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# Hearth and Home Technologies

Project # 19-502

Model: Pioneer-II-C

AKA: Northstar-C, Constitution  
(C40-C), WarmMajic-II

Type: Wood-Fired Room Heater

October 19, 2019

Revised December 11, 2023

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

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Testing Supervisor

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## Revision History

October 19, 2019 – Original Issue

December 11, 2023 – Revised Appliance Description section to include firebox volume calculation and specify usable firebox volume. See page 11.



## Contents

Affidavit .....	3
Introduction .....	4
Notes .....	4
Wood Heater Identification and Testing .....	5
Test Procedures and Equipment .....	6
Results .....	7
Summary Table .....	7
Test Run Narrative .....	8
Run 1 .....	8
Run 2 .....	8
Run 3 .....	8
Run 4 .....	8
Test Conditions Summary .....	9
Appliance Operation and Test Settings .....	9
Settings & Run Notes .....	9
Appliance Description .....	10
Appliance Dimensions .....	10
Firebox Volume .....	11
Test Fuel Properties .....	14
Sampling Locations and Descriptions .....	15
Sample Points .....	15
Sampling Methods .....	16
Analytical Methods Description .....	16
Calibration, Quality Control and Assurances .....	16
Appliance Sealing and Storage .....	16
Sealing Label .....	16
Sealed Unit .....	17
List of Appendices .....	18

## Affidavit

PFS-TECO was contracted by Hearth & Home Technologies to provide testing services for the Pioneer II-C 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 Hearth & Home's Mt. Pleasant IA facility beginning on 8/20/2019 and ending on 8/22/2019. The facility is located at 1915 W Saunders St, Mt Pleasant, IA 52641. Testing procedures followed ASTM E3053, with variances as 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.



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Aaron Kravitz, Testing Supervisor

## Introduction

Hearth and Home Technologies of Mt. Pleasant, IA, contracted with PFS-TECO to perform EPA certification testing on Pioneer II-C Wood-Fired Room Heater. All testing was performed at Hearth & Home's Mt. Pleasant facility. All testing was performed by Aaron Kravitz.

## 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 4 test runs.
- A total of 4 test runs were completed. Test runs were performed in accordance with ASTM E3053. For the three test runs used in the weighted average, no anomalies occurred. See the Run Narrative section for further detail on each run.

## Wood Heater Identification and Testing

- Appliance Tested: ***Pioneer II-C***
- Serial Number: ***Un-serialized Prototype – PFS Tracking Number 0037***
- Manufacturer: ***Hearth & Home Technologies***
- Catalyst: ***No***
- Heat exchange blower: ***Standard***
- Type: ***Fireplace***
- Style: ***Built-in Fireplace***
- Date Received: ***Tuesday, August 20, 2019***
- Testing Period – Start: ***Tuesday, August 20, 2019***  
Finish: ***Thursday, August 22, 2019***
- Test Location: ***Hearth & Home Technologies***  
***1915 W Saunders St, Mt Pleasant, IA 5264***
- Elevation: ***~715 Feet above sea level***
- Test Technician(s): ***Aaron Kravitz***
- Observers: ***Colin McCormick & Pie Hummel of Hearth & Home.***

## Test Procedures and Equipment

All Sampling and analytical procedures were performed by Aaron Kravitz. 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
4030806GM	Mettler Toledo Platform Scale & Indicator
129	APEX XC-50 Digital Emissions Sampling Box A
130	APEX XC-50 Digital Emissions Sampling Box B
109A/B	Troemner 100mg/200mg Audit Weights
V3WN5LYV	Horiba CO/CO2 Gas Analyzer
064	Digital Barometer
107	Sartorius Analytical Balance
10744	5 lb audit weight
090	Dewalt Tape Measure
092	Digital Calipers
095	Anemometer
111	Microtector
115	Delmhorst Wood Moisture Meter
XC032449B	Gas Analyzer Calibration Span Gas

## Results

The weighted average emissions rate for the 3 run test series was measured to be **1.84 g/hr** with a Higher Heating Value efficiency of **70.3%**. The average CO emission rate for the 3 tests was **3.33 g/min.** The Pioneer II-C Wood-Fired Room Heater meets the 2020 cordwood PM emission standard of  $\leq 2.5$  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 1 (Fire Out)*	Low Fire Test 2	Medium Fire Test
Date	8/20/2019	8/20/2019	8/21/2019	8/22/2019
Run Number	1	2	3	4
PM Emission Rate (g/hr)	4.78	N/A	1.59	0.62
Burn Rate (kg/hr)	3.52	N/A	1.29	1.72
Heat Output (BTU/hr)	48,212	N/A	17,632	24,005
HHV Efficiency (%)	68.6%	N/A	70.1%	71.5%
LHV Efficiency (%)	73.7%	N/A	75.3%	76.8%
CO Emissions (g/MJ output)	5.91	N/A	7.56	6.26
CO Emissions (g/kg dry fuel)	83.05	N/A	108.54	91.72
CO Emissions (g/min)	5.00	N/A	2.34	2.64
1 <sup>st</sup> Hour Emission Rate (g/hr)	8.54	N/A	11.47	1.56
Weighting Factor (%)	20%	0%	40%	40%
<b>Weighted particulate emission average of 3 test runs: 1.84 grams per hour.</b>				
<b>Weighted average HHV efficiency of 3 test runs: 70.3%.</b>				
<b>Average CO emission rate for 3 test runs: 3.33 grams per minute</b>				
<b>*Run 2 is not included in the weighted average - it was not completed due to loss of combustion prior to test end criteria being met. Therefore, no results can be computed from this run.</b>				

## Test Run Narrative

### *Run 1*

Run 1 was performed on 8/20/2019 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 25 minutes into the test. Testing was completed when 90% of the test fuel load was consumed. Total test time was 180 minutes, main test fuel load burn time was 155 min. The particulate emissions rate from kindling ignition to test completion was 4.78 g/h r. The burn rate of the test fuel load was 3.52 kg/hr. The main test load portion of the run had an overall HHV efficiency of 68.6%. 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 8/20/2019 as a low fire test run per ASTM E3053. 230 minutes into this run, combustion ceased, as defined by ASTM E3053. Therefore, the run is invalid and sampling was halted. No results were computed for this run, and it is not included in the weighted average. All sampling data for this run can be found in Appendix A. The low burn test run was repeated as Run 3.

### *Run 3*

Run 3 was performed on 8/21/2019 as a low fire test run per ASTM E3053. The overall test duration was 545 minutes. The burn rate for the test run was 1.29 kg/hr. The duration of the run was in excess of 8 hours, and the air control was set to fully closed for the test, therefore the run meets the low burn rate category requirements. The particulate emissions rate for the test run was 1.59 g/hr. The run had an overall HHV efficiency of 70.1%. The train A front filter was changed at 1 hr. There were no anomalies and all criteria were met.

### *Run 4*

Run 4 was performed on 8/22/2019 as a medium fire test run per ASTM E3053. The overall test duration was 420 minutes. The burn rate for the test run was 1.72 kg/hr, therefore the medium fire category requirements were met, less than the mid-point of the high and low burn rates (2.40 kg/hr). The particulate emissions rate for the test run was 0.62 g/hr. The run had an overall HHV efficiency of 71.5%. 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.)	Test Fuel Weight (lbs)	Test Fuel Moisture (%DB)	Test Run Time (Min)
	Pre	Post	Pre	Post				
1	73	76	48.5	42.8	29.94	28.24	22.4%	180
2*	74	73	42.8	44.2	29.92	31.43	21.8%	N/A
3	78	74	44.2	26.4	30.00	31.50	21.6%	545
4	75	73	37.8	35.7	29.90	32.55	22.4%	420

\*Fire out, run aborted at 230 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 and Fan Settings
<b>Run 1</b>	N/A – Cold Start Ignition	Air control set to startup and allowed to close automatically to high fire test setting. Fan on high throughout run.
<b>Run 2*</b>	Air control set to High Fire Setting in accordance with ASTM E3053	Air control set to startup for first 15 minutes, then set to low. Fan off for first 30 min, then set to low.
<b>Run 3</b>	Air control set to High Fire Setting in accordance with ASTM E3053	Air control set to startup for first 15 minutes, then set to low. Fan off for first 30 min, then set to low.
<b>Run 4</b>	Air control set to High Fire Setting in accordance with ASTM E3053	Air control set to startup for first 15 minutes, then set to medium. Fan off for first 30 min, then set to low.

\*Fire out, run aborted at 230 min



## Appliance Description

**Model(s):** Pioneer II-C

**Additional Models Discussion:** In addition to the tested model, this design is offered as the Northstar-C, Constitution (C40-C), and WarmMajic-II. All four designs are identical in all aspects that may impact emissions. The models are distinguished for branding purposes and differ only in the design and appearance on the decorative fascia on the front of the unit.

**Appliance Type:** Wood-Fired Fireplace

**Air Introduction System:** Primary Air enters the firebox through the required outside air system located at the rear of the appliance. Air 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 ashlip which moves left (closed) to right (open). Secondary air is pulled from the same outside air system and routed through 3 secondary air tubes. Dimensions on all these features can be found in Appendix D.

**Baffles & Refractory:** A 12.50" x 11.5" x 0.50" refractory panel rests on top of the secondary air tubes. This baffle is covered by a 1" thick insulation blanket. The firebox is lined with 1.25" thick firebrick.

**Insulation:** All six sides of the firebox are insulated from the outer shell with 1"-1.5" thick fiberglass insulation.

**Flue Outlet:** 8-inch exhaust outlet designed for direct connection to chimney located on the top of the appliance.

**Catalytic Combustor:** N/A

**Fan:** The Pioneer II-C is equipped from the factory with a convection fan located behind the firebox.

## Appliance Dimensions

Pioneer II-C Unit Dimensions

Height	Width	Depth	Firebox Volume
40.5"	40"	23.5"	2.7 ft <sup>3</sup>

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

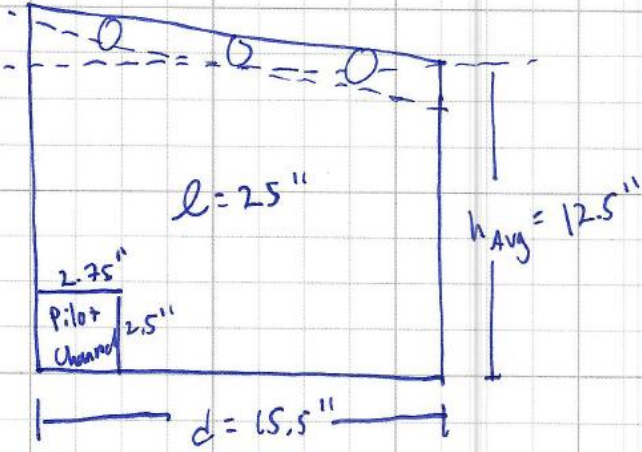
## Firebox Volume

**Total Firebox Volume:** 2.7 ft<sup>3</sup>

**Usable Firebox Volume:** 2.7 ft<sup>3</sup>

**Firebox Volume Calculation:**

Pioneer II FB Volume:



$$V = [(15.5 \times 12.5) - (2.75 \times 2.5)] \times 25$$

$$= 4671.875 \text{ in}^3$$

$$= \underline{2.70 \text{ ft}^3}$$

Appliance Front



Appliance Left



Appliance Right



Appliance Rear





## Test Fuel Properties

Test fuel used was white oak 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



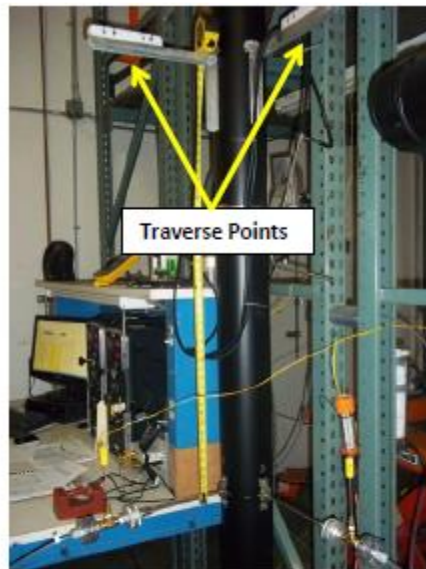
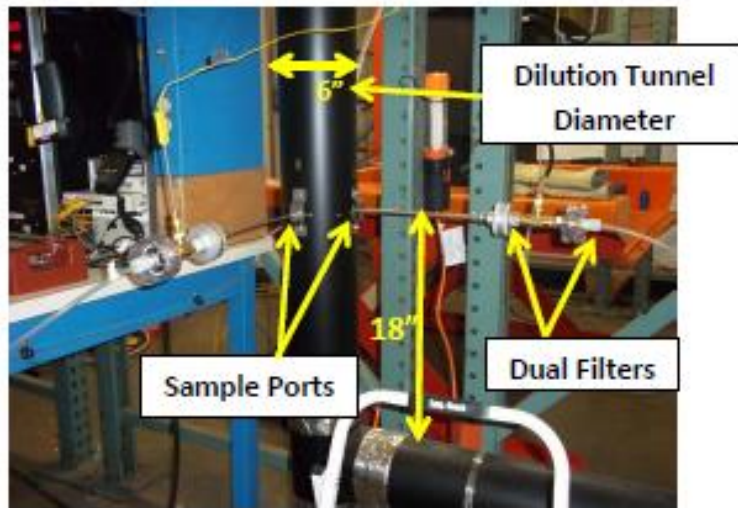
Typical Low Fire Load



## 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: 1915 W Saunders St, Mt. Pleasant, IA 52641, 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 - ft<sup>3</sup>  
Catalytic/Non-Cat  
Convection Air Fan (No, Standard, Optional)

Pioneer II-C  
Hearth and Home Technologies  
1915 W Saunders St  
Mt. Pleasant, IA 52641  
Fireplace  
2.7  
Non-Cat  
Standard

### 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  
8/20/2019 - 8/22/2019  
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/ft<sup>3</sup>  
 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	3	4	
8/20/2019	8/21/2019	8/21/2019	
High Fire	Low Fire	Medium Fire	
29.94	30.00	29.90	
82	80	78	
73	73	73	
90	90	86	
Oak, White	Oak, White	Oak, White	
0.71	0.71	0.71	
8819	8819	8819	
22	22	22	
5	5	5	
5.24	N/A	N/A	
19%	N/A	N/A	
10%	N/A	N/A	
2.16	N/A	N/A	
8.32	N/A	N/A	
29%	N/A	N/A	
23%	N/A	N/A	
3.07	N/A	N/A	
28.24	31.5	32.55	
22.4%	21.6%	22.4%	
10.46	11.75	12.06	
10.46	11.67	12.06	
4.00	N/A	N/A	
14%	N/A	N/A	
180	545	420	
3.00	9.08	7.00	
124	N/A	N/A	
2.07	N/A	N/A	
3.0	0	0	
12.52	11.75	12.06	
10.6%	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	3	4	
8/20/19	8/21/19	8/21/19	
High Fire	Low Fire	Medium Fire	
3.52	1.29	1.72	
48,212	17,632	24,005	
163.92	212.27	211.45	
0.151	0.123	0.119	
0.149	0.127	0.117	
14.41	15.40	4.29	
14.26	13.46	4.43	
14.332	14.432	4.362	
0.5%	6.7%	1.7%	
0.01	0.08	0.01	
4.78	1.59	0.62	
776	1276	1108	
300	140	158	
69%	70%	72%	
74%	75%	77%	

### 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
3.52	1.29	1.72
4.78	1.59	0.62
300.2	140.4	158.3
69%	70%	72%
74%	75%	77%
48200	17600	24000
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

1.84
199.7
3.33
70.3%
76%
17600 to 48200



## **LAB NOTES FOR LOADING FIREPLACE**

### **MODELS: PIONEER-II, C40-C, NORTHSTAR-C, AND WARMMAJIC**

- **Leave the door slightly open 2-4 inches for 2-3 minutes then close the door, latching it lightly to allow the flame to get going well.**
- **When ½ to 2/3 of the kindling burns down, open the door and level the firebox.**
- **Add 7 to 9 pounds of start-up wood (1-3-inch diameter pieces of cord wood) by stacking them in a crisscross pattern. This will allow for proper air flow.**
- **Leave the door slightly open 2-4 inches for 1-3 minutes or until a good flame is present. Then close the door, latching it lightly.**
- **After the flame gets established (approximately 3-5 minutes) shut and latch the door.**
- **When the start-up has burned down ½ to 2/3 and a good flame is still present, open the door. Level the coal bed ensuring that the combustion air holes are not blocked.**



- **Load 4-6 pieces of cord wood 22 inches long to achieve maximum firebox volume, stack 2 to 3 pieces high in the back first, then 2 to 3 pieces in the front, making sure to work the bottom pieces into the coal bed to insure a solid stack once all the wood is loaded. Leave at least a 1-inch gap between the two stacks to insure good air flow around the wood.**
- **Leave the door slightly open 2-5 inches for up to 5 minutes to get a good flame going, then close the door.**
- **When the fire has burned down and ready for reloading reset the ACC and level out the coal bed.**
- **Load the wood the same as the high burn. Then partially close the door leaving it open around 4-8 inches for up to 5 minutes or until the wood is burning good. Close the door and let it burn for up to 20 minutes before setting the combustion air control to the desired setting.**
- **Low setting - move the control all the way to the left.**
- **Medium setting – move the control all the way to the left then back to the right ½ inch.**

# Conditioning Data

Client: Hearth &amp; Home Technologies

Job #: 19-502

Model: Pioneer II-C

Tracking #: 0037

Date(s): 7/26/19 - 8/15/19

Technician: AK

Elapsed Time (hrs)	Scale Reading (lbs)	Average: Weight Change (lbs)	280.7	76.4	N/A
			Flue (°F)	Ambient (°F)	Catalyst Exit (°F)
0	31.2	-	258	78	N/A
1	11.7	-19.5	540	78	N/A
2	5.5	-6.1	238	83	N/A
3	3.8	-1.7	186	74	N/A
4	2.6	-1.3	170	76	N/A
5	1.5	-1.1	162	75	N/A
6	0.5	-0.9	146	74	N/A
7	25.7	25.1	541	77	N/A
8	11.7	-14.0	524	79	N/A
9	5.4	-6.3	226	79	N/A
10	4.1	-1.3	166	77	N/A
11	3.0	-1.1	158	76	N/A
12	2.1	-0.9	153	75	N/A
13	1.1	-1.0	154	74	N/A
14	0.4	-0.7	142	72	N/A
15	23.2	22.8	579	77	N/A
16	7.4	-15.8	505	80	N/A
17	2.8	-4.6	227	79	N/A
18	20.4	17.6	504	78	N/A
19	8.3	-12.1	378	79	N/A
20	5.7	-2.5	174	75	N/A
21	4.5	-1.3	154	74	N/A
22	3.5	-1.0	145	75	N/A
23	2.7	-0.8	144	75	N/A
24	1.9	-0.8	139	74	N/A
25	1.1	-0.7	128	73	N/A
26	0.5	-0.6	131	73	N/A
27	29.1	28.6	289	77	N/A
28	13.7	-15.5	548	79	N/A
29	6.0	-7.7	301	80	N/A
30	4.2	-1.7	183	78	N/A
31	3.0	-1.2	172	76	N/A
32	2.0	-1.1	163	73	N/A
33	1.1	-0.9	153	74	N/A
34	0.2	-0.9	147	73	N/A
35	32.9	32.6	598	74	N/A
36	17.1	-15.8	688	77	N/A
37	8.6	-8.5	293	78	N/A
38	19.5	10.9	630	78	N/A
39	6.9	-12.6	467	78	N/A
40	4.2	-2.7	238	76	N/A
41	2.6	-1.7	221	76	N/A
42	1.3	-1.3	204	76	N/A
43	0.3	-1.0	180	73	N/A
44	20.6	20.3	554	81	N/A
45	7.8	-12.8	496	87	N/A
46	5.4	-2.4	192	80	N/A
47	4.4	-1.0	169	76	N/A
48	3.6	-0.8	158	74	N/A
49	2.8	-0.8	150	74	N/A
50	2.0	-0.8	145	73	N/A

**WOOD STOVE TEST DATA PACKET**  
**ASTM E3053/E2515**



**Run 1 Data Summary**

Client: HHT  
Model: Pioneer II  
Job #: 19-502  
Tracking #: 0037  
Test Date: 8/20/2019

  
\_\_\_\_\_  
Technician Signature

10/7/2019  
\_\_\_\_\_  
Date



# TEST RESULTS - ASTM E3053 / ASTM E2515

Client: HHT

Model: Pioneer II

Run #: 1

Job #: 19-502

Tracking #: 0037

Technician: AK

Date: 8/20/2019

<b>Burn Rate (kg/hr):</b>	<b>3.52</b>
---------------------------	-------------

	Ambient Sample	Sample Train A	Sample Train B	1st Hour Filter
Total Sample Volume (ft <sup>3</sup> )	0.000	27.206	26.753	9.075
Average Gas Velocity in Dilution Tunnel (ft/sec)	16.64			
Average Gas Flow Rate in Dilution Tunnel (dscf/hr)	9835.0			
Average Gas Meter Temperature (°F)	77.2	80.0	84.4	80.0
Total Sample Volume (dscf)	0.000	26.621	26.078	10.598
Average Tunnel Temperature (°F)	158.8			
Total Time of Test (min)	180			
Total Particulate Catch (mg)		13.0	12.6	9.2
Particulate Concentration, dry-standard (g/dscf)	0.0000000	0.0004883	0.0004832	0.0008681
Total PM Emissions (g)	0.00	14.41	14.26	8.54
Particulate Emission Rate (g/hr)	0.00	4.80	4.75	8.54
Emissions Factor (g/kg)	-	1.15	1.14	-
Difference from Average Total Particulate Emissions (g)	-	0.08	0.08	-
Difference from Average Emissions Factor (g/kg)	-	0.01	0.01	-

Final Average Results	
Total Particulate Emissions (g)	14.33
Particulate Emission Rate (g/hr)	4.78
Emissions Factor (g/kg)	1.14
HHV Efficiency (%)	68.6%
LHV Efficiency (%)	73.7%
CO Emissions (g/min)	5.00

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	9.0	OK
Leakage Rate	Less than 4% of average sample rate	0 cfm	OK
Ambient Temp	55-90 °F	2.7080688 / Max: 82.04	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:** HHT  
**Model:** Pioneer II  
**Date:** 08/20/19  
**Run:** 1  
**Control #:** 19-502  
**Test Duration:** 155  
**Output Category:** High

### Test Results in Accordance with CSA B415.1-09

	HHV Basis	LHV Basis
<b>Overall Efficiency</b>	68.6%	73.7%
<b>Combustion Efficiency</b>	94.3%	94.3%
<b>Heat Transfer Efficiency</b>	72.7%	78.1%

<b>Output Rate (kJ/h)</b>	50,824	48,212	<b>(Btu/h)</b>
<b>Burn Rate (kg/h)</b>	3.62	7.97	<b>(lb/h)</b>
<b>Input (kJ/h)</b>	74,112	70,303	<b>(Btu/h)</b>

<b>Test Load Weight (dry kg)</b>	9.34	20.58	<b>dry lb</b>
<b>MC wet (%)</b>	18.32		
<b>MC dry (%)</b>	22.43		
<b>Particulate (g )</b>	14.33		
<b>CO (g)</b>	776		
<b>Test Duration (h)</b>	2.58		

<b>Emissions</b>	<b>Particulate</b>	<b>CO</b>
<b>g/MJ Output</b>	0.11	5.91
<b>g/kg Dry Fuel</b>	1.53	83.05
<b>g/h</b>	5.55	300.23
<b>g/min</b>	0.09	5.00
<b>lb/MM Btu Output</b>	0.25	13.73

<b>Air/Fuel Ratio (A/F)</b>	12.57
-----------------------------	-------

VERSION:

2.2

12/14/2009

# HIGH FIRE FUEL LOAD DATA - ASTM E3053

Client: HHT

Job #: 19-502

Model: Pioneer II

Tracking #0037

Run #: 1

Technician: AK

Date: 8/20/2019

Nominal Loading Density (lbs/ft<sup>3</sup>, wet basis): 10  
 Usable Firebox Volume (ft<sup>3</sup>): 2.70  
 Target Load Weight (lbs): 27.00  
 Total Load Weight Range (lbs): 25.70 to 28.40  
 Core Load Weight Range (lbs): 12.20 to 17.60  
 Remainder Load Weight Range (lbs): 9.50 to 14.90  
 Core Load Piece Range (lbs): 4.10 to 6.80  
 Remainder Load Piece Range (lbs): 2.70 to 14.90  
 Max Allowable Kindling Weight (lbs): 5.65  
 Max Allowable Start-up Fuel Weight (lbs): 8.47

## 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	22.00	4.96	In Range	20.0	22.0	23.0	21.7	In Range	4.08	1.85
2	22.00	5.40	In Range	24.0	24.0	22.0	23.3	In Range	4.38	1.99
3	22.00	6.36	In Range	22.0	23.0	21.0	22.0	In Range	5.21	2.36
Core Load Wt. (lbs)		16.72	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	22.00	6.56	In Range	21.0	24.0	21.0	22.0	In Range	5.38	2.44
2	22.00	4.96	In Range	24.0	24.0	22.0	23.3	In Range	4.02	1.82
3			NA				NA	NA	NA	NA
Remainder Load (lbs)		11.52	In Range							

Total Load Weight (lbs): 28.24 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: 105% In Range 95-105%  
 Actual Fuel Loading Density (lb/ft<sup>3</sup>): 10.5  
 Total Load Average Moisture Content (%DB): 22.4 In Range 19-25%  
 Total Load Average Moisture Content (%WB): 18.3  
 Total Test Load Weight (dry basis): 23.07 lbs 10.46 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
5.24	In Range	10			10.0	In Range	4.76	2.16

Start-up Fuel Wt. (lb)	Within Spec?	Start-up Moisture Readings (%DB)				Within Spec?	Dry Weight	
		1	2	3	Avg.		lbs	kg
8.32	In Range	23			23.0	In Range	6.76	3.07

## TEST FUEL LOADING RANGE

Allowable Residual Start-up Fuel Range (lb): 2.8 to 5.6  
 Actual Residual Start-up Fuel Weight (lb): 4.0 In Range

## TEST END POINT

High Fire Test Run End Point Range: 2.5 to 3.1 lb  
 Actual Fuel Load Ending Weight (lb): 3.0 In Range

Total Weight All Fuel Added: 41.80 lbs, wet basis      Total Weight All Fuel Burned (dry basis): 27.59 lbs  
 34.59 lbs, dry basis      12.52 kg  
 15.69 kg, dry basis

# DILUTION TUNNEL & MISC. DATA - ASTM E3053 / E2515

Client: HHT  
 Model: Pioneer II  
 Run #: 1  
 Test Start Time: 13:05  
 Test Type: High Fire

Job #: 19-502  
 Tracking #: 0037  
 Technician: AK  
 Date: 8/20/2019

Recording Interval (min): 5  
 Total Sampling Time (min): 180  
 High Fire Test Load Time (min): 25

Meter Box  $\gamma$  Factor: 0.998 (A)  
 Meter Box  $\gamma$  Factor: 1.002 (B)  
 Meter Box  $\gamma$  Factor: (Ambient)

	Pre-Test	Post Test	Avg.
Barometric Pressure (in. Hg)	29.94	29.94	29.94
Relative Humidity (%)	48.5	42.8	
Room Air Velocity (ft/min)	0	0	
Scale Audit (lbs)	5.0	5.0	
Ambient Sample Volume:			ft <sup>3</sup>

Induced Draft Check (in. H<sub>2</sub>O): 0  
 Smoke Capture Check (%): 100%  
 Date Flue Pipe Last Cleaned: 4/23/2019

**Sample Train Post-Test Leak Checks**

(A)	0.000	cfm @	-14	in. Hg
(B)	0.000	cfm @	-13	in. Hg
(Ambient)	0.002	cfm @	-14	in. Hg

## DILUTION TUNNEL FLOW

Traverse Data		
Point	dP (in H <sub>2</sub> O)	Temp (°F)
1	0.032	92
2	0.060	92
3	0.064	92
4	0.048	92
5	0.036	92
6	0.060	92
7	0.070	92
8	0.060	92
Center	0.074	92

Dilution Tunnel H<sub>2</sub>O: 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 ft<sup>2</sup>

V<sub>strav</sub>: 15.90 ft/sec  
 V<sub>scnt</sub>: 18.43 ft/sec  
 F<sub>p</sub>: 0.863 [ratio]

Initial Tunnel Flow: 172.1 scf/min

Static Pressure: -0.250 in. H<sub>2</sub>O

## 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
X	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
	Other						

## WOODSTOVE PREBURN DATA

Client: HHT  
Model: Pioneer II  
Run #: 1

Job #: 19-502  
Tracking #: 0037  
Technician: AK  
Date: 8/20/2019

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

# BOX A TEST DATA - ASTM E3053 / ASTM E2515

Client: HHT  
 Model: Pioneer II  
 Run #: 1

Job #: 19-502  
 Tracking #: 0037  
 Technician: AK  
 Date: 8/20/2019

Elapsed Time (min)	Particulate Sampling Data							Fuel Weight (lb)		Temperature Data (°F)			
	Gas Meter (ft <sup>3</sup> )	Sample Rate (cfm)	Dilution Tunnel dP (in H <sub>2</sub> O)	Orifice dH (in H <sub>2</sub> O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Scale Reading	Weight Change	Dilution Tunnel	Flue	Filter	Ambient
0	0.001		0.072	0.09	80	1.08		0.0		75	73	82	73
5	0.714	0.143	0.066	1.10	80	3.84	102	3.4	3.4	198	578	87	73
10	1.459	0.149	0.065	0.99	80	3.75	112	9.3	5.9	252	620	87	73
15	2.215	0.151	0.062	0.87	80	1.26	115	7.2	-2.1	234	702	88	74
20	2.992	0.155	0.068	1.94	80	1.13	111	4.7	-2.5	217	690	86	76
25	3.821	0.166	0.073	1.10	80	1.17	117	32.2	27.5	258	401	87	75
30	4.579	0.152	0.074	1.07	80	3.72	102	30.7	-1.5	190	495	87	76
35	5.322	0.149	0.076	1.05	80	3.94	96	29.5	-1.2	153	471	85	76
40	6.069	0.149	0.077	1.05	80	4.39	97	28.4	-1.1	167	548	85	76
45	6.815	0.149	0.074	1.00	80	1.46	99	27.0	-1.4	176	576	86	76
50	7.559	0.149	0.072	0.95	80	4.12	100	25.6	-1.4	183	597	85	77
55	8.318	0.152	0.076	1.03	80	4.76	99	24.4	-1.2	170	545	86	77
60	9.076	0.152	0.073	1.11	80	3.45	100	23.2	-1.2	167	549	85	78
65	9.912	0.167	0.076	1.01	80	0.67	108	22.0	-1.2	163	542	84	77
70	10.689	0.155	0.073	1.05	80	4.4	103	20.9	-1.1	161	534	85	76
75	11.448	0.152	0.073	1.10	80	1.7	100	19.8	-1.1	164	534	86	77
80	12.217	0.154	0.071	0.94	80	3.91	103	18.7	-1.1	166	535	87	78
85	12.989	0.154	0.073	1.04	80	3.07	102	17.5	-1.2	169	561	87	78
90	13.761	0.154	0.074	0.93	80	3.79	102	16.6	-0.9	166	549	87	78
95	14.511	0.150	0.074	0.96	80	1.62	98	15.4	-1.2	166	545	86	78
100	15.265	0.151	0.073	0.99	80	2.83	101	14.4	-1	172	579	86	77
105	16.017	0.150	0.072	0.97	80	4.39	101	13.3	-1.1	175	591	87	77
110	16.764	0.149	0.069	1.02	80	0.44	102	12.2	-1.1	178	597	87	78
115	17.500	0.147	0.070	0.91	80	0.82	100	11.4	-0.8	176	582	86	78
120	18.236	0.147	0.070	1.02	80	4.57	100	10.5	-0.9	172	556	86	79
125	18.975	0.148	0.070	0.92	80	0.78	100	9.8	-0.7	164	510	85	81
130	19.711	0.147	0.074	1.01	80	1.59	96	9.3	-0.5	148	480	84	82
135	20.452	0.148	0.072	0.97	80	4.61	96	8.9	-0.4	136	419	82	79
140	21.194	0.148	0.073	1.06	80	4.5	95	8.6	-0.3	126	384	81	79
145	21.938	0.149	0.073	0.95	80	0.79	94	8.4	-0.2	119	349	80	80
150	22.684	0.149	0.072	0.94	80	4.56	95	8.1	-0.3	112	323	80	78
155	23.432	0.150	0.074	0.91	80	3.29	94	7.9	-0.2	108	301	80	79
160	24.182	0.150	0.074	1.00	80	2.05	93	7.7	-0.2	103	276	80	78

# BOX A TEST DATA - ASTM E3053 / ASTM E2515

Client: HHT  
 Model: Pioneer II  
 Run #: 1

Job #: 19-502  
 Tracking #: 0037  
 Technician: AK  
 Date: 8/20/2019

Elapsed Time (min)	Particulate Sampling Data							Fuel Weight (lb)		Temperature Data (°F)			
	Gas Meter (ft <sup>3</sup> )	Sample Rate (cfm)	Dilution Tunnel dP (in H <sub>2</sub> O)	Orifice dH (in H <sub>2</sub> O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Scale Reading	Weight Change	Dilution Tunnel	Flue	Filter	Ambient
165	24.937	0.151	0.073	1.00	80	2.59	95	7.6	-0.1	103	264	80	77
170	25.689	0.150	0.074	1.02	80	0.84	93	7.4	-0.2	97	251	81	77
175	26.449	0.152	0.075	0.93	80	0.68	94	7.2	-0.2	97	241	80	77
180	27.206	0.151	0.074	0.98	80	4.22	94	7.0	-0.2	94	232	80	76
Avg/Tot	27.206	0.151	0.072	1.00	80	2.72	100			159	475	84	77.2

# BOX B TEST DATA - ASTM E3053 / ASTM E2515

Client: HHT  
 Model: Pioneer II  
 Run #: 1

Job #: 19-502  
 Tracking #: 0037  
 Technician: AK  
 Date: 8/20/2019

Elapsed Time (min)	Particulate Sampling Data							Flue Gas Data		
	Gas Meter (ft <sup>3</sup> )	Sample Rate (cfm)	Orifice dH (in H <sub>2</sub> O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Filter (°F)	Flue Draft (in H <sub>2</sub> O)	CO <sub>2</sub> (%)	CO (%)
0	0.001		0.00	73	-5		80	0.000	0.00	0.00
5	0.695	0.139	1.22	73	1.84	103	83	0.090	12.07	0.85
10	1.446	0.150	1.12	73	4.15	117	89	0.050	9.26	1.30
15	2.178	0.146	1.11	74	3.36	115	90	0.060	14.44	2.45
20	2.795	0.123	0.59	74	4.4	91	80	0.120	14.62	1.54
25	3.550	0.151	1.12	75	2.26	111	85	0.070	1.30	0.10
30	4.299	0.150	1.18	75	2.46	104	89	0.110	9.65	1.62
35	5.042	0.149	1.17	76	3.22	99	83	0.070	9.54	0.63
40	5.781	0.148	1.21	76	1.14	99	83	0.070	11.21	0.65
45	6.528	0.149	1.16	77	1.63	102	85	0.030	11.09	0.91
50	7.269	0.148	1.18	87	3.7	101	85	0.110	11.99	0.26
55	8.011	0.148	1.03	88	3.96	98	85	0.050	10.01	0.84
60	8.748	0.147	1.07	88	3.69	98	84	0.080	9.50	0.98
65	9.491	0.149	1.06	88	1.64	97	84	0.100	9.28	0.95
70	10.248	0.151	1.13	88	1.4	101	84	0.100	9.34	0.93
75	11.003	0.151	1.24	88	1.79	101	84	0.110	9.79	0.90
80	11.755	0.150	1.17	88	3.2	102	84	0.110	10.07	0.81
85	12.403	0.130	1.57	88	1.75	87	81	0.090	10.61	0.97
90	13.240	0.167	1.15	88	2.35	111	83	0.060	10.11	0.58
95	14.003	0.153	1.17	88	4.03	101	84	0.080	10.53	0.49
100	14.764	0.152	1.17	88	1.91	103	84	0.090	11.77	0.84
105	15.513	0.150	1.07	88	1.52	102	84	0.130	11.95	0.57
110	16.241	0.146	0.99	88	2.54	101	83	0.110	11.97	0.69
115	16.897	0.131	0.69	88	6.11	90	80	0.040	11.55	0.78
120	17.722	0.165	1.07	88	3.91	113	86	0.010	11.17	0.67
125	18.477	0.151	1.17	88	1.44	103	87	0.070	11.03	0.60
130	19.237	0.152	1.20	88	3.06	100	86	0.080	9.83	0.19
135	20.003	0.153	1.16	88	1.62	101	85	0.030	8.46	0.08
140	20.751	0.150	1.06	88	0.94	97	84	0.020	7.80	0.10
145	21.495	0.149	1.07	88	3.88	95	83	0.100	7.34	0.18
150	22.245	0.150	1.16	88	3.26	96	82	0.050	7.08	0.25
155	22.989	0.149	1.09	88	3.6	94	81	0.070	6.78	0.36



# BOX B TEST DATA - ASTM E3053 / ASTM E2515

Client: HHT  
 Model: Pioneer II  
 Run #: 1

Job #: 19-502  
 Tracking #: 0037  
 Technician: AK  
 Date: 8/20/2019

Elapsed Time (min)	Particulate Sampling Data							Flue Gas Data		
	Gas Meter (ft <sup>3</sup> )	Sample Rate (cfm)	Orifice dH (in H <sub>2</sub> O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Filter (°F)	Flue Draft (in H <sub>2</sub> O)	CO <sub>2</sub> (%)	CO (%)
160	23.737	0.150	1.04	88	3.59	94	81	0.070	6.46	0.59
165	24.483	0.149	1.19	88	2.27	95	83	0.050	6.10	0.74
170	25.237	0.151	1.19	88	0.91	94	80	0.010	5.90	0.75
175	25.993	0.151	1.18	88	3.2	94	82	0.050	5.65	0.69
180	26.753	0.152	1.23	88	1.56	95	81	0.060	5.55	0.68
Avg/Tot	26.753	0.149	1.09	84	2.49	100	84	0.070	9.21	0.72

# WOODSTOVE SURFACE TEMPERATURE DATA

Client: HHT

Job #: 19-502

Model: Pioneer II

Tracking #: 0037

Run #: 1

Technician: AK

Date: 8/20/2019

Elapsed Time (min)	Temperature Data (°F)						
	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
0	73	73	73	73	73	73.0	N/A
5	78	78	87	345	74	132.3	N/A
10	113	121	144	576	92	209.0	N/A
15	177	164	174	789	124	285.4	N/A
20	233	204	210	899	163	341.7	N/A
25	307	258	236	716	222	348.0	N/A
30	356	299	238	579	269	348.2	N/A
35	377	324	237	565	287	358.1	N/A
40	382	348	237	649	295	382.1	N/A
45	382	373	235	732	299	404.5	N/A
50	385	398	240	777	303	420.7	N/A
55	394	418	241	741	308	420.6	N/A
60	407	433	242	737	314	426.7	N/A
65	416	446	243	738	323	433.2	N/A
70	423	457	246	724	335	436.8	N/A
75	430	468	247	724	346	442.9	N/A
80	437	478	250	740	357	452.3	N/A
85	444	488	253	764	371	464.1	N/A
90	453	494	259	785	385	475.3	N/A
95	464	499	270	783	393	481.6	N/A
100	478	507	277	813	398	494.5	N/A
105	493	518	286	841	412	509.9	N/A
110	509	530	297	851	428	523.0	N/A
115	525	541	307	852	444	533.6	N/A
120	540	547	320	841	464	542.5	N/A
125	555	550	330	808	483	545.2	N/A
130	568	552	340	758	504	544.1	N/A
135	577	552	349	687	521	537.0	N/A
140	582	549	353	630	536	529.9	N/A
145	584	544	355	583	544	521.8	N/A
150	581	537	355	543	550	513.1	N/A
155	574	528	355	511	557	505.0	N/A
160	566	519	348	480	557	494.1	N/A
165	555	509	343	452	556	482.9	N/A
170	543	498	332	427	553	470.6	N/A
175	531	486	322	407	549	458.9	N/A
180	518	475	311	387	541	446.3	N/A
Average	433	426	269	657	376	432	N/A

# LAB SAMPLE DATA - ASTM E2515

Client: HHT  
 Model: Pioneer II  
 Run #: 1

Job #: 19-502  
 Tracking #: 0037  
 Technician: AK  
 Date: 8/20/2019

	Sample ID	Tare, mg	Total, mg	Final, mg	Catch, mg
Train A Filters - First Hour	T277	86.8	173.7	182.9	9.2
	T282	86.9			
Train A Filters - Remainder	T278	87.2	174.3	177.7	3.4
	T279	87.1			
Train A Probe	4A	116184.2	116184.2	116184.3	0.1
Train A O-Rings	4A	3591.3	3591.3	3591.6	0.3
Train B Filters	T280	87.9	349.7	361.1	11.4
	T281	88.0			
	T283	86.8			
	T284	87.0			
Train B Probe	4B	116366.9	116366.9	116367.1	0.2
Train B O-Rings	4B	3578.8	3578.8	3579.8	1.0
Background Filter			0.0	0.0	

Placed in  
Dessicator on:

Train A Filters - First Hour	182.8	9/4 9:03	182.9	9/5 9:30			
Train A Filters - Remainder	177.8	9/4 9:03	177.7	9/5 9:29			
Train A Probe	116184.3	9/4 9:17	116184.3	9/5 9:36			
Train A O-Rings	3591.5	9/4 8:57	3591.6	9/5 9:25			
Train B Filters	361.0	9/4 9:04	361.1	9/5 9:30			
Train B Probe	116367.3	9/4 9:17	116367.1	9/5 9:36			
Train B O-Rings	3580.0	9/4 8:58	3579.8	9/5 9:25			
Background Filter							

1st hour Sub-Total, mg:	9.2
Remainder Sub-Total, mg:	3.8
<b>Train 1 Aggregate, mg:</b>	<b>13.0</b>
<b>Train 2 Aggregate, mg:</b>	<b>12.6</b>
Ambient Aggregate, mg:	

# BOX A TEST DATA - ASTM E3053 / ASTM E2515

Client: HHT  
 Model: Pioneer II  
 Run #: 2

Job #: 19-464  
 Tracking #: 0037  
 Technician: AK  
 Date: 8/20/2019

Elapsed Time (min)	Particulate Sampling Data							Fuel Weight (lb)		Temperature Data (°F)			
	Gas Meter (ft <sup>3</sup> )	Sample Rate (cfm)	Dilution Tunnel dP (in H <sub>2</sub> O)	Orifice dH (in H <sub>2</sub> O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Scale Reading	Weight Change	Dilution Tunnel	Flue	Filter	Ambient
0	0.000		0.127	0.05	93	1.1		31.4		90	222	85	74
5	0.733	0.147	0.130	0.96	93	0.79	138	30.9	-0.54071	124	175	83	75
10	1.471	0.148	0.136	1.11	93	4.22	132	30.5	-0.40377	87	172	83	74
15	2.200	0.146	0.139	0.96	94	3.97	128	30.0	-0.51639	88	182	83	75
20	2.918	0.144	0.135	0.88	93	4.29	128	29.5	-0.47731	84	168	83	74
25	3.623	0.141	0.139	0.96	93	6.56	124	29.2	-0.28008	83	155	83	74
30	4.337	0.143	0.136	0.85	92	6.94	127	28.9	-0.28712	82	152	83	73
35	5.047	0.142	0.136	0.92	92	7.23	126	28.6	-0.28149	82	151	84	73
40	5.782	0.147	0.138	1.03	92	10.83	129	28.3	-0.34308	81	150	84	73
45	6.515	0.147	0.139	1.09	92	9.52	129	28.0	-0.27491	81	150	85	74
50	7.193	0.136	0.138	0.69	93	9.45	119	27.7	-0.37075	82	151	85	74
55	7.775	0.116	0.140	0.64	92	12.03	102	27.3	-0.39643	82	153	85	74
60	8.565	0.158	0.139	0.99	91	0.03	139	26.9	-0.31022	82	155	85	73
65	9.316	0.150	0.134	1.07	91	0.08	134	26.6	-0.35239	82	156	86	72
70	10.042	0.145	0.139	0.87	92	1.95	128	26.2	-0.34919	82	156	86	73
75	10.754	0.142	0.139	0.94	92	4.52	125	25.9	-0.38021	83	158	86	73
80	11.474	0.144	0.137	0.95	92	5.19	128	25.5	-0.39021	83	158	86	73
85	12.193	0.144	0.136	1.03	91	4.57	128	25.0	-0.42995	83	160	87	73
90	12.896	0.141	0.140	0.70	91	7.19	123	24.7	-0.38359	82	162	87	73
95	13.458	0.112	0.139	0.52	92	8.75	99	24.3	-0.39833	82	164	87	73
100	13.937	0.096	0.138	0.40	92	10.17	85	23.8	-0.47778	83	164	87	73
105	14.360	0.085	0.140	0.35	92	9.89	74	23.4	-0.42226	84	165	87	73
110	14.736	0.075	0.134	0.44	92	9.79	67	23.0	-0.41158	82	163	87	73
115	15.093	0.071	0.140	0.21	92	10.27	62	22.6	-0.38389	80	145	87	74
120	15.430	0.067	0.138	0.25	92	9.27	59	22.3	-0.22091	79	134	87	73
125	15.795	0.073	0.137	0.30	92	9.16	64	22.2	-0.10338	77	127	87	73
130	16.204	0.082	0.139	0.44	92	8.99	71	22.1	-0.11366	76	118	87	73
135	16.680	0.095	0.140	0.60	92	8.28	83	22.0	-0.15252	75	105	87	73
140	17.206	0.105	0.136	0.66	92	8.68	93	21.9	-0.12784	75	87	88	73
145	17.756	0.110	0.139	0.73	92	7.58	96	21.6	-0.22733	75	78	88	73
150	18.319	0.113	0.136	0.64	92	7.5	99	21.3	-0.29744	75	75	88	73
155	18.878	0.112	0.136	0.57	92	8.61	99	21.1	-0.24944	75	73	88	74
160	19.418	0.108	0.136	0.58	92	9.52	95	20.7	-0.3474	75	73	88	73

# BOX A TEST DATA - ASTM E3053 / ASTM E2515

Client: HHT  
 Model: Pioneer II  
 Run #: 2

Job #: 19-464  
 Tracking #: 0037  
 Technician: AK  
 Date: 8/20/2019

Elapsed Time (min)	Particulate Sampling Data							Fuel Weight (lb)		Temperature Data (°F)			
	Gas Meter (ft <sup>3</sup> )	Sample Rate (cfm)	Dilution Tunnel dP (in H <sub>2</sub> O)	Orifice dH (in H <sub>2</sub> O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Scale Reading	Weight Change	Dilution Tunnel	Flue	Filter	Ambient
165	19.934	0.103	0.136	0.59	92	8.38	91	20.4	-0.33827	75	74	88	74
170	20.441	0.101	0.139	0.48	92	9.58	89	20.1	-0.30587	75	76	88	73
175	20.956	0.103	0.136	0.49	92	10.15	91	19.8	-0.31594	75	77	88	73
180	21.461	0.101	0.139	0.54	92	8.36	88	19.5	-0.31005	75	79	88	73
185	21.953	0.098	0.138	0.56	92	9.91	86	19.1	-0.3634	75	79	88	73
190	22.438	0.097	0.134	0.48	92	9.7	86	18.8	-0.3175	75	80	88	73
195	22.917	0.096	0.138	0.38	92	8.41	84	18.8	0.05676	75	81	88	73
200	23.395	0.096	0.135	0.49	92	8.64	85	18.8	-0.02515	75	81	88	74
205	23.860	0.093	0.139	0.38	93	8.47	81	18.7	-0.06587	75	81	88	74
210	24.317	0.091	0.135	0.40	92	10.91	81	18.7	-0.03768	74	84	88	74
215	24.768	0.090	0.136	0.50	91	8.66	80	18.6	-0.11321	74	91	88	73
220	25.201	0.087	0.141	0.48	92	8.71	75	18.6	0.02265	74	92	88	73
225	25.635	0.087	0.137	0.43	92	9.67	76	18.5	-0.06847	75	92	88	73
230	26.066	0.086	0.142	0.33	92	8.84	75	18.4	-0.18278	75	89	88	73
Avg/Tot	26.066	0.113	0.137	0.64	92	7.56	100			80	126	86	73.4

# BOX B TEST DATA - ASTM E3053 / ASTM E2515

Client: HHT  
 Model: Pioneer II  
 Run #: 2

Job #: 19-464  
 Tracking #: 0037  
 Technician: AK  
 Date: 8/20/2019

Elapsed Time (min)	Particulate Sampling Data							Flue Gas Data		
	Gas Meter (ft <sup>3</sup> )	Sample Rate (cfm)	Orifice dH (in H <sub>2</sub> O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Filter (°F)	Flue Draft (in H <sub>2</sub> O)	CO <sub>2</sub> (%)	CO (%)
0	0.001		0.00	93	1		84	0.000	3.11	0.57
5	0.720	0.144	1.21	91	1.49	129	86	0.020	0.56	0.10
10	1.474	0.151	1.10	91	3.71	128	85	0.050	2.73	0.74
15	2.219	0.149	0.96	91	2.85	125	85	0.010	3.19	0.93
20	2.970	0.150	1.07	91	3.4	128	84	0.090	3.53	0.96
25	3.732	0.152	1.21	91	2.04	128	84	0.050	3.39	0.84
30	4.465	0.147	1.12	91	3.41	124	84	0.060	3.45	0.86
35	5.196	0.146	1.02	92	4.59	123	83	0.050	3.47	0.87
40	5.934	0.148	1.11	92	4	123	83	0.070	3.57	0.90
45	6.664	0.146	1.08	93	5.31	122	83	0.080	3.69	0.93
50	7.325	0.132	0.76	93	6.12	111	82	0.010	3.71	0.96
55	7.991	0.133	1.02	93	0.63	111	83	0.020	3.79	0.99
60	8.719	0.146	1.20	93	0.78	121	84	0.090	3.95	1.04
65	9.463	0.149	1.09	94	2.63	126	84	0.070	4.03	1.08
70	10.203	0.148	1.13	94	3.83	123	84	0.070	4.13	1.11
75	10.937	0.147	1.04	94	1.33	122	84	0.000	4.19	1.14
80	11.683	0.149	1.27	94	3.1	125	84	0.040	4.17	1.13
85	12.438	0.151	1.07	95	2.31	127	84	0.030	4.25	1.18
90	13.169	0.146	0.99	95	4.11	121	84	0.080	4.33	1.24
95	13.825	0.131	0.82	95	4.62	109	84	0.070	4.29	1.26
100	14.373	0.110	0.70	95	6.45	92	84	0.000	4.45	1.30
105	14.860	0.097	0.60	95	5.96	81	84	0.080	4.55	1.32
110	15.314	0.091	0.65	95	6.82	77	83	0.020	4.99	1.46
115	15.757	0.089	0.64	95	6.31	73	83	-0.010	5.63	1.70
120	16.189	0.086	0.50	95	6.86	72	83	0.080	4.81	1.07
125	16.627	0.088	0.56	95	5.68	73	83	0.010	4.23	0.84
130	17.093	0.093	0.71	95	6.6	77	83	0.030	3.45	0.64
135	17.592	0.100	0.64	95	5.62	82	83	0.040	1.98	0.34
140	18.125	0.107	0.65	96	5.49	89	83	0.050	0.00	0.00
145	18.671	0.109	0.67	96	6.34	90	83	0.060	0.06	0.01
150	19.238	0.113	0.81	96	5.17	94	83	-0.010	0.02	0.00
155	19.808	0.114	0.81	96	5.14	95	83	0.070	0.32	0.08

# BOX B TEST DATA - ASTM E3053 / ASTM E2515

Client: HHT  
 Model: Pioneer II  
 Run #: 2

Job #: 19-464  
 Tracking #: 0037  
 Technician: AK  
 Date: 8/20/2019

Elapsed Time (min)	Particulate Sampling Data							Flue Gas Data		
	Gas Meter (ft <sup>3</sup> )	Sample Rate (cfm)	Orifice dH (in H <sub>2</sub> O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Filter (°F)	Flue Draft (in H <sub>2</sub> O)	CO <sub>2</sub> (%)	CO (%)
160	20.382	0.115	0.84	96	4.94	96	83	0.060	0.18	0.04
165	20.944	0.112	0.67	96	6.75	94	83	0.070	0.30	0.07
170	21.498	0.111	0.76	96	5.39	91	83	0.050	0.40	0.10
175	22.046	0.110	0.69	96	5.5	91	83	-0.010	0.24	0.05
180	22.589	0.109	0.80	96	5.95	90	83	0.050	0.26	0.06
185	23.118	0.106	0.65	96	5.18	87	83	0.050	0.12	0.02
190	23.640	0.104	0.63	96	5.71	88	83	0.050	0.14	0.03
195	24.150	0.102	0.76	96	5.72	84	83	0.050	0.08	0.01
200	24.655	0.101	0.64	96	6.45	84	83	0.060	0.14	0.03
205	25.154	0.100	0.64	96	7.2	82	83	0.020	0.14	0.03
210	25.647	0.099	0.58	96	6.98	82	83	0.030	1.50	0.40
215	26.129	0.096	0.64	96	7.38	80	83	0.000	2.35	0.62
220	26.603	0.095	0.63	96	6.26	78	83	0.080	2.17	0.54
225	27.070	0.093	0.56	96	6.06	78	83	0.040	1.76	0.43
Avg/Tot	27.535	0.120	0.82	94	4.79	100	83	0.044	2.49	0.64

# LOW & MEDIUM FIRE FUEL LOAD DATA - ASTM E3053

Client: HHT  
 Model: Pioneer II  
 Run #: 2

Job #: 19-464  
 Tracking #: 0037  
 Technician: AK  
 Date: 8/20/2019

Nominal Loading Density (lbs/ft<sup>3</sup>, wet basis): 12  
 Usable Firebox Volume (ft<sup>3</sup>): 2.70  
 Target Load Weight (lbs): 32.40  
 Total Load Weight Range (lbs): 30.78 to 34.02  
 Core Load Weight Range (lbs): 14.58 to 21.06  
 Remainder Load Weight Range (lbs): 11.34 to 17.82  
 Core Load Piece Range (lbs): 4.86 to 8.10  
 Remainder Load Piece Range (lbs): 3.24 to 9.72

## 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		6.40	In Range	20.0	21.0	26.0	22.3	In Range	5.23	2.37
2		6.13	In Range	20.0	21.0	25.0	22.0	In Range	5.02	2.28
3		6.70	In Range	20.0	26.0	21.0	22.3	In Range	5.48	2.48
Core Load Wt. (lbs)		19.23	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		4.24	In Range	22.0	24.0	19.0	21.7	In Range	3.48	1.58
2		7.96	In Range	21.0	23.0	19.0	21.0	In Range	6.58	2.98
3			NA				NA	NA	NA	NA
Remainder Load (lbs)		12.20	In Range							

Remainder Load Small/Large Piece Weight Ratio: 53% In Range ≤ 67%  
 Total Load Weight (lbs): 31.43 In Range  
 Core Load % of Total Weight: 61% In Range 45-65%  
 Remainder % of Total Weight: 39% In Range 35-55%  
 Total Load % of Target Weight: 97% In Range 95-105%  
 Actual Fuel Loading Density (lb/ft<sup>3</sup>): 11.6  
 Total Load Average Moisture Content (%DB): 21.8 In Range 19-25%  
 Total Load Average Moisture Content (%WB): 17.9  
 Total Test Load Weight (dry basis): 25.80 lbs 11.70 kg

## TEST FUEL LOADING RANGE

Allowable Charcoal Bed Weight Range (lb): 3.2 to 6.2  
 Actual Charcoal Bed Wt. (lb): 5.9 In Range

## TEST END POINT

Actual Fuel Load Ending Weight (lb): 18.6 Invalid Test (<90%)

Total Fuel Burned During Test Run: 12.8 lbs, wet basis  
 7.2 lbs, dry basis  
 3.26 kg, dry basis



# LAB SAMPLE DATA - ASTM E2515

Client: HHT  
 Model: Pioneer II  
 Run #: 2

Job #: 19-464  
 Tracking #: 0037  
 Technician: AK  
 Date: 8/20/2019

	Sample ID	Tare, mg	Total, mg	Final, mg	Catch, mg
Train A Filters - First Hour	T285	87.2	87.2	109.2	22.0
Train A Filters - Remainder	T286	87.5	177.5	197.1	19.6
	T287	90.0			
Train A Probe	5A	116769.4	116769.4	116770.0	0.6
Train A O-Rings	5A	3533.1	3533.1	3534.8	1.7
Train B Filters	T289	86.9	261.0	296.2	35.2
	T288	86.1			
	T290	88.0			
Train B Probe	5B	116877.3	116877.3	116878.0	0.7
Train B O-Rings	5B	3529.5	3529.5	3530.4	0.9
Background Filter			0.0	0.0	

Placed in  
Dessicator on:

Train A Filters - First Hour	109.1	9/4 9:13	109.2	9/5 9:34			
Train A Filters - Remainder	197.3	9/4 9:11	197.1	9/5 9:34			
Train A Probe	116770.1	9/4 9:20	116770.0	9/5 9:35			
Train A O-Rings	3534.9	9/4 8:58	3534.8	9/5 9:28			
Train B Filters	296.2	9/4 9:12	296.2	9/5 9:34			
Train B Probe	116878.1	9/4 9:21	116878.0	9/5 9:36			
Train B O-Rings	3530.7	9/4 8:59	3530.3	9/5 9:28	3530.4	9/7 12:09	
Background Filter							

1st hour Sub-Total, mg:	22.0
Remainder Sub-Total, mg:	21.9
<b>Train 1 Aggregate, mg:</b>	<b>43.9</b>
<b>Train 2 Aggregate, mg:</b>	<b>36.8</b>
Ambient Aggregate, mg:	

# WOODSTOVE SURFACE TEMPERATURE DATA

Client: HHTModel: Pioneer IIRun #: 2Job #: 19-464Tracking #: 0037Technician: AKDate: 8/20/2019

Elapsed Time (min)	Temperature Data (°F)						
	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
0	446	404	247	311	472	375.7	N/A
5	430	388	240	235	478	354.2	N/A
10	405	362	248	229	472	343.2	N/A
15	376	334	268	246	474	339.7	N/A
20	352	316	276	256	475	335.1	N/A
25	335	303	277	257	476	329.7	N/A
30	320	293	275	257	476	324.1	N/A
35	307	285	271	256	474	318.6	N/A
40	297	278	266	256	470	313.6	N/A
45	289	272	261	257	466	309.0	N/A
50	282	267	257	258	462	305.2	N/A
55	276	264	252	259	458	301.8	N/A
60	271	260	248	261	454	299.0	N/A
65	267	258	245	263	450	296.7	N/A
70	265	257	242	265	447	294.9	N/A
75	263	256	239	267	444	293.7	N/A
80	262	255	237	269	441	292.9	N/A
85	261	255	235	272	438	292.5	N/A
90	262	256	234	275	436	292.4	N/A
95	263	257	232	279	434	292.8	N/A
100	264	258	232	282	432	293.5	N/A
105	266	259	231	285	431	294.3	N/A
110	271	263	197	268	408	281.6	N/A
115	278	263	163	244	402	270.0	N/A
120	279	259	149	223	400	261.9	N/A
125	274	253	142	206	394	253.8	N/A
130	267	247	136	191	386	245.5	N/A
135	259	240	133	179	377	237.5	N/A
140	251	234	129	168	368	230.1	N/A
145	245	229	127	164	362	225.4	N/A
150	242	226	126	163	358	222.9	N/A
155	243	224	126	166	354	222.5	N/A
160	247	222	126	170	352	223.4	N/A
165	251	222	127	172	351	224.7	N/A
170	256	222	128	174	350	225.7	N/A
175	260	222	128	173	348	226.3	N/A
180	264	222	128	173	347	227.0	N/A
185	268	222	129	174	346	227.8	N/A
190	271	223	130	175	344	228.5	N/A
195	274	223	129	176	341	228.8	N/A
200	277	223	130	177	339	229.2	N/A
205	279	224	131	179	337	229.9	N/A
210	282	224	131	181	332	229.8	N/A
215	282	224	131	181	324	228.4	N/A
220	281	222	131	179	318	226.1	N/A
225	277	220	131	176	313	223.5	N/A
Average	285	258	189	221	402	271	N/A

**WOOD STOVE TEST DATA PACKET**  
**ASTM E3053/E2515**



**Run 3 Data Summary**

Client: HHT  
Model: Pioneer II  
Job #: 19-502  
Tracking #: 0037  
Test Date: 8/21/2019

  
\_\_\_\_\_  
Technician Signature

10/7/2019  
\_\_\_\_\_  
Date

# TEST RESULTS - ASTM E3053 / ASTM E2515

Client: HHT

Model: Pioneer II

Run #: 3

Job #: 19-502

Tracking #: 0037

Technician: AK

Date: 8/21/2019

<b>Burn Rate (kg/hr):</b>	<b>1.29</b>
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	Ambient Sample	Sample Train A	Sample Train B	1st Hour Filter
Total Sample Volume (ft <sup>3</sup> )	0.000	67.209	68.972	7.261
Average Gas Velocity in Dilution Tunnel (ft/sec)	19.28			
Average Gas Flow Rate in Dilution Tunnel (dscf/hr)	12736.0			
Average Gas Meter Temperature (°F)	76.1	84.0	79.9	84.0
Total Sample Volume (dscf)	0.000	65.356	67.881	8.499
Average Tunnel Temperature (°F)	94.6			
Total Time of Test (min)	545			
Total Particulate Catch (mg)		8.7	7.9	7.7
Particulate Concentration, dry-standard (g/dscf)	0.0000000	0.0001331	0.0001164	0.0009059
Total PM Emissions (g)	0.00	15.40	13.46	11.54
Particulate Emission Rate (g/hr)	0.00	1.70	1.48	11.54
Emissions Factor (g/kg)	-	1.31	1.14	-
Difference from Average Total Particulate Emissions (g)	-	0.97	0.97	-
Difference from Average Emissions Factor (g/kg)	-	0.08	0.08	-

Final Average Results	
Total Particulate Emissions (g)	14.43
Particulate Emission Rate (g/hr)	1.59
Emissions Factor (g/kg)	1.23
HHV Efficiency (%)	70.1%
LHV Efficiency (%)	75.3%
CO Emissions (g/min)	2.34

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: 82 / Max: 90	OK
Face Velocity	< 30 ft/min	7.1	OK
Leakage Rate	Less than 4% of average sample rate	0.001 cfm	OK
Ambient Temp	55-90 °F	2.8011703 / Max: 80.2	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:** HHT  
**Model:** Pioneer II  
**Date:** 08/21/19  
**Run:** 3  
**Control #:** 19-502  
**Test Duration:** 545  
**Output Category:** Low

### Test Results in Accordance with CSA B415.1-09

	HHV Basis	LHV Basis
<b>Overall Efficiency</b>	70.1%	75.3%
<b>Combustion Efficiency</b>	92.7%	92.7%
<b>Heat Transfer Efficiency</b>	75.6%	81.2%

<b>Output Rate (kJ/h)</b>	18,587	17,632	<b>(Btu/h)</b>
<b>Burn Rate (kg/h)</b>	1.29	2.85	<b>(lb/h)</b>
<b>Input (kJ/h)</b>	26,527	25,163	<b>(Btu/h)</b>

<b>Test Load Weight (dry kg)</b>	11.75	25.91	<b>dry lb</b>
<b>MC wet (%)</b>	17.76		
<b>MC dry (%)</b>	21.60		
<b>Particulate (g )</b>	14.43		
<b>CO (g)</b>	1,276		
<b>Test Duration (h)</b>	9.08		

<b>Emissions</b>	<b>Particulate</b>	<b>CO</b>
<b>g/MJ Output</b>	0.09	7.56
<b>g/kg Dry Fuel</b>	1.23	108.54
<b>g/h</b>	1.59	140.45
<b>g/min</b>	0.03	2.34
<b>lb/MM Btu Output</b>	0.20	17.56

<b>Air/Fuel Ratio (A/F)</b>	15.07
-----------------------------	-------

VERSION:

2.2

12/14/2009

# HIGH FIRE FUEL LOAD DATA - ASTM E3053

Client: HHT

Job #: 19-502

Model: Pioneer II

Tracking #0037

Run #: 3

Technician: AK

Date: 8/21/2019

Nominal Loading Density (lbs/ft<sup>3</sup>, wet basis): 10  
 Usable Firebox Volume (ft<sup>3</sup>): 2.70  
 Target Load Weight (lbs): 27.00  
 Total Load Weight Range (lbs): 25.70 to 28.40  
 Core Load Weight Range (lbs): 12.20 to 17.60  
 Remainder Load Weight Range (lbs): 9.50 to 14.90  
 Core Load Piece Range (lbs): 4.10 to 6.80  
 Remainder Load Piece Range (lbs): 2.70 to 14.90  
 Max Allowable Kindling Weight (lbs): 5.26  
 Max Allowable Start-up Fuel Weight (lbs): 7.88

## 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	22.00	5.10	In Range	21.0	22.0	20.0	21.0	In Range	4.21	1.91
2	22.00	4.75	In Range	19.0	25.0	24.0	22.7	In Range	3.87	1.76
3	22.00	4.65	In Range	25.0	24.0	21.0	23.3	In Range	3.77	1.71
Core Load Wt. (lbs)		14.50	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	22.00	4.49	In Range	21.0	24.0	21.0	22.0	In Range	3.68	1.67
2	22.00	3.31	In Range	24.0	24.0	22.0	23.3	In Range	2.68	1.22
3	22.00	3.98	In Range	22.0	22.0	23.0	22.3	In Range	3.25	1.48
Remainder Load (lbs)		11.78	In Range							

Total Load Weight (lbs): 26.28 In Range  
 Core Load % of Total Weight: 55% In Range 45-65%  
 Remainder % of Total Weight: 45% In Range 35-55%  
 Total Load % of Target Weight: 97% In Range 95-105%  
 Actual Fuel Loading Density (lb/ft<sup>3</sup>): 9.7  
 Total Load Average Moisture Content (%DB): 22.4 In Range 19-25%  
 Total Load Average Moisture Content (%WB): 18.3  
 Total Test Load Weight (dry basis): 21.47 lbs 9.74 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
5.04	In Range	10			10.0	In Range	4.58	2.08

Start-up Fuel Wt. (lb)	Within Spec?	Start-up Moisture Readings (%DB)				Within Spec?	Dry Weight	
		1	2	3	Avg.		lbs	kg
7.65	In Range	23			23.0	In Range	6.22	2.82

## TEST FUEL LOADING RANGE

Allowable Residual Start-up Fuel Range (lb): 2.6 to 5.3  
 Actual Residual Start-up Fuel Weight (lb): 2.9 In Range

# LOW & MEDIUM FIRE FUEL LOAD DATA - ASTM E3053

Client: HHT

Job #: 19-502

Model: Pioneer II

Tracking #: 0037

Run #: 3

Technician: AK

Date: 8/21/2019

Nominal Loading Density (lbs/ft<sup>3</sup>, wet basis): 12  
 Usable Firebox Volume (ft<sup>3</sup>): 2.70  
 Target Load Weight (lbs): 32.40  
 Total Load Weight Range (lbs): 30.78 to 34.02  
 Core Load Weight Range (lbs): 14.58 to 21.06  
 Remainder Load Weight Range (lbs): 11.34 to 17.82  
 Core Load Piece Range (lbs): 4.86 to 8.10  
 Remainder Load Piece Range (lbs): 3.24 to 9.72

## 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	22.00	6.50	In Range	19.0	21.0	25.0	21.7	In Range	5.34	2.42
2	22.00	5.37	In Range	21.0	21.0	24.0	22.0	In Range	4.40	2.00
3	22.00	6.71	In Range	20.0	24.0	20.0	21.3	In Range	5.53	2.51
Core Load Wt. (lbs)		18.58	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	22.00	4.49	In Range	22.0	19.0	21.0	20.7	In Range	3.72	1.69
2	22.00	8.43	In Range	21.0	25.0	20.0	22.0	In Range	6.91	3.13
3			NA				NA	NA	NA	NA
Remainder Load (lbs)		12.92	In Range							

Remainder Load Small/Large Piece Weight Ratio: 53% In Range ≤ 67%  
 Total Load Weight (lbs): 31.50 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: 97% In Range 95-105%  
 Actual Fuel Loading Density (lb/ft<sup>3</sup>): 11.7  
 Total Load Average Moisture Content (%DB): 21.6 In Range 19-25%  
 Total Load Average Moisture Content (%WB): 17.8  
 Total Test Load Weight (dry basis): 25.91 lbs 11.75 kg

## TEST FUEL LOADING RANGE

Allowable Charcoal Bed Weight Range (lb): 3.2 to 6.3  
 Actual Charcoal Bed Wt. (lb): 6.3 In Range

## TEST END POINT

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

Total Fuel Burned During Test Run: 31.5 lbs, wet basis  
 25.9 lbs, dry basis  
 11.75 kg, dry basis

# DILUTION TUNNEL & MISC. DATA - ASTM E3053 / E2515

Client: **HHT**  
 Model: **Pioneer II**  
 Run #: **3**  
 Test Start Time:   
 Test Type: **Low Fire**

Job #: **19-502**  
 Tracking #: **0037**  
 Technician: **AK**  
 Date: **8/21/2019**

Recording Interval (min): **5**  
 Total Sampling Time (min): **545**

Meter Box  $\gamma$  Factor: **0.998** (A)  
 Meter Box  $\gamma$  Factor: **1.002** (B)  
 Meter Box  $\gamma$  Factor: (Ambient)

Induced Draft Check (in. H<sub>2</sub>O): **0**  
 Smoke Capture Check (%): **100%**  
 Date Flue Pipe Last Cleaned: **4/23/2019**

	Pre-Test	Post Test	Avg.
Barometric Pressure (in. Hg)	29.99	30	30.00
Relative Humidity (%)	44.2	36.4	
Room Air Velocity (ft/min)	0	0	
Scale Audit (lbs)	5.0	5.0	
Ambient Sample Volume:	0.000 ft <sup>3</sup>		

## Sample Train Post-Test Leak Checks

(A)	0.000	cfm @	-6 in. Hg
(B)	0.001	cfm @	-6 in. Hg
(Ambient)	0.002	cfm @	-14 in. Hg

## DILUTION TUNNEL FLOW

### Traverse Data

Point	dP (in H <sub>2</sub> O)	Temp (°F)
1	0.088	99
2	0.100	99
3	0.094	99
4	0.084	99
5	0.040	99
6	0.082	99
7	0.086	99
8	0.072	99
Center	0.106	99

Dilution Tunnel H<sub>2</sub>O: **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** ft<sup>2</sup>

V<sub>strav</sub>: **19.55** ft/sec  
 V<sub>scnt</sub>: **22.18** ft/sec  
 F<sub>p</sub>: **0.881** [ratio]

Initial Tunnel Flow: **210.0** scf/min

Static Pressure: **-0.340** in. H<sub>2</sub>O

## 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
X	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
	Other						



## WOODSTOVE PREBURN DATA

Client: HHT  
Model: Pioneer II  
Run #: 3

Job #: 19-502  
Tracking #: 0037  
Technician: AK  
Date: 8/21/2019

Recording Interval (min):

Run Time (min):

[illegible]

# BOX A TEST DATA - ASTM E3053 / ASTM E2515

Client: HHT  
 Model: Pioneer II  
 Run #: 3

Job #: 19-502  
 Tracking #: 0037  
 Technician: AK  
 Date: 8/21/2019

Elapsed Time (min)	Particulate Sampling Data							Fuel Weight (lb)		Temperature Data (°F)			
	Gas Meter (ft³)	Sample Rate (cfm)	Dilution Tunnel dP (in H <sub>2</sub> O)	Orifice dH (in H <sub>2</sub> O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Scale Reading	Weight Change	Dilution Tunnel	Flue	Filter	Ambient
0	0.002		0.103	0.07	84	1.19		31.5		98	234	84	78
5	0.592	0.118	0.097	0.69	84	1.17	104	31.1	-0.4	155	228	89	77
10	1.203	0.122	0.104	0.73	84	3.25	100	30.3	-0.8	104	269	85	77
15	1.797	0.119	0.099	0.67	84	0.08	102	29.0	-1.3	130	457	87	77
20	2.419	0.124	0.100	0.78	84	3.85	106	27.7	-1.3	133	456	87	77
25	3.024	0.121	0.100	0.78	84	3.91	103	26.6	-1.1	135	485	87	77
30	3.623	0.120	0.099	0.69	84	3.14	104	25.3	-1.3	141	506	88	77
35	4.232	0.122	0.098	0.71	84	4.45	106	24.1	-1.2	142	515	88	77
40	4.826	0.119	0.099	0.74	84	4.21	103	22.8	-1.3	145	509	88	77
45	5.414	0.118	0.098	0.61	84	4.42	103	21.5	-1.3	148	539	88	77
50	6.015	0.120	0.096	0.68	84	4.54	106	20.3	-1.2	149	534	89	78
55	6.602	0.117	0.100	0.77	84	3.82	102	19.0	-1.3	153	550	89	79
60	7.263	0.132	0.097	0.86	84	0.24	117	17.8	-1.2	156	545	89	78
65	7.883	0.124	0.099	0.71	84	0.84	108	16.8	-1	154	534	89	80
70	8.495	0.122	0.098	0.71	84	4.09	108	15.7	-1.1	153	528	89	78
75	9.112	0.123	0.097	0.79	84	0.97	109	14.5	-1.2	152	514	89	79
80	9.718	0.121	0.100	0.75	84	-0.21	105	13.4	-1.1	149	487	89	79
85	10.328	0.122	0.099	0.71	84	-0.12	106	12.6	-0.8	144	485	88	78
90	10.930	0.120	0.096	0.80	84	0.4	106	11.6	-1	141	472	88	79
95	11.537	0.121	0.101	0.73	84	2.48	104	10.7	-0.9	144	499	88	80
100	12.144	0.121	0.097	0.70	84	4.04	106	9.8	-0.9	140	481	88	79
105	12.742	0.120	0.098	0.79	84	0.94	103	9.1	-0.7	135	457	87	79
110	13.344	0.120	0.098	0.67	84	0.69	104	8.3	-0.8	130	436	87	80
115	13.960	0.123	0.102	0.73	84	3.68	103	7.8	-0.5	123	405	86	78
120	14.572	0.122	0.101	0.76	84	1.1	103	7.3	-0.5	116	365	86	78
125	15.187	0.123	0.100	0.66	84	0.25	103	7.0	-0.3	110	339	85	80
130	15.804	0.123	0.107	0.80	84	0.09	100	6.5	-0.5	104	303	85	78
135	16.416	0.122	0.104	0.65	84	4.09	100	6.2	-0.3	98	268	84	78
140	17.030	0.123	0.104	0.68	84	4.17	99	6.1	-0.1	93	238	84	79
145	17.641	0.122	0.106	0.81	84	0.79	98	5.9	-0.2	91	213	84	79
150	18.258	0.123	0.104	0.79	84	1.12	99	5.9	0	89	203	84	78
155	18.878	0.124	0.102	0.65	84	0.61	101	5.7	-0.2	88	195	83	78
160	19.500	0.124	0.103	0.81	84	3.5	101	5.7	0	87	189	83	78

# BOX A TEST DATA - ASTM E3053 / ASTM E2515

Client: HHT  
 Model: Pioneer II  
 Run #: 3

Job #: 19-502  
 Tracking #: 0037  
 Technician: AK  
 Date: 8/21/2019

Elapsed Time (min)	Particulate Sampling Data							Fuel Weight (lb)		Temperature Data (°F)			
	Gas Meter (ft <sup>3</sup> )	Sample Rate (cfm)	Dilution Tunnel dP (in H <sub>2</sub> O)	Orifice dH (in H <sub>2</sub> O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Scale Reading	Weight Change	Dilution Tunnel	Flue	Filter	Ambient
165	20.118	0.124	0.105	0.69	84	3.29	99	5.6	-0.1	86	185	83	78
170	20.735	0.123	0.104	0.82	84	2.58	99	5.4	-0.2	85	180	83	77
175	21.355	0.124	0.105	0.66	84	0.4	99	5.3	-0.1	85	177	83	77
180	21.972	0.123	0.106	0.65	84	2.51	98	5.1	-0.2	84	174	83	76
185	22.593	0.124	0.106	0.65	84	3.34	99	5.1	0	84	173	83	77
190	23.213	0.124	0.102	0.72	84	0.79	101	5.0	-0.1	84	171	83	76
195	23.825	0.122	0.104	0.74	84	1.67	98	4.8	-0.2	83	168	83	76
200	24.438	0.123	0.106	0.78	84	4.18	98	4.8	0	83	169	83	75
205	25.059	0.124	0.107	0.78	84	3.05	98	4.6	-0.2	83	171	83	75
210	25.676	0.123	0.105	0.69	84	2.3	98	4.5	-0.1	83	174	83	75
215	26.293	0.123	0.105	0.79	84	3.53	99	4.4	-0.1	83	173	83	76
220	26.916	0.125	0.106	0.82	84	-0.11	99	4.3	-0.1	83	174	83	76
225	27.535	0.124	0.102	0.68	84	0.28	100	4.2	-0.1	83	172	83	75
230	28.155	0.124	0.105	0.79	84	3.86	99	4.1	-0.1	82	170	83	75
235	28.772	0.123	0.103	0.66	84	3.8	99	3.9	-0.2	82	172	83	75
240	29.395	0.125	0.103	0.70	84	3.87	100	3.9	0	82	170	83	75
245	30.013	0.124	0.106	0.69	84	0.58	98	3.7	-0.2	82	172	83	75
250	30.636	0.125	0.105	0.78	84	1.71	99	3.6	-0.1	82	170	83	75
255	31.250	0.123	0.107	0.81	84	1.32	97	3.5	-0.1	82	170	83	75
260	31.869	0.124	0.106	0.70	84	3.97	98	3.5	0	82	172	83	75
265	32.492	0.125	0.107	0.80	84	3.91	98	3.3	-0.2	82	169	83	75
270	33.114	0.124	0.105	0.81	84	2.75	99	3.3	0	82	168	83	75
275	33.736	0.124	0.103	0.73	84	0.42	100	3.3	0	82	168	83	75
280	34.355	0.124	0.106	0.78	84	3.96	98	3.1	-0.2	81	165	83	76
285	34.976	0.124	0.107	0.63	84	1.45	98	3.0	-0.1	81	163	83	75
290	35.598	0.124	0.109	0.80	84	0.79	97	3.0	0	81	161	83	75
295	36.219	0.124	0.107	0.69	84	3.97	98	2.9	-0.1	80	156	83	75
300	36.840	0.124	0.106	0.82	84	1.39	98	2.8	-0.1	80	152	83	76
305	37.459	0.124	0.104	0.76	84	4.18	99	2.8	0	80	151	83	76
310	38.080	0.124	0.107	0.76	84	-0.22	98	2.8	0	80	149	83	75
315	38.702	0.124	0.105	0.77	84	-0.2	99	2.7	-0.1	80	148	83	76
320	39.324	0.124	0.105	0.82	84	1.59	99	2.6	-0.1	80	148	83	76
325	39.943	0.124	0.104	0.64	84	0.24	99	2.5	-0.1	80	147	83	76

# BOX A TEST DATA - ASTM E3053 / ASTM E2515

Client: HHT  
 Model: Pioneer II  
 Run #: 3

Job #: 19-502  
 Tracking #: 0037  
 Technician: AK  
 Date: 8/21/2019

Elapsed Time (min)	Particulate Sampling Data							Fuel Weight (lb)		Temperature Data (°F)			
	Gas Meter (ft³)	Sample Rate (cfm)	Dilution Tunnel dP (in H <sub>2</sub> O)	Orifice dH (in H <sub>2</sub> O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Scale Reading	Weight Change	Dilution Tunnel	Flue	Filter	Ambient
330	40.563	0.124	0.105	0.78	84	0.51	99	2.4	-0.1	80	145	83	75
335	41.182	0.124	0.104	0.68	84	4.13	99	2.4	0	80	144	83	76
340	41.797	0.123	0.104	0.74	84	4.11	98	2.3	-0.1	81	146	83	76
345	42.415	0.124	0.106	0.64	84	3.93	98	2.2	-0.1	81	144	83	75
350	43.033	0.124	0.105	0.67	84	0.41	98	2.1	-0.1	80	140	83	75
355	43.650	0.123	0.102	0.79	84	0	100	2.0	-0.1	80	138	83	76
360	44.266	0.123	0.102	0.81	84	0.44	100	2.0	0	80	136	83	76
365	44.888	0.124	0.106	0.69	84	3.61	99	2.0	0	80	132	83	75
370	45.508	0.124	0.104	0.75	84	0.26	99	1.9	-0.1	79	128	83	75
375	46.126	0.124	0.102	0.80	84	3.78	100	1.9	0	79	126	83	76
380	46.743	0.123	0.106	0.66	84	0.55	98	1.8	-0.1	79	126	83	76
385	47.359	0.123	0.103	0.82	84	3.9	99	1.8	0	79	127	83	75
390	47.978	0.124	0.106	0.81	84	-0.18	98	1.6	-0.2	79	126	83	75
395	48.598	0.124	0.105	0.82	84	0.22	98	1.6	0	79	126	83	76
400	49.218	0.124	0.106	0.83	84	4.13	98	1.6	0	79	123	83	76
405	49.837	0.124	0.106	0.64	84	1.41	98	1.6	0	79	123	83	75
410	50.457	0.124	0.104	0.66	84	-0.16	99	1.6	0	79	122	83	76
415	51.074	0.123	0.106	0.70	84	3.58	98	1.5	-0.1	79	123	83	76
420	51.696	0.124	0.106	0.69	84	4.11	99	1.5	0	79	122	83	76
425	52.312	0.123	0.104	0.84	84	4.11	98	1.3	-0.2	79	122	83	76
430	52.930	0.124	0.108	0.68	84	0.18	97	1.3	0	79	125	83	76
435	53.551	0.124	0.105	0.81	84	2.95	99	1.3	0	79	124	83	75
440	54.173	0.124	0.105	0.82	84	4.09	99	1.3	0	79	125	83	75
445	54.795	0.124	0.108	0.80	84	2.69	98	1.1	-0.2	79	125	83	76
450	55.417	0.124	0.106	0.64	84	4.18	99	1.1	0	79	127	83	76
455	56.042	0.125	0.106	0.67	84	0.54	99	1.1	0	79	126	83	75
460	56.661	0.124	0.106	0.69	84	2.92	98	1.1	0	79	127	83	75
465	57.285	0.125	0.107	0.79	84	-0.19	98	1.0	-0.1	79	128	83	76
470	57.906	0.124	0.105	0.68	84	3.78	99	0.9	-0.1	80	129	83	76
475	58.526	0.124	0.108	0.77	84	3.24	97	0.8	-0.1	79	131	83	75
480	59.140	0.123	0.107	0.81	84	4.17	97	0.7	-0.1	79	131	83	74
485	59.761	0.124	0.109	0.73	84	2.54	97	0.8	0.1	78	128	83	75
490	60.379	0.124	0.109	0.65	84	2.8	96	0.7	-0.1	78	128	83	74

# BOX A TEST DATA - ASTM E3053 / ASTM E2515

Client: HHT  
 Model: Pioneer II  
 Run #: 3

Job #: 19-502  
 Tracking #: 0037  
 Technician: AK  
 Date: 8/21/2019

Elapsed Time (min)	Particulate Sampling Data							Fuel Weight (lb)		Temperature Data (°F)			
	Gas Meter (ft <sup>3</sup> )	Sample Rate (cfm)	Dilution Tunnel dP (in H <sub>2</sub> O)	Orifice dH (in H <sub>2</sub> O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Scale Reading	Weight Change	Dilution Tunnel	Flue	Filter	Ambient
495	61.002	0.125	0.106	0.67	84	2.66	99	0.6	-0.1	77	131	83	74
500	61.621	0.124	0.105	0.82	84	4.19	98	0.6	0	77	129	83	74
505	62.237	0.123	0.105	0.84	84	0.12	98	0.5	-0.1	77	129	83	75
510	62.857	0.124	0.107	0.66	84	1.99	97	0.5	0	78	130	83	74
515	63.476	0.124	0.109	0.75	84	-0.04	97	0.4	-0.1	78	132	83	74
520	64.096	0.124	0.105	0.70	84	2.32	99	0.3	-0.1	77	132	83	73
525	64.717	0.124	0.106	0.67	84	-0.09	98	0.3	0	76	131	82	73
530	65.344	0.125	0.105	0.69	84	4.03	99	0.2	-0.1	76	129	82	73
535	65.967	0.125	0.106	0.69	84	0.05	98	0.2	0	77	131	83	73
540	66.589	0.124	0.109	0.79	84	3.82	97	0.1	-0.1	77	129	83	73
545	67.209	0.124	0.107	0.75	84	2.93	97	0.0	-0.1	77	130	83	74
Avg/Tot	67.209	0.123	0.104	0.73	84	2.20	100			95	224	84	76.1

# BOX B TEST DATA - ASTM E3053 / ASTM E2515

Client: HHT  
 Model: Pioneer II  
 Run #: 3

Job #: 19-502  
 Tracking #: 0037  
 Technician: AK  
 Date: 8/21/2019

Elapsed Time (min)	Particulate Sampling Data							Flue Gas Data		
	Gas Meter (ft <sup>3</sup> )	Sample Rate (cfm)	Orifice dH (in H <sub>2</sub> O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Filter (°F)	Flue Draft (in H <sub>2</sub> O)	CO <sub>2</sub> (%)	CO (%)
0	0.001		0.00	76	1		86	0.000	3.47	0.78
5	0.579	0.116	0.97	76	3.8	100	87	0.080	0.80	0.10
10	1.189	0.122	0.93	77	0.57	98	87	0.090	4.09	1.08
15	1.789	0.120	0.81	77	0.84	101	89	0.110	9.87	0.91
20	2.374	0.117	0.88	79	3.75	97	89	0.050	9.95	1.04
25	2.955	0.116	0.83	80	3	97	89	0.080	10.65	1.08
30	3.546	0.118	0.95	80	2.02	100	90	0.040	10.39	1.12
35	4.161	0.123	0.86	80	1.27	104	90	0.090	10.79	1.34
40	4.773	0.122	0.77	80	3.73	103	90	0.090	10.57	1.33
45	5.375	0.120	0.94	80	3.06	103	90	0.080	10.71	1.31
50	5.977	0.120	0.85	80	2.9	103	90	0.050	10.67	1.22
55	6.568	0.118	0.89	80	3.63	100	90	0.110	12.03	0.87
60	7.164	0.119	0.80	80	2.86	103	90	0.080	12.83	0.39
65	7.760	0.119	0.82	80	3.13	101	90	0.070	11.61	0.47
70	8.356	0.119	0.89	80	0.82	102	90	0.060	11.79	0.71
75	8.955	0.120	0.78	80	1.11	103	90	0.090	11.65	0.56
80	9.563	0.122	0.88	80	0.89	102	89	0.080	11.05	0.41
85	10.161	0.120	0.75	80	3.97	101	89	0.110	10.51	0.52
90	10.768	0.121	0.79	80	3.9	104	88	0.120	10.39	0.59
95	11.361	0.119	0.76	80	1.69	99	90	0.100	11.41	0.63
100	11.962	0.120	0.84	80	3.81	102	90	0.120	10.43	0.72
105	12.563	0.120	0.88	80	4.12	101	89	0.030	10.41	0.74
110	13.162	0.120	0.81	80	3.36	101	89	0.110	10.29	0.59
115	13.791	0.126	0.96	80	1.83	103	88	0.040	9.67	0.41
120	14.408	0.123	0.91	80	3.42	101	88	0.040	9.14	0.41
125	15.018	0.122	0.83	80	3.88	100	87	0.070	8.96	0.39
130	15.635	0.123	0.79	80	2.72	97	87	0.080	8.15	0.36
135	16.256	0.124	0.87	80	4.22	98	86	0.050	7.58	0.34
140	16.870	0.123	0.87	80	1.63	97	86	0.020	5.88	0.59
145	17.485	0.123	0.89	80	1.67	96	86	0.060	5.88	0.60
150	18.112	0.125	0.79	80	3.66	98	86	0.090	5.98	0.64
155	18.737	0.125	0.88	80	3.22	99	85	0.030	6.16	0.66

# BOX B TEST DATA - ASTM E3053 / ASTM E2515

Client: HHT  
 Model: Pioneer II  
 Run #: 3

Job #: 19-502  
 Tracking #: 0037  
 Technician: AK  
 Date: 8/21/2019

Elapsed Time (min)	Particulate Sampling Data							Flue Gas Data		
	Gas Meter (ft <sup>3</sup> )	Sample Rate (cfm)	Orifice dH (in H <sub>2</sub> O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Filter (°F)	Flue Draft (in H <sub>2</sub> O)	CO <sub>2</sub> (%)	CO (%)
160	19.363	0.125	0.88	80	3.38	99	85	0.040	6.14	0.72
165	19.986	0.125	0.86	80	1.24	97	85	0.060	6.20	0.78
170	20.613	0.125	0.85	80	3.02	98	85	0.010	6.16	0.79
175	21.237	0.125	0.91	80	3.04	97	85	0.040	6.18	0.81
180	21.870	0.127	0.90	80	1.8	98	85	0.030	6.14	0.83
185	22.503	0.127	0.85	80	3.4	98	85	0.070	6.30	0.87
190	23.137	0.127	0.82	80	1.59	100	85	0.080	6.26	0.87
195	23.770	0.127	0.78	80	3.41	99	85	0.070	6.28	0.87
200	24.410	0.128	0.83	80	1.56	99	85	0.080	6.30	0.87
205	25.047	0.127	0.91	80	1.58	98	85	0.010	6.36	1.00
210	25.677	0.126	0.81	80	1.6	98	85	0.050	6.48	0.95
215	26.311	0.127	0.90	80	1.5	99	85	0.040	6.54	0.92
220	26.948	0.127	0.87	80	1.97	99	85	0.050	6.56	0.91
225	27.586	0.128	0.82	80	1.68	100	85	0.060	6.50	0.89
230	28.225	0.128	0.96	80	1.27	99	85	0.060	6.56	0.89
235	28.869	0.129	0.93	80	1.2	101	85	0.050	6.54	0.89
240	29.513	0.129	0.81	80	3.04	101	85	0.070	6.42	0.89
245	30.152	0.128	0.97	80	3.43	99	85	0.010	6.42	0.89
250	30.790	0.128	0.85	80	2.27	99	85	0.020	6.36	0.87
255	31.431	0.128	0.82	80	3.7	99	85	0.080	6.40	0.89
260	32.068	0.127	0.92	80	1.48	98	85	0.070	6.42	0.90
265	32.714	0.129	0.91	80	3.48	99	85	0.030	6.38	0.92
270	33.359	0.129	0.95	80	1.43	100	85	0.020	6.36	0.91
275	33.995	0.127	0.95	80	1.56	100	85	0.000	6.38	0.93
280	34.640	0.129	0.96	80	1.78	99	85	0.010	6.42	0.93
285	35.277	0.127	0.95	80	2.02	98	85	0.000	6.52	0.92
290	35.921	0.129	0.89	80	1.54	98	85	0.050	6.44	0.92
295	36.559	0.128	0.80	80	1.76	98	85	0.060	6.62	0.92
300	37.198	0.128	0.94	80	3.56	99	85	0.010	6.60	0.96
305	37.833	0.127	0.95	80	1.39	99	85	0.000	6.60	0.97
310	38.476	0.129	0.95	80	2.08	99	85	0.020	6.64	1.01
315	39.115	0.128	0.96	80	3.42	99	85	0.020	6.56	1.02

# BOX B TEST DATA - ASTM E3053 / ASTM E2515

Client: HHT  
 Model: Pioneer II  
 Run #: 3

Job #: 19-502  
 Tracking #: 0037  
 Technician: AK  
 Date: 8/21/2019

Elapsed Time (min)	Particulate Sampling Data							Flue Gas Data		
	Gas Meter (ft <sup>3</sup> )	Sample Rate (cfm)	Orifice dH (in H <sub>2</sub> O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Filter (°F)	Flue Draft (in H <sub>2</sub> O)	CO <sub>2</sub> (%)	CO (%)
320	39.754	0.128	0.98	80	4.14	99	85	0.020	6.50	1.18
325	40.395	0.128	0.85	80	3.33	100	85	0.060	6.46	1.13
330	41.035	0.128	0.92	80	1.22	99	85	0.050	6.48	1.11
335	41.676	0.128	0.89	80	3.33	100	85	0.030	6.44	1.16
340	42.318	0.128	0.96	80	1.71	100	85	0.000	6.48	1.21
345	42.964	0.129	0.95	80	2.46	100	85	0.060	6.04	1.24
350	43.606	0.128	0.88	80	3.47	99	85	0.030	5.84	1.57
355	44.252	0.129	0.94	80	1.66	102	85	0.030	5.82	1.55
360	44.898	0.129	0.93	80	3.42	102	85	0.030	5.90	1.50
365	45.538	0.128	0.85	80	4.16	99	85	0.040	6.04	1.44
370	46.181	0.129	0.82	80	4.07	100	85	0.020	5.92	1.38
375	46.824	0.129	0.89	80	1.35	101	85	0.050	6.02	1.31
380	47.471	0.129	0.96	80	1.45	100	85	0.030	6.08	1.34
385	48.112	0.128	0.95	80	3.99	100	85	0.010	5.82	1.44
390	48.757	0.129	0.94	80	2.71	100	85	0.020	5.58	1.71
395	49.408	0.130	0.96	80	2.72	101	85	0.000	5.76	1.61
400	50.054	0.129	0.83	80	2.62	100	85	0.080	5.70	1.51
405	50.698	0.129	0.97	80	3.53	99	85	0.020	5.66	1.45
410	51.337	0.128	0.86	80	1.33	99	85	0.080	5.80	1.44
415	51.988	0.130	0.86	80	1.64	100	85	0.070	5.72	1.40
420	52.636	0.130	0.90	80	2.97	100	85	0.080	5.70	1.38
425	53.277	0.128	0.92	80	1.57	100	85	0.040	5.86	1.43
430	53.925	0.130	0.95	80	1.51	99	85	0.020	5.86	1.41
435	54.575	0.130	0.89	80	1.53	101	85	0.030	5.76	1.39
440	55.226	0.130	1.00	80	2.29	101	85	0.020	5.57	1.44
445	55.876	0.130	0.96	80	3.47	99	85	0.040	5.56	1.40
450	56.527	0.130	0.86	80	1.18	101	85	0.040	5.78	1.45
455	57.181	0.131	0.98	80	3.56	101	85	0.000	5.72	1.43
460	57.836	0.131	0.92	80	3.67	101	85	0.040	5.90	1.56
465	58.486	0.130	0.96	80	2.02	100	85	0.030	5.96	1.60
470	59.136	0.130	0.81	80	1.64	101	85	0.050	5.94	1.56
475	59.793	0.131	0.97	80	1.17	101	85	-0.010	6.06	1.59



# BOX B TEST DATA - ASTM E3053 / ASTM E2515

Client: HHTJob #: 19-502Model: Pioneer IITracking #: 0037Run #: 3Technician: AKDate: 8/21/2019

Elapsed Time (min)	Particulate Sampling Data							Flue Gas Data		
	Gas Meter (ft <sup>3</sup> )	Sample Rate (cfm)	Orifice dH (in H <sub>2</sub> O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Filter (°F)	Flue Draft (in H <sub>2</sub> O)	CO <sub>2</sub> (%)	CO (%)
480	60.452	0.132	1.00	80	2.53	101	85	0.000	6.00	1.56
485	61.112	0.132	0.92	80	1.57	100	85	0.060	5.92	1.48
490	61.775	0.133	1.02	80	3.58	101	85	0.010	6.00	1.52
495	62.430	0.131	0.97	80	1.72	101	85	0.020	5.94	1.53
500	63.084	0.131	0.83	80	1.15	101	85	0.080	5.94	1.50
505	63.743	0.132	0.98	80	1.85	102	85	0.010	6.04	1.44
510	64.402	0.132	0.95	80	3.69	101	85	0.070	5.90	1.41
515	65.061	0.132	1.00	80	3.73	100	85	0.050	5.92	1.42
520	65.719	0.132	0.99	80	1.72	102	85	-0.010	6.00	1.44
525	66.381	0.132	0.91	80	1.57	102	84	0.050	5.88	1.44
530	67.034	0.131	0.89	80	1.69	101	84	0.040	5.86	1.42
535	67.679	0.129	0.91	80	1.1	99	85	0.030	5.96	1.48
540	68.327	0.130	0.87	80	1.26	98	85	0.070	5.80	1.41
545	68.972	0.129	0.88	80	1.66	99	85	0.030	5.90	1.42
Avg/Tot	68.972	0.127	0.89	80	2.42	100	86	0.047	7.02	1.07

# WOODSTOVE SURFACE TEMPERATURE DATA

Client: HHTModel: Pioneer IIRun #: 3Job #: 19-502Tracking #: 0037Technician: AKDate: 8/21/2019

Elapsed Time (min)	Temperature Data (°F)						
	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
0	525	464	303	361	521	435.0	N/A
5	508	450	299	272	536	413.0	N/A
10	481	430	291	309	520	406.3	N/A
15	453	420	282	545	496	439.2	N/A
20	431	418	275	636	477	447.6	N/A
25	416	425	271	689	463	452.7	N/A
30	405	438	269	736	452	460.0	N/A
35	399	451	268	753	444	463.3	N/A
40	396	464	268	767	440	467.0	N/A
45	396	476	270	779	438	471.8	N/A
50	398	486	271	775	437	473.3	N/A
55	404	493	271	794	436	479.6	N/A
60	415	501	274	804	436	485.8	N/A
65	430	505	280	802	438	491.1	N/A
70	444	504	287	794	441	494.1	N/A
75	456	502	294	792	447	498.1	N/A
80	468	498	304	787	454	502.1	N/A
85	480	494	310	756	460	500.2	N/A
90	490	491	314	733	464	498.4	N/A
95	497	488	322	755	469	506.2	N/A
100	501	487	328	739	475	505.8	N/A
105	502	487	336	720	480	504.8	N/A
110	503	487	344	702	485	504.1	N/A
115	503	486	349	666	490	498.8	N/A
120	502	484	357	633	498	494.8	N/A
125	501	481	361	609	504	491.3	N/A
130	499	478	361	575	509	484.4	N/A
135	496	472	362	543	515	477.7	N/A
140	492	464	360	486	518	463.9	N/A
145	485	454	356	433	518	449.3	N/A
150	478	443	350	396	515	436.4	N/A
155	471	432	343	370	513	425.9	N/A
160	463	422	337	352	509	416.5	N/A
165	456	412	330	338	505	408.1	N/A
170	450	403	327	328	502	402.0	N/A
175	445	394	322	319	498	395.5	N/A
180	440	386	315	311	493	389.1	N/A
185	436	378	308	304	488	382.8	N/A
190	432	372	303	298	483	377.4	N/A
195	428	365	297	292	478	372.3	N/A
200	425	360	293	288	473	367.7	N/A
205	422	355	288	284	468	363.4	N/A
210	419	351	286	284	467	361.3	N/A
215	417	347	283	284	465	359.2	N/A
220	415	344	281	282	461	356.6	N/A
225	413	342	277	280	460	354.2	N/A
230	412	339	273	277	458	351.8	N/A
235	410	336	270	275	456	349.4	N/A

# WOODSTOVE SURFACE TEMPERATURE DATA

Client: HHT

Job #: 19-502

Model: Pioneer II

Tracking #: 0037

Run #: 3

Technician: AK

Date: 8/21/2019

Elapsed Time (min)	Temperature Data (°F)						
	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
240	408	334	268	272	453	346.9	N/A
245	405	331	267	271	452	345.3	N/A
250	403	329	267	271	450	344.1	N/A
255	400	327	267	269	448	342.5	N/A
260	398	325	264	268	445	339.9	N/A
265	396	324	261	267	442	338.0	N/A
270	395	322	259	266	440	336.3	N/A
275	393	320	258	266	438	335.0	N/A
280	392	318	244	258	428	328.1	N/A
285	390	316	233	252	420	322.1	N/A
290	387	312	227	246	414	317.3	N/A
295	384	309	223	240	411	313.3	N/A
300	380	305	217	236	406	308.7	N/A
305	375	301	214	231	399	304.0	N/A
310	370	297	211	229	395	300.4	N/A
315	366	293	209	226	391	296.8	N/A
320	362	289	205	222	387	293.0	N/A
325	359	286	202	220	383	290.0	N/A
330	356	282	201	218	381	287.8	N/A
335	354	279	197	217	379	285.2	N/A
340	351	275	195	217	376	282.6	N/A
345	348	272	193	217	373	280.7	N/A
350	346	269	190	215	371	278.1	N/A
355	344	265	188	213	367	275.3	N/A
360	342	262	183	211	361	271.8	N/A
365	339	258	180	210	360	269.3	N/A
370	336	255	176	209	356	266.2	N/A
375	332	251	173	207	353	263.1	N/A
380	328	247	169	205	350	259.7	N/A
385	323	243	167	201	350	256.8	N/A
390	318	239	164	199	348	253.5	N/A
395	311	235	161	196	342	249.2	N/A
400	304	232	160	195	339	245.8	N/A
405	299	228	157	192	334	242.1	N/A
410	293	225	155	190	331	238.9	N/A
415	288	222	153	189	327	235.6	N/A
420	284	218	152	187	325	233.1	N/A
425	280	215	150	185	323	230.5	N/A
430	275	213	148	184	319	227.9	N/A
435	271	211	149	184	321	227.2	N/A
440	268	210	150	184	321	226.5	N/A
445	266	209	149	185	321	225.8	N/A
450	264	208	148	186	320	225.3	N/A
455	264	207	149	187	322	225.6	N/A
460	263	207	148	188	323	225.6	N/A
465	263	207	148	190	323	226.3	N/A
470	263	207	149	192	323	226.7	N/A
475	264	208	150	193	324	227.5	N/A

# WOODSTOVE SURFACE TEMPERATURE DATA

Client: HHTJob #: 19-502Model: Pioneer IITracking #: 0037Run #: 3Technician: AKDate: 8/21/2019

Elapsed Time (min)	Temperature Data (°F)						
	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
480	264	208	149	194	324	228.0	N/A
485	266	209	148	195	323	228.1	N/A
490	267	210	148	195	323	228.7	N/A
495	268	210	149	195	325	229.5	N/A
500	270	211	148	195	325	229.9	N/A
505	272	212	149	195	326	230.7	N/A
510	274	212	148	196	325	231.1	N/A
515	275	213	150	196	325	231.7	N/A
520	275	214	149	197	325	232.1	N/A
525	276	214	150	196	326	232.4	N/A
530	276	215	150	196	328	232.9	N/A
535	276	216	150	195	328	233.0	N/A
540	275	216	152	193	329	233.1	N/A
545	274	217	152	193	328	233.1	N/A
Average	378	333	237	350	413	342	N/A

# LAB SAMPLE DATA - ASTM E2515

Client: HHT  
 Model: Pioneer II  
 Run #: 3

Job #: 19-502  
 Tracking #: 0037  
 Technician: AK  
 Date: 8/21/2019

	Sample ID	Tare, mg	Total, mg	Final, mg	Catch, mg
Train A Filters - First Hour	T291	87.3	87.3	95.0	7.7
Train A Filters - Remainder	T292	87.6	175.2	173.6	-1.6*
	T293	87.6			
Train A Probe	6A	116545.2	116545.2	116545.7	0.5
Train A O-Rings	6A	3614.7	3614.7	3616.8	2.1
Train B Filters	T294	86.9	174.1	180.8	6.7
	T295	87.2			
Train B Probe	6B	116118.3	116118.3	116118.5	0.2
Train B O-Rings	6B	3396.1	3396.1	3397.1	1.0
Background Filter			0.0	0.0	

\*Negative value corrected to zero

Placed in  
Dessicator on:

Train A Filters - First Hour	95.1	9/4 9:05	95.0	9/5 9:31			
Train A Filters - Remainder	173.4	9/4 9:07	173.6	9/5 9:31			
Train A Probe	116545.8	9/4 9:18	116545.7	9/5 9:37			
Train A O-Rings	3616.7	9/4 8:59	3616.8	9/5 9:23			
Train B Filters	181.0	9/4 9:08	180.8	9/5 9:31			
Train B Probe	116118.6	9/4 9:18	116118.3	9/5 9:37	116118.5	9/5 15:44	
Train B O-Rings	3397.1	9/4 9:00	3397.1	9/5 9:24			
Background Filter		4/26 13:02					

1st hour Sub-Total, mg:	7.7
Remainder Sub-Total, mg:	1.0
<b>Train 1 Aggregate, mg:</b>	<b>8.7</b>
<b>Train 2 Aggregate, mg:</b>	<b>7.9</b>
Ambient Aggregate, mg:	

**WOOD STOVE TEST DATA PACKET**  
**ASTM E3053/E2515**



**Run 4 Data Summary**

Client: HHT  
Model: Pioneer II  
Job #: 19-464  
Tracking #: 0024  
Test Date: 8/21/2019

  
\_\_\_\_\_  
Technician Signature

10/7/2019  
\_\_\_\_\_  
Date

# TEST RESULTS - ASTM E3053 / ASTM E2515

Client: HHT

Model: Pioneer II

Run #: 4

Job #: 19-464

Tracking #: 0024

Technician: AK

Date: 8/21/2019

<b>Burn Rate (kg/hr):</b>	<b>1.72</b>
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	Ambient Sample	Sample Train A	Sample Train B	1st Hour Filter
Total Sample Volume (ft <sup>3</sup> )	0.000	49.986	49.381	6.973
Average Gas Velocity in Dilution Tunnel (ft/sec)	19.46			
Average Gas Flow Rate in Dilution Tunnel (dscf/hr)	12686.8			
Average Gas Meter Temperature (°F)	74.7	93.4	84.0	93.9
Total Sample Volume (dscf)	0.000	47.624	48.068	8.157
Average Tunnel Temperature (°F)	100.1			
Total Time of Test (min)	420			
Total Particulate Catch (mg)		2.3	2.4	1.0
Particulate Concentration, dry-standard (g/dscf)	0.0000000	0.0000483	0.0000499	0.0001226
Total PM Emissions (g)	0.00	4.29	4.43	1.56
Particulate Emission Rate (g/hr)	0.00	0.61	0.63	1.56
Emissions Factor (g/kg)	-	0.35	0.37	-
Difference from Average Total Particulate Emissions (g)	-	0.07	0.07	-
Difference from Average Emissions Factor (g/kg)	-	0.01	0.01	-

Final Average Results	
Total Particulate Emissions (g)	4.36
Particulate Emission Rate (g/hr)	0.62
Emissions Factor (g/kg)	0.36
HHV Efficiency (%)	71.5%
LHV Efficiency (%)	76.8%
CO Emissions (g/min)	2.64

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: 86	OK
Face Velocity	< 30 ft/min	6.5	OK
Leakage Rate	Less than 4% of average sample rate	0.001 cfm	OK
Ambient Temp	55-90 °F	2.9930344 / Max: 77.84	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:** HHT  
**Model:** Pioneer II  
**Date:** 08/21/19  
**Run:** 4  
**Control #:** 19-464  
**Test Duration:** 420  
**Output Category:** Medium

### Test Results in Accordance with CSA B415.1-09

	HHV Basis	LHV Basis
<b>Overall Efficiency</b>	71.5%	76.8%
<b>Combustion Efficiency</b>	93.7%	93.7%
<b>Heat Transfer Efficiency</b>	76.3%	82.0%

<b>Output Rate (kJ/h)</b>	25,305	24,005	<b>(Btu/h)</b>
<b>Burn Rate (kg/h)</b>	1.73	3.80	<b>(lb/h)</b>
<b>Input (kJ/h)</b>	35,386	33,568	<b>(Btu/h)</b>

<b>Test Load Weight (dry kg)</b>	12.08	26.63	<b>dry lb</b>
<b>MC wet (%)</b>	18.31		
<b>MC dry (%)</b>	22.41		
<b>Particulate (g )</b>	4.36		
<b>CO (g)</b>	1,108		
<b>Test Duration (h)</b>	7.00		

<b>Emissions</b>	<b>Particulate</b>	<b>CO</b>
<b>g/MJ Output</b>	0.02	6.26
<b>g/kg Dry Fuel</b>	0.36	91.72
<b>g/h</b>	0.62	158.33
<b>g/min</b>	0.01	2.64
<b>lb/MM Btu Output</b>	0.06	14.54

<b>Air/Fuel Ratio (A/F)</b>	13.70
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VERSION:

2.2

12/14/2009



# HIGH FIRE FUEL LOAD DATA - ASTM E3053

Client: HHT

Job #: 19-464

Model: Pioneer II

Tracking #0024

Run #: 4

Technician: AK

Date: 8/21/2019

Nominal Loading Density (lbs/ft<sup>3</sup>, wet basis): 10  
 Usable Firebox Volume (ft<sup>3</sup>): 2.70  
 Target Load Weight (lbs): 27.00  
 Total Load Weight Range (lbs): 25.70 to 28.40  
 Core Load Weight Range (lbs): 12.20 to 17.60  
 Remainder Load Weight Range (lbs): 9.50 to 14.90  
 Core Load Piece Range (lbs): 4.10 to 6.80  
 Remainder Load Piece Range (lbs): 2.70 to 14.90  
 Max Allowable Kindling Weight (lbs): 5.47  
 Max Allowable Start-up Fuel Weight (lbs): 8.20

## 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	22.00	4.74	In Range	24.0	22.0	25.0	23.7	In Range	3.83	1.74
2	22.00	4.38	In Range	18.0	25.0	24.0	22.3	In Range	3.58	1.62
3	22.00	6.74	In Range	18.0	26.0	24.0	22.7	In Range	5.49	2.49
Core Load Wt. (lbs)		15.86	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	22.00	3.88	In Range	18.0	20.0	19.0	19.0	In Range	3.26	1.48
2	22.00	7.59	In Range	18.0	25.0	24.0	22.3	In Range	6.20	2.81
3			NA				NA	NA	NA	NA
Remainder Load (lbs)		11.47	In Range							

Total Load Weight (lbs): 27.33 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: 101% In Range 95-105%  
 Actual Fuel Loading Density (lb/ft<sup>3</sup>): 10.1  
 Total Load Average Moisture Content (%DB): 22.2 In Range 19-25%  
 Total Load Average Moisture Content (%WB): 18.1  
 Total Test Load Weight (dry basis): 22.37 lbs 10.15 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
5.27	In Range	10			10.0	In Range	4.79	2.17

Start-up Fuel Wt. (lb)	Within Spec?	Start-up Moisture Readings (%DB)				Within Spec?	Dry Weight	
		1	2	3	Avg.		lbs	kg
7.99	In Range	23			23.0	In Range	6.50	2.95

## TEST FUEL LOADING RANGE

Allowable Residual Start-up Fuel Range (lb): 2.7 to 5.5  
 Actual Residual Start-up Fuel Weight (lb): 2.9 In Range

# LOW & MEDIUM FIRE FUEL LOAD DATA - ASTM E3053

Client: HHT  
 Model: Pioneer II  
 Run #: 4

Job #: 19-464  
 Tracking #: 0024  
 Technician: AK  
 Date: 8/21/2019

Nominal Loading Density (lbs/ft<sup>3</sup>, wet basis): 12  
 Usable Firebox Volume (ft<sup>3</sup>): 2.70  
 Target Load Weight (lbs): 32.40  
 Total Load Weight Range (lbs): 30.78 to 34.02  
 Core Load Weight Range (lbs): 14.58 to 21.06  
 Remainder Load Weight Range (lbs): 11.34 to 17.82  
 Core Load Piece Range (lbs): 4.86 to 8.10  
 Remainder Load Piece Range (lbs): 3.24 to 9.72

## 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	22.00	6.43	In Range	22.0	26.0	23.0	23.7	In Range	5.20	2.36
2	22.00	7.56	In Range	22.0	19.0	26.0	22.3	In Range	6.18	2.80
3	22.00	5.77	In Range	20.0	22.0	26.0	22.7	In Range	4.70	2.13
Core Load Wt. (lbs)		19.76	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	22.00	4.69	In Range	22.0	24.0	23.0	23.0	In Range	3.81	1.73
2	22.00	8.10	In Range	19.0	22.0	22.0	21.0	In Range	6.69	3.04
3			NA				NA	NA	NA	NA
Remainder Load (lbs)		12.79	In Range							

Remainder Load Small/Large Piece Weight Ratio: 58% In Range ≤ 67%  
 Total Load Weight (lbs): 32.55 In Range  
 Core Load % of Total Weight: 61% In Range 45-65%  
 Remainder % of Total Weight: 39% In Range 35-55%  
 Total Load % of Target Weight: 100% In Range 95-105%  
 Actual Fuel Loading Density (lb/ft<sup>3</sup>): 12.1  
 Total Load Average Moisture Content (%DB): 22.4 In Range 19-25%  
 Total Load Average Moisture Content (%WB): 18.3  
 Total Test Load Weight (dry basis): 26.59 lbs 12.06 kg

## TEST FUEL LOADING RANGE

Allowable Charcoal Bed Weight Range (lb): 3.3 to 6.5  
 Actual Charcoal Bed Wt. (lb): 6.4 In Range

## TEST END POINT

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

Total Fuel Burned During Test Run: 32.6 lbs, wet basis  
 26.6 lbs, dry basis  
 12.06 kg, dry basis

# DILUTION TUNNEL & MISC. DATA - ASTM E3053 / E2515

Client: **HHT**  
 Model: **Pioneer II**  
 Run #: **4**  
 Test Start Time:   
 Test Type: **Medium Fire**

Job #: **19-464**  
 Tracking #: **0024**  
 Technician: **AK**  
 Date: **8/21/2019**

Recording Interval (min): **5**  
 Total Sampling Time (min): **420**

Meter Box  $\gamma$  Factor: **0.998** (A)  
 Meter Box  $\gamma$  Factor: **1.002** (B)  
 Meter Box  $\gamma$  Factor: (Ambient)

	Pre-Test	Post Test	Avg.
Barometric Pressure (in. Hg)	29.94	29.86	29.90
Relative Humidity (%)	37.8	35.7	
Room Air Velocity (ft/min)	0	0	
Scale Audit (lbs)	5.0	5.0	
Ambient Sample Volume:			ft <sup>3</sup>

Induced Draft Check (in. H<sub>2</sub>O): **0**  
 Smoke Capture Check (%): **100%**  
 Date Flue Pipe Last Cleaned: **4/23/2019**

**Sample Train Post-Test Leak Checks**

(A)	0.000	cfm @	-6 in. Hg
(B)	0.001	cfm @	-6 in. Hg
(Ambient)	0.002	cfm @	-14 in. Hg

## DILUTION TUNNEL FLOW

Traverse Data		
Point	dP (in H <sub>2</sub> O)	Temp (°F)
1	0.088	99
2	0.100	99
3	0.094	99
4	0.084	99
5	0.040	99
6	0.082	99
7	0.086	99
8	0.072	99
Center	0.106	99

Dilution Tunnel H<sub>2</sub>O: **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** ft<sup>2</sup>

V<sub>strav</sub>: **19.57** ft/sec  
 V<sub>scnt</sub>: **22.20** ft/sec  
 F<sub>p</sub>: **0.881** [ratio]

Initial Tunnel Flow: **209.7** scf/min

Static Pressure: **-0.340** in. H<sub>2</sub>O

## 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
X	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
	Other						

## WOODSTOVE PREBURN DATA

Client: HHT  
Model: Pioneer II  
Run #: 4

Job #: 19-464  
Tracking #: 0024  
Technician: AK  
Date: 8/21/2019

Recording Interval (min):

Run Time (min):

[illegible]

# BOX A TEST DATA - ASTM E3053 / ASTM E2515

Client: HHT  
 Model: Pioneer II  
 Run #: 4

Job #: 19-464  
 Tracking #: 0024  
 Technician: AK  
 Date: 8/21/2019

Elapsed Time (min)	Particulate Sampling Data							Fuel Weight (lb)		Temperature Data (°F)			
	Gas Meter (ft <sup>3</sup> )	Sample Rate (cfm)	Dilution Tunnel dP (in H <sub>2</sub> O)	Orifice dH (in H <sub>2</sub> O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Scale Reading	Weight Change	Dilution Tunnel	Flue	Filter	Ambient
0	0.051		0.101	-0.06	94	1.22		32.6		103	231	84	75
5	0.600	0.110	0.098	0.73	94	4.27	105	30.7	-1.9	220	555	84	75
10	1.195	0.119	0.097	0.79	93	1.87	108	29.6	-1.1	149	525	83	75
15	1.782	0.117	0.099	0.72	94	3.21	106	28.2	-1.4	152	534	84	75
20	2.371	0.118	0.096	0.72	94	-0.23	107	27.2	-1	148	534	84	75
25	2.954	0.117	0.099	0.67	94	0.85	105	25.6	-1.6	155	562	84	76
30	3.535	0.116	0.098	0.66	94	-0.24	106	24.1	-1.5	162	587	84	76
35	4.118	0.117	0.099	0.59	95	0.38	106	22.6	-1.5	164	592	85	76
40	4.698	0.116	0.098	0.75	94	3.54	106	21.2	-1.4	165	595	84	76
45	5.276	0.116	0.101	0.78	94	2.21	104	19.8	-1.4	163	581	84	76
50	5.857	0.116	0.097	0.59	95	2.68	107	18.6	-1.2	161	576	85	76
55	6.435	0.116	0.097	0.77	96	4.01	105	17.2	-1.4	158	570	86	77
60	7.024	0.118	0.097	0.77	94	4.17	108	15.9	-1.3	156	572	84	76
65	7.622	0.120	0.100	0.63	96	0.38	107	14.8	-1.1	153	562	86	77
70	8.217	0.119	0.101	0.63	96	4.17	106	13.5	-1.3	149	546	86	77
75	8.808	0.118	0.098	0.63	96	0.32	106	12.6	-0.9	147	531	86	77
80	9.398	0.118	0.100	0.76	96	4.14	105	11.6	-1	146	525	86	77
85	9.992	0.119	0.100	0.72	95	3.11	105	10.9	-0.7	141	500	85	76
90	10.584	0.118	0.103	0.67	96	3.1	103	10.0	-0.9	136	474	86	77
95	11.175	0.118	0.100	0.78	96	4.18	104	9.2	-0.8	131	445	86	78
100	11.770	0.119	0.103	0.71	96	0.53	102	8.6	-0.6	125	414	86	78
105	12.366	0.119	0.103	0.66	96	4.18	102	8.0	-0.6	118	383	86	77
110	12.956	0.118	0.105	0.78	96	2.61	99	7.5	-0.5	109	340	86	76
115	13.552	0.119	0.108	0.64	95	4.12	98	7.0	-0.5	101	293	85	77
120	14.146	0.119	0.108	0.67	95	4.02	97	7.1	0.1	94	252	85	76
125	14.746	0.120	0.107	0.65	94	2.93	99	6.9	-0.2	90	229	84	74
130	15.341	0.119	0.105	0.78	93	4.13	99	6.8	-0.1	87	218	83	74
135	15.939	0.120	0.106	0.64	93	0.17	98	6.5	-0.3	86	208	83	74
140	16.536	0.119	0.104	0.66	94	0.58	99	6.2	-0.3	86	201	84	75
145	17.130	0.119	0.106	0.59	94	0.88	98	6.1	-0.1	85	198	84	75
150	17.731	0.120	0.108	0.76	94	0.02	98	5.9	-0.2	85	193	84	75
155	18.330	0.120	0.105	0.79	94	0.42	99	5.7	-0.2	85	191	84	75
160	18.926	0.119	0.108	0.60	94	4.16	97	5.6	-0.1	85	187	84	76

# BOX A TEST DATA - ASTM E3053 / ASTM E2515

Client: HHT  
 Model: Pioneer II  
 Run #: 4

Job #: 19-464  
 Tracking #: 0024  
 Technician: AK  
 Date: 8/21/2019

Elapsed Time (min)	Particulate Sampling Data							Fuel Weight (lb)		Temperature Data (°F)			
	Gas Meter (ft <sup>3</sup> )	Sample Rate (cfm)	Dilution Tunnel dP (in H <sub>2</sub> O)	Orifice dH (in H <sub>2</sub> O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Scale Reading	Weight Change	Dilution Tunnel	Flue	Filter	Ambient
165	19.520	0.119	0.108	0.73	93	0.17	97	5.4	-0.2	83	184	83	74
170	20.117	0.119	0.106	0.63	92	1.27	98	5.2	-0.2	82	179	82	73
175	20.715	0.120	0.107	0.71	92	4.16	98	5.1	-0.1	81	177	82	73
180	21.307	0.118	0.105	0.68	93	-0.35	97	4.9	-0.2	82	176	83	74
185	21.901	0.119	0.110	0.67	93	0.59	96	4.7	-0.2	82	178	83	74
190	22.499	0.120	0.102	0.79	93	3.27	100	4.5	-0.2	82	179	83	74
195	23.102	0.121	0.104	0.65	93	3.13	100	4.4	-0.1	82	175	83	74
200	23.701	0.120	0.106	0.66	93	0.55	98	4.3	-0.1	82	176	83	74
205	24.296	0.119	0.104	0.62	93	3.68	99	4.1	-0.2	83	179	83	74
210	24.899	0.121	0.106	0.78	93	-0.23	99	4.0	-0.1	83	179	83	74
215	25.501	0.120	0.105	0.62	93	1.98	99	3.8	-0.2	83	180	83	75
220	26.095	0.119	0.104	0.61	93	0.11	99	3.9	0.1	83	179	83	74
225	26.693	0.120	0.105	0.77	93	0.57	99	3.7	-0.2	83	182	83	75
230	27.291	0.120	0.110	0.79	93	2.19	97	3.6	-0.1	83	182	83	74
235	27.886	0.119	0.108	0.69	93	4.13	97	3.4	-0.2	83	182	83	74
240	28.482	0.119	0.105	0.65	93	-0.13	99	3.3	-0.1	83	183	83	74
245	29.083	0.120	0.106	0.62	93	-0.11	99	3.2	-0.1	83	184	83	75
250	29.684	0.120	0.108	0.60	93	1.51	98	3.0	-0.2	83	183	83	74
255	30.282	0.120	0.107	0.69	93	0.55	98	2.9	-0.1	83	182	83	74
260	30.883	0.120	0.104	0.72	93	3.82	100	2.8	-0.1	83	183	83	74
265	31.476	0.119	0.106	0.73	93	-0.17	97	2.7	-0.1	83	182	83	74
270	32.075	0.120	0.108	0.76	93	1.82	98	2.5	-0.2	83	180	83	74
275	32.677	0.120	0.104	0.72	93	3.96	100	2.5	0	83	179	83	74
280	33.272	0.119	0.107	0.77	93	1.49	97	2.3	-0.2	82	174	83	74
285	33.865	0.119	0.105	0.77	93	4.15	98	2.3	0	81	168	83	74
290	34.465	0.120	0.108	0.78	93	0.63	98	2.2	-0.1	81	164	83	74
295	35.060	0.119	0.108	0.74	93	4.15	97	2.0	-0.2	81	163	83	75
300	35.666	0.121	0.106	0.75	93	-0.06	99	2.0	0	80	160	83	74
305	36.262	0.119	0.105	0.73	93	1.11	98	1.9	-0.1	80	159	83	74
310	36.858	0.119	0.106	0.73	93	3.2	98	1.8	-0.1	80	157	83	74
315	37.454	0.119	0.107	0.77	93	4.09	97	1.7	-0.1	80	159	83	74
320	38.053	0.120	0.107	0.71	93	1.28	98	1.5	-0.2	80	158	83	74
325	38.651	0.120	0.109	0.67	92	3.64	97	1.5	0	80	158	82	74

# BOX A TEST DATA - ASTM E3053 / ASTM E2515

Client: HHT  
 Model: Pioneer II  
 Run #: 4

Job #: 19-464  
 Tracking #: 0024  
 Technician: AK  
 Date: 8/21/2019

Elapsed Time (min)	Particulate Sampling Data							Fuel Weight (lb)		Temperature Data (°F)			
	Gas Meter (ft <sup>3</sup> )	Sample Rate (cfm)	Dilution Tunnel dP (in H <sub>2</sub> O)	Orifice dH (in H <sub>2</sub> O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Scale Reading	Weight Change	Dilution Tunnel	Flue	Filter	Ambient
330	39.247	0.119	0.105	0.78	92	-0.07	98	1.5	0	80	157	82	74
335	39.843	0.119	0.103	0.63	93	0.6	99	1.3	-0.2	80	157	83	74
340	40.440	0.119	0.107	0.66	93	4.01	97	1.3	0	80	157	83	74
345	41.036	0.119	0.107	0.78	93	4.17	97	1.2	-0.1	80	158	83	74
350	41.632	0.119	0.107	0.80	93	2.96	97	1.1	-0.1	80	156	83	74
355	42.228	0.119	0.106	0.70	92	1.14	98	1.0	-0.1	80	155	82	74
360	42.825	0.119	0.109	0.77	92	1.1	97	1.0	0	80	156	82	74
365	43.426	0.120	0.105	0.72	92	4.11	99	0.9	-0.1	80	155	82	74
370	44.026	0.120	0.105	0.77	92	3.45	99	0.7	-0.2	80	156	82	74
375	44.623	0.119	0.108	0.68	92	1.66	97	0.6	-0.1	80	157	82	74
380	45.215	0.118	0.108	0.73	92	-0.24	96	0.6	0	79	154	82	74
385	45.811	0.119	0.108	0.64	92	2.66	97	0.5	-0.1	79	153	82	74
390	46.409	0.120	0.107	0.75	92	3.73	98	0.4	-0.1	79	153	82	74
395	47.006	0.119	0.108	0.73	92	-0.27	97	0.3	-0.1	79	150	82	73
400	47.601	0.119	0.106	0.69	92	3.31	98	0.2	-0.1	79	150	82	74
405	48.195	0.119	0.105	0.60	92	0.23	98	0.2	0	79	149	82	74
410	48.792	0.119	0.106	0.77	92	0.82	98	0.1	-0.1	79	148	82	73
415	49.389	0.119	0.108	0.68	92	0.44	97	0.1	0	79	149	82	74
420	49.986	0.119	0.100	0.64	92	0.91	101	0.0	-0.1	79	150	82	73
Avg/Tot	49.986	0.119	0.104	0.69	93	2.01	100			100	266	83	74.7

# BOX B TEST DATA - ASTM E3053 / ASTM E2515

Client: HHT  
 Model: Pioneer II  
 Run #: 4

Job #: 19-464  
 Tracking #: 0024  
 Technician: AK  
 Date: 8/21/2019

Elapsed Time (min)	Particulate Sampling Data							Flue Gas Data		
	Gas Meter (ft <sup>3</sup> )	Sample Rate (cfm)	Orifice dH (in H <sub>2</sub> O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Filter (°F)	Flue Draft (in H <sub>2</sub> O)	CO <sub>2</sub> (%)	CO (%)
0	0.044		0.00	84	1		80	0.000	3.17	0.51
5	0.578	0.107	0.87	84	3.82	103	81	0.040	9.40	0.69
10	1.172	0.119	0.76	84	3.12	109	80	0.110	12.03	0.69
15	1.758	0.117	0.77	84	3.05	107	80	0.060	11.39	0.19
20	2.342	0.117	0.86	84	1.48	108	80	0.060	11.33	0.86
25	2.920	0.116	0.87	84	2.73	106	80	0.050	12.99	0.71
30	3.495	0.115	0.85	84	0.62	106	81	0.070	13.49	0.83
35	4.075	0.116	0.83	84	2.94	107	82	0.040	13.01	1.14
40	4.653	0.116	0.81	84	1.48	107	82	0.110	13.13	1.49
45	5.232	0.116	0.79	84	0.53	106	82	0.100	12.79	1.55
50	5.807	0.115	0.76	84	3.16	107	83	0.090	12.83	1.49
55	6.381	0.115	0.77	84	3.75	106	83	0.100	12.63	1.28
60	6.951	0.114	0.82	84	1.44	106	83	0.060	12.35	1.17
65	7.528	0.115	0.75	84	2.05	105	83	0.080	12.31	1.20
70	8.105	0.115	0.86	84	0.95	104	83	0.080	12.05	0.85
75	8.684	0.116	0.88	84	2.98	106	83	0.030	11.99	0.85
80	9.261	0.115	0.82	84	3.51	104	82	0.100	12.05	0.60
85	9.842	0.116	0.85	84	1.38	104	82	0.060	11.63	0.48
90	10.421	0.116	0.83	84	1.99	102	82	0.090	11.37	0.62
95	10.997	0.115	0.84	84	3.58	103	82	0.030	11.27	0.47
100	11.571	0.115	0.77	84	3.49	100	81	0.080	11.11	0.36
105	12.140	0.114	0.79	84	1.01	99	81	0.060	10.19	0.40
110	12.717	0.115	0.73	84	0.96	99	80	0.090	9.22	0.48
115	13.291	0.115	0.71	84	3.62	96	80	0.100	8.38	0.60
120	13.863	0.114	0.81	84	3.81	95	80	0.010	7.30	0.67
125	14.436	0.115	0.86	84	2.92	95	80	0.010	7.20	0.59
130	15.006	0.114	0.83	84	3.64	96	80	0.020	7.26	0.55
135	15.573	0.113	0.81	84	3.5	94	81	0.040	7.26	0.53
140	16.147	0.115	0.81	84	0.83	97	81	0.050	7.30	0.56
145	16.721	0.115	0.72	84	1.8	96	81	0.070	7.38	0.63
150	17.288	0.113	0.78	84	1.39	94	81	0.030	7.28	0.67
155	17.856	0.114	0.84	84	3.73	95	81	0.020	7.30	0.73



# BOX B TEST DATA - ASTM E3053 / ASTM E2515

Client: HHT  
 Model: Pioneer II  
 Run #: 4

Job #: 19-464  
 Tracking #: 0024  
 Technician: AK  
 Date: 8/21/2019

Elapsed Time (min)	Particulate Sampling Data							Flue Gas Data		
	Gas Meter (ft <sup>3</sup> )	Sample Rate (cfm)	Orifice dH (in H <sub>2</sub> O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Filter (°F)	Flue Draft (in H <sub>2</sub> O)	CO <sub>2</sub> (%)	CO (%)
160	18.425	0.114	0.82	84	3.88	94	81	0.070	7.12	0.83
165	18.994	0.114	0.84	84	2.67	94	81	0.000	6.98	0.91
170	19.569	0.115	0.81	84	0.87	95	81	0.030	7.02	0.93
175	20.144	0.115	0.73	84	1.67	95	81	0.060	7.02	0.95
180	20.717	0.115	0.77	84	3.85	95	82	0.030	7.06	1.03
185	21.294	0.115	0.84	84	1.39	94	82	0.020	7.14	1.06
190	21.860	0.113	0.74	84	0.93	96	83	0.060	7.10	1.06
195	22.434	0.115	0.80	84	3.55	96	83	0.030	7.02	1.10
200	23.005	0.114	0.78	84	2.26	95	83	0.050	7.20	1.25
205	23.586	0.116	0.84	84	1.12	97	84	0.050	7.08	1.05
210	24.183	0.119	0.84	84	1.09	99	84	0.040	7.18	1.02
215	24.785	0.120	0.79	84	1.25	101	84	0.040	7.16	1.01
220	25.381	0.119	0.79	84	1.51	100	84	0.060	7.28	0.98
225	25.980	0.120	0.79	84	2.62	100	84	0.040	7.28	0.98
230	26.581	0.120	0.79	84	2.34	98	84	0.030	7.28	0.97
235	27.181	0.120	0.90	84	0.94	99	84	0.020	7.36	0.96
240	27.785	0.121	0.77	84	1.27	101	84	0.090	7.30	0.95
245	28.383	0.120	0.79	84	0.65	99	84	0.070	7.14	0.93
250	28.984	0.120	0.88	84	3.39	99	84	0.040	7.26	0.95
255	29.585	0.120	0.78	84	1.1	100	84	0.050	7.24	0.96
260	30.186	0.120	0.78	84	3.8	101	84	0.030	7.22	0.96
265	30.786	0.120	0.88	84	3.84	100	84	0.020	7.16	0.95
270	31.385	0.120	0.91	84	3.79	99	84	0.010	7.22	0.94
275	31.986	0.120	0.85	84	3.65	101	84	0.070	7.16	0.91
280	32.587	0.120	0.72	84	3.8	99	84	0.060	6.48	1.10
285	33.188	0.120	0.84	84	1.13	100	84	0.030	6.36	1.02
290	33.788	0.120	0.82	84	3.85	99	84	0.000	6.42	0.99
295	34.392	0.121	0.81	84	0.88	99	84	0.080	5.84	1.18
300	34.992	0.120	0.83	84	1.17	100	84	0.050	5.92	1.12
305	35.590	0.120	0.77	84	3.87	100	84	0.060	6.02	1.01
310	36.195	0.121	0.88	84	3.03	100	84	0.040	6.18	0.98
315	36.793	0.120	0.90	84	3.76	99	83	0.010	6.28	0.97

# BOX B TEST DATA - ASTM E3053 / ASTM E2515

Client: HHT  
 Model: Pioneer II  
 Run #: 4

Job #: 19-464  
 Tracking #: 0024  
 Technician: AK  
 Date: 8/21/2019

Elapsed Time (min)	Particulate Sampling Data							Flue Gas Data		
	Gas Meter (ft <sup>3</sup> )	Sample Rate (cfm)	Orifice dH (in H <sub>2</sub> O)	Meter Temp (°F)	Meter Vacuum (in Hg)	Pro. Rate (%)	Filter (°F)	Flue Draft (in H <sub>2</sub> O)	CO <sub>2</sub> (%)	CO (%)
320	37.393	0.120	0.83	84	3.22	99	83	0.080	6.36	0.93
325	37.996	0.121	0.89	84	0.92	99	83	0.040	6.32	0.92
330	38.598	0.120	0.86	84	3.19	100	83	0.030	6.42	0.92
335	39.198	0.120	0.89	84	3.86	101	83	0.000	6.28	0.93
340	39.797	0.120	0.81	84	1.16	99	83	0.020	6.14	0.91
345	40.399	0.120	0.83	84	2.96	99	83	0.050	6.20	0.90
350	40.999	0.120	0.82	84	3.84	99	83	0.090	6.16	0.89
355	41.596	0.119	0.86	84	1.47	99	83	0.060	6.12	0.89
360	42.197	0.120	0.88	84	3.57	98	83	0.030	6.06	0.86
365	42.797	0.120	0.72	84	2.6	100	83	0.080	6.20	0.90
370	43.394	0.119	0.82	84	1.01	99	83	0.050	6.30	0.90
375	43.990	0.119	0.79	84	1.15	98	83	0.080	6.10	0.88
380	44.588	0.120	0.85	84	3.66	98	83	0.070	6.00	0.85
385	45.189	0.120	0.86	84	3.4	99	83	0.020	6.18	0.87
390	45.786	0.119	0.87	84	0.67	98	83	0.000	6.12	0.89
395	46.386	0.120	0.74	84	3.21	99	83	0.070	6.16	0.88
400	46.985	0.120	0.84	84	2.46	99	83	0.080	6.14	0.87
405	47.583	0.120	0.89	84	0.68	99	83	0.050	6.00	0.85
410	48.179	0.119	0.84	84	1.21	99	83	0.040	6.06	0.86
415	48.780	0.120	0.81	84	1.45	99	83	0.050	6.18	0.88
420	49.381	0.120	0.76	84	3.85	102	83	0.060	6.20	0.88
Avg/Tot	49.381	0.117	0.81	84	2.36	100	82	0.051	8.02	0.88

# WOODSTOVE SURFACE TEMPERATURE DATA

Client: HHT

Job #: 19-464

Model: Pioneer II

Tracking #: 0024

Run #: 4

Technician: AK

Date: 8/21/2019

Elapsed Time (min)	Temperature Data (°F)						
	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
0	517	432	262	523	231	392.8	N/A
5	509	425	259	513	555	452.1	N/A
10	504	425	256	492	525	440.4	N/A
15	500	427	250	472	534	436.8	N/A
20	495	429	244	455	534	431.3	N/A
25	488	431	236	441	562	431.7	N/A
30	484	435	233	430	587	433.7	N/A
35	483	441	232	421	592	433.7	N/A
40	484	446	232	416	595	434.6	N/A
45	487	453	230	414	581	432.8	N/A
50	492	459	233	413	576	434.6	N/A
55	499	466	234	413	570	436.4	N/A
60	505	473	238	415	572	440.4	N/A
65	510	480	242	417	562	442.4	N/A
70	515	487	248	421	546	443.3	N/A
75	520	494	252	426	531	444.6	N/A
80	526	500	257	434	525	448.4	N/A
85	533	505	262	441	500	448.3	N/A
90	538	509	270	449	474	448.0	N/A
95	542	512	276	456	445	446.2	N/A
100	545	513	282	465	414	443.7	N/A
105	546	512	283	473	383	439.6	N/A
110	545	510	285	481	340	432.3	N/A
115	542	505	285	489	293	422.7	N/A
120	536	497	282	495	252	412.6	N/A
125	527	487	276	497	229	403.3	N/A
130	516	476	270	496	218	395.4	N/A
135	504	465	263	494	208	387.0	N/A
140	493	454	257	493	201	379.5	N/A
145	482	444	251	489	198	372.8	N/A
150	472	435	246	486	193	366.5	N/A
155	463	427	242	482	191	360.9	N/A
160	454	419	237	478	187	355.2	N/A
165	447	412	232	473	184	349.7	N/A
170	440	406	228	468	179	344.0	N/A
175	433	400	223	463	177	339.2	N/A
180	426	394	219	459	176	335.0	N/A
185	420	389	218	455	178	331.9	N/A
190	415	384	215	450	179	328.6	N/A
195	411	380	213	447	175	325.2	N/A
200	407	377	212	444	176	323.1	N/A
205	403	373	209	440	179	320.9	N/A
210	400	371	207	437	179	318.9	N/A
215	398	368	206	434	180	317.1	N/A
220	396	366	204	431	179	315.3	N/A
225	394	364	204	429	182	314.8	N/A
230	393	363	202	427	182	313.3	N/A
235	392	361	202	425	182	312.5	N/A

# WOODSTOVE SURFACE TEMPERATURE DATA

Client: HHTModel: Pioneer IIRun #: 4Job #: 19-464Tracking #: 0024Technician: AKDate: 8/21/2019

Elapsed Time (min)	Temperature Data (°F)						
	FB Left	FB Right	FB Back	FB Top	FB Bottom	Stove Surface Average	Catalyst Exit
240	391	360	201	424	183	312.0	N/A
245	390	359	202	423	184	311.9	N/A
250	390	359	202	423	183	311.2	N/A
255	389	358	202	421	182	310.4	N/A
260	389	357	202	420	183	310.3	N/A
265	389	355	201	420	182	309.3	N/A
270	389	353	201	420	180	308.7	N/A
275	389	351	201	419	179	307.9	N/A
280	389	349	199	418	174	306.1	N/A
285	389	348	198	418	168	304.0	N/A
290	387	346	196	415	164	301.6	N/A
295	385	344	194	410	163	299.1	N/A
300	382	341	190	406	160	295.8	N/A
305	380	337	187	400	159	292.6	N/A
310	377	333	183	395	157	288.7	N/A
315	374	329	179	391	159	286.2	N/A
320	372	325	177	388	158	283.8	N/A
325	369	322	175	385	158	282.0	N/A
330	367	319	173	383	157	279.9	N/A
335	366	317	171	381	157	278.5	N/A
340	365	315	170	380	157	277.3	N/A
345	364	312	169	379	158	276.5	N/A
350	363	310	168	378	156	275.0	N/A
355	362	307	167	377	155	273.9	N/A
360	362	304	166	377	156	273.0	N/A
365	362	302	166	376	155	272.2	N/A
370	362	300	165	376	156	271.9	N/A
375	362	298	165	377	157	271.6	N/A
380	361	296	165	377	154	270.6	N/A
385	360	294	165	377	153	269.8	N/A
390	358	293	164	377	153	269.1	N/A
395	357	292	164	377	150	267.9	N/A
400	355	290	164	376	150	267.1	N/A
405	352	289	163	375	149	265.6	N/A
410	350	288	163	374	148	264.6	N/A
415	347	287	162	373	149	263.7	N/A
420	345	287	161	373	151	263.4	N/A
Average	431	388	215	428	266	346	N/A

# LAB SAMPLE DATA - ASTM E2515

Client: HHT  
 Model: Pioneer II  
 Run #: 4

Job #: 19-464  
 Tracking #: 0024  
 Technician: AK  
 Date: 8/21/2019

	Sample ID	Tare, mg	Total, mg	Final, mg	Catch, mg
Train A Filters - First Hour	T296	87.3	87.3	88.3	1.0
Train A Filters - Remainder	T297	87.7	174.2	174.3	0.1
	T298	86.5			
Train A Probe	7A	116741.2	116741.2	116741.8	0.6
Train A O-Rings	7A	3572.7	3572.7	3573.3	0.6
Train B Filters	T299	86.6	172.8	172.9	0.1
	T300	86.2			
Train B Probe	7B	117289.1	117289.1	117289.8	0.7
Train B O-Rings	7B	3521.7	3521.7	3523.3	1.6
Background Filter			0.0	0.0	

Placed in  
Dessicator on:

Train A Filters - First Hour	88.4	9/4 9:08	88.3	9/5 9:32			
Train A Filters - Remainder	174.5	9/4 9:09	174.3	9/5 9:33			
Train A Probe	116741.8	9/4 9:19	116741.8	9/5 9:38			
Train A O-Rings	3573.1	9/4 9:01	3573.4	9/5 9:24	3573.3	9/17 12:14	
Train B Filters	173.0	9/4 9:09	172.9	9/5 9:33			
Train B Probe	117289.7	9/4 9:19	117289.8	9/5 9:38			
Train B O-Rings	3523.2	9/4 9:01	3523.3	9/5 9:24			
Background Filter							

1st hour Sub-Total, mg:	1.0
Remainder Sub-Total, mg:	1.3
<b>Train 1 Aggregate, mg:</b>	<b>2.3</b>
<b>Train 2 Aggregate, mg:</b>	<b>2.4</b>
Ambient Aggregate, mg:	



# 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	87.8	-	-	SB	19-480	#3
T257	87.0	86.9	-	-	SB	19-496	#1
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	19-496	#2
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	19-496	#2
T270	88.2	88.2	-	-	SB	↓	↓
T271	87.7	87.7	-	-	SB	19-496	#3
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	14-502	1
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		2
T286	87.6	87.5	-	-	SB	6	↓

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 - TX Filters

Sample	Weight 1	Weight 2	Weight 3	Weight 4	Initial	Project	Run
T287	90.0	90.0	-	-	As	19-502	2
T288	86.0	86.1	-	-	As		
T289	87.0	86.9	-	-	As		
T290	88.0	88.0	-	-	As		
T291	87.2	87.3	-	-	As		3
T292	87.7	87.6	-	-	As		
T293	87.4	87.6	-	-	As		
T294	87.0	86.9	-	-	As		
T295	87.3	87.2	-	-	As		
T296	87.4	87.3	-	-	As		4
T297	87.7	87.7	-	-	As		
T298	86.6	86.5	-	-	As		
T299	86.5	86.6	-	-	As		
T300	86.2	86.2	-	-	As		
T301	86.6	86.7	-	-	As	19-494	#1
T302	87.0	87.2	-	-	As		
T303	88.5	88.4	-	-	As		
T304	87.2	87.4	-	-	As		

Weight 1 Date/Time:
8/15 0820
Weight 2 Date/Time:
8/16 0930
Weight 3 Date/Time:
Weight 4 Date/Time:

Sample	Weight 1	Weight 2	Weight 3	Weight 4	Initial	Project	Run
T305	90.3	90.3	-	-	SB	19-494	#1
T306	87.2	87.4	-	-	SB		
T307	87.2	87.1	-	-	SB		
T308	87.3	87.2	-	-	SB	19-494	#2
T309	86.9	86.9	-	-	SB		
T310	87.2	87.3	-	-	SB		
T311	87.0	87.1	-	-	SB		
T312	87.1	87.3	-	-	SB		
T313	86.7	86.7	-	-	SB		
T314	87.6	87.7	-	-	SB		
T315	87.3	87.2	-	-	SB		
T316	86.0	86.1	-	-	SB	19-494	#3
T317	86.4	86.4	-	-	SB		
T318	86.0	85.9	-	-	SB		
T319	86.1	86.1	-	-	SB		
T320	87.4	87.4	-	-	SB		
T321	86.2	86.3	-	-	SB		
T322	86.6	86.6	-	-	SB		

Weight 1 Date/Time:
9/9 8:00
Weight 2 Date/Time:
9/10 14:00
Weight 3 Date/Time:
Weight 4 Date/Time:



# ASTM E2515 - Probes

Sample	Weight 1	Weight 2	Weight 3	Weight 4	Initial	Project	Run
1A	115630.4	115630.6	-	-	SB	19-509	#6
1B	115904.2	115904.4	-	-	SB		
2A	116241.8	116241.7	-	-	SB	19-509	#
2B	116331.8	116331.6	-	-	SB		
3A	116076.7	116076.8	-	-	SB	19-510	#1
3B	116341.4	116341.4	-	-	SB		
4A	116184.3	116184.2	-	-	SB	19-502	1
4B	116366.9	116366.9	-	-	SB		
5A	116769.5	116769.4	-	-	SB	19-502	2
5B	116877.5	116877.3	-	-	SB		

Weight 1 Date/Time:  
7/22 - 7:00

Weight 2 Date/Time:  
7/23 - 8:00

Weight 3 Date/Time:

Weight 4 Date/Time:

Sample	Weight 1	Weight 2	Weight 3	Weight 4	Initial	Project	Run
6A	116545.1	116545.2	-	-	L	19-502	3
6B	116118.4	116118.3	-	-	L		
7A	116741.2	116741.2	-	-	L	19-502	4
7B	117280.3	117280.1	-	-	L		
8A	116824.4	116824.4	-	-	L	19-501	1
8B	116826.3	116826.2	-	-	L		
9A	116714.1	116714.2	-	-	L	19-501	1
9B	117910.9	117910.8	-	-	L		
10A	-	116821.1	116821.3	-	L	19-494	#11
10B	-	117904.7	117904.9	-	L	19-494	#11

Weight 1 Date/Time:  
8/15 0800

Weight 2 Date/Time:  
8/16 0930

Weight 3 Date/Time:  
8/15 15:45

Weight 4 Date/Time:

Sample	Weight 1	Weight 2	Weight 3	Weight 4	Initial	Project	Run
11A	117636.9	117636.7	-	-	SB	19-494	#2
11B	117490.9	117490.5	117490.7	-	SB		
12A	116889.6	116889.4	-	-	SB	19-494	#3
12B	117957.6	117957.5	-	-	SB		
13A	117456.4	117456.3	-	-	SB	19-494	#4
13B	117055.1	117055.2	-	-	SB		
14A	116818.4	-	116818.2	-	SB	19-494	#5
14B	116772.2	-	116772.0	-	SB		
15A	117410.0	-	-	-	-	-	-
15B	116905.8	-	-	-	-	-	-

Weight 1 Date/Time:  
9/5/ 15:45

Weight 2 Date/Time:  
9/9 8:00

Weight 3 Date/Time:  
9/10 - 1400

Weight 4 Date/Time:



# ASTM E2515 - O-Rings

Sample	Weight 1	Weight 2	Weight 3	Weight 4	Initial	Project	Run
1A	3565.5	3565.4	—	—	SB	19-509	#6
1B	3553.9	3554.1	—	—	SB		
2A	3551.2	3551.4	—	—	SB	19-509	#7
2B	3569.8	3570.0	—	—	SB		
3A	3578.3	3578.5	—	—	SB	19-510	#1
3B	3566.7	3567.3	3566.8	—	SB		
4A	3591.2	3591.3	—	—	SB	19-502	1
4B	3578.6	3578.8	—	—	SB		
5A	3532.9	3533.1	—	—	SB	19-502	2
5B	3529.3	3529.5	—	—	SB		

Weight 1 Date/Time:  
7/27-7/15

Weight 2 Date/Time:  
7/24-8:00

Weight 3 Date/Time:

Weight 4 Date/Time:

Sample	Weight 1	Weight 2	Weight 3	Weight 4	Initial	Project	Run
6A	3614.9	3614.7	—	—	A	19-502	3
6B	3395.9	3396.1	—	—	A		
7A	3572.6	3572.7	—	—	A	19-502	4
7B	3521.5	3521.7	—	—	A		
8A	3551.6	3551.5	—	—	A	19-511	1
8B	3585.3	3585.3	—	—	A		
9A	3581.0	3581.2	—	—	A	19-501	#1
9B	3524.0	3524.1	—	—	A		
10A	3430.9	3431.0	—	—	✓	19-494	#1
10B	3570.0	3570.2	—	—	✓		

Weight 1 Date/Time:  
8/15 0800

Weight 2 Date/Time:  
8/16 0930

Weight 3 Date/Time:

Weight 4 Date/Time:

Sample	Weight 1	Weight 2	Weight 3	Weight 4	Initial	Project	Run
11A	3424.3	3424.4	—	—	SB	19-494	#2
11B	4234.1	4234.2	—	—	SB		
12A	3396.0	3396.2	—	—	SB	19-494	#3
12B	3406.4	3406.6	—	—	SB		
13A	3361.1	3361.3	—	—	SB	19-494	#4
13B	3446.2	3446.1	—	—	SB		
14A	3367.2	3367.4	—	—	SB	19-494	#5
14B	3341.4	3341.6	—	—	SB		
15A	3569.9						
15B	3570.7						

Weight 1 Date/Time:  
9/5/10 16:00

Weight 2 Date/Time:  
9/9 8:00

Weight 3 Date/Time:

Weight 4 Date/Time:

## Sample Calculations – ASTM E3053 & E2515

Client: HHT  
 Model: Pioneer II  
 Run: 3

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)

$M_{SUdb}$  – 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)

$M_{TFBHdb}$  - 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<sub>Fldb</sub> – 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	6.50	21.7	$6.5 (100) / (100 + 21.7) =$	5.34
2	5.37	22.0	$5.37 (100) / (100 + 22) =$	4.40
3	6.71	21.3	$6.71 (100) / (100 + 21.3) =$	5.53
4	4.49	20.7	$4.49 (100) / (100 + 20.7) =$	3.72
5	8.43	22.0	$8.43 (100) / (100 + 22) =$	6.91
6	0.00	NA	N/A	-
7	0.00		N/A	-
			SUM	25.91 lbs
$M_{Fldb} =$	<b>25.91</b>	lbs		
$M_{Fldb} =$	<b>11.75</b>	kg		

**M<sub>SUdb</sub> – Weight of start-up fuel, dry basis, lb (kg)**

ASTM E3053 equation (2)

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

Where,

M<sub>SUwb</sub> = Total weight of start-up fuel pieces, wet basis, lb (kg)

MC<sub>SU</sub> = Average fuel moisture of the piece(s) from which start-up fuel was split, % dry basis

Sample Calculation:

M<sub>SUwb</sub> = N/A - Applicable to High Fire Tests Only

MC<sub>SU</sub> = N/A - Applicable to High Fire Tests Only

M<sub>SUdb</sub> = N/A (100/(100+ N/A )

M<sub>SUdb</sub> = **N/A** lbs

= **N/A** kg

**M<sub>Kdb</sub> - Weight of kindling, dry basis, lb (kg)**

ASTM E3053 equation (3)

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

Where,

M<sub>Kwb</sub> = Weight of kindling per 8.5.6, wet basis, lb (kg);

MC<sub>K</sub> = Average moisture of kindling (may be assumed 10%), % dry basis.

Sample calculation:

M<sub>Kwb</sub> = N/A - Applicable to High Fire Tests Only

MC<sub>K</sub> = N/A - Applicable to High Fire Tests Only

$$M_{Kdb} = N/A \quad (100 / (100 + N/A))$$

M<sub>Kdb</sub> = **N/A** lbs

= **N/A** kgs

**M<sub>FREHdb</sub> - 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<sub>RSUBdb</sub> = Weight of residual start-up fuel bed when high fire test load added, lb (kg)M<sub>FLEHdb</sub> = Weight of unburned portion of test fuel load at the end of the high fire test run, lb (kg)

Sample calculation:

M<sub>RSUBdb</sub> = N/A - Applicable to High Fire Tests OnlyM<sub>FLEHdb</sub> = N/A - Applicable to High Fire Tests Only

$$M_{FREHdb} = N/A + N/A$$

$$M_{FREHdb} = \mathbf{N/A} \quad \text{lbs}$$

$$= \mathbf{N/A} \quad \text{kg}$$

**M<sub>TFBHdb</sub> - 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:

$$M_{Kdb} = N/A$$

$$M_{SUDb} = N/A$$

$$M_{FLdb} = N/A$$

$$M_{FREHdb} = N/A$$

$$M_{TFBHdb} = N/A + N/A + N/A - N/A$$

$$= \mathbf{N/A} \quad \text{lbs}$$

$$= \mathbf{N/A} \quad \text{kg}$$

**BR<sub>H</sub>** – 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,

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

Sample calculation:

$M_{FLdb}$  = N/A - Applicable to High Fire Tests Only

$M_{FLEHdb}$  = N/A - Applicable to High Fire Tests Only

$\theta_{H1}$  = N/A - Applicable to High Fire Tests Only

$$BR_H = \frac{60 ( \quad N/A \quad - \quad N/A \quad )}{N/A}$$

$BR_H$  = **N/A** lb/hr

= **N/A** kg/hr

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

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

Where,

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

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

Sample Calculation:

$$M_{\text{FLdb}} = 25.91$$

$$M_{\text{FREdb}} = 0.00$$

$$M_{\text{TFBdb}} = 25.91 - 0.00$$

$$= \mathbf{25.91} \quad \text{lbs}$$

$$= \mathbf{11.75} \quad \text{kg}$$



**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,

$\theta$  = Total test run duration for low or medium fire test run, min.

Sample Calculation:

$$M_{TFBdb} = 25.91$$

$$\theta = 545$$

$$BR = \frac{60 \times 25.91}{545}$$

$$BR = 2.85 \text{ lb/hr}$$

$$= 1.29 \text{ kg/hr}$$

**V<sub>s</sub> – 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  
 $\Delta P^*$  = Velocity pressure in the dilution tunnel, in H<sub>2</sub>O  
 $T_s$  = 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. H<sub>2</sub>O; (in Hg = in H<sub>2</sub>O/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:

$$F_p = \frac{19.55}{22.18} = 0.881$$

$$V_s = 0.881 \times 85.49 \times 0.99 \times 0.322 \times \left( \left( \frac{94.6}{30.00} + \frac{460}{-0.34} \right) \times \frac{28.78}{13.6} \right)^{1/2}$$

$$V_s = \mathbf{19.28 \text{ ft/s}}$$

\*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<sub>sd</sub> – 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<sub>ws</sub> = Water vapor in gas stream, proportion by volume; assume 2%
- A = Cross sectional area of dilution tunnel, ft<sup>2</sup>
- T<sub>std</sub> = Standard absolute temperature, 528 °R
- P<sub>s</sub> = Absolute average gas static pressure in dilution tunnel, = P<sub>bar</sub> + P<sub>g</sub>, in Hg
- T<sub>s(avg)</sub> = Absolute average gas temperature in the dilution tunnel, °R; (°R = °F + 460)
- P<sub>std</sub> = Standard absolute pressure, 29.92 in Hg

Sample calculation:

$$Q_{sd} = 3600 \times (1 - 0.02) \times 19.28 \times 0.1963 \times \frac{528}{94.6 + 460} \times \frac{30.00 + \frac{-0.34}{13.6}}{29.92}$$

$$Q_{sd} = 12736.0 \text{ dscf/hr}$$

**$V_{m(std)}$  – 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
$\Delta H$	=	Average pressure differential across the orifice meter, in. H <sub>2</sub> O
$T_m$	=	Absolute average dry gas meter temperature, °R

Sample Calculation:

Using equation for Train 1:

$$V_{m(std)} = 17.64 \times 67.209 \times 0.998 \times \frac{(30.00 + \frac{0.73}{13.6})}{(84.0 + 460)}$$

$$V_{m(std)} = \mathbf{65.356} \text{ dscf}$$

Using equation for Train 2:

$$V_{m(std)} = 17.64 \times 68.972 \times 1.002 \times \frac{(30.00 + \frac{0.89}{13.6})}{(79.9 + 460)}$$

$$V_{m(std)} = \mathbf{67.881} \text{ dscf}$$

Using equation for ambient train:

$$V_{m(std)} = 17.64 \times 0.00 \times 0 \times \frac{(\underline{30} + \frac{0.00}{13.6})}{(76.1 + 460)}$$

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

**$m_n$  – 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):

$$m_n = 0.0 + 7.7 + 0.0$$

$$m_n = 7.7 \text{ mg}$$

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

$$m_n = 0.5 + -1.6 + 2.1$$

$$m_n = 1.0 \text{ mg}$$

Train A aggregate:

$$m_n = 7.7 + 1.0$$

$$m_n = 8.7 \text{ mg}$$

Using equation for Train B:

$$m_n = 0.2 + 6.7 + 1$$

$$m_n = 7.9 \text{ mg}$$

**C<sub>s</sub> - 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<sub>2</sub> = Constant, 0.001 g/mgm<sub>n</sub> = Total mass of particulate matter collected in the sampling train, mgV<sub>m(std)</sub> = Volume of gas sampled corrected to dry standard conditions, dscf

Sample calculation:

For Train 1:

$$C_s = 0.001 \times \frac{8.7}{65.36}$$

$$C_s = \mathbf{0.00013} \text{ g/dscf}$$

For Train 2

$$C_s = 0.001 \times \frac{7.9}{67.88}$$

$$C_s = \mathbf{0.00012} \text{ g/dscf}$$

For Ambient Train

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

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

**E<sub>T</sub> – Total Particulate Emissions, g**

ASTM E2515 equation (15)

$$E_T = (c_s - c_r) \times Q_{std} \times \theta$$

Where:

C <sub>s</sub>	=	Concentration of particulate matter in tunnel gas, g/dscf
C <sub>r</sub>	=	Concentration particulate matter room air, g/dscf
Q <sub>std</sub>	=	Average dilution tunnel gas flow rate, dscf/hr
θ	=	Total time of test run, minutes

Sample calculation:

For Train 1

$$E_T = (0.000133 - 0) \times 12736.0 \times 545 / 60$$

$$E_T = 15.40 \text{ g}$$

For Train 2

$$E_T = (0.000116 - 0) \times 12736.0 \times 545 / 60$$

$$E_T = 13.46 \text{ g}$$

Average

$$E = 14.43 \text{ g}$$

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

$$7.5\% \text{ of the average} = 1.08$$

$$\text{Train 1 difference} = 0.97$$

$$\text{Train 2 difference} = 0.97$$

**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:

- $\theta$  = Total sampling time, min  
 $\theta_i$  = 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):

$$PR = \left( \frac{545 \times 0.59 \times 19.28 \times (155.0 + 460) \times (84.0 + 460)}{5 \times 67.209 \times 19.65 \times (94.6 + 460) \times (84.0 + 460)} \right) \times 100$$

$$PR = 104 \%$$



**PM<sub>RH</sub> - Particulate emission rate for high fire test run, g/hr;**

ASTM E3053 equation (9)

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

Where,

E<sub>TH</sub> = Total particulate emissions for high fire test run including kindling and start-up, gθ<sub>H2</sub> = Total duration of high fire test run, from ignition of kindling to end of test run, min.

Sample Calculation:

E<sub>TH</sub> = N/A - Applicable to High Fire Tests Onlyθ<sub>H2</sub> = N/A - Applicable to High Fire Tests Only

$$PM_{RH} = 60( N/A / N/A )$$

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

**PM<sub>FH</sub> - 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<sub>TH</sub> = N/A - Applicable to High Fire Tests OnlyM<sub>TFBHdb</sub> = N/A - Applicable to High Fire Tests Only

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

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

**PM<sub>R</sub> - 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:

$$E_T = 14.43$$

$$\theta = 545$$

$$PM_R = 60( 14.43 / 545 )$$

$$PM_{RH} = 1.59 \text{ g/hr}$$

**PM<sub>FH</sub> - 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:

$$E_T = 14.43$$

$$M_{TFBdb} = 11.75$$

$$PM_{FH} = 14.43 / 11.75$$

$$= 1.23 \text{ g/kg}$$

## Sample Calculations – ASTM E3053 & E2515

Client: HHT  
 Model: Pioneer II  
 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)

$M_{SUdb}$  – 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)

$M_{TFBHdb}$  - 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<sub>Fldb</sub> – Weight of test fuel load, dry basis, lb (kg)**

ASTM E3053 equation (1)

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

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	4.96	21.7	$4.96 (100) / (100 + 21.7) =$	4.08
2	5.40	23.3	$5.4 (100) / (100 + 23.3) =$	4.38
3	6.36	22.0	$6.36 (100) / (100 + 22) =$	5.21
4	6.56	22.0	$6.56 (100) / (100 + 22) =$	5.38
5	4.96	23.3	$4.96 (100) / (100 + 23.3) =$	4.02
6	0.00	NA	N/A	-
7	N/A	N/A	N/A	-
SUM				23.07 lbs
$M_{Fldb} =$	<b>23.07</b>	lbs		
$M_{Fldb} =$	<b>10.46</b>	kg		

**M<sub>SUdb</sub> – Weight of start-up fuel, dry basis, lb (kg)**

ASTM E3053 equation (2)

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

Where,

M<sub>SUwb</sub> = Total weight of start-up fuel pieces, wet basis, lb (kg)

MC<sub>SU</sub> = Average fuel moisture of the piece(s) from which start-up fuel was split, % dry basis

Sample Calculation:

$$M_{SUwb} = 8.32$$

$$MC_{SU} = 23.0$$

$$M_{SUdb} = 8.3 \left( 100 / (100 + 23.0) \right)$$

$$M_{SUdb} = \mathbf{6.76 \text{ lbs}}$$

$$= \mathbf{3.07 \text{ kg}}$$

**M<sub>Kdb</sub> - Weight of kindling, dry basis, lb (kg)**

ASTM E3053 equation (3)

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

Where,

M<sub>Kwb</sub> = Weight of kindling per 8.5.6, wet basis, lb (kg);

MC<sub>K</sub> = Average moisture of kindling (may be assumed 10%), % dry basis.

Sample calculation:

$$M_{Kwb} = 5.24$$

$$MC_K = 10.0$$

$$M_{Kdb} = 5.24 (100 / (100 + 10.0))$$

$$M_{Kdb} = \mathbf{4.76} \text{ lbs}$$

$$= \mathbf{2.16} \text{ kgs}$$

**$M_{FREHdb}$  - 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:

$$M_{RSUBdb} = 4$$

$$M_{FLEHdb} = 3$$

$$M_{FREHdb} = 4.00 + 3$$

$$M_{FREHdb} = 7.00 \text{ lbs}$$

$$= 3.18 \text{ kg}$$

 **$M_{TFBHdb}$  - 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:

$$M_{Kdb} = 4.76$$

$$M_{SUdb} = 6.76$$

$$M_{FLdb} = 23.07$$

$$M_{FREHdb} = 7.00$$

$$M_{TFBHdb} = 4.76 + 6.76 + 23.07 - 7.00$$

$$= 27.59 \text{ lbs}$$

$$= 12.52 \text{ kg}$$

**BR<sub>H</sub> – 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,

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

Sample calculation:

$$\begin{aligned} M_{FLdb} &= 23.07 \\ M_{FLEHdb} &= 3.00 \\ \theta_{H1} &= 155 \end{aligned}$$

$$BR_H = \frac{60 ( 23.07 - 3.00 )}{155}$$

$$\begin{aligned} BR_H &= 7.77 \text{ lb/hr} \\ &= 3.52 \text{ kg/hr} \end{aligned}$$



**$M_{TFBdb}$  - 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,

$\theta$  = 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

$\theta$  = 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<sub>s</sub> – 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  
 $\Delta P^*$  = Velocity pressure in the dilution tunnel, in H<sub>2</sub>O  
 $T_s$  = 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. H<sub>2</sub>O; (in Hg = in H<sub>2</sub>O/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:

$$F_p = \frac{15.90}{18.43} = 0.863$$

$$V_s = 0.863 \times 85.49 \times 0.99 \times 0.269 \times \left( \left( \frac{158.8}{29.94} + \frac{460}{-0.25} \right) \times 28.78 \right)^{1/2}$$

$$V_s = 16.64 \text{ ft/s}$$

\*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<sub>sd</sub> – 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<sub>ws</sub> = Water vapor in gas stream, proportion by volume; assume 2%
- A = Cross sectional area of dilution tunnel, ft<sup>2</sup>
- T<sub>std</sub> = Standard absolute temperature, 528 °R
- P<sub>s</sub> = Absolute average gas static pressure in dilution tunnel, = P<sub>bar</sub> + P<sub>g</sub>, in Hg
- T<sub>s(avg)</sub> = Absolute average gas temperature in the dilution tunnel, °R; (°R = °F + 460)
- P<sub>std</sub> = Standard absolute pressure, 29.92 in Hg

Sample calculation:

$$Q_{sd} = 3600 \times (1 - 0.02) \times 16.64 \times 0.1963 \times \frac{528}{158.8 + 460} \times \frac{29.94 + \frac{-0.25}{13.6}}{29.92}$$

$$Q_{sd} = \mathbf{9835.0} \quad \text{dscf/hr}$$

**$V_{m(std)}$  – 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
$\Delta H$	=	Average pressure differential across the orifice meter, in. H <sub>2</sub> O
$T_m$	=	Absolute average dry gas meter temperature, °R

Sample Calculation:

Using equation for Train 1:

$$V_{m(std)} = 17.64 \times 27.206 \times 0.998 \times \frac{(29.94 + \frac{1.00}{13.6})}{(80.0 + 460)}$$

$$V_{m(std)} = \mathbf{26.621} \text{ dscf}$$

Using equation for Train 2:

$$V_{m(std)} = 17.64 \times 26.753 \times 1.002 \times \frac{(29.94 + \frac{1.09}{13.6})}{(84.4 + 460)}$$

$$V_{m(std)} = \mathbf{26.078} \text{ dscf}$$

Using equation for ambient train:

$$V_{m(std)} = 17.64 \times 0.00 \times 0 \times \frac{(29.94 + \frac{0.00}{13.6})}{(77.2 + 460)}$$

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

**$m_n$  – 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):

$$m_n = 0.0 + 9.2 + 0.0$$

$$m_n = 9.2 \text{ mg}$$

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

$$m_n = 0.1 + 3.4 + 0.3$$

$$m_n = 3.8 \text{ mg}$$

Train A aggregate:

$$m_n = 9.2 + 3.8$$

$$m_n = 13.0 \text{ mg}$$

Using equation for Train B:

$$m_n = 0.2 + 11.4 + 1$$

$$m_n = 12.6 \text{ mg}$$

**C<sub>s</sub> - 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<sub>2</sub> = Constant, 0.001 g/mgm<sub>n</sub> = Total mass of particulate matter collected in the sampling train, mgV<sub>m(std)</sub> = Volume of gas sampled corrected to dry standard conditions, dscf

Sample calculation:

For Train 1:

$$C_s = 0.001 \times \frac{13.0}{26.62}$$

$$C_s = \mathbf{0.00049} \text{ g/dscf}$$

For Train 2

$$C_s = 0.001 \times \frac{12.6}{26.08}$$

$$C_s = \mathbf{0.00048} \text{ g/dscf}$$

For Ambient Train

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

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

**E<sub>T</sub> – Total Particulate Emissions, g**

ASTM E2515 equation (15)

$$E_T = (c_s - c_r) \times Q_{std} \times \theta$$

Where:

C <sub>s</sub>	=	Concentration of particulate matter in tunnel gas, g/dscf
C <sub>r</sub>	=	Concentration particulate matter room air, g/dscf
Q <sub>std</sub>	=	Average dilution tunnel gas flow rate, dscf/hr
θ	=	Total time of test run, minutes

Sample calculation:

For Train 1

$$E_T = (0.000488 - 0) \times 9835.0 \times 180 / 60$$

$$E_T = 14.41 \text{ g}$$

For Train 2

$$E_T = (0.000483 - 0) \times 9835.0 \times 180 / 60$$

$$E_T = 14.26 \text{ g}$$

Average

$$E = 14.33 \text{ g}$$

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

$$7.5\% \text{ of the average} = 1.07$$

$$\text{Train 1 difference} = 0.08$$

$$\text{Train 2 difference} = 0.08$$



**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:

- $\theta$  = Total sampling time, min  
 $\theta_i$  = 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):

$$PR = \left( \frac{180 \times 0.713 \times 16.64 \times (198.0 + 460) \times (80.0 + 460)}{5 \times 27.206 \times 16.41 \times (158.8 + 460) \times (80.0 + 460)} \right) \times 100$$

$$PR = 102 \%$$

**PM<sub>RH</sub> - Particulate emission rate for high fire test run, g/hr;**

ASTM E3053 equation (9)

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

Where,

E<sub>TH</sub> = Total particulate emissions for high fire test run including kindling and start-up, gθ<sub>H2</sub> = Total duration of high fire test run, from ignition of kindling to end of test run, min.

Sample Calculation:

$$E_{TH} = 14.33$$

$$\theta_{H2} = 180$$

$$PM_{RH} = 60( 14.33 / 180 )$$

$$PM_{RH} = 4.78 \text{ g/hr}$$

**PM<sub>FH</sub> - 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:

$$E_{TH} = 14.33$$

$$M_{TFBHdb} = 12.52$$

$$PM_{FH} = 14.33 / 12.52$$

$$= 1.15 \text{ g/kg}$$

**PM<sub>R</sub> - Particulate emission rate for low or medium fire test runs, g/hr**

ASTM E3053 equation (12)

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

Where,

E<sub>T</sub> = Total particulate emissions for low or medium fire test runs from Test Method E2515, g

Sample Calculation:

E<sub>T</sub> = N/A - Applicable to Low/Medium Fire Tests Only

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

$$PM_R = 60( N/A / N/A )$$

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

**PM<sub>FH</sub> - 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<sub>T</sub> = N/A - Applicable to Low/Medium Fire Tests Only

M<sub>TFBdb</sub> = N/A - Applicable to Low/Medium Fire Tests Only

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

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



**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:

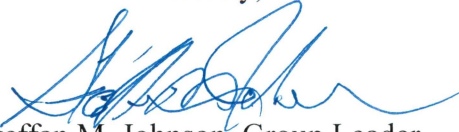
1. The filter temperature must be maintained between 80 and 90 degrees F during testing.
2. Filters must be weighed in pairs to reduce weighing error propagation; see ASTM 2515-11, Section 10.2.1 Analytical Procedure.
3. Sample filters must be Pall TX-40 or equivalent Teflon-coated glass fiber, and of 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](mailto: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



UL 127-2011, CAN/ULC-S610



Model:  
**WarmMajic**  
**EPA CERTIFIED FIREPLACE**



A brand of Hearth & Home Technologies  
7571 - 215th Street West, Lakeville, MN. 55044  
www.heatilator.com

SERIAL NO./NUMERO DESERE

MP188

MODEL

WarmMajic-II

FIRE CHAMBER INTENDED FOR USE WITH HEARTH & HOME TECHNOLOGIES LISTED FIREPLACE PARTS. SEE INSTALLATION AND OPERATING INSTRUCTIONS FOR THIS MODEL. REPLACE GLASS ONLY WITH CERAMIC.

DO NOT OVERFIRE. USE ONLY: SOLID WOOD FUEL. DO NOT USE A FIREPLACE INSERT OR OTHER PRODUCTS NOT SPECIFIED FOR USE WITH THIS PRODUCT.

WARNING! THIS FIREPLACE HAS NOT BEEN TESTED WITH AN UNVENTED GAS LOG SET. TO REDUCE THE RISK OF FIRE OR INJURY, DO NOT INSTALL AN UNVENTED GAS LOG SET INTO FIREPLACE.

DO NOT USE GRATE OR ELEVATE FIRE. BUILD WOOD FIRE DIRECTLY ON FIREBRICK.

WARNING! TO AVOID THE RISK OF DAMAGING FIREPLACE MATERIALS AND INCREASING THE RISK OF SPREADING A FIRE DO NOT USE THE FIREPLACE TO COOK OR WARM FOOD.

INSTALL AND USE ONLY IN ACCORDANCE WITH MANUFACTURER'S INSTALLATION, VENTING AND OPERATING INSTRUCTIONS. ANY AREA INCORPORATING WARM OR COLD AIR DUCTS SHALL BE ENCLOSED IN ACCORDANCE WITH THE MANUFACTURER'S INSTALLATION INSTRUCTIONS.

CONTACT YOUR LOCAL BUILDING OR FIRE OFFICIALS OR AUTHORITY HAVING JURISDICTION ABOUT RESTRICTIONS, INSTALLATION INSPECTION AND PERMITS REQUIRED IN YOUR AREA.

COMPONENTS REQUIRED FOR INSTALLATION: HHT SL300 SERIES PIPE OR DURAVENT DURA PLUS SYSTEM, TERMINATION CAP, HEARTH EXTENSION AND REQUIRED ACCESSORY CHIMNEY AIR KIT PART CAK4A.

DO NOT CONNECT THIS UNIT TO A CHIMNEY SERVING ANOTHER APPLIANCE.

DANGER: RISK OF ELECTRICAL SHOCK. DISCONNECT POWER SUPPLY BEFORE SERVICING.

ELECTRICAL RATING: 115 VAC <3.0 AMPS 60 HZ

MUST PROVIDE A SOURCE OF AIR TO PREVENT AIR STARVATION FROM COMBUSTION WHICH COULD RESULT IN HIGH LEVELS OF CARBON MONOXIDE.

FIREPLACE ALSO FOR USE IN MANUFACTURED/MOBILE HOMES WITH SOLID FUEL ONLY YES ☒ NO ☐

FIREPLACE FOR USE OUTDOORS YES ☐ NO ☒

FIREBOX/  
FOYER

CLEARANCE TO  
COMBUSTIBLES:  
DEGAGEMENT DES  
MATEAUX COMBUSTIBLES:

CHIMNEY/CHEMNEE  
2 IN. MIN.  
51 MM

BACK	1/2	IN. MIN.
RETOUR	13	MM MIN.
SIDE	1	IN. MIN.
COTÉ	25	MM MIN.

IF INSTALLATION OR OPERATING INSTRUCTIONS ARE MISSING CONTACT:  
HEARTH & HOME TECHNOLOGIES,  
7571 215th Street West, Lakeville, MN 55044

THE HEARTH EXTENSION MUST BE  
INSTALLED ACCORDING TO THE  
INSTALLATION INSTRUCTIONS.

This wood heater needs periodic inspection and repair for proper operation. Consult 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.

DO NOT REMOVE THIS LABEL

Made in U.S.A. of US and imported parts

Mfg  
by:



2019 2020 2021 2022 2023 2024 Jan Feb Mar Apr May June July Aug Sept Oct. Nov. Dec.

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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U.S. ENVIRONMENTAL PROTECTION AGENCY - Certified to comply with 2020 particulate emission standards using cord wood.

This wood heater was found to have an average emissions rate of 2.0g/hr using method ASTM E3053-17.

4188-990A



UL 127-2011, CAN/ULC-S610



Model:  
**WarmMajic**  
**EPA CERTIFIED FIREPLACE**



A brand of Hearth & Home Technologies  
7571 - 215th Street West, Lakeville, MN. 55044  
[www.quadrafire.com](http://www.quadrafire.com)

**NE PAS surcuison. UTILISER UNIQUEMENT: COMBUSTIBLES SOLIDES OU BOIS COTÉES APPLIANCE DE GAZ DÉCORATIF. NE PAS UTILISER UN INSERT CHEMINÉE OU AUTRES PRODUITS NON POUR USAGE SPÉCIFIÉ AVEC CE PRODUIT.**

**AVERTISSEMENT! CE FOYER N'A PAS ÉTÉ TESTÉ AVEC UN JOURNAL DE GAZ NON APPROUVÉ. POUR RÉDUIRE LES RISQUES D'INCENDIE OU DE BLESSURES, N'INSTALLEZ PAS D'ENREGISTREMENT DE GAZ NON CONTINU AU FOYER.**

**NE PAS UTILISER DE GRATE OU D'ÉLEVER UN FEU. CONSTRUISEZ UN FEU DE BOIS DIRECTEMENT SUR FIREBRICK.**

**ATTENTION! POUR ÉVITER LE RISQUE DE MATÉRIAUX ENDOMMAGER FOYER ET AUGMENTER LE RISQUE DE DIFFUSER UN INCENDIE NE PAS UTILISER LA FOYER À CHAUD DES ALIMENTS OU COOK.**

**INSTALLEZ ET UTILISEZ EN ACCORD AVEC LES INSTRUCTIONS D'INSTALLATION ET D'OPÉRATION DU FABRICANT. LES ZONES DE L'APPAREIL COMPORTANT DES CONDUITS D'AIR CHAUD ET FROID DOIVENT ÊTRE ENFERMÉES SELON LES INSTRUCTIONS D'INSTALLATION DU FABRICANT. CONTACTEZ LE BUREAU DE LA CONSTRUCTION OU LE BUREAU DES INCENDIES AU SUJET DES RESTRICTIONS ET DES INSPECTIONS D'INSTALLATION DANS VOTRE VOISINAGE.**

**LES PIÈCES EXIGÉES POUR L'INSTALLATION: LES SÉRIES DE CONDUITS HEARTH & HOME TECHNOLOGIES SL, CHAPEAU DE TERMINAISON, EXTENSION DE PROTECTION DE SOL ET LE KIT ACCESSOIRE DE CHEMINÉE CAK4A. NE PAS CONNECTER CET APPAREIL À UNE CHEMINÉE SERVANT UN AUTRE APPAREIL. DANGER: IL Y A RISQUE DE DÉCHARGE ÉLECTRIQUE. DÉCONNECTEZ LE FIL ÉLECTRIQUE DE LA PRISE DE CONTACT AVANT LE SERVICE. PUISSANCE ÉLECTRIQUE: 115 VAC, 3.0T AMPS, 60 HZ. DOIT FOURNIR UNE SOURCE D'AIR AFIN DE PRÉVENIR L'INANITION D'AIR DURANT LA COMBUSTION CE QUI POURRAIT CONDUIRE À DE HAUTS NIVEAUX DE MONOXYDE DE CARBONE.**

**SI DES INSTRUCTIONS D'INSTALLATION OU D'UTILISATION SONT MANQUANTES, CONTACTEZ:  
HEARTH & HOME TECHNOLOGIES,  
7571 215th Street West, Lakeville, MN 55044**

**LA PROTECTION DE SOL DOIT ÊTRE  
INSTALLÉE SELON LES INSTRUCTIONS  
D'INSTALLATION**

Cet appareil de chauffage au bois doit être inspecté et réparé périodiquement pour fonctionner correctement. Consultez le manuel du propriétaire pour plus d'informations. Il est contraire à la réglementation fédérale d'utiliser ce poêle à bois d'une manière non conforme aux instructions d'utilisation du manuel du propriétaire.

**NE PAS ENLEVER L'ÉTIQUETTE**

Fabriqués aux États-Unis-d'Amérique par des pièces d'origine américaine et pièces importées.

Mfg  
by:

 **HEARTH & HOME**  
technologies

**4188-990A**





UL 127-2011, CAN/ULC-S610



Model:  
**Constitution**  
**EPA CERTIFIED FIREPLACE**

**heatilator**  
*The first name in fireplaces*

A brand of Hearth & Home Technologies  
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www.heatilator.com

SERIAL NO./NUMERO DESERE

MP186

MODEL

C40-C

FIRE CHAMBER INTENDED FOR USE WITH HEARTH & HOME TECHNOLOGIES LISTED FIREPLACE PARTS. SEE INSTALLATION AND OPERATING INSTRUCTIONS FOR THIS MODEL. REPLACE GLASS ONLY WITH CERAMIC.

DO NOT OVERFIRE. USE ONLY: SOLID WOOD FUEL. DO NOT USE A FIREPLACE INSERT OR OTHER PRODUCTS NOT SPECIFIED FOR USE WITH THIS PRODUCT.

WARNING! THIS FIREPLACE HAS NOT BEEN TESTED WITH AN UNVENTED GAS LOG SET. TO REDUCE THE RISK OF FIRE OR INJURY, DO NOT INSTALL AN UNVENTED GAS LOG SET INTO FIREPLACE.

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DANGER: RISK OF ELECTRICAL SHOCK. DISCONNECT POWER SUPPLY BEFORE SERVICING. ELECTRICAL RATING: 115 VAC <3.0 AMPS 60 HZ  
MUST PROVIDE A SOURCE OF AIR TO PREVENT AIR STARVATION FROM COMBUSTION WHICH COULD RESULT IN HIGH LEVELS OF CARBON MONOXIDE.

FIREPLACE ALSO FOR USE IN MANUFACTURED/MOBILE HOMES WITH SOLID FUEL ONLY YES ☒ NO ☐

FIREPLACE FOR USE OUTDOORS YES ☐ NO ☒

FIREBOX/  
FOYER

CLEARANCE TO  
COMBUSTIBLES:  
DEGAGEMENT DES  
MATERIAUX COMBUSTIBLES:

CHIMNEY/CHEMNEE  
2 IN. MIN.  
51 MM

BACK	1/2	IN. MIN.
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SIDE	1	IN. MIN.
COTÉ	25	MM MIN.

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7571 215th Street West, Lakeville, MN 55044

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INSTALLATION INSTRUCTIONS.

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DO NOT REMOVE THIS LABEL

Made in U.S.A. of US and imported parts

Mfg  
by:



2019 2020 2021 2022 2023 2024 Jan Feb Mar Apr May June July Aug Sept Oct. Nov. Dec.

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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U.S. ENVIRONMENTAL PROTECTION AGENCY - Certified to comply with 2020 particulate emission standards using cord wood.  
This wood heater was found to have an average emissions rate of 2.0g/hr using method ASTM E3053-17.

