NON-CONFINDENTIAL BUSINESS INFORMATION
(Non-CBI)

Certification Test Report

Valley Comfort Systems, Inc.

Wood Stove Insert

Model: Sirocco SC 25 Insert

Prepared for:	Valley Comfort Systems Inc. 1290 commercial Way Penticton, BC V2A 3H5
Prepared by:	OMNI-Test Laboratories, Inc. 13327 NE Airport Way Portland, OR 97230 (503) 643-3788
Test Period:	**October 20, 2015 – October 23, 2015**
Report Date:	December 31, 2015
Revised Report Date:	March 8, 2016
Report Number:	0142WN016E

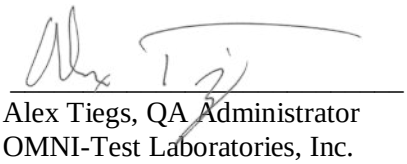
AUTHORIZED SIGNATORIES

This report has been reviewed and approved by the following authorized signatories:

Technician:

Bruce Davis
OMNI-Test Laboratories, Inc.

QA Review:



Alex Tiegs, QA Administrator
OMNI-Test Laboratories, Inc.

Evaluation Decision:

Sebastian Button, Testing Supervisor
OMNI-Test Laboratories, Inc.

March 8, 2016

Issue Date

TABLE OF CONTENTS

Section 1

Sampling Procedures and Test Results

INTRODUCTION

Valley Comfort Systems Inc. (Valley Comfort) retained *OMNI* to perform U.S. Environmental Protection Agency (EPA) certification testing on the Sirocco SC25 (SC25) wood stove. The SC25 wood stove is a Catalytic Insert-type room heater. The firebox is constructed of mild steel. Usable firebox volume was measured to be 2.30 cubic feet and the stove is vented through a 6" flue collar mounted on the top of the appliance near the rear.

The testing was performed at OMNI; altitude of the laboratory is 30 feet above sea level. The unit was received in good condition and logged in on October 12, 2015, then assigned and labeled with *OMNI* ID #2142. *OMNI* representative Bruce Davis conducted the certification testing and completed all testing by October 23, 2015.

This report is organized in accordance with the EPA-recommended outline and is summarized in the Table of Contents immediately preceding this section. The results in this report are limited to the item submitted.

SAMPLING PROCEDURE

The SC25 wood stove was tested in accordance with the U.S. EPA 40 CFR Part 60, Subpart AAA – Standards of Performance for New Residential Wood Heaters using EPA Method 28R, ASTM E2515 and ASTM E2780. Particulate emissions were measured using sampling trains consisting of two filters (front and back).

The model SC25 was tested for thermal efficiency and carbon monoxide (CO) emissions in accordance with CSA B415.1-10.

TEST RUN SUMMARY

Run 1 – Category 3 burn rate (1.59 kg/hr), no anomalies occurred, valid test run included in weighed average.

Run 2 - Category 2 burn rate (0.90 kg/hr), no anomalies occurred, valid test run included in weighed average.

Run 3 - Category 1 burn rate (0.66 kg/hr), no anomalies occurred, valid test run included in weighed average.

Run 4 - Category 4 burn rate (1.89 kg/hr), no anomalies occurred, valid test run included in weighed average.

SUMMARY OF RESULTS

The weighted average emissions of the four test runs included in the results indicate a particulate emission rate of 0.90 grams per hour. A room air fan is standard equipment on all appliances; therefore a fan confirmation test was not conducted. The SC25 results are within the emission limit of 4.5 g/hr for affected facilities manufactured on or after May 15, 2015, or sold at retail after December 31, 2015.

The proportionality results for all four test runs were acceptable. Quality check results for each test run are presented in Section 2 of this report.

Table 1 – Particulate Emissions

Run	Burn Rate (kg/hr dry)	ASTM E2515 Emissions (g/hr)
1	1.59	1.48
2	0.90	0.33
3	0.66	0.31
4	1.89	1.93
Weighted particulate emission average of four test runs: **0.90** grams per hour.		

Table 2 – Particulate Emissions (First Hour)

Run	ASTM E2515 Emissions – First Hour (g/hr)
1	3.44
2	1.73
3	1.71
4	5.25

Table 3 – B415.1 Efficiency and CO Emissions

Run	Heat Output (BTU/hr)	HHV Efficiency (%)	LHV Efficiency (%)	CO Emissions (g/MJ Output)	CO Emissions (g/kg Dry Fuel)	CO Emissions (g/hr)
1	21,541	72.6	78.4	1.13	16.31	25.75
2	13,816	79.3	85.8	2.35	36.91	34.20
3	10,097	81.9	88.5	0.63	10.25	6.73
4	26,290	74.6	80.6	0.65	9.66	18.12
Weighted average HHV efficiency of 4test runs: 77.0%.						

Table 4 – Test Facility Conditions

Run	Room Temperature (°F)		Barometric Pressure (Hg)		Air Velocity (ft/min)	
	Before	**After**	**Before**	**After**	**Before**	**After**
1	73	73	30.34	30.28	<50	<50
2	70	75	30.21	30.17	<50	<50
3	72	76	30.31	30.22	<50	<50
4	71	71	30.18	30.20	<50	<50

Table 5 – Fuel Measurement and Crib Description Summary – PRETEST

Run	Pretest Fuel Weight (Starting weight in lbs)	Pretest Moisture (Dry basis - %)	Coal Bed Weight (lbs)
1	12.1	21.83	3.6
2	4.4	21.86	3.7
3	4.5	21.80	3.7
4	12.9	20.90	3.3

Table 6 – Fuel Measurement and Crib Description Summary – TEST

Run	Test Fuel Wet Basis (lbs)	Firebox Volume (ft^3)	Fuel Loading Density Wet Basis (lbs/ft^3)	Test Fuel Dry Basis (lbs)	Piece Length (in)	2x4s Used	4x4s Used
1	15.7	2.26	6.95	12.8	16.75	3	2
2	15.3	2.26	6.77	12.6	17	3	2
3	15.4	2.26	6.81	12.8	17	3	2
4	15.2	2.26	6.73	12.5	17	3	2

Table 7 – Dilution Tunnel Gas Measurements and Sampling Data Summary

Run	Length of Test (min)	Average Dilution Tunnel Gas Measurements		
		Velocity (ft/sec)	Flow Rate (dscf/min)	Temperature (°F)
1	220	19.56	217.652	94
2	380	18.39	209.060	81
3	530	18.10	206.885	79
4	180	18.75	206.203	99

Table 8 - Average Temperature Data

Run	Beginning Surface Temperature Average[a]	Ending Surface Temperature Average[a]	Surface Delta T[b]
1	400.2	349.0	51.2
2	267.8	309.3	41.5
3	250.7	293.1	42.4
4	426.9	367.8	59.1
a. All temperatures are in degrees F.			
b. Represents the difference between beginning and ending average surface temperatures.			

Table 9 – Pretest Configuration

Run	Combustion Air	Fuel Added	Fuel Removed	Time (min)
1	-35° from horizontal	None	None	70
2	-10° from horizontal	None	None	60
3	-10° from horizontal	None	None	60
4	0° from vertical	None	None	67

Table 10 – Test Configurations

Run	Five-Minute Startup Procedures	Combustion Air
1	Fuel Loading: Fuel loaded by 30 seconds. Door: Cracked open until 3:00 minutes then closed. Primary Air: Fully open until 4:55 then set to test setting by 5 minutes. Secondary: N/A Fan: Off for the first 30 minutes then set to Medium High for remainder of test.	-35 degrees from horizontal.
2	Fuel Loading: Fuel loaded by 40 seconds. Door: Cracked open until 4:30 minutes then closed. Primary Air: Fully open until 4:55 then set to test setting by 5 minutes. Secondary: N/A Fan: Off for the first 30 minutes then set to low for the remainder of test.	-10 degrees from horizontal.
3	Fuel Loading: Fuel loaded by 35 seconds. Door: Cracked open until 4:00 minutes then closed. Primary Air: Fully open until 4:55 then set to test setting by 5 minutes. Secondary: N/A Fan: Off for the first 30 minutes then set to low for the remainder of test.	-10 degrees from horizontal.
4	Fuel Loading: Fuel loaded by 40 seconds. Door: Cracked open until 2:30 then closed. Primary Air: Fully open the entire test. Secondary: N/A Fan: Off for the first 30 minutes then turned to high for the remainder of test.	0 degrees from vertical.

ADDITIONAL MODELS

Valley Comfort is also requesting certification for an additional model, the Ashford 25 (AF25) catalytic wood stove insert.

The SC25 was tested by OMNI to EPA Methods 28R and ASTM E2780, as discussed previously. The AF25 insert is identical to the SC25 version of the stove in all interior parts and configurations. All critical components, air flow pathways, and K List items (aside from overall stove dimensions) are identical between the two models. They differ only in their outer “shells” to offer different styles to consumers. The differences between these heater models do not affect emissions performance.

Please refer to Appendix A for drawings of the AF25. All drawings of internal parts are identical between the stove models, as they use the same parts and components. Each appliance has their own individual manuals to reflect the different appearances of the stoves; however, the actual content of each manual is identical. A copy of the AF25 Label and Manual can also be found in Appendix A.

Section 2

Photographs/Appliance Description/Drawings

Valley Comfort Systems
Sirocco SC25 Insert
Test Dates: October 20, 2015 – October 23, 2015

Sirocco SC25 Front View

Sirocco SC25 Side View

Sirocco SC25 Rear View

Sirocco SC25 Side View

Valley Comfort Systems
Sirocco SC25 Insert

Run 1 – Fuel

Run 1 – Newly Loaded Stove

Run 2 – Fuel

Run 2 – Newly Loaded Stove

Valley Comfort Systems
Sirocco SC25 Insert

Run 3 – Fuel

Run 3 – Newly Loaded Stove

Run 4 – Fuel

Run 4 – Newly Loaded Stove

WOOD HEATER DESCRIPTION

Appliance Manufacturer: Valley Comfort Systems

Wood Stove Model: Sirocco SC25 Insert

Type: Catalytic Fireplace Insert

WOOD HEATER INFORMATION

Materials of Construction: The unit is constructed primarily of mild steel. The firebox is lined with firebrick that measures various sizes with the largest at 1.25 x 4.5 x 9". The feed door has a 24.25" x 11.5" glass panel and 7/8" rope gasket.

Air Introduction System: Primary air enters the appliance through a rectangular opening located in the front of the unit near the bottom. Air is controlled through this opening by a rotating flap that is operated by a rod extending out the left side of the appliance near the front. The rotating flap is further controlled by a Bi-metallic spring that closes the flap as the spring is heated. Primary air is channeled to the rear of the firebox, and up the back. It then enters the firebox and is channeled forward through two round tubes to the air wash manifold located above the fuel loading door. There is no dedicated secondary air introduction system supplying air to the catalytic combustor.

Combustion Control Mechanisms: Combustion rate is controlled by an air control system that is activated by a Bi-metallic spring. An adjustment knob is located on the left side of the appliance, when set a rotating flap will close over a rectangular opening. As the Bi-metallic spring cools it allows the air control to open slightly, it will then close as the increased combustion heats it up, thus maintaining a constant range of heat output.

Combustor: A metal combustor measuring 2.48" X 13" x 2" is mounted at the top of the firebox near the middle. The metal combustor is factory mounted inside a metal can with tabs used to assist in installation and removal.

Internal Baffles: Internal baffles to direct flame path are not used, the catalyst and bypass are mounted in a "dome" attached to the firebox top.

Other Features: Two fans operated by one power switch are located under the firebox near the rear; the power switch is also a rheostat that is used to adjust fan speed. Fans are provided on all models, not as an option.

Flue Outlet: The 6" diameter flue outlet is located in the rear of the unit; it is mounted at a 30 degree angle.

WOOD HEATER OPERATING INSTRUCTIONS

Specific Written Instructions: See Section 5 of this report. All markings and instruction materials were reviewed for content prior to printing.

Engineering Drawings/Blueprints
[Redacted]

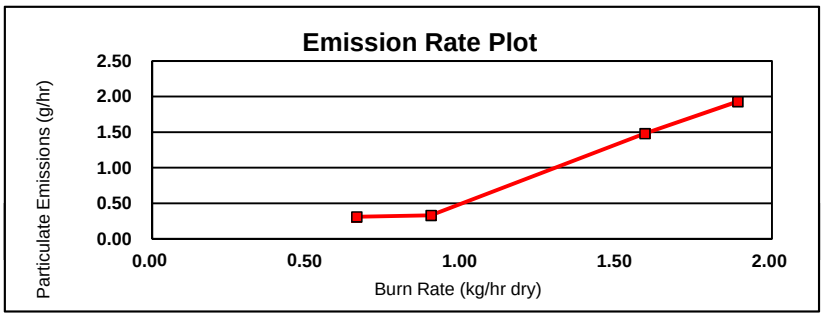
Section 3

Test Data by Run

EPA Weighted Average Emissions
EPA Method 28

Client:	Valley Comfort	Status:	Final
Stove Model:	Sirocco SC25 Insert	Stove Type:	Catalytic Stove
Test Dates:	10/20/15 - 10/23/15		
Project Number:	0142WN016E		
Tracking Number:	2142		

Weighted Averages	**Emissions (g/hr):**	**0.90**
	HHV Efficeincy (%):	**77.0**
	LHV Efficeincy (%):	**83.2**



Run #	3	
Burn Rate (dry kg/hr)	0.66	
Category	1	
LHV Efficiency (%)	88.5	
HHV Efficiency (%)	81.9	
Emissions (g/hr)	0.31	
Weighting Factor	0.300	16.99%

Run #	2	
Burn Rate (dry kg/hr)	0.90	
Category	2	
LHV Efficiency (%)	85.8	
HHV Efficiency (%)	79.3	
Emissions (g/hr)	0.33	
Weighting Factor	0.669	37.89%

Run #	1	
Burn Rate (dry kg/hr)	1.59	
Category	3	
LHV Efficiency (%)	78.4	
HHV Efficiency (%)	72.6	
Emissions (g/hr)	1.48	
Weighting Factor	0.592	33.55%

Run #	4	
Burn Rate (dry kg/hr)	1.89	
Category	3	
LHV Efficiency (%)	80.6	
HHV Efficiency (%)	74.6	
Emissions (g/hr)	1.93	
Weighting Factor	0.204	11.57%

Wood Heater Conditioning Data - ASTM E2780/ ASTM E2515

Manufacturer:	Valley Comfort
Model:	Sirocco SC25
Tracking No.:	2142
Project No.:	0142WN016E
Test Date:	10/12/15 - 10/19/15
Technician:	B. Davis
Operation Category:	2 through 4

Elapsed Time (hr)	Flue Gas Temp (degrees F)	Catalyst Exit Temp (degrees F)
0	N/A	1162.0
1	N/A	1259.0
2	N/A	1012.0
3	N/A	872.0
4	N/A	882.0
5	N/A	1086.0
6	N/A	1250.0
7	N/A	970.0
8	N/A	1228.0
9	N/A	991.0
10	N/A	799.0
11	N/A	867.0
12	N/A	679.0
13	N/A	1078.0
14	N/A	1005.0
15	N/A	1047.0
16	N/A	1088.0
17	N/A	1160.0
18	N/A	758.0
19	N/A	468.0
20	N/A	819.0
21	N/A	1006.0
22	N/A	692.0
23	N/A	1014.0
24	N/A	911.0
25	N/A	852.0
26	N/A	1133.0
27	N/A	777.0
28	N/A	641.0
29	N/A	760.0
30	N/A	802.0
31	N/A	917.0

32	N/A	1153.0
33	N/A	1089.0
34	N/A	1135.0
35	N/A	930.0
36	N/A	1162.0
37	N/A	1166.0
38	N/A	873.0
39	N/A	843.0
40	N/A	1251.0
41	N/A	1124.0
42	N/A	1108.0
43	N/A	914.0
44	N/A	860.0
45	N/A	937.0
46	N/A	901.0
47	N/A	893.0
48	N/A	751.0
49	N/A	525.0
50	N/A	1017.0

Run 1

Wood Heater Test Results - ASTM E2780 / ASTM E2515

Manufacturer: Valley Comfort
Model: Sirocco SC25 Insert
Project No.: 0142WN016E
Tracking No.: 2142
Run: 1
Test Date: 10/20/15

Burn Rate	**1.59 kg/hr dry**
Average Tunnel Temperature	94 degrees Fahrenheit
Average Gas Velocity in Dilution Tunnel - vs	19.56 feet/second
Average Gas Flow Rate in Dilution Tunnel - Qsd	13059.1 dscf/hour
Average Delta p	0.104 inches H20
Total Time of Test	220 minutes

	AMBIENT	SAMPLE TRAIN 1	SAMPLE TRAIN 2	FIRST HOUR FILTER (TRAIN 1)
Total Sample Volume - Vm	69.324 cubic feet	34.255 cubic feet	35.341 cubic feet	9.209 cubic feet
Average Gas Meter Temperature	73 degrees Fahrenheit	83 degrees Fahrenheit	83 degrees Fahrenheit	83 degrees Fahrenheit
Total Sample Volume (Standard Conditions) - Vmstd	68.699 dscf	33.881 dscf	35.018 dscf	9.108 dscf
Total Particulates - m_n	0 mg	3.9 mg	3.9 mg	2.4 mg
Particulate Concentration (dry-standard) - C_r/C_s	0.000000 grams/dscf	0.00012 grams/dscf	0.00011 grams/dscf	0.00026 grams/dscf
Total Particulate Emissions - E_T	0.00 grams	5.51 grams	5.33 grams	3.44 grams
Particulate Emission Rate	0.00 grams/hour	1.50 grams/hour	1.45 grams/hour	3.44 grams/hour
Emissisons Factor		0.95 g/kg	0.92 g/kg	2.12 g/kg
Difference from Average Total Particulate Emissions		0.09 grams	0.09 grams	
	Dual Train Comparison Results Are Acceptable			

FINAL AVERAGE RESULTS

Complete Test Run	
Total Particulate Emissions - E_T	5.42 grams
Particulate Emission Rate	**1.48 grams/hour**
Emissisons Factor	0.93 grams/kg
First Hour Emissions	
Total Particulate Emissions - E_T	3.44 grams
Particulate Emission Rate	3.44 grams/hour
Emissisons Factor	2.12 grams/kg

OMNI-Test Laboratories, Inc.

