be responsible for any warranty work done by a contractor that is not approved without first obtaining IHP's prior written consent.**

HOW TO REGISTER A CLAIM AGAINST WARRANTY

In order for any claim under this warranty to be valid, you must contact the IHP dealer/distributor from which you purchased the product. If you cannot locate the dealer/distributor, then you must notify IHP in writing. IHP must be notified of the claimed defect in writing within 90 days of the date of failure. Notices should be directed to the IHP Warranty Department at 1769 East Lawrence Street; Russellville, AL 35654 or visit our website at WWW.ASTRIA.US.COM.

WARRANTY

Your fireplace is covered by a limited warranty. Please read the warranty to be familiar with its coverage.

Retain this manual. File it with your other documents for future reference.

PRODUCT REFERENCE INFORMATION

We recommend that you record the following important information about your fireplace. Please contact your IHP dealer for any questions or concerns.

REPLACEMENT PARTS

See **Page 19** for a complete replacement parts list. Use only parts supplied from the manufacturer.

Normally, all parts should be ordered through your IHP distributor or dealer. Parts will be shipped at prevailing prices at time of order.

When ordering repair parts, always give the following information:

1. The model number of the appliance.
2. The serial number of the appliance.
3. The part number.
4. The description of the part.
5. The quantity required.
6. The installation date of the appliance.

If you encounter any problems or have any questions concerning the installation or application of this system, please contact your dealer.

IHP
1769 East Lawrence Street
Russellville, AL 35654
Visit us at Astria.us.com

Model Number _____
Serial Number _____
Date Installed _____
Dealer's Name _____
Dealer's Phone Number _____



Innovative Hearth Products (IHP) reserves the right to make changes at any time, without notice, in design, materials, specifications, and prices, and also to discontinue colors, styles, and products. Consult your local distributor for fireplace code information.





LISTED FACTORY BUILT FIREPLACE
FOYER PRÉFABRIQUE HOMOLOGUÉ



Report No. / Rapport n°
14-199

**FIREPLACE, ALSO FOR USE IN MANUFACTURED
HOMES WITH SOLID FUEL ONLY**
**CE FOYER EST ÉGALEMENT CERTIFIÉ POUR
INSTALLATION DANS LES MAISONS MOBILES.
COMBUSTIBLES SOLIDES SEULEMENT.**

Manufactured by / Fabriqué par:
INNOVATIVE HEARTH PRODUCTS
1502 14th St. NW
Auburn, WA 98001 USA

Serial No.
Numéro de série

Conforms to / Conforme au : UL STD 127
Certified to / Certifié au : ULC STD S610

Model / Modèle: WCT6920WS

Certification test emission value 1.9 g/hr per 2020 standard
Valeur d'émission du test d'homologation 1,9 g/h selon la norme 2020

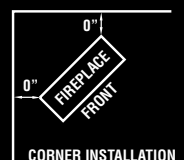
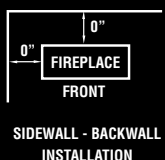
CLEARANCES TO COMBUSTIBLES:

SIDE WALL (FROM DOOR EDGE)	24 in. (610 mm)
MANTEL (ABOVE FIREPLACE'S BASE)	42 in. (1067 mm)
BACK WALL (FROM SPACERS)	0 in. (0 mm)
ABOVE THE FIREPLACE (FROM THE BASE OF THE FIREPLACE)	6 ft. 8 in. (2032 mm)
CHIMNEY	2 in. (51 mm)

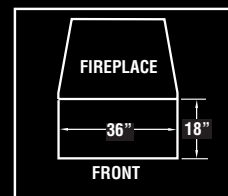
DÉGAGEMENTS AUX COMBUSTIBLES:

MUR LATÉRAL (DE L'OUVERTURE DE LA PORTE)	24 po. (610 mm)
LINTEAU (AU-DESSUS DE LA BASE DU FOYER)	42 po. (1067 mm)
MUR ARRIÈRE ET CÔTÉ DU FOYER (DES ESPACEURS)	0 po. (0 mm)
AU-DESSUS DU FOYER (À PARTIR DE LA BASE DU FOYER)	6 pi. 8 po. (2032 mm)
CHEMINÉE	2 po. (51 mm)

INSTALL WITH MINIMUM CLEARANCES TO WALL
AS SHOWN IN INCHES.



FLOOR PROTECTOR MINIMUM DISTANCE
FROM OPENING IN INCHES



HEARTH EXTENSION MATERIAL :
- 3/8 " THICKNESS NON COMBUSTIBLE
MATERIAL
- OR EQUIVALENT

U.S. ENVIRONMENTAL PROTECTION AGENCY
Certified to comply with 2020 particulate emission
standards using crib wood.