4186-990A



UL 127-2011, CAN/ULC-S610



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**heatilator**  
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HEARTH & HOME TECHNOLOGIES,  
7571 215th Street West, Lakeville, MN 55044**

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INSTALLÉE SELON LES INSTRUCTIONS  
D'INSTALLATION**

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Fabriqués aux États-Unis-d'Amérique par des pièces d'origine américaine et pièces importées.

Mfg  
by:

 **HEARTH & HOME**  
technologies

**4186-990A**



UL 127-2011, CAN/ULC-S610



Model:  
**Northstar**  
**EPA CERTIFIED FIREPLACE**

**HEAT&GLO**

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www.quadrafire.com

SERIAL NO./NUMERO DESERE

MP187

MODEL

Northstar-C

FIRE CHAMBER INTENDED FOR USE WITH HEARTH & HOME TECHNOLOGIES LISTED FIREPLACE PARTS. SEE INSTALLATION AND OPERATING INSTRUCTIONS FOR THIS MODEL. REPLACE GLASS ONLY WITH CERAMIC.

DO NOT OVERFIRE. USE ONLY: SOLID WOOD FUEL. DO NOT USE A FIREPLACE INSERT OR OTHER PRODUCTS NOT SPECIFIED FOR USE WITH THIS PRODUCT.

WARNING! THIS FIREPLACE HAS NOT BEEN TESTED WITH AN UNVENTED GAS LOG SET. TO REDUCE THE RISK OF FIRE OR INJURY, DO NOT INSTALL AN UNVENTED GAS LOG SET INTO FIREPLACE.

DO NOT USE GRATE OR ELEVATE FIRE. BUILD WOOD FIRE DIRECTLY ON FIREBRICK.

WARNING! TO AVOID THE RISK OF DAMAGING FIREPLACE MATERIALS AND INCREASING THE RISK OF SPREADING A FIRE DO NOT USE THE FIREPLACE TO COOK OR WARM FOOD.

INSTALL AND USE ONLY IN ACCORDANCE WITH MANUFACTURER'S INSTALLATION, VENTING AND OPERATING INSTRUCTIONS. ANY AREA INCORPORATING WARM OR COLD AIR DUCTS SHALL BE ENCLOSED IN ACCORDANCE WITH THE MANUFACTURER'S INSTALLATION INSTRUCTIONS.

CONTACT YOUR LOCAL BUILDING OR FIRE OFFICIALS OR AUTHORITY HAVING JURISDICTION ABOUT RESTRICTIONS, INSTALLATION INSPECTION AND PERMITS REQUIRED IN YOUR AREA.

COMPONENTS REQUIRED FOR INSTALLATION: HHT SL300 SERIES PIPE OR DURAVENT DURA PLUS SYSTEM, TERMINATION CAP, HEARTH EXTENSION AND REQUIRED ACCESSORY CHIMNEY AIR KIT PART CAK4A.

DO NOT CONNECT THIS UNIT TO A CHIMNEY SERVING ANOTHER APPLIANCE.

DANGER: RISK OF ELECTRICAL SHOCK. DISCONNECT POWER SUPPLY BEFORE SERVICING.

ELECTRICAL RATING: 115 VAC <3.0 AMPS 60 HZ

MUST PROVIDE A SOURCE OF AIR TO PREVENT AIR STARVATION FROM COMBUSTION WHICH COULD RESULT IN HIGH LEVELS OF CARBON MONOXIDE.

FIREPLACE ALSO FOR USE  
IN MANUFACTURED/MOBILE  
HOMES WITH SOLID FUEL ONLY

YES ☒ NO ☐

FIREPLACE FOR USE  
OUTDOORS

YES ☐ NO ☒

FIREBOX/  
FOYER

CLEARANCE TO  
COMBUSTIBLES:  
DEGAGEMENT DES  
MATERIAUX COMBUSTIBLES:

CHIMNEY/CHEMNEE  
2 IN. MIN.  
51 MM

BACK

1/2

IN.  
MIN.

RETOUR

13

MM  
MIN.

SIDE

1

IN.  
MIN.

COTÉ

25

MM  
MIN.

IF INSTALLATION OR OPERATING INSTRUCTIONS ARE MISSING CONTACT:  
HEARTH & HOME TECHNOLOGIES,  
7571 215th Street West, Lakeville, MN 55044

THE HEARTH EXTENSION MUST BE  
INSTALLED ACCORDING TO THE  
INSTALLATION INSTRUCTIONS.

This wood heater needs periodic inspection and repair for proper operation. Consult 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.

DO NOT REMOVE THIS LABEL

Made in U.S.A. of US and imported parts

Mfg  
by:



2019 2020 2021 2022 2023 2024 Jan Feb Mar Apr May June July Aug Sept Oct. Nov. Dec.

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

This wood heater was found to have an average emissions rate of 2.0g/hr using method ASTM E3053-17.

4187-990A



UL 127-2011, CAN/ULC-S610



Model:  
**Northstar**  
**EPA CERTIFIED FIREPLACE**

**HEAT&GLO**

A brand of Hearth & Home Technologies  
7571 - 215th Street West, Lakeville, MN. 55044  
[www.quadrafire.com](http://www.quadrafire.com)

**NE PAS surcuison. UTILISER UNIQUEMENT: COMBUSTIBLES SOLIDES OU BOIS COTÉES APPLIANCE DE GAZ DÉCORATIF. NE PAS UTILISER UN INSERT CHEMINÉE OU AUTRES PRODUITS NON POUR USAGE SPÉCIFIÉ AVEC CE PRODUIT.**

**AVERTISSEMENT! CE FOYER N'A PAS ÉTÉ TESTÉ AVEC UN JOURNAL DE GAZ NON APPROUVÉ. POUR RÉDUIRE LES RISQUES D'INCENDIE OU DE BLESSURES, N'INSTALLEZ PAS D'ENREGISTREMENT DE GAZ NON CONTINU AU FOYER.**

**NE PAS UTILISER DE GRATE OU D'ÉLEVER UN FEU. CONSTRUISEZ UN FEU DE BOIS DIRECTEMENT SUR FIREBRICK.**

**ATTENTION! POUR ÉVITER LE RISQUE DE MATÉRIAUX ENDOMMAGER FOYER ET AUGMENTER LE RISQUE DE DIFFUSER UN INCENDIE NE PAS UTILISER LA FOYER À CHAUD DES ALIMENTS OU COOK.**

**INSTALLEZ ET UTILISEZ EN ACCORD AVEC LES INSTRUCTIONS D'INSTALLATION ET D'OPÉRATION DU FABRICANT. LES ZONES DE L'APPAREIL COMPORTANT DES CONDUITS D'AIR CHAUD ET FROID DOIVENT ÊTRE ENFERMÉES SELON LES INSTRUCTIONS D'INSTALLATION DU FABRICANT. CONTACTEZ LE BUREAU DE LA CONSTRUCTION OU LE BUREAU DES INCENDIES AU SUJET DES RESTRICTIONS ET DES INSPECTIONS D'INSTALLATION DANS VOTRE VOISINAGE.**

**LES PIÈCES EXIGÉES POUR L'INSTALLATION: LES SÉRIES DE CONDUITS HEARTH & HOME TECHNOLOGIES SL, CHAPEAU DE TERMINAISON, EXTENSION DE PROTECTION DE SOL ET LE KIT ACCESSOIRE DE CHEMINÉE CAK4A. NE PAS CONNECTER CET APPAREIL À UNE CHEMINÉE SERVANT UN AUTRE APPAREIL. DANGER: IL Y A RISQUE DE DÉCHARGE ÉLECTRIQUE. DÉCONNECTEZ LE FIL ÉLECTRIQUE DE LA PRISE DE CONTACT AVANT LE SERVICE. PUISSANCE ÉLECTRIQUE: 115 VAC, 3.0T AMPS, 60 HZ. DOIT FOURNIR UNE SOURCE D'AIR AFIN DE PRÉVENIR L'INANITION D'AIR DURANT LA COMBUSTION CE QUI POURRAIT CONDUIRE À DE HAUTS NIVEAUX DE MONOXYDE DE CARBONE.**

**SI DES INSTRUCTIONS D'INSTALLATION OU D'UTILISATION SONT MANQUANTES, CONTACTEZ:  
HEARTH & HOME TECHNOLOGIES,  
7571 215th Street West, Lakeville, MN 55044**

**LA PROTECTION DE SOL DOIT ÊTRE  
INSTALLÉE SELON LES INSTRUCTIONS  
D'INSTALLATION**

Cet appareil de chauffage au bois doit être inspecté et réparé périodiquement pour fonctionner correctement. Consultez le manuel du propriétaire pour plus d'informations. Il est contraire à la réglementation fédérale d'utiliser ce poêle à bois d'une manière non conforme aux instructions d'utilisation du manuel du propriétaire.

**NE PAS ENLEVER L'ÉTIQUETTE**

Fabriqués aux États-Unis-d'Amérique par des pièces d'origine américaine et pièces importées.

Mfg  
by: **HEARTH & HOME**  
technologies

**4187-990A**



UL 127-2011, CAN/ULC-S610



Model:  
**Pioneer-II-C**  
**EPA CERTIFIED FIREPLACE**

**QUADRA-FIRE®**

**NOTHING BURNS LIKE A QUAD**

A brand of Hearth & Home Technologies  
7571 - 215th Street West, Lakeville, MN. 55044  
www.quadrafire.com

SERIAL NO./NUMERO DESERE

MP184

MODEL

PIONEER-II-C

FIRE CHAMBER INTENDED FOR USE WITH HEARTH & HOME TECHNOLOGIES LISTED FIREPLACE PARTS. SEE INSTALLATION AND OPERATING INSTRUCTIONS FOR THIS MODEL. REPLACE GLASS ONLY WITH CERAMIC.

DO NOT OVERFIRE. USE ONLY: SOLID WOOD FUEL. DO NOT USE A FIREPLACE INSERT OR OTHER PRODUCTS NOT SPECIFIED FOR USE WITH THIS PRODUCT.

WARNING! THIS FIREPLACE HAS NOT BEEN TESTED WITH AN UNVENTED GAS LOG SET. TO REDUCE THE RISK OF FIRE OR INJURY, DO NOT INSTALL AN UNVENTED GAS LOG SET INTO FIREPLACE.

DO NOT USE GRATE OR ELEVATE FIRE. BUILD WOOD FIRE DIRECTLY ON FIREBRICK.

WARNING! TO AVOID THE RISK OF DAMAGING FIREPLACE MATERIALS AND INCREASING THE RISK OF SPREADING A FIRE DO NOT USE THE FIREPLACE TO COOK OR WARM FOOD.

INSTALL AND USE ONLY IN ACCORDANCE WITH MANUFACTURER'S INSTALLATION, VENTING AND OPERATING INSTRUCTIONS. ANY AREA INCORPORATING WARM OR COLD AIR DUCTS SHALL BE ENCLOSED IN ACCORDANCE WITH THE MANUFACTURER'S INSTALLATION INSTRUCTIONS. CONTACT YOUR LOCAL BUILDING OR FIRE OFFICIALS OR AUTHORITY HAVING JURISDICTION ABOUT RESTRICTIONS, INSTALLATION INSPECTION AND PERMITS REQUIRED IN YOUR AREA. COMPONENTS REQUIRED FOR INSTALLATION: HHT SL300 SERIES PIPE OR DURAVENT DURA PLUS SYSTEM, TERMINATION CAP, HEARTH EXTENSION AND REQUIRED ACCESSORY CHIMNEY AIR KIT PART CAK4A. DO NOT CONNECT THIS UNIT TO A CHIMNEY SERVING ANOTHER APPLIANCE. DANGER: RISK OF ELECTRICAL SHOCK. DISCONNECT POWER SUPPLY BEFORE SERVICING. ELECTRICAL RATING: 115 VAC <3.0 AMPS 60 HZ MUST PROVIDE A SOURCE OF AIR TO PREVENT AIR STARVATION FROM COMBUSTION WHICH COULD RESULT IN HIGH LEVELS OF CARBON MONOXIDE.

FIREPLACE ALSO FOR USE IN MANUFACTURED/MOBILE HOMES WITH SOLID FUEL ONLY YES ☒ NO ☐

FIREPLACE FOR USE OUTDOORS YES ☐ NO ☒

FIREBOX/  
FOYER

CLEARANCE TO  
COMBUSTIBLES:  
DEGAGEMENT DES  
MATERIAUX COMBUSTIBLES:

CHIMNEY/CHEMNEE  
2 IN. MIN.  
51 MM

BACK	1/2	IN. MIN.
RETOUR	13	MM MIN.
SIDE	1	IN. MIN.
COTÉ	25	MM MIN.

IF INSTALLATION OR OPERATING INSTRUCTIONS ARE MISSING CONTACT:  
HEARTH & HOME TECHNOLOGIES,  
7571 215th Street West, Lakeville, MN 55044

THE HEARTH EXTENSION MUST BE  
INSTALLED ACCORDING TO THE  
INSTALLATION INSTRUCTIONS.

This wood heater needs periodic inspection and repair for proper operation. Consult 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.

DO NOT REMOVE THIS LABEL

Made in U.S.A. of US and imported parts

Mfg  
by:



2019 2020 2021 2022 2023 2024 Jan Feb Mar Apr May June July Aug Sept Oct. Nov. Dec.



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

This wood heater was found to have an average emissions rate of 2.0g/hr using method ASTM E3053-17.

4184-990A



UL 127-2011, CAN/ULC-S610



Model:  
**Pioneer-C-II**  
**EPA CERTIFIED FIREPLACE**



A brand of Hearth & Home Technologies  
7571 - 215th Street West, Lakeville, MN. 55044  
[www.quadrafire.com](http://www.quadrafire.com)

**NE PAS surcuison. UTILISER UNIQUEMENT: COMBUSTIBLES SOLIDES OU BOIS COTÉES APPLIANCE DE GAZ DÉCORATIF. NE PAS UTILISER UN INSERT CHEMINÉE OU AUTRES PRODUITS NON POUR USAGE SPÉCIFIÉ AVEC CE PRODUIT.**

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**SI DES INSTRUCTIONS D'INSTALLATION OU D'UTILISATION SONT MANQUANTES, CONTACTEZ:  
HEARTH & HOME TECHNOLOGIES,  
7571 215th Street West, Lakeville, MN 55044**

**LA PROTECTION DE SOL DOIT ÊTRE  
INSTALLÉE SELON LES INSTRUCTIONS  
D'INSTALLATION**

Cet appareil de chauffage au bois doit être inspecté et réparé périodiquement pour fonctionner correctement. Consultez le manuel du propriétaire pour plus d'informations. Il est contraire à la réglementation fédérale d'utiliser ce poêle à bois d'une manière non conforme aux instructions d'utilisation du manuel du propriétaire.

**NE PAS ENLEVER L'ÉTIQUETTE**

Fabriqués aux États-Unis-d'Amérique par des pièces d'origine américaine et pièces importées.

Mfg  
by: **HEARTH & HOME**  
technologies

**4184-990A**

# Installation Manual

## Installation and Fireplace Setup

Pour demander un exemplaire en français de ce Manuel du propriétaire, visitez [www.majesticproducts.com/translations](http://www.majesticproducts.com/translations).

**INSTALLER:** Leave this manual with party responsible for use and operation.

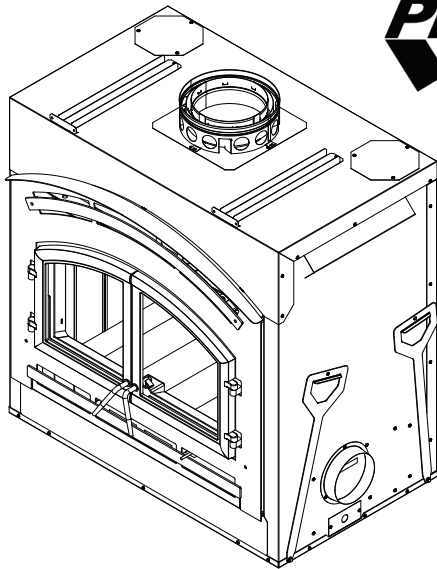
**OWNER:** Retain this manual for future reference.

Contact your dealer with questions on installation, operation, or service.



**Model(s):**

**WarmMajic-II**



**EPA CERTIFIED WOODBURNING  
FIREPLACE**

### **WARNING! Risk of Fire and/or Asphyxiation!**

- Read all the instructions before starting the installation. Follow these instructions carefully during the installation to ensure maximum safety and benefit.
- Comply with all minimum clearances to combustibles as specified. Failure to comply may cause house fire.

### **⚠ WARNING**



#### **HOT SURFACES!**

Glass and other surfaces are hot during operation AND cool down.

#### **Hot glass will cause burns.**

- **DO NOT** touch glass until it is cooled
  - NEVER allow children to touch glass
  - Keep children away
  - CAREFULLY SUPERVISE children in same room as fireplace.
  - Alert children and adults to hazards of high temperatures.
- High temperatures may ignite clothing or other flammable materials.**
- Keep clothing, furniture, draperies and other flammable materials away.

Installation and service of this appliance should be performed by qualified personnel, Hearth & Home Technologies recommends HHT Factory Trained or NFI certified professionals.



## Safety Alert Key:

- **DANGER!** Indicates a hazardous situation which, if not avoided will result in death or serious injury.
- **WARNING!** Indicates a hazardous situation which, if not avoided could result in death or serious injury.
- **CAUTION!** Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.
- **NOTICE:** Indicates practices which may cause damage to the fireplace or to property.

## Table of Contents

Installation Standard Work Checklist	3	<b>5 Chimney and Termination Requirements</b>	
<b>1 Product Specific &amp; Important Safety Information</b>		A. Chimney Requirements	23
A. Appliance Certification	4	B. Offsets/Returns	24
B. BTU & Efficiency Specifications	4	C. Termination Requirements	25
C. Mobile Home Approved	4	<b>6 Chimney Installation</b>	
D. Glass Specifications	4	A. Typical Chimney System	26
E. Non-Combustible Materials	5	B. Assemble Chimney Sections	27
F. Combustible Materials	5	C. Install Chimney Air kit (CAK4A)	27
G. Electrical Codes	5	D. Secure Offset/Return	28
<b>2 Getting Started</b>		E. Install Firestops	29
A. Typical Fireplace System	6	F. Install Attic Insulation Shield	30
B. Design and Installation Considerations	7	G. Roof Penetration	31
1. Selecting Fireplace Locations	7	H. Manufactured Home Installation	31
2. Locating Fireplace & Chimney	8	I. Install Chase/Chase Top	32
C. Tools and Supplies Needed	9	J. Install Termination Cap	33
D. Inspect Fireplace and Components	9	<b>7 Finishing</b>	
E. Fireplace System Requirements	9	A. Template	35
<b>3 Framing and Clearances</b>		B. Finish the Wall	36
A. Fireplace Dimensions	10	1. Stone, Brick Finish	36
B. Clearances	11	2. Tile, Granite, Marble Finish	36
C. Construct the Chase	12	C. Mantel and Wall Projections	36
D. Frame the Fireplace	12	D. Finishing the Hearth Extension	37
E. Secure and Level the Fireplace	13	E. Non-Combustible Sealant Material	38
F. Installation of Top Standoffs	14	<b>8 Reference Materials</b>	
G. Protective Metal Hearth Strips	14	A. Firebrick Placement	39
H. Non-Combustible Facing Board (Provided)	15	B. Baffle and Blanket Placement	40
I. Outside Air Kit	15	C. Install Fascia (Fronts)	40
J. Heat-Zone-WD Kit (Optional)	18	D. Chimney Components	41
<b>4 Electrical Wiring</b>	<b>22</b>	E. Accessories	46



## ATTENTION INSTALLER:

### Follow this Standard Work Checklist

This standard work checklist is to be used by the installer in conjunction with, not instead of, the instructions contained in this installation manual.

<b>Customer:</b> _____	<b>Date Installed:</b> _____	
<b>Lot/Address</b> _____	<b>Location of Fireplace:</b> _____	
_____	<b>Installer:</b> _____	
_____	<b>Dealer/Distributor Phone #</b> _____	
<b>Model:</b> WarmMajic-II	<b>Serial #:</b> _____	

**WARNING! Risk of Fire or Explosion!** Failure to install fireplace according to these instructions can lead to a fire or explosion.

#### **Fireplace Install Section 3 (page 10-18)**

Verified that the chase is insulated and sealed.  
 Required top standoffs installed.  
 Required non-combustible board is installed.  
 Verified clearances to combustibles.  
 Fireplace is leveled and secured.  
 Hearth extension size/height decided.  
 Outside air kit installed.  
 Optional Heat Zone has been installed by a qualified service technician.  
 Fan air kit installed.

YES	IF NO, WHY?
<input type="checkbox"/>	_____
<input type="checkbox"/>	_____
<input type="checkbox"/>	_____
<input type="checkbox"/>	_____
<input type="checkbox"/>	_____
<input type="checkbox"/>	_____
<input type="checkbox"/>	_____
<input type="checkbox"/>	_____

#### **Chimney Section 5 (page 26-33)**

Chimney configuration complies with diagrams.  
 Chimney installed, locked and secured in place with proper clearance.  
 Chimney air kit installed.  
 Firestops installed.  
 Attic insulation shields installed.  
 Roof flashing installed and sealed.  
 Terminations installed and sealed.

<input type="checkbox"/>	_____
<input type="checkbox"/>	_____
<input type="checkbox"/>	_____
<input type="checkbox"/>	_____
<input type="checkbox"/>	_____
<input type="checkbox"/>	_____
<input type="checkbox"/>	_____

#### **Electrical Section 4 (page 22)**

Switch wires properly installed.

<input type="checkbox"/>	_____
--------------------------	-------

#### **Finishing Section 7 (page 35-38)**

Combustible materials not installed in non-combustible areas.  
 Verified all clearances meet installation manual requirements.  
 Mantels and wall projections comply with installation manual requirements.  
 Protective hearth strips and hearth extension installed per manual requirements.

<input type="checkbox"/>	_____
<input type="checkbox"/>	_____
<input type="checkbox"/>	_____

#### **Fireplace Setup Section 8 (page 39-40)**

All packaging and protective materials removed.  
 Firebrick, baffle and ceramic blanket installed correctly.  
 Facia and doors properly installed.  
 Manual bag and all of its contents are removed from inside/under the fireplace and given to the party responsible for use and operation.  
 All packaging materials are removed from inside/under the fireplace.

<input type="checkbox"/>	_____
<input type="checkbox"/>	_____
<input type="checkbox"/>	_____
<input type="checkbox"/>	_____

#### **Hearth & Home Technologies recommends the following:**

- Photographing the installation and copying this checklist for your file.
- That this checklist remain visible at all times on the fireplace until the installation is complete.

**Comments:** Further description of the issues, who is responsible (Installer/Builder/Other Trades, etc.) and corrective action needed:

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Comments communicated to party responsible \_\_\_\_\_ by \_\_\_\_\_ on \_\_\_\_\_  
 (Builder/Gen. Contractor) (Installer) (Date)

# 1 Product Specific & Important Safety Information

## A. Appliance Certification

<b>Model:</b>	WarmMajic-II
<b>Laboratory:</b>	Underwriter's Laboratories, Inc.
<b>Report No:</b>	Project
<b>Type:</b>	Wood Fireplace
<b>Standard:</b>	UL127-2011 and CAN/ULC-S610-2018 (A1998) and (UM) 84-HUD, Manufactured Home Approved.

The WarmMajic-II Wood Appliance meets the U.S. ENVIRONMENTAL PROTECTION AGENCY Certified to comply with 2020 particulate emission standards using cord wood.

## B. BTU & Efficiency Specifications

EPA Certified Emissions:	1.8 g/hr
*LHV Tested Efficiency:	76%
**HHV Tested Efficiency:	70%
***EPA BTU Output:	17,600 to 48,200
Vent Size:	8 inches
Firebox Size:	2.7 cubic feet
Recommended Log Length:	22 inches
Fuel	Seasoned Cord Wood less than 20% moisture
HHT:	SL300 Series
DuraVent:	DuraPlus
*Weighted average LHV (Low Heating Value) efficiency using cord wood and data collected during EPA emission test. LHV assumes the moisture is already in a vapor state so there is no loss in energy to vaporize.	
**Weighted average HHV (High Heating Value) efficiency using cord wood and data collected during EPA emission test. HHV includes the energy required to vaporize the water in the fuel.	
***A range of BTU outputs based on HHV (High Heating Value) and the burn rates from the low and high EPA tests, using cord wood.	

The WarmMajic-II is Certified to comply with 2020 particulate emission standards.



## C. Mobile Home Approved

This appliance is approved for mobile home installations when not installed in a sleeping room and when an outside combustion air inlet is provided. The structural integrity of the mobile home floor, ceiling, and walls must be maintained. The appliance must be properly grounded to the frame of the mobile home and use only listed double-wall connector pipe.

## D. Glass Specifications

This appliance is equipped with 5mm ceramic glass. Replace glass only with 5mm ceramic glass. Please contact your dealer for replacement glass.

**NOTE:** This installation must conform with local codes. In the absence of local codes you must comply with the **UL127-2011, (UM) 84-HUD and NPFA211** in the U.S.A. and the **CAN/ULC S610-2018 (A1998) and CAN/CSA-B365 Installation Codes** in Canada.

### DO NOT:

- install or operate damaged fireplace
  - modify fireplace
  - install other than as instructed by *Hearth & Home Technologies*
  - operate the fireplace without fully assembling all components
  - install unvented gas log set
  - install any component not approved by *Hearth & Home Technologies*
  - install parts or components not Listed or approved
- Improper installation, adjustment, alteration, service or maintenance can cause injury or property damage. For assistance or additional information, consult a qualified installer, service agency or your dealer.*

**WARNING! Risk of Fire!** *Hearth & Home Technologies disclaims any responsibility for, and the warranty and agency listing will be voided by the above actions.*

Hearth & Home Technologies WILL NOT warranty appliances that exhibit evidence of over-firing. Evidence of over-firing includes, but is not limited to:

- Warped air tube
- Deteriorated refractory brick retainers
- Deteriorated baffle and other interior components

## E. Non-Combustible Materials

Material which will not ignite and burn, composed of any combination of the following:

- Steel
- Brick
- Concrete
- Glass
- Plaster
- Iron
- Tile
- Slate

Materials reported as passing **ASTM E 136, Standard Test Method for Behavior of Metals, in a Vertical Tube Furnace of 750° C.**

## F. Combustible Materials

Material made of or surfaced with any of the following materials:

- Wood
- Plant Fibers
- Plywood/OSB
- Foam insulation & sealants
- Compressed Paper
- Plastic
- Sheet Rock (drywall)

Any material that can ignite and burn: flame proofed or not, plastered or un-plastered.

## G. Electrical Codes

**NOTICE:** *This fireplace must be electrically wired and grounded in accordance with local codes or, in the absence of local codes, with **National Electric Code ANSI/NFPA 70-latest edition** or the **Canadian Electric Code CSA C22.1**.*

- A 110-120 VAC circuit for this product must be protected with ground-fault circuit-interrupter protection, in compliance with the applicable electrical codes, when it is installed in damp locations.

**WARNING!** *Improper installation, adjustment, alteration, service or maintenance can cause injury or property damage.*

## 2 Getting Started

### A. Typical Fireplace System

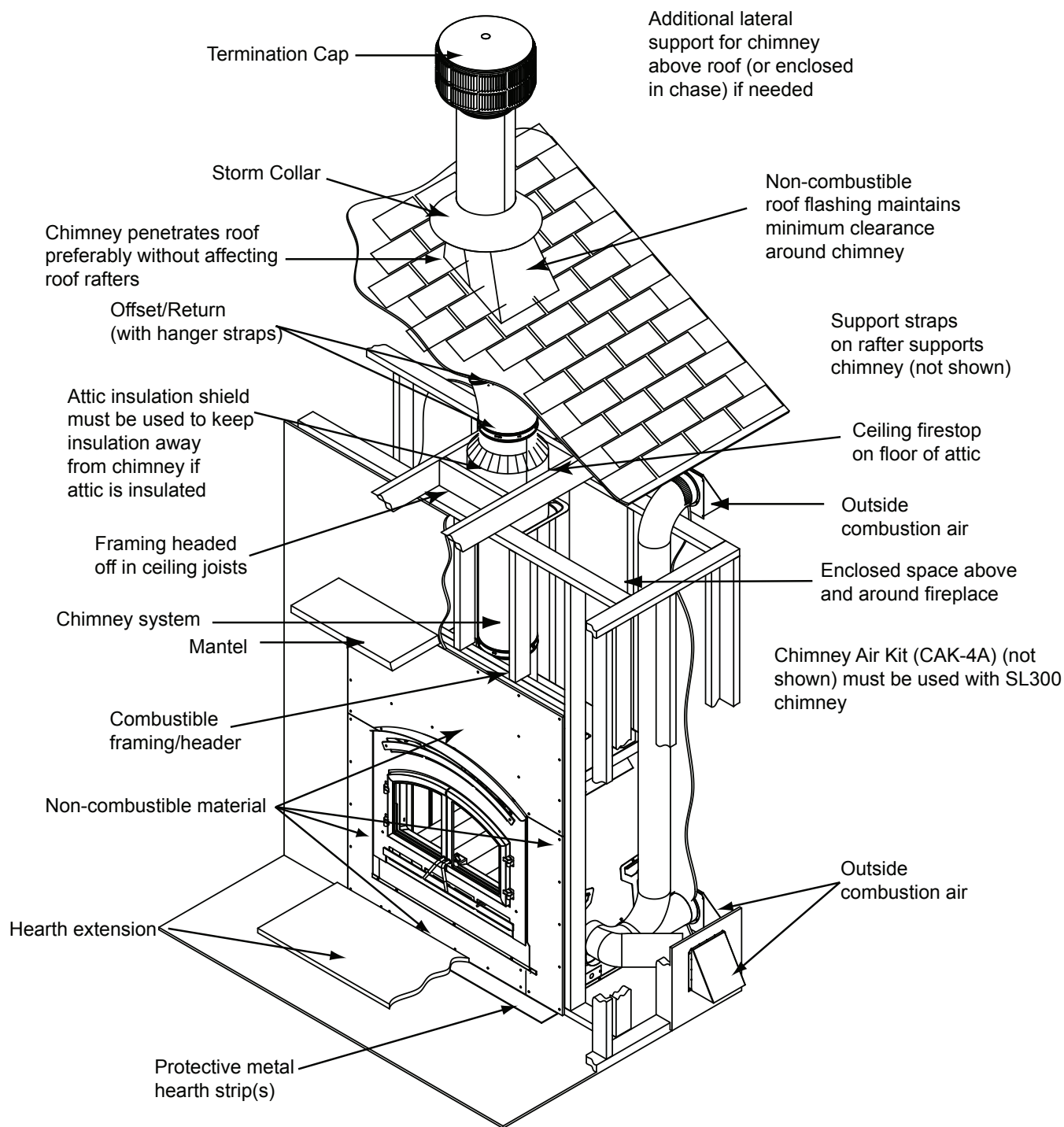


Figure 2.1 Typical Fireplace System

## B. Design and Installation Considerations

**NOTICE:** Check building codes prior to installation.

- Installation **MUST** comply with local, regional, state and national codes and regulations.
- Consult insurance carrier, local building inspector, fire officials or authorities having jurisdiction over restrictions, installation inspection and permits.

### 1. Selecting Fireplace Locations

This fireplace may be used as a room divider, installed along a wall, across a corner or used in an exterior chase. See Figure 2.2.

Locating the fireplace in a basement, near frequently opened doors, central heat outlets or returns, or other locations of considerable air movement can affect the performance.

Outside air must be used for combustion. The WarmMajic-II comes equipped with an outside air inlet to feed combustion air from outside the home, along with an outside air termination cap; the metal duct is required but not supplied. Consideration should be given to these factors before deciding on a location.

**NOTICE:** In addition to these framing dimensions, also reference the following section:

- Clearances (Section 3).

**NOTICE:**

- Illustrations and photos reflect typical installations and are FOR DESIGN PURPOSES ONLY.
- Illustrations/diagrams are not drawn to scale.
- Actual installation/appearance may vary due to individual design preference.
- Hearth & Home Technologies reserves the right to alter its products.

**NOTICE:**

A minimum 1/2 in. air clearance at the back and a minimum 1 in. air clearance to the sides of the fireplace assembly must be maintained.

Chimney sections at any level require a 2 in. minimum air space clearance between the framing and chimney sections.

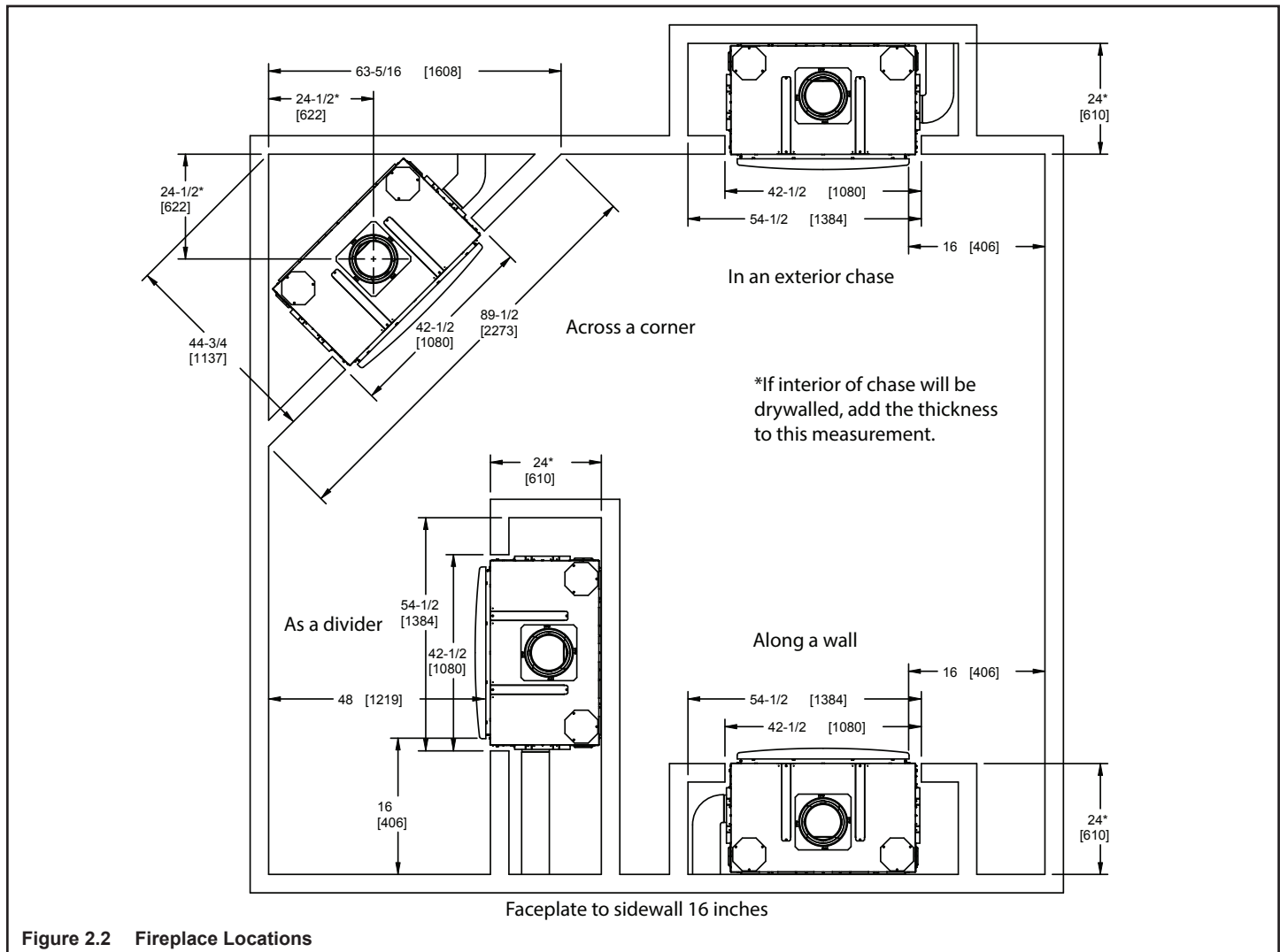
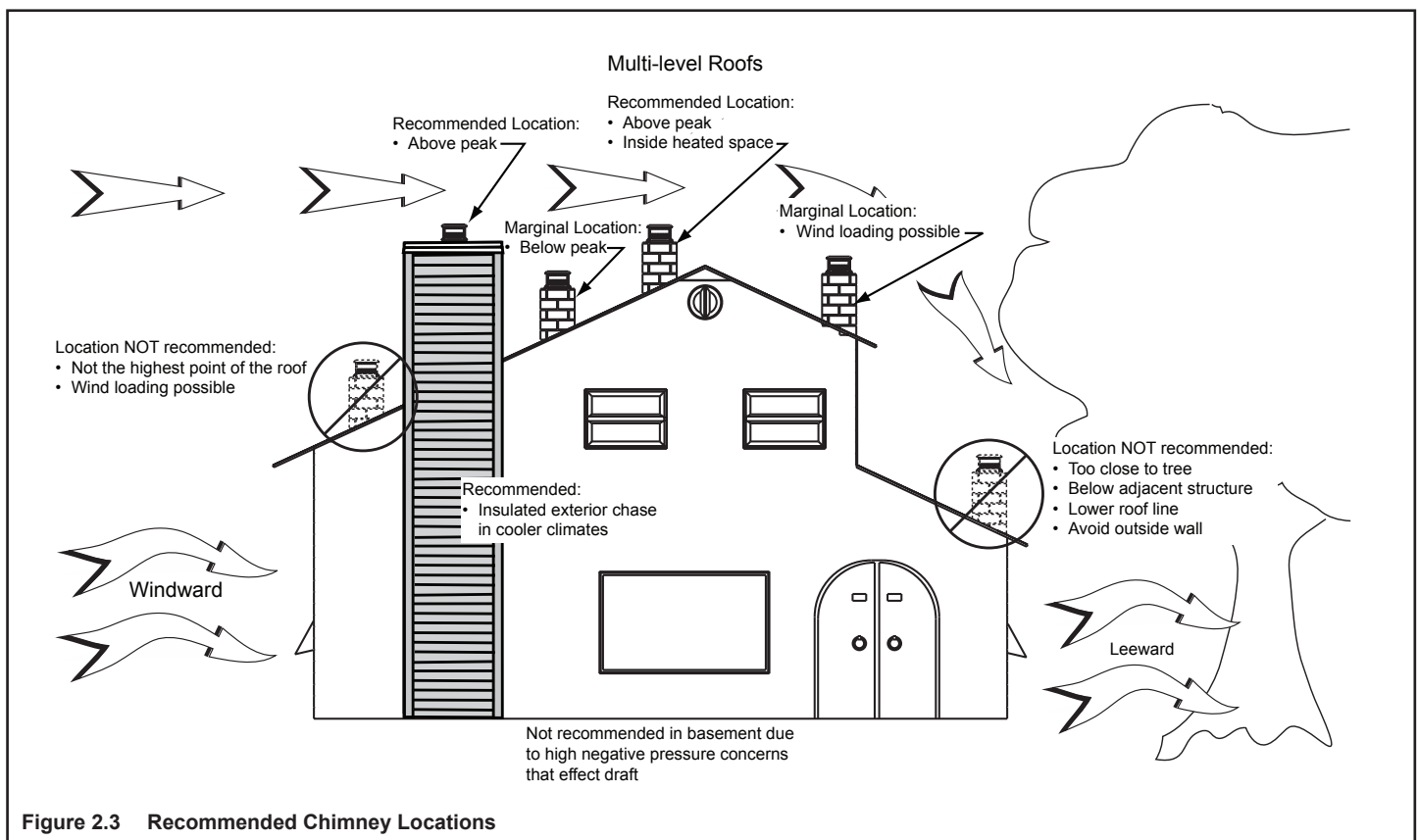


Figure 2.2 Fireplace Locations

## 2. Locating Fireplace & Chimney

Location of the fireplace and chimney will affect performance.

- Install within the warm airspace enclosed by the building envelope. This helps to produce more draft, especially during lighting and die-down of the fire.
- Penetrate the highest part of the roof. This minimizes the effects of wind loading.
- Locate termination cap away from trees, adjacent structures, uneven roof lines and other obstructions.
- Minimize the use of chimney offsets.
- Consider the fireplace location relative to floor and ceiling and attic joists.
- Take into consideration the termination requirements in Sections 5 and 6.
- Install the outside air kit and CAK (chimney air kit) with the intake facing prevailing winds during the heating season.
- Ensure adequate outdoor air for all combustion appliances and exhaust equipment.
- Ensure furnace and air conditioning return vents are not located in the immediate vicinity of the fireplace.
- Avoid installing the fireplace near doors, walkways or small isolated spaces.
- Recessed lighting should be a “sealed can” design.
- Attic hatches weather stripped or sealed.
- Attic mounted duct work and air handler joints and seams taped or sealed.



## C. Tools and Supplies Needed

Before beginning the installation be sure the following tools and building supplies are available:

Reciprocating saw	Framing material
Pliers	Non-combustible sealant
Hammer	Gloves
Phillips screwdriver	Framing square
Flat blade screwdriver	Electric drill and bits
Plumb line	Safety glasses
Level	Tape measure
1/2-3/4 in. length, #6 or #8 self-drilling screws	
Misc. screws and nails	

## D. Inspect Fireplace and Components

***WARNING! Risk of Fire and Asphyxiation! Damaged parts could impair safe operation. DO NOT install damaged, incomplete or substitute components.***

- Remove fireplace and components from packaging and inspect for damage.
- Chimney system components and other optional components are shipped separately.
- Report to your dealer any parts damaged in shipment.

## E. Fireplace System Requirements

The Majestic fireplace system requirements consist of the following:

- Fireplace
  - Firebrick (included with fireplace)
  - Door (included with fireplace)
  - Non-combustible facing material (included with fireplace)
  - Hearth Extension
- Outside Air System (hood and collars included with fireplace)
- Fascia
- Chimney System
  - CAK4A Chimney air kit (included with fireplace, required with SL300 series chimney)
  - Attic Insulation Shield (included with fireplace)
  - Chimney termination cap
- Non-combustible finish material
- Fans (included with fireplace)

Optional components include:

- LINTEL - Lintel Bar Kit
- Heat-Zone-WD Kit
- Mesh-HHT - Firescreen

# 3 Framing and Clearances

## A. Fireplace Dimensions

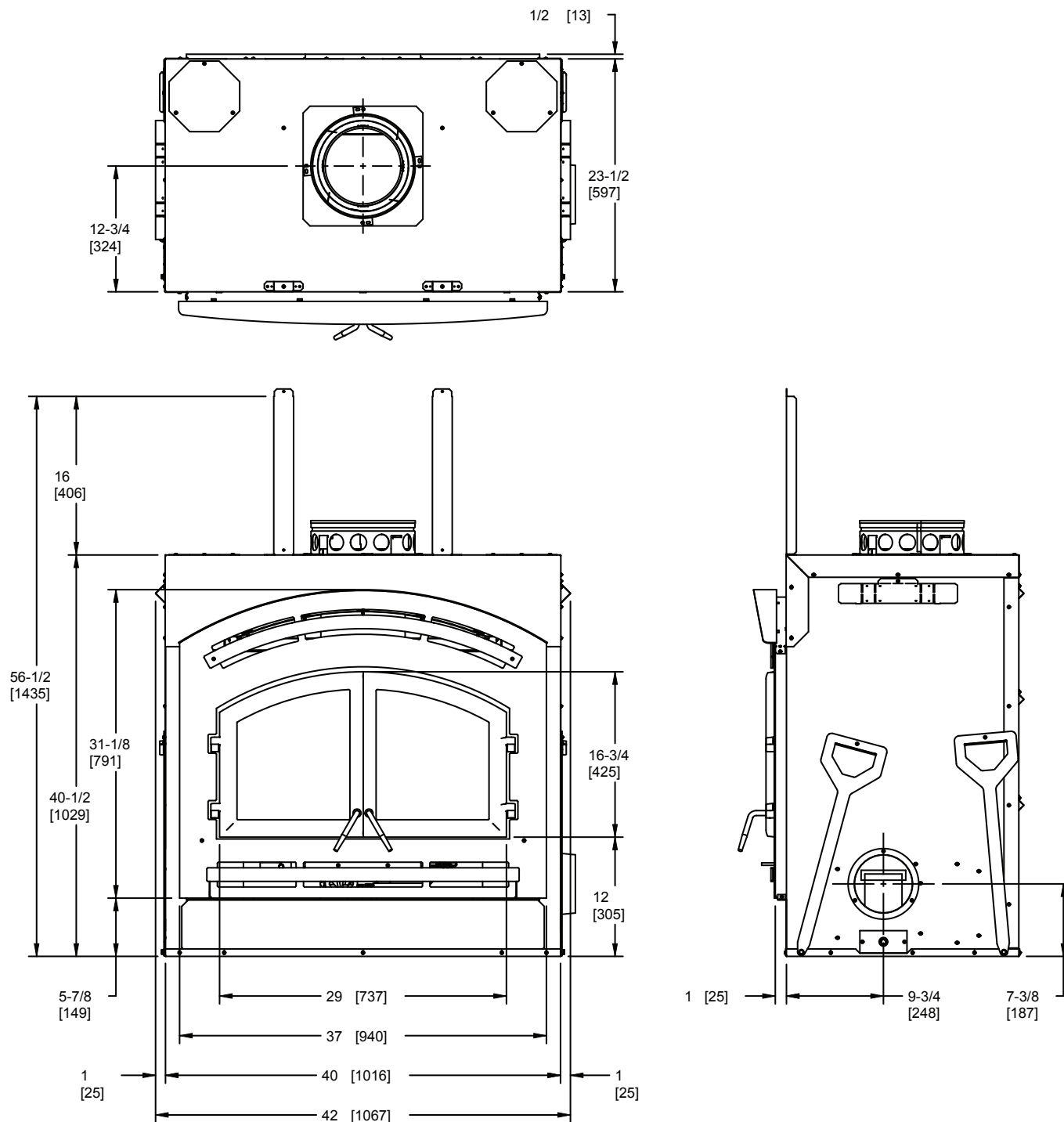


Figure 3.1 Fireplace Dimensions



## B. Clearances

### **WARNING! Risk of Fire!**

You must comply with all minimum air space clearances to combustibles as specified in Figure 3.2. **DO NOT** pack required air spaces with insulation or other materials. Framing or finishing material used on the front of, or in front of the fireplace closer than the minimums listed must be constructed entirely of non-combustible materials (i.e., steel studs, concrete board, etc.). Failure to comply may cause fire.

WITHIN ENCLOSURE AREA	
Fireplace to backwall	1/2 in. (13 mm)
Fireplace to sidewall	1 in. (25 mm)
Duct boots to framing	0 in. (0 mm)
Top of fireplace to header	16 in. (406 mm)
Door opening to sidewall	22-3/4 in. (578 mm)
EXPOSED SURFACES	
Faceplate to sidewall	16 in. (406 mm)
Heat zone air grills to ceiling	12 in. (305 mm)
MANTEL	
Non-combustible mantel	38 in. (965 mm) from the base of the fireplace up
Combustible mantel	60 in. (1524 mm) from the base of the fireplace up
Maximum mantel depth	12 in. (305 mm)

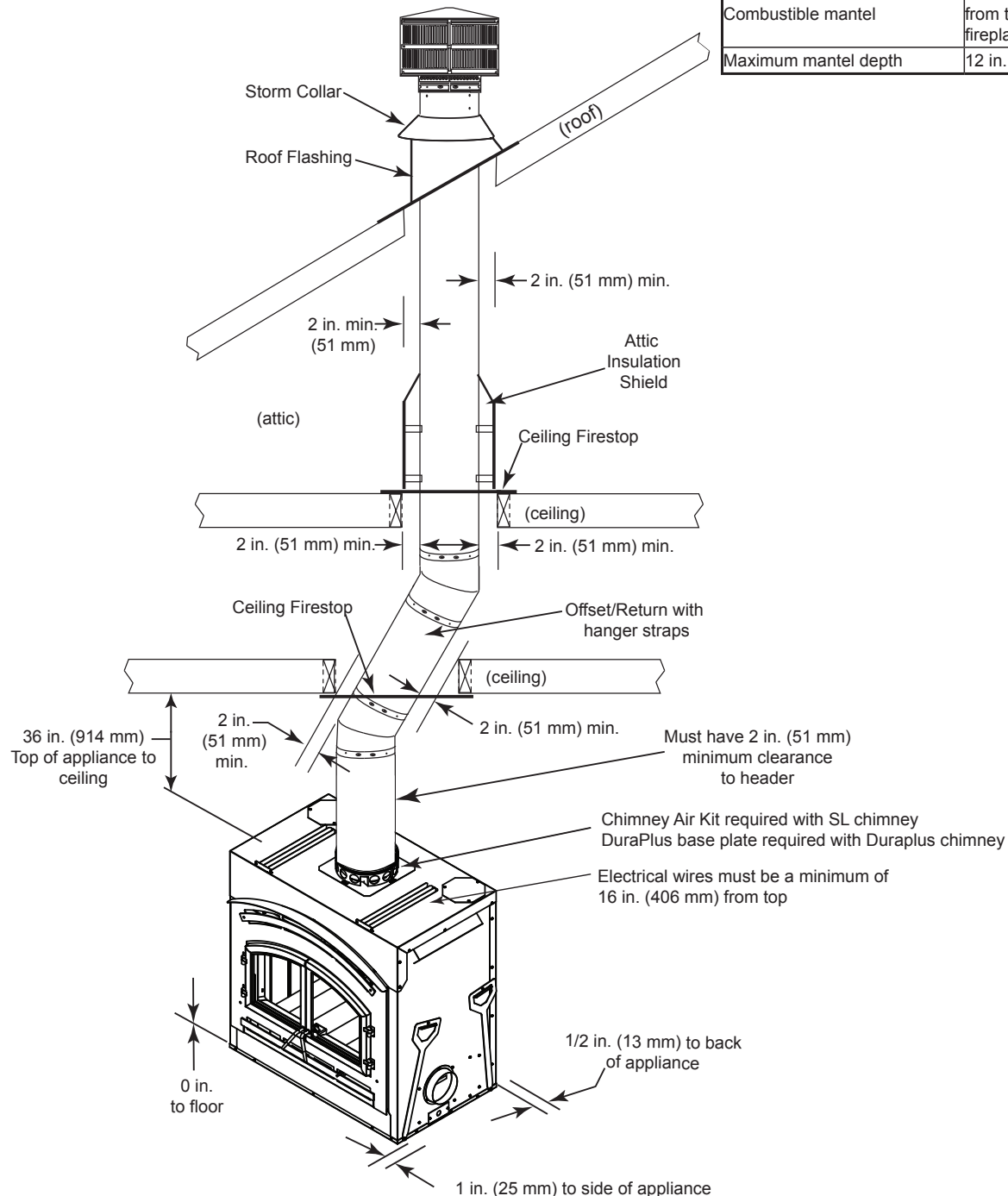


Figure 3.2 Clearances to Combustible Materials

## C. Construct the Chase

**WARNING! Risk of Fire! DO NOT** seal area between fire stop opening and chimney pipe except where they enter the attic or leave the warm air envelope of the home (use 600° F sealant).

**WARNING! Risk of Fire! You must maintain a minimum 2 in. (51 mm) air space clearance to insulation and framing surrounding the chimney system.**

A chase is a vertical boxlike structure built to enclose the fireplace and/or its vent system. Vertical chimneys that run on the outside of a building must be installed inside a chase. See Figure 3.4.

Construction of the chase may vary with the type of building. Local building codes **MUST** be followed.

Hearth & Home Technologies recommends:

- The inside surfaces be drywalled and taped (or the use of an equivalent method) for maximum air tightness to the false ceiling.
  - In cold climates, the walls of the chase should be insulated to the level of the false ceiling as shown in Figure 3.3. This will help reduce heat loss from the home around the fireplace.
  - Holes and other openings should be caulked with high temperature caulk or stuffed with unfaced fiberglass insulation.
- 
- Requirements for constructing the chase:
    - A firestop spacer and attic insulation shield should be installed at the false ceiling.
    - The chase must be properly blocked to prevent blown insulation or other combustibles from entering and making contact with fireplace or chimney.
    - The chase top must be constructed of non-combustible material.
  - The chase is constructed using framing materials much the same as the walls in your home. A variety of siding materials may be used including brick, stone, veneer brick, or standard siding materials.
  - In constructing the chase, several factors must be considered:
    - Maintain a 2 in. (51 mm) air space around the chimney.
    - The chase top must be constructed of non-combustible material.
    - In cold climates, a firestop spacer and attic insulation shield should be installed in an insulated false ceiling at the 8 ft. (2438 mm) level above the fireplace assembly. This reduces heat loss through the chase.
    - In cold climates, the walls of the chase should be insulated to the level of the false ceiling as shown in Figure 3.4. This will help reduce heat loss from the home around the fireplace.

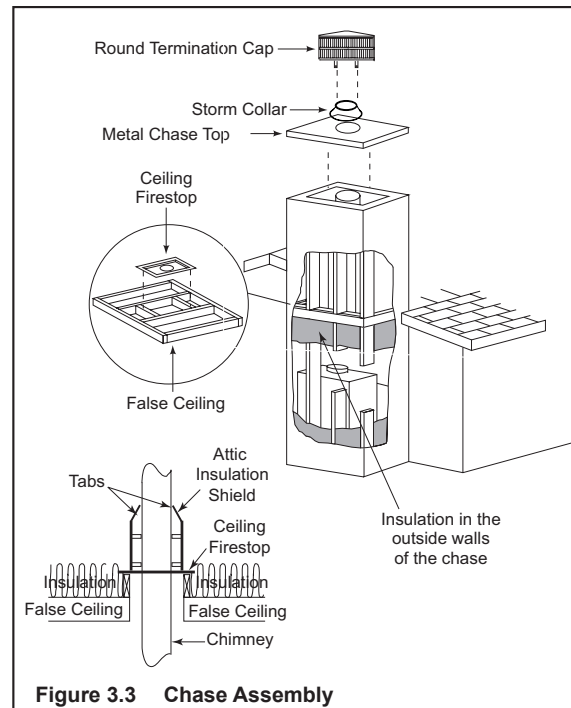


Figure 3.3 Chase Assembly

Three examples of chase applications are shown in Figure 3.4.

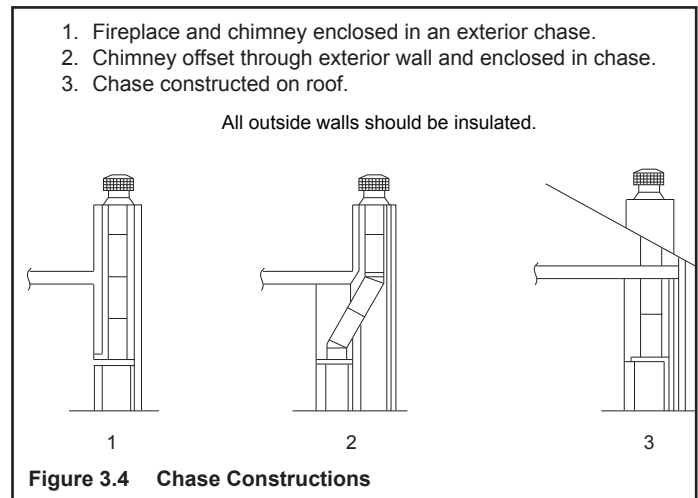


Figure 3.4 Chase Constructions

## D. Frame the Fireplace

**WARNING! Risk of Fire! Comply with all minimum clearances specified.**

- A minimum 1/2 in. (13 mm) air clearance must be maintained at the back and 1 in. (25 mm) to the sides of the fireplace assembly.
- Chimney sections at any level require a 2 in. (51 mm) minimum air space clearance between the framing and chimney section.

**WARNING! Risk of Fire! You must comply with all minimum air space clearances to combustibles. DO NOT** pack required air spaces with insulation or other materials.

**NOTICE:** Hearth extension design must be determined before installation of fireplace.

If the fireplace is placed on the floor, the maximum height of a finished raised hearth (constructed of non-combustible material) is 5-3/4 in. (147 mm). If a higher raised hearth is preferred, the fireplace must be placed on a platform.

**NOTICE:** Wiring for fans must be done before framed enclosure is completed. If using a Heat Zone Kit, it also must be installed before enclosure is complete.

### Standoffs are attached to the fireplace.

The unit can be positioned with the standoffs touching combustible walls or framing but DO NOT pack insulation or other materials in the air space between the fireplace and wall.

Figure 3.5 shows a typical framing (using 2 x 4 lumber) of the fireplace, assuming combustible materials are used. All required clearances to combustibles around the fireplace must be adhered to. See Figure 3.2. (No recess above fireplace.)

The finished cavity depth must be no less than 24 in. (610 mm) from the finished back wall to the outside of front wall framing. Framing must extend straight up all the way to the ceiling.

**CAUTION! Risk of Cuts/Abrasions.** Wear protective gloves and safety glasses during installation. Sheet metal edges are sharp.

### E. Secure and Level the Fireplace

This fireplace may be placed on either a combustible or noncombustible continuous flat surface. Follow the instructions for framing in Section 3. Slide the fireplace into position. Be sure to provide the minimum 1 in. air clearance at the sides and 1/2 in. at the back of the fireplace.

The fireplace should be positioned so the face of the non-combustible material on the fireplace will be flush with the face of the drywall on the walls. See Figure 3.6.

Level the fireplace and shim as necessary. Secure the fireplace (using the pallet mounting brackets located on either side of the fireplace) to the sub floor.

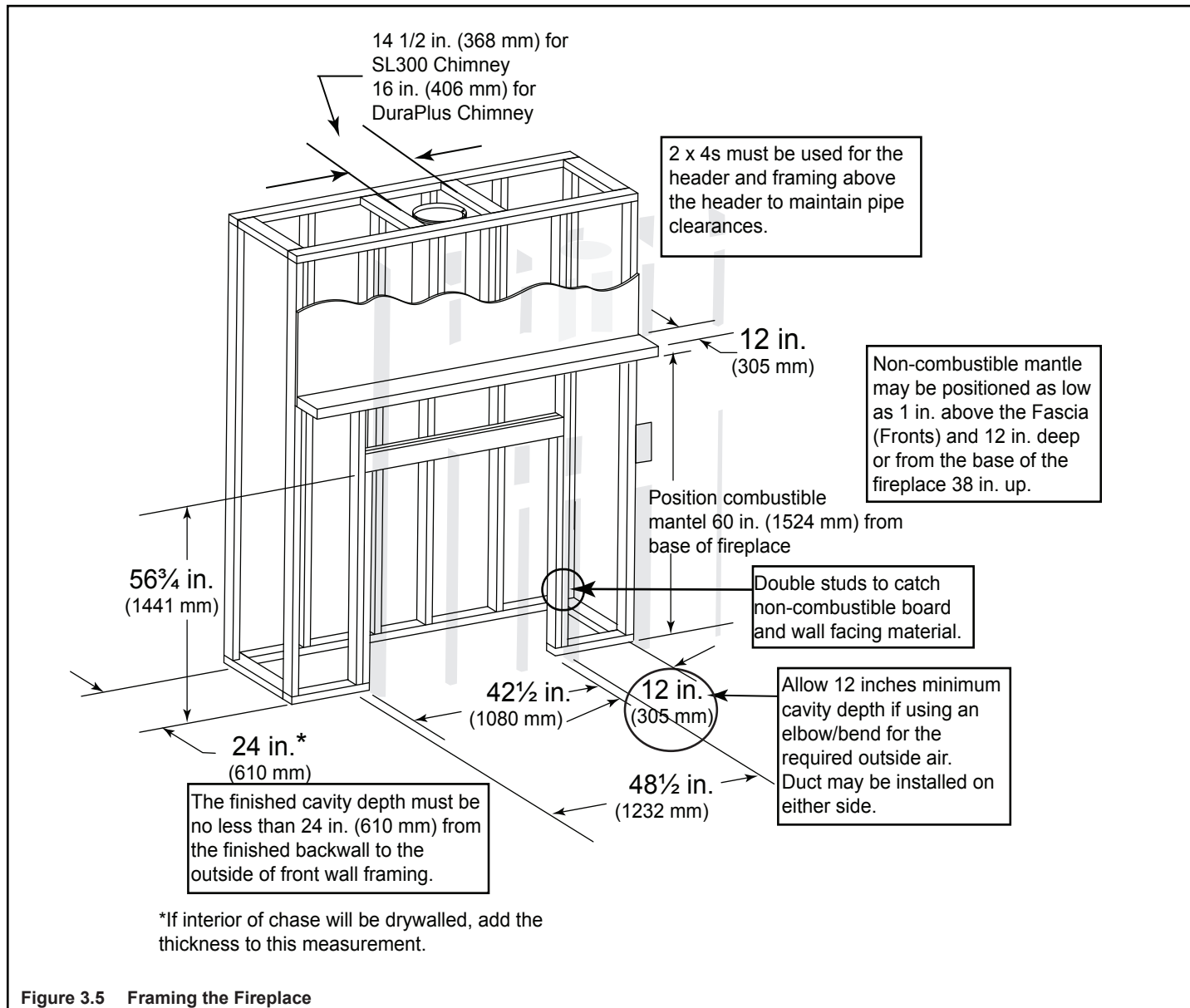


Figure 3.5 Framing the Fireplace

**WARNING! Risk of Fire!** Prevent contact with sagging, loose insulation.

- **DO NOT** install against vapor barriers or exposed insulation.
- Secure insulation and vapor barriers.
- Provide minimum air space clearances at the sides and back of the fireplace assembly as outlined in Section 3.

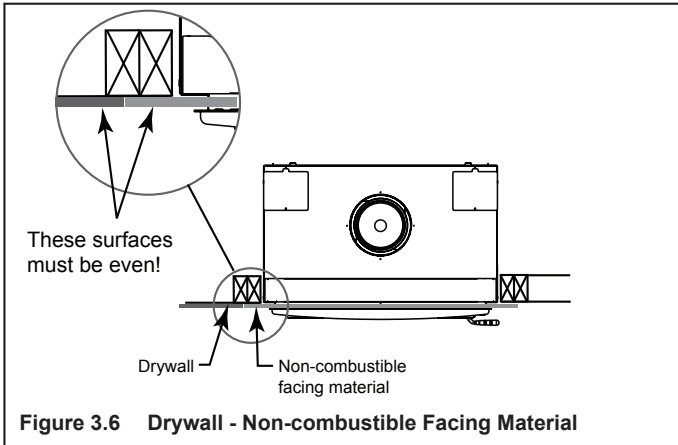


Figure 3.6 Drywall - Non-combustible Facing Material

## F. Installation of Top Standoffs

Remove the top front standoffs from the top of the fireplace. See Figure 3.7. Screw the standoffs to the fireplace as shown in Figure 3.8. The top of the standoffs will be screwed to the header.

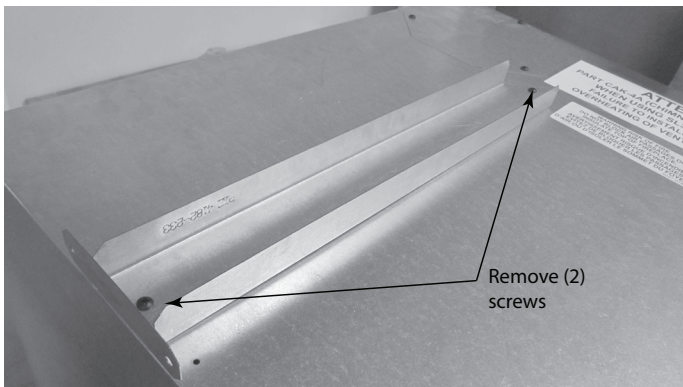


Figure 3.7 Remove Standoffs

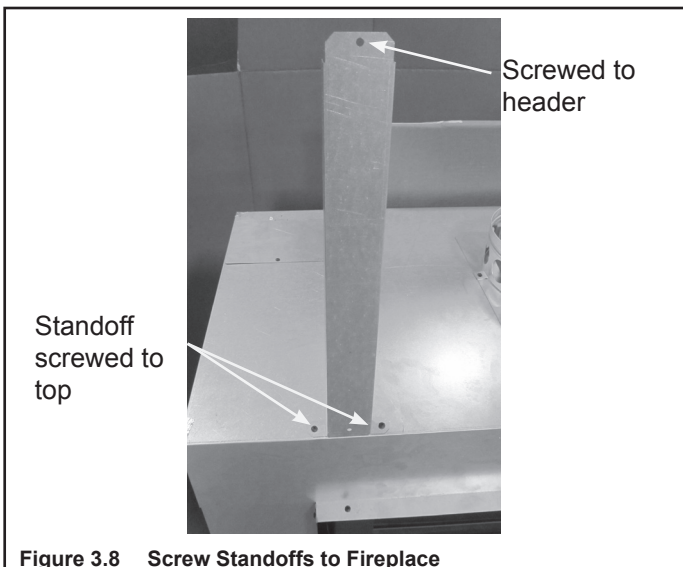


Figure 3.8 Screw Standoffs to Fireplace

## G. Protective Metal Hearth Strips

**WARNING! Risk of fire!** High temperatures, sparks, embers or other burning material falling from the fireplace may ignite flooring or concealed combustible surfaces.

- Protective metal hearth strips **MUST** be installed over combustible surfaces.
- Hearth extensions **MUST** be installed exactly as specified.
- Locate the two protective metal hearth strips measuring approximately 26 in. x 4 in. (660 mm x 102 mm) included with this fireplace.
- Slide each metal strip 2 in. (51 mm) under front edge of fireplace.
- Overlap strips in the middle of fireplace opening by 1 in. (25 mm) minimum.
- Metal strips must extend beyond the front and sides of the fireplace opening by at least 2 in. (51 mm). See Figure 3.6.
- Protect the front of a platform elevated above the hearth extension with metal strips (not included with fireplace) per Figure 3.10. See Section 7 for hearth extension instructions.
- **DO NOT** cover metal strips with combustible materials. Sparks or embers may ignite flooring.

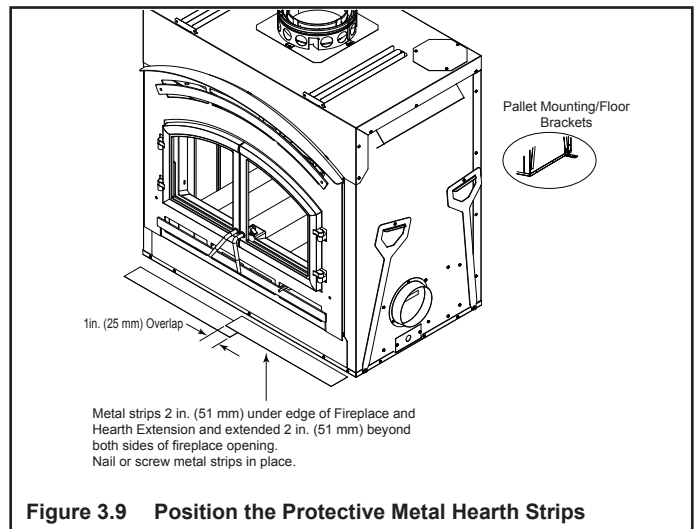


Figure 3.9 Position the Protective Metal Hearth Strips

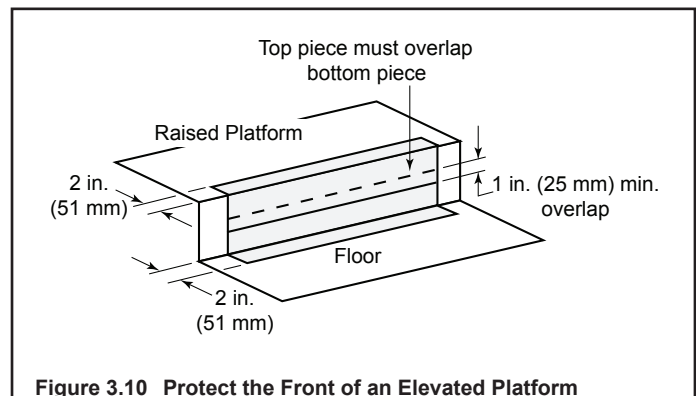


Figure 3.10 Protect the Front of an Elevated Platform



## H. Non-Combustible Facing Board (Provided)

### **WARNING! Risk of Fire!**

Follow these instructions exactly.

Facing materials must be installed properly to prevent fire.

No materials may be substituted without authorization by Hearth & Home Technologies.

**TOOLS NEEDED:** Powered drill with #2 Phillips head bit; caulking gun.

Only non-combustible materials (supplied with fireplace) may be used to cover the metal fireplace front.

**NOTE:** All boards are pre-drilled for your convenience. Boards **MUST** be attached in the following order: bottom, sides, and then the top, red-painted side out. The top and bottom board should each have a hang tag attached. Leave them attached for referral for the finishing operation.

- Attach the bottom board to the bottom of the outer fireplace outer shell with enclosed screws, ensuring the board is centered. **DO NOT remove hang tags.** Attach the side pieces to the outer can and framing members.
- Center and attach the top board to the outer shell and framing members. **DO NOT remove hang tags.**

**NOTICE:** 1/8 in. of the facing material may be visible after finishing materials are applied. This 1/8 in. must be painted or the red will show.

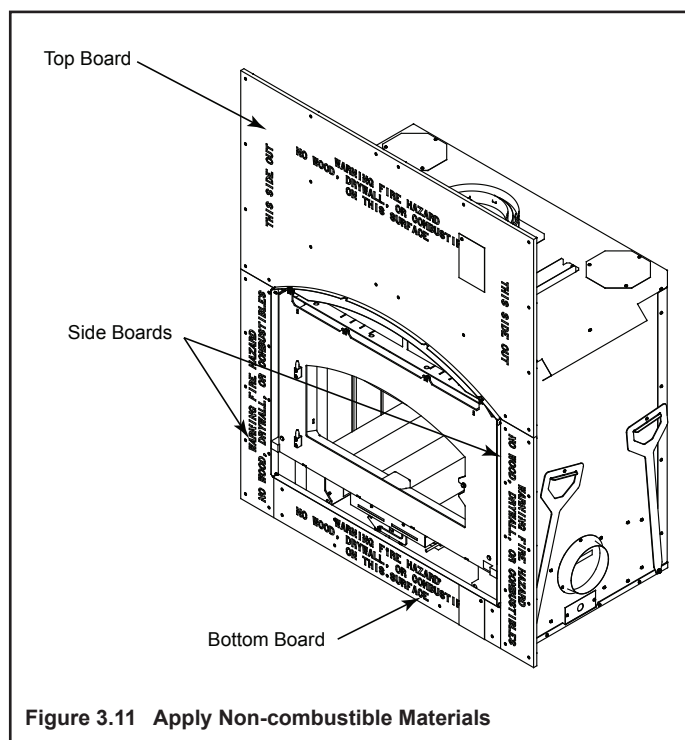


Figure 3.11 Apply Non-combustible Materials

## I. Outside Air Kit

An outside air kit must be used for combustion. Hearth & Home Technologies recommends you utilize the shortest duct run to optimize the performance of the outside air kit. The outside air inlet hood should be positioned in a manner that will not allow snow, leaves, etc. to block the inlet. In some installations the air duct may need to be run vertically. In such an installation, a 3 ft (914 mm) height difference must be maintained from the top of the uppermost chimney section to the outside air inlet hood.

Refer to Figures 3.18 and 3.19 when placing the outside air inlet hood.

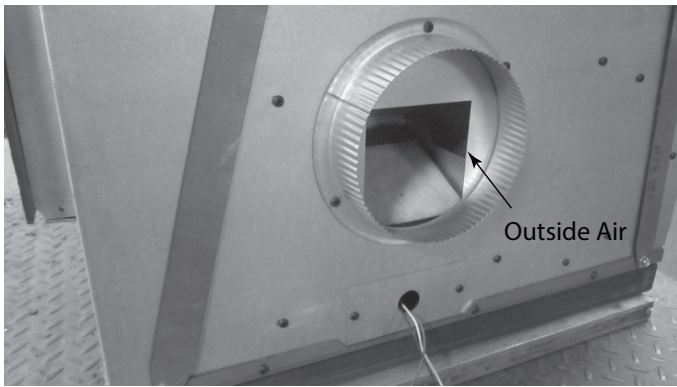
The outside air kit comes installed on the right hand side of the fireplace but may be moved to the other side by following these steps:

1. Remove outside air collar (Figure 3.12) and the outside air cover plate (Figure 3.13).
  2. Install the cover plate on the right side and the collar on the left side.
  3. Open and remove the lower access panel.
  4. Remove the two (2) outer screws (Figure 3.15) to allow the outside air box to be removed.
  5. Pull the outside air box straight out. See Figure 3.16.
  6. On the left side, remove the cover plate two (2) screws. See Figure 3.14.
  7. Install the cover plate on the right side where the outside air box was and install the outside air box in through the hole on the left side where the cover plate was.
- Cut a 6-1/2 in. (165 mm) hole in outside wall to accommodate air piping.
  - Use 6 in. (152 mm) metal flex or rigid piping (not supplied) to directly connect outside air to fireplace intake. Insulate the pipe to prevent frost condensation. See Figure 3.17.
  - Insulating the pipe isn't required but will help prevent frost condensation.
  - Use the supplied outside air inlet hood.
  - Seal between the wall and the pipe with silicone to prevent moisture penetration and air leaks.
  - Seal between the outside air inlet hood and the house with silicone to prevent air infiltration.

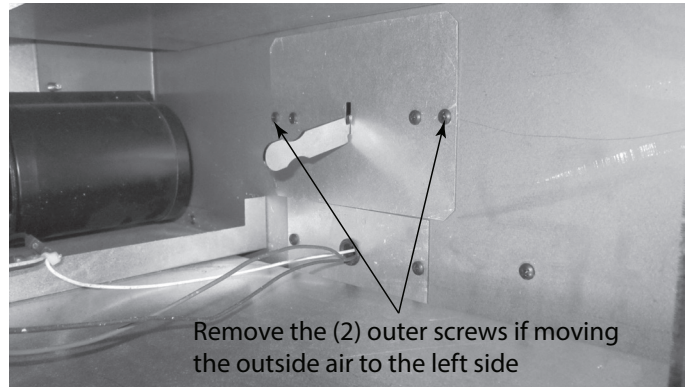
**CAUTION! Risk of Fire or Asphyxiation! DO NOT** draw outside combustion air from wall, floor or ceiling cavity, or enclosed spaces such as an attic or garage.

- **DO NOT** place outside air inlet hood close to exhaust vents or chimneys. Fumes or odor could be drawn into the room through the fireplace.
- Locate outside air inlet hood to prevent blockage from leaves, snow/ice, or other debris. Blockages could cause combustion air starvation.

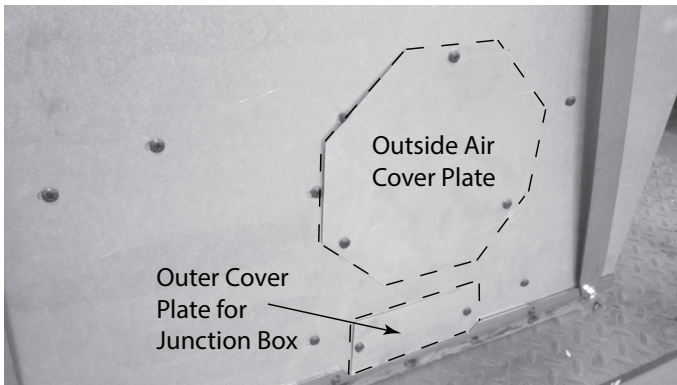
**CAUTION! Risk of Cuts/Abrasions.** Wear protective gloves and safety glasses during installation. Sheet metal edges are sharp.



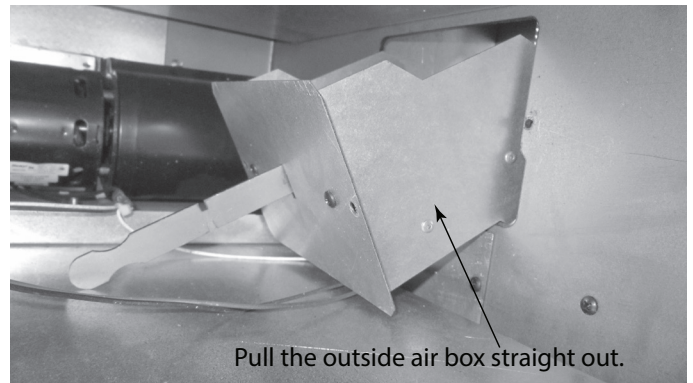
**Figure 3.12**



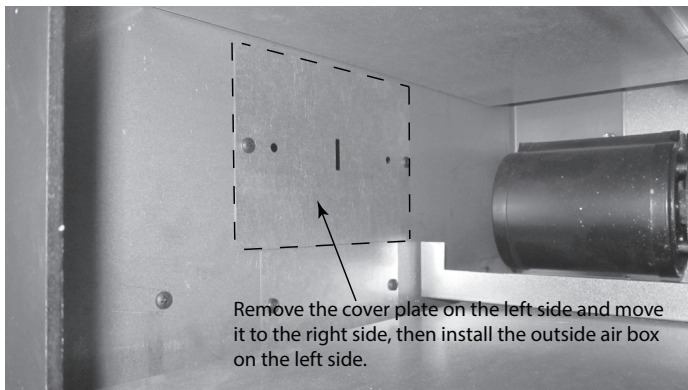
**Figure 3.15 Outside air handle shown on right side**



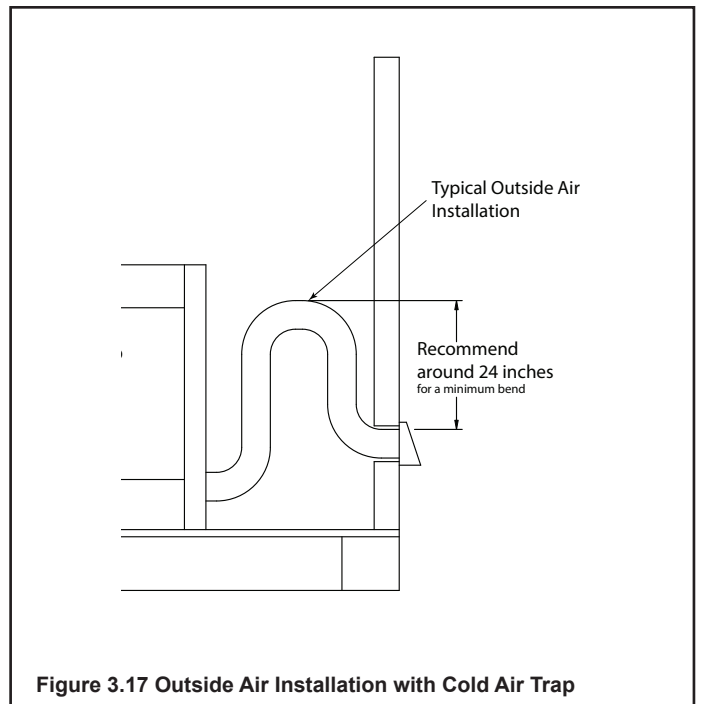
**Figure 3.13 Right Side**



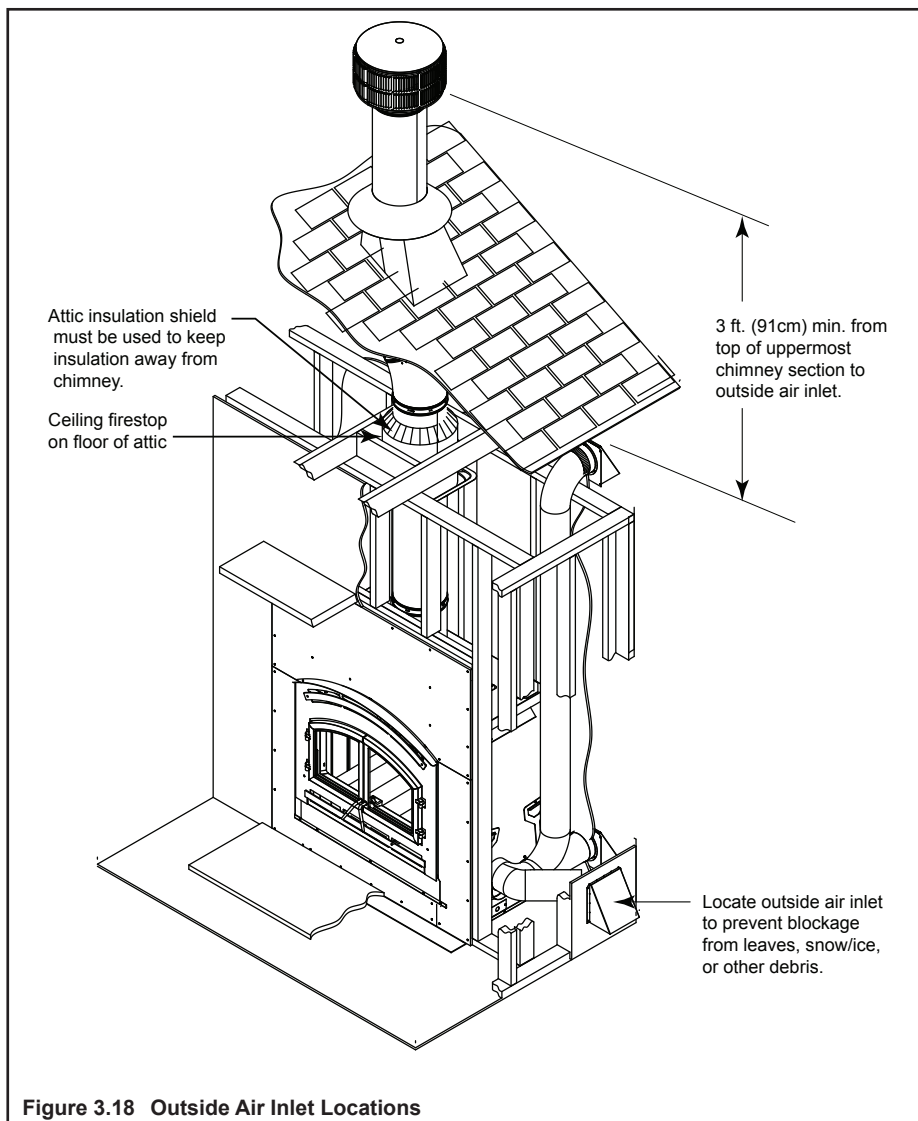
**Figure 3.16 Outside Air Box**



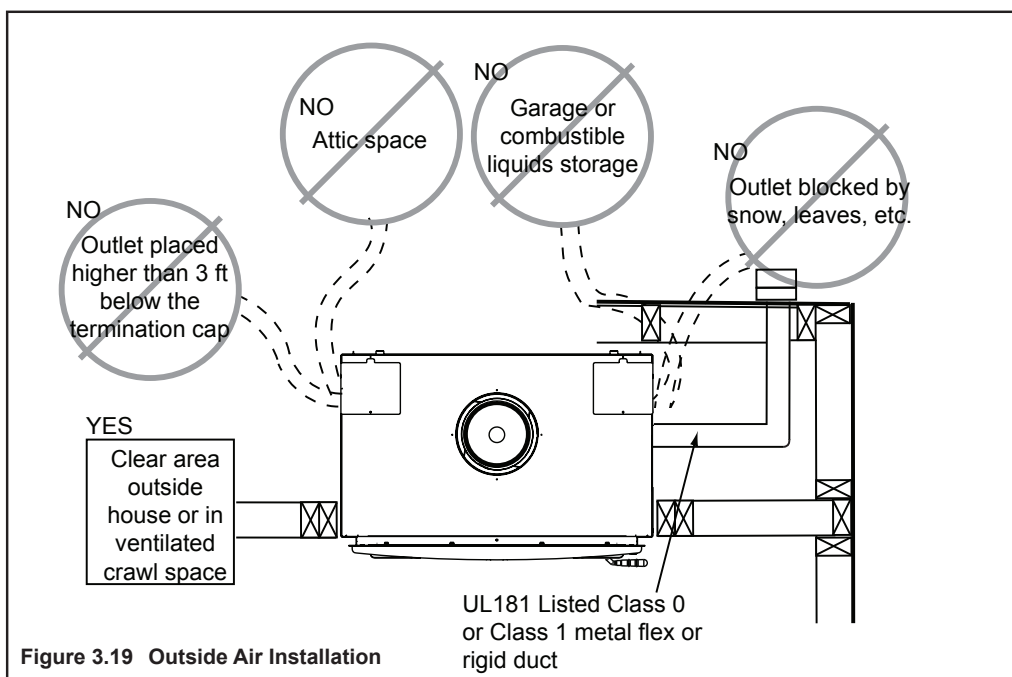
**Figure 3.14 Remove Cover Plate (Left Side)**



**Figure 3.17 Outside Air Installation with Cold Air Trap**



**Figure 3.18 Outside Air Inlet Locations**



**Figure 3.19 Outside Air Installation**

## J. Heat-Zone-WD Kit (Optional)

The Heat-Zone accessory kit conveys warm air from the fireplace through air duct(s) to remote locations in the same room or other rooms of the building. You may install 1 or 2 Heat-Zone kits on the fireplace. Installation of this kit **MUST** be performed by a qualified service technician. If any parts are missing or damaged, contact your local dealer before starting installation. DO NOT install a damaged kit.

This kit is tested and safe when installed in accordance with this installation manual. It is your responsibility to read all instructions before starting installation and to follow these instructions carefully during installations.

The Heat-Zone-WD kit is carefully engineered and must be installed only as specified. If you modify it or any of its components you will void the warranty and you may possibly cause a fire hazard. Installation must be done according to applicable local, state, provincial and/or national codes.

Plan the location of the fireplace and warm air duct run(s).

## DUCT RUN REQUIREMENTS

MAXIMUM Duct Run = 40-ft. (12 m)

MINIMUM Duct Run = 36 in. (914 mm)

## DUCTING MATERIAL

6 in. (152 mm) B-vent Only

DO NOT duct into existing furnace plenum

## MINIMUM CLEARANCE TO COMBUSTIBLES

1 in. (25 mm) from the B-vent

0 in. (0 mm) from top & bottom of outlet box

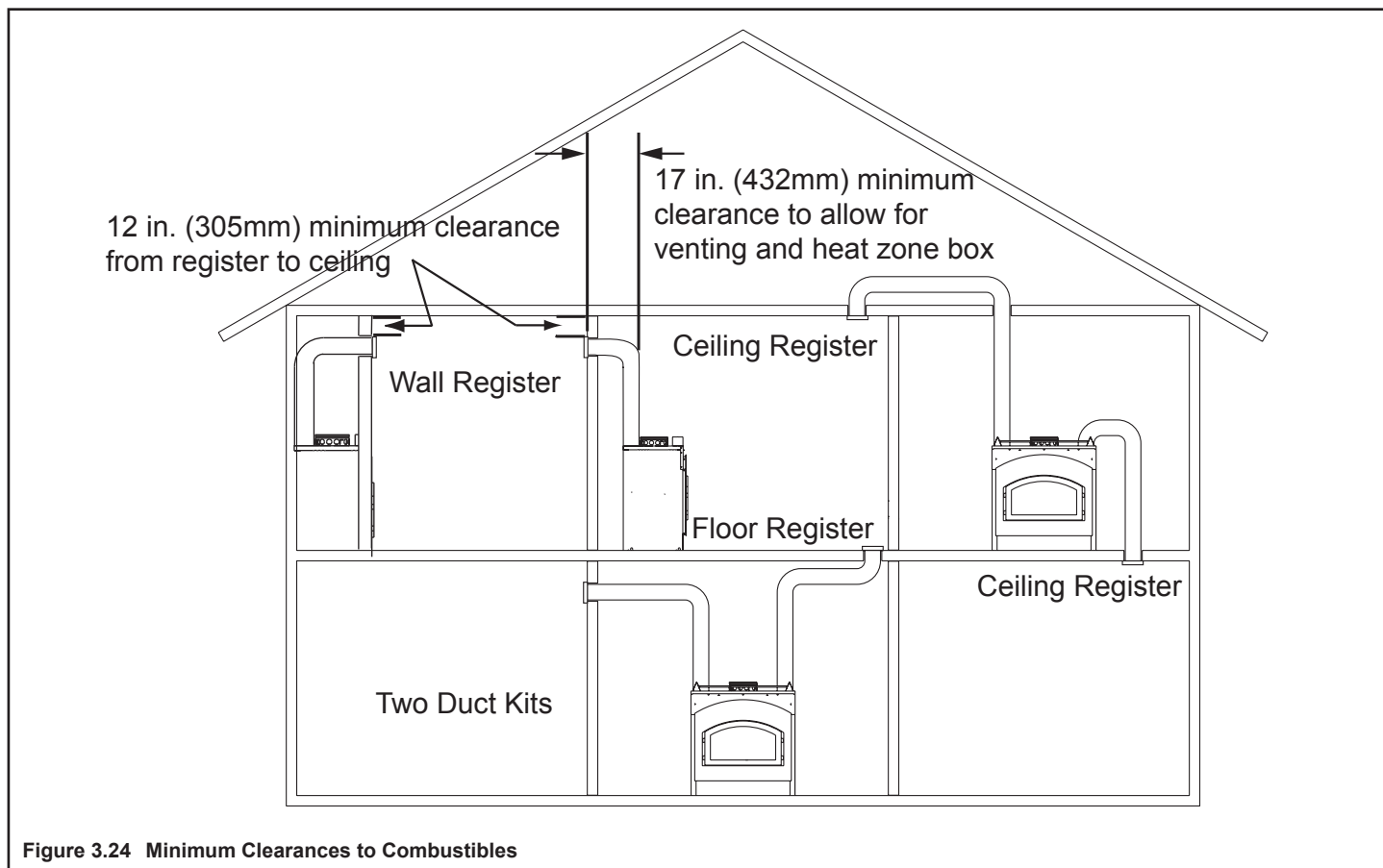
0 in. (0 mm) from the sides of outlet box

12 in. (305 mm) from wall register to ceiling

Refer to Figure 3.24.

**CAUTION!** ALL wiring should be done by a qualified electrician and shall be in compliance with local codes and with the National Electric Code NFPA/NEC No. 70-current. CSC22.1 Canadian Electric Code.

## Possible Air Duct Runs / Locations





## Installation

- Remove the knockout or cover plate from the top of the fireplace and discard it. See Figure 3.25.
- Cut a 3 in. (76 mm) hole in the insulation board and remove it as per the dimensions shown in Figure 3.25.

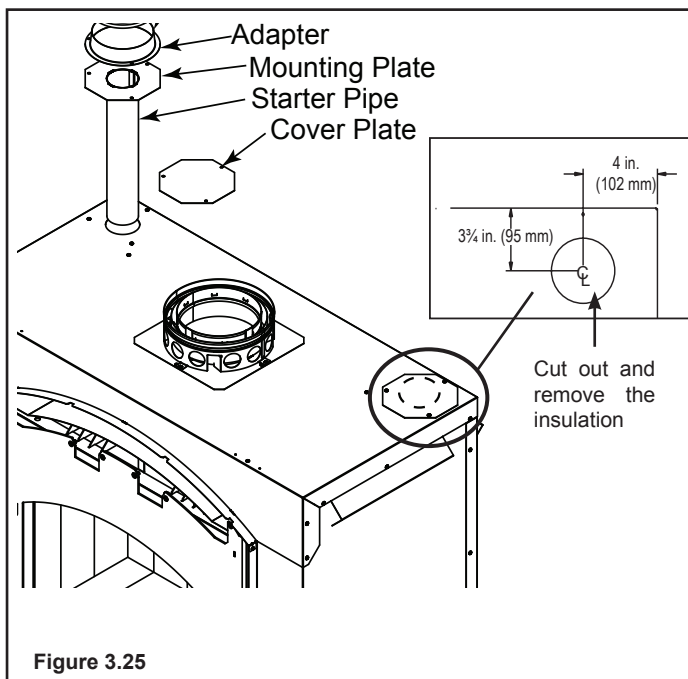


Figure 3.25

- Determine the necessary length of starter pipe from Table 3.1 and cut as required.

Table 3.1

Run Length	Cut Pipe Length
20 - 40 ft (6-12 m)	2 in. (51 mm)*
*A minimum of 2 in. (51 mm) pipe must be used to cover the raw insulation to prevent it from blowing out through the return air grille.	
10 - 20 ft (3 - 6 m)	8 in. (203 mm)
3 - 10 ft (1 - 3 m)	12 in. (305 mm)

**NOTE:** It is important the pipe length be adhered to or it will affect the performance of your fireplace.

- On the mounting plate, hand bend the tabs downward. Slide the tabs over the outside of the starter pipe. Secure with four sheet metal screws included in fasteners package. Figure 3.26.

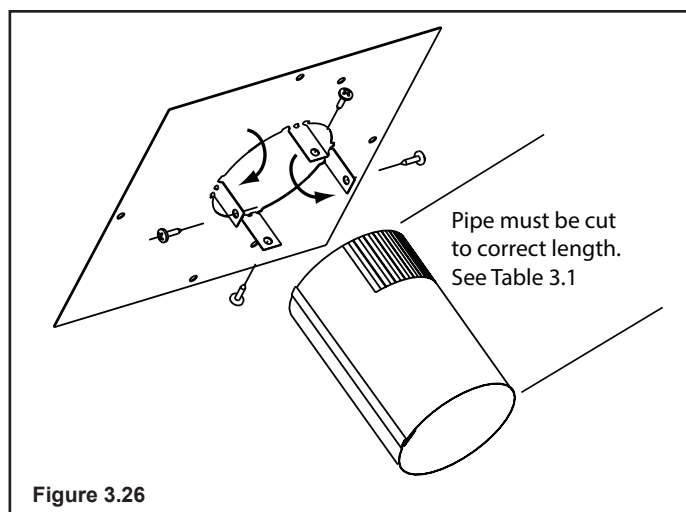


Figure 3.26

- Slide the starter pipe into the fireplace, matching the holes in the plate to the holes in the fireplace.
- Place the adapter on the mounting plate lining up holes. Using four sheet metal screws included in the kit, secure the adapter and mounting plate into fireplace. After securing to the fireplace, tape down the adapter edges to the top of the fireplace with aluminum tape to prevent leakage.
- Determine the location for the air register and fan housing assembly. Cut a 6-3/4 in. x 13-1/8 in. (177 mm x 333 mm) hole between framing members (wall studs or floor joists). Attach the brackets to the fan housing with the screws provided. The brackets can be rotated 180° and mounted to the back side of the 2 x 4 if necessary. See Figure 3.27.

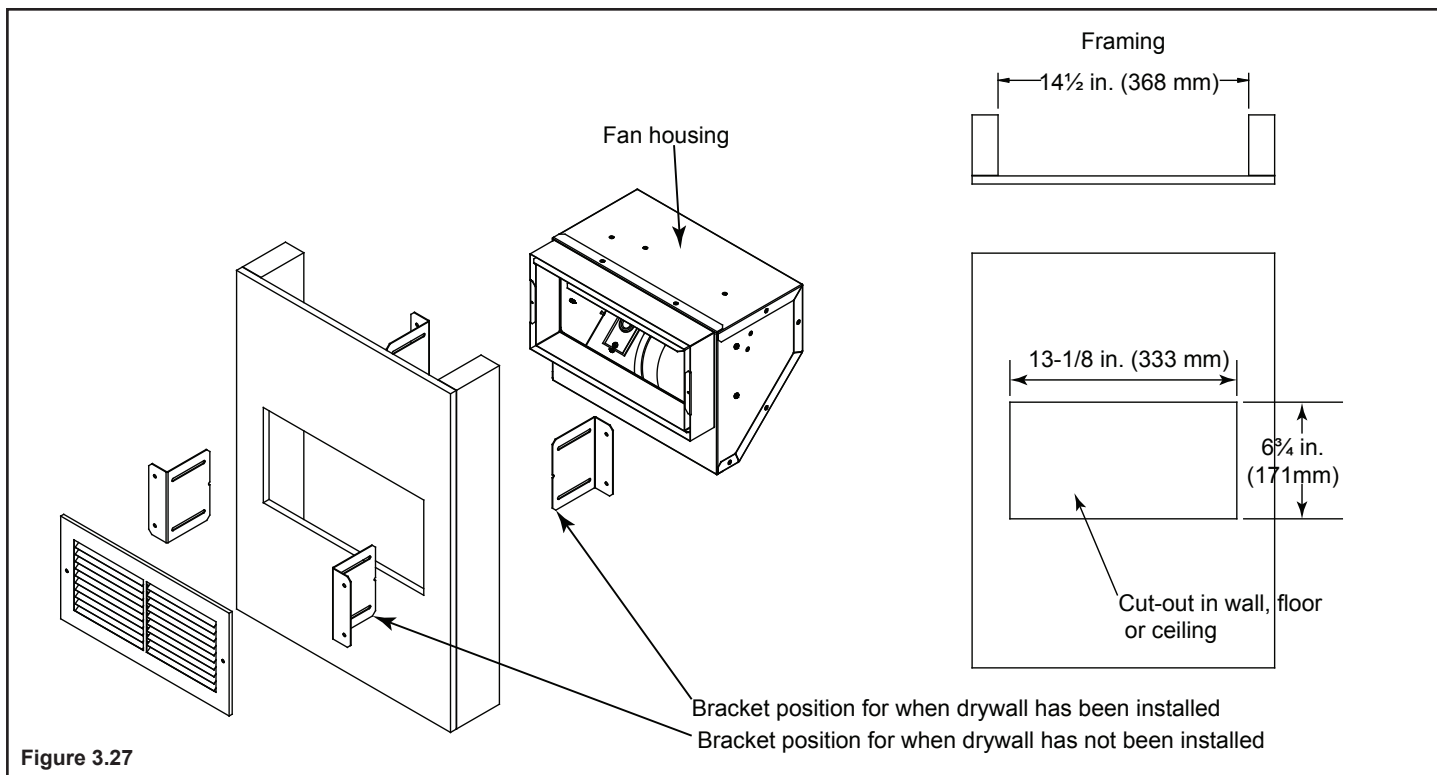
**NOTICE:** The fan and electrical connections must be accessible for servicing per local code requirements.

- Attach enough 6 in. (152 mm) B-Vent as required for your installation to the fan housing. **A maximum of (4) 90° elbows is recommended.** Screw the B-vent to the adapter.

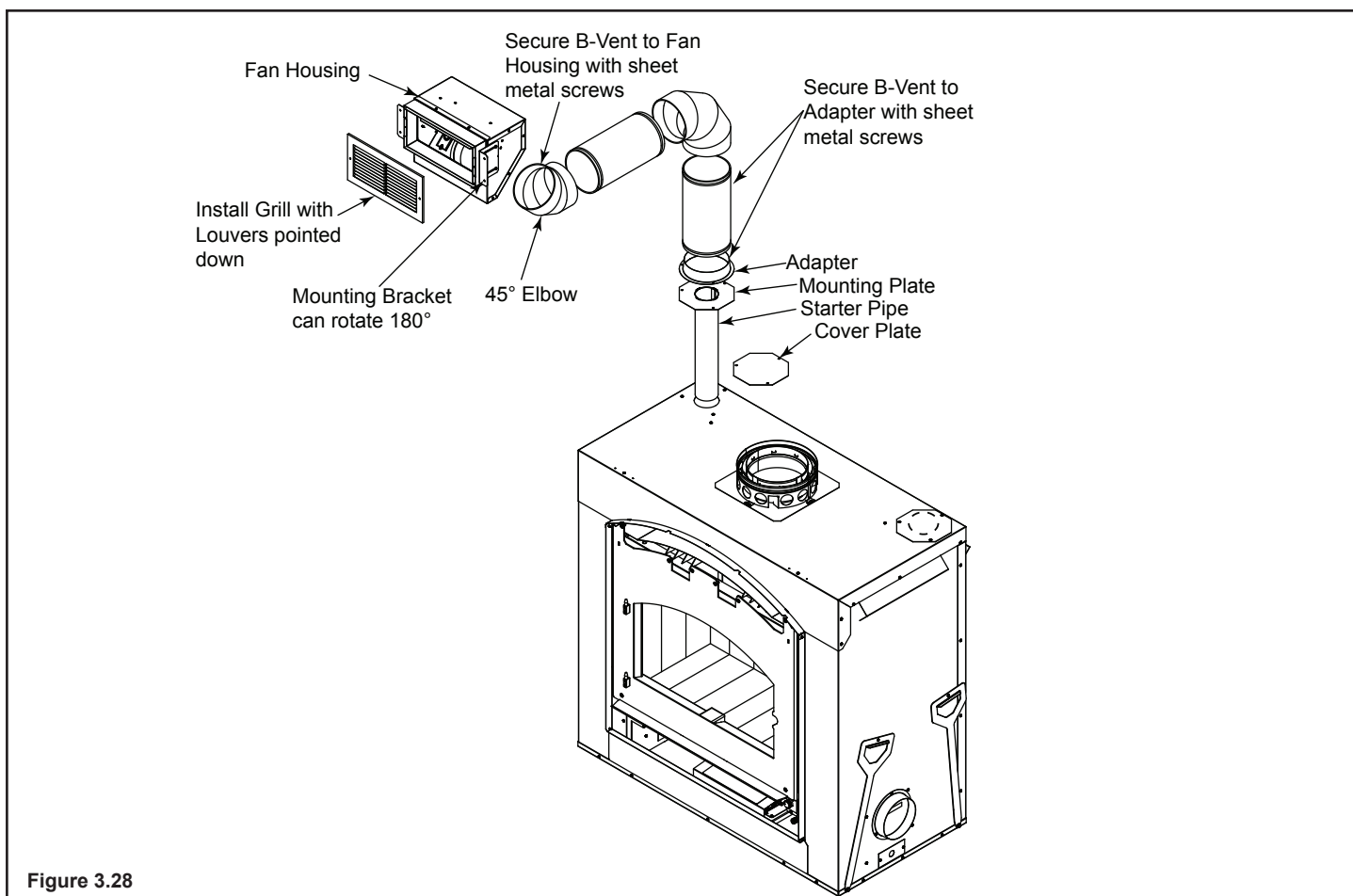
Also screw the B-vent to the outlet box on the fan housing. See Figure 3.26. Support duct at intervals of no greater than 4 ft (1 m) as required by local code.

**WARNING! Risk of Fire!** Comply with all minimum clearances specified.

- A minimum 1/2 in. (13 mm) air clearance must be maintained at the back and 1 in. (25 mm) to the sides of the fireplace assembly.



**NOTICE:** Secure the duct so that clearance to the fireplace outer wrap is maintained. Tape all seams with aluminum tape 1-1/4 in. (32 mm) minimum width or as specified by local codes.



## Installing Fan In Housing

- Insert fan into the fan housing starting with motor end first. Slip it below the "L" bracket on the left side allowing the right side to drop in. See Figure 3.29.

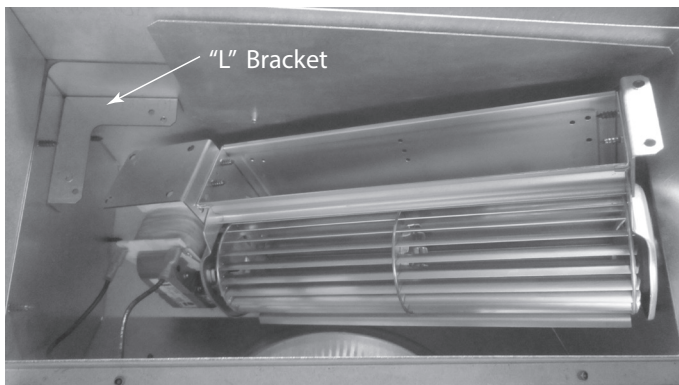


Figure 3.29

- Tilt the fan forward to clear the mounting brackets then lift the fan onto the brackets. See Figure 3.30.

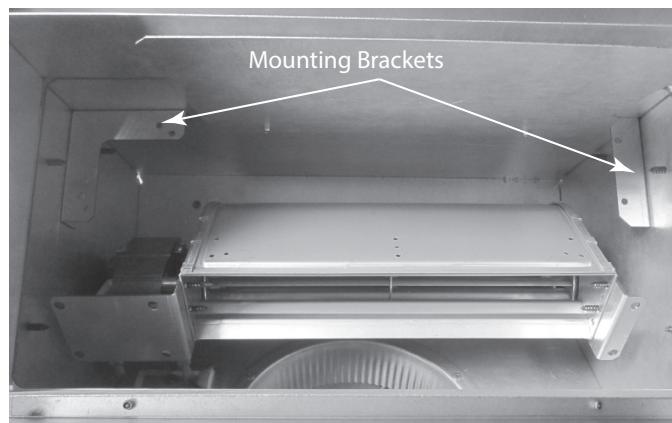


Figure 3.30

- Secure the fan to the mounting brackets with (4) screws provided. See Figure 3.31.

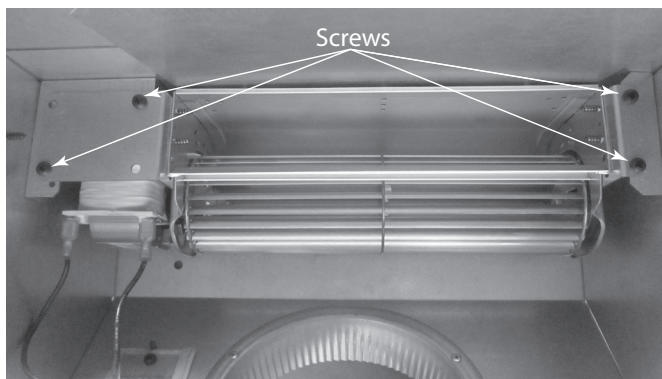


Figure 3.31

- Insert the fan wires through the grommet and into the junction box. See Figure 3.32.

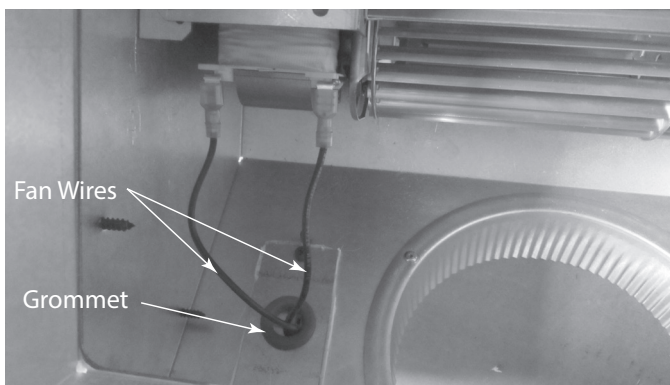


Figure 3.32

- Install the variable speed wall rheostat (with setting on "OFF") in a convenient location. This switch will control the Heat-Zone fan operation.
- Remove the junction box. Wire 110 VAC service TO the wall rheostat and FROM the wall rheostat to the fan junction box. Use wire nuts to secure the 110 VAC service wires to the hot (black) and neutral (white) fan wires and screw the 110 VAC ground wire to the junction box. See Figure 3.33.
- Secure the return air grille to the fan housing making sure it is flush. The grille must be installed with the louvers pointing down.

**NOTICE: DO NOT USE ADJUSTABLE REGISTERS.**

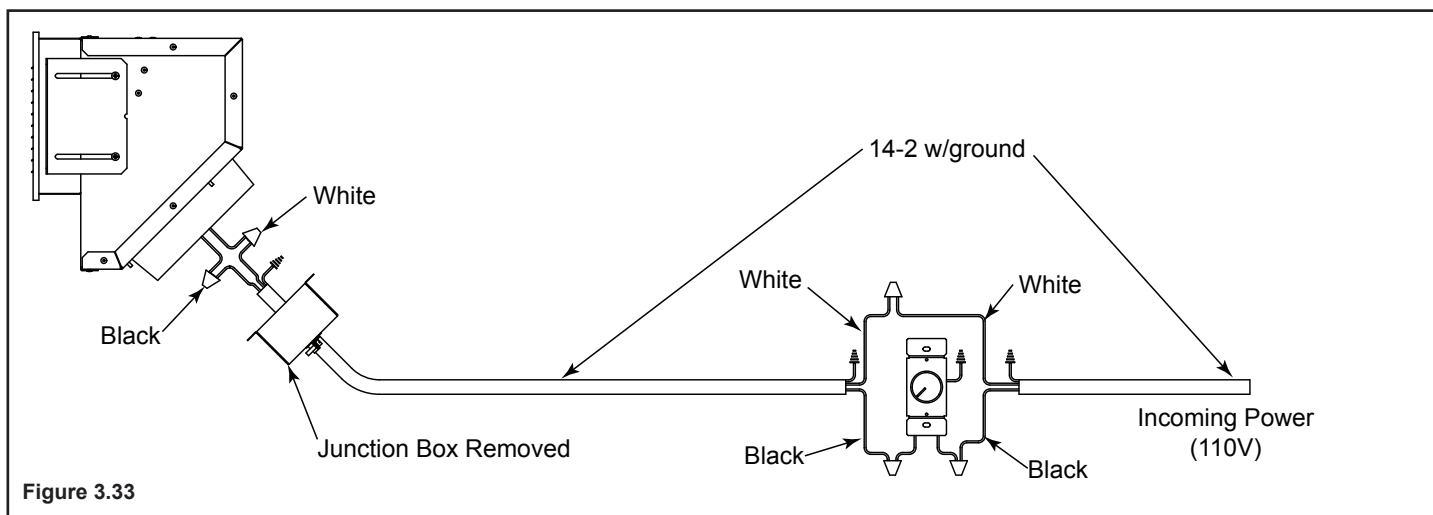


Figure 3.33

## 4 Electrical Wiring

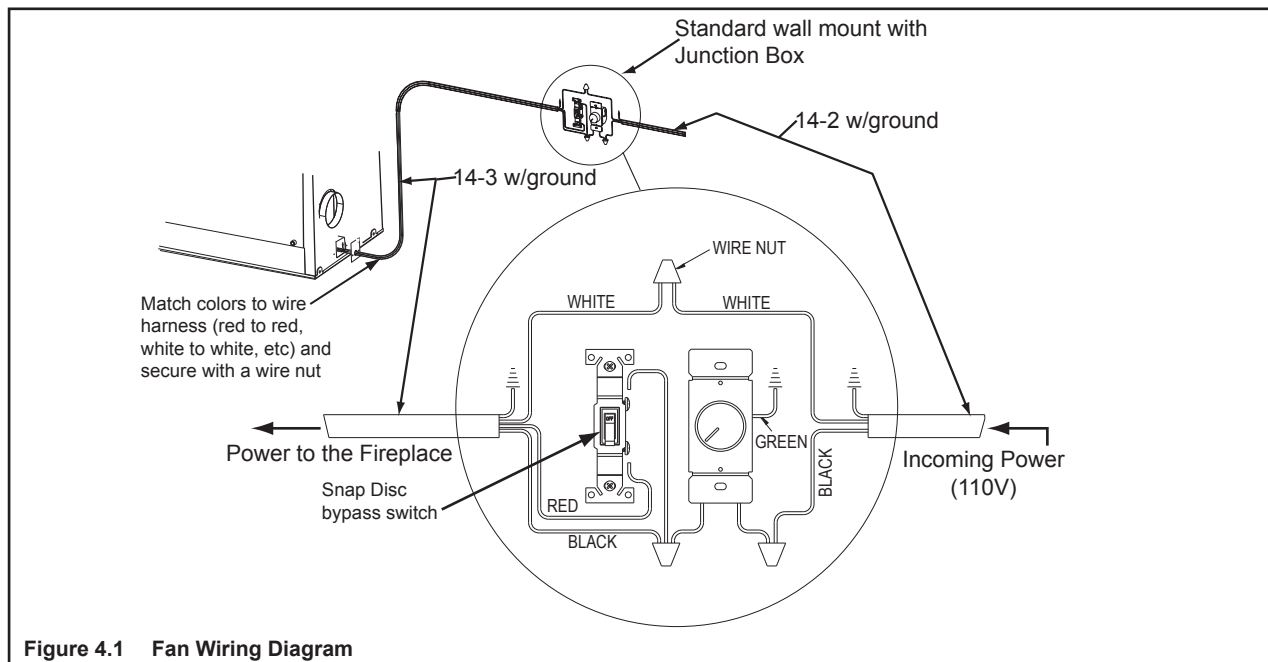
**NOTICE:** The manual override switch, rheostat speed control and cover plate are supplied. You will need to supply: 14-3 wire with ground; 14-2 wire with ground; standard wall mount junction box; wire nuts.

- Remove junction box cover plate on the bottom right side of the fireplace.
- Thread the 14-3 with ground wire through the opening with the strain relief on the cover plate.
- Match colors to wire harness, (red to red, white to white, etc.) and secure with wire nuts.

**NOTICE:** Wiring for fans must be done before framed enclosure is completed. If using a Heat Zone kit, it also must be installed before enclosure is complete.

**WARNING! Risk of Fire! DO NOT** apply combustible finishing materials over any part of the front of this fireplace.

- The metal fireplace face may only be covered with noncombustible materials such as ceramic tile, brick, or stone.
- Do not cover or block any cooling air slots.



# 5 Chimney and Termination Requirements

## A. Chimney Requirements

Vertical distances are measured from the base of the fireplace as shown in Figure 5.1.

**Table 5.1 Chimney Requirements**

Minimum overall straight height	13 ft	3.96 m
Minimum height with single offset/return	14.5 ft	4.42 m
Double offset/return minimum height	20 ft	6.1 m
Maximum height	90 ft	25.60 m
Maximum chimney length between an offset and return	20 ft	6.1 m
Maximum distance between chimney stabilizers	35 ft	10.67 m
Maximum unsupported chimney length between the offset and return	6 ft	1.83 m
Maximum unsupported chimney height above the fireplace	35 ft	10.67 m
Maximum unsupported chimney above roof	6 ft	1.83 m

**NOTICE:** A maximum of two pairs of offsets and returns may be used.

**WARNING! Risk of Fire!** You must maintain 2 in. (51 mm) air space clearance to insulation and other combustible materials around the chimney system. Failure to do so may cause overheating and fire.

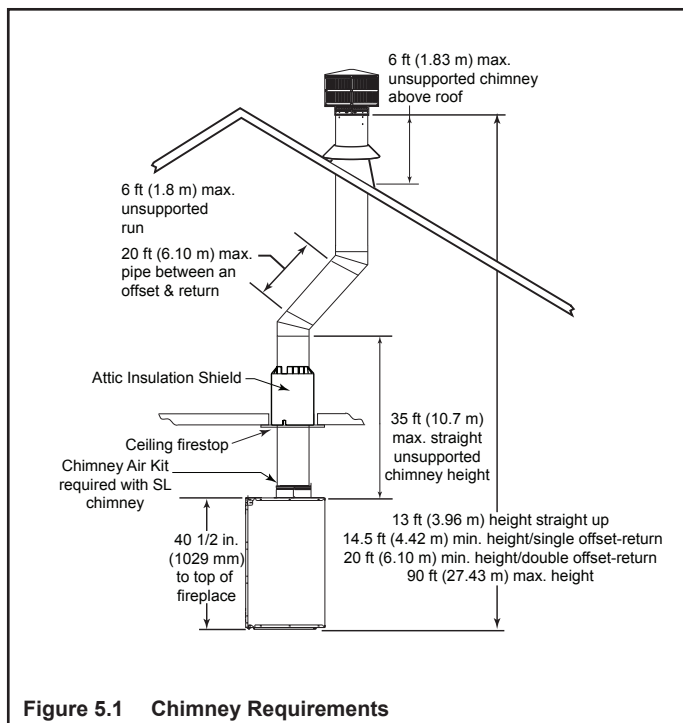
**NOTICE:** You must provide support for the pipe during construction and check to be sure inadvertent loading has not dislodged the chimney section from the fireplace or at any chimney joint.

**Table 5.2 Chimney Component Dimensions**

HEIGHT OF CHIMNEY COMPONENTS		in.	mm
<b>Chimney Stabilizer</b>			
	SL3	4-3/4	121
<b>Offsets/Returns</b>			
	SL315	13-3/8	340
	SL330	15-1/2	394
<b>Chimney Sections*</b>			
	SL306	4-3/4	121
	SL312	10-3/4	273
	SL318	16-3/4	425
	SL324	22-3/4	578
	SL336	34-3/4	883
	SL348	46-3/4	1187

\* Dimensions reflect effective height.

**Note:** 8 in. DuraPlus can also be used. See page 45.



**Figure 5.1 Chimney Requirements**



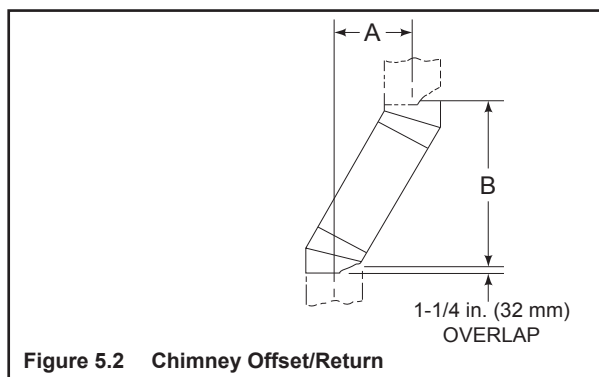
## B. Offsets/Returns

A 30° Elbow (measured from the vertical) is the largest that can be used in an offset. A 30° Elbow may not be combined with another Elbow to make a steeper offset (e.g. two 30° Elbows are not allowed to be put together to form a 60° elbow.). Avoid Elbows if possible. A totally vertical chimney is more efficient. When Elbows are necessary to avoid obstructions such as rafters, ridgepoles, or joists, you are only allowed to use 2 pair of Elbows in any one chimney system. Horizontal runs of chimney violate building code and are not allowed.

- An offset and return can be used as a single entity or separated by chimney section(s).

**WARNING! Risk of Fire! DO NOT** use offset/returns greater than 30° from vertical. Chimney draft will be restricted and could cause overheating and fire.

- Measure the shift needed to avoid the overhead obstruction. Refer to dimension A in Figure 5.2.
- Find the appropriate A dimension listed in Table 5.3. The B dimension coinciding with the A dimension measurement in Table 5.3 represents the required vertical clearance needed to complete the offset/return.
- Read across the chart to find the number of chimney sections/model numbers needed between the offset and return.



### Example:

Your "A" dimension from Figure 5.2 is 14-1/2 in. (368 mm). Using Table 5.3 the dimension closest to, but not less than 14-1/2 in. (368 mm) is 14-1/2 in. (368 mm) using a 30° offset/return.

You determine from the table that you need 34-1/8 in. (867 mm) (Dimension "B") between the offset and return.

The chimney component that best fits your application is one SL324.

**Table 5.3 Offset Dimensions**

15-degree				30-degree				SL306	SL312	SL318	SL324	SL336	SL348
A		B		A		B							
in.	mm	in.	mm	in.	mm	in.	mm						
1 5/8	41	13 3/8	340	3 5/8	92	15 1/2	394	-	-	-	-	-	-
2 7/8	73	17 3/4	451	5 1/2	140	18 5/8	473	1	-	-	-	-	-
4 1/8	102	22 3/8	568	7 1/4	184	21 3/4	552	2	-	-	-	-	-
4 1/2	114	23 5/8	600	8 1/2	216	23 3/4	603	-	1	-	-	-	-
5 3/4	146	28 1/4	718	10 1/4	260	27	686	1	1	-	-	-	-
6	152	29 3/8	746	11 1/2	292	29	737	-	-	1	-	-	-
7 1/4	184	34	864	13 1/4	337	32 1/8	816	-	2	-	-	-	-
7 3/4	197	36 1/8	918	14 1/2	368	34 1/8	867	-	-	-	1	-	-
8 3/4	222	39 3/4	1010	16 1/4	413	37 3/8	949	1	-	-	1	-	-
10 3/8	264	45 5/8	1159	19 1/4	489	42 1/2	1080	-	-	2	-	-	-
10 5/8	270	46 3/4	1187	20 1/2	521	44 5/8	1133	-	-	-	-	1	-
11 7/8	302	51 3/8	1305	22 1/4	565	47 3/4	1213	1	-	-	-	1	-
13 1/2	243	57 1/4	1454	25 1/4	641	52 7/8	1343	-	-	-	2	-	-
13 3/4	349	58 3/8	1483	26 1/2	673	55	1397	-	-	-	-	-	1
15	381	63	1600	28 1/4	718	58 1/8	1476	1	-	-	-	-	1
16 1/2	419	68 3/4	1746	31 1/4	794	63 1/4	1607	-	1	-	-	-	1
18	457	74 5/8	1895	34 1/4	870	68 1/2	1740	-	-	1	-	-	1
19 5/8	498	80 3/8	2042	37 1/4	946	73 3/4	1873	-	-	-	1	-	1
20 5/8	524	84 1/8	2137	39 1/8	994	76 7/8	1953	1	-	-	1	-	1
22 3/4	578	91 7/8	2334	43 1/4	1099	84 1/8	2137	-	-	-	-	1	1
24	610	96 1/2	2451	45 1/8	1146	87 1/4	2216	1	-	-	-	1	1
25 7/8	657	103 1/2	2629	49 1/4	1251	94 1/2	2400	-	-	-	-	-	2

Proper assembly of air-cooled chimney parts result in an overlap at chimney joints of 1-1/4 in. (32 mm). Effective length is built into this chart.

## C. Termination Requirements

- Install a cap approved and listed for this fireplace system.
- Locate cap where it will not become plugged by snow or other materials.
- Locate cap away from trees or other structures.
- The bottom of the termination cap must be at least 3 ft (.91 m) above the roof AND at least 2 ft (.61 m) above any portion of roof within 10 ft (3.05 m) as shown in Figure 5.3.
- The distance required between caps is shown in Figure 5.3.

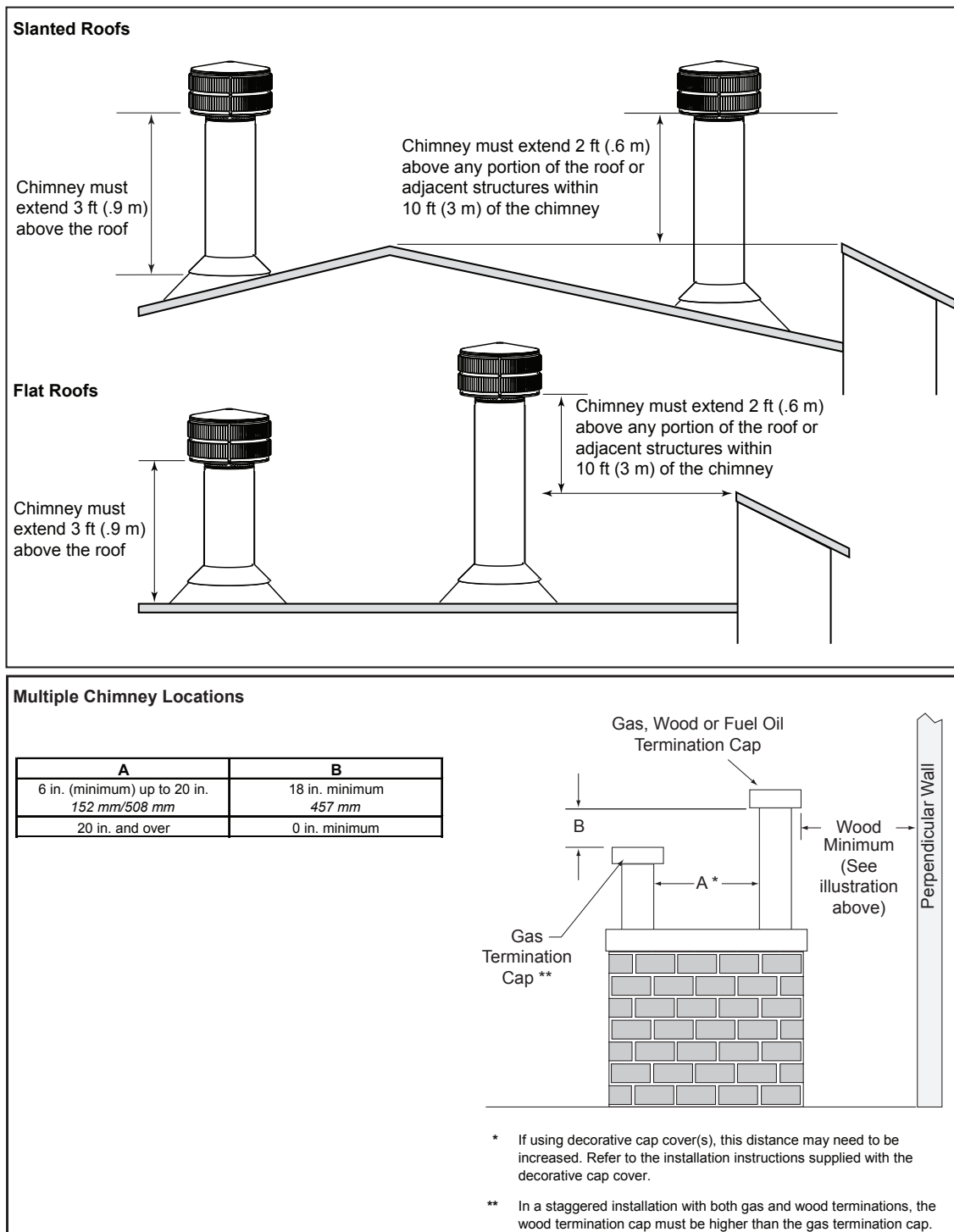


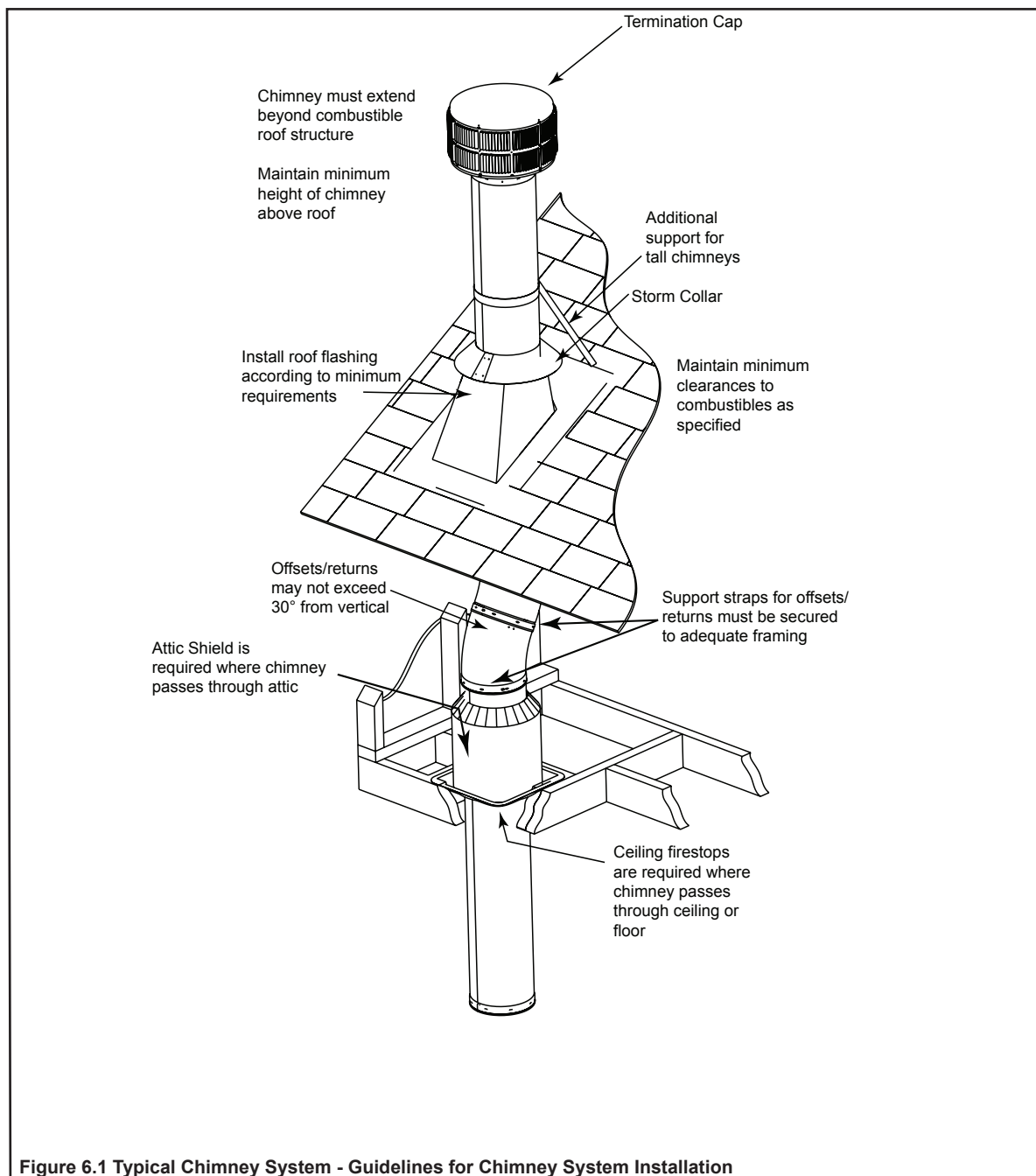
Figure 5.3 Multiple Chimney Locations

# 6 Chimney Installation

## A. Typical Chimney System

**NOTICE:** Chimney performance may vary.

- Trees, buildings, roof lines and wind conditions affect performance.
- Chimney height may need adjustment if smoking or overdraft occurs.



The SL300 series chimney (UL127 approved for use with this fireplace) is shipped with wrap around warning labels installed. These labels may be removed from the sections of chimney exposed above the roofline.



## B. Assemble Chimney Sections

**WARNING! Risk of Fire! DO NOT** install substitute or damaged chimney components.

Use only those components described in this manual.

Attach either a straight chimney section or an offset to the top of the fireplace starting with the inner flue followed by the outer casing. Continue this order until termination cap is reached (depending on your installation requirement). Chimney sections are locked together by pushing downward until the top section meets the stop bead on the lower section.

The inner flue is placed to the inside of the flue section below it. The outer casing is placed outside the outer casing of the chimney section below it. See Figure 6.2.

**NOTICE:** Chimney sections cannot be disassembled once locked together. Plan ahead!

- Lock chimney sections and/or offsets/returns together by pushing downward until the top section meets the stop bead on the lower section.
- Pull on the top of each section as installed to make sure it is fully engaged and will not separate.
- You may use #6 or #8 sheet metal screws no longer than 1/2 in. (13 mm) to fasten chimney outer sections together. Do NOT penetrate inner flue.
- Vertical straight runs of chimney must be supported every 35 ft (10.7 m).

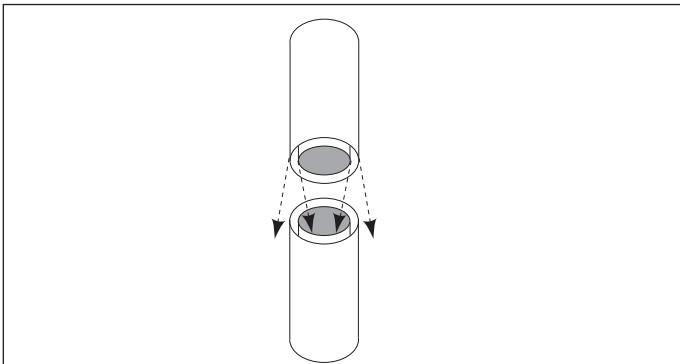


Figure 6.2 Assembling Chimney Sections

**WARNING! Risk of Fire! DO NOT** install substitute or damaged chimney components.

## C. Install Chimney Air kit (CAK4A)

**NOTICE:** Chimney Air Kit, Part CAK4A is required when using the SL-300 Pipe Series. Detailed instructions are supplied with the kit. If using the Dura-Plus System (must be 8 in./203 mm in diameter), the starter ring that came with the fireplace must be removed and replaced with the Dura-Plus Base Plate. The CAK4A is not required with a Dura-Plus System.

- Install the chimney pipe first.
- Hand bend the tabs in position before placing on the fireplace.

- Place the box on top of the fireplace around the chimney pipe, push both pieces together and secure with screws provided.
- Use the pre-punched holes in the tabs as guides and drill holes through the fireplace top.
- Secure the CAK4A in place. See Figure 6.3.
- Seal around the kit at the flue and at the top of the outer shell with high temp caulk with a minimum rating of 500 degrees. See Figure 6.3.

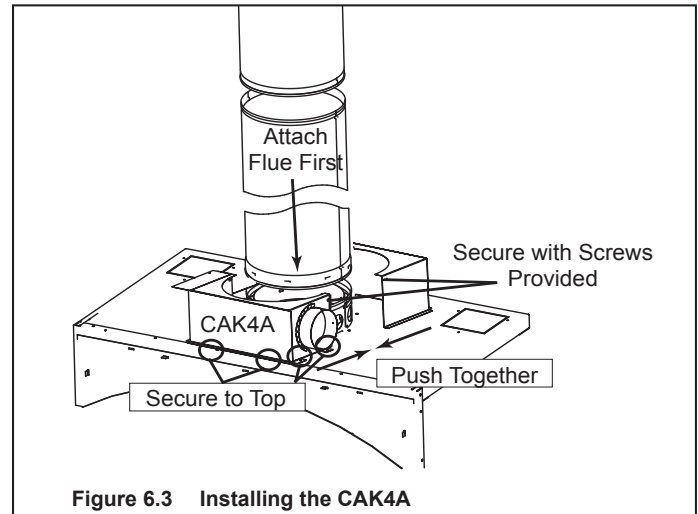


Figure 6.3 Installing the CAK4A

### NOTES:

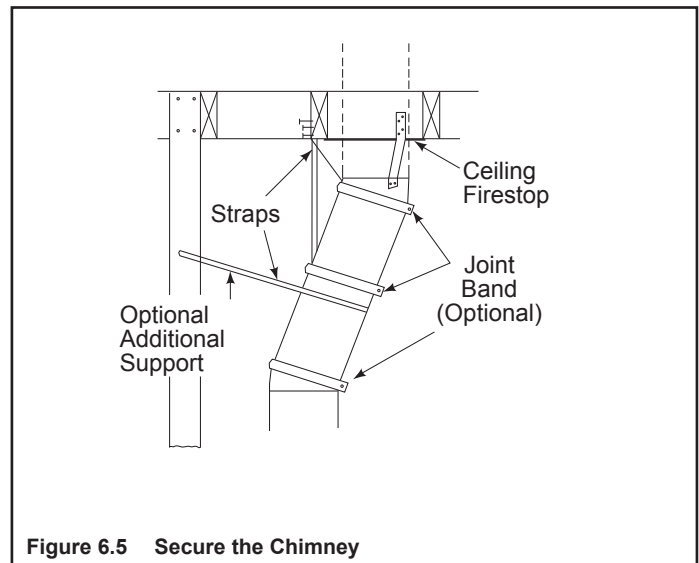
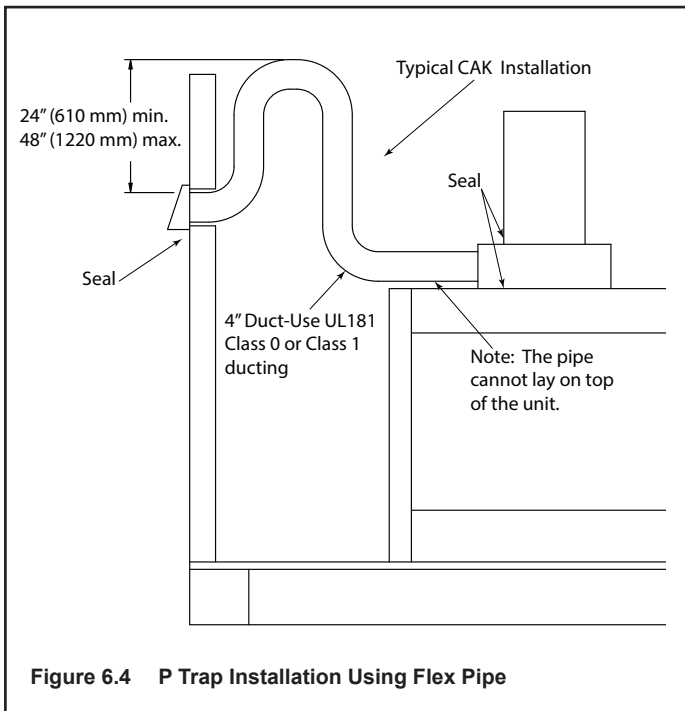
- The CAK4A termination cap must be a minimum of 4 ft (1219 mm) above the ground and kept free of debris.
- If the CAK4A is installed in a chase, the CAK4A side termination cap must be at least 3 ft (914 mm) below the chimney top.
- Seal around the cap and flex with caulk to stop air from getting into the chase. See Figure 6.4.
- The pipe cannot lay on top of the unit.

### **WARNING! Risk of Fire!**

- *The flex pipe must never be compressed or deformed!*
- *Restricting the airflow inside the flex pipe may increase flue pipe temperatures causing a chase fire.*

### **P Traps**

When using the chimney air kit (CAK) and the outside air kits, it is recommended that you install a P trap as shown in Figure 6.4 by bending the flex duct, or using 90° elbows if using rigid duct to help prevent air circulation when the fireplace is not in use. In colder climates, it is strongly recommended to use an insulated duct.



### **D. Secure Offset/Return**

#### **WARNING! Risk of Fire!**

- *Secure offsets with screws (not to exceed 1/2 in./13 mm in length).*
- *Secure returns with strapping.*
- *Straight chimney sections may be secured with screw (not to exceed 1/2 in./13 mm in length) at the joints.*
- *Keep chimney sections from separating or twisting.*

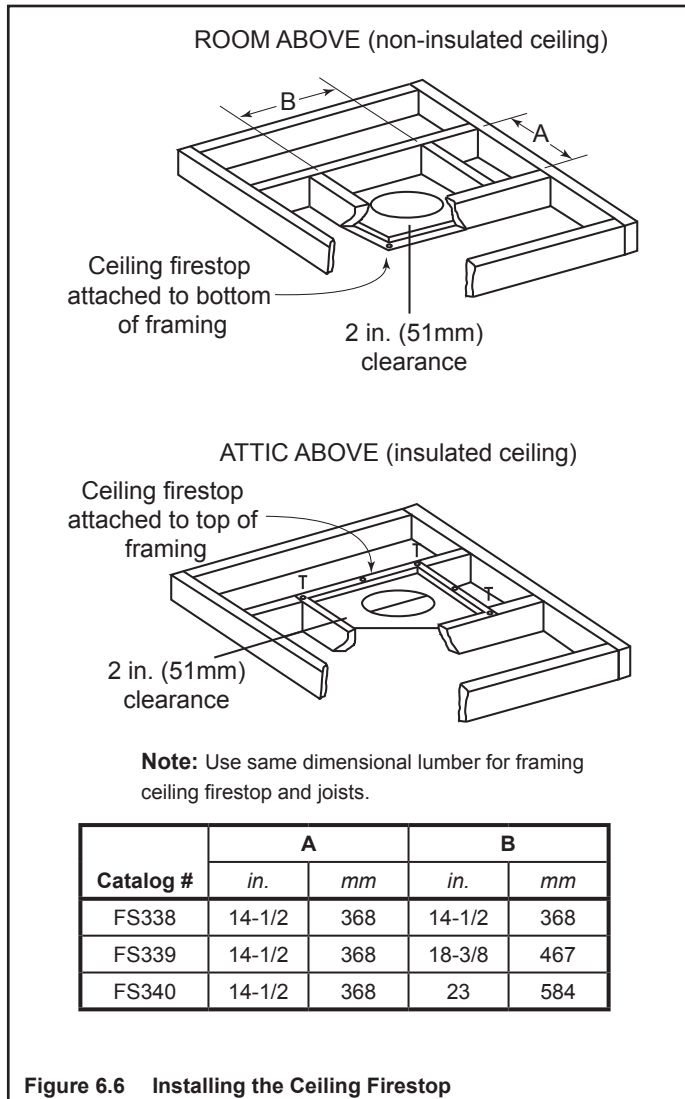
When offsets and returns are joined to straight pipe sections, they must be locked into position with screws (outer only). To prevent gravity from pulling the chimney sections apart, the returns and the chimney stabilizers have hanger straps for securing these parts to joists or rafters. See Figure 6.5.

- \* Use # 6 or # 8 sheet metal screw, or larger, no longer than 1/2 in. (13 mm).

## E. Install Firestops

**WARNING! Risk of Fire!** Firestops must be used whenever the chimney penetrates a ceiling/floor.

- Mark and cut an opening in ceiling/floor as shown in Figure 6.6.
- Frame the opening with the same size lumber used in the ceiling joists.
- Nail the firestop to the bottom of the ceiling/floor joists.
- Provide a means to maintain the required air space between the chimney and insulation or install an attic insulation shield.



**WARNING! Risk of Fire! DO NOT** seal area between firestop opening and chimney pipe except where they enter the attic or leave the warm air envelope of the home (use 600° F sealant).

## F. Install Attic Insulation Shield

**WARNING! Risk of Fire!** You **MUST** install an attic insulation shield when there is any possibility of insulation or other combustible material coming into contact with the chimney.

- **DO NOT** pack insulation between the chimney and the attic insulation shield.
- Failure to keep insulation and other materials away from chimney pipe could cause fire.
- **DO NOT** offset chimney inside insulation shield.
- Combustible material may come in contact with the attic insulation shield as long as the required clearances are maintained to the chimney pipe.

Installation of a ceiling firestop is required:

- Refer to Figures 6.6, 6.7, 6.8 and 6.9.
- If the attic shield is pre-rolled continue. If it is a flat part, try and roll it up to aid in wrapping it around the chimney.
- Pre-bend all the tabs in at the top to 45°.
- Wrap the shield (around the chimney if already installed) until you have an overlap and the three holes on each side match up (large holes on top).
- Insert three screws into the matching holes to form a tube starting at the bottom.
- Bend the tabs on the bottom of the tube inward to 90° to maintain chimney air space.
- Rest the insulation shield on the ceiling firestop below.
- Tape off any opening around the bottom.

If you wish to make a custom shield or barrier, follow these guidelines:

- Metal is preferred, although any material stiff enough to hold back the insulation can be used.

**WARNING! Risk of Fire!** Use of cardboard or other materials that can deflect under humidity or other environmental conditions is not recommended.

- The shield or barrier must be tall enough to extend above the insulation and prevent blown-in insulation from spilling into the cavity.
- Maintain specified air spaces around chimney.
- Check instructions and local codes for further details.

### Double-check the Chimney Assembly

Continue assembling the chimney sections up through the ceiling firestops as needed. While doing so, be aware of the height and unsupported chimney length limitations given under Section 5.

Check each section by pulling up slightly from the top to ensure proper engagement before installing the succeeding sections. If they have been connected correctly, they will not disengage when tested.

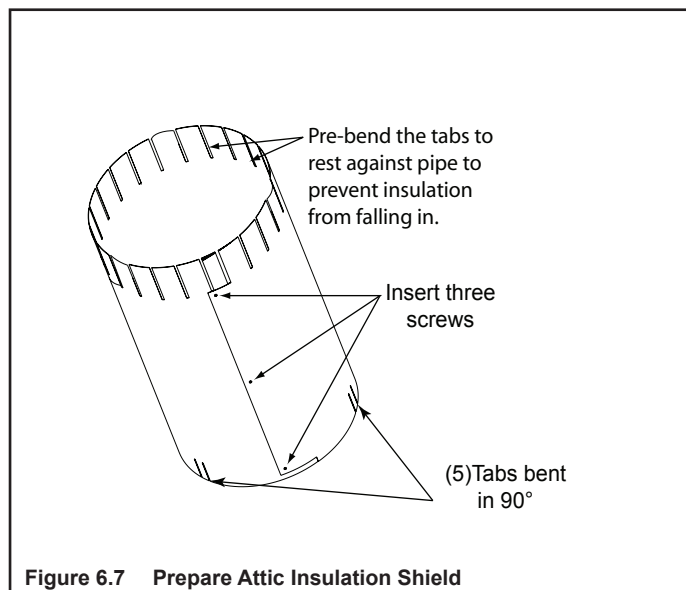


Figure 6.7 Prepare Attic Insulation Shield

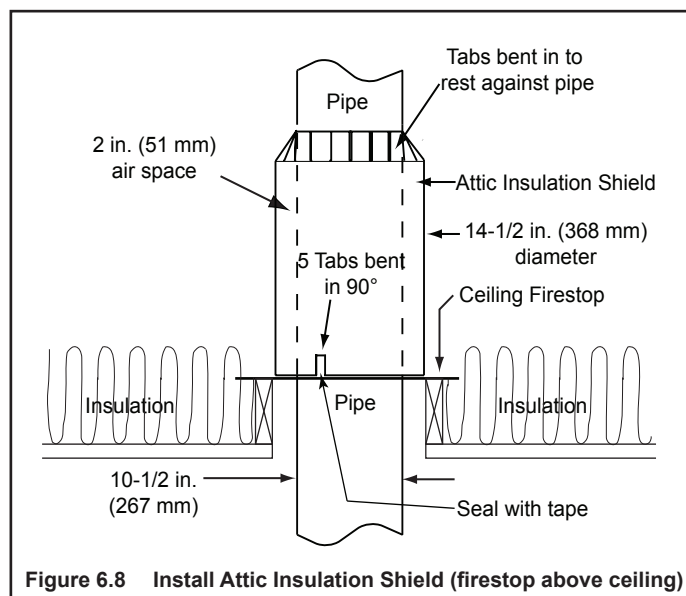


Figure 6.8 Install Attic Insulation Shield (firestop above ceiling)

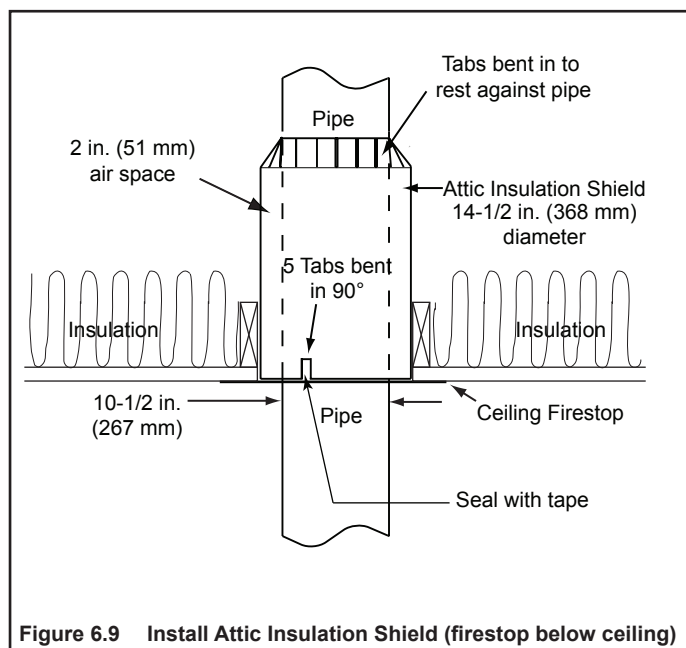


Figure 6.9 Install Attic Insulation Shield (firestop below ceiling)

## G. Roof Penetration

- Refer to Figure 6.10.
- Plumb from roof to center of chimney.
- Drive a nail up through roof to mark center of pipe.
- Measure to either side of nail and mark the 14-1/2 in. x 14-1/2 in. (368 mm x 368 mm) opening required.
- Measure opening on the horizontal; actual length may be larger depending on roof pitch.
- Cut out and frame opening.

### Install Flashing

- Assemble chimney so it passes through the framed opening.
- Slip the flashing over the chimney.

**NOTICE:** Roofing shingles must be below the flashing plate on the lower side of a sloped roof and over the flashing plate on the sides and top.

- Nail the flashing to the roof. Keep gaps between the flashing plate and the roof to a minimum.
- Caulk the flashing plate and roof junction as well as the vertical seam on the flashing. All nail heads must be caulked with a roofing sealant.
- Caulk the overlap seam of any exposed pipe sections that are located above the roof line to prevent leaks.

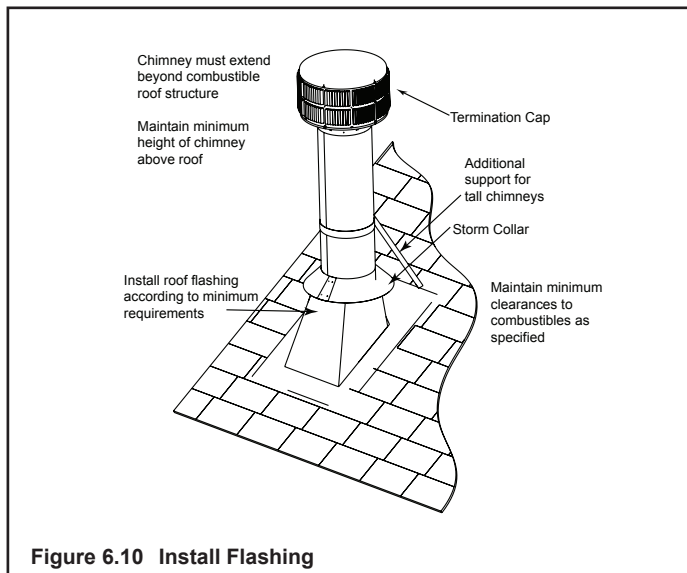


Figure 6.10 Install Flashing

## H. Manufactured Home Installation

### SL-300 Series Ceiling/Roof Thimble

**NOTICE: REQUIRED** for manufactured homes.

- Locate the point where the chimney will exit the roof by plumbing down to the center of the chimney. Lay out, cut and frame a 14-1/2 in. (368 mm) square opening (measured on the horizontal) through the ceiling and roof structure. **Consult local codes for framing details.**

- The thimble must extend completely through the roof structure shielding combustible materials. Five location holes have been provided to allow for a variety of ceiling/roof thicknesses. A thimble extension is required when the ceiling/roof thickness exceeds 12-1/2 in. (318 mm). The extension should overlap the thimble one inch.
- To attach the extension to the thimble, drill 1/8 in. (3 mm) holes through the outer shield of the thimble using the predrilled holes in the extension as guides. Attach the extension to the thimble using the screws provided with the extension.
- Install the thimble assembly and nail it securely to the framing members.

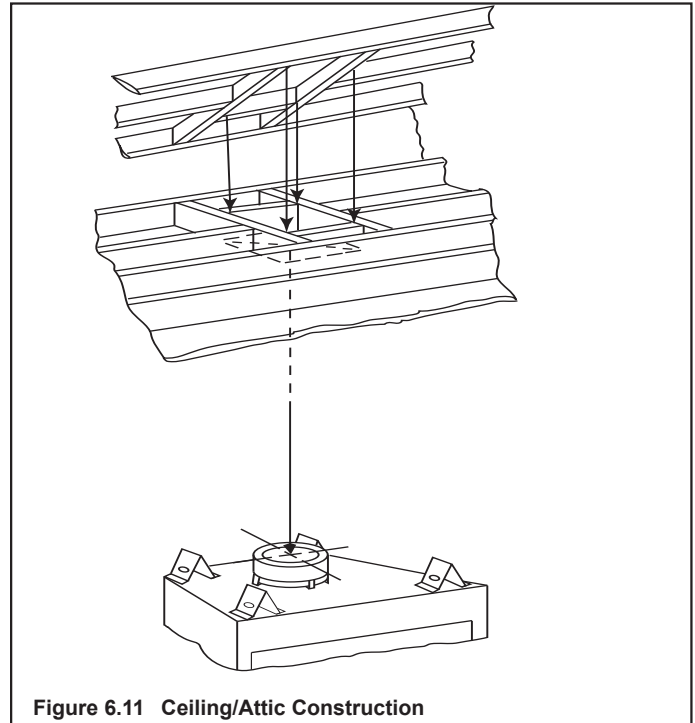


Figure 6.11 Ceiling/Attic Construction

- Center the flashing over the chimney and nail it to the roof. Keep gaps between the flashing plate and the roof to a minimum. Caulk the flashing plate and roof junction as well as the vertical seam on the flashing. All nail heads must be caulked with a roofing sealant.
- Finish assembling the chimney storm collar and termination cap following the installation instructions provided with them.

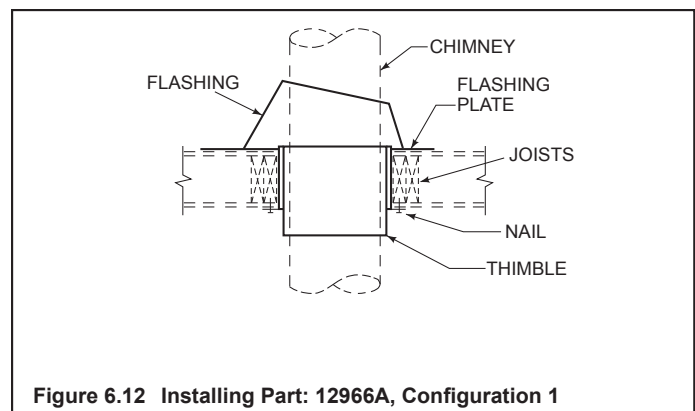


Figure 6.12 Installing Part: 12966A, Configuration 1

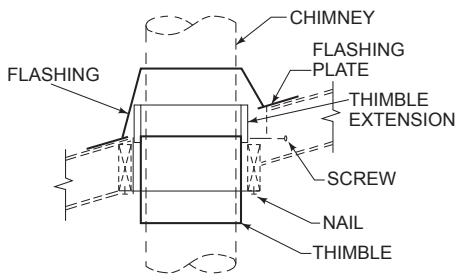


Figure 6.13 Installing Part 12966A, Configuration 2

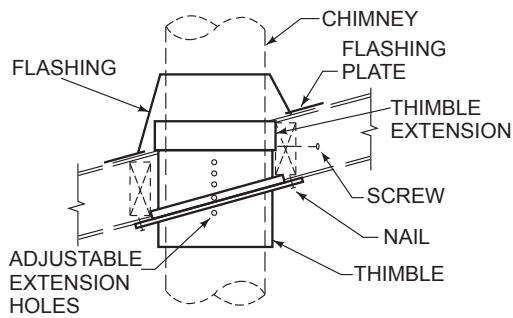


Figure 6.14 Installing Part 12966A Configuration 3

## I. Install Chase/Chase Top

- You **MUST** use a chase top in a chase installation. Chase tops are available from your Majestic dealer or may be field constructed.
- Include a turn-down and drip edge to prevent water from seeping into the chase.
- Include a 2 in. (51 mm) soldered, welded or spun collar around pipe opening to keep water out.
- Provide a 1/8 in. (3 mm) gap around the flue pipe.
- Slope the chase top downward away from the opening.

**WARNING! Risk of Fire! DO NOT** caulk the pipe to the chase top collar.

- Caulk all seams to prevent leaks.

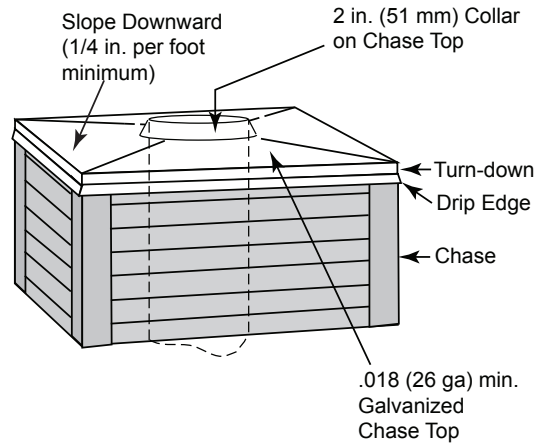


Figure 6.15 Chase Top Construction

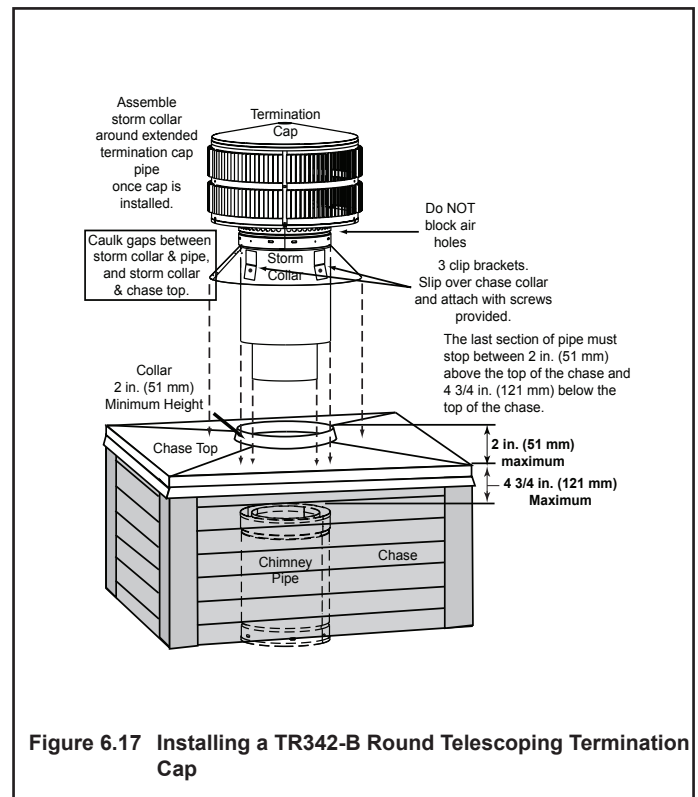
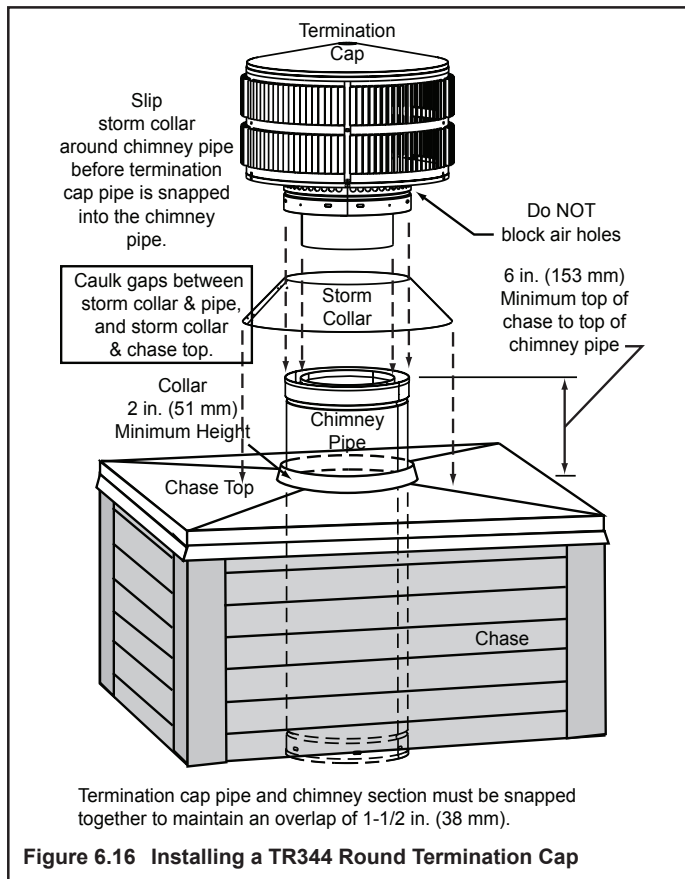
## J. Install Termination Cap

Install the chimney sections up through the chase enclosure.

- Caulk the overlap seam of any exposed pipe sections that are located above the roof line to prevent leaks.
- Refer to termination cap instructions.

**WARNING! Risk of Fire!** The minimum overlap of cap to pipe (as shown in the following illustrations) **MUST** be met or chimney may separate from cap. Separation allows sparks, heat and embers to escape.

**NOTICE:** Paint the termination cap with a rust-resistant paint to protect against the effects of corrosion on those parts exposed to the weather.





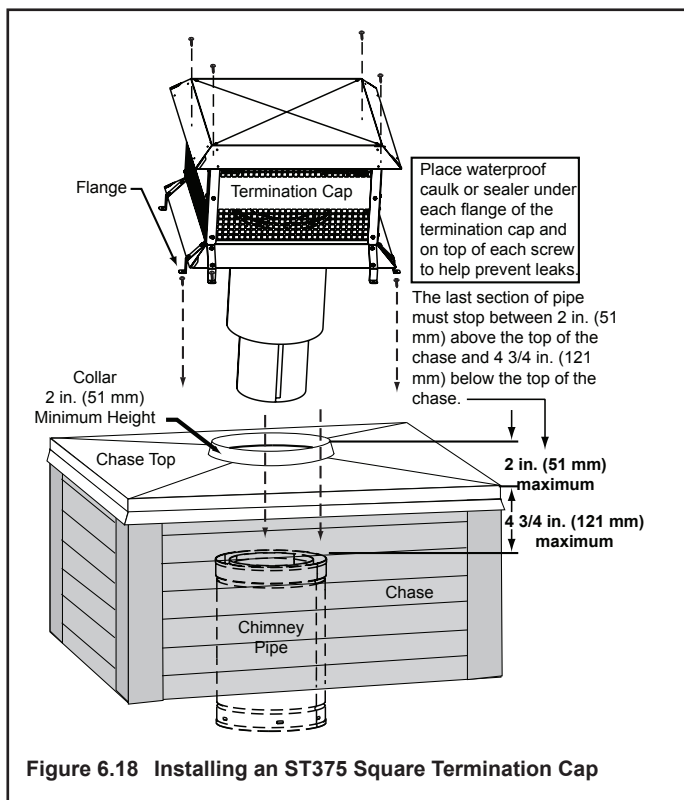


Figure 6.18 Installing an ST375 Square Termination Cap

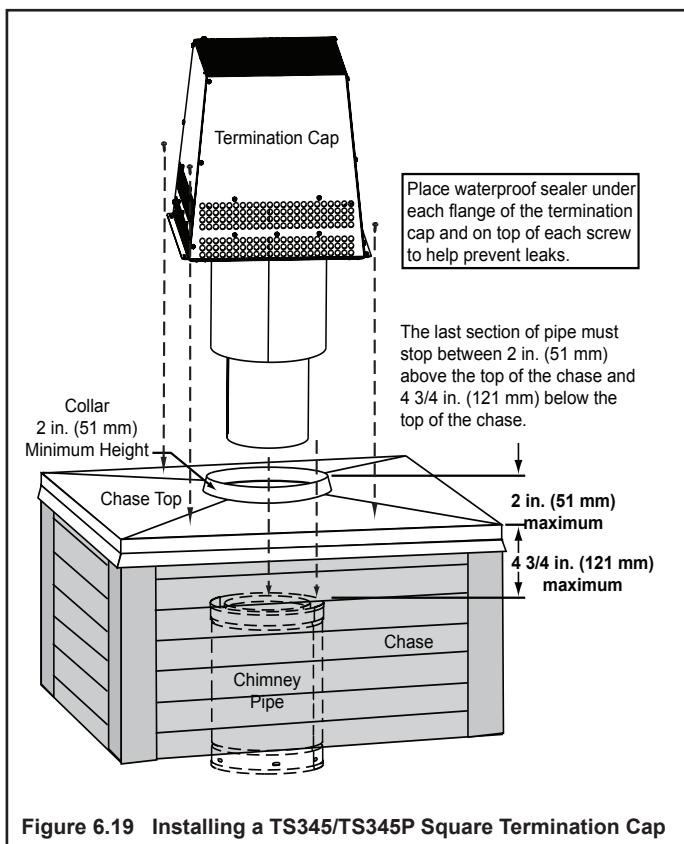


Figure 6.19 Installing a TS345/TS345P Square Termination Cap

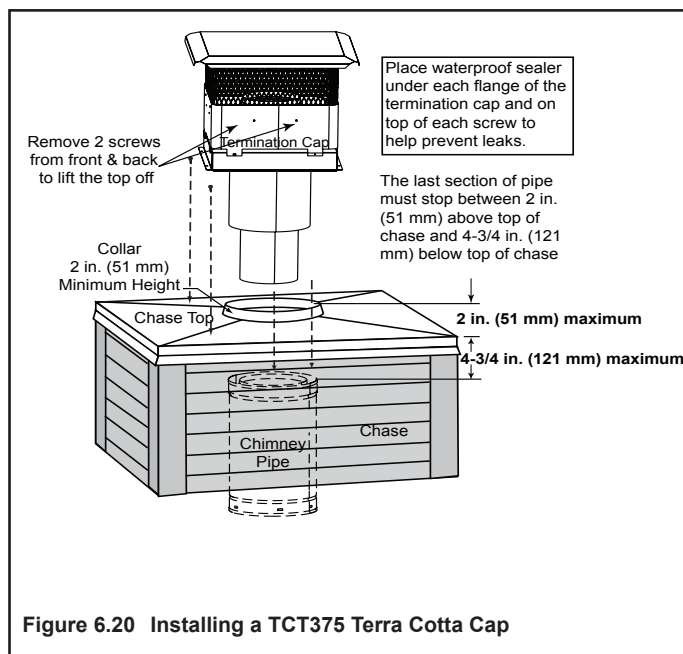


Figure 6.20 Installing a TCT375 Terra Cotta Cap

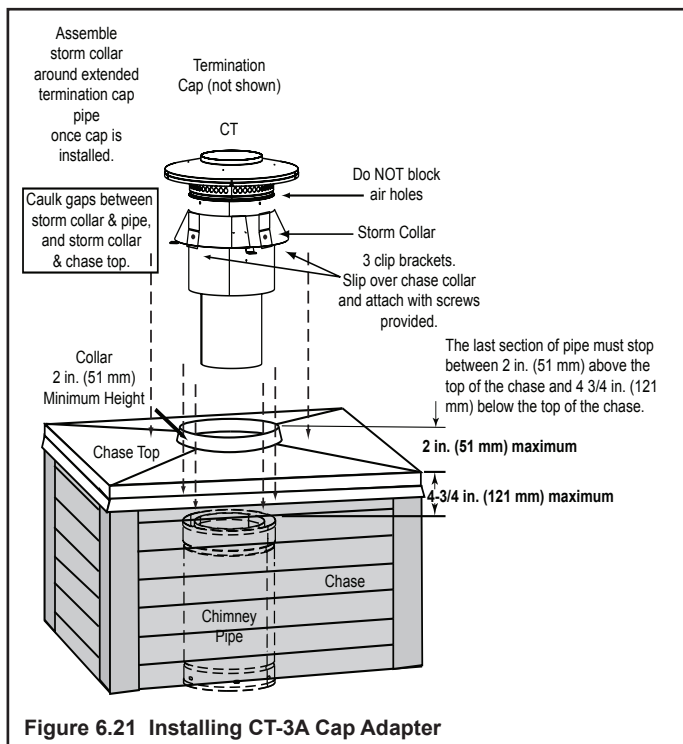


Figure 6.21 Installing CT-3A Cap Adapter



# 7 Finishing

## A. Template

A cardboard template of the front is printed on the outside of the shipping box. Cut out the template along the outside of the line for use in your installation. If using the cardboard template, it will require 1/4-20 bolts to attach it to the fireplace, (NOT INCLUDED). A metal template (see catalog) is available for more durable continued use, remaining accurate over time. Both measure 1/8 in. (3 mm) larger all the way around than the actual front.

Note: This 1/8 in. of the non-combustible material must be painted or the red will be visible.

**Tools Required:** 5/32 in. Allen wrench.

- Remove the screws from the fascia and remove fascia from the fireplace (if installed). Save the screws. Store the fascia in a safe, protected area to prevent scratching or other damage.
- Install the template on the front of the fireplace (Figure 7.1) with screws removed or provided.

NOTE: Do not over tighten the screws, just tighten up the template enough so that it comes in contact with the outer flanges on the front of the fireplace.

You are now ready to continue your installation with the desired decorative material. The template also serves as a protective covering and prevents damage to the front of the fireplace.

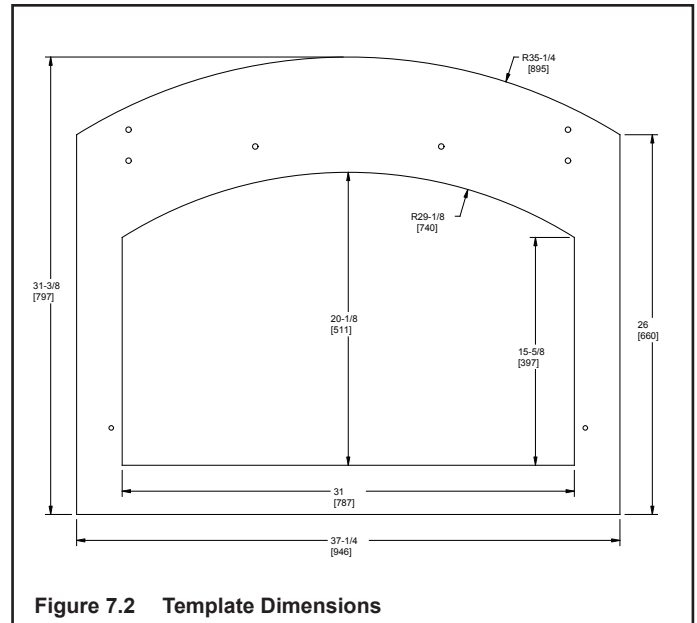


Figure 7.2 Template Dimensions

**Note: DO NOT** remove hang tags until installing finish materials.

**NOTE:** The decorative fascia must be removable for future serviceability.

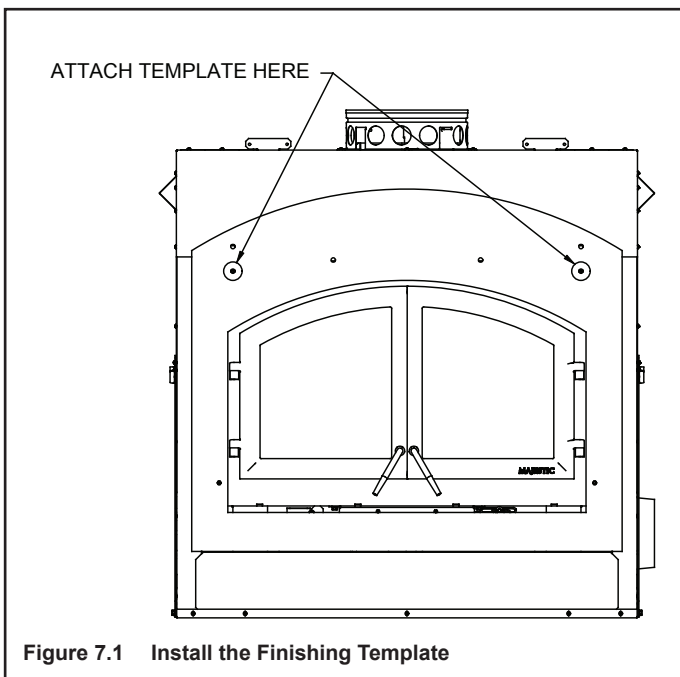


Figure 7.1 Install the Finishing Template

Figure 7.1 Install the Finishing Template

## B. Finish the Wall

Use a wet or dry towel or a soft brush to remove any dust or dirt from the non-combustible facing material.

Apply a non-combustible adhesive to attach tile, stone or other non-combustible finishing materials per manufacturer's instructions.

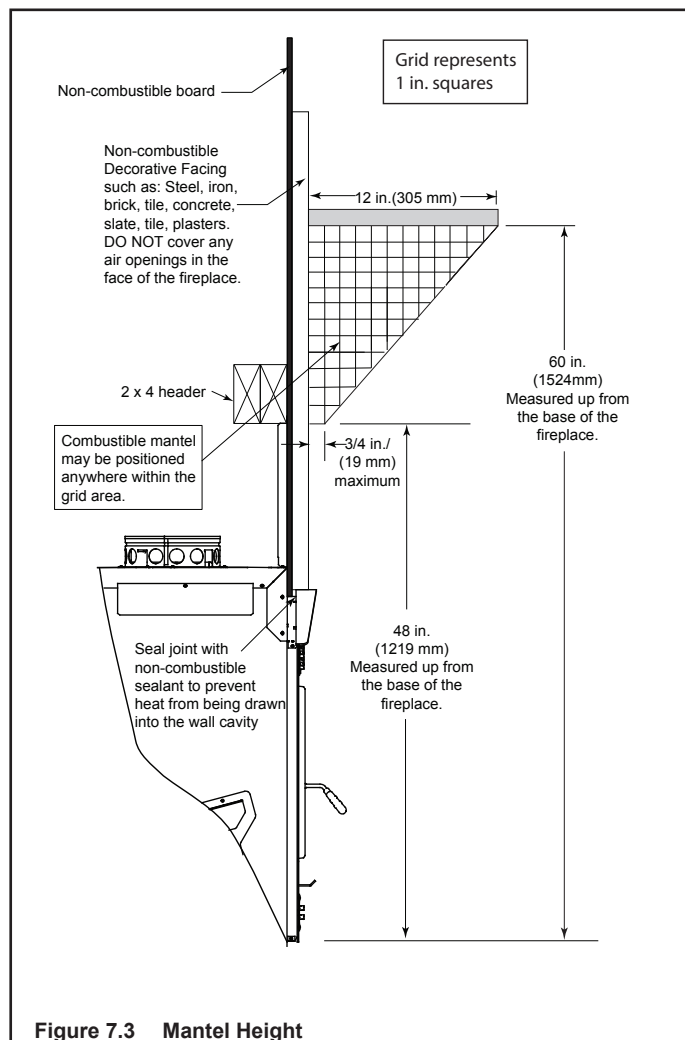
### 1. Stone, Brick Finish

**WARNING! Risk of Fire! DO NOT** apply tar paper or water resistive barrier over non-combustible board.

- Apply metal lath to the 1/2 in. thick non-combustible board with corrosion resistant self-tapping screws capable of penetrating the metal surface behind the non-combustible board.
- HHT recommends using type N or type S mortar. Due to high temperatures, review polymer modifiers specification sheet before using.

### 2. Tile, Granite, Marble Finish

- Due to high temperatures, HHT recommends using unmodified thinset when applying tile.
- When applying granite or marble, HHT recommends using thinset to adhere. If using a different adhesive, review specification sheet for application in high temperature areas.



## C. Mantel and Wall Projections

A combustible mantel may be positioned no lower than 60 in. (1524 mm) at 12 in. (305 mm) deep from the base of the fireplace.

Minimum clearance faceplate to sidewall is 16 in.

The combustible mantel may have a maximum depth of 12 in. (305 mm). Combustible trim pieces that project no more than 3/4 in. (19 mm) from the face of the fireplace can be placed no closer than 6 in. (152 mm) from the side of the decorative front. Surround legs that project more than 3/4 in. (19 mm) must be 16 in. (406 mm) away from the side of the decorative front. Combustible trim must not cover:

- the metal surfaces of the fireplace
- where the non-combustible board is placed over the metal surfaces
- the space between the metal face of the fireplace and framing members

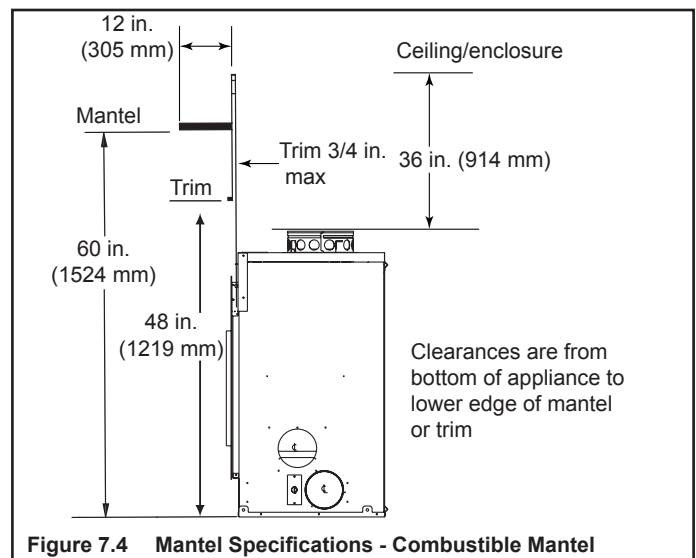


Figure 7.4 Mantel Specifications - Combustible Mantel

A noncombustible mantel may be positioned no lower than 38 in. (965 mm) from the base of the fireplace.

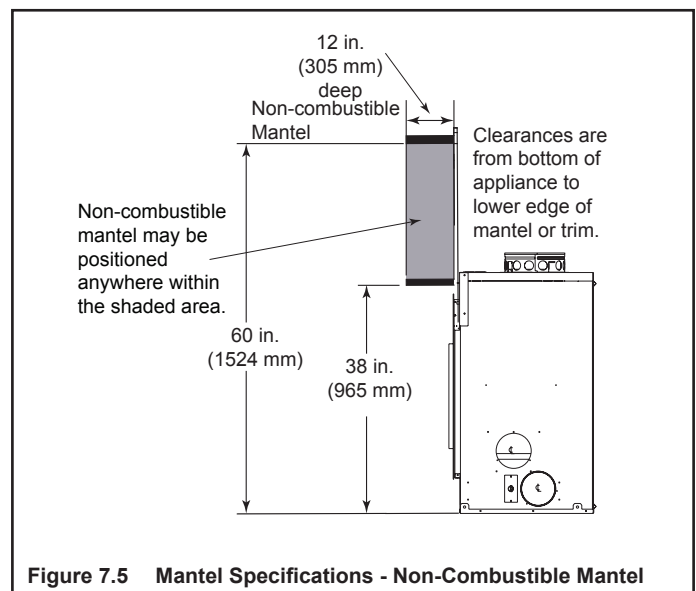


Figure 7.5 Mantel Specifications - Non-Combustible Mantel

## D. Finishing the Hearth Extension

**WARNING! Risk of Fire!** High temperatures, sparks, embers or other burning material falling from the fireplace may ignite flooring or concealed combustible surfaces.

- Protective metal hearth strips **MUST** be installed.
- Hearth extensions **MUST** be installed exactly as specified.

A hearth extension must be installed with all fireplaces to protect the combustible floor in front of the fireplace from both radiant heat and sparks.

- You **MUST** use a hearth extension with this fireplace.
- Refer to Figure 7.6 for minimum dimensions.
- This fireplace has been tested and approved for use with a hearth extension insulated to a minimum R value of 1.03.
- The hearth extension material **MUST** be covered with tile, stone or other non-combustible material.
- Manufactured hearth materials will usually have a published **R value** (resistance to heat) or **k value** (conductivity of heat). Refer to the formula in Table 7.1 to convert a k value to an R value,
- Refer to Table 7.2 for hearth extension insulation alternatives.

**Table 7.1**

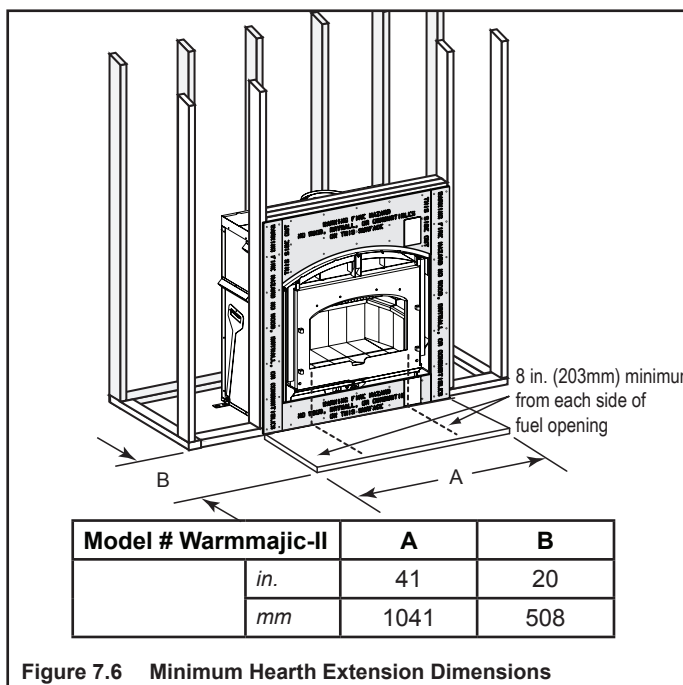
$$R = 1/k \times \text{inches of thickness}$$

**Table 7.2**

Hearth Extension Insulation Alternatives, R Value = 1.03			
Material	k per inch thick	r per inch thick	Minimum thickness required
Hearth & Home HX3, HX4	0.49	2.06	1/2 in.
USG Micore 300™	0.49	2.06	1/2 in.
USG Durock™ Cement Board	1.92	0.52	2 in.
Cement Mortar	5.0	0.20	5 1/8 in.
Common Brick	5.0	0.20	5 1/8 in.
Ceramic Tile	12.50	0.08	12 1/4 in.
Armstrong™ Privacy Guard Plus	0.46	2.18	1 in.
Marble	14.3-20.0	0.07-0.05	14 5/8 in. - 20 3/8 in.

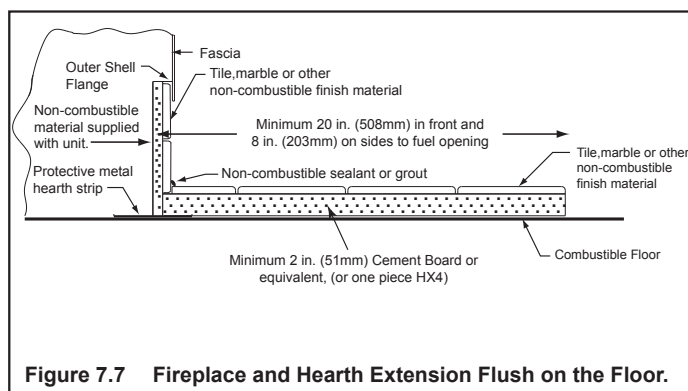
### **WARNING! Risk of Fire!**

You must comply with all minimum air space clearances to combustibles as specified. Framing or finishing material used on the front of, or in front of, the fireplace closer than the minimums listed must be constructed entirely of non-combustible materials (i.e., steel studs, concrete board, etc.). Failure to comply may cause fire.



**Figure 7.6 Minimum Hearth Extension Dimensions**

- Fireplace and Hearth Extension flush on the floor  
Non-combustible flooring a minimum of 20 in. (508 mm) in front of and 8 in. (203 mm) to either side of the fuel opening is required as shown in Figure 7.6.  
The construction of, and materials used for a hearth extension are shown in Figure 7.7. A hearth extension of this construction may be covered with any non-combustible decorative material and may have a minimum thickness as per Figure 7.7. Seal gaps between the hearth extension and the front of the fireplace with a bead of non-combustible sealant or grout.