Wood Heater Test Data - ASTM E2780 / ASTM E2515

Run: 1

Manufacturer: Valley Comfort
Model: Sirocco SC25 Insert
Tracking No.: 2142
Project No.: 0142WN016E
Test Date: 20-Oct-15
Beginning Clock Time: 12:27

Total Sampling Time: 220 min
Recording Interval: 10 min
Background Sample Volume: 69.324 cubic feet

Meter Box Y Factor: 1.001 (1) 1.003 (2) 0.988 (Amb)

Barometric Pressure:

Begin	Middle	End	Average
30.34	30.3	30.28	30.31 "Hg

OMNI Equipment Numbers: 00185, 00410, 00335, 00336, 00419, 00428b, 00296- T55, 00439, 00348

PM Control Modules: 335, 336
Dilution Tunnel MW(dry): 29.00 lb/lb-mole
Dilution Tunnel MW(wet): 28.78 lb/lb-mole
Dilution Tunnel H2O: 2.00 percent
Dilution Tunnel Static: -0.410 "H2O
Tunnel Area: 0.19635 ft2
Pitot Tube Cp: 0.99

Avg. Tunnel Velocity: 19.56 ft/sec.
Intial Tunnel Flow: 214.1 scfm
Average Tunnel Flow: 217.7 scfm
Post-Test Leak Check (1): 0 cfm @ 4 in. Hg
Post-Test Leak Check (2): 0 cfm @ 4 in. Hg
Average Test Piece Fuel Moisture: 23.01 Dry Basis %

Velocity Traverse Data

	Pt.1	Pt.2	Pt.3	Pt.4	Pt.5	Pt.6	Pt.7	Pt.8	Center	
Initial dP	0.070	0.098	0.074	0.080	0.074	0.090	0.100	0.070	0.104	"H2O
Temp:	97	97	97	97	97	97	97	97	97	°F

V_{strav} 19.60 ft/sec V_{scent} 21.81 ft/sec F_p 0.899

	Particulate Sampling Data														Fuel Weight (lb)		Temperature Data (°F)					Stack Gas Data		
Elapsed Time (min)	Gas Meter 1 (ft^3)	Gas Meter 2 (ft^3)	Sample Rate 1 (cfm)	Sample Rate 2 (cfm)	Orifice dH 1 ("H_2O)	Meter 1 Temp (°F)	Meter 1 Vacuum ("Hg)	Orifice dH 2 ("H_2O)	Meter 2 Temp (°F)	Meter 2 Vacuum ("Hg)	Dilution Tunnel (°F)	Dilution Tunnel Center dP	Pro. Rate 1	Pro. Rate 2	Scale Reading	Weight Change	Avg. Stove Surface Temp	Stack	Filter 1	Filter 2	Ambient	Draft ("H_2O)	CO_2 (%)	CO (%)
0	0.000	0.000			1.21	75	1.23	0.01	75	-0.4	107	0.104			15.7		400.2	464	71	71	73	-0.061	5.1	0.5
10	1.490	1.557	0.15	0.16	1.21	75	1.92	1.09	75	1.2	95	0.104	97	98	14.9	-0.8	368.9	372	71	75	72	-0.061	4.3	0.1
20	3.030	3.155	0.15	0.16	1.20	77	1.91	1.08	77	1.2	92	0.104	100	100	14.2	-0.7	347.7	348	71	75	72	-0.058	3.9	0
30	4.571	4.755	0.15	0.16	1.20	78	1.91	1.08	79	1.2	91	0.104	100	100	13.5	-0.7	340.6	347	71	75	72	-0.057	4.6	0
40	6.115	6.359	0.15	0.16	1.20	80	1.91	1.09	80	1.3	91	0.104	99	100	12.7	-0.8	319.3	355	71	75	72	-0.058	5.8	0
50	7.661	7.965	0.15	0.16	1.20	81	1.91	1.08	81	1.2	92	0.104	99	100	11.8	-0.9	319.9	366	71	75	72	-0.060	7.4	0
60	9.209	9.573	0.15	0.16	1.21	82	1.91	1.09	82	1.3	92	0.104	99	100	11.3	-0.5	322.7	378	71	75	72	-0.060	8	0
70	10.770	11.182	0.16	0.16	1.22	82	1.99	1.09	82	1.3	93	0.104	100	100	10.6	-0.7	323.9	387	74	75	72	-0.061	7.9	0
80	12.335	12.791	0.16	0.16	1.22	83	1.99	1.08	83	1.2	95	0.104	101	100	9.6	-1	339.9	410	75	76	71	-0.065	8.6	0.1
90	13.900	14.401	0.16	0.16	1.22	83	1.99	1.09	83	1.3	97	0.104	101	100	8.3	-1.3	359.6	416	76	76	73	-0.066	9.4	0.2
100	15.465	16.012	0.16	0.16	1.22	84	2	1.08	84	1.3	97	0.104	100	100	7.4	-0.9	371.6	425	76	76	73	-0.065	9.7	0.4
110	17.031	17.623	0.16	0.16	1.22	84	1.99	1.08	84	1.3	97	0.104	101	100	6.2	-1.2	381.1	427	76	77	74	-0.068	10	0.2
120	18.596	19.233	0.16	0.16	1.21	84	1.99	1.09	84	1.3	99	0.104	101	100	5.3	-0.9	392.6	440	77	77	74	-0.067	10.4	0.3
130	20.161	20.844	0.16	0.16	1.22	85	2	1.08	84	1.3	99	0.104	100	100	3.9	-1.4	403.5	435	77	77	73	-0.067	10.4	0.3
140	21.727	22.454	0.16	0.16	1.22	85	2.01	1.08	85	1.3	98	0.104	100	100	2.7	-1.2	416.5	423	77	77	74	-0.067	9.8	0.2
150	23.290	24.062	0.16	0.16	1.22	85	2.01	1.08	85	1.3	97	0.104	100	100	2.0	-0.7	427.9	411	77	77	75	-0.063	9.6	0.2
160	24.855	25.672	0.16	0.16	1.22	85	2	1.08	85	1.3	95	0.104	100	100	1.5	-0.5	423.6	380	77	77	73	-0.059	8.3	0
170	26.420	27.283	0.16	0.16	1.22	85	2.01	1.08	85	1.3	93	0.104	100	100	1.2	-0.3	401.6	356	77	77	74	-0.055	6.6	0
180	27.986	28.893	0.16	0.16	1.22	85	2	1.08	85	1.3	92	0.104	100	100	0.9	-0.3	383.8	340	77	77	74	-0.054	6.4	0
190	29.552	30.504	0.16	0.16	1.22	86	2	1.08	85	1.3	91	0.104	100	100	0.7	-0.2	371.2	334	77	77	74	-0.053	6.4	0
200	31.119	32.115	0.16	0.16	1.22	86	2.01	1.08	85	1.3	90	0.104	100	99	0.5	-0.2	361.7	328	76	76	74	-0.051	6.1	0
210	32.687	33.727	0.16	0.16	1.22	86	2	1.08	85	1.3	89	0.104	100	99	0.2	-0.3	355.4	323	76	76	73	-0.051	6.1	0
220	34.255	35.341	0.16	0.16	1.22	85	2	1.08	85	1.3	89	0.104	100	100	0.0	-0.2	349.0	319	76	76	73	-0.050	6	0
Avg/Tot	34.255	35.341	0.16	0.16	1.21	83		1.04	83		94	0.104	100	100			51.2		75	76	73	-0.060		

Wood Heater Lab Data - ASTM E2780 / ASTM E2515

Manufacturer:	Valley Comfort	Equipment Numbers:	00023, 00391, 00283A
Model:	Sirocco SC25 Insert		
Tracking No.:	2142		
Project No.:	0142WN016E		
Run #:	1		
Date:	10/20/15		

TRAIN 1 (First Hour emissions)

Sample Component	Reagent	Filter, Probe or Dish #	Weights		
			Final, mg	Tare, mg	Particulate, mg
B. Front filter catch	Filter	C234	123.5	121.3	2.2
C. Rear filter catch	Filter	C235	121.5	121.4	0.1
D. Probe catch*	Probe	1	122774.0	122774.0	0.0
E. Filter seals catch*	Seals	R348	3474.6	3474.5	0.1

Sub-Total Total Particulate, mg: 2.4

TRAIN 1 (Post First Hour Change-out)

Sample Component	Reagent	Filter, Probe or Dish #	Weights		
			Final, mg	Tare, mg	Particulate, mg
B. Front filter catch	Filter	C236	121.5	120.1	1.4
C. Rear filter catch	Filter	C237	120.2	120.1	0.1
D. Probe catch*	Probe	2	115023.4	115023.6	0.0
E. Filter seals catch*	Seals	R349	3245.9	3246.0	0.0

Sub-Total Total Particulate, mg: 1.5

Train 1 Aggregate Total Particulate, mg: **3.9**

TRAIN 2

Sample Component	Reagent	Filter, Probe or Dish #	Weights		
			Final, mg	Tare, mg	Particulate, mg
A. Front filter catch	Filter	C238	124.1	120.3	3.8
B. Rear filter catch	Filter	C239	120.2	120.3	-0.1
C. Probe catch*	Probe	OES 3	114773.2	114773.1	0.1
D. Filter seals catch*	Seals	R359	3510.3	3510.2	0.1

Total Particulate, mg: **3.9**

AMBIENT

Sample Component	Reagent	Filter # or Probe #	Weights		
			Final, mg	Tare, mg	Particulate, mg
A. Front filter catch*	Filter	C233	120.7	120.8	0.0

Total Particulate, mg: **0.0**

*Particulate catch that results in a negative number, is assumed to be zero for probes and seals, negative numbers for filters are assumed to be part of the seal weight.

Component	Equations:
A. Front filter catch	Final (mg) - Tare (mg) = Particulate, mg
B. Rear filter catch	Final (mg) - Tare (mg) = Particulate, mg
C. Probe catch	Final (mg) - Tare (mg) = Particulate, mg

Wood Heater Test Fuel Data - ASTM E2780

Manufacturer: Valley Comfort
Model: Sirocco SC25
Tracking No.: 2142
Project No.: 0142WN016E

Firebox Volume (ft^3):	2.26
Fuel Piece Length (in):	16.75
2x4 Crib Weight (lb):	6.5
4x4 Crib Weight (lb):	9.2

Total Fuel Weight (Dry Basis, lb):	12.8	
Fuel Density (lb/ft^3, Dry Basis):	28.64	OK
Loading Density (lb/ft^3, Wet Basis):	6.95	OK
2x4 Percentage:	41%	OK

Test Fuel Piece	Weight (lb)	Size	Readings (Dry Basis %)			Dry Weight (lb)
1	4.4	4"x 4"	23.8	24.5	22.6	3.56
2	4.3	4"x 4"	22.0	18.8	20.5	3.57
3	1.7	2"x 4"	22.6	23.8	23.2	1.38
4	1.6	2"x 4"	24.2	24.2	24.5	1.29
5	1.7	2"x 4"	23.2	24.7	22.6	1.38

Spacer Readings (Dry Basis %)			
19.9	22.7		
16.8	24.3		
22.0	23.8		
18.9			
20.9			
18.4			
21.7			
15.0			
22.3			
24.7			
21.4			
25.3			
20.8			

Run: 1

Manufacturer: Valley Comfort
Model: Sirocco SC25 Insert
Tracking No.: 2142
Project No.: 0142WN016E
Test Date: 20-Oct-15

ET (min)	Scale (LBS)	Weight Change	FB Top (oF)	FB Bot (oF)	FB Back (oF)	FB Left (oF)	FB Right (oF)	Pre Cat (oF)	Avg Surf (oF)	Stack (oF)	AMB (oF)	Draft In-H2O	Post Cat (oF)
0	12.1	0	640	151	190	405	381	1020	353.1	648	72	-0.083	908
10	10.4	-1.705	734	186	226	412	388	1174	389	452	72	-0.073	1069
20	9	-1.415	722	192	216	389	374	1073	378.6	425	71	-0.069	1069
30	7.8	-1.167	682	193	207	389	375	1194	369.3	411	71	-0.065	950
40	6.8	-1.018	680	191	200	397	394	1379	372.3	411	71	-0.065	970
50	5.7	-1.12	692	187	199	414	418	1402	381.9	413	72	-0.065	968
60	4.4	-1.27	732	183	199	431	434	1345	396	423	71	-0.065	1087
70	3.6	-0.836	722	182	203	440	455	1172	400.2	407	73	-0.063	1018

OMNI-Test Laboratories, Inc. **ASTM E2780 Wood Heater Run Sheets**

Client: Valley Comfort Project Number: 0142WN016E Run Number: 1

Model: Sirocco SC25 Insert Tracking Number: 2142 Date: 10/27/15

Test Crew: D Davis

OMNI Equipment ID numbers:

Wood Heater Run Notes

Air Control Settings

Primary:

35° below horizontal

-35°

Full High

Secondary: ~~Low~~ NA

Tertiary/Pilot: NA

Fan: Off Medium High (High = straight up.)

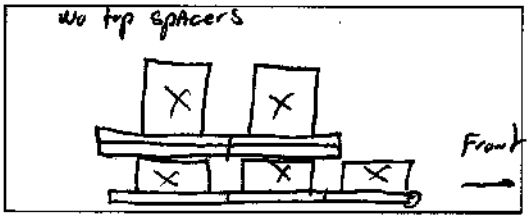
90° clockwise from high

Preburn Notes

Time	Notes
H	Rated coals

Test Notes

Sketch test fuel configuration:



Start up procedures & Timeline:

Bypass: opened until 3:00 minutes then closed

Fuel loaded by: 30 seconds

Door closed at: 3:00 minutes

Primary air: fully open until 4:55 then set to test setting at 5 cm

Notes: Fan off for first 30 minutes Then Set to Medium High for Remainder of Test.

Time	Notes
—	No Activities Noted.