DATE OF MFG. 1 2 3 4 5 6 7 8 9 10 11 12
2019-20-21-22-23-24-25

- USE WOOD FUEL ONLY
- NON COMBUSTIBLE HEARTH EXTENSION MUST BE INSTALLED AT FRONT OF UNIT EXTENDING 18 in. (457 mm) AT FRONT AND 36 in. (914 mm) WIDE MINIMUM.
- THIS FIREPLACE HAS NOT BEEN TESTED WITH UNVENTED GAS LOG SET. TO REDUCE RISK OF FIRE OR INJURY DO NOT INSTALL AN UNVENTED GAS LOG SET INTO THE FIREPLACE.
- ELECTRICAL RATING: 120 V, 60 Hz
- CHIMNEY TYPE: USE ONLY WITH LISTED 6 in. DIAMETER CHIMNEY, CERTIFIED MODEL ASHT+, S-2100+, HT6000+, HT6103+ OR AC.
- CAN BE CONNECTED TO A MASONRY CHIMNEY AS DESCRIBED IN THE INSTALLATION INSTRUCTIONS.
- COMPONENTS USED WITH THE FIREPLACE MUST BE LISTED. SEE LIST IN THE INSTALLATION INSTRUCTIONS.
- REPLACE GLASS WITH CERAMIC GLASS 5 mm THICK.
- FOR SAFE OPERATION INSTALL IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS.
- CAUTION: COMBUSTION AIR OPENING MUST NOT BE OBSTRUCTED.
- DO NOT OVERFIRE THE FIREPLACE.
- OPERATE THE FIREPLACE WITH DOOR FULLY OPEN OR FULLY CLOSED ONLY.
- DO NOT USE A FIREPLACE INSERT OR OTHER PRODUCTS NOT SPECIFIED FOR USE WITH THIS PRODUCT
- CONTACT YOUR LOCAL BUILDING OR FIRE OFFICIALS ABOUT RESTRICTIONS AND INSTALLATION INSPECTIONS IN YOUR AREA.
- CONTACTEZ LES RESPONSABLES DE VOTRE REGION A PROPOS DES RESTRICTIONS ET INSPECTIONS D'INSTALLATION.
- SEE IHP INSTALLATION AND OPERATING INSTRUCTIONS FOR THIS MODEL.
- INSTALL AND USE ONLY IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS AND LOCAL BUILDING CODES.
- SPECIAL METHODS ARE REQUIRED WHEN PASSING THROUGH A WALL OR CEILING. SEE INSTRUCTIONS AND BUILDING CODES.
- PREVENT CREOSOTE FIRE: INSPECT CHIMNEY CONNECTOR AND CHIMNEY FLUE MONTHLY AND CLEAN IF NECESSARY.
- DO NOT OVERFIRE. IF DOME OR CHIMNEY CONNECTOR GLOWS YOU ARE OVERFIRING.
- KEEP FURNISHINGS AND OTHER COMBUSTIBLE MATERIALS A CONSIDERABLE DISTANCE AWAY FROM APPLIANCE.
- MAINTENIR LES MEUBLES ET AUTRES OBJETS À UNE DISTANCE SÉCURITAIRE DU FOYER.
- THIS WOOD HEATER NEEDS PERIODIC INSPECTION AND REPAIR FOR PROPER OPERATION. CONSULT THE OWNER'S MANUAL FOR FURTHER INFORMATION. IT IS AGAINST FEDERAL REGULATIONS TO OPERATE THIS WOOD HEATER IN A MANNER INCONSISTENT WITH THE OPERATING INSTRUCTIONS IN THE OWNER'S MANUAL.
- CET APPAREIL DE CHAUFFAGE AU BOIS DOIT ÊTRE INSPECTÉ ET ENTRETENU PÉRIODIQUEMENT POUR FONCTIONNER CORRECTEMENT. VOIR LE MANUEL DU PROPRIÉTAIRE POUR PLUS D'INFORMATION. L'UTILISATION DE CET APPAREIL DE CHAUFFAGE AU BOIS DE MANIÈRE INCOMPATIBLE AVEC LES INSTRUCTIONS DU MANUEL DU PROPRIÉTAIRE CONSTITUE UNE INFRACTION AUX RÉGULATIONS FÉDÉRALES.
- POUR USAGE AVEC LE BOIS SEULEMENT
- UN TABLIER NON COMBUSTIBLE DOIT ÊTRE INSTALLÉ À L'AVANT DU FOYER. DIMENSION MINIMALE DE 18 po. (457 mm) PAR 36 po. (914 mm) DE LARGE.
- CE FOYER N'EST PAS HOMOLOGUÉ POUR ÊTRE UTILISÉ AVEC UN ENSEMBLE DE BÛCHES À GAZ SANS CONDUIT D'ÉVACUATION. AFIN DE RÉDUIRE LES RISQUES D'INCENDIE OU DE BLESSURES, N'INSTALLEZ PAS DE BÛCHES À GAZ SANS CONDUIT D'ÉVACUATION À L'INTÉRIEUR DE CE FOYER.
- ALIMENTATION ÉLECTRIQUE: 120V, 60 Hz
- UTILISER SEULEMENT AVEC UNE CHEMINÉE 6 po. (150 mm) DE DIAMÈTRE, MODÈLE ASHT+, S2100+, HT6000+, HT6103+ OU AC HOMOLOGUÉE.
- PEUT ÊTRE RACCORDÉ SUR UNE CHEMINÉE DE MAÇONNERIE TEL QUE DÉCRIT DANS LE MANUEL D'INSTALLATION.
- LES COMPOSANTES UTILISÉES AVEC LE FOYER DOIVENT ÊTRE HOMOLOGUÉES. VOIR LA LISTE DANS LE MANUEL D'INSTALLATION.
- REMPLACER LA VITRE AVEC UN VERRE CÉRAMIQUE DE 5 mm D'ÉPAISSEUR.
- POUR UNE UTILISATION SÉCURITAIRE, INSTALLER CONFORMÉMENT AUX DIRECTIVES DU FABRICANT.
- ATTENTION: NE PAS OBSTRUER LES ARRIVÉES D'AIR COMBURANT.
- NE PAS FAIRE SURCHAUFFER LE FOYER.
- LA PORTE DU FOYER DOIT DEMEURER TOTALEMENT OUVERTE OU TOTALEMENT FERMÉE LORSQUE LE FOYER FONCTIONNE.
- NE PAS UTILISER DE POÊLE ENCASTRABLE OU D'AUTRES PRODUITS NON SPÉCIFIÉS COMME ÉTANT UTILISABLES AVEC CE PRODUIT.



LISTED FACTORY BUILT FIREPLACE
FOYER PRÉFABRIQUÉ HOMOLOGUÉ

FIREPLACE, ALSO FOR USE IN MANUFACTURED

HOMES WITH SOLID FUEL ONLY

CE FOYER EST ÉGALEMENT CERTIFIÉ POUR

INSTALLATION DANS LES MAISONS MOBILES.

COMBUSTIBLES SOLIDES SEULEMENT.



Manufactured by / Fabriqué par:
INNOVATIVE HEARTH PRODUCTS
1502 14th St. NW
Auburn, WA 98001 USA

Conforms to / Conforme au : UL STD 127

Certified to / Certifié au : ULC STD S610

Serial No.
Numéro de série

Model / Modèle: WRT4920WS / WCT4920WS

Certification test emission value 1.9 g/hr per 2020 standard
Valeur d'émission du test d'homologation 1,9 g/h selon la norme 2020

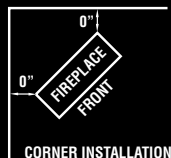
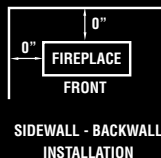
CLEARANCES TO COMBUSTIBLES:

SIDE WALL (FROM DOOR EDGE)	24 in. (610 mm)
MANTEL (ABOVE FIREPLACE'S BASE)	45 in. (1372 mm)
BACK WALL (FROM SPACERS)	0 in. (0 mm)
ABOVE THE FIREPLACE (FROM THE BASE OF THE FIREPLACE)	6 ft. 8 in. (2032 mm)
CHIMNEY	2 in. (51 mm)