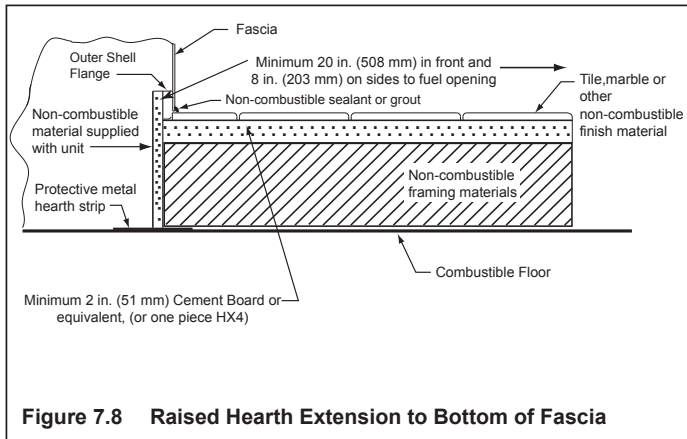
**Figure 7.7 Fireplace and Hearth Extension Flush on the Floor.**

- Fireplace installed flush on the floor and hearth extension raised to bottom of fascia:  
Non-combustible flooring a minimum of 20 in. (508 mm) in front of and 8 in. (203 mm) to either side of the fuel opening is required (see Figure 7.6).

- **Raised Hearth Extension Framing**

The hearth framing must be constructed of non-combustible materials (such as metal framing or equivalent material) and topped with one HX4, or equivalent material (Table 7.2).

**When creating the platform, allow for the thickness of the non-combustible finishing materials** (Figure 7.8).



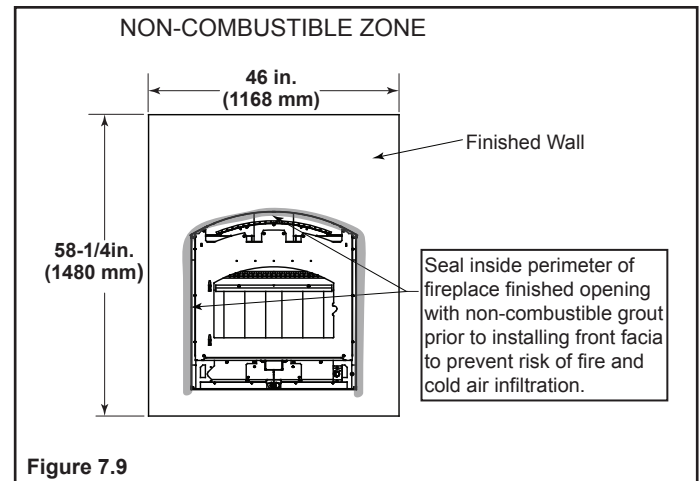
**Figure 7.8** Raised Hearth Extension to Bottom of Fascia

***WARNING! Risk of Fire!***

Hearth extensions are to be installed only as illustrated to prevent high temperatures from occurring on concealed combustible materials.

## E. Non-Combustible Sealant Material

- After completing the installation of non-combustible facing board in the required non-combustible zone and the non-combustible finishing material over that, remove the template.
- A bead of non-combustible sealant must be used to close off any gaps at the top and sides between the fireplace and non-combustible facing (Figure 7.9) to prevent cold air leaks and the risk of fire. Large gaps can be bridged with fiberglass rope gasket.
- When installation of the decorative material is complete, replace/install the fascia and fireplace doors.



**Figure 7.9**

***WARNING! Risk of Fire!***

- Maintain clearances.
- Use only non-combustible material below standoffs, material such as cement board is acceptable.
- Framing or finishing material used on the front of the fireplace closer than the minimums listed, must be constructed entirely of non-combustible materials (i.e., steel studs, concrete board, etc.).

***WARNING! Risk of Fire!***

Hearth & Home Technologies is not responsible for discoloration, cracking or other material failures of finishing materials due to heat exposure or smoke.

- Choose finishing materials carefully.

***WARNING! Risk of Fire!***

Seal around finishing material to fireplace.

# 8 Reference Materials

## A. Firebrick Placement

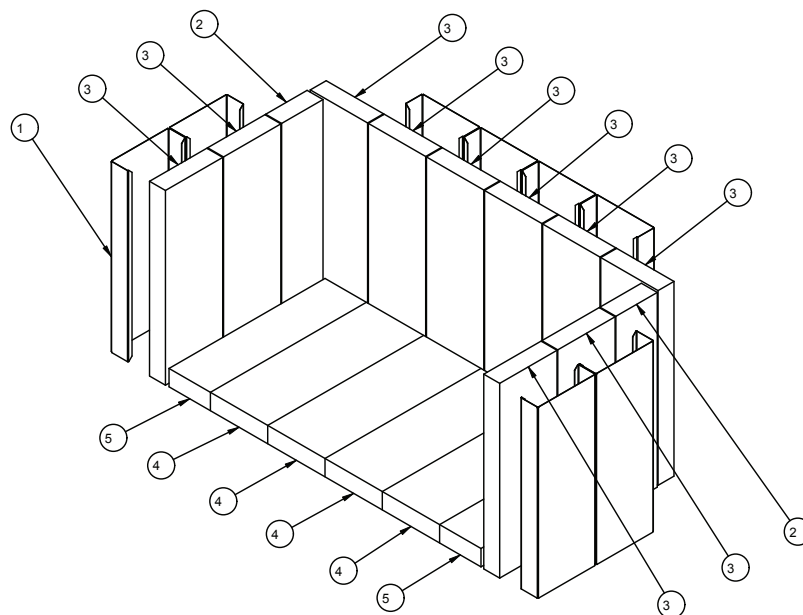
The firebox of your fireplace is lined with high quality firebrick, which has exceptional insulating properties.

Do not use a grate; simply build a fire on the firebox floor.

Do not operate the fireplace without bricks. Make sure bricks are installed as shown.

**IMPORTANT:** Be certain you have the proper brick in the correct location. Measure the brick size for accuracy.

- Remove new brick set from box and lay out to diagram as shown in Figure 8.1.
- Lay bottom bricks in firebox.
- Install rear bricks on the top of the bottom bricks. Slide top of bricks under clip on back of firebox wall and push bottom of brick back.
- Install side bricks. Slide top of brick under clips on side of firebox and push the bottom of the brick until it is flush with the side of the firebox.



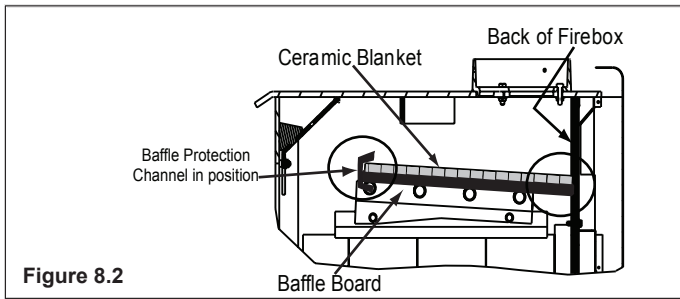
**Figure 8.1 Fire Brick Configurations**

**Table 8.1**

#	Brick Size	Qty. in Set
1	Brick Wrap	8
2	Firebrick 13.25 x 3.25	2
3	Firebrick 13.25 x 4.50 x 1.25	10
4	Firebrick 12.25 x 4.50	4
5	Firebrick 12.25 x 3.25	2

## B. Baffle and Blanket Placement

Ensure correct baffle and baffle protection channel placement; replace baffle components if damaged or missing.



The ceramic blanket and baffle board **MUST** be in contact with the back of the firebox and even with each other in the front. The baffle protection channel **MUST** be in position.

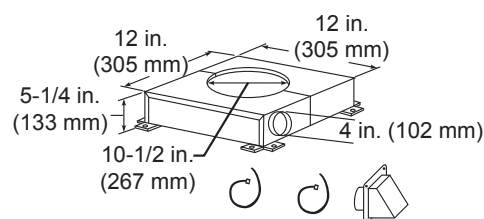
## C. Install Fascia (Fronts)

Front is required to complete the installation. Instructions for attachment of the front is included with it. Contact your local dealer with any questions on offerings or installation.

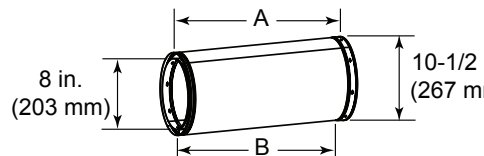
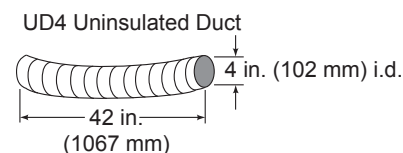
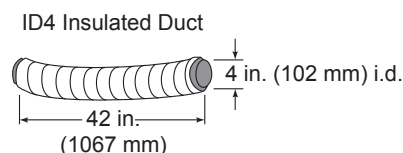
## D. Chimney Components

The following drawings show the SL-300 Series chimney and fireplace components which may be safely used with this fireplace. The 8 in. DuraPlus can also be used.

Catalog #	Description
CAK4A	Chimney Air Kit (shipped with fireplace)
ID4	Insulated Duct (used with chimney air kit)
UD4	Uninsulated Duct (used with chimney air kit)
SL306	Chimney Section - 6 in. (152 mm) long
SL312	Chimney Section - 12 in. (305 mm) long
SL318	Chimney Section - 18 in. (457 mm) long
SL324	Chimney Section - 24 in. (610 mm) long
SL336	Chimney Section - 36 in. (914 mm) long
SL348	Chimney Section - 48 in. (1219 mm) long
SL3	Chimney Stabilizer
SL315	Chimney Offset/Return - 15 deg
SL330	Chimney Offset/Return - 30 deg
FS338	Ceiling Firestop - Straight
FS339	Ceiling Firestop - 15 deg
FS340	Ceiling Firestop - 30 deg
AS8	SL300 Straight Attic Insulation Shield, 24 in. (610 mm) (shipped with fireplace)
JB877	Chimney Joint Band
CB876	Chimney Bracket
RF370	Roof Flashing - Flat to 6/12 Pitch
RF371	Roof Flashing - 6/12 to 12/12 Pitch
DTO134/146	Octagonal Decorative Caps
DTS134/146	Square Decorative Caps
ST375	Square Termination Cap
TCT375	Terra Cotta Termination Cap
TR344	Round Termination Cap
TR342-B	Round Telescoping Termination Cap
TR-TVK	TR Top Vent Kit
TS345	Square Termination Cap
TS345P	Square Termination Cap - Painted
12966A	Manufactured Home Thimble
MH841	Manufactured Home Thimble Extension 20 in./508 mm
HX4	Micore Hearth Extension, 20 in./508 mm wide
LDS33	Decorative Shroud - 3 ft x 3 ft (.91 m x .91 m)
LDS46	Decorative Shroud - 4 ft x 6 ft (1.22 m x 1.83 m)
LDS-BV	Decorative Shroud - 26 in. x 26 in. (660 mm x 660 mm)
	Field Constructed Shrouds (See "Woodburning Termination Cap")
CT-3A-B	Adapter - May be used with the following caps
	CT Series
	DT Series
8DP-BP	Duraplug Base Plate (required if using DuraPlus Chimney)

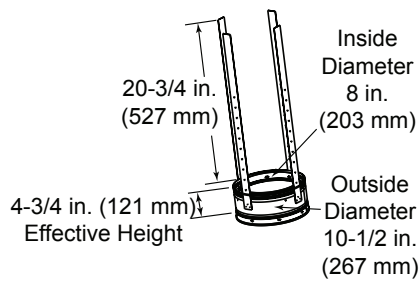


**CAK4A Chimney Air Kit (shipped with fireplace)**

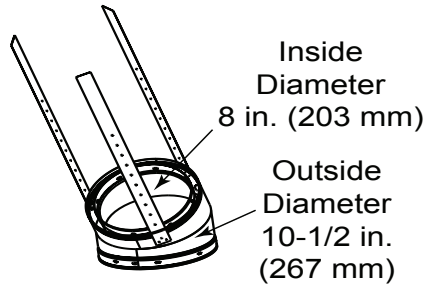


Catalog #	A		B	
	in	mm	in	mm
SL306	6	152	4-3/4	121
SL312	12	305	10-3/4	273
SL318	18	457	16-3/4	425
SL324	24	610	22-3/4	578
SL336	36	914	34-3/4	883
SL348	48	1219	46-3/4	1187

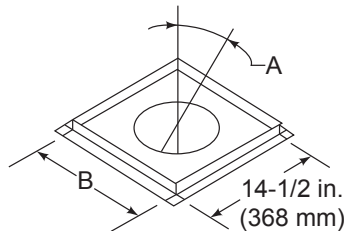




**SL3 Chimney Stabilizer**



**SL315 Chimney Offset/Return - Effective Height 13-3/8 in. (340 mm)**  
**SL330 Chimney Offset/Return - Effective Height 15-1/2 in. (394 mm)**

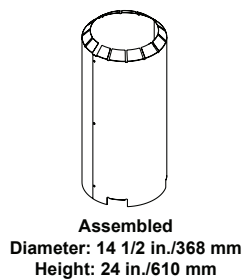


**Firestop Spacer**

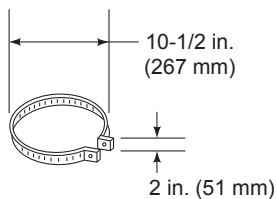
Catalog #	A	B	
FS338	0-deg.	14-1/2 in.	368 mm
FS339	15-deg.	18-3/8 in.	467 mm
FS340	30-deg.	23 in.	584 mm

A = Actual Length

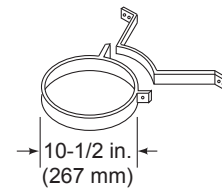
B = Effective length (length of chimney part after it has been snapped to another)



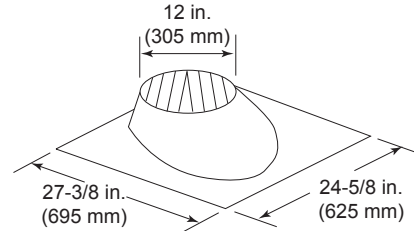
**AS8 SL300 Straight Attic Insulation Shield (shipped with unit)**



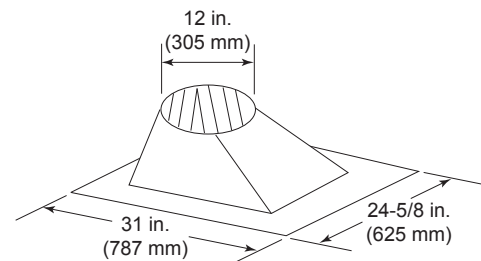
**JB877 Chimney Joint Band**



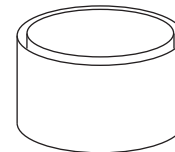
**CB876 Chimney Bracket**



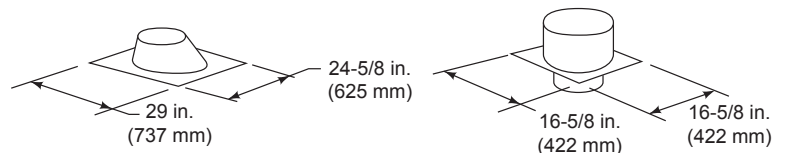
**RF370 - Roof Flashing Flat to 6/12 Pitch**



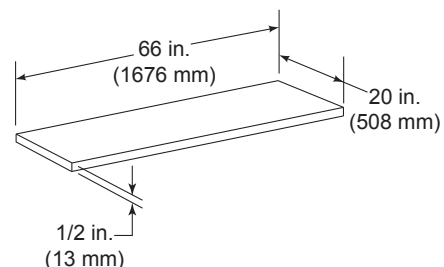
**RF371 - Roof Flashing 6/12 to 12/12 Pitch**



**MH841 Manufactured Home Thimble Extension**

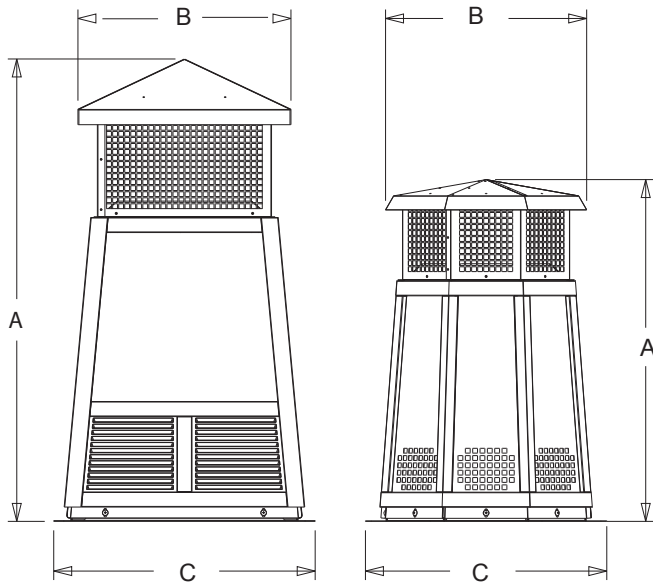


**12966A Manufactured Home Thimble**



**HX4 Micore Hearth Extension**





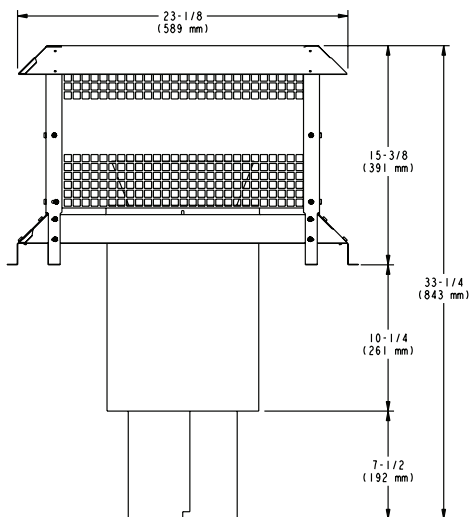
**DTS134/DTS146**

**DTO134/DTO146**

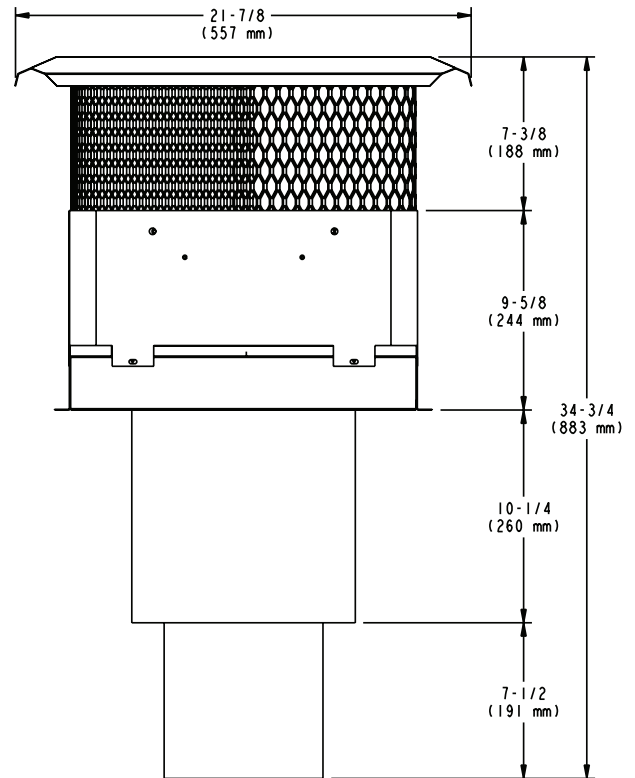
**Decorative Caps**

DTO134		A	B	C
	in	34	20	24
	mm	864	508	610
DTO146		A	B	C
	in	46	22.7	26
	mm	1168	576	660

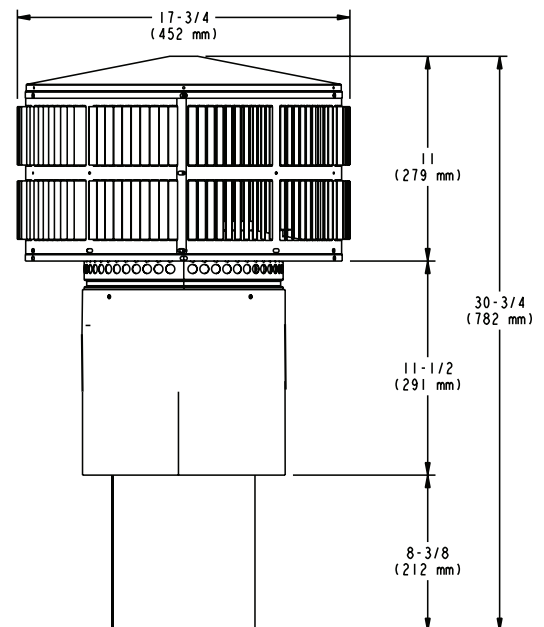
DTS134		A	B	C
	in	34	21.18	24
	mm	864	538	610
DTS146		A	B	C
	in	46	21.18	26
	mm	1168	538	660



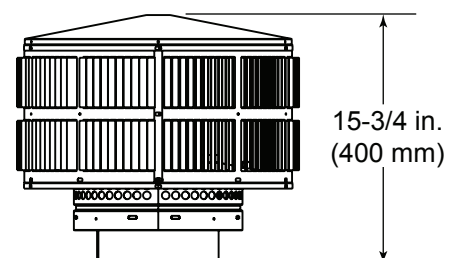
**ST375 Square Termination Cap**



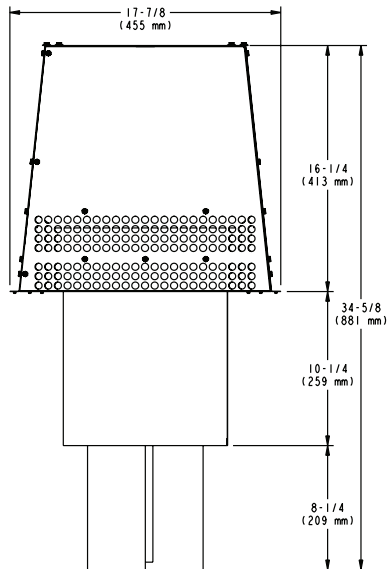
**TCT375 Terra Cotta Cap**



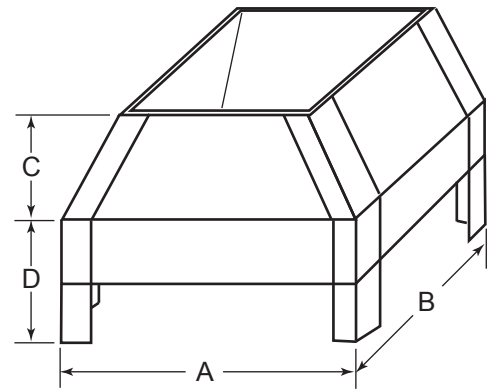
**TR342-B Round Telescoping Termination Cap**



**TR344 Round Termination Cap**

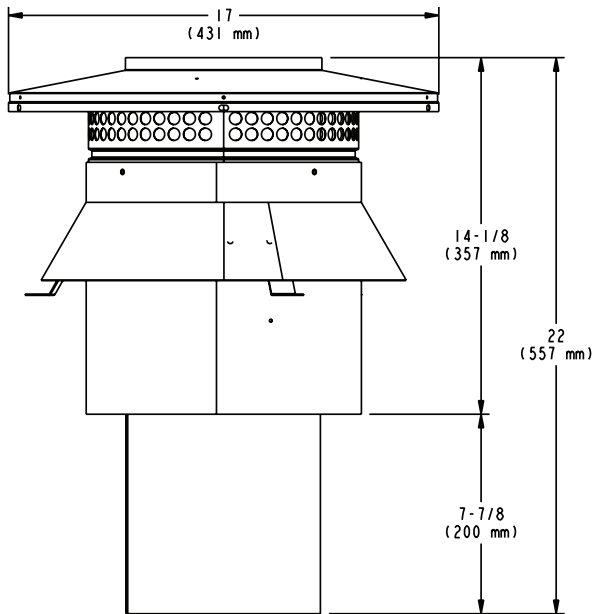


**TS345/TS345P Square Termination Cap**

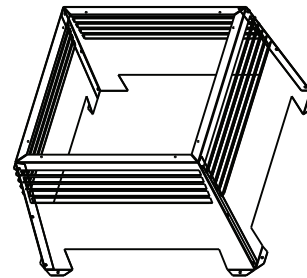


**LDS33/LDS46 Decorative Shroud**

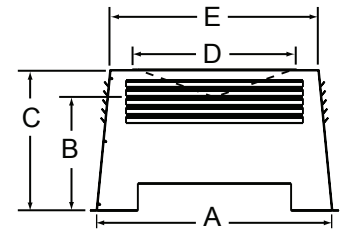
Catalog #	A		B		C		D	
	in.	mm	in.	mm	in.	mm	in.	mm
LDS33	36	914	36	914	8.5	216	11	279
LDS46	48	1219	72	1829	8.5	216	11	279



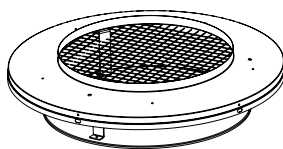
**CT-3-B**



**LDS-BV Decorative Shroud**



Catalog #		A	B	C	D	E
		in.	mm	in.	mm	mm
LDS-BV	in.	26	12.5	15.5	22	23
	mm	660	318	394	559	584



**TR-TVK Top Vent Kit**

## DuraPlus Venting

Catalog #	Description
DV-8DP-BP	8" DuraPlus base plate
DV-8DP-E15	8" DuraPlus 15° elbow kit
DV-8DP-E30	8" DuraPlus 30° elbow kit
DV-8DP-E15KSS	8" DuraPlus 15° elbow kit (SS)
DV-8DP-E30KSS	8" DuraPlus 30° elbow kit (SS)
DV-8DP-WS	8" DuraPlus wall strap
DV-8DP-ES	8" DuraPlus elbow strap
DV-8DP-AWS	8" DuraPlus adjustable wall strap
DV-8DP-WSSS	8" DuraPlus wall strap (SS)
DV-8DP-FRS	8" DuraPlus firestop radiation shield
DV-8DP-XRB	8" DuraPlus extended roof bracket
DV-6DP-SC	6-8 Storm collar
DV-8DP-F6	8" DuraPlus flashing 0/12-6/12
DV-8DP-FF	8" DuraPlus flat roof flashing
DV-8DP-F12	8" DuraPlus flashing 7/12-12/12
DV-8DP-06	8x6 DuraPlus pipe
DV-8DP-09	8x9 DuraPlus pipe
DV-8DP-12	8x12 DuraPlus pipe
DV-8DP-24	8x24 DuraPlus pipe
DV-8DP-24SS	8x24 DuraPlus pipe (SS)
DV-8DP-36	8x36 DuraPlus pipe
DV-8DP-36SS	8x36 DuraPlus pipe (SS)
DV-8DP-VC	8" DuraPlus chimney cap

## **E. Accessories**

### **Lintel Bar**

LINTEL- Lintel Bar

### **Finishing Template**

TMP-PIIA

### **Heat-Zone-WD**

### **Mesh-HHT Firescreen**

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Majestic, a brand of Hearth & Home Technologies  
1915 West Saunders Street, Mount Pleasant, Iowa 52641  
[www.Majesticproducts.com](http://www.Majesticproducts.com)

Please contact your Majestic dealer with any questions or concerns.  
For the location of your nearest Majestic dealer, please visit [www.Majesticproducts.com](http://www.Majesticproducts.com).

# Owner's Manual

## Care and Operation


Pour demander un exemplaire en français de ce Manuel du propriétaire, visitez [www.majestic-products.com/translations](http://www.majestic-products.com/translations).

**INSTALLER:** Leave this manual with party responsible for use and operation.

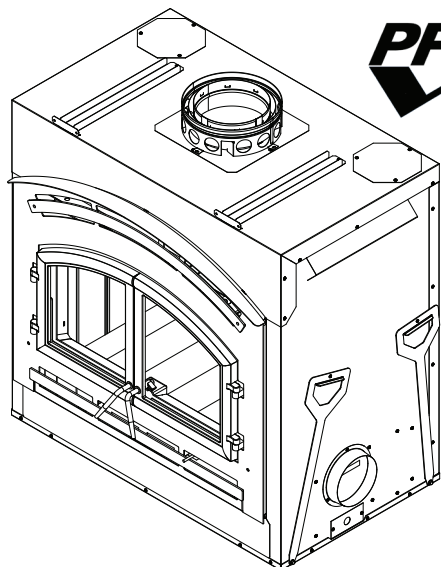
**OWNER:** Retain this manual for future reference.

**NOTICE:** *DO NOT* discard this manual!



Model(s): 

**WarmMajic-II**



**EPA CERTIFIED WOODBURNING  
FIREPLACE**

Installation and service of this appliance should be performed by qualified personnel. Hearth & Home Technologies recommends HHT Factory Trained or NFI certified professionals.

**hearthED**  
FACTORY TRAINING  
Fuel Your Fire



**⚠ WARNING:** If the information in these instructions is not followed exactly, a fire or explosion may result causing property damage, personal injury, or death.

- **DO NOT** store or use gasoline or other flammable vapors and liquids in the vicinity of this or any other appliance.
- **DO NOT** overfire. Overfiring will void your warranty.
- Comply with all minimum clearances to combustibles as specified. Failure to comply may cause house fire.

### ⚠ WARNING



#### **HOT SURFACES!**

Glass and other surfaces are hot during operation AND cool down.

#### **Hot glass will cause burns.**

- **DO NOT** touch glass until it is cooled
  - NEVER allow children to touch glass
  - Keep children away
  - CAREFULLY SUPERVISE children in same room as fireplace.
  - Alert children and adults to hazards of high temperatures.
- High temperatures may ignite clothing or other flammable materials.**
- Keep clothing, furniture, draperies and other flammable materials away.

### ⚠ WARNING



#### **Fire Risk.**

For use with solid wood fuel only.  
Other fuels may overfire and generate poisonous gases (i.e. carbon monoxide).

## Safety Alert Key:

- **DANGER!** Indicates a hazardous situation which, if not avoided will result in death or serious injury.
- **WARNING!** Indicates a hazardous situation which, if not avoided could result in death or serious injury.
- **CAUTION!** Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.
- **NOTICE:** Indicates practices which may cause damage to the fireplace or to property.

## Table of Contents

<b>1 Welcome</b>		<b>4 Maintenance and Service</b>	
A. Congratulations	3	A. Maintenance Tasks-Homeowners	18
B. LIMITED LIFETIME WARRANTY	4	1. Chimney Inspection	18
<b>2 Product Specific Information</b>		2. Creosote (Chimney) Cleaning	19
A. Appliance Certification	7	3. Care and Cleaning of Plated Surfaces	20
B. BTU & Efficiency Specifications	7	4. Glass Door	20
C. Mobile Home Approved	7	5. Glass Cleaning	20
D. Glass Specifications	7	6. Door Gasket	20
<b>3 Important Safety and Operating Information</b>		7. Ash Removal	20
A. Fireplace Safety	8	8. Baffle and Blanket	20
1. Clear Space	8	9. Firebrick	20
2. Firebrick	9	B. Replacement Maintenance	21
3. Baffle and Blanket	9	1. Glass Replacement	21
4. Over-Firing Your Fireplace	9	2. Tighten or Adjust Door Latch	21
5. Chimney Fire	9	3. Door Handle Assembly	22
B. General Operating Parts	10	4. Firebrick Replacement	22
1. Automatic Combustion Control (ACC)	11	5. Baffle Removal and Installation	23
2. ACC Override	11	6. Fan Replacement	23
3. Outside Air	11	7. Timer Assembly Replacement	24
4. Glass Doors	12	8. Timer Removal and Replacement	26
5. Convection Fan Operation	12	<b>5 Troubleshooting</b>	
C. Fuel	12	A. FAQs	29
1. Hardwood vs. Softwood	13	B. Troubleshooting Table	31
2. Moisture Content	13	<b>6 Reference Materials</b>	
3. Seasoning	13	A. Service Parts	32
4. Storing Wood	14	B. Contact Information	37
5. Burning Process	14		
6. Dirty Glass	14		
7. Creosote Formation	14		
8. Opacity	14		
D. First Fire	14		
E. Lighting Instructions	15		
F. Frequently Asked Questions	17		



# 1 Welcome

Read this manual before installing or operating this fireplace.  
Please retain this owner's manual for future references.

## A. Congratulations

Congratulations on selecting a Majestic wood burning fireplace. The Majestic fireplace you have selected is designed to provide the utmost in safety, reliability, and efficiency.

As the owner of a new fireplace, you'll want to read and carefully follow all of the instructions contained in this Owner's Manual. Pay special attention to all Cautions and Warnings.

This Owner's Manual should be retained for future reference. We suggest that you keep it with your other important documents and product manuals.

Your new Majestic wood burning fireplace will give you years of durable use and trouble-free enjoyment. Welcome to the Majestic family of fireplace products!

Majestic is a registered trademark of Hearth & Home Technologies.

### Local Dealer Information

**DEALER:** Fill in your name, address, phone and email information here and fireplace information below.

Dealer Name: \_\_\_\_\_  
Address: \_\_\_\_\_  
Phone: \_\_\_\_\_  
Email: \_\_\_\_\_

### Fireplace Information:

Brand: \_\_\_\_\_ Model Name: \_\_\_\_\_  
Serial Number: \_\_\_\_\_ Date Installed: \_\_\_\_\_

## Listing Label Information/Location

The model information regarding your specific fireplace can be found on the rating plate usually located in the control area of the fireplace.

**Model:**  
**WarmMajic**  
**EPA CERTIFIED FIREPLACE**

**SERIAL NO./NUMERO DESERE**  
MP188

**MODEL**  
WarmMajic-II

**FIRE CHAMBER INTENDED FOR USE WITH HEARTH & HOME TECHNOLOGIES LISTED FIREPLACE PARTS. SEE INSTALLATION AND OPERATING INSTRUCTIONS FOR THIS MODEL. REPLACE GLASS ONLY WITH CERAMIC.**

**DO NOT OVERFIRE. USE ONLY SOLID WOOD FUEL. DO NOT USE A FIREPLACE INSERT OR OTHER PRODUCTS NOT SPECIFIED FOR USE WITH THIS PRODUCT.**

**WARNING! THIS FIREPLACE HAS NOT BEEN TESTED WITH AN UNVENTED GAS LOG SET. TO REDUCE THE RISK OF FIRE OR INJURY, DO NOT INSTALL AN UNVENTED GAS LOG SET INTO FIREPLACE.**

**DO NOT USE GRATE OR ELEVATE FIRE. BUILD WOOD FIRE DIRECTLY ON FIREBRICK.**

**WARNING! TO AVOID THE RISK OF DAMAGING FIREPLACE MATERIALS AND INCREASING THE RISK OF SPREADING A FIRE DO NOT USE THE FIREPLACE TO COOK OR WARM FOOD.**

**INSTALL AND USE ONLY IN ACCORDANCE WITH MANUFACTURER'S INSTALLATION, VENTING AND OPERATING INSTRUCTIONS. ANY AREA INCORPORATING WARM OR COLD AIR DUCTS SHALL BE ENCLOSED IN ACCORDANCE WITH THE MANUFACTURER'S INSTALLATION INSTRUCTIONS. CONTACT YOUR LOCAL BUILDING OR FIRE OFFICIALS OR AUTHORITY HAVING JURISDICTION ABOUT RESTRICTIONS, INSTALLATION INSPECTION AND PERMITS REQUIRED IN YOUR AREA. COMPONENTS REQUIRED FOR INSTALLATION: HHT SL300 SERIES PIPE OR DURAVENT DURA PLUS SYSTEM, TERMINATION CAP, HEARTH EXTENSION AND REQUIRED ACCESSORY CHIMNEY AIR KIT PART CAK4A. DO NOT CONNECT THIS UNIT TO A CHIMNEY SERVING ANOTHER APPLIANCE.**

**DANGER: RISK OF ELECTRICAL SHOCK. DISCONNECT POWER SUPPLY BEFORE SERVICING.**

**ELECTRICAL RATING: 115 VAC <3.0 AMPS 60 HZ**

**MUST PROVIDE A SOURCE OF AIR TO PREVENT AIR STARVATION FROM COMBUSTION WHICH COULD RESULT IN HIGH LEVELS OF CARBON MONOXIDE.**

**CLEARANCE TO COMBUSTIBLES: 2 IN. MIN. 51 MM**

**CHIMNEY/CHEMNEE**

**DEGAGEMENT DES MATÉRIELS COMBUSTIBLES:**

**FIREPLACE ALSO FOR USE IN MANUFACTURED/MOBILE HOMES WITH SOLID FUEL ONLY**

**FIREPLACE FOR USE OUTDOORS**

**YES** ☒ **NO** ☐

**YES** ☐ **NO** ☒

**FIREBOX/POINTE**

**BACK** 1/2 IN. MIN.

**RETOUR** 13 IN. MIN.

**SIDE** 1 IN. MIN.

**COTE** 25 IN. MIN.

**IF INSTALLATION OR OPERATING INSTRUCTIONS ARE MISSING CONTACT: HEARTH & HOME TECHNOLOGIES, 7571 215th Street West, Lakeville, MN 55044**

**THE HEARTH EXTENSION MUST BE INSTALLED ACCORDING TO THE INSTALLATION INSTRUCTIONS.**

This wood heater needs periodic inspection and repair for proper operation. Consult 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.

**DO NOT REMOVE THIS LABEL**

**Made in U.S.A. of US and imported parts**

Mfg by: HEARTH & HOME technologies

2019 2020 2021 2022 2023 2024 Jan Feb Mar Apr May June July Aug Sept Oct Nov Dec.

U.S. ENVIRONMENTAL PROTECTION AGENCY - Certified to comply with 2020 particulate emission standards using cord wood. This wood heater was found to have an average emissions rate of 2.0g/hr using method ASTM E3053-17.

4188-990A

Model Number

Serial Number

## B. LIMITED LIFETIME WARRANTY

### Hearth & Home Technologies LIMITED LIFETIME WARRANTY

Hearth & Home Technologies, on behalf of its hearth brands ("HHT"), extends the following warranty for HHT gas, wood, pellet and electric hearth appliances that are purchased from an HHT authorized dealer.

#### **WARRANTY COVERAGE:**

HHT warrants to the original owner of the HHT appliance at the site of installation, and to any transferee taking ownership of the appliance at the site of installation within two years following the date of original purchase, that the HHT appliance will be free from defects in materials and workmanship at the time of manufacture. After installation, if covered components manufactured by HHT are found to be defective in materials or workmanship during the applicable warranty period, HHT will, at its option, repair or replace the covered components. HHT, at its own discretion, may fully discharge all of its obligations under such warranties by replacing the product itself or refunding the verified purchase price of the product itself. The maximum amount recoverable under this warranty is limited to the purchase price of the product. This warranty is subject to conditions, exclusions and limitations as described below.

#### **WARRANTY PERIOD:**

Warranty coverage for consumers begins at the date of installation. 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, authorized HHT dealer/distributor, whichever occurs earlier. However, the warranty shall commence no later than 24 months following the date of product shipment from HHT, regardless of the installation or occupancy date. The warranty period for parts and labor for covered components is produced in the following table.

The term "Limited Lifetime" in the table below is defined as: 20 years from the beginning date of warranty coverage for gas appliances, and 10 years from the beginning date of warranty coverage for wood and pellet appliances. These time periods reflect the minimum expected useful lives of the designated components under normal operating conditions.

Warranty Period		HHT Manufactured Appliances and Venting					
Parts	Labor	Gas	Pellet	Wood	Electric	Venting	Components Covered
1 Year		X	X	X	X	x	All parts and material except as covered by Conditions, Exclusions, and Limitations listed
2 years			X	X			Igniters, auger motors, electronic components, and glass
		X	X	X			Factory-installed blowers
				X			Molded refractory panels
		X					Ignition Modules
3 years			X				Firepots, burnpots, mechanical feeders/auger assemblies
5 years	1 year	X					Vent Free burners, Vent Free ceramic fiber logs, Aluminized Burners
			X	X			Castings and Baffles
6 years	3 years			X			Catalyst - limitations listed
7 years	3 years		X	X			Manifold tubes, HHT chimney and termination
10 years	1 year	X					Burners, logs and refractory
Limited Lifetime	3 years	X	X	X			Firebox and heat exchanger, Grate and Stainless Steel Burners, FlexBurn® System (engine, inner cover, access cover and fireback)
90 Days		X	X	X	X	X	All replacement parts beyond warranty period

**WARRANTY CONDITIONS:**

- This warranty only covers HHT appliances that are purchased through an HHT authorized dealer or distributor. A list of HHT authorized dealers is available on the HHT branded websites.
- This warranty is only valid while the HHT appliance remains at the site of original installation.
- This warranty is only valid in the country in which the HHT authorized dealer or distributor that sold the appliance resides.
- Contact your installing dealer for warranty service. If the installing dealer or distributor is unable to provide necessary parts, contact the nearest HHT authorized dealer or supplier. Additional service fees may apply if you are seeking warranty service from a dealer other than the dealer from whom you originally purchased the product.
- Check with your dealer in advance for any costs to you when arranging a warranty call. Travel and shipping charges for parts are not covered by this warranty.
- Limited Catalyst Warranty
  - o For wood burning products containing a catalyst, the catalyst will be warranted for a six-year period as follows: if the original catalyst or a replacement catalyst proves defective or ceases to maintain 70% of its particulate emission reduction activity (as measured by an approved testing procedure) within 36 months from the purchase date, the catalyst will be replaced for free.
  - o From 37 to 72 months a pro-rated credit will be allowed against a replacement catalyst and labor credit necessary to install the replacement catalyst. The proration rate is as follows:

Amount of Time Since Purchase	Credit Towards Replacement Cost
0 - 36 Months	100%
37 - 48 Months	30%
49 - 60 Months	20%
61 - 72 Months	10%

- o Any replacement catalyst will be warranted under the terms of the catalyst warranty for the remaining term of the original warranty. The purchaser must provide the name, address, and telephone number of the location where the product is installed, proof of original purchase date, date of failure, and any relevant information regarding the failure of the catalyst.

**WARRANTY EXCLUSIONS:**

This warranty does not cover the following:

- Changes in surface finishes as a result of normal use. As a heating appliance, some changes in color of interior and exterior surface finishes may occur. This is not a flaw and is not covered under warranty.
- Damage to printed, plated, or enameled surfaces caused by fingerprints, accidents, misuse, scratches, melted items, or other external sources and residues left on the plated surfaces from the use of abrasive cleaners or polishes.
- Repair or replacement of parts that are subject to normal wear and tear during the warranty period are not covered. These parts include: paint, wood and pellet gaskets, firebricks, grates, flame guides, batteries and the discoloration of glass.
- Minor expansion, contraction, or movement of certain parts causing noise. These conditions are normal and complaints related to this noise are not covered by this warranty.
- Damages resulting from: (1) failure to install, operate, or maintain the appliance in accordance with the installation instructions, operating instructions, and listing agent identification label furnished with the appliance; (2) failure to install the appliance in accordance with local building codes; (3) shipping or improper handling; (4) improper operation, abuse, misuse, continued operation with damaged, corroded or failed components, accident, or improperly/incorrectly performed repairs (5) environmental conditions, inadequate ventilation, negative pressure, or drafting caused by tightly sealed constructions, insufficient make-up air supply, or handling devices such as exhaust fans or forced air furnaces or other such causes; (6) use of fuels other than those specified in the operation instructions; (7) installation or use of components not supplied with the appliance or any other components not expressly authorized and approved by HHT; (8) modification of the appliance not expressly authorized and approved by HHT in writing; and/or (9) interruptions or fluctuations of electrical power supply to the appliance.
- Non-HHT venting components, hearth connections or other accessories used in conjunction with the appliance.
- Any part of a pre-existing fireplace system in which an insert or a decorative gas appliance is installed.
- HHT's obligation under this warranty does not extend to the appliance's capability to heat the desired space. Information is provided to assist the consumer and the dealer in selecting the proper appliance for the application. Consideration must be given to the appliance location and configuration, environmental conditions, insulation and air tightness of the structure.

**This warranty is void if:**

- The appliance has been over-fired, operated in atmospheres contaminated by chlorine, fluorine, or other damaging chemicals. Over-firing can be identified by, but not limited to, warped plates or tubes, deformation/warping of interior cast iron structure or components, rust colored cast iron, bubbling, cracking and discoloration of steel or enamel finishes.
- The appliance is subjected to prolonged periods of dampness or condensation.
- There is any damage to the appliance or other components due to water or weather damage which is the result of, but not limited to, improper chimney or venting installation.

**LIMITATIONS OF LIABILITY**

- The owner's exclusive remedy and HHT's sole obligation under this warranty, under any other warranty, express or implied, or in contract, tort or otherwise, shall be limited to replacement, repair, or refund, as specified above. In no event will HHT be liable for any incidental or consequential damages caused by defects in the appliance. Some states do not allow exclusions or limitation of incidental or consequential damages, so these limitations may not apply to you. This warranty gives you specific rights; you may also have other rights, which vary from state to state. EXCEPT TO THE EXTENT PROVIDED BY LAW, HHT MAKES NO EXPRESS WARRANTIES OTHER THAN THE WARRANTY SPECIFIED HEREIN. THE DURATION OF ANY IMPLIED WARRANTY IS LIMITED TO DURATION OF THE EXPRESSED WARRANTY SPECIFIED ABOVE.

## 2 Listing and Code Approvals

### A. Appliance Certification

<b>Model:</b>	WarmMajic-II
<b>Laboratory:</b>	Underwriters Laboratories, Inc.
<b>Report No:</b>	Project
<b>Type:</b>	Wood Fireplace
<b>Standard:</b>	UL 127 - 2011 and CAN/ULC S610-2018 (A1998) and (UM) 84-HUD, Manufactured Home Approved.

### B. BTU & Efficiency Specifications

EPA Certified Emissions:	1.8 g/hr
*LHV Tested Efficiency:	76%
**HHV Tested Efficiency:	70%
***EPA BTU Output:	17,600 to 48,200
Vent Size:	8 inches
Firebox Size:	2.7 cubic feet
Recommended Log Length:	22 inches
Fuel	Seasoned Cord Wood less than 20% moisture
*Weighted average LHV (Low Heating Value) efficiency using cord wood and data collected during EPA emission test. LHV assumes the moisture is already in a vapor state so there is no loss in energy to vaporize.	
**Weighted average HHV (High Heating Value) efficiency using cord wood and data collected during EPA emission test. HHV includes the energy required to vaporize the water in the fuel.	
***A range of BTU outputs based on HHV and the burn rates from the low and high EPA tests, using cord wood.	

The WarmMajic-II is Certified to comply with 2020 particulate emission standards.



The WarmMajic-II Wood Appliance meets the U.S. ENVIRONMENTAL PROTECTION AGENCY Certified to comply with 2020 particulate emission standards using cord wood.

This wood heater needs periodic inspection and repair for proper operation. It is against federal regulations to operate this wood heater in a manner inconsistent with operating instructions in this manual.

### C. Mobile Home Approved

- This appliance is approved for mobile home installations when not installed in a sleeping room and when an outside combustion air inlet is provided.
- The structural integrity of the mobile home floor, ceiling, and walls must be maintained.
- The appliance must be properly grounded to the frame of the mobile home with #8 copper ground wire.
- Outside Air Kit must be installed in a mobile home installation.

### D. Glass Specifications

This fireplace is equipped with 5mm ceramic glass. Replace glass only with 5mm ceramic glass. Please contact your dealer for replacement glass.



#### WARNING



##### Fire Risk.

Hearth & Home Technologies disclaims any responsibility for, and the warranty will be voided by, the following actions:

- Installation and use of any damaged appliance.
- Modification of the appliance.
- Installation other than as instructed by Hearth & Home Technologies.
- Installation and/or use of any component part not approved by Hearth & Home Technologies.
- Operating appliance without fully assembling all components.
- Do NOT Overfire - If appliance or chimney connector glows, you are overfiring.

Any such action that may cause a fire hazard.

Improper installation, adjustment, alteration, service or maintenance can cause injury or property damage.

For assistance or additional information, consult a qualified installer, service agency or your dealer.

**NOTE:** Hearth & Home Technologies, manufacturer of this appliance, reserves the right to alter its products, their specifications and/or price without notice.

Majestic is a registered trademark of Hearth & Home Technologies.

# 3 Important Safety and Operating Information

## A. Fireplace Safety

Most problems are caused by improper installation and operation of the fireplace. To provide reasonable fire safety, the following should be given serious consideration:

- The fire should be supervised whenever the fireplace is in use.
- An annual inspection should be performed on the fireplace system.
- Install at least one smoke detector on each floor of your home to ensure your safety.
- Install a CO detector in the room with the fireplace.
- Install a conveniently located Class A fire extinguisher near the fireplace.
- Devise a practiced evacuation plan, consisting of at least two escape routes.
- Devise a plan to deal with a chimney fire:
  - Close all openings into the fireplace.
  - Evacuate.
  - Notify the fire department.

**WARNING! Risk of Fire!** *Hearth & Home Technologies disclaims any responsibility for, and the warranty and agency listing will be voided by the following actions.*

### DO NOT:

- operate damaged fireplace
- modify fireplace
- overfire
- install any gas log set
- install any component not approved by Hearth & Home Technologies
- install parts or components not Listed or approved
- operate the fireplace without fully assembling all components

*Improper installation, adjustment, alteration, service or maintenance can cause injury or property damage.*

**WARNING:** This product and the fuels used to operate this product (wood and wood pellets), and the products of combustion of such fuels, 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](http://www.P65Warnings.ca.gov).

## 1. Clear Space

Combustible materials must not be stored on the hearth extension. Room furnishings such as drapes, curtains, chairs or other combustibles must be at least 4 ft (1219 mm) from the open front of the fireplace.

Combustible materials are materials made of or surfaced with any of the following materials:

- Wood
- Plant fibers
- Plywood/OSB
- Any material that can ignite and burn, flame proofed or not, plastered or un-plastered.
- Compressed paper
- Plastic
- Drywall

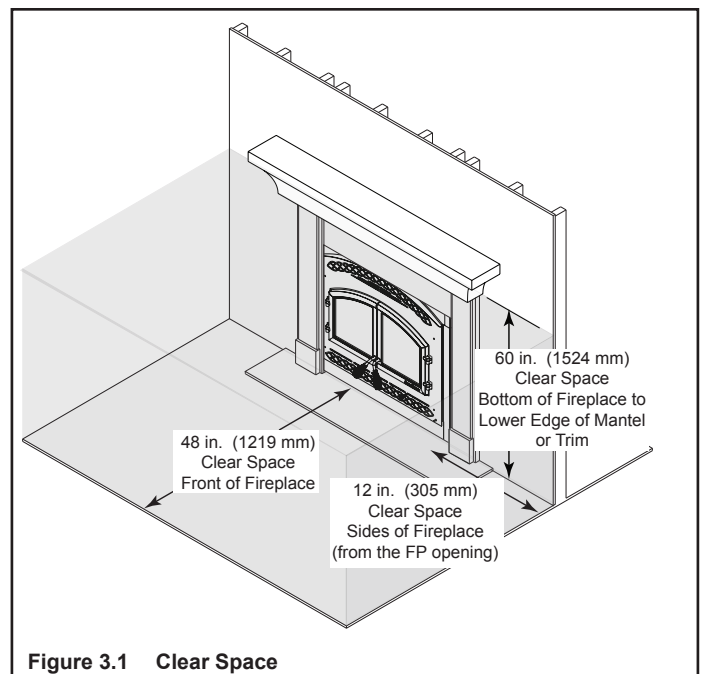
Non-combustible materials are materials which will not ignite and burn, composed of any combination of the following:

- Steel
- Brick
- Concrete
- Glass
- Iron
- Tile
- Slate
- Plasters

**WARNING! Risk of Fire!** *Keep combustible materials, gasoline and other flammable vapors and liquids clear of the fireplace.*

### DO NOT:

- store flammable materials close to the fireplace
- use gasoline, lantern fuel, kerosene, charcoal lighter fluid or similar liquids to start or “freshen up” a fire in this fireplace.





## 2. Firebrick

Your fireplace is lined with high quality firebrick, which has exceptional insulating properties.

Do not operate the fireplace without bricks. Make sure bricks are installed as shown in Section 5.

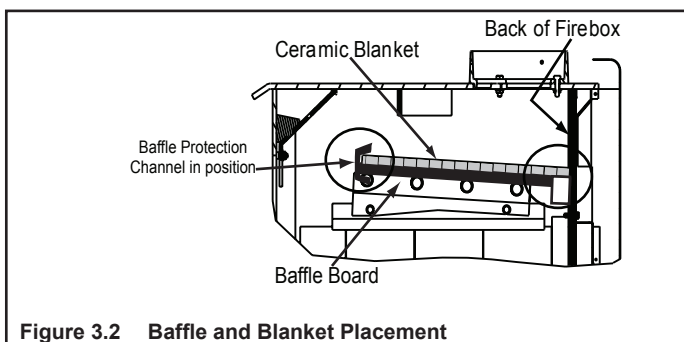
Do not use a grate; simply build a fire on the firebox floor.

## 3. Baffle and Blanket

Ensure correct baffle and baffle protection channel placement; replace baffle components if damaged or missing. (Please refer to Section 5.)

**NOTICE:** Firebox damage due to improper baffle placement is not covered by warranty. Operate the wood burning fireplace with the baffle in the correct position only. Not doing so could result in:

- reduced efficiency
- overheating the chimney
- overheating the rear of the firebox
- poor performance



The baffle board must be in contact with the back of the firebox. The ceramic blanket should lay on top of the baffle board.

The baffle protection channel should be in position and cover the front of the blanket and baffle board.

## 4. Over-Firing Your Fireplace

### DO NOT OVERFIRE THIS FIREPLACE UNIT

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

To prevent over-firing your fireplace. **DO NOT:**

- use flammable liquids
- overload with wood
- burn trash or large amounts of scrap lumber
- permit too much air to the fire (leaving the door open)

Symptoms of over-firing may include one or more of the following:

- chimney connector or fireplace glowing
- roaring, rumbling noises
- loud cracking or banging sounds
- metal warping
- chimney fire

What to do if your fireplace is over-firing:

- Immediately close the door and air controls to reduce air supply to the fire.
- If you suspect a chimney fire, call the fire department and evacuate your house.
- Contact your local chimney professional and have your fireplace and chimney inspected for any damage.
- Do not use your fireplace until the chimney professional informs you it is safe to do so.
- Hearth & Home Technologies WILL NOT warranty fireplaces that exhibit evidence of over-firing. Evidence of over-firing includes, but is not limited to:
  - warped air tube
  - deteriorated refractory brick
  - deteriorated baffle and other interior components

## 5. Chimney Fire

In the event of a chimney fire:

- Have the chimney and adjacent structure inspected by qualified professionals. Hearth & Home Technologies recommends that NFI or CSIA certified professionals, or technicians under the direction of certified professionals, conduct a minimum of an **NFPA 211 Level 2** inspection of the chimney.
- Replace components of the chimney and fireplace as specified by the professionals.
- Ensure all joints are properly engaged and the chimney is properly secured.

**WARNING! Risk of Fire!** A chimney fire can permanently damage your chimney system. Failure to replace damaged components and make proper repairs can cause a structure fire.

## **WARNING**



### **HOT SURFACES!**

Glass and other surfaces are hot during operation AND cool down.

### **Hot glass will cause burns.**

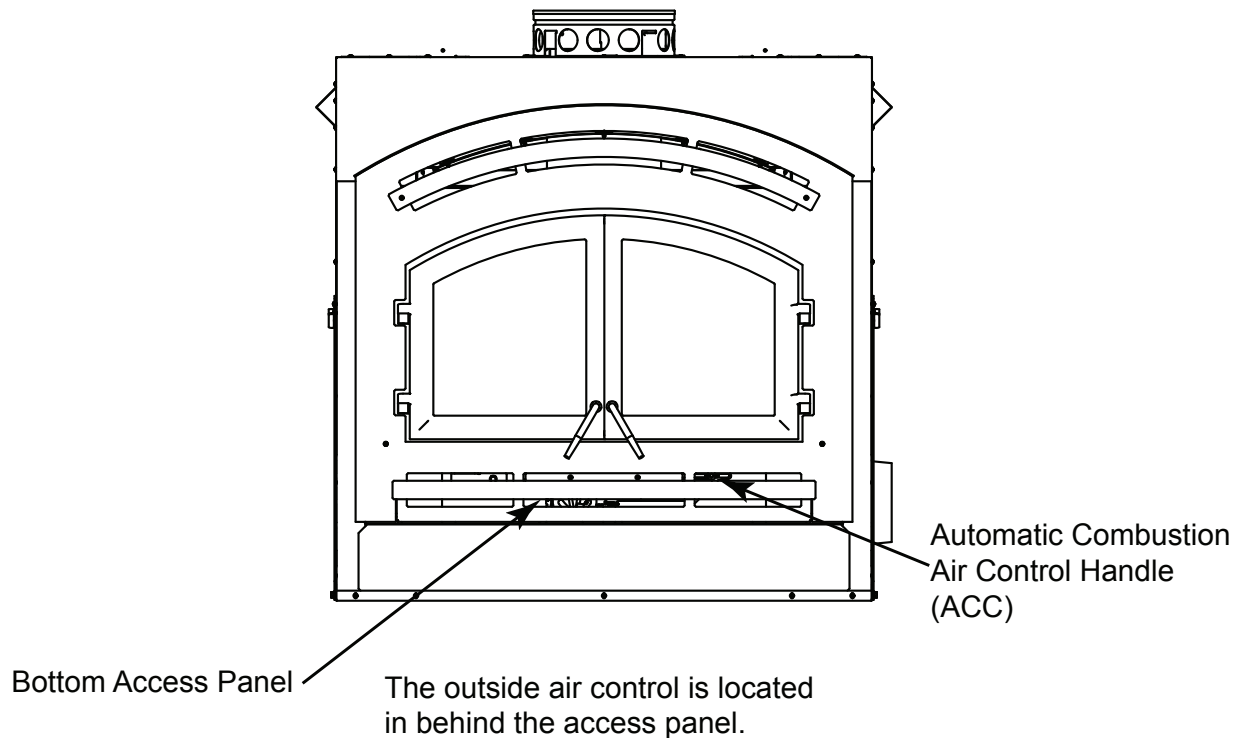
- **DO NOT** touch glass until it is cooled
- NEVER allow children to touch glass
- Keep children away
- CAREFULLY SUPERVISE children in same room as fireplace.
- Alert children and adults to hazards of high temperatures.

### **High temperatures may ignite clothing or other flammable materials.**

- Keep clothing, furniture, draperies and other flammable materials away.

## **B. General Operating Parts**

**WARNING! DO NOT** operate fireplace before reading and understanding operating instructions. Failure to operate fireplace according to operating instructions could cause fire or injury.



**Figure 3.3** General Operating Parts



## 1. Automatic Combustion Control (ACC)

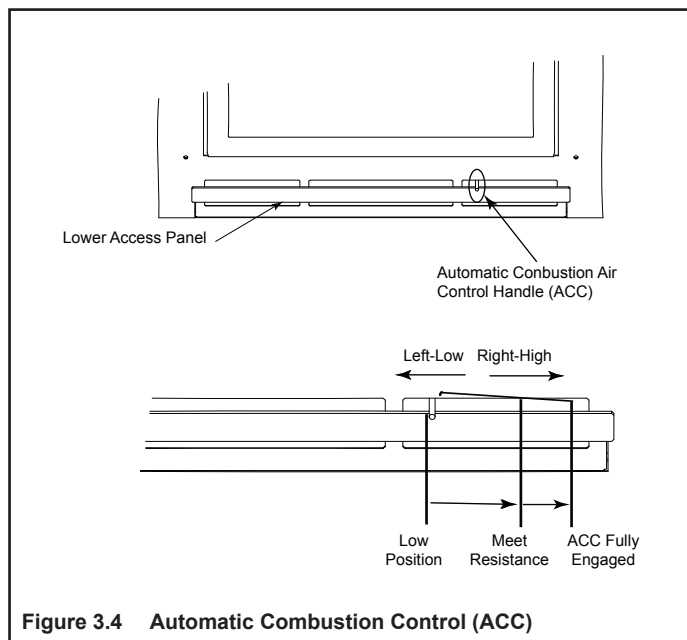
The automatic combustion control system allows you to set the fireplace to high (slide the combustion air control all the way to the right), start the fire, and then move the combustion air control to the desired burn level. The fire will automatically go to that level once it is fully established. This allows for less interaction with the fire by the homeowner and more efficient use of fuel while maintaining the desired heat output.

After the fireplace becomes hot, you may prefer to not activate the ACC when reloading fuel. If you do not slide the combustion air control all the way to the right, the ACC will not be activated.

**NOTICE:** If reloading a bright, hot coal bed for longer (low) burn time, setting the ACC may not be required. Burn dry, well seasoned wood.

**NOTICE:** To establish your settings, always begin with the air control all the way to the left to CLOSED and then move it to the right for your desired setting.

**IMPORTANT!** As you move the combustion air control to the RIGHT, you will feel resistance about three-fourths of the way. You must move past that resistance approximately 1 in. (25mm) to fully engage the automatic combustion control (ACC) system.



## 2. ACC Override

The ACC OVERRIDE lever is located behind the lower access panel (See Figure 3.4) and may be used to override the setting of the automatic combustion air control. If the ACC has been activated and burn rate needs to be slowed, remove the bottom access panel by lifting it up and pulling it off. To close down the air supply for an over-fire situation or to slow the burn rate down immediately, slide the linkage to the left. See Figure 3.5.

Slide the combustion air control all the way to the left also. Reinstall the access panel.

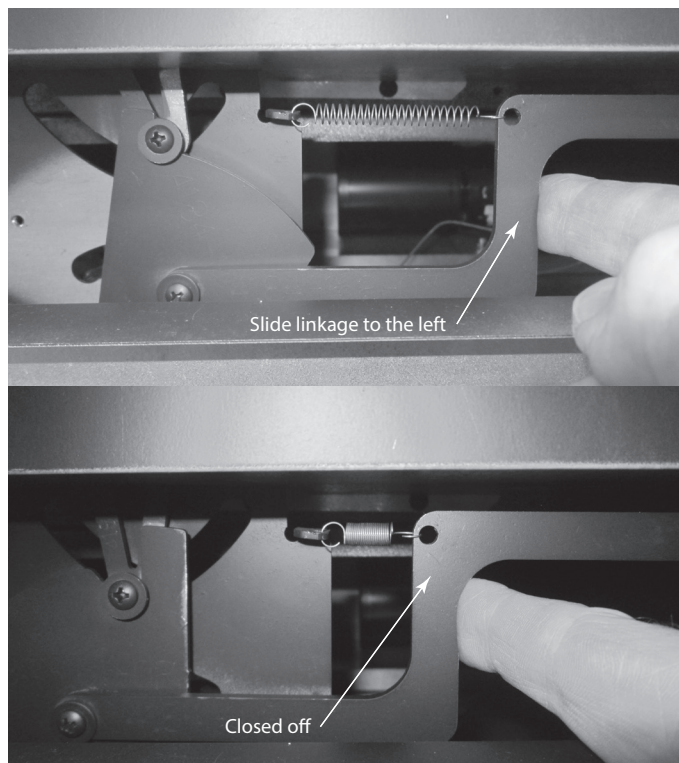


Figure 3.5 ACC Override

## 3. Outside Air

**NOTICE:** Use of outside air is required.

**CAUTION!** Outside air control handle may be warm. Allow unit to cool down before closing.

A source of air (oxygen) is required in order for combustion to take place.

1. Before lighting the fire open the bottom access panel by lifting it up and pulling it off.
2. Locate the handle on either the left or right side. Lift the handle up and pull out to open the door (pushing the handle in will close the door).
3. Reinstall the bottom access panel.

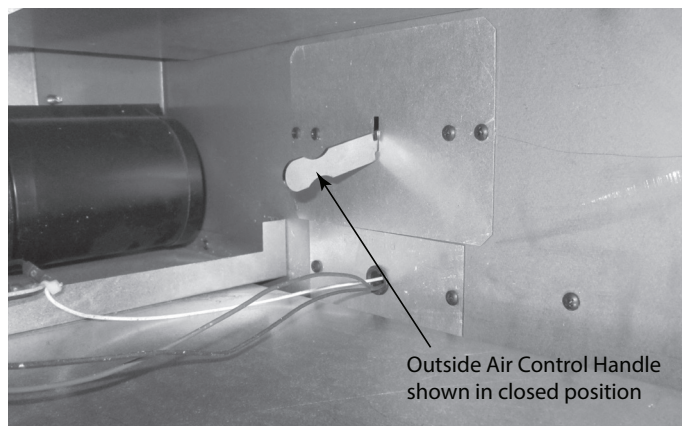


Figure 3.6 Outside Air Control Handle

#### 4. Glass Door

This fireplace has been tested and is intended for use with doors as supplied with this fireplace.

**WARNING! Risk of Fire and Smoke! Fireplace should be operated only with doors fully open or doors fully closed. If doors are left partly open, gas and flame may be drawn out of the fireplace opening.**

A firescreen (MESH-HHT) must be used to control sparks if the homeowner chooses to operate the fireplace with the doors open.

##### **WARNING! Fire Risk!**

- Use firescreen when burning fireplace with doors open.
- Do not use firescreen or glass doors to hold burning material in fireplace.

*Firescreen controls sparks.*

*Glass may break or burning material may roll out.*

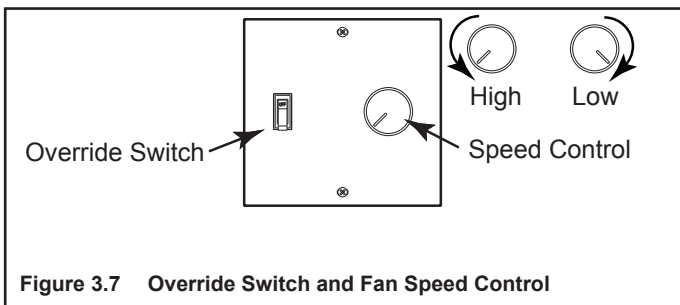
Only the screen specifically tested and listed for use with this fireplace model should be used.

**WARNING! RISK OF Fire! Do NOT install and or use any component not approved by Hearth & Home Technologies**

Always wear gloves when installing or removing the screen as the screen may become extremely hot while in use.

#### 5. Convection Fan Operation

The fireplace is equipped with a temperature-sensitive snap disc that will turn the convection fan on and off automatically, depending on the temperature of the fireplace.



An override switch and fan speed control have been installed on the wall in close proximity to the fireplace.

The speed of the fan can be regulated by the speed control knob.

If the fan is not coming on at the desired time, flip the override switch to manual and operate the fan as described below:

##### • Initial (cold) Startup

Leave fan off until your fireplace is hot and a good coal bed is established, approximately 30 minutes after fuel is lit.

##### • High Burn Setting

The fan may be left on throughout the burn.

##### • Medium or Medium High Burn Setting

The fan should be left off until a good burn is established, then turned on medium or high rate.

##### • Low Burn Setting

The fan tends to cool off the fireplace. Leave fan off until the burn is well established; then, if you wish, turn the fan on at a low rate.

#### C. Fuel

**WARNING! For use with solid wood fuel only.**

*Other fuels may overfire and generate poisonous gases (i.e. carbon monoxide).*

This fireplace 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
- Paper products, cardboard, plywood, or particleboard.

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.

## 1. Hardwood vs. Softwood

Your fireplace's performance depends on the quality of the firewood you use. One species of wood varies very little to the other in terms of energy content. All seasoned wood contains about 8,000 BTU's per pound. Hardwoods have a greater density than softwoods; a piece of hardwood will contain about 60% more BTU's than an equal size piece of softwood. A cord of seasoned oak (hardwood) would contain about 60% more potential energy than a cord of seasoned pine (softwood).

Most softwoods are coniferous. These are trees with needle-like leaves that stay green all year and carry their seeds exposed in a cone. Examples of coniferous trees are Douglas fir, pine, spruce and cedar. Softwoods, being more porous, require less time to dry, burn faster and are easier to ignite than hardwoods. Hardwoods are deciduous trees, broadleaf trees that lose their leaves in the fall. Their seeds are usually found within a protective pod or enclosure. Some examples of deciduous trees are oak, maple, apple, and birch. However, it should be noted that there are some deciduous trees that are definitely not considered hardwoods such as poplar, aspen and alder. Hardwoods require more time to season, burn slower and are usually harder to ignite than softwoods. Obviously, you will use the type of wood that is most readily available in your area. However, if at all possible the best arrangement is to have a mix of softwood and hardwood. This way you can use the softwood for starting the fire, giving off quick heat to bring the fireplace up to operating temperature. Add the hardwood for slow, even heat and longer burn time.

### **WARNING! Risk of Fire!**

- **DO NOT** burn wet or green wood.
- Wet, unseasoned wood can cause accumulation of creosote.

Soft woods	Hard woods
<ul style="list-style-type: none"><li>• Douglas Fir</li><li>• Pine</li><li>• Spruce</li><li>• Cedar</li><li>• Poplar</li><li>• Aspen</li><li>• Alder</li></ul>	<ul style="list-style-type: none"><li>• Oak</li><li>• Maple</li><li>• Apple</li><li>• Birch</li></ul>

## 2. Moisture Content

The majority of the problems fireplace owners experience are caused by trying to burn wet, unseasoned wood. Freshly cut wood can be as much water as it is wood, having a moisture content of around 50%. Imagine a wooden bucket that weighs about 8 pounds. Fill it with a gallon of water, put it in the firebox and try to burn it. This sounds ridiculous but that is exactly what you are doing if you burn unseasoned wood. Dead wood lying on the forest floor should be considered wet, and requires full seasoning time. Standing dead wood can be considered to be about two-thirds seasoned, if cut at the dry time of the year.

Burning wet, unseasoned wood will produce less heat output because it requires energy in the form of heat to evaporate the water trapped inside. This is wasted energy that should be used for heating your home. This moisture evaporates in the form of steam which has a cooling effect in your firebox and chimney system. When combined with tar and other organic vapors from burning wood it will form creosote which condenses in the relatively cool firebox and chimney.

Even dry wood contains at least 15% moisture by weight, and should be burned hot enough to keep the chimney hot for as long as it takes to dry the wood out - about one hour. To tell if wood is dry enough to burn, check the ends of the logs. If there are cracks radiating in all directions from the center, it is dry. If your wood sizzles in the fire, even though the surface is dry, it may not be fully cured.

## 3. Seasoning

Seasoned firewood is nothing more than wood that is cut to size, split and air dried to a moisture content of around 20%. The time it takes to season wood varies from around nine months for soft woods to as long as eighteen months for hardwoods. The key to seasoning wood is to be sure it has been split, exposing the wet interior and increasing the surface area of each piece. A tree that was cut down a year ago and not split is likely to have almost as high a moisture content now as it did when it was cut.

To season wood:

- Cut logs to size
- Split to 6 in. (152 mm) or less
- Air dry to a moisture content of around 20%
  - Soft wood - about nine months
  - Hard wood - about eighteen months

**NOTICE:** Seasoning time may vary depending on drying conditions.



#### 4. Storing Wood

Splitting wood before it is stored reduces drying time. The following guideline will ensure properly seasoned wood:

- Stack the wood to allow air to circulate freely around and through the woodpile.
- Elevate the woodpile off the ground to allow air circulation underneath.
- The smaller the pieces, the faster the drying process. Any piece over 6 in. (152 mm) in diameter should be split.
- Wood should be stacked so that both ends of each piece are exposed to air, since more drying occurs through the cut ends than the sides. This is true even with wood that has been split.
- Store wood under cover, such as in a shed, or covered with a tarp, plastic, tar paper, sheets of scrap plywood, etc., as uncovered wood can absorb water from rain or snow, delaying the seasoning process. Avoid covering the sides and ends completely. Doing so may trap moisture from the ground and impede air circulation.

#### 5. Burning Process

Fire requires fuel, air and heat. If heat is robbed from the fireplace during the drying stage, the new load of wood has reduced the chances for a good clean burn. Always burn dry, seasoned firewood.

- **Kindling or 1st stage:**

In this stage, the wood is heated to a temperature high enough to evaporate the moisture which is present in all wood. The wood will reach the boiling point of water (212°F) and will not get any hotter until the water is evaporated. This process takes heat from coals and tends to cool the fireplace.

- **2nd stage:**

The secondary stage is when the wood gives off flammable gases which burn above the fuel with bright flames. It is very important that the flames be maintained and not allowed to go out. This will ensure the cleanest possible fire. You should close down the air to control the point where you can still maintain some flame. If the flames tend to go out, more air is necessary.

- **Final stage:**

The final stage of burning is the charcoal stage. This occurs when the flammable gases have been mostly burned and only charcoal remains. This is a naturally clean portion of the burn. The coals burn with hot blue flames.

It is very important to reload your fireplace while enough lively hot coals remain in order to rekindle the next load of wood.

#### 6. Dirty Glass

A portion of the combustion air entering the firebox is deflected down over the inside of the door glass. This air flow “washes” the glass, helping to keep smoke from adhering to its surface. When operated at a low burn rate, less air will be flowing over the glass and the smoky, relatively cool condition of a low fire will cause the glass to become coated. Operating the fireplace with the burn rate air control and start-up air control all the way open for 15-20 minutes should remove the built up coating.

#### 7. Creosote Formation

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 newly-started or a slow-burning fire. As a result, creosote residue accumulates on the flue lining.

When ignited, creosote creates an extremely hot fire which may damage the chimney or even destroy the house.

The chimney shall be inspected at least annually before lighting, or once every two months during heating season.

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

#### 8. Opacity

Opacity indicates how cleanly your fireplace is burning. Opacity is measured in percent; 100% opacity is when an object is totally obscured by the smoke column from a chimney, and 0% opacity means that no smoke column can be seen. Periodically check the opacity and burn your fireplace as nearly smoke-free as possible (goal of 0% opacity).

#### D. First Fire

Before lighting your first fire in the fireplace, make certain that:

- the baffle and ceramic blanket are correctly positioned, resting against the rear support
- firebrick are in place
- all labels have been removed
- all plated surfaces have been cleaned

**NOTICE:** Oils can cause permanent markings on plating if not removed before the first fire.

**NOTICE:** The first three or four fires should be of moderate size to allow the oils and binders to be burned from the fireplace and the refractory and paint to cure. You may notice an industrial odor the first few fires. This is considered normal.

## E. Lighting Instructions/Establish Coal Bed

- Open outside air by opening the lower access panel and locate the outside air handle (it could be on the left or right). Lift the handle up and pull out to open. See Figure 3.20.

Note: This may be closed only when the fireplace is not in use to prevent cold air infiltration.

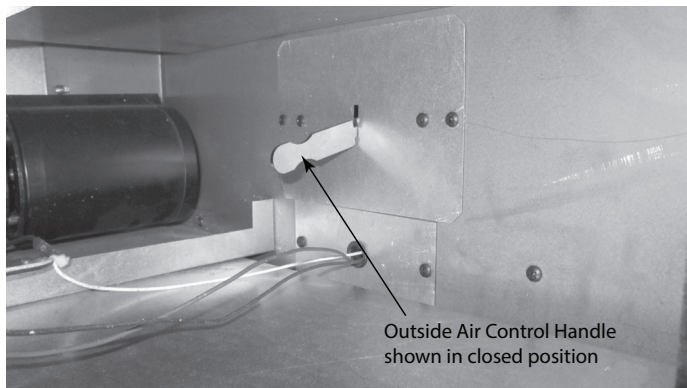


Figure 3.20 Outside Air Handle Shown on Right Side

- Move the combustion air control to the right, you will feel resistance about three-fourths of the way. You must move past that resistance approximately 3/4 in. (19 mm) to fully engage the automatic combustion control (ACC) system.
- Place several wads (3-4 pieces) of crumpled newspaper on the firebox floor. Add 5-6 lbs. of kindling (pieces of dry cord wood less than 1 inch in diameter) stacked on top of the paper crisscrossed. See Figure 3.21.
- Make sure that no matches or other combustibles are in the immediate area of the fireplace. Be sure the room is adequately ventilated and the flue unobstructed.
- For best results, use a hand held homeowner-type gas torch to light the paper and wood for approximately one minute.



Figure 3.21 Placing Kindling

- Leave the door slightly open 2-4 inches (see Figure 3.25) for 2-3 minutes then close the door, latching it lightly to allow the flame to get going good.
- When 1/2 to 2/3 of the kindling burns down, open the door and level the firebox.
- Add 7 to 9 pounds of start-up wood (1-3 inch diameter pieces of cord wood) by stacking them in a crisscross pattern. This will allow for proper air flow.
- Leave door slightly open 2-4 inches (see Figure 3.25) for 1-3 minutes or until a good flame is present. Then close the door, latching it lightly.
- After the flame gets established (approximately 3-5 minutes) shut and latch the door.
- When the start-up has burned down 1/2 to 2/3 and a good flame is still present, open the door. Level the coal bed insuring that the combustion air holes are not blocked.

### High Burn

- Load 4-6 pieces of cord wood 22 inches long to achieve maximum firebox volume, stack 2 to 3 pieces high in the back first, then 2 to 3 pieces in the front, making sure to work the bottom pieces into the coal bed to insure solid stack once all the wood is loaded. Leave at least a 1 inch gap between the two stacks to insure good air flow around the wood. See Figures 3.22, 3.23 & 3.24 for examples.
- Leave the door slightly open 2-5 inches (see Figure 3.25) for up to 5 minutes to get a good flame going then close the door. See Figure 3.27.
- When fire has burned down and ready for reloading, level out the coal bed first and reset the ACC if needed.



Figure 3.22 Loading Wood



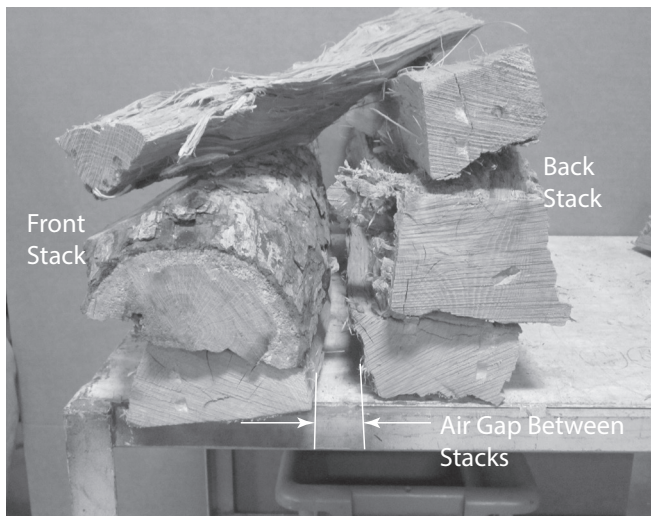


Figure 3.23 Stacking Wood

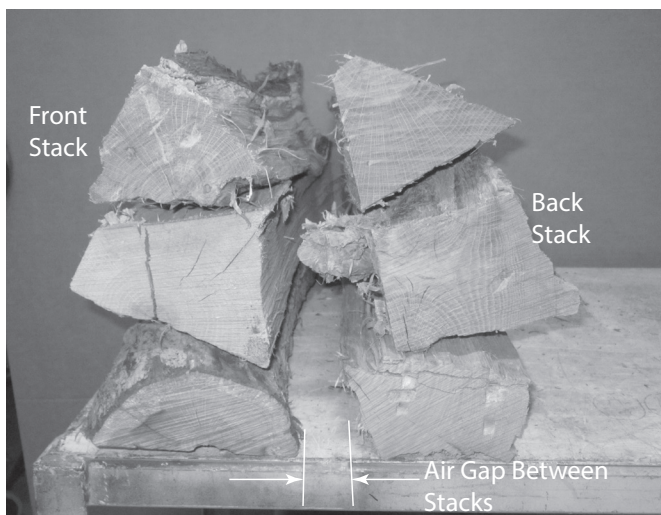


Figure 3.24 Stacking Wood

#### Medium/Low Burn

- Open the door and load the wood the same as the high burn. Then partially close the door leaving it open around 4-8 inches for up to 5 minutes or until the wood is burning good. Close the door and reset the ACC if needed. Let it burn for up to 20 minutes before setting the combustion air control to the desired setting.

#### COMBUSTION AIR CONTROL SETTINGS

- LOW - all the way to the left.
- MEDIUM - from the low setting go up to 1/2 inch to the right.
- HIGH - all the way to the right until resistance is felt.

NOTE: The ACC should only need to be activated when starting from a cold start or if a lively coal bed isn't present when reloading.

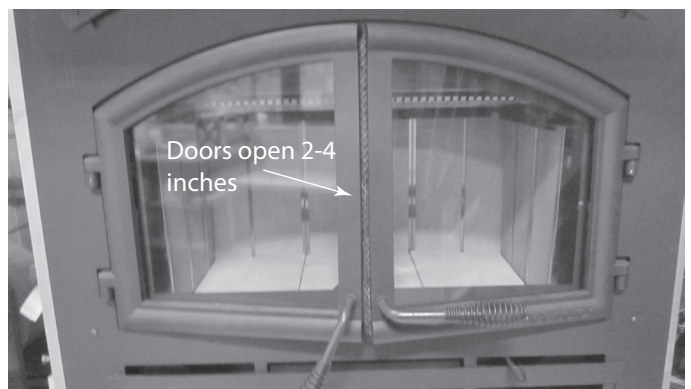


Figure 3.25 Doors Open 2-4 Inches



Figure 3.26 Doors Latched Lightly

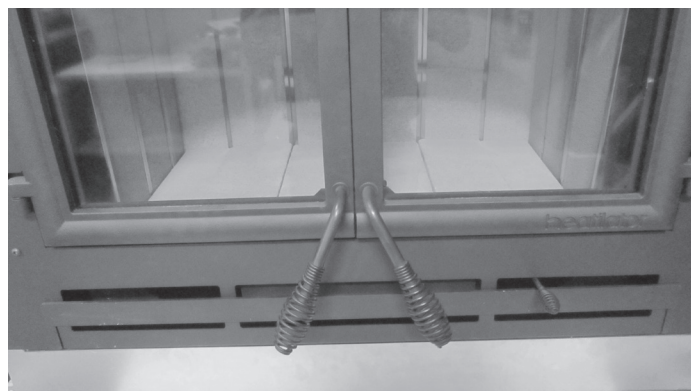


Figure 3.27 Door Fully Closed

## H. Frequently Asked Questions

ISSUES	SOLUTIONS
Odor from appliance	When first operated, this appliance may release an odor for the first several hours. This is caused by the curing of the paint and the burning off of any oils remaining from manufacturing.
Metallic noise	Noise is caused by metal expanding and contracting as it heats up and cools down, similar to the sound produced by a furnace or heating duct. This noise does not affect the operation or longevity of the appliance.
Whirring sound	The fan produces a whirring sound which increases in volume as the speed is increased.

**CONTACT YOUR DEALER** for additional information regarding operation and troubleshooting.  
Visit [www.majesticproducts.com](http://www.majesticproducts.com) to find a dealer.

### **WARNING**

DO NOT PLACE COMBUSTIBLE OBJECTS IN FRONT OF THE APPLIANCE. High temperatures may ignite clothing, furniture or draperies.

### **WARNING**



#### **Fire Risk.**

- DO NOT BURN GARBAGE OR FLAMMABLE FLUIDS SUCH AS GASOLINE, NAPHTHA OR ENGINE OIL.
- Do NOT burn treated wood or wood with salt (driftwood).
- May generate carbon monoxide if burn material other than wood.

May result in illness or possible death.

### **WARNING**



#### **Fire Risk.**

Keep combustible materials, gasoline and other flammable vapors and liquids clear of appliance.

- Do NOT store flammable materials in the appliance's vicinity.
- DO NOT USE GASOLINE, LANTERN FUEL, KEROSENE, CHARCOAL LIGHTER FLUID OR SIMILAR LIQUIDS TO START OR "FRESHEN UP" A FIRE IN THIS HEATER.
- Keep all such liquids well away from the heater while it is in use.
- Combustible materials may ignite.

## 4 Maintenance and Service

This fireplace needs periodic inspection and repair for proper operation. It is against federal regulations to operate this fireplace in a manner inconsistent with operating instructions in this manual.

### **WARNING! Hot Surfaces!**

*Glass and other surfaces are hot during operation AND cool down. **DO NOT** clean fireplace until it is cooled.*

Task	Frequency	To be completed by
1. Chimney Inspection	As needed	Homeowner or Chimney Sweep
2. Chimney Cleaning	As needed	Chimney Sweep
3. Plated Surfaces Cleaning	As needed	Homeowner
4. Glass Door	Seasonally	
5. Glass Cleaning	As needed	
6. Door Gasket	Seasonally	
7. Ash Removal	As needed	
8. Baffle/Blanket/Channel Protector	Seasonally	
9. Firebrick	Seasonally	

### **A. Maintenance Tasks-Homeowners**

Installation and repair should be done by a qualified service technician only. The fireplace should be inspected before use and at least annually by a professional service person.

The following tasks may be performed annually by the homeowner. If you are uncomfortable performing any of the listed tasks, please call your dealer for a service appointment.

#### **1. Chimney Inspection**

**Frequency:** As necessary; at least annually before lighting fireplace, or once every two months during heating season.

**By:** Homeowner/Chimney Sweep

- Confirm that termination cap remains clear and unobstructed.
- Inspect for blockages such as bird nests, leaves, etc.
- Inspect for corrosion or separation.
- Inspect for creosote and remove as needed, at least every two months during the heating season.
- Inspect the system at the fireplace connection and at the chimney top.

In the event of a chimney fire, Hearth & Home Technologies recommends replacement of the chimney and inspection of the adjacent structure to the provisions of NFPA Level III inspection criteria.

**WARNING! Risk of Asphyxiation and Fire! Annual inspection by qualified technician recommended.**

*Check:*

- *condition of door, surrounds and fronts*
- *condition of glass and glass assembly*
- *obstructions of combustion and ventilation air*
- *obstructions of termination cap*

*Clean:*

- *glass*
- *air passageways, grilles*



## 2. Creosote (Chimney) Cleaning

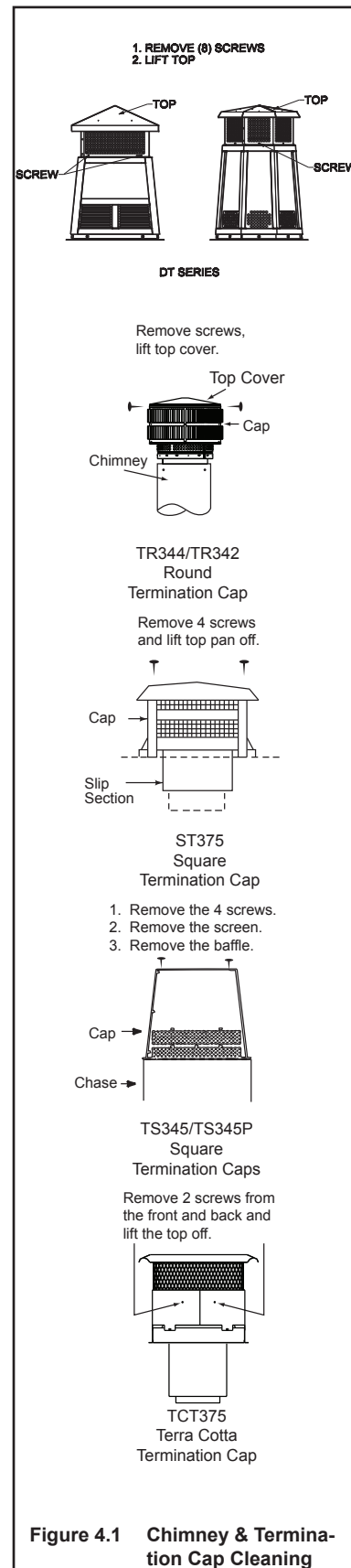
**Frequency:** As needed; at least annually before lighting, or once every two months during heating season. When creosote has accumulated it shall be removed to reduce the risk of a chimney fire.

**By:** Chimney Sweep

**Tools Needed:** Brush, Phillips screwdriver

- 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.
- Remove all ash from the firebox and extinguish all hot embers before disposal. Allow the fireplace to cool completely.
- Remove baffle and ceramic blanket from fireplace before cleaning chimney (refer to Section 5.C.3 Baffle Removal and Installation).
- Close the door tightly.
- Remove the top of the termination cap as shown in Figure 4.1 to clean the cap and chimney.
- The creosote or soot should be removed from the chimney with a brush specifically designed for the size of chimney in use.
- Reinstall termination cap.
- Clean out fallen debris from the firebox.
- Replace baffle and ceramic blanket.

**WARNING! Risk of Fire! Ignited creosote is extremely HOT. Prevent creosote buildup.**



### 3. Care and Cleaning of Plated Surfaces

**Frequency:** Initially and as needed

**By:** Homeowner

**Tools Needed:** Vinegar or glass cleaner, soft towel

**CAUTION!** Do not use a polish with abrasives. It will scratch plated surfaces.

- Use a glass cleaner or vinegar and towel to remove the oils.
- Oils can cause permanent markings on plating if not removed.
- After plating is cured, oils will not affect the finish.

### 4. Glass Door

**Frequency:** As necessary

**By:** Homeowner

- Inspect glass panel for cracks. Replace if this condition is present.
- Inspect glass gasket. Confirm glass does not move around in glass frame.

### 5. Glass Cleaning

**Frequency:** As necessary

**By:** Homeowner

**Tools Needed:** Vinegar or glass cleaner, soft towel

- Clean glass with a non-abrasive glass cleaner. Use a damp cloth dipped in wood ashes or a commercially available oven cleaner. Remove any oven cleaner residue with a glass cleaner or soap and water.

### 6. Door Gasket

**Frequency:** Seasonally

**By:** Homeowner

- Open door, place half a dollar bill inside and close the door.
- Attempt to pull the bill out.
- If the bill gives good resistance or is not removable, the gasket is adjusted correctly. If the bill is easily removed, the gasket needs adjustment or replacement to create an even seal all around door.

It may be necessary to adjust or tighten the door latch.

### 7. Ash Removal

**Frequency:** As necessary

**By:** Homeowner

**Tools Needed:** Covered metal container, metal shovel, fireplace broom

**WARNING! Risk of Fire! DO NOT** remove ashes until the fire is out and the fireplace is cold.

- Ashes should be placed in metal container with tight fitting lid.
- The closed container of ashes should be placed on a noncombustible 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.

### 8. Baffle and Blanket

**Frequency:** As necessary

**By:** Homeowner

**Tools Needed:**

- Ensure correct baffle and baffle protection channel placement; replace baffle components if damaged or missing.
- The ceramic blanket and baffle board **MUST** be in contact with the back of the firebox and even with each other in the front. The baffle protection channel **MUST** be in position. Refer to Section 3.A.3.

### 9. Firebrick

**Frequency:**

**By:**

**Tools Needed:**

- Inspect condition of brick. Replace if crumbly or otherwise deteriorated, or if cracks exceed 1/4 in. (6 mm).

## B. Replacement Maintenance

### 1. Glass Replacement

- Ensure that the fire is out and the fireplace is cool to the touch.
- Protect a table or counter top with padding or towels.
- Remove door with broken glass from the fireplace by lifting door up and off of the hinges.
- Lay door face down on table or counter making sure handle and handle attachment knob hang over the edge of the table top so door lays flat on the soft surface.
- Remove screws from the top and bottom glass frames (five on each door) using a #2 Phillips Head screwdriver. Set frames aside and retain screws.  
**HINT:** Soak screws in penetrating oil for easy removal.

- Remove the glass and discard.
- Position the new glass with edges evenly overlapping the opening in the front door.
- Replace the glass frames.
- Start screws to secure glass frames to door, keeping them loose for adjusting the glass. Then continue to tighten each screw alternately, a few turns at a time, until the glass panel is tightened snugly. **DO NOT OVERTIGHTEN OR CROSS THREAD SCREWS.**
- Replace the door on the fireplace.
- After the first burn, recheck the tightness of the screws.

### 2. Tighten or Adjust Door Latch

Remove the lock nut holding latch cam and four spacing washers on the right hand door as shown in Figure 4.2. Move 1-3 spacing washers to the opposite side of cam. Reinstall the cam and tighten locknut. At least one spacing washer and the black washer must be left in place.

OR

Replace the gasket material. Wear or damage to the gasket material can cause air leakage into the firebox resulting in overfiring and loss of efficiency.

A replacement gasket is available from your dealer.

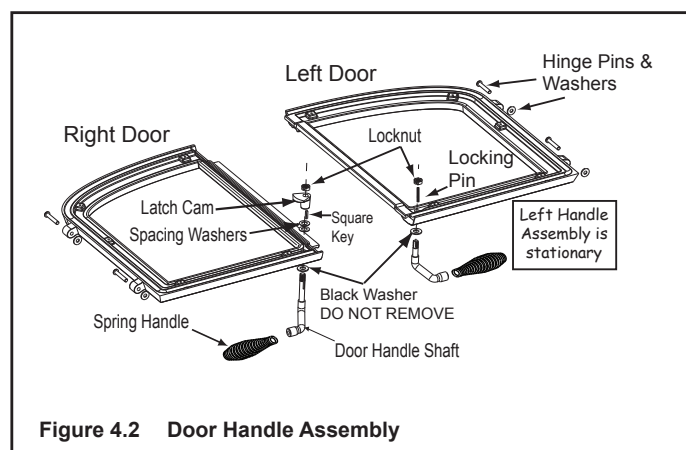
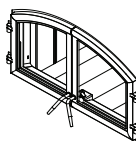


Figure 4.2 Door Handle Assembly

**NOTICE:** Remove all labels from glass before lighting the first fire in your fireplace.

### CAUTION!



Handle glass assembly with care.

#### When cleaning glass:

- Avoid striking, scratching or slamming glass.
- Do NOT clean glass when hot.
- Do NOT use abrasive cleaners.
- Use a hard water deposit glass cleaner on white film.
- **Refer to maintenance instructions.**



### WARNING

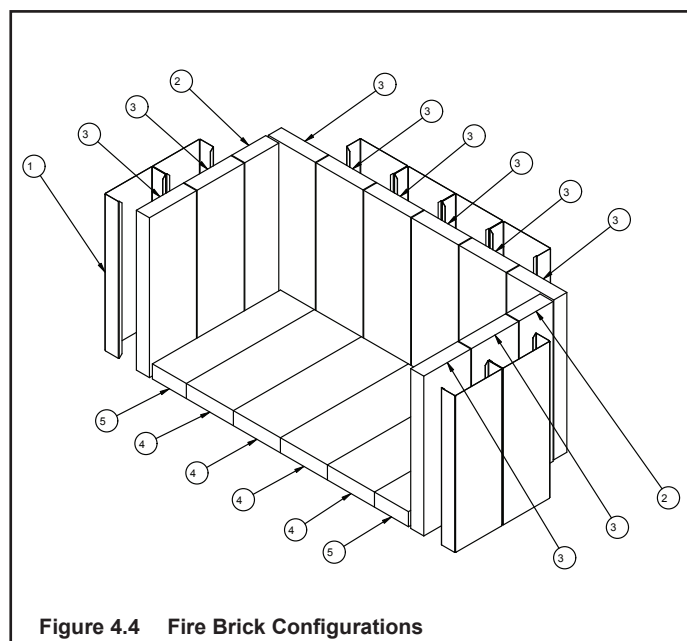
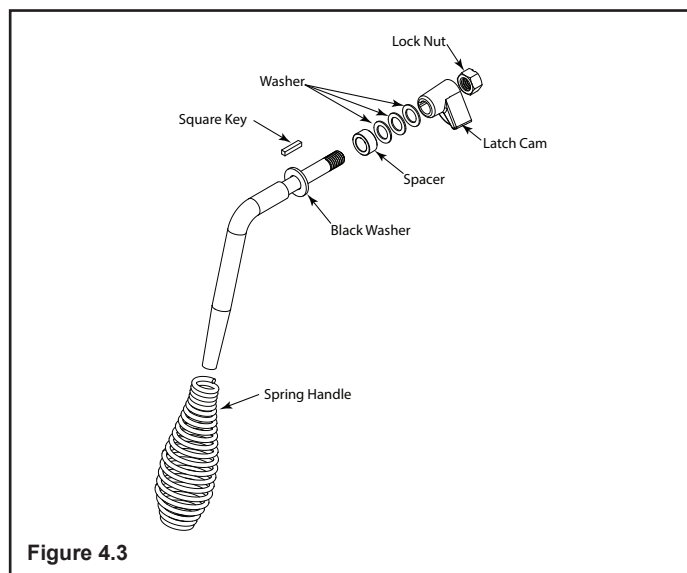


#### Injury Risk.

- Use only glass specified in manual.
- **DO NOT REPLACE** with any other material.

### 3. Door Handle Assembly

- Slide door handle through door.
- Install washer(s) as shown in Figure 4.3.
- Install key groove.
- Align groove in latch cam with key; slide latch cam over shaft.
- Install locknut but do not overtighten, the handle needs to move smoothly.
- Install fiber handle using a clockwise motion until the fiber handle is snug against the door handle shaft.



#	Brick Size	Qty. in Set
1	Brick Wrap	8
2	Firebrick 13.25 x 3.25	2
3	Firebrick 13.25 x 4.50 x 1.25	10
4	Firebrick 12.25 x 4.50	4
5	Firebrick 12.25 x 3.25	2

### 4. Firebrick Replacement

The firebox of your fireplace is lined with high quality firebrick and refractory board under the bottom firebrick only, which has exceptional insulating properties. There is no need to use a grate; simply build a fire on the firebox floor. Do not operate the fireplace without bricks.

**IMPORTANT:** The bricks are very similar in size. Be certain you have the proper brick in the correct location. Measure the brick size for accuracy.

After the coals are completely cooled, remove all old firebrick and ash from unit and vacuum out firebox.

- Remove new brick set from box and lay out to diagram shown in Figure 4.4.
- Install rear bricks on the top of the bottom bricks. Slide top of bricks under clip on back of firebox wall and push bottom of brick back.
- Install side bricks. Slide top of brick under clips on side of firebox and push the bottom of the brick until it is flush with the side of the unit.
- Lay bottom bricks in unit.



## 5. Baffle Removal and Installation

### **WARNING! Hot Surfaces!**

Glass and other surfaces are hot during operation AND cool down. **DO NOT** clean fireplace until it is cooled.

1. Remove all ash from firebox and place into a metal container.
2. Remove the baffle protection channel by lifting it up and turning it down and pulling it out of the firebox. See Figure 4.5.

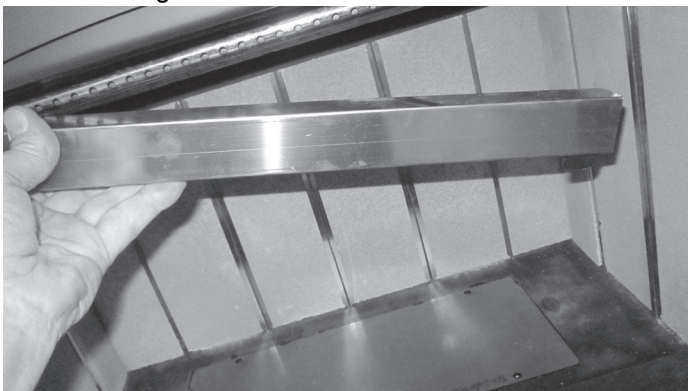


Figure 4.5 Removing Baffle Protection Channel

3. Using a 3/16 inch Allen wrench, remove the front manifold tube retainer bolt on the air channel behind the end of the front tube on the right side. See Figure 4.6.

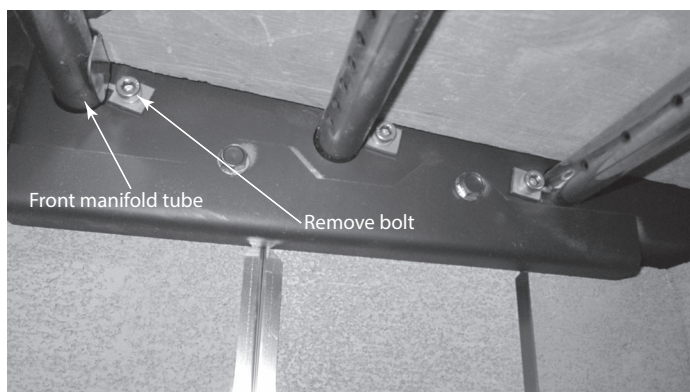


Figure 4.6 Remove Retainer Bolt

4. To remove the manifold tube, slide the tube to one side until one end is out of its hole then pull it down and out of the other hole. It is only necessary to remove the front tube in order to remove the baffle.
5. Pull the two (2) piece baffle board and insulation down and out of the firebox. See Figure 4.7.

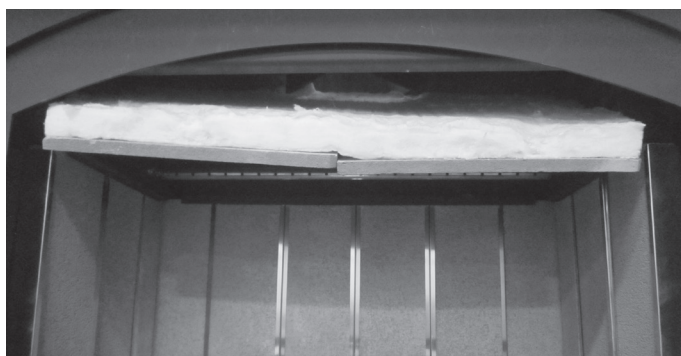


Figure 4.7

6. To install the baffle board and insulation, repeat steps 2 thru 5 in reverse. Be sure the baffle board and insulation are pushed back fully and the insulation is down and flat. See Figures 4.8 & 4.9.

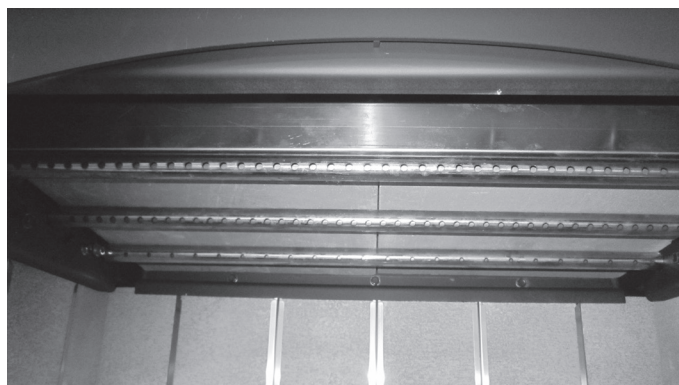


Figure 4.8 Reinstall Baffle Boards

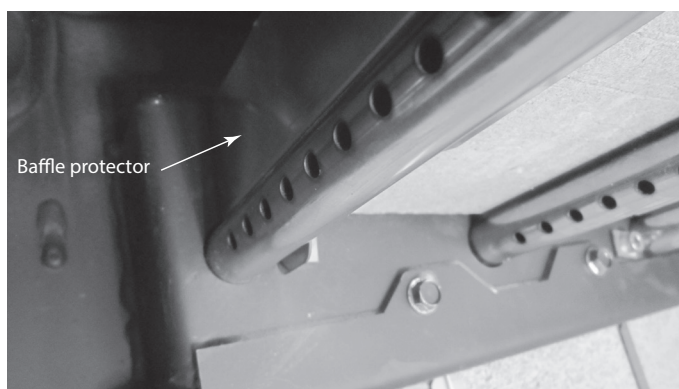


Figure 4.9 Reinstall Baffle Protection Channel

## 6. Fan Replacement

**CAUTION! Risk of Shock! Disconnect power by turning off circuit breaker before servicing or unplugging control board from junction box in behind the access panel..**

The Fireplace comes equipped with two fans, installed at the factory with electric access on both sides of the fireplace.

1. Remove the bottom firebrick.
2. Remove the four (4) 5/32 Allen head screws and pry open the access door with a flat blade screwdriver. See Figure 4.10 and remove it.

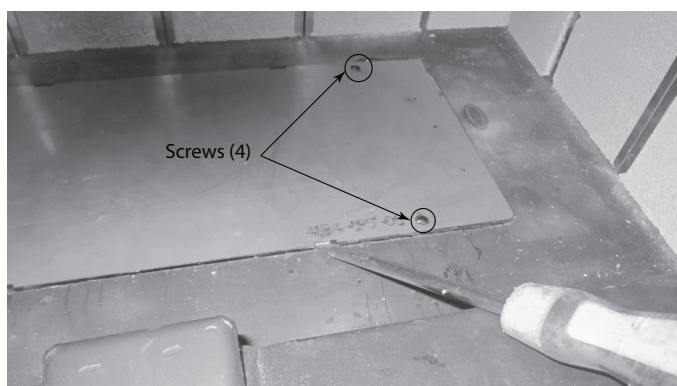


Figure 4.10 Pry Open Access Door



3. While holding the handle, remove the four (4) screws at each corner of the combustion cover and fish it up and out of the bottom of the fireplace. See Figures 4.11 & 4.12.

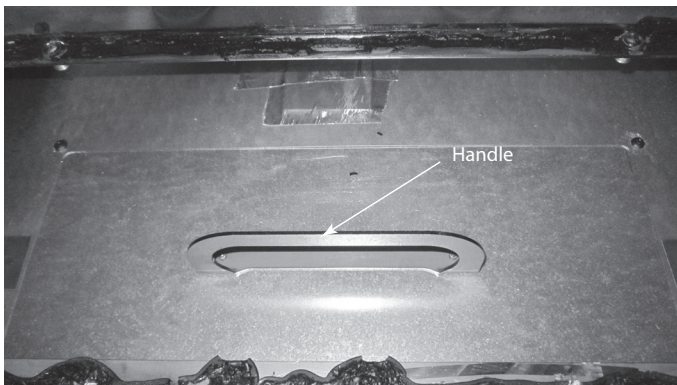


Figure 4.11 Removal of Combustion Cover Screws

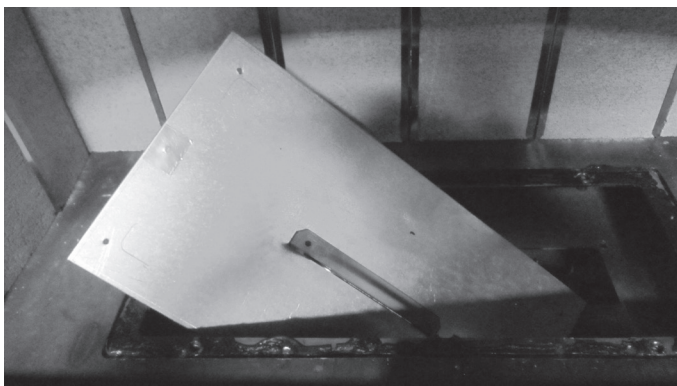


Figure 4.12 Removal of Combustion Cover

4. Unplug the wire harness from the fans and remove the wing nut holding the fan in place. See Figure 4.13.

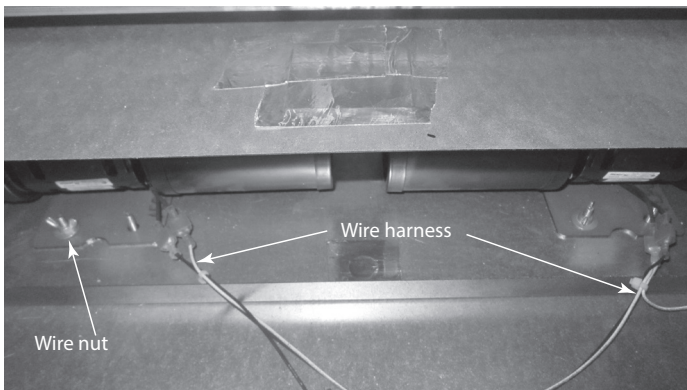


Figure 4.13 Unplug Wire Harness

5. Lift the fan up and off of the locating pins and remove up through the access hole. See Figure 4.14.



Figure 4.14 Remove Fan from Access Hole

6. Install new fans in reverse order.

## 7. Timer Assembly Replacement

1. Remove the bottom front access panel by lifting it up and off.
2. Remove the two (2) screws in the air chamber cover. See Figure 4.15. Pull it down and off. See Figure 4.16.

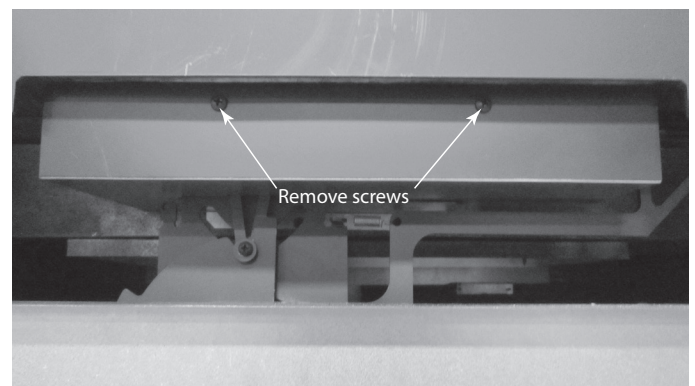


Figure 4.15 Removal of Screws on Air Chamber Cover

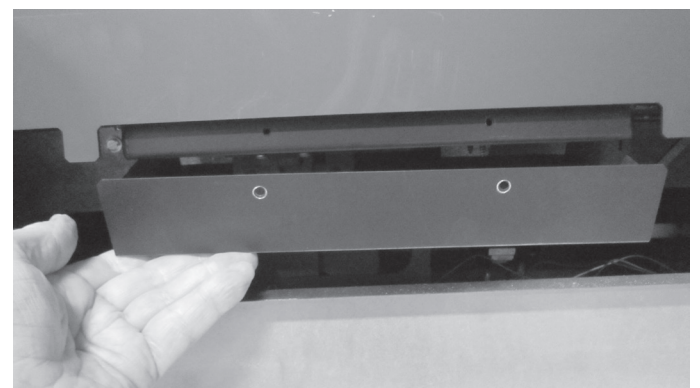
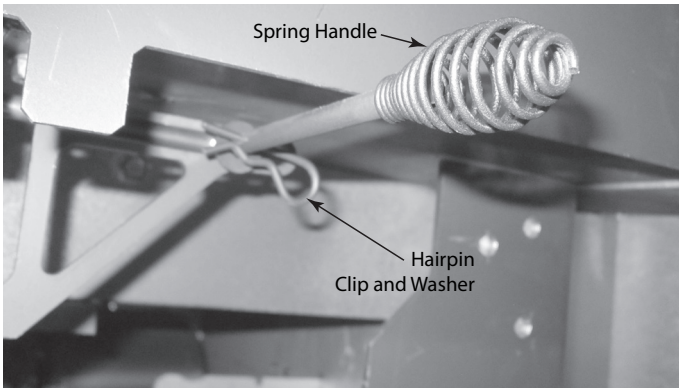


Figure 4.16 Removal of Air Chamber Cover

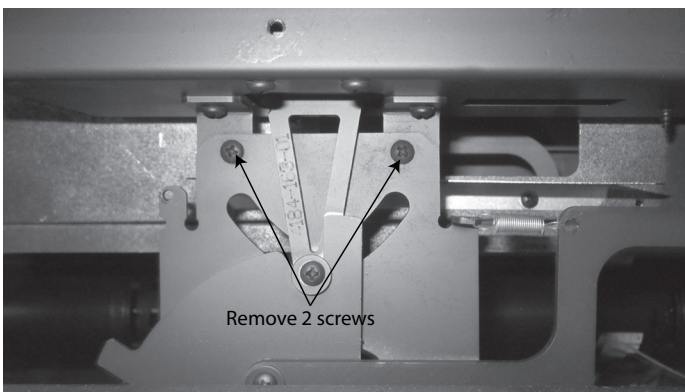


3. Remove the spring handle by twisting it to the left and pulling on it. Hold on to the rod as this is being done. See Figure 4.17.
4. Pull off and remove the front hairpin clip and washer on the rod. See Figure 4.17.



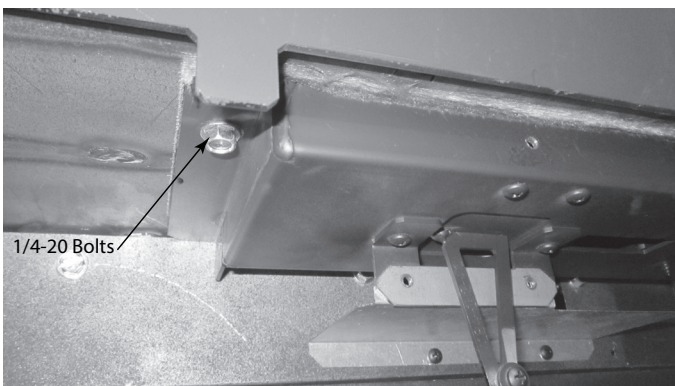
**Figure 4.17 Removal of Spring Handle**

5. While holding on to the timer assembly, remove the two (2) screws and slide the linkage arm off of the rod and pull the assembly out of the front. See Figure 4.18.

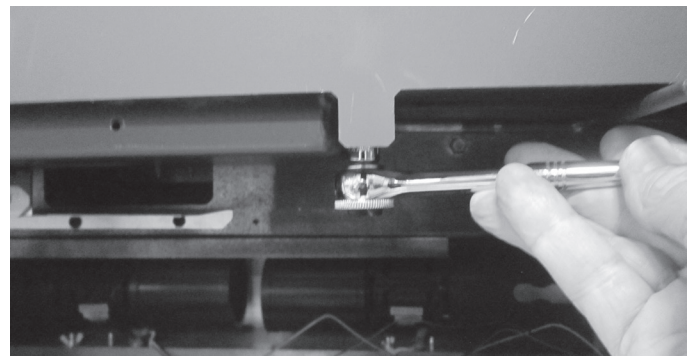


**Figure 4.18 Removal of Timer Assembly Screws**

6. While supporting the air chamber, remove the two (2) 1/4-20 bolts at each end of it. Then pull it down and out the front. See Figures 4.19 & 4.20.

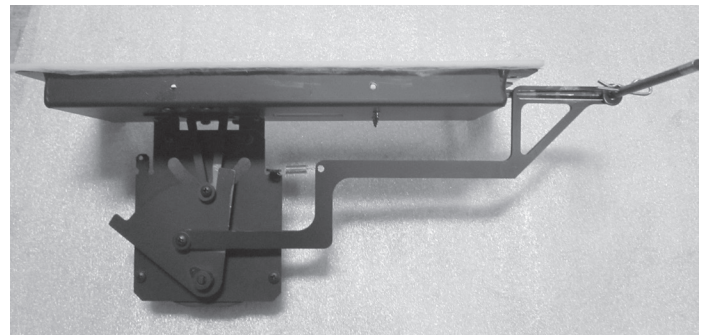


**Figure 4.19 Location of Bolts**

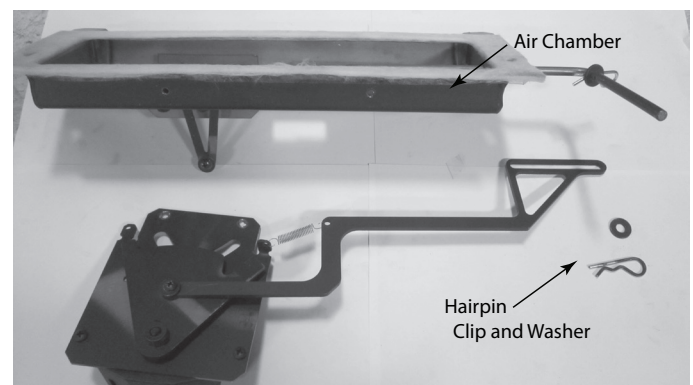


**Figure 4.20 Removal of Bolts (2)**

7. On the new timer assembly, Figure 4.21, remove the front hairpin clip and washer then two (2) screws disconnecting the air chamber before installation. See Figure 4.22.

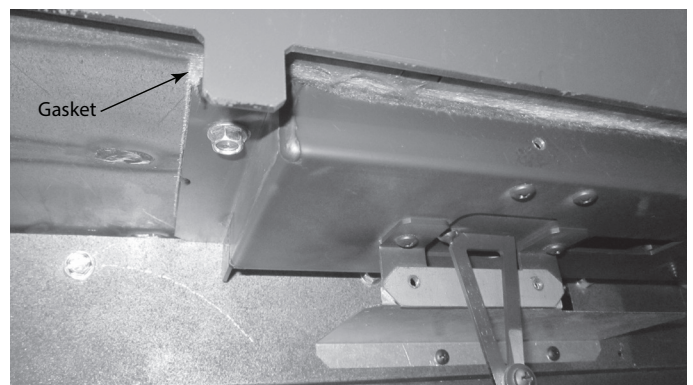


**Figure 4.21 Timer Assembly**



**Figure 4.22 Removal of Hairpin Clip, Washer and Air Chamber**

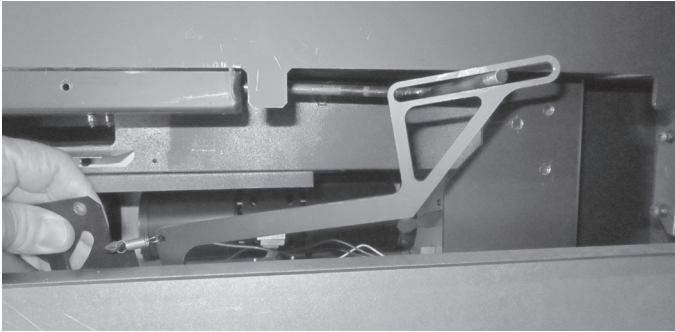
8. Install the new air chamber using the 1/4-20 bolts making sure the gasket is installed also. See Figure 4.22.



**Figure 4.22 Install New Air Chamber**

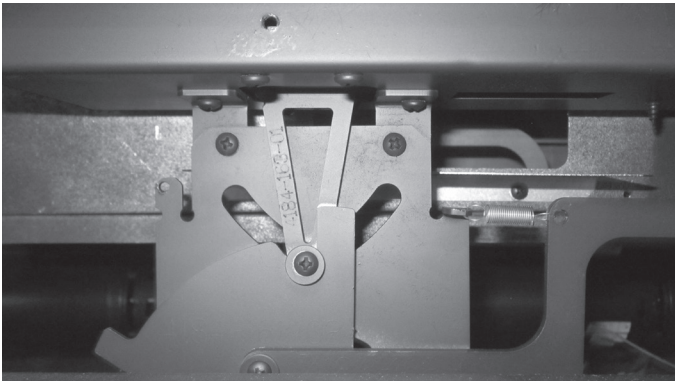


9. Install the timer/linkage by inserting the timer in first and slipping the linkage over the rod. See Figure 4.23.



**Figure 4.23 Inserting Timer Assembly**

10. Screw the timer to the air chamber. See Figure 4.24.



**Figure 4.24 Screwing Timer to Air Chamber**

11. Install the washer and hairpin clip back on the rod. See Figure 4.25.

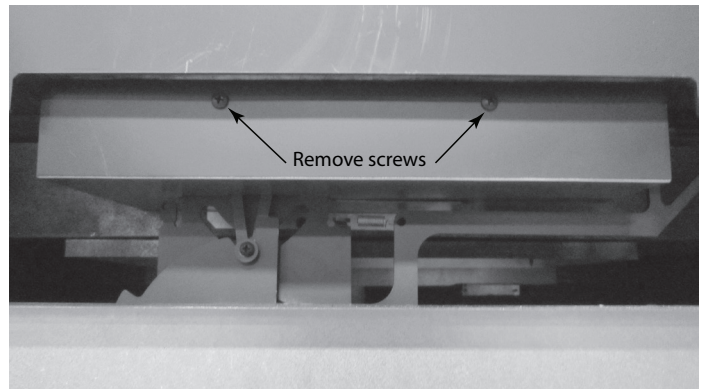


**Figure 4.25 Reinstalling Hairpin Clip and Washer**

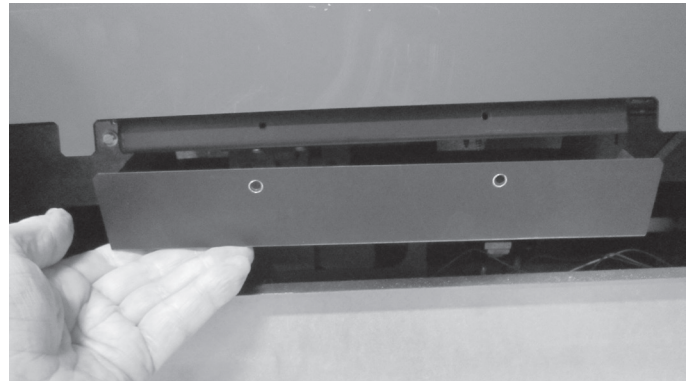
12. Reinstall air chamber cover. See Figure 4.26.
13. Reinstall the bottom front access panel.

## 8. Timer Removal & Replacement

1. Remove the bottom front access panel by lifting it up and off.
2. Remove the two (2) screws in the cover. See Figure 4.26 and pull it down and off. See Figure 4.27.

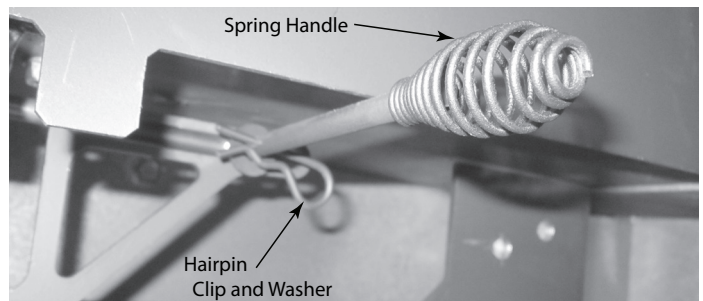


**Figure 4.26 Air Chamber Cover**



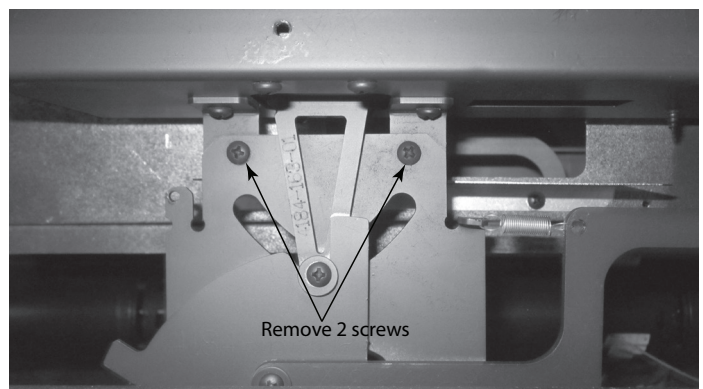
**Figure 4.27 Removal of Air Chamber Cover**

3. Remove the spring handle by twisting it to the left and pulling on it. Hold on to the rod as this is being done. See Figure 4.28.
4. Pull off and remove the hairpin clip and the washer on the rod. See Figure 4.28.



**Figure 4.28 Removal of Spring Handle**

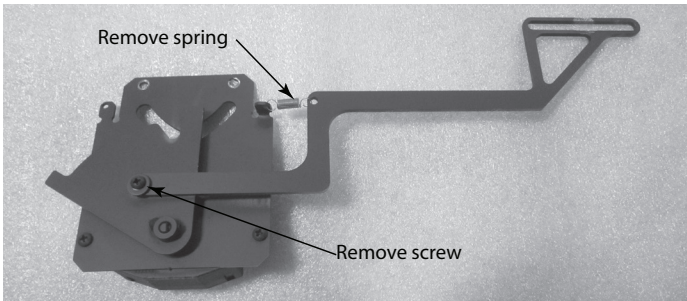
5. While holding on to the timer assembly, remove the two (2) screws, Figure 4.29 and slide the linkage arm off of the rod and pull the assembly out of the front.



**Figure 4.29 Removal of Screws**

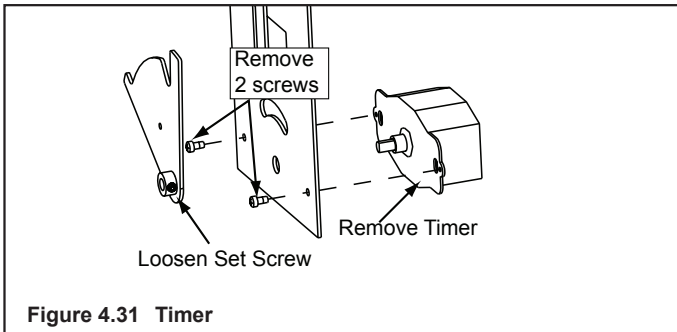


6. Remove the linkage arm and the spring from the timer. See Figure 4.30.



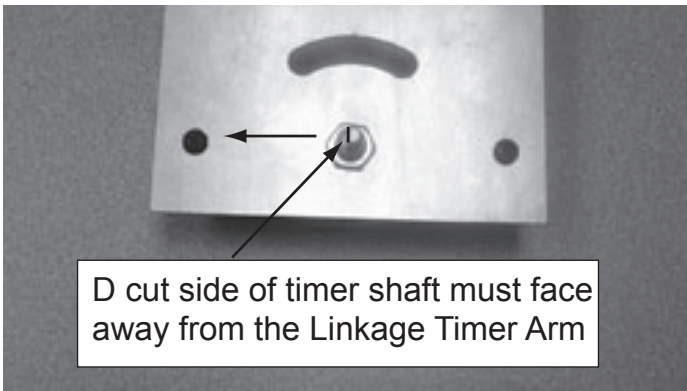
**Figure 4.30 Removal of Linkage Arm and Spring**

7. Loosen set screw on timer, remove two screws and remove timer. See Figure 4.31.



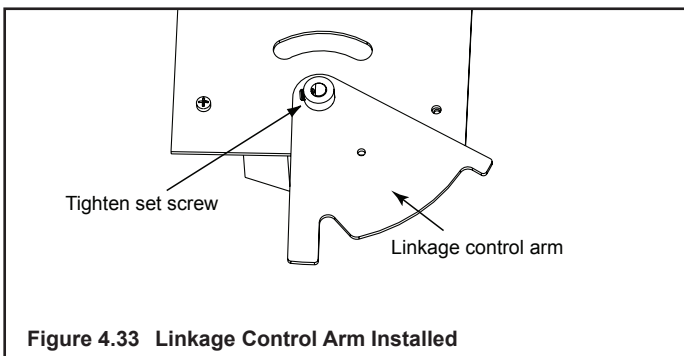
**Figure 4.31 Timer**

8. Install new timer using same two screws. It is very important that the D cut side of the timer shaft is facing the opposite side of the linkage timer arm. See Figure 4.32.



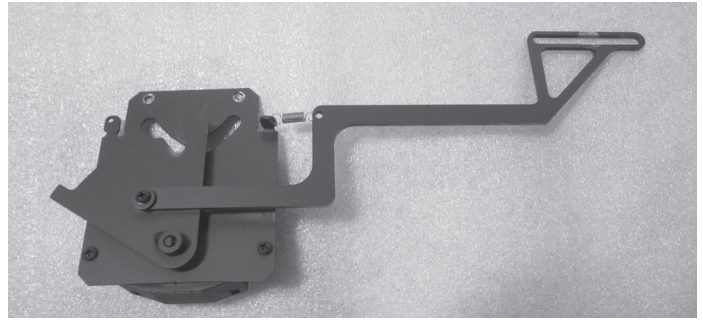
**Figure 4.32 D Cut on Shaft**

9. • Place linkage control arm over timer shaft and tighten set screw, Figure 4.33.



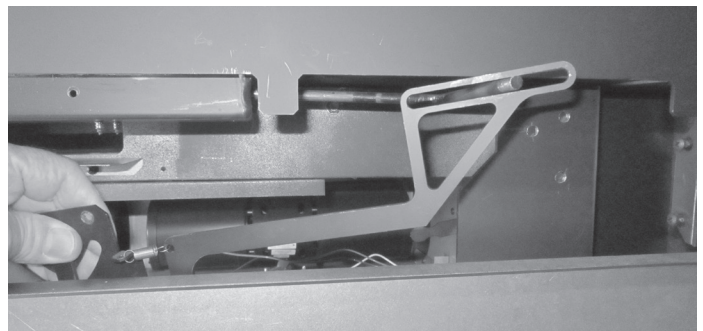
**Figure 4.33 Linkage Control Arm Installed**

10. Rotate linkage control arm into final position. Note that the D cut is now facing the linkage timer arm. Re-attach the linkage timer arm and spring. See Figure 4.34.



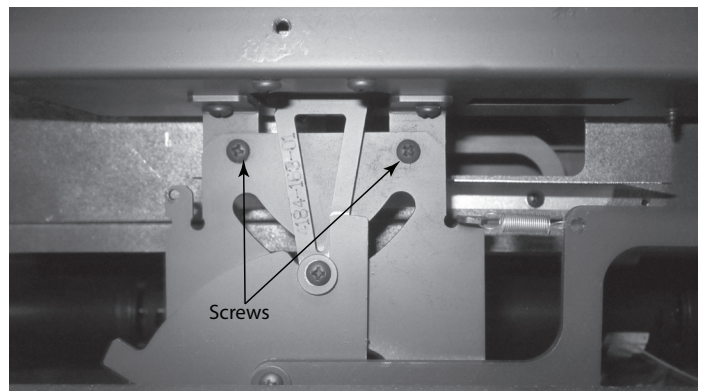
**Figure 4.34 Reattach the Linkage Timer Arm**

11. Install the timer/leakage by inserting the timer in first and slipping the linkage over the rod. See Figure 4.34.



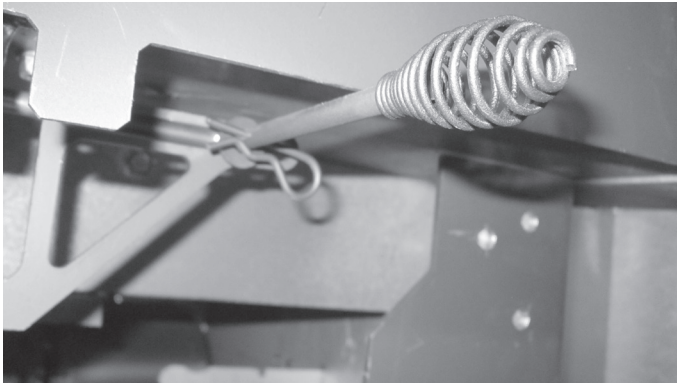
**Figure 4.34 Insert the Timer/Leakage**

12. Screw the timer to the air chamber. See Figure 4.35.



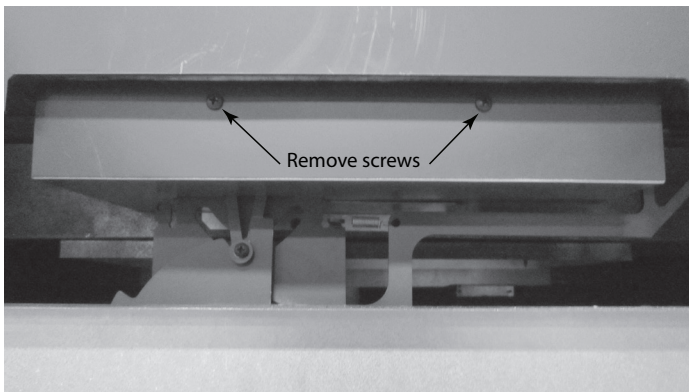
**Figure 4.35 Screw Timer to Air Chamber**

13. Install the washer and the hairpin clip back on the rod. See Figure 4.36.



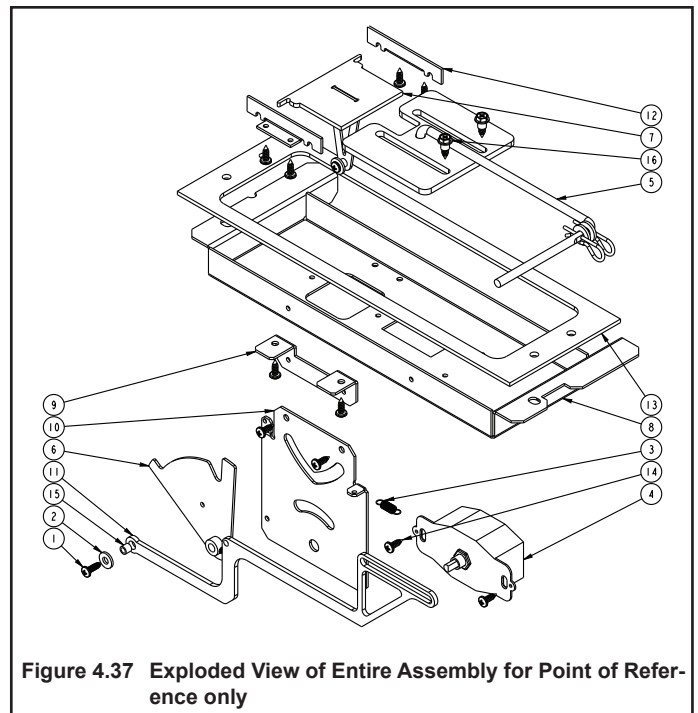
**Figure 4.36 Reinstalling Hairpin Clip and Washer**

14. Reinstall the air chamber cover. See Figure 4.37.



**Figure 4.37 Air Chamber Cover**

15. Reinstall the bottom front access panel.



**Figure 4.37 Exploded View of Entire Assembly for Point of Reference only**

Item	Description	Qty
1	Screw 8-32 x 1/2 PPH BK	1
2	Washer #10 SAE ZN	1
3	Extension Spring	1
4	Timer Mechanical 12 HR	1
5	Slide Assembly	1
6	Timer Arm Assembly	1
7	Timer Door Assembly	1
8	Air Channel Bottom	1
9	Timer Bracket	1
10	Timer Base	1
11	Timer Handle	1
12	Timer Door Retainer	2
13	Air Channel Gasket	1
14	Screw 8 x 12 PPH BK	10
15	Spacer #8 1/4D 7/32L ZN	1
16	HHSS #10 x 1/4D 1/4 L BK	2

# 5 Troubleshooting

## A. FAQs

Hearth & Home Technologies assumes no responsibility for the improper performance of the fireplace system caused by inadequate draft due to environmental conditions, down drafts, tight sealing construction of the structure, or mechanical exhausting devices which will create a negative air pressure within the structure where the fireplace is located.

If smoke spillage occurs from a fireplace opening when the door is open, there is either a leakage in the flue, a blockage in the flue, or some condition is affecting draft. Understanding and differentiating the conditions which can cause each of these kinds of spillage problems is essential to their solution.

- **Flue Leakage**  
Check for improperly connected flue joints or a damaged flue joint in the chimney system. Such leakage would reduce draft (air would be drawn in through the leaks rather than through the fireplace). The result might be difficult start-up and smoky fires that might spill if other adverse draft conditions accompany this problem.
- **Flue Blockage**  
The damper should be open.  
Check for objects that may have fallen down the chimney.

Flue draft is measured as negative pressure in the chimney. The amount of negative pressure determines how strong the draft is. The draft is important because it draws the combustion air into the fireplace and pulls the smoke out of the chimney.

There are three basic criteria essential in establishing and maintaining flue draft:

- availability of combustion air
- heat generated from the fire
- diameter and height of the flue system

These three factors work together as a system to create the flue draft. Increasing or decreasing any one of them will affect the other two and thus change the amount of draft in the entire system.

If the fire is hard to start and smoke spills out of the fireplace, or you find it difficult to establish and maintain a moderately high burn rate, then the flue draft is too low and corrective measures must be taken.

Be sure you have air available for combustion and that your firewood is dry and well seasoned. Build your fires properly and according to the instructions given in op-

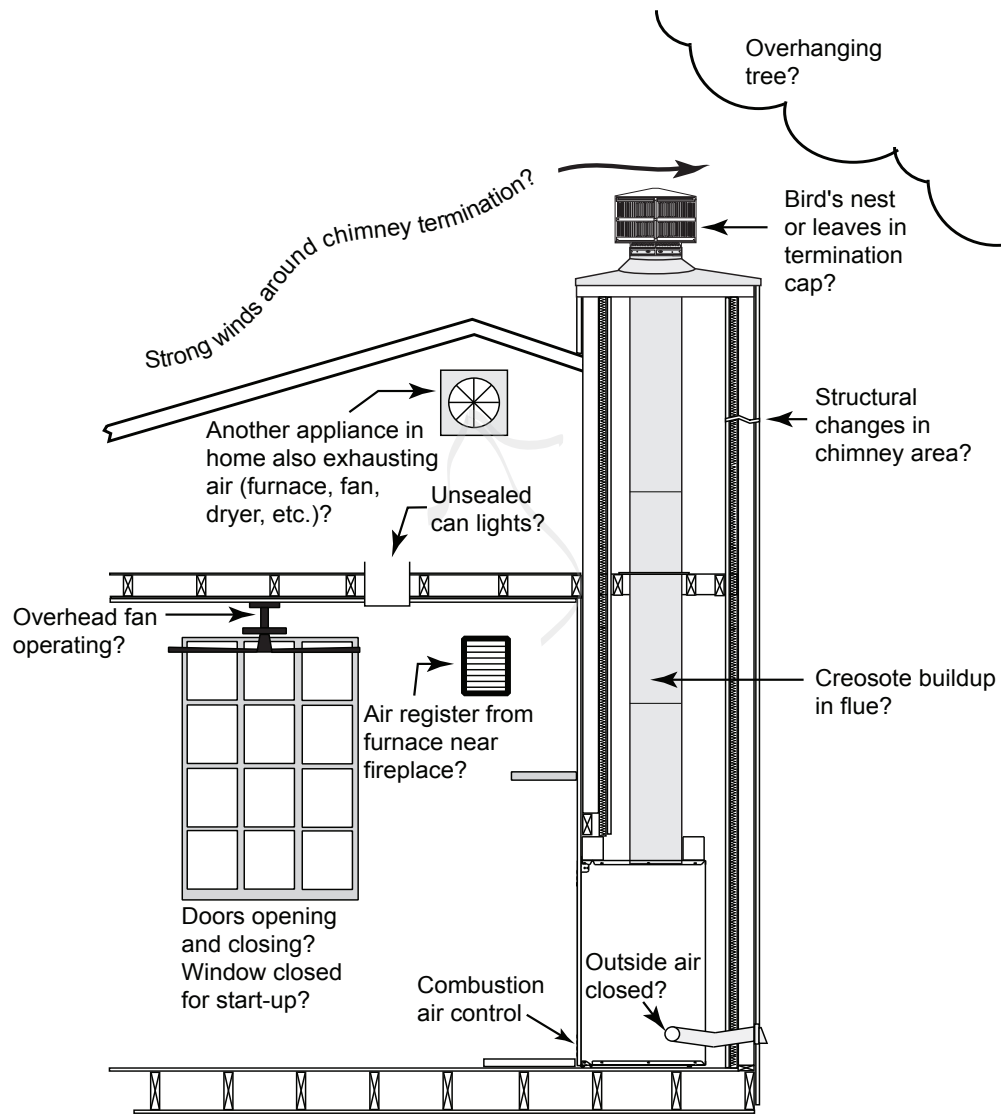
erating instructions, "Starting a Fire". Be sure your flue system is installed correctly and that it is the proper diameter and height. Check for the following:

- All chimney sections are properly installed.
- The chimney is clean and free of creosote or soot buildup.
- Make sure overhanging trees and branches are cut back within ten feet of the top of the chimney and the chimney is free of debris from animals.
- Ensure the chimney cap is clean and free of any buildup of soot or creosote if cap is equipped with a spark arrestor screen.
- Be sure the ceramic blanket (above the baffle) and the baffle are in their proper positions
- The wood being used is dry and well seasoned.

If you still suspect you have a low draft problem it may be necessary to increase the volume of air in your flue system. Since the diameter of your flue system is matched with the size of the flue collar and should not be changed, then the height of the system must be increased. Add chimney sections one at a time until the draft improves.

In some cases, regardless of what you do, it can still be difficult to establish the proper flue draft. This is especially evident when using an exterior factory-built chimney or exterior masonry chimney. Try holding a burning rolled up newspaper as close to the flue outlet as possible for a few minutes, then light the paper under the kindling. The heat generated from the burning rolled up newspaper should help get the draft established.

Still other factors can affect how well your flue system performs. Neighboring structures, high winds, tall trees, even hillsides can affect air currents around the chimney. Well designed chimney caps are available that can help. Your fireplace dealer is the local expert in your area. He can usually make suggestions or discover problems that can be easily corrected allowing your fireplace to operate correctly as it has been designed, providing safe and economical heat for your home.



**Figure 5.1 Factory-built Fireplaces: Troubleshooting**

## B. Troubleshooting Table

Fire is difficult to start	• Refer to section 4.C. Lighting Instructions
	• Open air controls
	• Establish draft: Hold a lighted, rolled up newspaper under the front of the baffle
	• Place DRY kindling over wadded up newspaper; leave air spaces between pieces of wood
	• Light the paper, allow kindling to ignite and progress to a lively burn
	• Slowly add progressively larger pieces of dry wood until the fire is well established
Smoke in the house at startup	• Check and clean chimney if needed
	• Open air controls
	• Establish draft
	• Do not use exhaust fans during startup
	• Do not close doors until the fire is well-established
Smoke in the house during operation	• Check and clean chimney if needed
	• Check door rope for seal
	• Open air controls (ACC)
Smoke in the house during refueling	• Open air controls (ACC) to establish a lively coal bed
	• Open doors SLOWLY
	• Add progressively larger wood to establish a hot fire
Fuel burns too fast	• ACC not working properly
	• Wood too dry, mix in less seasoned wood after the fire is established
	• User larger diameter wood
	• Check baffle/ceramic blanket for proper placement (Section 3.A.3)
	• Close down ACC (refer to section 4.D. Heat Management)
Glass doesn't stay clean	• Establish a good, hot fire
	• Use well-seasoned wood
Not enough or no heat	• Move combustion air control to fully open position
	• Fan is not on
	• Insufficient fuel for fire/heat required
Fan doesn't come on	• No power
	• Fireplace is not hot enough to activate snap disc
	• Snap disc may be faulty

## **6** Reference Materials

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### **A. Service Parts**











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## B. Contact Information



Majestic a brand of Hearth & Home Technologies  
1915 West Saunders Street  
Mount Pleasant, Iowa 52641

**Please contact your Heatilator dealer with any questions or concerns.**

For the number of your nearest Heatilator dealer, please visit [www.majesticproducts.com](http://www.majesticproducts.com).

### – NOTES –

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#### CAUTION



##### DO NOT DISCARD THIS MANUAL

- Important operating and maintenance instructions included.
- Read, understand and follow these instructions for safe installation and operation.
- Leave this manual with party responsible for use and operation.



This product may be covered by one or more of the following patents: (United States) 5613487, 5647340, 5890485, 5941237, 6006743, 6019099, 6053165, 6145502, 6374822, 6484712, 6601579, 6769426, 6863064, 7077122, 7098269, 7258116, 7470729, 8147240 or other U.S. and foreign patents pending.

2000-945C

# Installation Manual

## Installation and Fireplace Setup

Pour demander un exemplaire en français de ce Manuel du propriétaire, visitez [www.heatnglo.com/translations](http://www.heatnglo.com/translations).

**INSTALLER:** Leave this manual with party responsible for use and operation.

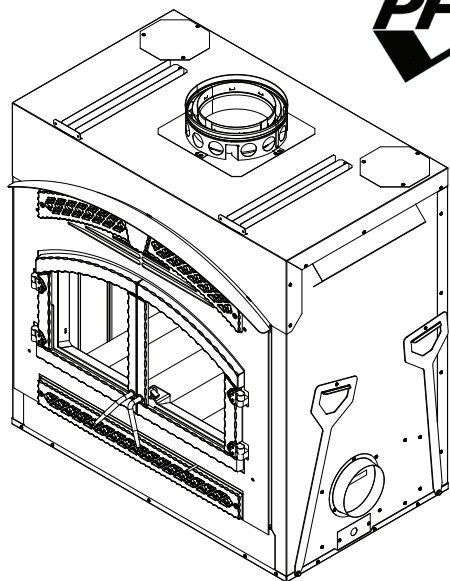
**OWNER:** Retain this manual for future reference.

Contact your dealer with questions on installation, operation, or service.

# HEAT & GLO™

Model(s):

**Northstar-C**



**EPA CERTIFIED WOODBURNING  
FIREPLACE**

### **WARNING! Risk of Fire and/or Asphyxiation!**

- Read all the instructions before starting the installation. Follow these instructions carefully during the installation to ensure maximum safety and benefit.
- Comply with all minimum clearances to combustibles as specified. Failure to comply may cause house fire.

### **⚠ WARNING**



#### **HOT SURFACES!**

Glass and other surfaces are hot during operation AND cool down.

#### **Hot glass will cause burns.**

- **DO NOT** touch glass until it is cooled
  - NEVER allow children to touch glass
  - Keep children away
  - CAREFULLY SUPERVISE children in same room as fireplace.
  - Alert children and adults to hazards of high temperatures.
- High temperatures may ignite clothing or other flammable materials.**
- Keep clothing, furniture, draperies and other flammable materials away.

Installation and service of this appliance should be performed by qualified personnel, Hearth & Home Technologies recommends HHT Factory Trained or NFI certified professionals.



## Safety Alert Key:

- **DANGER!** Indicates a hazardous situation which, if not avoided will result in death or serious injury.
- **WARNING!** Indicates a hazardous situation which, if not avoided could result in death or serious injury.
- **CAUTION!** Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.
- **NOTICE:** Indicates practices which may cause damage to the fireplace or to property.

## Table of Contents

Installation Standard Work Checklist	3	<b>5 Chimney and Termination Requirements</b>	
<b>1 Product Specific &amp; Important Safety Information</b>		A. Chimney Requirements	23
A. Appliance Certification	4	B. Offsets/Returns	24
B. BTU & Efficiency Specifications	4	C. Termination Requirements	25
C. Mobile Home Approved	4	<b>6 Chimney Installation</b>	
D. Glass Specifications	4	A. Typical Chimney System	26
E. Non-Combustible Materials	5	B. Assemble Chimney Sections	27
F. Combustible Materials	5	C. Install Chimney Air kit (CAK4A)	27
G. Electrical Codes	5	D. Secure Offset/Return	28
<b>2 Getting Started</b>		E. Install Firestops	29
A. Typical Fireplace System	6	F. Install Attic Insulation Shield	30
B. Design and Installation Considerations	7	G. Roof Penetration	31
1. Selecting Fireplace Locations	7	H. Manufactured Home Installation	31
2. Locating Fireplace & Chimney	8	I. Install Chase/Chase Top	32
C. Tools and Supplies Needed	9	J. Install Termination Cap	33
D. Inspect Fireplace and Components	9	<b>7 Finishing</b>	
E. Fireplace System Requirements	9	A. Template	35
<b>3 Framing and Clearances</b>		B. Finish the Wall	36
A. Fireplace Dimensions	10	1. Stone, Brick Finish	36
B. Clearances	11	2. Tile, Granite, Marble Finish	36
C. Construct the Chase	12	C. Mantel and Wall Projections	36
D. Frame the Fireplace	12	D. Finishing the Hearth Extension	37
E. Secure and Level the Fireplace	13	E. Non-Combustible Sealant Material	38
F. Installation of Top Standoffs	14	<b>8 Reference Materials</b>	
G. Protective Metal Hearth Strips	14	A. Firebrick Placement	39
H. Non-Combustible Facing Board (Provided)	15	B. Baffle and Blanket Placement	40
I. Outside Air Kit	15	C. Install Fascia (Fronts)	40
J. Heat-Zone-WD Kit (Optional)	18	D. Chimney Components	41
<b>4 Electrical Wiring</b>	<b>22</b>	E. Accessories	46



# 1 Product Specific & Important Safety Information

## A. Appliance Certification

<b>Model:</b>	Northstar-C
<b>Laboratory:</b>	Underwriter's Laboratories, Inc.
<b>Report No:</b>	Project
<b>Type:</b>	Wood Fireplace
<b>Standard:</b>	UL127-2011 and CAN/ULC-S610-2018 (A1998) and (UM) 84-HUD, Manufactured Home Approved.

The Northstar Wood Appliance meets the U.S. ENVIRONMENTAL PROTECTION AGENCY Certified to comply with 2020 particulate emission standards using cord wood.

## B. BTU & Efficiency Specifications

EPA Certified Emissions:	1.8 g/hr
*LHV Tested Efficiency:	76%
**HHV Tested Efficiency:	70%
***EPA BTU Output:	17,600 to 48,200
Vent Size:	8 inches
Firebox Size:	2.7 cubic feet
Recommended Log Length:	22 inches
Fuel	Seasoned Cord Wood less than 20% moisture
HHT:	SL300 Series
DuraVent:	DuraPlus
*Weighted average LHV (Low Heating Value) efficiency using cord wood and data collected during EPA emission test. LHV assumes the moisture is already in a vapor state so there is no loss in energy to vaporize.	
**Weighted average HHV (High Heating Value) efficiency using cord wood and data collected during EPA emission test. HHV includes the energy required to vaporize the water in the fuel.	
***A range of BTU outputs based on HHV (High Heating Value) and the burn rates from the low and high EPA tests, using cord wood.	

The Northstar is Certified to comply with 2020 particulate emission standards.



## C. Mobile Home Approved

This appliance is approved for mobile home installations when not installed in a sleeping room and when an outside combustion air inlet is provided. The structural integrity of the mobile home floor, ceiling, and walls must be maintained. The appliance must be properly grounded to the frame of the mobile home and use only listed double-wall connector pipe.

## D. Glass Specifications

This appliance is equipped with 5mm ceramic glass. Replace glass only with 5mm ceramic glass. Please contact your dealer for replacement glass.

**NOTE:** This installation must conform with local codes. In the absence of local codes you must comply with the **UL127-2011, (UM) 84-HUD and NPFA211** in the U.S.A. and the **CAN/ULC S610-2018 (A1998) and CAN/CSA-B365 Installation Codes** in Canada.

### DO NOT:

- install or operate damaged fireplace
- modify fireplace
- install other than as instructed by *Hearth & Home Technologies*
- operate the fireplace without fully assembling all components
- install unvented gas log set
- install any component not approved by *Hearth & Home Technologies*
- install parts or components not Listed or approved

*Improper installation, adjustment, alteration, service or maintenance can cause injury or property damage. For assistance or additional information, consult a qualified installer, service agency or your dealer.*

**WARNING! Risk of Fire!** *Hearth & Home Technologies disclaims any responsibility for, and the warranty and agency listing will be voided by the above actions.*

Hearth & Home Technologies WILL NOT warranty appliances that exhibit evidence of over-firing. Evidence of over-firing includes, but is not limited to:

- Warped air tube
- Deteriorated refractory brick retainers
- Deteriorated baffle and other interior components

## E. Non-Combustible Materials

Material which will not ignite and burn, composed of any combination of the following:

- Steel
- Brick
- Concrete
- Glass
- Plaster
- Iron
- Tile
- Slate

Materials reported as passing **ASTM E 136, Standard Test Method for Behavior of Metals, in a Vertical Tube Furnace of 750° C.**

## F. Combustible Materials

Material made of or surfaced with any of the following materials:

- Wood
- Plant Fibers
- Plywood/OSB
- Foam insulation & sealants
- Compressed Paper
- Plastic
- Sheet Rock (drywall)

Any material that can ignite and burn: flame proofed or not, plastered or un-plastered.

## G. Electrical Codes

**NOTICE:** *This fireplace must be electrically wired and grounded in accordance with local codes or, in the absence of local codes, with **National Electric Code ANSI/NFPA 70-latest edition** or the **Canadian Electric Code CSA C22.1**.*

- A 110-120 VAC circuit for this product must be protected with ground-fault circuit-interrupter protection, in compliance with the applicable electrical codes, when it is installed in damp locations.

**WARNING!** *Improper installation, adjustment, alteration, service or maintenance can cause injury or property damage.*



## 2 Getting Started

### A. Typical Fireplace System

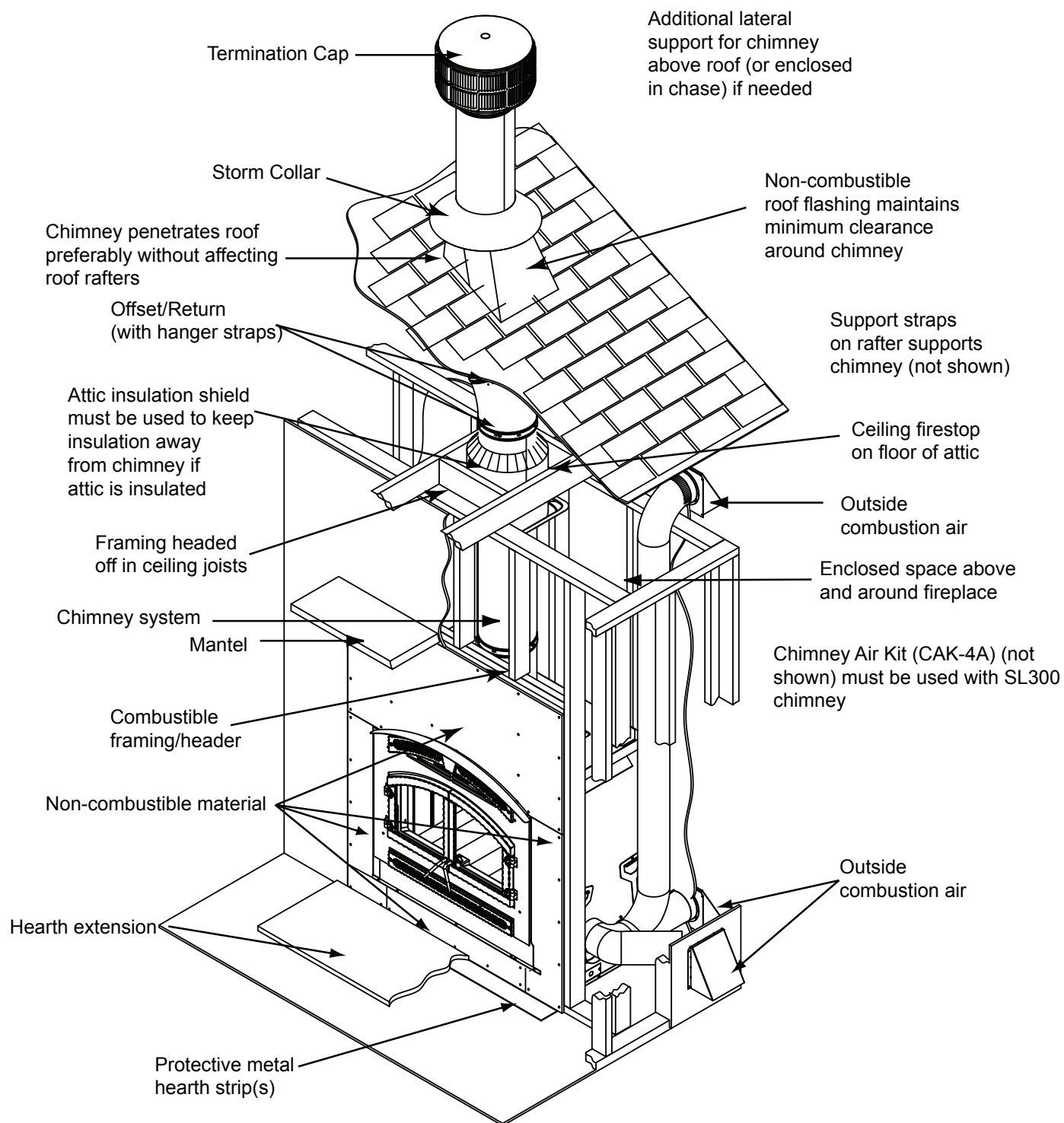


Figure 2.1 Typical Fireplace System

## B. Design and Installation Considerations

**NOTICE:** Check building codes prior to installation.

- Installation **MUST** comply with local, regional, state and national codes and regulations.
- Consult insurance carrier, local building inspector, fire officials or authorities having jurisdiction over restrictions, installation inspection and permits.

### 1. Selecting Fireplace Locations

This fireplace may be used as a room divider, installed along a wall, across a corner or used in an exterior chase. See Figure 2.2.

Locating the fireplace in a basement, near frequently opened doors, central heat outlets or returns, or other locations of considerable air movement can affect the performance.

Outside air must be used for combustion. The Northstar-C comes equipped with an outside air inlet to feed combustion air from outside the home, along with an outside air termination cap; the metal duct is required but not supplied. Consideration should be given to these factors before deciding on a location.

**NOTICE:** In addition to these framing dimensions, also reference the following section:

- Clearances (Section 3).

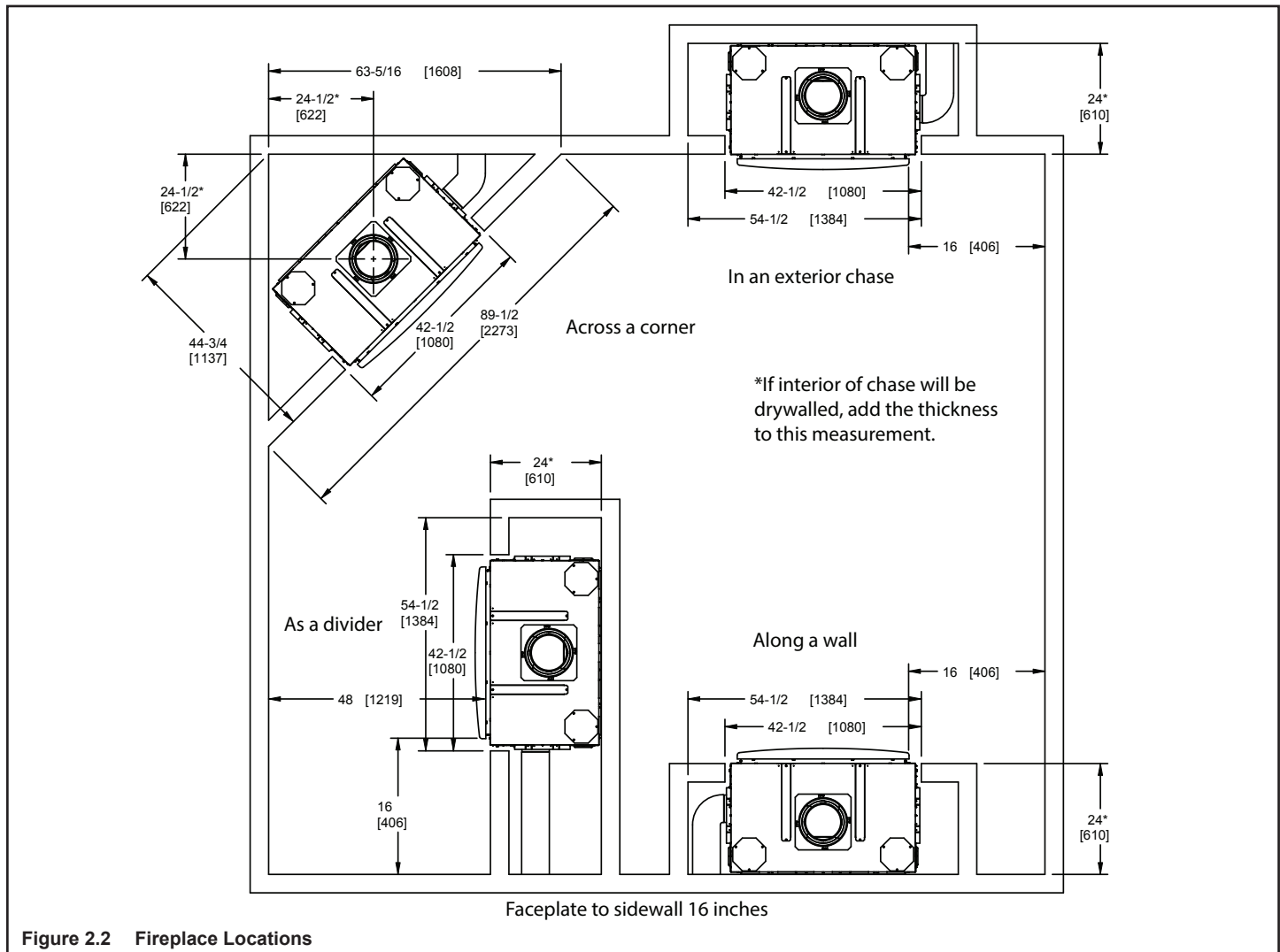
**NOTICE:**

- Illustrations and photos reflect typical installations and are **FOR DESIGN PURPOSES ONLY**.
- Illustrations/diagrams are not drawn to scale.
- Actual installation/appearance may vary due to individual design preference.
- Hearth & Home Technologies reserves the right to alter its products.

**NOTICE:**

A minimum 1/2 in. air clearance at the back and a minimum 1 in. air clearance to the sides of the fireplace assembly must be maintained.

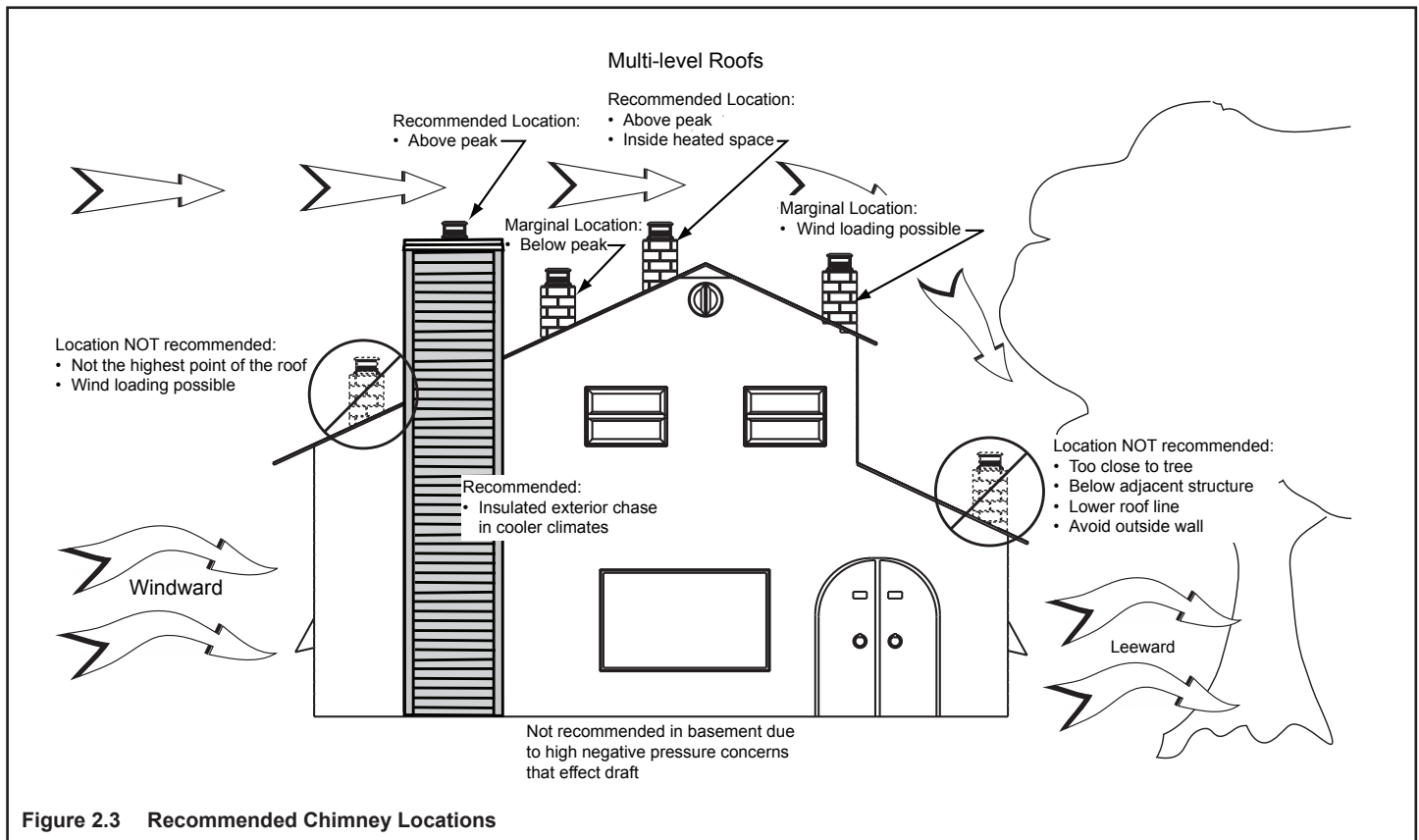
Chimney sections at any level require a 2 in. minimum air space clearance between the framing and chimney sections.



## 2. Locating Fireplace & Chimney

Location of the fireplace and chimney will affect performance.

- Install within the warm airspace enclosed by the building envelope. This helps to produce more draft, especially during lighting and die-down of the fire.
- Penetrate the highest part of the roof. This minimizes the effects of wind loading.
- Locate termination cap away from trees, adjacent structures, uneven roof lines and other obstructions.
- Minimize the use of chimney offsets.
- Consider the fireplace location relative to floor and ceiling and attic joists.
- Take into consideration the termination requirements in Sections 5 and 6.
- Install the outside air kit and CAK (chimney air kit) with the intake facing prevailing winds during the heating season.
- Ensure adequate outdoor air for all combustion appliances and exhaust equipment.
- Ensure furnace and air conditioning return vents are not located in the immediate vicinity of the fireplace.
- Avoid installing the fireplace near doors, walkways or small isolated spaces.
- Recessed lighting should be a “sealed can” design.
- Attic hatches weather stripped or sealed.
- Attic mounted duct work and air handler joints and seams taped or sealed.



### C. Tools and Supplies Needed

Before beginning the installation be sure the following tools and building supplies are available:

Reciprocating saw	Framing material
Pliers	Non-combustible sealant
Hammer	Gloves
Phillips screwdriver	Framing square
Flat blade screwdriver	Electric drill and bits
Plumb line	Safety glasses
Level	Tape measure
1/2-3/4 in. length, #6 or #8 self-drilling screws	
Misc. screws and nails	

### D. Inspect Fireplace and Components

***WARNING! Risk of Fire and Asphyxiation! Damaged parts could impair safe operation. DO NOT install damaged, incomplete or substitute components.***

- Remove fireplace and components from packaging and inspect for damage.
- Chimney system components and other optional components are shipped separately.
- Report to your dealer any parts damaged in shipment.

### E. Fireplace System Requirements

The Heat & Glo fireplace system requirements consist of the following:

- Fireplace
  - Firebrick (included with fireplace)
  - Door (included with fireplace)
  - Non-combustible facing material (included with fireplace)
  - Hearth Extension
- Outside Air System (hood and collars included with fireplace)
- Fascia
- Chimney System
  - CAK4A Chimney air kit (included with fireplace, required with SL300 series chimney)
  - Attic Insulation Shield (included with fireplace)
  - Chimney termination cap
- Non-combustible finish material
- Fans (included with fireplace)

Optional components include:

- LINTEL - Lintel Bar Kit
- Heat-Zone-WD Kit
- Mesh-HHT - Firescreen

# 3 Framing and Clearances

## A. Fireplace Dimensions

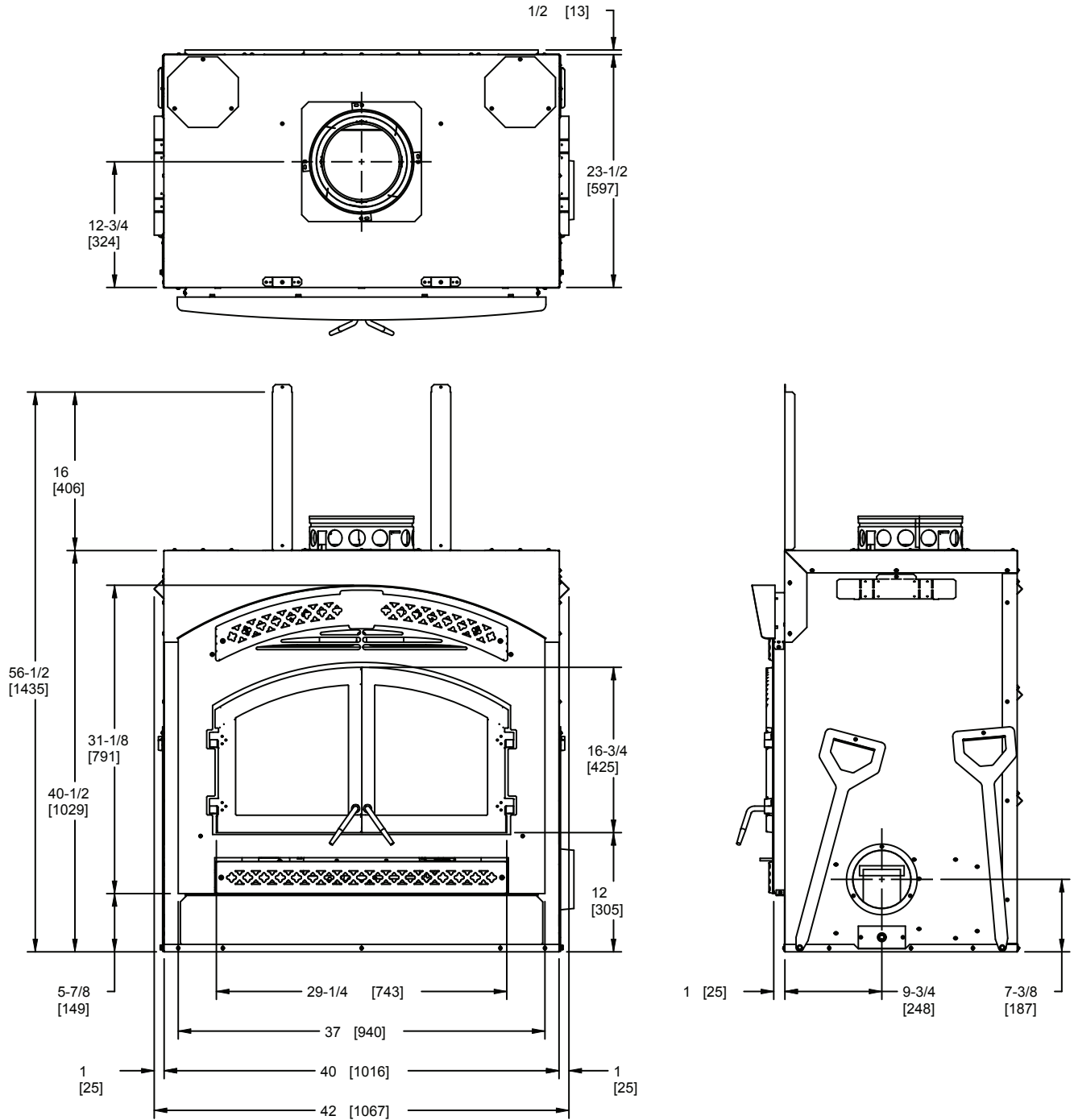


Figure 3.1 Fireplace Dimensions

## B. Clearances

### **WARNING! Risk of Fire!**

You must comply with all minimum air space clearances to combustibles as specified in Figure 3.2. **DO NOT** pack required air spaces with insulation or other materials. Framing or finishing material used on the front of, or in front of the fireplace closer than the minimums listed must be constructed entirely of non-combustible materials (i.e., steel studs, concrete board, etc.). Failure to comply may cause fire.

WITHIN ENCLOSURE AREA	
Fireplace to backwall	1/2 in. (13 mm)
Fireplace to sidewall	1 in. (25 mm)
Duct boots to framing	0 in. (0 mm)
Top of fireplace to header	16 in. (406 mm)
Door opening to sidewall	22-3/4 in. (578 mm)
EXPOSED SURFACES	
Faceplate to sidewall	16 in. (406 mm)
Heat zone air grills to ceiling	12 in. (305 mm)
MANTEL	
Non-combustible mantel	38 in. (965 mm) from the base of the fireplace up
Combustible mantel	60 in. (1524 mm) from the base of the fireplace up
Maximum mantel depth	12 in. (305 mm)

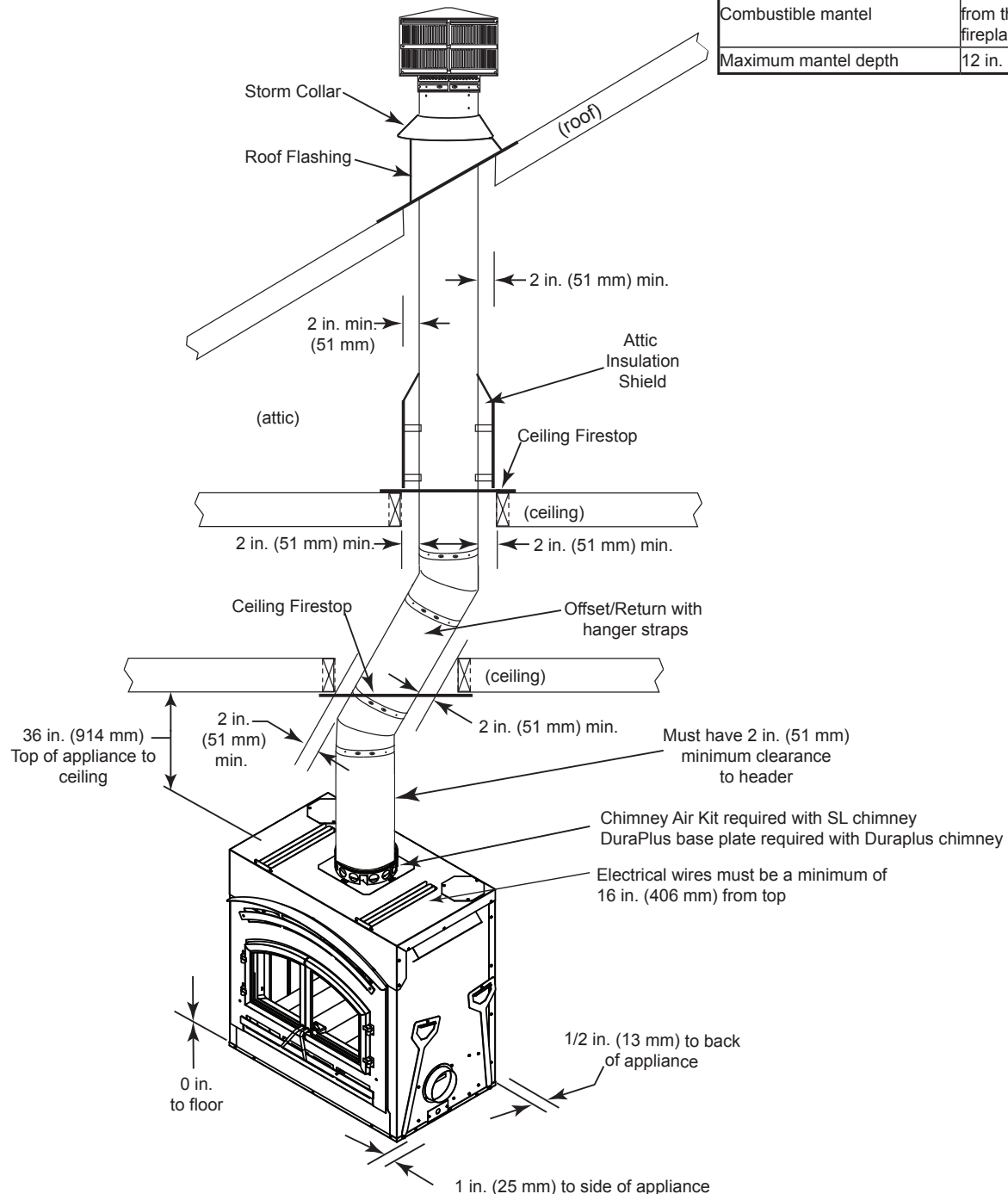


Figure 3.2 Clearances to Combustible Materials

## C. Construct the Chase

**WARNING! Risk of Fire! DO NOT** seal area between fire stop opening and chimney pipe except where they enter the attic or leave the warm air envelope of the home (use 600° F sealant).

**WARNING! Risk of Fire! You must maintain a minimum 2 in. (51 mm) air space clearance to insulation and framing surrounding the chimney system.**

A chase is a vertical boxlike structure built to enclose the fireplace and/or its vent system. Vertical chimneys that run on the outside of a building must be installed inside a chase. See Figure 3.4.

Construction of the chase may vary with the type of building. Local building codes **MUST** be followed.

Hearth & Home Technologies recommends:

- The inside surfaces be drywalled and taped (or the use of an equivalent method) for maximum air tightness to the false ceiling.
  - In cold climates, the walls of the chase should be insulated to the level of the false ceiling as shown in Figure 3.3. This will help reduce heat loss from the home around the fireplace.
  - Holes and other openings should be caulked with high temperature caulk or stuffed with unfaced fiber glass insulation.
- Requirements for constructing the chase:
    - A firestop spacer and attic insulation shield should be installed at the false ceiling.
    - The chase must be properly blocked to prevent blown insulation or other combustibles from entering and making contact with fireplace or chimney.
    - The chase top must be constructed of non-combustible material.
  - The chase is constructed using framing materials much the same as the walls in your home. A variety of siding materials may be used including brick, stone, veneer brick, or standard siding materials.
  - In constructing the chase, several factors must be considered:
    - Maintain a 2 in. (51 mm) air space around the chimney.
    - The chase top must be constructed of non-combustible material.
    - In cold climates, a firestop spacer and attic insulation shield should be installed in an insulated false ceiling at the 8 ft. (2438 mm) level above the fireplace assembly. This reduces heat loss through the chase.
    - In cold climates, the walls of the chase should be insulated to the level of the false ceiling as shown in Figure 3.4. This will help reduce heat loss from the home around the fireplace.

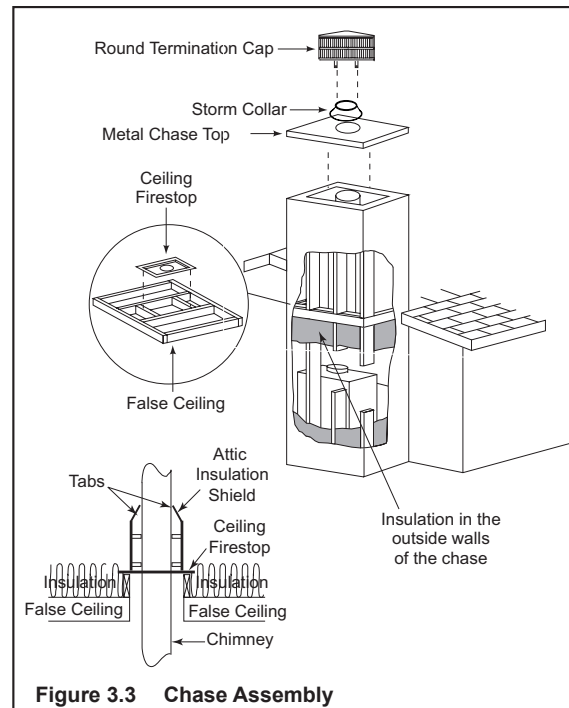


Figure 3.3 Chase Assembly

Three examples of chase applications are shown in Figure 3.4.

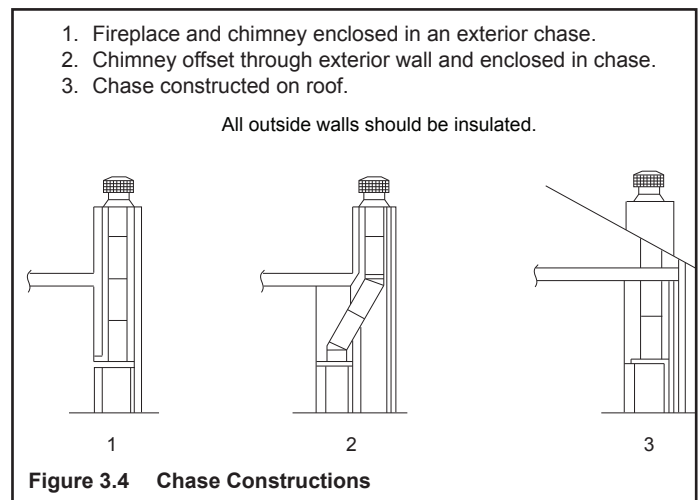


Figure 3.4 Chase Constructions

## D. Frame the Fireplace

**WARNING! Risk of Fire! Comply with all minimum clearances specified.**

- A minimum 1/2 in. (13 mm) air clearance must be maintained at the back and 1 in. (25 mm) to the sides of the fireplace assembly.
- Chimney sections at any level require a 2 in. (51 mm) minimum air space clearance between the framing and chimney section.

**WARNING! Risk of Fire! You must comply with all minimum air space clearances to combustibles. DO NOT** pack required air spaces with insulation or other materials.



**NOTICE:** Hearth extension design must be determined before installation of fireplace.

If the fireplace is placed on the floor, the maximum height of a finished raised hearth (constructed of non-combustible material) is 5-3/4 in. (147 mm). If a higher raised hearth is preferred, the fireplace must be placed on a platform.

**NOTICE:** Wiring for fans must be done before framed enclosure is completed. If using a Heat Zone Kit, it also must be installed before enclosure is complete.

### Standoffs are attached to the fireplace.

The unit can be positioned with the standoffs touching combustible walls or framing but DO NOT pack insulation or other materials in the air space between the fireplace and wall.

Figure 3.5 shows a typical framing (using 2 x 4 lumber) of the fireplace, assuming combustible materials are used. All required clearances to combustibles around the fireplace must be adhered to. See Figure 3.2. (No recess above fireplace.)

The finished cavity depth must be no less than 24 in. (610 mm) from the finished back wall to the outside of front wall framing. Framing must extend straight up all the way to the ceiling.