Technician Signature:

Date: 11/13/15

OMNI-Test Laboratories, Inc. **ASTM E2780 Wood Heater Run Sheets**

Client: Valley Comfort Project Number: 0142WN016E Run Number: 1

Model: Sirocco SC25 Insert Tracking Number: 2142 Date: 10/20/15

Test Crew: BO Aus

OMNI Equipment ID numbers: 340, 353, 431

Wood Heater Fuel Data

Fuel: Douglas fir, untreated and air dried, standard grade or better dimensional lumber

Pre-Burn Fuel

Calibration: Cal Value (1) = 12% Actual Reading 12

Cal Value (2) = 22% Actual Reading 22

Piece:	Length:	Reading:	Piece:	Length:	Reading:
1	17 in	23.8	7	12 in	21.9
2	17 in	18.4	8	12 in	21.4
3	17 in	20.5	9	____ in	____
4	17 in	23.8	10	____ in	____
5	12 in	23.8	11	____ in	____
6	12 in	21.0	12	____ in	____

Total Pre-Burn Fuel Weight: 12.7 Pre-Burn Fuel Average Moisture: 21.83

Time (clock): 10:30 Room Temperature (F): 71 Initials: BA

Test Fuel

Firebox Volume (ft^3): 2.26 Test Fuel Piece Length (in): 16.75

Load Weight Range (lb): 14.2 - 17.4 Total Wet Fuel Load Weight (lb): 15.7

3.2 - 3.9

Fuel Type & Amount: 2 x 4: 3 4 x 4: 2

Weight (with spacers): 6.5 Weight (with spacers): 9.2

Piece:	Weight (lbs):	Moisture Readings (%DB):				Fuel Type:
1	~~24.5~~ 4.4	23.8	24.5	22.6		4x4
2	4.3	22.0	18.8	20.5		4x4
3	1.7	22.6	23.8	23.2		2x4
4	1.6	24.2	24.2	24.5		2x4
5	1.7	~~25.5~~ 23.2	24.7	22.6		
6						
7						

Spacer Moisture Readings (%DB)

19.9	16.8	22.0	18.9	20.9	18.4	21.7	15.0
22.3	24.7	21.4	25.3	20.8	22.7	24.3	23.8

Time (clock): 10:30 Room Temperature (F): 71 Initials: BA

Technician Signature: BO Aus Date: 11/13/15

OMNI-Test Laboratories, Inc. **ASTM E2780 Wood Heater Run Sheets**

Client: Valley Comfort Project Number: 0142WN016E Run Number: 1

Model: Sirocco SC25 Insert Tracking Number: 2142 Date: 10/20/15

Test Crew: BDA

OMNI Equipment ID numbers:

Wood Heater Supplemental Data

Start Time: 12:27 Booth #: 1

Stop Time: 16:07

Stack Gas Leak Check:

Initial: good Final: good

Sample Train Leak Check:

A: 0.0 @ 4 "Hg

B: 0.0 @ 4 "Hg

Calibrations: Span Gas CO_2: 16.89 CO: 4.29

	Pre Test		Post Test	
	Zero	Span	Zero	Span
Time	12:02	12:02	16:09	16:09
CO_2	0.00	16.89	0.00	16.90
CO	0.00	4.296	0.00	4.274

Air Velocity (ft/min): Initial: 650 Final: 650

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

Pitot Tube Leak Test: Initial: good Final: good

Stack Diameter (in): 6"

Induced Draft: 0.0

% Smoke Capture: 100 %

Flue Pipe Cleaned Prior to First Test in Series:

Date: 10/20/15 Initials: BR

	Initial	Middle	Ending
P_b (in/Hg)	30.34	30.30	30.28
RH (%)	53.1	46.2	45.4
Ambient (°F)	70	72	75

Background Filter Volume: 69.324

Tunnel Traverse

Microtector Reading	dP (in H_2O)	T(°F)
1	.070	97
2	.098	97
3	.074	97
4	.080	97
1	.074	97
2	.090	97
3	.100	97
4	.076	97
Center:		
	.104	97

Tunnel Static Pressure (in H_2O):	
Beginning of Test	End of Test
-0.04 -0.41	- 0.41

Technician Signature: BDA Date: 11/13/15

OMNI-Test Laboratories, Inc.

Manufacturer: Valley Comfort
Model: Sirocco SC25
Date: 10/20/15
Run: 1
Control #: 0142WN016E
Test Duration: 220
Output Category: 3

Technicians: B. Davis

Test Results in Accordance with CSA B415.1-09

	HHV Basis	LHV Basis
Overall Efficiency	72.6%	78.4%
Combustion Efficiency	99.3%	99.3%
Heat Transfer Efficiency	73%	79.0%

Output Rate (kJ/h)	22,708	21,541	**(Btu/h)**
Burn Rate (kg/h)	1.58	3.48	**(lb/h)**
Input (kJ/h)	31,285	29,677	**(Btu/h)**

Test Load Weight (dry kg)	5.79	12.76	**dry lb**
MC wet (%)	18.71		
MC dry (%)	23.02		
Particulate (g)	5.42		
CO (g)	94		
Test Duration (h)	3.67		

Emissions	**Particulate**	**CO**
g/MJ Output	0.07	1.13
g/kg Dry Fuel	0.94	16.31
g/h	1.48	25.75
lb/MM Btu Output	0.15	2.64

Air/Fuel Ratio (A/F)	16.25

VERSION: **2.2** **12/14/2009**

VERSION: 2.2 12/14/2009

Manufacturer: Valley Comfort
Model: Sirocco SC25
Date: 10/20/2015
Run: 1
Control #: 0142WN016E
Test Duration: 220
Output Category: 3

Appliance Type: Cat (Cat, Non

Temp. Units F (F or C)
Weight Units lb (kg or lb)

Wood Moisture (% wet): 18.71
Load Weight (lb wet): 15.70
Burn Rate (dry kg/h): 1.58
Total Particulate Emissions: 5.42 g

Fuel Data

	D. Fir	
HHV	19,810	kj/kg
%C	48.73	
%H	6.87	
%O	43.9	
%ASH	0.5	

Averages	**0.11**	**7.43**	**#DIV/0!**	**381.91**	**73.00**	
					Temp. (ºF)	
Elapsed Time (min)	**Fuel Weight Remaining (lb)**	**Flue Gas Composition (%) CO**	**CO_2**	**O_2**	**Flue Gas**	**Room Temp**
0	15.70	0.50	5.10		464.0	73.0
10	14.90	0.10	4.30		372.0	72.0
20	14.20	0.00	3.90		348.0	72.0
30	13.50	0.00	4.60		347.0	72.0
40	12.70	0.00	5.80		355.0	72.0
50	11.80	0.00	7.40		366.0	72.0
60	11.30	0.00	8.00		378.0	72.0
70	10.60	0.00	7.90		387.0	72.0
80	9.60	0.10	8.60		410.0	71.0
90	8.30	0.20	9.40		416.0	73.0
100	7.40	0.40	9.70		425.0	73.0
110	6.20	0.20	10.00		427.0	74.0
120	5.30	0.30	10.40		440.0	74.0
130	3.90	0.30	10.40		435.0	73.0
140	2.70	0.20	9.80		423.0	74.0
150	2.00	0.20	9.60		411.0	75.0
160	1.50	0.00	8.30		380.0	73.0
170	1.20	0.00	6.60		356.0	74.0
180	0.90	0.00	6.40		340.0	74.0
190	0.70	0.00	6.40		334.0	74.0
200	0.50	0.00	6.10		328.0	74.0
210	0.20	0.00	6.10		323.0	73.0
220	0.00	0.00	6.00		319.0	73.0

Run 2

Wood Heater Test Results - ASTM E2780 / ASTM E2515

Manufacturer: Valley Comfort
Model: Sirocco SC25 Insert
Project No.: 0142WN016E
Tracking No.: 2142
Run: 2
Test Date: 10/20/15

Burn Rate	**0.90 kg/hr dry**
Average Tunnel Temperature	81 degrees Fahrenheit
Average Gas Velocity in Dilution Tunnel - vs	18.39 feet/second
Average Gas Flow Rate in Dilution Tunnel - Qsd	12543.6 dscf/hour
Average Delta p	0.090 inches H20
Total Time of Test	380 minutes

	AMBIENT	SAMPLE TRAIN 1	SAMPLE TRAIN 2	FIRST HOUR FILTER (TRAIN 1)
Total Sample Volume - Vm	62.901 cubic feet	60.975 cubic feet	60.907 cubic feet	9.569 cubic feet
Average Gas Meter Temperature	73 degrees Fahrenheit	83 degrees Fahrenheit	82 degrees Fahrenheit	83 degrees Fahrenheit
Total Sample Volume (Standard Conditions) - Vmstd	62.140 dscf	60.100 dscf	60.164 dscf	9.432 dscf
Total Particulates - m_n	0 mg	1.8 mg	1.4 mg	1.3 mg
Particulate Concentration (dry-standard) - C_r/C_s	0.000000 grams/dscf	0.00003 grams/dscf	0.00002 grams/dscf	0.00014 grams/dscf
Total Particulate Emissions - E_T	0.00 grams	2.38 grams	1.85 grams	1.73 grams
Particulate Emission Rate	0.00 grams/hour	0.38 grams/hour	0.29 grams/hour	1.73 grams/hour
Emissisons Factor		0.42 g/kg	0.32 g/kg	1.71 g/kg
Difference from Average Total Particulate Emissions		0.27 grams	0.27 grams	
	Dual Train Comparison Results Are Acceptable			

FINAL AVERAGE RESULTS

Complete Test Run	
Total Particulate Emissions - E_T	2.11 grams
Particulate Emission Rate	**0.33 grams/hour**
Emissisons Factor	0.37 grams/kg
First Hour Emissions	
Total Particulate Emissions - E_T	1.73 grams
Particulate Emission Rate	1.73 grams/hour
Emissisons Factor	1.71 grams/kg

Wood Heater Test Data - ASTM E2780 / ASTM E2515

Run: 2

Manufacturer: Valley Comfort
Model: Sirocco SC25 Insert
Tracking No.: 2142
Project No.: 0142WN016E
Test Date: 20-Oct-15
Beginning Clock Time: 12:27

Total Sampling Time: 380 min
Recording Interval: 10 min
Background Sample Volume: 62.901 cubic feet

Meter Box Y Factor: 1.001 (1) 1.003 (2) 0.988 (Amb)

Barometric Pressure:	Begin	Middle	End	Average
	30.21	30.2	30.17	30.19 "Hg

OMNI Equipment Numbers: 00185, 00410, 00335, 00336, 00419, 00428b, 00296- T55, 00439, 00348

PM Control Modules:
Dilution Tunnel MW(dry): 29.00 lb/lb-mole
Dilution Tunnel MW(wet): 28.78 lb/lb-mole
Dilution Tunnel H2O: 2.00 percent
Dilution Tunnel Static: -0.350 "H2O
Tunnel Area: 0.19635 ft2
Pitot Tube Cp: 0.99

Avg. Tunnel Velocity: 18.39 ft/sec.
Intial Tunnel Flow: 208.2 scfm
Average Tunnel Flow: 209.1 scfm
Post-Test Leak Check (1): 0 cfm @ 5 in. Hg
Post-Test Leak Check (2): 0 cfm @ 3 in. Hg
Average Test Piece Fuel Moisture: 21.39 Dry Basis %

Velocity Traverse Data

	Pt.1	Pt.2	Pt.3	Pt.4	Pt.5	Pt.6	Pt.7	Pt.8	Center	
Initial dP	0.080	0.090	0.084	0.052	0.050	0.088	0.088	0.068	0.090	"H2O
Temp:	73	73	73	73	73	73	73	73	73	°F

V_{strav} 18.26 ft/sec V_{scent} 19.89 ft/sec F_p 0.918

	Particulate Sampling Data														Fuel Weight (lb)		Temperature Data (°F)					Stack Gas Data		
Elapsed Time (min)	Gas Meter 1 (ft^3)	Gas Meter 2 (ft^3)	Sample Rate 1 (cfm)	Sample Rate 2 (cfm)	Orifice dH 1 ("H_2O)	Meter 1 Temp (°F)	Meter 1 Vacuum ("Hg)	Orifice dH 2 ("H_2O)	Meter 2 Temp (°F)	Meter 2 Vacuum ("Hg)	Dilution Tunnel (°F)	Dilution Tunnel Center dP	Pro. Rate 1	Pro. Rate 2	Scale Reading	Weight Change	Avg. Stove Surface Temp	Stack	Filter 1	Filter 2	Ambient	Draft ("H_2O)	CO_2 (%)	CO (%)
0	0.000	0.000			1.30	71	1.99	1.03	71	1.2	81	0.090			15.7		267.8	225	70	70	70	-0.028	4.7	0
10	1.602	1.580	0.16	0.16	1.28	72	1.97	1.07	72	1.2	75	0.090	101	100	14.9	-0.8	246.4	161	70	71	70	-0.029	1.8	0.2
20	3.184	3.186	0.16	0.16	1.27	74	1.94	1.10	74	1.2	75	0.090	100	101	14.7	-0.2	241.0	159	70	71	70	-0.030	3.1	0.1
30	4.770	4.797	0.16	0.16	1.29	76	1.96	1.07	76	1.2	75	0.090	100	101	14.3	-0.4	244.4	173	70	71	70	-0.033	4.3	0
40	6.366	6.399	0.16	0.16	1.29	77	1.97	1.07	77	1.2	75	0.090	100	100	13.9	-0.4	235.7	180	70	71	70	-0.033	4.9	0
50	7.967	8.003	0.16	0.16	1.29	79	1.97	1.08	78	1.2	76	0.090	100	100	13.5	-0.4	236.2	199	70	71	70	-0.037	6.1	0
60	9.569	9.608	0.16	0.16	1.29	80	1.98	1.08	79	1.2	78	0.090	100	100	13.0	-0.5	245.6	220	70	71	71	-0.041	7	0
70	11.157	11.216	0.16	0.16	1.27	80	2.03	1.08	80	1.2	79	0.090	99	101	12.5	-0.5	259.5	237	71	72	71	-0.042	7.8	0
80	12.751	12.823	0.16	0.16	1.29	81	2.07	1.07	80	1.2	80	0.090	100	101	11.8	-0.7	274.7	250	72	72	71	-0.045	8.3	0
90	14.357	14.423	0.16	0.16	1.29	81	2.06	1.06	81	1.2	81	0.090	100	100	11.0	-0.8	293.0	274	73	72	70	-0.050	9.2	0.5
100	15.961	16.023	0.16	0.16	1.28	82	2.07	1.07	81	1.2	83	0.090	100	100	10.0	-1	306.0	283	73	73	72	-0.050	9.2	2.7
110	17.567	17.624	0.16	0.16	1.28	82	2.07	1.07	81	1.2	82	0.090	100	100	9.3	-0.7	317.4	265	73	73	72	-0.046	9.5	0.7
120	19.175	19.225	0.16	0.16	1.29	82	2.07	1.07	82	1.2	81	0.090	100	100	8.9	-0.4	315.3	252	73	73	72	-0.045	8.3	0
130	20.782	20.828	0.16	0.16	1.29	82	2.06	1.07	82	1.2	81	0.090	100	100	8.4	-0.5	312.9	245	73	73	72	-0.044	7.9	0
140	22.389	22.431	0.16	0.16	1.29	82	2.07	1.07	82	1.2	81	0.090	100	100	7.9	-0.5	313.2	244	73	73	72	-0.044	8	0
150	23.997	24.033	0.16	0.16	1.29	83	2.06	1.07	82	1.2	80	0.090	100	100	7.5	-0.4	313.8	243	73	73	71	-0.044	7.9	0
160	25.605	25.635	0.16	0.16	1.29	83	2.07	1.07	82	1.2	81	0.090	100	100	7.0	-0.5	312.9	240	73	73	71	-0.042	7.8	0
170	27.212	27.238	0.16	0.16	1.28	83	2.06	1.07	83	1.2	80	0.090	100	100	6.6	-0.4	308.4	229	73	73	72	-0.041	7.1	0
180	28.819	28.841	0.16	0.16	1.28	83	2.06	1.07	83	1.2	80	0.090	100	100	6.3	-0.3	301.1	222	73	73	72	-0.040	6.4	0
190	30.427	30.444	0.16	0.16	1.28	83	2.06	1.06	83	1.2	80	0.090	100	100	6.0	-0.3	293.9	216	73	73	71	-0.038	6	0
200	32.035	32.047	0.16	0.16	1.28	83	2.06	1.07	83	1.2	80	0.090	100	100	5.7	-0.3	289.6	214	73	73	73	-0.039	6	0
210	33.643	33.649	0.16	0.16	1.28	84	2.06	1.06	83	1.2	80	0.090	100	100	5.3	-0.4	292.8	219	74	73	73	-0.040	6.8	0
220	35.250	35.252	0.16	0.16	1.28	84	2.06	1.06	83	1.2	81	0.090	100	100	4.9	-0.4	298.0	224	74	74	72	-0.040	7	0
230	36.858	36.854	0.16	0.16	1.28	84	2.06	1.06	84	1.2	81	0.090	100	100	4.6	-0.3	298.6	225	74	74	74	-0.040	7.1	0
240	38.464	38.457	0.16	0.16	1.28	84	2.07	1.07	84	1.2	82	0.090	100	100	4.3	-0.3	298.2	223	75	74	74	-0.039	7	0
250	40.071	40.061	0.16	0.16	1.28	85	2.06	1.06	84	1.2	81	0.090	100	100	4.0	-0.3	298.2	220	75	75	74	-0.039	7.1	0
260	41.679	41.664	0.16	0.16	1.28	85	2.07	1.07	84	1.2	82	0.090	100	100	3.6	-0.4	303.4	226	75	75	74	-0.041	7.5	0
270	43.288	43.267	0.16	0.16	1.28	85	2.07	1.06	85	1.2	82	0.090	100	100	3.1	-0.5	314.8	236	75	75	73	-0.042	8.3	0.2
280	44.895	44.870	0.16	0.16	1.28	85	2.06	1.06	85	1.2	84	0.090	100	100	2.6	-0.5	325.3	247	75	75	75	-0.044	8.5	0.6
290	46.502	46.472	0.16	0.16	1.28	85	2.08	1.07	85	1.2	85	0.090	100	100	2.0	-0.6	342.3	264	76	75	74	-0.047	9.5	0.8
300	48.109	48.075	0.16	0.16	1.28	86	2.07	1.06	85	1.2	85	0.090	100	100	1.5	-0.5	352.5	255	76	76	76	-0.045	9.1	1
310	49.716	49.678	0.16	0.16	1.27	86	2.07	1.06	86	1.2	85	0.090	100	100	1.1	-0.4	347.7	242	76	76	76	-0.041	8.1	0.1
320	51.323	51.282	0.16	0.16	1.28	86	2.07	1.06	86	1.2	84	0.090	100	100	1.0	-0.1	336.8	222	76	76	75	-0.037	7.3	0
330	52.931	52.885	0.16	0.16	1.28	87	2.07	1.06	86	1.2	83	0.090	100	100	0.7	-0.3	326.7	207	76	76	76	-0.035	7	0
340	54.540	54.488	0.16	0.16	1.27	87	2.06	1.06	86	1.2	82	0.090	100	99	0.6	-0.1	321.3	198	76	76	75	-0.033	6.9	0
350	56.148	56.093	0.16	0.16	1.26	87	2.06	1.06	87	1.2	83	0.090	100	99	0.4	-0.2	316.1	192	76	76	76	-0.032	6.8	0