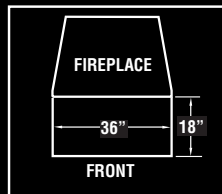
DÉGAGEMENTS AUX COMBUSTIBLES:

MUR LATÉRAL (DE L'OUVREURE DE LA PORTE)	24 po. (610 mm)
LINTEAU (AU-DESSUS DE LA BASE DU FOYER)	45 po. (1372 mm)
MUR ARRIÈRE ET CÔTÉ DU FOYER (DES ESPACEURS)	0 po. (0 mm)
AU-DESSUS DU FOYER (À PARTIR DE LA BASE DU FOYER)	6 pi. 8 po. (2032 mm)
CHEMINÉE	2 po. (51 mm)

INSTALL WITH MINIMUM CLEARANCES TO WALL
AS SHOWN IN INCHES.



FLOOR PROTECTOR MINIMUM DISTANCE
FROM OPENING IN INCHES



HEARTH EXTENSION MATERIAL :

- 3/8" THICKNESS NON COMBUSTIBLE MATERIAL
- OR EQUIVALENT

U.S. ENVIRONMENTAL PROTECTION AGENCY
Certified to comply with 2020 particulate emission
standards using crib wood.

DATE OF MFG. 1 2 3 4 5 6 7 8 9 10 11 12

2019-20-21-22-23-24-25

- USE WOOD FUEL ONLY
- NON COMBUSTIBLE HEARTH EXTENSION MUST BE INSTALLED AT FRONT OF UNIT EXTENDING 18 in. (457 mm) AT FRONT AND 36 in. (914 mm) WIDE MINIMUM.
- THIS FIREPLACE HAS NOT BEEN TESTED WITH UNVENTED GAS LOG SET. TO REDUCE RISK OF FIRE OR INJURY DO NOT INSTALL AN UNVENTED GAS LOG SET INTO THE FIREPLACE.
- ELECTRICAL RATING: 120 V, 60 Hz
- CHIMNEY TYPE: USE ONLY WITH LISTED 6 in. DIAMETER CHIMNEY, CERTIFIED MODEL ASHT+, S-2100+, HT6000+, HT6103+ OR AC.
- CAN BE CONNECTED TO A MASONRY CHIMNEY AS DESCRIBED IN THE INSTALLATION INSTRUCTIONS.
- COMPONENTS USED WITH THE FIREPLACE MUST BE LISTED. SEE LIST IN THE INSTALLATION INSTRUCTIONS.
- REPLACE GLASS WITH CERAMIC GLASS 5 mm THICK.
- FOR SAFE OPERATION INSTALL IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS.
- CAUTION: COMBUSTION AIR OPENING MUST NOT BE OBSTRUCTED.
- DO NOT OVERFIRE THE FIREPLACE.
- OPERATE THE FIREPLACE WITH DOOR FULLY OPEN OR FULLY CLOSED ONLY.
- DO NOT USE A FIREPLACE INSERT OR OTHER PRODUCTS NOT SPECIFIED FOR USE WITH THIS PRODUCT
- CONTACT YOUR LOCAL BUILDING OR FIRE OFFICIALS ABOUT RESTRICTIONS AND INSTALLATION INSPECTIONS IN YOUR AREA.
- CONTACTEZ LES RESPONSABLES DE VOTRE REGION A PROPOS DES RESTRICTIONS ET INSPECTIONS D'INSTALLATION.
- SEE IHP INSTALLATION AND OPERATING INSTRUCTIONS FOR THIS MODEL.
- INSTALL AND USE ONLY IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS AND LOCAL BUILDING CODES.
- SPECIAL METHODS ARE REQUIRED WHEN PASSING THROUGH A WALL OR CEILING. SEE INSTRUCTIONS AND BUILDING CODES.
- PREVENT CREOSOTE FIRE: INSPECT CHIMNEY CONNECTOR AND CHIMNEY FLUE MONTHLY AND CLEAN IF NECESSARY.
- DO NOT OVERFIRE. IF DOME OR CHIMNEY CONNECTOR GLOWS YOU ARE OVERFIRING.
- KEEP FURNISHINGS AND OTHER COMBUSTIBLE MATERIALS A CONSIDERABLE DISTANCE AWAY FROM APPLIANCE.
- MAINTENIR LES MEUBLES ET AUTRES OBJETS À UNE DISTANCE SÉCURITAIRE DU FOYER.
- THIS WOOD HEATER NEEDS PERIODIC INSPECTION AND REPAIR FOR PROPER OPERATION. CONSULT THE OWNER'S MANUAL FOR FURTHER INFORMATION. IT IS AGAINST FEDERAL REGULATIONS TO OPERATE THIS WOOD HEATER IN A MANNER INCONSISTENT WITH THE OPERATING INSTRUCTIONS IN THE OWNER'S MANUAL.
- CET APPAREIL DE CHAUFFAGE AU BOIS DOIT ÊTRE INSPECTÉ ET ENTRETENU PÉRIODIQUEMENT POUR FONCTIONNER CORRECTEMENT. VOIR LE MANUEL DU PROPRIÉTAIRE POUR PLUS D'INFORMATION. L'UTILISATION DE CET APPAREIL DE CHAUFFAGE AU BOIS DE MANIÈRE INCOMPATIBLE AVEC LES INSTRUCTIONS DU MANUEL DU PROPRIÉTAIRE CONSTITUE UNE INFRACTION AUX RÉGULATIONS FÉDÉRALES.
- POUR USAGE AVEC LE BOIS SEULEMENT
- UN TABLIER NON COMBUSTIBLE DOIT ÊTRE INSTALLÉ À L'AVANT DU FOYER. DIMENSION MINIMALE DE 18 po. (457 mm) PAR 36 po. (914 mm) DE LARGE.
- CE FOYER N'EST PAS HOMOLOGUÉ POUR ÊTRE UTILISÉ AVEC UN ENSEMBLE DE BÛCHES À GAZ SANS CONDUIT D'ÉVACUATION. AFIN DE RÉDUIRE LES RISQUES D'INCENDIE OU DE BLESSURES, N'INSTALLEZ PAS DE BÛCHES À GAZ SANS CONDUIT D'ÉVACUATION À L'INTÉRIEUR DE CE FOYER.
- ALIMENTATION ÉLECTRIQUE: 120V, 60 Hz
- UTILISER SEULEMENT AVEC UNE CHEMINÉE 6 po. (150 mm) DE DIAMÈTRE, MODÈLE ASHT+, S2100+, HT6000+, HT6103+ OU AC HOMOLOGUÉE.
- PEUT ÊTRE RACCORDÉ SUR UNE CHEMINÉE DE MAÇONNERIE TEL QUE DÉCRIT DANS LE MANUEL D'INSTALLATION.
- LES COMPOSANTES UTILISÉES AVEC LE FOYER DOIVENT ÊTRE HOMOLOGUÉES. VOIR LA LISTE DANS LE MANUEL D'INSTALLATION.
- REMPLACER LA VITRE AVEC UN VERRE CÉRAMIQUE DE 5mm D'ÉPAISSEUR.
- POUR UNE UTILISATION SÉCURITAIRE, INSTALLER CONFORMÉMENT AUX DIRECTIVES DU FABRICANT.
- ATTENTION: NE PAS OBSTRUER LES ARRIVÉES D'AIR COMBURANT.
- NE PAS FAIRE SURCHAUFFER LE FOYER.
- LA PORTE DU FOYER DOIT DEMEURER TOTALEMENT OUVERTE OU TOTALEMENT FERMÉE LORSQUE LE FOYER FONCTIONNE.
- NE PAS UTILISER DE POÊLE ENCASTRABLE OU D'AUTRES PRODUITS NON SPÉCIFIÉS COMME ÉTANT UTILISABLES AVEC CE PRODUIT.