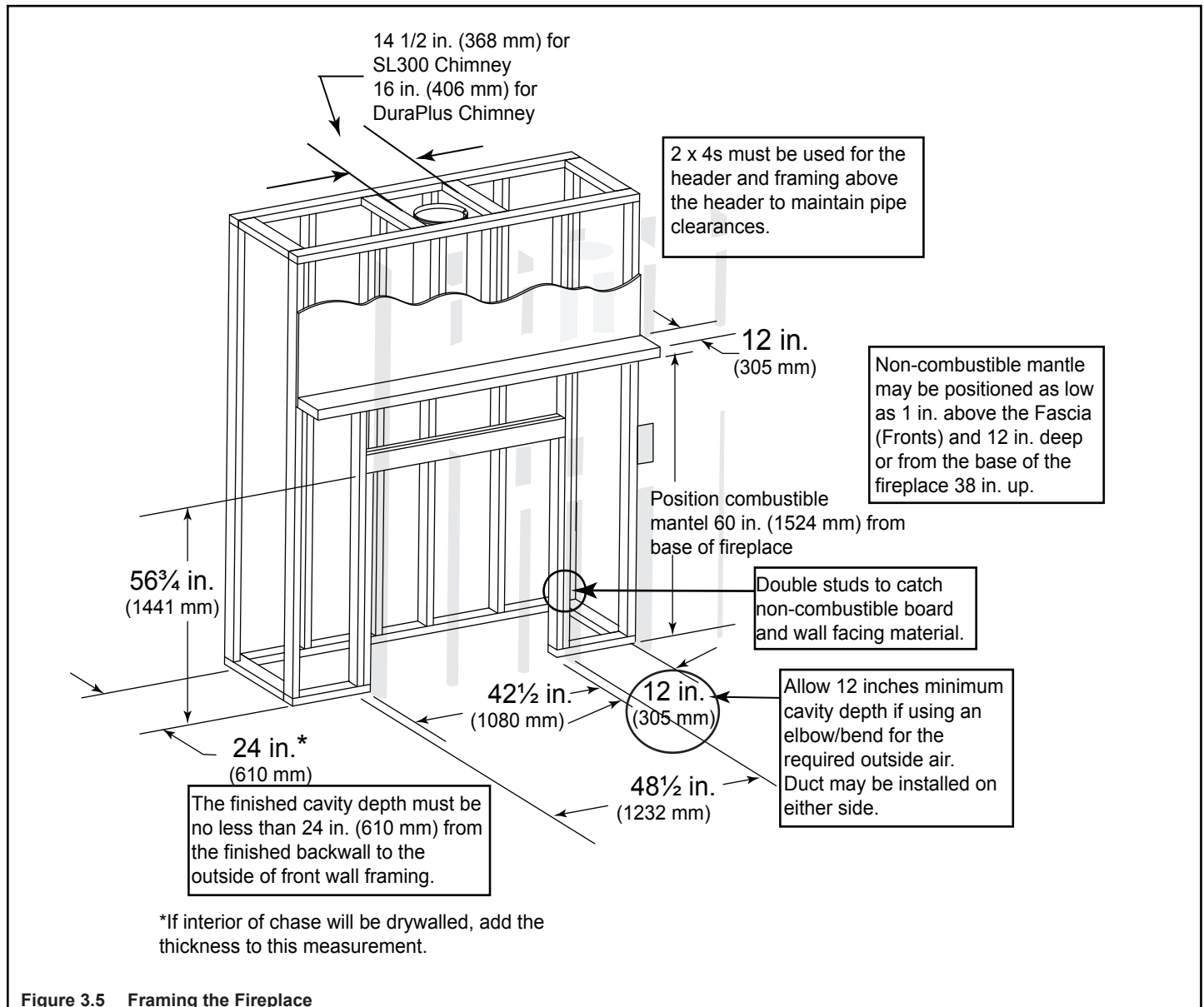
**CAUTION! Risk of Cuts/Abrasions. Wear protective gloves and safety glasses during installation. Sheet metal edges are sharp.**

### E. Secure and Level the Fireplace

This fireplace may be placed on either a combustible or noncombustible continuous flat surface. Follow the instructions for framing in Section 3. Slide the fireplace into position. Be sure to provide the minimum 1 in. air clearance at the sides and 1/2 in. at the back of the fireplace.

The fireplace should be positioned so the face of the non-combustible material on the fireplace will be flush with the face of the drywall on the walls. See Figure 3.6.

Level the fireplace and shim as necessary. Secure the fireplace (using the pallet mounting brackets located on either side of the fireplace) to the sub floor.





**WARNING! Risk of Fire!** Prevent contact with sagging, loose insulation.

- **DO NOT** install against vapor barriers or exposed insulation.
- Secure insulation and vapor barriers.
- Provide minimum air space clearances at the sides and back of the fireplace assembly as outlined in Section 3.

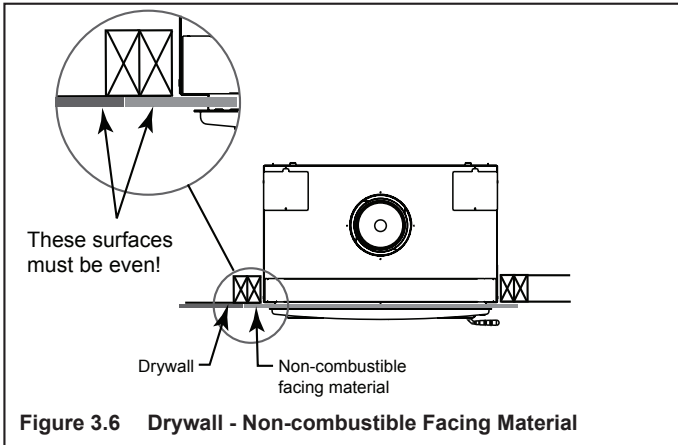


Figure 3.6 Drywall - Non-combustible Facing Material

## F. Installation of Top Standoffs

Remove the top front standoffs from the top of the fireplace. See Figure 3.7. Screw the standoffs to the fireplace as shown in Figure 3.8. The top of the standoffs will be screwed to the header.

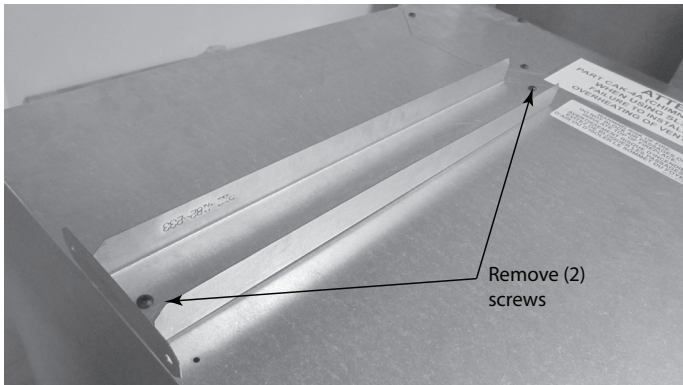


Figure 3.7 Remove Standoffs

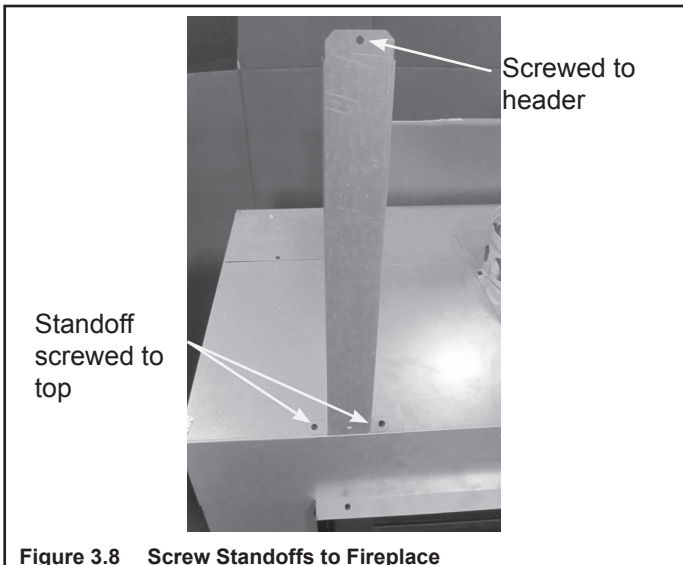


Figure 3.8 Screw Standoffs to Fireplace

## G. Protective Metal Hearth Strips

**WARNING! Risk of fire!** High temperatures, sparks, embers or other burning material falling from the fireplace may ignite flooring or concealed combustible surfaces.

- Protective metal hearth strips **MUST** be installed over combustible surfaces.
- Hearth extensions **MUST** be installed exactly as specified.
- Locate the two protective metal hearth strips measuring approximately 26 in. x 4 in. (660 mm x 102 mm) included with this fireplace.
- Slide each metal strip 2 in. (51 mm) under front edge of fireplace.
- Overlap strips in the middle of fireplace opening by 1 in. (25 mm) minimum.
- Metal strips must extend beyond the front and sides of the fireplace opening by at least 2 in. (51 mm). See Figure 3.6.
- Protect the front of a platform elevated above the hearth extension with metal strips (not included with fireplace) per Figure 3.10. See Section 7 for hearth extension instructions.
- **DO NOT** cover metal strips with combustible materials. Sparks or embers may ignite flooring.

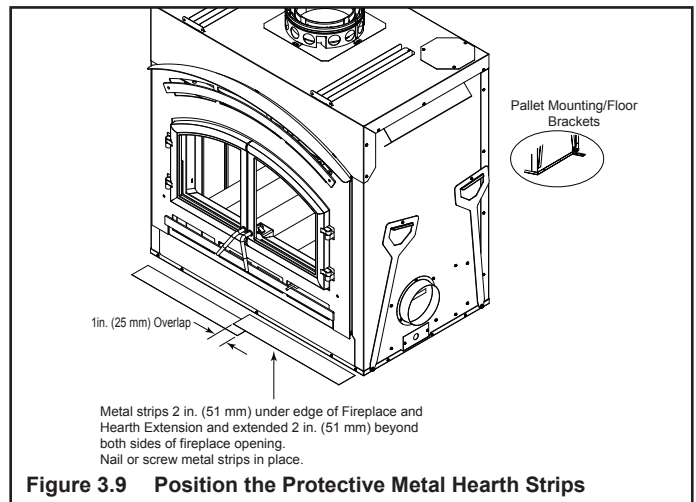


Figure 3.9 Position the Protective Metal Hearth Strips

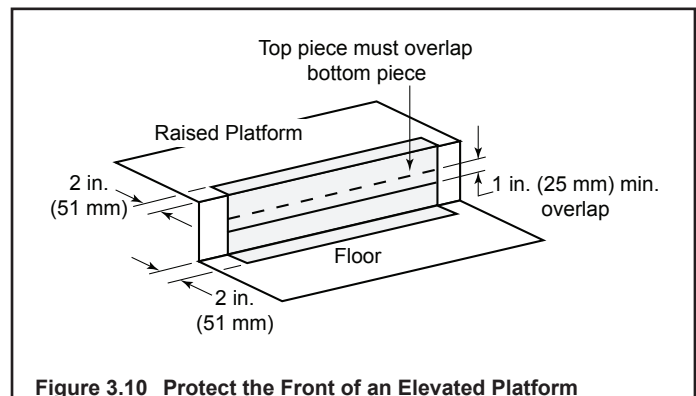


Figure 3.10 Protect the Front of an Elevated Platform

## H. Non-Combustible Facing Board (Provided)

### **WARNING! Risk of Fire!**

Follow these instructions exactly.

Facing materials must be installed properly to prevent fire.

No materials may be substituted without authorization by Hearth & Home Technologies.

**TOOLS NEEDED:** Powered drill with #2 Phillips head bit; caulking gun.

Only non-combustible materials (supplied with fireplace) may be used to cover the metal fireplace front.

**NOTE:** All boards are pre-drilled for your convenience. Boards **MUST** be attached in the following order: bottom, sides, and then the top, red-painted side out. The top and bottom board should each have a hang tag attached. Leave them attached for referral for the finishing operation.

- Attach the bottom board to the bottom of the fireplace outer shell with enclosed screws, ensuring the board is centered. **DO NOT remove hang tags.** Attach the side pieces to the outer shell and framing members.
- Center and attach the top board to the outer shell and framing members. **DO NOT remove hang tags.**

**NOTICE:** 1/8 in. of the facing material may be visible after finishing materials are applied. This 1/8 in. must be painted or the red will show.

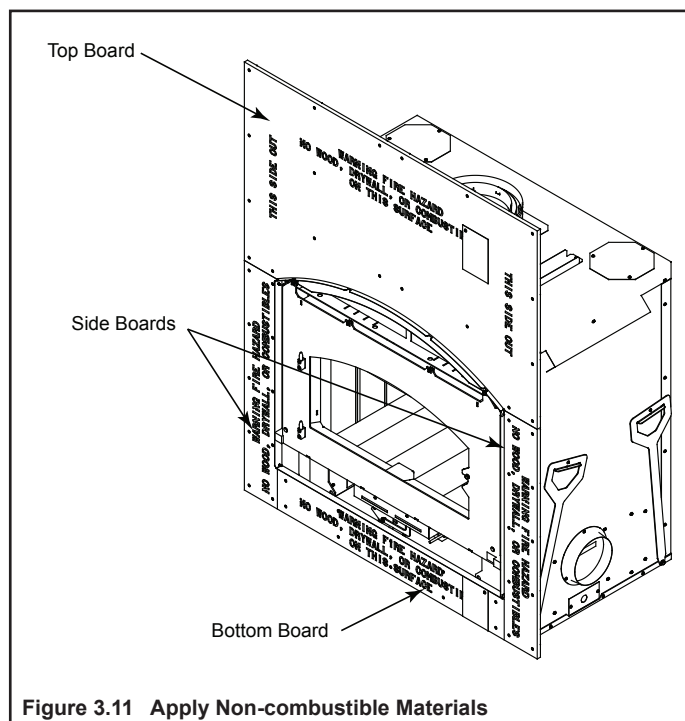


Figure 3.11 Apply Non-combustible Materials

## I. Outside Air Kit

An outside air kit must be used for combustion. Hearth & Home Technologies recommends you utilize the shortest duct run to optimize the performance of the outside air kit. The outside air inlet hood should be positioned in a manner that will not allow snow, leaves, etc. to block the inlet. In some installations the air duct may need to be run vertically. In such an installation, a 3 ft (914 mm) height difference must be maintained from the top of the uppermost chimney section to the outside air inlet hood.

Refer to Figures 3.18 and 3.19 when placing the outside air inlet hood.

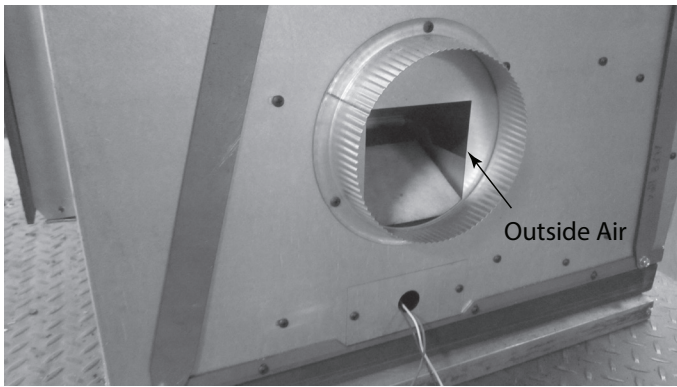
The outside air kit comes installed on the right hand side of the fireplace but may be moved to the other side by following these steps:

1. Remove outside air collar (Figure 3.12) and the outside air cover plate (Figure 3.13).
  2. Install the cover plate on the right side and the collar on the left side.
  3. Open and remove the lower access panel.
  4. Remove the two (2) outer screws (Figure 3.15) to allow the outside air box to be removed.
  5. Pull the outside air box straight out. See Figure 3.16.
  6. On the left side, remove the cover plate two (2) screws. See Figure 3.14.
  7. Install the cover plate on the right side where the outside air box was and install the outside air box in through the hole on the left side where the cover plate was.
- Cut a 6-1/2 in. (165 mm) hole in outside wall to accommodate air piping.
  - Use 6 in. (152 mm) metal flex or rigid piping (not supplied) to directly connect outside air to fireplace intake. Insulate the pipe to prevent frost condensation. See Figure 3.17.
  - Insulating the pipe isn't required but will help prevent frost condensation.
  - Use the supplied outside air inlet hood.
  - Seal between the wall and the pipe with silicone to prevent moisture penetration and air leaks.
  - Seal between the outside air inlet hood and the house with silicone to prevent air infiltration.

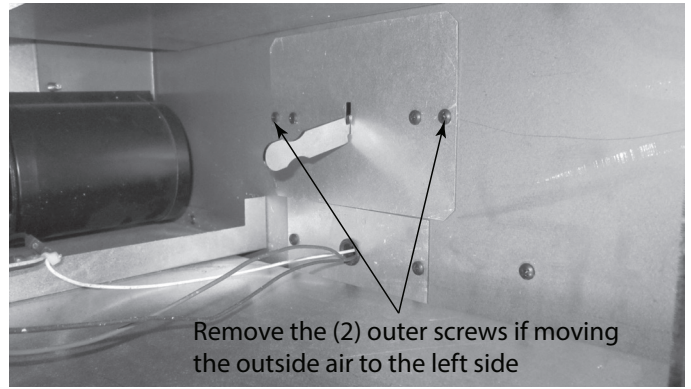
**CAUTION! Risk of Fire or Asphyxiation! DO NOT** draw outside combustion air from wall, floor or ceiling cavity, or enclosed spaces such as an attic or garage.

- **DO NOT** place outside air inlet hood close to exhaust vents or chimneys. Fumes or odor could be drawn into the room through the fireplace.
- Locate outside air inlet hood to prevent blockage from leaves, snow/ice, or other debris. Blockages could cause combustion air starvation.

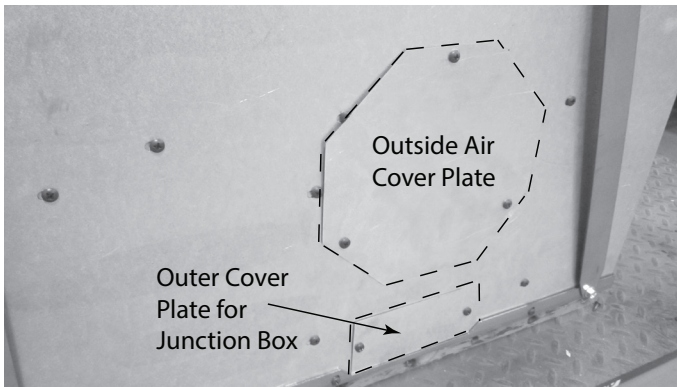
**CAUTION! Risk of Cuts/Abrasions.** Wear protective gloves and safety glasses during installation. Sheet metal edges are sharp.



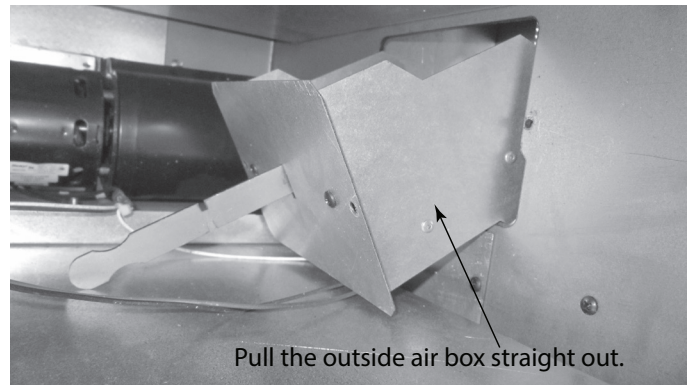
**Figure 3.12**



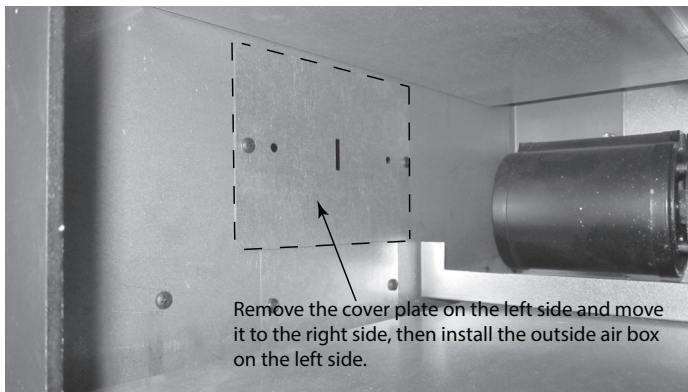
**Figure 3.15 Outside air handle shown on right side**



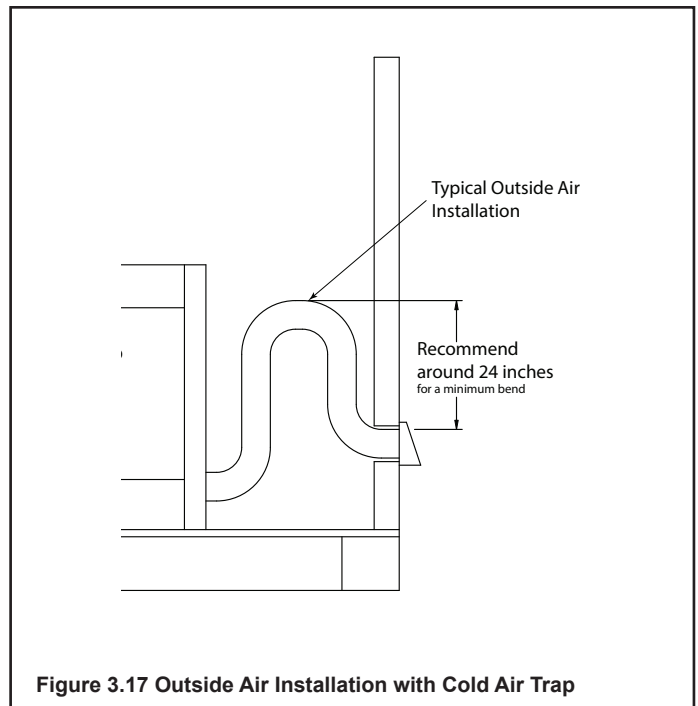
**Figure 3.13 Right Side**



**Figure 3.16 Outside Air Box**

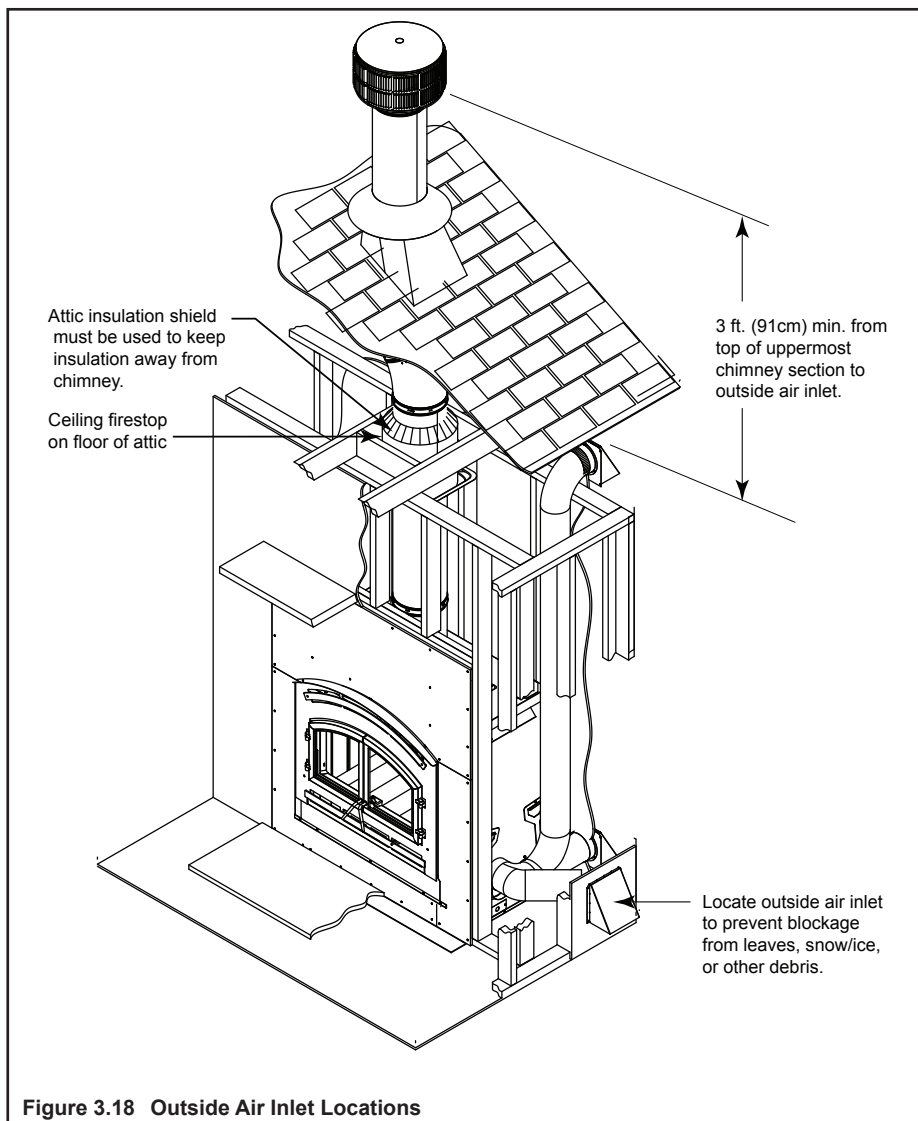


**Figure 3.14 Remove Cover Plate (Left Side)**

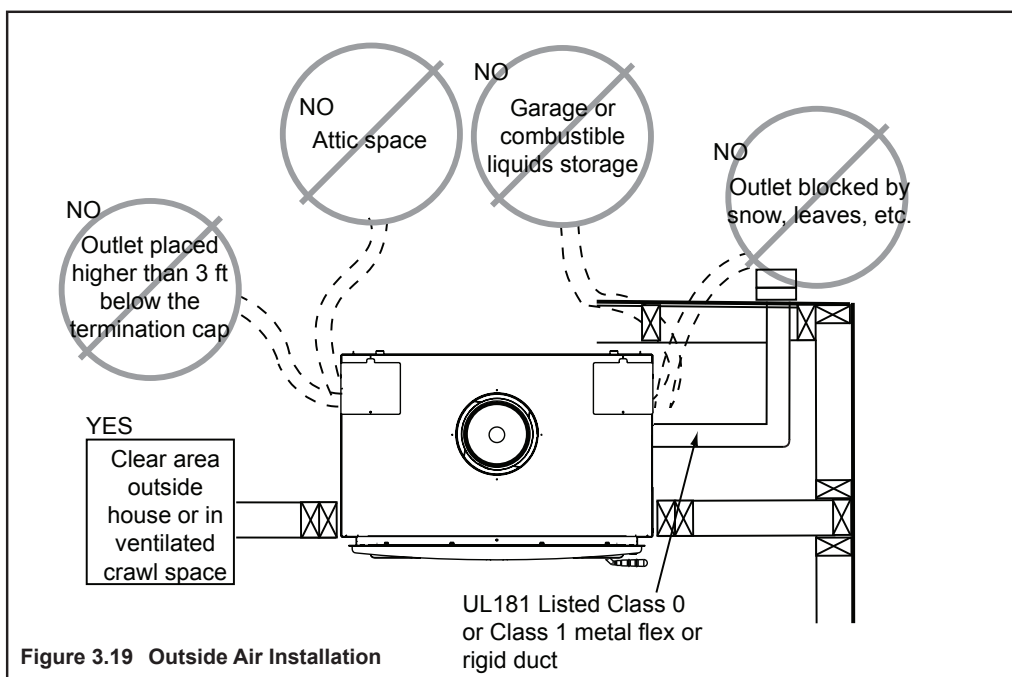


**Figure 3.17 Outside Air Installation with Cold Air Trap**





**Figure 3.18 Outside Air Inlet Locations**



**Figure 3.19 Outside Air Installation**

## J. Heat-Zone-WD Kit (Optional)

The Heat-Zone accessory kit conveys warm air from the fireplace through air duct(s) to remote locations in the same room or other rooms of the building. You may install 1 or 2 Heat-Zone kits on the fireplace. Installation of this kit **MUST** be performed by a qualified service technician. If any parts are missing or damaged, contact your local dealer before starting installation. DO NOT install a damaged kit.

This kit is tested and safe when installed in accordance with this installation manual. It is your responsibility to read all instructions before starting installation and to follow these instructions carefully during installations.

The Heat-Zone-WD kit is carefully engineered and must be installed only as specified. If you modify it or any of its components you will void the warranty and you may possibly cause a fire hazard. Installation must be done according to applicable local, state, provincial and/or national codes.

Plan the location of the fireplace and warm air duct run(s).

## DUCT RUN REQUIREMENTS

MAXIMUM Duct Run = 40-ft. (12 m)

MINIMUM Duct Run = 36 in. (914 mm)

## DUCTING MATERIAL

6 in. (152 mm) B-vent Only

DO NOT duct into existing furnace plenum

## MINIMUM CLEARANCE TO COMBUSTIBLES

1 in. (25 mm) from the B-vent

0 in. (0 mm) from top & bottom of outlet box

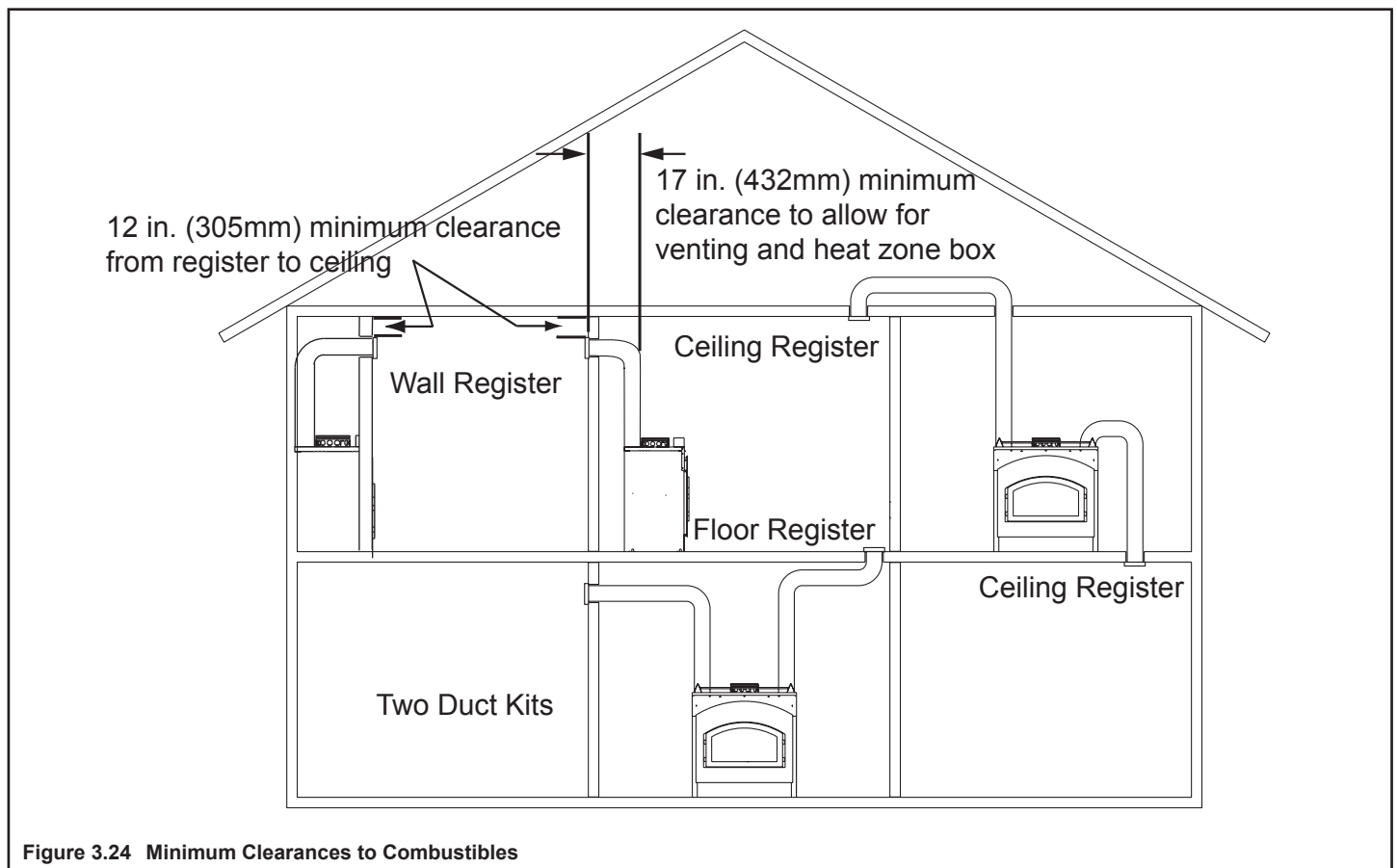
0 in. (0 mm) from the sides of outlet box

12 in. (305 mm) from wall register to ceiling

Refer to Figure 3.24.

**CAUTION!** ALL wiring should be done by a qualified electrician and shall be in compliance with local codes and with the National Electric Code NFPA/NEC No. 70-current. CSC22.1 Canadian Electric Code.

## Possible Air Duct Runs / Locations



## Installation

- Remove the knockout or cover plate from the top of the fireplace and discard it. See Figure 3.25.
- Cut a 3 in. (76 mm) hole in the insulation board and remove it as per the dimensions shown in Figure 3.25.

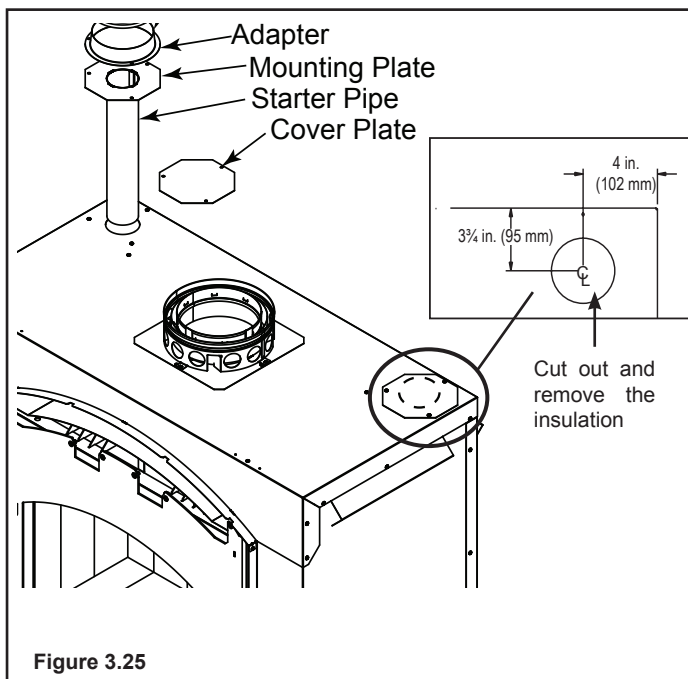


Figure 3.25

- Determine the necessary length of starter pipe from Table 3.1 and cut as required.

Table 3.1

Run Length	Cut Pipe Length
20 - 40 ft (6-12 m)	2 in. (51 mm)*
*A minimum of 2 in. (51 mm) pipe must be used to cover the raw insulation to prevent it from blowing out through the return air grille.	
10 - 20 ft (3 - 6 m)	8 in. (203 mm)
3 - 10 ft (1 - 3 m)	12 in. (305 mm)

**NOTE:** It is important the pipe length be adhered to or it will affect the performance of your fireplace.

- On the mounting plate, hand bend the tabs downward. Slide the tabs over the outside of the starter pipe. Secure with four sheet metal screws included in fasteners package. Figure 3.26.

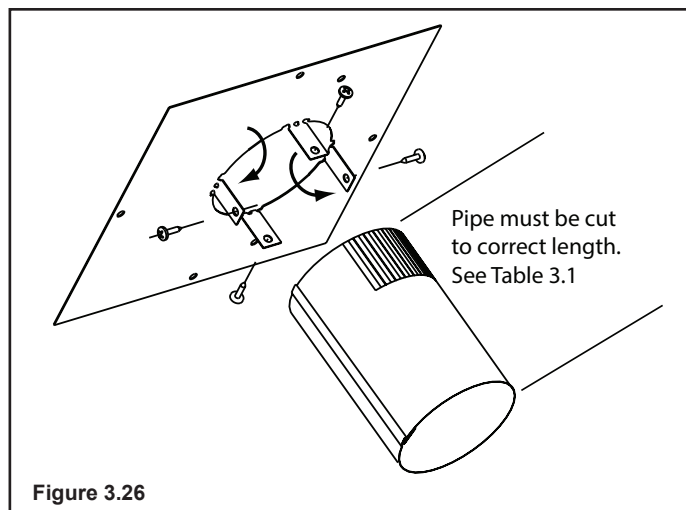


Figure 3.26

- Slide the starter pipe into the fireplace, matching the holes in the plate to the holes in the fireplace.
- Place the adapter on the mounting plate lining up holes. Using four sheet metal screws included in the kit, secure the adapter and mounting plate into fireplace. After securing to the fireplace, tape down the adapter edges to the top of the fireplace with aluminum tape to prevent leakage.
- Determine the location for the air register and fan housing assembly. Cut a 6-3/4 in. x 13-1/8 in. (171 mm x 333 mm) hole between framing members (wall studs or floor joists). Attach the brackets to the fan housing with the screws provided. The brackets can be rotated 180° and mounted to the back side of the 2 x 4 if necessary. See Figure 3.27.

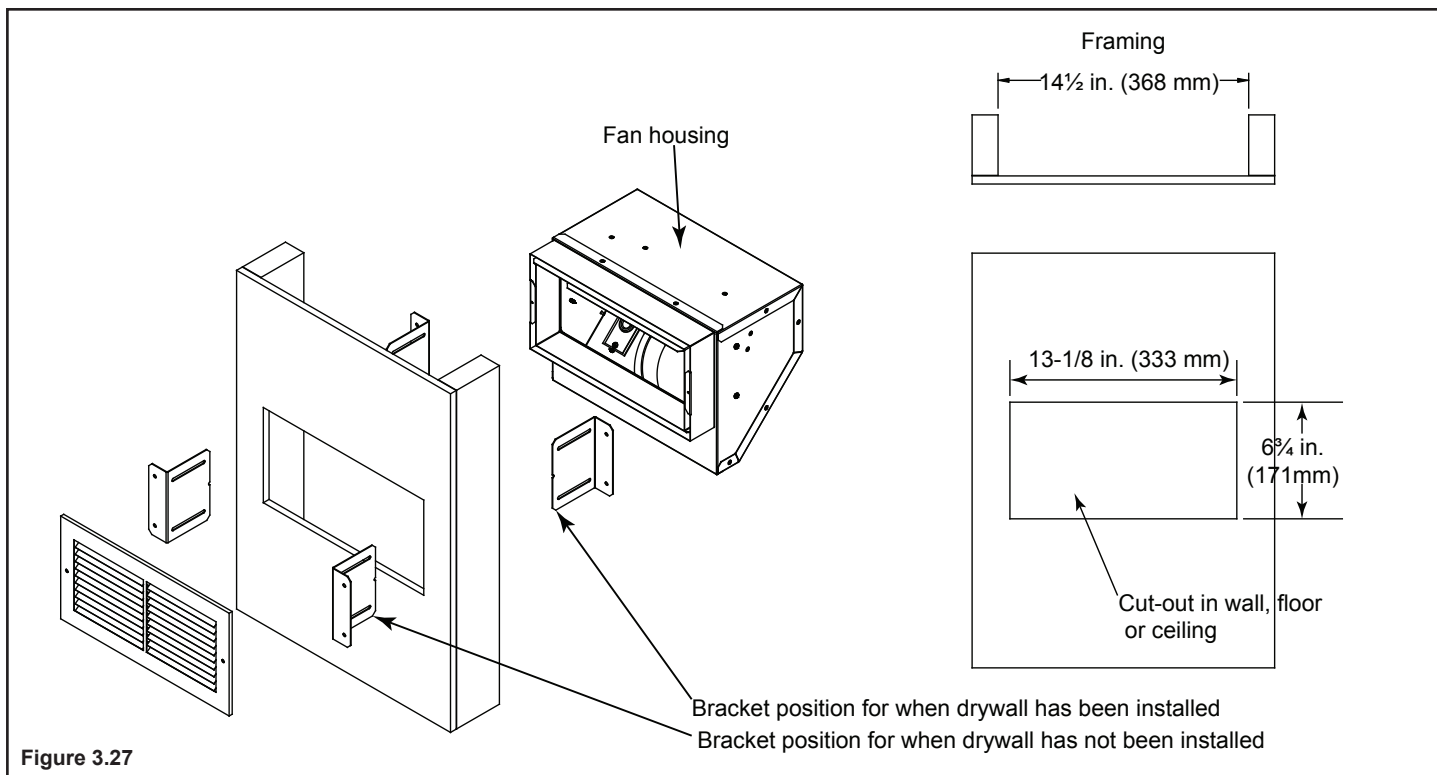
**NOTICE:** The fan and electrical connections must be accessible for servicing per local code requirements.

- Attach enough 6 in. (152 mm) B-Vent as required for your installation to the fan housing. **A maximum of (4) 90° elbows is recommended.** Screw the B-vent to the adapter.

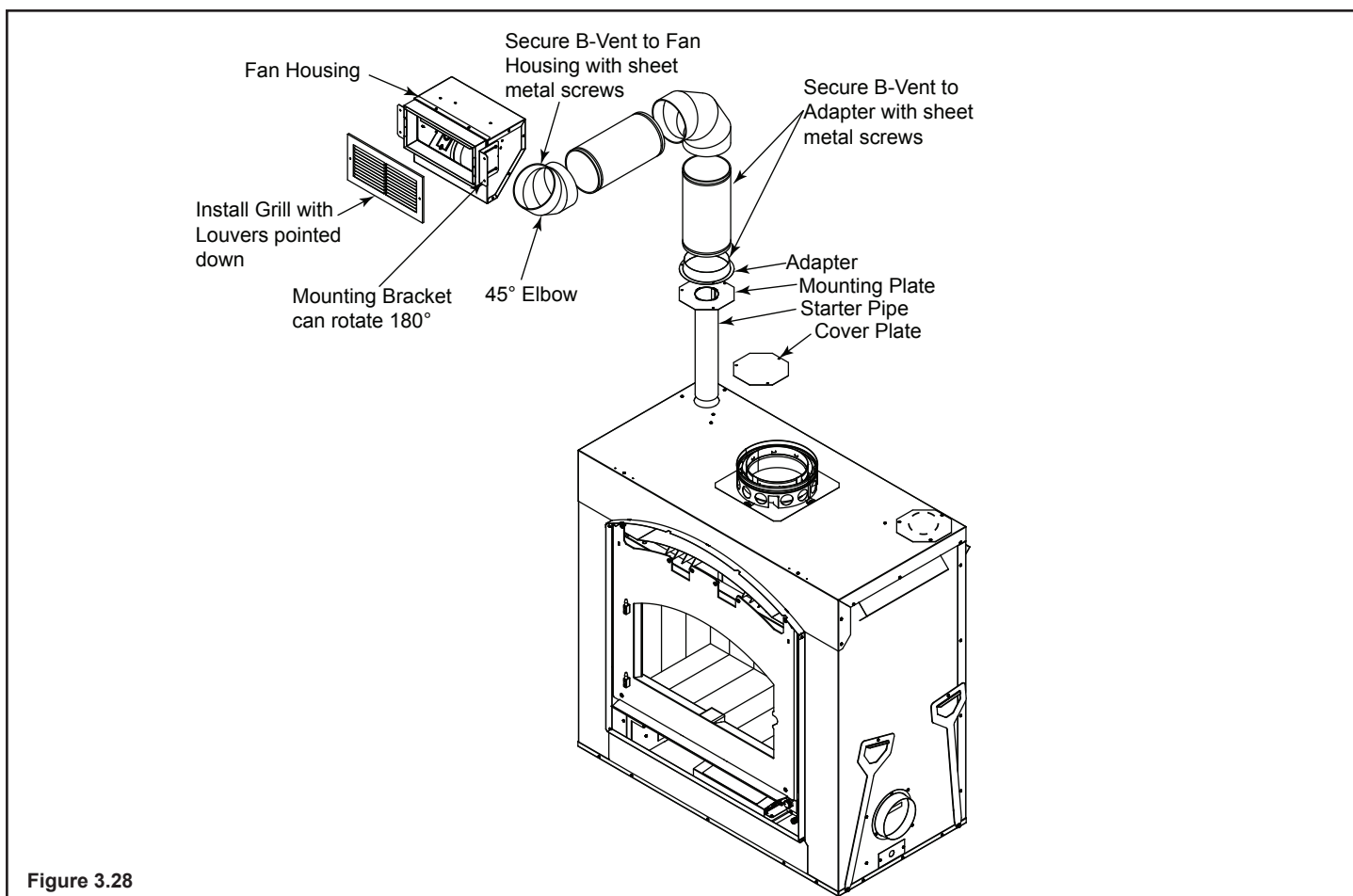
Also screw the B-vent to the outlet box on the fan housing. See Figure 3.26. Support duct at intervals of no greater than 4 ft (1 m) as required by local code.

**WARNING! Risk of Fire!** Comply with all minimum clearances specified.

- A minimum 1/2 in. (13 mm) air clearance must be maintained at the back and 1 in. (25 mm) to the sides of the fireplace assembly.



**NOTICE:** Secure the duct so that clearance to the fireplace outer wrap is maintained. Tape all seams with aluminum tape 1-1/4 in. (32 mm) minimum width or as specified by local codes.



## Installing Fan In Housing

- Insert fan into the fan housing starting with motor end first. Slip it below the "L" bracket on the left side allowing the right side to drop in. See Figure 3.29.

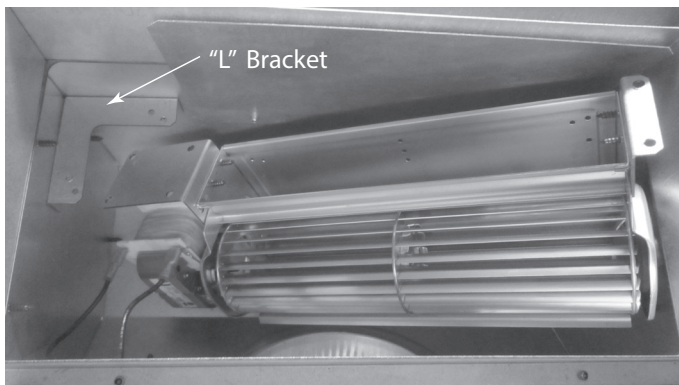


Figure 3.29

- Tilt the fan forward to clear the mounting brackets then lift the fan onto the brackets. See Figure 3.30.

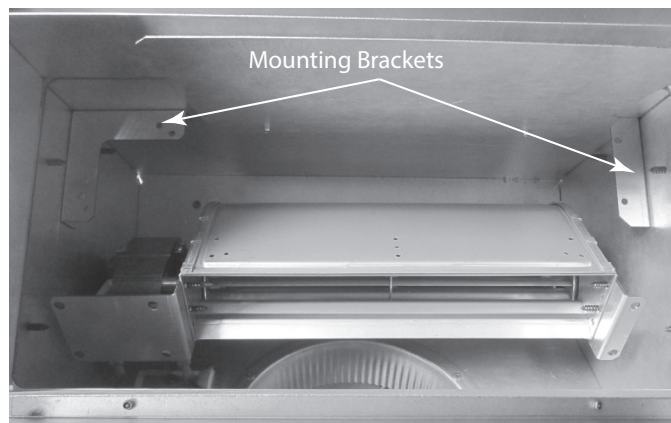


Figure 3.30

- Secure the fan to the mounting brackets with (4) screws provided. See Figure 3.31.

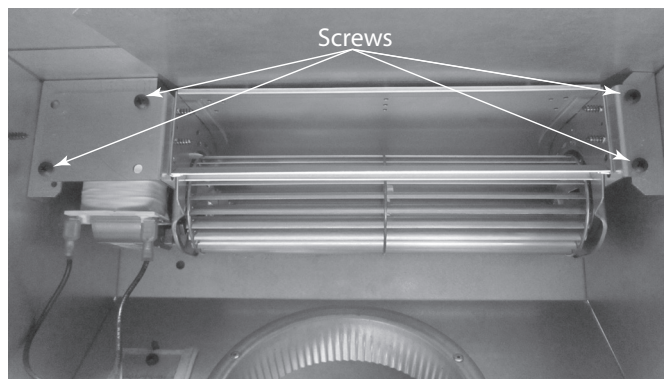


Figure 3.31

- Insert the fan wires through the grommet and into the junction box. See Figure 3.32.

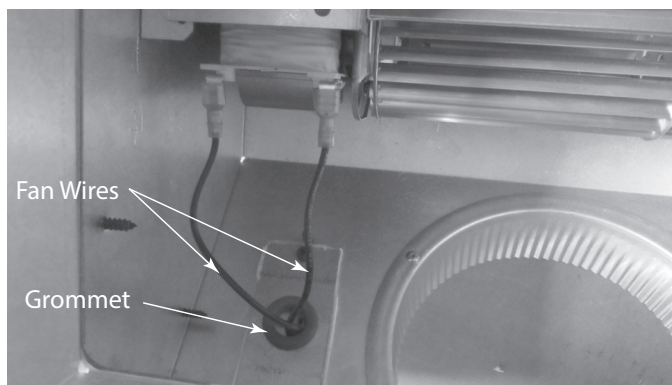


Figure 3.32

- Install the variable speed wall rheostat (with setting on "OFF") in a convenient location. This switch will control the Heat-Zone fan operation.
- Remove the junction box. Wire 110 VAC service TO the wall rheostat and FROM the wall rheostat to the fan junction box. Use wire nuts to secure the 110 VAC service wires to the hot (black) and neutral (white) fan wires and screw the 110 VAC ground wire to the junction box. See Figure 3.33.
- Secure the return air grille to the fan housing making sure it is flush. The grille must be installed with the louvers pointing down.

**NOTICE: DO NOT USE ADJUSTABLE REGISTERS.**

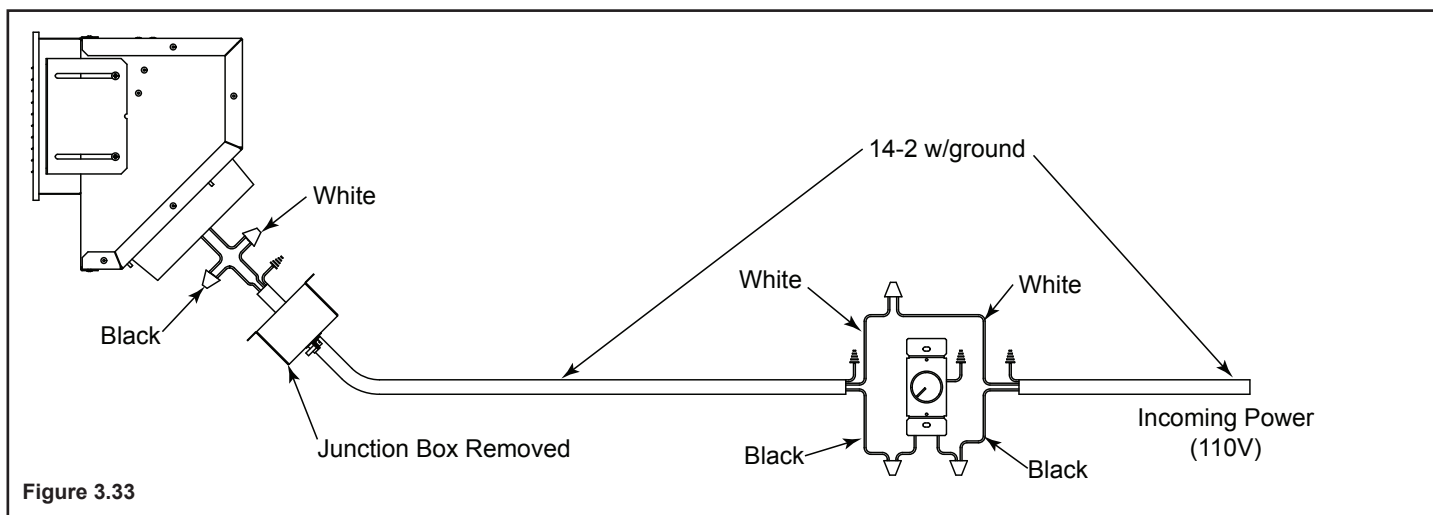


Figure 3.33



## 4 Electrical Wiring

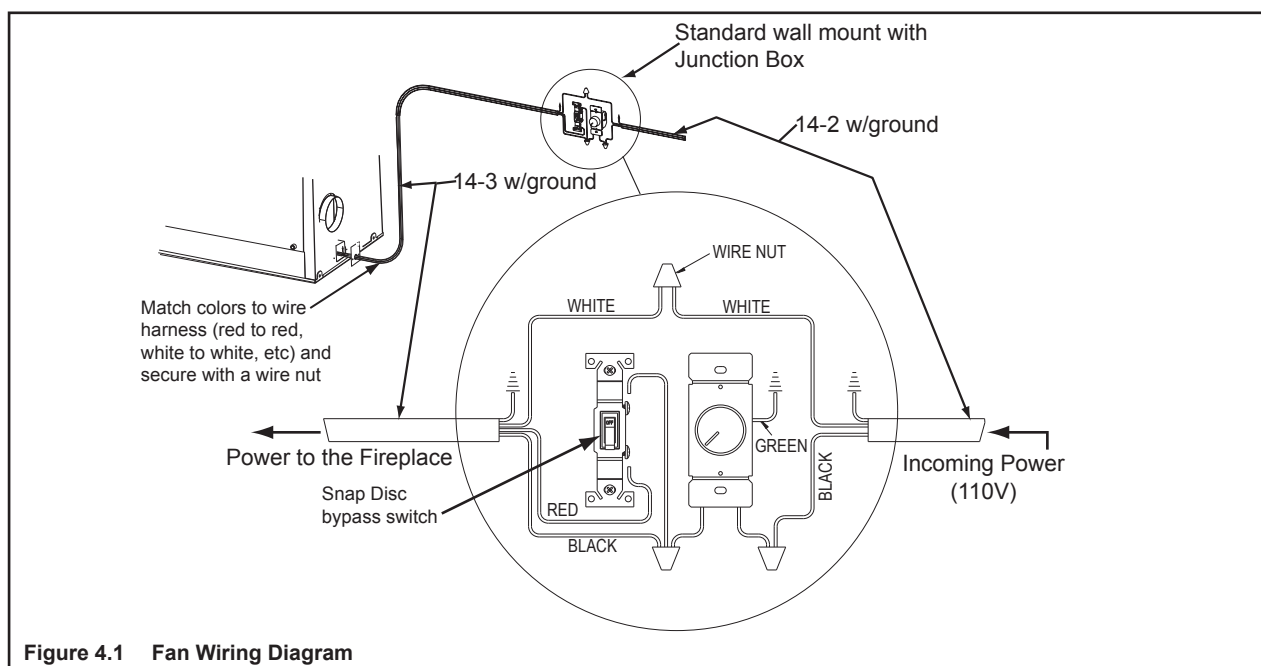
**NOTICE:** The manual override switch, rheostat speed control and cover plate are supplied. You will need to supply: 14-3 wire with ground; 14-2 wire with ground; standard wall mount junction box; wire nuts.

- Remove junction box cover plate on the bottom right side of the fireplace.
- Thread the 14-3 with ground wire through the opening with the strain relief on the cover plate.
- Match colors to wire harness, (red to red, white to white, etc.) and secure with wire nuts.

**NOTICE:** Wiring for fans must be done before framed enclosure is completed. If using a Heat Zone kit, it also must be installed before enclosure is complete.

**WARNING! Risk of Fire! DO NOT** apply combustible finishing materials over any part of the front of this fireplace.

- The metal fireplace face may only be covered with noncombustible materials such as ceramic tile, brick, or stone.
- Do not cover or block any cooling air slots.



# 5 Chimney and Termination Requirements

## A. Chimney Requirements

Vertical distances are measured from the base of the fireplace as shown in Figure 5.1.

**Table 5.1 Chimney Requirements**

Minimum overall straight height	13 ft	3.96 m
Minimum height with single offset/return	14.5 ft	4.42 m
Double offset/return minimum height	20 ft	6.1 m
Maximum height	90 ft	25.60 m
Maximum chimney length between an offset and return	20 ft	6.1 m
Maximum distance between chimney stabilizers	35 ft	10.67 m
Maximum unsupported chimney length between the offset and return	6 ft	1.83 m
Maximum unsupported chimney height above the fireplace	35 ft	10.67 m
Maximum unsupported chimney above roof	6 ft	1.83 m

**NOTICE:** A maximum of two pairs of offsets and returns may be used.

**WARNING! Risk of Fire!** You must maintain 2 in. (51 mm) air space clearance to insulation and other combustible materials around the chimney system. Failure to do so may cause overheating and fire.

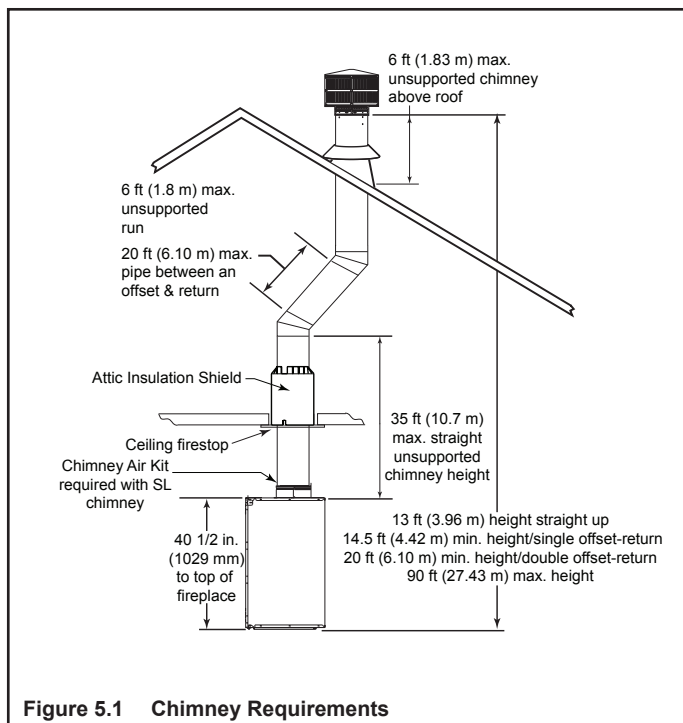
**NOTICE:** You must provide support for the pipe during construction and check to be sure inadvertent loading has not dislodged the chimney section from the fireplace or at any chimney joint.

**Table 5.2 Chimney Component Dimensions**

HEIGHT OF CHIMNEY COMPONENTS		in.	mm
<b>Chimney Stabilizer</b>			
	SL3	4-3/4	121
<b>Offsets/Returns</b>			
	SL315	13-3/8	340
	SL330	15-1/2	394
<b>Chimney Sections*</b>			
	SL306	4-3/4	121
	SL312	10-3/4	273
	SL318	16-3/4	425
	SL324	22-3/4	578
	SL336	34-3/4	883
	SL348	46-3/4	1187

\* Dimensions reflect effective height.

**Note:** 8 in. DuraPlus can also be used. See page 45.



**Figure 5.1 Chimney Requirements**

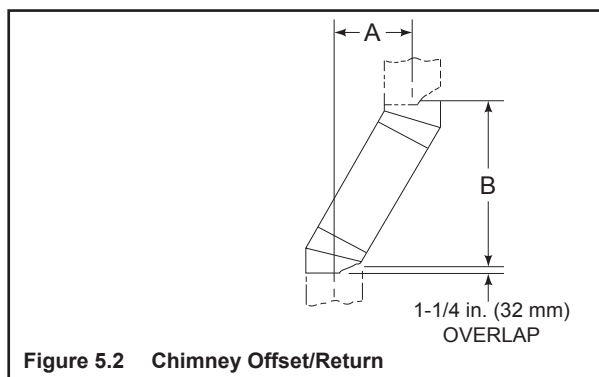
## B. Offsets/Returns

A 30° Elbow (measured from the vertical) is the largest that can be used in an offset. A 30° Elbow may not be combined with another Elbow to make a steeper offset (e.g. two 30° Elbows are not allowed to be put together to form a 60° elbow.). Avoid Elbows if possible. A totally vertical chimney is more efficient. When Elbows are necessary to avoid obstructions such as rafters, ridgepoles, or joists, you are only allowed to use 2 pair of Elbows in any one chimney system. Horizontal runs of chimney violate building code and are not allowed.

- An offset and return can be used as a single entity or separated by chimney section(s).

**WARNING! Risk of Fire! DO NOT** use offset/returns greater than 30° from vertical. Chimney draft will be restricted and could cause overheating and fire.

- Measure the shift needed to avoid the overhead obstruction. Refer to dimension A in Figure 5.2.
- Find the appropriate A dimension listed in Table 5.3. The B dimension coinciding with the A dimension measurement in Table 5.3 represents the required vertical clearance needed to complete the offset/return.
- Read across the chart to find the number of chimney sections/model numbers needed between the offset and return.



### Example:

Your "A" dimension from Figure 5.2 is 14-1/2 in. (368 mm). Using Table 5.3 the dimension closest to, but not less than 14-1/2 in. (368 mm) is 14-1/2 in. (368 mm) using a 30° offset/return.

You determine from the table that you need 34-1/8 in. (867 mm) (Dimension "B") between the offset and return.

The chimney component that best fits your application is one SL324.

**Table 5.3 Offset Dimensions**

15-degree				30-degree				SL306	SL312	SL318	SL324	SL336	SL348
A		B		A		B							
in.	mm	in.	mm	in.	mm	in.	mm						
1 5/8	41	13 3/8	340	3 5/8	92	15 1/2	394	-	-	-	-	-	-
2 7/8	73	17 3/4	451	5 1/2	140	18 5/8	473	1	-	-	-	-	-
4 1/8	102	22 3/8	568	7 1/4	184	21 3/4	552	2	-	-	-	-	-
4 1/2	114	23 5/8	600	8 1/2	216	23 3/4	603	-	1	-	-	-	-
5 3/4	146	28 1/4	718	10 1/4	260	27	686	1	1	-	-	-	-
6	152	29 3/8	746	11 1/2	292	29	737	-	-	1	-	-	-
7 1/4	184	34	864	13 1/4	337	32 1/8	816	-	2	-	-	-	-
7 3/4	197	36 1/8	918	14 1/2	368	34 1/8	867	-	-	-	1	-	-
8 3/4	222	39 3/4	1010	16 1/4	413	37 3/8	949	1	-	-	1	-	-
10 3/8	264	45 5/8	1159	19 1/4	489	42 1/2	1080	-	-	2	-	-	-
10 5/8	270	46 3/4	1187	20 1/2	521	44 5/8	1133	-	-	-	-	1	-
11 7/8	302	51 3/8	1305	22 1/4	565	47 3/4	1213	1	-	-	-	1	-
13 1/2	243	57 1/4	1454	25 1/4	641	52 7/8	1343	-	-	-	2	-	-
13 3/4	349	58 3/8	1483	26 1/2	673	55	1397	-	-	-	-	-	1
15	381	63	1600	28 1/4	718	58 1/8	1476	1	-	-	-	-	1
16 1/2	419	68 3/4	1746	31 1/4	794	63 1/4	1607	-	1	-	-	-	1
18	457	74 5/8	1895	34 1/4	870	68 1/2	1740	-	-	1	-	-	1
19 5/8	498	80 3/8	2042	37 1/4	946	73 3/4	1873	-	-	-	1	-	1
20 5/8	524	84 1/8	2137	39 1/8	994	76 7/8	1953	1	-	-	1	-	1
22 3/4	578	91 7/8	2334	43 1/4	1099	84 1/8	2137	-	-	-	-	1	1
24	610	96 1/2	2451	45 1/8	1146	87 1/4	2216	1	-	-	-	1	1
25 7/8	657	103 1/2	2629	49 1/4	1251	94 1/2	2400	-	-	-	-	-	2

Proper assembly of air-cooled chimney parts result in an overlap at chimney joints of 1-1/4 in. (32 mm). Effective length is built into this chart.

## C. Termination Requirements

- Install a cap approved and listed for this fireplace system.
- Locate cap where it will not become plugged by snow or other materials.
- Locate cap away from trees or other structures.
- The bottom of the termination cap must be at least 3 ft (.91 m) above the roof AND at least 2 ft (.61 m) above any portion of roof within 10 ft (3.05 m) as shown in Figure 5.3.
- The distance required between caps is shown in Figure 5.3.

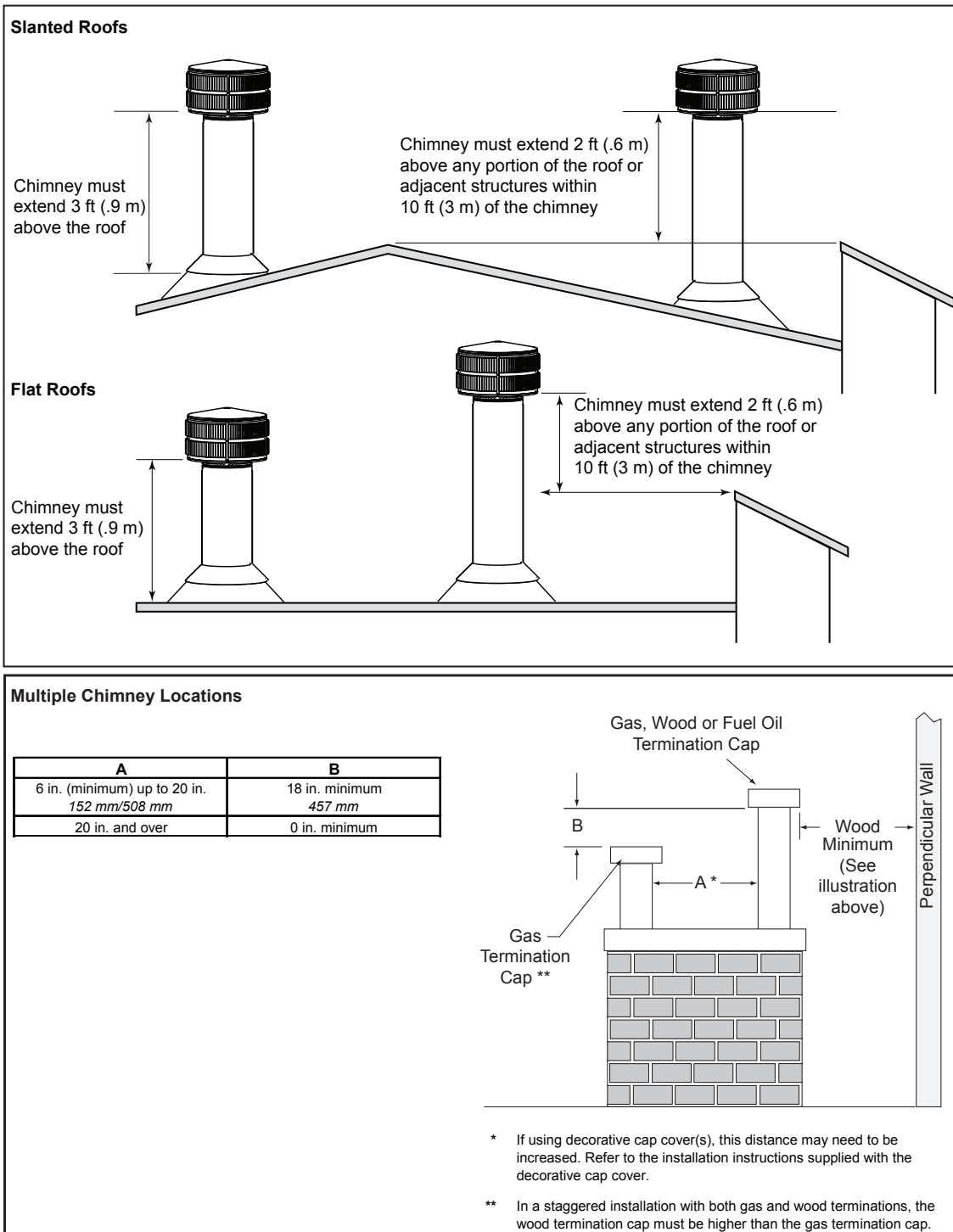


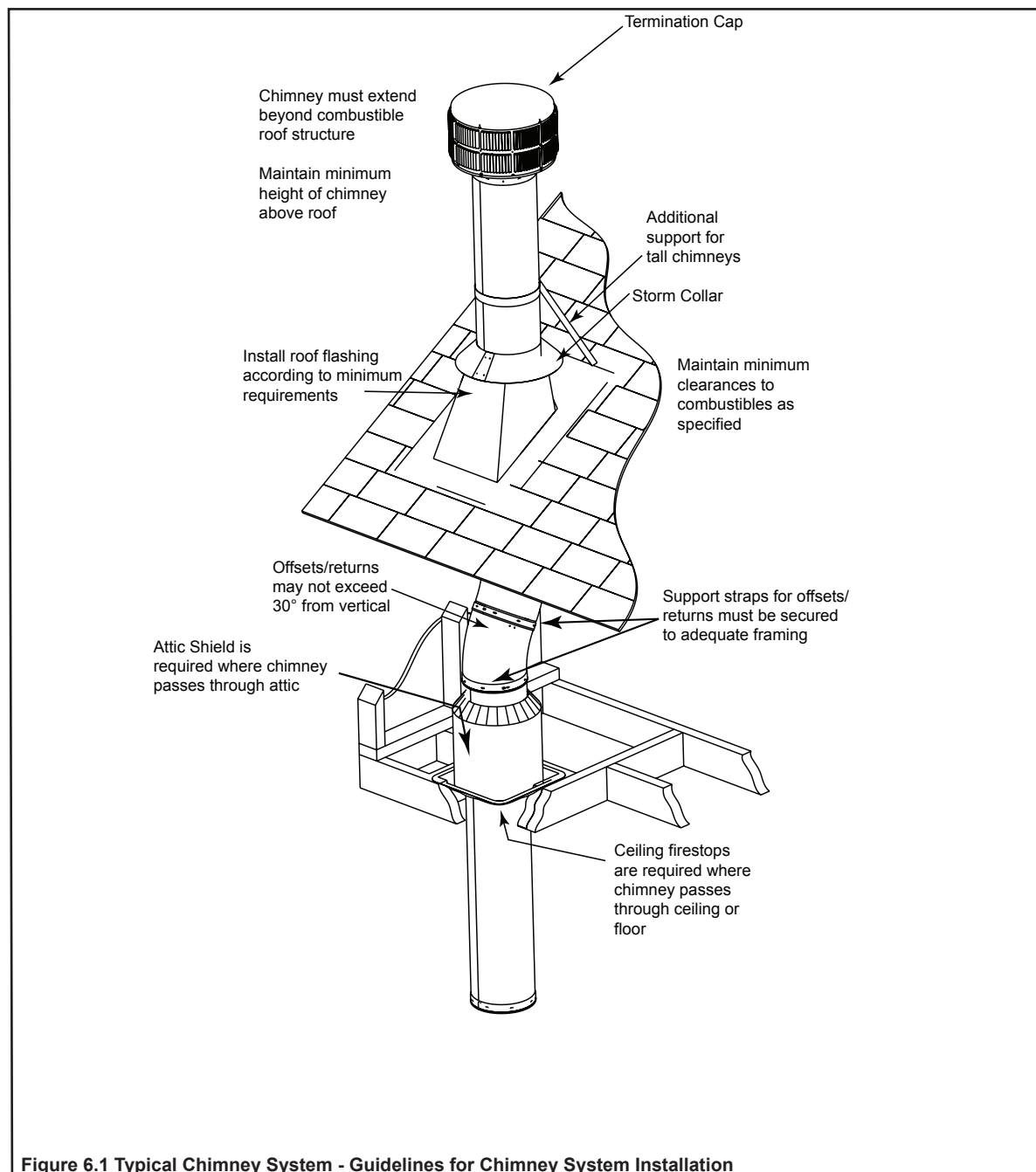
Figure 5.3 Multiple Chimney Locations

# 6 Chimney Installation

## A. Typical Chimney System

**NOTICE:** Chimney performance may vary.

- Trees, buildings, roof lines and wind conditions affect performance.
- Chimney height may need adjustment if smoking or overdraft occurs.



The SL300 series chimney (UL127 approved for use with this fireplace) is shipped with wrap around warning labels installed. These labels may be removed from the sections of chimney exposed above the roofline.

## B. Assemble Chimney Sections

**WARNING! Risk of Fire! DO NOT** install substitute or damaged chimney components.

Use only those components described in this manual.

Attach either a straight chimney section or an offset to the top of the fireplace starting with the inner flue followed by the outer casing. Continue this order until termination cap is reached (depending on your installation requirement). Chimney sections are locked together by pushing downward until the top section meets the stop bead on the lower section.

The inner flue is placed to the inside of the flue section below it. The outer casing is placed outside the outer casing of the chimney section below it. See Figure 6.2.

**NOTICE:** Chimney sections cannot be disassembled once locked together. Plan ahead!

- Lock chimney sections and/or offsets/returns together by pushing downward until the top section meets the stop bead on the lower section.
- Pull on the top of each section as installed to make sure it is fully engaged and will not separate.
- You may use #6 or #8 sheet metal screws no longer than 1/2 in. (13 mm) to fasten chimney outer sections together. Do NOT penetrate inner flue.
- Vertical straight runs of chimney must be supported every 35 ft (10.7 m).

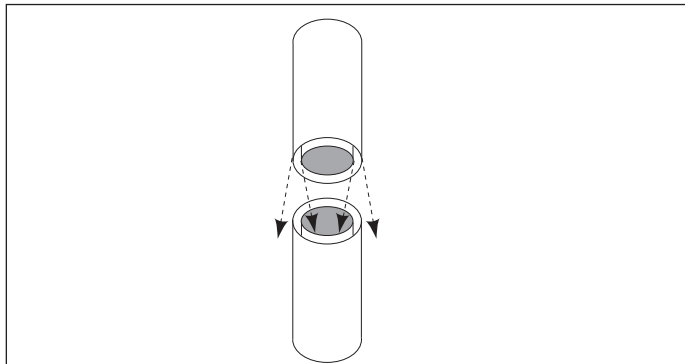


Figure 6.2 Assembling Chimney Sections

**WARNING! Risk of Fire! DO NOT** install substitute or damaged chimney components.

## C. Install Chimney Air kit (CAK4A)

**NOTICE:** Chimney Air Kit, Part CAK4A is required when using the SL-300 Pipe Series. Detailed instructions are supplied with the kit. If using the Dura-Plus System (must be 8 in./203 mm in diameter), the starter ring that came with the fireplace must be removed and replaced with the Dura-Plus Base Plate. The CAK4A is not required with a Dura-Plus System.

- Install the chimney pipe first.
- Hand bend the tabs in position before placing on the fireplace.

- Place the box on top of the fireplace around the chimney pipe, push both pieces together and secure with screws provided.
- Use the pre-punched holes in the tabs as guides and drill holes through the fireplace top.
- Secure the CAK4A in place. See Figure 6.3.
- Seal around the kit at the flue and at the top of the outer shell with high temp caulk with a minimum rating of 500 degrees. See Figure 6.3.

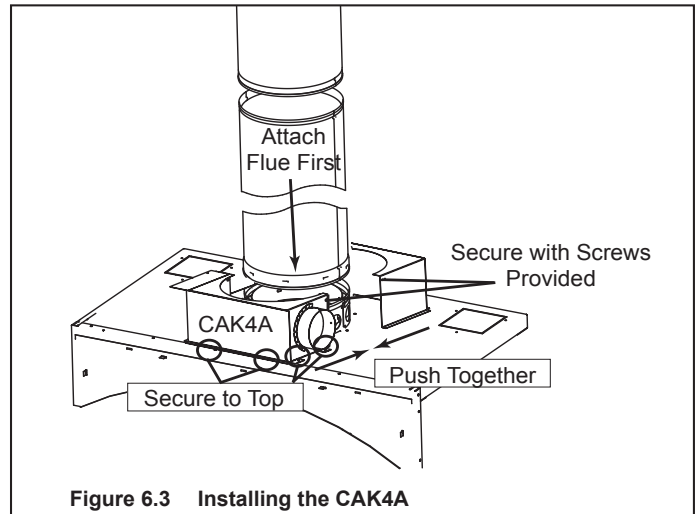


Figure 6.3 Installing the CAK4A

### NOTES:

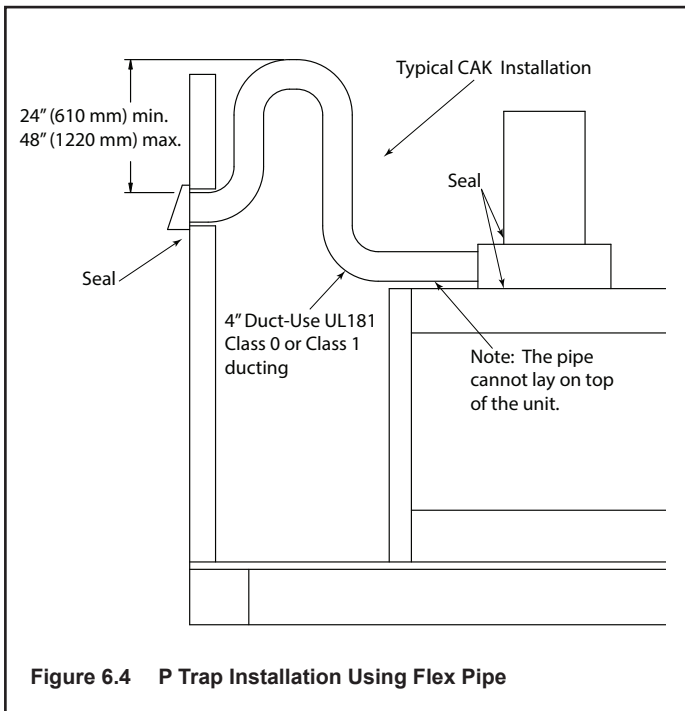
- The CAK4A termination cap must be a minimum of 4 ft (1219 mm) above the ground and kept free of debris.
- If the CAK4A is installed in a chase, the CAK4A side termination cap must be at least 3 ft (914 mm) below the chimney top.
- Seal around the cap and flex with caulk to stop air from getting into the chase. See Figure 6.4.
- The pipe cannot lay on top of the unit.

### **WARNING! Risk of Fire!**

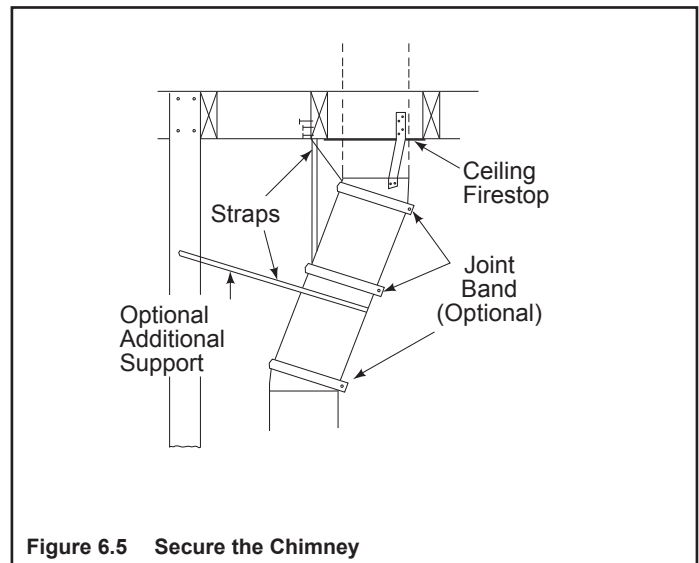
- *The flex pipe must never be compressed or deformed!*
- *Restricting the airflow inside the flex pipe may increase flue pipe temperatures causing a chase fire.*

### **P Traps**

When using the chimney air kit (CAK) and the outside air kits, it is recommended that you install a P trap as shown in Figure 6.4 by bending the flex duct, or using 90° elbows if using rigid duct to help prevent air circulation when the fireplace is not in use. In colder climates, it is strongly recommended to use an insulated duct.



**Figure 6.4 P Trap Installation Using Flex Pipe**



**Figure 6.5 Secure the Chimney**

## **D. Secure Offset/Return**

### **WARNING! Risk of Fire!**

- *Secure offsets with screws (not to exceed 1/2 in./13 mm in length).*
- *Secure returns with strapping.*
- *Straight chimney sections may be secured with screw (not to exceed 1/2 in./13 mm in length) at the joints.*
- *Keep chimney sections from separating or twisting.*

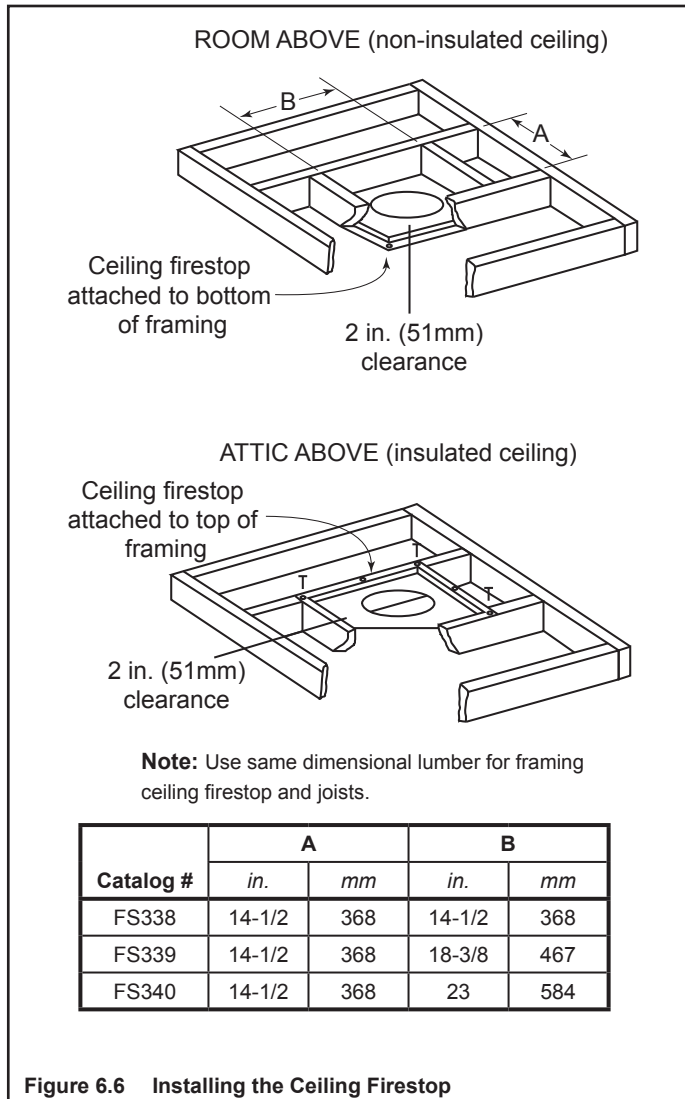
When offsets and returns are joined to straight pipe sections, they must be locked into position with screws (outer only). To prevent gravity from pulling the chimney sections apart, the returns and the chimney stabilizers have hanger straps for securing these parts to joists or rafters. See Figure 6.5.

- \* Use # 6 or # 8 sheet metal screw, or larger, no longer than 1/2 in. (13 mm).

## E. Install Firestops

**WARNING! Risk of Fire!** Firestops must be used whenever the chimney penetrates a ceiling/floor.

- Mark and cut an opening in ceiling/floor as shown in Figure 6.6.
- Frame the opening with the same size lumber used in the ceiling joists.
- Nail the firestop to the bottom of the ceiling/floor joists.
- Provide a means to maintain the required air space between the chimney and insulation or install an attic insulation shield.



**WARNING! Risk of Fire! DO NOT** seal area between firestop opening and chimney pipe except where they enter the attic or leave the warm air envelope of the home (use 600° F sealant).



## F. Install Attic Insulation Shield

**WARNING! Risk of Fire!** You **MUST** install an attic insulation shield when there is any possibility of insulation or other combustible material coming into contact with the chimney.

- **DO NOT** pack insulation between the chimney and the attic insulation shield.
- Failure to keep insulation and other materials away from chimney pipe could cause fire.
- **DO NOT** offset chimney inside insulation shield.
- Combustible material may come in contact with the attic insulation shield as long as the required clearances are maintained to the chimney pipe.

Installation of a ceiling firestop is required:

- Refer to Figures 6.6, 6.7, 6.8 and 6.9.
- If the attic shield is pre-rolled continue. If it is a flat part, try and roll it up to aid in wrapping it around the chimney.
- Pre-bend all the tabs in at the top to 45°.
- Wrap the shield (around the chimney if already installed) until you have an overlap and the three holes on each side match up (large holes on top).
- Insert three screws into the matching holes to form a tube starting at the bottom.
- Bend the tabs on the bottom of the tube inward to 90° to maintain chimney air space.
- Rest the insulation shield on the ceiling firestop below.
- Tape off any opening around the bottom.

If you wish to make a custom shield or barrier, follow these guidelines:

- Metal is preferred, although any material stiff enough to hold back the insulation can be used.

**WARNING! Risk of Fire!** Use of cardboard or other materials that can deflect under humidity or other environmental conditions is not recommended.

- The shield or barrier must be tall enough to extend above the insulation and prevent blown-in insulation from spilling into the cavity.
- Maintain specified air spaces around chimney.
- Check instructions and local codes for further details.

### Double-check the Chimney Assembly

Continue assembling the chimney sections up through the ceiling firestops as needed. While doing so, be aware of the height and unsupported chimney length limitations given under Section 5.

Check each section by pulling up slightly from the top to ensure proper engagement before installing the succeeding sections. If they have been connected correctly, they will not disengage when tested.

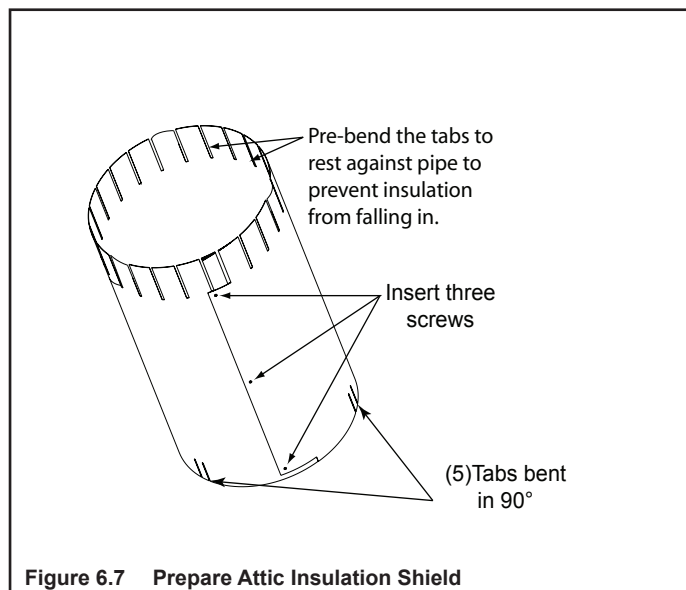


Figure 6.7 Prepare Attic Insulation Shield

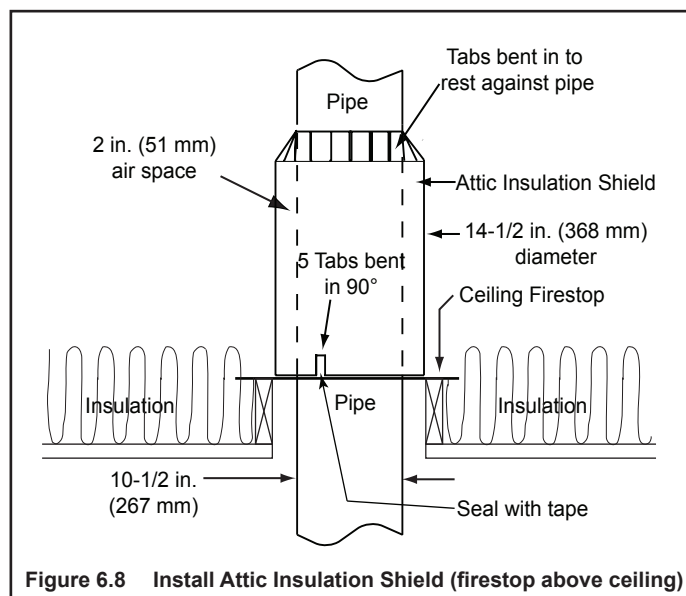


Figure 6.8 Install Attic Insulation Shield (firestop above ceiling)

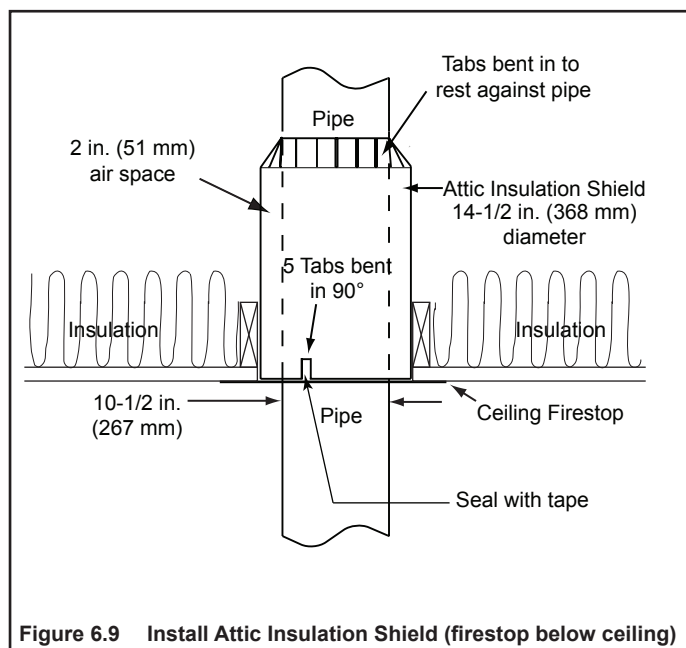


Figure 6.9 Install Attic Insulation Shield (firestop below ceiling)

## G. Roof Penetration

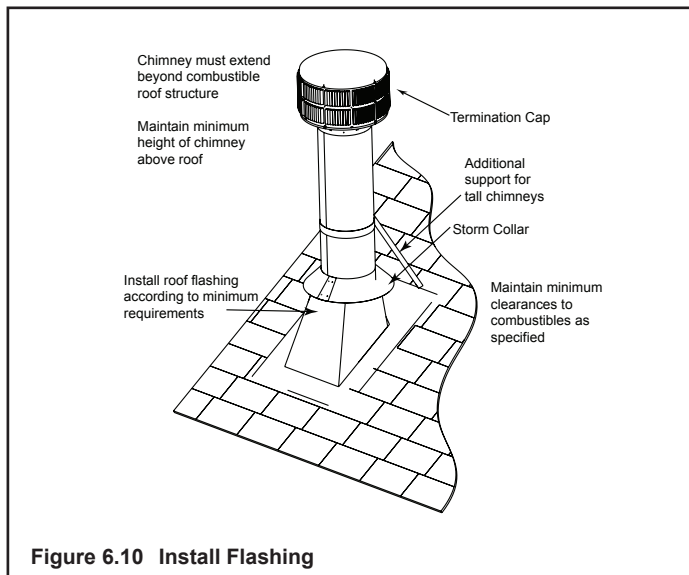
- Refer to Figure 6.10.
- Plumb from roof to center of chimney.
- Drive a nail up through roof to mark center of pipe.
- Measure to either side of nail and mark the 14-1/2 in. x 14-1/2 in. (368 mm x 368 mm) opening required.
- Measure opening on the horizontal; actual length may be larger depending on roof pitch.
- Cut out and frame opening.

### Install Flashing

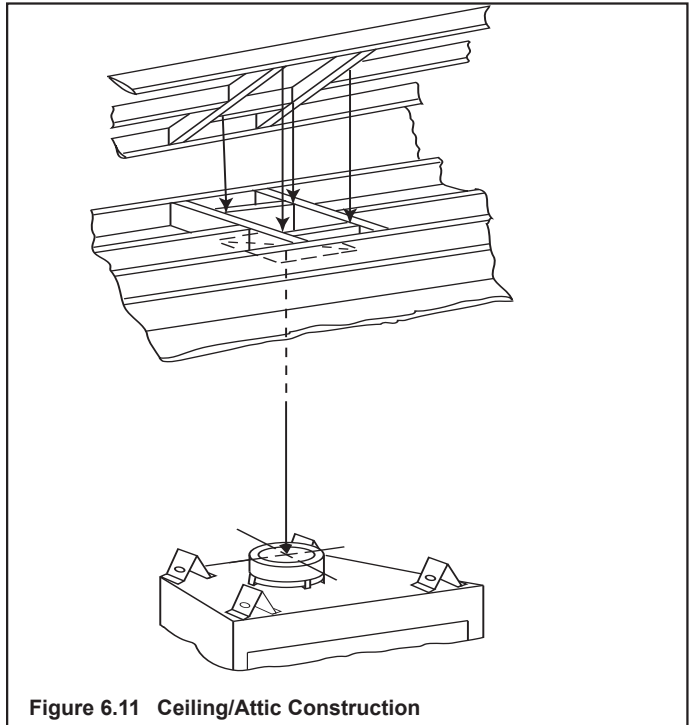
- Assemble chimney so it passes through the framed opening.
- Slip the flashing over the chimney.

**NOTICE:** Roofing shingles must be below the flashing plate on the lower side of a sloped roof and over the flashing plate on the sides and top.

- Nail the flashing to the roof. Keep gaps between the flashing plate and the roof to a minimum.
- Caulk the flashing plate and roof junction as well as the vertical seam on the flashing. All nail heads must be caulked with a roofing sealant.
- Caulk the overlap seam of any exposed pipe sections that are located above the roof line to prevent leaks.



- The thimble must extend completely through the roof structure shielding combustible materials. Five location holes have been provided to allow for a variety of ceiling/roof thicknesses. A thimble extension is required when the ceiling/roof thickness exceeds 12-1/2 in. (318 mm). The extension should overlap the thimble one inch.
- To attach the extension to the thimble, drill 1/8 in. (3 mm) holes through the outer shield of the thimble using the predrilled holes in the extension as guides. Attach the extension to the thimble using the screws provided with the extension.
- Install the thimble assembly and nail it securely to the framing members.



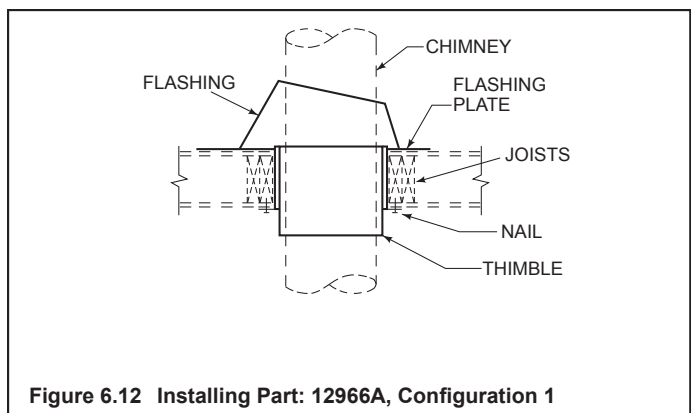
- Center the flashing over the chimney and nail it to the roof. Keep gaps between the flashing plate and the roof to a minimum. Caulk the flashing plate and roof junction as well as the vertical seam on the flashing. All nail heads must be caulked with a roofing sealant.
- Finish assembling the chimney storm collar and termination cap following the installation instructions provided with them.

## H. Manufactured Home Installation

### SL-300 Series Ceiling/Roof Thimble

**NOTICE: REQUIRED** for manufactured homes.

- Locate the point where the chimney will exit the roof by plumbing down to the center of the chimney. Lay out, cut and frame a 14-1/2 in. (368 mm) square opening (measured on the horizontal) through the ceiling and roof structure. **Consult local codes for framing details.**



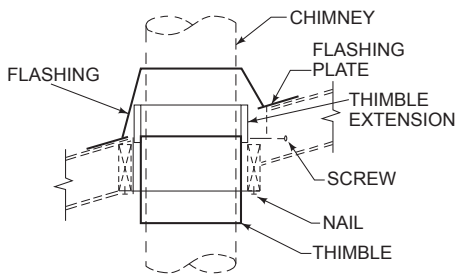


Figure 6.13 Installing Part 12966A, Configuration 2

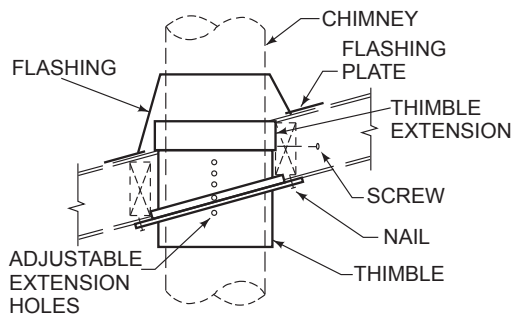


Figure 6.14 Installing Part 12966A Configuration 3

## I. Install Chase/Chase Top

- You **MUST** use a chase top in a chase installation. Chase tops are available from your Heat & Glo dealer or may be field constructed.
- Include a turn-down and drip edge to prevent water from seeping into the chase.
- Include a 2 in. (51 mm) soldered, welded or spun collar around pipe opening to keep water out.
- Provide a 1/8 in. (3 mm) gap around the flue pipe.
- Slope the chase top downward away from the opening.

**WARNING! Risk of Fire! DO NOT** caulk the pipe to the chase top collar.

- Caulk all seams to prevent leaks.

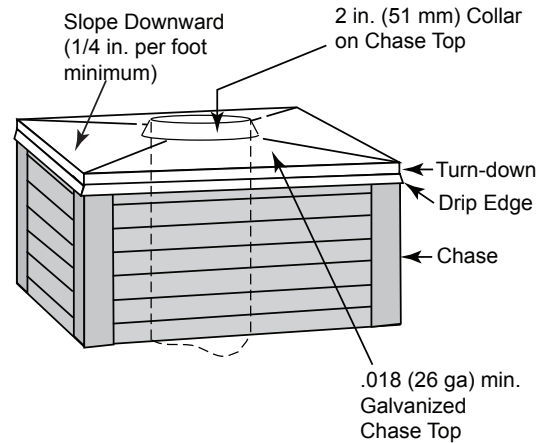


Figure 6.15 Chase Top Construction

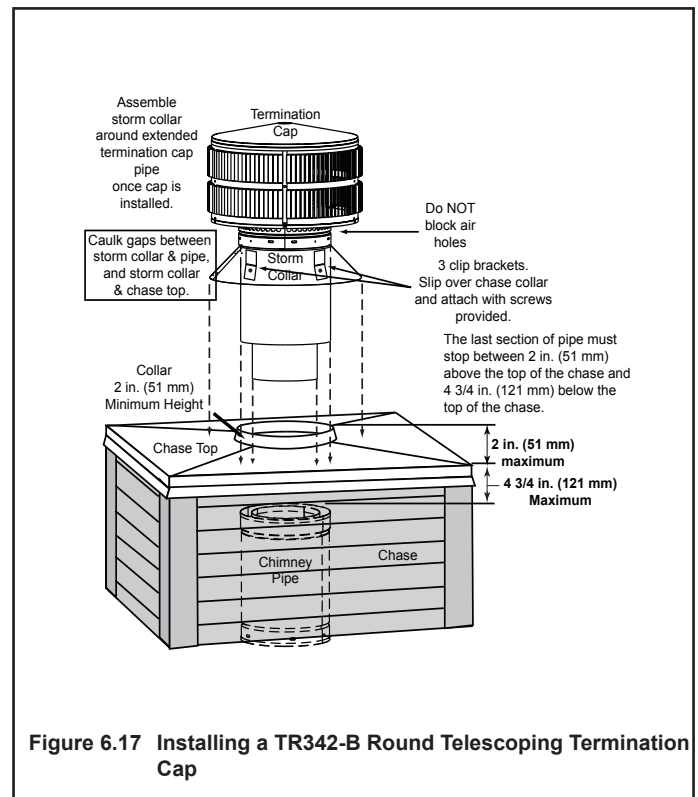
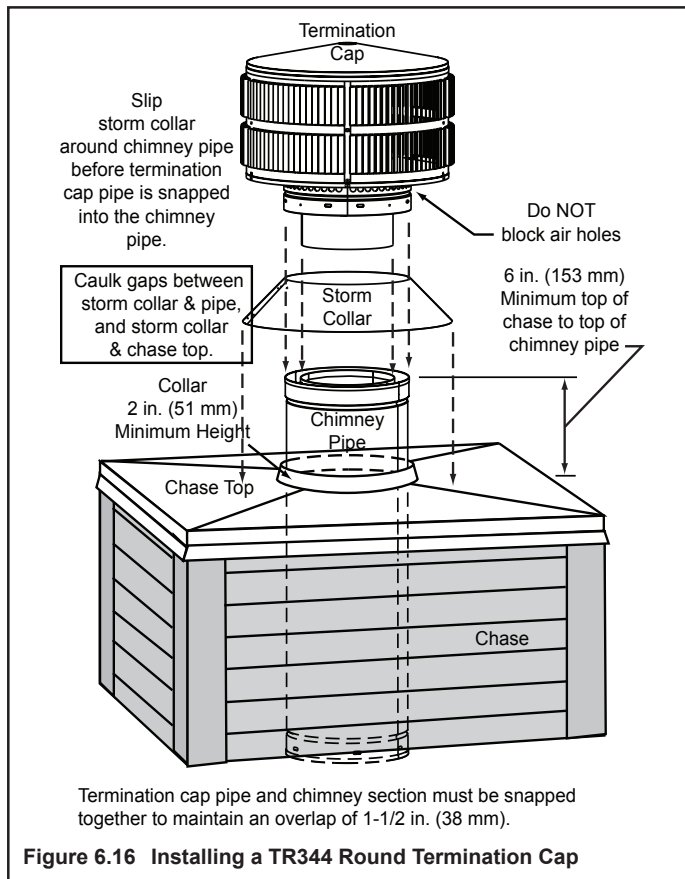
## J. Install Termination Cap

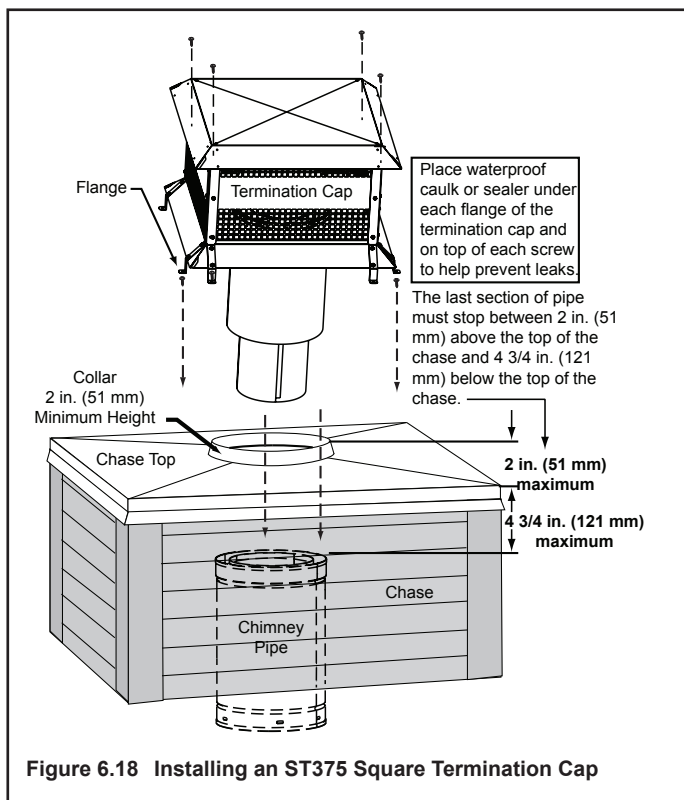
Install the chimney sections up through the chase enclosure.

- Caulk the overlap seam of any exposed pipe sections that are located above the roof line to prevent leaks.
- Refer to termination cap instructions.

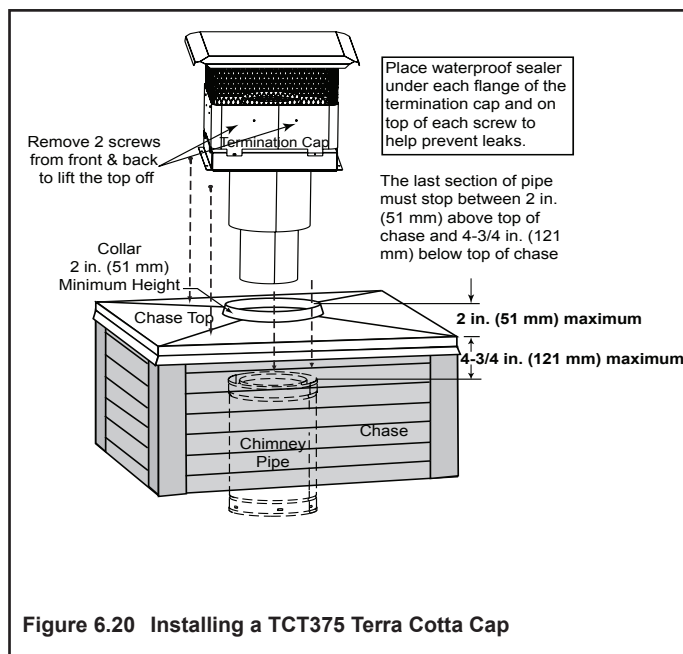
**WARNING! Risk of Fire!** The minimum overlap of cap to pipe (as shown in the following illustrations) **MUST** be met or chimney may separate from cap. Separation allows sparks, heat and embers to escape.

**NOTICE:** Paint the termination cap with a rust-resistant paint to protect against the effects of corrosion on those parts exposed to the weather.

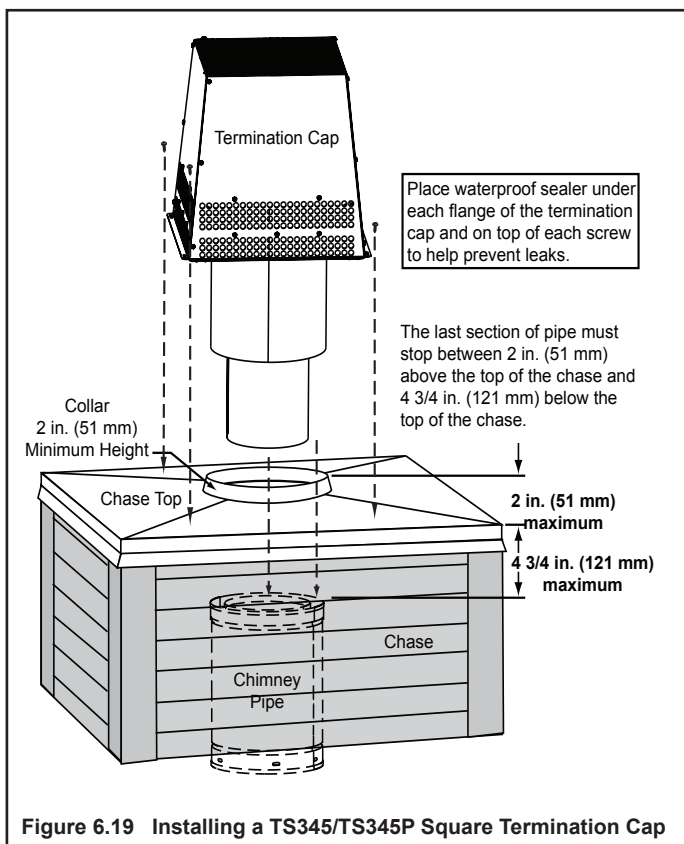




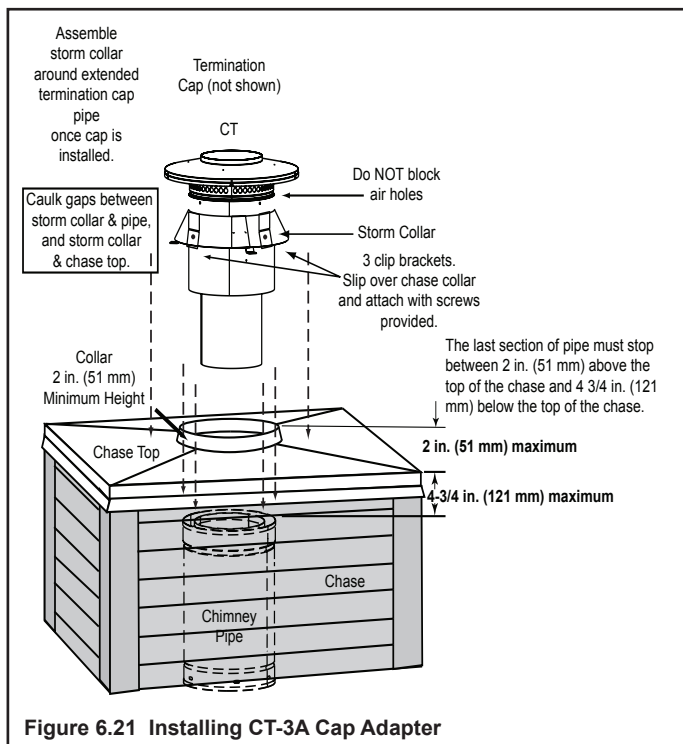
**Figure 6.18 Installing an ST375 Square Termination Cap**



**Figure 6.20 Installing a TCT375 Terra Cotta Cap**



**Figure 6.19 Installing a TS345/TS345P Square Termination Cap**



**Figure 6.21 Installing CT-3A Cap Adapter**

# 7 Finishing

## A. Template

A cardboard template of the front is printed on the outside of the shipping box. Cut out the template along the outside of the line for use in your installation. If using the cardboard template, it will require 1/4-20 bolts to attach it to the fireplace, (NOT INCLUDED). A metal template (see catalog) is available for more durable continued use, remaining accurate over time. Both measure 1/8 in. (3 mm) larger all the way around than the actual front.

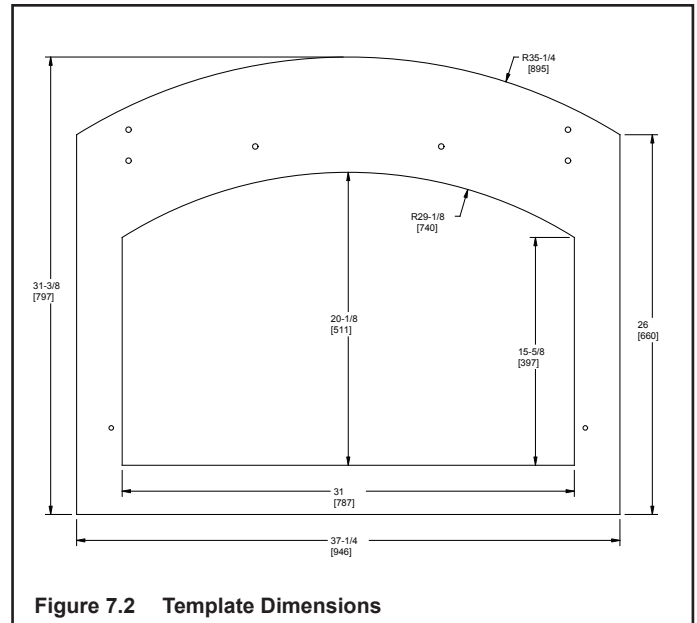
Note: This 1/8 in. of the non-combustible material must be painted or the red will be visible.

**Tools Required:** 5/32 in. Allen wrench.

- Remove the screws from the fascia and remove fascia from the fireplace (if installed). Save the screws. Store the fascia in a safe, protected area to prevent scratching or other damage.
- Install the template on the front of the fireplace (Figure 7.1) with screws removed or provided.

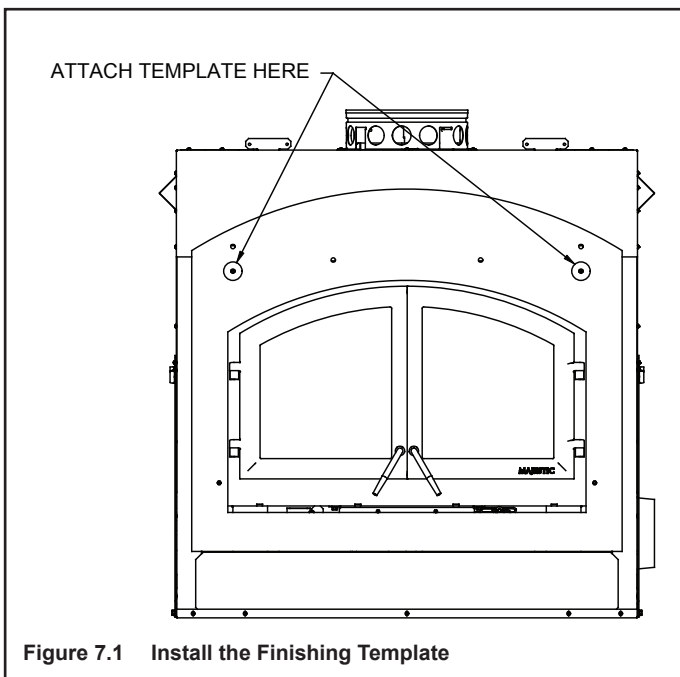
NOTE: Do not over tighten the screws, just tighten up the template enough so that it comes in contact with the outer flanges on the front of the fireplace.

You are now ready to continue your installation with the desired decorative material. The template also serves as a protective covering and prevents damage to the front of the fireplace.



**Note: DO NOT** remove hang tags until installing finish materials.

**NOTE:** The decorative fascia must be removable for future serviceability.





## B. Finish the Wall

Use a wet or dry towel or a soft brush to remove any dust or dirt from the non-combustible facing material.

Apply a non-combustible adhesive to attach tile, stone or other non-combustible finishing materials per manufacturer's instructions.

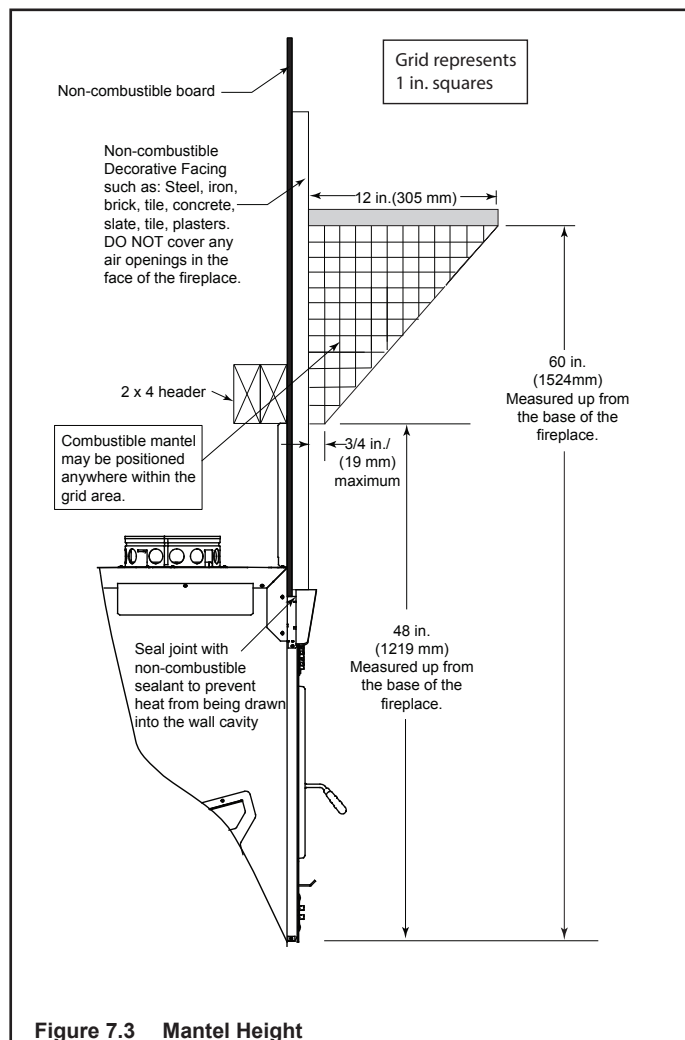
### 1. Stone, Brick Finish

**WARNING! Risk of Fire! DO NOT** apply tar paper or water resistive barrier over non-combustible board.

- Apply metal lath to the 1/2 in. thick non-combustible board with corrosion resistant self-tapping screws capable of penetrating the metal surface behind the non-combustible board.
- HHT recommends using type N or type S mortar. Due to high temperatures, review polymer modifiers specification sheet before using.

### 2. Tile, Granite, Marble Finish

- Due to high temperatures, HHT recommends using unmodified thinset when applying tile.
- When applying granite or marble, HHT recommends using thinset to adhere. If using a different adhesive, review specification sheet for application in high temperature areas.



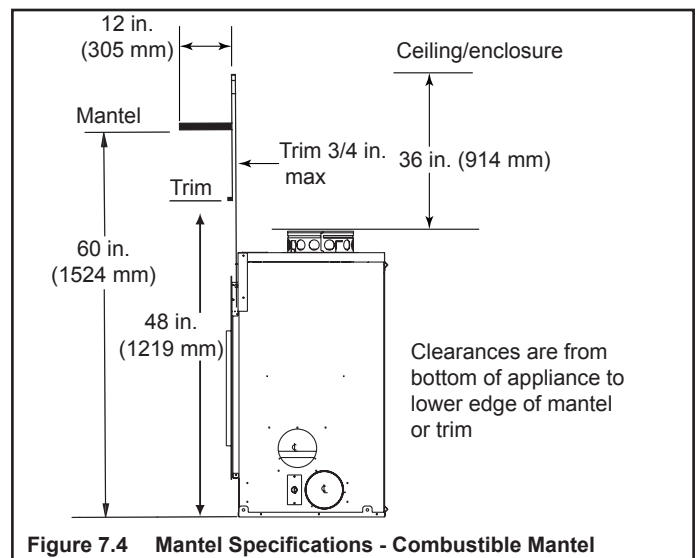
## C. Mantel and Wall Projections

A combustible mantel may be positioned no lower than 60 in. (1524 mm) at 12 in. (305 mm) deep from the base of the fireplace.

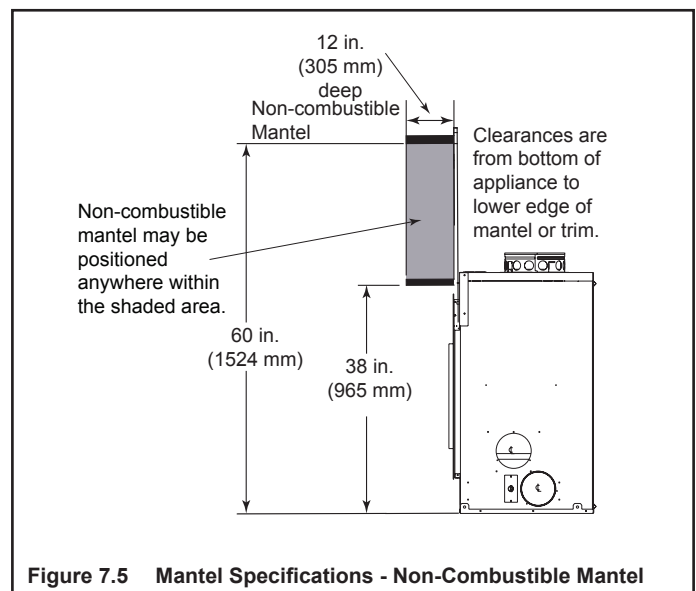
Minimum clearance faceplate to sidewall is 16 in.

The combustible mantel may have a maximum depth of 12 in. (305 mm). Combustible trim pieces that project no more than 3/4 in. (19 mm) from the face of the fireplace can be placed no closer than 6 in. (152 mm) from the side of the decorative front. Surround legs that project more than 3/4 in. (19 mm) must be 16 in. (406 mm) away from the side of the decorative front. Combustible trim must not cover:

- the metal surfaces of the fireplace
- where the non-combustible board is placed over the metal surfaces
- the space between the metal face of the fireplace and framing members



A noncombustible mantel may be positioned no lower than 38 in. (965 mm) from the base of the fireplace.





## D. Finishing the Hearth Extension

**WARNING! Risk of Fire!** High temperatures, sparks, embers or other burning material falling from the fireplace may ignite flooring or concealed combustible surfaces.

- Protective metal hearth strips **MUST** be installed.
- Hearth extensions **MUST** be installed exactly as specified.

A hearth extension must be installed with all fireplaces to protect the combustible floor in front of the fireplace from both radiant heat and sparks.

- You **MUST** use a hearth extension with this fireplace.
- Refer to Figure 7.6 for minimum dimensions.
- This fireplace has been tested and approved for use with a hearth extension insulated to a minimum R value of 1.03.
- The hearth extension material **MUST** be covered with tile, stone or other non-combustible material.
- Manufactured hearth materials will usually have a published **R value** (resistance to heat) or **k value** (conductivity of heat). Refer to the formula in Table 7.1 to convert a k value to an R value,
- Refer to Table 7.2 for hearth extension insulation alternatives.

**Table 7.1**

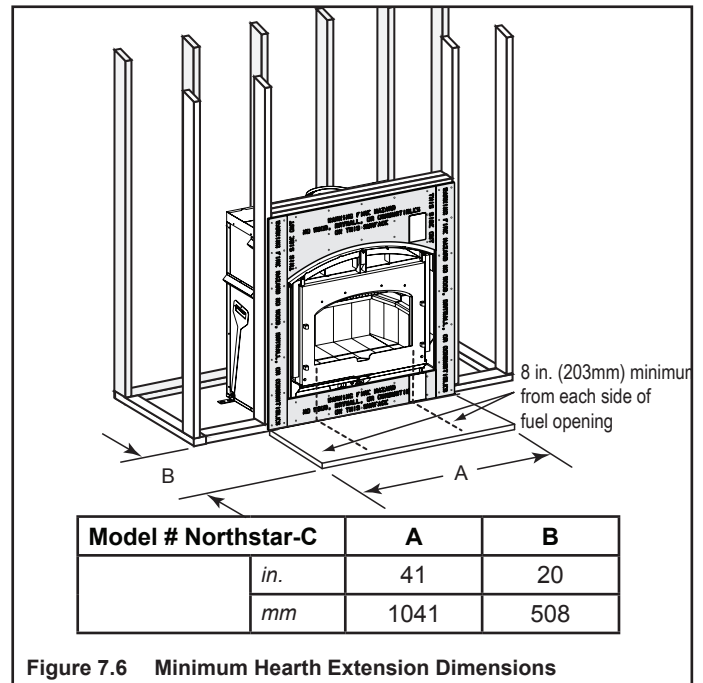
$$R = 1/k \times \text{inches of thickness}$$

**Table 7.2**

Hearth Extension Insulation Alternatives, R Value = 1.03			
Material	k per inch thick	r per inch thick	Minimum thickness required
Hearth & Home HX3, HX4	0.49	2.06	1/2 in.
USG Micore 300™	0.49	2.06	1/2 in.
USG Durock™ Cement Board	1.92	0.52	2 in.
Cement Mortar	5.0	0.20	5 1/8 in.
Common Brick	5.0	0.20	5 1/8 in.
Ceramic Tile	12.50	0.08	12 1/4 in.
Armstrong™ Privacy Guard Plus	0.46	2.18	1 in.
Marble	14.3-20.0	0.07-0.05	14 5/8 in. - 20 3/8 in.

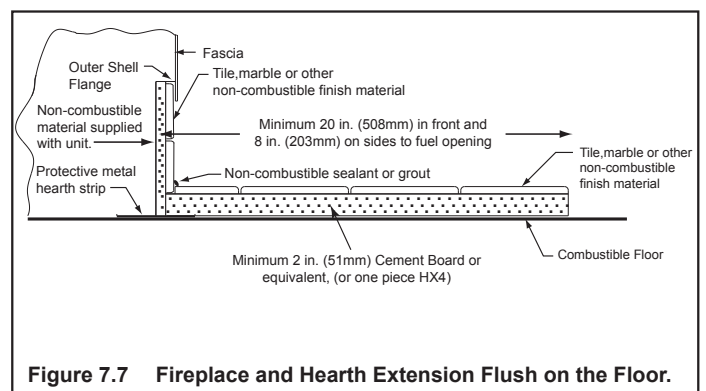
### WARNING! Risk of Fire!

You must comply with all minimum air space clearances to combustibles as specified. Framing or finishing material used on the front of, or in front of, the fireplace closer than the minimums listed must be constructed entirely of non-combustible materials (i.e., steel studs, concrete board, etc.). Failure to comply may cause fire.



**Figure 7.6 Minimum Hearth Extension Dimensions**

- Fireplace and Hearth Extension flush on the floor  
Non-combustible flooring a minimum of 20 in. (508 mm) in front of and 8 in. (203 mm) to either side of the fuel opening is required as shown in Figure 7.6.  
The construction of, and materials used for a hearth extension are shown in Figure 7.7. A hearth extension of this construction may be covered with any non-combustible decorative material and may have a minimum thickness as per Figure 7.7. Seal gaps between the hearth extension and the front of the fireplace with a bead of non-combustible sealant or grout.



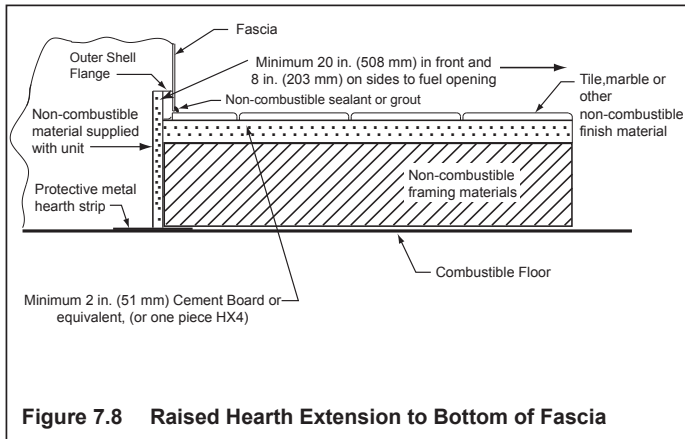
**Figure 7.7 Fireplace and Hearth Extension Flush on the Floor.**

- Fireplace installed flush on the floor and hearth extension raised to bottom of fascia:  
Non-combustible flooring a minimum of 20 in. (508 mm) in front of and 8 in. (203 mm) to either side of the fuel opening is required (see Figure 7.6).

- **Raised Hearth Extension Framing**

The hearth framing must be constructed of non-combustible materials (such as metal framing or equivalent material) and topped with one HX4, or equivalent material (Table 7.2).

**When creating the platform, allow for the thickness of the non-combustible finishing materials** (Figure 7.8).



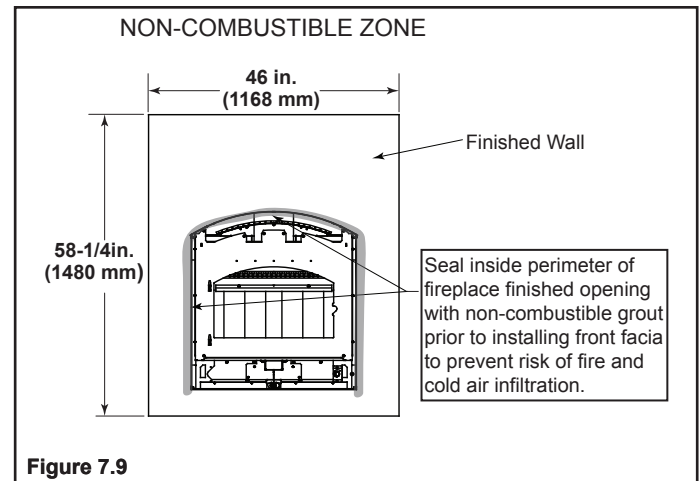
**Figure 7.8** Raised Hearth Extension to Bottom of Fascia

***WARNING! Risk of Fire!***

Hearth extensions are to be installed only as illustrated to prevent high temperatures from occurring on concealed combustible materials.

## E. Non-Combustible Sealant Material

- After completing the installation of non-combustible facing board in the required non-combustible zone and the non-combustible finishing material over that, remove the template.
- A bead of non-combustible sealant must be used to close off any gaps at the top and sides between the fireplace and non-combustible facing (Figure 7.9) to prevent cold air leaks and the risk of fire. Large gaps can be bridged with fiberglass rope gasket.
- When installation of the decorative material is complete, replace/install the fascia and fireplace doors.



**Figure 7.9**

***WARNING! Risk of Fire!***

- Maintain clearances.
- Use only non-combustible material below standoffs, material such as cement board is acceptable.
- Framing or finishing material used on the front of the fireplace closer than the minimums listed, must be constructed entirely of non-combustible materials (i.e., steel studs, concrete board, etc.).

***WARNING! Risk of Fire!***

Hearth & Home Technologies is not responsible for discoloration, cracking or other material failures of finishing materials due to heat exposure or smoke.

- Choose finishing materials carefully.

***WARNING! Risk of Fire!***

Seal around finishing material to fireplace.

# 8 Reference Materials

## A. Firebrick Placement

The firebox of your fireplace is lined with high quality firebrick, which has exceptional insulating properties.

Do not use a grate; simply build a fire on the firebox floor.

Do not operate the fireplace without bricks. Make sure bricks are installed as shown.

**IMPORTANT:** Be certain you have the proper brick in the correct location. Measure the brick size for accuracy.

- Remove new brick set from box and lay out to diagram as shown in Figure 8.1.
- Lay bottom bricks in firebox.
- Install rear bricks on the top of the bottom bricks. Slide top of bricks under clip on back of firebox wall and push bottom of brick back.
- Install side bricks. Slide top of brick under clips on side of firebox and push the bottom of the brick until it is flush with the side of the firebox.

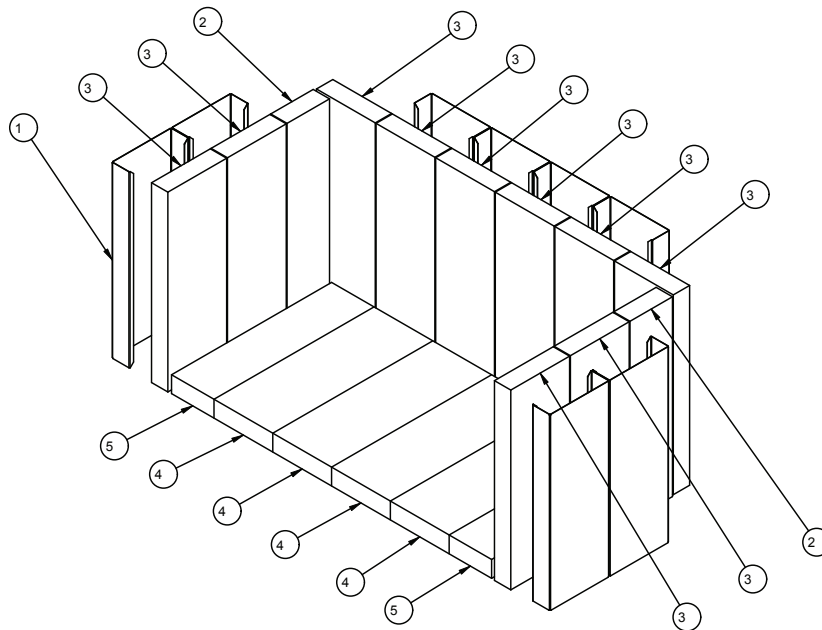


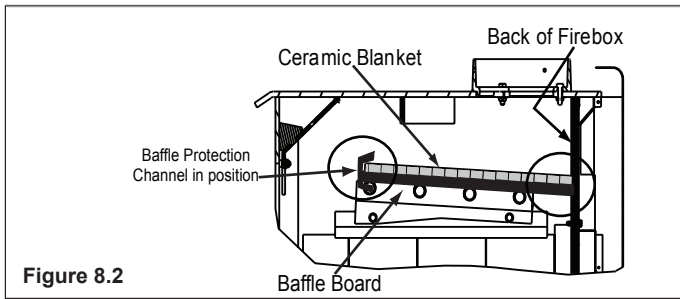
Figure 8.1 Fire Brick Configurations

Table 8.1

#	Brick Size	Qty. in Set
1	Brick Wrap	8
2	Firebrick 13.25 x 3.25	2
3	Firebrick 13.25 x 4.50 x 1.25	10
4	Firebrick 12.25 x 4.50	4
5	Firebrick 12.25 x 3.25	2

## B. Baffle and Blanket Placement

Ensure correct baffle and baffle protection channel placement; replace baffle components if damaged or missing.



The ceramic blanket and baffle board **MUST** be in contact with the back of the firebox and even with each other in the front. The baffle protection channel **MUST** be in position.

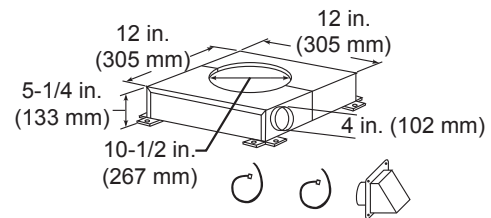
## C. Install Fascia (Fronts)

Front is required to complete the installation. Instructions for attachment of the front is included with it. Contact your local dealer with any questions on offerings or installation.

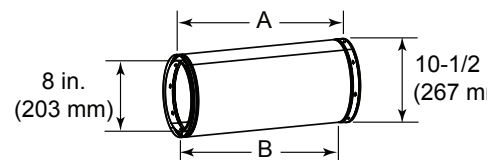
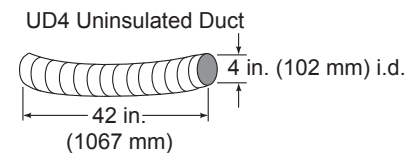
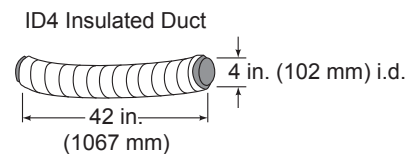
## D. Chimney Components

The following drawings show the SL-300 Series chimney and fireplace components which may be safely used with this fireplace. The 8 in. DuraPlus can also be used.

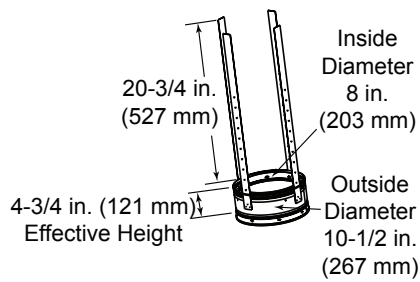
Catalog #	Description
CAK4A	Chimney Air Kit (shipped with fireplace)
ID4	Insulated Duct (used with chimney air kit)
UD4	Uninsulated Duct (used with chimney air kit)
SL306	Chimney Section - 6 in. (152 mm) long
SL312	Chimney Section - 12 in. (305 mm) long
SL318	Chimney Section - 18 in. (457 mm) long
SL324	Chimney Section - 24 in. (610 mm) long
SL336	Chimney Section - 36 in. (914 mm) long
SL348	Chimney Section - 48 in. (1219 mm) long
SL3	Chimney Stabilizer
SL315	Chimney Offset/Return - 15 deg
SL330	Chimney Offset/Return - 30 deg
FS338	Ceiling Firestop - Straight
FS339	Ceiling Firestop - 15 deg
FS340	Ceiling Firestop - 30 deg
AS8	SL300 Straight Attic Insulation Shield, 24 in. (610 mm) (shipped with fireplace)
JB877	Chimney Joint Band
CB876	Chimney Bracket
RF370	Roof Flashing - Flat to 6/12 Pitch
RF371	Roof Flashing - 6/12 to 12/12 Pitch
DTO134/146	Octagonal Decorative Caps
DTS134/146	Square Decorative Caps
ST375	Square Termination Cap
TCT375	Terra Cotta Termination Cap
TR344	Round Termination Cap
TR342-B	Round Telescoping Termination Cap
TR-TVK	TR Top Vent Kit
TS345	Square Termination Cap
TS345P	Square Termination Cap - Painted
12966A	Manufactured Home Thimble
MH841	Manufactured Home Thimble Extension 20 in./508 mm
HX4	Micore Hearth Extension, 20 in./508 mm wide
LDS33	Decorative Shroud - 3 ft x 3 ft (.91 m x .91 m)
LDS46	Decorative Shroud - 4 ft x 6 ft (1.22 m x 1.83 m)
LDS-BV	Decorative Shroud - 26 in. x 26 in. (660 mm x 660 mm)
	Field Constructed Shrouds (See "Woodburning Termination Cap")
CT-3A-B	Adapter - May be used with the following caps
	CT Series
	DT Series
8DP-BP	Duraplus Base Plate (required if using DuraPlus Chimney)



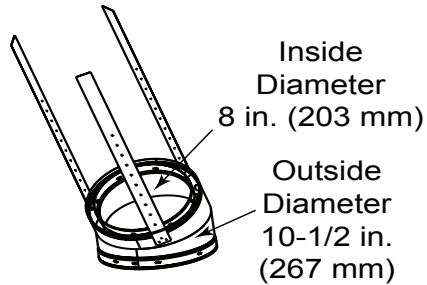
**CAK4A Chimney Air Kit (shipped with fireplace)**



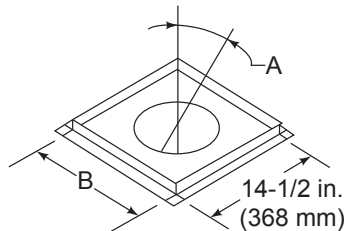
Catalog #	A		B	
	in	mm	in	mm
SL306	6	152	4-3/4	121
SL312	12	305	10-3/4	273
SL318	18	457	16-3/4	425
SL324	24	610	22-3/4	578
SL336	36	914	34-3/4	883
SL348	48	1219	46-3/4	1187



**SL3 Chimney Stabilizer**



**SL315 Chimney Offset/Return - Effective Height 13-3/8 in. (340 mm)**  
**SL330 Chimney Offset/Return - Effective Height 15-1/2 in. (394 mm)**

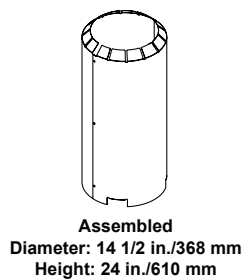


**Firestop Spacer**

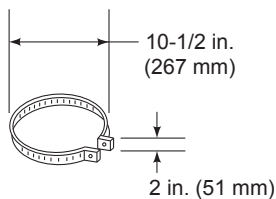
Catalog #	A	B	
FS338	0-deg.	14-1/2 in.	368 mm
FS339	15-deg.	18-3/8 in.	467 mm
FS340	30-deg.	23 in.	584 mm

A = Actual Length

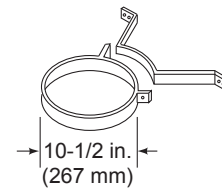
B = Effective length (length of chimney part after it has been snapped to another)



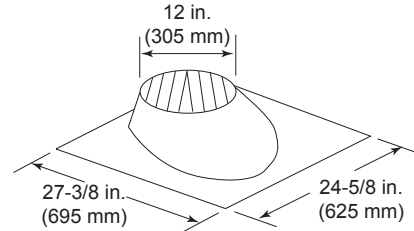
**AS8 SL300 Straight Attic Insulation Shield (shipped with unit)**



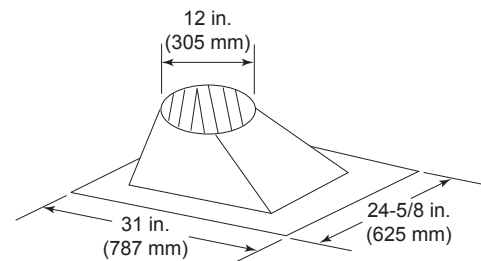
**JB877 Chimney Joint Band**



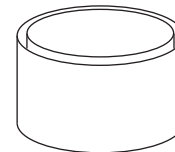
**CB876 Chimney Bracket**



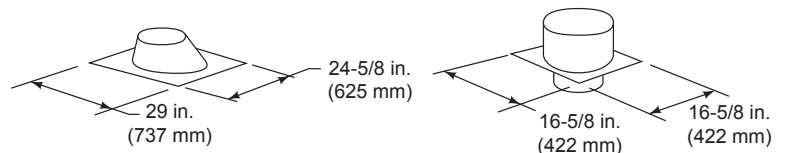
**RF370 - Roof Flashing Flat to 6/12 Pitch**



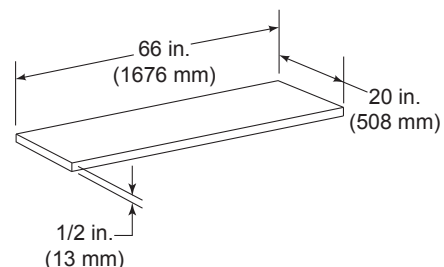
**RF371 - Roof Flashing 6/12 to 12/12 Pitch**



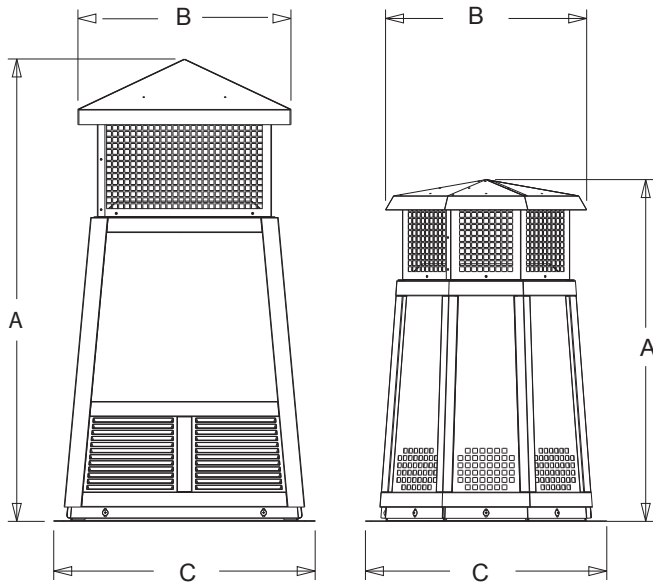
**MH841 Manufactured Home Thimble Extension**



**12966A Manufactured Home Thimble**



**HX4 Micore Hearth Extension**



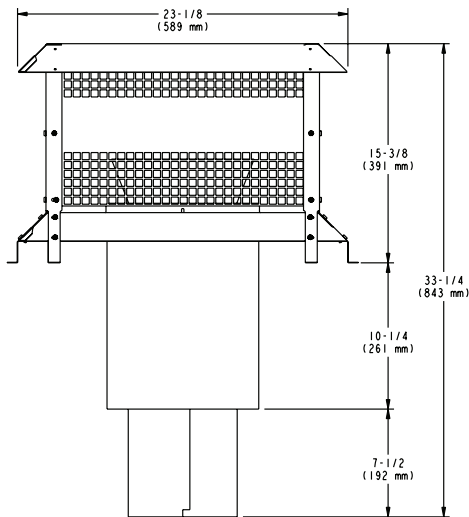
**DTS134/DTS146**

**DTO134/DTO146**

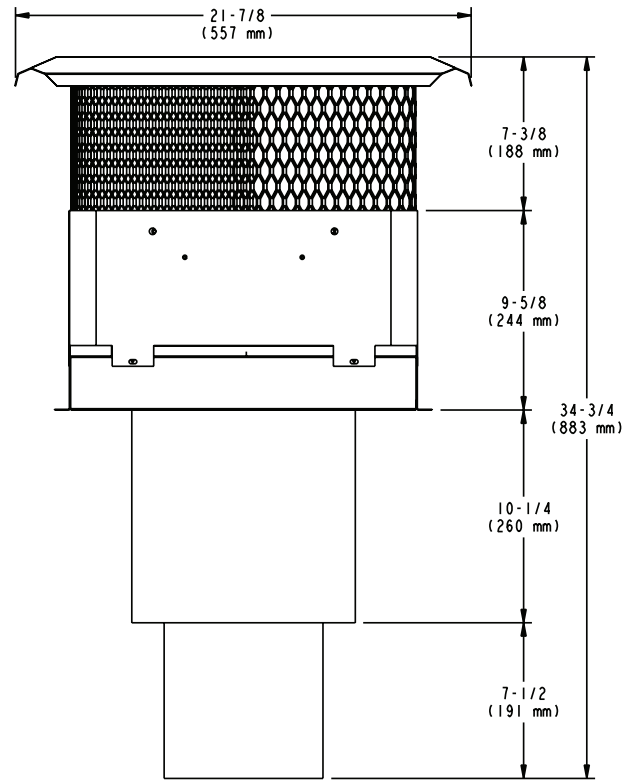
**Decorative Caps**

DTO134		A	B	C
	in	34	20	24
	mm	864	508	610
DTO146		A	B	C
	in	46	22.7	26
	mm	1168	576	660

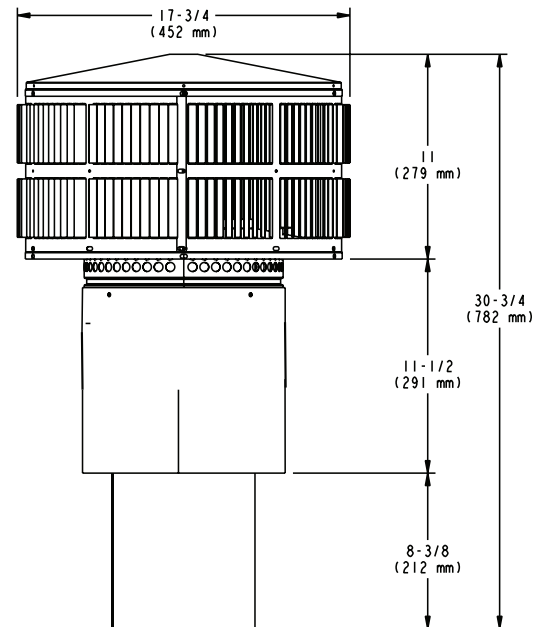
DTS134		A	B	C
	in	34	21.18	24
	mm	864	538	610
DTS146		A	B	C
	in	46	21.18	26
	mm	1168	538	660



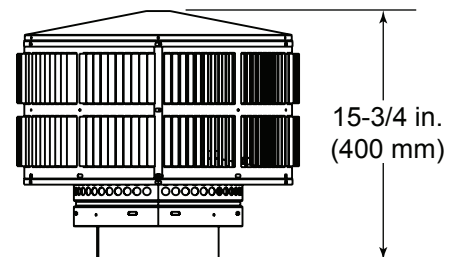
**ST375 Square Termination Cap**



**TCT375 Terra Cotta Cap**

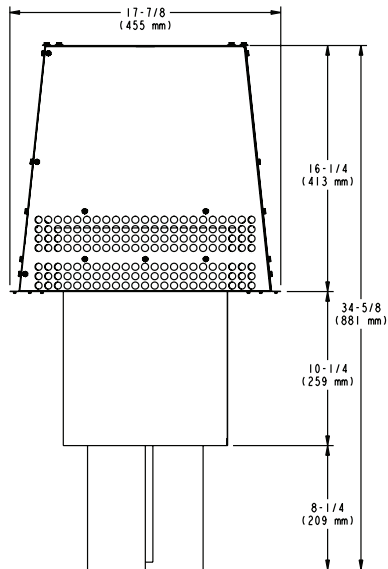


**TR342-B Round Telescoping Termination Cap**

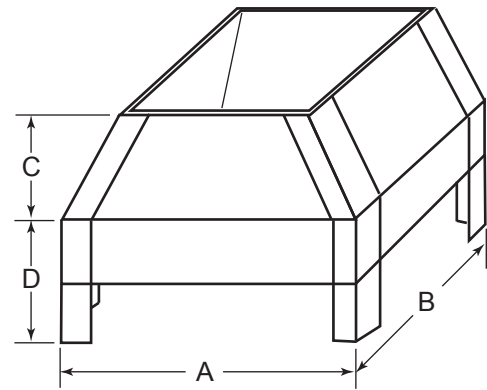


**TR344 Round Termination Cap**



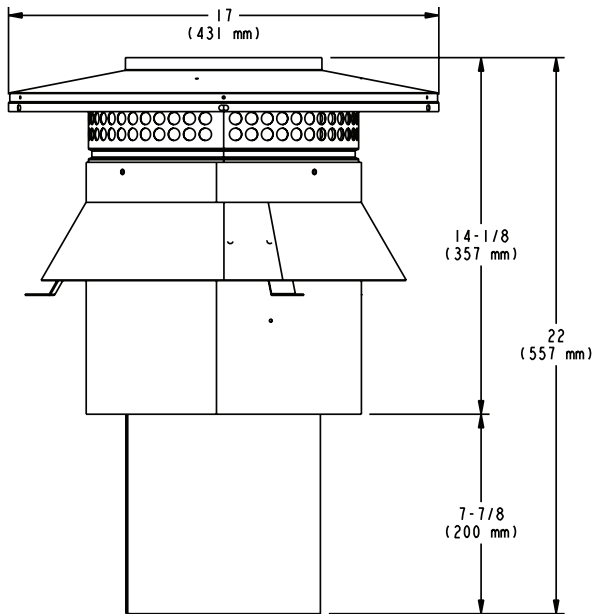


**TS345/TS345P Square Termination Cap**

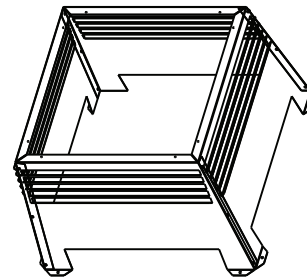


**LDS33/LDS46 Decorative Shroud**

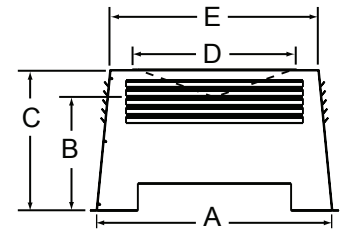
Catalog #	A		B		C		D	
	in.	mm	in.	mm	in.	mm	in.	mm
LDS33	36	914	36	914	8.5	216	11	279
LDS46	48	1219	72	1829	8.5	216	11	279



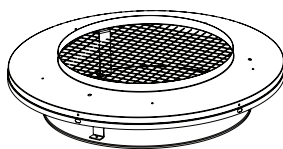
**CT-3-B**



**LDS-BV Decorative Shroud**



Catalog #		A	B	C	D	E
LDS-BV	in.	26	12.5	15.5	22	23
	mm	660	318	394	559	584



**TR-TVK Top Vent Kit**

## DuraPlus Venting

Catalog #	Description
DV-8DP-BP	8" DuraPlus base plate
DV-8DP-E15	8" DuraPlus 15° elbow kit
DV-8DP-E30	8" DuraPlus 30° elbow kit
DV-8DP-E15KSS	8" DuraPlus 15° elbow kit (SS)
DV-8DP-E30KSS	8" DuraPlus 30° elbow kit (SS)
DV-8DP-WS	8" DuraPlus wall strap
DV-8DP-ES	8" DuraPlus elbow strap
DV-8DP-AWS	8" DuraPlus adjustable wall strap
DV-8DP-WSSS	8" DuraPlus wall strap (SS)
DV-8DP-FRS	8" DuraPlus firestop radiation shield
DV-8DP-XRB	8" DuraPlus extended roof bracket
DV-6DP-SC	6-8 Storm collar
DV-8DP-F6	8" DuraPlus flashing 0/12-6/12
DV-8DP-FF	8" DuraPlus flat roof flashing
DV-8DP-F12	8" DuraPlus flashing 7/12-12/12
DV-8DP-06	8x6 DuraPlus pipe
DV-8DP-09	8x9 DuraPlus pipe
DV-8DP-12	8x12 DuraPlus pipe
DV-8DP-24	8x24 DuraPlus pipe
DV-8DP-24SS	8x24 DuraPlus pipe (SS)
DV-8DP-36	8x36 DuraPlus pipe
DV-8DP-36SS	8x36 DuraPlus pipe (SS)
DV-8DP-VC	8" DuraPlus chimney cap

## **E. Accessories**

### **Lintel Bar**

LINTEL- Lintel Bar

### **Finishing Template**

TMP-PIIA

### **Heat-Zone-WD**

### **Mesh-HHT Firescreen**

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Heat & Glo, a brand of Hearth & Home Technologies  
1915 West Saunders Street, Mount Pleasant, Iowa 52641  
[www.HeatnGlo.com](http://www.HeatnGlo.com)

Please contact your Heat & Glo dealer with any questions or concerns.  
For the location of your nearest Heat & Glo dealer, please visit [www.HeatnGlo.com](http://www.HeatnGlo.com).

# Owner's Manual

## Care and Operation

Pour demander un exemplaire en français de ce Manuel du propriétaire, visitez [www.heatnglo.com/translations](http://www.heatnglo.com/translations).

**INSTALLER:** Leave this manual with party responsible for use and operation.

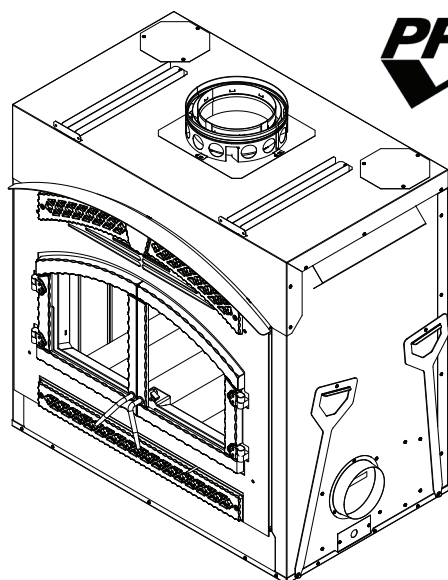
**OWNER:** Retain this manual for future reference.

**NOTICE:** *DO NOT* discard this manual!

# HEAT & GLO™

Model(s):

**Northstar-C**



**EPA CERTIFIED WOODBURNING  
FIREPLACE**

Installation and service of this appliance should be performed by qualified personnel. Hearth & Home Technologies recommends HHT Factory Trained or NFI certified professionals.

**hearthED**  
FACTORY TRAINING  
Fuel Your Fire



**⚠ WARNING:** If the information in these instructions is not followed exactly, a fire or explosion may result causing property damage, personal injury, or death.

- **DO NOT** store or use gasoline or other flammable vapors and liquids in the vicinity of this or any other appliance.
- **DO NOT** overfire. Overfiring will void your warranty.
- Comply with all minimum clearances to combustibles as specified. Failure to comply may cause house fire.

### ⚠ WARNING



#### **HOT SURFACES!**

Glass and other surfaces are hot during operation AND cool down.

#### **Hot glass will cause burns.**

- **DO NOT** touch glass until it is cooled
  - NEVER allow children to touch glass
  - Keep children away
  - CAREFULLY SUPERVISE children in same room as fireplace.
  - Alert children and adults to hazards of high temperatures.
- High temperatures may ignite clothing or other flammable materials.**
- Keep clothing, furniture, draperies and other flammable materials away.

### ⚠ WARNING



#### **Fire Risk.**

For use with solid wood fuel only.  
Other fuels may overfire and generate poisonous gases (i.e. carbon monoxide).

## Safety Alert Key:

- **DANGER!** Indicates a hazardous situation which, if not avoided will result in death or serious injury.
- **WARNING!** Indicates a hazardous situation which, if not avoided could result in death or serious injury.
- **CAUTION!** Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.
- **NOTICE:** Indicates practices which may cause damage to the fireplace or to property.

## Table of Contents

<b>1 Welcome</b>		<b>4 Maintenance and Service</b>	
A. Congratulations	3	A. Maintenance Tasks-Homeowners	18
B. LIMITED LIFETIME WARRANTY	4	1. Chimney Inspection	18
<b>2 Product Specific Information</b>		2. Creosote (Chimney) Cleaning	19
A. Appliance Certification	7	3. Care and Cleaning of Plated Surfaces	20
B. BTU & Efficiency Specifications	7	4. Glass Door	20
C. Mobile Home Approved	7	5. Glass Cleaning	20
D. Glass Specifications	7	6. Door Gasket	20
<b>3 Important Safety and Operating Information</b>		7. Ash Removal	20
A. Fireplace Safety	8	8. Baffle and Blanket	20
1. Clear Space	8	9. Firebrick	20
2. Firebrick	9	B. Replacement Maintenance	21
3. Baffle and Blanket	9	1. Glass Replacement	21
4. Over-Firing Your Fireplace	9	2. Tighten or Adjust Door Latch	21
5. Chimney Fire	9	3. Door Handle Assembly	22
B. General Operating Parts	10	4. Firebrick Replacement	22
1. Automatic Combustion Control (ACC)	11	5. Baffle Removal and Installation	23
2. ACC Override	11	6. Fan Replacement	23
3. Outside Air	11	7. Timer Assembly Replacement	24
4. Glass Doors	12	8. Timer Removal and Replacement	26
5. Convection Fan Operation	12	<b>5 Troubleshooting</b>	
C. Fuel	12	A. FAQs	29
1. Hardwood vs. Softwood	13	B. Troubleshooting Table	31
2. Moisture Content	13	<b>6 Reference Materials</b>	
3. Seasoning	13	A. Service Parts	32
4. Storing Wood	14	B. Contact Information	37
5. Burning Process	14		
6. Dirty Glass	14		
7. Creosote Formation	14		
8. Opacity	14		
D. First Fire	14		
E. Lighting Instructions	15		
F. Frequently Asked Questions	17		



# 1 Welcome

Read this manual before installing or operating this fireplace.  
Please retain this owner's manual for future references.

## A. Congratulations

Congratulations on selecting a Heat & Glo wood burning fireplace. The Heat & Glo fireplace you have selected is designed to provide the utmost in safety, reliability, and efficiency.

As the owner of a new fireplace, you'll want to read and carefully follow all of the instructions contained in this Owner's Manual. Pay special attention to all Cautions and Warnings.

This Owner's Manual should be retained for future reference. We suggest that you keep it with your other important documents and product manuals.

Your new Heat & Glo wood burning fireplace will give you years of durable use and trouble-free enjoyment. Welcome to the Heat & Glo family of fireplace products!

Heat & Glo is a registered trademark of Hearth & Home Technologies.

### Local Dealer Information

**DEALER:** Fill in your name, address, phone and email information here and fireplace information below.

Dealer Name: \_\_\_\_\_  
Address: \_\_\_\_\_  
Phone: \_\_\_\_\_  
Email: \_\_\_\_\_

### **Fireplace Information:**

Brand: \_\_\_\_\_ Model Name: \_\_\_\_\_  
Serial Number: \_\_\_\_\_ Date Installed: \_\_\_\_\_

## Listing Label Information/Location

The model information regarding your specific fireplace can be found on the rating plate usually located in the control area of the fireplace.

Model: **Northstar**  
**EPA CERTIFIED FIREPLACE**

HEAT & GLO  
A brand of Hearth & Home Technologies  
7571 - 215th Street West, Lakeville, MN 55044  
www.quadfire.com

SERIAL NO./NUMERO DESERE: **MP187**  
MODEL: **Northstar-C**

FIRE CHAMBER INTENDED FOR USE WITH HEARTH & HOME TECHNOLOGIES LISTED FIREPLACE PARTS. SEE INSTALLATION AND OPERATING INSTRUCTIONS FOR THIS MODEL. REPLACE GLASS ONLY WITH CERAMIC.

DO NOT OVERFIRE. USE ONLY SOLID WOOD FUEL. DO NOT USE A FIREPLACE INSERT OR OTHER PRODUCTS NOT SPECIFIED FOR USE WITH THIS PRODUCT.

WARNING! THIS FIREPLACE HAS NOT BEEN TESTED WITH AN UNVENTED GAS LOG SET. TO REDUCE THE RISK OF FIRE OR INJURY, DO NOT INSTALL AN UNVENTED GAS LOG SET INTO FIREPLACE.

DO NOT USE GRATE OR ELEVATE FIRE. BUILD WOOD FIRE DIRECTLY ON FIREBRICK.

WARNING! TO AVOID THE RISK OF DAMAGING FIREPLACE MATERIALS AND INCREASING THE RISK OF SPREADING A FIRE DO NOT USE THE FIREPLACE TO COOK OR WARM FOOD.

INSTALL AND USE ONLY IN ACCORDANCE WITH MANUFACTURER'S INSTALLATION, VENTING AND OPERATING INSTRUCTIONS. ANY AREA INCORPORATING WARM OR COLD AIR DUCTS SHALL BE ENCLOSED IN ACCORDANCE WITH THE MANUFACTURER'S INSTALLATION INSTRUCTIONS. CONTACT YOUR LOCAL BUILDING OR FIRE OFFICIALS OR AUTHORITY HAVING JURISDICTION ABOUT RESTRICTIONS, INSTALLATION INSPECTION AND PERMITS REQUIRED IN YOUR AREA. COMPONENTS REQUIRED FOR INSTALLATION: HHT SL300 SERIES PIPE OR DURAVENT DURA PLUS SYSTEM, TERMINATION CAP, HEARTH EXTENSION AND REQUIRED ACCESSORY CHIMNEY AIR KIT PART CAK4A. DO NOT CONNECT THIS UNIT TO A CHIMNEY SERVING ANOTHER APPLIANCE.

DANGER: RISK OF ELECTRICAL SHOCK. DISCONNECT POWER SUPPLY BEFORE SERVICING.

ELECTRICAL RATING: 115 VAC <3.0 AMPS 60 HZ  
MUST PROVIDE A SOURCE OF AIR TO PREVENT AIR STARVATION FROM COMBUSTION WHICH COULD RESULT IN HIGH LEVELS OF CARBON MONOXIDE.

THIS WOOD HEATER NEEDS PERIODIC INSPECTION AND REPAIR FOR PROPER OPERATION. CONSULT 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.

DO NOT REMOVE THIS LABEL

Made in U.S.A. of US and imported parts

2019 2020 2021 2022 2023 2024 Jan Feb Mar Apr May June July Aug Sept Oct. Nov. Dec.

U.S. ENVIRONMENTAL PROTECTION AGENCY - Certified to comply with 2020 particulate emission standards using cord wood.  
This wood heater was found to have an average emissions rate of 2.0g/hr using method ASTM E3053-17.

4187-990A

Model Number  
Serial Number

## B. LIMITED LIFETIME WARRANTY

### Hearth & Home Technologies LIMITED LIFETIME WARRANTY

Hearth & Home Technologies, on behalf of its hearth brands ("HHT"), extends the following warranty for HHT gas, wood, pellet and electric hearth appliances that are purchased from an HHT authorized dealer.

#### **WARRANTY COVERAGE:**

HHT warrants to the original owner of the HHT appliance at the site of installation, and to any transferee taking ownership of the appliance at the site of installation within two years following the date of original purchase, that the HHT appliance will be free from defects in materials and workmanship at the time of manufacture. After installation, if covered components manufactured by HHT are found to be defective in materials or workmanship during the applicable warranty period, HHT will, at its option, repair or replace the covered components. HHT, at its own discretion, may fully discharge all of its obligations under such warranties by replacing the product itself or refunding the verified purchase price of the product itself. The maximum amount recoverable under this warranty is limited to the purchase price of the product. This warranty is subject to conditions, exclusions and limitations as described below.

#### **WARRANTY PERIOD:**

Warranty coverage for consumers begins at the date of installation. 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, authorized HHT dealer/distributor, whichever occurs earlier. However, the warranty shall commence no later than 24 months following the date of product shipment from HHT, regardless of the installation or occupancy date. The warranty period for parts and labor for covered components is produced in the following table.

The term "Limited Lifetime" in the table below is defined as: 20 years from the beginning date of warranty coverage for gas appliances, and 10 years from the beginning date of warranty coverage for wood and pellet appliances. These time periods reflect the minimum expected useful lives of the designated components under normal operating conditions.

Warranty Period		HHT Manufactured Appliances and Venting					
Parts	Labor	Gas	Pellet	Wood	Electric	Venting	Components Covered
1 Year		X	X	X	X	x	All parts and material except as covered by Conditions, Exclusions, and Limitations listed
2 years			X	X			Igniters, auger motors, electronic components, and glass
		X	X	X			Factory-installed blowers
				X			Molded refractory panels
		X					Ignition Modules
3 years			X				Firepots, burnpots, mechanical feeders/auger assemblies
5 years	1 year	X					Vent Free burners, Vent Free ceramic fiber logs, Aluminized Burners
			X	X			Castings and Baffles
6 years	3 years			X			Catalyst - limitations listed
7 years	3 years		X	X			Manifold tubes, HHT chimney and termination
10 years	1 year	X					Burners, logs and refractory
Limited Lifetime	3 years	X	X	X			Firebox and heat exchanger, Grate and Stainless Steel Burners, FlexBurn® System (engine, inner cover, access cover and fireback)
90 Days		X	X	X	X	X	All replacement parts beyond warranty period

### **WARRANTY CONDITIONS:**

- This warranty only covers HHT appliances that are purchased through an HHT authorized dealer or distributor. A list of HHT authorized dealers is available on the HHT branded websites.
- This warranty is only valid while the HHT appliance remains at the site of original installation.
- This warranty is only valid in the country in which the HHT authorized dealer or distributor that sold the appliance resides.
- Contact your installing dealer for warranty service. If the installing dealer or distributor is unable to provide necessary parts, contact the nearest HHT authorized dealer or supplier. Additional service fees may apply if you are seeking warranty service from a dealer other than the dealer from whom you originally purchased the product.
- Check with your dealer in advance for any costs to you when arranging a warranty call. Travel and shipping charges for parts are not covered by this warranty.
- Limited Catalyst Warranty
  - o For wood burning products containing a catalyst, the catalyst will be warranted for a six-year period as follows: if the original catalyst or a replacement catalyst proves defective or ceases to maintain 70% of its particulate emission reduction activity (as measured by an approved testing procedure) within 36 months from the purchase date, the catalyst will be replaced for free.
  - o From 37 to 72 months a pro-rated credit will be allowed against a replacement catalyst and labor credit necessary to install the replacement catalyst. The proration rate is as follows:

Amount of Time Since Purchase	Credit Towards Replacement Cost
0 - 36 Months	100%
37 - 48 Months	30%
49 - 60 Months	20%
61 - 72 Months	10%

- o Any replacement catalyst will be warranted under the terms of the catalyst warranty for the remaining term of the original warranty. The purchaser must provide the name, address, and telephone number of the location where the product is installed, proof of original purchase date, date of failure, and any relevant information regarding the failure of the catalyst.

### **WARRANTY EXCLUSIONS:**

This warranty does not cover the following:

- Changes in surface finishes as a result of normal use. As a heating appliance, some changes in color of interior and exterior surface finishes may occur. This is not a flaw and is not covered under warranty.
- Damage to printed, plated, or enameled surfaces caused by fingerprints, accidents, misuse, scratches, melted items, or other external sources and residues left on the plated surfaces from the use of abrasive cleaners or polishes.
- Repair or replacement of parts that are subject to normal wear and tear during the warranty period are not covered. These parts include: paint, wood and pellet gaskets, firebricks, grates, flame guides, batteries and the discoloration of glass.
- Minor expansion, contraction, or movement of certain parts causing noise. These conditions are normal and complaints related to this noise are not covered by this warranty.
- Damages resulting from: (1) failure to install, operate, or maintain the appliance in accordance with the installation instructions, operating instructions, and listing agent identification label furnished with the appliance; (2) failure to install the appliance in accordance with local building codes; (3) shipping or improper handling; (4) improper operation, abuse, misuse, continued operation with damaged, corroded or failed components, accident, or improperly/incorrectly performed repairs (5) environmental conditions, inadequate ventilation, negative pressure, or drafting caused by tightly sealed constructions, insufficient make-up air supply, or handling devices such as exhaust fans or forced air furnaces or other such causes; (6) use of fuels other than those specified in the operation instructions; (7) installation or use of components not supplied with the appliance or any other components not expressly authorized and approved by HHT; (8) modification of the appliance not expressly authorized and approved by HHT in writing; and/or (9) interruptions or fluctuations of electrical power supply to the appliance.
- Non-HHT venting components, hearth connections or other accessories used in conjunction with the appliance.
- Any part of a pre-existing fireplace system in which an insert or a decorative gas appliance is installed.
- HHT's obligation under this warranty does not extend to the appliance's capability to heat the desired space. Information is provided to assist the consumer and the dealer in selecting the proper appliance for the application. Consideration must be given to the appliance location and configuration, environmental conditions, insulation and air tightness of the structure.

**This warranty is void if:**

- The appliance has been over-fired, operated in atmospheres contaminated by chlorine, fluorine, or other damaging chemicals. Over-firing can be identified by, but not limited to, warped plates or tubes, deformation/warping of interior cast iron structure or components, rust colored cast iron, bubbling, cracking and discoloration of steel or enamel finishes.
- The appliance is subjected to prolonged periods of dampness or condensation.
- There is any damage to the appliance or other components due to water or weather damage which is the result of, but not limited to, improper chimney or venting installation.

**LIMITATIONS OF LIABILITY**

- The owner's exclusive remedy and HHT's sole obligation under this warranty, under any other warranty, express or implied, or in contract, tort or otherwise, shall be limited to replacement, repair, or refund, as specified above. In no event will HHT be liable for any incidental or consequential damages caused by defects in the appliance. Some states do not allow exclusions or limitation of incidental or consequential damages, so these limitations may not apply to you. This warranty gives you specific rights; you may also have other rights, which vary from state to state. EXCEPT TO THE EXTENT PROVIDED BY LAW, HHT MAKES NO EXPRESS WARRANTIES OTHER THAN THE WARRANTY SPECIFIED HEREIN. THE DURATION OF ANY IMPLIED WARRANTY IS LIMITED TO DURATION OF THE EXPRESSED WARRANTY SPECIFIED ABOVE.

## 2 Listing and Code Approvals

### A. Appliance Certification

<b>Model:</b>	Northstar-C
<b>Laboratory:</b>	Underwriters Laboratories, Inc.
<b>Report No:</b>	Project
<b>Type:</b>	Wood Fireplace
<b>Standard:</b>	UL 127 - 2011 and CAN/ULC S610-2018 (A1998) and (UM) 84-HUD, Manufactured Home Approved.

### B. BTU & Efficiency Specifications

EPA Certified Emissions:	1.8 g/hr
*LHV Tested Efficiency:	76%
**HHV Tested Efficiency:	70%
***EPA BTU Output:	17,600 to 48,200
Vent Size:	8 inches
Firebox Size:	2.7 cubic feet
Recommended Log Length:	22 inches
Fuel	Seasoned Cord Wood less than 20% moisture
*Weighted average LHV (Low Heating Value) efficiency using cord wood and data collected during EPA emission test. LHV assumes the moisture is already in a vapor state so there is no loss in energy to vaporize.	
**Weighted average HHV (High Heating Value) efficiency using cord wood and data collected during EPA emission test. HHV includes the energy required to vaporize the water in the fuel.	
***A range of BTU outputs based on HHV and the burn rates from the low and high EPA tests, using cord wood.	

The Northstar-C is Certified to comply with 2020 particulate emission standards.



The Northstar-C Wood Appliance meets the U.S. ENVIRONMENTAL PROTECTION AGENCY Certified to comply with 2020 particulate emission standards using cord wood.

This wood heater needs periodic inspection and repair for proper operation. It is against federal regulations to operate this wood heater in a manner inconsistent with operating instructions in this manual.

### C. Mobile Home Approved

- This appliance is approved for mobile home installations when not installed in a sleeping room and when an outside combustion air inlet is provided.
- The structural integrity of the mobile home floor, ceiling, and walls must be maintained.
- The appliance must be properly grounded to the frame of the mobile home with #8 copper ground wire.
- Outside Air Kit must be installed in a mobile home installation.

### D. Glass Specifications

This fireplace is equipped with 5mm ceramic glass. Replace glass only with 5mm ceramic glass. Please contact your dealer for replacement glass.



#### WARNING



##### Fire Risk.

Hearth & Home Technologies disclaims any responsibility for, and the warranty will be voided by, the following actions:

- Installation and use of any damaged appliance.
- Modification of the appliance.
- Installation other than as instructed by Hearth & Home Technologies.
- Installation and/or use of any component part not approved by Hearth & Home Technologies.
- Operating appliance without fully assembling all components.
- Do NOT Overfire - If appliance or chimney connector glows, you are overfiring.

Any such action that may cause a fire hazard.

Improper installation, adjustment, alteration, service or maintenance can cause injury or property damage.

For assistance or additional information, consult a qualified installer, service agency or your dealer.

NOTE: Hearth & Home Technologies, manufacturer of this appliance, reserves the right to alter its products, their specifications and/or price without notice.

Heat & Glo is a registered trademark of Hearth & Home Technologies.

# 3 Important Safety and Operating Information

## A. Fireplace Safety

Most problems are caused by improper installation and operation of the fireplace. To provide reasonable fire safety, the following should be given serious consideration:

- The fire should be supervised whenever the fireplace is in use.
- An annual inspection should be performed on the fireplace system.
- Install at least one smoke detector on each floor of your home to ensure your safety.
- Install a CO detector in the room with the fireplace.
- Install a conveniently located Class A fire extinguisher near the fireplace.
- Devise a practiced evacuation plan, consisting of at least two escape routes.
- Devise a plan to deal with a chimney fire:
  - Close all openings into the fireplace.
  - Evacuate.
  - Notify the fire department.

**WARNING! Risk of Fire!** *Hearth & Home Technologies disclaims any responsibility for, and the warranty and agency listing will be voided by the following actions.*

### DO NOT:

- operate damaged fireplace
- modify fireplace
- overfire
- install any gas log set
- install any component not approved by *Hearth & Home Technologies*
- install parts or components not Listed or approved
- operate the fireplace without fully assembling all components

*Improper installation, adjustment, alteration, service or maintenance can cause injury or property damage.*

**WARNING:** This product and the fuels used to operate this product (wood and wood pellets), and the products of combustion of such fuels, 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](http://www.P65Warnings.ca.gov).

## 1. Clear Space

Combustible materials must not be stored on the hearth extension. Room furnishings such as drapes, curtains, chairs or other combustibles must be at least 4 ft (1219 mm) from the open front of the fireplace.

Combustible materials are materials made of or surfaced with any of the following materials:

- Wood
- Plant fibers
- Plywood/OSB
- Any material that can ignite and burn, flame proofed or not, plastered or un-plastered.
- Compressed paper
- Plastic
- Drywall

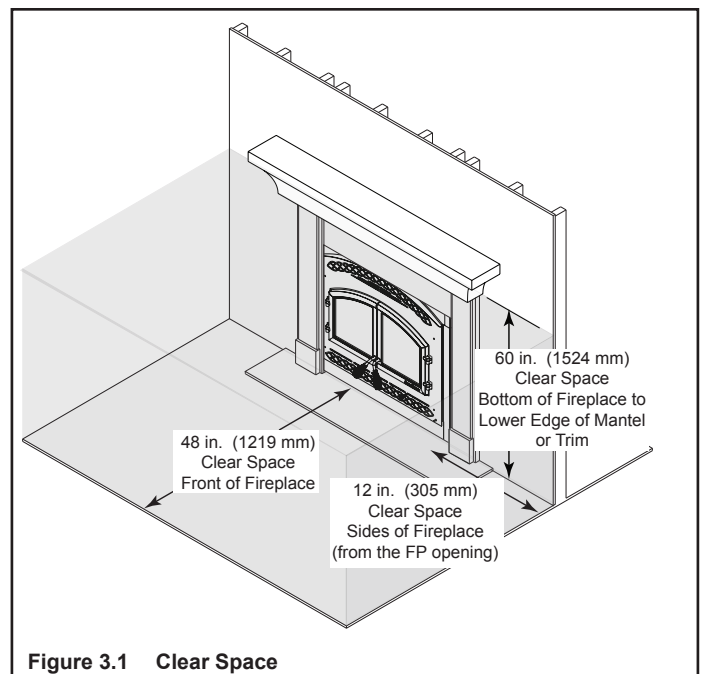
Non-combustible materials are materials which will not ignite and burn, composed of any combination of the following:

- Steel
- Brick
- Concrete
- Glass
- Iron
- Tile
- Slate
- Plasters

**WARNING! Risk of Fire!** *Keep combustible materials, gasoline and other flammable vapors and liquids clear of the fireplace.*

### DO NOT:

- store flammable materials close to the fireplace
- use gasoline, lantern fuel, kerosene, charcoal lighter fluid or similar liquids to start or “freshen up” a fire in this fireplace.





## 2. Firebrick

Your fireplace is lined with high quality firebrick, which has exceptional insulating properties.

Do not operate the fireplace without bricks. Make sure bricks are installed as shown in Section 5.

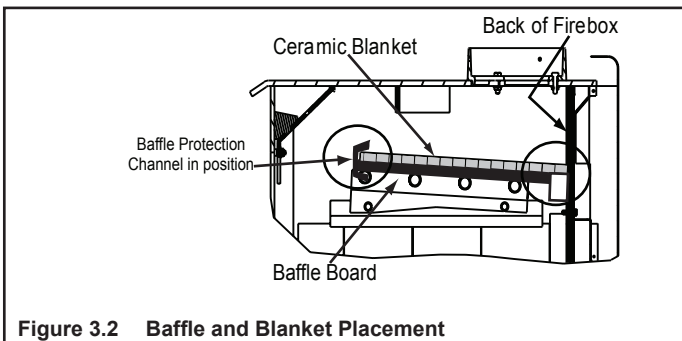
Do not use a grate; simply build a fire on the firebox floor.

## 3. Baffle and Blanket

Ensure correct baffle and baffle protection channel placement; replace baffle components if damaged or missing. (Please refer to Section 5.)

**NOTICE:** Firebox damage due to improper baffle placement is not covered by warranty. Operate the wood burning fireplace with the baffle in the correct position only. Not doing so could result in:

- reduced efficiency
- overheating the chimney
- overheating the rear of the firebox
- poor performance



The baffle board must be in contact with the of the firebox. The ceramic blanket should lay on top of the baffle board.

The baffle protection channel should be in position and cover the front of the blanket and baffle board.

## 4. Over-Firing Your Fireplace

### DO NOT OVERFIRE THIS FIREPLACE UNIT

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

To prevent over-firing your fireplace. **DO NOT:**

- use flammable liquids
- overload with wood
- burn trash or large amounts of scrap lumber
- permit too much air to the fire (leaving the door open)

Symptoms of over-firing may include one or more of the following:

- chimney connector or fireplace glowing
- roaring, rumbling noises
- loud cracking or banging sounds
- metal warping
- chimney fire

What to do if your fireplace is over-firing:

- Immediately close the door and air controls to reduce air supply to the fire.
- If you suspect a chimney fire, call the fire department and evacuate your house.
- Contact your local chimney professional and have your fireplace and chimney inspected for any damage.
- Do not use your fireplace until the chimney professional informs you it is safe to do so.
- Hearth & Home Technologies WILL NOT warranty fireplaces that exhibit evidence of over-firing. Evidence of over-firing includes, but is not limited to:
  - warped air tube
  - deteriorated refractory brick
  - deteriorated baffle and other interior components

## 5. Chimney Fire

In the event of a chimney fire:

- Have the chimney and adjacent structure inspected by qualified professionals. Hearth & Home Technologies recommends that NFI or CSIA certified professionals, or technicians under the direction of certified professionals, conduct a minimum of an **NFPA 211 Level 2** inspection of the chimney.
- Replace components of the chimney and fireplace as specified by the professionals.
- Ensure all joints are properly engaged and the chimney is properly secured.

**WARNING! Risk of Fire!** A chimney fire can permanently damage your chimney system. Failure to replace damaged components and make proper repairs can cause a structure fire.



## **WARNING**



### **HOT SURFACES!**

Glass and other surfaces are hot during operation AND cool down.

### **Hot glass will cause burns.**

- **DO NOT** touch glass until it is cooled
- **NEVER** allow children to touch glass
- Keep children away
- **CAREFULLY SUPERVISE** children in same room as fireplace.
- Alert children and adults to hazards of high temperatures.

### **High temperatures may ignite clothing or other flammable materials.**

- Keep clothing, furniture, draperies and other flammable materials away.

## **B. General Operating Parts**

**WARNING! DO NOT** operate fireplace before reading and understanding operating instructions. Failure to operate fireplace according to operating instructions could cause fire or injury.

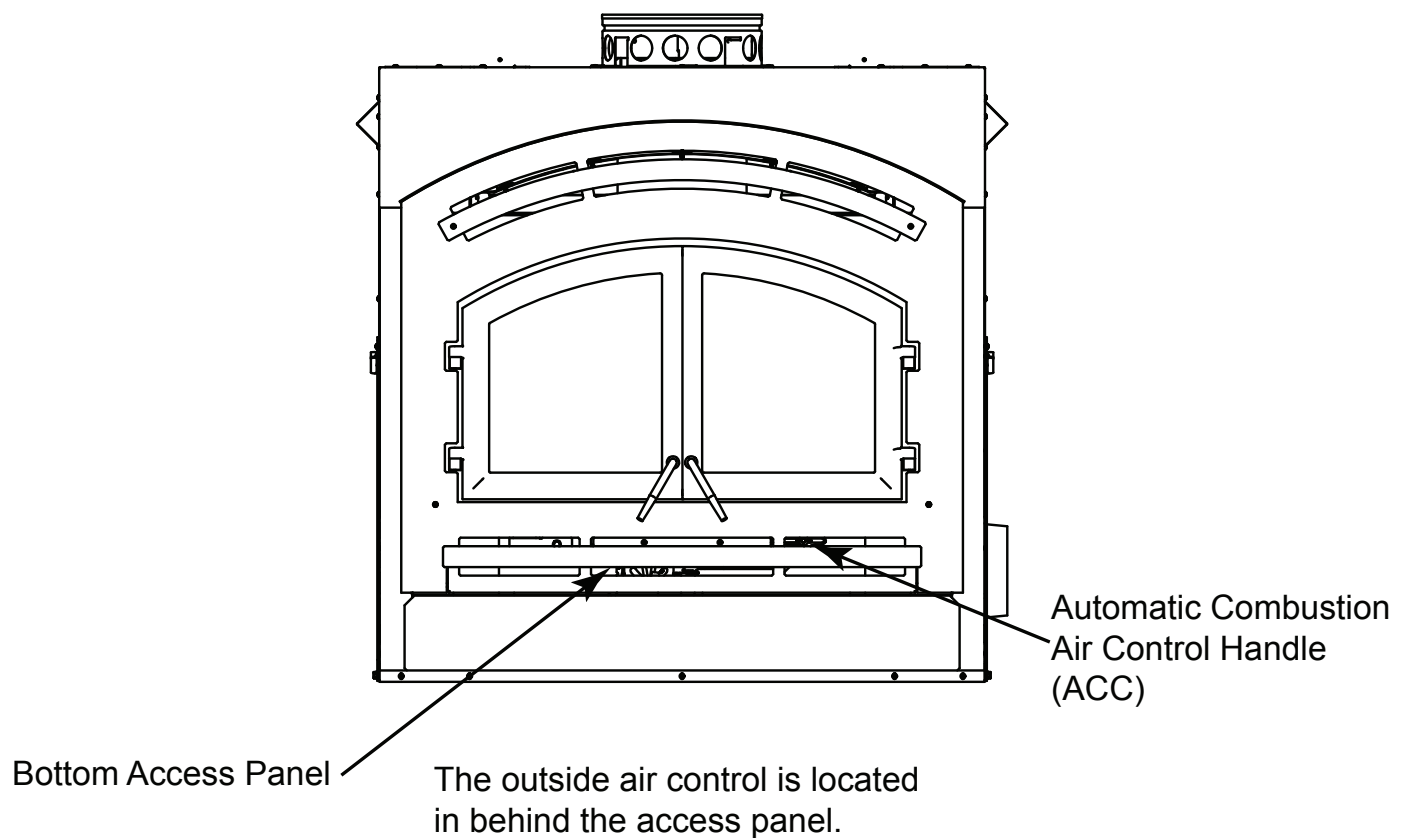


Figure 3.3 General Operating Parts

## 1. Automatic Combustion Control (ACC)

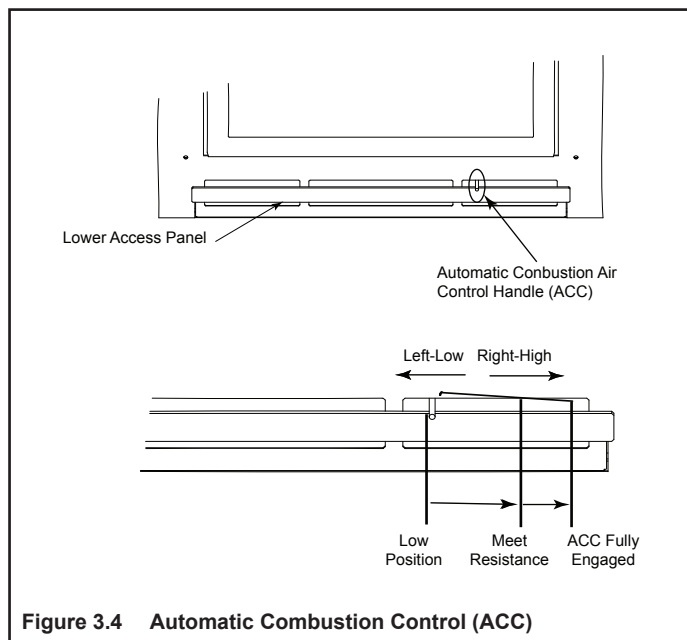
The automatic combustion control system allows you to set the fireplace to high (slide the combustion air control all the way to the right), start the fire, and then move the combustion air control to the desired burn level. The fire will automatically go to that level once it is fully established. This allows for less interaction with the fire by the homeowner and more efficient use of fuel while maintaining the desired heat output.