Wood Heater Test Data - ASTM E2780 / ASTM E2515

Run: 2

Manufacturer: Valley Comfort
Model: Sirocco SC25 Insert
Tracking No.: 2142
Project No.: 0142WN016E
Test Date: 20-Oct-15
Beginning Clock Time: 12:27

Total Sampling Time: 380 min
Recording Interval: 10 min
Background Sample Volume: 62.901 cubic feet

Meter Box Y Factor: 1.001 (1) 1.003 (2) 0.988 (Amb)

Barometric Pressure:

Begin	Middle	End	Average
30.21	30.2	30.17	30.19 "Hg

OMNI Equipment Numbers: 00185, 00410, 00335, 00336, 00419, 00428b, 00296- T55, 00439, 00348

PM Control Modules:
Dilution Tunnel MW(dry): 29.00 lb/lb-mole
Dilution Tunnel MW(wet): 28.78 lb/lb-mole
Dilution Tunnel H2O: 2.00 percent
Dilution Tunnel Static: -0.350 "H2O
Tunnel Area: 0.19635 ft2
Pitot Tube Cp: 0.99

Avg. Tunnel Velocity: 18.39 ft/sec.
Intial Tunnel Flow: 208.2 scfm
Average Tunnel Flow: 209.1 scfm
Post-Test Leak Check (1): 0 cfm @ 5 in. Hg
Post-Test Leak Check (2): 0 cfm @ 3 in. Hg
Average Test Piece Fuel Moisture: 21.39 Dry Basis %

Velocity Traverse Data

	Pt.1	Pt.2	Pt.3	Pt.4	Pt.5	Pt.6	Pt.7	Pt.8	Center	
Initial dP	0.080	0.090	0.084	0.052	0.050	0.088	0.088	0.068	0.090	"H2O
Temp:	73	73	73	73	73	73	73	73	73	°F

V_{strav} 18.26 ft/sec V_{scent} 19.89 ft/sec F_p 0.918

	Particulate Sampling Data														Fuel Weight (lb)		Temperature Data (°F)					Stack Gas Data		
Elapsed Time (min)	Gas Meter 1 (ft^3)	Gas Meter 2 (ft^3)	Sample Rate 1 (cfm)	Sample Rate 2 (cfm)	Orifice dH 1 ("H_2O)	Meter 1 Temp (°F)	Meter 1 Vacuum ("Hg)	Orifice dH 2 ("H_2O)	Meter 2 Temp (°F)	Meter 2 Vacuum ("Hg)	Dilution Tunnel (°F)	Dilution Tunnel Center dP	Pro. Rate 1	Pro. Rate 2	Scale Reading	Weight Change	Avg. Stove Surface Temp	Stack	Filter 1	Filter 2	Ambient	Draft ("H_2O)	CO_2 (%)	CO (%)
360	57.757	57.697	0.16	0.16	1.27	87	2.07	1.06	87	1.2	82	0.090	100	99	0.2	-0.2	312.5	188	76	76	75	-0.031	6.9	0
370	59.366	59.302	0.16	0.16	1.28	87	2.07	1.06	87	1.2	82	0.090	100	99	0.1	-0.1	310.3	185	77	76	74	-0.030	7.1	0
380	60.975	60.907	0.16	0.16	1.27	88	2.07	1.06	87	1.2	82	0.090	99	99	0.0	-0.1	309.3	182	77	76	75	-0.029	7	0
Avg/Tot	60.975	60.907	0.16	0.16	1.28	83		1.07	82		81	0.090	100	100			41.5		74	74	73	-0.039		

Wood Heater Lab Data - ASTM E2780 / ASTM E2515

Manufacturer:	Valley Comfort	Equipment Numbers:	00023, 00391, 00283A
Model:	Sirocco SC25 Insert		
Tracking No.:	2142		
Project No.:	0142WN016E		
Run #:	2		
Date:	10/20/15		

TRAIN 1 (First Hour emissions)

Sample Component	Reagent	Filter, Probe or Dish #	Weights		
			Final, mg	Tare, mg	Particulate, mg
B. Front filter catch	Filter	C241	121.6	120.7	0.9
C. Rear filter catch	Filter	C242	121.3	121.4	-0.1
D. Probe catch*	Probe	OES 4	114147.7	114147.6	0.1
E. Filter seals catch*	Seals	R361	4917.0	4916.6	0.4

Sub-Total Total Particulate, mg: 1.3

TRAIN 1 (Post First Hour Change-out)

Sample Component	Reagent	Filter, Probe or Dish #	Weights		
			Final, mg	Tare, mg	Particulate, mg
B. Front filter catch	Filter	C243	121.3	120.9	0.4
C. Rear filter catch	Filter	C244	120.3	120.3	0.0
D. Probe catch*	Probe	4	114866.4	114866.4	0.0
E. Filter seals catch*	Seals	R360	3308.7	3308.6	0.1

Sub-Total Total Particulate, mg: 0.5

Train 1 Aggregate Total Particulate, mg: **1.8**

TRAIN 2

Sample Component	Reagent	Filter, Probe or Dish #	Weights		
			Final, mg	Tare, mg	Particulate, mg
A. Front filter catch	Filter	C245	121.8	120.4	1.4
B. Rear filter catch	Filter	C246	119.8	119.8	0.0
C. Probe catch*	Probe	OES 5	113557.2	113557.2	0.0
D. Filter seals catch*	Seals	R362	3379.2	3379.2	0.0

Total Particulate, mg: **1.4**

AMBIENT

Sample Component	Reagent	Filter # or Probe #	Weights		
			Final, mg	Tare, mg	Particulate, mg
A. Front filter catch*	Filter	C240	120.3	120.5	0.0

Total Particulate, mg: **0.0**

*Particulate catch that results in a negative number, is assumed to be zero for probes and seals, negative numbers for filters are assumed to be part of the seal weight.

Component	Equations:
A. Front filter catch	Final (mg) - Tare (mg) = Particulate, mg
B. Rear filter catch	Final (mg) - Tare (mg) = Particulate, mg
C. Probe catch	Final (mg) - Tare (mg) = Particulate, mg

Wood Heater Test Fuel Data - ASTM E2780

Manufacturer: Valley Comfort
Model: Sirocco SC25
Tracking No.: 2142
Project No.: 0142WN016E

Firebox Volume (ft^3):	2.26
Fuel Piece Length (in):	17
2x4 Crib Weight (lb):	6.9
4x4 Crib Weight (lb):	8.4

Total Fuel Weight (Dry Basis, lb):	12.6	
Fuel Density (lb/ft^3, Dry Basis):	28.22	OK
Loading Density (lb/ft^3, Wet Basis):	6.77	OK
2x4 Percentage:	45%	OK

Test Fuel Piece	Weight (lb)	Size	Readings (Dry Basis %)			Dry Weight (lb)
1	1.9	2"x 4"	20.8	20.4	20.2	1.58
2	2	2"x 4"	22.5	23.0	22.6	1.63
3	1.7	2"x 4"	20.4	19.0	19.1	1.42
4	4.3	4"x 4"	25.3	22.4	22.0	3.49
5	3.7	4"x 4"	23.2	20.6	19.3	3.06

Spacer Readings (Dry Basis %)			
19.1	17.7		
19.3	14.4		
19.3	20.6		
18.6			
17.0			
20.9			
13.4			
17.0			
18.0			
18.7			
15.1			
13.6			
20.9			

Run: 2

Manufacturer: Valley Comfort
Model: Sirocco SC25 Insert
Tracking No.: 2142
Project No.: 0142WN016E
Test Date: 21-Oct-15

ET (min)	Scale (LBS)	Weight Change	FB Top (oF)	FB Bot (oF)	FB Back (oF)	FB Left (oF)	FB Right (oF)	Pre Cat (oF)	Avg Surf (oF)	Stack (oF)	AMB (oF)	Draft In-H2O	Post Cat (oF)
0	4.4	0.00	764	190	214	466	503	1175	427.5	390	70	-0.06	1058
10	4	-0.42	686	210	228	434	447	1214	401	199	70	-0.039	926
20	3.9	-0.15	610	220	226	394	398	990	369.6	161	69	-0.031	852
30	3.8	-0.06	532	224	217	359	358	853	337.7	145	69	-0.025	738
40	3.8	-0.02	461	223	205	328	322	784	307.9	133	69	-0.023	647
50	3.8	-0.02	415	219	193	304	294	794	285	131	70	-0.021	617
60	3.7	-0.07	390	213	183	286	272	805	268.9	130	70	-0.02	607

OMNI-Test Laboratories, Inc. **ASTM E2780 Wood Heater Run Sheets**

Client: Valley Comfort Project Number: 0142WN016E Run Number: 2

Model: Sirocco SC25 Insert Tracking Number: 2142 Date: 10/21/15

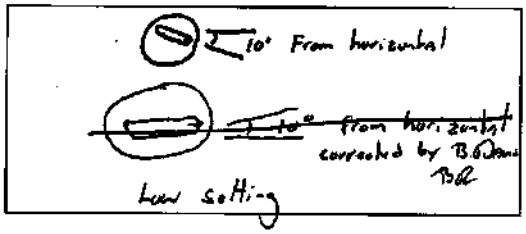
Test Crew:

OMNI Equipment ID numbers:

Wood Heater Run Notes

Air Control Settings

Primary:



Secondary: ~~Closed~~ N/A (on)

Tertiary/Pilot: NA

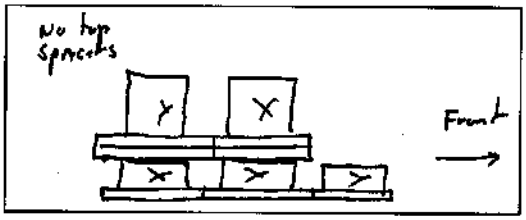
Fan: On Low

Preburn Notes

Time	Notes
61	Rated coals

Test Notes

Sketch test fuel configuration:



Start up procedures & Timeline:

Bypass: open until 4:30 then closed

Fuel loaded by: 40 seconds

Door closed at: closed at 430

Primary air: fully open until 4:55 then set to test setting

Notes: Fan off for first 30 minutes Then turned to Low

Time	Notes
NA	No Activities

Technician Signature: [signature] Date: 11/13/15

OMNI-Test Laboratories, Inc. **ASTM E2780 Wood Heater Run Sheets**

Client: Valley Comfort Project Number: 0142WN016E Run Number: 2

Model: Sirocco SC25 Insert Tracking Number: 2142 Date: 10/21/15

Test Crew: D. Davis

OMNI Equipment ID numbers:

Wood Heater Fuel Data

Fuel: Douglas fir, untreated and air dried, standard grade or better dimensional lumber

Pre-Burn Fuel

Calibration: Cal Value (1) = 12% Actual Reading 12

Cal Value (2) = 22% Actual Reading 22

Piece:	Length:	Reading:	Piece:	Length:	Reading:
1	17 in	18.7	7	12 in	19.7
2	17 in	24.5	8	12 in	22.0
3	17 in	24.7	9	in	
4	17 in	21.0	10	in	
5	12 in	21.9	11	in	
6	12 in	23.6	12	in	

Total Pre-Burn Fuel Weight: 12.3 Pre-Burn Fuel Average Moisture: 21.86

Time (clock): 0730 Room Temperature (F): 70 Initials: BL

Test Fuel

Firebox Volume (ft³): 2.26 Test Fuel Piece Length (in): 17"

Load Weight Range (lb): 14.2-17.4 Total Wet Fuel Load Weight (lb): 15.3

Fuel Type & Amount: 2 x 4: 3 4 x 4: 2

Weight (with spacers): 6.9 Weight (with spacers): 8.4

Piece:	Weight (lbs):	Moisture Readings (%DB):			Fuel Type:
1	1.9	20.8	20.4	20.2	2x4
2	2.0	22.5	23.0	22.6	2x4
3	1.7	18.8 20.4	19.0	19.1	2x4
4	4.3	25.3	22.4	22.0	4x4
5	3.7	23.2	20.6	19.3	4x4
6					
7					

Spacer Moisture Readings (%DB)

19.1	19.3	19.3	18.6	17.0	20.9	13.4	17.0
18.0	18.7	15.1	13.6	20.9	17.7	14.4	20.6

Time (clock): 0730 Room Temperature (F): 70 Initials: BL

Technician Signature: Date: 11/13/15

OMNI-Test Laboratories, Inc. **ASTM E2780 Wood Heater Run Sheets**

Client: Valley Comfort Project Number: 0142WN016E Run Number: 2

Model: Sirocco SC25 Insert Tracking Number: 2142 Date: 10/21/15

Test Crew: B Davis

OMNI Equipment ID numbers:

Wood Heater Supplemental Data

Start Time: 0923 Booth #: 1

Stop Time: 15:43

Stack Gas Leak Check:

Initial: good Final: good

Sample Train Leak Check:

A: 0.0 @ 5 "Hg

B: 0.0 @ 3 "Hg

Calibrations: Span Gas CO_2: 16.89 CO: 4.29

	Pre Test		Post Test	
	Zero	Span	Zero	Span
Time	9:01	9:01	15:43	15:43
CO_2	0.00	16.85	~~-0.046~~ 0.01	16.86
CO	0.000	4.29	~~-0.016~~ 0.01	4.23

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

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

Pitot Tube Leak Test: Initial: good Final: good

Stack Diameter (in): 6"

Induced Draft: 0.0

% Smoke Capture: 100%

Flue Pipe Cleaned Prior to First Test in Series:

Date: 10/20/15 Initials: DL

	Initial	Middle	Ending
P_b (in/Hg)	30.21	30.20	30.17
RH (%)	52.5	49.9	46.3
Ambient (°F)	70	73	75

Background Filter Volume: 62.901

Tunnel Traverse		
Microtector Reading	dP (in H_2O)	T(°F)
1	.080	73
2	.090	73
3	.084	72
4	.052	72
1	.050	72
2	.088	73
3	.088	72
4	.088	72
Center:		
	.096	73

Tunnel Static Pressure (in H_2O):	
Beginning of Test	End of Test
-.35	-.35

Technician Signature: Date: 11/13/15

OMNI-Test Laboratories, Inc.