Certificate of Accuracy - Standard Scale

Date: 03/14/2019
Completed: 03/14/2019
For: INNOVATIVE HEARTH PRODUCTS
WID No: 102697
MFG: AWTX
Model: WI125
Serial No: 71712

Order #: 1420927
Cert #: 14209271
Location: Asset No:
Other: Next Due:

Ship To: 1502 14TH ST NW
Address: AUBURN, WA 98001
Shop: MICHELLI MEASUREMENT GROUP
Address: 19612 70TH AVE. SOUTH, #2-5, KENT, WA 98032

Capacity: 1000
Division: 0.1
Units: LBS

Readings

Reading	Applied Weight	As Found	Final	+/- Tolerance	As Found Error
1	100.0	99.9	100.0	0.2	-0.1
2	250.0	249.9	250.0	0.3	-0.1
3	550.0	550.3	550.0	0.5	0.3
4	805.0	805.4	805.0	0.5	0.4

Corner Test

Applied Weight: 550.0

Corner/Shift	As Found	Final	+/- Tolerance	As Found Error
1 ☐ ☐	550.0	550.0	0.5	0.0
2 ☐ ☐	550.0	550.0	0.5	0.0
3 ☐ ☐	550.0	550.0	0.5	0.0
4 ☐ ☐	550.0	550.0	0.5	0.0

Michelli Measurement Group certifies this instrument has been repaired, if necessary and calibrated to published manufacturers specification with standards traceable to a National Metrological Institute such as NIST, to consensus standards, to ratio methods or to accepted fundamental physical constants. This certificate only applies to the above listed item. Michelli Measurement Group Quality Management System meets the requirements of ISO 9001. This document shall not be reproduced, except for in full without expressed written permission of Michelli Measurement Group.

Scale Details

Temperature: % Relative Humidity: Condition of Scale: Good
Initial Tolerance: In Final Tolerance: In Cert Type: H-44
Certificate: Standards Used: 16-50LB
OR-17-209-F Test Date: 2017-08-26 Retest Date: 2019-07-26
Weight: UoM: LBS

Notes

CALIBRATED, TESTED AND INSPECTED SCALE TESTED GOOD AFTER ADJUSTMENTS

Technician

BRANDIN SLISH

License Number

791

B.S.

Dry Gas Meter Calibration

Meter Manufacturer: Apex
 Model: XC-60-EP
 Lab ID #: IHP Box A
 Serial #: 8001993
 Calibration Date: 1/25/2019
 Calibration Expiration: 7/25/2019
 Barometric Pressure: 30.33 in. Hg



Reference Standard DGM	
Manufacturer:	Apex
Model:	SK25DA
Lab ID#:	47
Serial #:	1101001
Calibration Expiration Date:	3/5/2019
Calibration γ Factor:	0.998

Unit Under Test Previous Calibration	
Date	6/20/2018
γ Factor:	0.988
Allowable Deviation ($\pm 5\%$):	0.0494
Actual Deviation:	0.00
Result:	PASS

Calibration Data	Run 1	Run 2	Run 3
Standard DGM Initial Volume (L)	0.000	0.000	0.000
Standard DGM Final Volume (L)	141.496	143.413	142.137
Standard DGM Temperature ($^{\circ}\text{F}$)	70.0	70.0	68.0
Standard DGM Pressure (in H_2O)	0.00	0.00	0.0
DGM Initial Volume (ft^3)	0.000	0.000	0.000
DGM Final Volume (ft^3)	5.124	5.200	5.107
DGM Temperature ($^{\circ}\text{F}$)	76.0	77.0	74.0
DGM Pressure (in H_2O)	0.55	0.40	0.17
Time (min)	24.0	28.0	50.0
Net Volume for Standard DGM (ft^3)	4.997	5.065	5.020
Net Volume for DGM (ft^3)	5.124	5.200	5.107

Dry Gas Meter γ Factor	0.983	0.984	0.992
γ Factor Deviation From Average	0.983	0.984	0.992

Average Gas Meter γ Factor

0.986

Calculations:

- Deviation = |Average value for all runs - current run value|
- $\gamma = [V_{\text{std}} \times (\gamma_{\text{std}}) \times (P_{\text{bar}} + P_{\text{std}}/13.6) \times (T_{\text{DGM}} + 460)] / [V_{\text{DGM}} \times (T_{\text{std}} + 460) \times (P_{\text{bar}} + P_{\text{DGM}}/13.6)]$

Standard Reference Meter is calibrated to NIST traceable standards. Uncertainty of measurement is $\pm 0.5\%$.