After the fireplace becomes hot, you may prefer to not activate the ACC when reloading fuel. If you do not slide the combustion air control all the way to the right, the ACC will not be activated.

**NOTICE:** If reloading a bright, hot coal bed for longer (low) burn time, setting the ACC may not be required. Burn dry, well seasoned wood.

**NOTICE:** To establish your settings, always begin with the air control all the way to the left to CLOSED and then move it to the right for your desired setting.

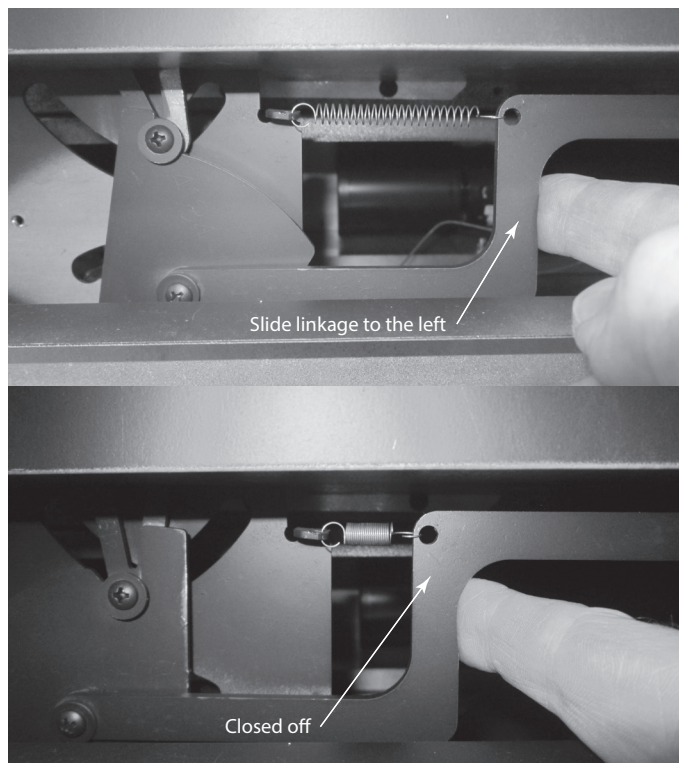
**IMPORTANT!** As you move the combustion air control to the RIGHT, you will feel resistance about three-fourths of the way. You must move past that resistance approximately 1 in. (25mm) to fully engage the automatic combustion control (ACC) system.



## 2. ACC Override

The ACC OVERRIDE lever is located behind the lower access panel (See Figure 3.4) and may be used to override the setting of the automatic combustion air control. If the ACC has been activated and burn rate needs to be slowed, remove the bottom access panel by lifting it up and pulling it off. To close down the air supply for an over-fire situation or to slow the burn rate down immediately, slide the linkage to the left. See Figure 3.5.

Slide the combustion air control all the way to the left also. Reinstall the access panel.



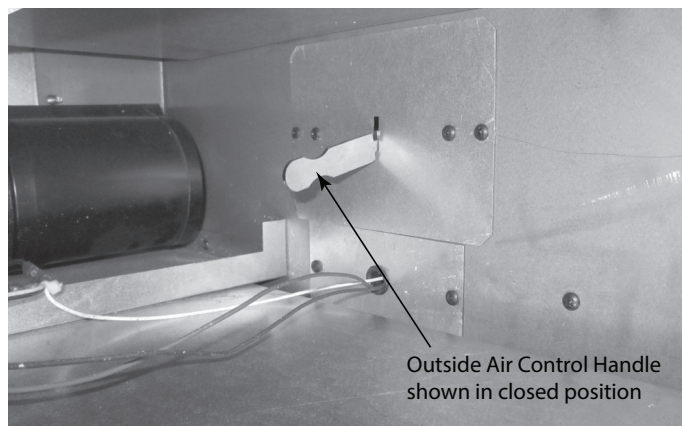
## 3. Outside Air

**NOTICE:** Use of outside air is required.

**CAUTION!** Outside air control handle may be warm. Allow unit to cool down before closing.

A source of air (oxygen) is required in order for combustion to take place.

1. Before lighting the fire open the bottom access panel by lifting it up and pulling it off.
2. Locate the handle on either the left or right side. Lift the handle up and pull out to open the door (pushing the handle in will close the door).
3. Reinstall the bottom access panel.



#### 4. Glass Door

This fireplace has been tested and is intended for use with doors as supplied with this fireplace.

**WARNING! Risk of Fire and Smoke! Fireplace should be operated only with doors fully open or doors fully closed. If doors are left partly open, gas and flame may be drawn out of the fireplace opening.**

A firescreen (MESH-HHT) must be used to control sparks if the homeowner chooses to operate the fireplace with the doors open.

##### **WARNING! Fire Risk!**

- Use firescreen when burning fireplace with doors open.
- Do not use firescreen or glass doors to hold burning material in fireplace.

*Firescreen controls sparks.*

*Glass may break or burning material may roll out.*

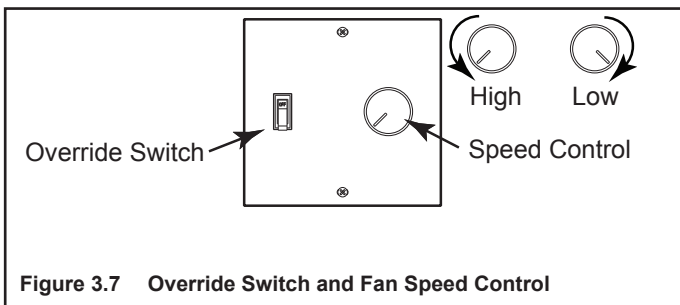
Only the screen specifically tested and listed for use with this fireplace model should be used.

**WARNING! RISK OF Fire! Do NOT install and or use any component not approved by Hearth & Home Technologies**

Always wear gloves when installing or removing the screen as the screen may become extremely hot while in use.

#### 5. Convection Fan Operation

The fireplace is equipped with a temperature-sensitive snap disc that will turn the convection fan on and off automatically, depending on the temperature of the fireplace.



An override switch and fan speed control have been installed on the wall in close proximity to the fireplace.

The speed of the fan can be regulated by the speed control knob.

If the fan is not coming on at the desired time, flip the override switch to manual and operate the fan as described below:

- **Initial (cold) Startup**

Leave fan off until your fireplace is hot and a good coal bed is established, approximately 30 minutes after fuel is lit.

- **High Burn Setting**

The fan may be left on throughout the burn.

- **Medium or Medium High Burn Setting**

The fan should be left off until a good burn is established, then turned on medium or high rate.

- **Low Burn Setting**

The fan tends to cool off the fireplace. Leave fan off until the burn is well established; then, if you wish, turn the fan on at a low rate.

#### C. Fuel

**WARNING! For use with solid wood fuel only.**

*Other fuels may overfire and generate poisonous gases (i.e. carbon monoxide).*

This fireplace 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
- Paper products, cardboard, plywood, or particleboard.

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.

## 1. Hardwood vs. Softwood

Your fireplace's performance depends on the quality of the firewood you use. One species of wood varies very little to the other in terms of energy content. All seasoned wood contains about 8,000 BTU's per pound. Hardwoods have a greater density than softwoods; a piece of hardwood will contain about 60% more BTU's than an equal size piece of softwood. A cord of seasoned oak (hardwood) would contain about 60% more potential energy than a cord of seasoned pine (softwood).

Most softwoods are coniferous. These are trees with needle-like leaves that stay green all year and carry their seeds exposed in a cone. Examples of coniferous trees are Douglas fir, pine, spruce and cedar. Softwoods, being more porous, require less time to dry, burn faster and are easier to ignite than hardwoods. Hardwoods are deciduous trees, broadleaf trees that lose their leaves in the fall. Their seeds are usually found within a protective pod or enclosure. Some examples of deciduous trees are oak, maple, apple, and birch. However, it should be noted that there are some deciduous trees that are definitely not considered hardwoods such as poplar, aspen and alder. Hardwoods require more time to season, burn slower and are usually harder to ignite than softwoods. Obviously, you will use the type of wood that is most readily available in your area. However, if at all possible the best arrangement is to have a mix of softwood and hardwood. This way you can use the softwood for starting the fire, giving off quick heat to bring the fireplace up to operating temperature. Add the hardwood for slow, even heat and longer burn time.

### **WARNING! Risk of Fire!**

- **DO NOT** burn wet or green wood.
- Wet, unseasoned wood can cause accumulation of creosote.

Soft woods	Hard woods
<ul style="list-style-type: none"><li>• Douglas Fir</li><li>• Pine</li><li>• Spruce</li><li>• Cedar</li><li>• Poplar</li><li>• Aspen</li><li>• Alder</li></ul>	<ul style="list-style-type: none"><li>• Oak</li><li>• Maple</li><li>• Apple</li><li>• Birch</li></ul>

## 2. Moisture Content

The majority of the problems fireplace owners experience are caused by trying to burn wet, unseasoned wood. Freshly cut wood can be as much water as it is wood, having a moisture content of around 50%. Imagine a wooden bucket that weighs about 8 pounds. Fill it with a gallon of water, put it in the firebox and try to burn it. This sounds ridiculous but that is exactly what you are doing if you burn unseasoned wood. Dead wood lying on the forest floor should be considered wet, and requires full seasoning time. Standing dead wood can be considered to be about two-thirds seasoned, if cut at the dry time of the year.

Burning wet, unseasoned wood will produce less heat output because it requires energy in the form of heat to evaporate the water trapped inside. This is wasted energy that should be used for heating your home. This moisture evaporates in the form of steam which has a cooling effect in your firebox and chimney system. When combined with tar and other organic vapors from burning wood it will form creosote which condenses in the relatively cool firebox and chimney.

Even dry wood contains at least 15% moisture by weight, and should be burned hot enough to keep the chimney hot for as long as it takes to dry the wood out - about one hour. To tell if wood is dry enough to burn, check the ends of the logs. If there are cracks radiating in all directions from the center, it is dry. If your wood sizzles in the fire, even though the surface is dry, it may not be fully cured.

## 3. Seasoning

Seasoned firewood is nothing more than wood that is cut to size, split and air dried to a moisture content of around 20%. The time it takes to season wood varies from around nine months for soft woods to as long as eighteen months for hardwoods. The key to seasoning wood is to be sure it has been split, exposing the wet interior and increasing the surface area of each piece. A tree that was cut down a year ago and not split is likely to have almost as high a moisture content now as it did when it was cut.

To season wood:

- Cut logs to size
- Split to 6 in. (152 mm) or less
- Air dry to a moisture content of around 20%
  - Soft wood - about nine months
  - Hard wood - about eighteen months

**NOTICE:** Seasoning time may vary depending on drying conditions.



## 4. Storing Wood

Splitting wood before it is stored reduces drying time. The following guideline will ensure properly seasoned wood:

- Stack the wood to allow air to circulate freely around and through the woodpile.
- Elevate the woodpile off the ground to allow air circulation underneath.
- The smaller the pieces, the faster the drying process. Any piece over 6 in. (152 mm) in diameter should be split.
- Wood should be stacked so that both ends of each piece are exposed to air, since more drying occurs through the cut ends than the sides. This is true even with wood that has been split.
- Store wood under cover, such as in a shed, or covered with a tarp, plastic, tar paper, sheets of scrap plywood, etc., as uncovered wood can absorb water from rain or snow, delaying the seasoning process. Avoid covering the sides and ends completely. Doing so may trap moisture from the ground and impede air circulation.

## 5. Burning Process

Fire requires fuel, air and heat. If heat is robbed from the fireplace during the drying stage, the new load of wood has reduced the chances for a good clean burn. Always burn dry, seasoned firewood.

### • Kindling or 1st stage:

In this stage, the wood is heated to a temperature high enough to evaporate the moisture which is present in all wood. The wood will reach the boiling point of water (212°F) and will not get any hotter until the water is evaporated. This process takes heat from coals and tends to cool the fireplace.

### • 2nd stage:

The secondary stage is when the wood gives off flammable gases which burn above the fuel with bright flames. It is very important that the flames be maintained and not allowed to go out. This will ensure the cleanest possible fire. You should close down the air to control the point where you can still maintain some flame. If the flames tend to go out, more air is necessary.

### • Final stage:

The final stage of burning is the charcoal stage. This occurs when the flammable gases have been mostly burned and only charcoal remains. This is a naturally clean portion of the burn. The coals burn with hot blue flames.

It is very important to reload your fireplace while enough lively hot coals remain in order to rekindle the next load of wood.

## 6. Dirty Glass

A portion of the combustion air entering the firebox is deflected down over the inside of the door glass. This air flow “washes” the glass, helping to keep smoke from adhering to its surface. When operated at a low burn rate, less air will be flowing over the glass and the smoky, relatively cool condition of a low fire will cause the glass to become coated. Operating the fireplace with the burn rate air control and start-up air control all the way open for 15-20 minutes should remove the built up coating.

## 7. Creosote Formation

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 newly-started or a slow-burning fire. As a result, creosote residue accumulates on the flue lining.

When ignited, creosote creates an extremely hot fire which may damage the chimney or even destroy the house.

The chimney shall be inspected at least annually before lighting, or once every two months during heating season.

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

## 8. Opacity

Opacity indicates how cleanly your fireplace is burning. Opacity is measured in percent; 100% opacity is when an object is totally obscured by the smoke column from a chimney, and 0% opacity means that no smoke column can be seen. Periodically check the opacity and burn your fireplace as nearly smoke-free as possible (goal of 0% opacity).

## D. First Fire

Before lighting your first fire in the fireplace, make certain that:

- the baffle and ceramic blanket are correctly positioned, resting against the rear support
- firebrick are in place
- all labels have been removed
- all plated surfaces have been cleaned

**NOTICE:** Oils can cause permanent markings on plating if not removed before the first fire.

**NOTICE:** The first three or four fires should be of moderate size to allow the oils and binders to be burned from the fireplace and the refractory and paint to cure. You may notice an industrial odor the first few fires. This is considered normal.

## E. Lighting Instructions/Establish Coal Bed

- Open outside air by opening the lower access panel and locate the outside air handle (it could be on the left or right). Lift the handle up and pull out to open. See Figure 3.20.

Note: This may be closed only when the fireplace is not in use to prevent cold air infiltration.

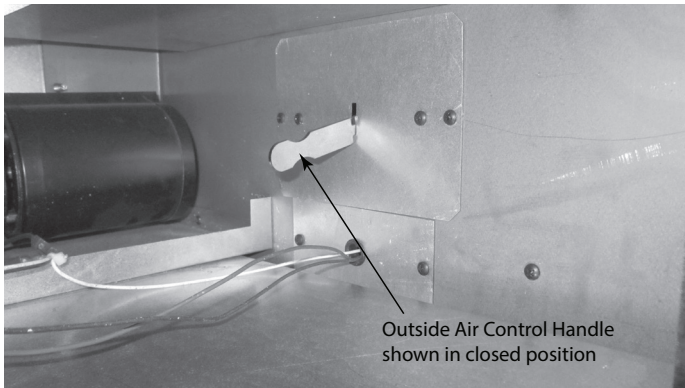


Figure 3.20 Outside Air Handle Shown on Right Side

- Move the combustion air control to the right, you will feel resistance about three-fourths of the way. You must move past that resistance approximately 3/4 in. (19 mm) to fully engage the automatic combustion control (ACC) system.
- Place several wads (3-4 pieces) of crumpled newspaper on the firebox floor. Add 5-6 lbs. of kindling (pieces of dry cord wood less than 1 inch in diameter) stacked on top of the paper crisscrossed. See Figure 3.21.
- Make sure that no matches or other combustibles are in the immediate area of the fireplace. Be sure the room is adequately ventilated and the flue unobstructed.
- For best results, use a hand held homeowner-type gas torch to light the paper and wood for approximately one minute.



Figure 3.21 Placing Kindling

- Leave the door slightly open 2-4 inches (see Figure 3.25) for 2-3 minutes then close the door, latching it lightly to allow the flame to get going good.
- When 1/2 to 2/3 of the kindling burns down, open the door and level the firebox.
- Add 7 to 9 pounds of start-up wood (1-3 inch diameter pieces of cord wood) by stacking them in a crisscross pattern. This will allow for proper air flow.
- Leave door slightly open 2-4 inches (see Figure 3.25) for 1-3 minutes or until a good flame is present. Then close the door, latching it lightly.
- After the flame gets established (approximately 3-5 minutes) shut and latch the door.
- When the start-up has burned down 1/2 to 2/3 and a good flame is still present, open the door. Level the coal bed insuring that the combustion air holes are not blocked.

### High Burn

- Load 4-6 pieces of cord wood 22 inches long to achieve maximum firebox volume, stack 2 to 3 pieces high in the back first, then 2 to 3 pieces in the front, making sure to work the bottom pieces into the coal bed to insure solid stack once all the wood is loaded. Leave at least a 1 inch gap between the two stacks to insure good air flow around the wood. See Figures 3.22, 3.23 & 3.24 for examples.
- Leave the door slightly open 2-5 inches (see Figure 3.25) for up to 5 minutes to get a good flame going then close the door. See Figure 3.27.
- When fire has burned down and ready for reloading, level out the coal bed first and reset the ACC if needed.



Figure 3.22 Loading Wood



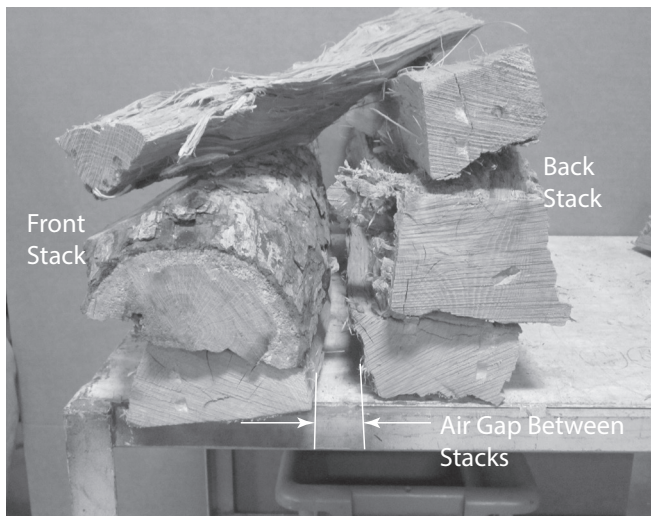


Figure 3.23 Stacking Wood

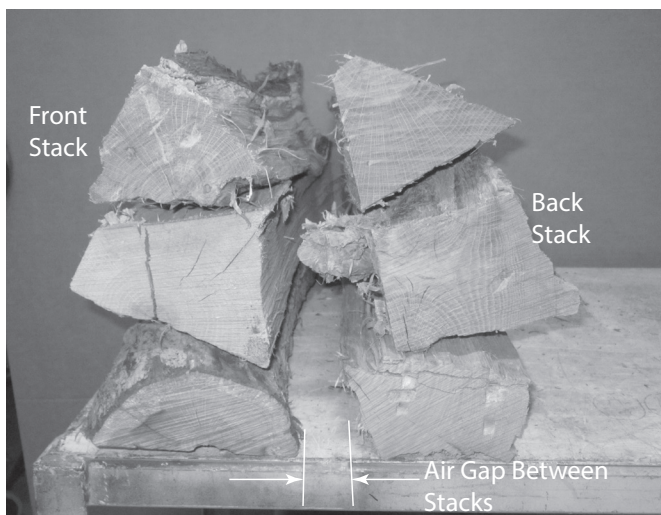


Figure 3.24 Stacking Wood

#### Medium/Low Burn

- Open the door and load the wood the same as the high burn. Then partially close the door leaving it open around 4-8 inches for up to 5 minutes or until the wood is burning good. Close the door and reset the ACC if needed. Let it burn for up to 20 minutes before setting the combustion air control to the desired setting.

#### COMBUSTION AIR CONTROL SETTINGS

- LOW - all the way to the left.
- MEDIUM - from the low setting go up to 1/2 inch to the right.
- HIGH - all the way to the right until resistance is felt.

NOTE: The ACC should only need to be activated when starting from a cold start or if a lively coal bed isn't present when reloading.

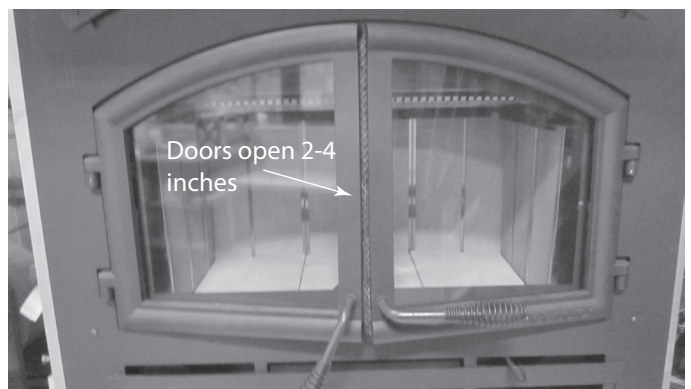


Figure 3.25 Doors Open 2-4 Inches



Figure 3.26 Doors Latched Lightly

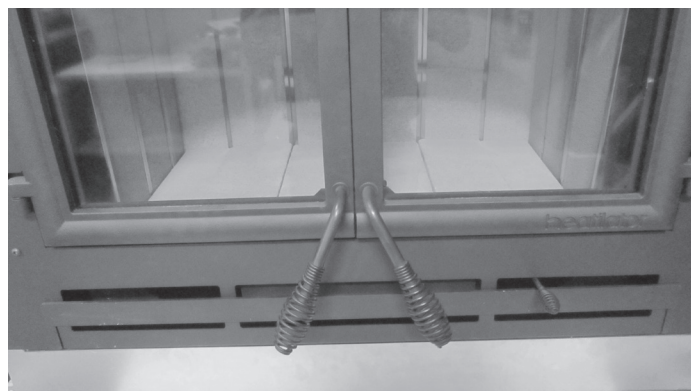


Figure 3.27 Door Fully Closed

Figure 3.27 Door Fully Closed



## H. Frequently Asked Questions

ISSUES	SOLUTIONS
Odor from appliance	When first operated, this appliance may release an odor for the first several hours. This is caused by the curing of the paint and the burning off of any oils remaining from manufacturing.
Metallic noise	Noise is caused by metal expanding and contracting as it heats up and cools down, similar to the sound produced by a furnace or heating duct. This noise does not affect the operation or longevity of the appliance.
Whirring sound	The fan produces a whirring sound which increases in volume as the speed is increased.

**CONTACT YOUR DEALER** for additional information regarding operation and troubleshooting.  
Visit [www.heatnglo.com](http://www.heatnglo.com) to find a dealer.

### **WARNING**

DO NOT PLACE COMBUSTIBLE OBJECTS IN FRONT OF THE APPLIANCE. High temperatures may ignite clothing, furniture or draperies.

### **WARNING**



#### **Fire Risk.**

- DO NOT BURN GARBAGE OR FLAMMABLE FLUIDS SUCH AS GASOLINE, NAPHTHA OR ENGINE OIL.
- Do NOT burn treated wood or wood with salt (driftwood).
- May generate carbon monoxide if burn material other than wood.

May result in illness or possible death.

### **WARNING**



#### **Fire Risk.**

Keep combustible materials, gasoline and other flammable vapors and liquids clear of appliance.

- Do NOT store flammable materials in the appliance's vicinity.
- DO NOT USE GASOLINE, LANTERN FUEL, KEROSENE, CHARCOAL LIGHTER FLUID OR SIMILAR LIQUIDS TO START OR "FRESHEN UP" A FIRE IN THIS HEATER.
- Keep all such liquids well away from the heater while it is in use.
- Combustible materials may ignite.

## 4 Maintenance and Service

This fireplace needs periodic inspection and repair for proper operation. It is against federal regulations to operate this fireplace in a manner inconsistent with operating instructions in this manual.

### **WARNING! Hot Surfaces!**

*Glass and other surfaces are hot during operation AND cool down. **DO NOT** clean fireplace until it is cooled.*

Task	Frequency	To be completed by
1. Chimney Inspection	As needed	Homeowner or Chimney Sweep
2. Chimney Cleaning	As needed	Chimney Sweep
3. Plated Surfaces Cleaning	As needed	Homeowner
4. Glass Door	Seasonally	
5. Glass Cleaning	As needed	
6. Door Gasket	Seasonally	
7. Ash Removal	As needed	
8. Baffle/Blanket/Channel Protector	Seasonally	
9. Firebrick	Seasonally	

### **A. Maintenance Tasks-Homeowners**

Installation and repair should be done by a qualified service technician only. The fireplace should be inspected before use and at least annually by a professional service person.

The following tasks may be performed annually by the homeowner. If you are uncomfortable performing any of the listed tasks, please call your dealer for a service appointment.

#### **1. Chimney Inspection**

**Frequency:** As necessary; at least annually before lighting fireplace, or once every two months during heating season.

**By:** Homeowner/Chimney Sweep

- Confirm that termination cap remains clear and unobstructed.
- Inspect for blockages such as bird nests, leaves, etc.
- Inspect for corrosion or separation.
- Inspect for creosote and remove as needed, at least every two months during the heating season.
- Inspect the system at the fireplace connection and at the chimney top.

In the event of a chimney fire, Hearth & Home Technologies recommends replacement of the chimney and inspection of the adjacent structure to the provisions of NFPA Level III inspection criteria.

**WARNING! Risk of Asphyxiation and Fire! Annual inspection by qualified technician recommended.**

*Check:*

- *condition of door, surrounds and fronts*
- *condition of glass and glass assembly*
- *obstructions of combustion and ventilation air*
- *obstructions of termination cap*

*Clean:*

- *glass*
- *air passageways, grilles*

## 2. Creosote (Chimney) Cleaning

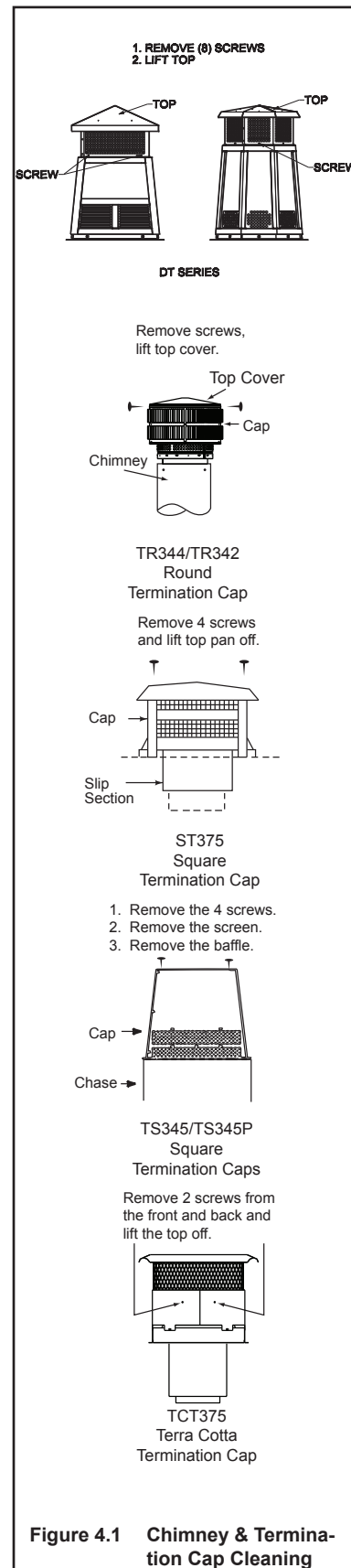
**Frequency:** As needed; at least annually before lighting, or once every two months during heating season. When creosote has accumulated it shall be removed to reduce the risk of a chimney fire.

**By:** Chimney Sweep

**Tools Needed:** Brush, Phillips screwdriver

- 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.
- Remove all ash from the firebox and extinguish all hot embers before disposal. Allow the fireplace to cool completely.
- Remove baffle and ceramic blanket from fireplace before cleaning chimney (refer to Section 5.C.3 Baffle Removal and Installation).
- Close the door tightly.
- Remove the top of the termination cap as shown in Figure 4.1 to clean the cap and chimney.
- The creosote or soot should be removed from the chimney with a brush specifically designed for the size of chimney in use.
- Reinstall termination cap.
- Clean out fallen debris from the firebox.
- Replace baffle and ceramic blanket.

**WARNING! Risk of Fire! Ignited creosote is extremely HOT. Prevent creosote buildup.**



### 3. Care and Cleaning of Plated Surfaces

**Frequency:** Initially and as needed

**By:** Homeowner

**Tools Needed:** Vinegar or glass cleaner, soft towel

**CAUTION!** Do not use a polish with abrasives. It will scratch plated surfaces.

- Use a glass cleaner or vinegar and towel to remove the oils.
- Oils can cause permanent markings on plating if not removed.
- After plating is cured, oils will not affect the finish.

### 4. Glass Door

**Frequency:** As necessary

**By:** Homeowner

- Inspect glass panel for cracks. Replace if this condition is present.
- Inspect glass gasket. Confirm glass does not move around in glass frame.

### 5. Glass Cleaning

**Frequency:** As necessary

**By:** Homeowner

**Tools Needed:** Vinegar or glass cleaner, soft towel

- Clean glass with a non-abrasive glass cleaner. Use a damp cloth dipped in wood ashes or a commercially available oven cleaner. Remove any oven cleaner residue with a glass cleaner or soap and water.

### 6. Door Gasket

**Frequency:** Seasonally

**By:** Homeowner

- Open door, place half a dollar bill inside and close the door.
- Attempt to pull the bill out.
- If the bill gives good resistance or is not removable, the gasket is adjusted correctly. If the bill is easily removed, the gasket needs adjustment or replacement to create an even seal all around door.

It may be necessary to adjust or tighten the door latch.

### 7. Ash Removal

**Frequency:** As necessary

**By:** Homeowner

**Tools Needed:** Covered metal container, metal shovel, fireplace broom

**WARNING! Risk of Fire! DO NOT** remove ashes until the fire is out and the fireplace is cold.

- Ashes should be placed in metal container with tight fitting lid.
- The closed container of ashes should be placed on a noncombustible 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.

### 8. Baffle and Blanket

**Frequency:** As necessary

**By:** Homeowner

**Tools Needed:**

- Ensure correct baffle and baffle protection channel placement; replace baffle components if damaged or missing.
- The ceramic blanket and baffle board **MUST** be in contact with the back of the firebox and even with each other in the front. The baffle protection channel **MUST** be in position. Refer to Section 3.A.3.

### 9. Firebrick

**Frequency:**

**By:**

**Tools Needed:**

- Inspect condition of brick. Replace if crumbly or otherwise deteriorated, or if cracks exceed 1/4 in. (6 mm).

## B. Replacement Maintenance

### 1. Glass Replacement

- Ensure that the fire is out and the fireplace is cool to the touch.
- Protect a table or counter top with padding or towels.
- Remove door with broken glass from the fireplace by lifting door up and off of the hinges.
- Lay door face down on table or counter making sure handle and handle attachment knob hang over the edge of the table top so door lays flat on the soft surface.
- Remove screws from the top and bottom glass frames (five on each door) using a #2 Phillips Head screwdriver. Set frames aside and retain screws.  
**HINT:** Soak screws in penetrating oil for easy removal.

- Remove the glass and discard.
- Position the new glass with edges evenly overlapping the opening in the front door.
- Replace the glass frames.
- Start screws to secure glass frames to door, keeping them loose for adjusting the glass. Then continue to tighten each screw alternately, a few turns at a time, until the glass panel is tightened snugly. **DO NOT OVERTIGHTEN OR CROSS THREAD SCREWS.**
- Replace the door on the fireplace.
- After the first burn, recheck the tightness of the screws.

### 2. Tighten or Adjust Door Latch

Remove the lock nut holding latch cam and four spacing washers on the right hand door as shown in Figure 4.2. Move 1-3 spacing washers to the opposite side of cam. Reinstall the cam and tighten locknut. At least one spacing washer and the black washer must be left in place.

OR

Replace the gasket material. Wear or damage to the gasket material can cause air leakage into the firebox resulting in overfiring and loss of efficiency.

A replacement gasket is available from your dealer.

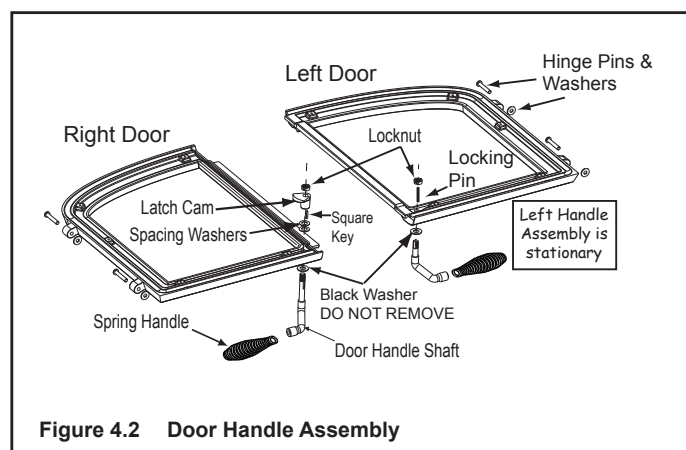
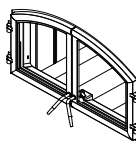


Figure 4.2 Door Handle Assembly

**NOTICE:** Remove all labels from glass before lighting the first fire in your fireplace.

### CAUTION!



Handle glass assembly with care.

#### When cleaning glass:

- Avoid striking, scratching or slamming glass.
- Do NOT clean glass when hot.
- Do NOT use abrasive cleaners.
- Use a hard water deposit glass cleaner on white film.
- **Refer to maintenance instructions.**



### WARNING



#### Injury Risk.

- Use only glass specified in manual.
- **DO NOT REPLACE** with any other material.

### 3. Door Handle Assembly

- Slide door handle through door.
- Install washer(s) as shown in Figure 4.3.
- Install key groove.
- Align groove in latch cam with key; slide latch cam over shaft.
- Install locknut but do not overtighten, the handle needs to move smoothly.
- Install fiber handle using a clockwise motion until the fiber handle is snug against the door handle shaft.

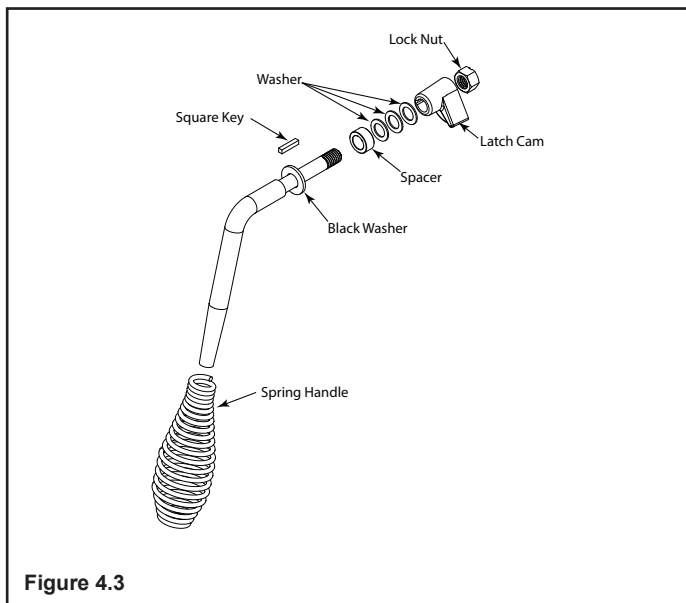


Figure 4.3

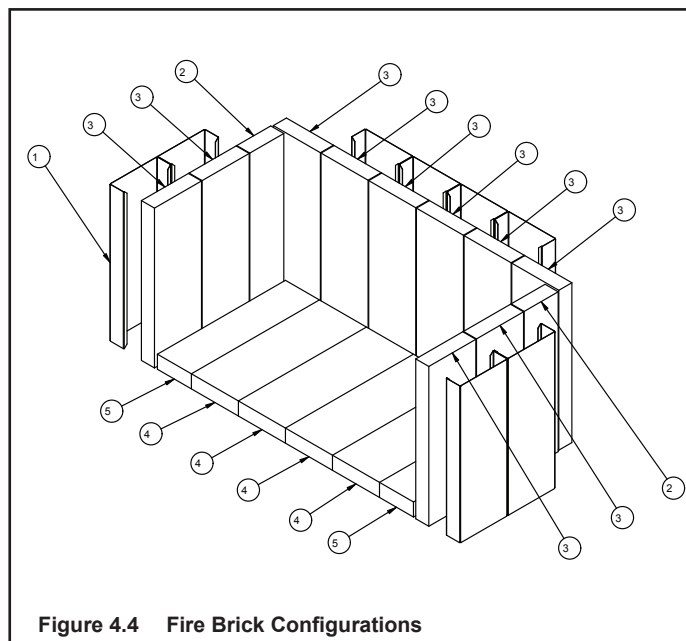


Figure 4.4 Fire Brick Configurations

#	Brick Size	Qty. in Set
1	Brick Wrap	8
2	Firebrick 13.25 x 3.25	2
3	Firebrick 13.25 x 4.50 x 1.25	10
4	Firebrick 12.25 x 4.50	4
5	Firebrick 12.25 x 3.25	2

### 4. Firebrick Replacement

The firebox of your fireplace is lined with high quality firebrick and refractory board under the bottom firebrick only, which has exceptional insulating properties. There is no need to use a grate; simply build a fire on the firebox floor. Do not operate the fireplace without bricks.

**IMPORTANT:** The bricks are very similar in size. Be certain you have the proper brick in the correct location. Measure the brick size for accuracy.

After the coals are completely cooled, remove all old firebrick and ash from unit and vacuum out firebox.

- Remove new brick set from box and lay out to diagram shown in Figure 4.4.
- If the bottom refractory board needs replacing, do so at this time.
- Install rear bricks. Slide top of bricks under clip on back of firebox wall and push bottom of brick back.
- Install side bricks. Slide top of brick under clips on side of firebox and push the bottom of the brick until it is flush with the side of the unit.
- Lay bottom bricks in unit.



## 5. Baffle Removal and Installation

### **WARNING! Hot Surfaces!**

Glass and other surfaces are hot during operation AND cool down. **DO NOT** clean fireplace until it is cooled.

1. Remove all ash from firebox and place into a metal container.
2. Remove the baffle protection channel by lifting it up and turning it down and pulling it out of the firebox. See Figure 4.5.

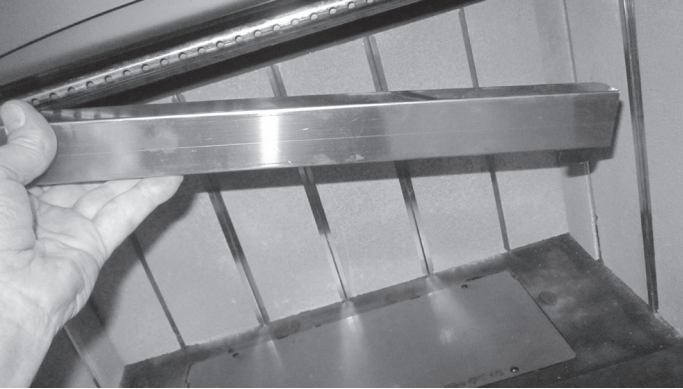


Figure 4.5 Removing Baffle Protection Channel

3. Using a 3/16 inch Allen wrench, remove the front manifold tube retainer bolt on the air channel behind the end of the front tube on the right side. See Figure 4.6.

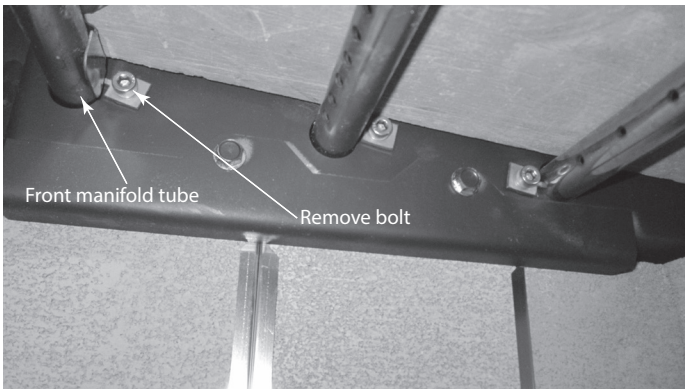


Figure 4.6 Remove Retainer Bolt

4. To remove the manifold tube, slide the tube to one side until one end is out of its hole then pull it down and out of the other hole. It is only necessary to remove the front tube in order to remove the baffle.
5. Pull the two (2) piece baffle board and insulation down and out of the firebox. See Figure 4.7.

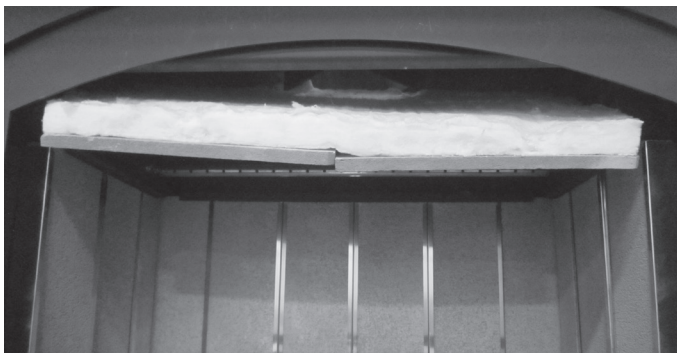


Figure 4.7

6. To install the baffle board and insulation, repeat steps 2 thru 5 in reverse. Be sure the baffle board and insulation are pushed back fully and the insulation is down and flat. See Figures 4.8 & 4.9.

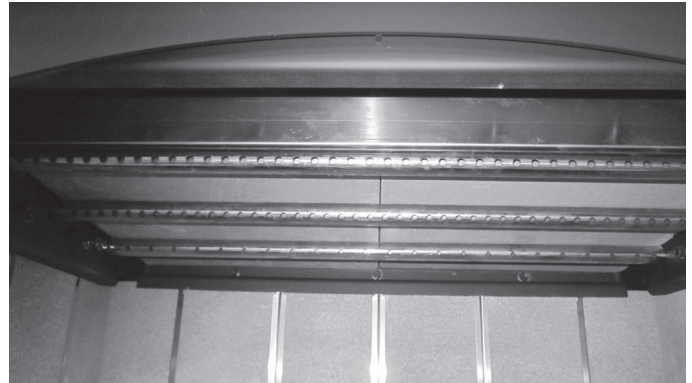


Figure 4.8 Reinstall Baffle Boards

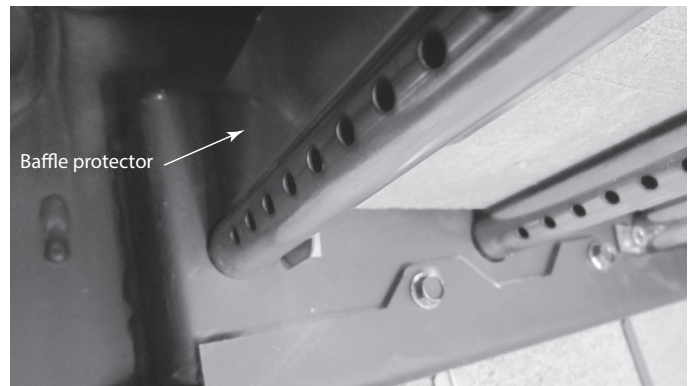


Figure 4.9 Reinstall Baffle Protection Channel

## 6. Fan Replacement

**CAUTION! Risk of Shock! Disconnect power by turning off circuit breaker before servicing or unplugging control board from junction box in behind the access panel..**

The Fireplace comes equipped with two fans, installed at the factory with electric access on both sides of the fireplace.

1. Remove the bottom firebrick.
2. Remove the four (4) 5/32 Allen head screws and pry open the access door with a flat blade screwdriver. See Figure 4.10 and remove it.

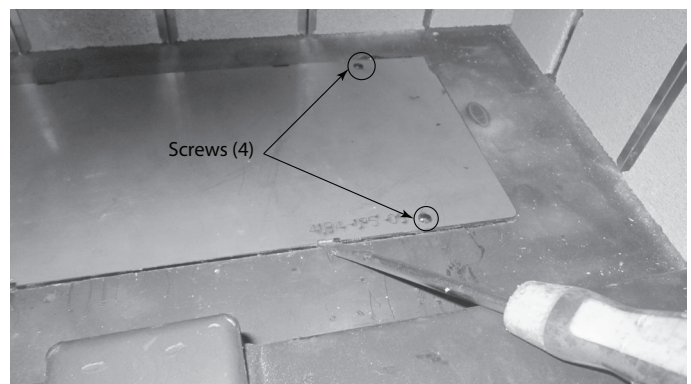


Figure 4.10 Pry Open Access Door



3. While holding the handle, remove the four (4) screws at each corner of the combustion cover and fish it up and out of the bottom of the fireplace. See Figures 4.11 & 4.12.

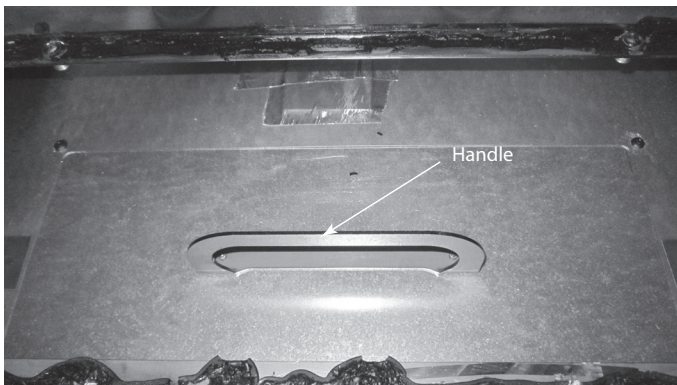


Figure 4.11 Removal of Combustion Cover Screws

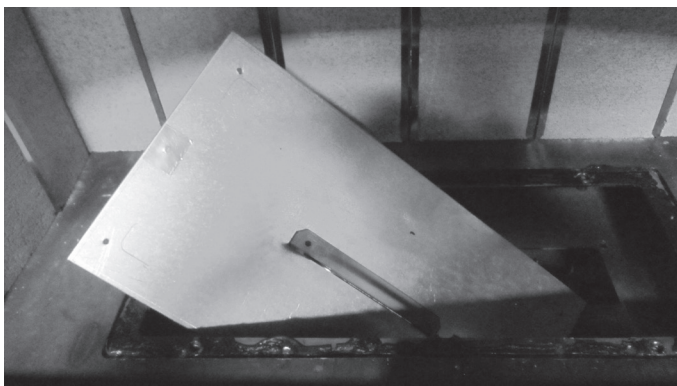


Figure 4.12 Removal of Combustion Cover

4. Unplug the wire harness from the fans and remove the wing nut holding the fan in place. See Figure 4.13.

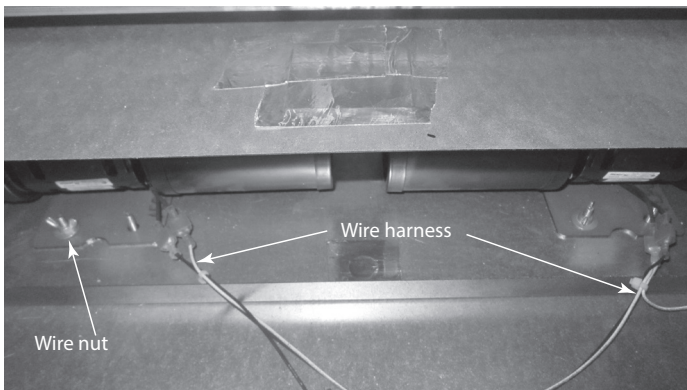


Figure 4.13 Unplug Wire Harness

5. Lift the fan up and off of the locating pins and remove up through the access hole. See Figure 4.14.



Figure 4.14 Remove Fan from Access Hole

6. Install new fans in reverse order.

## 7. Timer Assembly Replacement

1. Remove the bottom front access panel by lifting it up and off.
2. Remove the two (2) screws in the air chamber cover. See Figure 4.15. Pull it down and off. See Figure 4.16.

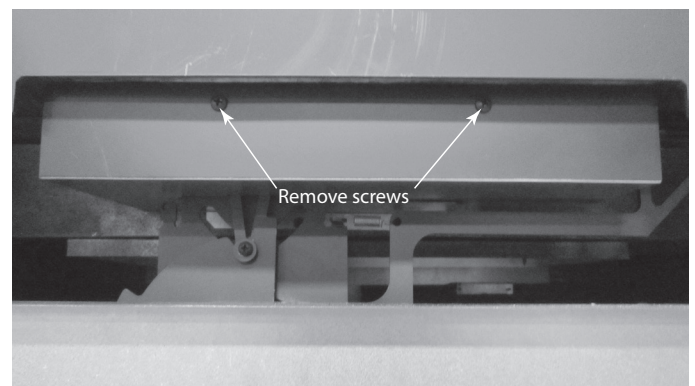


Figure 4.15 Removal of Screws on Air Chamber Cover

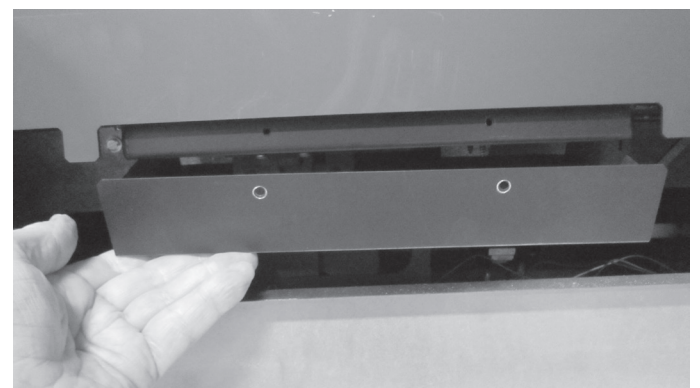
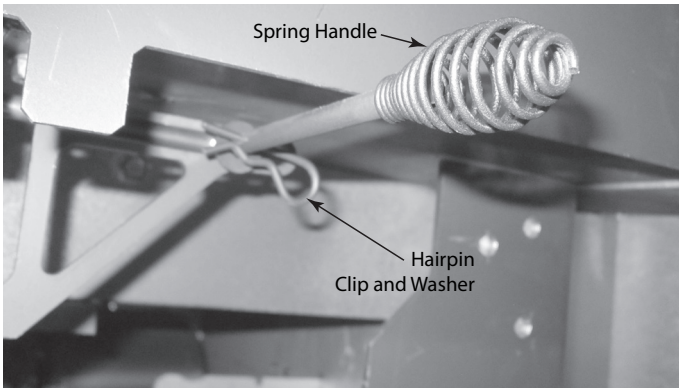


Figure 4.16 Removal of Air Chamber Cover

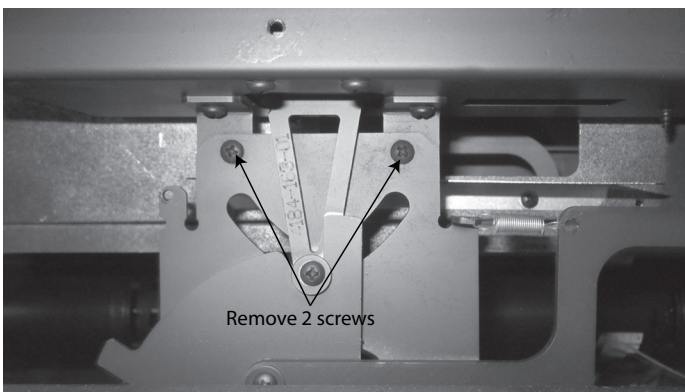


3. Remove the spring handle by twisting it to the left and pulling on it. Hold on to the rod as this is being done. See Figure 4.17.
4. Pull off and remove the front hairpin clip and washer on the rod. See Figure 4.17.



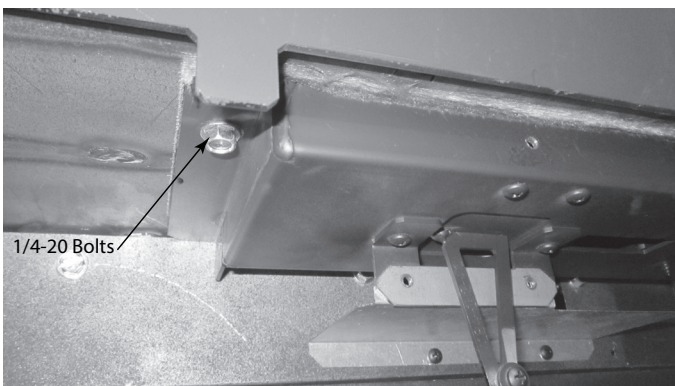
**Figure 4.17 Removal of Spring Handle**

5. While holding on to the timer assembly, remove the two (2) screws and slide the linkage arm off of the rod and pull the assembly out of the front. See Figure 4.18.

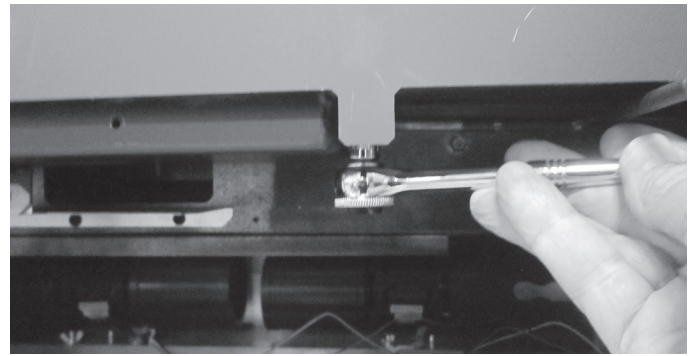


**Figure 4.18 Removal of Timer Assembly Screws**

6. While supporting the air chamber, remove the two (2) 1/4-20 bolts at each end of it. Then pull it down and out the front. See Figures 4.19 & 4.20.

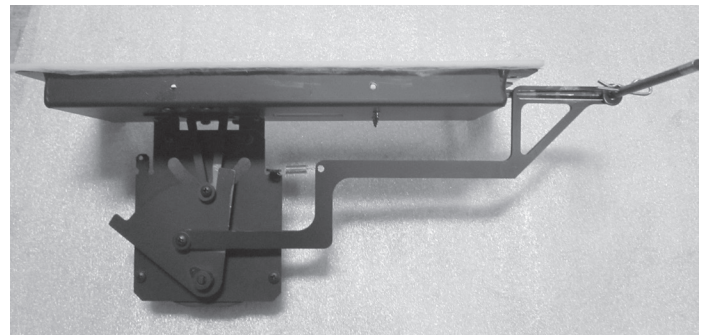


**Figure 4.19 Location of Bolts**

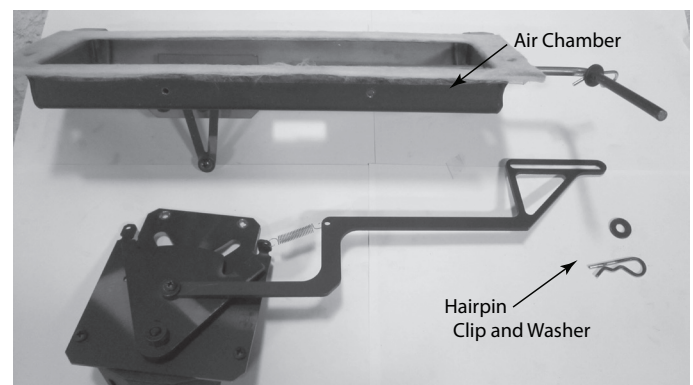


**Figure 4.20 Removal of Bolts (2)**

7. On the new timer assembly, Figure 4.21, remove the front hairpin clip and washer then two (2) screws disconnecting the air chamber before installation. See Figure 4.22.

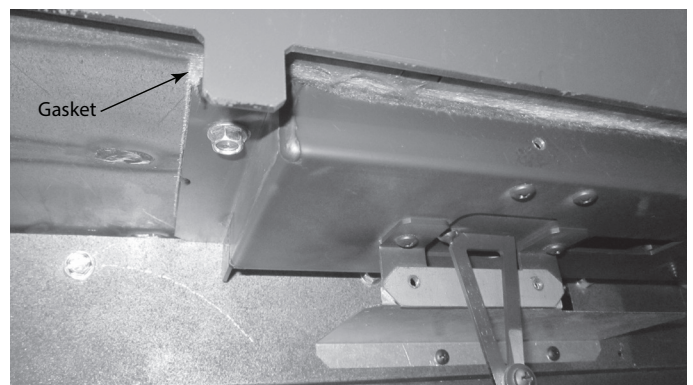


**Figure 4.21 Timer Assembly**



**Figure 4.22 Removal of Hairpin Clip, Washer and Air Chamber**

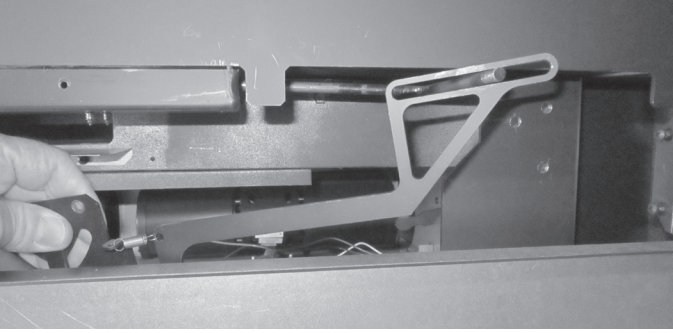
8. Install the new air chamber using the 1/4-20 bolts making sure the gasket is installed also. See Figure 4.22.



**Figure 4.22 Install New Air Chamber**

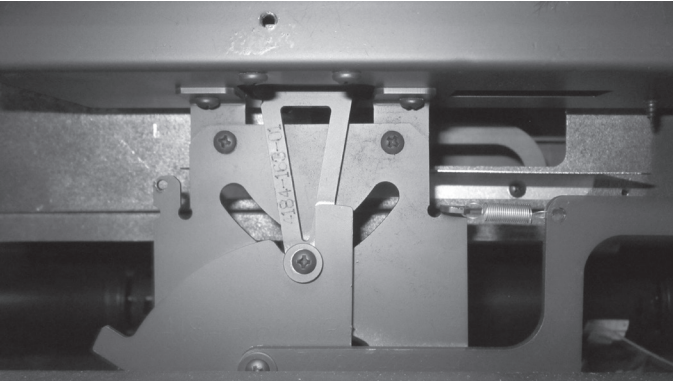


9. Install the timer/linkage by inserting the timer in first and slipping the linkage over the rod. See Figure 4.23.



**Figure 4.23 Inserting Timer Assembly**

10. Screw the timer to the air chamber. See Figure 4.24.



**Figure 4.24 Screwing Timer to Air Chamber**

11. Install the washer and hairpin clip back on the rod. See Figure 4.25.

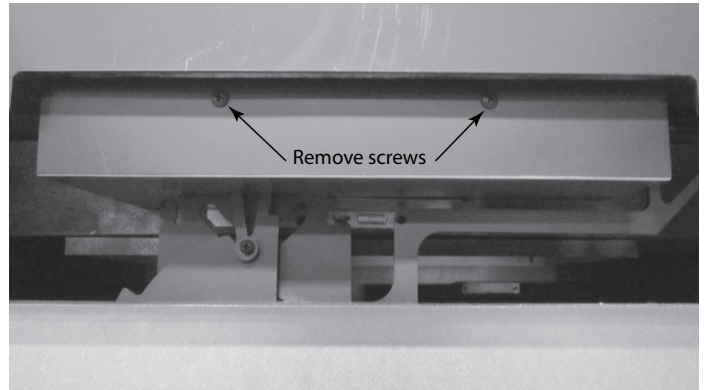


**Figure 4.25 Reinstalling Hairpin Clip and Washer**

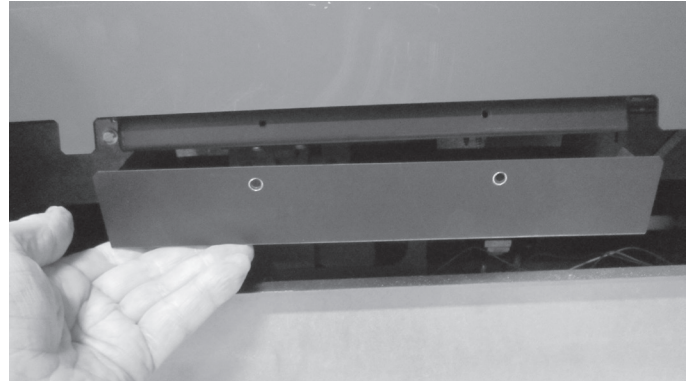
12. Reinstall air chamber cover. See Figure 4.26.
13. Reinstall the bottom front access panel.

## 8. Timer Removal & Replacement

1. Remove the bottom front access panel by lifting it up and off.
2. Remove the two (2) screws in the cover. See Figure 4.26 and pull it down and off. See Figure 4.27.

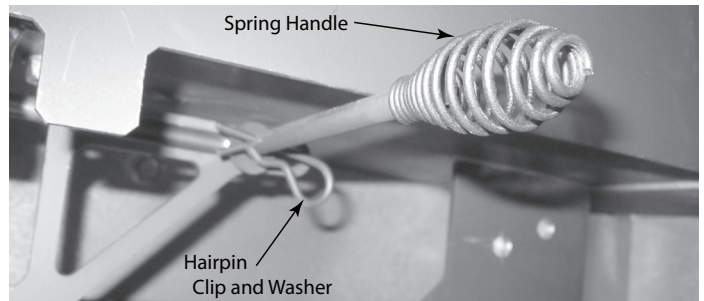


**Figure 4.26 Air Chamber Cover**



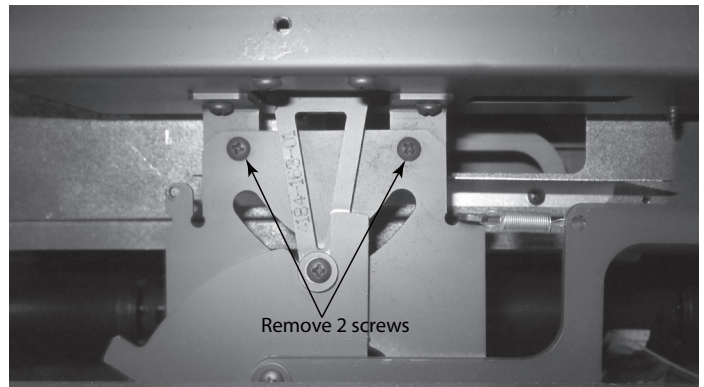
**Figure 4.27 Removal of Air Chamber Cover**

3. Remove the spring handle by twisting it to the left and pulling on it. Hold on to the rod as this is being done. See Figure 4.28.
4. Pull off and remove the hairpin clip and the washer on the rod. See Figure 4.28.



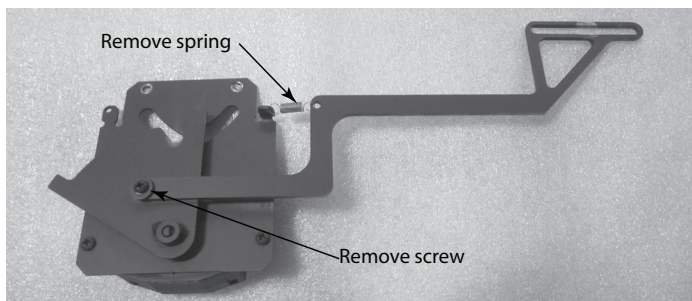
**Figure 4.28 Removal of Spring Handle**

5. While holding on to the timer assembly, remove the two (2) screws, Figure 4.29 and slide the linkage arm off of the rod and pull the assembly out of the front.



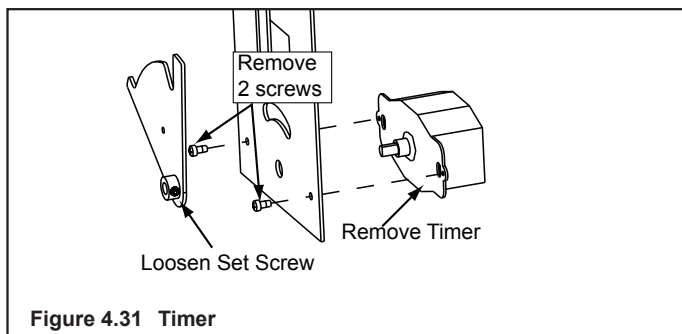
**Figure 4.29 Removal of Screws**

6. Remove the linkage arm and the spring from the timer. See Figure 4.30.



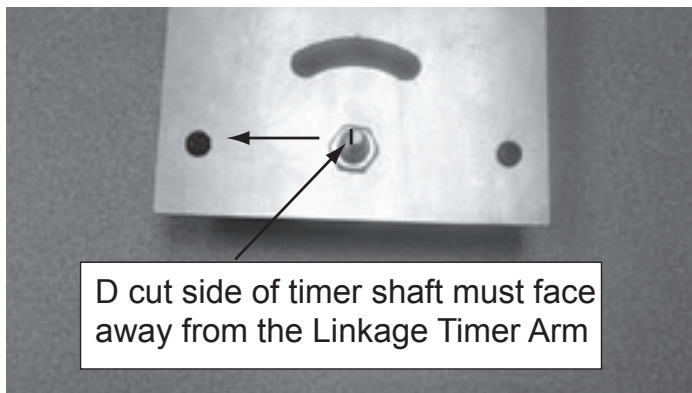
**Figure 4.30 Removal of Linkage Arm and Spring**

7. Loosen set screw on timer, remove two screws and remove timer. See Figure 4.31.



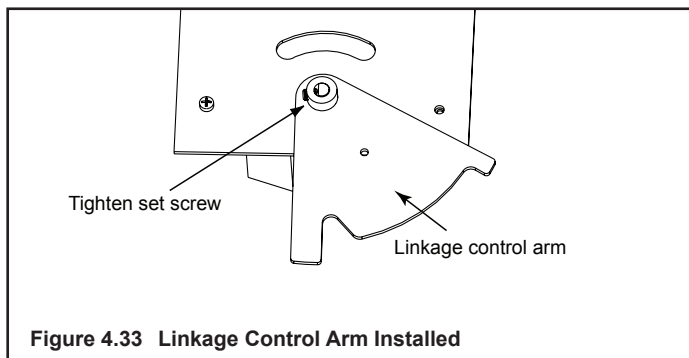
**Figure 4.31 Timer**

8. Install new timer using same two screws. It is very important that the D cut side of the timer shaft is facing the opposite side of the linkage timer arm. See Figure 4.32.



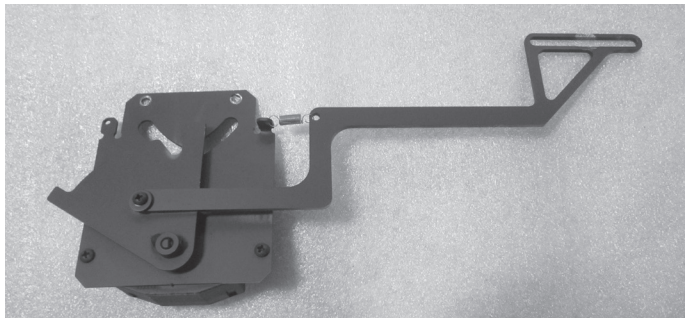
**Figure 4.32 D Cut on Shaft**

9. • Place linkage control arm over timer shaft and tighten set screw, Figure 4.33.



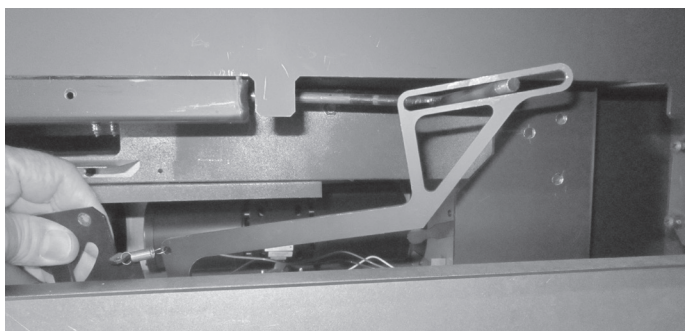
**Figure 4.33 Linkage Control Arm Installed**

10. Rotate linkage control arm into final position. Note that the D cut is now facing the linkage timer arm. Re-attach the linkage timer arm and spring. See Figure 4.34.



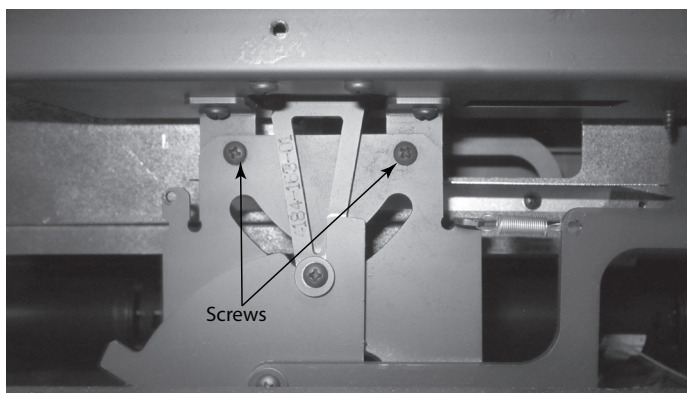
**Figure 4.34 Reattach the Linkage Timer Arm**

11. Install the timer/leakage by inserting the timer in first and slipping the linkage over the rod. See Figure 4.34.



**Figure 4.34 Insert the Timer/Leakage**

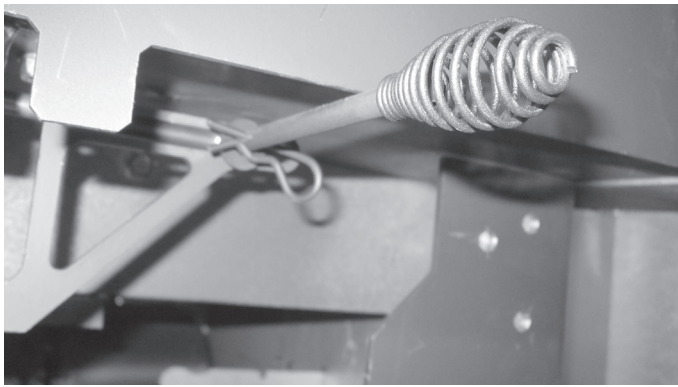
12. Screw the timer to the air chamber. See Figure 4.35.



**Figure 4.35 Screw Timer to Air Chamber**

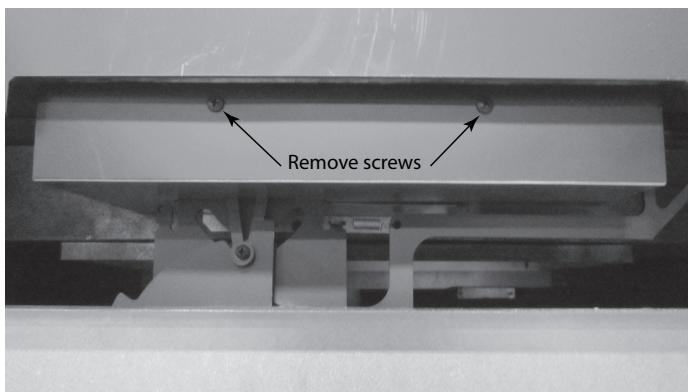


13. Install the washer and the hairpin clip back on the rod. See Figure 4.36.



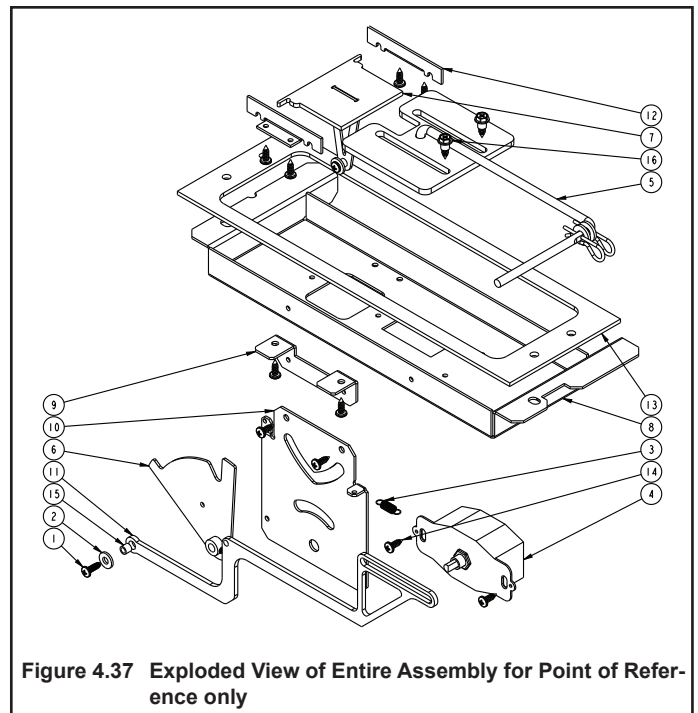
**Figure 4.36 Reinstalling Hairpin Clip and Washer**

14. Reinstall the air chamber cover. See Figure 4.37.



**Figure 4.37 Air Chamber Cover**

15. Reinstall the bottom front access panel.



**Figure 4.37 Exploded View of Entire Assembly for Point of Reference only**

Item	Description	Qty
1	Screw 8-32 x 1/2 PPH BK	1
2	Washer #10 SAE ZN	1
3	Extension Spring	1
4	Timer Mechanical 12 HR	1
5	Slide Assembly	1
6	Timer Arm Assembly	1
7	Timer Door Assembly	1
8	Air Channel Bottom	1
9	Timer Bracket	1
10	Timer Base	1
11	Timer Handle	1
12	Timer Door Retainer	2
13	Air Channel Gasket	1
14	Screw 8 x 12 PPH BK	10
15	Spacer #8 1/4D 7/32L ZN	1
16	HHSS #10 x 1/4D 1/4 L BK	2

# 5 Troubleshooting

## A. FAQs

Hearth & Home Technologies assumes no responsibility for the improper performance of the fireplace system caused by inadequate draft due to environmental conditions, down drafts, tight sealing construction of the structure, or mechanical exhausting devices which will create a negative air pressure within the structure where the fireplace is located.

If smoke spillage occurs from a fireplace opening when the door is open, there is either a leakage in the flue, a blockage in the flue, or some condition is affecting draft. Understanding and differentiating the conditions which can cause each of these kinds of spillage problems is essential to their solution.

- **Flue Leakage**  
Check for improperly connected flue joints or a damaged flue joint in the chimney system. Such leakage would reduce draft (air would be drawn in through the leaks rather than through the fireplace). The result might be difficult start-up and smoky fires that might spill if other adverse draft conditions accompany this problem.
- **Flue Blockage**  
The damper should be open.  
Check for objects that may have fallen down the chimney.

Flue draft is measured as negative pressure in the chimney. The amount of negative pressure determines how strong the draft is. The draft is important because it draws the combustion air into the fireplace and pulls the smoke out of the chimney.

There are three basic criteria essential in establishing and maintaining flue draft:

- availability of combustion air
- heat generated from the fire
- diameter and height of the flue system

These three factors work together as a system to create the flue draft. Increasing or decreasing any one of them will affect the other two and thus change the amount of draft in the entire system.

If the fire is hard to start and smoke spills out of the fireplace, or you find it difficult to establish and maintain a moderately high burn rate, then the flue draft is too low and corrective measures must be taken.

Be sure you have air available for combustion and that your firewood is dry and well seasoned. Build your fires properly and according to the instructions given in op-

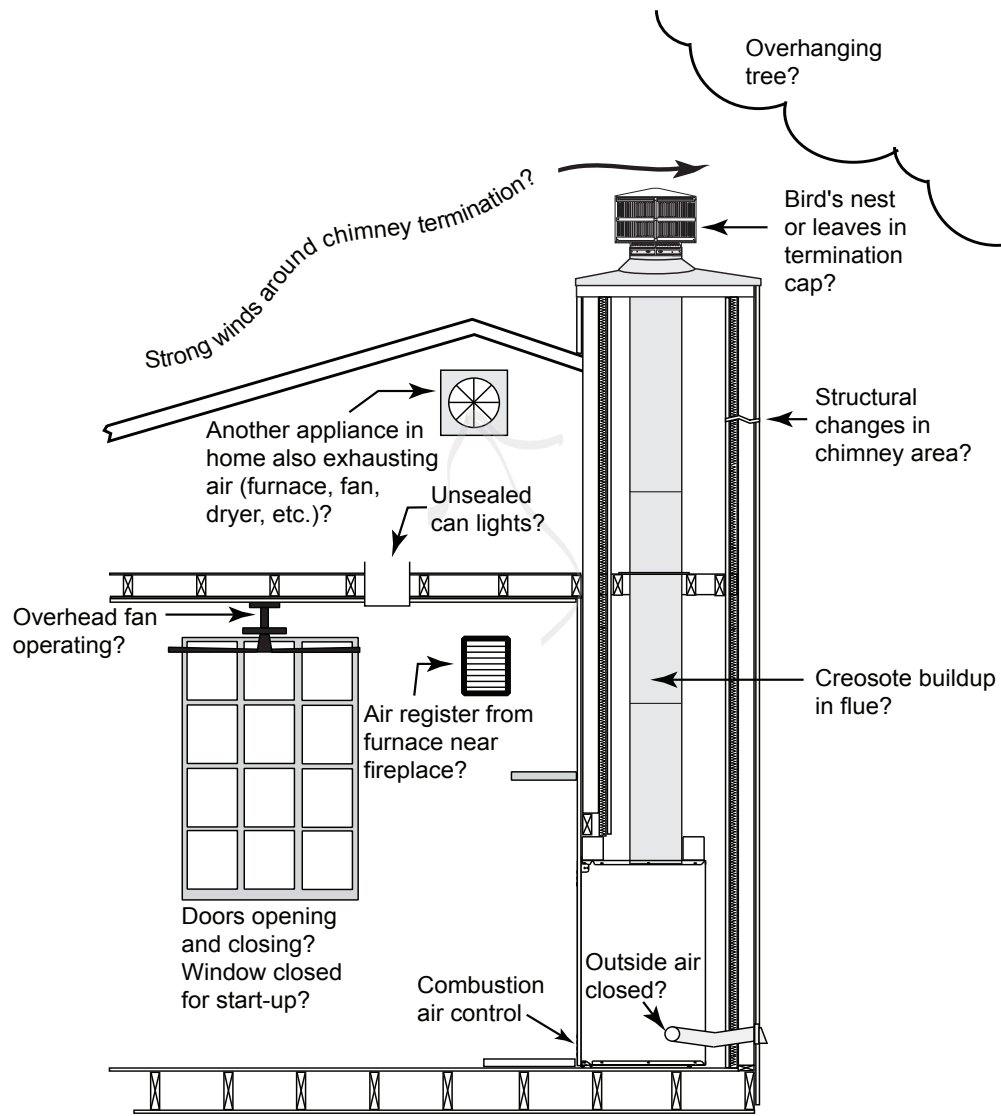
erating instructions, "Starting a Fire". Be sure your flue system is installed correctly and that it is the proper diameter and height. Check for the following:

- All chimney sections are properly installed.
- The chimney is clean and free of creosote or soot buildup.
- Make sure overhanging trees and branches are cut back within ten feet of the top of the chimney and the chimney is free of debris from animals.
- Ensure the chimney cap is clean and free of any buildup of soot or creosote if cap is equipped with a spark arrestor screen.
- Be sure the ceramic blanket (above the baffle) and the baffle are in their proper positions
- The wood being used is dry and well seasoned.

If you still suspect you have a low draft problem it may be necessary to increase the volume of air in your flue system. Since the diameter of your flue system is matched with the size of the flue collar and should not be changed, then the height of the system must be increased. Add chimney sections one at a time until the draft improves.

In some cases, regardless of what you do, it can still be difficult to establish the proper flue draft. This is especially evident when using an exterior factory-built chimney or exterior masonry chimney. Try holding a burning rolled up newspaper as close to the flue outlet as possible for a few minutes, then light the paper under the kindling. The heat generated from the burning rolled up newspaper should help get the draft established.

Still other factors can affect how well your flue system performs. Neighboring structures, high winds, tall trees, even hillsides can affect air currents around the chimney. Well designed chimney caps are available that can help. Your fireplace dealer is the local expert in your area. He can usually make suggestions or discover problems that can be easily corrected allowing your fireplace to operate correctly as it has been designed, providing safe and economical heat for your home.



**Figure 5.1** Factory-built Fireplaces: Troubleshooting



## B. Troubleshooting Table

Fire is difficult to start	• Refer to section 4.C. Lighting Instructions
	• Open air controls
	• Establish draft: Hold a lighted, rolled up newspaper under the front of the baffle
	• Place DRY kindling over wadded up newspaper; leave air spaces between pieces of wood
	• Light the paper, allow kindling to ignite and progress to a lively burn
	• Slowly add progressively larger pieces of dry wood until the fire is well established
Smoke in the house at startup	• Check and clean chimney if needed
	• Open air controls
	• Establish draft
	• Do not use exhaust fans during startup
	• Do not close doors until the fire is well-established
Smoke in the house during operation	• Check and clean chimney if needed
	• Check door rope for seal
	• Open air controls (ACC)
Smoke in the house during refueling	• Open air controls (ACC) to establish a lively coal bed
	• Open doors SLOWLY
	• Add progressively larger wood to establish a hot fire
Fuel burns too fast	• ACC not working properly
	• Wood too dry, mix in less seasoned wood after the fire is established
	• User larger diameter wood
	• Check baffle/ceramic blanket for proper placement (Section 3.A.3)
	• Close down ACC (refer to section 4.D. Heat Management)
Glass doesn't stay clean	• Establish a good, hot fire
	• Use well-seasoned wood
Not enough or no heat	• Move combustion air control to fully open position
	• Fan is not on
	• Insufficient fuel for fire/heat required
Fan doesn't come on	• No power
	• Fireplace is not hot enough to activate snap disc
	• Snap disc may be faulty

## **6** Reference Materials

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### **A. Service Parts**







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## B. Contact Information



**No one builds a better fire**

Heat & Glo a brand of Hearth & Home Technologies  
1915 West Saunders Street  
Mount Pleasant, Iowa 52641

**Please contact your Heatilator dealer with any questions or concerns.**

For the number of your nearest Heatilator dealer, please visit [www.heatnglo.com](http://www.heatnglo.com).

### – NOTES –

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### CAUTION



#### DO NOT DISCARD THIS MANUAL

- Important operating and maintenance instructions included.
- Read, understand and follow these instructions for safe installation and operation.
- Leave this manual with party responsible for use and operation.



This product may be covered by one or more of the following patents: (United States) 5613487, 5647340, 5890485, 5941237, 6006743, 6019099, 6053165, 6145502, 6374822, 6484712, 6601579, 6769426, 6863064, 7077122, 7098269, 7258116, 7470729, 8147240 or other U.S. and foreign patents pending.

2000-945C



# Installation Manual

## Installation and Fireplace Setup

Pour demander un exemplaire en français de ce Manuel du propriétaire, visitez [www.heatilator.com/translations](http://www.heatilator.com/translations).

**INSTALLER:** Leave this manual with party responsible for use and operation.

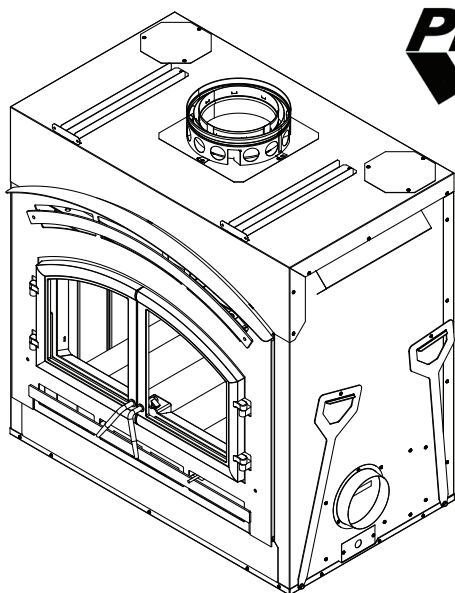
**OWNER:** Retain this manual for future reference.

Contact your dealer with questions on installation, operation, or service.

**heatilator®**  
*The first name in fireplaces*

**Model(s):**

**C40-C**



**EPA CERTIFIED WOODBURNING  
FIREPLACE**

### **WARNING! Risk of Fire and/or Asphyxiation!**

- Read all the instructions before starting the installation. Follow these instructions carefully during the installation to ensure maximum safety and benefit.
- Comply with all minimum clearances to combustibles as specified. Failure to comply may cause house fire.

### **⚠ WARNING**



#### **HOT SURFACES!**

Glass and other surfaces are hot during operation AND cool down.

#### **Hot glass will cause burns.**

- **DO NOT** touch glass until it is cooled
  - NEVER allow children to touch glass
  - Keep children away
  - CAREFULLY SUPERVISE children in same room as fireplace.
  - Alert children and adults to hazards of high temperatures.
- High temperatures may ignite clothing or other flammable materials.**
- Keep clothing, furniture, draperies and other flammable materials away.

Installation and service of this appliance should be performed by qualified personnel, Hearth & Home Technologies recommends HHT Factory Trained or NFI certified professionals.



## Safety Alert Key:

- **DANGER!** Indicates a hazardous situation which, if not avoided will result in death or serious injury.
- **WARNING!** Indicates a hazardous situation which, if not avoided could result in death or serious injury.
- **CAUTION!** Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.
- **NOTICE:** Indicates practices which may cause damage to the fireplace or to property.

## Table of Contents

Installation Standard Work Checklist	3	<b>5 Chimney and Termination Requirements</b>	
<b>1 Product Specific &amp; Important Safety Information</b>		A. Chimney Requirements	23
A. Appliance Certification	4	B. Offsets/Returns	24
B. BTU & Efficiency Specifications	4	C. Termination Requirements	25
C. Mobile Home Approved	4	<b>6 Chimney Installation</b>	
D. Glass Specifications	4	A. Typical Chimney System	26
E. Non-Combustible Materials	5	B. Assemble Chimney Sections	27
F. Combustible Materials	5	C. Install Chimney Air kit (CAK4A)	27
G. Electrical Codes	5	D. Secure Offset/Return	28
<b>2 Getting Started</b>		E. Install Firestops	29
A. Typical Fireplace System	6	F. Install Attic Insulation Shield	30
B. Design and Installation Considerations	7	G. Roof Penetration	31
1. Selecting Fireplace Locations	7	H. Manufactured Home Installation	31
2. Locating Fireplace & Chimney	8	I. Install Chase/Chase Top	32
C. Tools and Supplies Needed	9	J. Install Termination Cap	33
D. Inspect Fireplace and Components	9	<b>7 Finishing</b>	
E. Fireplace System Requirements	9	A. Template	35
<b>3 Framing and Clearances</b>		B. Finish the Wall	36
A. Fireplace Dimensions	10	1. Stone, Brick Finish	36
B. Clearances	11	2. Tile, Granite, Marble Finish	36
C. Construct the Chase	12	C. Mantel and Wall Projections	36
D. Frame the Fireplace	12	D. Finishing the Hearth Extension	37
E. Secure and Level the Fireplace	13	E. Non-Combustible Sealant Material	38
F. Installation of Top Standoffs	14	<b>8 Reference Materials</b>	
G. Protective Metal Hearth Strips	14	A. Firebrick Placement	39
H. Non-Combustible Facing Board (Provided)	15	B. Baffle and Blanket Placement	40
I. Outside Air Kit	15	C. Install Fascia (Fronts)	40
J. Heat-Zone-WD Kit (Optional)	18	D. Chimney Components	41
<b>4 Electrical Wiring</b>	<b>22</b>	E. Accessories	46

## ATTENTION INSTALLER:

### Follow this Standard Work Checklist

This standard work checklist is to be used by the installer in conjunction with, not instead of, the instructions contained in this installation manual.

<b>Customer:</b> _____ <b>Lot/Address</b> _____  <b>Model:</b> C40-C	<b>Date Installed:</b> _____ <b>Location of Fireplace:</b> _____ <b>Installer:</b> _____ <b>Dealer/Distributor Phone #</b> _____ <b>Serial #:</b> _____
---	---

**WARNING! Risk of Fire or Explosion!** Failure to install fireplace according to these instructions can lead to a fire or explosion.

**Fireplace Install Section 3 (page 10-18)**

Verified that the chase is insulated and sealed.  
 Required top standoffs installed.  
 Required non-combustible board is installed.  
 Verified clearances to combustibles.  
 Fireplace is leveled and secured.  
 Hearth extension size/height decided.  
 Outside air kit installed.  
 Optional Heat Zone has been installed by a qualified service technician.  
 Fan air kit installed.

YES	IF NO, WHY?
<input type="checkbox"/>	_____
<input type="checkbox"/>	_____
<input type="checkbox"/>	_____
<input type="checkbox"/>	_____
<input type="checkbox"/>	_____
<input type="checkbox"/>	_____
<input type="checkbox"/>	_____
<input type="checkbox"/>	_____

**Chimney Section 5 (page 26-33)**

Chimney configuration complies with diagrams.  
 Chimney installed, locked and secured in place with proper clearance.  
 Chimney air kit installed.  
 Firestops installed.  
 Attic insulation shields installed.  
 Roof flashing installed and sealed.  
 Terminations installed and sealed.

<input type="checkbox"/>	_____
<input type="checkbox"/>	_____
<input type="checkbox"/>	_____
<input type="checkbox"/>	_____
<input type="checkbox"/>	_____
<input type="checkbox"/>	_____
<input type="checkbox"/>	_____

**Electrical Section 4 (page 22)**

Switch wires properly installed.

<input type="checkbox"/>	_____
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**Finishing Section 7 (page 35-38)**

Combustible materials not installed in non-combustible areas.  
 Verified all clearances meet installation manual requirements.  
 Mantels and wall projections comply with installation manual requirements.  
 Protective hearth strips and hearth extension installed per manual requirements.

<input type="checkbox"/>	_____
<input type="checkbox"/>	_____
<input type="checkbox"/>	_____

**Fireplace Setup Section 8 (page 39-40)**

All packaging and protective materials removed.  
 Firebrick, baffle and ceramic blanket installed correctly.  
 Facia and doors properly installed.  
 Manual bag and all of its contents are removed from inside/under the fireplace and given to the party responsible for use and operation.  
 All packaging materials are removed from inside/under the fireplace.

<input type="checkbox"/>	_____
<input type="checkbox"/>	_____
<input type="checkbox"/>	_____
<input type="checkbox"/>	_____

**Hearth & Home Technologies recommends the following:**

- Photographing the installation and copying this checklist for your file.
- That this checklist remain visible at all times on the fireplace until the installation is complete.

**Comments:** Further description of the issues, who is responsible (Installer/Builder/Other Trades, etc.) and corrective action needed:

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Comments communicated to party responsible \_\_\_\_\_ by \_\_\_\_\_ on \_\_\_\_\_  
 (Builder/Gen. Contractor) (Installer) (Date)

# 1 Product Specific & Important Safety Information

## A. Appliance Certification

<b>Model:</b>	C40-C
<b>Laboratory:</b>	Underwriter's Laboratories, Inc.
<b>Report No:</b>	Project
<b>Type:</b>	Wood Fireplace
<b>Standard:</b>	UL127-2011 and CAN/ULC-S610-2018 (A1998) and (UM) 84-HUD, Manufactured Home Approved.

The Constitution Wood Appliance meets the U.S. ENVIRONMENTAL PROTECTION AGENCY Certified to comply with 2020 particulate emission standards using cord wood.

## B. BTU & Efficiency Specifications

EPA Certified Emissions:	1.8 g/hr
*LHV Tested Efficiency:	76%
**HHV Tested Efficiency:	70%
***EPA BTU Output:	17,600 to 48,200
Vent Size:	8 inches
Firebox Size:	2.7 cubic feet
Recommended Log Length:	22 inches
Fuel	Seasoned Cord Wood less than 20% moisture
HHT:	SL300 Series
DuraVent:	DuraPlus
*Weighted average LHV (Low Heating Value) efficiency using cord wood and data collected during EPA emission test. LHV assumes the moisture is already in a vapor state so there is no loss in energy to vaporize.	
**Weighted average HHV (High Heating Value) efficiency using cord wood and data collected during EPA emission test. HHV includes the energy required to vaporize the water in the fuel.	
***A range of BTU outputs based on HHV (High Heating Value) and the burn rates from the low and high EPA tests, using cord wood.	

The Constitution is Certified to comply with 2020 particulate emission standards.



## C. Mobile Home Approved

This appliance is approved for mobile home installations when not installed in a sleeping room and when an outside combustion air inlet is provided. The structural integrity of the mobile home floor, ceiling, and walls must be maintained. The appliance must be properly grounded to the frame of the mobile home and use only listed double-wall connector pipe.

## D. Glass Specifications

This appliance is equipped with 5mm ceramic glass. Replace glass only with 5mm ceramic glass. Please contact your dealer for replacement glass.

**NOTE:** This installation must conform with local codes. In the absence of local codes you must comply with the **UL127-2011, (UM) 84-HUD and NPFA211** in the U.S.A. and the **CAN/ULC S610-2018 (A1998) and CAN/CSA-B365 Installation Codes** in Canada.

### DO NOT:

- install or operate damaged fireplace
  - modify fireplace
  - install other than as instructed by *Hearth & Home Technologies*
  - operate the fireplace without fully assembling all components
  - install unvented gas log set
  - install any component not approved by *Hearth & Home Technologies*
  - install parts or components not Listed or approved
- Improper installation, adjustment, alteration, service or maintenance can cause injury or property damage. For assistance or additional information, consult a qualified installer, service agency or your dealer.*

**WARNING! Risk of Fire!** *Hearth & Home Technologies disclaims any responsibility for, and the warranty and agency listing will be voided by the above actions.*

Hearth & Home Technologies WILL NOT warranty appliances that exhibit evidence of over-firing. Evidence of over-firing includes, but is not limited to:

- Warped air tube
- Deteriorated refractory brick retainers
- Deteriorated baffle and other interior components

## E. Non-Combustible Materials

Material which will not ignite and burn, composed of any combination of the following:

- Steel
- Brick
- Concrete
- Glass
- Plaster
- Iron
- Tile
- Slate

Materials reported as passing **ASTM E 136, Standard Test Method for Behavior of Metals, in a Vertical Tube Furnace of 750° C.**

## F. Combustible Materials

Material made of or surfaced with any of the following materials:

- Wood
- Plant Fibers
- Plywood/OSB
- Foam insulation & sealants
- Compressed Paper
- Plastic
- Sheet Rock (drywall)

Any material that can ignite and burn: flame proofed or not, plastered or un-plastered.

## G. Electrical Codes

**NOTICE:** *This fireplace must be electrically wired and grounded in accordance with local codes or, in the absence of local codes, with **National Electric Code ANSI/NFPA 70-latest edition** or the **Canadian Electric Code CSA C22.1**.*

- A 110-120 VAC circuit for this product must be protected with ground-fault circuit-interrupter protection, in compliance with the applicable electrical codes, when it is installed in damp locations.

**WARNING!** *Improper installation, adjustment, alteration, service or maintenance can cause injury or property damage.*

## 2 Getting Started

### A. Typical Fireplace System

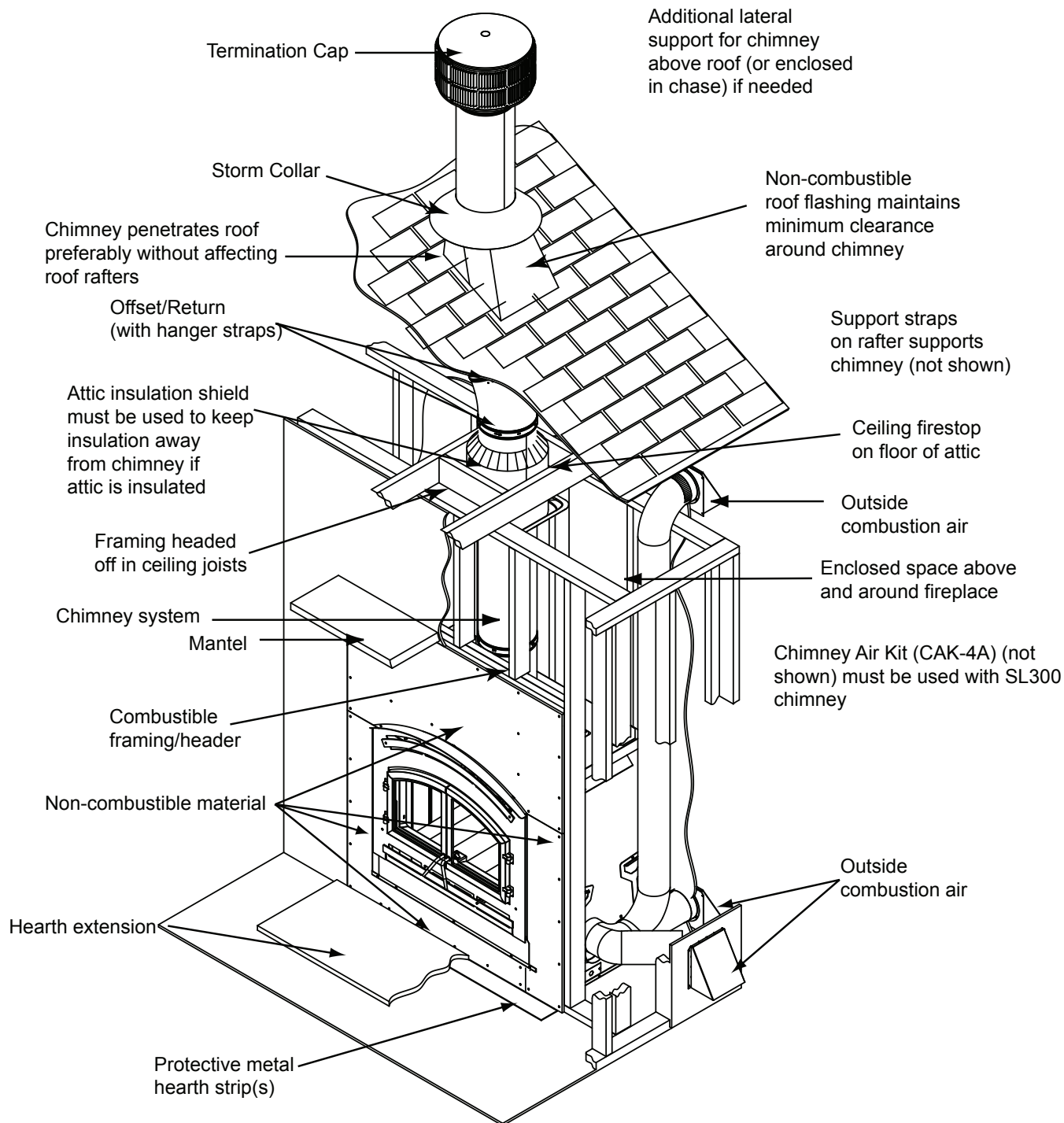


Figure 2.1 Typical Fireplace System

## B. Design and Installation Considerations

**NOTICE:** Check building codes prior to installation.

- Installation **MUST** comply with local, regional, state and national codes and regulations.
- Consult insurance carrier, local building inspector, fire officials or authorities having jurisdiction over restrictions, installation inspection and permits.

### 1. Selecting Fireplace Locations

This fireplace may be used as a room divider, installed along a wall, across a corner or used in an exterior chase. See Figure 2.2.

Locating the fireplace in a basement, near frequently opened doors, central heat outlets or returns, or other locations of considerable air movement can affect the performance.

Outside air must be used for combustion. The C40-C comes equipped with an outside air inlet to feed combustion air from outside the home, along with an outside air termination cap; the metal duct is required but not supplied. Consideration should be given to these factors before deciding on a location.

**NOTICE:** In addition to these framing dimensions, also reference the following section:

- Clearances (Section 3).

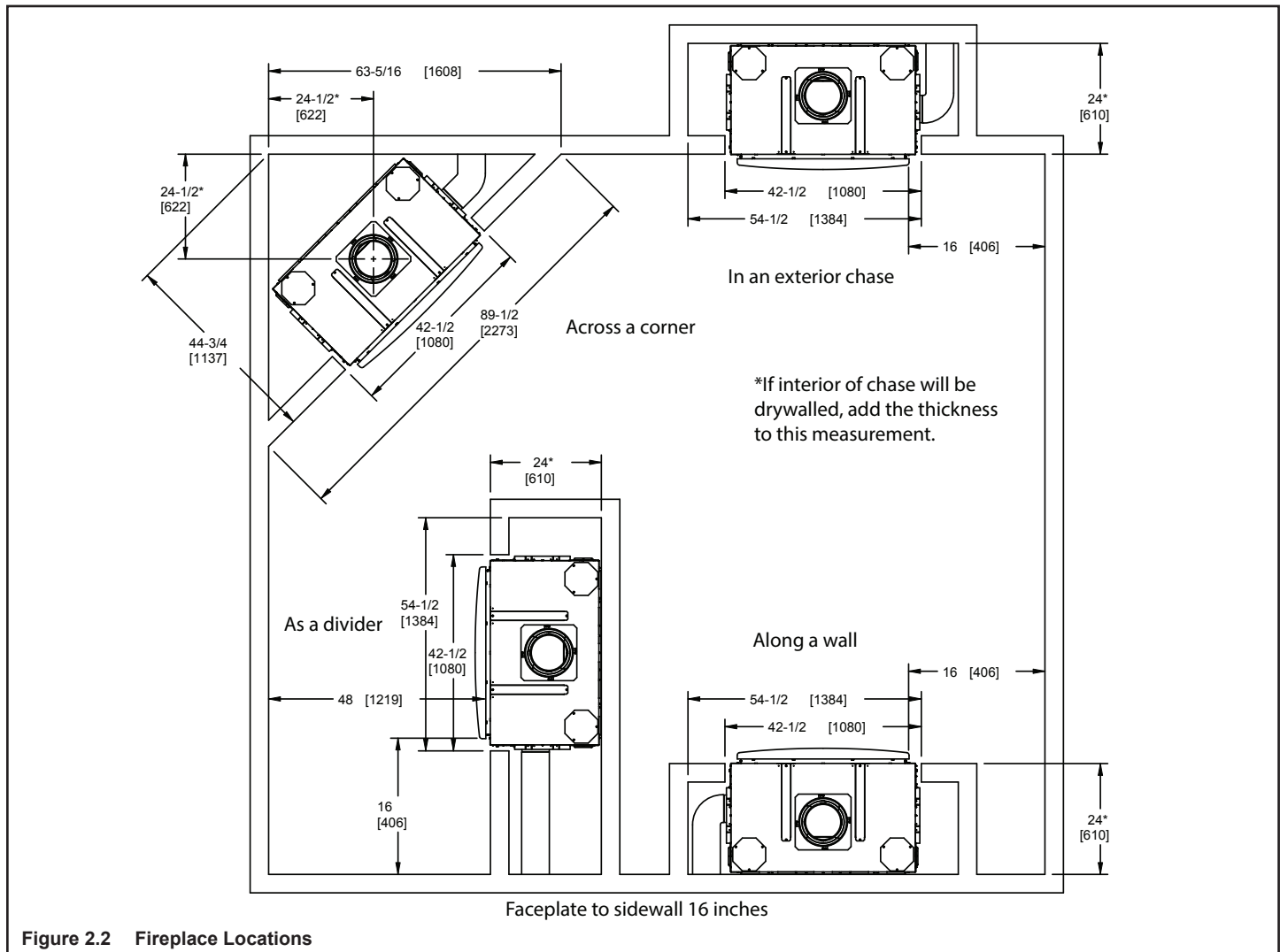
**NOTICE:**

- Illustrations and photos reflect typical installations and are FOR DESIGN PURPOSES ONLY.
- Illustrations/diagrams are not drawn to scale.
- Actual installation/appearance may vary due to individual design preference.
- Hearth & Home Technologies reserves the right to alter its products.

**NOTICE:**

A minimum 1/2 in. air clearance at the back and a minimum 1 in. air clearance to the sides of the fireplace assembly must be maintained.

Chimney sections at any level require a 2 in. minimum air space clearance between the framing and chimney sections.





## 2. Locating Fireplace & Chimney

Location of the fireplace and chimney will affect performance.

- Install within the warm airspace enclosed by the building envelope. This helps to produce more draft, especially during lighting and die-down of the fire.
- Penetrate the highest part of the roof. This minimizes the effects of wind loading.
- Locate termination cap away from trees, adjacent structures, uneven roof lines and other obstructions.
- Minimize the use of chimney offsets.
- Consider the fireplace location relative to floor and ceiling and attic joists.
- Take into consideration the termination requirements in Sections 5 and 6.
- Install the outside air kit and CAK (chimney air kit) with the intake facing prevailing winds during the heating season.
- Ensure adequate outdoor air for all combustion appliances and exhaust equipment.
- Ensure furnace and air conditioning return vents are not located in the immediate vicinity of the fireplace.
- Avoid installing the fireplace near doors, walkways or small isolated spaces.
- Recessed lighting should be a “sealed can” design.
- Attic hatches weather stripped or sealed.
- Attic mounted duct work and air handler joints and seams taped or sealed.

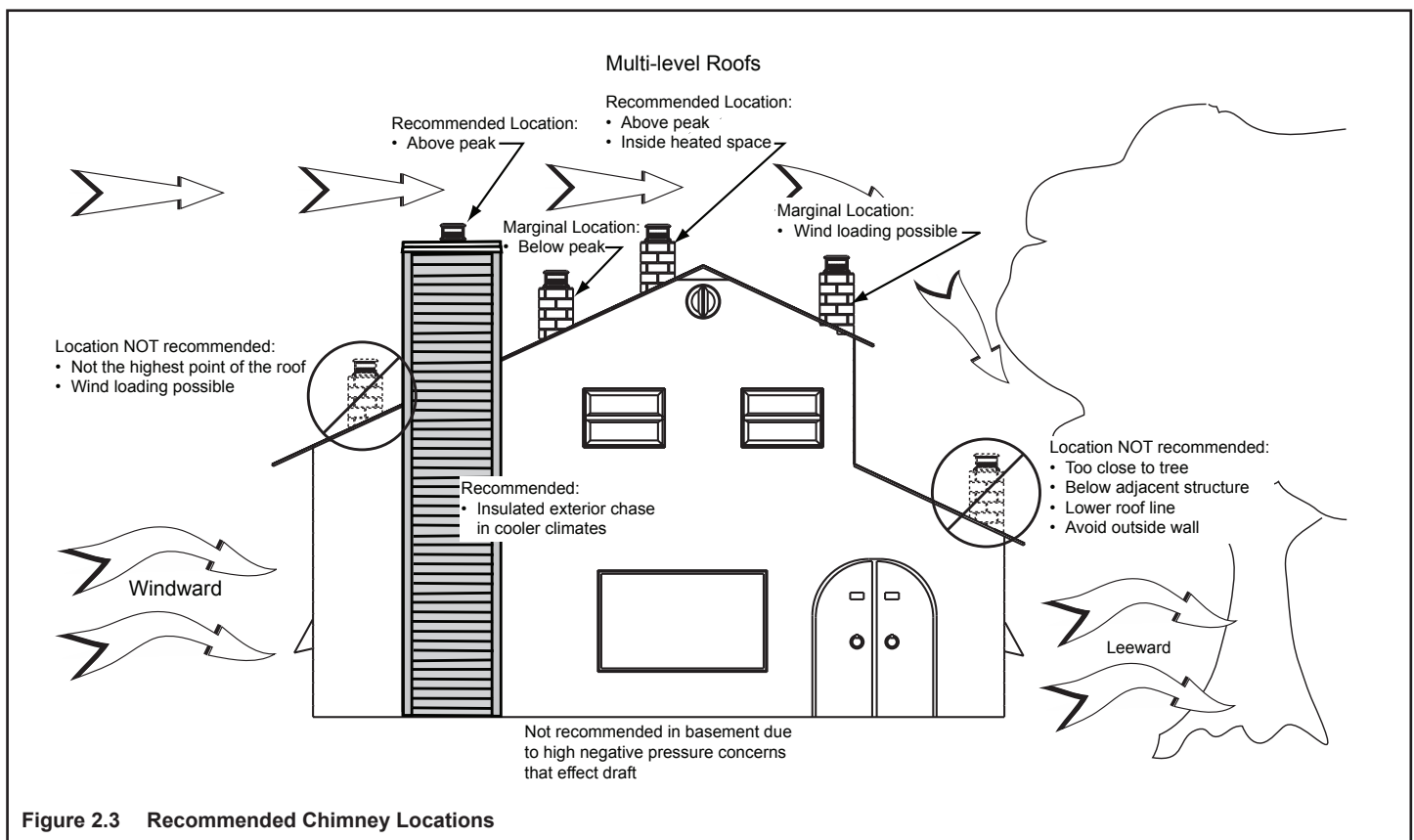


Figure 2.3 Recommended Chimney Locations

## C. Tools and Supplies Needed

Before beginning the installation be sure the following tools and building supplies are available:

Reciprocating saw	Framing material
Pliers	Non-combustible sealant
Hammer	Gloves
Phillips screwdriver	Framing square
Flat blade screwdriver	Electric drill and bits
Plumb line	Safety glasses
Level	Tape measure
1/2-3/4 in. length, #6 or #8 self-drilling screws	
Misc. screws and nails	

## D. Inspect Fireplace and Components

***WARNING! Risk of Fire and Asphyxiation! Damaged parts could impair safe operation. DO NOT install damaged, incomplete or substitute components.***

- Remove fireplace and components from packaging and inspect for damage.
- Chimney system components and other optional components are shipped separately.
- Report to your dealer any parts damaged in shipment.

## E. Fireplace System Requirements

The Heatilator fireplace system requirements consist of the following:

- Fireplace
  - Firebrick (included with fireplace)
  - Door (included with fireplace)
  - Non-combustible facing material (included with fireplace)
  - Hearth Extension
- Outside Air System (hood and collars included with fireplace)
- Fascia
- Chimney System
  - CAK4A Chimney air kit (included with fireplace, required with SL300 series chimney)
  - Attic Insulation Shield (included with fireplace)
  - Chimney termination cap
- Non-combustible finish material
- Fans (included with fireplace)

Optional components include:

- LINTEL - Lintel Bar Kit
- Heat-Zone-WD Kit
- Mesh-HHT - Firescreen

# 3 Framing and Clearances

## A. Fireplace Dimensions

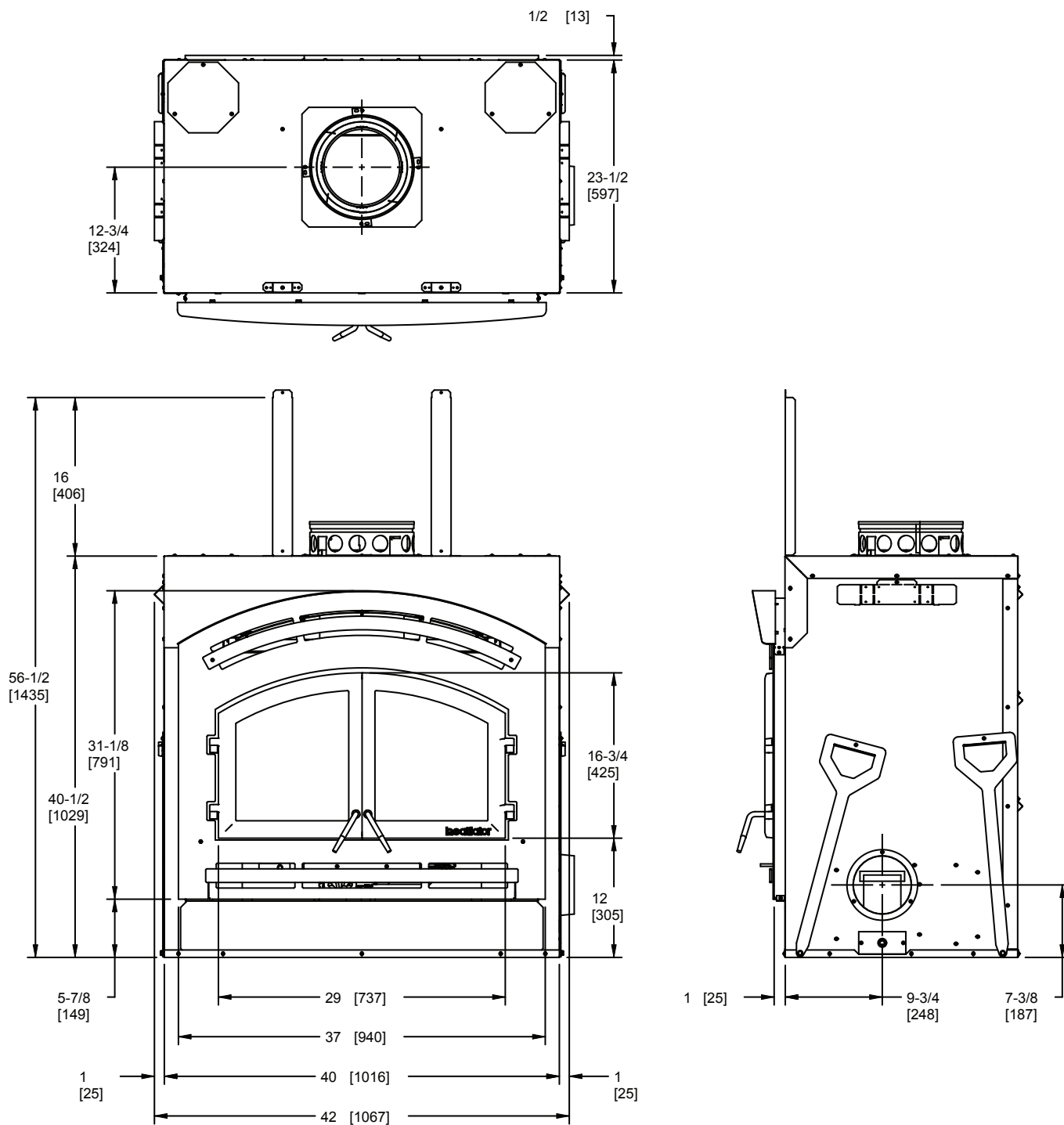


Figure 3.1 Fireplace Dimensions

B. Clearances

WARNING! Risk of Fire!

You must comply with all minimum air space clearances to combustibles as specified in Figure 3.2. **DO NOT** pack required air spaces with insulation or other materials. Framing or finishing material used on the front of, or in front of the fireplace closer than the minimums listed must be constructed entirely of non-combustible materials (i.e., steel studs, concrete board, etc.). Failure to comply may cause fire.

WITHIN ENCLOSURE AREA	
Fireplace to backwall	1/2 in. (13 mm)
Fireplace to sidewall	1 in. (25 mm)
Duct boots to framing	0 in. (0 mm)
Top of fireplace to header	16 in. (406 mm)
Door opening to sidewall	22-3/4 in. (578 mm)
EXPOSED SURFACES	
Faceplate to sidewall	16 in. (406 mm)
Heat zone air grills to ceiling	12 in. (305 mm)
MANTEL	
Non-combustible mantel	38 in. (965 mm) from the base of the fireplace up
Combustible mantel	60 in. (1524 mm) from the base of the fireplace up
Maximum mantel depth	12 in. (305 mm)

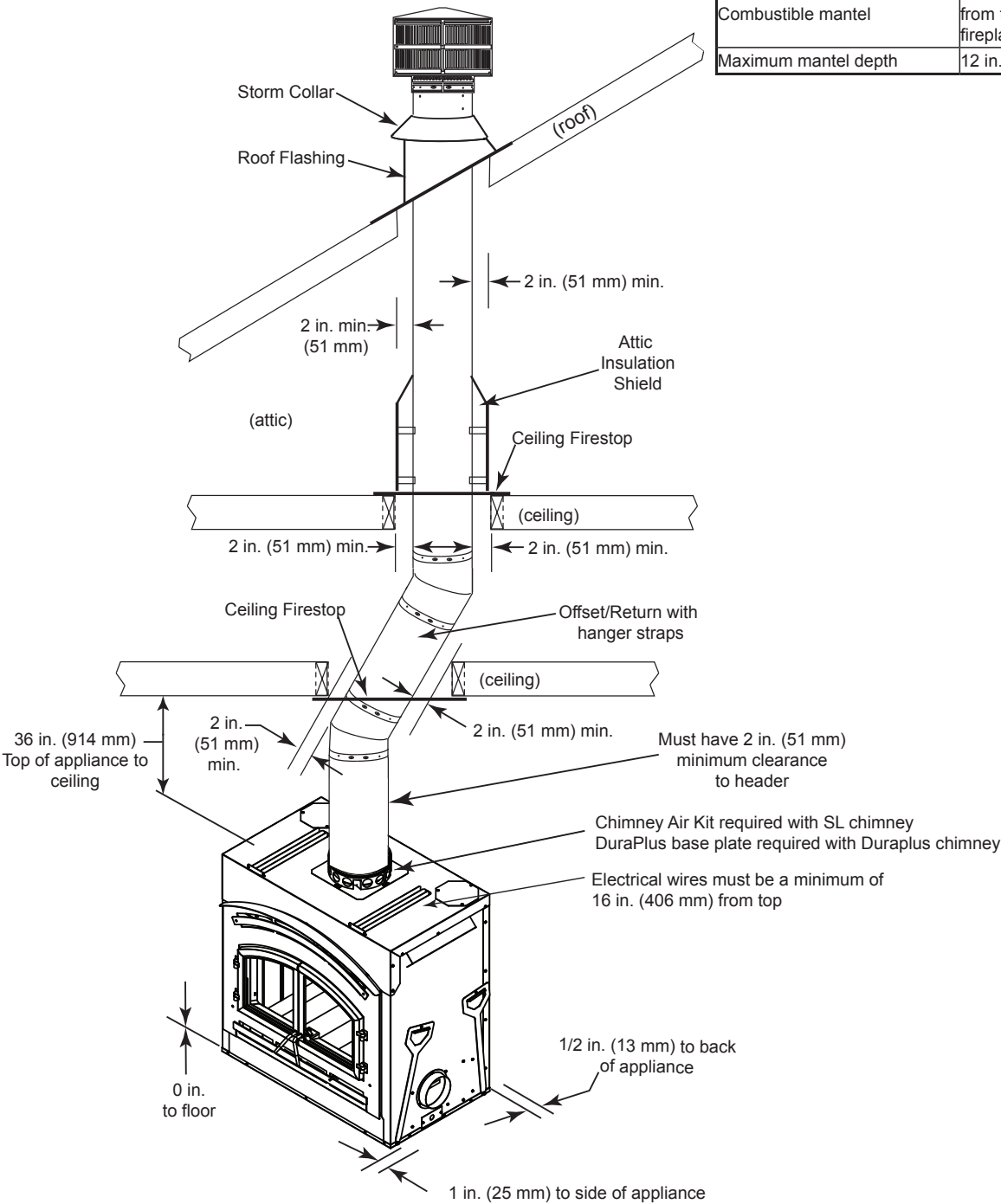


Figure 3.2 Clearances to Combustible Materials

## C. Construct the Chase

**WARNING! Risk of Fire! DO NOT** seal area between fire stop opening and chimney pipe except where they enter the attic or leave the warm air envelope of the home (use 600° F sealant).

**WARNING! Risk of Fire! You must maintain a minimum 2 in. (51 mm) air space clearance to insulation and framing surrounding the chimney system.**

A chase is a vertical boxlike structure built to enclose the fireplace and/or its vent system. Vertical chimneys that run on the outside of a building must be installed inside a chase. See Figure 3.4.

Construction of the chase may vary with the type of building. Local building codes **MUST** be followed.

Hearth & Home Technologies recommends:

- The inside surfaces be drywalled and taped (or the use of an equivalent method) for maximum air tightness to the false ceiling.
  - In cold climates, the walls of the chase should be insulated to the level of the false ceiling as shown in Figure 3.3. This will help reduce heat loss from the home around the fireplace.
  - Holes and other openings should be caulked with high temperature caulk or stuffed with unfaced fiber glass insulation.
- Requirements for constructing the chase:
    - A firestop spacer and attic insulation shield should be installed at the false ceiling.
    - The chase must be properly blocked to prevent blown insulation or other combustibles from entering and making contact with fireplace or chimney.
    - The chase top must be constructed of non-combustible material.
  - The chase is constructed using framing materials much the same as the walls in your home. A variety of siding materials may be used including brick, stone, veneer brick, or standard siding materials.
  - In constructing the chase, several factors must be considered:
    - Maintain a 2 in. (51 mm) air space around the chimney.
    - The chase top must be constructed of non-combustible material.
    - In cold climates, a firestop spacer and attic insulation shield should be installed in an insulated false ceiling at the 8 ft. (2438 mm) level above the fireplace assembly. This reduces heat loss through the chase.
    - In cold climates, the walls of the chase should be insulated to the level of the false ceiling as shown in Figure 3.4. This will help reduce heat loss from the home around the fireplace.

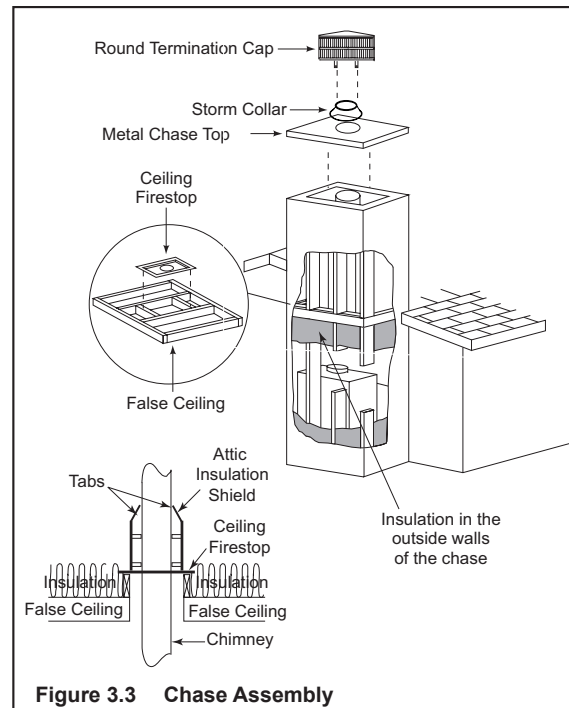


Figure 3.3 Chase Assembly

Three examples of chase applications are shown in Figure 3.4.

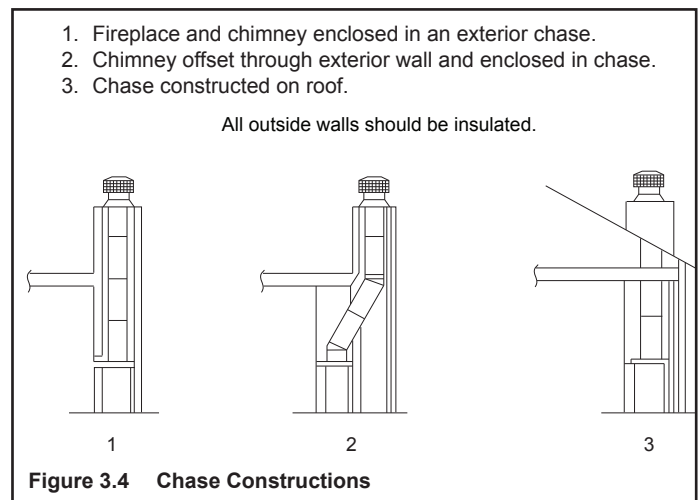


Figure 3.4 Chase Constructions

## D. Frame the Fireplace

**WARNING! Risk of Fire! Comply with all minimum clearances specified.**

- A minimum 1/2 in. (13 mm) air clearance must be maintained at the back and 1 in. (25 mm) to the sides of the fireplace assembly.
- Chimney sections at any level require a 2 in. (51 mm) minimum air space clearance between the framing and chimney section.

**WARNING! Risk of Fire! You must comply with all minimum air space clearances to combustibles. DO NOT** pack required air spaces with insulation or other materials.

**NOTICE:** Hearth extension design must be determined before installation of fireplace.

If the fireplace is placed on the floor, the maximum height of a finished raised hearth (constructed of non-combustible material) is 5-3/4 in. (147 mm). If a higher raised hearth is preferred, the fireplace must be placed on a platform.

**NOTICE:** Wiring for fans must be done before framed enclosure is completed. If using a Heat Zone Kit, it also must be installed before enclosure is complete.

### Standoffs are attached to the fireplace.

The unit can be positioned with the standoffs touching combustible walls or framing but DO NOT pack insulation or other materials in the air space between the fireplace and wall.

Figure 3.5 shows a typical framing (using 2 x 4 lumber) of the fireplace, assuming combustible materials are used. All required clearances to combustibles around the fireplace must be adhered to. See Figure 3.2. (No recess above fireplace.)

The finished cavity depth must be no less than 24 in. (610 mm) from the finished back wall to the outside of front wall framing. Framing must extend straight up all the way to the ceiling.

**CAUTION! Risk of Cuts/Abrasions. Wear protective gloves and safety glasses during installation. Sheet metal edges are sharp.**

### E. Secure and Level the Fireplace

This fireplace may be placed on either a combustible or noncombustible continuous flat surface. Follow the instructions for framing in Section 3. Slide the fireplace into position. Be sure to provide the minimum 1 in. air clearance at the sides and 1/2 in. at the back of the fireplace.

The fireplace should be positioned so the face of the non-combustible material on the fireplace will be flush with the face of the drywall on the walls. See Figure 3.6.

Level the fireplace and shim as necessary. Secure the fireplace (using the pallet mounting brackets located on either side of the fireplace) to the sub floor.

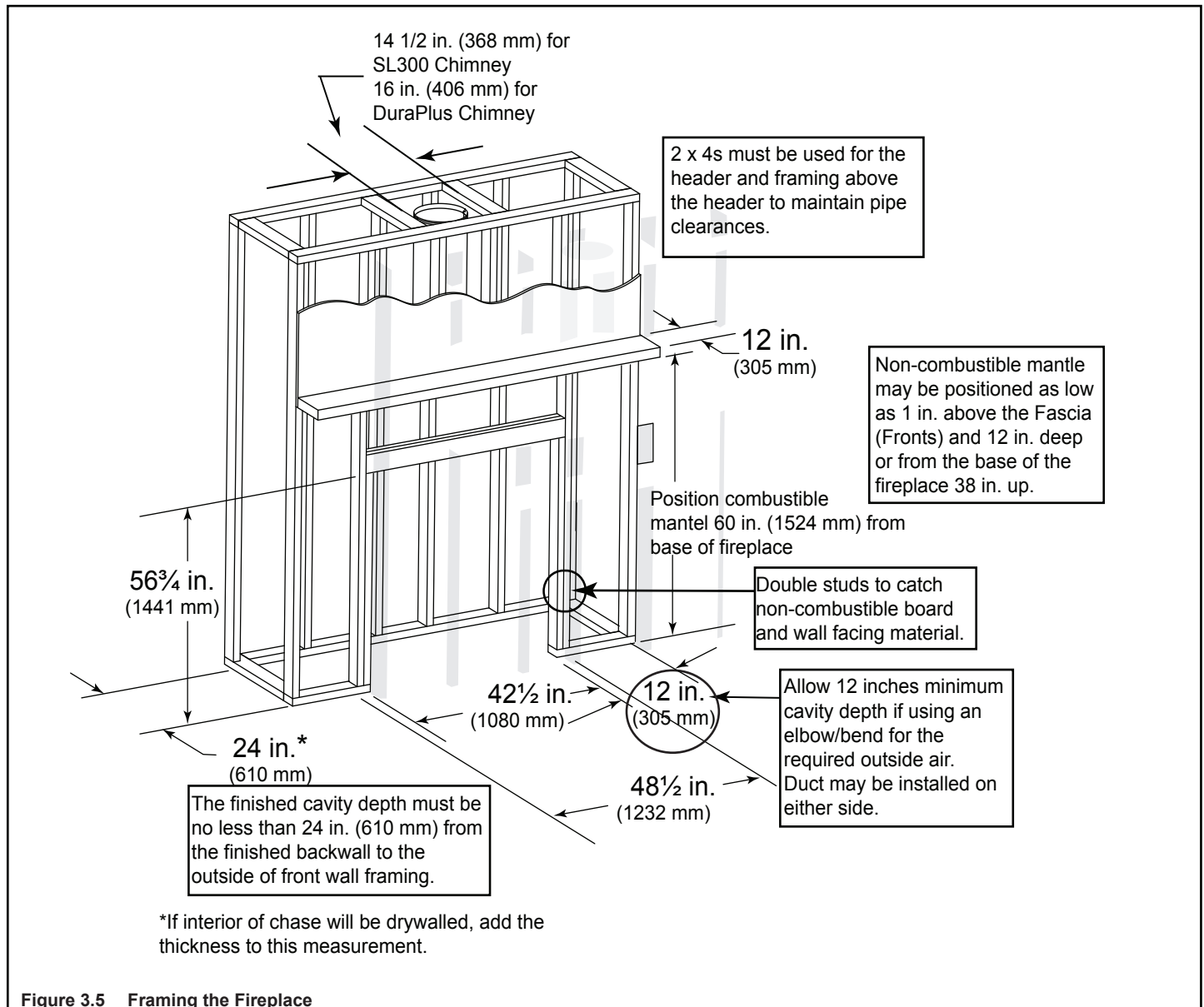


Figure 3.5 Framing the Fireplace



**WARNING! Risk of Fire!** Prevent contact with sagging, loose insulation.

- **DO NOT** install against vapor barriers or exposed insulation.
- Secure insulation and vapor barriers.
- Provide minimum air space clearances at the sides and back of the fireplace assembly as outlined in Section 3.

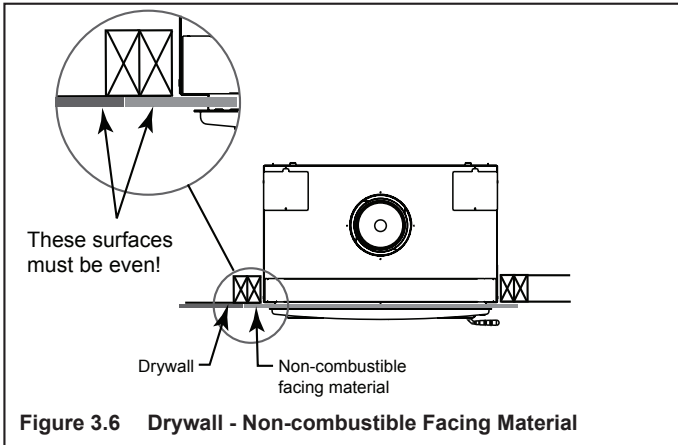


Figure 3.6 Drywall - Non-combustible Facing Material

## F. Installation of Top Standoffs

Remove the top front standoffs from the top of the fireplace. See Figure 3.7. Screw the standoffs to the fireplace as shown in Figure 3.8. The top of the standoffs will be screwed to the header.

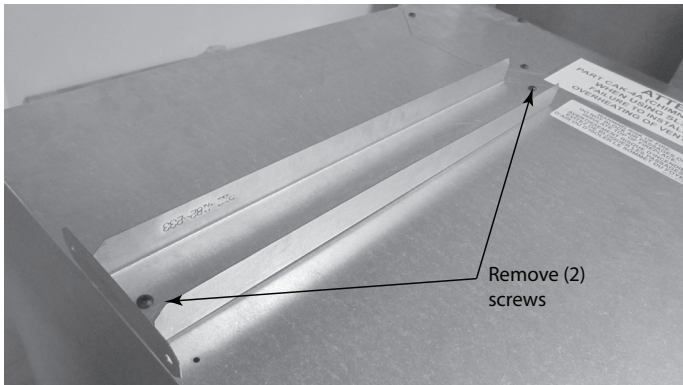


Figure 3.7 Remove Standoffs

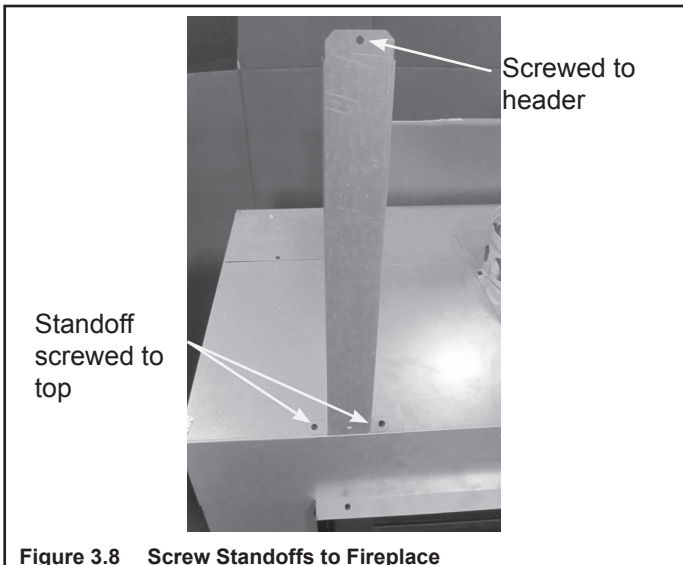


Figure 3.8 Screw Standoffs to Fireplace

## G. Protective Metal Hearth Strips

**WARNING! Risk of fire!** High temperatures, sparks, embers or other burning material falling from the fireplace may ignite flooring or concealed combustible surfaces.

- Protective metal hearth strips **MUST** be installed over combustible surfaces.
- Hearth extensions **MUST** be installed exactly as specified.
- Locate the two protective metal hearth strips measuring approximately 26 in. x 4 in. (660 mm x 102 mm) included with this fireplace.
- Slide each metal strip 2 in. (51 mm) under front edge of fireplace.
- Overlap strips in the middle of fireplace opening by 1 in. (25 mm) minimum.
- Metal strips must extend beyond the front and sides of the fireplace opening by at least 2 in. (51 mm). See Figure 3.6.
- Protect the front of a platform elevated above the hearth extension with metal strips (not included with fireplace) per Figure 3.10. See Section 7 for hearth extension instructions.
- **DO NOT** cover metal strips with combustible materials. Sparks or embers may ignite flooring.

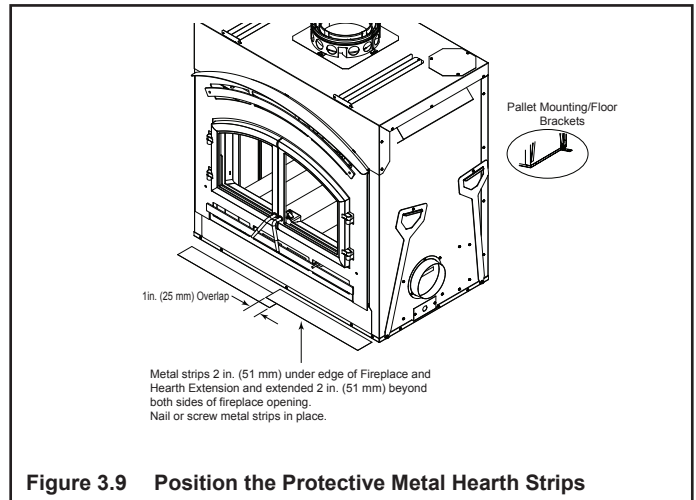


Figure 3.9 Position the Protective Metal Hearth Strips

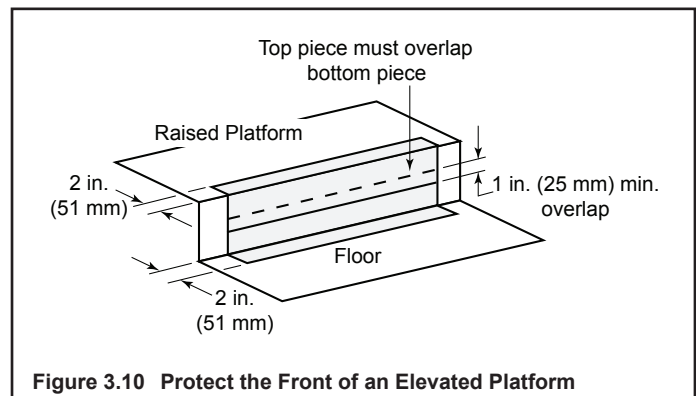


Figure 3.10 Protect the Front of an Elevated Platform



## H. Non-Combustible Facing Board (Provided)

### **WARNING! Risk of Fire!**

Follow these instructions exactly.

Facing materials must be installed properly to prevent fire.

No materials may be substituted without authorization by Hearth & Home Technologies.

**TOOLS NEEDED:** Powered drill with #2 Phillips head bit; caulking gun.

Only non-combustible materials (supplied with fireplace) may be used to cover the metal fireplace front.

**NOTE:** All boards are pre-drilled for your convenience. Boards **MUST** be attached in the following order: bottom, sides, and then the top, red-painted side out. The top and bottom board should each have a hang tag attached. Leave them attached for referral for the finishing operation.

- Attach the bottom board to the bottom of the fireplace outer shell with enclosed screws, ensuring the board is centered. **DO NOT remove hang tags.** Attach the side pieces to the outer shell and framing members.
- Center and attach the top board to the outer shell and framing members. **DO NOT remove hang tags.**

**NOTICE:** 1/8 in. of the facing material may be visible after finishing materials are applied. This 1/8 in. must be painted or the red will show.

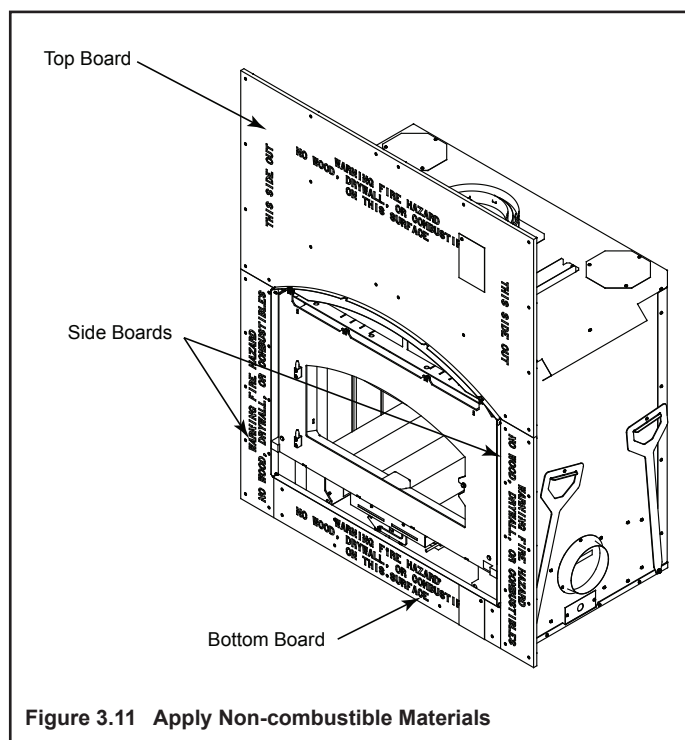


Figure 3.11 Apply Non-combustible Materials

## I. Outside Air Kit

An outside air kit must be used for combustion. Hearth & Home Technologies recommends you utilize the shortest duct run to optimize the performance of the outside air kit. The outside air inlet hood should be positioned in a manner that will not allow snow, leaves, etc. to block the inlet. In some installations the air duct may need to be run vertically. In such an installation, a 3 ft (914 mm) height difference must be maintained from the top of the uppermost chimney section to the outside air inlet hood.

Refer to Figures 3.18 and 3.19 when placing the outside air inlet hood.

The outside air kit comes installed on the right hand side of the fireplace but may be moved to the other side by following these steps:

1. Remove outside air collar (Figure 3.12) and the outside air cover plate (Figure 3.13).
  2. Install the cover plate on the right side and the collar on the left side.
  3. Open and remove the lower access panel.
  4. Remove the two (2) outer screws (Figure 3.15) to allow the outside air box to be removed.
  5. Pull the outside air box straight out. See Figure 3.16.
  6. On the left side, remove the cover plate two (2) screws. See Figure 3.14.
  7. Install the cover plate on the right side where the outside air box was and install the outside air box in through the hole on the left side where the cover plate was.
- Cut a 6-1/2 in. (165 mm) hole in outside wall to accommodate air piping.
  - Use 6 in. (152 mm) metal flex or rigid piping (not supplied) to directly connect outside air to fireplace intake. Insulate the pipe to prevent frost condensation. See Figure 3.17.
  - Insulating the pipe isn't required but will help prevent frost condensation.
  - Use the supplied outside air inlet hood.
  - Seal between the wall and the pipe with silicone to prevent moisture penetration and air leaks.
  - Seal between the outside air inlet hood and the house with silicone to prevent air infiltration.

**CAUTION! Risk of Fire or Asphyxiation! DO NOT** draw outside combustion air from wall, floor or ceiling cavity, or enclosed spaces such as an attic or garage.

- **DO NOT** place outside air inlet hood close to exhaust vents or chimneys. Fumes or odor could be drawn into the room through the fireplace.
- Locate outside air inlet hood to prevent blockage from leaves, snow/ice, or other debris. Blockages could cause combustion air starvation.

**CAUTION! Risk of Cuts/Abrasions.** Wear protective gloves and safety glasses during installation. Sheet metal edges are sharp.

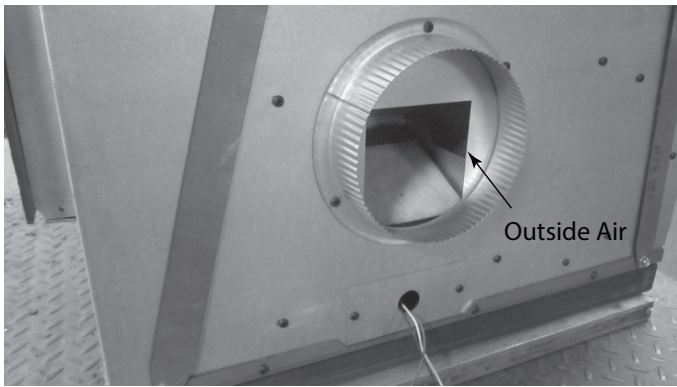


Figure 3.12

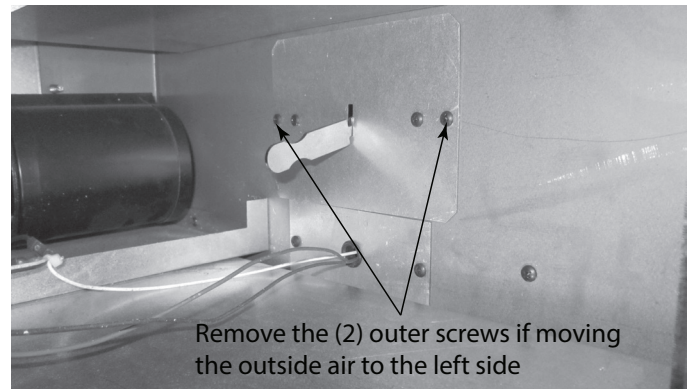


Figure 3.15 Outside air handle shown on right side

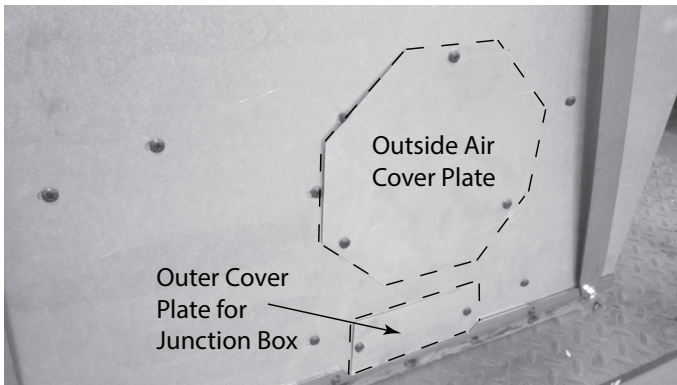


Figure 3.13 Right Side

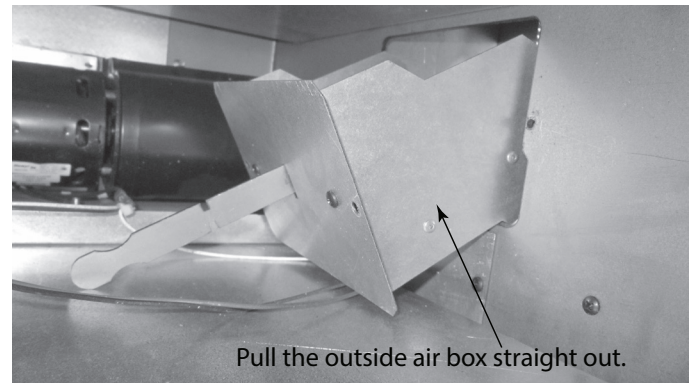


Figure 3.16 Outside Air Box

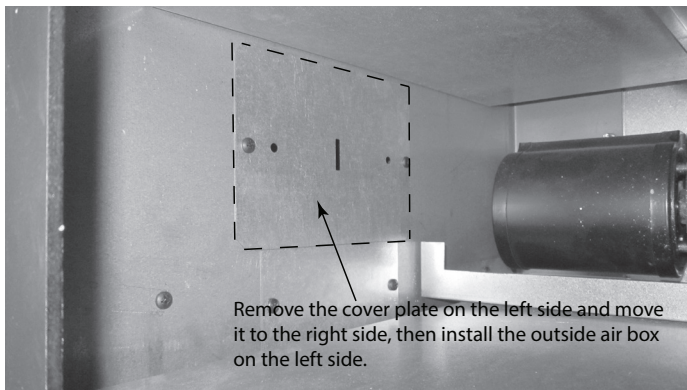


Figure 3.14 Remove Cover Plate (Left Side)

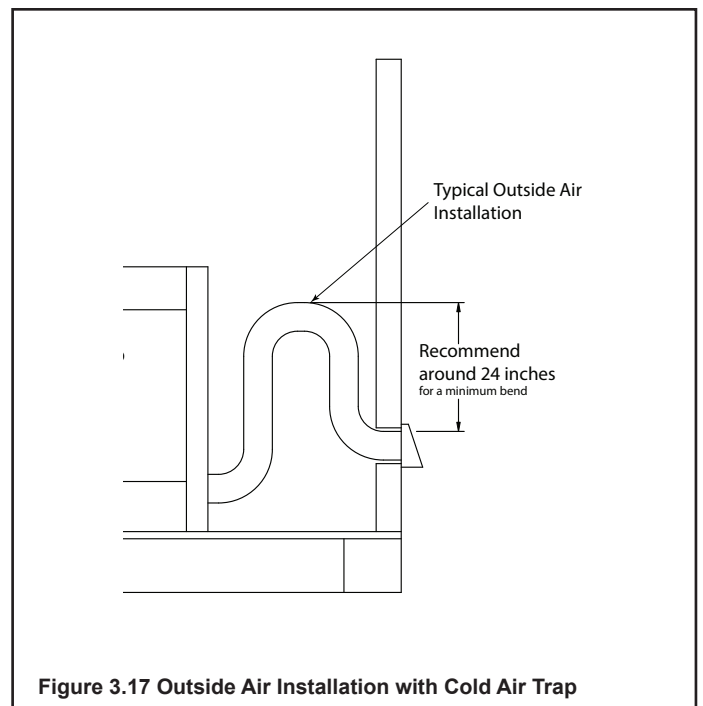
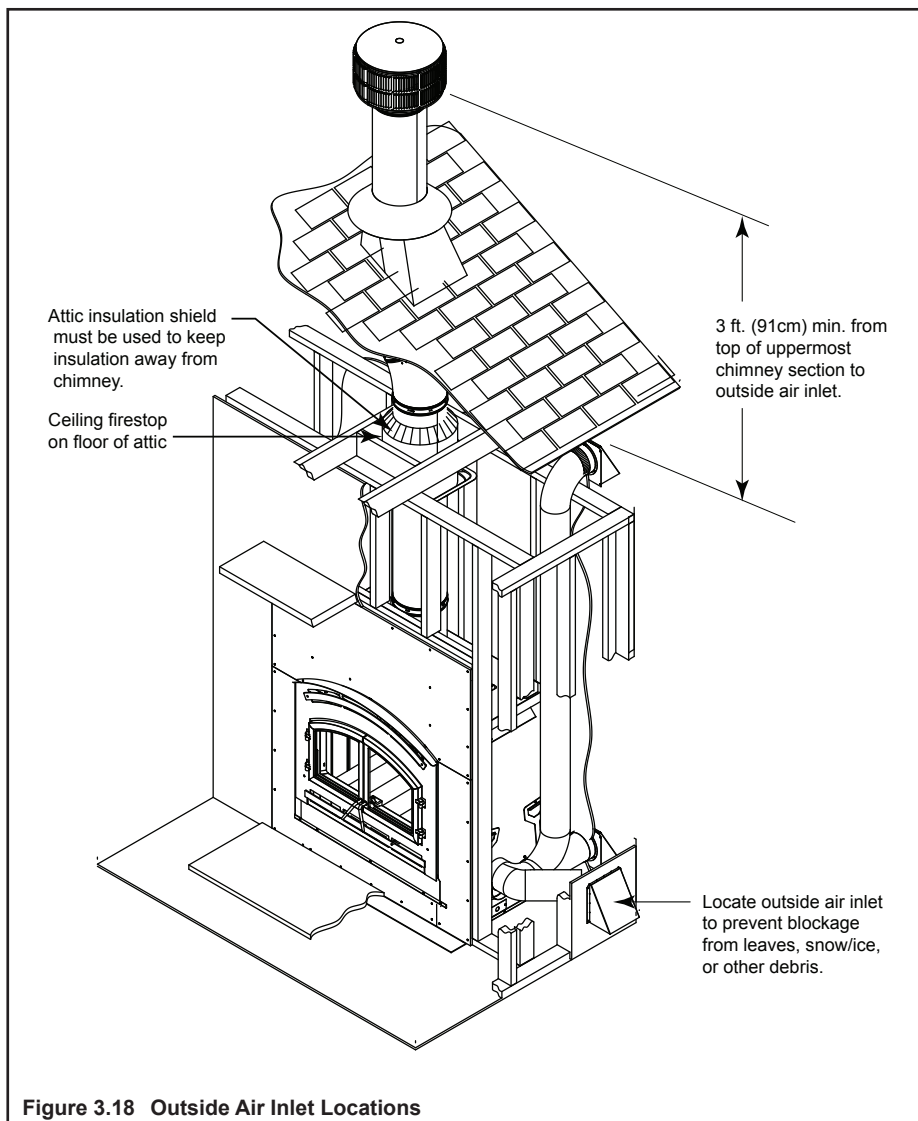
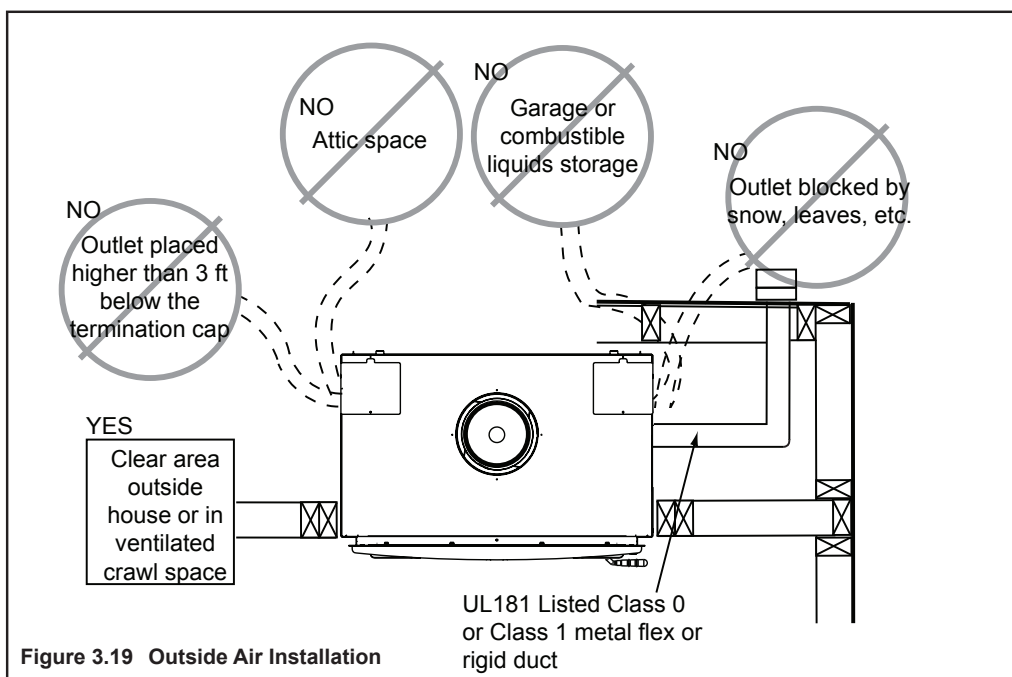


Figure 3.17 Outside Air Installation with Cold Air Trap



**Figure 3.18 Outside Air Inlet Locations**



**Figure 3.19 Outside Air Installation**

## J. Heat-Zone-WD Kit (Optional)

The Heat-Zone accessory kit conveys warm air from the fireplace through air duct(s) to remote locations in the same room or other rooms of the building. You may install 1 or 2 Heat-Zone kits on the fireplace. Installation of this kit **MUST** be performed by a qualified service technician. If any parts are missing or damaged, contact your local dealer before starting installation. DO NOT install a damaged kit.

This kit is tested and safe when installed in accordance with this installation manual. It is your responsibility to read all instructions before starting installation and to follow these instructions carefully during installations.

The Heat-Zone-WD kit is carefully engineered and must be installed only as specified. If you modify it or any of its components you will void the warranty and you may possibly cause a fire hazard. Installation must be done according to applicable local, state, provincial and/or national codes.

Plan the location of the fireplace and warm air duct run(s).

## DUCT RUN REQUIREMENTS

MAXIMUM Duct Run = 40-ft. (12 m)

MINIMUM Duct Run = 36 in. (914 mm)

## DUCTING MATERIAL

6 in. (152 mm) B-vent Only

DO NOT duct into existing furnace plenum

## MINIMUM CLEARANCE TO COMBUSTIBLES

1 in. (25 mm) from the B-vent

0 in. (0 mm) from top & bottom of outlet box

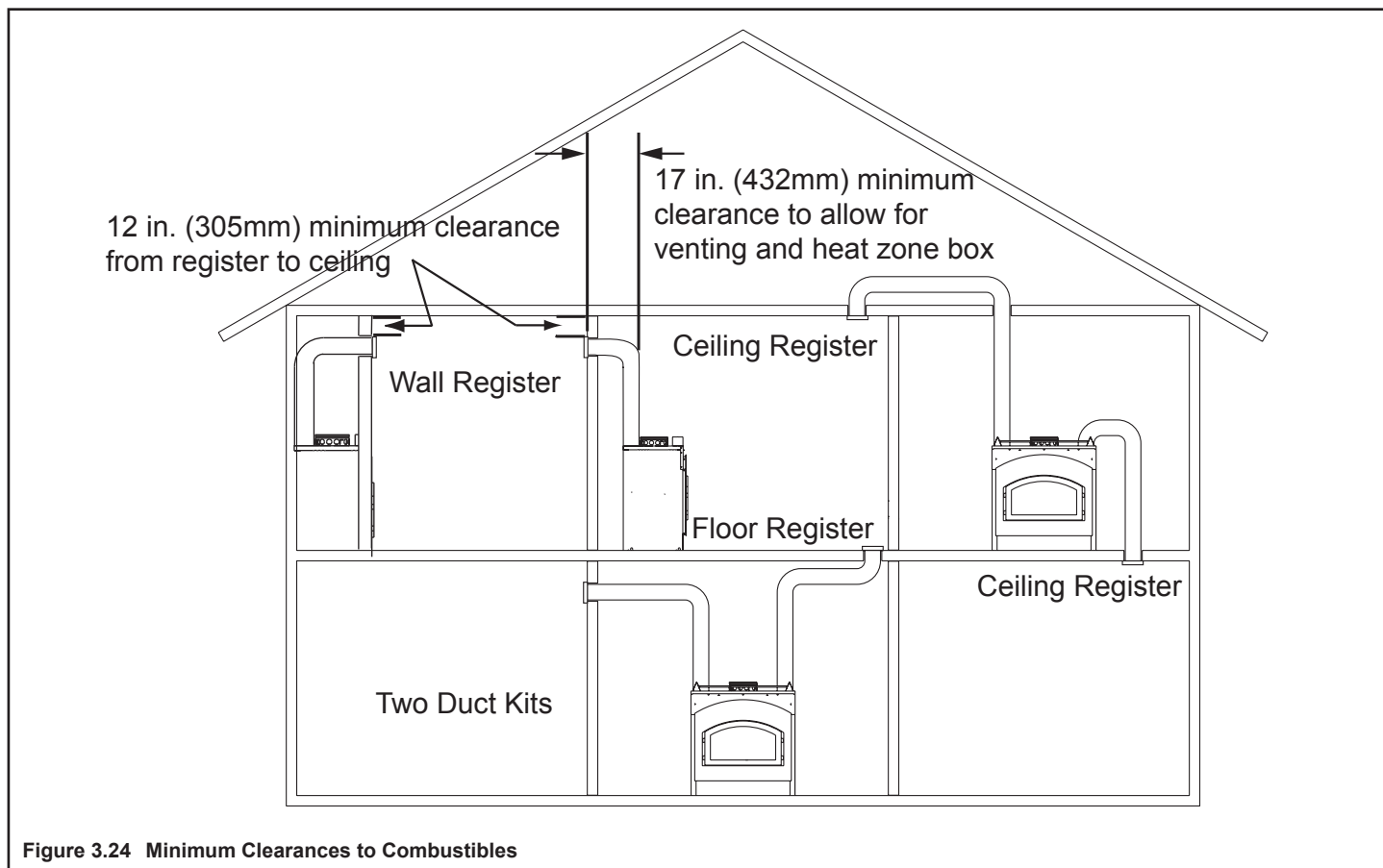
0 in. (0 mm) from the sides of outlet box

12 in. (305 mm) from wall register to ceiling

Refer to Figure 3.24.

**CAUTION!** ALL wiring should be done by a qualified electrician and shall be in compliance with local codes and with the National Electric Code NFPA/NEC No. 70-current. CSC22.1 Canadian Electric Code.

## Possible Air Duct Runs / Locations





## Installation

- Remove the knockout or cover plate from the top of the fireplace and discard it. See Figure 3.25.
- Cut a 3 in. (76 mm) hole in the insulation board and remove it as per the dimensions shown in Figure 3.25.

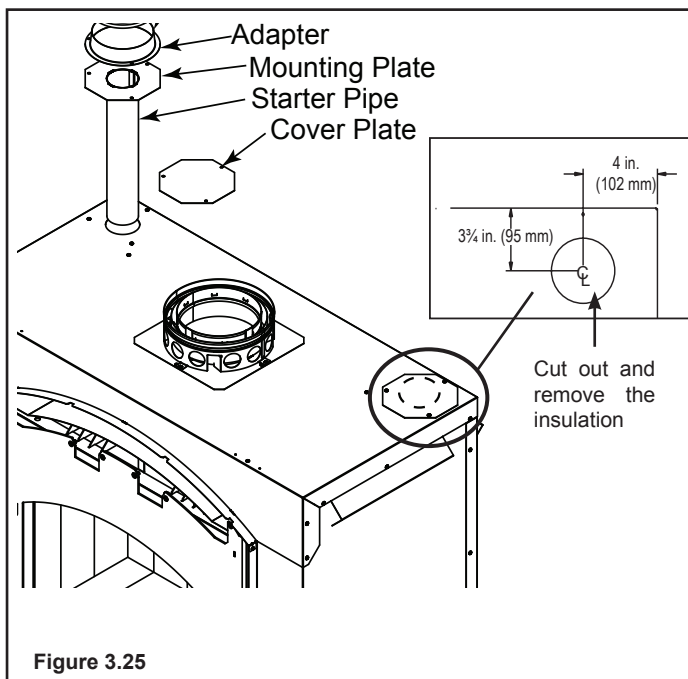


Figure 3.25

- Determine the necessary length of starter pipe from Table 3.1 and cut as required.

Table 3.1

Run Length	Cut Pipe Length
20 - 40 ft (6-12 m)	2 in. (51 mm)*
*A minimum of 2 in. (51 mm) pipe must be used to cover the raw insulation to prevent it from blowing out through the return air grille.	
10 - 20 ft (3 - 6 m)	8 in. (203 mm)
3 - 10 ft (1 - 3 m)	12 in. (305 mm)

**NOTE:** It is important the pipe length be adhered to or it will affect the performance of your fireplace.

- On the mounting plate, hand bend the tabs downward. Slide the tabs over the outside of the starter pipe. Secure with four sheet metal screws included in fasteners package. Figure 3.26.

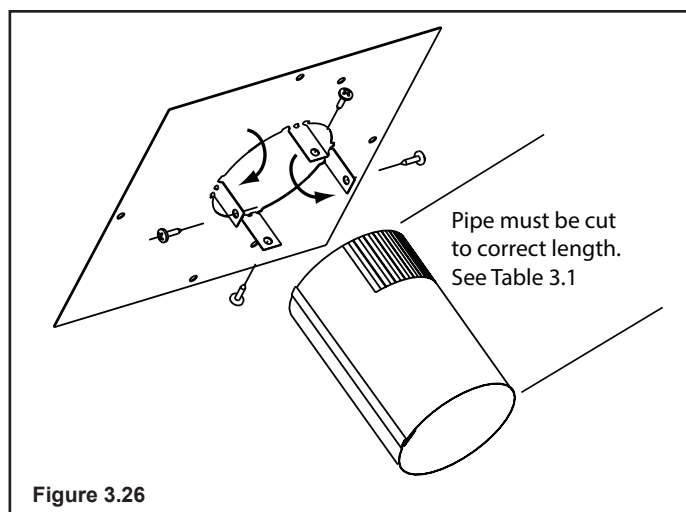


Figure 3.26

- Slide the starter pipe into the fireplace, matching the holes in the plate to the holes in the fireplace.
- Place the adapter on the mounting plate lining up holes. Using four sheet metal screws included in the kit, secure the adapter and mounting plate into fireplace. After securing to the fireplace, tape down the adapter edges to the top of the fireplace with aluminum tape to prevent leakage.
- Determine the location for the air register and fan housing assembly. Cut a 6-3/4 in. x 13-1/8 in. (213 mm x 333 mm) hole between framing members (wall studs or floor joists). Attach the brackets to the fan housing with the screws provided. The brackets can be rotated 180° and mounted to the back side of the 2 x 4 if necessary. See Figure 3.27.

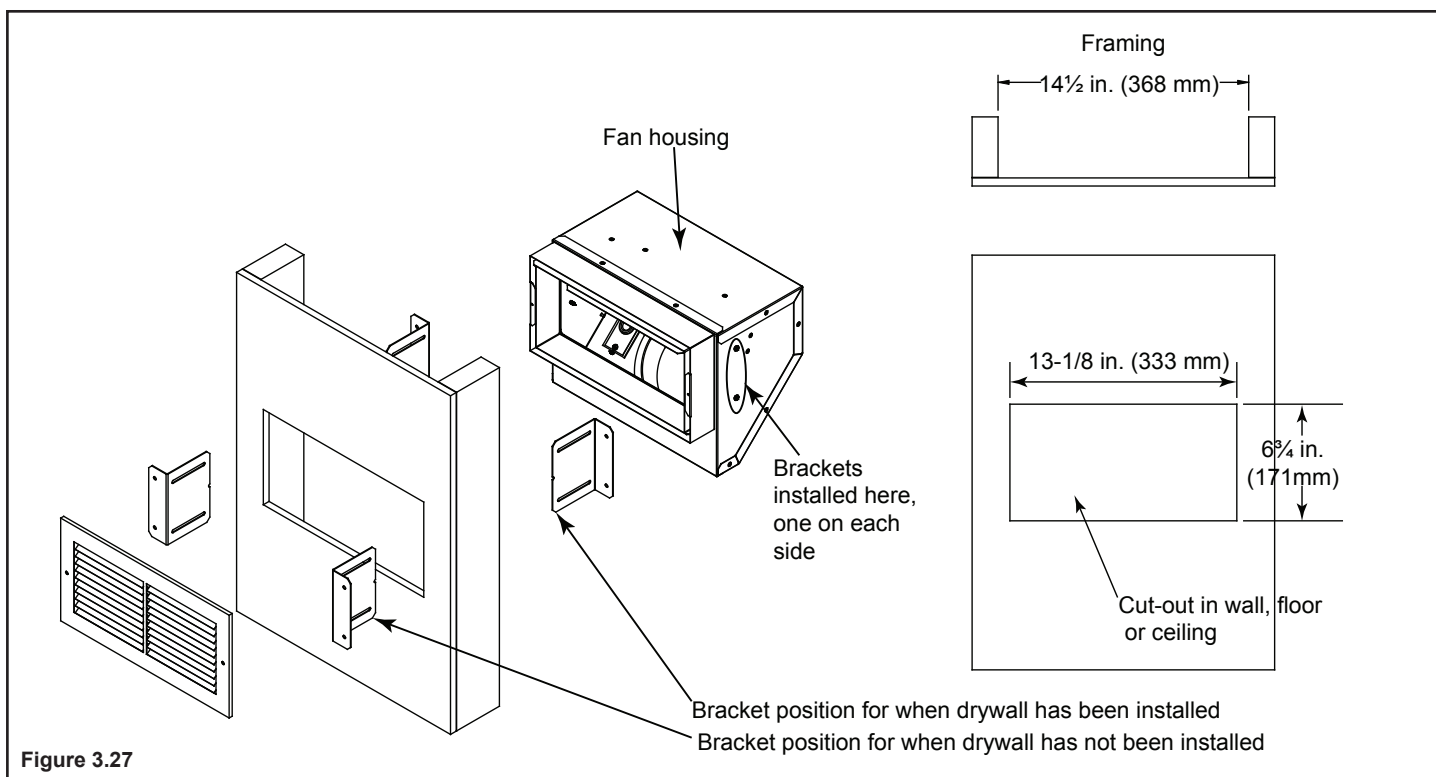
**NOTICE:** The fan and electrical connections must be accessible for servicing per local code requirements.

- Attach enough 6 in. (152 mm) B-Vent as required for your installation to the fan housing. **A maximum of (4) 90° elbows is recommended.** Screw the B-vent to the adapter.

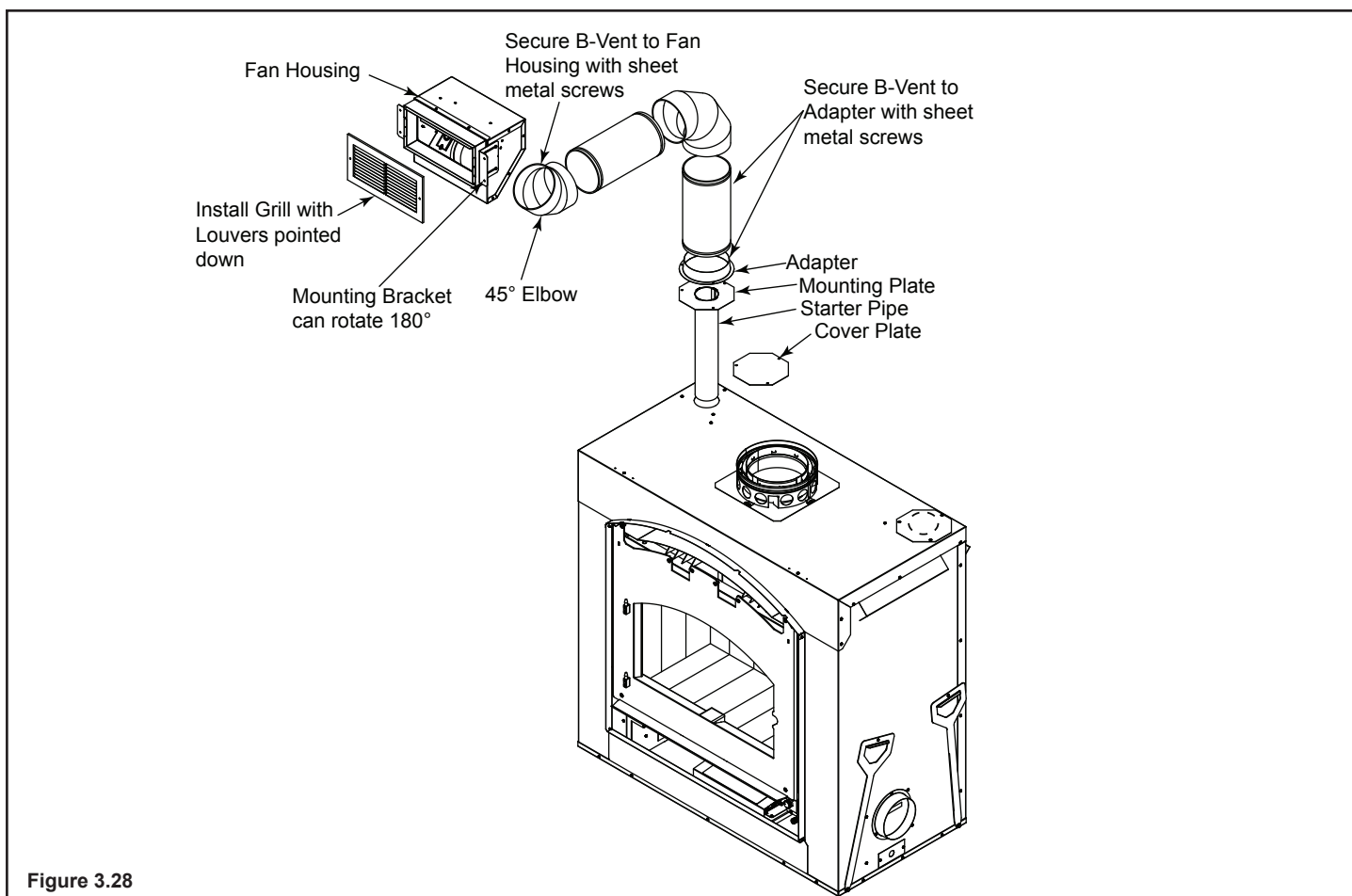
Also screw the B-vent to the outlet box on the fan housing. See Figure 3.26. Support duct at intervals of no greater than 4 ft (1 m) as required by local code.

**WARNING! Risk of Fire!** Comply with all minimum clearances specified.

- A minimum 1/2 in. (13 mm) air clearance must be maintained at the back and 1 in. (25 mm) to the sides of the fireplace assembly.



**NOTICE:** Secure the duct so that clearance to the fireplace outer wrap is maintained. Tape all seams with aluminum tape 1-1/4 in. (32 mm) minimum width or as specified by local codes.



## Installing Fan In Housing

- Insert fan into the fan housing starting with motor end first. Slip it below the "L" bracket on the left side allowing the right side to drop in. See Figure 3.29.

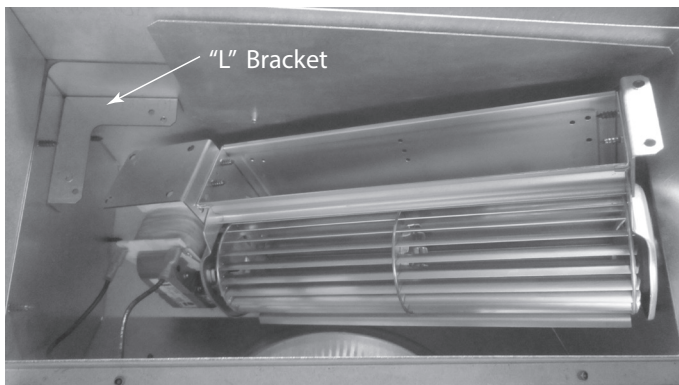


Figure 3.29

- Tilt the fan forward to clear the mounting brackets then lift the fan onto the brackets. See Figure 3.30.

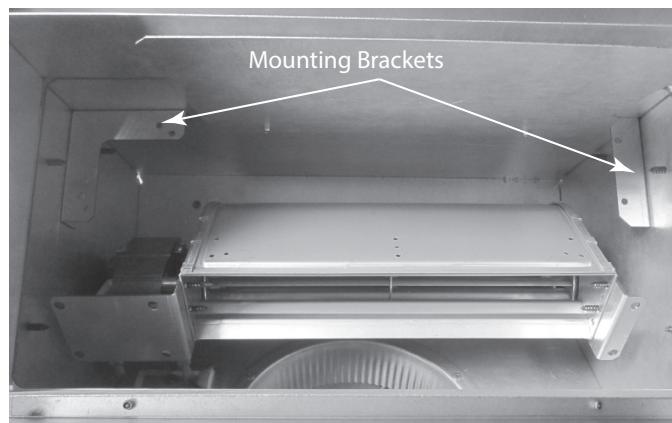


Figure 3.30

- Secure the fan to the mounting brackets with (4) screws provided. See Figure 3.31.

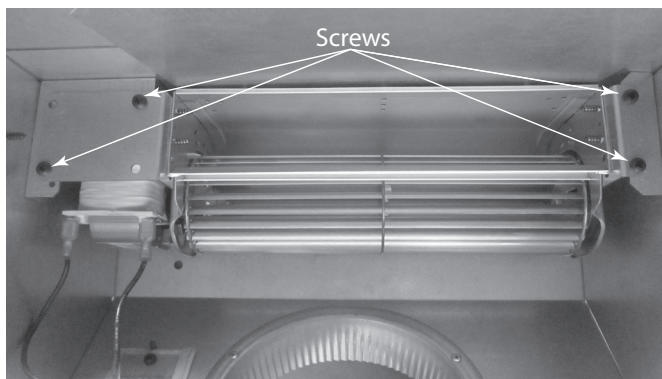


Figure 3.31

- Insert the fan wires through the grommet and into the junction box. See Figure 3.32.

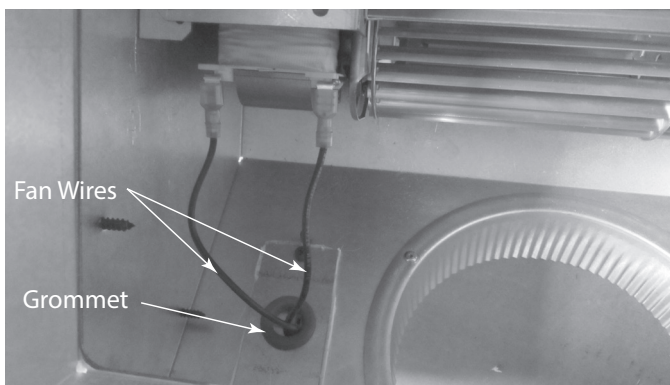


Figure 3.32

- Install the variable speed wall rheostat (with setting on "OFF") in a convenient location. This switch will control the Heat-Zone fan operation.
- Remove the junction box. Wire 110 VAC service TO the wall rheostat and FROM the wall rheostat to the fan junction box. Use wire nuts to secure the 110 VAC service wires to the hot (black) and neutral (white) fan wires and screw the 110 VAC ground wire to the junction box. See Figure 3.33.
- Secure the return air grille to the fan housing making sure it is flush. The grille must be installed with the louvers pointing down.

**NOTICE: DO NOT USE ADJUSTABLE REGISTERS.**

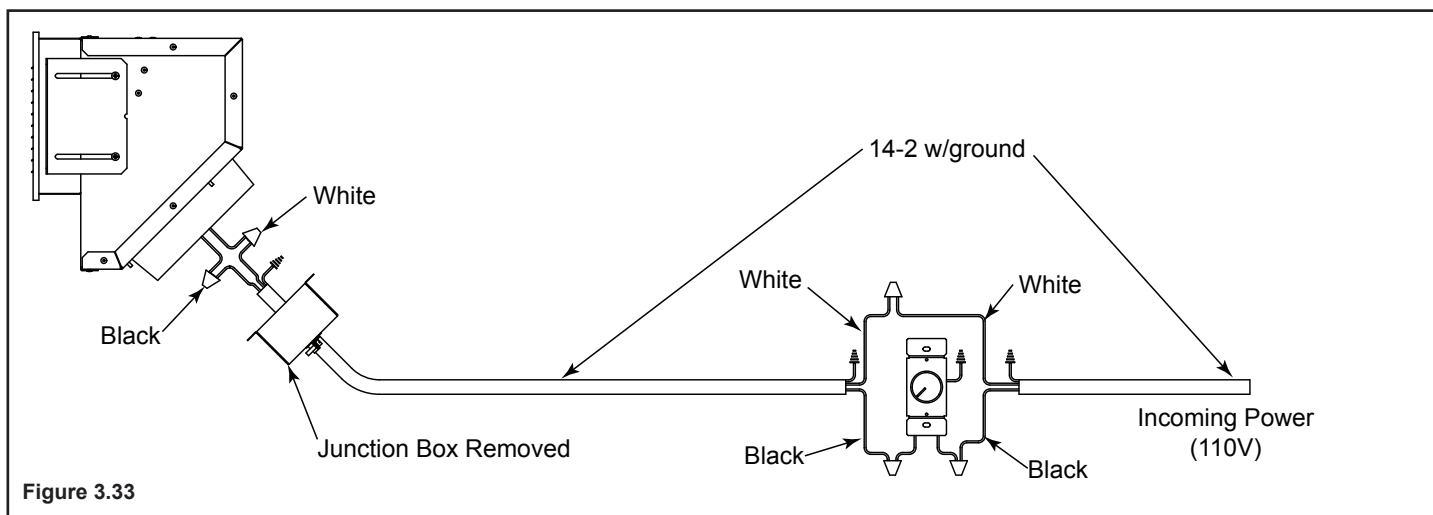


Figure 3.33



## 4 Electrical Wiring

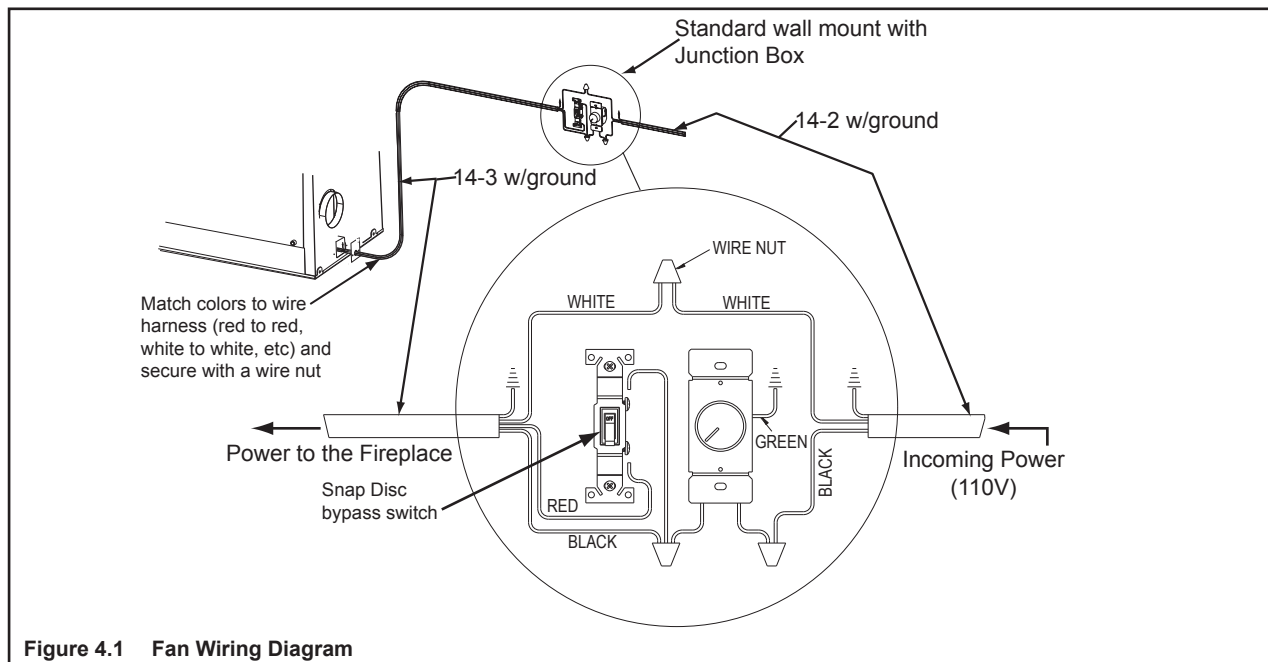
**NOTICE:** The manual override switch, rheostat speed control and cover plate are supplied. You will need to supply: 14-3 wire with ground; 14-2 wire with ground; standard wall mount junction box; wire nuts.

- Remove junction box cover plate on the bottom right side of the fireplace.
- Thread the 14-3 with ground wire through the opening with the strain relief on the cover plate.
- Match colors to wire harness, (red to red, white to white, etc.) and secure with wire nuts.

**NOTICE:** Wiring for fans must be done before framed enclosure is completed. If using a Heat Zone kit, it also must be installed before enclosure is complete.

**WARNING! Risk of Fire! DO NOT** apply combustible finishing materials over any part of the front of this fireplace.

- The metal fireplace face may only be covered with noncombustible materials such as ceramic tile, brick, or stone.
- Do not cover or block any cooling air slots.