Manufacturer: Valley Comfort
Model: Sirocco SC25
Date: 10/21/15
Run: 2
Control #: 0142WN016E
Test Duration: 380
Output Category: 2

Technicians: B. Davis

Test Results in Accordance with CSA B415.1-09

	HHV Basis	LHV Basis
Overall Efficiency	79.3%	85.8%
Combustion Efficiency	97.9%	97.9%
Heat Transfer Efficiency	81%	87.6%

Output Rate (kJ/h)	14,564	13,816	**(Btu/h)**
Burn Rate (kg/h)	0.93	2.04	**(lb/h)**
Input (kJ/h)	18,355	17,412	**(Btu/h)**

Test Load Weight (dry kg)	5.87	12.93	**dry lb**
MC wet (%)	17.62		
MC dry (%)	21.39		
Particulate (g)	2.11		
CO (g)	217		
Test Duration (h)	6.33		

Emissions	**Particulate**	**CO**
g/MJ Output	0.02	2.35
g/kg Dry Fuel	0.36	36.91
g/h	0.33	34.20
lb/MM Btu Output	0.05	5.46

Air/Fuel Ratio (A/F)	16.85

VERSION: **2.2** **12/14/2009**

VERSION: 2.2 12/14/2009

Manufacturer: Valley Comfort
Model: Sirocco SC25
Date: 10/21/2015
Run: 2
Control #: 0142WN016E
Test Duration: 380
Output Category: 2

Appliance Type: Cat (Cat, Non

Temp. Units F (F or C)
Weight Units lb (kg or lb)

Fuel Data

	D. Fir	
HHV	19,810	kj/kg
%C	48.73	
%H	6.87	
%O	43.9	
%ASH	0.5	

Wood Moisture (% wet): 17.62
Load Weight (lb wet): 15.70
Burn Rate (dry kg/h): 0.93
Total Particulate Emissions: 2.11 g

	Averages	**0.18**	**7.08**	**#DIV/0!**	**222.72**	**72.67**
					Temp. (ºF)	
Elapsed Time (min)	**Fuel Weight Remaining (lb)**	**Flue Gas Composition (%) CO**	**CO_2**	**O_2**	**Flue Gas**	**Room Temp**
0	15.70	0.00	4.70		225.0	70.0
10	14.90	0.20	1.80		161.0	70.0
20	14.70	0.10	3.10		159.0	70.0
30	14.30	0.00	4.30		173.0	70.0
40	13.90	0.00	4.90		180.0	70.0
50	13.50	0.00	6.10		199.0	70.0
60	13.00	0.00	7.00		220.0	71.0
70	12.50	0.00	7.80		237.0	71.0
80	11.80	0.00	8.30		250.0	71.0
90	11.00	0.50	9.20		274.0	70.0
100	10.00	2.70	9.20		283.0	72.0
110	9.30	0.70	9.50		265.0	72.0
120	8.90	0.00	8.30		252.0	72.0
130	8.40	0.00	7.90		245.0	72.0
140	7.90	0.00	8.00		244.0	72.0
150	7.50	0.00	7.90		243.0	71.0
160	7.00	0.00	7.80		240.0	71.0
170	6.60	0.00	7.10		229.0	72.0
180	6.30	0.00	6.40		222.0	72.0
190	6.00	0.00	6.00		216.0	71.0
200	5.70	0.00	6.00		214.0	73.0
210	5.30	0.00	6.80		219.0	73.0
220	4.90	0.00	7.00		224.0	72.0
230	4.60	0.00	7.10		225.0	74.0
240	4.30	0.00	7.00		223.0	74.0
250	4.00	0.00	7.10		220.0	74.0
260	3.60	0.00	7.50		226.0	74.0
270	3.10	0.20	8.30		236.0	73.0
280	2.60	0.60	8.50		247.0	75.0
290	2.00	0.80	9.50		264.0	74.0
300	1.50	1.00	9.10		255.0	76.0
310	1.10	0.10	8.10		242.0	76.0
320	1.00	0.00	7.30		222.0	75.0
330	0.70	0.00	7.00		207.0	76.0
340	0.60	0.00	6.90		198.0	75.0
350	0.40	0.00	6.80		192.0	76.0
360	0.20	0.00	6.90		188.0	75.0
370	0.10	0.00	7.10		185.0	74.0
380	0.00	0.00	7.00		182.0	75.0

Run 3

Wood Heater Test Results - ASTM E2780 / ASTM E2515

Manufacturer: Valley Comfort
Model: Sirocco SC25 Insert
Project No.: 0142WN016E
Tracking No.: 2142
Run: 3
Test Date: 10/22/15

Burn Rate	**0.66 kg/hr dry**
Average Tunnel Temperature	79 degrees Fahrenheit
Average Gas Velocity in Dilution Tunnel - vs	18.10 feet/second
Average Gas Flow Rate in Dilution Tunnel - Qsd	12413.1 dscf/hour
Average Delta p	0.092 inches H20
Total Time of Test	530 minutes

	AMBIENT	SAMPLE TRAIN 1	SAMPLE TRAIN 2	FIRST HOUR FILTER (TRAIN 1)
Total Sample Volume - Vm	88.201 cubic feet	85.044 cubic feet	85.202 cubic feet	9.577 cubic feet
Average Gas Meter Temperature	73 degrees Fahrenheit	85 degrees Fahrenheit	84 degrees Fahrenheit	85 degrees Fahrenheit
Total Sample Volume (Standard Conditions) - Vmstd	87.253 dscf	83.722 dscf	84.084 dscf	9.428 dscf
Total Particulates - m_n	0.5 mg	2.7 mg	2.4 mg	1.3 mg
Particulate Concentration (dry-standard) - C_r/C_s	0.000006 grams/dscf	0.00003 grams/dscf	0.00003 grams/dscf	0.00014 grams/dscf
Total Particulate Emissions - E_T	0.63 grams	2.91 grams	2.50 grams	1.71 grams
Particulate Emission Rate	0.07 grams/hour	0.33 grams/hour	0.28 grams/hour	1.71 grams/hour
Emissisons Factor		0.50 g/kg	0.43 g/kg	2.27 g/kg
Difference from Average Total Particulate Emissions		0.20 grams	0.20 grams	
	Dual Train Comparison Results Are Acceptable			

FINAL AVERAGE RESULTS

Complete Test Run	
Total Particulate Emissions - E_T	2.70 grams
Particulate Emission Rate	**0.31 grams/hour**
Emissisons Factor	0.46 grams/kg
First Hour Emissions	
Total Particulate Emissions - E_T	1.71 grams
Particulate Emission Rate	1.71 grams/hour
Emissisons Factor	2.27 grams/kg

Wood Heater Test Data - ASTM E2780 / ASTM E2515

Run: 3

Manufacturer: Valley Comfort
Model: Sirocco SC25 Insert
Tracking No.: 2142
Project No.: 0142WN016E
Test Date: 22-Oct-15
Beginning Clock Time: 10:13

Total Sampling Time: 530 min
Recording Interval: 10 min
Background Sample Volume: 88.201 cubic feet

Meter Box Y Factor: 1.001 (1) 1.003 (2) 0.988 (Amb)

Barometric Pressure:	Begin	Middle	End	Average
	30.31	30.26	30.22	30.26 "Hg

OMNI Equipment Numbers: 00185, 00410, 00335, 00336, 00419, 00428b, 00296- T55, 00439, 00348

PM Control Modules: 335, 336
Dilution Tunnel MW(dry): 29.00 lb/lb-mole
Dilution Tunnel MW(wet): 28.78 lb/lb-mole
Dilution Tunnel H2O: 2.00 percent
Dilution Tunnel Static: -0.330 "H2O
Tunnel Area: 0.19635 ft2
Pitot Tube Cp: 0.99

Avg. Tunnel Velocity: 18.10 ft/sec.
Intial Tunnel Flow: 204.6 scfm
Average Tunnel Flow: 206.9 scfm
Post-Test Leak Check (1): 0 cfm @ 4 in. Hg
Post-Test Leak Check (2): 0 cfm @ 6 in. Hg
Average Test Piece Fuel Moisture: 20.54 Dry Basis %

Velocity Traverse Data

	Pt.1	Pt.2	Pt.3	Pt.4	Pt.5	Pt.6	Pt.7	Pt.8	Center	
Initial dP	0.060	0.082	0.082	0.054	0.070	0.090	0.080	0.060	0.092	"H2O
Temp:	75	75	75	75	75	75	75	75	75	°F

V_{strav} 18.02 ft/sec V_{scent} 20.11 ft/sec F_p 0.896

	Particulate Sampling Data														Fuel Weight (lb)		Temperature Data (°F)					Stack Gas Data		
Elapsed Time (min)	Gas Meter 1 (ft^3)	Gas Meter 2 (ft^3)	Sample Rate 1 (cfm)	Sample Rate 2 (cfm)	Orifice dH 1 ("H_2O)	Meter 1 Temp (°F)	Meter 1 Vacuum ("Hg)	Orifice dH 2 ("H_2O)	Meter 2 Temp (°F)	Meter 2 Vacuum ("Hg)	Dilution Tunnel (°F)	Dilution Tunnel Center dP	Pro. Rate 1	Pro. Rate 2	Scale Reading	Weight Change	Avg. Stove Surface Temp	Stack	Filter 1	Filter 2	Ambient	Draft ("H_2O)	CO_2 (%)	CO (%)
0	0.000	0.000			1.30	75	1.9	1.06	75	1.2	80	0.092			15.4		250.7	187	71	71	72	-0.021	3.3	0.1
10	1.587	1.582	0.16	0.16	1.27	76	1.93	1.07	76	1.2	77	0.092	100	100	15.0	-0.4	237.6	173	71	73	72	-0.030	5.4	0.1
20	3.181	3.176	0.16	0.16	1.29	77	1.95	1.07	77	1.2	76	0.092	100	100	14.8	-0.2	233.5	159	72	73	72	-0.029	3.5	0.2
30	4.775	4.778	0.16	0.16	1.29	79	1.94	1.09	78	1.2	75	0.092	100	100	14.5	-0.3	234.3	168	72	72	71	-0.031	5.4	0.1
40	6.373	6.396	0.16	0.16	1.28	80	1.94	1.10	80	1.2	76	0.092	100	101	14.2	-0.3	224.7	170	72	72	72	-0.031	5.8	0
50	7.975	8.017	0.16	0.16	1.28	81	1.94	1.10	81	1.2	76	0.092	100	101	13.8	-0.4	222.3	175	72	72	71	-0.032	6.7	0
60	9.577	9.638	0.16	0.16	1.28	82	1.94	1.10	81	1.2	76	0.092	100	101	13.4	-0.4	226.4	185	72	73	71	-0.034	7.6	0
70	11.181	11.262	0.16	0.16	1.28	83	2.04	1.10	82	1.2	77	0.092	100	101	13.0	-0.4	232.5	191	73	73	71	-0.035	7.6	0
80	12.786	12.886	0.16	0.16	1.28	83	2.05	1.10	82	1.2	78	0.092	100	101	12.5	-0.5	242.0	204	73	73	72	-0.038	7.5	0
90	14.391	14.511	0.16	0.16	1.29	83	2.06	1.10	83	1.2	78	0.092	100	101	12.1	-0.4	254.2	208	73	73	72	-0.038	7.5	0
100	15.998	16.136	0.16	0.16	1.29	83	2.05	1.10	83	1.2	77	0.092	100	101	11.6	-0.5	254.1	191	73	73	71	-0.036	5.8	0
110	17.605	17.749	0.16	0.16	1.28	83	2.05	1.07	83	1.2	77	0.092	100	100	11.4	-0.2	248.4	177	73	73	72	-0.032	5	0
120	19.211	19.356	0.16	0.16	1.29	83	2.05	1.07	83	1.2	76	0.092	100	100	11.2	-0.2	241.4	167	73	73	71	-0.030	4.8	0
130	20.819	20.963	0.16	0.16	1.28	84	2.05	1.07	83	1.2	76	0.092	100	100	11.0	-0.2	237.8	157	73	73	71	-0.028	5	0
140	22.426	22.570	0.16	0.16	1.28	84	2.06	1.08	83	1.2	75	0.092	100	100	10.8	-0.2	235.2	155	73	73	72	-0.028	5	0
150	24.033	24.177	0.16	0.16	1.28	84	2.05	1.08	83	1.2	76	0.092	100	100	10.6	-0.2	233.2	155	73	73	71	-0.027	5.1	0
160	25.639	25.784	0.16	0.16	1.28	84	2.04	1.07	83	1.2	75	0.092	100	100	10.3	-0.3	230.9	156	73	73	72	-0.027	4.6	0
170	27.247	27.391	0.16	0.16	1.27	84	2.06	1.07	83	1.2	76	0.092	100	100	10.2	-0.1	228.8	160	74	73	71	-0.028	4.1	0
180	28.853	28.998	0.16	0.16	1.28	84	2.06	1.07	83	1.2	77	0.092	100	100	9.8	-0.4	233.7	178	74	73	72	-0.032	4.2	0
190	30.459	30.605	0.16	0.16	1.28	84	2.05	1.07	84	1.2	79	0.092	100	100	9.3	-0.5	250.5	211	74	73	72	-0.041	4.4	0
200	32.064	32.211	0.16	0.16	1.28	84	2.06	1.07	84	1.2	80	0.092	100	100	8.6	-0.7	276.3	233	74	74	72	-0.043	8.6	1.1
210	33.668	33.816	0.16	0.16	1.28	85	2.05	1.07	84	1.2	80	0.092	100	100	8.0	-0.6	292.4	234	75	74	73	-0.043	10.8	0.7
220	35.273	35.423	0.16	0.16	1.28	85	2.05	1.07	84	1.2	81	0.092	100	100	7.5	-0.5	304.0	233	75	74	72	-0.042	10.6	0.1
230	36.880	37.030	0.16	0.16	1.28	85	2.06	1.07	84	1.2	81	0.092	100	100	7.1	-0.4	307.6	229	74	74	73	-0.042	9.5	0
240	38.486	38.637	0.16	0.16	1.28	85	2.05	1.07	84	1.2	82	0.092	100	100	6.7	-0.4	307.3	219	74	74	73	-0.040	8.9	0
250	40.091	40.243	0.16	0.16	1.28	85	2.05	1.07	84	1.2	82	0.092	100	100	6.3	-0.4	304.6	210	75	74	74	-0.037	8.2	0
260	41.696	41.848	0.16	0.16	1.27	85	2.06	1.07	85	1.2	82	0.092	100	100	6.0	-0.3	300.4	204	75	75	74	-0.035	7.7	0
270	43.299	43.453	0.16	0.16	1.28	85	2.05	1.07	85	1.2	81	0.092	100	100	5.7	-0.3	296.7	197	75	75	73	-0.035	7.6	0
280	44.904	45.058	0.16	0.16	1.27	86	2.05	1.07	85	1.2	80	0.092	100	100	5.4	-0.3	294.7	198	75	75	72	-0.035	7.5	0
290	46.510	46.665	0.16	0.16	1.28	86	2.06	1.07	85	1.2	80	0.092	100	100	5.1	-0.3	294.2	198	75	74	71	-0.036	7.1	0
300	48.117	48.272	0.16	0.16	1.28	86	2.06	1.07	85	1.2	79	0.092	100	100	4.8	-0.3	293.3	196	74	74	71	-0.035	6.2	0
310	49.726	49.881	0.16	0.16	1.27	85	2.05	1.07	85	1.2	80	0.092	100	100	4.6	-0.2	287.2	189	74	74	73	-0.033	5.1	0
320	51.332	51.487	0.16	0.16	1.27	85	2.06	1.06	85	1.2	79	0.092	100	100	4.4	-0.2	278.3	178	74	74	72	-0.031	5.8	0
330	52.937	53.094	0.16	0.16	1.28	85	2.06	1.07	85	1.2	80	0.092	100	100	4.3	-0.1	269.3	171	75	74	73	-0.029	5.7	0
340	54.544	54.700	0.16	0.16	1.26	86	2.05	1.06	85	1.2	80	0.092	100	100	4.2	-0.1	261.4	165	75	74	75	-0.028	5.7	0
350	56.148	56.305	0.16	0.16	1.27	86	2.06	1.07	85	1.2	79	0.092	100	100	4.1	-0.1	254.3	162	75	75	75	-0.027	5.5	0