Dry Gas Meter Calibration

Meter Manufacturer: Apex
 Model: XC-60-EP
 Lab ID #: IHP Box B
 Serial #: 8001994
 Calibration Date: 1/28/2019
 Calibration Expiration: 7/28/2019
 Barometric Pressure: 30.18 in. Hg



Reference Standard DGM	
Manufacturer:	Apex
Model:	SK25DA
Lab ID#:	47
Serial #:	1101001
Calibration Expiration Date:	3/5/2019
Calibration γ Factor:	0.998

Unit Under Test Previous Calibration	
Date:	4/3/2013
γ Factor:	0.988
Allowable Deviation ($\pm 5\%$):	0.0494
Actual Deviation:	0.02
Result:	PASS

Calibration Data	Run 1	Run 2	Run 3
Standard DGM Initial Volume (L)	0.000	0.000	0.000
Standard DGM Final Volume (L)	152.200	151.585	171.917
Standard DGM Temperature ($^{\circ}\text{F}$)	69.0	69.0	69.0
Standard DGM Pressure (in H_2O)	0.00	0.00	0.0
DGM Initial Volume (ft^3)	0.000	0.000	0.000
DGM Final Volume (ft^3)	5.447	5.437	6.035
DGM Temperature ($^{\circ}\text{F}$)	77.0	76.0	77.0
DGM Pressure (in H_2O)	0.50	0.30	0.2
Time (min)	26.0	36.0	67.0
Net Volume for Standard DGM (ft^3)	5.375	5.353	6.071
Net Volume for DGM (ft^3)	5.447	5.437	6.035

Dry Gas Meter γ Factor	0.998	0.995	1.019
γ Factor Deviation From Average	0.998	0.995	1.019

Average Gas Meter γ Factor

1.004

Calculations:

- Deviation = |Average value for all runs - current run value|
- $\gamma = [V_{\text{std}} \times (\gamma_{\text{std}}) \times (P_{\text{bar}} + P_{\text{std}}/13.6) \times (T_{\text{DGM}} + 460)] / [V_{\text{DGM}} \times (T_{\text{std}} + 460) \times (P_{\text{bar}} + P_{\text{DGM}}/13.6)]$

Standard Reference Meter is calibrated to NIST traceable standards. Uncertainty of measurement is $\pm 0.5\%$.



Calibration complies with ISO/IEC
17025, ANSI/NCSL Z540-1, and 9001



Cert. No.: 4198-9765787

Traceable® Certificate of Calibration for Hand Held Barometer

Customer: PFS TECO Suite 305, 11785 SE Highway 212, Clackamas, OR-97015, U.S.A.

Instrument Identification:

Model: 4198,

S/N: 80531676

Manufacturer: Control Company

Standards/Equipment:

Description	Serial Number	Due Date	NIST Traceable Reference
Digital Barometer	D4540001	09 Oct 2018	1000415948
Digital Thermometer	111879345	09 Apr 2019	4000-9377595

Certificate Information:

Technician: 57

Procedure: CAL-32

Cal Date: 29 Aug 2018

Cal Due Date: 29 Aug 2019

Test Conditions: 62.73%RH 23.92°C 1018mBar

Calibration Data:

Unit(s)	Nominal	As Found	In Tol	Nominal	As Left	In Tol	Min	Max	±U	TUR
°C	24.10	24.1	Y	23.51	23.9	Y	22.01	25.01	0.05	>4:1
mb/hPa	551.55	552	Y	551.62	546	Y	544	560	0.62	>4:1
mb/hPa	751.22	744	Y	748.87	746	Y	741	757	0.62	>4:1
mb/hPa	1015.90	1011	Y	1018.22	1017	Y	1010	1026	0.62	>4:1

This certificate indicates Traceability to standards provided by (NIST) National Institute of Standards and Technology and/or a National Standards Laboratory.

A Test Uncertainty Ratio of at least 4:1 is maintained unless otherwise stated and is calculated using the expanded measurement uncertainty. Uncertainty evaluation includes the instrument under test and is calculated in accordance with the ISO "Guide to the Expression of Uncertainty in Measurement": (GUM). The uncertainty represents an expanded uncertainty using a coverage factor k=2 to approximate a 95% confidence level. In tolerance conditions are based on test results falling within specified limits with no reduction by the uncertainty of the measurement. The results contained herein relate only to the item calibrated. This certificate shall not be reproduced except in full, without written approval of Control Company.

Nominal=Standard's Reading; As Left=Instrument's Reading; In Tol=In Tolerance; Min/Max=Acceptance Range; ±U=Expanded Measurement Uncertainty; TUR=Test Uncertainty Ratio; Accuracy=±(Max-Min)/2; Min=As Left Nominal(Rounded) - Tolerance; Max= As Left Nominal(Rounded) + Tolerance;

Nicol Rodriguez

Nicol Rodriguez, Quality Manager

Aaron Judice

Aaron Judice, Technical Manager

Note :

Maintaining Accuracy:

In our opinion once calibrated your Hand Held Barometer should maintain its accuracy. There is no exact way to determine how long calibration will be maintained. Hand Held Barometer change little, if any at all, but can be affected by aging, temperature, shock, and contamination.

Recalibration:

For factory calibration and re-certification traceable to National Institute of Standards and Technology contact Control Company.

CONTROL COMPANY 12554 Galveston RD Suite B230 Webster TX USA 77598
Phone 281 482-1714 Fax 281 482-9448 sales@control3.com www.control3.com

Control Company is an ISO/IEC 17025:2005 Calibration Laboratory Accredited by (A2LA) American Association for Laboratory Accreditation, Certificate No. 1750.01.
Control Company is ISO 9001:2008 Quality Certified by DNV GL, Certificate No. CERT-01805-2006-AQ-HOU-RvA.
International Laboratory Accreditation Cooperation (ILAC) - Multilateral Recognition Arrangement (MRA).



QUALITY CONTROL SERVICES

LABORATORY EQUIPMENT • SALES • SERVICE • CALIBRATION • REPAIRS
2340 SE 11TH Ave. Portland, Oregon 97214 • Box 14831 Portland, Oregon 97293
(503) 236-2712 • FAX (503) 235-2535 • www.qc-services.com



Report of Calibration

Firm: Dirigo Laboratories
Address: 11785 SE Hwy 212, Ste 305
City/State/Zip: Clackamas, OR 97015

Test Completed: 03/21/17
Submitted By: John Steiner
Traceable Number: 20170468

Test Item: 200mg and 100mg Individual Weights
Serial No.: Listed in Table

Manufacturer: Troemner

<u>Material</u>	<u>Assumed Density</u>	<u>Range</u>	<u>Tolerance Class</u>
Stainless Steel	7.95 g/cm ³	200mg & 100mg	ASTM Class 1

Method and Traceability

The procedure used for this calibration is NIST IR 6969 SOP 4 Double Substitution Weighing Design. Standards used for comparison are traceable to the National Institute of Standards and Technology (reports on file) and are part of a comprehensive measurement assurance program for ensuring continued accuracy and traceability within the level of uncertainty reported. The Traceable Number listed above is Traceable to National Standards through an unbroken chain of comparison each having stated uncertainties.