# 5 Chimney and Termination Requirements

## A. Chimney Requirements

Vertical distances are measured from the base of the fireplace as shown in Figure 5.1.

**Table 5.1 Chimney Requirements**

Minimum overall straight height	13 ft	3.96 m
Minimum height with single offset/return	14.5 ft	4.42 m
Double offset/return minimum height	20 ft	6.1 m
Maximum height	90 ft	25.60 m
Maximum chimney length between an offset and return	20 ft	6.1 m
Maximum distance between chimney stabilizers	35 ft	10.67 m
Maximum unsupported chimney length between the offset and return	6 ft	1.83 m
Maximum unsupported chimney height above the fireplace	35 ft	10.67 m
Maximum unsupported chimney above roof	6 ft	1.83 m

**NOTICE:** A maximum of two pairs of offsets and returns may be used.

**WARNING! Risk of Fire!** You must maintain 2 in. (51 mm) air space clearance to insulation and other combustible materials around the chimney system. Failure to do so may cause overheating and fire.

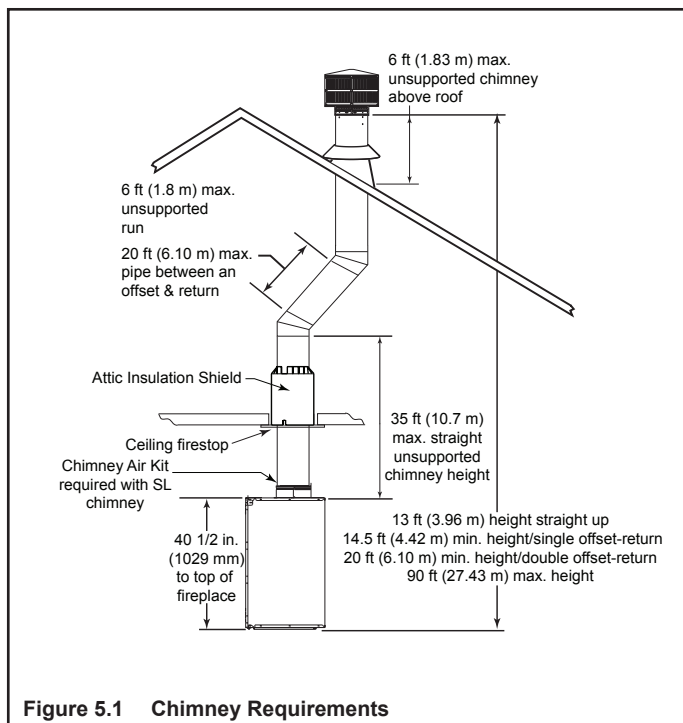
**NOTICE:** You must provide support for the pipe during construction and check to be sure inadvertent loading has not dislodged the chimney section from the fireplace or at any chimney joint.

**Table 5.2 Chimney Component Dimensions**

HEIGHT OF CHIMNEY COMPONENTS		in.	mm
<b>Chimney Stabilizer</b>			
	SL3	4-3/4	121
<b>Offsets/Returns</b>			
	SL315	13-3/8	340
	SL330	15-1/2	394
<b>Chimney Sections*</b>			
	SL306	4-3/4	121
	SL312	10-3/4	273
	SL318	16-3/4	425
	SL324	22-3/4	578
	SL336	34-3/4	883
	SL348	46-3/4	1187

\* Dimensions reflect effective height.

**Note:** 8 in. DuraPlus can also be used. See page 45.



**Figure 5.1 Chimney Requirements**

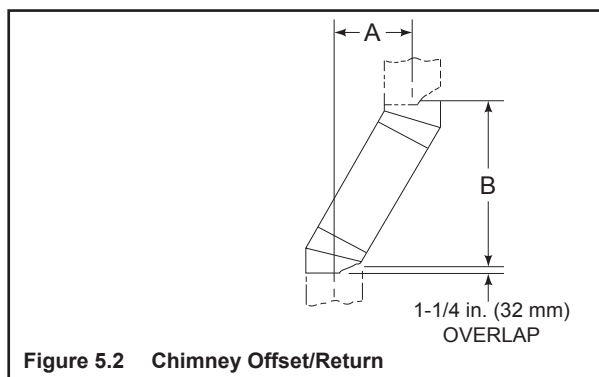
## B. Offsets/Returns

A 30° Elbow (measured from the vertical) is the largest that can be used in an offset. A 30° Elbow may not be combined with another Elbow to make a steeper offset (e.g. two 30° Elbows are not allowed to be put together to form a 60° elbow.). Avoid Elbows if possible. A totally vertical chimney is more efficient. When Elbows are necessary to avoid obstructions such as rafters, ridgepoles, or joists, you are only allowed to use 2 pair of Elbows in any one chimney system. Horizontal runs of chimney violate building code and are not allowed.

- An offset and return can be used as a single entity or separated by chimney section(s).

**WARNING! Risk of Fire! DO NOT** use offset/returns greater than 30° from vertical. Chimney draft will be restricted and could cause overheating and fire.

- Measure the shift needed to avoid the overhead obstruction. Refer to dimension A in Figure 5.2.
- Find the appropriate A dimension listed in Table 5.3. The B dimension coinciding with the A dimension measurement in Table 5.3 represents the required vertical clearance needed to complete the offset/return.
- Read across the chart to find the number of chimney sections/model numbers needed between the offset and return.



### Example:

Your "A" dimension from Figure 5.2 is 14-1/2 in. (368 mm). Using Table 5.3 the dimension closest to, but not less than 14-1/2 in. (368 mm) is 14-1/2 in. (368 mm) using a 30° offset/return.

You determine from the table that you need 34-1/8 in. (867 mm) (Dimension "B") between the offset and return.

The chimney component that best fits your application is one SL324.

**Table 5.3 Offset Dimensions**

15-degree				30-degree				SL306	SL312	SL318	SL324	SL336	SL348
A		B		A		B							
<i>in.</i>	<i>mm</i>	<i>in.</i>	<i>mm</i>	<i>in.</i>	<i>mm</i>	<i>in.</i>	<i>mm</i>						
1 5/8	41	13 3/8	340	3 5/8	92	15 1/2	394	-	-	-	-	-	-
2 7/8	73	17 3/4	451	5 1/2	140	18 5/8	473	1	-	-	-	-	-
4 1/8	102	22 3/8	568	7 1/4	184	21 3/4	552	2	-	-	-	-	-
4 1/2	114	23 5/8	600	8 1/2	216	23 3/4	603	-	1	-	-	-	-
5 3/4	146	28 1/4	718	10 1/4	260	27	686	1	1	-	-	-	-
6	152	29 3/8	746	11 1/2	292	29	737	-	-	1	-	-	-
7 1/4	184	34	864	13 1/4	337	32 1/8	816	-	2	-	-	-	-
7 3/4	197	36 1/8	918	14 1/2	368	34 1/8	867	-	-	-	1	-	-
8 3/4	222	39 3/4	1010	16 1/4	413	37 3/8	949	1	-	-	1	-	-
10 3/8	264	45 5/8	1159	19 1/4	489	42 1/2	1080	-	-	2	-	-	-
10 5/8	270	46 3/4	1187	20 1/2	521	44 5/8	1133	-	-	-	-	1	-
11 7/8	302	51 3/8	1305	22 1/4	565	47 3/4	1213	1	-	-	-	1	-
13 1/2	243	57 1/4	1454	25 1/4	641	52 7/8	1343	-	-	-	2	-	-
13 3/4	349	58 3/8	1483	26 1/2	673	55	1397	-	-	-	-	-	1
15	381	63	1600	28 1/4	718	58 1/8	1476	1	-	-	-	-	1
16 1/2	419	68 3/4	1746	31 1/4	794	63 1/4	1607	-	1	-	-	-	1
18	457	74 5/8	1895	34 1/4	870	68 1/2	1740	-	-	1	-	-	1
19 5/8	498	80 3/8	2042	37 1/4	946	73 3/4	1873	-	-	-	1	-	1
20 5/8	524	84 1/8	2137	39 1/8	994	76 7/8	1953	1	-	-	1	-	1
22 3/4	578	91 7/8	2334	43 1/4	1099	84 1/8	2137	-	-	-	-	1	1
24	610	96 1/2	2451	45 1/8	1146	87 1/4	2216	1	-	-	-	1	1
25 7/8	657	103 1/2	2629	49 1/4	1251	94 1/2	2400	-	-	-	-	-	2

Proper assembly of air-cooled chimney parts result in an overlap at chimney joints of 1-1/4 in. (32 mm). Effective length is built into this chart.

## C. Termination Requirements

- Install a cap approved and listed for this fireplace system.
- Locate cap where it will not become plugged by snow or other materials.
- Locate cap away from trees or other structures.
- The bottom of the termination cap must be at least 3 ft (.91 m) above the roof AND at least 2 ft (.61 m) above any portion of roof within 10 ft (3.05 m) as shown in Figure 5.3.
- The distance required between caps is shown in Figure 5.3.

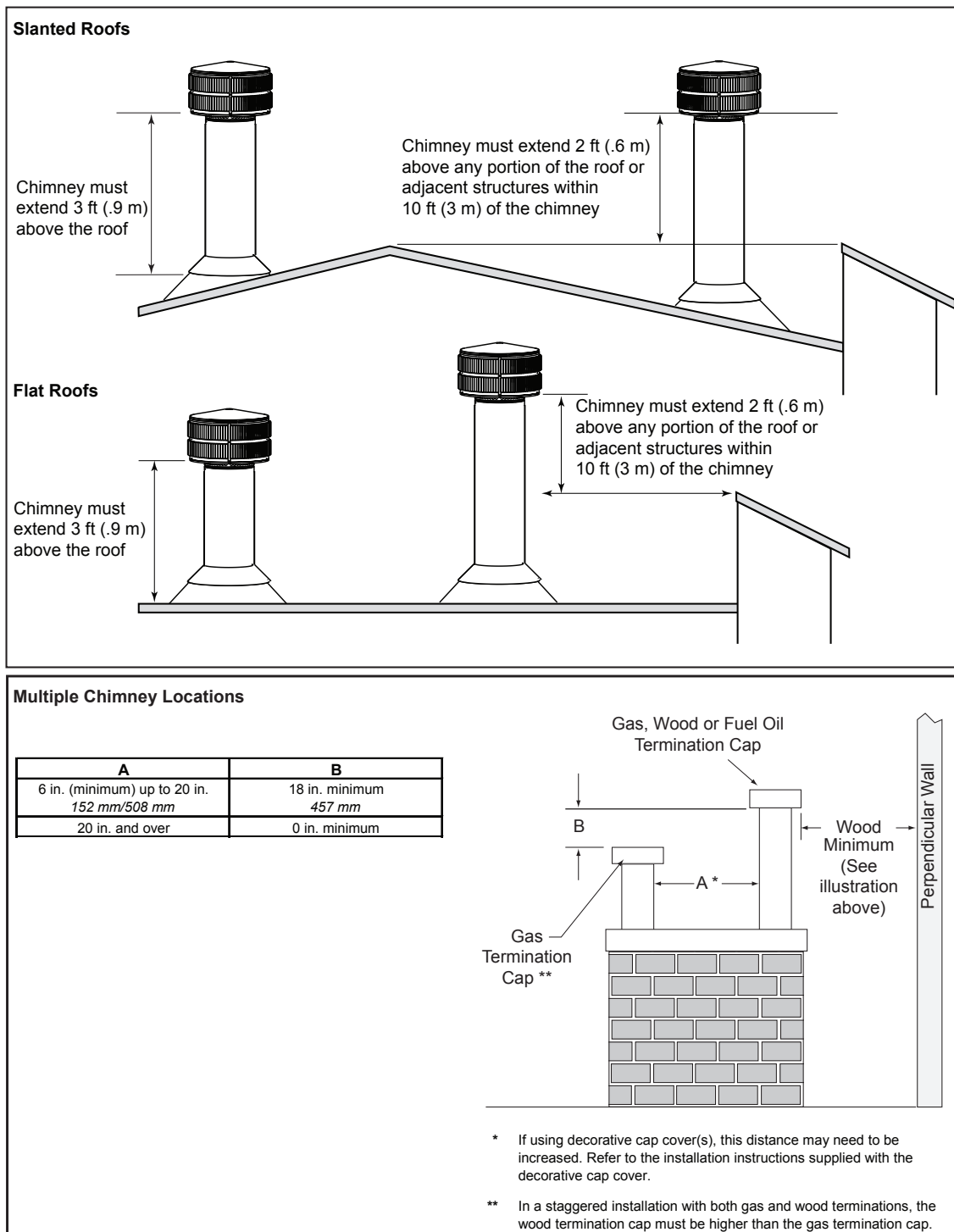


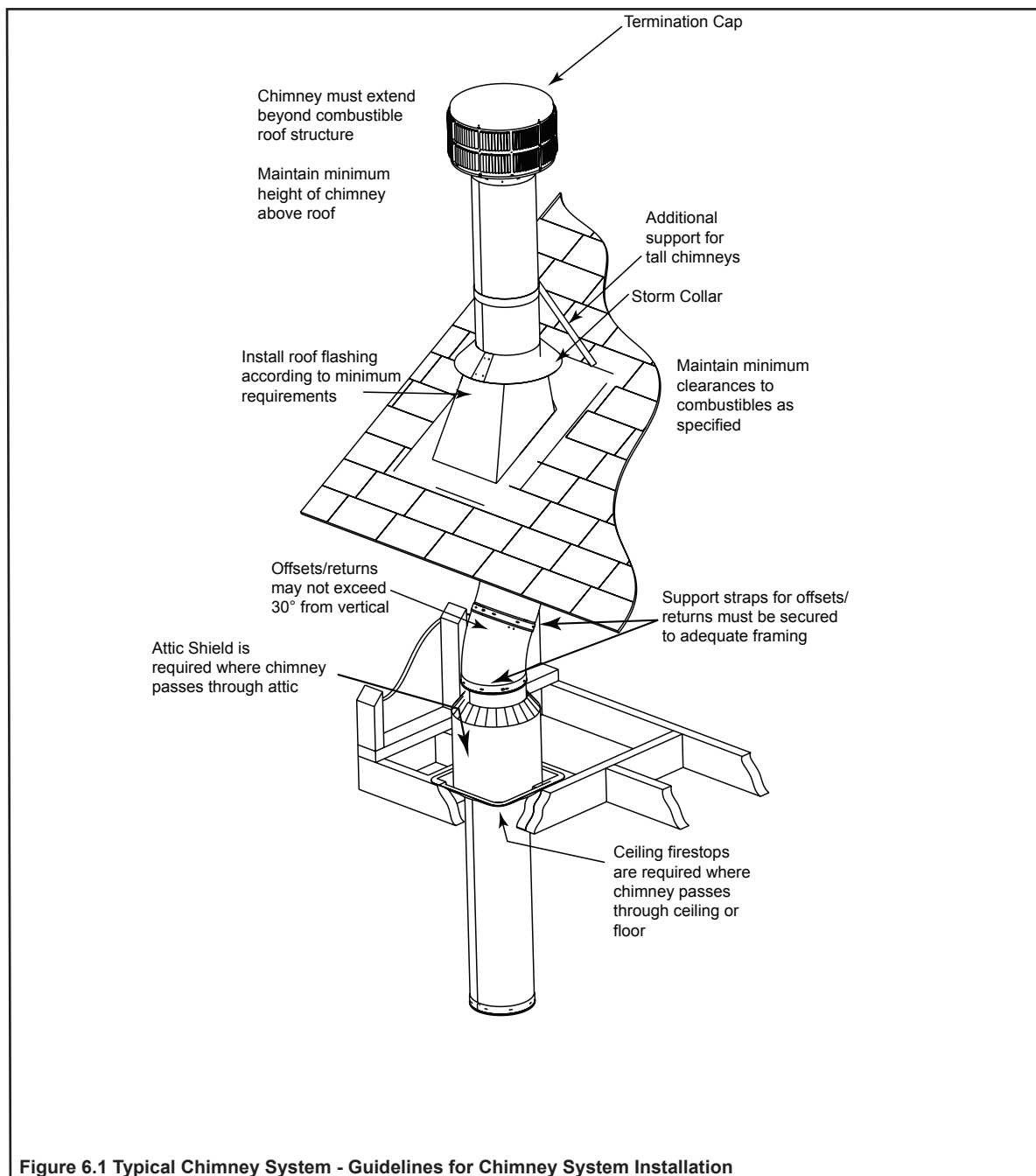
Figure 5.3 Multiple Chimney Locations

# 6 Chimney Installation

## A. Typical Chimney System

**NOTICE:** Chimney performance may vary.

- Trees, buildings, roof lines and wind conditions affect performance.
- Chimney height may need adjustment if smoking or overdraft occurs.



The SL300 series chimney (UL127 approved for use with this fireplace) is shipped with wrap around warning labels installed. These labels may be removed from the sections of chimney exposed above the roofline.

## B. Assemble Chimney Sections

**WARNING! Risk of Fire! DO NOT** install substitute or damaged chimney components.

Use only those components described in this manual.

Attach either a straight chimney section or an offset to the top of the fireplace starting with the inner flue followed by the outer casing. Continue this order until termination cap is reached (depending on your installation requirement). Chimney sections are locked together by pushing downward until the top section meets the stop bead on the lower section.

The inner flue is placed to the inside of the flue section below it. The outer casing is placed outside the outer casing of the chimney section below it. See Figure 6.2.

**NOTICE:** Chimney sections cannot be disassembled once locked together. Plan ahead!

- Lock chimney sections and/or offsets/returns together by pushing downward until the top section meets the stop bead on the lower section.
- Pull on the top of each section as installed to make sure it is fully engaged and will not separate.
- You may use #6 or #8 sheet metal screws no longer than 1/2 in. (13 mm) to fasten chimney outer sections together. Do NOT penetrate inner flue.
- Vertical straight runs of chimney must be supported every 35 ft (10.7 m).

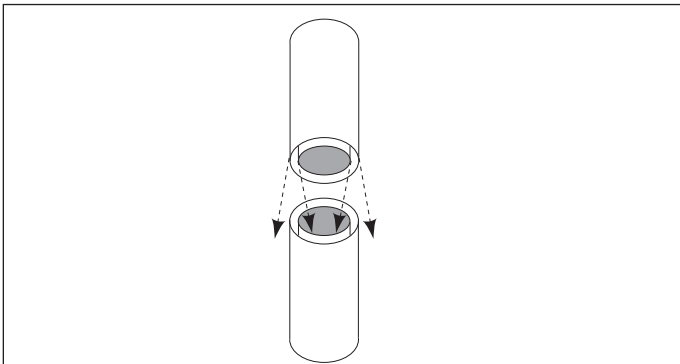


Figure 6.2 Assembling Chimney Sections

**WARNING! Risk of Fire! DO NOT** install substitute or damaged chimney components.

## C. Install Chimney Air Kit (CAK4A)

**NOTICE:** Chimney Air Kit, Part CAK4A is required when using the SL-300 Pipe Series. Detailed instructions are supplied with the kit. If using the Dura-Plus System (must be 8 in./203 mm in diameter), the starter ring that came with the fireplace must be removed and replaced with the Dura-Plus Base Plate. The CAK4A is not required with a Dura-Plus System.

- Install the chimney pipe first.
- Hand bend the tabs in position before placing on the fireplace.

- Place the box on top of the fireplace around the chimney pipe, push both pieces together and secure with screws provided.
- Use the pre-punched holes in the tabs as guides and drill holes through the fireplace top.
- Secure the CAK4A in place. See Figure 6.3.
- Seal around the kit at the flue and at the top of the outer shell with high temp caulk with a minimum rating of 500 degrees. See Figure 6.3.

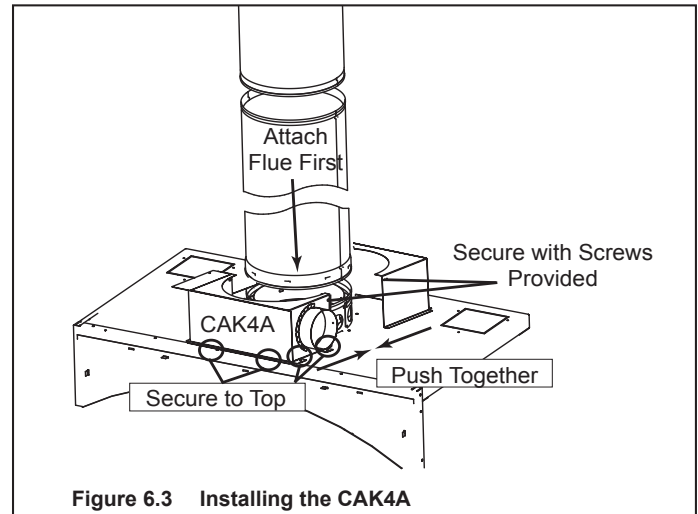


Figure 6.3 Installing the CAK4A

### NOTES:

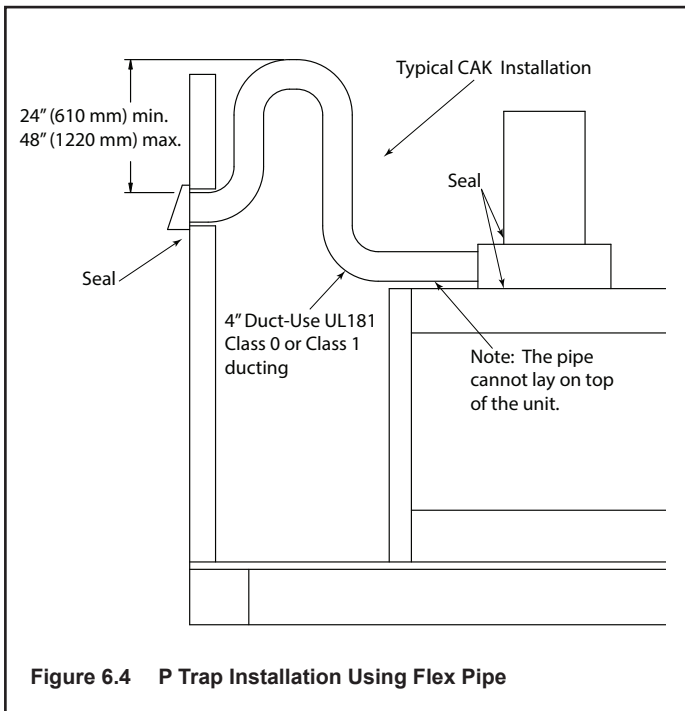
- The CAK4A termination cap must be a minimum of 4 ft (1219 mm) above the ground and kept free of debris.
- If the CAK4A is installed in a chase, the CAK4A side termination cap must be at least 3 ft (914 mm) below the chimney top.
- Seal around the cap and flex with caulk to stop air from getting into the chase. See Figure 6.4.
- The pipe cannot lay on top of the unit.

### **WARNING! Risk of Fire!**

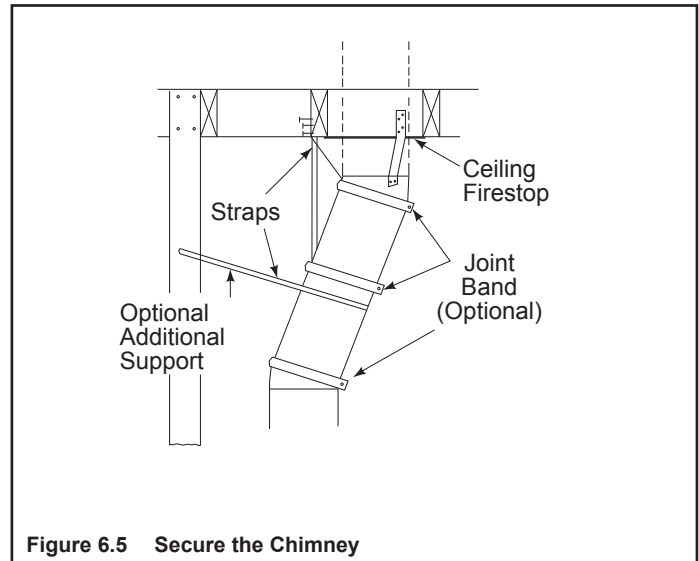
- *The flex pipe must never be compressed or deformed!*
- *Restricting the airflow inside the flex pipe may increase flue pipe temperatures causing a chase fire.*

### **P Traps**

When using the chimney air kit (CAK) and the outside air kits, it is recommended that you install a P trap as shown in Figure 6.4 by bending the flex duct, or using 90° elbows if using rigid duct to help prevent air circulation when the fireplace is not in use. In colder climates, it is strongly recommended to use an insulated duct.



**Figure 6.4 P Trap Installation Using Flex Pipe**



**Figure 6.5 Secure the Chimney**

### **D. Secure Offset/Return**

#### **WARNING! Risk of Fire!**

- *Secure offsets with screws (not to exceed 1/2 in./13 mm in length).*
- *Secure returns with strapping.*
- *Straight chimney sections may be secured with screw (not to exceed 1/2 in./13 mm in length) at the joints.*
- *Keep chimney sections from separating or twisting.*

When offsets and returns are joined to straight pipe sections, they must be locked into position with screws (outer only). To prevent gravity from pulling the chimney sections apart, the returns and the chimney stabilizers have hanger straps for securing these parts to joists or rafters. See Figure 6.5.

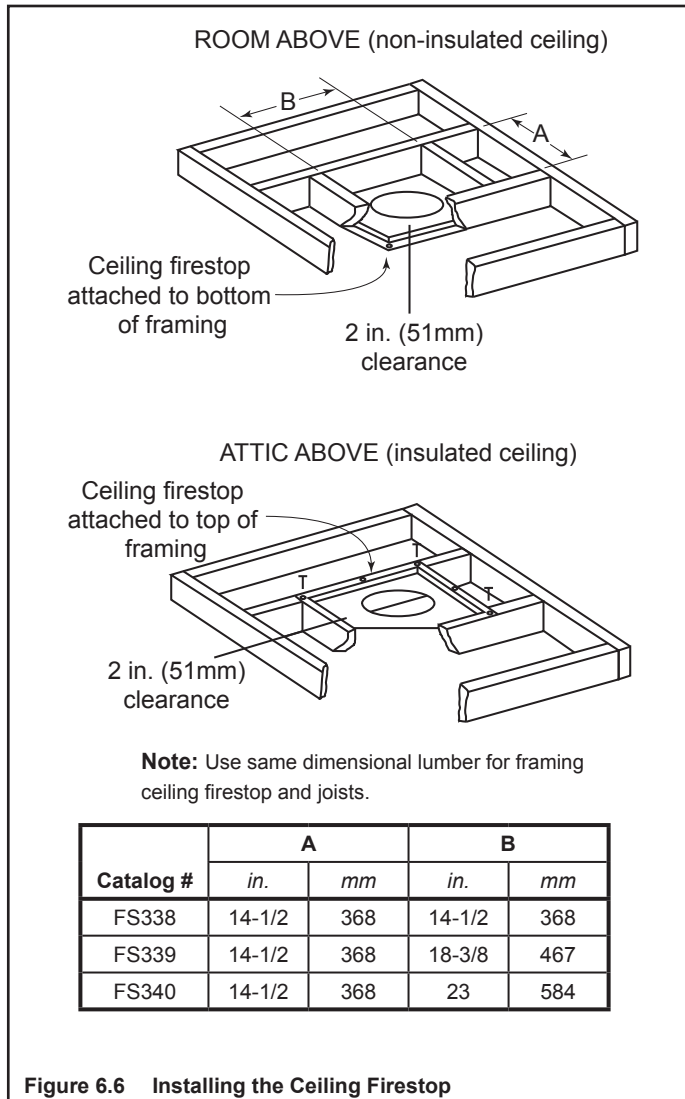
- \* Use # 6 or # 8 sheet metal screw, or larger, no longer than 1/2 in. (13 mm).



## E. Install Firestops

**WARNING! Risk of Fire!** Firestops must be used whenever the chimney penetrates a ceiling/floor.

- Mark and cut an opening in ceiling/floor as shown in Figure 6.6.
- Frame the opening with the same size lumber used in the ceiling joists.
- Nail the firestop to the bottom of the ceiling/floor joists.
- Provide a means to maintain the required air space between the chimney and insulation or install an attic insulation shield.



**WARNING! Risk of Fire! DO NOT** seal area between firestop opening and chimney pipe except where they enter the attic or leave the warm air envelope of the home (use 600° F sealant).

## F. Install Attic Insulation Shield

**WARNING! Risk of Fire!** You **MUST** install an attic insulation shield when there is any possibility of insulation or other combustible material coming into contact with the chimney.

- **DO NOT** pack insulation between the chimney and the attic insulation shield.
- Failure to keep insulation and other materials away from chimney pipe could cause fire.
- **DO NOT** offset chimney inside insulation shield.
- Combustible material may come in contact with the attic insulation shield as long as the required clearances are maintained to the chimney pipe.

Installation of a ceiling firestop is required:

- Refer to Figures 6.6, 6.7, 6.8 and 6.9.
- If the attic shield is pre-rolled continue. If it is a flat part, try and roll it up to aid in wrapping it around the chimney.
- Pre-bend all the tabs in at the top to 45°.
- Wrap the shield (around the chimney if already installed) until you have an overlap and the three holes on each side match up (large holes on top).
- Insert three screws into the matching holes to form a tube starting at the bottom.
- Bend the tabs on the bottom of the tube inward to 90° to maintain chimney air space.
- Rest the insulation shield on the ceiling firestop below.
- Tape off any opening around the bottom.

If you wish to make a custom shield or barrier, follow these guidelines:

- Metal is preferred, although any material stiff enough to hold back the insulation can be used.

**WARNING! Risk of Fire!** Use of cardboard or other materials that can deflect under humidity or other environmental conditions is not recommended.

- The shield or barrier must be tall enough to extend above the insulation and prevent blown-in insulation from spilling into the cavity.
- Maintain specified air spaces around chimney.
- Check instructions and local codes for further details.

### Double-check the Chimney Assembly

Continue assembling the chimney sections up through the ceiling firestops as needed. While doing so, be aware of the height and unsupported chimney length limitations given under Section 5.

Check each section by pulling up slightly from the top to ensure proper engagement before installing the succeeding sections. If they have been connected correctly, they will not disengage when tested.

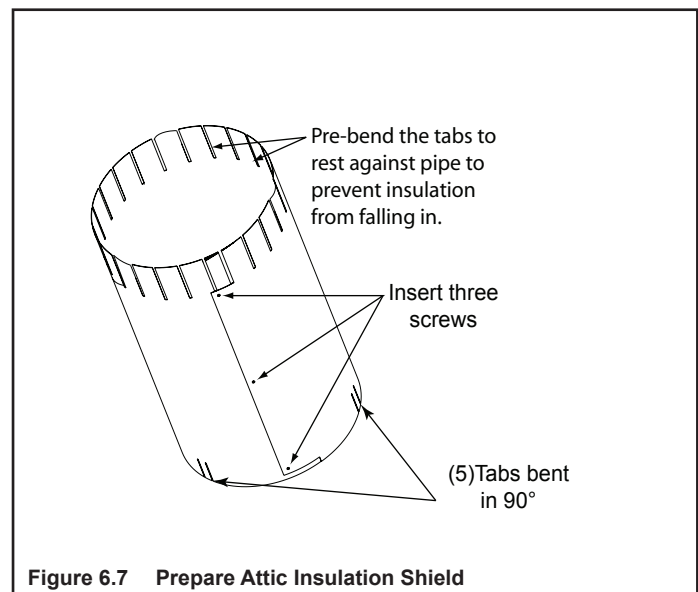


Figure 6.7 Prepare Attic Insulation Shield

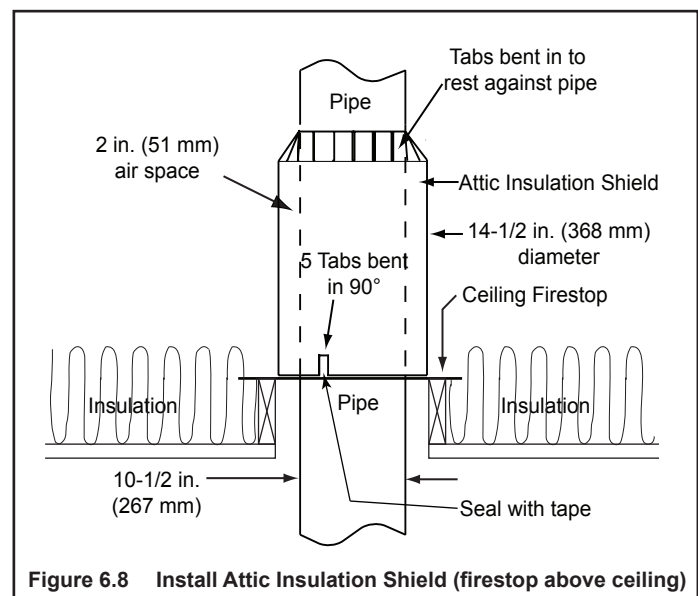


Figure 6.8 Install Attic Insulation Shield (firestop above ceiling)

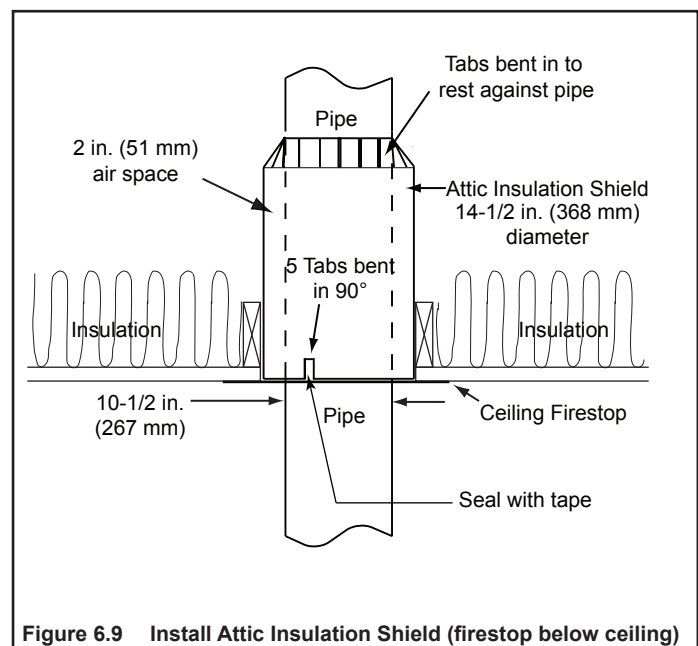


Figure 6.9 Install Attic Insulation Shield (firestop below ceiling)

## G. Roof Penetration

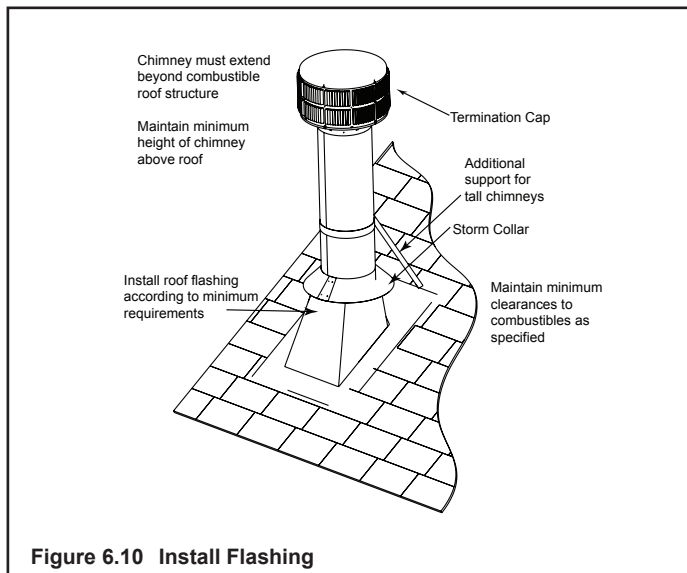
- Refer to Figure 6.10.
- Plumb from roof to center of chimney.
- Drive a nail up through roof to mark center of pipe.
- Measure to either side of nail and mark the 14-1/2 in. x 14-1/2 in. (368 mm x 368 mm) opening required.
- Measure opening on the horizontal; actual length may be larger depending on roof pitch.
- Cut out and frame opening.

### Install Flashing

- Assemble chimney so it passes through the framed opening.
- Slip the flashing over the chimney.

**NOTICE:** Roofing shingles must be below the flashing plate on the lower side of a sloped roof and over the flashing plate on the sides and top.

- Nail the flashing to the roof. Keep gaps between the flashing plate and the roof to a minimum.
- Caulk the flashing plate and roof junction as well as the vertical seam on the flashing. All nail heads must be caulked with a roofing sealant.
- Caulk the overlap seam of any exposed pipe sections that are located above the roof line to prevent leaks.



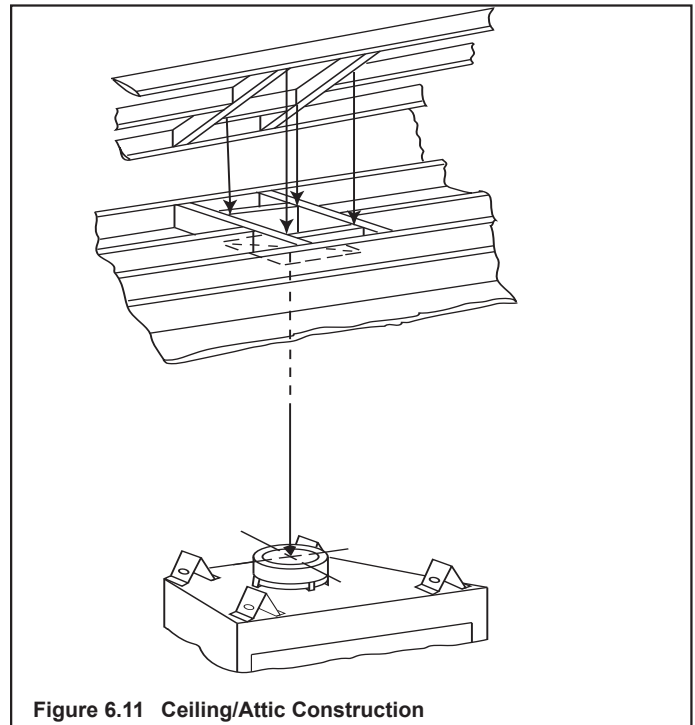
## H. Manufactured Home Installation

### SL-300 Series Ceiling/Roof Thimble

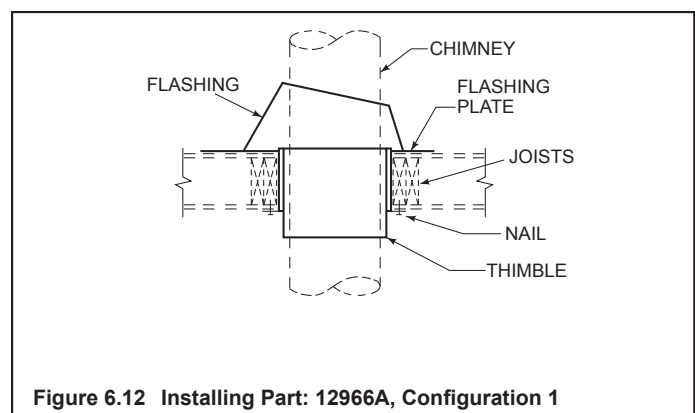
**NOTICE: REQUIRED** for manufactured homes.

- Locate the point where the chimney will exit the roof by plumbing down to the center of the chimney. Lay out, cut and frame a 14-1/2 in. (368 mm) square opening (measured on the horizontal) through the ceiling and roof structure. **Consult local codes for framing details.**

- The thimble must extend completely through the roof structure shielding combustible materials. Five location holes have been provided to allow for a variety of ceiling/roof thicknesses. A thimble extension is required when the ceiling/roof thickness exceeds 12-1/2 in. (318 mm). The extension should overlap the thimble one inch.
- To attach the extension to the thimble, drill 1/8 in. (3 mm) holes through the outer shield of the thimble using the predrilled holes in the extension as guides. Attach the extension to the thimble using the screws provided with the extension.
- Install the thimble assembly and nail it securely to the framing members.



- Center the flashing over the chimney and nail it to the roof. Keep gaps between the flashing plate and the roof to a minimum. Caulk the flashing plate and roof junction as well as the vertical seam on the flashing. All nail heads must be caulked with a roofing sealant.
- Finish assembling the chimney storm collar and termination cap following the installation instructions provided with them.



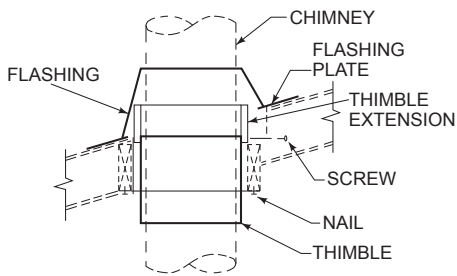


Figure 6.13 Installing Part 12966A, Configuration 2

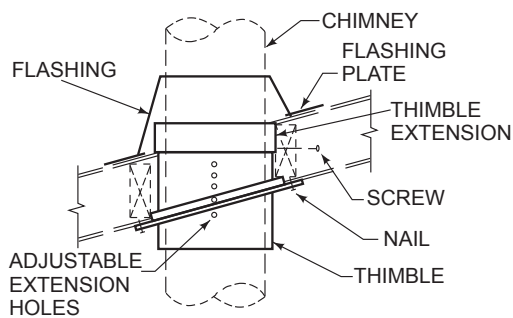


Figure 6.14 Installing Part 12966A Configuration 3

## I. Install Chase/Chase Top

- You **MUST** use a chase top in a chase installation. Chase tops are available from your Heatilator dealer or may be field constructed.
- Include a turn-down and drip edge to prevent water from seeping into the chase.
- Include a 2 in. (51 mm) soldered, welded or spun collar around pipe opening to keep water out.
- Provide a 1/8 in. (3 mm) gap around the flue pipe.
- Slope the chase top downward away from the opening.

**WARNING! Risk of Fire! DO NOT** caulk the pipe to the chase top collar.

- Caulk all seams to prevent leaks.

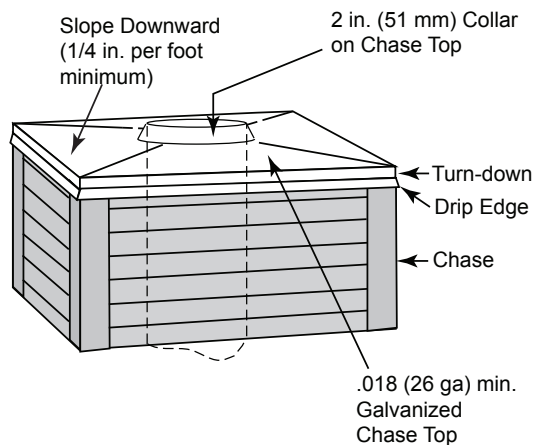


Figure 6.15 Chase Top Construction

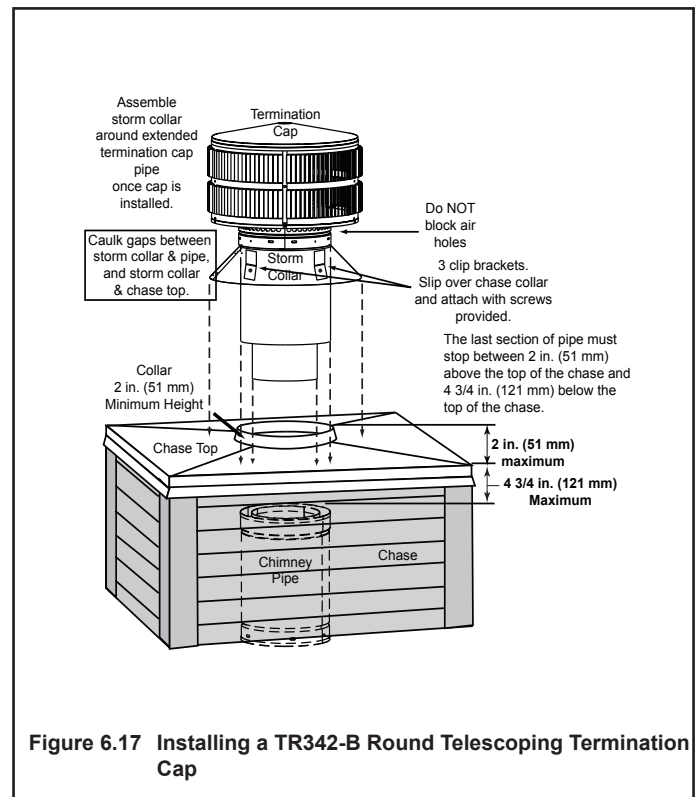
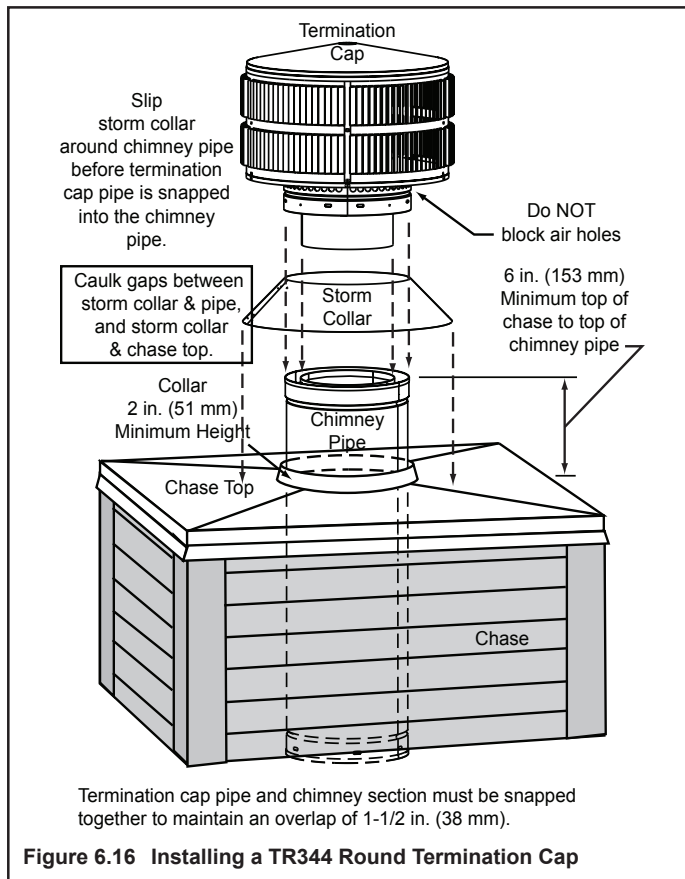
## J. Install Termination Cap

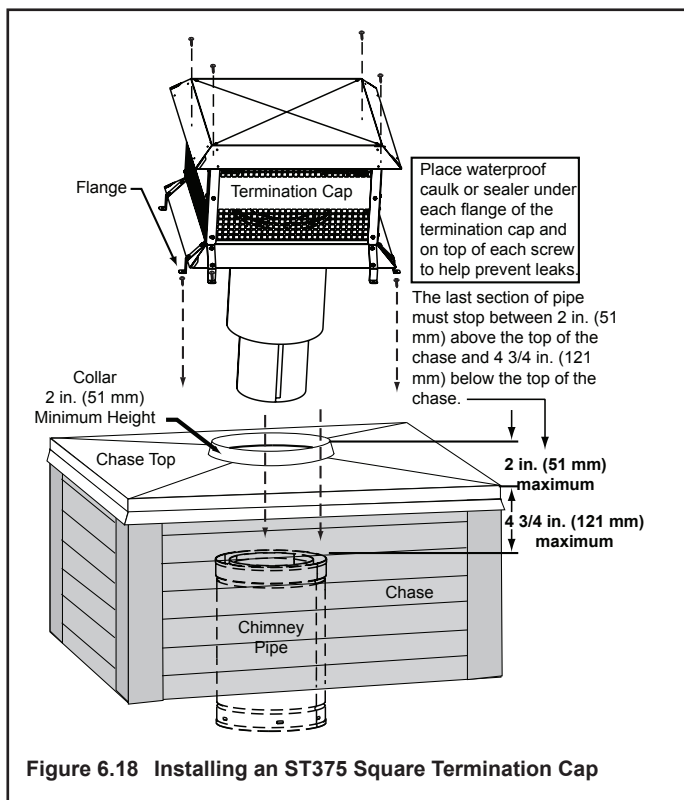
Install the chimney sections up through the chase enclosure.

- Caulk the overlap seam of any exposed pipe sections that are located above the roof line to prevent leaks.
- Refer to termination cap instructions.

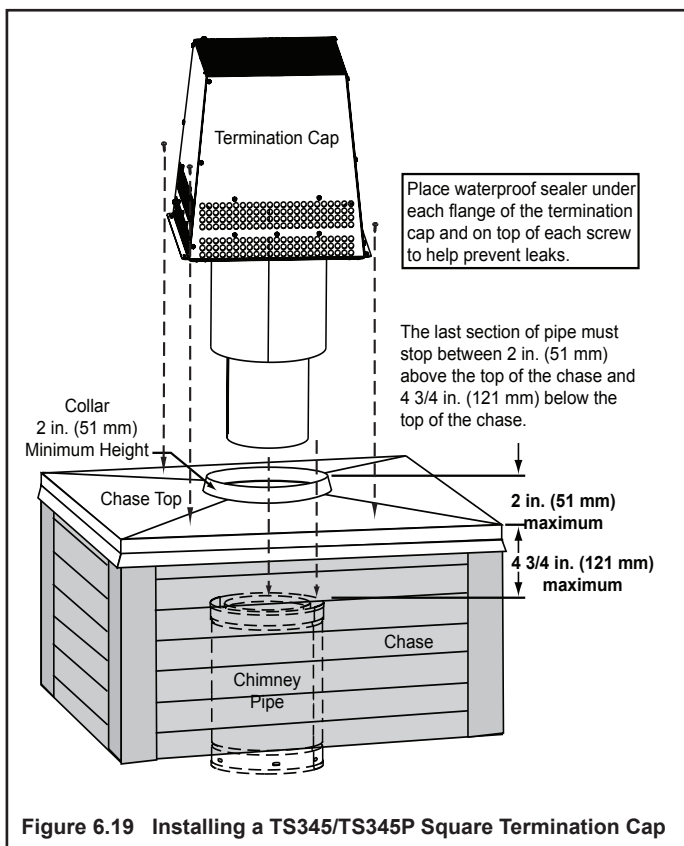
**WARNING! Risk of Fire!** The minimum overlap of cap to pipe (as shown in the following illustrations) **MUST** be met or chimney may separate from cap. Separation allows sparks, heat and embers to escape.

**NOTICE:** Paint the termination cap with a rust-resistant paint to protect against the effects of corrosion on those parts exposed to the weather.

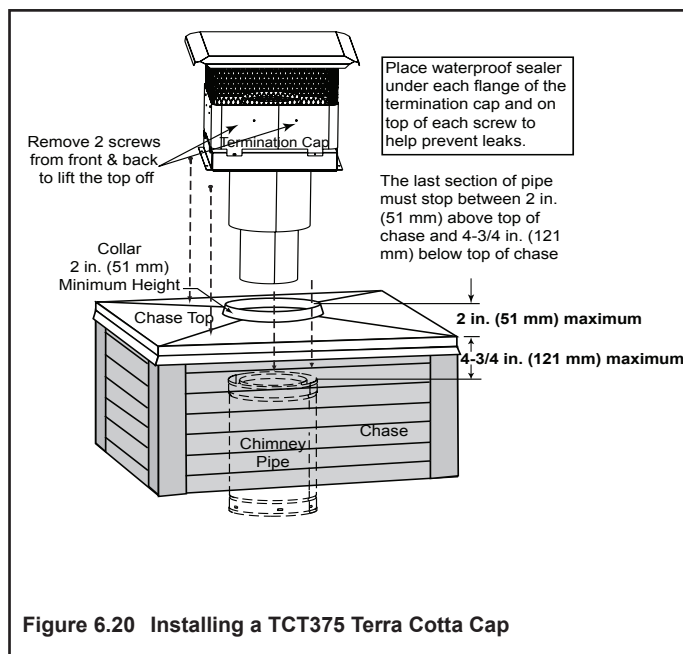




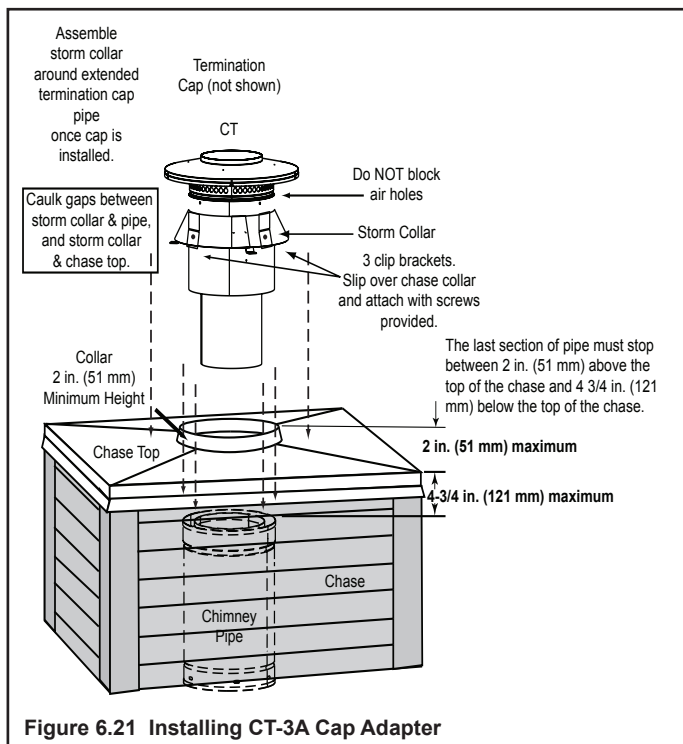
**Figure 6.18 Installing an ST375 Square Termination Cap**



**Figure 6.19 Installing a TS345/TS345P Square Termination Cap**



**Figure 6.20 Installing a TCT375 Terra Cotta Cap**



**Figure 6.21 Installing CT-3A Cap Adapter**

# 7 Finishing

## A. Template

A cardboard template of the front is printed on the outside of the shipping box. Cut out the template along the outside of the line for use in your installation. If using the cardboard template, it will require 1/4-20 bolts to attach it to the fireplace, (NOT INCLUDED). A metal template (see catalog) is available for more durable continued use, remaining accurate over time. Both measure 1/8 in. (3 mm) larger all the way around than the actual front.

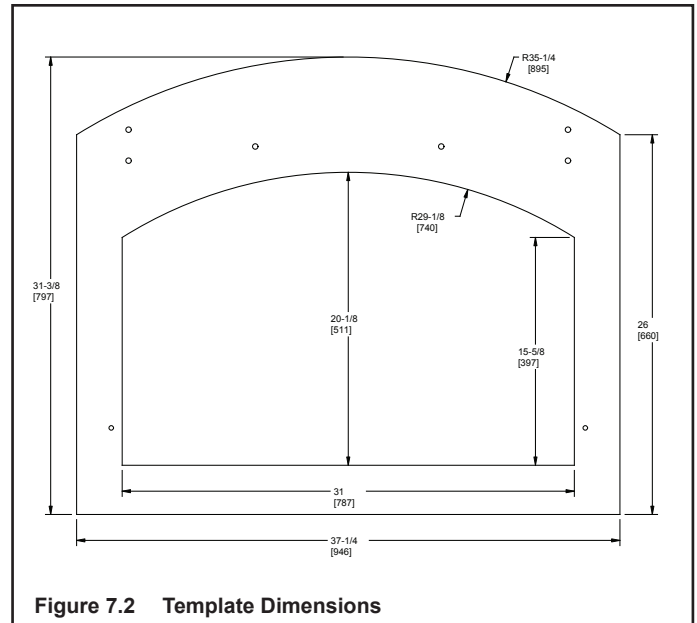
Note: This 1/8 in. of the non-combustible material must be painted or the red will be visible.

**Tools Required:** 5/32 in. Allen wrench.

- Remove the screws from the fascia and remove fascia from the fireplace (if installed). Save the screws. Store the fascia in a safe, protected area to prevent scratching or other damage.
- Install the template on the front of the fireplace (Figure 7.1) with screws removed or provided.

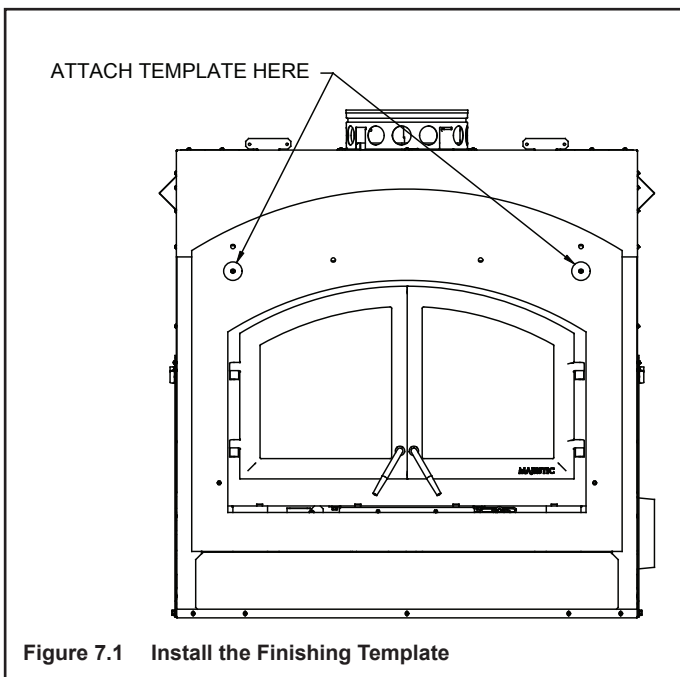
NOTE: Do not over tighten the screws, just tighten up the template enough so that it comes in contact with the outer flanges on the front of the fireplace.

You are now ready to continue your installation with the desired decorative material. The template also serves as a protective covering and prevents damage to the front of the fireplace.



**Note: DO NOT** remove hang tags until installing finish materials.

**NOTE:** The decorative fascia must be removable for future serviceability.





## B. Finish the Wall

Use a wet or dry towel or a soft brush to remove any dust or dirt from the non-combustible facing material.

Apply a non-combustible adhesive to attach tile, stone or other non-combustible finishing materials per manufacturer's instructions.

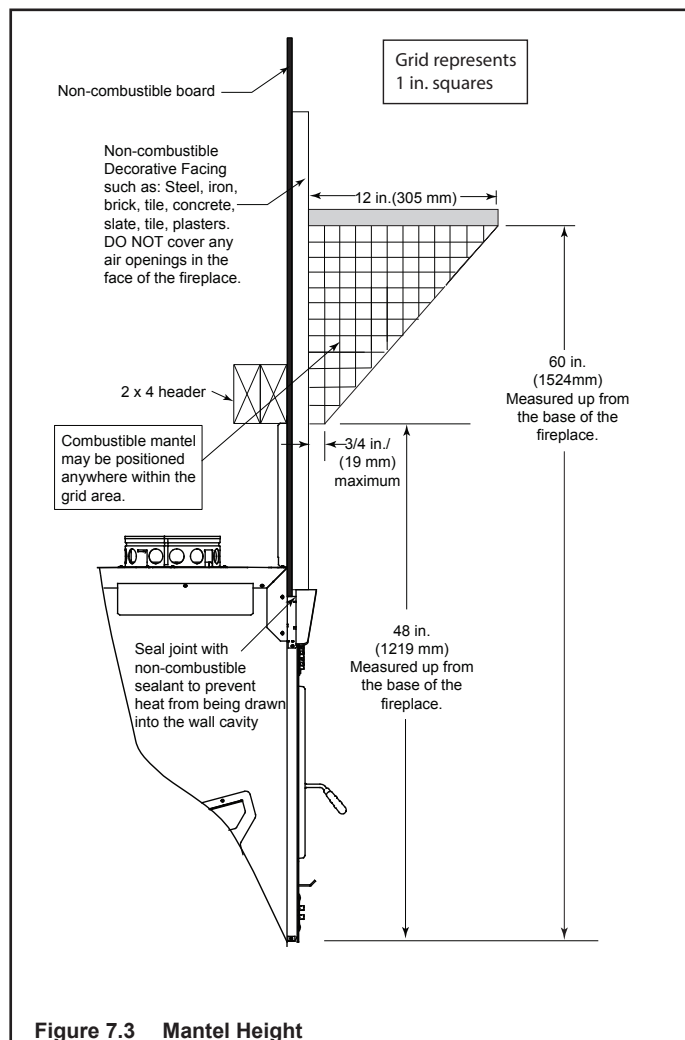
### 1. Stone, Brick Finish

**WARNING! Risk of Fire! DO NOT** apply tar paper or water resistive barrier over non-combustible board.

- Apply metal lath to the 1/2 in. thick non-combustible board with corrosion resistant self-tapping screws capable of penetrating the metal surface behind the non-combustible board.
- HHT recommends using type N or type S mortar. Due to high temperatures, review polymer modifiers specification sheet before using.

### 2. Tile, Granite, Marble Finish

- Due to high temperatures, HHT recommends using unmodified thinset when applying tile.
- When applying granite or marble, HHT recommends using thinset to adhere. If using a different adhesive, review specification sheet for application in high temperature areas.



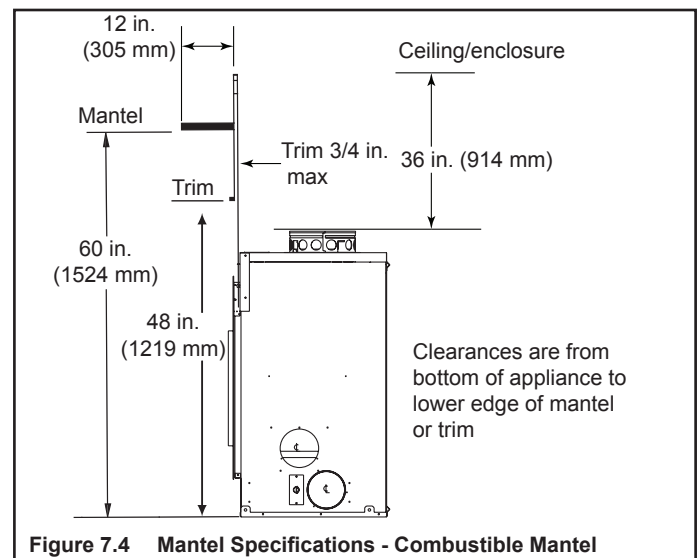
## C. Mantel and Wall Projections

A combustible mantel may be positioned no lower than 60 in. (1524 mm) at 12 in. (305 mm) deep from the base of the fireplace.

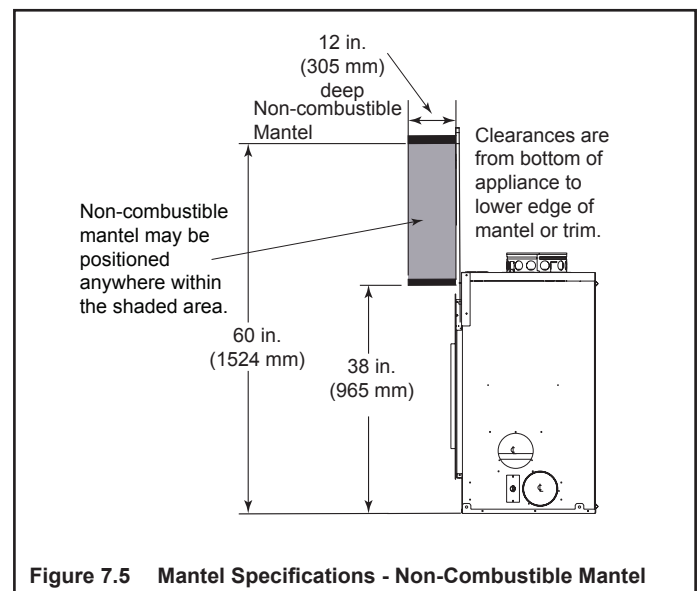
Minimum clearance faceplate to sidewall is 16 in.

The combustible mantel may have a maximum depth of 12 in. (305 mm). Combustible trim pieces that project no more than 3/4 in. (19 mm) from the face of the fireplace can be placed no closer than 6 in. (152 mm) from the side of the decorative front. Surround legs that project more than 3/4 in. (19 mm) must be 16 in. (406 mm) away from the side of the decorative front. Combustible trim must not cover:

- the metal surfaces of the fireplace
- where the non-combustible board is placed over the metal surfaces
- the space between the metal face of the fireplace and framing members



A noncombustible mantel may be positioned no lower than 38 in. (965 mm) from the base of the fireplace.



## D. Finishing the Hearth Extension

**WARNING! Risk of Fire!** High temperatures, sparks, embers or other burning material falling from the fireplace may ignite flooring or concealed combustible surfaces.

- Protective metal hearth strips **MUST** be installed.
- Hearth extensions **MUST** be installed exactly as specified.

A hearth extension must be installed with all fireplaces to protect the combustible floor in front of the fireplace from both radiant heat and sparks.

- You **MUST** use a hearth extension with this fireplace.
- Refer to Figure 7.6 for minimum dimensions.
- This fireplace has been tested and approved for use with a hearth extension insulated to a minimum R value of 1.03.
- The hearth extension material **MUST** be covered with tile, stone or other non-combustible material.
- Manufactured hearth materials will usually have a published **R value** (resistance to heat) or **k value** (conductivity of heat). Refer to the formula in Table 7.1 to convert a k value to an R value,
- Refer to Table 7.2 for hearth extension insulation alternatives.

**Table 7.1**

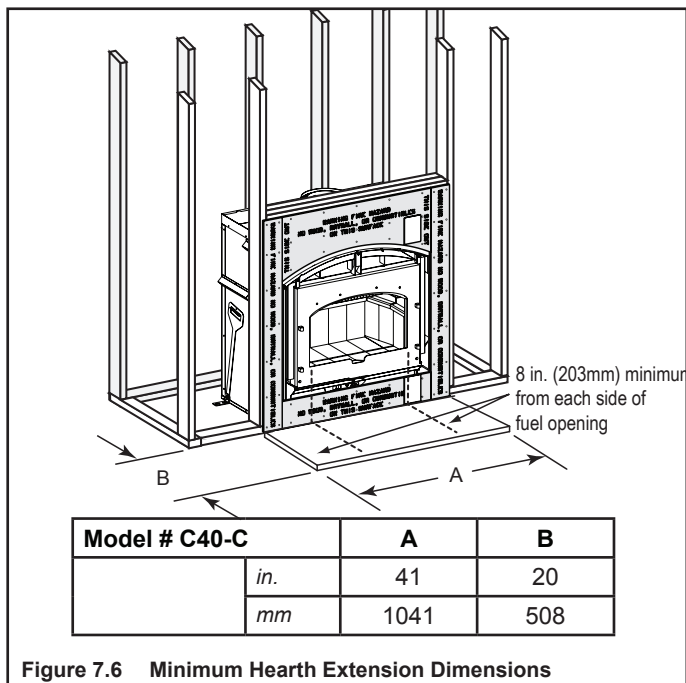
$$R = 1/k \times \text{inches of thickness}$$

**Table 7.2**

Hearth Extension Insulation Alternatives, R Value = 1.03			
Material	k per inch thick	r per inch thick	Minimum thickness required
Hearth & Home HX3, HX4	0.49	2.06	1/2 in.
USG Micore 300™	0.49	2.06	1/2 in.
USG Durock™ Cement Board	1.92	0.52	2 in.
Cement Mortar	5.0	0.20	5 1/8 in.
Common Brick	5.0	0.20	5 1/8 in.
Ceramic Tile	12.50	0.08	12 1/4 in.
Armstrong™ Privacy Guard Plus	0.46	2.18	1 in.
Marble	14.3-20.0	0.07-0.05	14 5/8 in. - 20 3/8 in.

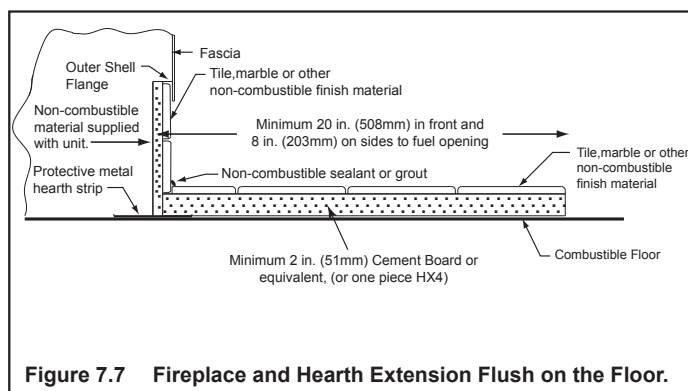
### WARNING! Risk of Fire!

You must comply with all minimum air space clearances to combustibles as specified. Framing or finishing material used on the front of, or in front of, the fireplace closer than the minimums listed must be constructed entirely of non-combustible materials (i.e., steel studs, concrete board, etc.). Failure to comply may cause fire.



**Figure 7.6 Minimum Hearth Extension Dimensions**

- Fireplace and Hearth Extension flush on the floor  
Non-combustible flooring a minimum of 20 in. (508 mm) in front of and 8 in. (203 mm) to either side of the fuel opening is required as shown in Figure 7.6.  
The construction of, and materials used for a hearth extension are shown in Figure 7.7. A hearth extension of this construction may be covered with any non-combustible decorative material and may have a minimum thickness as per Figure 7.7. Seal gaps between the hearth extension and the front of the fireplace with a bead of non-combustible sealant or grout.



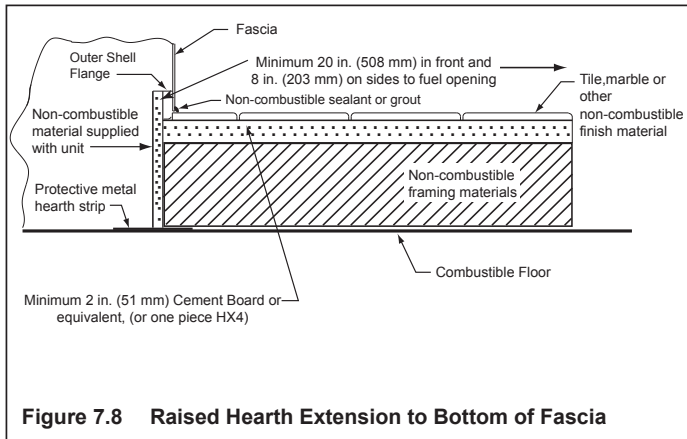
**Figure 7.7 Fireplace and Hearth Extension Flush on the Floor.**

- Fireplace installed flush on the floor and hearth extension raised to bottom of fascia:  
Non-combustible flooring a minimum of 20 in. (508 mm) in front of and 8 in. (203 mm) to either side of the fuel opening is required (see Figure 7.6).

- **Raised Hearth Extension Framing**

The hearth framing must be constructed of non-combustible materials (such as metal framing or equivalent material) and topped with one HX4, or equivalent material (Table 7.2).

**When creating the platform, allow for the thickness of the non-combustible finishing materials** (Figure 7.8).



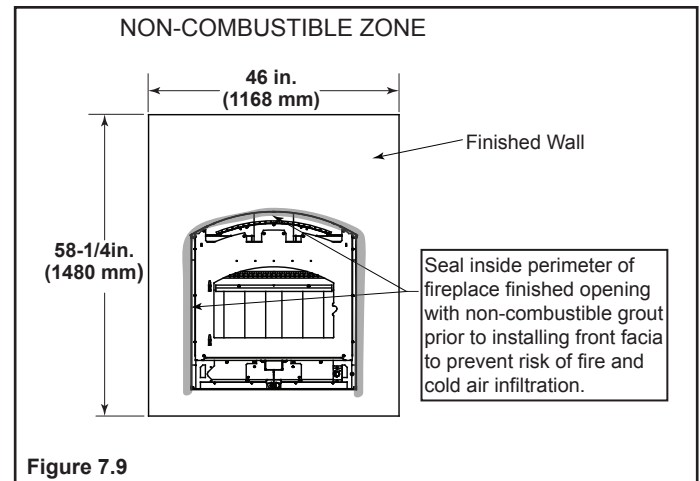
**Figure 7.8** Raised Hearth Extension to Bottom of Fascia

***WARNING! Risk of Fire!***

Hearth extensions are to be installed only as illustrated to prevent high temperatures from occurring on concealed combustible materials.

## E. Non-Combustible Sealant Material

- After completing the installation of non-combustible facing board in the required non-combustible zone and the non-combustible finishing material over that, remove the template.
- A bead of non-combustible sealant must be used to close off any gaps at the top and sides between the fireplace and non-combustible facing (Figure 7.9) to prevent cold air leaks and the risk of fire. Large gaps can be bridged with fiberglass rope gasket.
- When installation of the decorative material is complete, replace/install the fascia and fireplace doors.



**Figure 7.9**

***WARNING! Risk of Fire!***

- Maintain clearances.
- Use only non-combustible material below standoffs, material such as cement board is acceptable.
- Framing or finishing material used on the front of the fireplace closer than the minimums listed, must be constructed entirely of non-combustible materials (i.e., steel studs, concrete board, etc.).

***WARNING! Risk of Fire!***

Hearth & Home Technologies is not responsible for discoloration, cracking or other material failures of finishing materials due to heat exposure or smoke.

- Choose finishing materials carefully.

***WARNING! Risk of Fire!***

Seal around finishing material to fireplace.

## 8 Reference Materials

### A. Firebrick Placement

The firebox of your fireplace is lined with high quality firebrick, which has exceptional insulating properties.

Do not use a grate; simply build a fire on the firebox floor.

Do not operate the fireplace without bricks. Make sure bricks are installed as shown.

**IMPORTANT:** Be certain you have the proper brick in the correct location. Measure the brick size for accuracy.

- Remove new brick set from box and lay out to diagram as shown in Figure 8.1.
- Lay bottom bricks in firebox.
- Install rear bricks on the top of the bottom bricks. Slide top of bricks under clip on back of firebox wall and push bottom of brick back.
- Install side bricks. Slide top of brick under clips on side of firebox and push the bottom of the brick until it is flush with the side of the firebox.

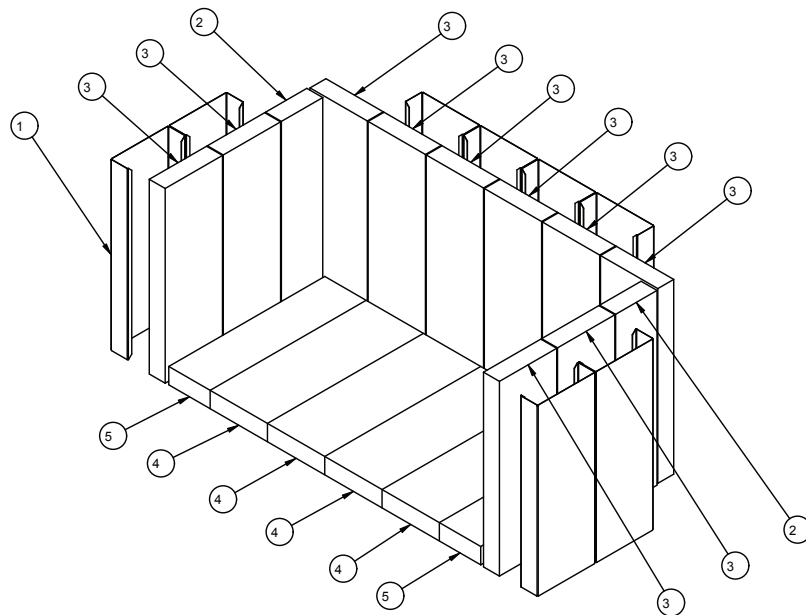


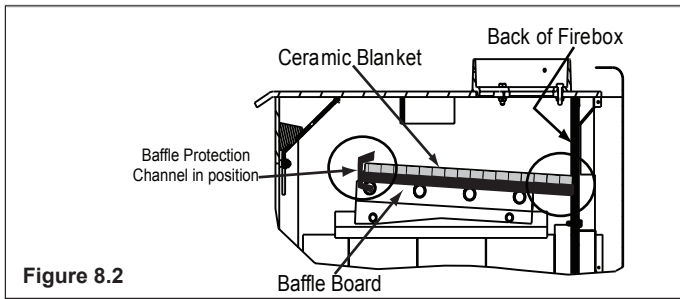
Figure 8.1 Fire Brick Configurations

Table 8.1

#	Brick Size	Qty. in Set
1	Brick Wrap	8
2	Firebrick 13.25 x 3.25	2
3	Firebrick 13.25 x 4.50 x 1.25	10
4	Firebrick 12.25 x 4.50	4
5	Firebrick 12.25 x 3.25	2

## B. Baffle and Blanket Placement

Ensure correct baffle and baffle protection channel placement; replace baffle components if damaged or missing.



The ceramic blanket and baffle board **MUST** be in contact with the back of the firebox and even with each other in the front. The baffle protection channel **MUST** be in position.

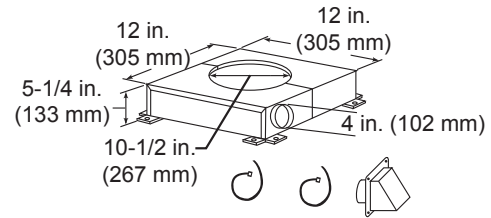
## C. Install Fascia (Fronts)

Front is required to complete the installation. Instructions for attachment of the front is included with it. Contact your local dealer with any questions on offerings or installation.

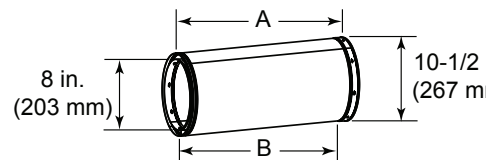
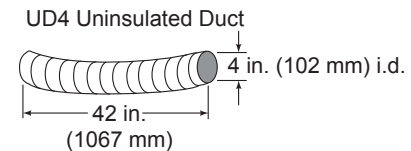
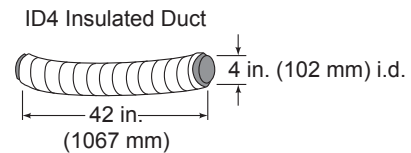
## D. Chimney Components

The following drawings show the SL-300 Series chimney and fireplace components which may be safely used with this fireplace. The 8 in. DuraPlus can also be used.

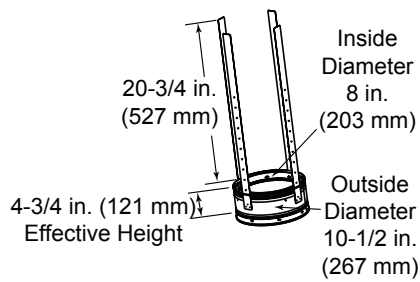
Catalog #	Description
CAK4A	Chimney Air Kit (shipped with fireplace)
ID4	Insulated Duct (used with chimney air kit)
UD4	Uninsulated Duct (used with chimney air kit)
SL306	Chimney Section - 6 in. (152 mm) long
SL312	Chimney Section - 12 in. (305 mm) long
SL318	Chimney Section - 18 in. (457 mm) long
SL324	Chimney Section - 24 in. (610 mm) long
SL336	Chimney Section - 36 in. (914 mm) long
SL348	Chimney Section - 48 in. (1219 mm) long
SL3	Chimney Stabilizer
SL315	Chimney Offset/Return - 15 deg
SL330	Chimney Offset/Return - 30 deg
FS338	Ceiling Firestop - Straight
FS339	Ceiling Firestop - 15 deg
FS340	Ceiling Firestop - 30 deg
AS8	SL300 Straight Attic Insulation Shield, 24 in. (610 mm) (shipped with fireplace)
JB877	Chimney Joint Band
CB876	Chimney Bracket
RF370	Roof Flashing - Flat to 6/12 Pitch
RF371	Roof Flashing - 6/12 to 12/12 Pitch
DTO134/146	Octagonal Decorative Caps
DTS134/146	Square Decorative Caps
ST375	Square Termination Cap
TCT375	Terra Cotta Termination Cap
TR344	Round Termination Cap
TR342-B	Round Telescoping Termination Cap
TR-TVK	TR Top Vent Kit
TS345	Square Termination Cap
TS345P	Square Termination Cap - Painted
12966A	Manufactured Home Thimble
MH841	Manufactured Home Thimble Extension 20 in./508 mm
HX4	Micore Hearth Extension, 20 in./508 mm wide
LDS33	Decorative Shroud - 3 ft x 3 ft (.91 m x .91 m)
LDS46	Decorative Shroud - 4 ft x 6 ft (1.22 m x 1.83 m)
LDS-BV	Decorative Shroud - 26 in. x 26 in. (660 mm x 660 mm)
	Field Constructed Shrouds (See "Woodburning Termination Cap")
CT-3A-B	Adapter - May be used with the following caps
	CT Series
	DT Series
8DP-BP	Duraplus Base Plate (required if using DuraPlus Chimney)



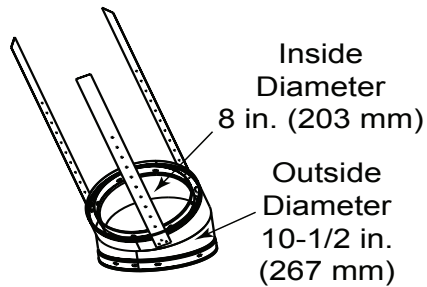
**CAK4A Chimney Air Kit (shipped with fireplace)**



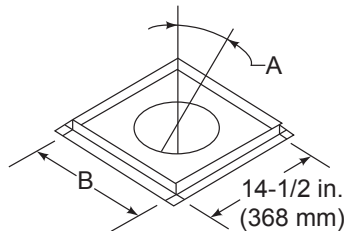
Catalog #	A		B	
	in	mm	in	mm
SL306	6	152	4-3/4	121
SL312	12	305	10-3/4	273
SL318	18	457	16-3/4	425
SL324	24	610	22-3/4	578
SL336	36	914	34-3/4	883
SL348	48	1219	46-3/4	1187



**SL3 Chimney Stabilizer**



**SL315 Chimney Offset/Return - Effective Height 13-3/8 in. (340 mm)**  
**SL330 Chimney Offset/Return - Effective Height 15-1/2 in. (394 mm)**

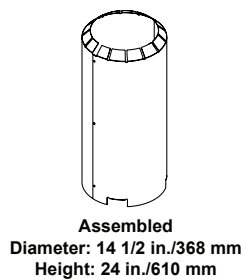


**Firestop Spacer**

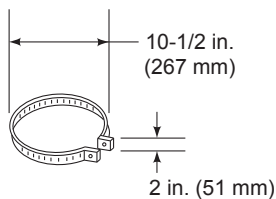
Catalog #	A	B	
FS338	0-deg.	14-1/2 in.	368 mm
FS339	15-deg.	18-3/8 in.	467 mm
FS340	30-deg.	23 in.	584 mm

A = Actual Length

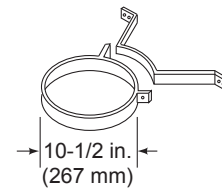
B = Effective length (length of chimney part after it has been snapped to another)



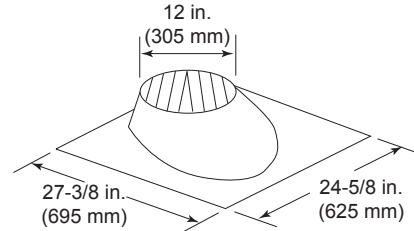
**AS8 SL300 Straight Attic Insulation Shield (shipped with unit)**



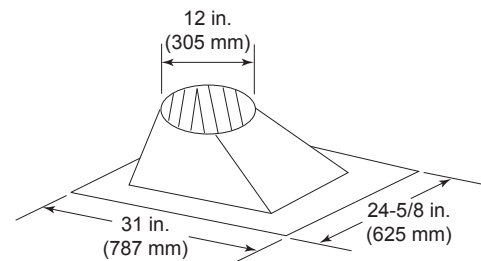
**JB877 Chimney Joint Band**



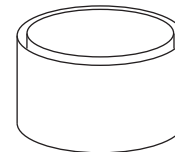
**CB876 Chimney Bracket**



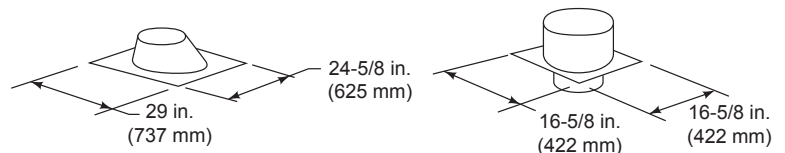
**RF370 - Roof Flashing Flat to 6/12 Pitch**



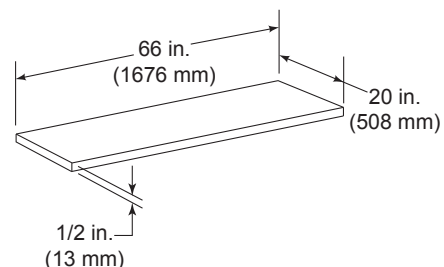
**RF371 - Roof Flashing 6/12 to 12/12 Pitch**



**MH841 Manufactured Home Thimble Extension**

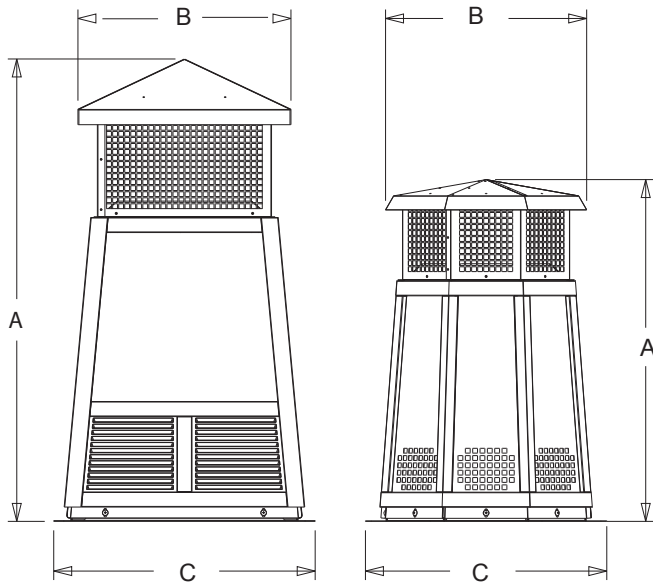


**12966A Manufactured Home Thimble**



**HX4 Micore Hearth Extension**





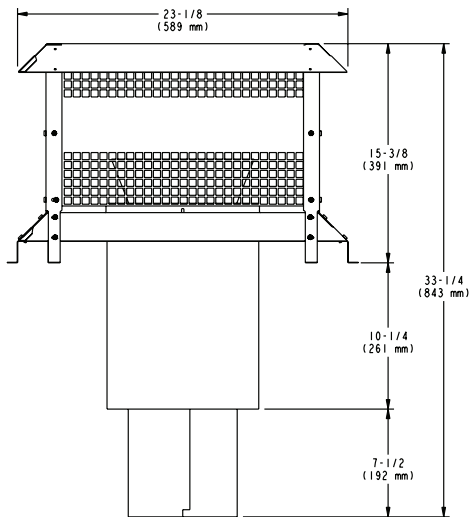
**DTS134/DTS146**

**DTO134/DTO146**

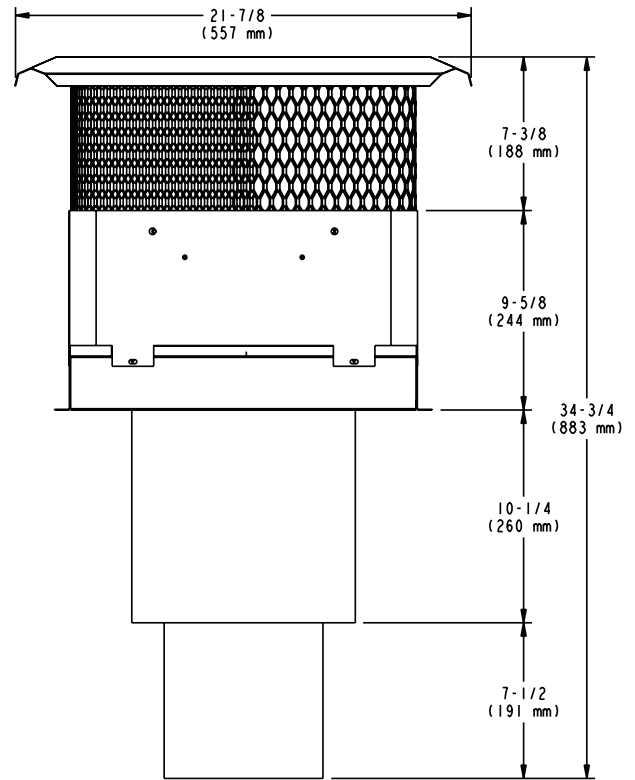
**Decorative Caps**

DTO134		A	B	C
	in	34	20	24
	mm	864	508	610
DTO146		A	B	C
	in	46	22.7	26
	mm	1168	576	660

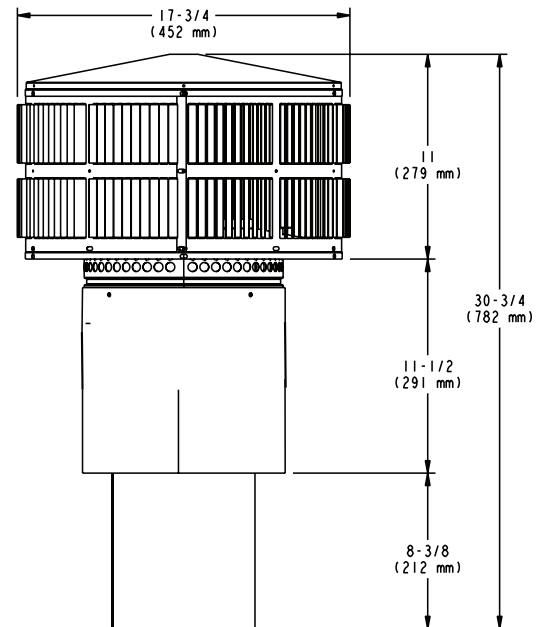
DTS134		A	B	C
	in	34	21.18	24
	mm	864	538	610
DTS146		A	B	C
	in	46	21.18	26
	mm	1168	538	660



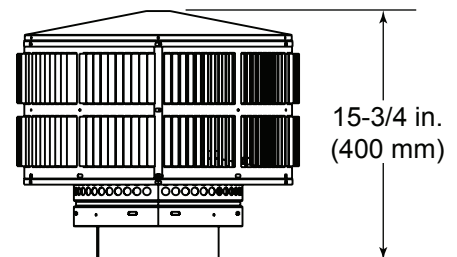
**ST375 Square Termination Cap**



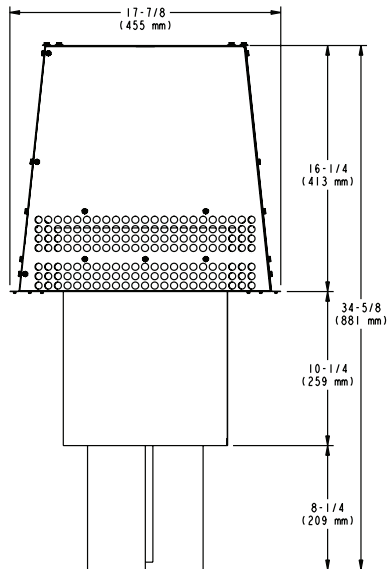
**TCT375 Terra Cotta Cap**



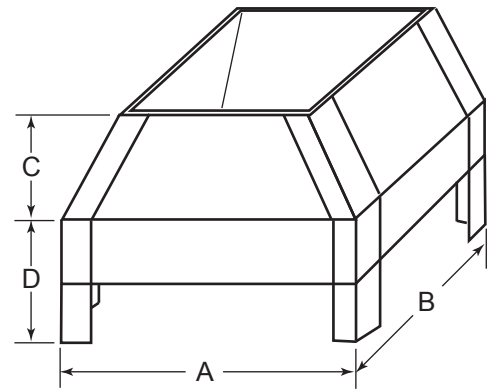
**TR342-B Round Telescoping Termination Cap**



**TR344 Round Termination Cap**

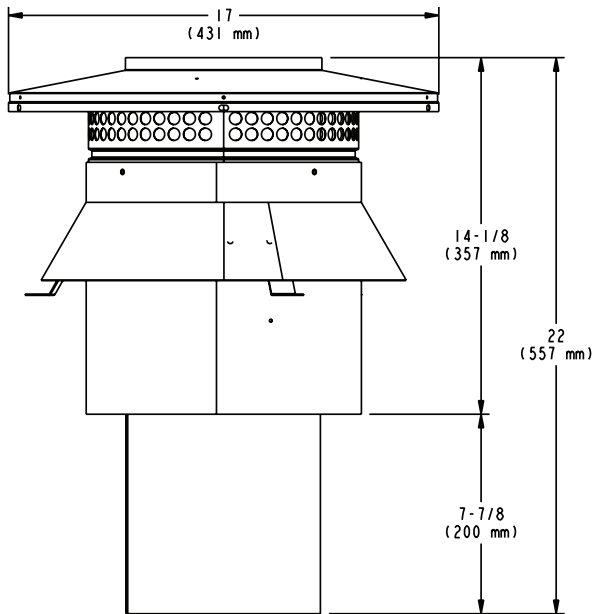


**TS345/TS345P Square Termination Cap**

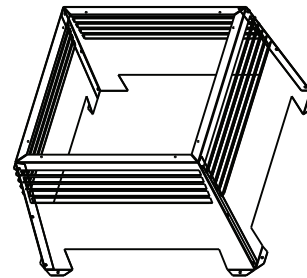


**LDS33/LDS46 Decorative Shroud**

Catalog #	A		B		C		D	
	in.	mm	in.	mm	in.	mm	in.	mm
LDS33	36	914	36	914	8.5	216	11	279
LDS46	48	1219	72	1829	8.5	216	11	279

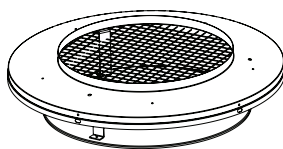


**CT-3-B**



**LDS-BV Decorative Shroud**

Catalog #	A	B	C	D	E
	in.	mm	in.	mm	mm
LDS-BV	26	12.5	15.5	22	23
	660	318	394	559	584



**TR-TVK Top Vent Kit**

## DuraPlus Venting

Catalog #	Description
DV-8DP-BP	8" DuraPlus base plate
DV-8DP-E15	8" DuraPlus 15° elbow kit
DV-8DP-E30	8" DuraPlus 30° elbow kit
DV-8DP-E15KSS	8" DuraPlus 15° elbow kit (SS)
DV-8DP-E30KSS	8" DuraPlus 30° elbow kit (SS)
DV-8DP-WS	8" DuraPlus wall strap
DV-8DP-ES	8" DuraPlus elbow strap
DV-8DP-AWS	8" DuraPlus adjustable wall strap
DV-8DP-WSSS	8" DuraPlus wall strap (SS)
DV-8DP-FRS	8" DuraPlus firestop radiation shield
DV-8DP-XRB	8" DuraPlus extended roof bracket
DV-6DP-SC	6-8 Storm collar
DV-8DP-F6	8" DuraPlus flashing 0/12-6/12
DV-8DP-FF	8" DuraPlus flat roof flashing
DV-8DP-F12	8" DuraPlus flashing 7/12-12/12
DV-8DP-06	8x6 DuraPlus pipe
DV-8DP-09	8x9 DuraPlus pipe
DV-8DP-12	8x12 DuraPlus pipe
DV-8DP-24	8x24 DuraPlus pipe
DV-8DP-24SS	8x24 DuraPlus pipe (SS)
DV-8DP-36	8x36 DuraPlus pipe
DV-8DP-36SS	8x36 DuraPlus pipe (SS)
DV-8DP-VC	8" DuraPlus chimney cap

## **E. Accessories**

### **Lintel Bar**

LINTEL- Lintel Bar

### **Finishing Template**

TMP-PIIA

### **Heat-Zone-WD**

### **Mesh-HHT Firescreen**

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Heatilator, a brand of Hearth & Home Technologies  
1915 West Saunders Street, Mount Pleasant, Iowa 52641  
[www.heatilator.com](http://www.heatilator.com)

Please contact your Heatilator dealer with any questions or concerns.  
For the location of your nearest Heatilator dealer, please visit [www.heatilator.com](http://www.heatilator.com).

# Owner's Manual

## Care and Operation

Pour demander un exemplaire en français de ce Manuel du propriétaire, visitez [www.heatilator.com/translations](http://www.heatilator.com/translations).

**INSTALLER:** Leave this manual with party responsible for use and operation.

**OWNER:** Retain this manual for future reference.

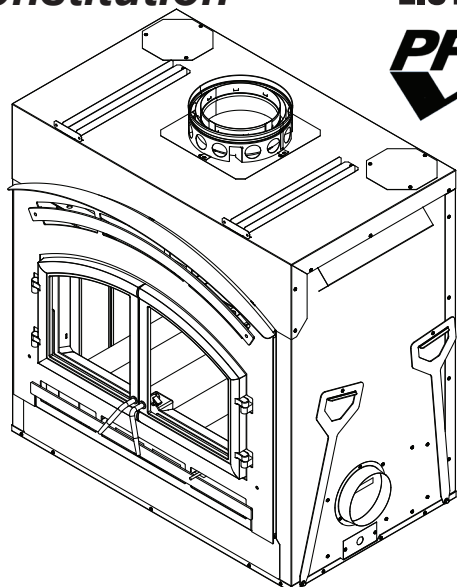
**NOTICE:** *DO NOT* discard this manual!

**heatilator**<sup>®</sup>  
*The first name in fireplaces*

**Model(s):**

**C40-C**

**Constitution**



**EPA CERTIFIED WOODBURNING  
FIREPLACE**

Installation and service of this appliance should be performed by qualified personnel. Hearth & Home Technologies recommends HHT Factory Trained or NFI certified professionals.

**hearthED**  
**FACTORY TRAINING**  
*Fuel Your Fire*



**⚠ WARNING:** If the information in these instructions is not followed exactly, a fire or explosion may result causing property damage, personal injury, or death.

- **DO NOT** store or use gasoline or other flammable vapors and liquids in the vicinity of this or any other appliance.
- **DO NOT** overfire. Overfiring will void your warranty.
- Comply with all minimum clearances to combustibles as specified. Failure to comply may cause house fire.

### ⚠ WARNING



#### **HOT SURFACES!**

Glass and other surfaces are hot during operation AND cool down.

#### **Hot glass will cause burns.**

- **DO NOT** touch glass until it is cooled
  - NEVER allow children to touch glass
  - Keep children away
  - CAREFULLY SUPERVISE children in same room as fireplace.
  - Alert children and adults to hazards of high temperatures.
- High temperatures may ignite clothing or other flammable materials.**
- Keep clothing, furniture, draperies and other flammable materials away.

### ⚠ WARNING



#### **Fire Risk.**

For use with solid wood fuel only.  
Other fuels may overfire and generate poisonous gases (i.e. carbon monoxide).



## Safety Alert Key:

- **DANGER!** Indicates a hazardous situation which, if not avoided will result in death or serious injury.
- **WARNING!** Indicates a hazardous situation which, if not avoided could result in death or serious injury.
- **CAUTION!** Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.
- **NOTICE:** Indicates practices which may cause damage to the fireplace or to property.

## Table of Contents

<b>1 Welcome</b>		<b>4 Maintenance and Service</b>	
A. Congratulations	3	A. Maintenance Tasks-Homeowners	18
B. LIMITED LIFETIME WARRANTY	4	1. Chimney Inspection	18
<b>2 Product Specific Information</b>		2. Creosote (Chimney) Cleaning	19
A. Appliance Certification	7	3. Care and Cleaning of Plated Surfaces	20
B. BTU & Efficiency Specifications	7	4. Glass Door	20
C. Mobile Home Approved	7	5. Glass Cleaning	20
D. Glass Specifications	7	6. Door Gasket	20
<b>3 Important Safety and Operating Information</b>		7. Ash Removal	20
A. Fireplace Safety	8	8. Baffle and Blanket	20
1. Clear Space	8	9. Firebrick	20
2. Firebrick	9	B. Replacement Maintenance	21
3. Baffle and Blanket	9	1. Glass Replacement	21
4. Over-Firing Your Fireplace	9	2. Tighten or Adjust Door Latch	21
5. Chimney Fire	9	3. Door Handle Assembly	22
B. General Operating Parts	10	4. Firebrick Replacement	22
1. Automatic Combustion Control (ACC)	11	5. Baffle Removal and Installation	23
2. ACC Override	11	6. Fan Replacement	23
3. Outside Air	11	7. Timer Assembly Replacement	24
4. Glass Doors	12	8. Timer Removal and Replacement	26
5. Convection Fan Operation	12	<b>5 Troubleshooting</b>	
C. Fuel	12	A. FAQs	29
1. Hardwood vs. Softwood	13	B. Troubleshooting Table	31
2. Moisture Content	13	<b>6 Reference Materials</b>	
3. Seasoning	13	A. Service Parts	32
4. Storing Wood	14	B. Contact Information	37
5. Burning Process	14		
6. Dirty Glass	14		
7. Creosote Formation	14		
8. Opacity	14		
D. First Fire	14		
E. Lighting Instructions	15		
F. Frequently Asked Questions	17		

# 1 Welcome

Read this manual before installing or operating this fireplace.  
Please retain this owner's manual for future references.

## A. Congratulations

Congratulations on selecting a Heatilator wood burning fireplace. The Heatilator fireplace you have selected is designed to provide the utmost in safety, reliability, and efficiency.

As the owner of a new fireplace, you'll want to read and carefully follow all of the instructions contained in this Owner's Manual. Pay special attention to all Cautions and Warnings.

This Owner's Manual should be retained for future reference. We suggest that you keep it with your other important documents and product manuals.

Your new Heatilator wood burning fireplace will give you years of durable use and trouble-free enjoyment. Welcome to the Heatilator family of fireplace products!

Heatilator is a registered trademark of Hearth & Home Technologies.

### Local Dealer Information

**DEALER:** Fill in your name, address, phone and email information here and fireplace information below.

Dealer Name: \_\_\_\_\_  
Address: \_\_\_\_\_  
Phone: \_\_\_\_\_  
Email: \_\_\_\_\_

### **Fireplace Information:**

Brand: \_\_\_\_\_ Model Name: \_\_\_\_\_  
Serial Number: \_\_\_\_\_ Date Installed: \_\_\_\_\_

## Listing Label Information/Location

The model information regarding your specific fireplace can be found on the rating plate usually located in the control area of the fireplace.

Model: **Constitution**  
EPA CERTIFIED FIREPLACE

UL LISTED  
UL 127-2011, CAN/ULC-S610

PFS

heatilator  
The first name in fireplaces  
A brand of Hearth & Home Technologies  
7571 - 215th Street West, Lakeville, MN 55044  
www.heatilator.com

SERIAL NO./NUMERO DESERE  
MP186

MODEL  
C40-C

FIRE CHAMBER INTENDED FOR USE WITH HEARTH & HOME TECHNOLOGIES LISTED FIREPLACE PARTS. SEE INSTALLATION AND OPERATING INSTRUCTIONS FOR THIS MODEL. REPLACE GLASS ONLY WITH CERAMIC.

DO NOT OVERFIRE. USE ONLY SOLID WOOD FUEL. DO NOT USE A FIREPLACE INSERT OR OTHER PRODUCTS NOT SPECIFIED FOR USE WITH THIS PRODUCT.

WARNING! THIS FIREPLACE HAS NOT BEEN TESTED WITH AN UNVENTED GAS LOG SET. TO REDUCE THE RISK OF FIRE OR INJURY, DO NOT INSTALL AN UNVENTED GAS LOG SET INTO FIREPLACE.

DO NOT USE GRATE OR ELEVATE FIRE. BUILD WOOD FIRE DIRECTLY ON FIREBRICK.

WARNING! TO AVOID THE RISK OF DAMAGING FIREPLACE MATERIALS AND INCREASING THE RISK OF SPREADING A FIRE DO NOT USE THE FIREPLACE TO COOK OR WARM FOOD.

INSTALL AND USE ONLY IN ACCORDANCE WITH MANUFACTURER'S INSTALLATION, VENTING AND OPERATING INSTRUCTIONS. ANY AREA INCORPORATING WARM OR COLD AIR DUCTS SHALL BE ENCLOSED IN ACCORDANCE WITH THE MANUFACTURER'S INSTALLATION INSTRUCTIONS. CONTACT YOUR LOCAL BUILDING OR FIRE OFFICIALS OR AUTHORITY HAVING JURISDICTION ABOUT RESTRICTIONS, INSTALLATION INSPECTION AND PERMITS REQUIRED IN YOUR AREA. COMPONENTS REQUIRED FOR INSTALLATION: HHT SL300 SERIES PIPE OR DURAVENT DURA PLUS SYSTEM, TERMINATION CAP, HEARTH EXTENSION AND REQUIRED ACCESSORY CHIMNEY AIR KIT PART CAK4A. DO NOT CONNECT THIS UNIT TO A CHIMNEY SERVING ANOTHER APPLIANCE.

DANGER: RISK OF ELECTRICAL SHOCK. DISCONNECT POWER SUPPLY BEFORE SERVICING.

ELECTRICAL RATING: 115 VAC <3.0 AMPS 60 HZ

MUST PROVIDE A SOURCE OF AIR TO PREVENT AIR STARVATION FROM COMBUSTION WHICH COULD RESULT IN HIGH LEVELS OF CARBON MONOXIDE.

THIS WOOD HEATER NEEDS PERIODIC INSPECTION AND REPAIR FOR PROPER OPERATION. CONSULT 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.

DO NOT REMOVE THIS LABEL

Made in U.S.A. of US and imported parts

2019 2020 2021 2022 2023 2024 Jan Feb Mar Apr May June July Aug Sept Oct. Nov. Dec.

U.S. ENVIRONMENTAL PROTECTION AGENCY - Certified to comply with 2020 particulate emission standards using cord wood. This wood heater was found to have an average emissions rate of 2.0g/hr using method ASTM E3053-17.

4186-990A

Model Number  
Serial Number

FIREPLACE ALSO FOR USE IN MANUFACTURED/MOBILE HOMES WITH SOLID FUEL ONLY  
YES ☒ NO ☐

FIREPLACE FOR USE OUTDOORS  
YES ☐ NO ☒

FIREBOX/VALVE

CLEARANCE TO COMBUSTIBLES  
DEGAGEMENT DES MATERIAUX COMBUSTIBLES:

CHIMNEY/CHEMNEE  
2 IN. MIN.  
51 MM

BACK 1/2 IN. MIN.  
RETOUR 13 MM MIN.

SIDE 1 IN. MIN.  
COTE 25 MM MIN.

IF INSTALLATION OR OPERATING INSTRUCTIONS ARE MISSING CONTACT:  
HEARTH & HOME TECHNOLOGIES,  
7571 215th Street West, Lakeville, MN 55044

THE HEARTH EXTENSION MUST BE INSTALLED ACCORDING TO THE INSTALLATION INSTRUCTIONS.

## B. LIMITED LIFETIME WARRANTY

### Hearth & Home Technologies LIMITED LIFETIME WARRANTY

Hearth & Home Technologies, on behalf of its hearth brands ("HHT"), extends the following warranty for HHT gas, wood, pellet and electric hearth appliances that are purchased from an HHT authorized dealer.

#### **WARRANTY COVERAGE:**

HHT warrants to the original owner of the HHT appliance at the site of installation, and to any transferee taking ownership of the appliance at the site of installation within two years following the date of original purchase, that the HHT appliance will be free from defects in materials and workmanship at the time of manufacture. After installation, if covered components manufactured by HHT are found to be defective in materials or workmanship during the applicable warranty period, HHT will, at its option, repair or replace the covered components. HHT, at its own discretion, may fully discharge all of its obligations under such warranties by replacing the product itself or refunding the verified purchase price of the product itself. The maximum amount recoverable under this warranty is limited to the purchase price of the product. This warranty is subject to conditions, exclusions and limitations as described below.

#### **WARRANTY PERIOD:**

Warranty coverage for consumers begins at the date of installation. 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, authorized HHT dealer/distributor, whichever occurs earlier. However, the warranty shall commence no later than 24 months following the date of product shipment from HHT, regardless of the installation or occupancy date. The warranty period for parts and labor for covered components is produced in the following table.

The term "Limited Lifetime" in the table below is defined as: 20 years from the beginning date of warranty coverage for gas appliances, and 10 years from the beginning date of warranty coverage for wood and pellet appliances. These time periods reflect the minimum expected useful lives of the designated components under normal operating conditions.

Warranty Period		HHT Manufactured Appliances and Venting					
Parts	Labor	Gas	Pellet	Wood	Electric	Venting	Components Covered
1 Year		X	X	X	X	x	All parts and material except as covered by Conditions, Exclusions, and Limitations listed
2 years			X	X			Igniters, auger motors, electronic components, and glass
		X	X	X			Factory-installed blowers
				X			Molded refractory panels
		X					Ignition Modules
3 years			X				Firepots, burnpots, mechanical feeders/auger assemblies
5 years	1 year	X					Vent Free burners, Vent Free ceramic fiber logs, Aluminized Burners
			X	X			Castings and Baffles
6 years	3 years			X			Catalyst - limitations listed
7 years	3 years		X	X			Manifold tubes, HHT chimney and termination
10 years	1 year	X					Burners, logs and refractory
Limited Lifetime	3 years	X	X	X			Firebox and heat exchanger, Grate and Stainless Steel Burners, FlexBurn® System (engine, inner cover, access cover and fireback)
90 Days		X	X	X	X	X	All replacement parts beyond warranty period

**WARRANTY CONDITIONS:**

- This warranty only covers HHT appliances that are purchased through an HHT authorized dealer or distributor. A list of HHT authorized dealers is available on the HHT branded websites.
- This warranty is only valid while the HHT appliance remains at the site of original installation.
- This warranty is only valid in the country in which the HHT authorized dealer or distributor that sold the appliance resides.
- Contact your installing dealer for warranty service. If the installing dealer or distributor is unable to provide necessary parts, contact the nearest HHT authorized dealer or supplier. Additional service fees may apply if you are seeking warranty service from a dealer other than the dealer from whom you originally purchased the product.
- Check with your dealer in advance for any costs to you when arranging a warranty call. Travel and shipping charges for parts are not covered by this warranty.
- Limited Catalyst Warranty
  - For wood burning products containing a catalyst, the catalyst will be warranted for a six-year period as follows: if the original catalyst or a replacement catalyst proves defective or ceases to maintain 70% of its particulate emission reduction activity (as measured by an approved testing procedure) within 36 months from the purchase date, the catalyst will be replaced for free.
  - From 37 to 72 months a pro-rated credit will be allowed against a replacement catalyst and labor credit necessary to install the replacement catalyst. The proration rate is as follows:

Amount of Time Since Purchase	Credit Towards Replacement Cost
0 - 36 Months	100%
37 - 48 Months	30%
49 - 60 Months	20%
61 - 72 Months	10%

- Any replacement catalyst will be warranted under the terms of the catalyst warranty for the remaining term of the original warranty. The purchaser must provide the name, address, and telephone number of the location where the product is installed, proof of original purchase date, date of failure, and any relevant information regarding the failure of the catalyst.

**WARRANTY EXCLUSIONS:**

This warranty does not cover the following:

- Changes in surface finishes as a result of normal use. As a heating appliance, some changes in color of interior and exterior surface finishes may occur. This is not a flaw and is not covered under warranty.
- Damage to printed, plated, or enameled surfaces caused by fingerprints, accidents, misuse, scratches, melted items, or other external sources and residues left on the plated surfaces from the use of abrasive cleaners or polishes.
- Repair or replacement of parts that are subject to normal wear and tear during the warranty period are not covered. These parts include: paint, wood and pellet gaskets, firebricks, grates, flame guides, batteries and the discoloration of glass.
- Minor expansion, contraction, or movement of certain parts causing noise. These conditions are normal and complaints related to this noise are not covered by this warranty.
- Damages resulting from: (1) failure to install, operate, or maintain the appliance in accordance with the installation instructions, operating instructions, and listing agent identification label furnished with the appliance; (2) failure to install the appliance in accordance with local building codes; (3) shipping or improper handling; (4) improper operation, abuse, misuse, continued operation with damaged, corroded or failed components, accident, or improperly/incorrectly performed repairs (5) environmental conditions, inadequate ventilation, negative pressure, or drafting caused by tightly sealed constructions, insufficient make-up air supply, or handling devices such as exhaust fans or forced air furnaces or other such causes; (6) use of fuels other than those specified in the operation instructions; (7) installation or use of components not supplied with the appliance or any other components not expressly authorized and approved by HHT; (8) modification of the appliance not expressly authorized and approved by HHT in writing; and/or (9) interruptions or fluctuations of electrical power supply to the appliance.
- Non-HHT venting components, hearth connections or other accessories used in conjunction with the appliance.
- Any part of a pre-existing fireplace system in which an insert or a decorative gas appliance is installed.
- HHT's obligation under this warranty does not extend to the appliance's capability to heat the desired space. Information is provided to assist the consumer and the dealer in selecting the proper appliance for the application. Consideration must be given to the appliance location and configuration, environmental conditions, insulation and air tightness of the structure.

**This warranty is void if:**

- The appliance has been over-fired, operated in atmospheres contaminated by chlorine, fluorine, or other damaging chemicals. Over-firing can be identified by, but not limited to, warped plates or tubes, deformation/warping of interior cast iron structure or components, rust colored cast iron, bubbling, cracking and discoloration of steel or enamel finishes.
- The appliance is subjected to prolonged periods of dampness or condensation.
- There is any damage to the appliance or other components due to water or weather damage which is the result of, but not limited to, improper chimney or venting installation.

**LIMITATIONS OF LIABILITY**

- The owner's exclusive remedy and HHT's sole obligation under this warranty, under any other warranty, express or implied, or in contract, tort or otherwise, shall be limited to replacement, repair, or refund, as specified above. In no event will HHT be liable for any incidental or consequential damages caused by defects in the appliance. Some states do not allow exclusions or limitation of incidental or consequential damages, so these limitations may not apply to you. This warranty gives you specific rights; you may also have other rights, which vary from state to state. EXCEPT TO THE EXTENT PROVIDED BY LAW, HHT MAKES NO EXPRESS WARRANTIES OTHER THAN THE WARRANTY SPECIFIED HEREIN. THE DURATION OF ANY IMPLIED WARRANTY IS LIMITED TO DURATION OF THE EXPRESSED WARRANTY SPECIFIED ABOVE.

## 2 Listing and Code Approvals

### A. Appliance Certification

<b>Model:</b>	C40-C
<b>Laboratory:</b>	Underwriters Laboratories, Inc.
<b>Report No:</b>	Project
<b>Type:</b>	Wood Fireplace
<b>Standard:</b>	UL 127 - 2011 and CAN/ULC S610-2018 (A1998) and (UM) 84-HUD, Manufactured Home Approved.

### B. BTU & Efficiency Specifications

EPA Certified Emissions:	1.8 g/hr
*LHV Tested Efficiency:	76%
**HHV Tested Efficiency:	70%
***EPA BTU Output:	17,600 to 48,200
Vent Size:	8 inches
Firebox Size:	2.7 cubic feet
Recommended Log Length:	22 inches
Fuel	Seasoned Cord Wood less than 20% moisture
*Weighted average LHV (Low Heating Value) efficiency using cord wood and data collected during EPA emission test. LHV assumes the moisture is already in a vapor state so there is no loss in energy to vaporize.	
**Weighted average HHV (High Heating Value) efficiency using cord wood and data collected during EPA emission test. HHV includes the energy required to vaporize the water in the fuel.	
***A range of BTU outputs based on HHV and the burn rates from the low and high EPA tests, using cord wood.	

The Constitution is Certified to comply with 2020 particulate emission standards.



The Constitution Wood Appliance meets the U.S. ENVIRONMENTAL PROTECTION AGENCY Certified to comply with 2020 particulate emission standards using cord wood.

This wood heater needs periodic inspection and repair for proper operation. It is against federal regulations to operate this wood heater in a manner inconsistent with operating instructions in this manual.

### C. Mobile Home Approved

- This appliance is approved for mobile home installations when not installed in a sleeping room and when an outside combustion air inlet is provided.
- The structural integrity of the mobile home floor, ceiling, and walls must be maintained.
- The appliance must be properly grounded to the frame of the mobile home with #8 copper ground wire.
- Outside Air Kit must be installed in a mobile home installation.

### D. Glass Specifications

This fireplace is equipped with 5mm ceramic glass. Replace glass only with 5mm ceramic glass. Please contact your dealer for replacement glass.



#### WARNING



##### Fire Risk.

Hearth & Home Technologies disclaims any responsibility for, and the warranty will be voided by, the following actions:

- Installation and use of any damaged appliance.
- Modification of the appliance.
- Installation other than as instructed by Hearth & Home Technologies.
- Installation and/or use of any component part not approved by Hearth & Home Technologies.
- Operating appliance without fully assembling all components.
- Do NOT Overfire - If appliance or chimney connector glows, you are overfiring.

Any such action that may cause a fire hazard.

Improper installation, adjustment, alteration, service or maintenance can cause injury or property damage.

For assistance or additional information, consult a qualified installer, service agency or your dealer.

NOTE: Hearth & Home Technologies, manufacturer of this appliance, reserves the right to alter its products, their specifications and/or price without notice.

Heatilator is a registered trademark of Hearth & Home Technologies.



# 3 Important Safety and Operating Information

## A. Fireplace Safety

Most problems are caused by improper installation and operation of the fireplace. To provide reasonable fire safety, the following should be given serious consideration:

- The fire should be supervised whenever the fireplace is in use.
- An annual inspection should be performed on the fireplace system.
- Install at least one smoke detector on each floor of your home to ensure your safety.
- Install a CO detector in the room with the fireplace.
- Install a conveniently located Class A fire extinguisher near the fireplace.
- Devise a practiced evacuation plan, consisting of at least two escape routes.
- Devise a plan to deal with a chimney fire:
  - Close all openings into the fireplace.
  - Evacuate.
  - Notify the fire department.

**WARNING! Risk of Fire!** *Hearth & Home Technologies disclaims any responsibility for, and the warranty and agency listing will be voided by the following actions.*

### DO NOT:

- operate damaged fireplace
- modify fireplace
- overfire
- install any gas log set
- install any component not approved by *Hearth & Home Technologies*
- install parts or components not Listed or approved
- operate the fireplace without fully assembling all components

*Improper installation, adjustment, alteration, service or maintenance can cause injury or property damage.*

**WARNING:** This product and the fuels used to operate this product (wood and wood pellets), and the products of combustion of such fuels, 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](http://www.P65Warnings.ca.gov).

## 1. Clear Space

Combustible materials must not be stored on the hearth extension. Room furnishings such as drapes, curtains, chairs or other combustibles must be at least 4 ft (1219 mm) from the open front of the fireplace.

Combustible materials are materials made of or surfaced with any of the following materials:

- Wood
- Plant fibers
- Plywood/OSB
- Any material that can ignite and burn, flame proofed or not, plastered or un-plastered.
- Compressed paper
- Plastic
- Drywall

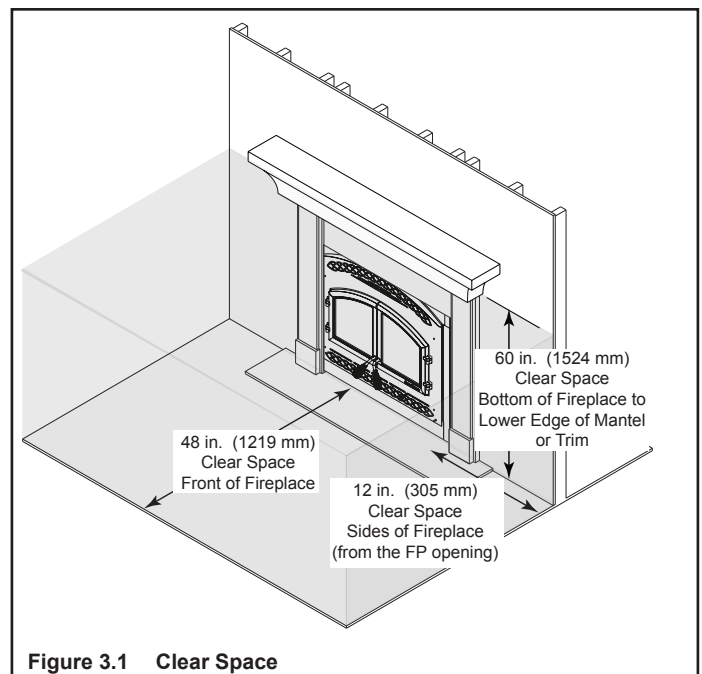
Non-combustible materials are materials which will not ignite and burn, composed of any combination of the following:

- Steel
- Brick
- Concrete
- Glass
- Iron
- Tile
- Slate
- Plasters

**WARNING! Risk of Fire!** *Keep combustible materials, gasoline and other flammable vapors and liquids clear of the fireplace.*

### DO NOT:

- store flammable materials close to the fireplace
- use gasoline, lantern fuel, kerosene, charcoal lighter fluid or similar liquids to start or “freshen up” a fire in this fireplace.





## 2. Firebrick

Your fireplace is lined with high quality firebrick, which has exceptional insulating properties.

Do not operate the fireplace without bricks. Make sure bricks are installed as shown in Section 5.

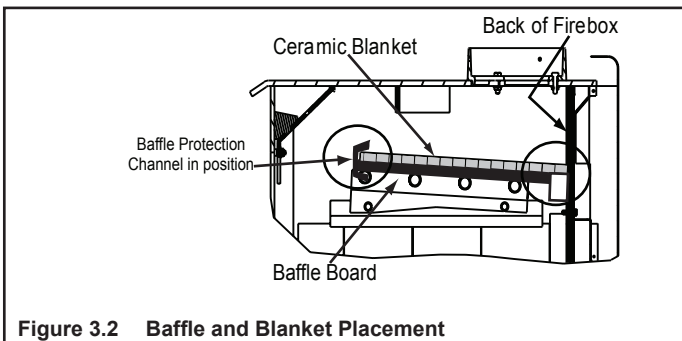
Do not use a grate; simply build a fire on the firebox floor.

## 3. Baffle and Blanket

Ensure correct baffle and baffle protection channel placement; replace baffle components if damaged or missing. (Please refer to Section 5.)

**NOTICE:** Firebox damage due to improper baffle placement is not covered by warranty. Operate the wood burning fireplace with the baffle in the correct position only. Not doing so could result in:

- reduced efficiency
- overheating the chimney
- overheating the rear of the firebox
- poor performance



The baffle board must be in contact with the back of the firebox. The ceramic blanket should lay on top of the baffle board. The baffle protection channel should be in position and cover the front of the blanket and baffle board.

## 4. Over-Firing Your Fireplace

### DO NOT OVERFIRE THIS FIREPLACE UNIT

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

To prevent over-firing your fireplace. **DO NOT:**

- use flammable liquids
- overload with wood
- burn trash or large amounts of scrap lumber
- permit too much air to the fire (leaving the door open)

Symptoms of over-firing may include one or more of the following:

- chimney connector or fireplace glowing
- roaring, rumbling noises
- loud cracking or banging sounds
- metal warping
- chimney fire

What to do if your fireplace is over-firing:

- Immediately close the door and air controls to reduce air supply to the fire.
- If you suspect a chimney fire, call the fire department and evacuate your house.
- Contact your local chimney professional and have your fireplace and chimney inspected for any damage.
- Do not use your fireplace until the chimney professional informs you it is safe to do so.
- Hearth & Home Technologies WILL NOT warranty fireplaces that exhibit evidence of over-firing. Evidence of over-firing includes, but is not limited to:
  - warped air tube
  - deteriorated refractory brick
  - deteriorated baffle and other interior components

## 5. Chimney Fire

In the event of a chimney fire:

- Have the chimney and adjacent structure inspected by qualified professionals. Hearth & Home Technologies recommends that NFI or CSIA certified professionals, or technicians under the direction of certified professionals, conduct a minimum of an **NFPA 211 Level 2** inspection of the chimney.
- Replace components of the chimney and fireplace as specified by the professionals.
- Ensure all joints are properly engaged and the chimney is properly secured.

**WARNING! Risk of Fire!** A chimney fire can permanently damage your chimney system. Failure to replace damaged components and make proper repairs can cause a structure fire.

## **WARNING**



### **HOT SURFACES!**

Glass and other surfaces are hot during operation AND cool down.

### **Hot glass will cause burns.**

- **DO NOT** touch glass until it is cooled
- NEVER allow children to touch glass
- Keep children away
- CAREFULLY SUPERVISE children in same room as fireplace.
- Alert children and adults to hazards of high temperatures.

### **High temperatures may ignite clothing or other flammable materials.**

- Keep clothing, furniture, draperies and other flammable materials away.

## **B. General Operating Parts**

**WARNING! DO NOT** operate fireplace before reading and understanding operating instructions. Failure to operate fireplace according to operating instructions could cause fire or injury.

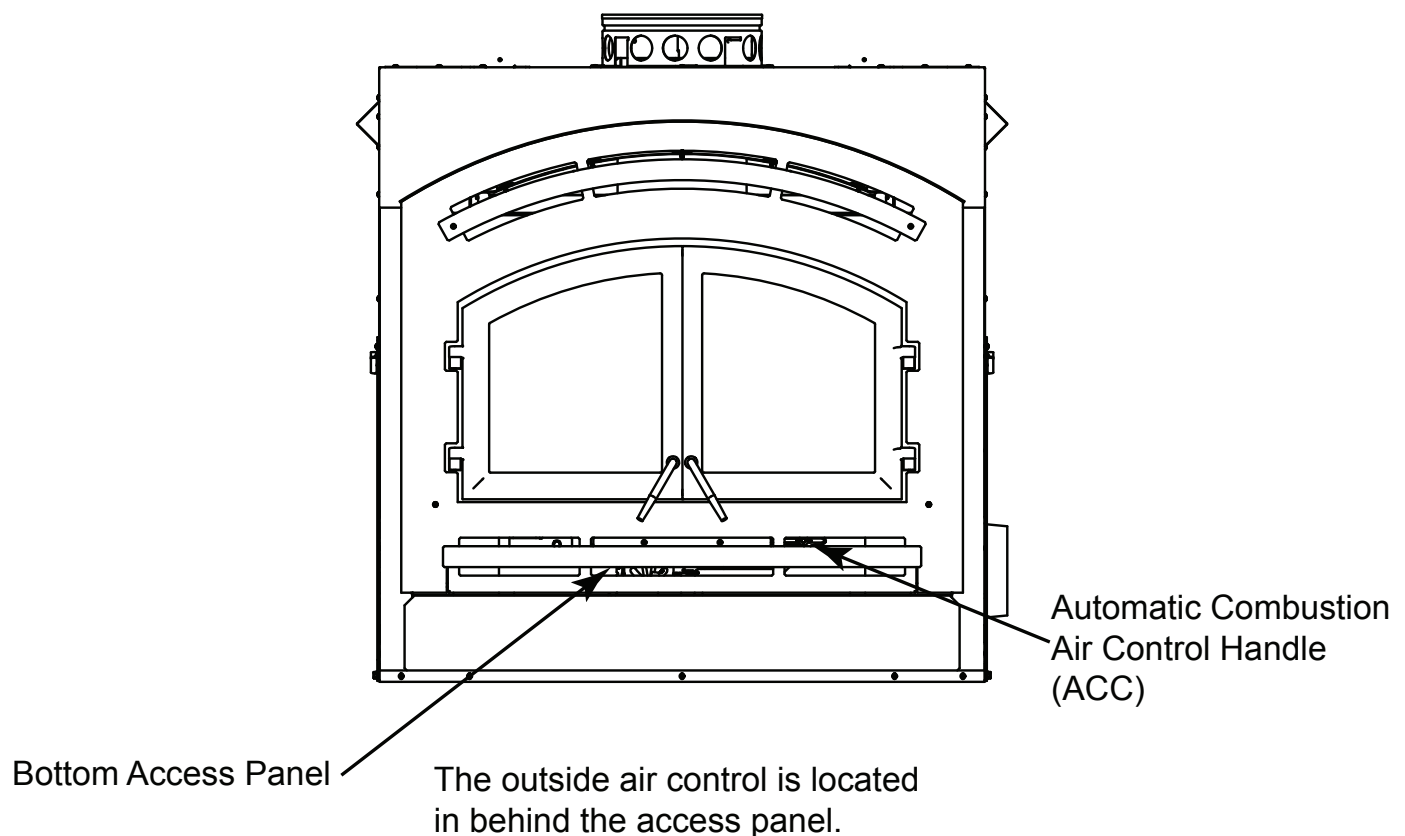


Figure 3.3 General Operating Parts

## 1. Automatic Combustion Control (ACC)

The automatic combustion control system allows you to set the fireplace to high (slide the combustion air control all the way to the right), start the fire, and then move the combustion air control to the desired burn level. The fire will automatically go to that level once it is fully established. This allows for less interaction with the fire by the homeowner and more efficient use of fuel while maintaining the desired heat output.

After the fireplace becomes hot, you may prefer to not activate the ACC when reloading fuel. If you do not slide the combustion air control all the way to the right, the ACC will not be activated.

**NOTICE:** If reloading a bright, hot coal bed for longer (low) burn time, setting the ACC may not be required. Burn dry, well seasoned wood.

**NOTICE:** To establish your settings, always begin with the air control all the way to the left to CLOSED and then move it to the right for your desired setting.

**IMPORTANT!** As you move the combustion air control to the RIGHT, you will feel resistance about three-fourths of the way. You must move past that resistance approximately 1 in. (25mm) to fully engage the automatic combustion control (ACC) system.

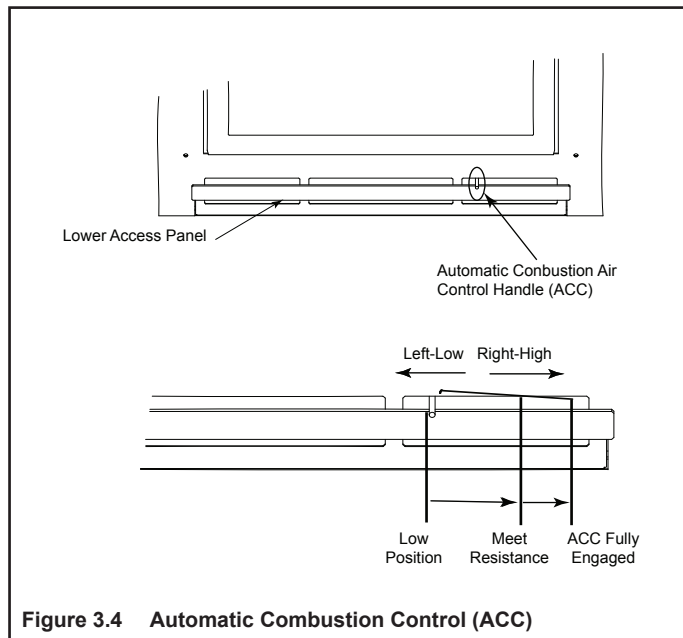


Figure 3.4 Automatic Combustion Control (ACC)

## 2. ACC Override

The ACC OVERRIDE lever is located behind the lower access panel (See Figure 3.4) and may be used to override the setting of the automatic combustion air control. If the ACC has been activated and burn rate needs to be slowed, remove the bottom access panel by lifting it up and pulling it off. To close down the air supply for an over-fire situation or to slow the burn rate down immediately, slide the linkage to the left. See Figure 3.5.

Slide the combustion air control all the way to the left also. Reinstall the access panel.

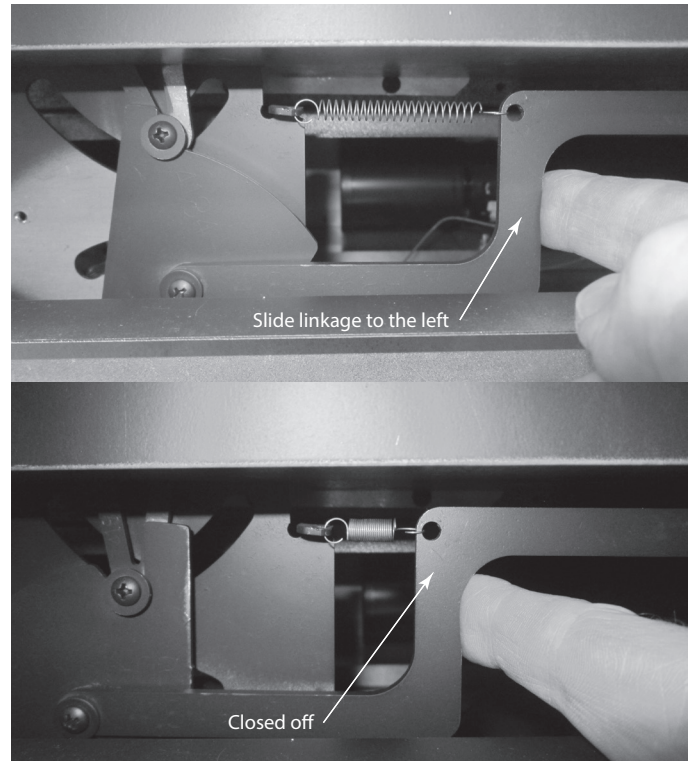


Figure 3.5 ACC Override

## 3. Outside Air

**NOTICE:** Use of outside air is required.

**CAUTION!** Outside air control handle may be warm. Allow unit to cool down before closing.

A source of air (oxygen) is required in order for combustion to take place.

1. Before lighting the fire open the bottom access panel by lifting it up and pulling it off.
2. Locate the handle on either the left or right side. Lift the handle up and pull out to open the door (pushing the handle in will close the door).
3. Reinstall the bottom access panel.

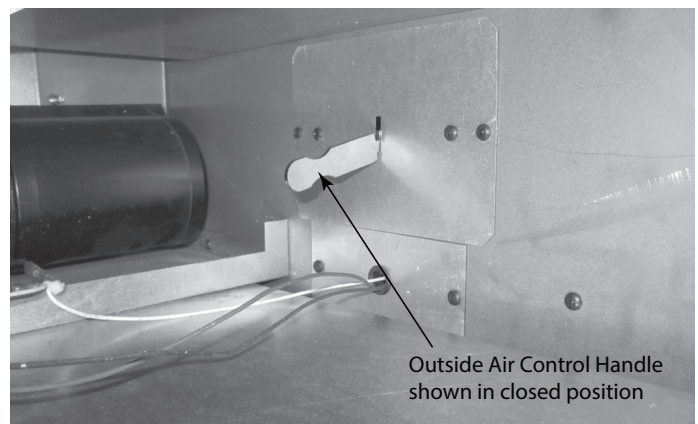


Figure 3.6 Outside Air Control Handle

#### 4. Glass Door

This fireplace has been tested and is intended for use with doors as supplied with this fireplace.

**WARNING! Risk of Fire and Smoke! Fireplace should be operated only with doors fully open or doors fully closed. If doors are left partly open, gas and flame may be drawn out of the fireplace opening.**

A firescreen (MESH-HHT) must be used to control sparks if the homeowner chooses to operate the fireplace with the doors open.

##### **WARNING! Fire Risk!**

- Use firescreen when burning fireplace with doors open.
- Do not use firescreen or glass doors to hold burning material in fireplace.

*Firescreen controls sparks.*

*Glass may break or burning material may roll out.*

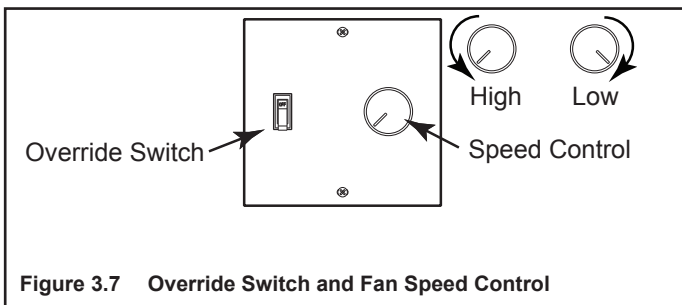
Only the screen specifically tested and listed for use with this fireplace model should be used.

**WARNING! RISK OF Fire! Do NOT install and or use any component not approved by Hearth & Home Technologies**

Always wear gloves when installing or removing the screen as the screen may become extremely hot while in use.

#### 5. Convection Fan Operation

The fireplace is equipped with a temperature-sensitive snap disc that will turn the convection fan on and off automatically, depending on the temperature of the fireplace.



An override switch and fan speed control have been installed on the wall in close proximity to the fireplace.

The speed of the fan can be regulated by the speed control knob.

If the fan is not coming on at the desired time, flip the override switch to manual and operate the fan as described below:

- **Initial (cold) Startup**

Leave fan off until your fireplace is hot and a good coal bed is established, approximately 30 minutes after fuel is lit.

- **High Burn Setting**

The fan may be left on throughout the burn.

- **Medium or Medium High Burn Setting**

The fan should be left off until a good burn is established, then turned on medium or high rate.

- **Low Burn Setting**

The fan tends to cool off the fireplace. Leave fan off until the burn is well established; then, if you wish, turn the fan on at a low rate.

#### C. Fuel

**WARNING! For use with solid wood fuel only.**

*Other fuels may overfire and generate poisonous gases (i.e. carbon monoxide).*

This fireplace 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
- Paper products, cardboard, plywood, or particleboard.

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.



## 1. Hardwood vs. Softwood

Your fireplace's performance depends on the quality of the firewood you use. One species of wood varies very little to the other in terms of energy content. All seasoned wood contains about 8,000 BTU's per pound. Hardwoods have a greater density than softwoods; a piece of hardwood will contain about 60% more BTU's than an equal size piece of softwood. A cord of seasoned oak (hardwood) would contain about 60% more potential energy than a cord of seasoned pine (softwood).

Most softwoods are coniferous. These are trees with needle-like leaves that stay green all year and carry their seeds exposed in a cone. Examples of coniferous trees are Douglas fir, pine, spruce and cedar. Softwoods, being more porous, require less time to dry, burn faster and are easier to ignite than hardwoods. Hardwoods are deciduous trees, broadleaf trees that lose their leaves in the fall. Their seeds are usually found within a protective pod or enclosure. Some examples of deciduous trees are oak, maple, apple, and birch. However, it should be noted that there are some deciduous trees that are definitely not considered hardwoods such as poplar, aspen and alder. Hardwoods require more time to season, burn slower and are usually harder to ignite than softwoods. Obviously, you will use the type of wood that is most readily available in your area. However, if at all possible the best arrangement is to have a mix of softwood and hardwood. This way you can use the softwood for starting the fire, giving off quick heat to bring the fireplace up to operating temperature. Add the hardwood for slow, even heat and longer burn time.

### **WARNING! Risk of Fire!**

- **DO NOT** burn wet or green wood.
- Wet, unseasoned wood can cause accumulation of creosote.

Soft woods	Hard woods
<ul style="list-style-type: none"><li>• Douglas Fir</li><li>• Pine</li><li>• Spruce</li><li>• Cedar</li><li>• Poplar</li><li>• Aspen</li><li>• Alder</li></ul>	<ul style="list-style-type: none"><li>• Oak</li><li>• Maple</li><li>• Apple</li><li>• Birch</li></ul>

## 2. Moisture Content

The majority of the problems fireplace owners experience are caused by trying to burn wet, unseasoned wood. Freshly cut wood can be as much water as it is wood, having a moisture content of around 50%. Imagine a wooden bucket that weighs about 8 pounds. Fill it with a gallon of water, put it in the firebox and try to burn it. This sounds ridiculous but that is exactly what you are doing if you burn unseasoned wood. Dead wood lying on the forest floor should be considered wet, and requires full seasoning time. Standing dead wood can be considered to be about two-thirds seasoned, if cut at the dry time of the year.

Burning wet, unseasoned wood will produce less heat output because it requires energy in the form of heat to evaporate the water trapped inside. This is wasted energy that should be used for heating your home. This moisture evaporates in the form of steam which has a cooling effect in your firebox and chimney system. When combined with tar and other organic vapors from burning wood it will form creosote which condenses in the relatively cool firebox and chimney.

Even dry wood contains at least 15% moisture by weight, and should be burned hot enough to keep the chimney hot for as long as it takes to dry the wood out - about one hour. To tell if wood is dry enough to burn, check the ends of the logs. If there are cracks radiating in all directions from the center, it is dry. If your wood sizzles in the fire, even though the surface is dry, it may not be fully cured.

## 3. Seasoning

Seasoned firewood is nothing more than wood that is cut to size, split and air dried to a moisture content of around 20%. The time it takes to season wood varies from around nine months for soft woods to as long as eighteen months for hardwoods. The key to seasoning wood is to be sure it has been split, exposing the wet interior and increasing the surface area of each piece. A tree that was cut down a year ago and not split is likely to have almost as high a moisture content now as it did when it was cut.

To season wood:

- Cut logs to size
- Split to 6 in. (152 mm) or less
- Air dry to a moisture content of around 20%
  - Soft wood - about nine months
  - Hard wood - about eighteen months

**NOTICE:** Seasoning time may vary depending on drying conditions.

#### 4. Storing Wood

Splitting wood before it is stored reduces drying time. The following guideline will ensure properly seasoned wood:

- Stack the wood to allow air to circulate freely around and through the woodpile.
- Elevate the woodpile off the ground to allow air circulation underneath.
- The smaller the pieces, the faster the drying process. Any piece over 6 in. (152 mm) in diameter should be split.
- Wood should be stacked so that both ends of each piece are exposed to air, since more drying occurs through the cut ends than the sides. This is true even with wood that has been split.
- Store wood under cover, such as in a shed, or covered with a tarp, plastic, tar paper, sheets of scrap plywood, etc., as uncovered wood can absorb water from rain or snow, delaying the seasoning process. Avoid covering the sides and ends completely. Doing so may trap moisture from the ground and impede air circulation.

#### 5. Burning Process

Fire requires fuel, air and heat. If heat is robbed from the fireplace during the drying stage, the new load of wood has reduced the chances for a good clean burn. Always burn dry, seasoned firewood.

- **Kindling or 1st stage:**

In this stage, the wood is heated to a temperature high enough to evaporate the moisture which is present in all wood. The wood will reach the boiling point of water (212°F) and will not get any hotter until the water is evaporated. This process takes heat from coals and tends to cool the fireplace.

- **2nd stage:**

The secondary stage is when the wood gives off flammable gases which burn above the fuel with bright flames. It is very important that the flames be maintained and not allowed to go out. This will ensure the cleanest possible fire. You should close down the air to control the point where you can still maintain some flame. If the flames tend to go out, more air is necessary.

- **Final stage:**

The final stage of burning is the charcoal stage. This occurs when the flammable gases have been mostly burned and only charcoal remains. This is a naturally clean portion of the burn. The coals burn with hot blue flames.

It is very important to reload your fireplace while enough lively hot coals remain in order to rekindle the next load of wood.

#### 6. Dirty Glass

A portion of the combustion air entering the firebox is deflected down over the inside of the door glass. This air flow “washes” the glass, helping to keep smoke from adhering to its surface. When operated at a low burn rate, less air will be flowing over the glass and the smoky, relatively cool condition of a low fire will cause the glass to become coated. Operating the fireplace with the burn rate air control and start-up air control all the way open for 15-20 minutes should remove the built up coating.

#### 7. Creosote Formation

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 newly-started or a slow-burning fire. As a result, creosote residue accumulates on the flue lining.

When ignited, creosote creates an extremely hot fire which may damage the chimney or even destroy the house.

The chimney shall be inspected at least annually before lighting, or once every two months during heating season.

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

#### 8. Opacity

Opacity indicates how cleanly your fireplace is burning. Opacity is measured in percent; 100% opacity is when an object is totally obscured by the smoke column from a chimney, and 0% opacity means that no smoke column can be seen. Periodically check the opacity and burn your fireplace as nearly smoke-free as possible (goal of 0% opacity).

#### D. First Fire

Before lighting your first fire in the fireplace, make certain that:

- the baffle and ceramic blanket are correctly positioned, resting against the rear support
- firebrick are in place
- all labels have been removed
- all plated surfaces have been cleaned

**NOTICE:** Oils can cause permanent markings on plating if not removed before the first fire.

**NOTICE:** The first three or four fires should be of moderate size to allow the oils and binders to be burned from the fireplace and the refractory and paint to cure. You may notice an industrial odor the first few fires. This is considered normal.

## E. Lighting Instructions/Establish Coal Bed

- Open outside air by opening the lower access panel and locate the outside air handle (it could be on the left or right). Lift the handle up and pull out to open. See Figure 3.20.

Note: This may be closed only when the fireplace is not in use to prevent cold air infiltration.

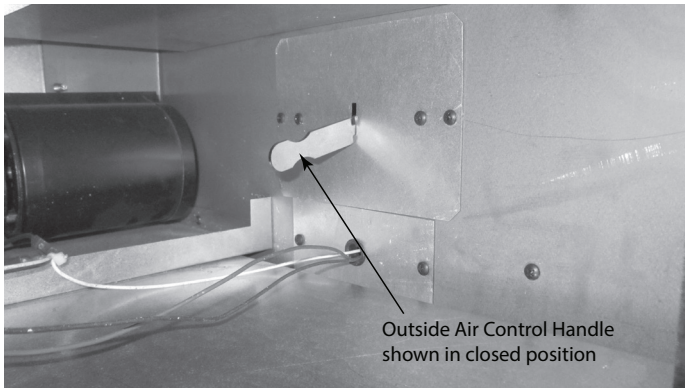


Figure 3.20 Outside Air Handle Shown on Right Side

- Move the combustion air control to the right, you will feel resistance about three-fourths of the way. You must move past that resistance approximately 3/4 in. (19 mm) to fully engage the automatic combustion control (ACC) system.
- Place several wads (3-4 pieces) of crumpled newspaper on the firebox floor. Add 5-6 lbs. of kindling (pieces of dry cord wood less than 1 inch in diameter) stacked on top of the paper crisscrossed. See Figure 3.21.
- Make sure that no matches or other combustibles are in the immediate area of the fireplace. Be sure the room is adequately ventilated and the flue unobstructed.
- For best results, use a hand held homeowner-type gas torch to light the paper and wood for approximately one minute.



Figure 3.21 Placing Kindling

- Leave the door slightly open 2-4 inches (see Figure 3.25) for 2-3 minutes then close the door, latching it lightly to allow the flame to get going good.
- When 1/2 to 2/3 of the kindling burns down, open the door and level the firebox.
- Add 7 to 9 pounds of start-up wood (1-3 inch diameter pieces of cord wood) by stacking them in a crisscross pattern. This will allow for proper air flow.
- Leave door slightly open 2-4 inches (see Figure 3.25) for 1-3 minutes or until a good flame is present. Then close the door, latching it lightly.
- After the flame gets established (approximately 3-5 minutes) shut and latch the door.
- When the start-up has burned down 1/2 to 2/3 and a good flame is still present, open the door. Level the coal bed insuring that the combustion air holes are not blocked.

### High Burn

- Load 4-6 pieces of cord wood 22 inches long to achieve maximum firebox volume, stack 2 to 3 pieces high in the back first, then 2 to 3 pieces in the front, making sure to work the bottom pieces into the coal bed to insure solid stack once all the wood is loaded. Leave at least a 1 inch gap between the two stacks to insure good air flow around the wood. See Figures 3.22, 3.23 & 3.24 for examples.
- Leave the door slightly open 2-5 inches (see Figure 3.25) for up to 5 minutes to get a good flame going then close the door. See Figure 3.27.
- When fire has burned down and ready for reloading, level out the coal bed first and reset the ACC if needed.



Figure 3.22 Loading Wood



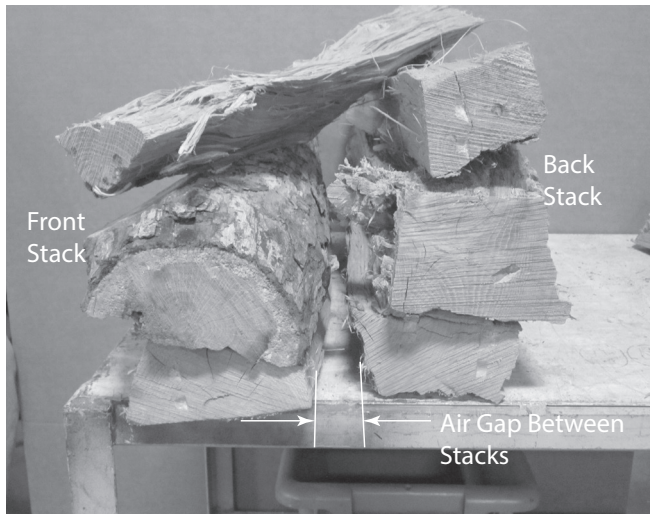


Figure 3.23 Stacking Wood

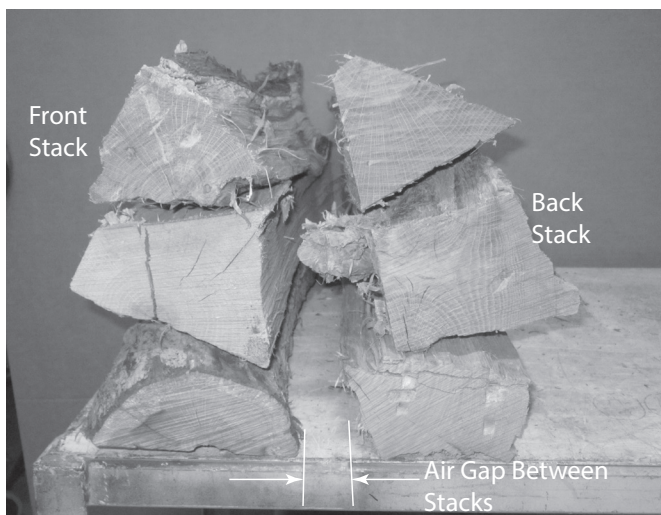


Figure 3.24 Stacking Wood

#### Medium/Low Burn

- Open the door and load the wood the same as the high burn. Then partially close the door leaving it open around 4-8 inches for up to 5 minutes or until the wood is burning good. Close the door and reset the ACC if needed. Let it burn for up to 20 minutes before setting the combustion air control to the desired setting.

#### COMBUSTION AIR CONTROL SETTINGS

- LOW - all the way to the left.
- MEDIUM - from the low setting go up to 1/2 inch to the right.
- HIGH - all the way to the right until resistance is felt.

NOTE: The ACC should only need to be activated when starting from a cold start or if a lively coal bed isn't present when reloading.

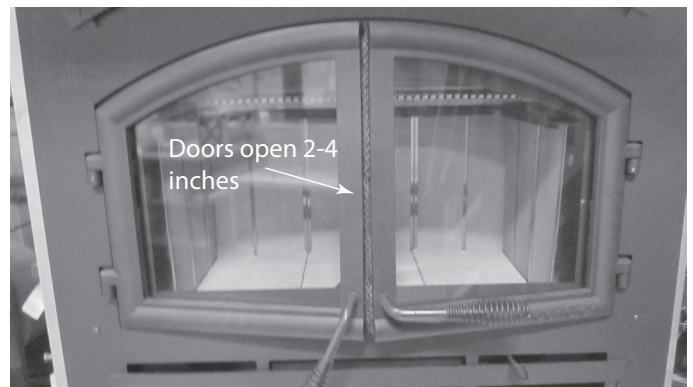


Figure 3.25 Doors Open 2-4 Inches



Figure 3.26 Doors Latched Lightly

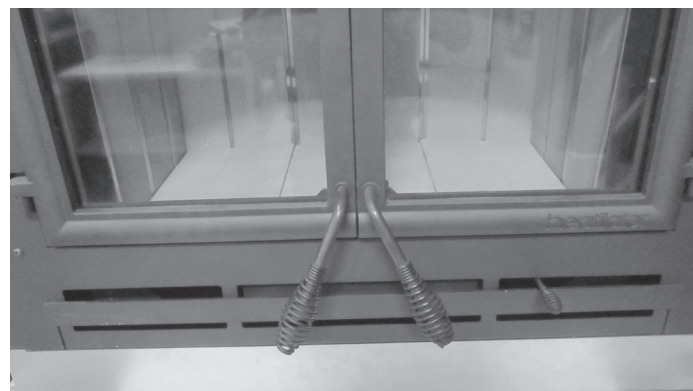


Figure 3.27 Door Fully Closed

## H. Frequently Asked Questions

ISSUES	SOLUTIONS
Odor from appliance	When first operated, this appliance may release an odor for the first several hours. This is caused by the curing of the paint and the burning off of any oils remaining from manufacturing.
Metallic noise	Noise is caused by metal expanding and contracting as it heats up and cools down, similar to the sound produced by a furnace or heating duct. This noise does not affect the operation or longevity of the appliance.
Whirring sound	The fan produces a whirring sound which increases in volume as the speed is increased.

**CONTACT YOUR DEALER** for additional information regarding operation and troubleshooting.  
Visit [www.heatilator.com](http://www.heatilator.com) to find a dealer.

### **WARNING**

DO NOT PLACE COMBUSTIBLE OBJECTS IN FRONT OF THE APPLIANCE. High temperatures may ignite clothing, furniture or draperies.

### **WARNING**



#### **Fire Risk.**

- DO NOT BURN GARBAGE OR FLAMMABLE FLUIDS SUCH AS GASOLINE, NAPHTHA OR ENGINE OIL.
- Do NOT burn treated wood or wood with salt (driftwood).
- May generate carbon monoxide if burn material other than wood.

May result in illness or possible death.

### **WARNING**



#### **Fire Risk.**

Keep combustible materials, gasoline and other flammable vapors and liquids clear of appliance.

- Do NOT store flammable materials in the appliance's vicinity.
- DO NOT USE GASOLINE, LANTERN FUEL, KEROSENE, CHARCOAL LIGHTER FLUID OR SIMILAR LIQUIDS TO START OR "FRESHEN UP" A FIRE IN THIS HEATER.
- Keep all such liquids well away from the heater while it is in use.
- Combustible materials may ignite.

## 4 Maintenance and Service

This fireplace needs periodic inspection and repair for proper operation. It is against federal regulations to operate this fireplace in a manner inconsistent with operating instructions in this manual.

### **WARNING! Hot Surfaces!**

*Glass and other surfaces are hot during operation AND cool down. **DO NOT** clean fireplace until it is cooled.*

Task	Frequency	To be completed by
1. Chimney Inspection	As needed	Homeowner or Chimney Sweep
2. Chimney Cleaning	As needed	Chimney Sweep
3. Plated Surfaces Cleaning	As needed	Homeowner
4. Glass Door	Seasonally	
5. Glass Cleaning	As needed	
6. Door Gasket	Seasonally	
7. Ash Removal	As needed	
8. Baffle/Blanket/Channel Protector	Seasonally	
9. Firebrick	Seasonally	

### **A. Maintenance Tasks-Homeowners**

Installation and repair should be done by a qualified service technician only. The fireplace should be inspected before use and at least annually by a professional service person.

The following tasks may be performed annually by the homeowner. If you are uncomfortable performing any of the listed tasks, please call your dealer for a service appointment.

#### **1. Chimney Inspection**

**Frequency:** As necessary; at least annually before lighting fireplace, or once every two months during heating season.

**By:** Homeowner/Chimney Sweep

- Confirm that termination cap remains clear and unobstructed.
- Inspect for blockages such as bird nests, leaves, etc.
- Inspect for corrosion or separation.
- Inspect for creosote and remove as needed, at least every two months during the heating season.
- Inspect the system at the fireplace connection and at the chimney top.

In the event of a chimney fire, Hearth & Home Technologies recommends replacement of the chimney and inspection of the adjacent structure to the provisions of NFPA Level III inspection criteria.

**WARNING! Risk of Asphyxiation and Fire! Annual inspection by qualified technician recommended.**

*Check:*

- *condition of door, surrounds and fronts*
- *condition of glass and glass assembly*
- *obstructions of combustion and ventilation air*
- *obstructions of termination cap*

*Clean:*

- *glass*
- *air passageways, grilles*

## 2. Creosote (Chimney) Cleaning

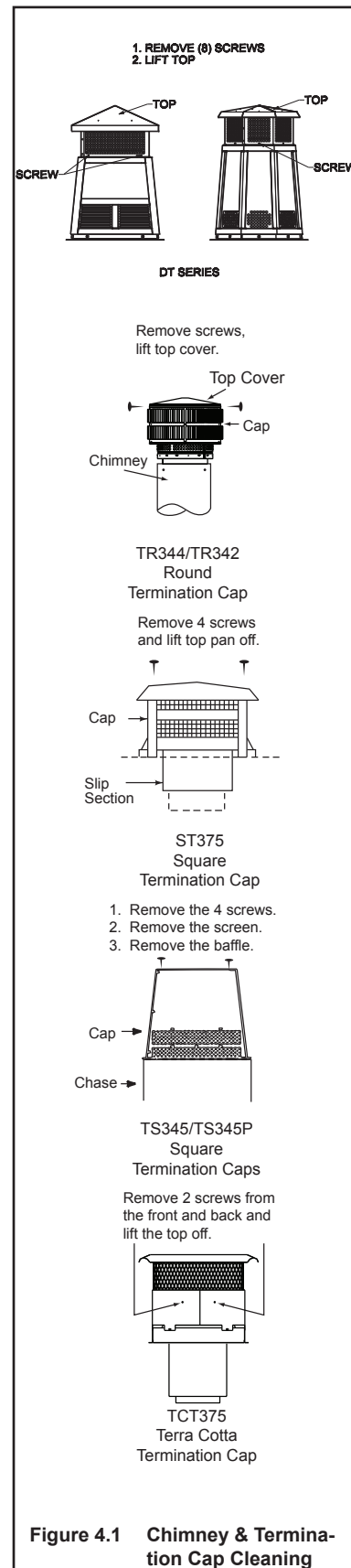
**Frequency:** As needed; at least annually before lighting, or once every two months during heating season. When creosote has accumulated it shall be removed to reduce the risk of a chimney fire.

**By:** Chimney Sweep

**Tools Needed:** Brush, Phillips screwdriver

- 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.
- Remove all ash from the firebox and extinguish all hot embers before disposal. Allow the fireplace to cool completely.
- Remove baffle and ceramic blanket from fireplace before cleaning chimney (refer to Section 5.C.3 Baffle Removal and Installation).
- Close the door tightly.
- Remove the top of the termination cap as shown in Figure 4.1 to clean the cap and chimney.
- The creosote or soot should be removed from the chimney with a brush specifically designed for the size of chimney in use.
- Reinstall termination cap.
- Clean out fallen debris from the firebox.
- Replace baffle and ceramic blanket.

**WARNING! Risk of Fire! Ignited creosote is extremely HOT. Prevent creosote buildup.**



### 3. Care and Cleaning of Plated Surfaces

**Frequency:** Initially and as needed

**By:** Homeowner

**Tools Needed:** Vinegar or glass cleaner, soft towel

**CAUTION!** Do not use a polish with abrasives. It will scratch plated surfaces.

- Use a glass cleaner or vinegar and towel to remove the oils.
- Oils can cause permanent markings on plating if not removed.
- After plating is cured, oils will not affect the finish.

### 4. Glass Door

**Frequency:** As necessary

**By:** Homeowner

- Inspect glass panel for cracks. Replace if this condition is present.
- Inspect glass gasket. Confirm glass does not move around in glass frame.

### 5. Glass Cleaning

**Frequency:** As necessary

**By:** Homeowner

**Tools Needed:** Vinegar or glass cleaner, soft towel

- Clean glass with a non-abrasive glass cleaner. Use a damp cloth dipped in wood ashes or a commercially available oven cleaner. Remove any oven cleaner residue with a glass cleaner or soap and water.

### 6. Door Gasket

**Frequency:** Seasonally

**By:** Homeowner

- Open door, place half a dollar bill inside and close the door.
- Attempt to pull the bill out.
- If the bill gives good resistance or is not removable, the gasket is adjusted correctly. If the bill is easily removed, the gasket needs adjustment or replacement to create an even seal all around door.

It may be necessary to adjust or tighten the door latch.

### 7. Ash Removal

**Frequency:** As necessary

**By:** Homeowner

**Tools Needed:** Covered metal container, metal shovel, fireplace broom

**WARNING! Risk of Fire! DO NOT** remove ashes until the fire is out and the fireplace is cold.

- Ashes should be placed in metal container with tight fitting lid.
- The closed container of ashes should be placed on a noncombustible 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.

### 8. Baffle and Blanket

**Frequency:** As necessary

**By:** Homeowner

**Tools Needed:**

- Ensure correct baffle and baffle protection channel placement; replace baffle components if damaged or missing.
- The ceramic blanket and baffle board **MUST** be in contact with the back of the firebox and even with each other in the front. The baffle protection channel **MUST** be in position. Refer to Section 3.A.3.

### 9. Firebrick

**Frequency:**

**By:**

**Tools Needed:**

- Inspect condition of brick. Replace if crumbly or otherwise deteriorated, or if cracks exceed 1/4 in. (6 mm).



## B. Replacement Maintenance

### 1. Glass Replacement

- Ensure that the fire is out and the fireplace is cool to the touch.
- Protect a table or counter top with padding or towels.
- Remove door with broken glass from the fireplace by lifting door up and off of the hinges.
- Lay door face down on table or counter making sure handle and handle attachment knob hang over the edge of the table top so door lays flat on the soft surface.
- Remove screws from the top and bottom glass frames (five on each door) using a #2 Phillips Head screwdriver. Set frames aside and retain screws.  
**HINT:** Soak screws in penetrating oil for easy removal.

- Remove the glass and discard.
- Position the new glass with edges evenly overlapping the opening in the front door.
- Replace the glass frames.
- Start screws to secure glass frames to door, keeping them loose for adjusting the glass. Then continue to tighten each screw alternately, a few turns at a time, until the glass panel is tightened snugly. **DO NOT OVERTIGHTEN OR CROSS THREAD SCREWS.**
- Replace the door on the fireplace.
- After the first burn, recheck the tightness of the screws.

### 2. Tighten or Adjust Door Latch

Remove the lock nut holding latch cam and four spacing washers on the right hand door as shown in Figure 4.2. Move 1-3 spacing washers to the opposite side of cam. Reinstall the cam and tighten locknut. At least one spacing washer and the black washer must be left in place.

OR

Replace the gasket material. Wear or damage to the gasket material can cause air leakage into the firebox resulting in overfiring and loss of efficiency.

A replacement gasket is available from your dealer.

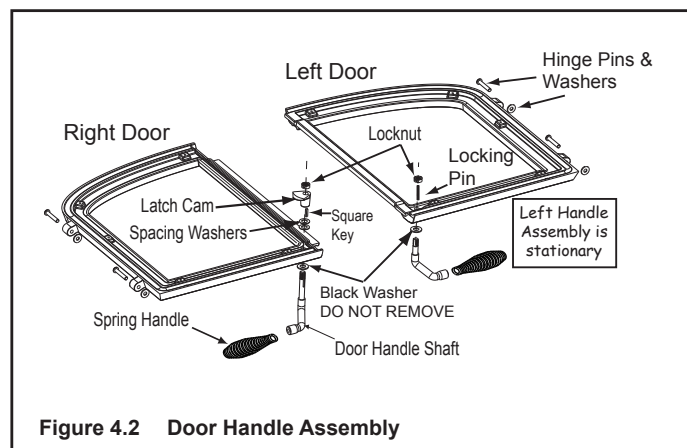
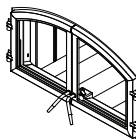


Figure 4.2 Door Handle Assembly

**NOTICE:** Remove all labels from glass before lighting the first fire in your fireplace.

### CAUTION!



Handle glass assembly with care.

#### When cleaning glass:

- Avoid striking, scratching or slamming glass.
- Do NOT clean glass when hot.
- Do NOT use abrasive cleaners.
- Use a hard water deposit glass cleaner on white film.
- **Refer to maintenance instructions.**



### WARNING

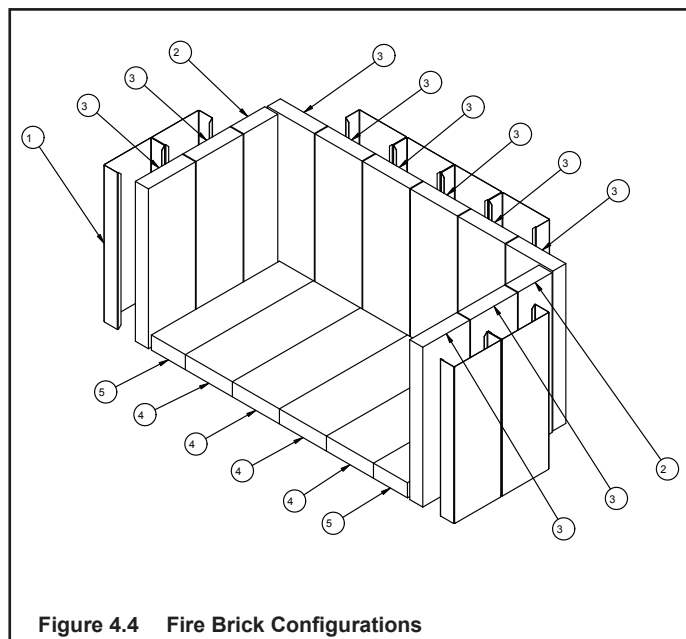
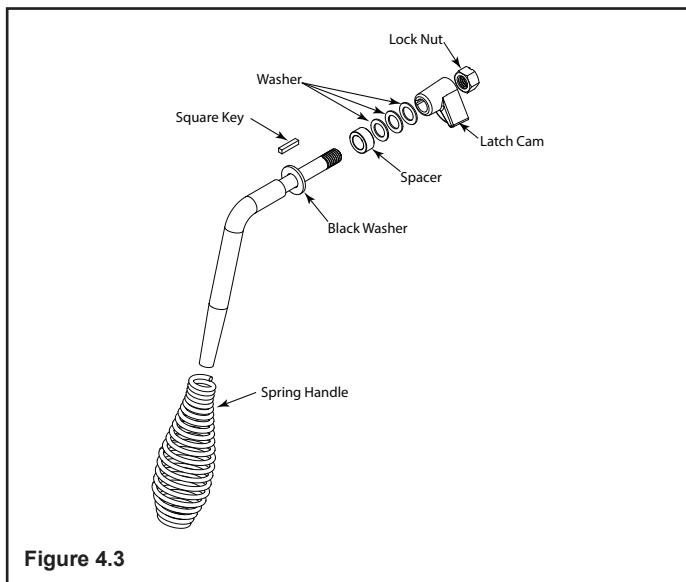


#### Injury Risk.

- Use only glass specified in manual.
- **DO NOT REPLACE** with any other material.

### 3. Door Handle Assembly

- Slide door handle through door.
- Install washer(s) as shown in Figure 4.3.
- Install key groove.
- Align groove in latch cam with key; slide latch cam over shaft.
- Install locknut but do not overtighten, the handle needs to move smoothly.
- Install fiber handle using a clockwise motion until the fiber handle is snug against the door handle shaft.



#	Brick Size	Qty. in Set
1	Brick Wrap	8
2	Firebrick 13.25 x 3.25	2
3	Firebrick 13.25 x 4.50 x 1.25	10
4	Firebrick 12.25 x 4.50	4
5	Firebrick 12.25 x 3.25	2

### 4. Firebrick Replacement

The firebox of your fireplace is lined with high quality firebrick and refractory board under the bottom firebrick only, which has exceptional insulating properties. There is no need to use a grate; simply build a fire on the firebox floor. Do not operate the fireplace without bricks.

**IMPORTANT:** The bricks are very similar in size. Be certain you have the proper brick in the correct location. Measure the brick size for accuracy.

After the coals are completely cooled, remove all old firebrick and ash from unit and vacuum out firebox.

- Remove new brick set from box and lay out to diagram shown in Figure 4.4.
- Install rear bricks. Slide top of bricks under clip on back of firebox wall and push bottom of brick back.
- Install side bricks. Slide top of brick under clips on side of firebox and push the bottom of the brick until it is flush with the side of the unit.
- Lay bottom bricks in unit.



## 5. Baffle Removal and Installation

### **WARNING! Hot Surfaces!**

Glass and other surfaces are hot during operation AND cool down. **DO NOT** clean fireplace until it is cooled.

1. Remove all ash from firebox and place into a metal container.
2. Remove the baffle protection channel by lifting it up and turning it down and pulling it out of the firebox. See Figure 4.5.

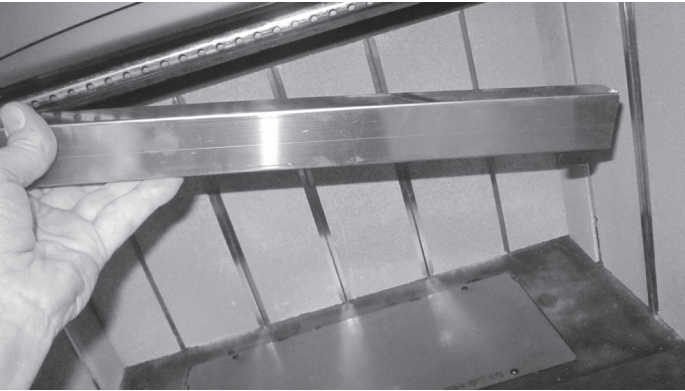


Figure 4.5 Removing Baffle Protection Channel

3. Using a 3/16 inch Allen wrench, remove the front manifold tube retainer bolt on the air channel behind the end of the front tube on the right side. See Figure 4.6.

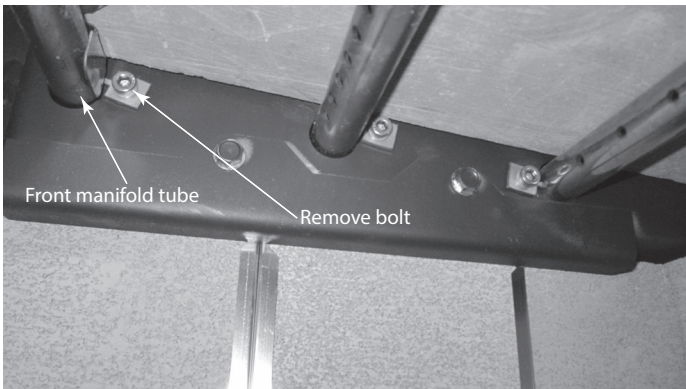


Figure 4.6 Remove Retainer Bolt

4. To remove the manifold tube, slide the tube to one side until one end is out of its hole then pull it down and out of the other hole. It is only necessary to remove the front tube in order to remove the baffle.
5. Pull the two (2) piece baffle board and insulation down and out of the firebox. See Figure 4.7.

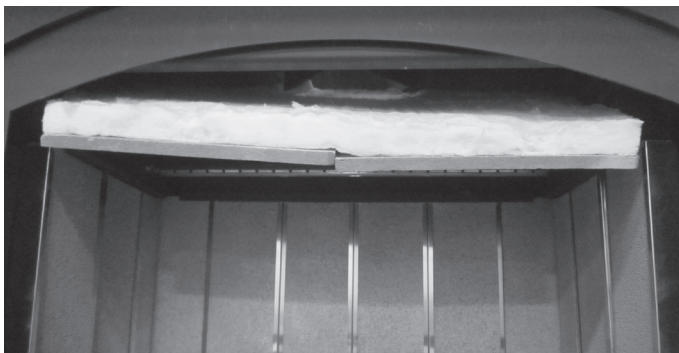


Figure 4.7

6. To install the baffle board and insulation, repeat steps 2 thru 5 in reverse. Be sure the baffle board and insulation are pushed back fully and the insulation is down and flat. See Figures 4.8 & 4.9.

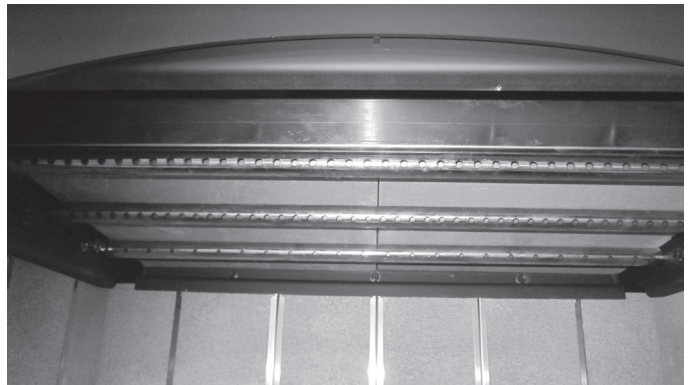


Figure 4.8 Reinstall Baffle Boards

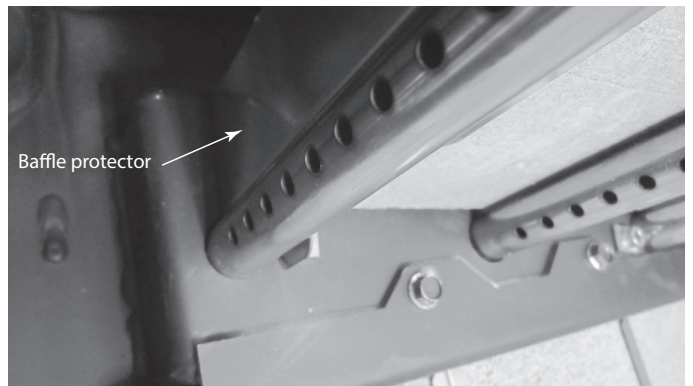


Figure 4.9 Reinstall Baffle Protection Channel

## 6. Fan Replacement

**CAUTION! Risk of Shock! Disconnect power by turning off circuit breaker before servicing or unplugging control board from junction box in behind the access panel..**

The Fireplace comes equipped with two fans, installed at the factory with electric access on both sides of the fireplace.

1. Remove the bottom firebrick.
2. Remove the four (4) 5/32 Allen head screws and pry open the access door with a flat blade screwdriver. See Figure 4.10 and remove it.

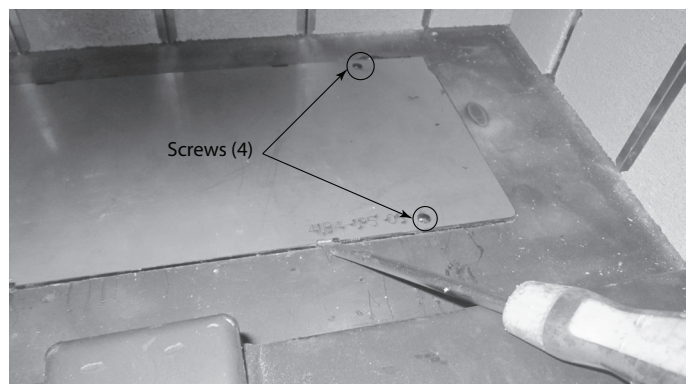


Figure 4.10 Pry Open Access Door



3. While holding the handle, remove the four (4) screws at each corner of the combustion cover and fish it up and out of the bottom of the fireplace. See Figures 4.11 & 4.12.

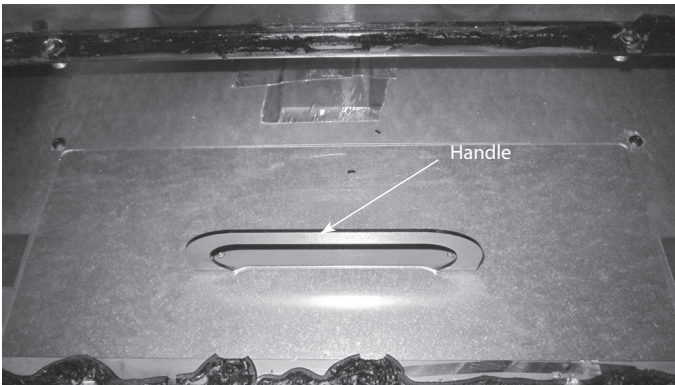


Figure 4.11 Removal of Combustion Cover Screws

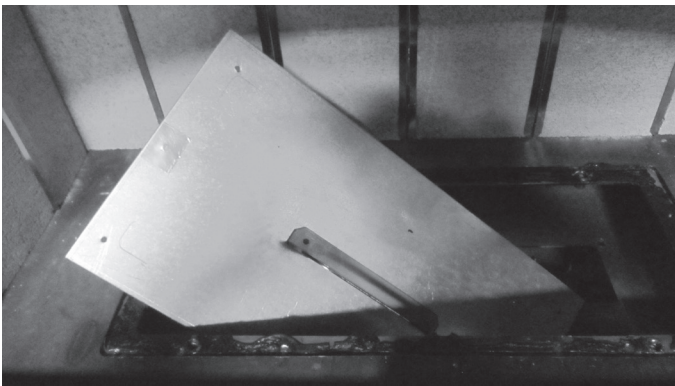


Figure 4.12 Removal of Combustion Cover

4. Unplug the wire harness from the fans and remove the wing nut holding the fan in place. See Figure 4.13.

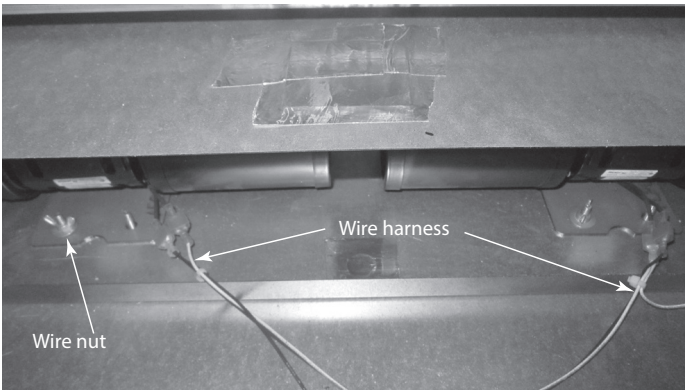


Figure 4.13 Unplug Wire Harness

5. Lift the fan up and off of the locating pins and remove up through the access hole. See Figure 4.14.

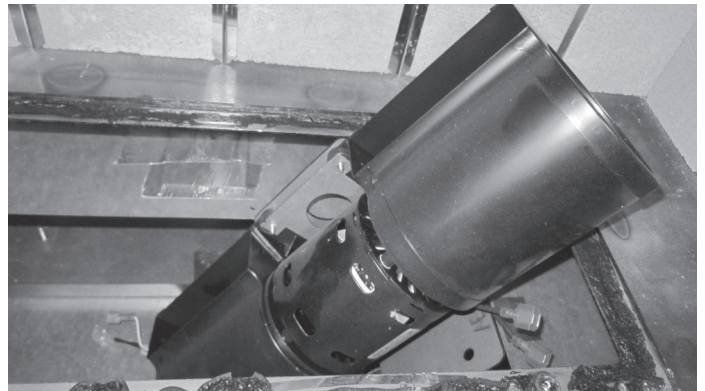


Figure 4.14 Remove Fan from Access Hole

6. Install new fans in reverse order.

## 7. Timer Assembly Replacement

1. Remove the bottom front access panel by lifting it up and off.
2. Remove the two (2) screws in the air chamber cover. See Figure 4.15. Pull it down and off. See Figure 4.16.

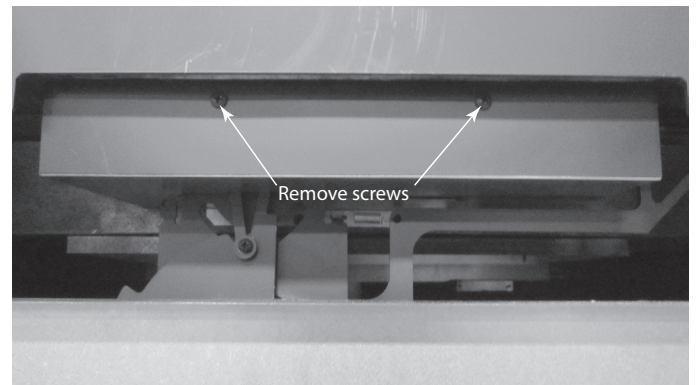


Figure 4.15 Removal of Screws on Air Chamber Cover

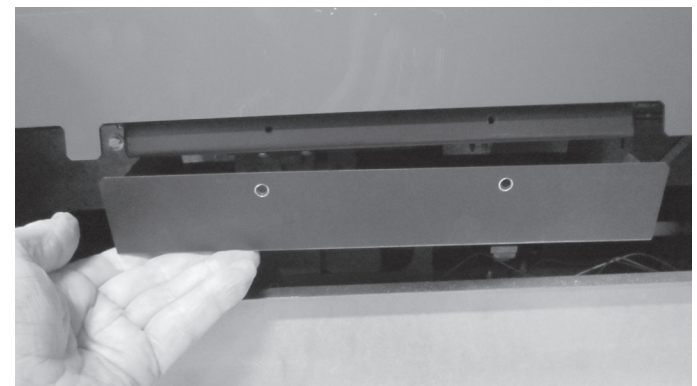
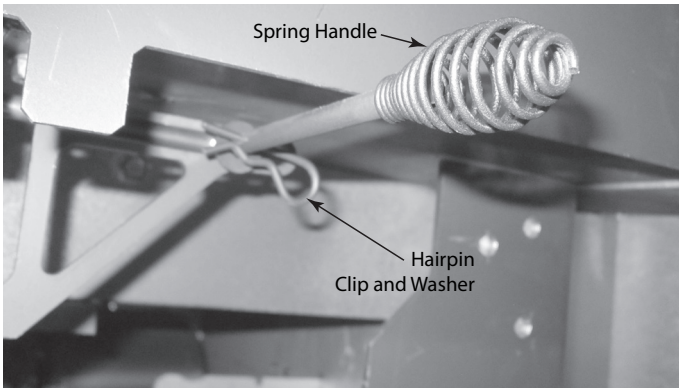


Figure 4.16 Removal of Air Chamber Cover

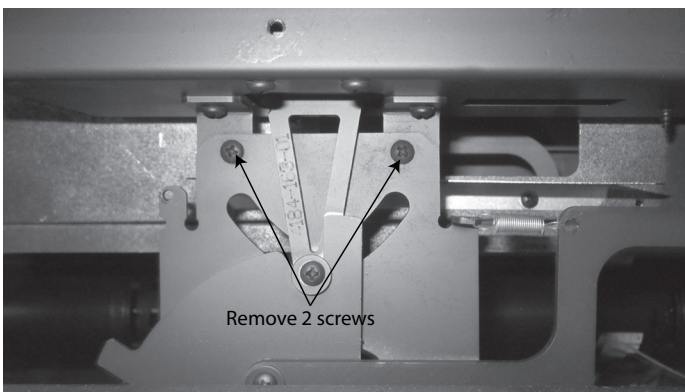


3. Remove the spring handle by twisting it to the left and pulling on it. Hold on to the rod as this is being done. See Figure 4.17.
4. Pull off and remove the front hairpin clip and washer on the rod. See Figure 4.17.