Wood Heater Test Data - ASTM E2780 / ASTM E2515

Run: 3

Manufacturer: Valley Comfort
Model: Sirocco SC25 Insert
Tracking No.: 2142
Project No.: 0142WN016E
Test Date: 22-Oct-15
Beginning Clock Time: 10:13

Total Sampling Time: 530 min
Recording Interval: 10 min
Background Sample Volume: 88.201 cubic feet

Meter Box Y Factor: 1.001 (1) 1.003 (2) 0.988 (Amb)

Barometric Pressure:	Begin	Middle	End	Average
	30.31	30.26	30.22	30.26 "Hg

OMNI Equipment Numbers: 00185, 00410, 00335, 00336, 00419, 00428b, 00296- T55, 00439, 00348

PM Control Modules: 335, 336
Dilution Tunnel MW(dry): 29.00 lb/lb-mole
Dilution Tunnel MW(wet): 28.78 lb/lb-mole
Dilution Tunnel H2O: 2.00 percent
Dilution Tunnel Static: -0.330 "H2O
Tunnel Area: 0.19635 ft2
Pitot Tube Cp: 0.99

Avg. Tunnel Velocity: 18.10 ft/sec.
Intial Tunnel Flow: 204.6 scfm
Average Tunnel Flow: 206.9 scfm
Post-Test Leak Check (1): 0 cfm @ 4 in. Hg
Post-Test Leak Check (2): 0 cfm @ 6 in. Hg
Average Test Piece Fuel Moisture: 20.54 Dry Basis %

Velocity Traverse Data

	Pt.1	Pt.2	Pt.3	Pt.4	Pt.5	Pt.6	Pt.7	Pt.8	Center	
Initial dP	0.060	0.082	0.082	0.054	0.070	0.090	0.080	0.060	0.092	"H2O
Temp:	75	75	75	75	75	75	75	75	75	°F

V_{strav} 18.02 ft/sec V_{scent} 20.11 ft/sec F_p 0.896

	Particulate Sampling Data														Fuel Weight (lb)		Temperature Data (°F)					Stack Gas Data		
Elapsed Time (min)	Gas Meter 1 (ft^3)	Gas Meter 2 (ft^3)	Sample Rate 1 (cfm)	Sample Rate 2 (cfm)	Orifice dH 1 ("H_2O)	Meter 1 Temp (°F)	Meter 1 Vacuum ("Hg)	Orifice dH 2 ("H_2O)	Meter 2 Temp (°F)	Meter 2 Vacuum ("Hg)	Dilution Tunnel (°F)	Dilution Tunnel Center dP	Pro. Rate 1	Pro. Rate 2	Scale Reading	Weight Change	Avg. Stove Surface Temp	Stack	Filter 1	Filter 2	Ambient	Draft ("H_2O)	CO_2 (%)	CO (%)
360	57.753	57.910	0.16	0.16	1.27	86	2.06	1.07	85	1.2	79	0.092	100	100	4.0	-0.1	248.0	160	75	75	75	-0.025	5.5	0
370	59.358	59.516	0.16	0.16	1.27	86	2.06	1.07	86	1.2	79	0.092	100	100	3.9	-0.1	243.3	157	76	75	74	-0.026	5.3	0
380	60.963	61.121	0.16	0.16	1.27	86	2.06	1.06	86	1.2	79	0.092	100	99	3.8	-0.1	239.4	155	76	75	75	-0.025	5.2	0
390	62.568	62.726	0.16	0.16	1.27	87	2.05	1.06	86	1.2	79	0.092	100	99	3.7	-0.1	235.7	153	76	75	74	-0.024	5.3	0
400	64.173	64.331	0.16	0.16	1.26	87	2.06	1.07	86	1.2	78	0.092	99	99	3.6	-0.1	233.2	156	76	75	75	-0.025	5.3	0
410	65.779	65.938	0.16	0.16	1.27	87	2.06	1.06	86	1.2	78	0.092	100	99	3.5	-0.1	231.3	156	76	75	75	-0.026	5.3	0
420	67.385	67.544	0.16	0.16	1.27	87	2.06	1.07	86	1.2	79	0.092	100	100	3.4	-0.1	230.3	158	76	75	75	-0.026	5	0
430	68.991	69.150	0.16	0.16	1.27	87	2.05	1.06	86	1.2	78	0.092	100	99	3.2	-0.2	227.9	157	76	75	74	-0.026	4.6	0
440	70.596	70.756	0.16	0.16	1.27	87	2.05	1.06	86	1.2	78	0.092	99	99	3.2	0	224.4	152	76	75	75	-0.026	4	0
450	72.203	72.362	0.16	0.16	1.27	87	2.06	1.06	86	1.2	79	0.092	100	100	3.1	-0.1	220.9	169	76	75	75	-0.030	7	0
460	73.808	73.967	0.16	0.16	1.27	87	2.06	1.06	87	1.2	81	0.092	100	99	2.5	-0.6	250.6	217	76	76	76	-0.040	9	0
470	75.414	75.573	0.16	0.16	1.27	87	2.06	1.07	87	1.2	83	0.092	100	100	2.0	-0.5	276.4	246	76	76	76	-0.045	7.7	0
480	77.020	77.178	0.16	0.16	1.27	87	2.06	1.06	87	1.2	84	0.092	100	100	1.5	-0.5	292.7	258	77	76	76	-0.046	7.7	0
490	78.624	78.783	0.16	0.16	1.27	87	2.06	1.06	87	1.2	84	0.092	100	100	1.0	-0.5	302.3	249	77	76	76	-0.045	6.5	0
500	80.228	80.386	0.16	0.16	1.27	87	2.07	1.06	87	1.2	83	0.092	100	100	0.7	-0.3	301.5	232	77	76	76	-0.042	3.9	0
510	81.834	81.991	0.16	0.16	1.26	87	2.07	1.06	87	1.2	83	0.092	100	100	0.4	-0.3	297.2	221	77	76	76	-0.040	3.7	0
520	83.438	83.596	0.16	0.16	1.27	87	2.07	1.06	87	1.2	82	0.092	100	100	0.1	-0.3	294.4	209	77	76	75	-0.037	3.9	0
530	85.044	85.202	0.16	0.16	1.26	87	2.06	1.06	87	1.2	82	0.092	100	100	0.0	-0.1	293.1	201	76	76	76	-0.036	3.8	0
Avg/Tot	85.044	85.202	0.16	0.16	1.28	85		1.07	84		79	0.092	100	100			42.4		74	74	73	-0.033		

Wood Heater Lab Data - ASTM E2780 / ASTM E2515

Manufacturer:	Valley Comfort	Equipment Numbers:	0023, 00391, 00283A
Model:	Sirocco SC25 Insert		
Tracking No.:	2142		
Project No.:	0142WN016E		
Run #:	3		
Date:	10/22/15		

TRAIN 1 (First Hour emissions)

Sample Component	Reagent	Filter, Probe or Dish #	Weights		
			Final, mg	Tare, mg	Particulate, mg
B. Front filter catch	Filter	C248	121.2	120.0	1.2
C. Rear filter catch	Filter	C249	119.8	119.9	-0.1
D. Probe catch*	Probe	OES 6	113704.4	113704.5	0.0
E. Filter seals catch*	Seals	R363	4060.1	4059.9	0.2

Sub-Total Total Particulate, mg: 1.3

TRAIN 1 (Post First Hour Change-out)

Sample Component	Reagent	Filter, Probe or Dish #	Weights		
			Final, mg	Tare, mg	Particulate, mg
B. Front filter catch	Filter	C250	121.1	119.9	1.2
C. Rear filter catch	Filter	C251	121.0	120.9	0.1
D. Probe catch*	Probe	6	115358.5	115358.4	0.1
E. Filter seals catch*	Seals	R364	3318.5	3318.5	0.0

Sub-Total Total Particulate, mg: 1.4

Train 1 Aggregate Total Particulate, mg: **2.7**

TRAIN 2

Sample Component	Reagent	Filter, Probe or Dish #	Weights		
			Final, mg	Tare, mg	Particulate, mg
A. Front filter catch	Filter	C252	121.2	119.0	2.2
B. Rear filter catch	Filter	C253	120.1	119.9	0.2
C. Probe catch*	Probe	8	115599.1	115599.1	0.0
D. Filter seals catch*	Seals	R367	3366.7	3366.7	0.0

Total Particulate, mg: **2.4**

AMBIENT

Sample Component	Reagent	Filter # or Probe #	Weights		
			Final, mg	Tare, mg	Particulate, mg
A. Front filter catch*	Filter	C247	119.8	119.3	0.5

Total Particulate, mg: **0.5**

*Particulate catch that results in a negative number, is assumed to be zero for probes and seals, negative numbers for filters are assumed to be part of the seal weight.

Component	Equations:
A. Front filter catch	Final (mg) - Tare (mg) = Particulate, mg
B. Rear filter catch	Final (mg) - Tare (mg) = Particulate, mg
C. Probe catch	Final (mg) - Tare (mg) = Particulate, mg

Wood Heater Test Fuel Data - ASTM E2780

Manufacturer: Valley Comfort
Model: Sirocco SC25 Insert
Tracking No.: 2142
Project No.: 0142WN016E

Firebox Volume (ft^3):	2.26
Fuel Piece Length (in):	17
2x4 Crib Weight (lb):	6.6
4x4 Crib Weight (lb):	8.8

Total Fuel Weight (Dry Basis, lb):	12.8	
Fuel Density (lb/ft^3, Dry Basis):	28.48	OK
Loading Density (lb/ft^3, Wet Basis):	6.81	OK
2x4 Percentage:	43%	OK

Test Fuel Piece	Weight (lb)	Size	Readings (Dry Basis %)			Dry Weight (lb)
1	1.8	2"x 4"	21.4	20.5	20.4	1.49
2	1.7	2"x 4"	18.6	19.3	19.6	1.43
3	1.7	2"x 4"	21.5	21.0	21.6	1.40
4	4.2	4"x 4"	22.4	20.8	19.4	3.47
5	4.2	4"x 4"	18.7	22.4	20.5	3.48

Spacer Readings (Dry Basis %)			
18.0	13.4		
14.8	14.8		
17.1	18.7		
15.4			
18.0			
16.3			
12.6			
15.6			
13.8			
18.3			
12.5			
18.0			
18.7			

Run: 3
Manufacturer: Valley Comfort
Model: Sirocco SC25 Insert
Tracking No.: 2142
Project No.: 0142WN016E
Test Date: 22-Oct-15

ET (min)	Scale (LBS)	Weight Change	FB Top (oF)	FB Bot (oF)	FB Back (oF)	FB Left (oF)	FB Right (oF)	Pre Cat (oF)	Avg Surf (oF)	Stack (oF)	AMB (oF)	Draft In-H2O	Post Cat (oF)
0	4.5	0	739	185	205	442	506	1146	415.4	386	73	-0.058	1046
10	4	-0.492	650	206	225	407	438	1193	385.4	178	73	-0.037	869
20	3.8	-0.236	579	217	223	369	385	1130	354.5	149	72	-0.029	804
30	3.8	0.025	515	219	214	339	344	886	326.1	134	73	-0.024	735
40	3.7	-0.075	446	217	203	310	310	832	297.2	122	73	-0.02	622
50	3.7	-0.011	396	213	191	285	282	784	273.6	114	72	-0.017	556
60	3.7	-0.01	361	207	181	262	260	758	254.2	109	72	-0.015	517

OMNI-Test Laboratories, Inc. **ASTM E2780 Wood Heater Run Sheets**

Client: Valley Comfort Project Number: 0142WN016E Run Number: 3

Model: Sirocco SC25 Insert Tracking Number: 2142 Date: 10/22/15

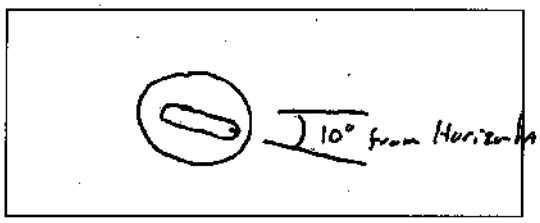
Test Crew: B Davis

OMNI Equipment ID numbers:

Wood Heater Run Notes

Air Control Settings

Primary:



Secondary: Bypass N/A

Tertiary/Pilot: NA

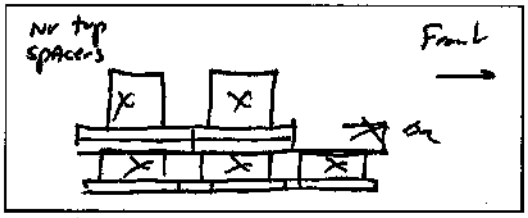
Fan: on Low

Preburn Notes

Time	Notes
61	Raked coals

Test Notes

Sketch test fuel configuration:



Start up procedures & Timeline:

Bypass: closed at 4:20

Fuel loaded by: 35 Seconds

Door closed at: closed at 4:00

Primary air: fully open until 4:55 then set to low setting

Notes: Fan off for first 30 minutes Then turned to low

Time	Notes
@	7:22 @ wt. loss in 10 minutes. moved wood from back of FB forward.