Standards Used:

100g to 1mg Working Standards Were Calibrated: 03/03/17 Due: 03/31/18 Standards ID: 723318

Mass Comparators Used: MET-05

Tested by: D. Thompson

Conventional Mass: “The conventional value of the result of weighing a body in air is equal to the mass of a standard, of conventionally chosen density, at a conventionally chosen temperature, which balances this body at this reference temperature in air of conventionally chosen density. International Recommendation 33 (OIML IR 33 1973, 1979). “Conventional Value of the Result of Weighing in Air” (Previously known as “Apparent Mass vs. 8.0g/cm³).

Uncertainty Statement: The uncertainty conforms to the ISO Guide to the Expressions of Uncertainty in Measurement. Uncertainty as reported is based on a coverage factor k=2 for an approximate 95 percent level of uncertainty. Uncertainty components include the standard deviation of the process, the uncertainty of the standard used, an uncertainty component associated with the potential drift of the standard used, and the estimated uncertainty related to measuring and determining the air buoyancy effect.

Conventional Mass Values are listed on page 2 of this report.

page 1 of 2

Quality Control Services, Inc.
Metrology Laboratory Manager
E-mail dthompson@qc-services.com

Date: 03/21/17

Signature David S. Thompson

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Member: National Conference of Standards Laboratories and Weights & Measures



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Report of Calibration

Firm: Dirigo Laboratories
Address: 11785 SE Hwy 212, Ste 305
City/State/Zip: Clackamas, OR 97015

Test Completed: 03/21/17
Submitted By: John Steiner
Traceable Number: 20170468

Test Item: 200mg and 100mg Individual Weights
Serial No.: Listed in Table

Manufacturer: Troemner

Laboratory Environment at time of test

Temperature °C	Pressure mmHg	Humidity %RH
21.967	753.44	49.44

Conventional Mass Value

Nominal Value	As Found grams	As Found Correction* (mg)	Uncertainty (mg)	Tolerance (mg)
200mg SN 1000101395	0.2000061	0.0061	0.0026	0.01
100mg SN 1000126267	0.1000046	0.0046	0.0028	0.01

*Correction is the difference between the conventional mass value of a weight and its nominal value.

Comments: These weights were new from the manufacturer and were within ASTM Class 1 tolerances As Found. No adjustments or changes were made so As Found values should be considered to be As Left values.

Accredited by the American Association for Laboratory Accreditation (A2LA) under Calibration Laboratory Code 115953 and Certificate Number 1550.01. This laboratory meets the requirements of ISO/IEC 17025:2005 *General Requirements for the Competence of Testing and Calibration Laboratories*. This laboratory also meets the requirements of ANSI/NCSL Z540-1-1994 and any additional program requirements in the field of calibration.

page 2 of 2

Quality Control Services, Inc.
Metrology Laboratory Manager
E-mail dthompson@qc-services.com

Date: 03/21/17

Signature David S. Thompson



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(503) 236-2712 • FAX (503) 235-2535 • www.qc-services.com



Calibration Services
Certificate Number: 1550.01
Laboratory code: 115953

Report of Calibration

Firm: Dirigo Laboratories
Address: 11785 SE Hwy 212, Ste 305
City/State/Zip: Clackamas, OR 97015

Test Completed: 01/15/16
Purchase Order: 1001
Traceable Number: 20152489

Test Item: 20lb and 10lb Individual Grip Handle Weights
Serial No.: Listed in Table

Manufacturer: Unknown

Laboratory Environment at time of test

Temperature °C	Pressure mmHg	Humidity %RH
21.448	760.64	44.58

Conventional Mass Value

Nominal Value	As Found pounds	As Found Correction* (mg)	Uncertainty (mg)	Tolerance (mg)
20lb #098	19.9995450	-206.4	6.4	910
10lb #097	10.0006510	295.3	5.1	450
10lb #051	10.0003421	155.2	5.1	450

*Correction is the difference between the conventional mass value of a weight and its nominal value.

Comments: These weights were received in good condition and were within NIST Handbook 105-1 Class F tolerances As Found. No adjustments or changes were made so As Found values should be considered to be As Left values.

Accredited by the American Association for Laboratory Accreditation (A2LA) under Calibration Laboratory Code 115953 and Certificate Number 1550.01. This laboratory meets the requirements of ISO/IEC 17025:2005 *General Requirements for the Competence of Testing and Calibration Laboratories*. This laboratory also meets the requirements of ANSI/NCSL Z540-1-1994 and any additional program requirements in the field of calibration.

page 2 of 2

Quality Control Services, Inc.
Metrology Laboratory Manager
E-mail dthompson@qc-services.com

Date: 01/15/16

Signature David S. Thompson



Established 1974

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PFS Teco
11785 SE Hwy 212 STE#305
Clackamas, OR 97015

Report Number: DIRI0134307497181218

A2LA ACCREDITED **CERTIFICATE OF CALIBRATION WITH DATA**

INSTRUMENT INFORMATION

Item	Make	Model	Serial Number	Customer ID	Location
Balance	Sartorius	ENTRIS224-1S	34307497	#107	Lab
Units	Readability	SOP	Cal Date	Last Cal Date	Cal Due Date
g	0.0001	QC012	12/18/18	6/13/18	12/2019

FUNCTIONAL CHECKS

ECCENTRICITY		LINEARITY		STANDARD DEVIATION			ENVIRONMENTAL CONDITIONS		
Test Wt:	Tol:	Test Wt:	Tol:	Test Wt:	Tol:		☐	☒	☐
100	0.0003	50 x 4	0.0002	100	0.0001		Good	Fair	Poor
As-Found:		As-Found:		1. 100.0001	5. 100.0002	9. 100.0001	Temperature: 21.3°C		
Pass: ☒	Fail: ☐	Pass: ☒	Fail: ☐	2. 100.0001	6. 100.0001	10. 100.0001			
As-Left:		As-Left:		3. 100.0001	7. 100.0001	Result			
Pass: ☒	Fail: ☐	Pass: ☒	Fail: ☐	4. 100.0001	8. 100.0002	0.00004			