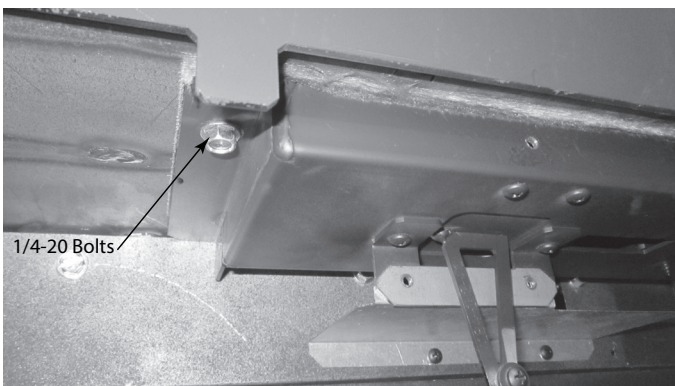
**Figure 4.17 Removal of Spring Handle**

5. While holding on to the timer assembly, remove the two (2) screws and slide the linkage arm off of the rod and pull the assembly out of the front. See Figure 4.18.

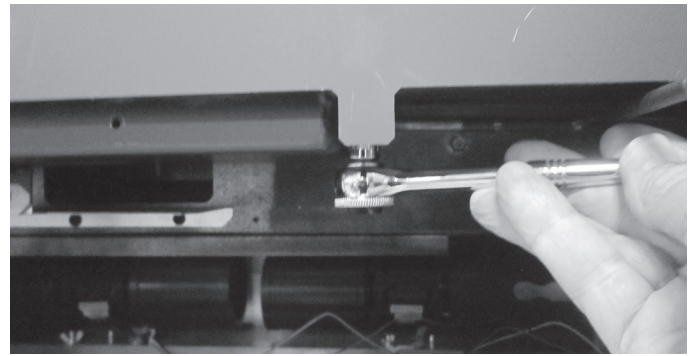


**Figure 4.18 Removal of Timer Assembly Screws**

6. While supporting the air chamber, remove the two (2) 1/4-20 bolts at each end of it. Then pull it down and out the front. See Figures 4.19 & 4.20.

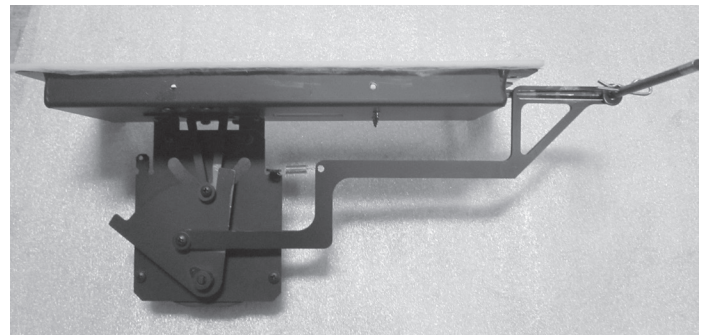


**Figure 4.19 Location of Bolts**

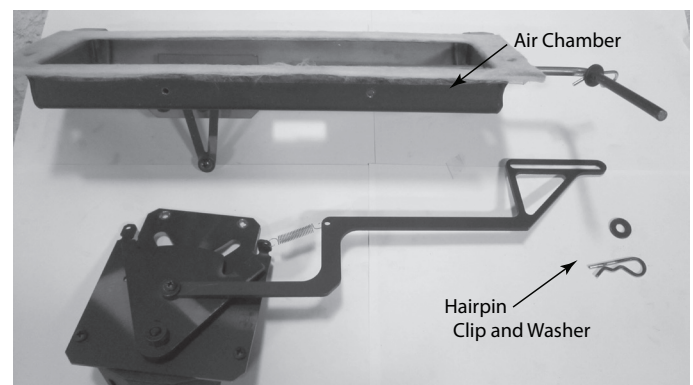


**Figure 4.20 Removal of Bolts (2)**

7. On the new timer assembly, Figure 4.21, remove the front hairpin clip and washer then two (2) screws disconnecting the air chamber before installation. See Figure 4.22.

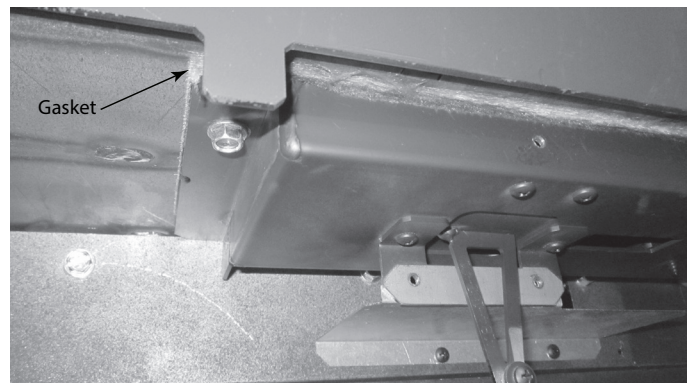


**Figure 4.21 Timer Assembly**



**Figure 4.22 Removal of Hairpin Clip, Washer and Air Chamber**

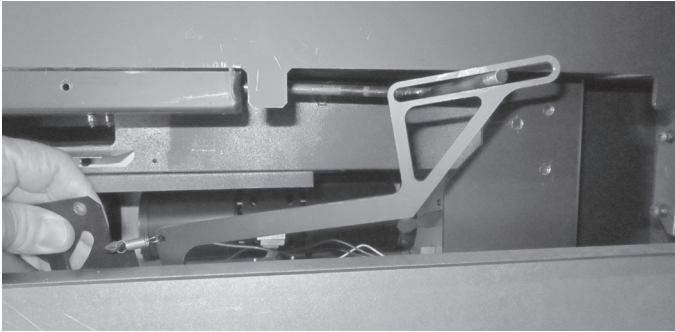
8. Install the new air chamber using the 1/4-20 bolts making sure the gasket is installed also. See Figure 4.22.



**Figure 4.22 Install New Air Chamber**

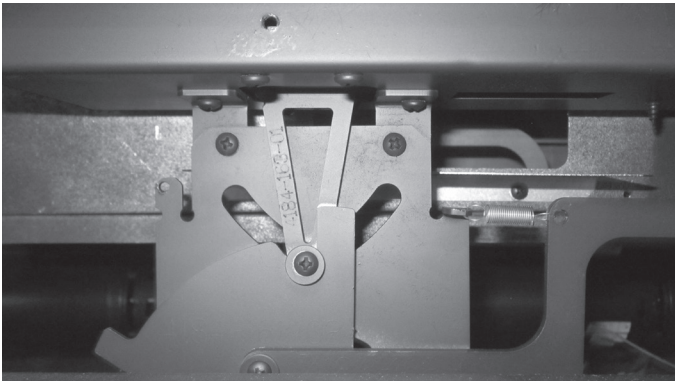


9. Install the timer/linkage by inserting the timer in first and slipping the linkage over the rod. See Figure 4.23.



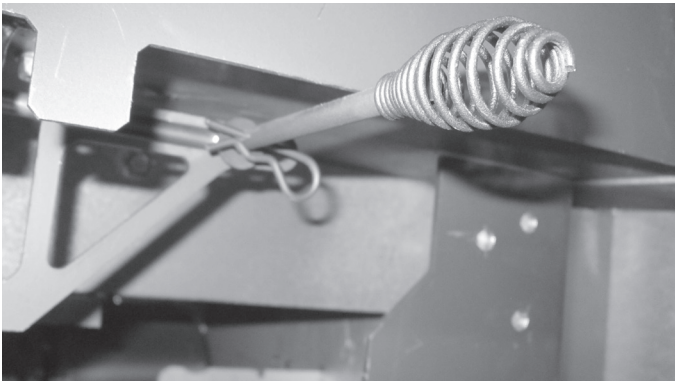
**Figure 4.23 Inserting Timer Assembly**

10. Screw the timer to the air chamber. See Figure 4.24.



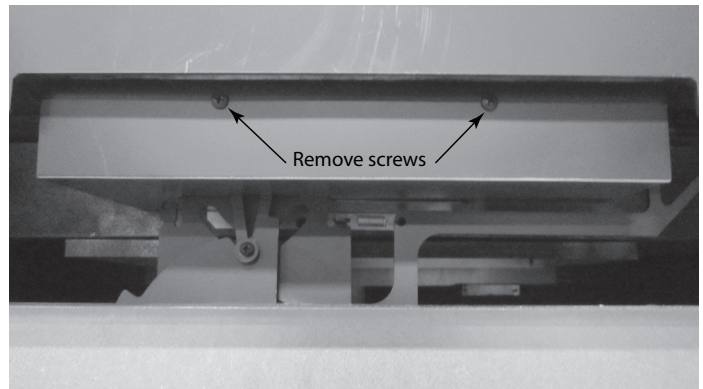
**Figure 4.24 Screwing Timer to Air Chamber**

11. Install the washer and hairpin clip back on the rod. See Figure 4.25.

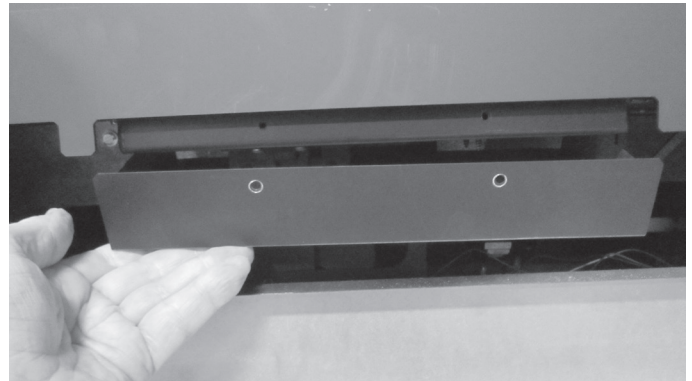


**Figure 4.25 Reinstalling Hairpin Clip and Washer**

12. Reinstall air chamber cover. See Figure 4.26.
13. Reinstall the bottom front access panel.

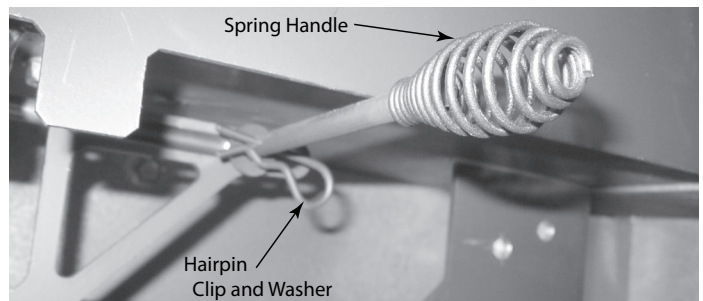


**Figure 4.26 Air Chamber Cover**



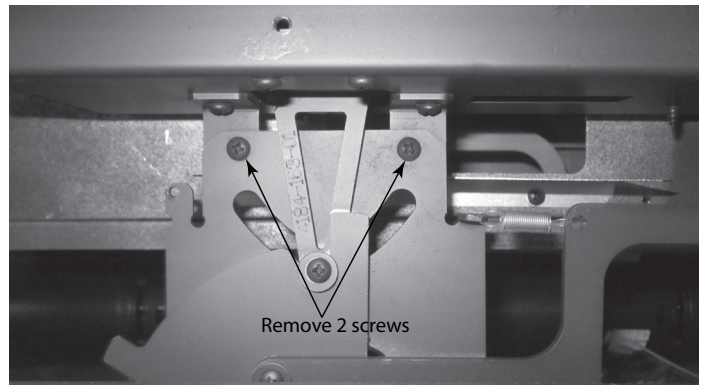
**Figure 4.27 Removal of Air Chamber Cover**

3. Remove the spring handle by twisting it to the left and pulling on it. Hold on to the rod as this is being done. See Figure 4.28.
4. Pull off and remove the hairpin clip and the washer on the rod. See Figure 4.28.



**Figure 4.28 Removal of Spring Handle**

5. While holding on to the timer assembly, remove the two (2) screws, Figure 4.29 and slide the linkage arm off of the rod and pull the assembly out of the front.

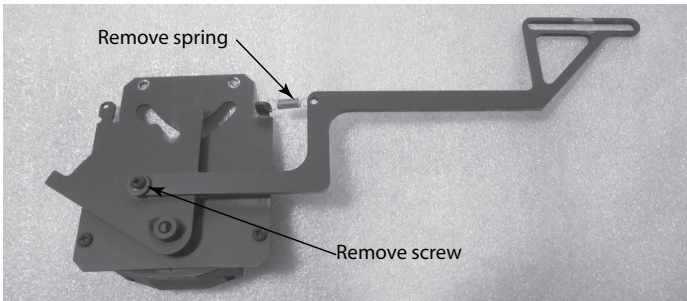


**Figure 4.29 Removal of Screws**

## 8. Timer Removal & Replacement

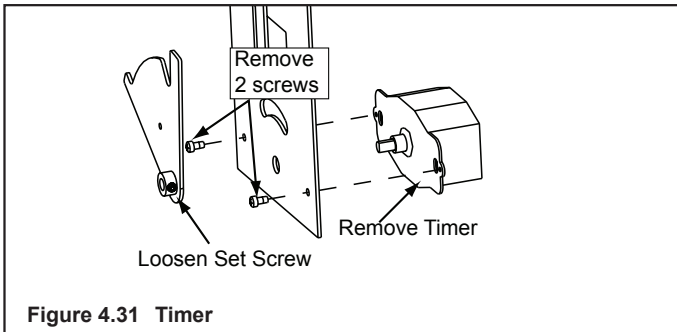
1. Remove the bottom front access panel by lifting it up and off.
2. Remove the two (2) screws in the cover. See Figure 4.26 and pull it down and off. See Figure 4.27.

6. Remove the linkage arm and the spring from the timer. See Figure 4.30.



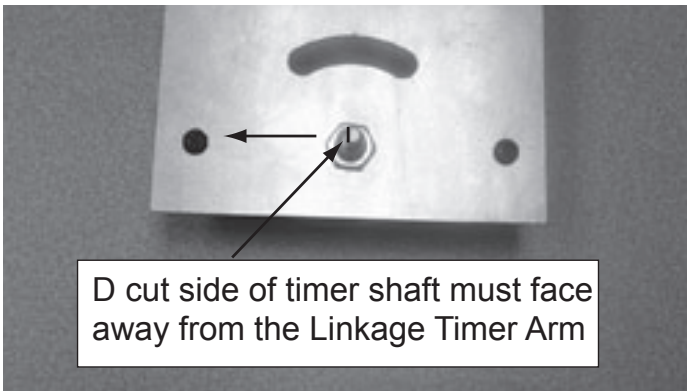
**Figure 4.30 Removal of Linkage Arm and Spring**

7. Loosen set screw on timer, remove two screws and remove timer. See Figure 4.31.



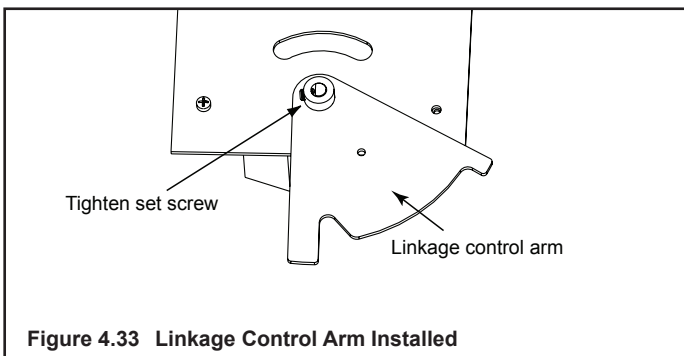
**Figure 4.31 Timer**

8. Install new timer using same two screws. It is very important that the D cut side of the timer shaft is facing the opposite side of the linkage timer arm. See Figure 4.32.



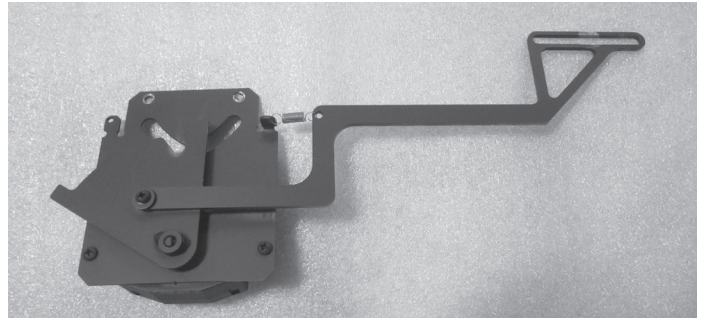
**Figure 4.32 D Cut on Shaft**

9. • Place linkage control arm over timer shaft and tighten set screw, Figure 4.33.



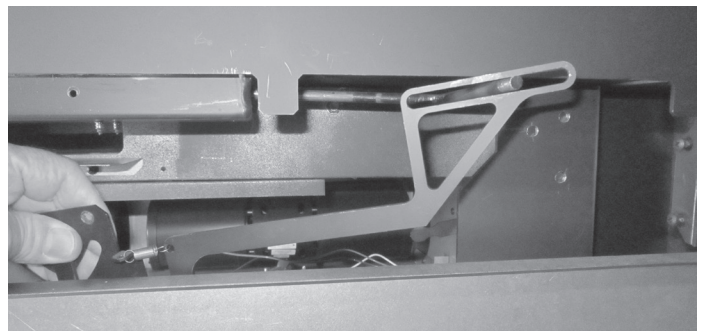
**Figure 4.33 Linkage Control Arm Installed**

10. Rotate linkage control arm into final position. Note that the D cut is now facing the linkage timer arm. Re-attach the linkage timer arm and spring. See Figure 4.34.



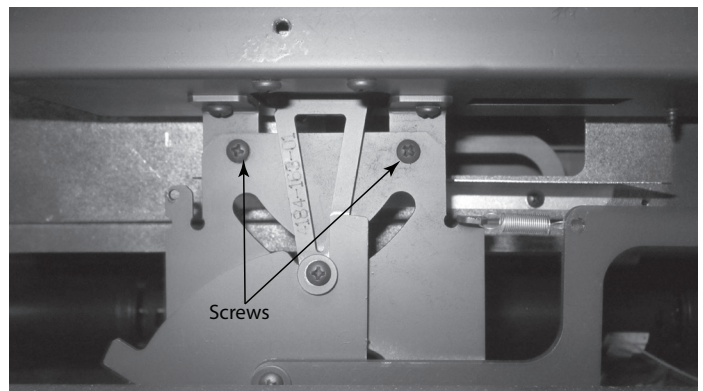
**Figure 4.34 Reattach the Linkage Timer Arm**

11. Install the timer/leakage by inserting the timer in first and slipping the linkage over the rod. See Figure 4.34.



**Figure 4.34 Insert the Timer/Leakage**

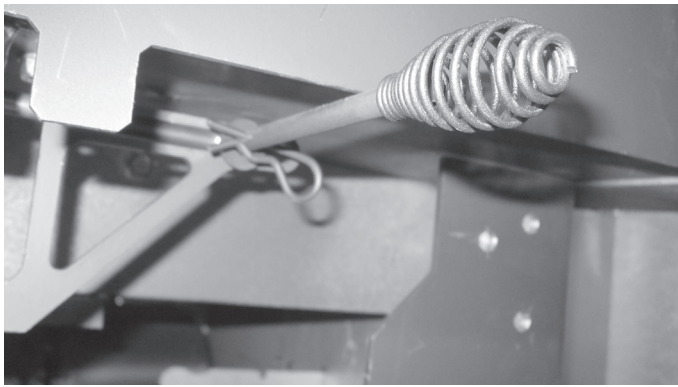
12. Screw the timer to the air chamber. See Figure 4.35.



**Figure 4.35 Screw Timer to Air Chamber**

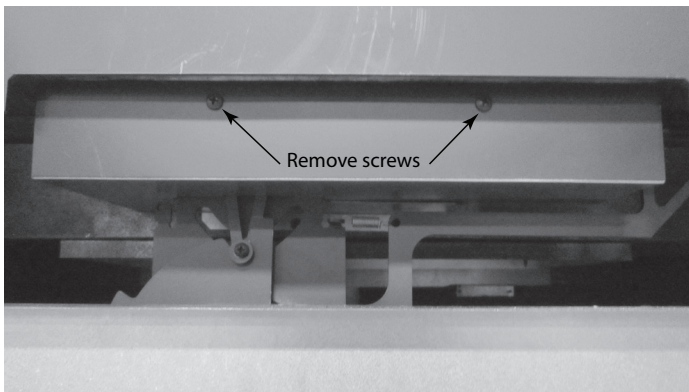


13. Install the washer and the hairpin clip back on the rod. See Figure 4.36.



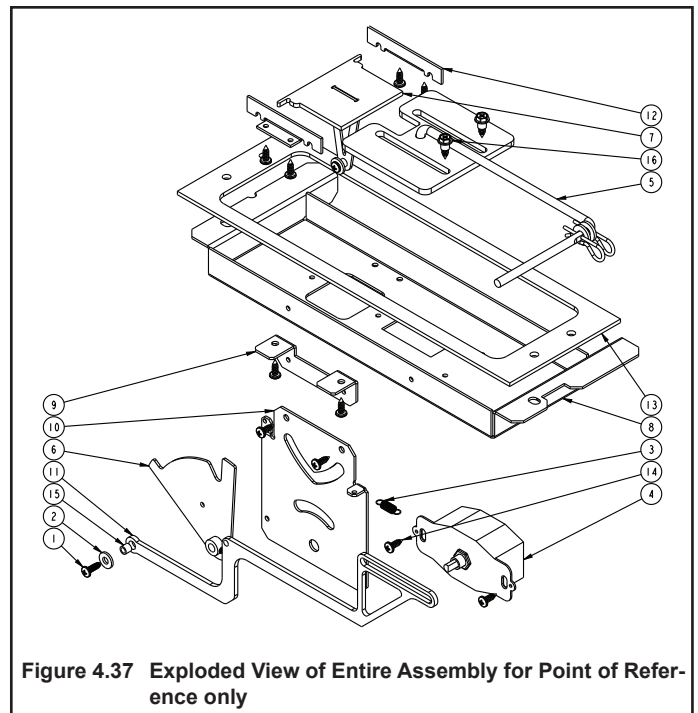
**Figure 4.36 Reinstalling Hairpin Clip and Washer**

14. Reinstall the air chamber cover. See Figure 4.37.



**Figure 4.37 Air Chamber Cover**

15. Reinstall the bottom front access panel.



**Figure 4.37 Exploded View of Entire Assembly for Point of Reference only**

Item	Description	Qty
1	Screw 8-32 x 1/2 PPH BK	1
2	Washer #10 SAE ZN	1
3	Extension Spring	1
4	Timer Mechanical 12 HR	1
5	Slide Assembly	1
6	Timer Arm Assembly	1
7	Timer Door Assembly	1
8	Air Channel Bottom	1
9	Timer Bracket	1
10	Timer Base	1
11	Timer Handle	1
12	Timer Door Retainer	2
13	Air Channel Gasket	1
14	Screw 8 x 12 PPH BK	10
15	Spacer #8 1/4D 7/32L ZN	1
16	HHSS #10 x 1/4D 1/4 L BK	2

# 5 Troubleshooting

## A. FAQs

Hearth & Home Technologies assumes no responsibility for the improper performance of the fireplace system caused by inadequate draft due to environmental conditions, down drafts, tight sealing construction of the structure, or mechanical exhausting devices which will create a negative air pressure within the structure where the fireplace is located.

If smoke spillage occurs from a fireplace opening when the door is open, there is either a leakage in the flue, a blockage in the flue, or some condition is affecting draft. Understanding and differentiating the conditions which can cause each of these kinds of spillage problems is essential to their solution.

- **Flue Leakage**  
Check for improperly connected flue joints or a damaged flue joint in the chimney system. Such leakage would reduce draft (air would be drawn in through the leaks rather than through the fireplace). The result might be difficult start-up and smoky fires that might spill if other adverse draft conditions accompany this problem.
- **Flue Blockage**  
The damper should be open.  
Check for objects that may have fallen down the chimney.

Flue draft is measured as negative pressure in the chimney. The amount of negative pressure determines how strong the draft is. The draft is important because it draws the combustion air into the fireplace and pulls the smoke out of the chimney.

There are three basic criteria essential in establishing and maintaining flue draft:

- availability of combustion air
- heat generated from the fire
- diameter and height of the flue system

These three factors work together as a system to create the flue draft. Increasing or decreasing any one of them will affect the other two and thus change the amount of draft in the entire system.

If the fire is hard to start and smoke spills out of the fireplace, or you find it difficult to establish and maintain a moderately high burn rate, then the flue draft is too low and corrective measures must be taken.

Be sure you have air available for combustion and that your firewood is dry and well seasoned. Build your fires properly and according to the instructions given in op-

erating instructions, "Starting a Fire". Be sure your flue system is installed correctly and that it is the proper diameter and height. Check for the following:

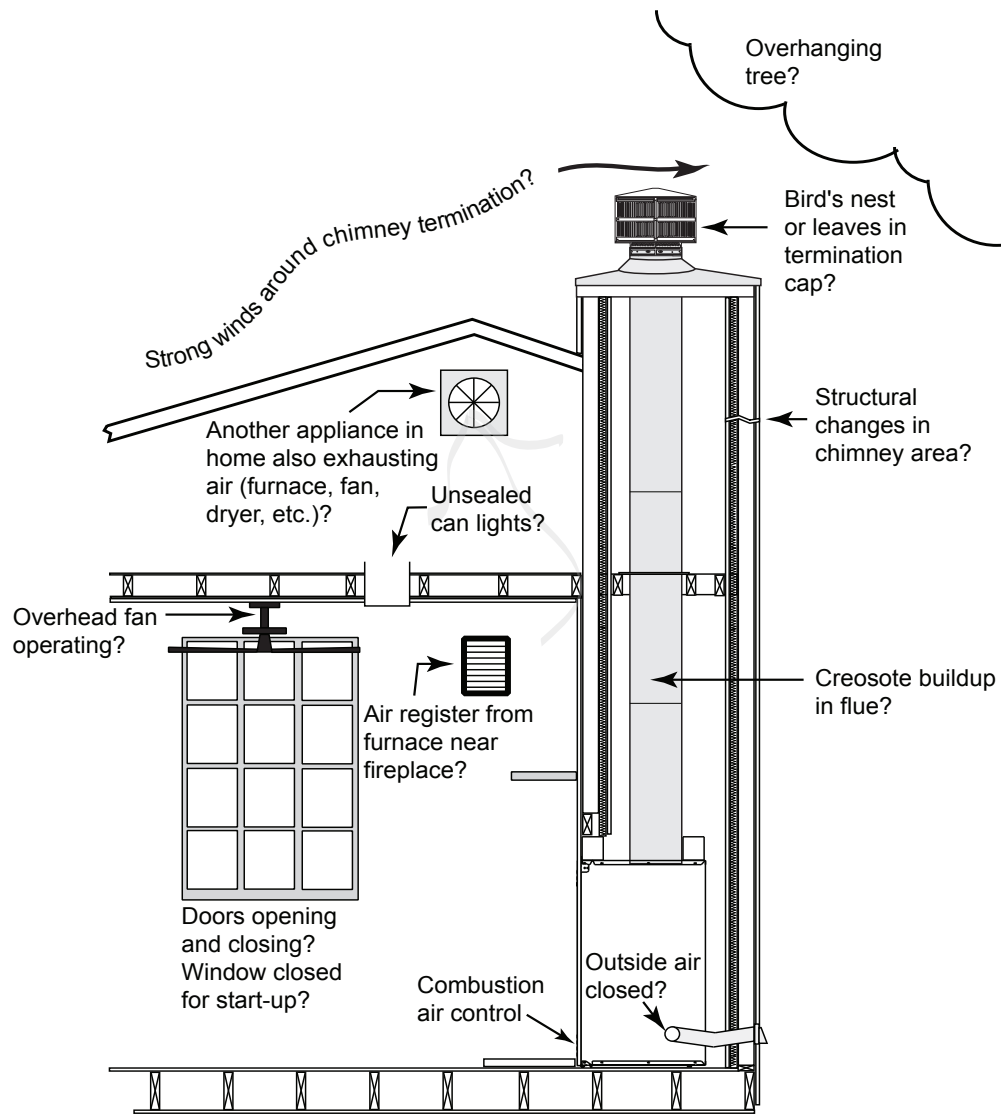
- All chimney sections are properly installed.
- The chimney is clean and free of creosote or soot buildup.
- Make sure overhanging trees and branches are cut back within ten feet of the top of the chimney and the chimney is free of debris from animals.
- Ensure the chimney cap is clean and free of any buildup of soot or creosote if cap is equipped with a spark arrestor screen.
- Be sure the ceramic blanket (above the baffle) and the baffle are in their proper positions
- The wood being used is dry and well seasoned.

If you still suspect you have a low draft problem it may be necessary to increase the volume of air in your flue system. Since the diameter of your flue system is matched with the size of the flue collar and should not be changed, then the height of the system must be increased. Add chimney sections one at a time until the draft improves.

In some cases, regardless of what you do, it can still be difficult to establish the proper flue draft. This is especially evident when using an exterior factory-built chimney or exterior masonry chimney. Try holding a burning rolled up newspaper as close to the flue outlet as possible for a few minutes, then light the paper under the kindling. The heat generated from the burning rolled up newspaper should help get the draft established.

Still other factors can affect how well your flue system performs. Neighboring structures, high winds, tall trees, even hillsides can affect air currents around the chimney. Well designed chimney caps are available that can help. Your fireplace dealer is the local expert in your area. He can usually make suggestions or discover problems that can be easily corrected allowing your fireplace to operate correctly as it has been designed, providing safe and economical heat for your home.





**Figure 5.1 Factory-built Fireplaces: Troubleshooting**

## B. Troubleshooting Table

Fire is difficult to start	• Refer to section 4.C. Lighting Instructions
	• Open air controls
	• Establish draft: Hold a lighted, rolled up newspaper under the front of the baffle
	• Place DRY kindling over wadded up newspaper; leave air spaces between pieces of wood
	• Light the paper, allow kindling to ignite and progress to a lively burn
	• Slowly add progressively larger pieces of dry wood until the fire is well established
Smoke in the house at startup	• Check and clean chimney if needed
	• Open air controls
	• Establish draft
	• Do not use exhaust fans during startup
	• Do not close doors until the fire is well-established
Smoke in the house during operation	• Check and clean chimney if needed
	• Check door rope for seal
	• Open air controls (ACC)
Smoke in the house during refueling	• Open air controls (ACC) to establish a lively coal bed
	• Open doors SLOWLY
	• Add progressively larger wood to establish a hot fire
Fuel burns too fast	• ACC not working properly
	• Wood too dry, mix in less seasoned wood after the fire is established
	• User larger diameter wood
	• Check baffle/ceramic blanket for proper placement (Section 3.A.3)
	• Close down ACC (refer to section 4.D. Heat Management)
Glass doesn't stay clean	• Establish a good, hot fire
	• Use well-seasoned wood
Not enough or no heat	• Move combustion air control to fully open position
	• Fan is not on
	• Insufficient fuel for fire/heat required
Fan doesn't come on	• No power
	• Fireplace is not hot enough to activate snap disc
	• Snap disc may be faulty

## **6** Reference Materials

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### **A. Service Parts**







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## B. Contact Information



Heatilator, a brand of Hearth & Home Technologies  
1915 West Saunders Street  
Mount Pleasant, Iowa 52641

**Please contact your Heatilator dealer with any questions or concerns.**

For the number of your nearest Heatilator dealer, please visit [www.heatilator.com](http://www.heatilator.com).

### – NOTES –

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#### CAUTION



##### DO NOT DISCARD THIS MANUAL

- Important operating and maintenance instructions included.
- Read, understand and follow these instructions for safe installation and operation.
- Leave this manual with party responsible for use and operation.



This product may be covered by one or more of the following patents: (United States) 5613487, 5647340, 5890485, 5941237, 6006743, 6019099, 6053165, 6145502, 6374822, 6484712, 6601579, 6769426, 6863064, 7077122, 7098269, 7258116, 7470729, 8147240 or other U.S. and foreign patents pending.

2000-945C

# Installation Manual

## Installation and Fireplace Setup

Pour demander un exemplaire en français de ce Manuel du propriétaire, visitez [www.quadrafire.com/translations](http://www.quadrafire.com/translations).

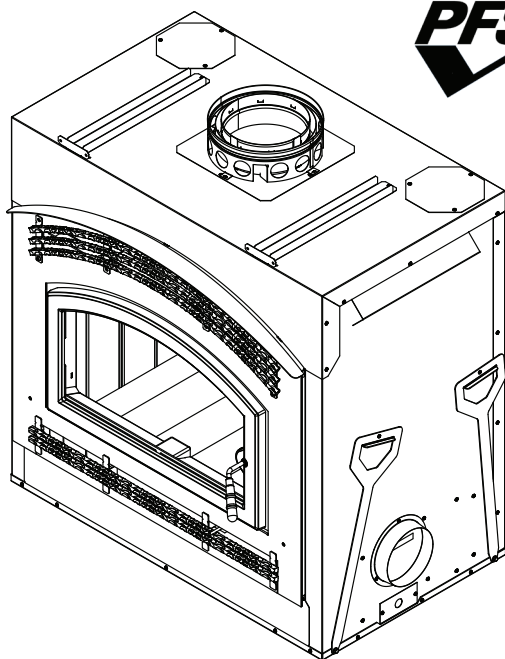
**INSTALLER:** Leave this manual with party responsible for use and operation.

**OWNER:** Retain this manual for future reference.

Contact your dealer with questions on installation, operation, or service.

# QUADRA-FIRE®

Model(s):  
**Pioneer-II-C**



**EPA CERTIFIED WOODBURNING  
FIREPLACE**

### **WARNING! Risk of Fire and/or Asphyxiation!**

- Read all the instructions before starting the installation. Follow these instructions carefully during the installation to ensure maximum safety and benefit.
- Comply with all minimum clearances to combustibles as specified. Failure to comply may cause house fire.

### **⚠ WARNING**



#### **HOT SURFACES!**

Glass and other surfaces are hot during operation AND cool down.

#### **Hot glass will cause burns.**

- **DO NOT** touch glass until it is cooled
  - NEVER allow children to touch glass
  - Keep children away
  - CAREFULLY SUPERVISE children in same room as fireplace.
  - Alert children and adults to hazards of high temperatures.
- High temperatures may ignite clothing or other flammable materials.**
- Keep clothing, furniture, draperies and other flammable materials away.

Installation and service of this appliance should be performed by qualified personnel, Hearth & Home Technologies recommends HHT Factory Trained or NFI certified professionals.



### Safety Alert Key:

- **DANGER!** Indicates a hazardous situation which, if not avoided will result in death or serious injury.
- **WARNING!** Indicates a hazardous situation which, if not avoided could result in death or serious injury.
- **CAUTION!** Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.
- **NOTICE:** Indicates practices which may cause damage to the fireplace or to property.

## Table of Contents

<b>1 Product Specific &amp; Important Safety Information</b>		<b>5 Chimney and Termination Requirements</b>	
A. Appliance Certification	4	A. Chimney Requirements	23
B. BTU & Efficiency Specifications	4	B. Offsets/Returns	24
C. Mobile Home Approved	4	C. Termination Requirements	25
D. Glass Specifications	4	<b>6 Chimney Installation</b>	
E. Non-Combustible Materials	5	A. Typical Chimney System	26
F. Combustible Materials	5	B. Assemble Chimney Sections	27
G. Electrical Codes	5	C. Install Chimney Air kit (CAK4A)	27
<b>2 Getting Started</b>		D. Secure Offset/Return	28
A. Typical Fireplace System	6	E. Install Ceiling Firestops	29
B. Design and Installation Considerations	7	F. Install Attic Insulation Shield	30
1. Selecting Fireplace Locations	7	G. Roof Penetration	31
2. Locating Fireplace & Chimney	8	H. Manufactured Home Installation	31
C. Tools and Supplies Needed	9	I. Install Chase/Chase Top	32
D. Inspect Fireplace and Components	9	J. Install Termination Cap	33
E. Fireplace System Requirements	9	<b>7 Finishing</b>	
<b>3 Framing and Clearances</b>		A. Template	35
A. Fireplace Dimensions	10	B. Finish the Wall	36
B. Clearances	11	1. Stone, Brick Finish	36
C. Construct the Chase	12	2. Tile, Granite, Marble Finish	36
D. Frame the Fireplace	13	C. Mantel and Wall Projections	36
E. Secure and Level the Fireplace	13	D. Finishing the Hearth Extension	37
F. Installation of Top Standoffs	14	E. Non-Combustible Sealant Material	38
G. Protective Metal Hearth Strips	14	<b>8 Fireplace Setup</b>	
H. Non-Combustible Facing Board (Provided)	15	A. Firebrick Placement	39
I. Outside Air Kit	15	B. Baffle and Blanket Placement	40
J. Heat Zone Kit (Optional)	18	C. Install Fascia (Fronts)	40
<b>4 Electrical Wiring</b>	<b>22</b>	<b>9 Reference Materials</b>	
		A. Chimney Components	41
		B. Accessories	46

## ATTENTION INSTALLER:

### Follow this Standard Work Checklist

This standard work checklist is to be used by the installer in conjunction with, not instead of, the instructions contained in this installation manual.

<b>Customer:</b> _____ <b>Lot/Address</b> _____  <b>Model:</b> Pioneer-II-C	<b>Date Installed:</b> _____ <b>Location of Fireplace:</b> _____ <b>Installer:</b> _____ <b>Dealer/Distributor Phone #</b> _____ <b>Serial #:</b> _____
--	---

**WARNING! Risk of Fire or Explosion!** Failure to install fireplace according to these instructions can lead to a fire or explosion.

#### **Fireplace Install Section 3 (page 10-18)**

Verified that the chase is insulated and sealed.  
 Required top standoffs installed.  
 Required non-combustible board is installed.  
 Verified clearances to combustibles.  
 Fireplace is leveled and secured.  
 Hearth extension size/height decided.  
 Outside air kit installed.  
 Optional Heat Zone has been installed by a qualified service technician.  
 Fan air kit installed.

YES	IF NO, WHY?
<input type="checkbox"/>	_____
<input type="checkbox"/>	_____
<input type="checkbox"/>	_____
<input type="checkbox"/>	_____
<input type="checkbox"/>	_____
<input type="checkbox"/>	_____
<input type="checkbox"/>	_____
<input type="checkbox"/>	_____

#### **Chimney Section 5 (page 26-33)**

Chimney configuration complies with diagrams.  
 Chimney installed, locked and secured in place with proper clearance.  
 Chimney air kit installed.  
 Firestops installed.  
 Attic insulation shields installed.  
 Roof flashing installed and sealed.  
 Terminations installed and sealed.

<input type="checkbox"/>	_____
<input type="checkbox"/>	_____
<input type="checkbox"/>	_____
<input type="checkbox"/>	_____
<input type="checkbox"/>	_____
<input type="checkbox"/>	_____
<input type="checkbox"/>	_____

#### **Electrical Section 4 (page 22)**

Switch wires properly installed.

<input type="checkbox"/>	_____
--------------------------	-------

#### **Finishing Section 7 (page 35-38)**

Combustible materials not installed in non-combustible areas.  
 Verified all clearances meet installation manual requirements.  
 Mantels and wall projections comply with installation manual requirements.  
 Protective hearth strips and hearth extension installed per manual requirements.

<input type="checkbox"/>	_____
<input type="checkbox"/>	_____
<input type="checkbox"/>	_____

#### **Fireplace Setup Section 8 (page 39-40)**

All packaging and protective materials removed.  
 Firebrick, baffle and ceramic blanket installed correctly.  
 Facia and doors properly installed.  
 Manual bag and all of its contents are removed from inside/under the fireplace and given to the party responsible for use and operation.  
 All packaging materials are removed from inside/under the fireplace.

<input type="checkbox"/>	_____
<input type="checkbox"/>	_____
<input type="checkbox"/>	_____
<input type="checkbox"/>	_____

#### **Hearth & Home Technologies recommends the following:**

- Photographing the installation and copying this checklist for your file.
- That this checklist remain visible at all times on the fireplace until the installation is complete.

**Comments:** Further description of the issues, who is responsible (Installer/Builder/Other Trades, etc.) and corrective action needed:

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Comments communicated to party responsible \_\_\_\_\_ by \_\_\_\_\_ on \_\_\_\_\_  
 (Builder/Gen. Contractor) (Installer) (Date)

# 1 Product Specific & Important Safety Information

## A. Appliance Certification

<b>Model:</b>	Pioneer II-C
<b>Laboratory:</b>	Underwriter's Laboratories, Inc.
<b>Report No:</b>	Project
<b>Type:</b>	Wood Fireplace
<b>Standard:</b>	UL127-2011 and CAN/ULC-S610-2018 (A1998) and (UM) 84-HUD, Manufactured Home Approved.

The Pioneer II Wood Appliance meets the U.S. ENVIRONMENTAL PROTECTION AGENCY Certified to comply with 2020 particulate emission standards using cord wood.

## B. BTU & Efficiency Specifications

EPA Certified Emissions:	1.8 g/hr
*LHV Tested Efficiency:	76%
**HHV Tested Efficiency:	70%
***EPA BTU Output:	17,600 to 48,200
Vent Size:	8 inches
Firebox Size:	2.7 cubic feet
Recommended Log Length:	22 inches
Fuel	Seasoned Cord Wood less than 20% moisture
HHT:	SL300 Series
DuraVent:	DuraPlus
*Weighted average LHV (Low Heating Value) efficiency using cord wood and data collected during EPA emission test. LHV assumes the moisture is already in a vapor state so there is no loss in energy to vaporize.	
**Weighted average HHV (High Heating Value) efficiency using cord wood and data collected during EPA emission test. HHV includes the energy required to vaporize the water in the fuel.	
***A range of BTU outputs based on HHV (High Heating Value) and the burn rates from the low and high EPA tests, using cord wood.	

The Pioneer II is Certified to comply with 2020 particulate emission standards.



## C. Mobile Home Approved

This appliance is approved for mobile home installations when not installed in a sleeping room and when an outside combustion air inlet is provided. The structural integrity of the mobile home floor, ceiling, and walls must be maintained. The appliance must be properly grounded to the frame of the mobile home and use only listed double-wall connector pipe.

## D. Glass Specifications

This appliance is equipped with 5mm ceramic glass. Replace glass only with 5mm ceramic glass. Please contact your dealer for replacement glass.

**NOTE:** This installation must conform with local codes. In the absence of local codes you must comply with the **UL127-2011, (UM) 84-HUD and NPFA211** in the U.S.A. and the **CAN/ULC S610-2018 (A1998) and CAN/CSA-B365 Installation Codes** in Canada.

### DO NOT:

- install or operate damaged fireplace
- modify fireplace
- install other than as instructed by *Hearth & Home Technologies*
- operate the fireplace without fully assembling all components
- install unvented gas log set
- install any component not approved by *Hearth & Home Technologies*
- install parts or components not Listed or approved

*Improper installation, adjustment, alteration, service or maintenance can cause injury or property damage. For assistance or additional information, consult a qualified installer, service agency or your dealer.*

**WARNING! Risk of Fire!** *Hearth & Home Technologies disclaims any responsibility for, and the warranty and agency listing will be voided by the above actions.*

Hearth & Home Technologies WILL NOT warranty appliances that exhibit evidence of over-firing. Evidence of over-firing includes, but is not limited to:

- Warped air tube
- Deteriorated refractory brick retainers
- Deteriorated baffle and other interior components

## E. Non-Combustible Materials

Material which will not ignite and burn, composed of any combination of the following:

- Steel
- Brick
- Concrete
- Glass
- Plaster
- Iron
- Tile
- Slate

Materials reported as passing **ASTM E 136, Standard Test Method for Behavior of Metals, in a Vertical Tube Furnace of 750° C.**

## F. Combustible Materials

Material made of or surfaced with any of the following materials:

- Wood
- Plant Fibers
- Plywood/OSB
- Foam insulation & sealants
- Compressed Paper
- Plastic
- Sheet Rock (drywall)

Any material that can ignite and burn: flame proofed or not, plastered or un-plastered.

## G. Electrical Codes

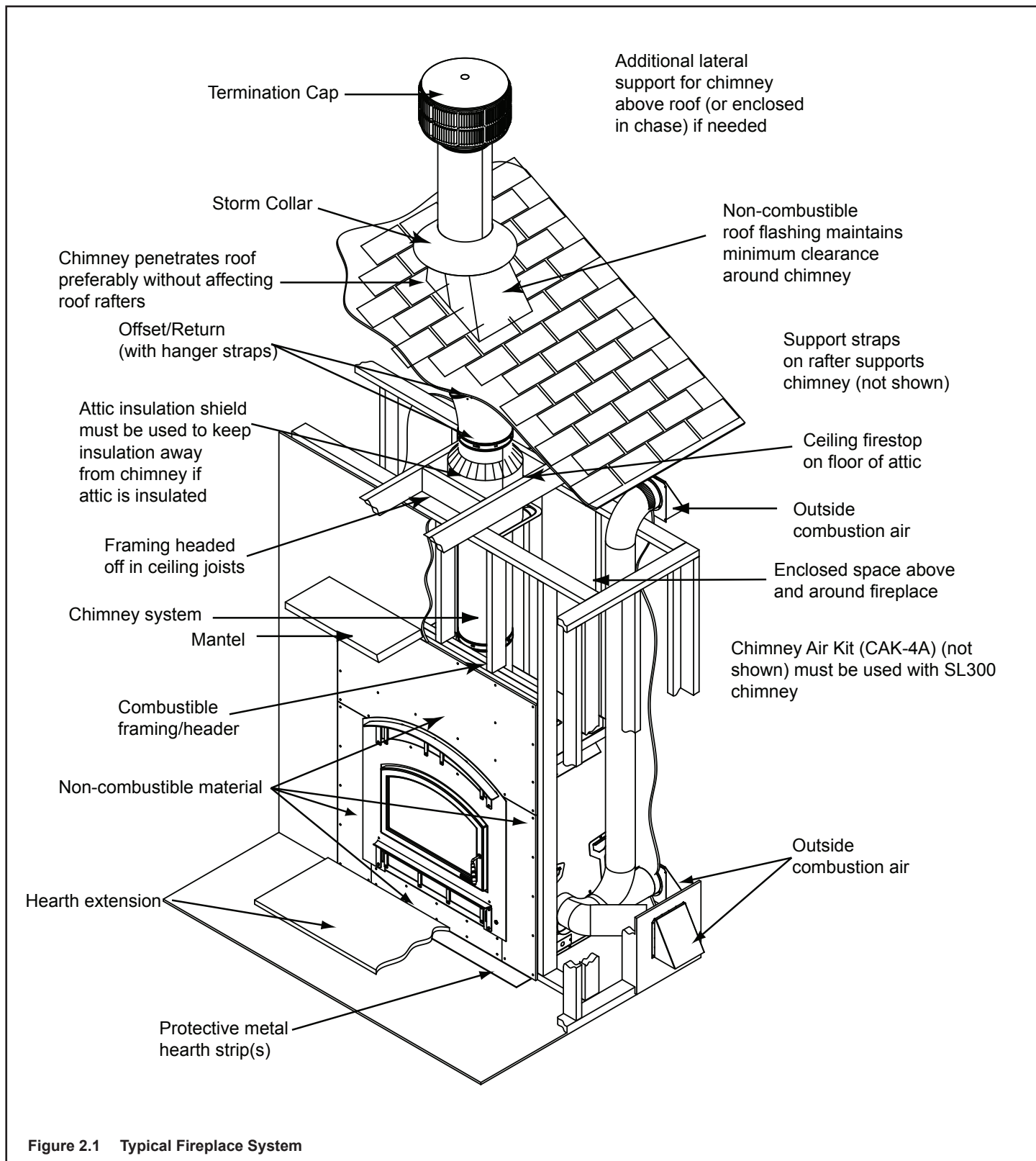
**NOTICE:** *This fireplace must be electrically wired and grounded in accordance with local codes or, in the absence of local codes, with **National Electric Code ANSI/NFPA 70-latest edition** or the **Canadian Electric Code CSA C22.1**.*

- A 110-120 VAC circuit for this product must be protected with ground-fault circuit-interrupter protection, in compliance with the applicable electrical codes, when it is installed in damp locations.

**WARNING!** *Improper installation, adjustment, alteration, service or maintenance can cause injury or property damage.*

## 2 Getting Started

### A. Typical Fireplace System





## B. Design and Installation Considerations

**NOTICE:** Check building codes prior to installation.

- Installation **MUST** comply with local, regional, state and national codes and regulations.
- Consult insurance carrier, local building inspector, fire officials or authorities having jurisdiction over restrictions, installation inspection and permits.

### 1. Selecting Fireplace Locations

This fireplace may be used as a room divider, installed along a wall, across a corner or used in an exterior chase. See Figure 2.2.

Locating the fireplace in a basement, near frequently opened doors, central heat outlets or returns, or other locations of considerable air movement can affect the performance.

Outside air must be used for combustion. The PIONEER II-C comes equipped with an outside air inlet to feed combustion air from outside the home, along with an outside air termination cap; the metal duct is required but not supplied. Consideration should be given to these factors before deciding on a location.

**NOTICE:** In addition to these framing dimensions, also reference the following section:

- Clearances (Section 3).

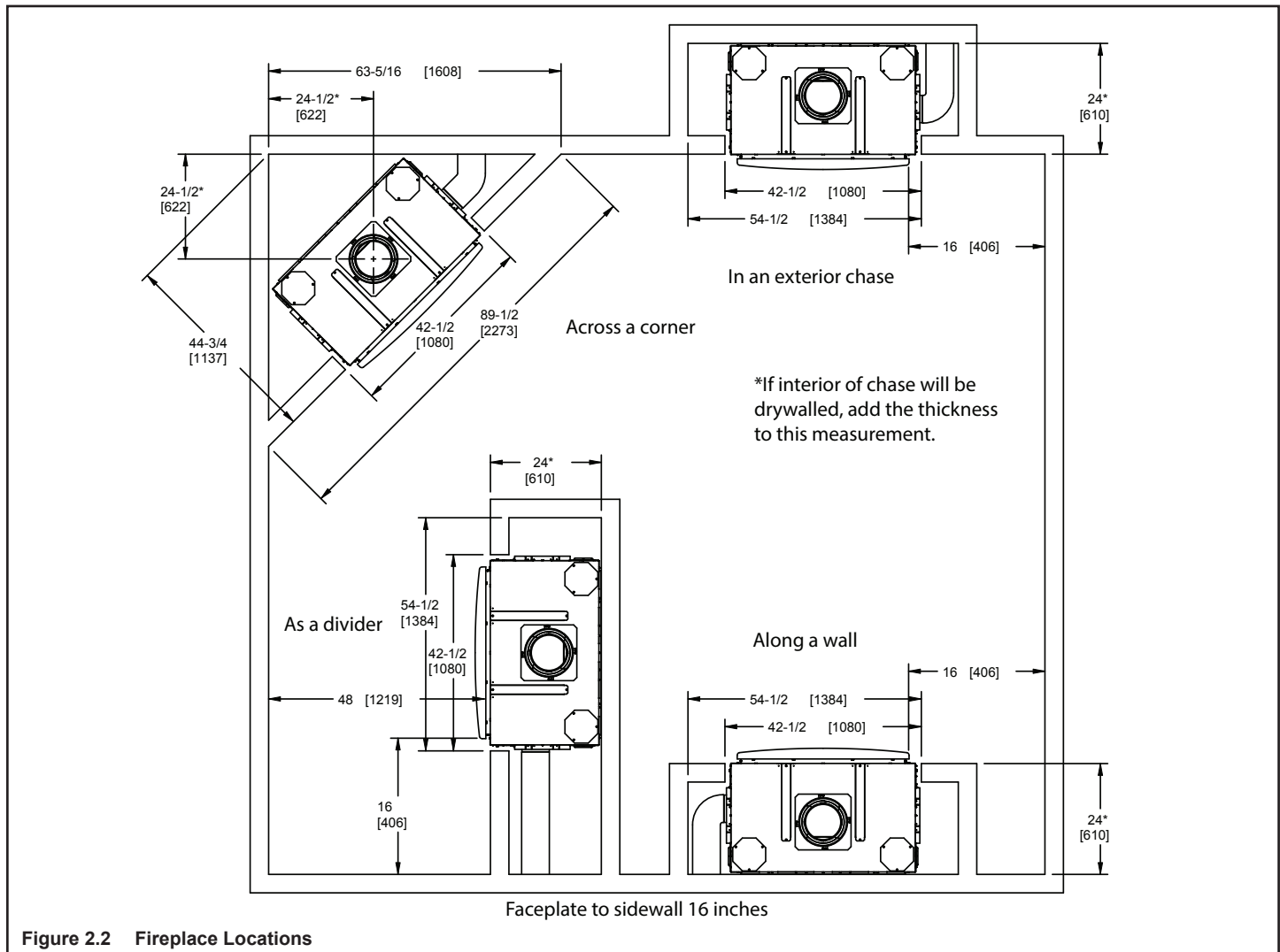
**NOTICE:**

- Illustrations and photos reflect typical installations and are FOR DESIGN PURPOSES ONLY.
- Illustrations/diagrams are not drawn to scale.
- Actual installation/appearance may vary due to individual design preference.
- Hearth & Home Technologies reserves the right to alter its products.

**NOTICE:**

A minimum 1/2 in. air clearance at the back and a minimum 1 in. air clearance to the sides of the fireplace assembly must be maintained.

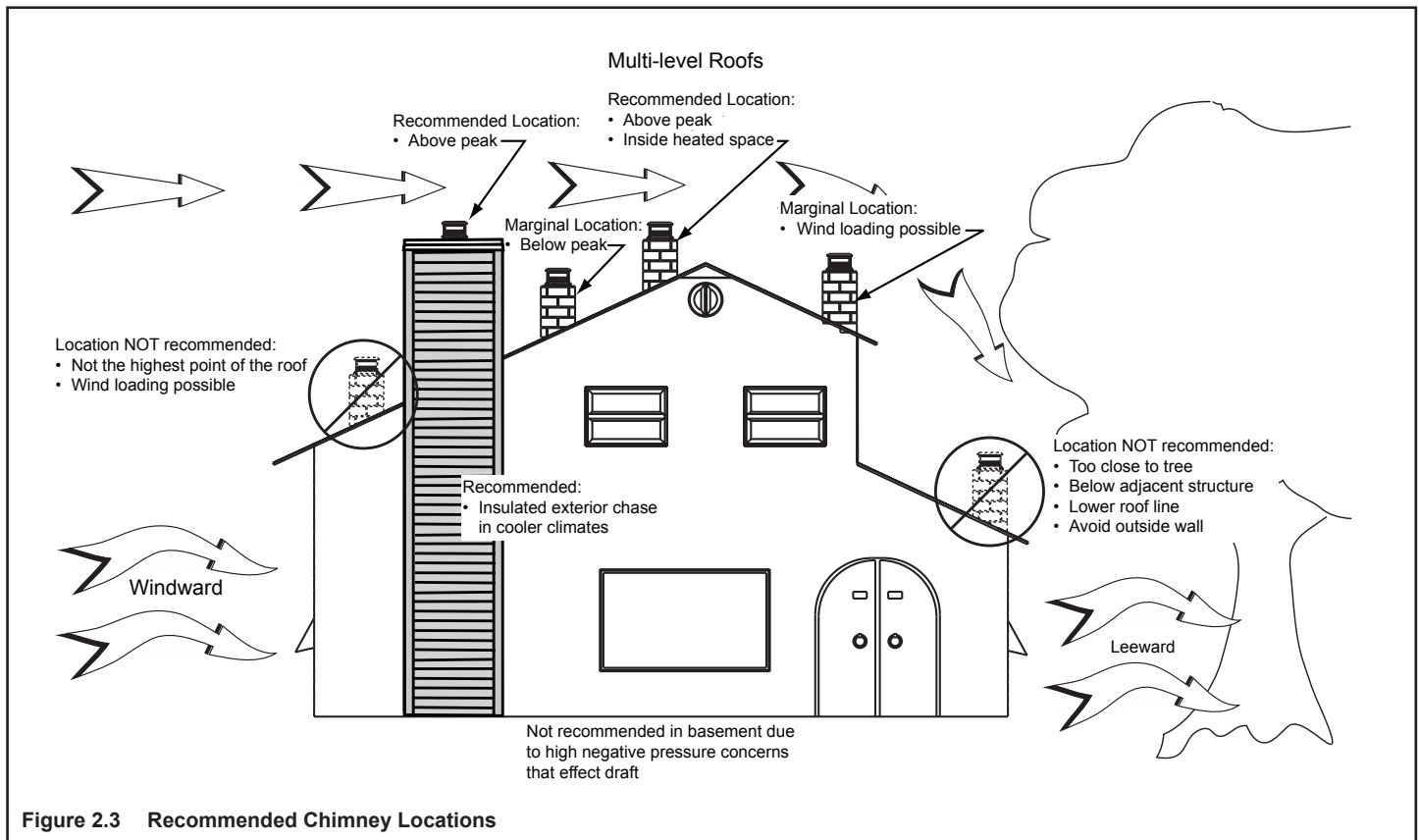
Chimney sections at any level require a 2 in. minimum air space clearance between the framing and chimney sections.



## 2. Locating Fireplace & Chimney

Location of the fireplace and chimney will affect performance.

- Install within the warm airspace enclosed by the building envelope. This helps to produce more draft, especially during lighting and die-down of the fire.
- Penetrate the highest part of the roof. This minimizes the effects of wind loading.
- Locate termination cap away from trees, adjacent structures, uneven roof lines and other obstructions.
- Minimize the use of chimney offsets.
- Consider the fireplace location relative to floor and ceiling and attic joists.
- Take into consideration the termination requirements in Sections 5 and 6.
- Install the outside air kit and CAK (chimney air kit) with the intake facing prevailing winds during the heating season.
- Ensure adequate outdoor air for all combustion appliances and exhaust equipment.
- Ensure furnace and air conditioning return vents are not located in the immediate vicinity of the fireplace.
- Avoid installing the fireplace near doors, walkways or small isolated spaces.
- Recessed lighting should be a “sealed can” design.
- Attic hatches weather stripped or sealed.
- Attic mounted duct work and air handler joints and seams taped or sealed.



### C. Tools and Supplies Needed

Before beginning the installation be sure the following tools and building supplies are available:

Reciprocating saw	Framing material
Pliers	Non-combustible sealant
Hammer	Gloves
Phillips screwdriver	Framing square
Flat blade screwdriver	Electric drill and bits
Plumb line	Safety glasses
Level	Tape measure
1/2-3/4 in. length, #6 or #8 self-drilling screws	
Misc. screws and nails	

### D. Inspect Fireplace and Components

***WARNING! Risk of Fire and Asphyxiation! Damaged parts could impair safe operation. DO NOT install damaged, incomplete or substitute components.***

- Remove fireplace and components from packaging and inspect for damage.
- Chimney system components and other optional components are shipped separately.
- Report to your dealer any parts damaged in shipment.

### E. Fireplace System Requirements

The Quadra-Fire fireplace system requirements consist of the following:

- Fireplace
  - Firebrick (included with fireplace)
  - Door (included with fireplace)
  - Non-combustible facing material (included with fireplace)
  - Hearth Extension
- Outside Air System (hood and collars included with fireplace)
- Fascia
- Chimney System
  - CAK4A Chimney air kit (included with fireplace, required with SL300 series chimney)
  - Attic Insulation Shield (included with fireplace)
  - Chimney termination cap
- Non-combustible finish material
- Fans (included with fireplace)

Optional components include:

- LINTEL - Lintel Bar Kit
- Heat-Zone-WD Kit
- Mesh-HHT - Firescreen

# 3 Framing and Clearances

## A. Fireplace Dimensions

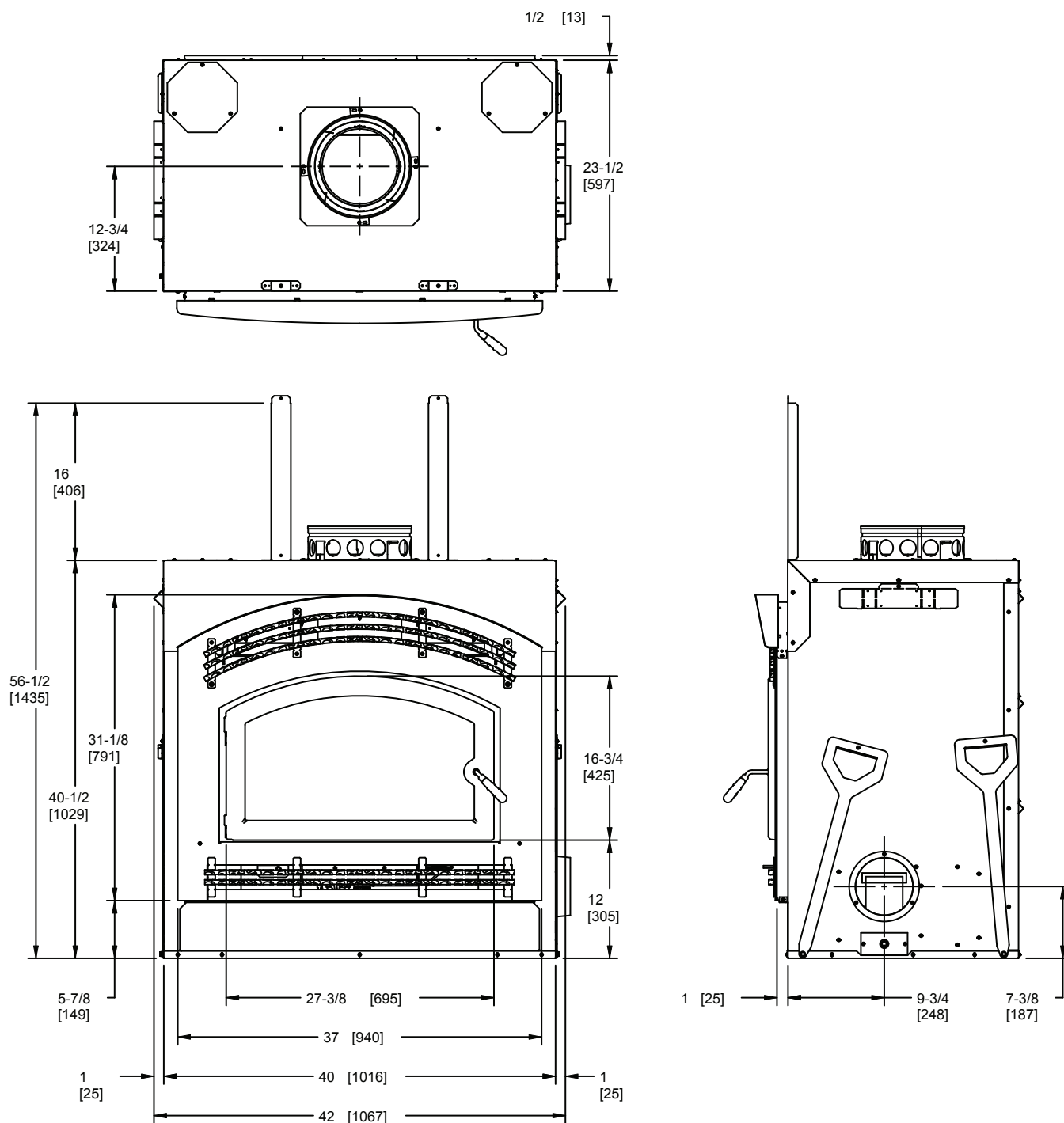
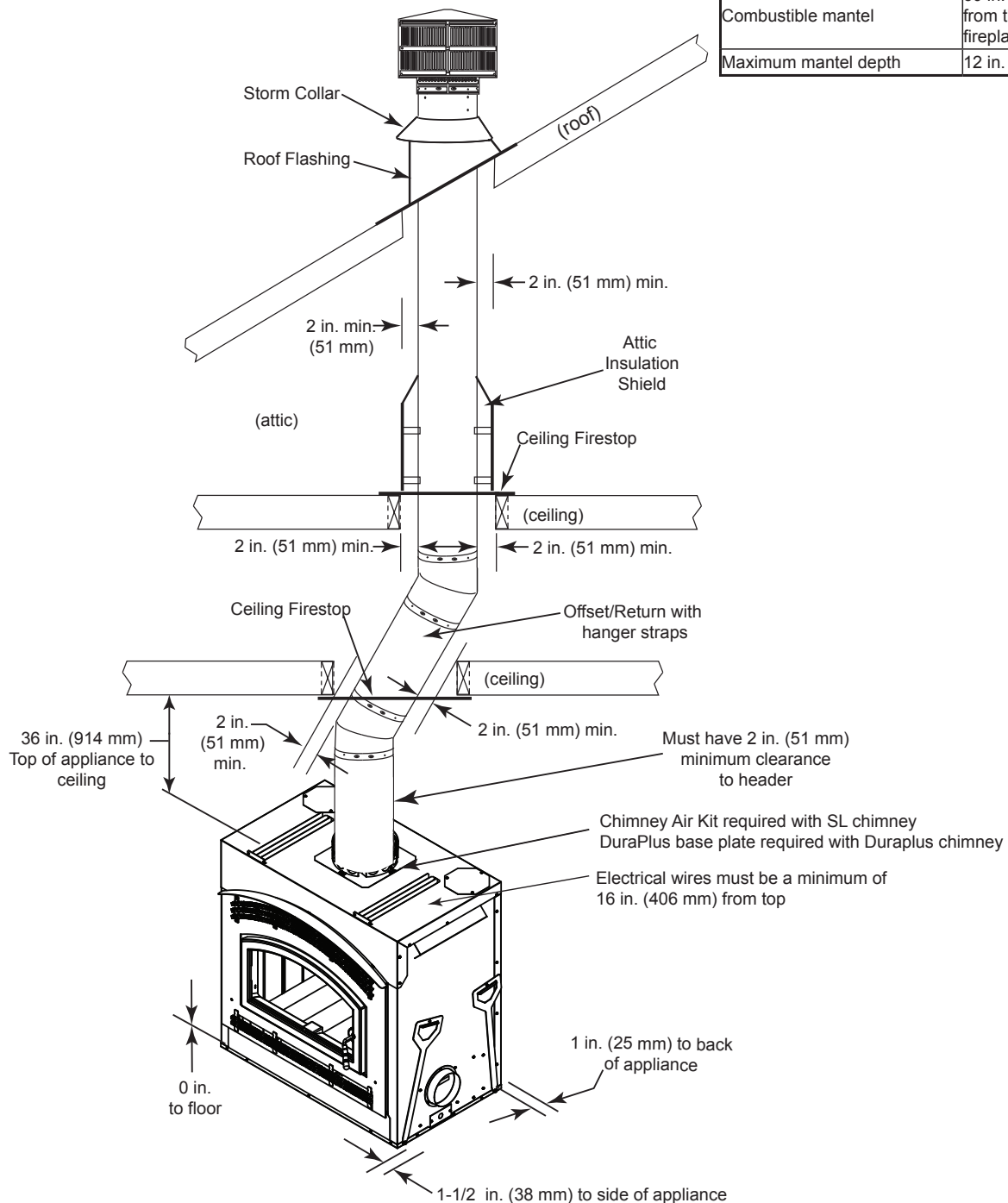


Figure 3.1 Fireplace Dimensions

## B. Clearances

### **WARNING! Risk of Fire!**

You must comply with all minimum air space clearances to combustibles as specified in Figure 3.2. **DO NOT** pack required air spaces with insulation or other materials. Framing or finishing material used on the front of, or in front of the fireplace closer than the minimums listed must be constructed entirely of non-combustible materials (i.e., steel studs, concrete board, etc.). Failure to comply may cause fire.



WITHIN ENCLOSURE AREA	
Fireplace to backwall	1/2 in. (13 mm)
Fireplace to sidewall	1 in. (25 mm)
Duct boots to framing	0 in. (0 mm)
Top of fireplace to header	16 in. (406 mm)
Door opening to sidewall	22-3/4 in. (578 mm)
EXPOSED SURFACES	
Faceplate to sidewall	16 in. (406 mm)
Heat zone air grills to ceiling	12 in. (305 mm)
MANTEL	
Non-combustible mantel	38 in. (965 mm) from the base of the fireplace up
Combustible mantel	60 in. (1524 mm) from the base of the fireplace up
Maximum mantel depth	12 in. (305 mm)

Figure 3.2 Clearances to Combustible Materials

## C. Construct the Chase

**WARNING! Risk of Fire! DO NOT** seal area between fire stop opening and chimney pipe except where they enter the attic or leave the warm air envelope of the home (use 600° F sealant).

**WARNING! Risk of Fire! You must maintain a minimum 2 in. (51 mm) air space clearance to insulation and framing surrounding the chimney system.**

A chase is a vertical boxlike structure built to enclose the fireplace and/or its vent system. Vertical chimneys that run on the outside of a building must be installed inside a chase. See Figure 3.4.

Construction of the chase may vary with the type of building. Local building codes **MUST** be followed.

Hearth & Home Technologies recommends:

- The inside surfaces be drywalled and taped (or the use of an equivalent method) for maximum air tightness to the false ceiling.
  - In cold climates, the walls of the chase should be insulated to the level of the false ceiling as shown in Figure 3.3. This will help reduce heat loss from the home around the fireplace.
  - Holes and other openings should be caulked with high temperature caulk or stuffed with unfaced fiber glass insulation.
- 
- Requirements for constructing the chase:
    - A firestop spacer and attic insulation shield should be installed at the false ceiling.
    - The chase must be properly blocked to prevent blown insulation or other combustibles from entering and making contact with fireplace or chimney.
    - The chase top must be constructed of non-combustible material.
  - The chase is constructed using framing materials much the same as the walls in your home. A variety of siding materials may be used including brick, stone, veneer brick, or standard siding materials.
  - In constructing the chase, several factors must be considered:
    - Maintain a 2 in. (51 mm) air space around the chimney.
    - The chase top must be constructed of non-combustible material.
    - In cold climates, a firestop spacer and attic insulation shield should be installed in an insulated false ceiling at the 8 ft. (2438 mm) level above the fireplace assembly. This reduces heat loss through the chase.
    - In cold climates, the walls of the chase should be insulated to the level of the false ceiling as shown in Figure 3.4. This will help reduce heat loss from the home around the fireplace.

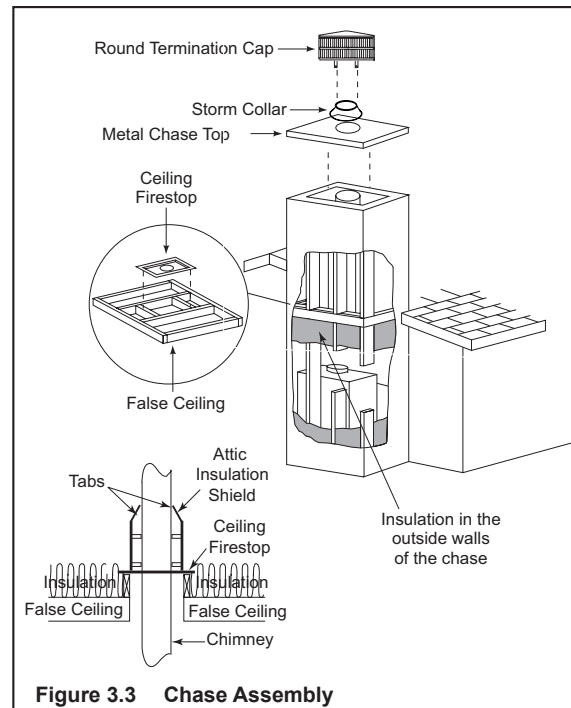


Figure 3.3 Chase Assembly

Three examples of chase applications are shown in Figure 3.4.

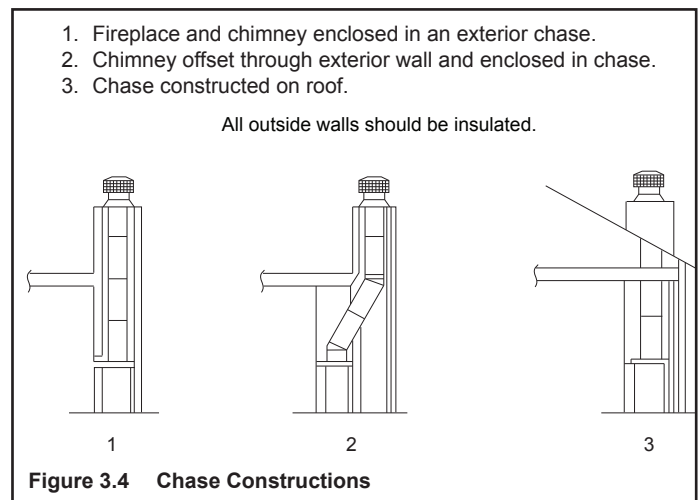


Figure 3.4 Chase Constructions

## D. Frame the Fireplace

**WARNING! Risk of Fire! Comply with all minimum clearances specified.**

- A minimum 1/2 in. (13 mm) air clearance must be maintained at the back and 1 in. (25 mm) to the sides of the fireplace assembly.
- Chimney sections at any level require a 2 in. (51 mm) minimum air space clearance between the framing and chimney section.

**WARNING! Risk of Fire! You must comply with all minimum air space clearances to combustibles. DO NOT** pack required air spaces with insulation or other materials.

**NOTICE:** Hearth extension design must be determined before installation of fireplace.

If the fireplace is placed on the floor, the maximum height of a finished raised hearth (constructed of non-combustible material) is 5-3/4 in. (147 mm). If a higher raised hearth is preferred, the fireplace must be placed on a platform.

**NOTICE:** Wiring for fans must be done before framed enclosure is completed. If using a Heat Zone Kit, it also must be installed before enclosure is complete.

### Standoffs are attached to the fireplace.

The unit can be positioned with the standoffs touching combustible walls or framing but DO NOT pack insulation or other materials in the air space between the fireplace and wall.

Figure 3.5 shows a typical framing (using 2 x 4 lumber) of the fireplace, assuming combustible materials are used. All required clearances to combustibles around the fireplace must be adhered to. See Figure 3.2. (No recess above fireplace.)

The finished cavity depth must be no less than 24 in. (610 mm) from the finished back wall to the outside of front wall framing. Framing must extend straight up all the way to the ceiling.

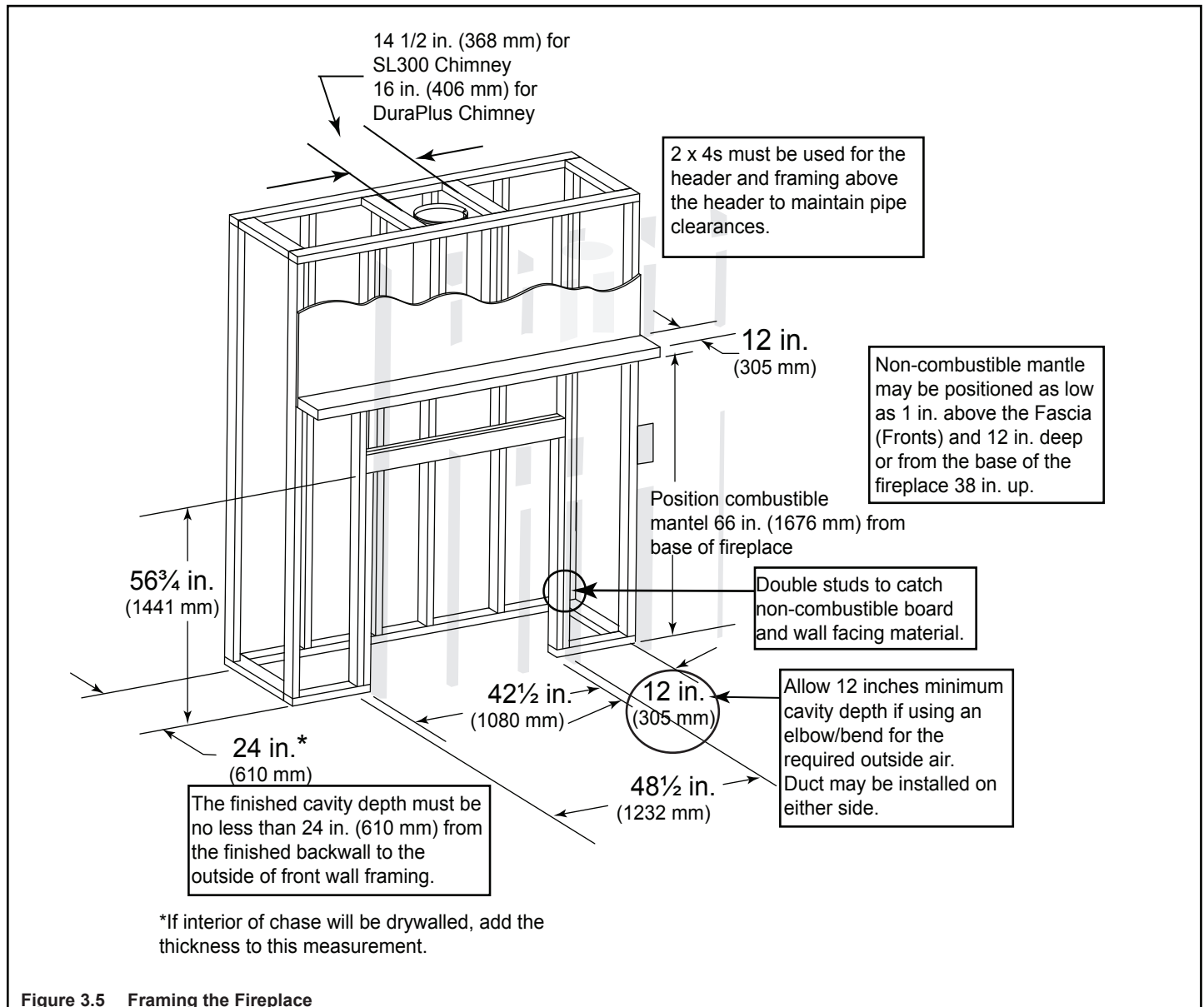
**CAUTION! Risk of Cuts/Abrasions.** Wear protective gloves and safety glasses during installation. Sheet metal edges are sharp.

### E. Secure and Level the Fireplace

This fireplace may be placed on either a combustible or noncombustible continuous flat surface. Follow the instructions for framing in Section 3. Slide the fireplace into position. Be sure to provide the minimum 1 in. air clearance at the sides and 1/2 in. at the back of the fireplace.

The fireplace should be positioned so the face of the non-combustible material on the fireplace will be flush with the face of the drywall on the walls. See Figure 3.6.

Level the fireplace and shim as necessary. Secure the fireplace (using the pallet mounting brackets located on either side of the fireplace) to the sub floor.





**WARNING! Risk of Fire!** Prevent contact with sagging, loose insulation.

- **DO NOT** install against vapor barriers or exposed insulation.
- Secure insulation and vapor barriers.
- Provide minimum air space clearances at the sides and back of the fireplace assembly as outlined in Section 3.

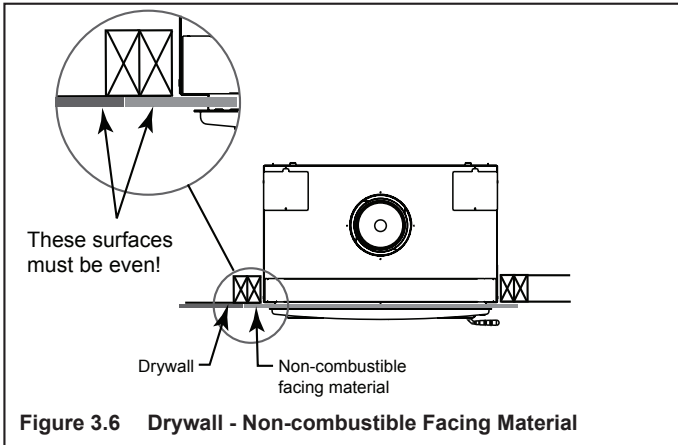


Figure 3.6 Drywall - Non-combustible Facing Material

## F. Installation of Top Standoffs

Remove the top front standoffs from the top of the fireplace. See Figure 3.7. Screw the standoffs to the fireplace as shown in Figure 3.8. The top of the standoffs will be screwed to the header.

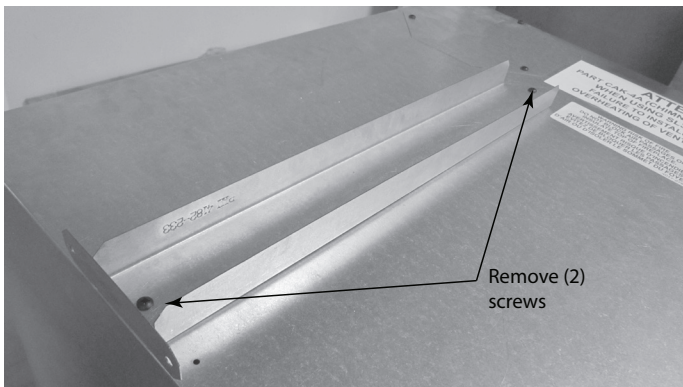


Figure 3.7 Remove Standoffs

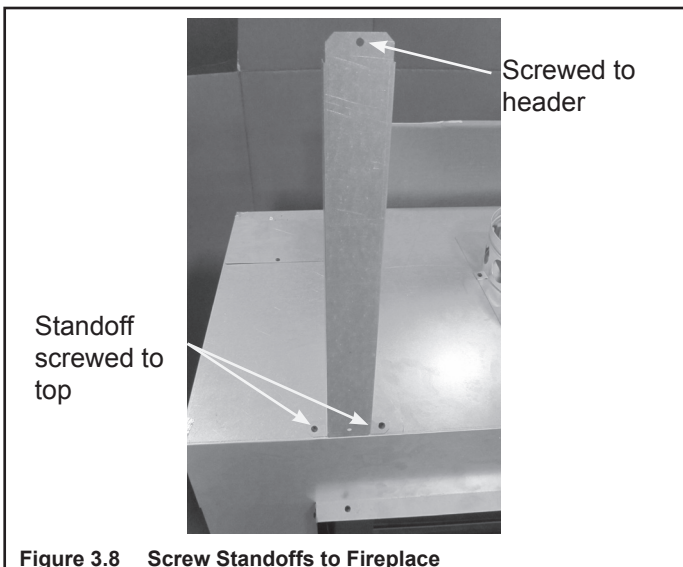


Figure 3.8 Screw Standoffs to Fireplace

## G. Protective Metal Hearth Strips

**WARNING! Risk of fire!** High temperatures, sparks, embers or other burning material falling from the fireplace may ignite flooring or concealed combustible surfaces.

- Protective metal hearth strips **MUST** be installed over combustible surfaces.
- Hearth extensions **MUST** be installed exactly as specified.
- Locate the two protective metal hearth strips measuring approximately 26 in. x 4 in. (660 mm x 102 mm) included with this fireplace.
- Slide each metal strip 2 in. (51 mm) under front edge of fireplace.
- Overlap strips in the middle of fireplace opening by 1 in. (25 mm) minimum.
- Metal strips must extend beyond the front and sides of the fireplace opening by at least 2 in. (51 mm). See Figure 3.6.
- Protect the front of a platform elevated above the hearth extension with metal strips (not included with fireplace) per Figure 3.10. See Section 7 for hearth extension instructions.
- **DO NOT** cover metal strips with combustible materials. Sparks or embers may ignite flooring.

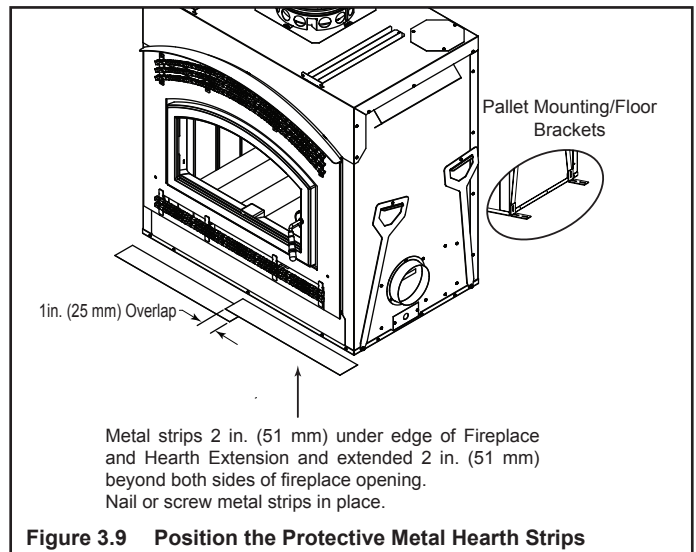


Figure 3.9 Position the Protective Metal Hearth Strips

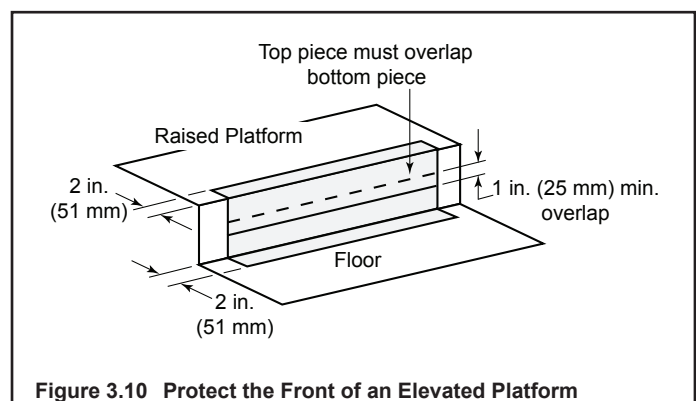


Figure 3.10 Protect the Front of an Elevated Platform

## H. Non-Combustible Facing Board (Provided)

### **WARNING! Risk of Fire!**

Follow these instructions exactly.

Facing materials must be installed properly to prevent fire.

No materials may be substituted without authorization by Hearth & Home Technologies.

**TOOLS NEEDED:** Powered drill with #2 Phillips head bit; caulking gun.

Only non-combustible materials (supplied with fireplace) may be used to cover the metal fireplace front.

**NOTE:** All boards are pre-drilled for your convenience. Boards **MUST** be attached in the following order: bottom, sides, and then the top, red-painted side out. The top and bottom board should each have a hang tag attached. Leave them attached for referral for the finishing operation.

- Attach the bottom board to the bottom of the fireplace outer shell with enclosed screws, ensuring the board is centered. **DO NOT remove hang tags.** Attach the side pieces to the outer shell and framing members.
- Center and attach the top board to the outer shell and framing members. **DO NOT remove hang tags.**

**NOTICE:** 1/8 in. of the facing material may be visible after finishing materials are applied. This 1/8 in. must be painted or the red will show.

**AFTER** finishing materials are applied. This 1/8 in. must be painted or the red will show.

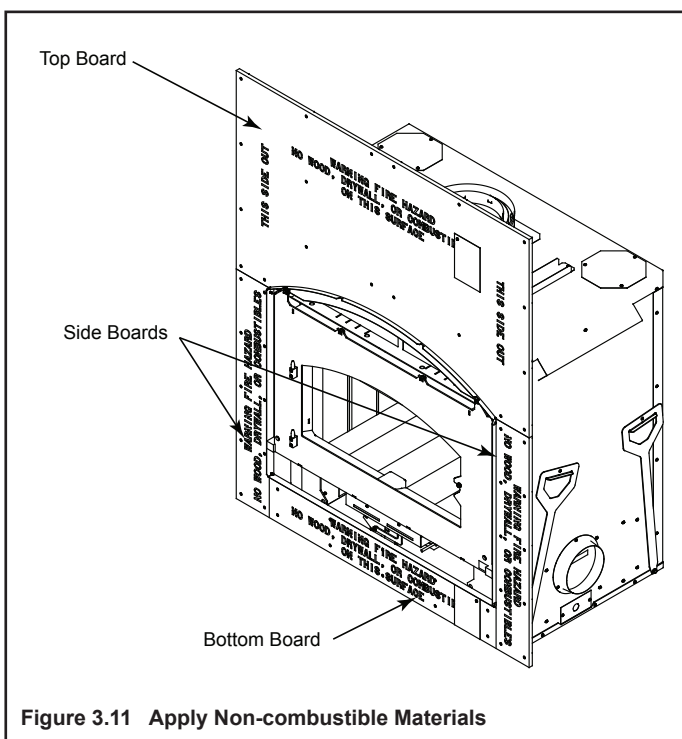


Figure 3.11 Apply Non-combustible Materials

## I. Outside Air Kit

An outside air kit must be used for combustion. Hearth & Home Technologies recommends you utilize the shortest duct run to optimize the performance of the outside air kit. The outside air inlet hood should be positioned in a manner that will not allow snow, leaves, etc. to block the inlet. In some installations the air duct may need to be run vertically. In such an installation, a 3 ft (914 mm) height difference must be maintained from the top of the uppermost chimney section to the outside air inlet hood.

Refer to Figures 3.18 and 3.19 when placing the outside air inlet hood.

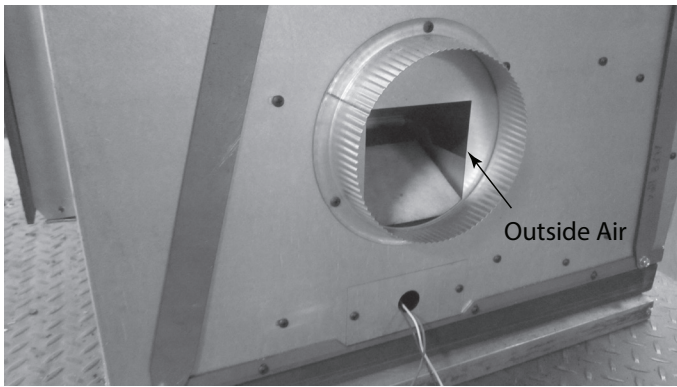
The outside air kit comes installed on the right hand side of the fireplace but may be moved to the other side by following these steps:

1. Remove outside air collar (Figure 3.12) and the outside air cover plate (Figure 3.13).
  2. Install the cover plate on the right side and the collar on the left side.
  3. Open and remove the lower access panel.
  4. Remove the two (2) outer screws (Figure 3.15) to allow the outside air box to be removed.
  5. Pull the outside air box straight out. See Figure 3.16.
  6. On the left side, remove the cover plate two (2) screws. See Figure 3.14.
  7. Install the cover plate on the right side where the outside air box was and install the outside air box in through the hole on the left side where the cover plate was.
- Cut a 6-1/2 in. (165 mm) hole in outside wall to accommodate air piping.
  - Use 6 in. (152 mm) metal flex or rigid piping (not supplied) to directly connect outside air to fireplace intake. Insulate the pipe to prevent frost condensation. See Figure 3.17.
  - Insulating the pipe isn't required but will help prevent frost condensation.
  - Use the supplied outside air inlet hood.
  - Seal between the wall and the pipe with silicone to prevent moisture penetration and air leaks.
  - Seal between the outside air inlet hood and the house with silicone to prevent air infiltration.

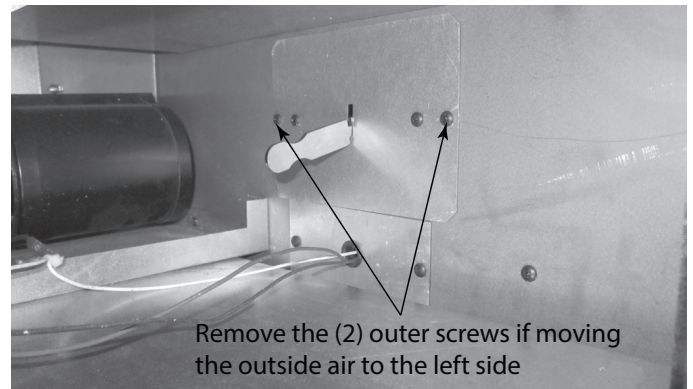
**CAUTION! Risk of Fire or Asphyxiation! DO NOT** draw outside combustion air from wall, floor or ceiling cavity, or enclosed spaces such as an attic or garage.

- **DO NOT** place outside air inlet hood close to exhaust vents or chimneys. Fumes or odor could be drawn into the room through the fireplace.
- Locate outside air inlet hood to prevent blockage from leaves, snow/ice, or other debris. Blockages could cause combustion air starvation.

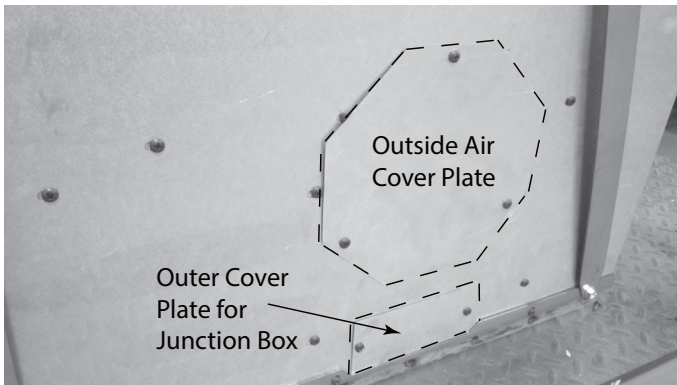
**CAUTION! Risk of Cuts/Abrasions.** Wear protective gloves and safety glasses during installation. Sheet metal edges are sharp.



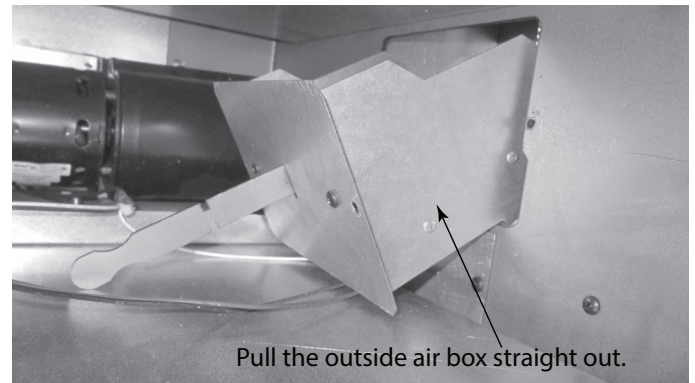
**Figure 3.12**



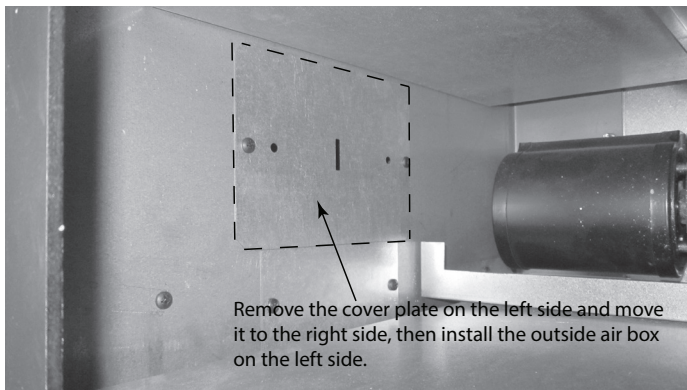
**Figure 3.15 Outside air handle shown on right side**



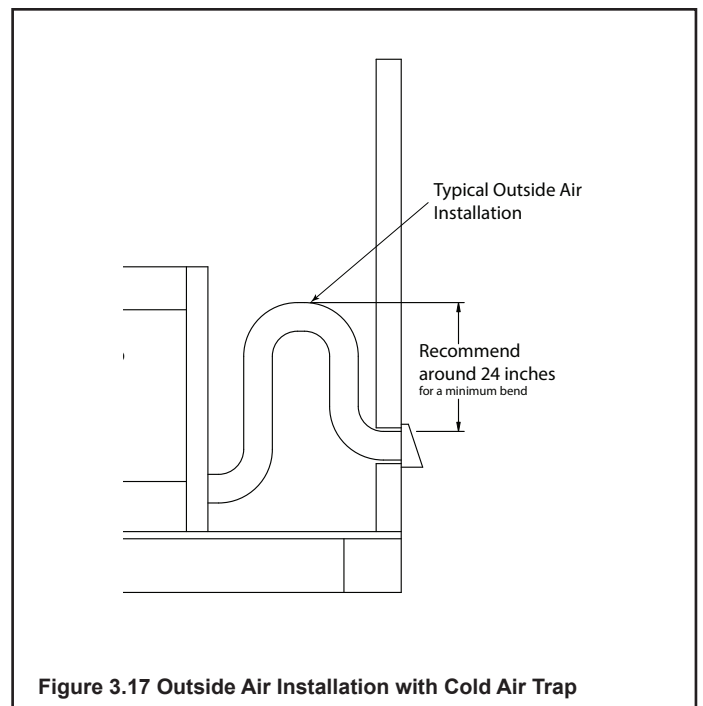
**Figure 3.13 Right Side**



**Figure 3.16 Outside Air Box**

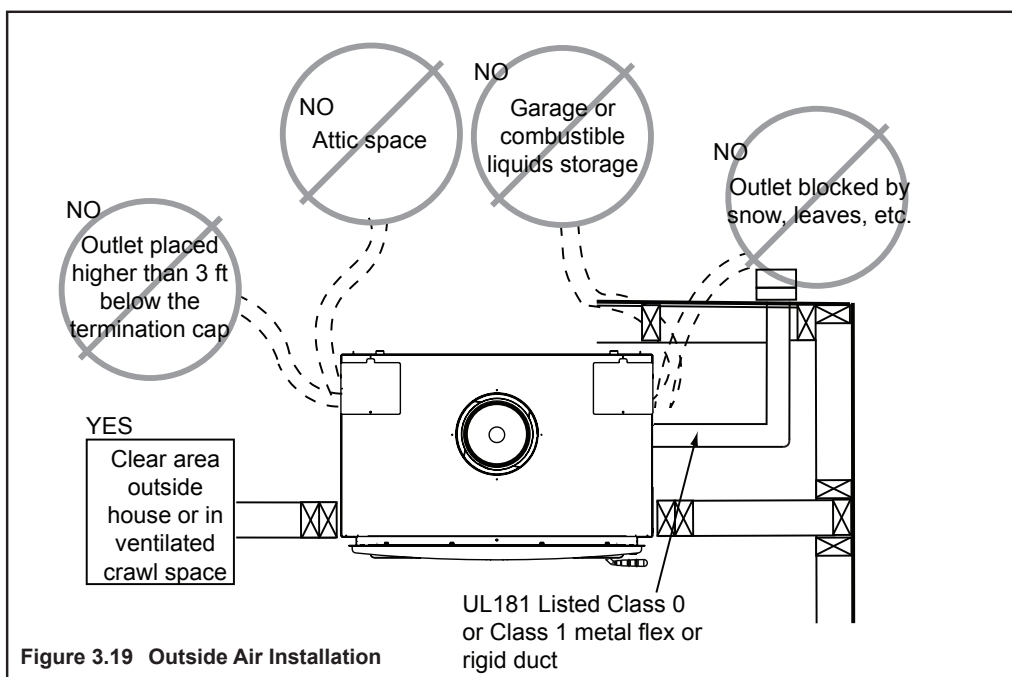
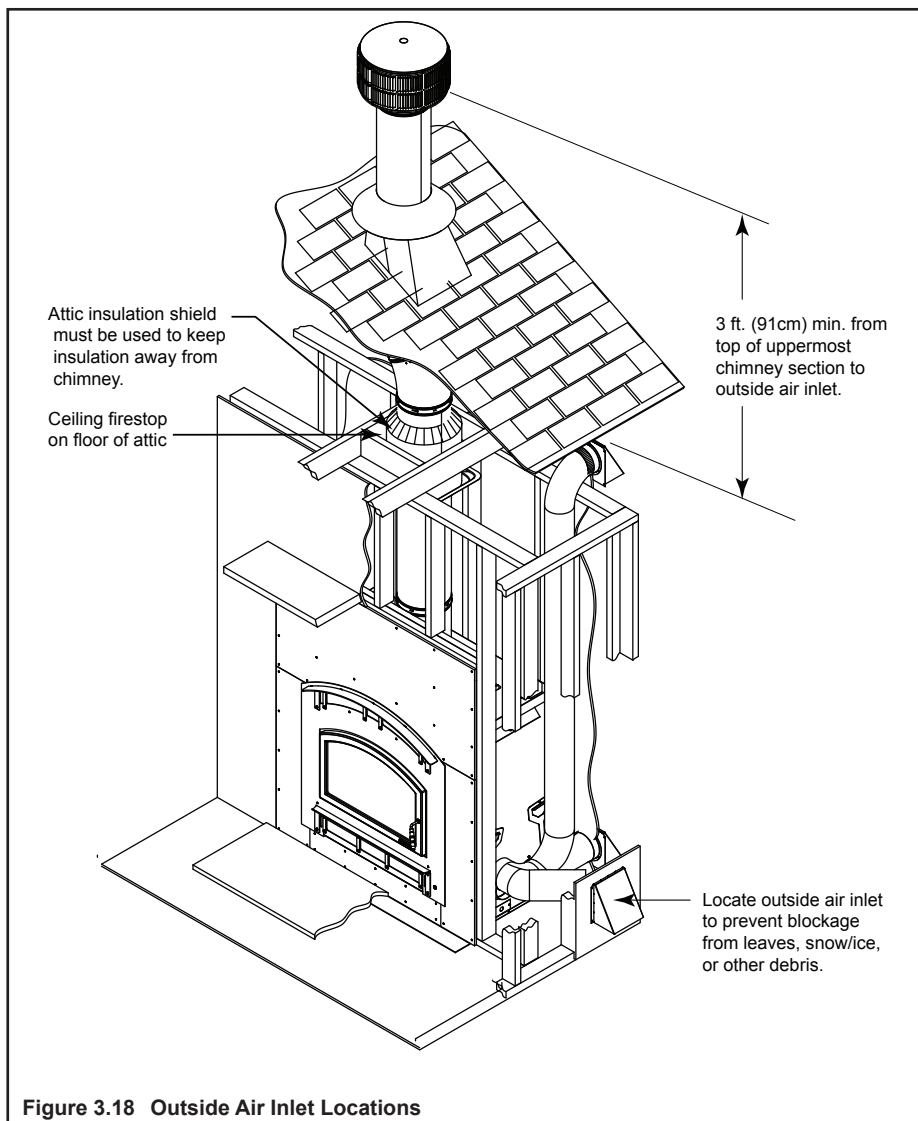


**Figure 3.14 Remove Cover Plate (Left Side)**



**Figure 3.17 Outside Air Installation with Cold Air Trap**





## J. Heat-Zone-WD Kit (Optional)

The Heat-Zone accessory kit conveys warm air from the fireplace through air duct(s) to remote locations in the same room or other rooms of the building. You may install 1 or 2 Heat-Zone kits on the fireplace. Installation of this kit **MUST** be performed by a qualified service technician. If any parts are missing or damaged, contact your local dealer before starting installation. DO NOT install a damaged kit.

This kit is tested and safe when installed in accordance with this installation manual. It is your responsibility to read all instructions before starting installation and to follow these instructions carefully during installations.

The Heat-Zone-WD kit is carefully engineered and must be installed only as specified. If you modify it or any of its components you will void the warranty and you may possibly cause a fire hazard. Installation must be done according to applicable local, state, provincial and/or national codes.

Plan the location of the fireplace and warm air duct run(s).

## DUCT RUN REQUIREMENTS

MAXIMUM Duct Run = 40-ft. (12 m)

MINIMUM Duct Run = 36 in. (914 mm)

## DUCTING MATERIAL

6 in. (152 mm) B-vent Only

DO NOT duct into existing furnace plenum

## MINIMUM CLEARANCE TO COMBUSTIBLES

1 in. (25 mm) from the B-vent

0 in. (0 mm) from top & bottom of outlet box

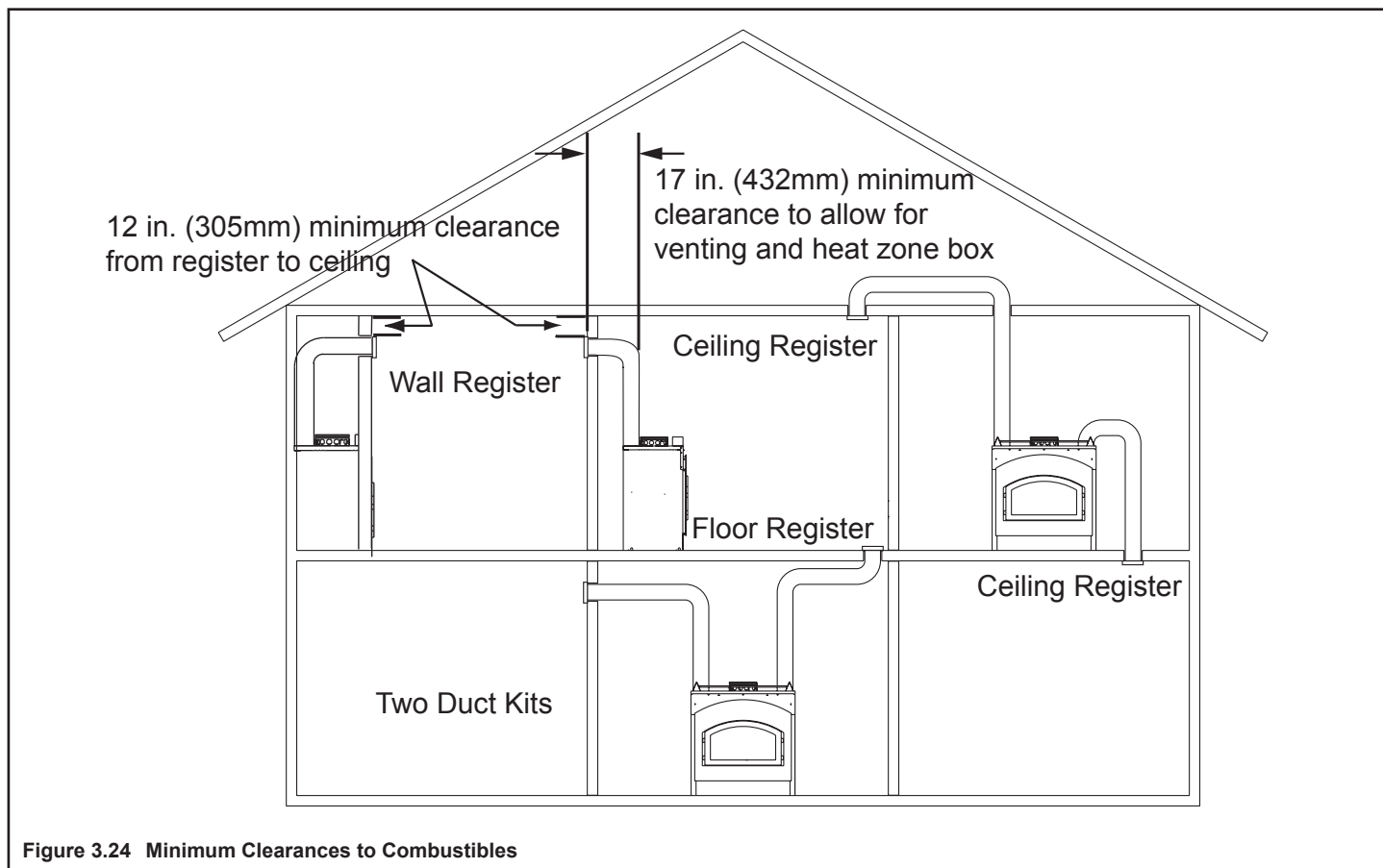
0 in. (0 mm) from the sides of outlet box

12 in. (305 mm) from wall register to ceiling

Refer to Figure 3.24.

**CAUTION!** ALL wiring should be done by a qualified electrician and shall be in compliance with local codes and with the National Electric Code NFPA/NEC No. 70-current. CSC22.1 Canadian Electric Code.

## Possible Air Duct Runs / Locations



## Installation

- Remove the knockout or cover plate from the top of the fireplace and discard it. See Figure 3.25.
- Cut a 3 in. (76 mm) hole in the insulation board and remove it as per the dimensions shown in Figure 3.25.

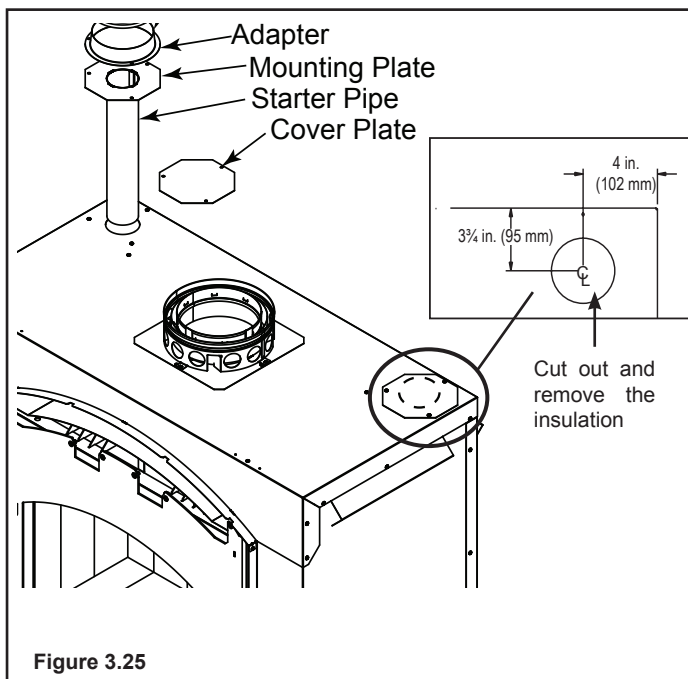


Figure 3.25

- Determine the necessary length of starter pipe from Table 3.1 and cut as required.

Table 3.1

Run Length	Cut Pipe Length
20 - 40 ft (6-12 m)	2 in. (51 mm)*
*A minimum of 2 in. (51 mm) pipe must be used to cover the raw insulation to prevent it from blowing out through the return air grille.	
10 - 20 ft (3 - 6 m)	8 in. (203 mm)
3 - 10 ft (1 - 3 m)	12 in. (305 mm)

**NOTE:** It is important the pipe length be adhered to or it will affect the performance of your fireplace.

- On the mounting plate, hand bend the tabs downward. Slide the tabs over the outside of the starter pipe. Secure with four sheet metal screws included in fasteners package. Figure 3.26.

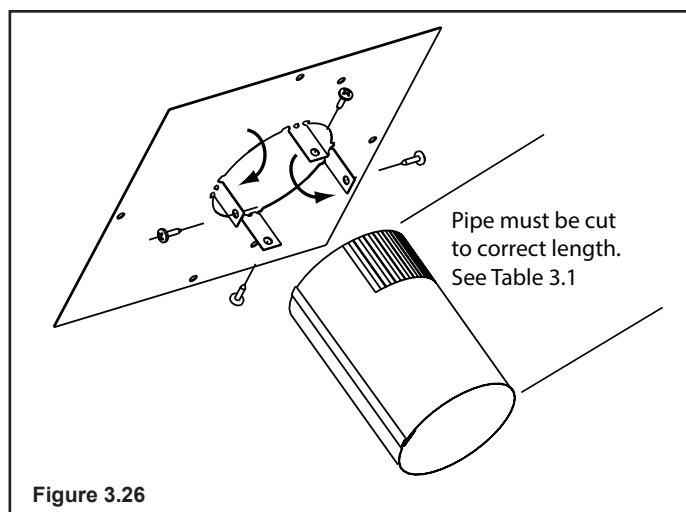


Figure 3.26

- Slide the starter pipe into the fireplace, matching the holes in the plate to the holes in the fireplace.
- Place the adapter on the mounting plate lining up holes. Using four sheet metal screws included in the kit, secure the adapter and mounting plate into fireplace. After securing to the fireplace, tape down the adapter edges to the top of the fireplace with aluminum tape to prevent leakage.
- Determine the location for the air register and fan housing assembly. Cut a 6-3/4 in. x 13-1/8 in. (177 mm x 333 mm) hole between framing members (wall studs or floor joists). Attach the brackets to the fan housing with the screws provided. The brackets can be rotated 180° and mounted to the back side of the 2 x 4 if necessary. See Figure 3.27.

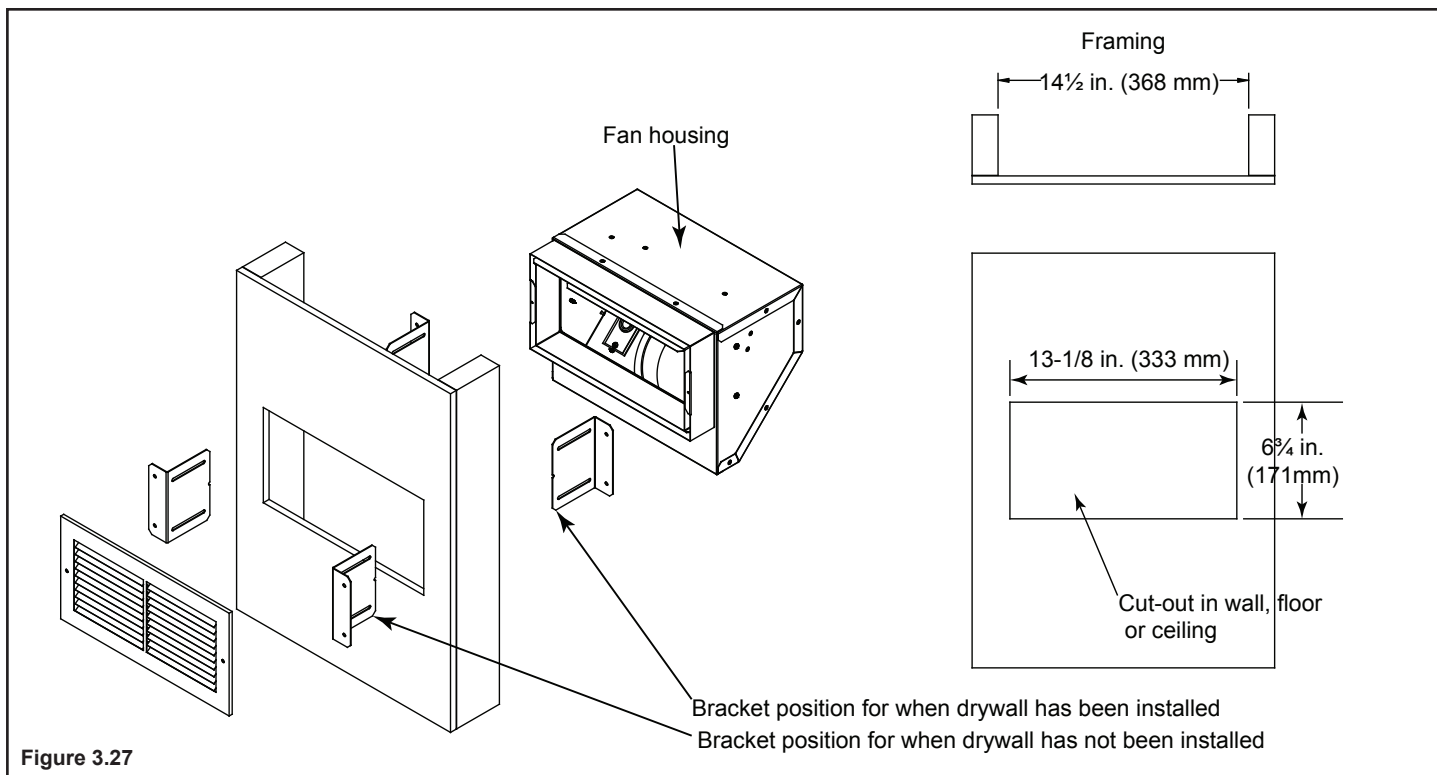
**NOTICE:** The fan and electrical connections must be accessible for servicing per local code requirements.

- Attach enough 6 in. (152 mm) B-Vent as required for your installation to the fan housing. **A maximum of (4) 90° elbows is recommended.** Screw the B-vent to the adapter.

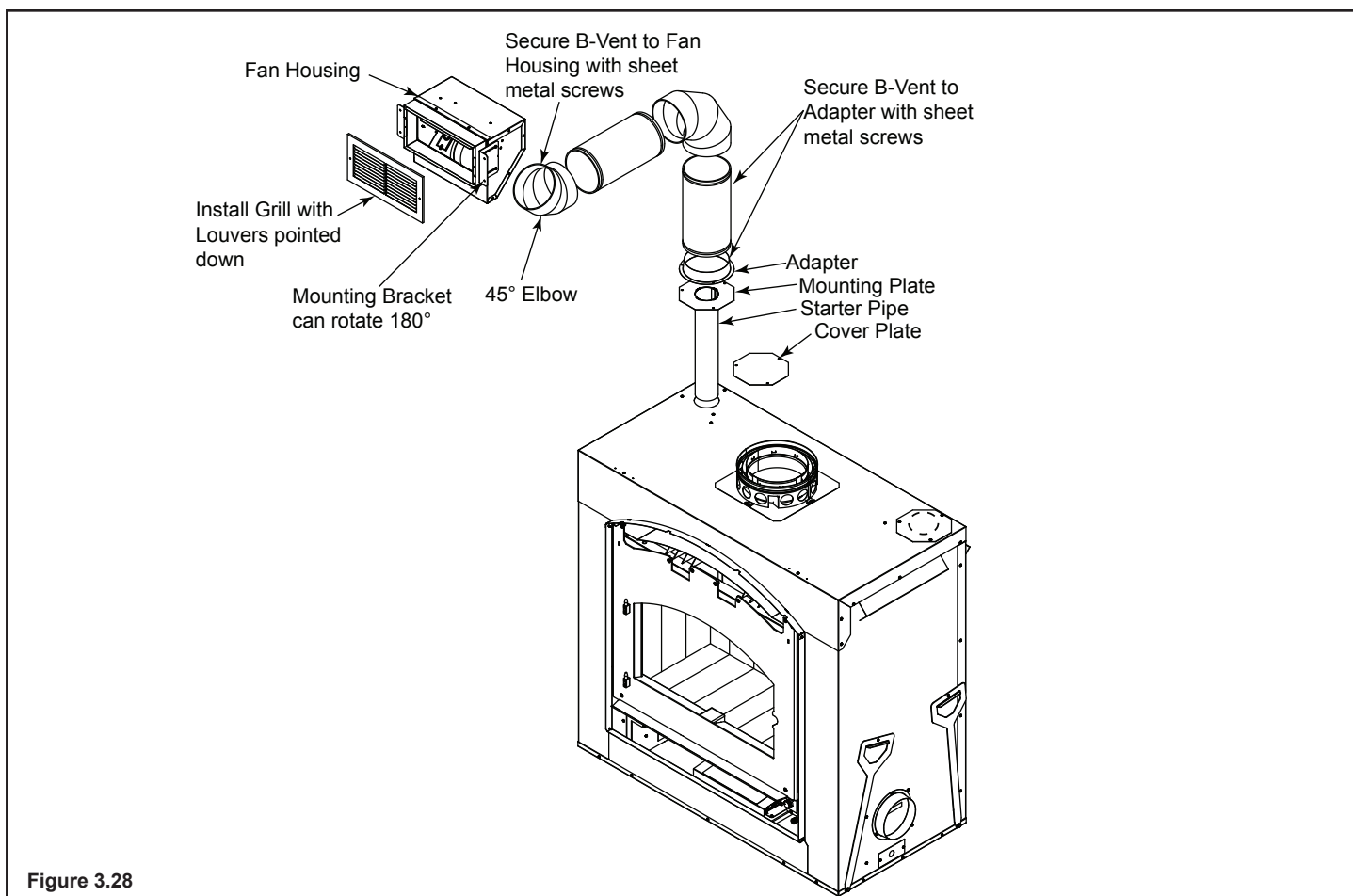
Also screw the B-vent to the outlet box on the fan housing. See Figure 3.26. Support duct at intervals of no greater than 4 ft (1 m) as required by local code.

**WARNING! Risk of Fire!** Comply with all minimum clearances specified.

- A minimum 1/2 in. (13 mm) air clearance must be maintained at the back and 1 in. (25 mm) to the sides of the fireplace assembly.



**NOTICE:** Secure the duct so that clearance to the fireplace outer wrap is maintained. Tape all seams with aluminum tape 1-1/4 in. (32 mm) minimum width or as specified by local codes.





## Installing Fan In Housing

- Insert fan into the fan housing starting with motor end first. Slip it below the "L" bracket on the left side allowing the right side to drop in. See Figure 3.29.

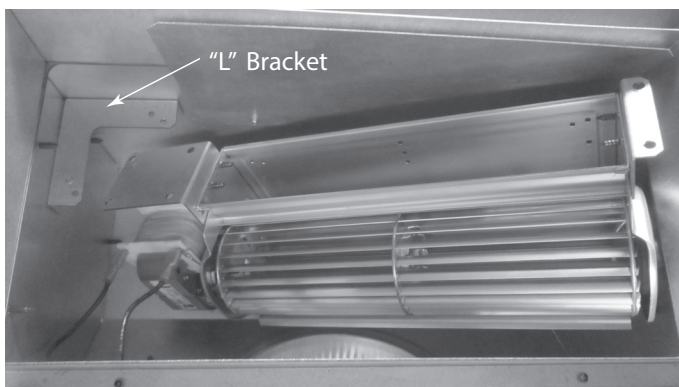


Figure 3.29

- Tilt the fan forward to clear the mounting brackets then lift the fan onto the brackets. See Figure 3.30.

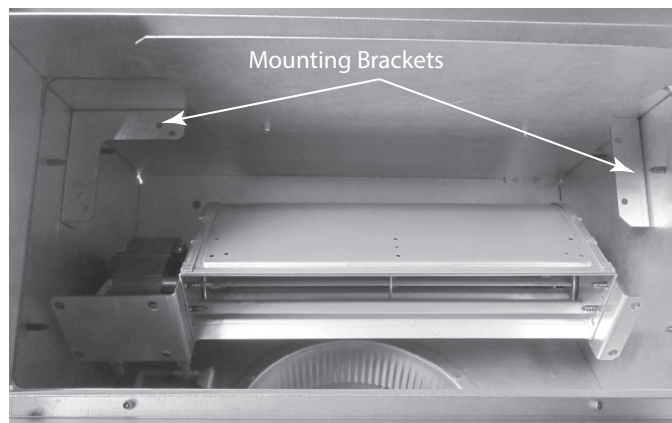


Figure 3.30

- Secure the fan to the mounting brackets with (4) screws provided. See Figure 3.31.

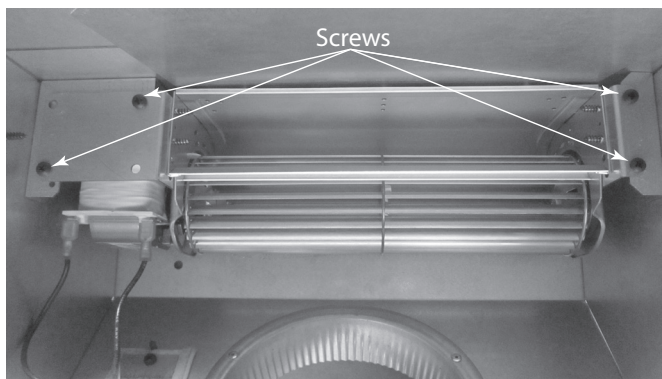


Figure 3.31

- Insert the fan wires through the grommet and into the junction box. See Figure 3.32.

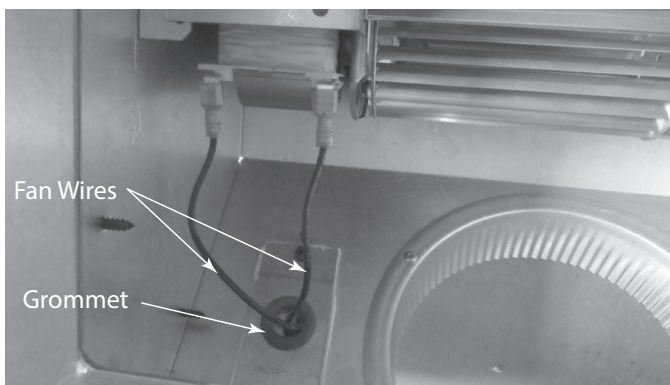


Figure 3.32

- Install the variable speed wall rheostat (with setting on "OFF") in a convenient location. This switch will control the Heat-Zone fan operation.
- Remove the junction box. Wire 110 VAC service TO the wall rheostat and FROM the wall rheostat to the fan junction box. Use wire nuts to secure the 110 VAC service wires to the hot (black) and neutral (white) fan wires and screw the 110 VAC ground wire to the junction box. See Figure 3.33.
- Secure the return air grille to the fan housing making sure it is flush. The grille must be installed with the louvers pointing down.

**NOTICE: DO NOT USE ADJUSTABLE REGISTERS.**

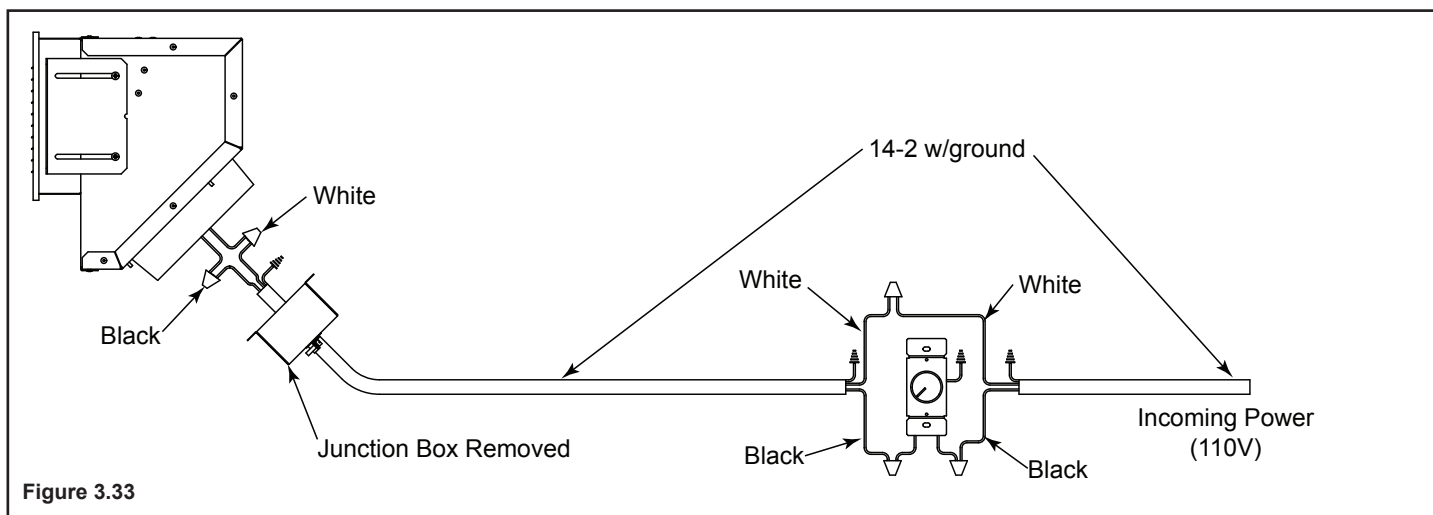


Figure 3.33

## 4 Electrical Wiring

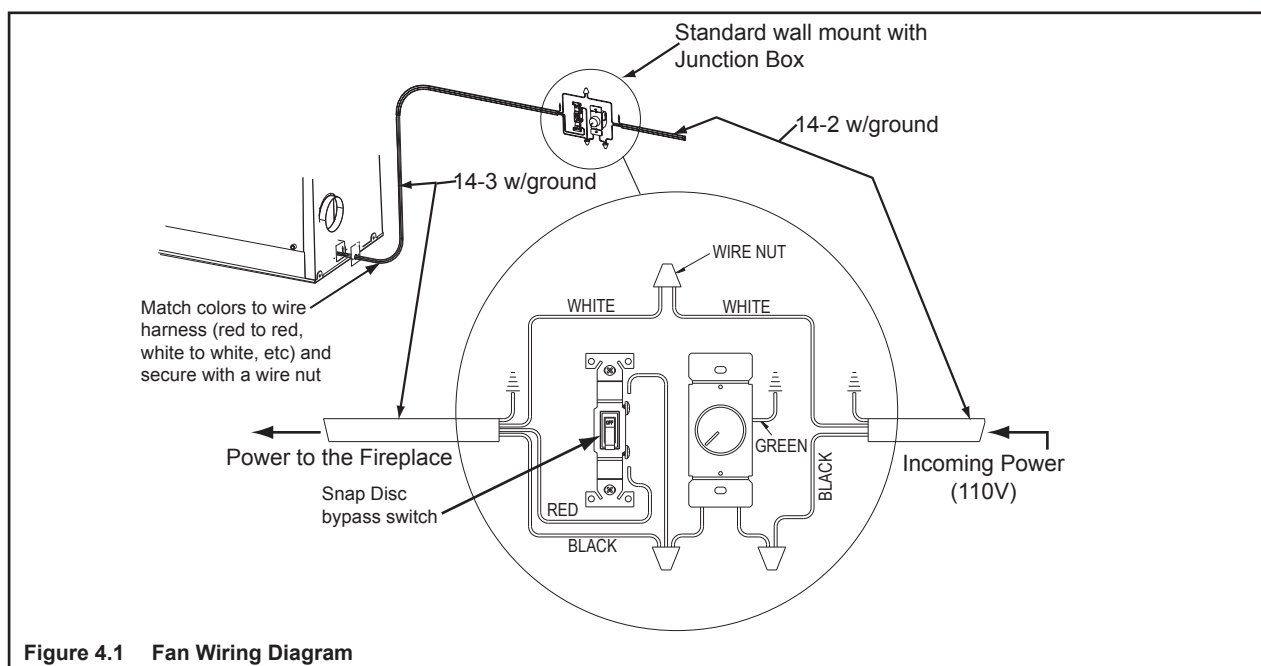
**NOTICE:** The manual override switch, rheostat speed control and cover plate are supplied. You will need to supply: 14-3 wire with ground; 14-2 wire with ground; standard wall mount junction box; wire nuts.

- Remove junction box cover plate on the bottom right side of the fireplace.
- Thread the 14-3 with ground wire through the opening with the strain relief on the cover plate.
- Match colors to wire harness, (red to red, white to white, etc.) and secure with wire nuts.

**NOTICE:** Wiring for fans must be done before framed enclosure is completed. If using a Heat Zone kit, it also must be installed before enclosure is complete.

**WARNING! Risk of Fire! DO NOT** apply combustible finishing materials over any part of the front of this fireplace.

- The metal fireplace face may only be covered with noncombustible materials such as ceramic tile, brick, or stone.
- Do not cover or block any cooling air slots.



# 5 Chimney and Termination Requirements

## A. Chimney Requirements

Vertical distances are measured from the base of the fireplace as shown in Figure 5.1.

**Table 5.1 Chimney Requirements**

Minimum overall straight height	13 ft	3.96 m
Minimum height with single offset/return	14.5 ft	4.42 m
Double offset/return minimum height	20 ft	6.1 m
Maximum height	90 ft	25.60 m
Maximum chimney length between an offset and return	20 ft	6.1 m
Maximum distance between chimney stabilizers	35 ft	10.67 m
Maximum unsupported chimney length between the offset and return	6 ft	1.83 m
Maximum unsupported chimney height above the fireplace	35 ft	10.67 m
Maximum unsupported chimney above roof	6 ft	1.83 m

**NOTICE:** A maximum of two pairs of offsets and returns may be used.

**WARNING! Risk of Fire!** You must maintain 2 in. (51 mm) air space clearance to insulation and other combustible materials around the chimney system. Failure to do so may cause overheating and fire.

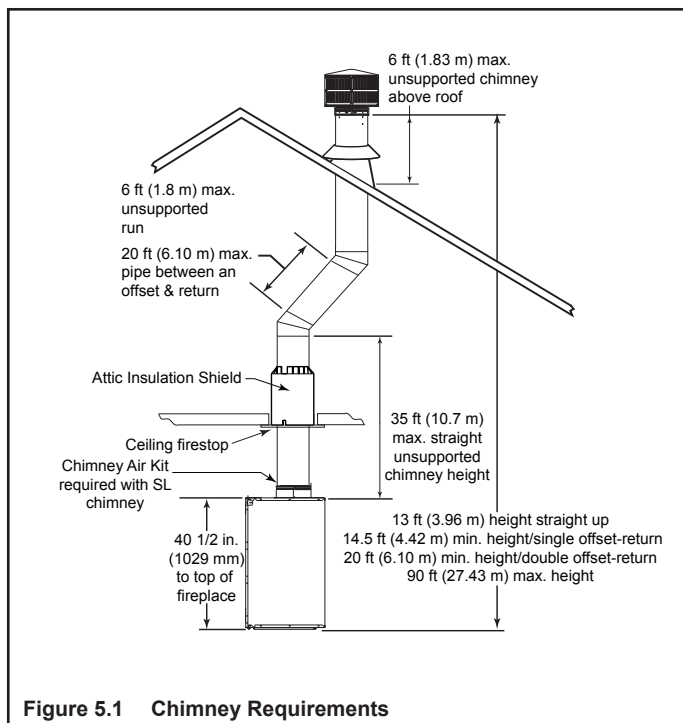
**NOTICE:** You must provide support for the pipe during construction and check to be sure inadvertent loading has not dislodged the chimney section from the fireplace or at any chimney joint.

**Table 5.2 Chimney Component Dimensions**

HEIGHT OF CHIMNEY COMPONENTS		in.	mm
<b>Chimney Stabilizer</b>			
	SL3	4-3/4	121
<b>Offsets/Returns</b>			
	SL315	13-3/8	340
	SL330	15-1/2	394
<b>Chimney Sections*</b>			
	SL306	4-3/4	121
	SL312	10-3/4	273
	SL318	16-3/4	425
	SL324	22-3/4	578
	SL336	34-3/4	883
	SL348	46-3/4	1187

\* Dimensions reflect effective height.

**Note:** 8 in. DuraPlus can also be used. See page 45.



**Figure 5.1 Chimney Requirements**

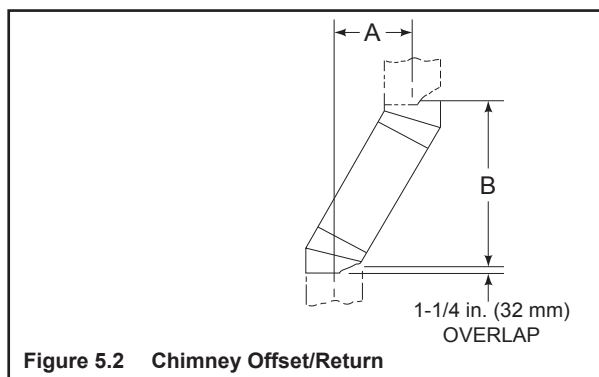
## B. Offsets/Returns

A 30° Elbow (measured from the vertical) is the largest that can be used in an offset. A 30° Elbow may not be combined with another Elbow to make a steeper offset (e.g. two 30° Elbows are not allowed to be put together to form a 60° elbow.). Avoid Elbows if possible. A totally vertical chimney is more efficient. When Elbows are necessary to avoid obstructions such as rafters, ridgepoles, or joists, you are only allowed to use 2 pair of Elbows in any one chimney system. Horizontal runs of chimney violate building code and are not allowed.

- An offset and return can be used as a single entity or separated by chimney section(s).

**WARNING! Risk of Fire! DO NOT** use offset/returns greater than 30° from vertical. Chimney draft will be restricted and could cause overheating and fire.

- Measure the shift needed to avoid the overhead obstruction. Refer to dimension A in Figure 5.2.
- Find the appropriate A dimension listed in Table 5.3. The B dimension coinciding with the A dimension measurement in Table 5.3 represents the required vertical clearance needed to complete the offset/return.
- Read across the chart to find the number of chimney sections/model numbers needed between the offset and return.



### Example:

Your "A" dimension from Figure 5.2 is 14-1/2 in. (368 mm). Using Table 5.3 the dimension closest to, but not less than 14-1/2 in. (368 mm) is 14-1/2 in. (368 mm) using a 30° offset/return.

You determine from the table that you need 34-1/8 in. (867 mm) (Dimension "B") between the offset and return.

The chimney component that best fits your application is one SL324.

**Table 5.3 Offset Dimensions**

15-degree				30-degree				SL306	SL312	SL318	SL324	SL336	SL348
A		B		A		B							
in.	mm	in.	mm	in.	mm	in.	mm						
1 5/8	41	13 3/8	340	3 5/8	92	15 1/2	394	-	-	-	-	-	-
2 7/8	73	17 3/4	451	5 1/2	140	18 5/8	473	1	-	-	-	-	-
4 1/8	102	22 3/8	568	7 1/4	184	21 3/4	552	2	-	-	-	-	-
4 1/2	114	23 5/8	600	8 1/2	216	23 3/4	603	-	1	-	-	-	-
5 3/4	146	28 1/4	718	10 1/4	260	27	686	1	1	-	-	-	-
6	152	29 3/8	746	11 1/2	292	29	737	-	-	1	-	-	-
7 1/4	184	34	864	13 1/4	337	32 1/8	816	-	2	-	-	-	-
7 3/4	197	36 1/8	918	14 1/2	368	34 1/8	867	-	-	-	1	-	-
8 3/4	222	39 3/4	1010	16 1/4	413	37 3/8	949	1	-	-	1	-	-
10 3/8	264	45 5/8	1159	19 1/4	489	42 1/2	1080	-	-	2	-	-	-
10 5/8	270	46 3/4	1187	20 1/2	521	44 5/8	1133	-	-	-	-	1	-
11 7/8	302	51 3/8	1305	22 1/4	565	47 3/4	1213	1	-	-	-	1	-
13 1/2	243	57 1/4	1454	25 1/4	641	52 7/8	1343	-	-	-	2	-	-
13 3/4	349	58 3/8	1483	26 1/2	673	55	1397	-	-	-	-	-	1
15	381	63	1600	28 1/4	718	58 1/8	1476	1	-	-	-	-	1
16 1/2	419	68 3/4	1746	31 1/4	794	63 1/4	1607	-	1	-	-	-	1
18	457	74 5/8	1895	34 1/4	870	68 1/2	1740	-	-	1	-	-	1
19 5/8	498	80 3/8	2042	37 1/4	946	73 3/4	1873	-	-	-	1	-	1
20 5/8	524	84 1/8	2137	39 1/8	994	76 7/8	1953	1	-	-	1	-	1
22 3/4	578	91 7/8	2334	43 1/4	1099	84 1/8	2137	-	-	-	-	1	1
24	610	96 1/2	2451	45 1/8	1146	87 1/4	2216	1	-	-	-	1	1
25 7/8	657	103 1/2	2629	49 1/4	1251	94 1/2	2400	-	-	-	-	-	2

Proper assembly of air-cooled chimney parts result in an overlap at chimney joints of 1-1/4 in. (32 mm). Effective length is built into this chart.

## C. Termination Requirements

- Install a cap approved and listed for this fireplace system.
- Locate cap where it will not become plugged by snow or other materials.
- Locate cap away from trees or other structures.
- The bottom of the termination cap must be at least 3 ft (.91 m) above the roof AND at least 2 ft (.61 m) above any portion of roof within 10 ft (3.05 m) as shown in Figure 5.3.
- The distance required between caps is shown in Figure 5.3.

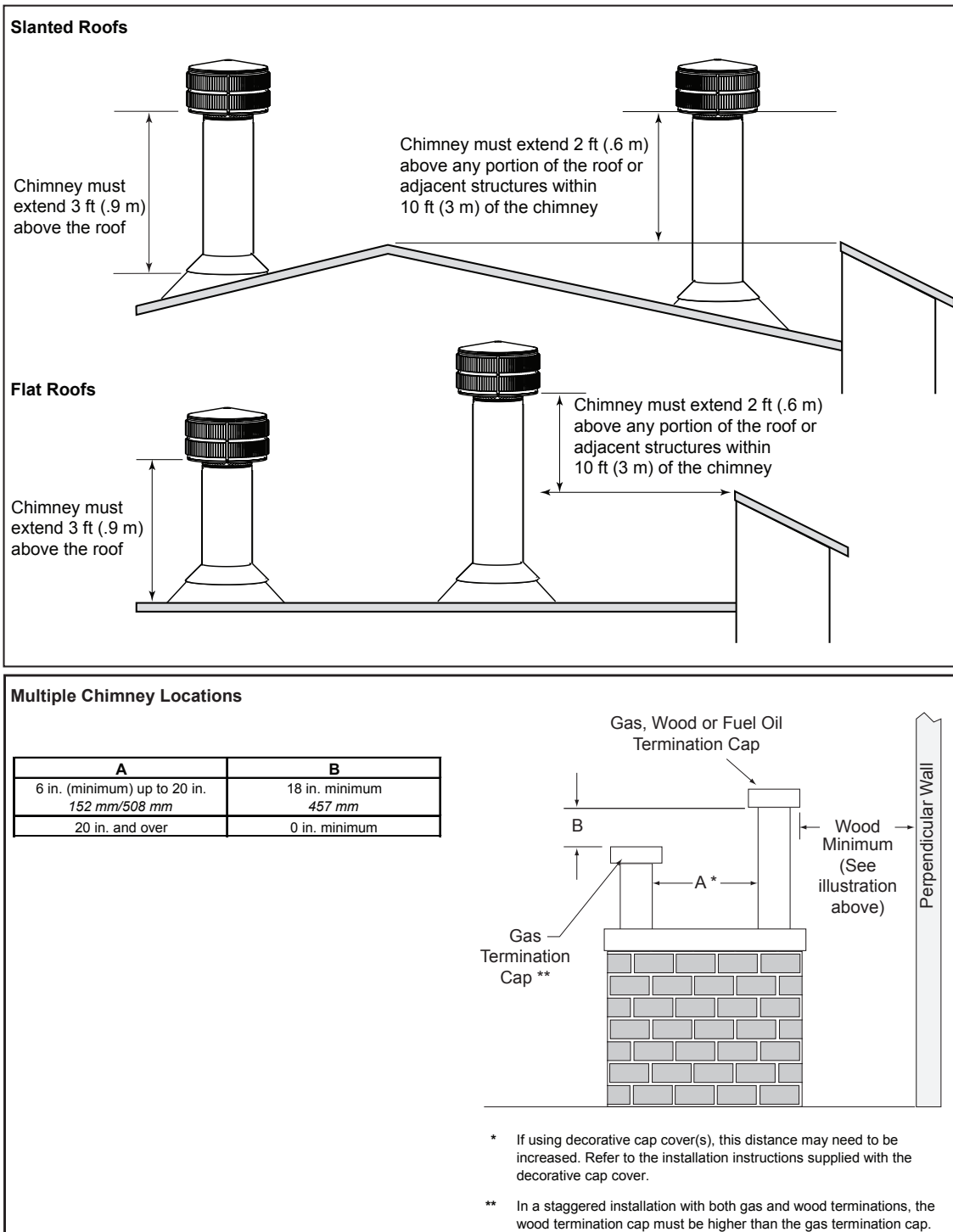


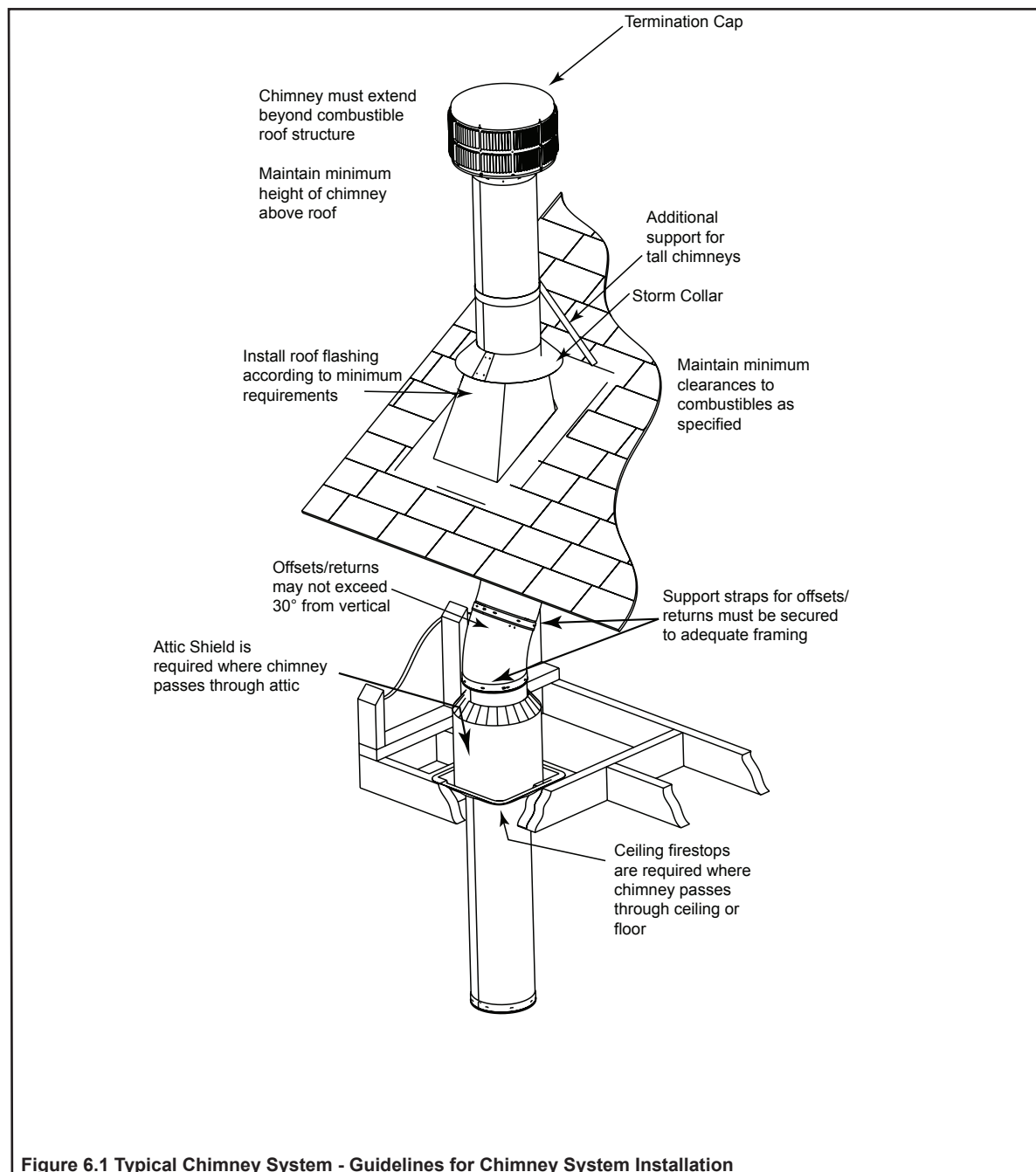
Figure 5.3 Multiple Chimney Locations

# 6 Chimney Installation

## A. Typical Chimney System

**NOTICE:** Chimney performance may vary.

- Trees, buildings, roof lines and wind conditions affect performance.
- Chimney height may need adjustment if smoking or overdraft occurs.



The SL300 series chimney (UL127 approved for use with this fireplace) is shipped with wrap around warning labels installed. These labels may be removed from the sections of chimney exposed above the roofline.



## B. Assemble Chimney Sections

**WARNING! Risk of Fire! DO NOT** install substitute or damaged chimney components.

Use only those components described in this manual.

Attach either a straight chimney section or an offset to the top of the fireplace starting with the inner flue followed by the outer casing. Continue this order until termination cap is reached (depending on your installation requirement). Chimney sections are locked together by pushing downward until the top section meets the stop bead on the lower section.

The inner flue is placed to the inside of the flue section below it. The outer casing is placed outside the outer casing of the chimney section below it. See Figure 6.2.

**NOTICE:** Chimney sections cannot be disassembled once locked together. Plan ahead!

- Lock chimney sections and/or offsets/returns together by pushing downward until the top section meets the stop bead on the lower section.
- Pull on the top of each section as installed to make sure it is fully engaged and will not separate.
- You may use #6 or #8 sheet metal screws no longer than 1/2 in. (13 mm) to fasten chimney outer sections together. Do NOT penetrate inner flue.
- Vertical straight runs of chimney must be supported every 35 ft (10.7 m).

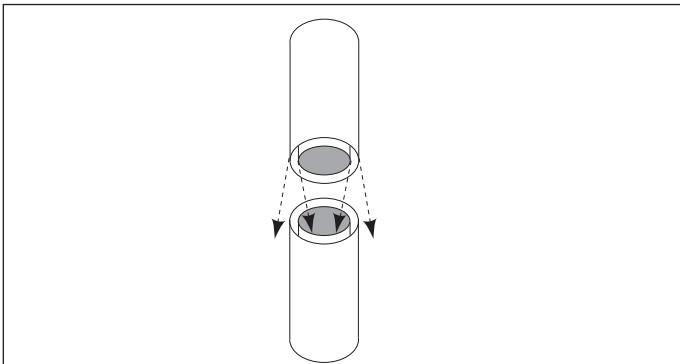


Figure 6.2 Assembling Chimney Sections

**WARNING! Risk of Fire! DO NOT** install substitute or damaged chimney components.

## C. Install Chimney Air kit (CAK4A)

**NOTICE:** Chimney Air Kit, Part CAK4A is required when using the SL-300 Pipe Series. Detailed instructions are supplied with the kit. If using the Dura-Plus System (must be 8 in./203 mm in diameter), the starter ring that came with the fireplace must be removed and replaced with the Dura-Plus Base Plate. The CAK4A is not required with a Dura-Plus System.

- Install the chimney pipe first.
- Hand bend the tabs in position before placing on the fireplace.

- Place the box on top of the fireplace around the chimney pipe, push both pieces together and secure with screws provided.
- Use the pre-punched holes in the tabs as guides and drill holes through the fireplace top.
- Secure the CAK4A in place. See Figure 6.3.
- Seal around the kit at the flue and at the top of the can with high temp caulk with a minimum rating of 500 degrees. See Figure 6.3.

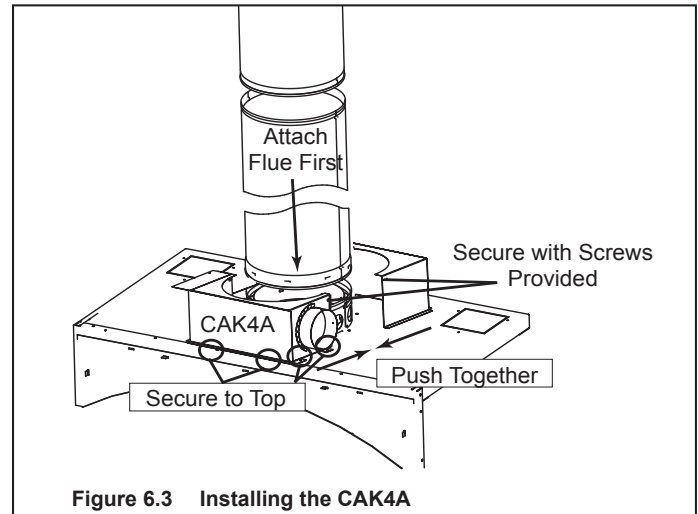


Figure 6.3 Installing the CAK4A

### NOTES:

- The CAK4A termination cap must be a minimum of 4 ft (1219 mm) above the ground and kept free of debris.
- If the CAK4A is installed in a chase, the CAK4A side termination cap must be at least 3 ft (914 mm) below the chimney top.
- Seal around the cap and flex with caulk to stop air from getting into the chase. See Figure 6.4.
- The pipe cannot lay on top of the unit.

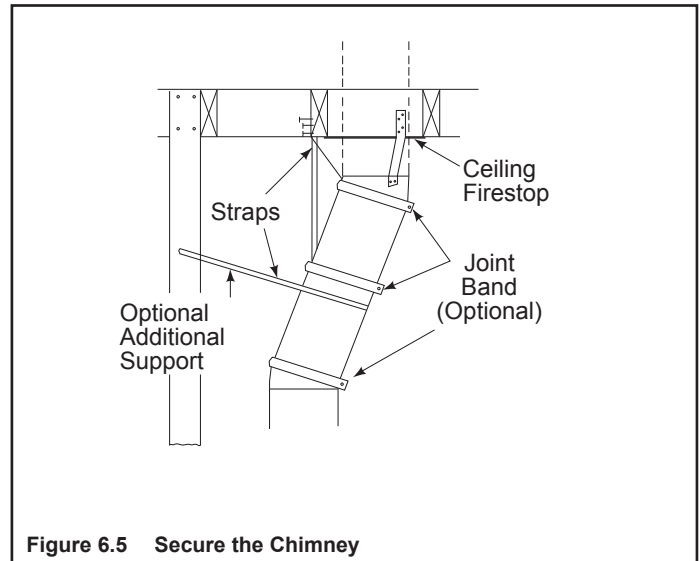
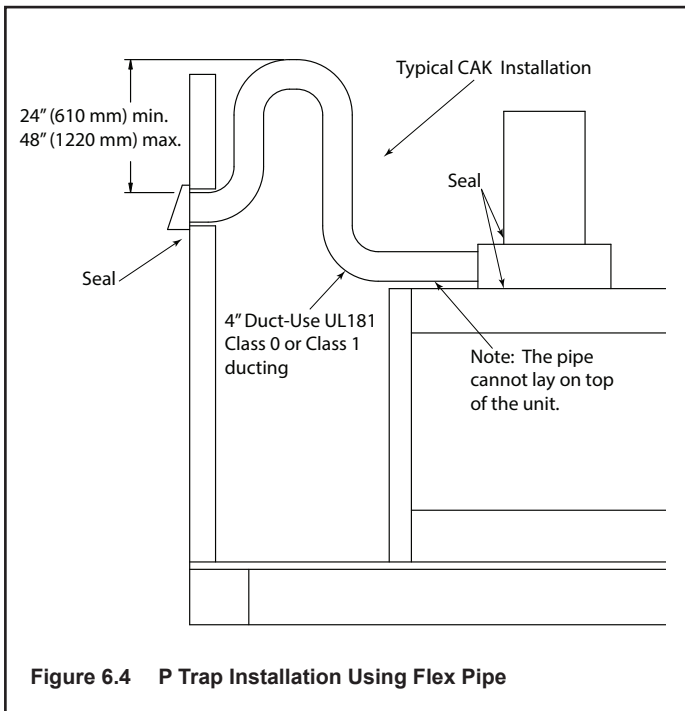


### **WARNING! Risk of Fire!**

- *The flex pipe must never be compressed or deformed!*
- *Restricting the airflow inside the flex pipe may increase flue pipe temperatures causing a chase fire.*

### **P Traps**

When using the chimney air kit (CAK) and the outside air kits, it is recommended that you install a P trap as shown in Figure 6.4 by bending the flex duct, or using 90° elbows if using rigid duct to help prevent air circulation when the fireplace is not in use. In colder climates, it is strongly recommended to use an insulated duct.



### **D. Secure Offset/Return**

#### **WARNING! Risk of Fire!**

- *Secure offsets with screws (not to exceed 1/2 in./13 mm in length).*
- *Secure returns with strapping.*
- *Straight chimney sections may be secured with screw (not to exceed 1/2 in./13 mm in length) at the joints.*
- *Keep chimney sections from separating or twisting.*

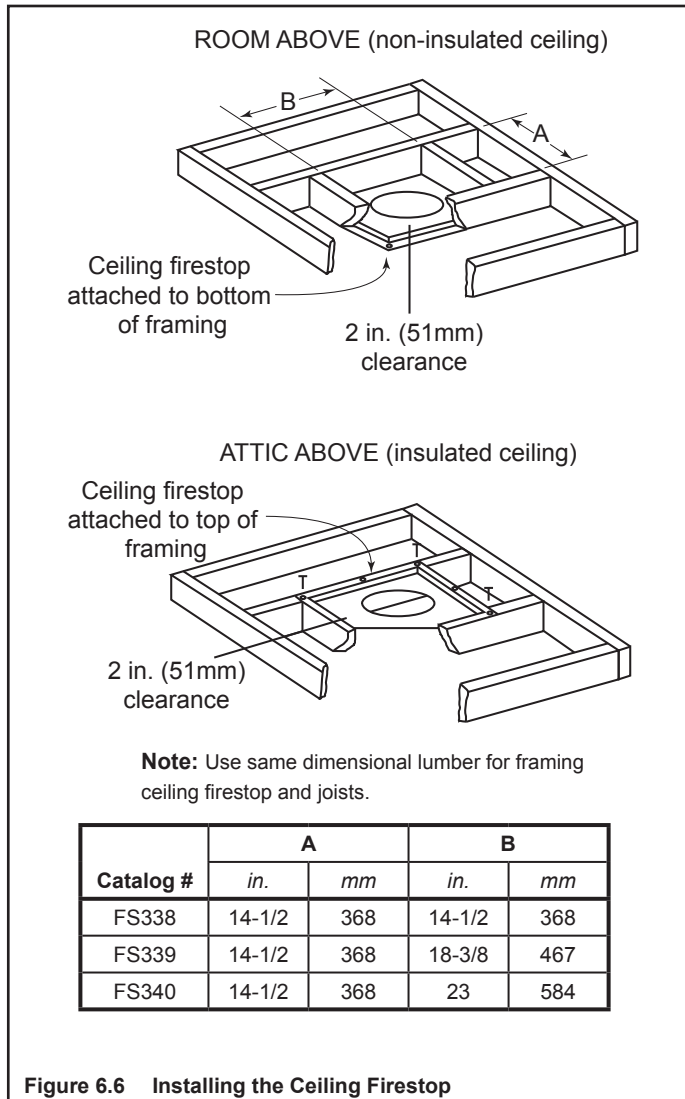
When offsets and returns are joined to straight pipe sections, they must be locked into position with screws (outer only). To prevent gravity from pulling the chimney sections apart, the returns and the chimney stabilizers have hanger straps for securing these parts to joists or rafters. See Figure 6.5.

- \* Use # 6 or # 8 sheet metal screw, or larger, no longer than 1/2 in. (13 mm).

## E. Install Firestops

**WARNING! Risk of Fire!** Firestops must be used whenever the chimney penetrates a ceiling/floor.

- Mark and cut an opening in ceiling/floor as shown in Figure 6.6.
- Frame the opening with the same size lumber used in the ceiling joists.
- Nail the firestop to the bottom of the ceiling/floor joists.
- Provide a means to maintain the required air space between the chimney and insulation or install an attic insulation shield.



**WARNING! Risk of Fire! DO NOT** seal area between firestop opening and chimney pipe except where they enter the attic or leave the warm air envelope of the home (use 600° F sealant).

## F. Install Attic Insulation Shield

**WARNING! Risk of Fire!** You **MUST** install an attic insulation shield when there is any possibility of insulation or other combustible material coming into contact with the chimney.

- **DO NOT** pack insulation between the chimney and the attic insulation shield.
- Failure to keep insulation and other materials away from chimney pipe could cause fire.
- **DO NOT** offset chimney inside insulation shield.
- Combustible material may come in contact with the attic insulation shield as long as the required clearances are maintained to the chimney pipe.

Installation of a ceiling firestop is required:

- Refer to Figures 6.6, 6.7, 6.8 and 6.9.
- If the attic shield is pre-rolled continue. If it is a flat part, try and roll it up to aid in wrapping it around the chimney.
- Pre-bend all the tabs in at the top to 45°.
- Wrap the shield (around the chimney if already installed) until you have an overlap and the three holes on each side match up (large holes on top).
- Insert three screws into the matching holes to form a tube starting at the bottom.
- Bend the tabs on the bottom of the tube inward to 90° to maintain chimney air space.
- Rest the insulation shield on the ceiling firestop below.
- Tape off any opening around the bottom.

If you wish to make a custom shield or barrier, follow these guidelines:

- Metal is preferred, although any material stiff enough to hold back the insulation can be used.

**WARNING! Risk of Fire!** Use of cardboard or other materials that can deflect under humidity or other environmental conditions is not recommended.

- The shield or barrier must be tall enough to extend above the insulation and prevent blown-in insulation from spilling into the cavity.
- Maintain specified air spaces around chimney.
- Check instructions and local codes for further details.

### Double-check the Chimney Assembly

Continue assembling the chimney sections up through the ceiling firestops as needed. While doing so, be aware of the height and unsupported chimney length limitations given under Section 5.

Check each section by pulling up slightly from the top to ensure proper engagement before installing the succeeding sections. If they have been connected correctly, they will not disengage when tested.

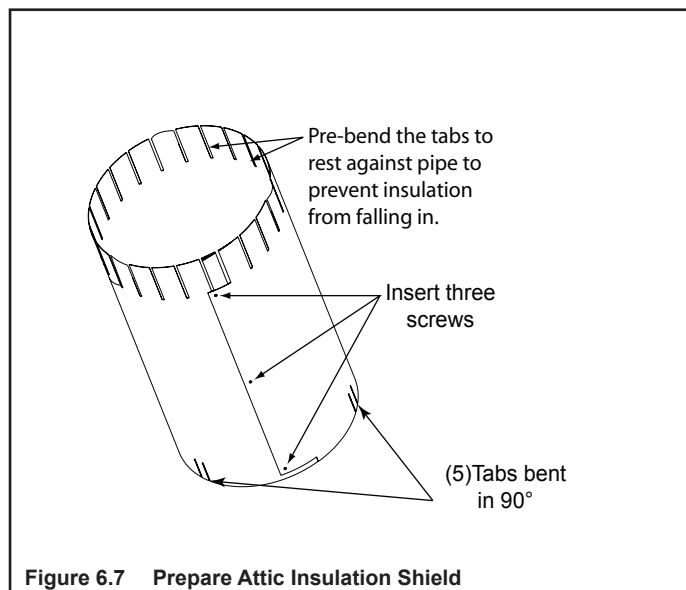


Figure 6.7 Prepare Attic Insulation Shield

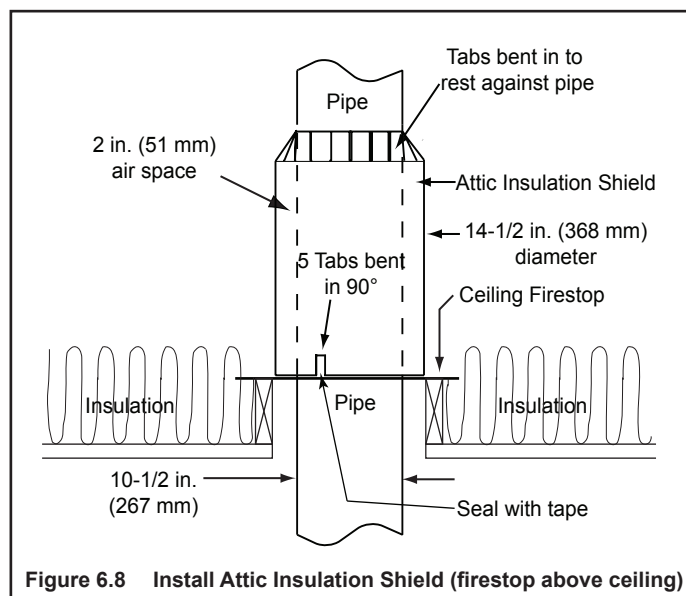


Figure 6.8 Install Attic Insulation Shield (firestop above ceiling)

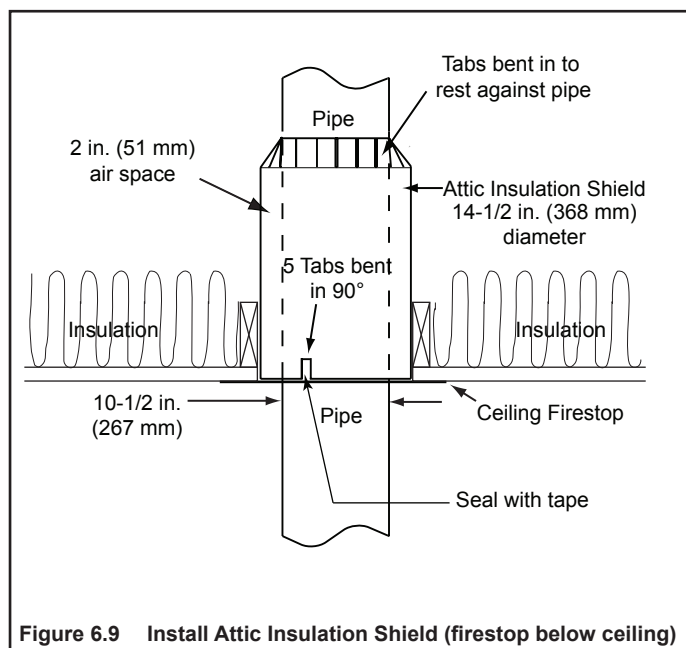


Figure 6.9 Install Attic Insulation Shield (firestop below ceiling)

## G. Roof Penetration

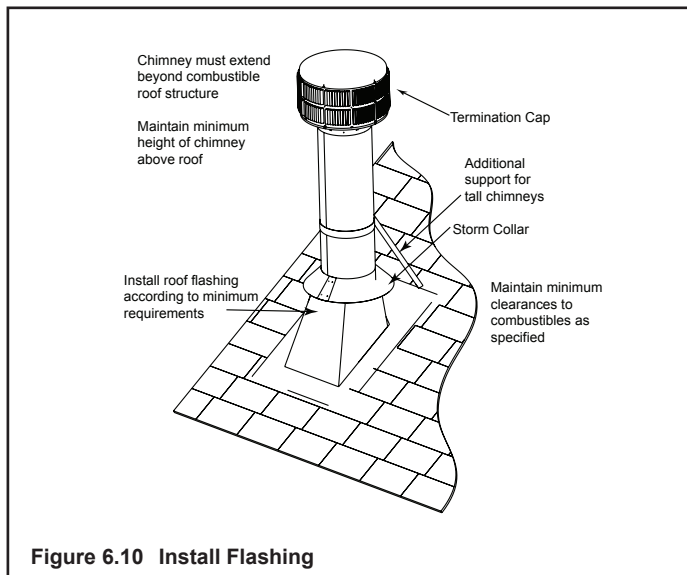
- Refer to Figure 6.10.
- Plumb from roof to center of chimney.
- Drive a nail up through roof to mark center of pipe.
- Measure to either side of nail and mark the 14-1/2 in. x 14-1/2 in. (368 mm x 368 mm) opening required.
- Measure opening on the horizontal; actual length may be larger depending on roof pitch.
- Cut out and frame opening.

### Install Flashing

- Assemble chimney so it passes through the framed opening.
- Slip the flashing over the chimney.

**NOTICE:** Roofing shingles must be below the flashing plate on the lower side of a sloped roof and over the flashing plate on the sides and top.

- Nail the flashing to the roof. Keep gaps between the flashing plate and the roof to a minimum.
- Caulk the flashing plate and roof junction as well as the vertical seam on the flashing. All nail heads must be caulked with a roofing sealant.
- Caulk the overlap seam of any exposed pipe sections that are located above the roof line to prevent leaks.



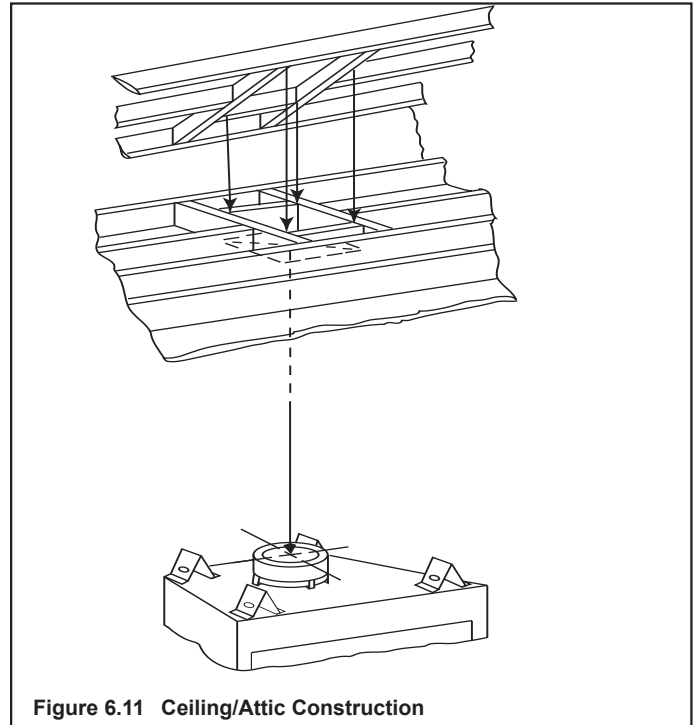
## H. Manufactured Home Installation

### SL-300 Series Ceiling/Roof Thimble

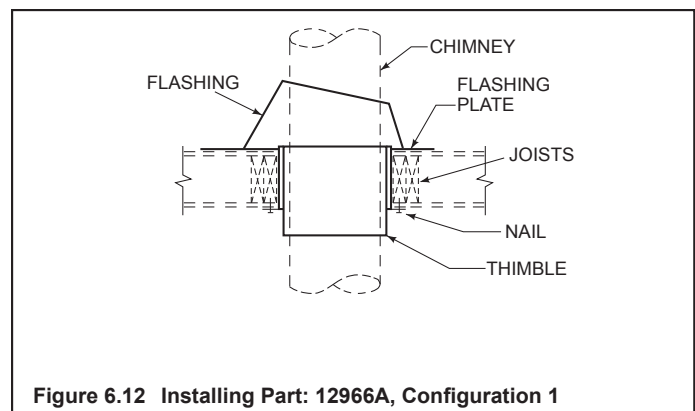
**NOTICE: REQUIRED** for manufactured homes.

- Locate the point where the chimney will exit the roof by plumbing down to the center of the chimney. Lay out, cut and frame a 14-1/2 in. (368 mm) square opening (measured on the horizontal) through the ceiling and roof structure. **Consult local codes for framing details.**

- The thimble must extend completely through the roof structure shielding combustible materials. Five location holes have been provided to allow for a variety of ceiling/roof thicknesses. A thimble extension is required when the ceiling/roof thickness exceeds 12-1/2 in. (318 mm). The extension should overlap the thimble one inch.
- To attach the extension to the thimble, drill 1/8 in. (3 mm) holes through the outer shield of the thimble using the predrilled holes in the extension as guides. Attach the extension to the thimble using the screws provided with the extension.
- Install the thimble assembly and nail it securely to the framing members.



- Center the flashing over the chimney and nail it to the roof. Keep gaps between the flashing plate and the roof to a minimum. Caulk the flashing plate and roof junction as well as the vertical seam on the flashing. All nail heads must be caulked with a roofing sealant.
- Finish assembling the chimney storm collar and termination cap following the installation instructions provided with them.



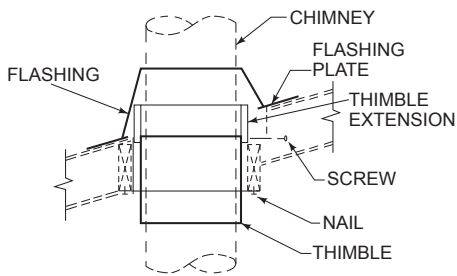


Figure 6.13 Installing Part 12966A, Configuration 2

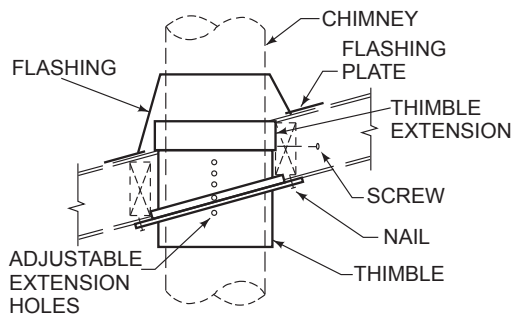


Figure 6.14 Installing Part 12966A Configuration 3

## I. Install Chase/Chase Top

- You **MUST** use a chase top in a chase installation. Chase tops are available from your Quadra-Fire dealer or may be field constructed.
- Include a turn-down and drip edge to prevent water from seeping into the chase.
- Include a 2 in. (51 mm) soldered, welded or spun collar around pipe opening to keep water out.
- Provide a 1/8 in. (3 mm) gap around the flue pipe.
- Slope the chase top downward away from the opening.

**WARNING! Risk of Fire! DO NOT** caulk the pipe to the chase top collar.

- Caulk all seams to prevent leaks.

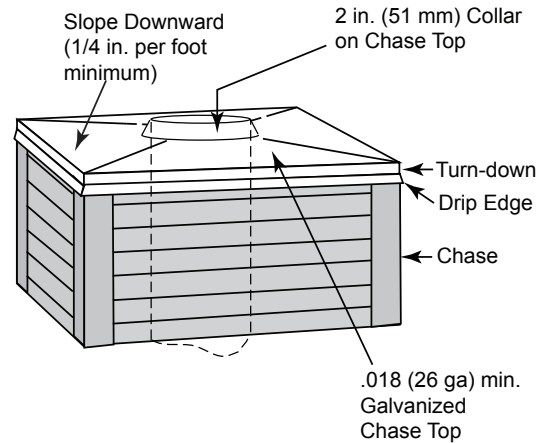


Figure 6.15 Chase Top Construction

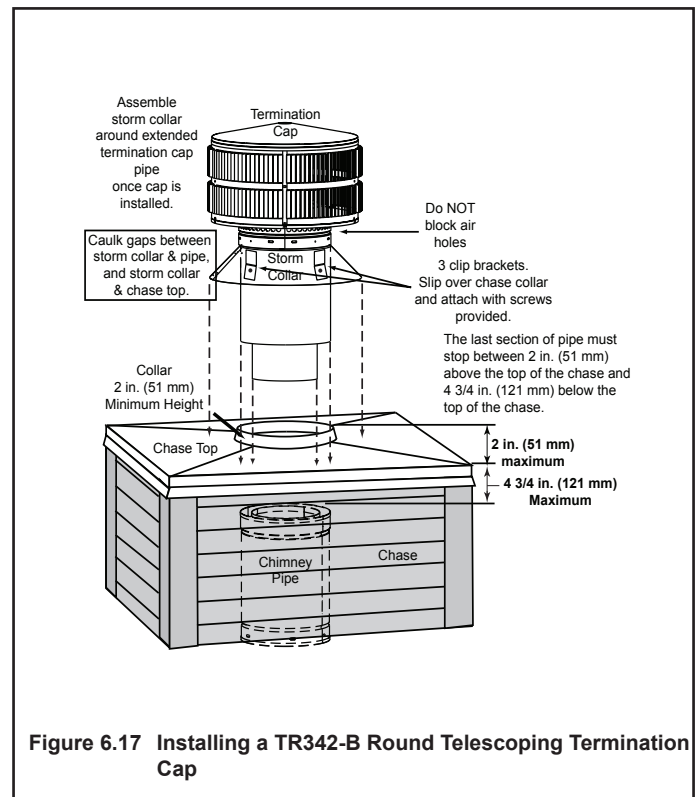
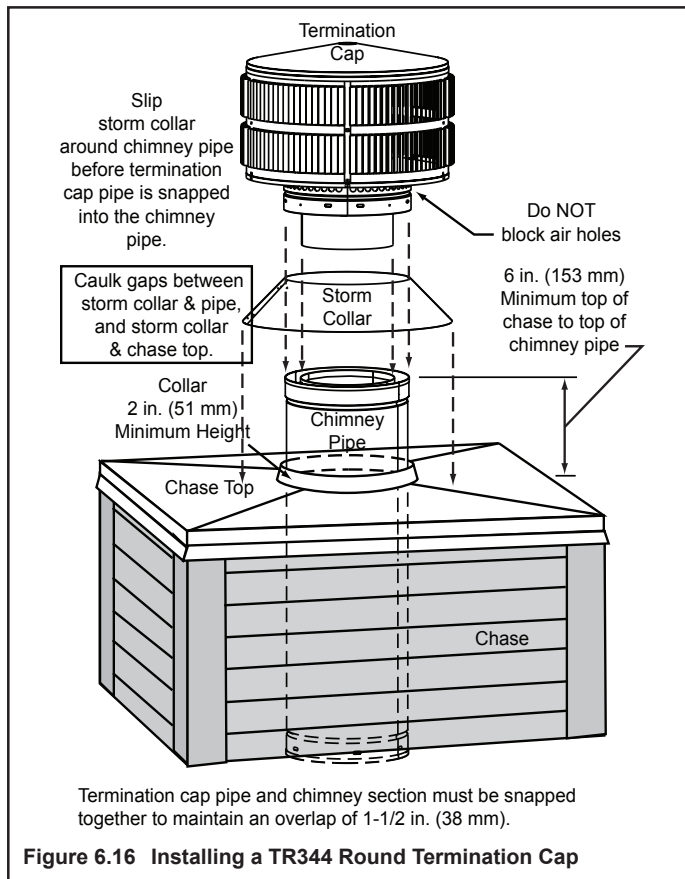
## J. Install Termination Cap

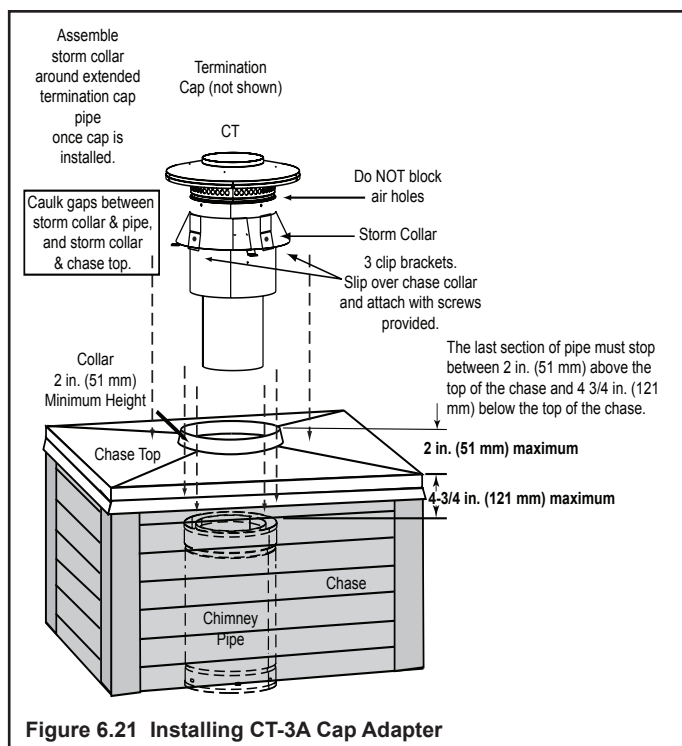
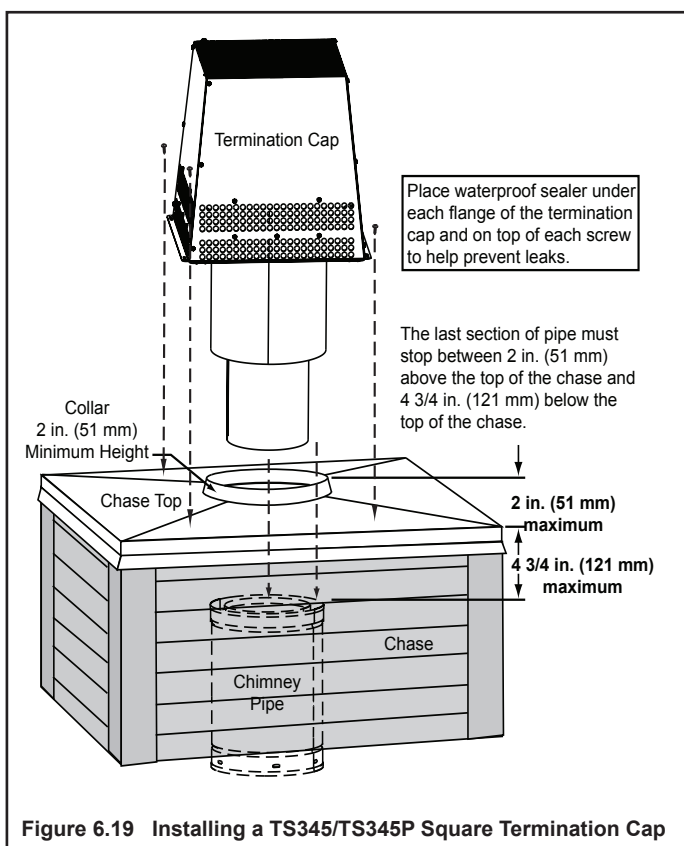
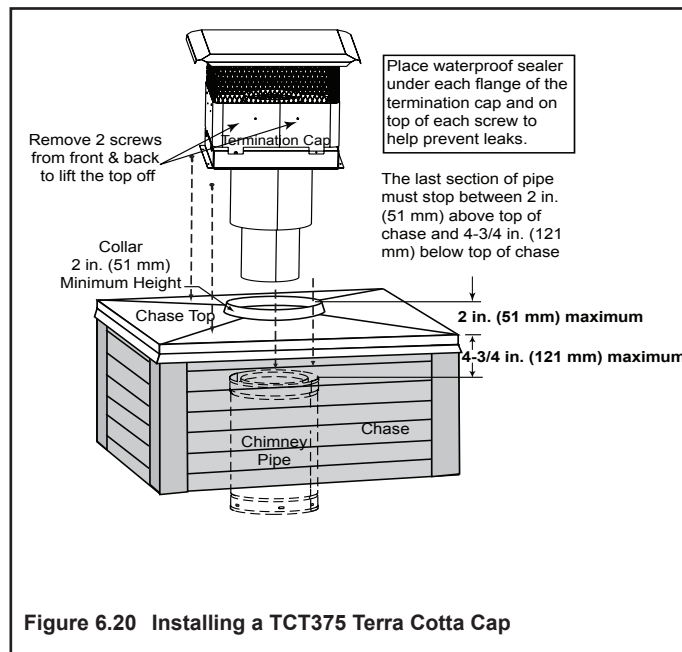
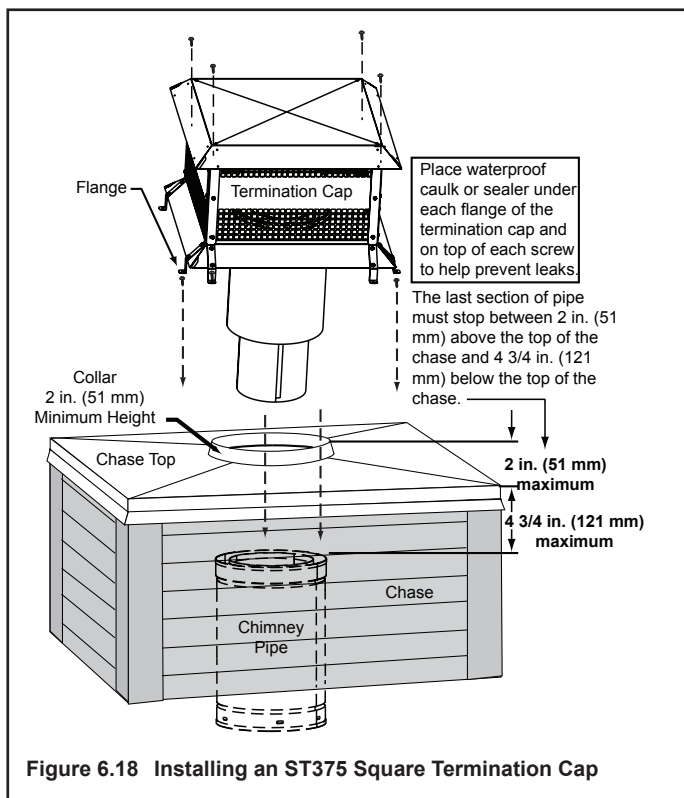
Install the chimney sections up through the chase enclosure.