Technician Signature: BD

Date: 11/13/15

OMNI-Test Laboratories, Inc. **ASTM E2780 Wood Heater Run Sheets**

Client: Valley Comfort Project Number: 0142WN016E Run Number: 3

Model: Sirocco SC25 Insert Tracking Number: 2142 Date: 10/24/15

Test Crew: D Dow

OMNI Equipment ID numbers: 340, 296-754, 431

Wood Heater Fuel Data

Fuel: Douglas fir, untreated and air dried, standard grade or better dimensional lumber

Pre-Burn Fuel

Calibration: Cal Value (1) = 12% Actual Reading 12

Cal Value (2) = 22% Actual Reading 22

Piece:	Length:		Reading:	Piece:	Length:		Reading:
1	16.75 17	in	19.4	7	11.75 12.25	in	21.2
2	16.75 17	in	21.3	8	11.75 12.25	in	23.0
3	16.75 17	in	23.8	9		in	
4	16.75 17	in	22.3	10		in	
5	11.75 12.25	in	23.0	11		in	
6	11.75 12.25	in	20.4	12		in	

Total Pre-Burn Fuel Weight: 12.5 Pre-Burn Fuel Average Moisture: 21.80

Time (clock): 0745 Room Temperature (F): 70 Initials: DS

Test Fuel

Firebox Volume (ft^3): 2.26 Test Fuel Piece Length (in): 17

Load Weight Range (lb): 14.2 - 17.4 Total Wet Fuel Load Weight (lb): 15.84

Fuel Type & Amount: 2 x 4: 3 4 x 4: 2

Weight (with spacers): 6.6 Weight (with spacers): 8.8

Piece:	Weight (lbs):	Moisture Readings (%DB):			Fuel Type:
1	1.8	21.4	20.5	20.4	2x4
2	1.7	18.6	19.3	19.6	2x4
3	1.7	21.5	21.0	21.6	2x4
4		~~19.9~~ OK	~~20.0~~ OK		~~4x4~~ OK
5	4.2	22.4	20.8	19.4	4x4
6	4.2	18.7	22.4	20.5	4x4
7					

Spacer Moisture Readings (%DB)

18.0	14.8	17.1	15.4	18.0	16.3	12.6	15.6
13.8	18.3	12.5	18.0	18.7	13.4	14.8	18.7

Time (clock): 0745 Room Temperature (F): 70 Initials: DS

Technician Signature: [signature] Date: 10/13/15

OMNI-Test Laboratories, Inc. **ASTM E2780 Wood Heater Run Sheets**

Client: Valley Comfort Project Number: 0142WN016E Run Number: 3

Model: Sirocco SC25 Insert Tracking Number: 2142 Date: 10/22/15

Test Crew: B Davis

OMNI Equipment ID numbers:

Wood Heater Supplemental Data

Start Time: 10:13 Booth #: 1

Stop Time: 19:03

Stack Gas Leak Check:

Initial: good Final: good

Sample Train Leak Check:

A: 0.0 @ 4 "Hg

B: 0.0 @ 6 "Hg

Calibrations: Span Gas CO_2: 16.89 CO: 4.29

	Pre Test		Post Test	
	Zero	Span	Zero	Span
Time	10:10	10:10	19:18	19:18
CO_2	0.00	16.88	0.05	16.98
CO	0.000	4.27	-0.004	4.27

Air Velocity (ft/min): Initial: <50 Final: <50

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

Pitot Tube Leak Test: Initial: good Final: good

Stack Diameter (in): 6"

Induced Draft: 0.0

% Smoke Capture: 100%

Flue Pipe Cleaned Prior to First Test in Series:

Date: 10/21/15 Initials: BA

	Initial	Middle	Ending
P_b (in/Hg)	30.31	30.26	30.22
RH (%)	48.3	42.5	38.2
Ambient (°F)	72	72	76

Background Filter Volume: 86.201

Tunnel Traverse		
Microtector Reading	dP (in H_2O)	T(°F)
1	.060	75
2	.082	75
3	.082	75
4	.054	75
1	.070	75
2	.090	75
3	.080	75
4	.060	75
Center:		
	.092	25

Tunnel Static Pressure (in H_2O):	
Beginning of Test	End of Test
~.32	-.33

Technician Signature: [signature] Date: 11/13/15

OMNI-Test Laboratories, Inc.

Manufacturer: Valley Comfort
Model: Sirocco SC25
Date: 10/22/15
Run: 3
Control #: 0142WN016E
Test Duration: 530
Output Category: 2

Technicians: B. Davis

Test Results in Accordance with CSA B415.1-09

	HHV Basis	LHV Basis
Overall Efficiency	81.9%	88.5%
Combustion Efficiency	99.5%	99.5%
Heat Transfer Efficiency	82%	88.9%

Output Rate (kJ/h)	10,644	10,097	**(Btu/h)**
Burn Rate (kg/h)	0.66	1.45	**(lb/h)**
Input (kJ/h)	13,000	12,332	**(Btu/h)**

Test Load Weight (dry kg)	5.80	12.78	**dry lb**
MC wet (%)	17.04		
MC dry (%)	20.54		
Particulate (g)	2.7		
CO (g)	59		
Test Duration (h)	8.83		

Emissions	**Particulate**	**CO**
g/MJ Output	0.03	0.63
g/kg Dry Fuel	0.47	10.25
g/h	0.31	6.73
lb/MM Btu Output	0.07	1.47

Air/Fuel Ratio (A/F)	20.05

VERSION: **2.2** **12/14/2009**

VERSION: 2.2 12/14/2009

Manufacturer:	Valley Comfort		**Appliance Type:**	Cat	(Cat, Non
Model:	Sirocco SC25				
Date:	10/22/2015		**Temp. Units**	F	(F or C)
Run:	3		**Weight Units**	lb	(kg or lb)
Control #:	0142WN016E				
Test Duration:	530				
Output Category:	2				

			Fuel Data		
				D. Fir	
Wood Moisture (% wet):	17.04		**HHV**	19,810	kj/kg
Load Weight (lb wet):	15.40		**%C**	48.73	
Burn Rate (dry kg/h):	0.66		**%H**	6.87	
Total Particulate Emissions:	2.7	g	**%O**	43.9	
			%ASH	0.5	

	Averages	**0.04**	**6.06**	**#DIV/0!**		**187.94**	**73.17**
						Temp. (ºF)	
Elapsed	**Fuel Weight**	**Flue Gas Composition (%)**				**Flue**	**Room**
Time (min)	**Remaining (lb)**	**CO**	**CO_2**	**O_2**		**Gas**	**Temp**
0	15.40	0.10	3.30			187.0	72.0
10	15.00	0.10	5.40			173.0	72.0
20	14.80	0.20	3.50			159.0	72.0
30	14.50	0.10	5.40			168.0	71.0
40	14.20	0.00	5.80			170.0	72.0
50	13.80	0.00	6.70			175.0	71.0
60	13.40	0.00	7.60			185.0	71.0
70	13.00	0.00	7.60			191.0	71.0
80	12.50	0.00	7.50			204.0	72.0
90	12.10	0.00	7.50			208.0	72.0
100	11.60	0.00	5.80			191.0	71.0
110	11.40	0.00	5.00			177.0	72.0
120	11.20	0.00	4.80			167.0	71.0
130	11.00	0.00	5.00			157.0	71.0
140	10.80	0.00	5.00			155.0	72.0
150	10.60	0.00	5.10			155.0	71.0
160	10.30	0.00	4.60			156.0	72.0
170	10.20	0.00	4.10			160.0	71.0
180	9.80	0.00	4.20			178.0	72.0
190	9.30	0.00	4.40			211.0	72.0
200	8.60	1.10	8.60			233.0	72.0
210	8.00	0.70	10.80			234.0	73.0
220	7.50	0.10	10.60			233.0	72.0
230	7.10	0.00	9.50			229.0	73.0
240	6.70	0.00	8.90			219.0	73.0
250	6.30	0.00	8.20			210.0	74.0
260	6.00	0.00	7.70			204.0	74.0
270	5.70	0.00	7.60			197.0	73.0
280	5.40	0.00	7.50			198.0	72.0
290	5.10	0.00	7.10			198.0	71.0
300	4.80	0.00	6.20			196.0	71.0
310	4.60	0.00	5.10			189.0	73.0
320	4.40	0.00	5.80			178.0	72.0
330	4.30	0.00	5.70			171.0	73.0
340	4.20	0.00	5.70			165.0	75.0
350	4.10	0.00	5.50			162.0	75.0
360	4.00	0.00	5.50			160.0	75.0
370	3.90	0.00	5.30			157.0	74.0
380	3.80	0.00	5.20			155.0	75.0
390	3.70	0.00	5.30			153.0	74.0
400	3.60	0.00	5.30			156.0	75.0
410	3.50	0.00	5.30			156.0	75.0
420	3.40	0.00	5.00			158.0	75.0
430	3.20	0.00	4.60			157.0	74.0
440	3.20	0.00	4.00			152.0	75.0
450	3.10	0.00	7.00			169.0	75.0
460	2.50	0.00	9.00			217.0	76.0
470	2.00	0.00	7.70			246.0	76.0
480	1.50	0.00	7.70			258.0	76.0
490	1.00	0	6.5			249	76
500	0.70	0	3.9			232	76
510	0.40	0	3.7			221	76
520	0.10	0	3.9			209	75
530	0.00	0	3.8			201	76

Run 4

Wood Heater Test Results - ASTM E2780 / ASTM E2515

Manufacturer: Valley Comfort
Model: Sirocco SC25 Insert
Project No.: 0142WN016E
Tracking No.: 2142
Run: 4
Test Date: 10/23/15

Burn Rate	**1.89 kg/hr dry**
Average Tunnel Temperature	99 degrees Fahrenheit
Average Gas Velocity in Dilution Tunnel - vs	18.75 feet/second
Average Gas Flow Rate in Dilution Tunnel - Qsd	12372.2 dscf/hour
Average Delta p	0.092 inches H20
Total Time of Test	180 minutes

	AMBIENT	SAMPLE TRAIN 1	SAMPLE TRAIN 2	FIRST HOUR FILTER (TRAIN 1)
Total Sample Volume - Vm	28.844 cubic feet	28.803 cubic feet	28.818 cubic feet	9.512 cubic feet
Average Gas Meter Temperature	71 degrees Fahrenheit	80 degrees Fahrenheit	80 degrees Fahrenheit	80 degrees Fahrenheit
Total Sample Volume (Standard Conditions) - Vmstd	28.592 dscf	28.547 dscf	28.590 dscf	9.427 dscf
Total Particulates - m_n	0 mg	4.5 mg	4.4 mg	4 mg
Particulate Concentration (dry-standard) - C_r/C_s	0.000000 grams/dscf	0.00016 grams/dscf	0.00015 grams/dscf	0.00042 grams/dscf
Total Particulate Emissions - E_T	0.00 grams	5.85 grams	5.71 grams	5.25 grams
Particulate Emission Rate	0.00 grams/hour	1.95 grams/hour	1.90 grams/hour	5.25 grams/hour
Emissisons Factor		1.03 g/kg	1.01 g/kg	1.84 g/kg
Difference from Average Total Particulate Emissions		0.07 grams	0.07 grams	
	Dual Train Comparison Results Are Acceptable			

FINAL AVERAGE RESULTS

Complete Test Run	
Total Particulate Emissions - E_T	5.78 grams
Particulate Emission Rate	**1.93 grams/hour**
Emissisons Factor	1.02 grams/kg
First Hour Emissions	
Total Particulate Emissions - E_T	5.25 grams
Particulate Emission Rate	5.25 grams/hour
Emissisons Factor	1.84 grams/kg

Wood Heater Test Data - ASTM E2780 / ASTM E2515

Run: 4

Manufacturer: Valley Comfort
Model: Sirocco SC25 Insert
Tracking No.: 2142
Project No.: 0142WN016E
Test Date: 23-Oct-15
Beginning Clock Time: 10:19

Total Sampling Time: 180 min
Recording Interval: 10 min
Background Sample Volume: 28.844 cubic feet

Meter Box Y Factor: 1.001 (1) 1.003 (2) 0.988 (Amb)

Barometric Pressure:	Begin	Middle	End	Average
	30.18	30.19	30.2	30.19 "Hg

OMNI Equipment Numbers: 00185, 00410, 00335, 00336, 00419, 00428b, 00296- T55, 00439, 00348

PM Control Modules:
Dilution Tunnel MW(dry): 29.00 lb/lb-mole
Dilution Tunnel MW(wet): 28.78 lb/lb-mole
Dilution Tunnel H2O: 2.00 percent
Dilution Tunnel Static: -0.320 "H2O
Tunnel Area: 0.19635 ft2
Pitot Tube Cp: 0.99

Avg. Tunnel Velocity: 18.75 ft/sec.
Intial Tunnel Flow: 203.3 scfm
Average Tunnel Flow: 206.2 scfm
Post-Test Leak Check (1): 0 cfm @ 4 in. Hg
Post-Test Leak Check (2): 0 cfm @ 4 in. Hg
Average Test Piece Fuel Moisture: 22.58 Dry Basis %

Velocity Traverse Data

	Pt.1	Pt.2	Pt.3	Pt.4	Pt.5	Pt.6	Pt.7	Pt.8	Center	
Initial dP	0.060	0.088	0.088	0.070	0.066	0.082	0.084	0.060	0.092	"H2O
Temp:	101	101	101	101	101	100	100	100	100	°F

V_{strav} 18.77 ft/sec V_{scent} 20.62 ft/sec F_p 0.910

	Particulate Sampling Data														Fuel Weight (lb)		Temperature Data (°F)					Stack Gas Data		
Elapsed Time (min)	Gas Meter 1 (ft^3)	Gas Meter 2 (ft^3)	Sample Rate 1 (cfm)	Sample Rate 2 (cfm)	Orifice dH 1 ("H_2O)	Meter 1 Temp (°F)	Meter 1 Vacuum ("Hg)	Orifice dH 2 ("H_2O)	Meter 2 Temp (°F)	Meter 2 Vacuum ("Hg)	Dilution Tunnel (°F)	Dilution Tunnel Center dP	Pro. Rate 1	Pro. Rate 2	Scale Reading	Weight Change	Avg. Stove Surface Temp	Stack	Filter 1	Filter 2	Ambient	Draft ("H_2O)	CO_2 (%)	CO (%)
0	0.000	0.000			1.05	70	1.82	0.82	71	1.2	111	0.092			15.2		426.9	478	68	70	71	-0.065	11.2	0.2
10	1.573	1.607	0.16	0.16	1.27	72	1.96	1.08	72	1.2	106	0.092	100	102	13.6	-1.6	405.4	481	69	75	69	-0.076	9.3	0.1
20	3.153	3.203	0.16	0.16	1.27	73	1.94	1.06	74	1.2	103	0.092	100	101	12.3	-1.3	408.9	447	69	76	70	-0.072	8.9	0
30	4.736	4.797	0.16	0.16	1.27	75	1.93	1.07	76	1.2	101	0.092	100	100	10.9	-1.4	425.2	447	69	76	70	-0.072	10.6	0
40	6.320	6.394	0.16	0.16	1.26	77	1.94	1.06	78	1.2	100	0.092	100	100	9.8	-1.1	395.5	438	69	76	70	-0.071	10	0
50	7.911	7.992	0.16	0.16	1.28	79	1.96	1.07	79	1.2	100	0.092	100	100	8.6	-1.2	385.4	456	69	76	71	-0.071	11.2	0.1
60	9.512	9.592	0.16	0.16	1.29	80	1.96	1.07	80	1.2	101	0.092	100	100	7.5	-1.1	384.8	448	69	76	70	-0.071	11.3	0.2
70	11.116	11.192	0.16	0.16	1.28	80	2.05	1.06	81	1.3	101	0.092	100	100	6.4	-1.1	386.6	441	73	76	72	-0.069	11.2	0.3
80	12.722	12.792	0.16	0.16	1.29	81	2.05	1.07	81	1.3	100	0.092	100	100	5.3	-1.1	389.5	439	74	76	71	-0.069	11.2	0.2
90	14.330	14.394	0.16	0.16	1.28	81	2.05	1.07	81	1.3	100	0.092	100	100	4.4	-0.9	393.4	447	75	76	72	-0.069	11.1	0.1
100	15.936	15.996	0.16	0.16	1.28	82	2.07	1.06	82	1.3	101	0.092	100	100	3.4	-1	406.7	441	75	76	71	-0.068	12	0.3
110	17.543	17.599	0.16	0.16	1.28	82	2.06	1.06	82	1.3	98	0.092	100	100	2.7	-0.7	407.3	411	75	76	72	-0.066	9.6	0
120	19.151	19.201	0.16	0.16	1.29	82	2.05	1.06	82	1.3	97	0.092	100	99	2.2	-0.5	399.2	398	75	76	70	-0.064	9.6	0
130	20.760	20.803	0.16	0.16	1.28	82	2.06	1.06	82	1.3	96	0.092	100	99	1.6	-0.6	395.8	394	75	76	71	-0.062	9.4	0
140	22.367	22.405	0.16	0.16	1.28	83	2.06	1.06	83	1.3	95	0.092	99	99	1.2	-0.4	391.7	385	75	76	71	-0.062	8.3	0
150	23.975	24.007	0.16	0.16	1.29	83	2.06	1.06	83	1.3	94	0.092	99	99	0.8	-0.4	386.1	379	75	75	72	-0.061	8.3	0
160	25.583	25.610	0.16	0.16	1.28	83	2.06	1.06	83	1.3	93	0.092	99	99	0.4	-0.4	375.0	367	75	75	71	-0.060	7.9	0
170	27.193	27.214	0.16	0.16	1.28	83	2.06	1.06	83	1.3	92	0.092	99	99	0.1	-0.3	370.7	362	75	75	70	-0.060	8	0
180	28.803	28.818	0.16	0.16	1.28	83	2.07	1.06	83	1.3	92	0.092	99	99	0.0	-0.1	367.8	363	75	75	71	-0.059	7.8	0
Avg/Tot	28.803	28.818	0.16	0.16	1.27	80		1.05	80		99	0.092	100	100			59.1		73	75	71	-0.067		

Wood Heater Lab Data - ASTM E2780 / ASTM E2515

Manufacturer:	Valley Comfort	Equipment Numbers:	00023, 00391, 00283A
Model:	Sirocco SC25 Insert		
Tracking No.:	2142		
Project No.:	0142WN016E		
Run #:	4		
Date:	10/23/15		

TRAIN 1 (First Hour emissions)

Sample Component	Reagent	Filter, Probe or Dish #	Weights		
			Final, mg	Tare, mg	Particulate, mg
B. Front filter catch	Filter	C255	122.5	119.1	3.4
C. Rear filter catch	Filter	C256	119.7	119.7	0.0
D. Probe catch*	Probe	7	114986.5	114986.6	0.0
E. Filter seals catch*	Seals	R368	3297.5	3296.9	0.6

Sub-Total Total Particulate, mg: 4.0

TRAIN 1 (Post First Hour Change-out)

Sample Component	Reagent	Filter, Probe or Dish #	Weights		
			Final, mg	Tare, mg	Particulate, mg
B. Front filter catch	Filter	C257	121.0	120.5	0.5
C. Rear filter catch	Filter	C258	118.9	119.0	-0.1
D. Probe catch*	Probe	11	114194.5	114194.5	0.0
E. Filter seals catch*	Seals	R369	3287.8	3287.7	0.1

Sub-Total Total Particulate, mg: 0.5

Train 1 Aggregate Total Particulate, mg: **4.5**

TRAIN 2

Sample Component	Reagent	Filter, Probe or Dish #	Weights		
			Final, mg	Tare, mg	Particulate, mg
A. Front filter catch	Filter	C259	123.6	119.7	3.9
B. Rear filter catch	Filter	C260	120.7	120.5	0.2
C. Probe catch*	Probe	13	114326.6	114326.4	0.2
D. Filter seals catch*	Seals	R370	3338.3	3338.2	0.1

Total Particulate, mg: **4.4**

AMBIENT

Sample Component	Reagent	Filter # or Probe #	Weights		
			Final, mg	Tare, mg	Particulate, mg
A. Front filter catch*	Filter	C254	120.6	120.7	0.0

Total Particulate, mg: **0.0**

*Particulate catch that results in a negative number, is assumed to be zero for probes and seals, negative numbers for filters are assumed to be part of the seal weight.