A2LA ACCREDITED SECTION OF REPORT

Standard	As-Found	As-Left	Expanded Uncertainty
200	200.0002	200.0001	0.00014
100	100.0001	100.0001	0.00014
50	50.0003	50.0001	0.00014
20	20.0001	20.0001	0.00014
1	1.0001	1.0000	0.00014
0.1	0.1000	0.1000	0.00014

CALIBRATION STANDARDS

Item	Make	Model	Serial Number	Cal Date	Cal Due Date	NIST ID
Weight Set	R.L./Troemner	10kg to 1mg	G782	1/3/18	1/2019	20172421

Permanent Information Concerning this Equipment:

12 month calibration cycle.

Comments/Info Concerning this Calibration:

12/18 - RH = 56%. Adjusted span.

Report prepared/reviewed by: ServiceTech X Date: 12/28/18

Technician: R. Kauble

Signature:

THIS CERTIFICATE SHALL NOT BE REPRODUCED WITHOUT THE APPROVAL OF QUALITY CONTROL SERVICES, INC.

The uncertainty is calculated according to the ISO Guide to the Expression of Uncertainty in Measurement and includes the uncertainty of standards used combined with the observed standard deviation and readability of the unit under test. The uncertainty is expanded with a k factor of 2 for an approximate 95% level of confidence. Instruments listed above were calibrated using standards traceable to the National Institute of Standards and Technology (NIST). Calibration data reflect results at the time and location of calibration. Calibration data should be reviewed to insure that the instrument is performing to its required accuracy. Calibrations comply with ISO/IEC 17025 and ANSI/Z540-1-1994 quality standards.

Verification of Standardization

of

Tape Measure

by

Advanced Calibration Technologies

28111 S.E. Wally Road

Boring, OR 97009

1-800-259-5058



Customer:	PFS Teco, Inc	Street:	11785 Southeast Highway 212 Suite 305
City:	Clackamas	State:	OR
Machine Manufacturer:	Dewalt	Zip:	97015
Capacity:	0.000 - 192.000 inches	Location:	In House
Calibration Cycle:	12 Months	Model:	16' Tape Measure
Previous Calibration Date:	January 2019	Serial #:	090
Equipment Used:	Gauge Blocks S/N: ADGB002	Lab ID#:	#090
If Other, Explain:		Calibration Procedure:	Ad-Tek SR
		Action Recommended:	

Verification Data

Purpose: This method provides instructions for checking the critical dimensions of the equipment.			
Tolerance: Equipment shall meet the dimensional tolerances specified in the applicable test method.			
Procedure: Verified using manufacturer's procedures.			
Actual Dimensions (inches)	Unit Under Test As Found (inches)	Unit Under Test As Left (inches)	Difference (inches)
0.0000	0.000	0.000	0.000
0.1250	0.050	0.050	-0.075
0.2500	0.250	0.250	0.000
0.5000	0.500	0.500	0.000
0.7500	0.750	0.750	0.000
1.0000	1.000	1.000	0.000
3.0000	3.000	3.000	0.000
5.0000	5.000	5.000	0.000
7.0000	7.000	7.000	0.000
9.0000	9.000	9.000	0.000
12.0000	12.000	12.000	0.000
The overall condition of the device as found:		Within Specification	
The overall condition of the device as left:		Within Specification	
The measurement of uncertainty (MU) was calculated to be:		0.00060	

File No: PFS-101666-0119D0120-AH-SR-090

Temperature: 72.1°F Humidity: 41.1%

The equipment used in the verification of this instrument has been calibrated and is NIST traceable.

The uncertainty of calibration was estimated at the 95% confidence level, coverage factor (k=2).

Remarks:

This certificate of verification is issued as a statement of fact that on the date of verification the above instrument had an accuracy as indicated and was calibrated to meet the requirements of the manufacturer's specifications. This certificate should not be construed or regarded as a guarantee or warranty of any kind that the instrument will retain the same percentage of accuracy as determined on the date when the verification was performed and reported. Ad-Tek, Inc. hereby expressly disclaims any and all liability for damage or loss by all parties arising or resulting from deterioration, obsolescence, malfunction, subsequent calibration performed by another agency or substandard performance of said instrument.

This report and certificate of verification shall not be reproduced except in full, without the written approval of Ad-Tek, Inc.

Service Technician:	Alisa Houser	Date of Service:	January 16, 2019
Technical Manager:	Nicole Ostrowski	Date Next Due:	January 2020

We sincerely appreciate your business and thank you for selecting Advanced Calibration Technologies, Inc. for servicing your equipment.
To reschedule, please call (800) 259-5058. Thank You.



CERTIFICATE OF CALIBRATION

CUSTOMER: PFS-TECO : CLACKAMAS, OR
PO NUMBER: N/A
INST. MANUFACTURER: DWYER
INST. DESCRIPTION: VELOMETER
MODEL NUMBER: 471
SERIAL NUMBER: CP288559 (ID# 095)
RATED UNCERTAINTY: SEE NOTES BELOW.
UNCERTAINTY GIVEN: $\pm .20\%$ RD ; k=2

CALIBRATION DATE: 03/14/2019
CALIBRATION DUE: 03/14/2020
PROCEDURE: T.O.33K6-4-1769-1
CALIBRATION FLUID: AIR @ 14.7 PSIA 70°F
RECEIVED CONDITION: WITHIN MFG. SPECS.
LEFT CONDITION: WITHIN MFG. SPECS.
AMBIENT CONDITIONS: 762 mm HGA 43% RH 69°F
CERTIFICATE FILE #: 490265.2019

NOTES: $\pm 3\%$ FS (0-500 / 0-1500) *** $\pm 4\%$ F.S. (0-5000) *** $\pm 5\%$ F.S. (0-15000) *** $\pm 2^\circ\text{F}$
NOTES CONT. : Q.MANUAL IM 1.5 REV 2017.1 DATED 7-18-2017