- Caulk the overlap seam of any exposed pipe sections that are located above the roof line to prevent leaks.
- Refer to termination cap instructions.

**WARNING! Risk of Fire!** The minimum overlap of cap to pipe (as shown in the following illustrations) **MUST** be met or chimney may separate from cap. Separation allows sparks, heat and embers to escape.

**NOTICE:** Paint the termination cap with a rust-resistant paint to protect against the effects of corrosion on those parts exposed to the weather.







# 7 Finishing

## A. Template

A cardboard template of the front is printed on the outside of the shipping box. Cut out the template along the outside of the line for use in your installation. If using the cardboard template, it will require 1/4-20 bolts to attach it to the fireplace, (NOT INCLUDED). A metal template (see catalog) is available for more durable continued use, remaining accurate over time. Both measure 1/8 in. (3 mm) larger all the way around than the actual front.

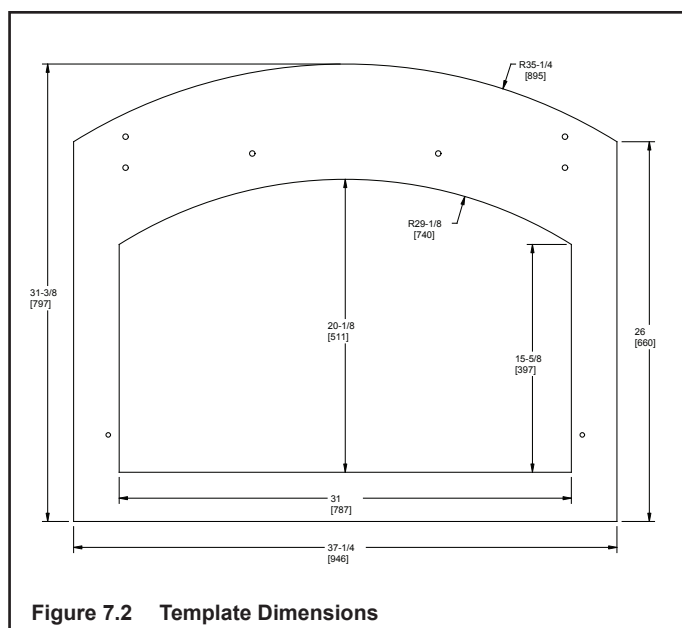
**Note:** This 1/8 in. of the non-combustible material must be painted or the red will be visible.

**Tools Required:** 5/32 in. Allen wrench.

- Remove the screws from the fascia and remove fascia from the fireplace (if installed). Save the screws. Store the fascia in a safe, protected area to prevent scratching or other damage.
- Install the template on the front of the fireplace (Figure 7.1) with screws removed or provided.

**NOTE:** Do not over tighten the screws, just tighten up the template enough so that it comes in contact with the outer flanges on the front of the fireplace.

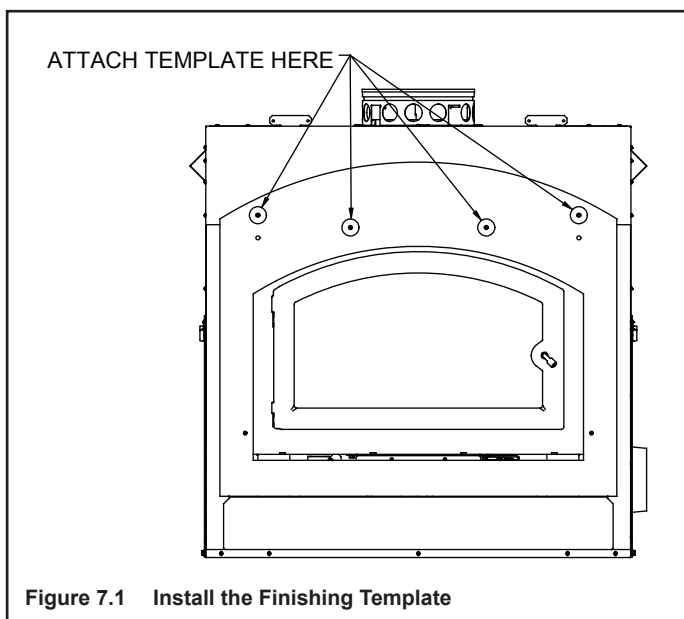
You are now ready to continue your installation with the desired decorative material. The template also serves as a protective covering and prevents damage to the front of the fireplace.



**Figure 7.2** Template Dimensions

**Note: DO NOT** remove hang tags until installing finish materials.

**NOTE:** The decorative fascia must be removable for future serviceability.



**Figure 7.1** Install the Finishing Template

## B. Finish the Wall

Use a wet or dry towel or a soft brush to remove any dust or dirt from the non-combustible facing material.

Apply a non-combustible adhesive to attach tile, stone or other non-combustible finishing materials per manufacturer's instructions.

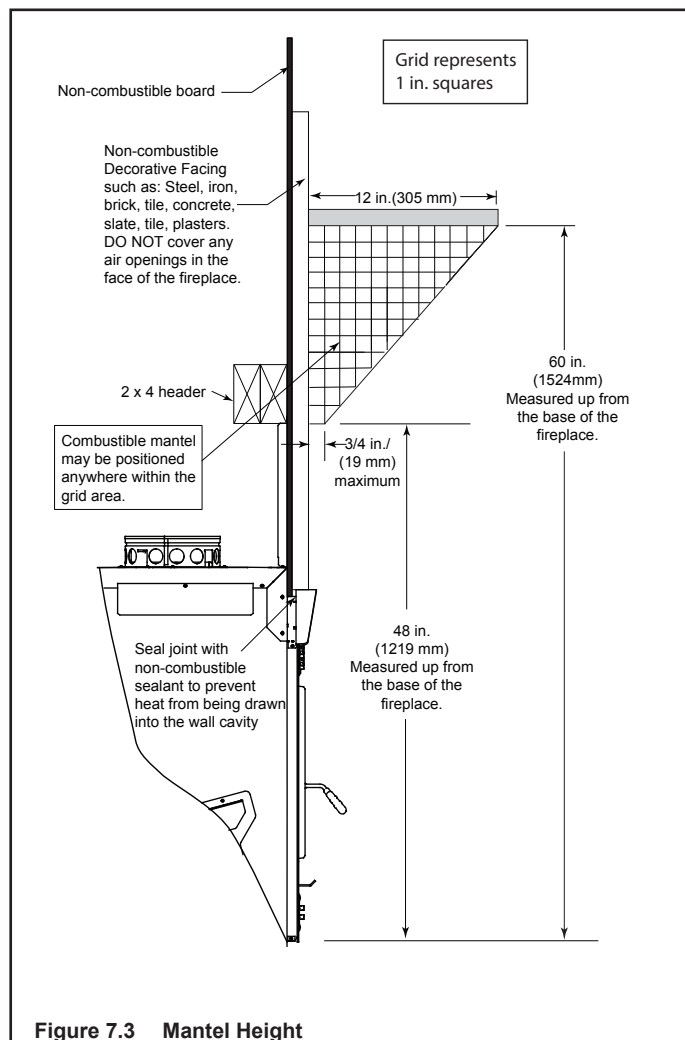
### 1. Stone, Brick Finish

**WARNING! Risk of Fire! DO NOT** apply tar paper or water resistive barrier over non-combustible board.

- Apply metal lath to the 1/2 in. thick non-combustible board with corrosion resistant self-tapping screws capable of penetrating the metal surface behind the non-combustible board.
- HHT recommends using type N or type S mortar. Due to high temperatures, review polymer modifiers specification sheet before using.

### 2. Tile, Granite, Marble Finish

- Due to high temperatures, HHT recommends using unmodified thinset when applying tile.
- When applying granite or marble, HHT recommends using thinset to adhere. If using a different adhesive, review specification sheet for application in high temperature areas.



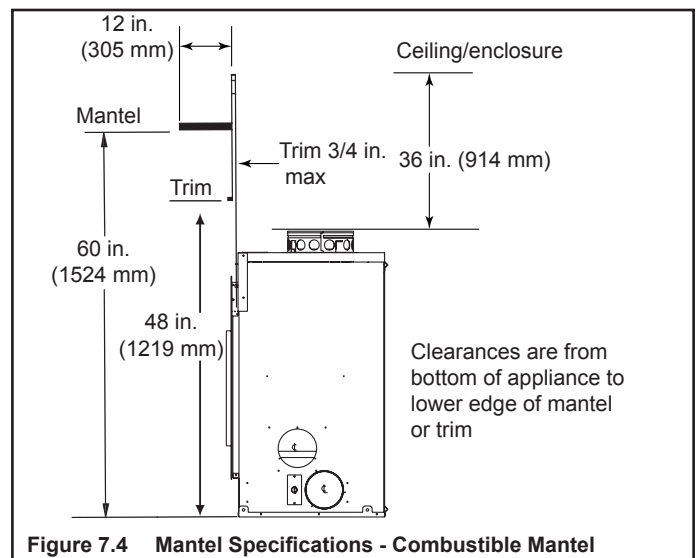
## C. Mantel and Wall Projections

A combustible mantel may be positioned no lower than 60 in. (1524 mm) at 12 in. (305 mm) deep from the base of the fireplace.

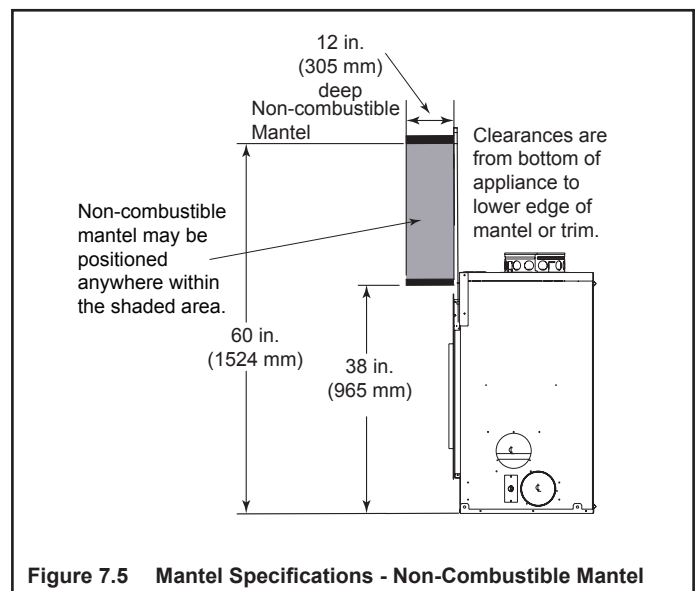
Minimum clearance faceplate to sidewall is 16 in.

The combustible mantel may have a maximum depth of 12 in. (305 mm). Combustible trim pieces that project no more than 3/4 in. (19 mm) from the face of the fireplace can be placed no closer than 6 in. (152 mm) from the side of the decorative front. Surround legs that project more than 3/4 in. (19 mm) must be 16 in. (406 mm) away from the side of the decorative front. Combustible trim must not cover:

- the metal surfaces of the fireplace
- where the non-combustible board is placed over the metal surfaces
- the space between the metal face of the fireplace and framing members



A noncombustible mantel may be positioned no lower than 38 in. (965 mm) from the base of the fireplace.



## D. Finishing the Hearth Extension

**WARNING! Risk of Fire!** High temperatures, sparks, embers or other burning material falling from the fireplace may ignite flooring or concealed combustible surfaces.

- Protective metal hearth strips **MUST** be installed.
- Hearth extensions **MUST** be installed exactly as specified.

A hearth extension must be installed with all fireplaces to protect the combustible floor in front of the fireplace from both radiant heat and sparks.

- You **MUST** use a hearth extension with this fireplace.
- Refer to Figure 7.6 for minimum dimensions.
- This fireplace has been tested and approved for use with a hearth extension insulated to a minimum R value of 1.03.
- The hearth extension material **MUST** be covered with tile, stone or other non-combustible material.
- Manufactured hearth materials will usually have a published **R value** (resistance to heat) or **k value** (conductivity of heat). Refer to the formula in Table 7.1 to convert a k value to an R value,
- Refer to Table 7.2 for hearth extension insulation alternatives.

**Table 7.1**

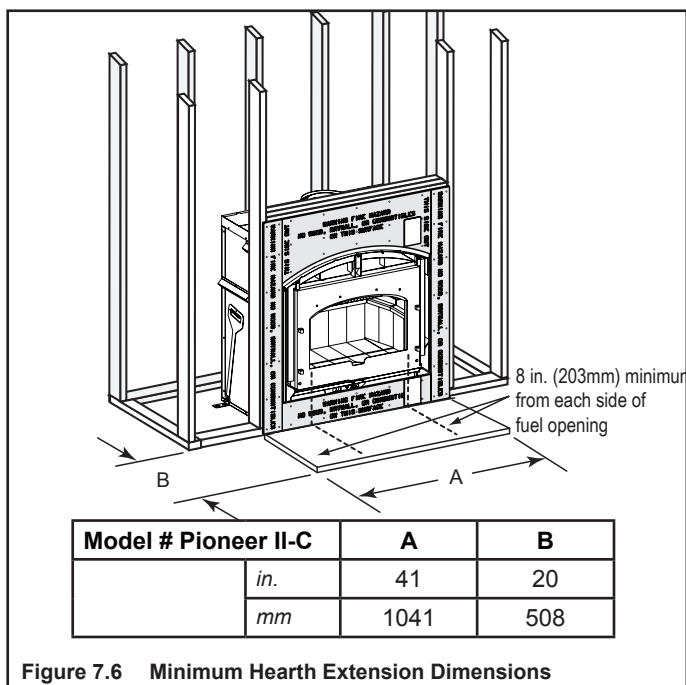
$$R = 1/k \times \text{inches of thickness}$$

**Table 7.2**

Hearth Extension Insulation Alternatives, R Value = 1.03			
Material	k per inch thick	r per inch thick	Minimum thickness required
Hearth & Home HX3, HX4	0.49	2.06	1/2 in.
USG Micore 300™	0.49	2.06	1/2 in.
USG Durock™ Cement Board	1.92	0.52	2 in.
Cement Mortar	5.0	0.20	5 1/8 in.
Common Brick	5.0	0.20	5 1/8 in.
Ceramic Tile	12.50	0.08	12 1/4 in.
Armstrong™ Privacy Guard Plus	0.46	2.18	1 in.
Marble	14.3-20.0	0.07-0.05	14 5/8 in. - 20 3/8 in.

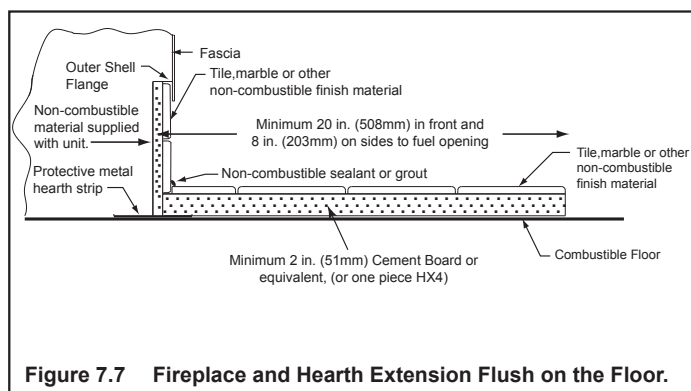
### WARNING! Risk of Fire!

You must comply with all minimum air space clearances to combustibles as specified. Framing or finishing material used on the front of, or in front of, the fireplace closer than the minimums listed must be constructed entirely of non-combustible materials (i.e., steel studs, concrete board, etc.). Failure to comply may cause fire.



**Figure 7.6 Minimum Hearth Extension Dimensions**

- Fireplace and Hearth Extension flush on the floor  
Non-combustible flooring a minimum of 20 in. (508 mm) in front of and 8 in. (203 mm) to either side of the fuel opening is required as shown in Figure 7.6.  
The construction of, and materials used for a hearth extension are shown in Figure 7.7. A hearth extension of this construction may be covered with any non-combustible decorative material and may have a minimum thickness as per Figure 7.7. Seal gaps between the hearth extension and the front of the fireplace with a bead of non-combustible sealant or grout.



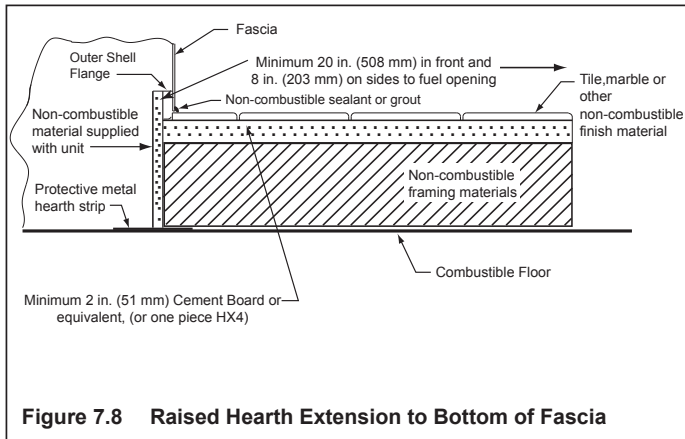
**Figure 7.7 Fireplace and Hearth Extension Flush on the Floor.**

- Fireplace installed flush on the floor and hearth extension raised to bottom of fascia:  
Non-combustible flooring a minimum of 20 in. (508 mm) in front of and 8 in. (203 mm) to either side of the fuel opening is required (see Figure 7.6).

- **Raised Hearth Extension Framing**

The hearth framing must be constructed of non-combustible materials (such as metal framing or equivalent material) and topped with one HX4, or equivalent material (Table 7.2).

**When creating the platform, allow for the thickness of the non-combustible finishing materials** (Figure 7.8).



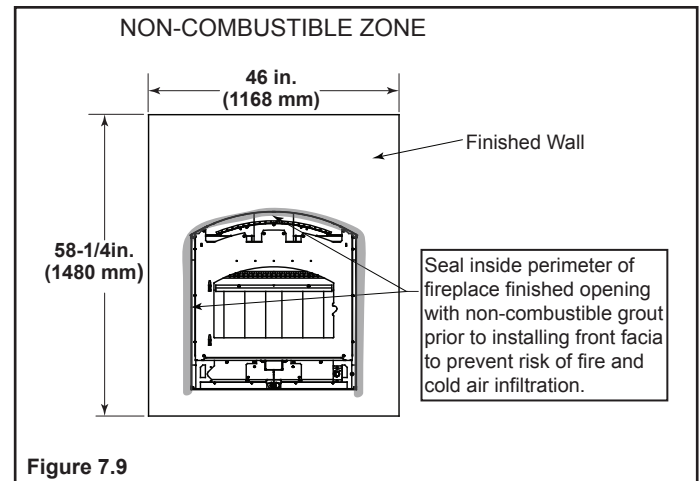
**Figure 7.8** Raised Hearth Extension to Bottom of Fascia

***WARNING! Risk of Fire!***

Hearth extensions are to be installed only as illustrated to prevent high temperatures from occurring on concealed combustible materials.

## E. Non-Combustible Sealant Material

- After completing the installation of non-combustible facing board in the required non-combustible zone and the non-combustible finishing material over that, remove the template.
- A bead of non-combustible sealant must be used to close off any gaps at the top and sides between the fireplace and non-combustible facing (Figure 7.9) to prevent cold air leaks and the risk of fire. Large gaps can be bridged with fiberglass rope gasket.
- When installation of the decorative material is complete, replace/install the fascia and fireplace doors.



**Figure 7.9**

***WARNING! Risk of Fire!***

- Maintain clearances.
- Use only non-combustible material below standoffs, material such as cement board is acceptable.
- Framing or finishing material used on the front of the fireplace closer than the minimums listed, must be constructed entirely of non-combustible materials (i.e., steel studs, concrete board, etc.).

***WARNING! Risk of Fire!***

Hearth & Home Technologies is not responsible for discoloration, cracking or other material failures of finishing materials due to heat exposure or smoke.

- Choose finishing materials carefully.

***WARNING! Risk of Fire!***

Seal around finishing material to fireplace.

# 8 Reference Materials

## A. Firebrick Placement

The firebox of your fireplace is lined with high quality firebrick, which has exceptional insulating properties.

Do not use a grate; simply build a fire on the firebox floor.

Do not operate the fireplace without bricks. Make sure bricks are installed as shown.

**IMPORTANT:** Be certain you have the proper brick in the correct location. Measure the brick size for accuracy.

- Remove new brick set from box and lay out to diagram as shown in Figure 8.1.
- Lay bottom bricks in firebox.
- Install rear bricks on the top of the bottom bricks. Slide top of bricks under clip on back of firebox wall and push bottom of brick back.
- Install side bricks. Slide top of brick under clips on side of firebox and push the bottom of the brick until it is flush with the side of the firebox.

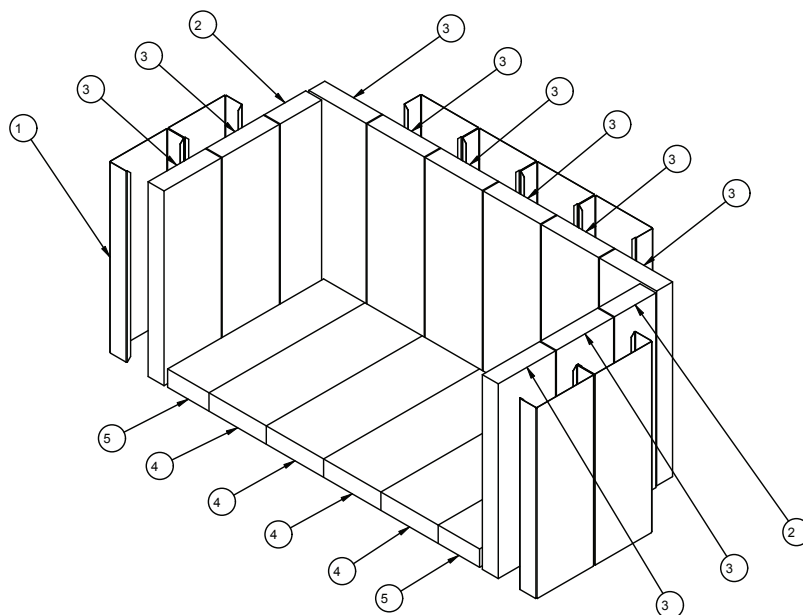


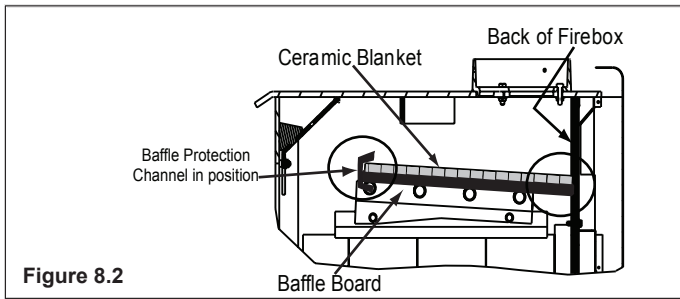
Figure 8.1 Fire Brick Configurations

Table 8.1

#	Brick Size	Qty. in Set
1	Brick Wrap	8
2	Firebrick 13.25 x 3.25	2
3	Firebrick 13.25 x 4.50 x 1.25	10
4	Firebrick 12.25 x 4.50	4
5	Firebrick 12.25 x 3.25	2

## B. Baffle and Blanket Placement

Ensure correct baffle and baffle protection channel placement; replace baffle components if damaged or missing.



The ceramic blanket and baffle board **MUST** be in contact with the back of the firebox and even with each other in the front. The baffle protection channel **MUST** be in position.

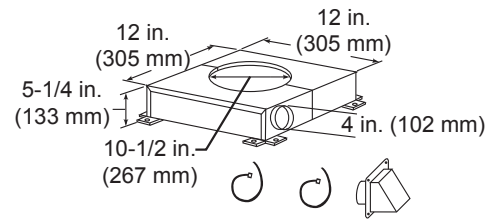
## C. Install Fascia (Fronts)

Front is required to complete the installation. Instructions for attachment of the front is included with it. Contact your local dealer with any questions on offerings or installation.

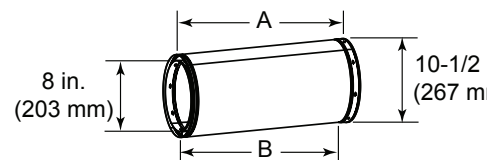
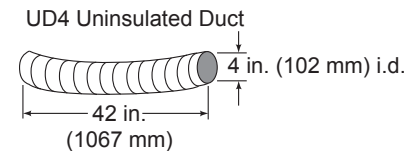
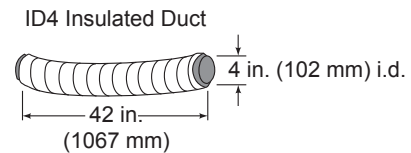
## D. Chimney Components

The following drawings show the SL-300 Series chimney and fireplace components which may be safely used with this fireplace. The 8 in. DuraPlus can also be used.

Catalog #	Description
CAK4A	Chimney Air Kit (shipped with fireplace)
ID4	Insulated Duct (used with chimney air kit)
UD4	Uninsulated Duct (used with chimney air kit)
SL306	Chimney Section - 6 in. (152 mm) long
SL312	Chimney Section - 12 in. (305 mm) long
SL318	Chimney Section - 18 in. (457 mm) long
SL324	Chimney Section - 24 in. (610 mm) long
SL336	Chimney Section - 36 in. (914 mm) long
SL348	Chimney Section - 48 in. (1219 mm) long
SL3	Chimney Stabilizer
SL315	Chimney Offset/Return - 15 deg
SL330	Chimney Offset/Return - 30 deg
FS338	Ceiling Firestop - Straight
FS339	Ceiling Firestop - 15 deg
FS340	Ceiling Firestop - 30 deg
AS8	SL300 Straight Attic Insulation Shield, 24 in. (610 mm) (shipped with fireplace)
JB877	Chimney Joint Band
CB876	Chimney Bracket
RF370	Roof Flashing - Flat to 6/12 Pitch
RF371	Roof Flashing - 6/12 to 12/12 Pitch
DTO134/146	Octagonal Decorative Caps
DTS134/146	Square Decorative Caps
ST375	Square Termination Cap
TCT375	Terra Cotta Termination Cap
TR344	Round Termination Cap
TR342-B	Round Telescoping Termination Cap
TR-TVK	TR Top Vent Kit
TS345	Square Termination Cap
TS345P	Square Termination Cap - Painted
12966A	Manufactured Home Thimble
MH841	Manufactured Home Thimble Extension 20 in./508 mm
HX4	Micore Hearth Extension, 20 in./508 mm wide
LDS33	Decorative Shroud - 3 ft x 3 ft (.91 m x .91 m)
LDS46	Decorative Shroud - 4 ft x 6 ft (1.22 m x 1.83 m)
LDS-BV	Decorative Shroud - 26 in. x 26 in. (660 mm x 660 mm)
	Field Constructed Shrouds (See "Woodburning Termination Cap")
CT-3A-B	Adapter - May be used with the following caps
	CT Series
	DT Series
8DP-BP	Duraplug Base Plate (required if using DuraPlus Chimney)

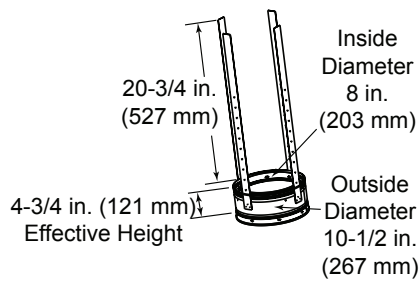


**CAK4A Chimney Air Kit (shipped with fireplace)**

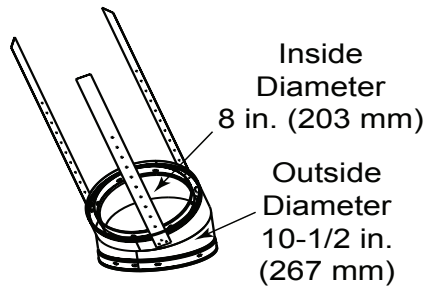


Catalog #	A		B	
	in	mm	in	mm
SL306	6	152	4-3/4	121
SL312	12	305	10-3/4	273
SL318	18	457	16-3/4	425
SL324	24	610	22-3/4	578
SL336	36	914	34-3/4	883
SL348	48	1219	46-3/4	1187

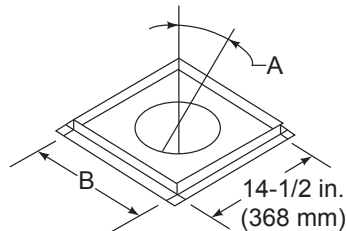




**SL3 Chimney Stabilizer**



**SL315 Chimney Offset/Return - Effective Height 13-3/8 in. (340 mm)**  
**SL330 Chimney Offset/Return - Effective Height 15-1/2 in. (394 mm)**

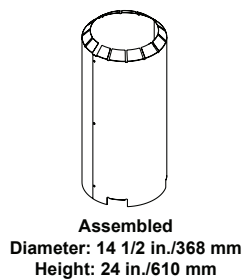


**Firestop Spacer**

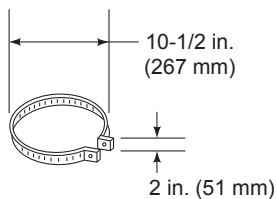
Catalog #	A	B	
FS338	0-deg.	14-1/2 in.	368 mm
FS339	15-deg.	18-3/8 in.	467 mm
FS340	30-deg.	23 in.	584 mm

A = Actual Length

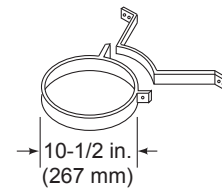
B = Effective length (length of chimney part after it has been snapped to another)



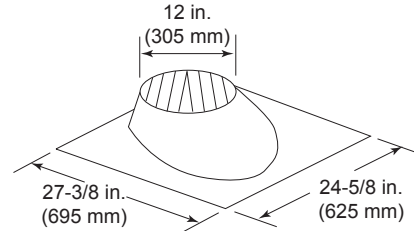
**AS8 SL300 Straight Attic Insulation Shield (shipped with unit)**



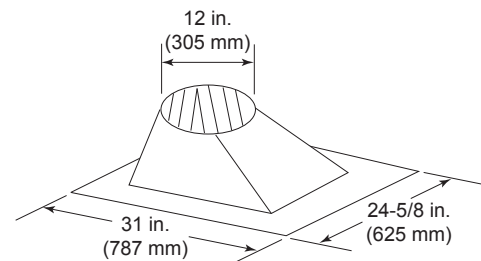
**JB877 Chimney Joint Band**



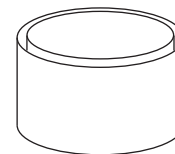
**CB876 Chimney Bracket**



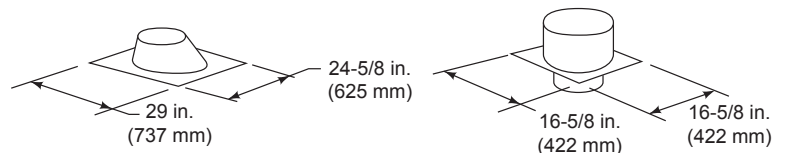
**RF370 - Roof Flashing Flat to 6/12 Pitch**



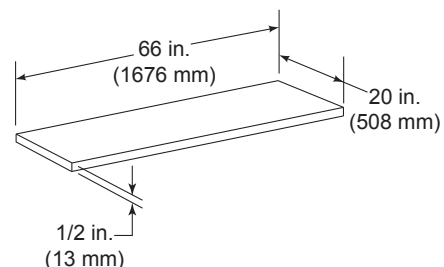
**RF371 - Roof Flashing 6/12 to 12/12 Pitch**



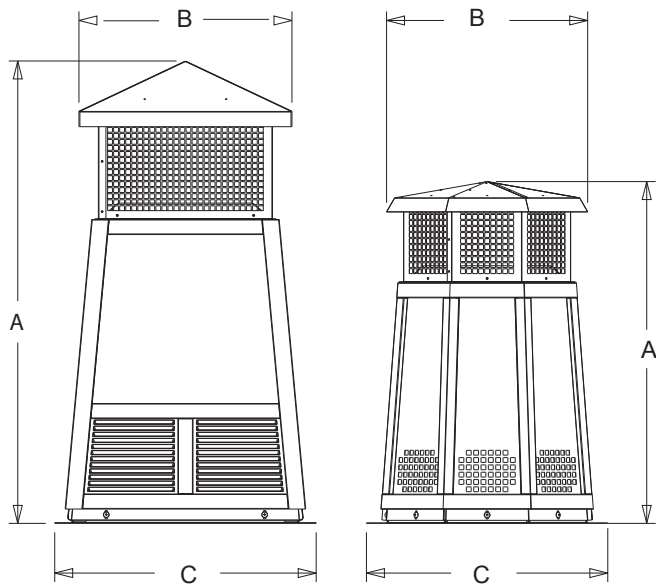
**MH841 Manufactured Home Thimble Extension**



**12966A Manufactured Home Thimble**



**HX4 Micore Hearth Extension**



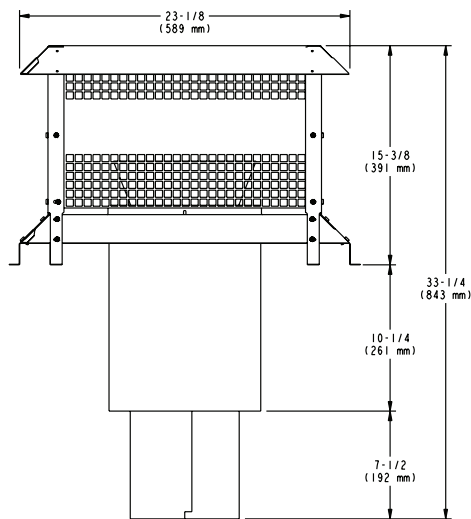
**DTS134/DTS146**

**DTO134/DTO146**

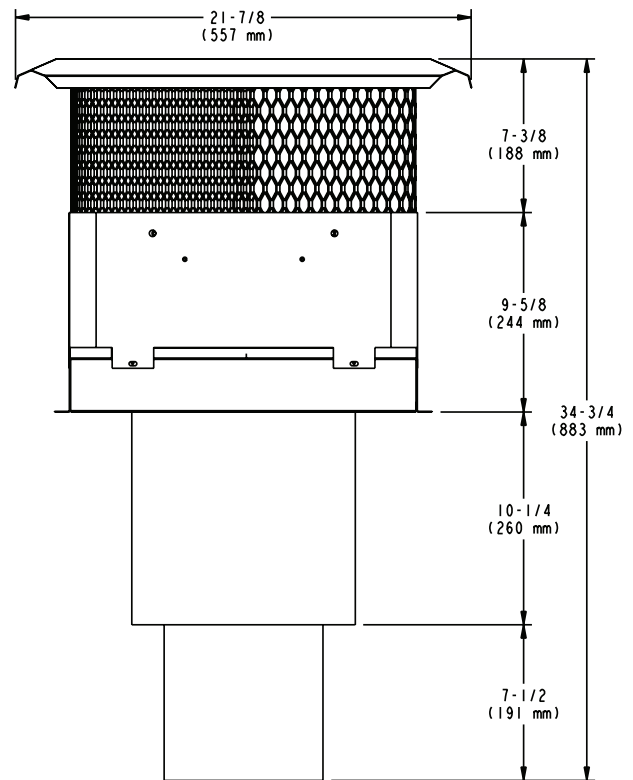
**Decorative Caps**

DTO134		A	B	C
	in	34	20	24
	mm	864	508	610
DTO146		A	B	C
	in	46	22.7	26
	mm	1168	576	660

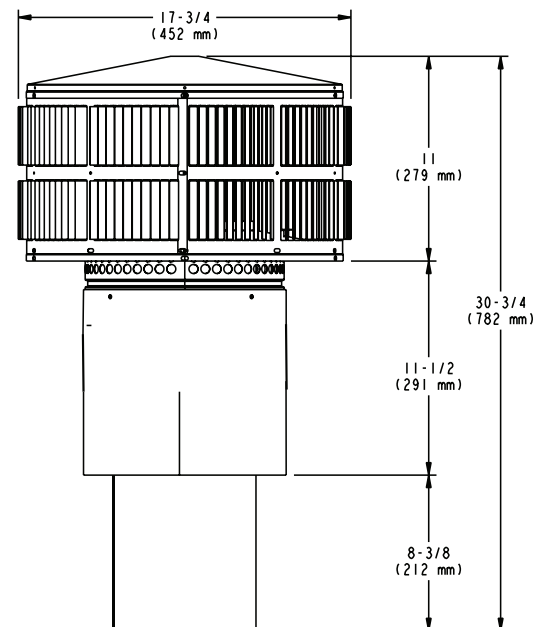
DTS134		A	B	C
	in	34	21.18	24
	mm	864	538	610
DTS146		A	B	C
	in	46	21.18	26
	mm	1168	538	660



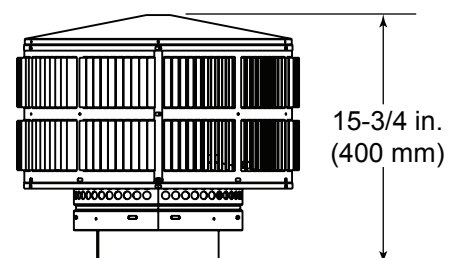
**ST375 Square Termination Cap**



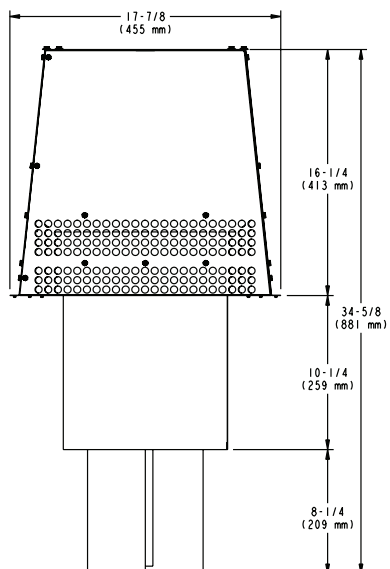
**TCT375 Terra Cotta Cap**



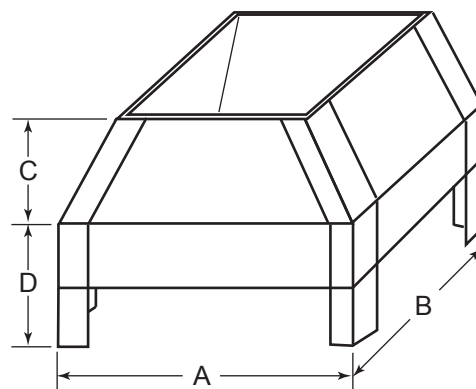
**TR342-B Round Telescoping Termination Cap**



**TR344 Round Termination Cap**

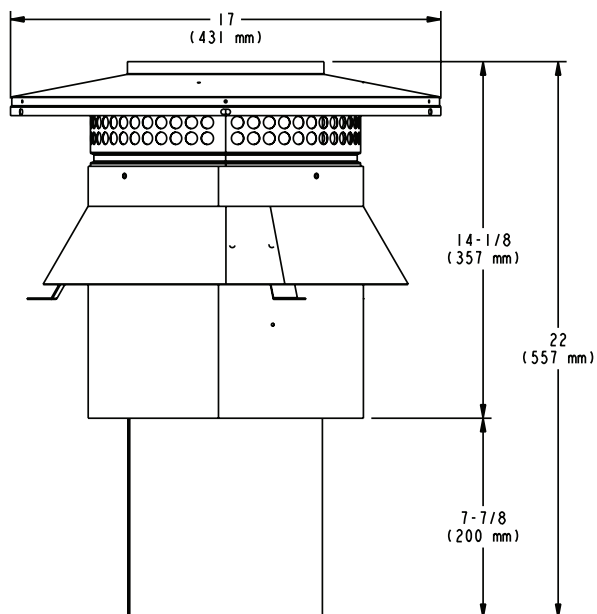


**TS345/TS345P Square Termination Cap**

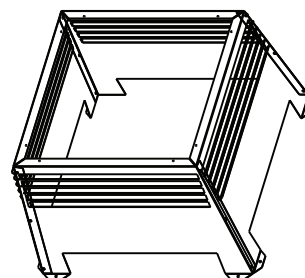


**LDS33/LDS46 Decorative Shroud**

Catalog #	A		B		C		D	
	in.	mm	in.	mm	in.	mm	in.	mm
LDS33	36	914	36	914	8.5	216	11	279
LDS46	48	1219	72	1829	8.5	216	11	279

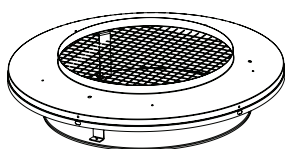


**CT-3-B**



**LDS-BV Decorative Shroud**

Catalog #	A		B		C		D		E	
	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm
LDS-BV	26	660	12.5	318	15.5	394	22	559	23	584
	mm		mm		mm		mm		mm	



**TR-TVK Top Vent Kit**

## DuraPlus Venting

Catalog #	Description
DV-8DP-BP	8" DuraPlus base plate
DV-8DP-E15	8" DuraPlus 15° elbow kit
DV-8DP-E30	8" DuraPlus 30° elbow kit
DV-8DP-E15KSS	8" DuraPlus 15° elbow kit (SS)
DV-8DP-E30KSS	8" DuraPlus 30° elbow kit (SS)
DV-8DP-WS	8" DuraPlus wall strap
DV-8DP-ES	8" DuraPlus elbow strap
DV-8DP-AWS	8" DuraPlus adjustable wall strap
DV-8DP-WSSS	8" DuraPlus wall strap (SS)
DV-8DP-FRS	8" DuraPlus firestop radiation shield
DV-8DP-XRB	8" DuraPlus extended roof bracket
DV-6DP-SC	6-8 Storm collar
DV-8DP-F6	8" DuraPlus flashing 0/12-6/12
DV-8DP-FF	8" DuraPlus flat roof flashing
DV-8DP-F12	8" DuraPlus flashing 7/12-12/12
DV-8DP-06	8x6 DuraPlus pipe
DV-8DP-09	8x9 DuraPlus pipe
DV-8DP-12	8x12 DuraPlus pipe
DV-8DP-24	8x24 DuraPlus pipe
DV-8DP-24SS	8x24 DuraPlus pipe (SS)
DV-8DP-36	8x36 DuraPlus pipe
DV-8DP-36SS	8x36 DuraPlus pipe (SS)
DV-8DP-VC	8" DuraPlus chimney cap

## **E. Accessories**

### **Lintel Bar**

LINTEL- Lintel Bar

### **Finishing Template**

TMP-PIIA

### **Heat-Zone-WD**

### **Mesh-HHT Firescreen**

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Quadra-Fire, a brand of Hearth & Home Technologies  
1915 West Saunders Street, Mount Pleasant, Iowa 52641  
[www.QuadraFire.com](http://www.QuadraFire.com)

Please contact your Quadra-Fire dealer with any questions or concerns.  
For the location of your nearest Quadra-Fire dealer, please visit [www.QuadraFire.com](http://www.QuadraFire.com).



# Owner's Manual

## Care and Operation

Pour demander un exemplaire en français de ce Manuel du propriétaire, visitez [www.quadra-fire.com/translations](http://www.quadra-fire.com/translations).

**INSTALLER:** Leave this manual with party responsible for use and operation.

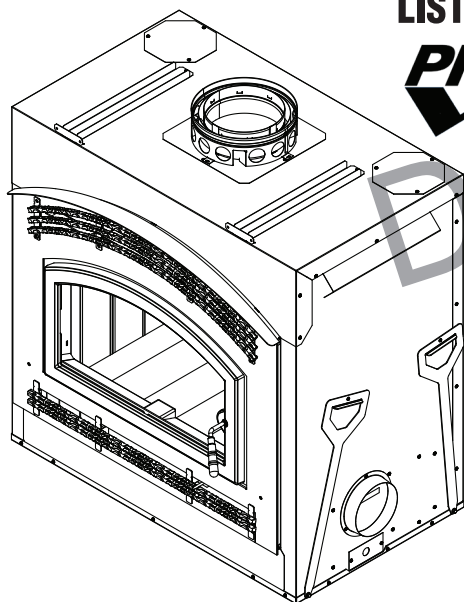
**OWNER:** Retain this manual for future reference.

**NOTICE:** *DO NOT* discard this manual!

# QUADRA-FIRE®

Model(s):

**Pioneer-II-C**



**EPA CERTIFIED WOODBURNING  
FIREPLACE**

Installation and service of this appliance should be performed by qualified personnel. Hearth & Home Technologies recommends HHT Factory Trained or NFI certified professionals.

**hearthED**  
FACTORY TRAINING  
Fuel Your Fire



**⚠ WARNING:** If the information in these instructions is not followed exactly, a fire or explosion may result causing property damage, personal injury, or death.

- **DO NOT** store or use gasoline or other flammable vapors and liquids in the vicinity of this or any other appliance.
- **DO NOT** overfire. Overfiring will void your warranty.
- Comply with all minimum clearances to combustibles as specified. Failure to comply may cause house fire.

### ⚠ WARNING



#### **HOT SURFACES!**

Glass and other surfaces are hot during operation AND cool down.

#### **Hot glass will cause burns.**

- **DO NOT** touch glass until it is cooled
  - NEVER allow children to touch glass
  - Keep children away
  - CAREFULLY SUPERVISE children in same room as fireplace.
  - Alert children and adults to hazards of high temperatures.
- High temperatures may ignite clothing or other flammable materials.**
- Keep clothing, furniture, draperies and other flammable materials away.

### ⚠ WARNING



#### **Fire Risk.**

For use with solid wood fuel only.

Other fuels may overfire and generate poisonous gases (i.e. carbon monoxide).

## Safety Alert Key:

- **DANGER!** Indicates a hazardous situation which, if not avoided will result in death or serious injury.
- **WARNING!** Indicates a hazardous situation which, if not avoided could result in death or serious injury.
- **CAUTION!** Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.
- **NOTICE:** Indicates practices which may cause damage to the fireplace or to property.

## Table of Contents

<b>1 Welcome</b>		<b>4 Maintenance and Service</b>	
A. Congratulations	3	A. Maintenance Tasks-Homeowners	18
B. LIMITED LIFETIME WARRANTY	4	1. Chimney Inspection	18
<b>2 Product Specific Information</b>		2. Creosote (Chimney) Cleaning	19
A. Appliance Certification	7	3. Care and Cleaning of Plated Surfaces	20
B. BTU & Efficiency Specifications	7	4. Glass Door	20
C. Mobile Home Approved	7	5. Glass Cleaning	20
D. Glass Specifications	7	6. Door Gasket	20
<b>3 Important Safety and Operating Information</b>		7. Ash Removal	20
A. Fireplace Safety	8	8. Baffle and Blanket	20
1. Clear Space	8	9. Firebrick	20
2. Firebrick	9	B. Replacement Maintenance	21
3. Baffle and Blanket	9	1. Glass Replacement	21
4. Over-Firing Your Fireplace	9	2. Tighten or Adjust Door Latch	21
5. Chimney Fire	9	3. Door Handle Assembly	22
B. General Operating Parts	10	4. Firebrick Replacement	22
1. Automatic Combustion Control (ACC)	11	5. Baffle Removal and Installation	23
2. ACC Override	11	6. Fan Replacement	23
3. Outside Air	11	7. Timer Assembly Replacement	24
4. Glass Doors	12	8. Timer Removal and Replacement	26
5. Convection Fan Operation	12	<b>5 Troubleshooting</b>	
C. Fuel	12	A. FAQs	29
1. Hardwood vs. Softwood	13	B. Troubleshooting Table	31
2. Moisture Content	13	<b>6 Reference Materials</b>	
3. Seasoning	13	A. Service Parts	32
4. Storing Wood	14	B. Contact Information	37
5. Burning Process	14		
6. Dirty Glass	14		
7. Creosote Formation	14		
8. Opacity	14		
D. First Fire	14		
E. Lighting Instructions	15		
F. Frequently Asked Questions	17		

# 1 Welcome

Read this manual before installing or operating this fireplace.  
Please retain this owner's manual for future references.

## A. Congratulations

Congratulations on selecting a Quadra-Fire wood burning fireplace. The Quadra-Fire fireplace you have selected is designed to provide the utmost in safety, reliability, and efficiency.

As the owner of a new fireplace, you'll want to read and carefully follow all of the instructions contained in this Owner's Manual. Pay special attention to all Cautions and Warnings.

This Owner's Manual should be retained for future reference. We suggest that you keep it with your other important documents and product manuals.

Your new Quadra-Fire wood burning fireplace will give you years of durable use and trouble-free enjoyment. Welcome to the Quadra-Fire family of fireplace products!

Quadra-Fire is a registered trademark of Hearth & Home Technologies.

### Local Dealer Information

**DEALER:** Fill in your name, address, phone and email information here and fireplace information below.

Dealer Name: \_\_\_\_\_  
Address: \_\_\_\_\_  
Phone: \_\_\_\_\_  
Email: \_\_\_\_\_

### Fireplace Information:

Brand: \_\_\_\_\_ Model Name: \_\_\_\_\_  
Serial Number: \_\_\_\_\_ Date Installed: \_\_\_\_\_

## Listing Label Information/Location

The model information regarding your specific fireplace can be found on the rating plate usually located in the control area of the fireplace.

**Model:** Pioneer-II-C  
**EPA CERTIFIED FIREPLACE**

**QUADRA-FIRE**  
NOTHING BURNS LIKE A QUAD  
A brand of Hearth & Home Technologies  
7571 - 215th Street West, Lakeville, MN 55044  
www.quadrafire.com

**SERIAL NO./NUMERO DESERE**  
MP184

**MODEL**  
PIONEER-II-C

**FIRE CHAMBER INTENDED FOR USE WITH HEARTH & HOME TECHNOLOGIES LISTED FIREPLACE PARTS. SEE INSTALLATION AND OPERATING INSTRUCTIONS FOR THIS MODEL. REPLACE GLASS ONLY WITH CERAMIC.**

**DO NOT OVERFIRE. USE ONLY: SOLID WOOD FUEL. DO NOT USE A FIREPLACE INSERT OR OTHER PRODUCTS NOT SPECIFIED FOR USE WITH THIS PRODUCT.**

**WARNING! THIS FIREPLACE HAS NOT BEEN TESTED WITH AN UNVENTED GAS LOG SET. TO REDUCE THE RISK OF FIRE OR INJURY, DO NOT INSTALL AN UNVENTED GAS LOG SET INTO FIREPLACE.**

**DO NOT USE GRATE OR ELEVATE FIRE. BUILD WOOD FIRE DIRECTLY ON FIREBRICK.**

**WARNING! TO AVOID THE RISK OF DAMAGING FIREPLACE MATERIALS AND INCREASING THE RISK OF SPREADING A FIRE DO NOT USE THE FIREPLACE TO COOK OR WARM FOOD.**

**INSTALL AND USE ONLY IN ACCORDANCE WITH MANUFACTURER'S INSTALLATION, VENTING AND OPERATING INSTRUCTIONS. ANY AREA INCORPORATING WARM OR COLD AIR DUCTS SHALL BE ENCLOSED IN ACCORDANCE WITH THE MANUFACTURER'S INSTALLATION INSTRUCTIONS. CONTACT YOUR LOCAL BUILDING OR FIRE OFFICIALS OR AUTHORITY HAVING JURISDICTION ABOUT RESTRICTIONS, INSTALLATION INSPECTION AND PERMITS REQUIRED IN YOUR AREA. COMPONENTS REQUIRED FOR INSTALLATION: HHT SL300 SERIES PIPE OR DURAVENT DURA PLUS SYSTEM, TERMINATION CAP, HEARTH EXTENSION AND REQUIRED ACCESSORY CHIMNEY AIR KIT PART CAK4A. DO NOT CONNECT THIS UNIT TO A CHIMNEY SERVING ANOTHER APPLIANCE. DANGER: RISK OF ELECTRICAL SHOCK. DISCONNECT POWER SUPPLY BEFORE SERVICING. ELECTRICAL RATING: 115 VAC <3.0 AMPS 60 HZ MUST PROVIDE A SOURCE OF AIR TO PREVENT AIR STARVATION FROM COMBUSTION WHICH COULD RESULT IN HIGH LEVELS OF CARBON MONOXIDE.**

**FIREPLACE ALSO FOR USE IN MANUFACTURED/MOBILE HOMES WITH SOLID FUEL ONLY**  
YES ☒ NO ☐

**FIREPLACE FOR USE OUTDOORS**  
YES ☐ NO ☒

**CHIMNEY/CHEMNEE**  
2 IN. MIN.  
51 MM

**CLEARANCE TO COMBUSTIBLES:**  
DEGAGEMENT DES MATEAUX COMBUSTIBLES:

**BACK** 1/2 IN. MIN. 13 MM MIN.  
**RETOUR** 13 IN. MIN. 25 MM MIN.  
**SIDE** 1 IN. MIN. 25 MM MIN.  
**COTE** 25 IN. MIN. 635 MM MIN.

**IF INSTALLATION OR OPERATING INSTRUCTIONS ARE MISSING CONTACT: HEARTH & HOME TECHNOLOGIES, 7571 215th Street West, Lakeville, MN 55044**

**THE HEARTH EXTENSION MUST BE INSTALLED ACCORDING TO THE INSTALLATION INSTRUCTIONS.**

This wood heater needs periodic inspection and repair for proper operation. Consult 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.

**DO NOT REMOVE THIS LABEL** Made in U.S.A. of US and imported parts

Mfg by: HEARTH & HOME technologies 2019 2020 2021 2022 2023 2024 Jan Feb Mar Apr May June July Aug Sept Oct. Nov. Dec.

U.S. ENVIRONMENTAL PROTECTION AGENCY - Certified to comply with 2020 particulate emission standards using cord wood. This wood heater was found to have an average emissions rate of 2.0g/hr using method ASTM E3053-17.

4184-990A

Model Number

Serial Number

## B. LIMITED LIFETIME WARRANTY

### Hearth & Home Technologies LIMITED LIFETIME WARRANTY

Hearth & Home Technologies, on behalf of its hearth brands ("HHT"), extends the following warranty for HHT gas, wood, pellet and electric hearth appliances that are purchased from an HHT authorized dealer.

#### **WARRANTY COVERAGE:**

HHT warrants to the original owner of the HHT appliance at the site of installation, and to any transferee taking ownership of the appliance at the site of installation within two years following the date of original purchase, that the HHT appliance will be free from defects in materials and workmanship at the time of manufacture. After installation, if covered components manufactured by HHT are found to be defective in materials or workmanship during the applicable warranty period, HHT will, at its option, repair or replace the covered components. HHT, at its own discretion, may fully discharge all of its obligations under such warranties by replacing the product itself or refunding the verified purchase price of the product itself. The maximum amount recoverable under this warranty is limited to the purchase price of the product. This warranty is subject to conditions, exclusions and limitations as described below.

#### **WARRANTY PERIOD:**

Warranty coverage for consumers begins at the date of installation. 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, authorized HHT dealer/distributor, whichever occurs earlier. However, the warranty shall commence no later than 24 months following the date of product shipment from HHT, regardless of the installation or occupancy date. The warranty period for parts and labor for covered components is produced in the following table.

The term "Limited Lifetime" in the table below is defined as: 20 years from the beginning date of warranty coverage for gas appliances, and 10 years from the beginning date of warranty coverage for wood and pellet appliances. These time periods reflect the minimum expected useful lives of the designated components under normal operating conditions.

Warranty Period		HHT Manufactured Appliances and Venting					
Parts	Labor	Gas	Pellet	Wood	Electric	Venting	Components Covered
1 Year		X	X	X	X	x	All parts and material except as covered by Conditions, Exclusions, and Limitations listed
2 years			X	X			Igniters, auger motors, electronic components, and glass
		X	X	X			Factory-installed blowers
				X			Molded refractory panels
		X					Ignition Modules
3 years			X				Firepots, burnpots, mechanical feeders/auger assemblies
5 years	1 year	X					Vent Free burners, Vent Free ceramic fiber logs, Aluminized Burners
			X	X			Castings and Baffles
6 years	3 years			X			Catalyst - limitations listed
7 years	3 years		X	X			Manifold tubes, HHT chimney and termination
10 years	1 year	X					Burners, logs and refractory
Limited Lifetime	3 years	X	X	X			Firebox and heat exchanger, Grate and Stainless Steel Burners, FlexBurn® System (engine, inner cover, access cover and fireback)
90 Days		X	X	X	X	X	All replacement parts beyond warranty period

### **WARRANTY CONDITIONS:**

- This warranty only covers HHT appliances that are purchased through an HHT authorized dealer or distributor. A list of HHT authorized dealers is available on the HHT branded websites.
- This warranty is only valid while the HHT appliance remains at the site of original installation.
- This warranty is only valid in the country in which the HHT authorized dealer or distributor that sold the appliance resides.
- Contact your installing dealer for warranty service. If the installing dealer or distributor is unable to provide necessary parts, contact the nearest HHT authorized dealer or supplier. Additional service fees may apply if you are seeking warranty service from a dealer other than the dealer from whom you originally purchased the product.
- Check with your dealer in advance for any costs to you when arranging a warranty call. Travel and shipping charges for parts are not covered by this warranty.
- Limited Catalyst Warranty
  - o For wood burning products containing a catalyst, the catalyst will be warranted for a six-year period as follows: if the original catalyst or a replacement catalyst proves defective or ceases to maintain 70% of its particulate emission reduction activity (as measured by an approved testing procedure) within 36 months from the purchase date, the catalyst will be replaced for free.
  - o From 37 to 72 months a pro-rated credit will be allowed against a replacement catalyst and labor credit necessary to install the replacement catalyst. The proration rate is as follows:

Amount of Time Since Purchase	Credit Towards Replacement Cost
0 - 36 Months	100%
37 - 48 Months	30%
49 - 60 Months	20%
61 - 72 Months	10%

- o Any replacement catalyst will be warranted under the terms of the catalyst warranty for the remaining term of the original warranty. The purchaser must provide the name, address, and telephone number of the location where the product is installed, proof of original purchase date, date of failure, and any relevant information regarding the failure of the catalyst.

### **WARRANTY EXCLUSIONS:**

This warranty does not cover the following:

- Changes in surface finishes as a result of normal use. As a heating appliance, some changes in color of interior and exterior surface finishes may occur. This is not a flaw and is not covered under warranty.
- Damage to printed, plated, or enameled surfaces caused by fingerprints, accidents, misuse, scratches, melted items, or other external sources and residues left on the plated surfaces from the use of abrasive cleaners or polishes.
- Repair or replacement of parts that are subject to normal wear and tear during the warranty period are not covered. These parts include: paint, wood and pellet gaskets, firebricks, grates, flame guides, batteries and the discoloration of glass.
- Minor expansion, contraction, or movement of certain parts causing noise. These conditions are normal and complaints related to this noise are not covered by this warranty.
- Damages resulting from: (1) failure to install, operate, or maintain the appliance in accordance with the installation instructions, operating instructions, and listing agent identification label furnished with the appliance; (2) failure to install the appliance in accordance with local building codes; (3) shipping or improper handling; (4) improper operation, abuse, misuse, continued operation with damaged, corroded or failed components, accident, or improperly/incorrectly performed repairs (5) environmental conditions, inadequate ventilation, negative pressure, or drafting caused by tightly sealed constructions, insufficient make-up air supply, or handling devices such as exhaust fans or forced air furnaces or other such causes; (6) use of fuels other than those specified in the operation instructions; (7) installation or use of components not supplied with the appliance or any other components not expressly authorized and approved by HHT; (8) modification of the appliance not expressly authorized and approved by HHT in writing; and/or (9) interruptions or fluctuations of electrical power supply to the appliance.
- Non-HHT venting components, hearth connections or other accessories used in conjunction with the appliance.
- Any part of a pre-existing fireplace system in which an insert or a decorative gas appliance is installed.
- HHT's obligation under this warranty does not extend to the appliance's capability to heat the desired space. Information is provided to assist the consumer and the dealer in selecting the proper appliance for the application. Consideration must be given to the appliance location and configuration, environmental conditions, insulation and air tightness of the structure.

**This warranty is void if:**

- The appliance has been over-fired, operated in atmospheres contaminated by chlorine, fluorine, or other damaging chemicals. Over-firing can be identified by, but not limited to, warped plates or tubes, deformation/warping of interior cast iron structure or components, rust colored cast iron, bubbling, cracking and discoloration of steel or enamel finishes.
- The appliance is subjected to prolonged periods of dampness or condensation.
- There is any damage to the appliance or other components due to water or weather damage which is the result of, but not limited to, improper chimney or venting installation.

**LIMITATIONS OF LIABILITY**

- The owner's exclusive remedy and HHT's sole obligation under this warranty, under any other warranty, express or implied, or in contract, tort or otherwise, shall be limited to replacement, repair, or refund, as specified above. In no event will HHT be liable for any incidental or consequential damages caused by defects in the appliance. Some states do not allow exclusions or limitation of incidental or consequential damages, so these limitations may not apply to you. This warranty gives you specific rights; you may also have other rights, which vary from state to state. EXCEPT TO THE EXTENT PROVIDED BY LAW, HHT MAKES NO EXPRESS WARRANTIES OTHER THAN THE WARRANTY SPECIFIED HEREIN. THE DURATION OF ANY IMPLIED WARRANTY IS LIMITED TO DURATION OF THE EXPRESSED WARRANTY SPECIFIED ABOVE.

DRAFT



## 2 Product Specific Information

### A. Appliance Certification

<b>Model:</b>	Pioneer-II-C
<b>Laboratory:</b>	Underwriters Laboratories, Inc.
<b>Report No:</b>	Project
<b>Type:</b>	Wood Fireplace
<b>Standard:</b>	UL 127 - 2011 and CAN/ULC S610-2018 (A1998) and (UM) 84-HUD, Manufactured Home Approved.

### B. BTU & Efficiency Specifications

EPA Certified Emissions:	1.8 g/hr
*LHV Tested Efficiency:	76%
**HHV Tested Efficiency:	70%
***EPA BTU Output:	17,600 to 48,200
Vent Size:	8 inches
Firebox Size:	2.7
Recommended Log Length:	22 inches
Fuel	Seasoned Cord Wood less than 20% moisture
*Weighted average LHV (Low Heating Value) efficiency using cord wood and data collected during EPA emission test. LHV assumes the moisture is already in a vapor state so there is no loss in energy to vaporize.	
**Weighted average HHV (High Heating Value) efficiency using cord wood and data collected during EPA emission test. HHV includes the energy required to vaporize the water in the fuel.	
***A range of BTU outputs based on HHV and the burn rates from the low and high EPA tests, using cord wood.	

The Pioneer-II-C is Certified to comply with 2020 particulate emission standards.



The Pioneer-II-C Wood Appliance meets the U.S. ENVIRONMENTAL PROTECTION AGENCY Certified to comply with 2020 particulate emission standards using cord wood.

This wood heater needs periodic inspection and repair for proper operation. It is against federal regulations to operate this wood heater in a manner inconsistent with operating instructions in this manual.

### C. Mobile Home Approved

- This appliance is approved for mobile home installations when not installed in a sleeping room and when an outside combustion air inlet is provided.
- The structural integrity of the mobile home floor, ceiling, and walls must be maintained.
- The appliance must be properly grounded to the frame of the mobile home with #8 copper ground wire.
- Outside Air Kit must be installed in a mobile home installation.

### D. Glass Specifications

This fireplace is equipped with 5mm ceramic glass. Replace glass only with 5mm ceramic glass. Please contact your dealer for replacement glass.



#### WARNING



#### Fire Risk.

Hearth & Home Technologies disclaims any responsibility for, and the warranty will be voided by, the following actions:

- Installation and use of any damaged appliance.
- Modification of the appliance.
- Installation other than as instructed by Hearth & Home Technologies.
- Installation and/or use of any component part not approved by Hearth & Home Technologies.
- Operating appliance without fully assembling all components.
- Do NOT Overfire - If appliance or chimney connector glows, you are overfiring.

Any such action that may cause a fire hazard.

Improper installation, adjustment, alteration, service or maintenance can cause injury or property damage.

For assistance or additional information, consult a qualified installer, service agency or your dealer.

NOTE: Hearth & Home Technologies, manufacturer of this appliance, reserves the right to alter its products, their specifications and/or price without notice.

Quadra-Fire is a registered trademark of Hearth & Home Technologies.



# 3 Important Safety and Operating Information

## A. Fireplace Safety

Most problems are caused by improper installation and operation of the fireplace. To provide reasonable fire safety, the following should be given serious consideration:

- The fire should be supervised whenever the fireplace is in use.
- An annual inspection should be performed on the fireplace system.
- Install at least one smoke detector on each floor of your home to ensure your safety.
- Install a CO detector in the room with the fireplace.
- Install a conveniently located Class A fire extinguisher near the fireplace.
- Devise a practiced evacuation plan, consisting of at least two escape routes.
- Devise a plan to deal with a chimney fire:
  - Close all openings into the fireplace.
  - Evacuate.
  - Notify the fire department.

**WARNING! Risk of Fire!** *Hearth & Home Technologies disclaims any responsibility for, and the warranty and agency listing will be voided by the following actions.*

### DO NOT:

- operate damaged fireplace
- modify fireplace
- overfire
- install any gas log set
- install any component not approved by Hearth & Home Technologies
- install parts or components not Listed or approved
- operate the fireplace without fully assembling all components

*Improper installation, adjustment, alteration, service or maintenance can cause injury or property damage.*

**WARNING:** This product and the fuels used to operate this product (wood and wood pellets), and the products of combustion of such fuels, 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](http://www.P65Warnings.ca.gov).

## 1. Clear Space

Combustible materials must not be stored on the hearth extension. Room furnishings such as drapes, curtains, chairs or other combustibles must be at least 4 ft (1219 mm) from the open front of the fireplace.

Combustible materials are materials made of or surfaced with any of the following materials:

- Wood
- Plant fibers
- Plywood/OSB
- Any material that can ignite and burn, flame proofed or not, plastered or un-plastered.
- Compressed paper
- Plastic
- Drywall

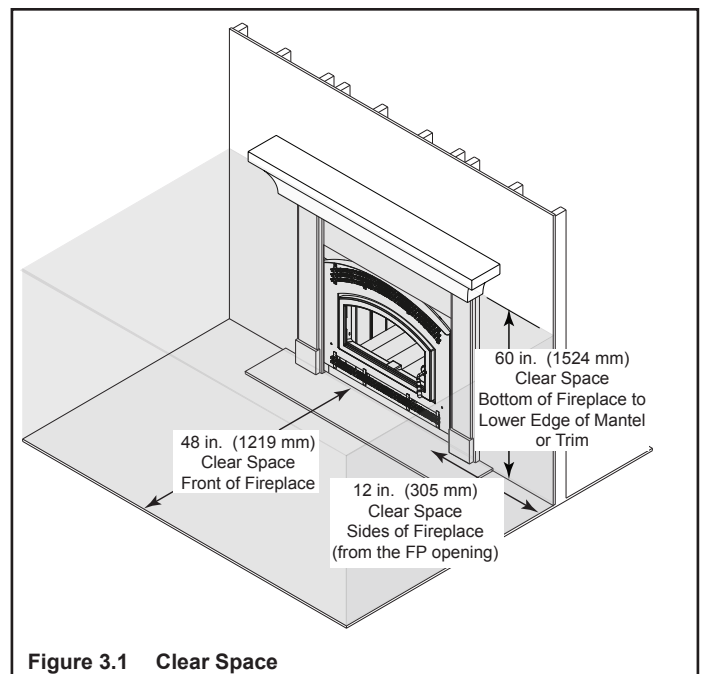
Non-combustible materials are materials which will not ignite and burn, composed of any combination of the following:

- Steel
- Brick
- Concrete
- Glass
- Iron
- Tile
- Slate
- Plasters

**WARNING! Risk of Fire!** *Keep combustible materials, gasoline and other flammable vapors and liquids clear of the fireplace.*

### DO NOT:

- store flammable materials close to the fireplace
- use gasoline, lantern fuel, kerosene, charcoal lighter fluid or similar liquids to start or “freshen up” a fire in this fireplace.



## 2. Firebrick

Your fireplace is lined with high quality firebrick, which has exceptional insulating properties.

Do not operate the fireplace without bricks. Make sure bricks are installed as shown in Section 5.

Do not use a grate; simply build a fire on the firebox floor.

## 3. Baffle and Blanket

Ensure correct baffle and baffle protection channel placement; replace baffle components if damaged or missing. (Please refer to Section 5.)

**NOTICE:** Firebox damage due to improper baffle placement is not covered by warranty. Operate the wood burning fireplace with the baffle in the correct position only. Not doing so could result in:

- reduced efficiency
- overheating the chimney
- overheating the rear of the firebox
- poor performance

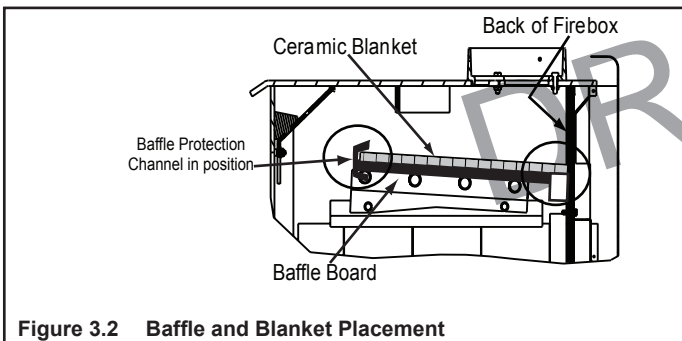


Figure 3.2 Baffle and Blanket Placement

The baffle board must be in contact with the back of the firebox. The ceramic blanket should lay on top of the baffle board. The baffle protection channel should be in position and cover the front of the blanket and baffle board.

## 4. Over-Firing Your Fireplace

### DO NOT OVERFIRE THIS FIREPLACE UNIT

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

To prevent over-firing your fireplace. DO NOT:

- use flammable liquids
- overload with wood
- burn trash or large amounts of scrap lumber
- permit too much air to the fire (leaving the door open)

Symptoms of over-firing may include one or more of the following:

- chimney connector or fireplace glowing
- roaring, rumbling noises
- loud cracking or banging sounds
- metal warping
- chimney fire

What to do if your fireplace is over-firing:

- Immediately close the door and air controls to reduce air supply to the fire.
- If you suspect a chimney fire, call the fire department and evacuate your house.
- Contact your local chimney professional and have your fireplace and chimney inspected for any damage.
- Do not use your fireplace until the chimney professional informs you it is safe to do so.
- Hearth & Home Technologies WILL NOT warranty fireplaces that exhibit evidence of over-firing. Evidence of over-firing includes, but is not limited to:
  - warped air tube
  - deteriorated refractory brick
  - deteriorated baffle and other interior components

## 5. Chimney Fire

In the event of a chimney fire:

- Have the chimney and adjacent structure inspected by qualified professionals. Hearth & Home Technologies recommends that NFI or CSIA certified professionals, or technicians under the direction of certified professionals, conduct a minimum of an **NFPA 211 Level 2** inspection of the chimney.
- Replace components of the chimney and fireplace as specified by the professionals.
- Ensure all joints are properly engaged and the chimney is properly secured.

**WARNING! Risk of Fire!** A chimney fire can permanently damage your chimney system. Failure to replace damaged components and make proper repairs can cause a structure fire.

## **WARNING**



### **HOT SURFACES!**

Glass and other surfaces are hot during operation AND cool down.

### **Hot glass will cause burns.**

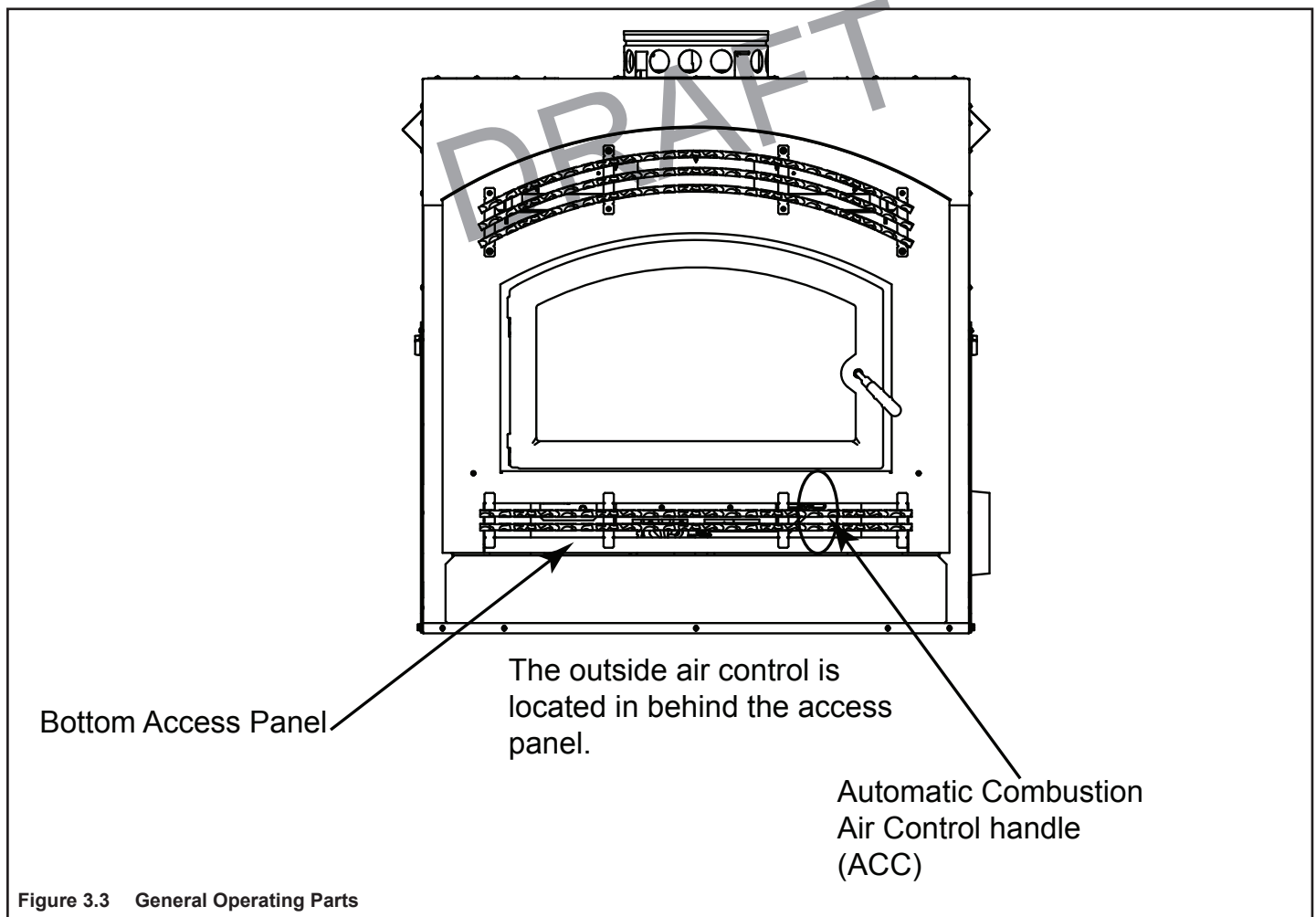
- **DO NOT** touch glass until it is cooled
- NEVER allow children to touch glass
- Keep children away
- CAREFULLY SUPERVISE children in same room as fireplace.
- Alert children and adults to hazards of high temperatures.

### **High temperatures may ignite clothing or other flammable materials.**

- Keep clothing, furniture, draperies and other flammable materials away.

## **B. General Operating Parts**

**WARNING! DO NOT** operate fireplace before reading and understanding operating instructions. Failure to operate fireplace according to operating instructions could cause fire or injury.



## 1. Automatic Combustion Control (ACC)

The automatic combustion control system allows you to set the fireplace to high (slide the combustion air control all the way to the right), start the fire, and then move the combustion air control to the desired burn level. The fire will automatically go to that level once it is fully established. This allows for less interaction with the fire by the homeowner and more efficient use of fuel while maintaining the desired heat output.

After the fireplace becomes hot, you may prefer to not activate the ACC when reloading fuel. If you do not slide the combustion air control all the way to the right, the ACC will not be activated.

**NOTICE:** If reloading a bright, hot coal bed for longer (low) burn time, setting the ACC may not be required. Burn dry, well seasoned wood.

**NOTICE:** To establish your settings, always begin with the air control all the way to the left to CLOSED and then move it to the right for your desired setting.

**IMPORTANT!** As you move the combustion air control to the RIGHT, you will feel resistance about three-fourths of the way. You must move past that resistance approximately 1 in. (25mm) to fully engage the automatic combustion control (ACC) system.

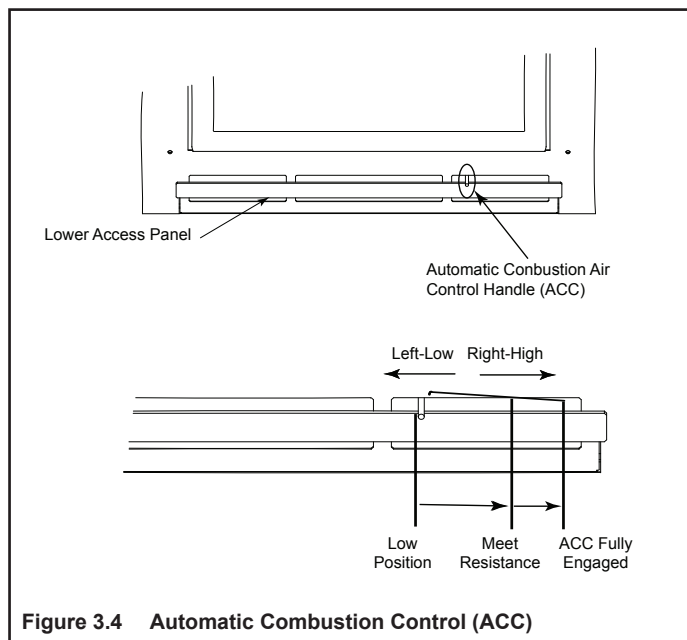


Figure 3.4 Automatic Combustion Control (ACC)

## 2. ACC Override

The ACC OVERRIDE lever is located behind the lower access panel (See Figure 3.4) and may be used to override the setting of the automatic combustion air control. If the ACC has been activated and burn rate needs to be slowed, remove the bottom access panel by lifting it up and pulling it off. To close down the air supply for an over-fire situation or to slow the burn rate down immediately, slide the linkage to the left. See Figure 3.5.

Slide the combustion air control all the way to the left also. Reinstall the access panel.

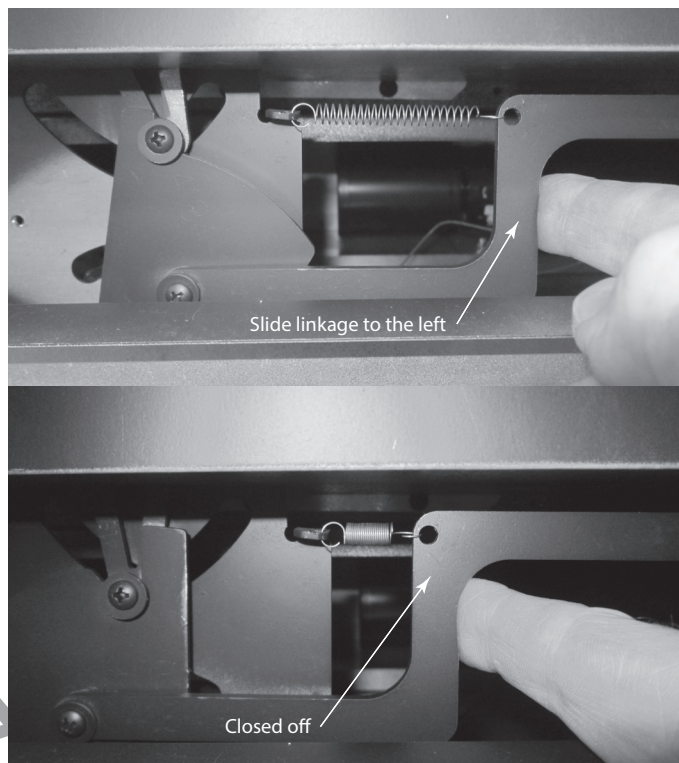


Figure 3.5 ACC Override

## 3. Outside Air

**NOTICE:** Use of outside air is required.

**CAUTION!** Outside air control handle may be warm. Allow unit to cool down before closing.

A source of air (oxygen) is required in order for combustion to take place.

1. Before lighting the fire open the bottom access panel by lifting it up and pulling it off.
2. Locate the handle on either the left or right side. Lift the handle up and pull out to open the door (pushing the handle in will close the door).
3. Reinstall the bottom access panel.

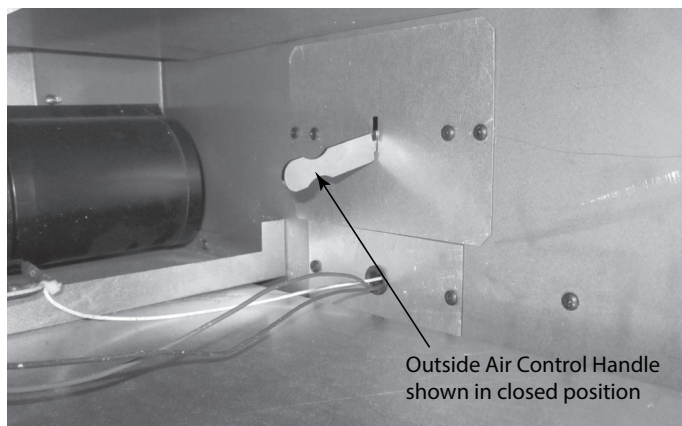


Figure 3.6 Outside Air Control Handle



#### 4. Glass Door

This fireplace has been tested and is intended for use with doors as supplied with this fireplace.

**WARNING! Risk of Fire and Smoke! Fireplace should be operated only with doors fully open or door fully closed. If door is left partly open, gas and flame may be drawn out of the fireplace opening.**

A firescreen (MESH-HHT) must be used to control sparks if the homeowner chooses to operate the fireplace with the door open.

##### **WARNING! Fire Risk!**

- Use firescreen when burning fireplace with door open.
- Do not use firescreen or glass door to hold burning material in fireplace.

*Firescreen controls sparks.*

*Glass may break or burning material may roll out.*

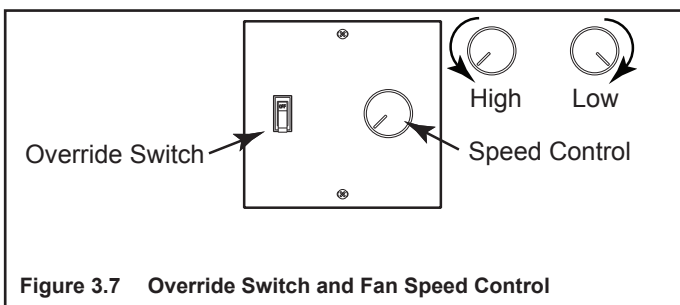
Only the screen specifically tested and listed for use with this fireplace model should be used.

**WARNING! RISK OF Fire! Do NOT install and or use any component not approved by Hearth & Home Technologies.**

Always wear gloves when installing or removing the screen as the screen may become extremely hot while in use.

#### 5. Convection Fan Operation

The fireplace is equipped with a temperature-sensitive snap disc that will turn the convection fan on and off automatically, depending on the temperature of the fireplace.



An override switch and fan speed control have been installed on the wall in close proximity to the fireplace.

The speed of the fan can be regulated by the speed control knob.

If the fan is not coming on at the desired time, flip the override switch to manual and operate the fan as described below:

- **Initial (cold) Startup**

Leave fan off until your fireplace is hot and a good coal bed is established, approximately 30 minutes after fuel is lit.

- **High Burn Setting**

The fan may be left on throughout the burn.

- **Medium or Medium High Burn Setting**

The fan should be left off until a good burn is established, then turned on medium or high rate.

- **Low Burn Setting**

The fan tends to cool off the fireplace. Leave fan off until the burn is well established; then, if you wish, turn the fan on at a low rate.

#### C. Fuel

**WARNING! For use with solid wood fuel only.**

*Other fuels may overfire and generate poisonous gases (i.e. carbon monoxide).*

This fireplace 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
- Paper products, cardboard, plywood, or particleboard.

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.

## 1. Hardwood vs. Softwood

Your fireplace's performance depends on the quality of the firewood you use. One species of wood varies very little to the other in terms of energy content. All seasoned wood contains about 8,000 BTU's per pound. Hardwoods have a greater density than softwoods; a piece of hardwood will contain about 60% more BTU's than an equal size piece of softwood. A cord of seasoned oak (hardwood) would contain about 60% more potential energy than a cord of seasoned pine (softwood).

Most softwoods are coniferous. These are trees with needle-like leaves that stay green all year and carry their seeds exposed in a cone. Examples of coniferous trees are Douglas fir, pine, spruce and cedar. Softwoods, being more porous, require less time to dry, burn faster and are easier to ignite than hardwoods. Hardwoods are deciduous trees, broadleaf trees that lose their leaves in the fall. Their seeds are usually found within a protective pod or enclosure. Some examples of deciduous trees are oak, maple, apple, and birch. However, it should be noted that there are some deciduous trees that are definitely not considered hardwoods such as poplar, aspen and alder. Hardwoods require more time to season, burn slower and are usually harder to ignite than softwoods. Obviously, you will use the type of wood that is most readily available in your area. However, if at all possible the best arrangement is to have a mix of softwood and hardwood. This way you can use the softwood for starting the fire, giving off quick heat to bring the fireplace up to operating temperature. Add the hardwood for slow, even heat and longer burn time.

### **WARNING! Risk of Fire!**

- **DO NOT** burn wet or green wood.
- Wet, unseasoned wood can cause accumulation of creosote.

Soft woods	Hard woods
<ul style="list-style-type: none"><li>• Douglas Fir</li><li>• Pine</li><li>• Spruce</li><li>• Cedar</li><li>• Poplar</li><li>• Aspen</li><li>• Alder</li></ul>	<ul style="list-style-type: none"><li>• Oak</li><li>• Maple</li><li>• Apple</li><li>• Birch</li></ul>

## 2. Moisture Content

The majority of the problems fireplace owners experience are caused by trying to burn wet, unseasoned wood. Freshly cut wood can be as much water as it is wood, having a moisture content of around 50%. Imagine a wooden bucket that weighs about 8 pounds. Fill it with a gallon of water, put it in the firebox and try to burn it. This sounds ridiculous but that is exactly what you are doing if you burn unseasoned wood. Dead wood lying on the forest floor should be considered wet, and requires full seasoning time. Standing dead wood can be considered to be about two-thirds seasoned, if cut at the dry time of the year.

Burning wet, unseasoned wood will produce less heat output because it requires energy in the form of heat to evaporate the water trapped inside. This is wasted energy that should be used for heating your home. This moisture evaporates in the form of steam which has a cooling effect in your firebox and chimney system. When combined with tar and other organic vapors from burning wood it will form creosote which condenses in the relatively cool firebox and chimney.

Even dry wood contains at least 15% moisture by weight, and should be burned hot enough to keep the chimney hot for as long as it takes to dry the wood out - about one hour. To tell if wood is dry enough to burn, check the ends of the logs. If there are cracks radiating in all directions from the center, it is dry. If your wood sizzles in the fire, even though the surface is dry, it may not be fully cured.

## 3. Seasoning

Seasoned firewood is nothing more than wood that is cut to size, split and air dried to a moisture content of around 20%. The time it takes to season wood varies from around nine months for soft woods to as long as eighteen months for hardwoods. The key to seasoning wood is to be sure it has been split, exposing the wet interior and increasing the surface area of each piece. A tree that was cut down a year ago and not split is likely to have almost as high a moisture content now as it did when it was cut.

To season wood:

- Cut logs to size
- Split to 6 in. (152 mm) or less
- Air dry to a moisture content of around 20%
  - Soft wood - about nine months
  - Hard wood - about eighteen months

**NOTICE:** Seasoning time may vary depending on drying conditions.

#### 4. Storing Wood

Splitting wood before it is stored reduces drying time. The following guideline will ensure properly seasoned wood:

- Stack the wood to allow air to circulate freely around and through the woodpile.
- Elevate the woodpile off the ground to allow air circulation underneath.
- The smaller the pieces, the faster the drying process. Any piece over 6 in. (152 mm) in diameter should be split.
- Wood should be stacked so that both ends of each piece are exposed to air, since more drying occurs through the cut ends than the sides. This is true even with wood that has been split.
- Store wood under cover, such as in a shed, or covered with a tarp, plastic, tar paper, sheets of scrap plywood, etc., as uncovered wood can absorb water from rain or snow, delaying the seasoning process. Avoid covering the sides and ends completely. Doing so may trap moisture from the ground and impede air circulation.

#### 5. Burning Process

Fire requires fuel, air and heat. If heat is robbed from the fireplace during the drying stage, the new load of wood has reduced the chances for a good clean burn. Always burn dry, seasoned firewood.

- **Kindling or 1st stage:**

In this stage, the wood is heated to a temperature high enough to evaporate the moisture which is present in all wood. The wood will reach the boiling point of water (212°F) and will not get any hotter until the water is evaporated. This process takes heat from coals and tends to cool the fireplace.

- **2nd stage:**

The secondary stage is when the wood gives off flammable gases which burn above the fuel with bright flames. It is very important that the flames be maintained and not allowed to go out. This will ensure the cleanest possible fire. You should close down the air to control the point where you can still maintain some flame. If the flames tend to go out, more air is necessary.

- **Final stage:**

The final stage of burning is the charcoal stage. This occurs when the flammable gases have been mostly burned and only charcoal remains. This is a naturally clean portion of the burn. The coals burn with hot blue flames.

It is very important to reload your fireplace while enough lively hot coals remain in order to rekindle the next load of wood.

#### 6. Dirty Glass

A portion of the combustion air entering the firebox is deflected down over the inside of the door glass. This air flow “washes” the glass, helping to keep smoke from adhering to its surface. When operated at a low burn rate, less air will be flowing over the glass and the smoky, relatively cool condition of a low fire will cause the glass to become coated. Operating the fireplace with the burn rate air control and start-up air control all the way open for 15-20 minutes should remove the built up coating.

#### 7. Creosote Formation

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 newly-started or a slow-burning fire. As a result, creosote residue accumulates on the flue lining.

When ignited, creosote creates an extremely hot fire which may damage the chimney or even destroy the house.

The chimney shall be inspected at least annually before lighting, or once every two months during heating season.

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

#### 8. Opacity

Opacity indicates how cleanly your fireplace is burning. Opacity is measured in percent; 100% opacity is when an object is totally obscured by the smoke column from a chimney, and 0% opacity means that no smoke column can be seen. Periodically check the opacity and burn your fireplace as nearly smoke-free as possible (goal of 0% opacity).

#### D. First Fire

Before lighting your first fire in the fireplace, make certain that:

- the baffle and ceramic blanket are correctly positioned, resting against the rear support
- firebrick are in place
- all labels have been removed
- all plated surfaces have been cleaned

**NOTICE:** Oils can cause permanent markings on plating if not removed before the first fire.

**NOTICE:** The first three or four fires should be of moderate size to allow the oils and binders to be burned from the fireplace and the refractory and paint to cure. You may notice an industrial odor the first few fires. This is considered normal.



## E. Lighting Instructions/Establish Coal Bed

- Open outside air by opening the lower access panel and locate the outside air handle (it could be on the left or right). Lift the handle up and pull out to open. See Figure 3.20.

Note: This may be closed only when the fireplace is not in use to prevent cold air infiltration.

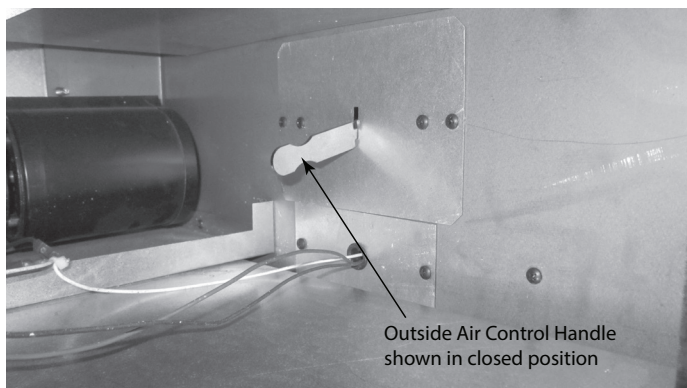


Figure 3.20 Outside Air Handle Shown on Right Side

- Move the combustion air control to the right, you will feel resistance about three-fourths of the way. You must move past that resistance approximately 3/4 in. (19 mm) to fully engage the automatic combustion control (ACC) system.
- Place several wads (3-4 pieces) of crumpled newspaper on the firebox floor. Add 5-6 lbs. of kindling (pieces of dry cord wood less than 1 inch in diameter) stacked on top of the paper crisscrossed. See Figure 3.21.
- Make sure that no matches or other combustibles are in the immediate area of the fireplace. Be sure the room is adequately ventilated and the flue unobstructed.
- For best results, use a hand held homeowner-type gas torch to light the paper and wood for approximately one minute.



Figure 3.21 Placing Kindling

- Leave the door slightly open 2-4 inches (see Figure 3.25) for 2-3 minutes then close the door, latching it lightly to allow the flame to get going good.
- When 1/2 to 2/3 of the kindling burns down, open the door and level the firebox.
- Add 7 to 9 pounds of start-up wood (1-3 inch diameter pieces of cord wood) by stacking them in a crisscross pattern. This will allow for proper air flow.
- Leave door slightly open 2-4 inches (see Figure 3.25) for 1-3 minutes or until a good flame is present. Then close the door, latching it lightly.
- After the flame gets established (approximately 3-5 minutes) shut and latch the door.
- When the start-up has burned down 1/2 to 2/3 and a good flame is still present, open the door. Level the coal bed insuring that the combustion air holes are not blocked.

### High Burn

- Load 4-6 pieces of cord wood 22 inches long to achieve maximum firebox volume, stack 2 to 3 pieces high in the back first, then 2 to 3 pieces in the front, making sure to work the bottom pieces into the coal bed to insure solid stack once all the wood is loaded. Leave at least a 1 inch gap between the two stacks to insure good air flow around the wood. See Figures 3.22, 3.23 & 3.24 for examples.
- Leave the door slightly open 2-5 inches (see Figure 3.25) for up to 5 minutes to get a good flame going then close the door. See Figure 3.27.
- When fire has burned down and ready for reloading, level out the coal bed first and reset the ACC if needed.



Figure 3.22 Loading Wood

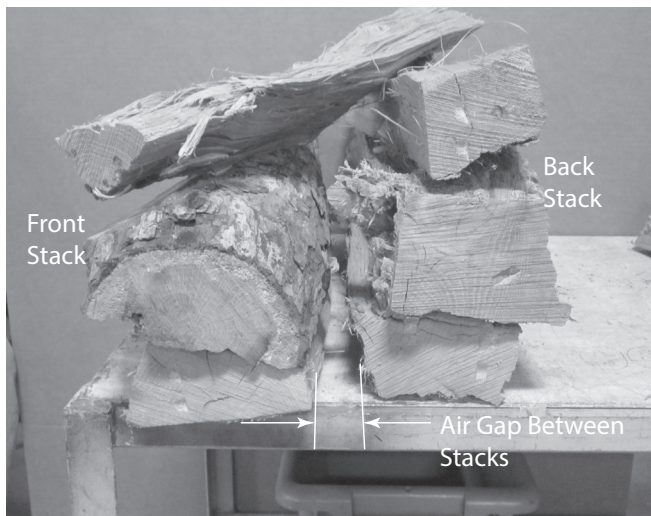


Figure 3.23 Stacking Wood

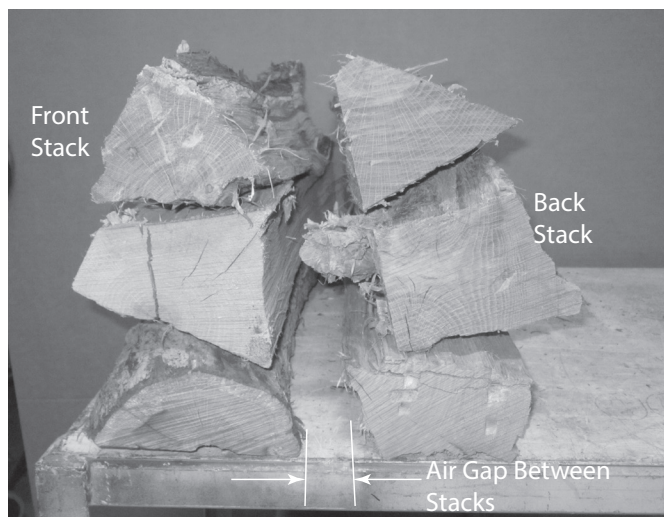


Figure 3.24 Stacking Wood

#### Medium/Low Burn

- Open the door and load the wood the same as the high burn. Then partially close the door leaving it open around 4-8 inches for up to 5 minutes or until the wood is burning good then close the door. Let it burn for up to 20 minutes before setting the combustion air control to the desired setting.

#### COMBUSTION AIR CONTROL SETTINGS

- LOW - all the way to the left.
- MEDIUM - from the low setting go up to 1/2 inch to the right.
- HIGH - all the way to the right until resistance is felt.

NOTE: The ACC should only need to be activated when starting from a cold start or if a lively coal bed isn't present when reloading.



Figure 3.25 Door Open 2-4 Inches



Figure 3.26 Door Latched Lightly



Figure 3.27 Door Fully Closed

## F. Frequently Asked Questions

ISSUES	SOLUTIONS
Odor from appliance	When first operated, this appliance may release an odor for the first several hours. This is caused by the curing of the paint and the burning off of any oils remaining from manufacturing.
Metallic noise	Noise is caused by metal expanding and contracting as it heats up and cools down, similar to the sound produced by a furnace or heating duct. This noise does not affect the operation or longevity of the appliance.
Whirring sound	The fan produces a whirring sound which increases in volume as the speed is increased.

**CONTACT YOUR DEALER** for additional information regarding operation and troubleshooting.  
Visit [www.quadrafire.com](http://www.quadrafire.com) to find a dealer.

### **WARNING**

DO NOT PLACE COMBUSTIBLE OBJECTS IN FRONT OF THE APPLIANCE. High temperatures may ignite clothing, furniture or draperies.

### **WARNING**



#### **Fire Risk.**

- DO NOT BURN GARBAGE OR FLAMMABLE FLUIDS SUCH AS GASOLINE, NAPHTHA OR ENGINE OIL.
- Do NOT burn treated wood or wood with salt (driftwood).
- May generate carbon monoxide if burn material other than wood.

May result in illness or possible death.

### **WARNING**



#### **Fire Risk.**

Keep combustible materials, gasoline and other flammable vapors and liquids clear of appliance.

- Do NOT store flammable materials in the appliance's vicinity.
- DO NOT USE GASOLINE, LANTERN FUEL, KEROSENE, CHARCOAL LIGHTER FLUID OR SIMILAR LIQUIDS TO START OR "FRESHEN UP" A FIRE IN THIS HEATER.
- Keep all such liquids well away from the heater while it is in use.
- Combustible materials may ignite.



## 4 Maintenance and Service

This fireplace needs periodic inspection and repair for proper operation. It is against federal regulations to operate this fireplace in a manner inconsistent with operating instructions in this manual.

### **WARNING! Hot Surfaces!**

*Glass and other surfaces are hot during operation AND cool down. **DO NOT** clean fireplace until it is cooled.*

Task	Frequency	To be completed by
1. Chimney Inspection	As needed	Homeowner or Chimney Sweep
2. Chimney Cleaning	As needed	Chimney Sweep
3. Plated Surfaces Cleaning	As needed	Homeowner
4. Glass Door	Seasonally	
5. Glass Cleaning	As needed	
6. Door Gasket	Seasonally	
7. Ash Removal	As needed	
8. Baffle/Blanket/Channel Protector	Seasonally	
9. Firebrick	Seasonally	

### **A. Maintenance Tasks-Homeowners**

Installation and repair should be done by a qualified service technician only. The fireplace should be inspected before use and at least annually by a professional service person.

The following tasks may be performed annually by the homeowner. If you are uncomfortable performing any of the listed tasks, please call your dealer for a service appointment.

#### **1. Chimney Inspection**

**Frequency:** As necessary; at least annually before lighting fireplace, or once every two months during heating season.

**By:** Homeowner/Chimney Sweep

- Confirm that termination cap remains clear and unobstructed.
- Inspect for blockages such as bird nests, leaves, etc.
- Inspect for corrosion or separation.
- Inspect for creosote and remove as needed, at least every two months during the heating season.
- Inspect the system at the fireplace connection and at the chimney top.

In the event of a chimney fire, Hearth & Home Technologies recommends replacement of the chimney and inspection of the adjacent structure to the provisions of NFPA Level III inspection criteria.

**WARNING! Risk of Asphyxiation and Fire! Annual inspection by qualified technician recommended.**

*Check:*

- *condition of door, surrounds and fronts*
- *condition of glass and glass assembly*
- *obstructions of combustion and ventilation air*
- *obstructions of termination cap*

*Clean:*

- *glass*
- *air passageways, grilles*

## 2. Creosote (Chimney) Cleaning

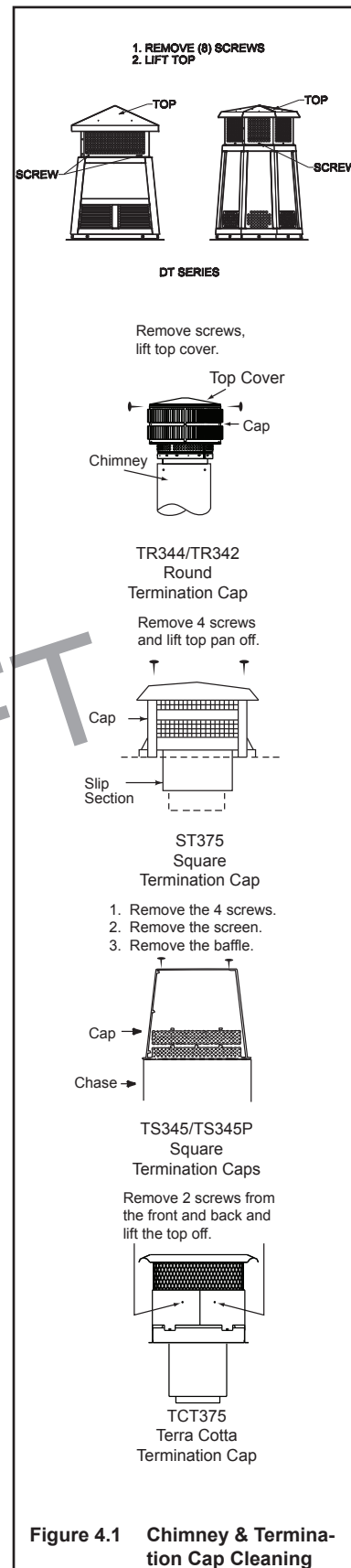
**Frequency:** As needed; at least annually before lighting, or once every two months during heating season. When creosote has accumulated it shall be removed to reduce the risk of a chimney fire.

**By:** Chimney Sweep

**Tools Needed:** Brush, Phillips screwdriver

- 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.
- Remove all ash from the firebox and extinguish all hot embers before disposal. Allow the fireplace to cool completely.
- Remove baffle and ceramic blanket from fireplace before cleaning chimney (refer to Section 5.C.3 Baffle Removal and Installation).
- Close the door tightly.
- Remove the top of the termination cap as shown in Figure 4.1 to clean the cap and chimney.
- The creosote or soot should be removed from the chimney with a brush specifically designed for the size of chimney in use.
- Reinstall termination cap.
- Clean out fallen debris from the firebox.
- Replace baffle and ceramic blanket.

**WARNING! Risk of Fire! Ignited creosote is extremely HOT. Prevent creosote buildup.**



### 3. Care and Cleaning of Plated Surfaces

**Frequency:** Initially and as needed

**By:** Homeowner

**Tools Needed:** Vinegar or glass cleaner, soft towel

**CAUTION!** Do not use a polish with abrasives. It will scratch plated surfaces.

- Use a glass cleaner or vinegar and towel to remove the oils.
- Oils can cause permanent markings on plating if not removed.
- After plating is cured, oils will not affect the finish.

### 4. Glass Door

**Frequency:** As necessary

**By:** Homeowner

- Inspect glass panel for cracks. Replace if this condition is present.
- Inspect glass gasket. Confirm glass does not move around in glass frame.

### 5. Glass Cleaning

**Frequency:** As necessary

**By:** Homeowner

**Tools Needed:** Vinegar or glass cleaner, soft towel

- Clean glass with a non-abrasive glass cleaner. Use a damp cloth dipped in wood ashes or a commercially available oven cleaner. Remove any oven cleaner residue with a glass cleaner or soap and water.

### 6. Door Gasket

**Frequency:** Seasonally

**By:** Homeowner

- Open door, place half a dollar bill inside and close the door.
- Attempt to pull the bill out.
- If the bill gives good resistance or is not removable, the gasket is adjusted correctly. If the bill is easily removed, the gasket needs adjustment or replacement to create an even seal all around door.

It may be necessary to adjust or tighten the door latch.

### 7. Ash Removal

**Frequency:** As necessary

**By:** Homeowner

**Tools Needed:** Covered metal container, metal shovel, fireplace broom

**WARNING! Risk of Fire! DO NOT** remove ashes until the fire is out and the fireplace is cold.

- Ashes should be placed in metal container with tight fitting lid.
- The closed container of ashes should be placed on a noncombustible 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.

### 8. Baffle and Blanket

**Frequency:** As necessary

**By:** Homeowner

**Tools Needed:**

- Ensure correct baffle and baffle protection channel placement; replace baffle components if damaged or missing.
- The ceramic blanket and baffle board **MUST** be in contact with the back of the firebox and even with each other in the front. The baffle protection channel **MUST** be in position. Refer to Section 3.A.3.

### 9. Firebrick

**Frequency:**

**By:**

**Tools Needed:**

- Inspect condition of brick. Replace if crumbly or otherwise deteriorated, or if cracks exceed 1/4 in. (6 mm).

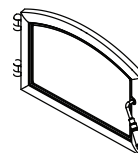
## B. Replacement Maintenance

### 1. Glass Replacement

- Ensure that the fire is out and the fireplace is cool to the touch.
- Protect a table or counter top with padding or towels.
- Remove door with broken glass from the fireplace by lifting door up and off of the hinges.
- Lay door face down on table or counter making sure handle and handle attachment knob hang over the edge of the table top so door lays flat on the soft surface.
- Remove screws from the top and bottom glass frames (five on each door) using a #2 Phillips Head screwdriver. Set frames aside and retain screws.  
**HINT:** Soak screws in penetrating oil for easy removal.
- Remove the glass and discard.
- Position the new glass with edges evenly overlapping the opening in the front door.
- Replace the glass frames.
- Start screws to secure glass frames to door, keeping them loose for adjusting the glass. Then continue to tighten each screw alternately, a few turns at a time, until the glass panel is tightened snugly. **DO NOT OVERTIGHTEN OR CROSS THREAD SCREWS.**
- Replace the door on the fireplace.
- After the first burn, recheck the tightness of the screws.

**NOTICE:** Remove all labels from glass before lighting the first fire in your fireplace.

### CAUTION!



Handle glass assembly with care.

#### When cleaning glass:

- Avoid striking, scratching or slamming glass.
- Do NOT clean glass when hot.
- Do NOT use abrasive cleaners.
- Use a hard water deposit glass cleaner on white film.
- **Refer to maintenance instructions.**



### WARNING



#### Injury Risk.

- Use only glass specified in manual.
- **DO NOT REPLACE** with any other material.

### 2. Tighten or Adjust Door Latch

Remove the lock nut holding latch cam and two spacing washers on the door as shown in Figure 4.2. Move 1-2 spacing washers to the opposite side of cam. Reinstall the cam and tighten locknut. The black washer must be left in place.

OR

Replace the gasket material. Wear or damage to the gasket material can cause air leakage into the firebox resulting in overfiring and loss of efficiency.

A replacement gasket is available from your dealer.

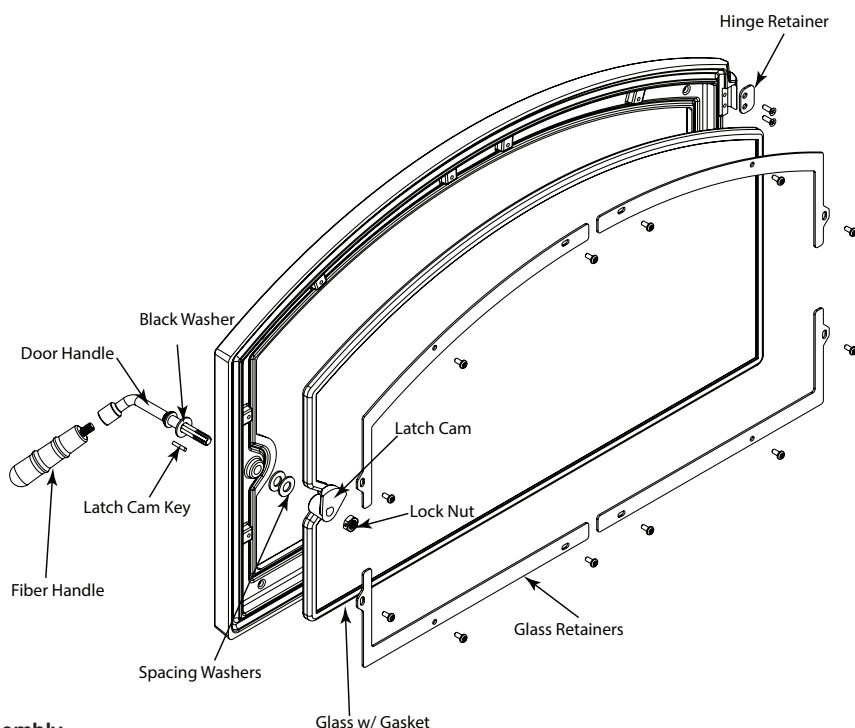
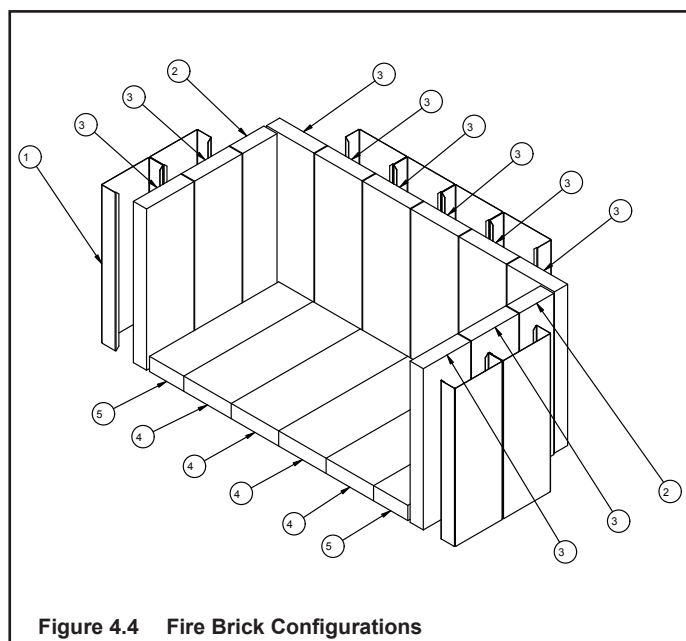
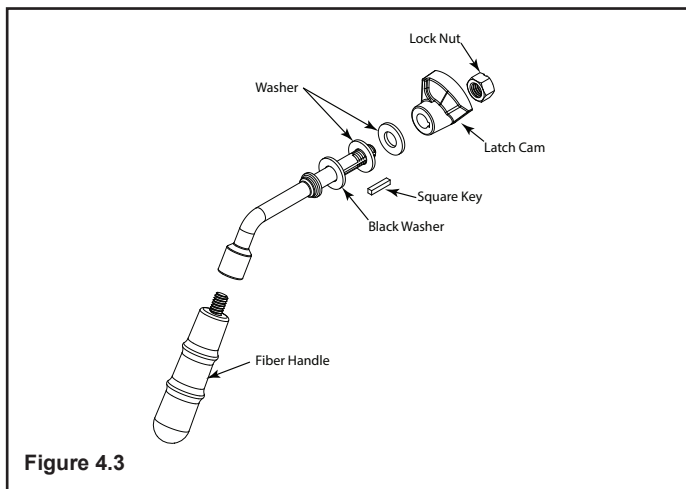


Figure 4.2 Door Handle Assembly



### 3. Door Handle Assembly

- Slide door handle through door.
- Install washer(s) as shown in Figure 4.3.
- Install key groove.
- Align groove in latch cam with key; slide latch cam over shaft.
- Install locknut but do not overtighten, the handle needs to move smoothly.
- Install fiber handle using a clockwise motion until the fiber handle is snug against the door handle shaft.



#	Brick Size	Qty. in Set
1	Brick Wrap	8
2	Firebrick 13.25 x 3.25	2
3	Firebrick 13.25 x 4.50 x 1.25	10
4	Firebrick 12.25 x 4.50	4
5	Firebrick 12.25 x 3.25	2

### 4. Firebrick Replacement

The firebox of your fireplace is lined with high quality firebrick and refractory board under the bottom firebrick only, which has exceptional insulating properties. There is no need to use a grate; simply build a fire on the firebox floor. Do not operate the fireplace without bricks.

**IMPORTANT:** The bricks are very similar in size. Be certain you have the proper brick in the correct location. Measure the brick size for accuracy.

After the coals are completely cooled, remove all old firebrick and ash from unit and vacuum out firebox.

- Remove new brick set from box and lay out to diagram shown in Figure 4.4.
- Install rear bricks. Slide top of bricks under clip on back of firebox wall and push bottom of brick back.
- Install side bricks. Slide top of brick under clips on side of firebox and push the bottom of the brick until it is flush with the side of the unit.
- Lay bottom bricks in unit.

## 5. Baffle Removal and Installation

### **WARNING! Hot Surfaces!**

Glass and other surfaces are hot during operation AND cool down. **DO NOT** clean fireplace until it is cooled.

1. Remove all ash from firebox and place into a metal container.
2. Remove the baffle protection channel by lifting it up and turning it down and pulling it out of the firebox. See Figure 4.5.

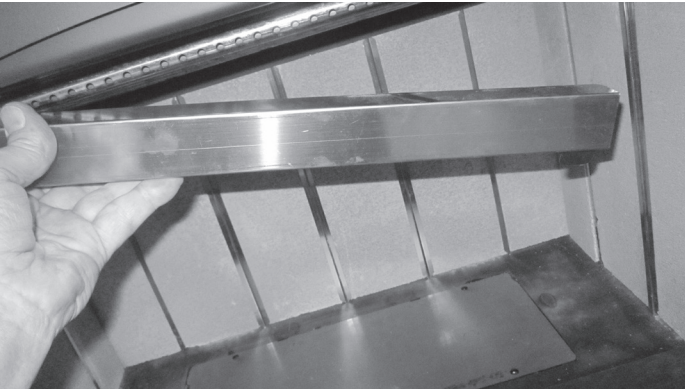


Figure 4.5 Removing Baffle Protection Channel

3. Using a 3/16 inch Allen wrench, remove the front manifold tube retainer bolt on the air channel behind the end of the front tube on the right side. See Figure 4.6.

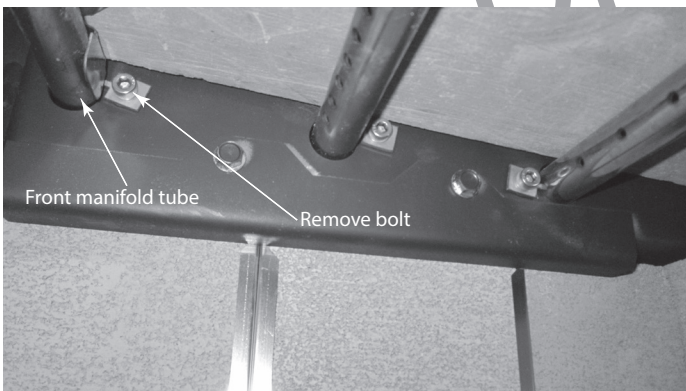


Figure 4.6 Remove Retainer Bolt

4. To remove the manifold tube, slide the tube to one side until one end is out of its hole then pull it down and out of the other hole. It is only necessary to remove the front tube in order to remove the baffle.
5. Pull the two (2) piece baffle board and insulation down and out of the firebox. See Figure 4.7.

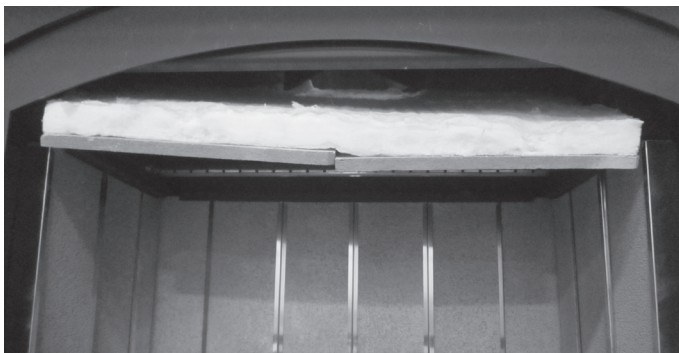


Figure 4.7

6. To install the baffle board and insulation, repeat steps 2 thru 5 in reverse. Be sure the baffle board and insulation are pushed back fully and the insulation is down and flat. See Figures 4.8 & 4.9.

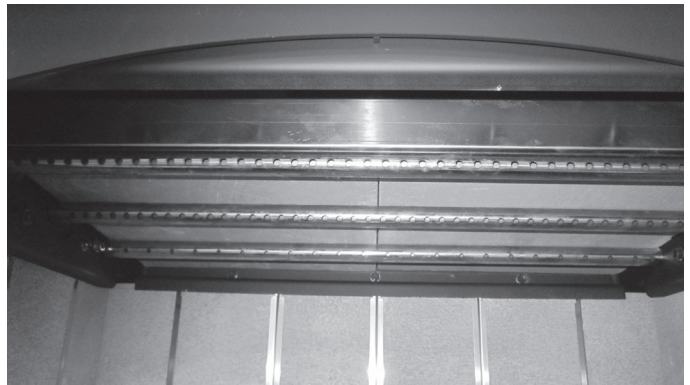


Figure 4.8 Reinstall Baffle Boards

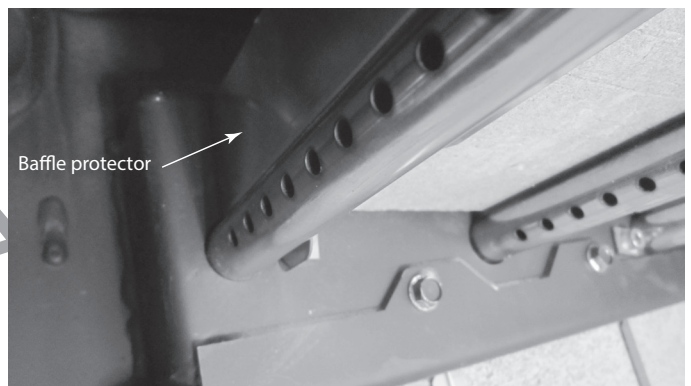


Figure 4.9 Reinstall Baffle Protection Channel

## 6. Fan Replacement

**CAUTION! Risk of Shock! Disconnect power by turning off circuit breaker before servicing or unplugging control board from junction box in behind the access panel..**

The Fireplace comes equipped with two fans, installed at the factory with electric access on both sides of the fireplace.

1. Remove the bottom firebrick.
2. Remove the four (4) 5/32 Allen head screws and pry open the access door with a flat blade screwdriver. See Figure 4.10 and remove it.

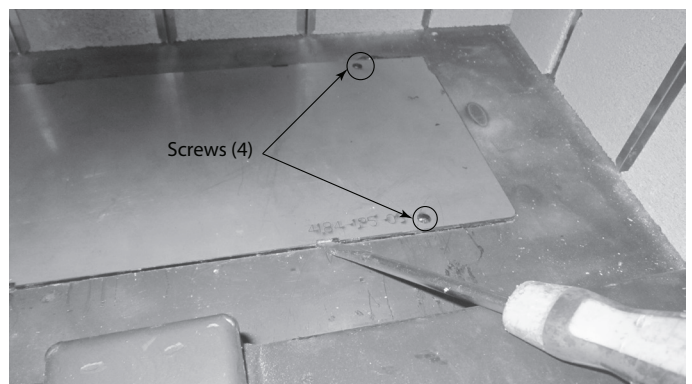


Figure 4.10 Pry Open Access Door



3. While holding the handle, remove the four (4) screws at each corner of the combustion cover and fish it up and out of the bottom of the fireplace. See Figures 4.11 & 4.12.

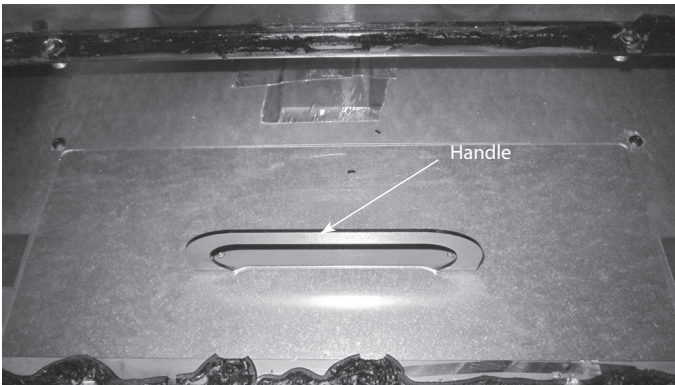


Figure 4.11 Removal of Combustion Cover Screws

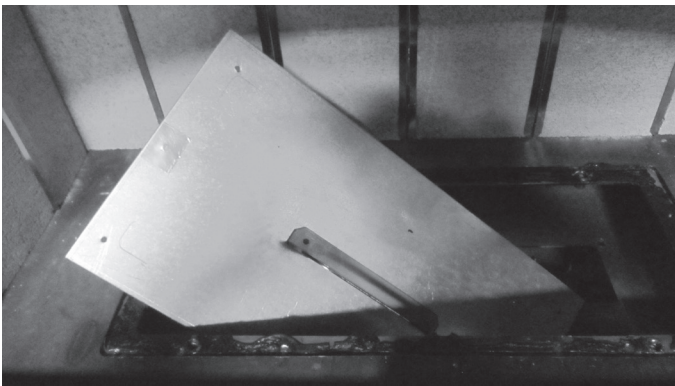


Figure 4.12 Removal of Combustion Cover

4. Unplug the wire harness from the fans and remove the wing nut holding the fan in place. See Figure 4.13.

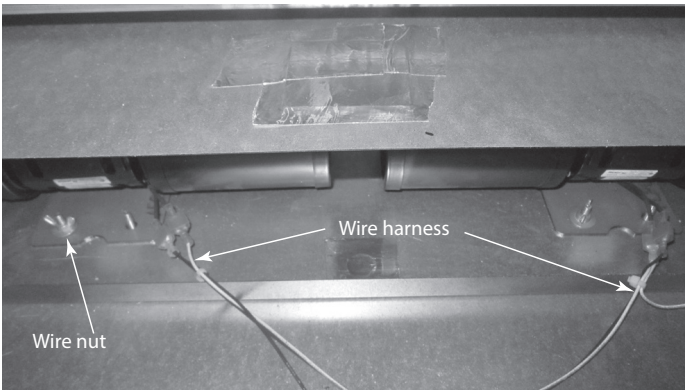


Figure 4.13 Unplug Wire Harness

5. Lift the fan up and off of the locating pins and remove up through the access hole. See Figure 4.14.

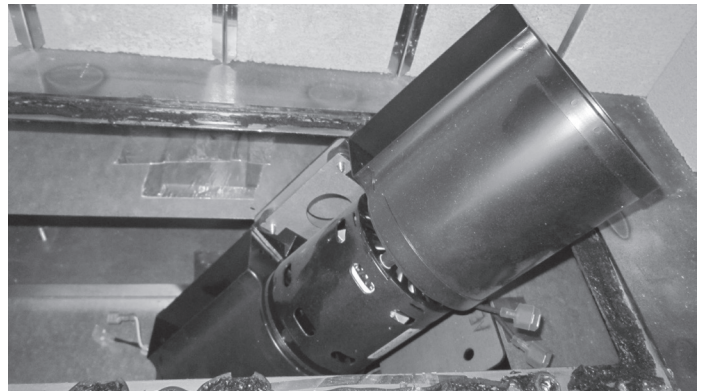


Figure 4.14 Remove Fan from Access Hole

6. Install new fans in reverse order.

## 7. Timer Assembly Replacement

1. Remove the bottom front access panel by lifting it up and off.
2. Remove the two (2) screws in the air chamber cover. See Figure 4.15. Pull it down and off. See Figure 4.16.

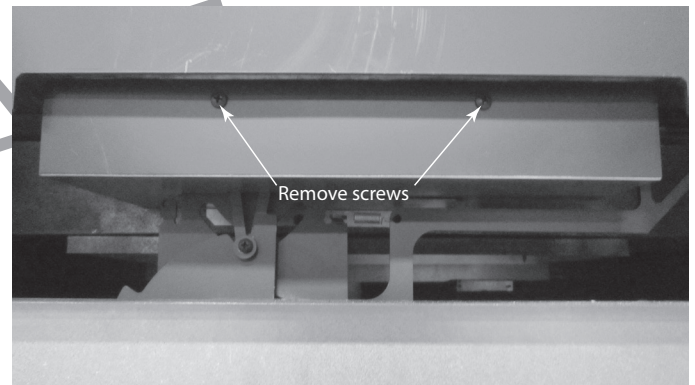


Figure 4.15 Removal of Screws on Air Chamber Cover

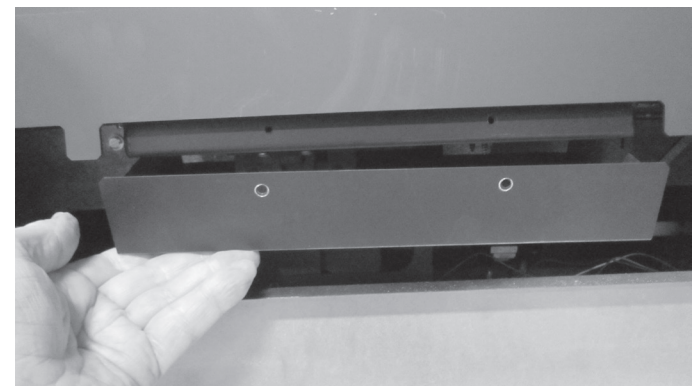
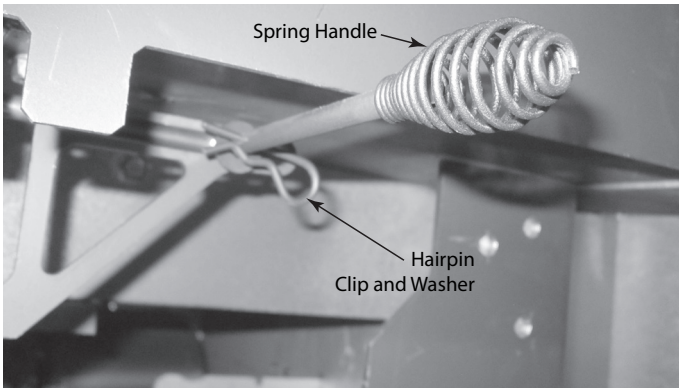


Figure 4.16 Removal of Air Chamber Cover

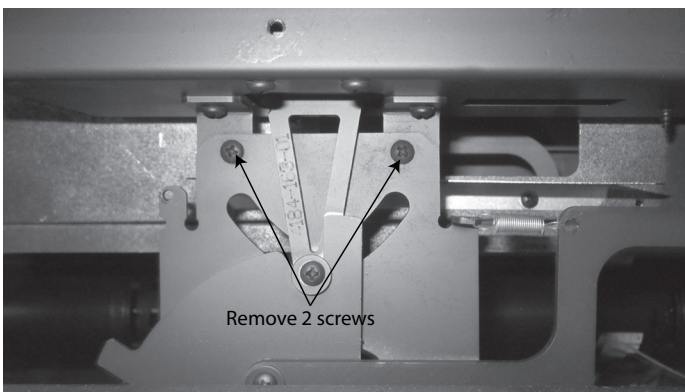


3. Remove the spring handle by twisting it to the left and pulling on it. Hold on to the rod as this is being done. See Figure 4.17.
4. Pull off and remove the front hairpin clip and washer on the rod. See Figure 4.17.



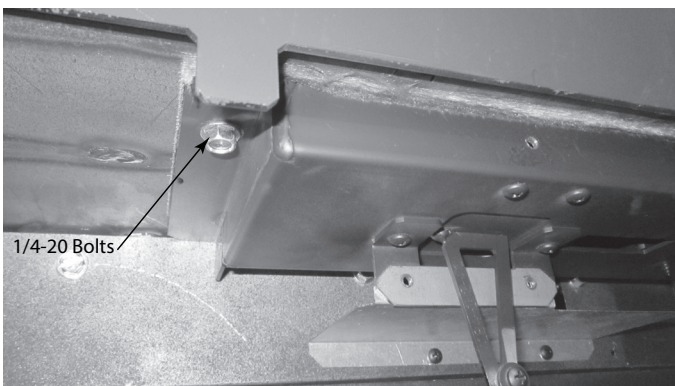
**Figure 4.17 Removal of Spring Handle**

5. While holding on to the timer assembly, remove the two (2) screws and slide the linkage arm off of the rod and pull the assembly out of the front. See Figure 4.18.

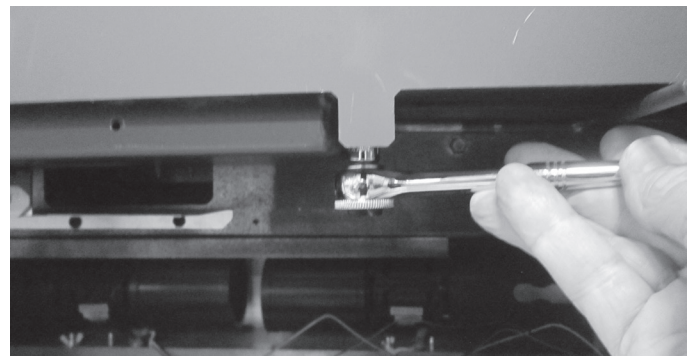


**Figure 4.18 Removal of Timer Assembly Screws**

6. While supporting the air chamber, remove the two (2) 1/4-20 bolts at each end of it. Then pull it down and out the front. See Figures 4.19 & 4.20.

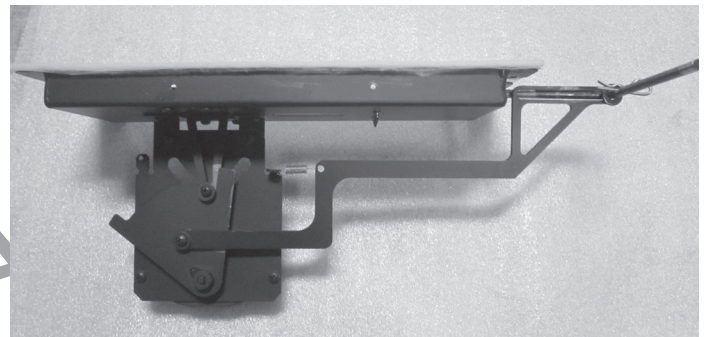


**Figure 4.19 Location of Bolts**

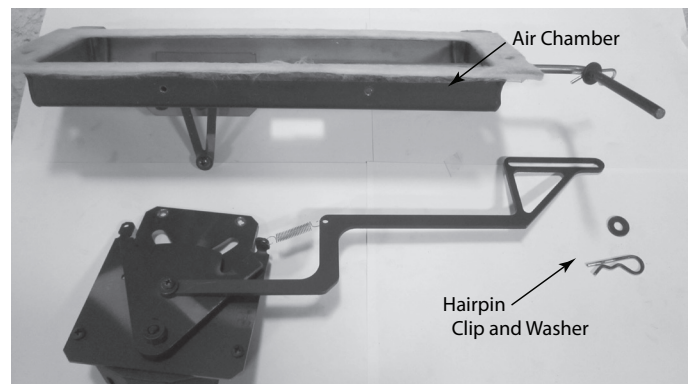


**Figure 4.20 Removal of Bolts (2)**

7. On the new timer assembly, Figure 4.21, remove the front hairpin clip and washer then two (2) screws disconnecting the air chamber before installation. See Figure 4.22.

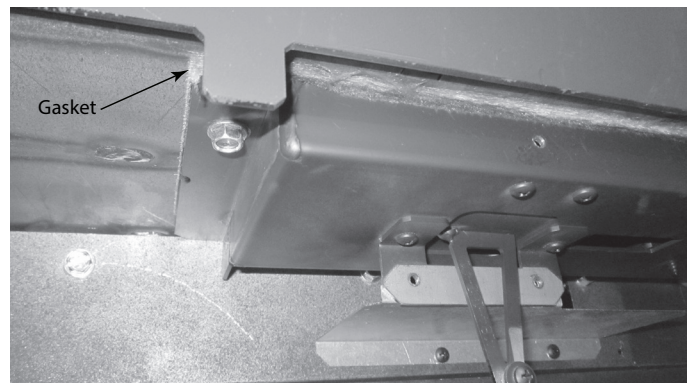


**Figure 4.21 Timer Assembly**



**Figure 4.22 Removal of Hairpin Clip, Washer and Air Chamber**

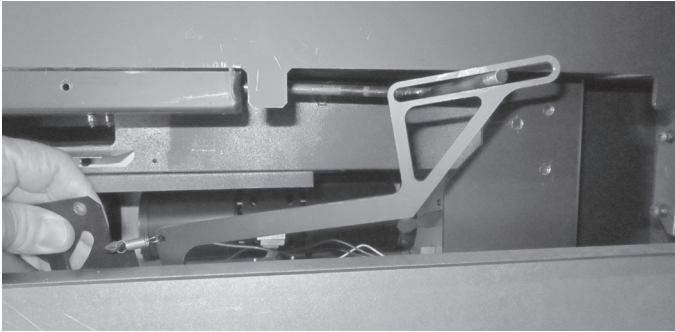
8. Install the new air chamber using the 1/4-20 bolts making sure the gasket is installed also. See Figure 4.22.



**Figure 4.22 Install New Air Chamber**

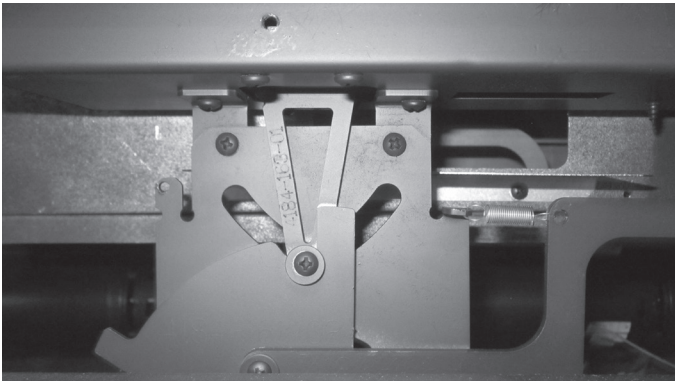


9. Install the timer/linkage by inserting the timer in first and slipping the linkage over the rod. See Figure 4.23.



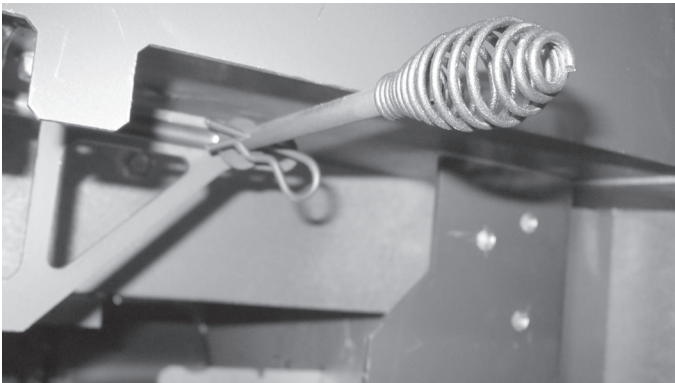
**Figure 4.23 Inserting Timer Assembly**

10. Screw the timer to the air chamber. See Figure 4.24.



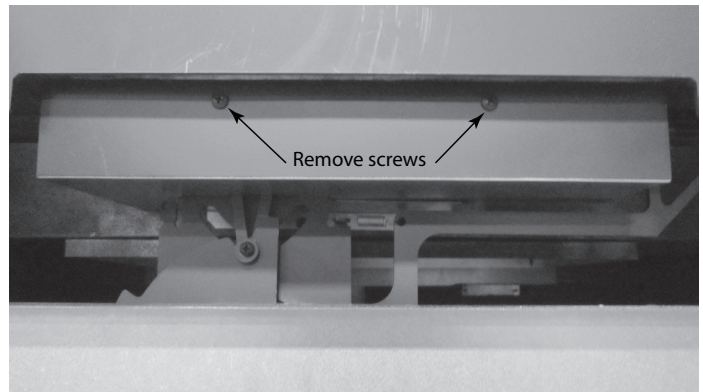
**Figure 4.24 Screwing Timer to Air Chamber**

11. Install the washer and hairpin clip back on the rod. See Figure 4.25.

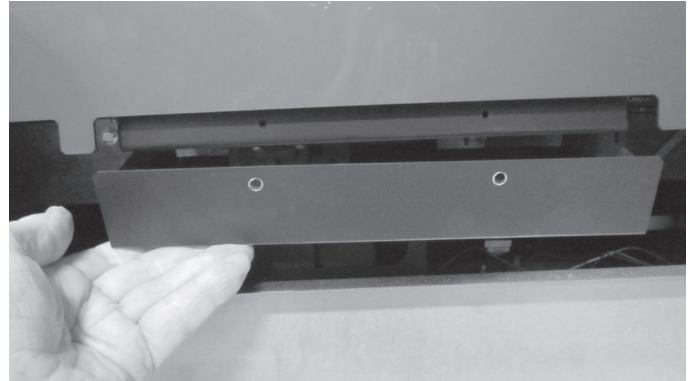


**Figure 4.25 Reinstalling Hairpin Clip and Washer**

12. Reinstall air chamber cover. See Figure 4.26.
13. Reinstall the bottom front access panel.

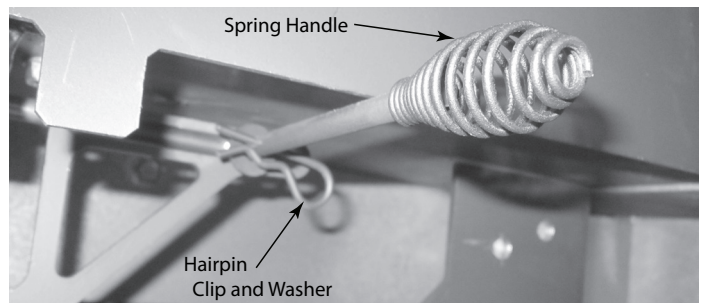


**Figure 4.26 Air Chamber Cover**



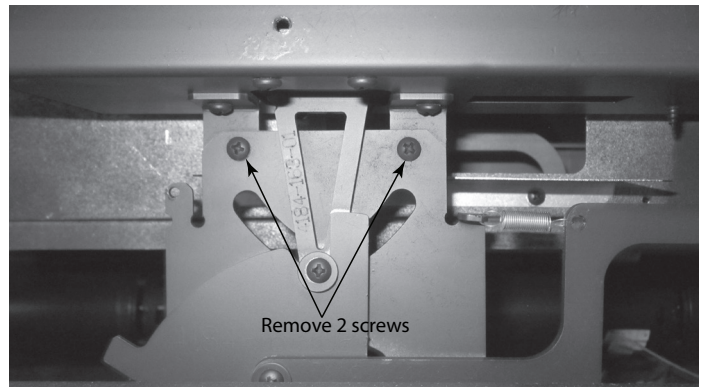
**Figure 4.27 Removal of Air Chamber Cover**

3. Remove the spring handle by twisting it to the left and pulling on it. Hold on to the rod as this is being done. See Figure 4.28.
4. Pull off and remove the hairpin clip and the washer on the rod. See Figure 4.28.



**Figure 4.28 Removal of Spring Handle**

5. While holding on to the timer assembly, remove the two (2) screws, Figure 4.29 and slide the linkage arm off of the rod and pull the assembly out of the front.

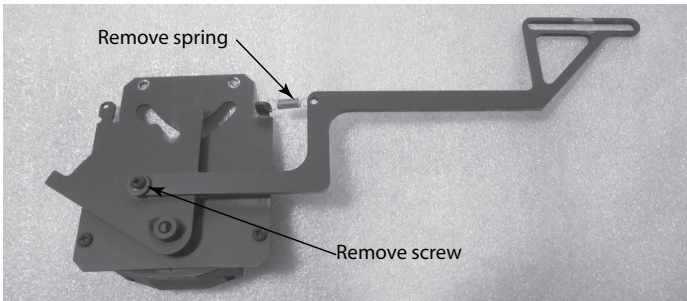


**Figure 4.29 Removal of Screws**

## 8. Timer Removal & Replacement

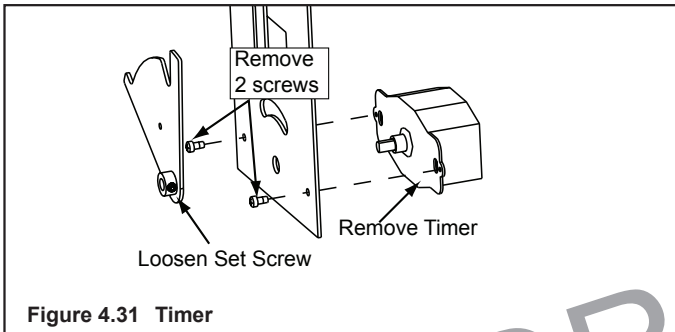
1. Remove the bottom front access panel by lifting it up and off.
2. Remove the two (2) screws in the cover. See Figure 4.26 and pull it down and off. See Figure 4.27.

6. Remove the linkage arm and the spring from the timer. See Figure 4.30.



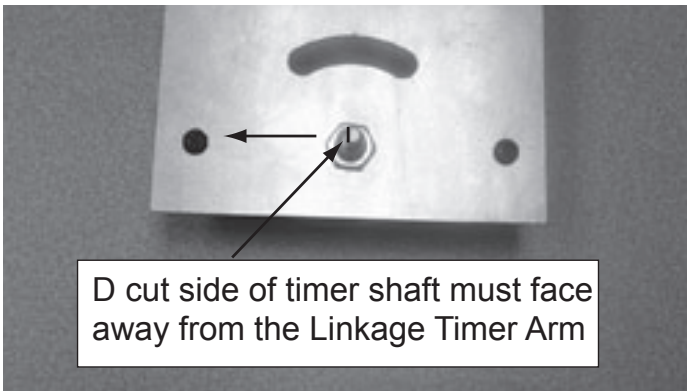
**Figure 4.30 Removal of Linkage Arm and Spring**

7. Loosen set screw on timer, remove two screws and remove timer. See Figure 4.31.



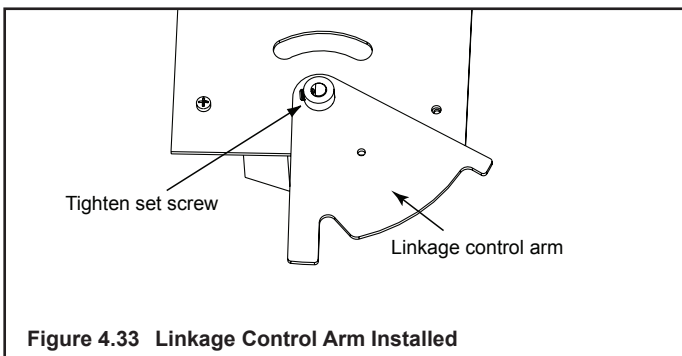
**Figure 4.31 Timer**

8. Install new timer using same two screws. It is very important that the D cut side of the timer shaft is facing the opposite side of the linkage timer arm. See Figure 4.32.



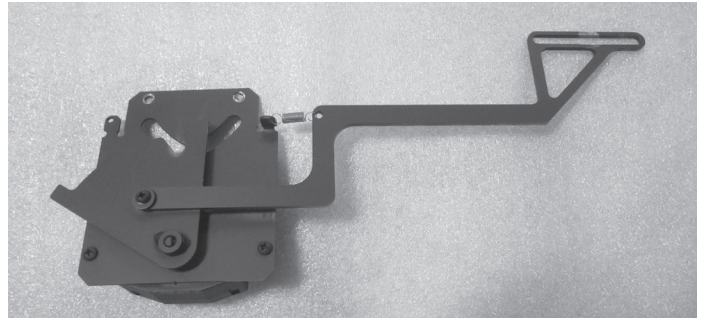
**Figure 4.32 D Cut on Shaft**

9. • Place linkage control arm over timer shaft and tighten set screw, Figure 4.33.



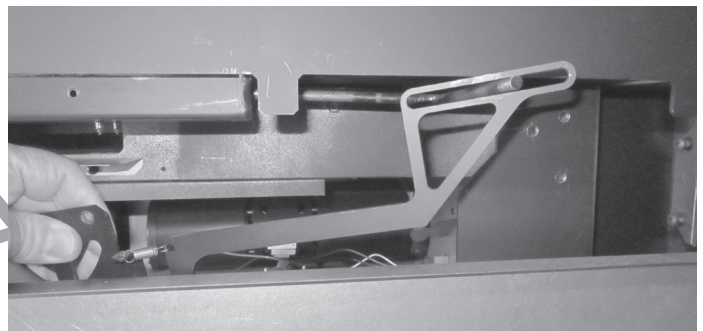
**Figure 4.33 Linkage Control Arm Installed**

10. Rotate linkage control arm into final position. Note that the D cut is now facing the linkage timer arm. Re-attach the linkage timer arm and spring. See Figure 4.34.



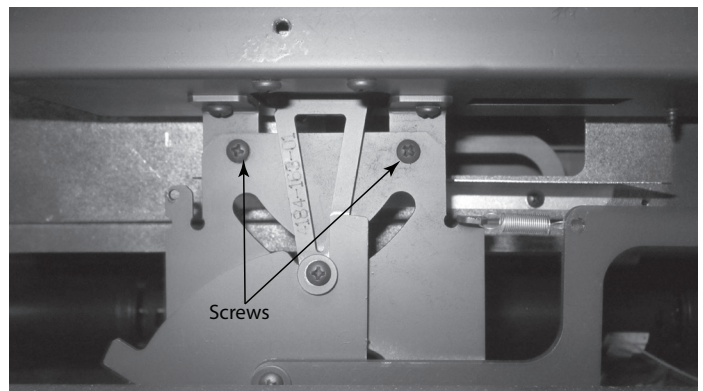
**Figure 4.34 Reattach the Linkage Timer Arm**

11. Install the timer/leakage by inserting the timer in first and slipping the linkage over the rod. See Figure 4.34.



**Figure 4.34 Insert the Timer/Leakage**

12. Screw the timer to the air chamber. See Figure 4.35.



**Figure 4.35 Screw Timer to Air Chamber**

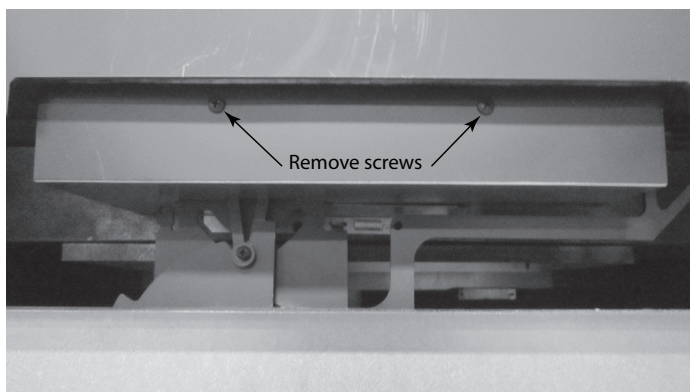


13. Install the washer and the hairpin clip back on the rod. See Figure 4.36.



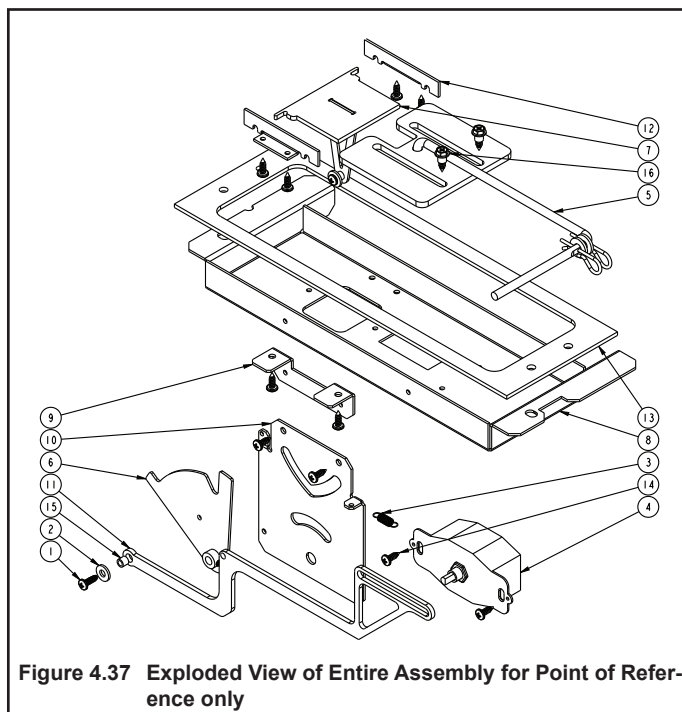
**Figure 4.36 Reinstalling Hairpin Clip and Washer**

14. Reinstall the air chamber cover. See Figure 4.37.



**Figure 4.37 Air Chamber Cover**

15. Reinstall the bottom front access panel.



**Figure 4.37 Exploded View of Entire Assembly for Point of Reference only**

Item	Description	Qty
1	Screw 8-32 x 1/2 PPH BK	1
2	Washer #10 SAE ZN	1
3	Extension Spring	1
4	Timer Mechanical 12 HR	1
5	Slide Assembly	1
6	Timer Arm Assembly	1
7	Timer Door Assembly	1
8	Air Channel Bottom	1
9	Timer Bracket	1
10	Timer Base	1
11	Timer Handle	1
12	Timer Door Retainer	2
13	Air Channel Gasket	1
14	Screw 8 x 12 PPH BK	10
15	Spacer #8 1/4D 7/32L ZN	1
16	HHSS #10 x 1/4D 1/4 L BK	2



# 5 Troubleshooting

## A. FAQs

Hearth & Home Technologies assumes no responsibility for the improper performance of the fireplace system caused by inadequate draft due to environmental conditions, down drafts, tight sealing construction of the structure, or mechanical exhausting devices which will create a negative air pressure within the structure where the fireplace is located.

If smoke spillage occurs from a fireplace opening when the door is open, there is either a leakage in the flue, a blockage in the flue, or some condition is affecting draft. Understanding and differentiating the conditions which can cause each of these kinds of spillage problems is essential to their solution.

- **Flue Leakage**  
Check for improperly connected flue joints or a damaged flue joint in the chimney system. Such leakage would reduce draft (air would be drawn in through the leaks rather than through the fireplace). The result might be difficult start-up and smoky fires that might spill if other adverse draft conditions accompany this problem.
- **Flue Blockage**  
The damper should be open.  
Check for objects that may have fallen down the chimney.

Flue draft is measured as negative pressure in the chimney. The amount of negative pressure determines how strong the draft is. The draft is important because it draws the combustion air into the fireplace and pulls the smoke out of the chimney.

There are three basic criteria essential in establishing and maintaining flue draft:

- availability of combustion air
- heat generated from the fire
- diameter and height of the flue system

These three factors work together as a system to create the flue draft. Increasing or decreasing any one of them will affect the other two and thus change the amount of draft in the entire system.

If the fire is hard to start and smoke spills out of the fireplace, or you find it difficult to establish and maintain a moderately high burn rate, then the flue draft is too low and corrective measures must be taken.

Be sure you have air available for combustion and that your firewood is dry and well seasoned. Build your fires properly and according to the instructions given in op-

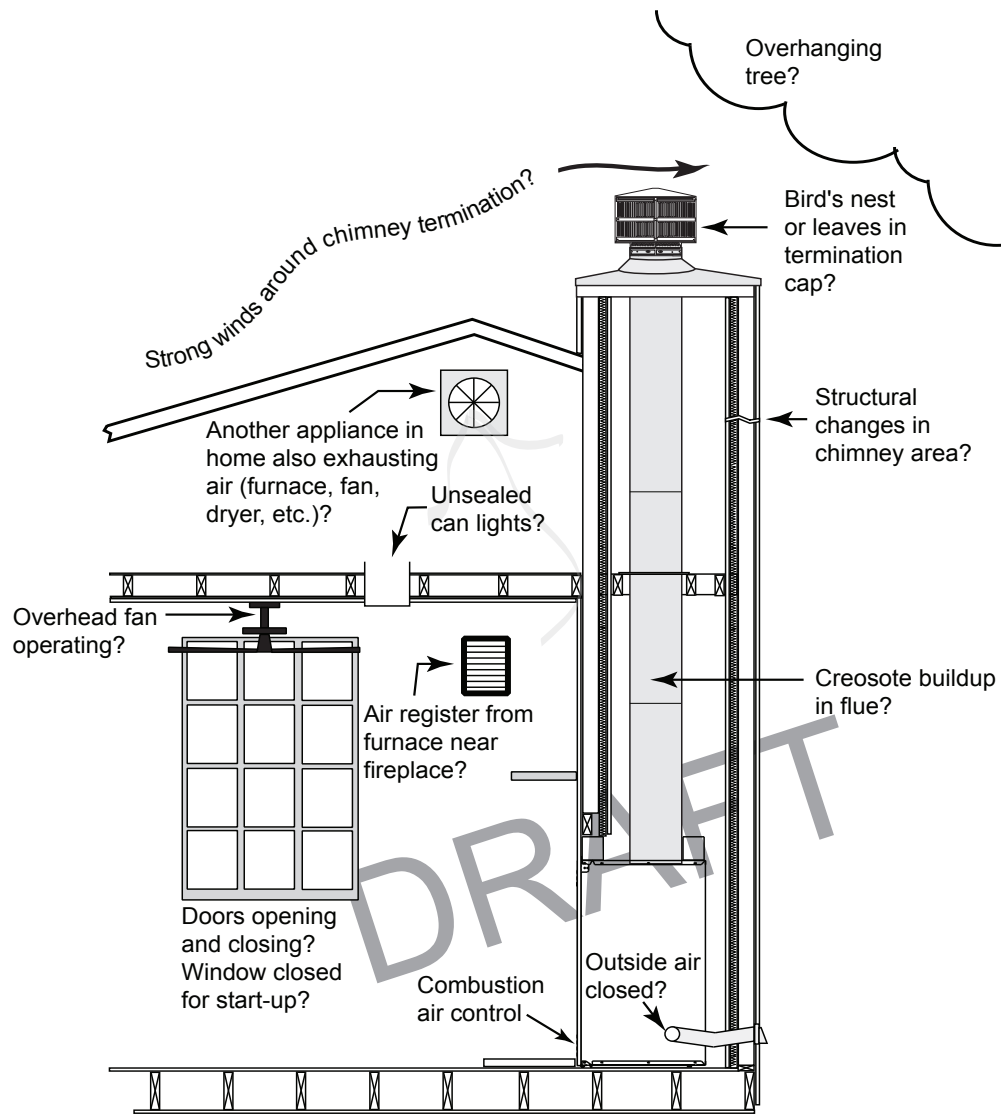
erating instructions, "Starting a Fire". Be sure your flue system is installed correctly and that it is the proper diameter and height. Check for the following:

- All chimney sections are properly installed.
- The chimney is clean and free of creosote or soot buildup.
- Make sure overhanging trees and branches are cut back within ten feet of the top of the chimney and the chimney is free of debris from animals.
- Ensure the chimney cap is clean and free of any buildup of soot or creosote if cap is equipped with a spark arrestor screen.
- Be sure the ceramic blanket (above the baffle) and the baffle are in their proper positions
- The wood being used is dry and well seasoned.

If you still suspect you have a low draft problem it may be necessary to increase the volume of air in your flue system. Since the diameter of your flue system is matched with the size of the flue collar and should not be changed, then the height of the system must be increased. Add chimney sections one at a time until the draft improves.

In some cases, regardless of what you do, it can still be difficult to establish the proper flue draft. This is especially evident when using an exterior factory-built chimney or exterior masonry chimney. Try holding a burning rolled up newspaper as close to the flue outlet as possible for a few minutes, then light the paper under the kindling. The heat generated from the burning rolled up newspaper should help get the draft established.

Still other factors can affect how well your flue system performs. Neighboring structures, high winds, tall trees, even hillsides can affect air currents around the chimney. Well designed chimney caps are available that can help. Your fireplace dealer is the local expert in your area. He can usually make suggestions or discover problems that can be easily corrected allowing your fireplace to operate correctly as it has been designed, providing safe and economical heat for your home.



**Figure 5.1 Factory-built Fireplaces: Troubleshooting**

## B. Troubleshooting Table

Fire is difficult to start	• Refer to section 4.C. Lighting Instructions
	• Open air controls
	• Establish draft: Hold a lighted, rolled up newspaper under the front of the baffle
	• Place DRY kindling over wadded up newspaper; leave air spaces between pieces of wood
	• Light the paper, allow kindling to ignite and progress to a lively burn
	• Slowly add progressively larger pieces of dry wood until the fire is well established
Smoke in the house at startup	• Check and clean chimney if needed
	• Open air controls
	• Establish draft
	• Do not use exhaust fans during startup
	• Do not close doors until the fire is well-established
Smoke in the house during operation	• Check and clean chimney if needed
	• Check door rope for seal
	• Open air controls (ACC)
Smoke in the house during refueling	• Open air controls (ACC) to establish a lively coal bed
	• Open doors SLOWLY
	• Add progressively larger wood to establish a hot fire
Fuel burns too fast	• ACC not working properly
	• Wood too dry, mix in less seasoned wood after the fire is established
	• User larger diameter wood
	• Check baffle/ceramic blanket for proper placement (Section 3.A.3)
	• Close down ACC (refer to section 4.D. Heat Management)
Glass doesn't stay clean	• Establish a good, hot fire
	• Use well-seasoned wood
Not enough or no heat	• Move combustion air control to fully open position
	• Fan is not on
	• Insufficient fuel for fire/heat required
Fan doesn't come on	• No power
	• Fireplace is not hot enough to activate snap disc
	• Snap disc may be faulty

## **6** Reference Materials

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### **A. Service Parts**

DRAFT

DRAFT

DRAFT



DRAFT

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DRAFT

## B. Contact Information



Quadra-Fire a brand of Hearth & Home Technologies  
1915 West Saunders Street  
Mount Pleasant, Iowa 52641

**Please contact your Heatilator dealer with any questions or concerns.**

For the number of your nearest Heatilator dealer, please visit [www.quadrafire.com](http://www.quadrafire.com).

### – NOTES –

DRAFT

#### CAUTION



##### DO NOT DISCARD THIS MANUAL

- Important operating and maintenance instructions included.
- Read, understand and follow these instructions for safe installation and operation.
- Leave this manual with party responsible for use and operation.



This product may be covered by one or more of the following patents: (United States) 5613487, 5647340, 5890485, 5941237, 6006743, 6019099, 6053165, 6145502, 6374822, 6484712, 6601579, 6769426, 6863064, 7077122, 7098269, 7258116, 7470729, 8147240 or other U.S. and foreign patents pending.

2000-945C

# Scale Test and Calibration Report

Customer / Acct# 1354  
Hearth and Home Technologies  
1915 W Saunders St

Calibration Date: 03/25/2019

Next Calibration Due: 09/2019

This Calibration Completed At Customer Site: ☒

Mt Pleasant IA 52641

Tech/License: Chris Day 121-12/0628

(\*)Make: Mettler Toledo Model : 56H100000000A00 SN#: 04030806GM Capacity: 0 Display Graduation: 0 Display

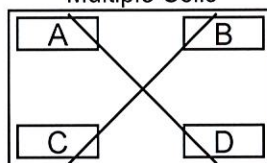
Make: Mettler Toledo Model : 2256402021-A SN#: 1172984-1JM Capacity: 1000 lb Graduation: 0.1 lb

Scale Location: R and D

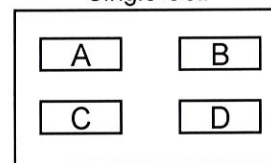
Alternate MFG SN or Unit ID:

## Indicate Shift Test Method Used

Multiple Cells



Single Cell



Weight Applied	Repeatability As Found	As Left
100	100.0	-
100	100.0	-

Weight	As Found Reading	(error)
0	0.0	0
100	100.0	0
250	250.0	0
500	500.0	0
250	250.0	0
0	0.0	0
Pass <input checked="" type="checkbox"/>		Fail

Weight	As Left Reading	(error)
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-
Pass		Fail

## Strain Test

Substitute Weight	Test Weight	Test Load	(error)
-	-	-	-

When practical a "Strain Test" may be conducted. The term "Test Load" means the sum of any substitute weight acting as the "Applied Load" added to the amount of certified "Test Weight" applied. However, only the amount of certified "Test Weight" applied can determine if the scale is out of tolerance.

☒ Approval Seal Signed

The Increasing/Decreasing measurements shown were assessed against the Maintenance Tolerances defined by NIST Handbook 44. The range of the measurements for Shift, Repeatability and Strain (if performed) tests are assessed against Maintenance Tolerances.

Comments:

\*All 'As Left' (-) = As Found when no adjustments were performed.

Calibration Procedure Used: Handbook 44 Field Manual

The calibrations within this report are traceable through NIST or another National Metrology Institute to the International System of Units (SI units). All calibration weights are certified and traceable to NIST or the SI. The weights assigned to this calibration Work Order can be found on the "Service Order Task Ticket". Copies of certificates are available.

**Controlled Document - This record shall not be reproduced.**

Calibration Measurement Capabilities (CMC) are calculated from an Expanded Uncertainty of Measurement (UNC). Technicians do not calculate CMC's or UNC's in locations other than strictly controlled environments. See our \*Calibration and Confidentiality Statement\* available on our website <http://www.roganinc.com/iso17025.html> for complete details.

# Dry Gas Meter Calibration

Meter Manufacturer: Apex  
 Model: XC-50-DIR  
 Lab ID #: 129  
 Serial #: 1906005  
 Calibration Date: 7/23/2019  
 Calibration Expiration: 1/23/2020  
 Barometric Pressure: 29.99 in. Hg



Reference Standard DGM	
Manufacturer:	Apex
Model:	SK25DA
Lab ID#:	47
Serial #:	1101001
Calibration Expiration Date:	3/13/2020
Calibration $\gamma$ Factor:	0.998

Unit Under Test Previous Calibration	
Date	N/A
$\gamma$ Factor:	1.000
Allowable Deviation ( $\pm 5\%$ ):	0.05
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)	142.099	149.680	147.972
Standard DGM Temperature ( $^{\circ}\text{F}$ )	74.5	74.4	74.4
Standard DGM Pressure (in $\text{H}_2\text{O}$ )	0.00	0.00	0.0
DGM Initial Volume ( $\text{ft}^3$ )	0.000	0.000	0.000
DGM Final Volume ( $\text{ft}^3$ )	5.156	5.446	5.386
DGM Temperature ( $^{\circ}\text{F}$ )	92.0	92.0	92.0
DGM Pressure (in $\text{H}_2\text{O}$ )	1.00	2.00	0.5
Time (min)	34.0	23.0	58.0
Net Volume for Standard DGM ( $\text{ft}^3$ )	5.018	5.286	5.226
Net Volume for DGM ( $\text{ft}^3$ )	5.156	5.446	5.386
Dry Gas Meter $\gamma$ Factor	1.001	0.996	0.999
$\gamma$ Factor Deviation From Average	1.001	0.996	0.999

Average Gas Meter  $\gamma$  Factor

0.998

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-50-DIR  
 Lab ID #: 130  
 Serial #: 1906006  
 Calibration Date: 7/25/2019  
 Calibration Expiration: 1/25/2020  
 Barometric Pressure: 30.02 in. Hg



Reference Standard DGM	
Manufacturer:	Apex
Model:	SK25DA
Lab ID#:	47
Serial #:	1101001
Calibration Expiration Date:	3/13/2020
Calibration $\gamma$ Factor:	0.998

Unit Under Test Previous Calibration	
Date	N/A
$\gamma$ Factor:	1.000
Allowable Deviation ( $\pm 5\%$ ):	0.05
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)	144.596	154.993	146.498
Standard DGM Temperature ( $^{\circ}\text{F}$ )	72.0	72.0	72.0
Standard DGM Pressure (in $\text{H}_2\text{O}$ )	0.00	0.00	0.0
DGM Initial Volume ( $\text{ft}^3$ )	0.000	0.000	0.000
DGM Final Volume ( $\text{ft}^3$ )	5.328	5.629	5.372
DGM Temperature ( $^{\circ}\text{F}$ )	95.0	95.0	96.0
DGM Pressure (in $\text{H}_2\text{O}$ )	1.04	1.99	0.6
Time (min)	35.0	25.0	54.0
Net Volume for Standard DGM ( $\text{ft}^3$ )	5.106	5.474	5.174
Net Volume for DGM ( $\text{ft}^3$ )	5.328	5.629	5.372
Dry Gas Meter $\gamma$ Factor	0.995	1.007	1.003
$\gamma$ Factor Deviation From Average	0.995	1.007	1.003

Average Gas Meter  $\gamma$  Factor

1.002

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  $\pm 0.5\%$ .



# Emissions Sampling System Thermocouple Calibration Check

Calibration based on NIST Monograph 175 per ASTM E2515-11

All thermocouples are type "K"

Date: 7/26/2019

Sampling System ID Numbers: 129/130

Performed By: S. Button

Calibration Instrument ID Number: 039

Reference Temperature (F)	Acceptable Error (F)	Thermocouple Location						
		FB Left	FB Right	FB Back	FB Top	FB Bottom	Catalyst Exit	Flue
0	± 4.0	0	0	0	0	0	0	0
200	± 4.0	199	199	199	199	199	199	199
400	± 4.0	398	398	398	398	398	398	398
600	± 4.5	599	599	600	599	599	599	600
800	± 6.0	800	800	800	800	800	800	800

Reference Temperature (F)	Acceptable Error (F)	Thermocouple Location					
		Ambient	Filter A	Filter B	Meter A	Meter B	Dilution Tunnel
0	± 4.0	0	0	0	0	-1	0
200	± 4.0	198	199	198	199	198	199
400	± 4.0	398	398	398	398	398	398
600	± 4.5	599	599	599	600	599	600
800	± 6.0	800	800	800	800	800	800

Technician Signature: 

Date: 12/17/2018



# QUALITY CONTROL SERVICES

LABORATORY EQUIPMENT • SALES • SERVICE • CALIBRATION • REPAIRS  
2340 SE 11<sup>TH</sup> Ave. Portland, Oregon 97214 • Box 14831 Portland, Oregon 97293  
(503) 236-2712 • FAX (503) 235-2535 • [www.qc-services.com](http://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 <sup>3</sup>	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/cm<sup>3</sup>).

**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](mailto: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



# QUALITY CONTROL SERVICES

LABORATORY EQUIPMENT • SALES • SERVICE • CALIBRATION • REPAIRS  
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(503) 236-2712 • FAX (503) 235-2535 • [www.qc-services.com](http://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

### 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](mailto:dthompson@qc-services.com)

Date: 03/21/17

Signature David S. Thompson



# QUALITY CONTROL SERVICES

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(503) 236-2712 • FAX (503) 235-2535 • [www.qc-services.com](http://www.qc-services.com)



## Report of Calibration

Firm: PFS Teco  
Address: 11785 SE Hwy 212, Ste 305  
City/State/Zip: Clackamas, OR 97015

Test Completed: 08/27/18  
Submitted By: John Steinert  
Traceable Number: 20181772

Test Item: 5 lb Individual Grip Handle Weight  
Serial No.: 10744

Manufacturer: Rice Lake

### Laboratory Environment at time of test

Temperature °C	Pressure mmHg	Humidity %RH
21.838	762.06	52.23

### Conventional Mass Value

Nominal Value	As Found pounds	As Found Correction* (mg)	Uncertainty (mg)	Tolerance (mg)
5 lb	5.0006085	276.0	2.0	760

\*Correction is the difference between the conventional mass value of a weight and its nominal value.


**Comments:** This weight was new from the manufacturer and was within ASTM Class 7 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 [dtompson@qc-services.com](mailto:dtompson@qc-services.com)

Date: 08/28/18

  
Signature David S. Thompson

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Member: National Conference of Standards Laboratories and Weights & Measures





Established 1974

# QUALITY CONTROL SERVICES

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2340 SE 11<sup>TH</sup> Ave. Portland, Oregon 97214 • Box 14831 Portland, Oregon 97293  
(503) 236-2712 • FAX (503) 235-2535 • www.qc-services.com



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:		<div><input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/></div> <div>Good Fair Poor</div> <div>Temperature: 21.3°C</div>		
100	0.0003	50 x 4	0.0002	100	0.0001				
As-Found:		As-Found:		1. 100.0001	5. 100.0002	9. 100.0001	<div><b>Result</b></div> <div>0.00004</div>		
Pass: <input checked="" type="checkbox"/>	Fail: <input type="checkbox"/>	Pass: <input checked="" type="checkbox"/>	Fail: <input type="checkbox"/>	2. 100.0001	6. 100.0001	10. 100.0001			
As-Left:		As-Left:		3. 100.0001	7. 100.0001				
Pass: <input checked="" type="checkbox"/>	Fail: <input type="checkbox"/>	Pass: <input checked="" type="checkbox"/>	Fail: <input type="checkbox"/>	4. 100.0001	8. 100.0002				

### 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.



# 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.



# HORIBA

Automotive Test Systems

## CALIBRATION TABLE

CUSTOMER	Hearth and Home	MODEL	Mexa-584L
SRA#	5000478538/54362	SERIAL #	V3WN5LYV
DATE	7/3/2019	ANALYZER	CO2
TECH	E. Oerther		

Range	1
Full Scale	20 %
Calib. Gas	17.88
Flow Factor	0.8795

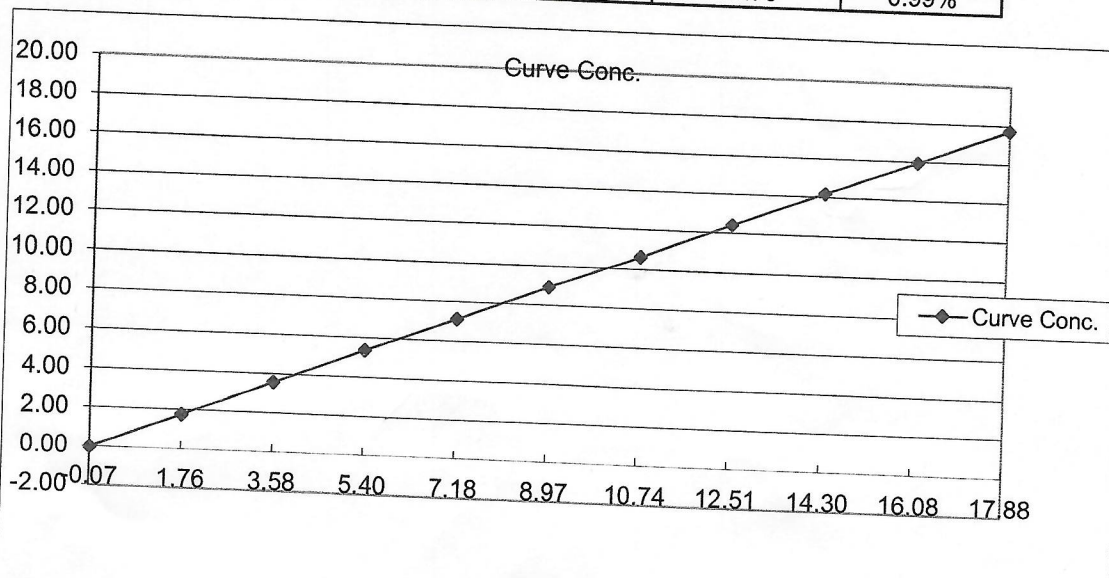
COEFFICIENTS	
a0	1.851756E-02
a1	9.891342E-01
a2	0.000000E+00
a3	0.000000E+00
a4	0.000000E+00

Weights ?  
TRUE

Flow Factors: Use with gas concentrations above 1%

CO2/N2=.8795	C3H8/N2=1.2304	O2/N2=0.894
CO2/AIR=.9006	C3H8/AIR=1.2599	SO2/N2=.8130
CO/N2=1.0000	CH4/N2=1.4430	SO2/AIR=.8325
CO/AIR=1.0240	CH4/AIR=1.4770	

Fixed pt.	Analyzer Reading	Cutpoints 11	Bottle Conc.	Curve Conc.	% POINT Error
1	-0.07	0.0	0.000	-0.05	0.29%
2	1.76	10.0	1.753	1.76	-0.35%
3	3.58	20.0	3.514	3.56	-1.28%
4	5.40	30.0	5.283	5.36	-1.44%
5	7.18	40.0	7.059	7.12	-0.87%
6	8.97	50.0	8.843	8.89	-0.54%
7	10.74	60.0	10.634	10.64	-0.07%
8	12.51	70.0	12.434	12.39	0.33%
9	14.30	80.0	14.241	14.16	0.55%
10	16.08	90.0	16.057	15.92	0.83%
11	17.88	100.0	17.880	17.70	0.99%



# HORIBA

Automotive Test Systems

## CALIBRATION TABLE

<b>CUSTOMER</b>	Hearth and Home	<b>MODEL</b>	Mexa-584L
<b>SRA#</b>	5000478538/54362	<b>SERIAL #</b>	V3WN5LYV
<b>DATE</b>	7/3/2019	<b>ANALYZER</b>	CO
<b>TECH</b>	Kyle Joseph		

<b>Range</b>	1
<b>Full Scale</b>	10 %
<b>Calib. Gas</b>	9.04 %
<b>Flow Factor</b>	1.0000

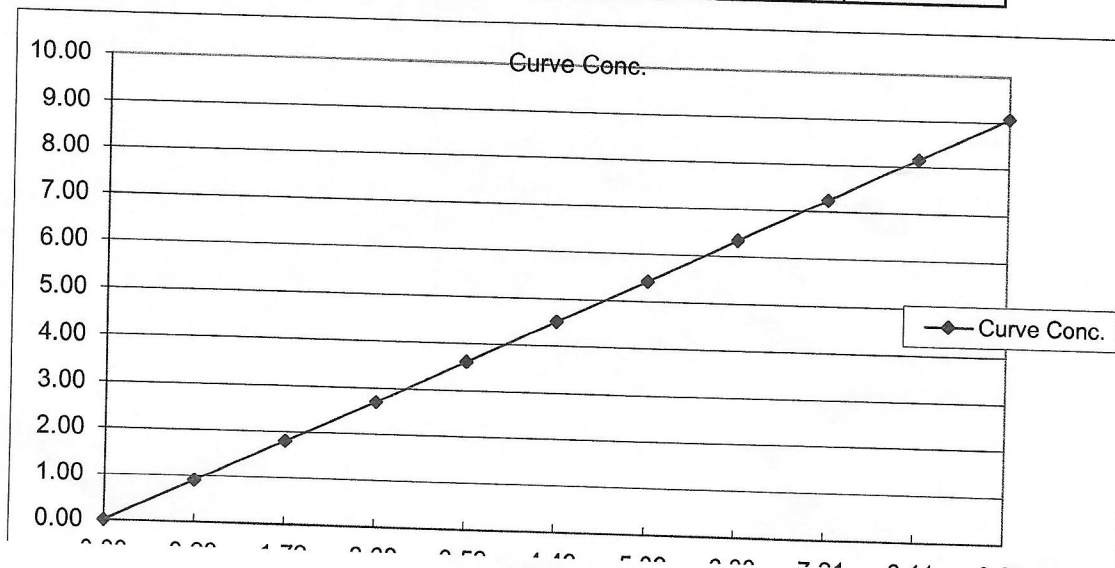
<b>COEFFICIENTS</b>	
a0	3.722343E-03
a1	1.004604E+00
a2	0.000000E+00
a3	0.000000E+00
a4	0.000000E+00

Weights ?  
TRUE

Flow Factors: Use with gas concentrations above 1%

CO <sub>2</sub> /N <sub>2</sub> =.8795	C <sub>3</sub> H <sub>8</sub> /N <sub>2</sub> =1.2304	O <sub>2</sub> /N <sub>2</sub> =0.894
CO <sub>2</sub> /AIR=.9006	C <sub>3</sub> H <sub>8</sub> /AIR=1.2599	SO <sub>2</sub> /N <sub>2</sub> =.8130
CO/N <sub>2</sub> =1.0000	CH <sub>4</sub> /N <sub>2</sub> =1.4430	SO <sub>2</sub> /AIR=.8325
CO/AIR=1.0240	CH <sub>4</sub> /AIR=1.4770	

Fixed pt.	Analyzer Reading	Cutpoints 11	Bottle Conc.	Curve Conc.	% POINT Error
1	0.00	0.0	0.000	0.00	-0.04%
2	0.90	10.0	0.904	0.91	-0.43%
3	1.79	20.0	1.808	1.80	0.34%
4	2.68	30.0	2.712	2.70	0.59%
5	3.59	40.0	3.616	3.61	0.16%
6	4.49	50.0	4.520	4.51	0.12%
7	5.39	60.0	5.424	5.42	0.10%
8	6.30	70.0	6.328	6.33	-0.07%
9	7.21	80.0	7.232	7.25	-0.21%
10	8.11	90.0	8.136	8.15	-0.18%
11	9.03	100.0	9.040	9.08	-0.39%





## CERTIFICATE OF ANALYSIS

### Grade of Product: EPA Protocol

Part Number: E03NI79E15A2VT7      Reference Number: 54-124358094-1  
Cylinder Number: XC032449B      Cylinder Volume: 153.4 CF  
Laboratory: ASG - Chicago - IL      Cylinder Pressure: 2015 PSIG  
PGVP Number: B12013      Valve Outlet: 350  
Gas Code: APPVD      Analysis Date: Feb 11, 2013

Expiration Date: Feb 11, 2021

Certification performed in accordance with "EPA Traceability Protocol for Assay and Certification of Gaseous Calibration Standards (May 2012)" document EPA 600/R-12/531, using the assay procedures listed. Analytical Methodology does not require correction for analytical interference. This cylinder has a total analytical uncertainty as stated below with a confidence level of 95%. There are no significant impurities which affect the use of this calibration mixture. All concentrations are on a volume/volume basis unless otherwise noted.

Do Not Use This Cylinder below 100 psig, i.e. 0.7 megapascals.

ANALYTICAL RESULTS				
Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty
CARBON MONOXIDE	6.000 %	6.137 %	G1	+/- 1% NIST Traceable
CARBON DIOXIDE	15.00 %	15.05 %	G1	+/- 1% NIST Traceable
NITROGEN	Balance			

CALIBRATION STANDARDS				
Type	Lot ID	Cylinder No	Concentration	Expiration Date
NTRM/CO	08061217	CC269481	7.976 % CARBON MONOXIDE/NITROGEN	Jun 22, 2018
NTRM/CO2	06120403	CC185079	19.66 % CARBON DIOXIDE/NITROGEN	May 01, 2016

ANALYTICAL EQUIPMENT		
Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
CO2-1 HORIBA VIA-510 V1E3H7P5	NDIR	Jan 28, 2013
(CO-3) HORIBA VIA-510	NDIR	Jan 28, 2013

Triad Data Available Upon Request

Notes:

Approved for Release



# 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](http://www.dwyer-inst.com)

e-mail: [info@dwyer-inst.com](mailto:info@dwyer-inst.com)

# 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

<b>Purpose:</b> This method provides instructions for checking the critical dimensions of the equipment.			
<b>Tolerance:</b> Equipment shall meet the dimensional tolerances specified in the applicable test method.			
<b>Procedure:</b> 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.



# Verification of Standardization of Calipers

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:	General	Zip:	97015 Location: In House
Capacity:	0.0000 - 6.0000 inches 0.0005 Divisions	Model:	6" Digital Caliper
Calibration Cycle:	12 Months	Serial #:	092
Previous Calibration Date:	January 2018	Lab ID#:	092
Equipment Used:	Gauge Blocks S/N: ADGB002	Calibration Procedure:	Ad-Tek DC
If Other, Explain:		Action Recommended:	

## Verification Data

<b>Purpose:</b> This method provides instructions for checking the critical dimensions of the inside diameter of the equipment. <b>Tolerance:</b> Equipment shall meet the dimensional tolerances specified by the manufacturer for the inside diameter. <b>Procedure:</b> Verified using the procedure to meet manufacturer's tolerance for inside diameter.			
Actual Dimensions (inches)	Unit Under Test As Found (inches)	Unit Under Test As Left (inches)	Difference (inches)
0.0000	0.0000	0.0000	0.0000
0.0500	0.0500	0.0500	0.0000
0.1000	0.1000	0.1000	0.0000
0.1010	0.1010	0.1010	0.0000
0.1050	0.1050	0.1050	0.0000
0.1100	0.1100	0.1100	0.0000
0.1500	0.1500	0.1500	0.0000
0.5000	0.5000	0.5000	0.0000
1.0000	1.0000	1.0000	0.0000
3.0000	2.9995	2.9995	-0.0005
5.0000	4.9990	4.9990	-0.0010
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:		0.00062	

This certificate does not reflect measurements for inside jaws, step height, or depth.

File No: PFS-101666-0119D0120-AH-DC-092

Temperature: 68.2°F Humidity: 41.6%

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 15, 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.



# J-2000

## owner's manual



**DELMHORST**<sup>®</sup>  
INSTRUMENT CO.  
WHEN ACCURACY IS THE POINT.<sup>™</sup>



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).