UUT INDICATED FT/MIN	DM.STD. ACTUAL FT/MIN	UUT INDICATED DEG. F	DM STD. ACTUAL DEG. F
64	65	0 TO 200°F	0 TO 200°F
110	112	43.4	43.5
206	210	69.0	68.9
498	509	99.4	99.2
503	505		
1049	1058		
1497	1514		
509	513		
3419	3460		
4992	5068		
5136	5235		
13928	14232		

STANDARDS USED:

A220: 12" WIND TUNNEL 0 - 8000 FPM CMC $\pm .203\%$ RD TRACE# 1520423238	DUE	05/23/2019
A24: HART SCIENTIFIC TEMP. STANDARD $\pm .024^\circ\text{F}$ TRACE# 1520423238	DUE	03/07/2020

All instruments used in the performance of the shown calibration have traceability to the National Institute of Standards and Technology (NIST). The uncertainty ratio between the calibration standards (DM.STD.) used and the unit under test (UUT) is a minimum of 4:1, unless otherwise noted. Calibration has been performed per the shown procedure number, in accordance with ISO 10012:2003, ISO 17025:2005, ANSI/NC SL-Z-540.3, and/or MIL-STD-45662A. Test methods: API2530-92 & ASME MFC-3M-1989.

Dick Munns Company • 11133 Winners Circle • Los Alamitos, CA 90720
Phone (714) 827-1215 • Fax (714) 827-0823

This Calibration Certificate shall not be reproduced, except in full, without approval by DICK MUNN'S COMPANY. The data shown applies only to the instrument being calibrated and under the stated conditions of calibration.

Date:

3/14/2019

Approved By:

Calibration Technician:

D.C.



Model 1430 Microtector® Electronic Point Gage

Installation and Operating Instructions



Model 1430 Microtector® Portable Electronic Point Gage combines modern, solid-state integrated circuit electronics with a time-proven point gage manometer to provide fast, accurate pressure measurements.

SPECIFICATIONS AND FEATURES

- Accurate and repeatable to $\pm .00025$ inches water column
- Pressure range: 0 - 2" w.c., positive, negative, or differential pressures
- Non-toxic and inexpensive gage fluid consists of distilled water mixed with a small amount of fluorescein green color concentrate
- Convenient, portable, lightweight and self-contained, the unit requires no external power connections and is operated by a 1.5 volt penlight cell
- A.C. detector current eliminates point plating, fouling and erosion
- Micrometers are manufactured in accordance with ASME B89.1.13-2001, and are traceable to a standard at the National Institute of Standards and Technology

- Three-point mounting, dual leveling adjustment, and circular level vial assure rapid setup
- Durablock® precision-machined acrylic plastic gage body
- Sensitive 0 - 50 microamp D.C. meter acts as a detector and also indicates battery and probe condition
- Heavy 2" thick steel base plate provides steady mounting
- Top-quality glass epoxy circuit board and solid-state, integrated circuit electronics
- Electronic enclosure of tough, molded styrene acrylonitrile provides maximum protection to components yet allows easy access to battery compartment
- Rugged sheet steel cover and carrying case protects the entire unit when not in use
- Accessories included are (2) 3-foot lengths Tygon® tubing, (2) 1/8" pipe thread adapters and 3/4 oz. bottle of fluorescein green color concentrate with wetting agent

Maximum pressure: 100 psig with optional pipe thread connections.

Tygon® is a registered trademark of Saint-Gobain Corporation

DWYER INSTRUMENTS, INC.

P.O. BOX 373

MICHIGAN CITY, INDIANA 46361, U.S.A

Phone: 219/879-8000

Fax: 219/872-9057

www.dwyer-inst.com

e-mail: info@dwyer-inst.com

J-2000

owner's manual



DELMHORST[®]
INSTRUMENT CO.
WHEN ACCURACY IS THE POINT.[™]



A DIVISION OF NORCO, INC.

Calibration Gases & Equipment

CERTIFICATE OF ANALYSIS

Central Gases/ Div of CWS

4429 Airport Way S.
Seattle, WA 98108

Cust Number H1205
Order Number 59682169
PO Number XC101846

Lot Number 8-313-121
Part Number SPG 2C1016.5VM4
Cylinder Size 30A
Pressure 2200 psig @ 70°F

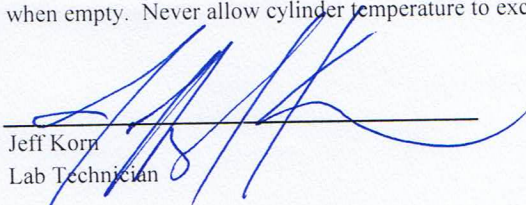
Date Analyzed 11/12/18
Expires 11-2021
Analytical Accuracy +/- 2%

Cylinder Number(s)
EA0015365

Component	Reported Concentration	Requested Concentration	Analytical Method
Carbon Dioxide	9.00 %	9 %	Gravimetric
Carbon Monoxide	0.500 %	0.5 %	Gravimetric
Nitrogen	Balance	Balance	Gravimetric

Storage: Keep away from heat, flames, and sparks. Store and use with adequate ventilation. Close valve when not in use and when empty. Never allow cylinder temperature to exceed 125 degrees F.

Approved:


Jeff Korn
Lab Technician

Date Signed: November 12, 2018

The cylinders in this lot were prepared gravimetrically and are traceable to the NIST by certified weights used to calibrate the scales.
The cylinders were then analyzed against standards traceable to the NIST by weights or SRM's.
NIST Traceability Numbers are available upon request.



Calibration Gases & Equipment

CERTIFICATE OF ANALYSIS

Central Gases / Div. of CWS
4429 Airport Way S.

Seattle, WA 98108

Cust Number H1205
Order Number 61116634
PO Number XC101956

Lot Number 9-140-123
Part Number SPG 2C10164VM4
Cylinder Size 30A
Pressure 2015 psig @ 70°F

Date Analyzed 5/22/19
Expires 5-2022
Analytical Accuracy +/- 2%

Cylinder Number(s) FF29781

Component	Reported Concentration	Requested Concentration	Analytical Method
Carbon Monoxide	4.00 %	4 %	GC-TCD
Carbon Dioxide	17.0 %	17 %	Gravimetric
Nitrogen	Balance	Balance	Gravimetric

Storage:

Keep away from heat, flames, and sparks. Store and use with adequate ventilation. Close valve when not in use and when empty. Never allow cylinder temperature to exceed 125 degrees F.