Component	Equations:
A. Front filter catch	Final (mg) - Tare (mg) = Particulate, mg
B. Rear filter catch	Final (mg) - Tare (mg) = Particulate, mg
C. Probe catch	Final (mg) - Tare (mg) = Particulate, mg

Wood Heater Test Fuel Data - ASTM E2780

Manufacturer: Valley Comfort
Model: Sirocco SC25 Insert
Tracking No.: 2142
Project No.: 0142WN016N

Firebox Volume (ft^3):	2.26
Fuel Piece Length (in):	17
2x4 Crib Weight (lb):	6.8
4x4 Crib Weight (lb):	8.4

Total Fuel Weight (Dry Basis, lb):	12.5	
Fuel Density (lb/ft^3, Dry Basis):	27.93	OK
Loading Density (lb/ft^3, Wet Basis):	6.73	OK
2x4 Percentage:	45%	OK

Test Fuel Piece	Weight (lb)	Size	Readings (Dry Basis %)			Dry Weight (lb)
1	3.9	4"x 4"	22.2	19.4	20.0	3.24
2	4.1	4"x 4"	21.3	21.4	22.1	3.37
3	1.9	2"x 4"	23.8	24.5	24.9	1.53
4	1.8	2"x 4"	24.8	24.8	25.5	1.44
5	1.8	2"x 4"	19.4	21.6	23.0	1.48

Spacer Readings (Dry Basis %)			
13.5	17.7		
17.0	13.6		
19.3	18.8		
14.3			
14.7			
19.7			
15.3			
16.0			
16.1			
18.4			
19.7			
16.0			
16.6			

Run: 4
Manufacturer: Valley Comfort
Model: Sirocco SC25 Insert
Tracking No.: 2142
Project No.: 0142WN016E
Test Date: 23-Oct-15

ET (min)	Scale (LBS)	Weight Change	FB Top (oF)	FB Bot (oF)	FB Back (oF)	FB Left (oF)	FB Right (oF)	Pre Cat (oF)	Avg Surf (oF)	Stack (oF)	AMB (oF)	Draft In-H2O	Post Cat (oF)
0	12.9	0	605	176	224	466	451	951	384.5	785	69	-0.087	781
10	11.1	-1.823	674	197	231	430	403	1393	387.1	481	69	-0.078	1059
20	9.4	-1.66	690	203	218	423	405	1351	387.8	462	69	-0.073	1010
30	8	-1.408	681	199	208	428	424	1322	387.9	451	69	-0.072	977
40	6.5	-1.501	712	193	205	440	452	1445	400.5	464	69	-0.073	1071
50	5	-1.491	762	188	206	456	487	1375	419.9	471	70	-0.073	1110
60	3.7	-1.317	759	185	209	485	540	1224	435.7	458	71	-0.071	1064
67	3.3	-0.375	722	185	219	496	521	1065	428.7	422	70	-0.066	948

OMNI-Test Laboratories, Inc. **ASTM E2780 Wood Heater Run Sheets**

Client: Valley Comfort Project Number: 0142WN016E Run Number: 4

Model: Sirocco SC25 Insert Tracking Number: 2142 Date: 10/23/15

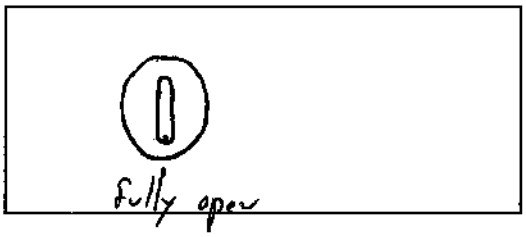
Test Crew: D Davis

OMNI Equipment ID numbers:

Wood Heater Run Notes

Air Control Settings

Primary:



Secondary: ~~fixed~~ NA

Tertiary/Pilot: NA

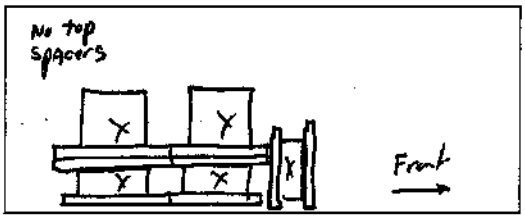
Fan: on High

Preburn Notes

Time	Notes
68	Raked coals

Test Notes

Sketch test fuel configuration:



Start up procedures & Timeline:

Bypass: open unk / 2:30 then closed

Fuel loaded by: 40 seconds

Door closed at: 2:30 minutes

Primary air: Fully open ~~during~~ heat

Notes: Fan off for ~~full~~ 5 first 30 minutes then turned to high

Time	Notes
NA	No Activities

Technician Signature: [signature] Date: 11/13/15

OMNI-Test Laboratories, Inc. **ASTM E2780 Wood Heater Run Sheets**

Client: Valley Comfort Project Number: 0142WN016E Run Number: 4

Model: Sirocco SC25 Insert Tracking Number: 2142 Date: 10/23/15

Test Crew: B. Davis

OMNI Equipment ID numbers:

Wood Heater Fuel Data

Fuel: Douglas fir, untreated and air dried, standard grade or better dimensional lumber

Pre-Burn Fuel

Calibration: Cal Value (1) = 12% Actual Reading 12

Cal Value (2) = 22% Actual Reading 22

Piece:	Length:	Reading:	Piece:	Length:	Reading:
1	12 in	19.8	7	17 in	22.4
2	12 in	21.3	8	17 in	18.8
3	12 in	22.4	9	in	
4	12 in	20.4	10	in	
5	17 in	21.3	11	in	
6	17 in	20.8	12	in	

Total Pre-Burn Fuel Weight: 12.7 Pre-Burn Fuel Average Moisture: 20.9

Time (clock): 0830 Room Temperature (F): 70 Initials: BL

Test Fuel

Firebox Volume (ft^3): 2.26 Test Fuel Piece Length (in): 17"

Load Weight Range (lb): 14.2 - 17.4 Total Wet Fuel Load Weight (lb): 15.2

Fuel Type & Amount: 2 x 4: 3 4 x 4: 2

Weight (with spacers): 6.8 Weight (with spacers): 8.4

Piece:	Weight (lbs):	Moisture Readings (%DB):				Fuel Type:
1	3.9	22.2	19.4	20.0		4x4
2	4.1	21.3	21.4	22.1		4x4
3	1.9	23.8	24.5	24.9		2x4
4	1.8	24.8	24.8	25.5		2x4
5	1.8	19.4	21.6	23.0		2x4
6						
7						

Spacer Moisture Readings (%DB)

13.5	17.0	19.3	14.3	14.7	19.7	15.3	16.0
16.1	18.4	19.7	16.0	16.6	17.7	13.6	18.8

Time (clock): 0845 Room Temperature (F): 70 Initials: BL

Technician Signature: Date: 11/13/15

OMNI-Test Laboratories, Inc. **ASTM E2780 Wood Heater Run Sheets**

Client: Valley Comfort Project Number: 0142WN016E Run Number: 4

Model: Sirocco SC25 Insert Tracking Number: 2142 Date: 10/29/15

Test Crew: B DAVIS

OMNI Equipment ID numbers:

Wood Heater Supplemental Data

Start Time: 10:19 Booth #: 1

Stop Time: 1:19

Stack Gas Leak Check:

Initial: good Final: good

Sample Train Leak Check:

A: 0.0 @ 4 "Hg

B: 0.0 @ 4 "Hg

Calibrations: Span Gas CO_2: 16.89 CO: 4.29

	Pre Test		Post Test	
	Zero	Span	Zero	Span
Time	10:05	10:05	1:40	1:40
CO_2	0.00	16.90	0.00	16.74
CO	0.000	4.29	0.003	4.25

Air Velocity (ft/min): Initial: <50 Final: <50

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

Pitot Tube Leak Test: Initial: good Final: good

Stack Diameter (in): 6"

Induced Draft: 0.0

% Smoke Capture: 100%

Flue Pipe Cleaned Prior to First Test in Series:

Date: 10/29/15 Initials: BA

	Initial	Middle	Ending
P_b (in/Hg)	30.18	30.19	30.20
RH (%)	41.8	43.3	44.9
Ambient (°F)	71	71	71

Background Filter Volume: 28.544

Tunnel Traverse

Microtector Reading	dP (in H_2O)	T(°F)
1	.060	101
2	.088	101
3	.088	101
4	.070	101
1	.066	101
2	.082	100
3	.084	100
4	.060	100
Center:		
	092	100

Tunnel Static Pressure (in H_2O):	
Beginning of Test	End of Test
-.32	-.32

Technician Signature: BA Date: 11/13/15

OMNI-Test Laboratories, Inc.

Manufacturer: Valley Comfort
Model: Sirocco SC25
Date: 10/22/15
Run: 4
Control #: 0142WN016E
Test Duration: 180
Output Category: 2

Technicians: B. Davis

Test Results in Accordance with CSA B415.1-09

	HHV Basis	LHV Basis
Overall Efficiency	74.6%	80.6%
Combustion Efficiency	99.5%	99.5%
Heat Transfer Efficiency	75%	81.0%

Output Rate (kJ/h)	27,715	26,290	**(Btu/h)**
Burn Rate (kg/h)	1.88	4.13	**(lb/h)**
Input (kJ/h)	37,152	35,242	**(Btu/h)**

Test Load Weight (dry kg)	5.63	12.40	**dry lb**
MC wet (%)	18.42		
MC dry (%)	22.58		
Particulate (g)	5.78		
CO (g)	54		
Test Duration (h)	3.00		

Emissions	**Particulate**	**CO**
g/MJ Output	0.07	0.65
g/kg Dry Fuel	1.03	9.66
g/h	1.93	18.12
lb/MM Btu Output	0.16	1.52

Air/Fuel Ratio (A/F)	12.34

VERSION: **2.2** **12/14/2009**

Manufacturer:	Valley Comfort		**Appliance Type:**	Cat	(Cat, Non
Model:	Sirocco SC25				
Date:	10/22/2015		**Temp. Units**	F	(F or C)
Run:	4		**Weight Units**	lb	(kg or lb)
Control #:	0142WN016E				
Test Duration:	180				
Output Category:	2				

			Fuel Data		
				D. Fir	
Wood Moisture (% wet):	18.42		**HHV**	19,810	kj/kg
Load Weight (lb wet):	15.20		**%C**	48.73	
Burn Rate (dry kg/h):	1.87		**%H**	6.87	
Total Particulate Emissions:	5.78	g	**%O**	43.9	
			%ASH	0.5	

Averages	**0.08**	**9.84**	**#DIV/0!**	**422.21**	**70.79**	
				Temp. (ºF)	
Elapsed Time (min)	**Fuel Weight Remaining (lb)**	**Flue Gas Composition (%) CO**	**CO_2**	**O_2**	**Flue Gas**	**Room Temp**
0	15.20	0.20	11.20		478.0	71.0
10	13.60	0.10	9.30		481.0	69.0
20	12.30	0.00	8.90		447.0	70.0
30	10.90	0.00	10.60		447.0	70.0
40	9.80	0.00	10.00		438.0	70.0
50	8.60	0.10	11.20		456.0	71.0
60	7.50	0.20	11.30		448.0	70.0
70	6.40	0.30	11.20		441.0	72.0
80	5.30	0.20	11.20		439.0	71.0
90	4.40	0.10	11.10		447.0	72.0
100	3.40	0.30	12.00		441.0	71.0
110	2.70	0.00	9.60		411.0	72.0
120	2.20	0.00	9.60		398.0	70.0
130	1.60	0.00	9.40		394.0	71.0
140	1.20	0.00	8.30		385.0	71.0
150	0.80	0.00	8.30		379.0	72.0
160	0.40	0.00	7.90		367.0	71.0
170	0.10	0.00	8.00		362.0	70.0
180	0.00	0.00	7.80		363.0	71.0

Section 4

Quality Assurance/Quality Control

QUALITY ASSURANCE/QUALITY CONTROL

OMNI follows the guidelines of ISO/IEC 17025, "General Requirements for the Competence of Testing and Calibration Laboratories," and the quality assurance/quality control (QA/QC) procedures found in *OMNI*'s Quality Assurance Manual.

OMNI's scope of accreditation includes, but is not limited to, the following:

- ANSI (American National Standards Institute) for certification of product to safety standards.
- To perform product safety testing by the International Accreditation Service, Inc. (formerly ICBO ES) under accreditation as a testing laboratory designated TL-130.
- To perform product safety testing as a "Certification Organization" by the Standards Council of Canada (SCC).
- Serving as a testing laboratory for the certification of wood heaters by the U.S. Environmental Protection Agency.

This report is issued within the scope of *OMNI*'s accreditation. Accreditation certificates are available upon request.

The manufacturing facilities and quality control system for the production of the «ModelNameNumber» at «Manufacturer_Name» were evaluated to determine if sufficient to maintain conformance with OMNI's requirements for product certification. OMNI has concluded that the manufacturing facilities, processes, and quality control system are adequate to produce the appliance congruous with the standards and model codes to which it was evaluated.

Sample Analysis

Analysis Worksheets
Tared Filter, Probe, and O-Ring Data

OMNI-Test Laboratories, Inc. **ASTM E2780 Wood Heater Run Sheets**

Client: Valley Comfort Project Number: 0142WN016E Run Number: 1

Model: Sirocco SC25 Insert Tracking Number: 2142 Date: 10/20/15

Test Crew: B Davis

OMNI Equipment ID numbers: 00023, 00391, 00283A

ASTM E2515 Lab Sheet

Assembled By:

B Davis

Date/Time in Dessicator:

10/20/15 1620

	Weighing #1	Weighing #2	Weighing #3	Weighing #4	Weighing #5
Date:	10/20/15	10/23/15	10/26/15		
Time:	0720	1045	0720		
R/H %:	12.5	11.6	22.3		
Temp:	72.2	72.1	73.4		
Audit:	100.0000	100.0000	100.0000		
Initials:	BC	BC	BC		

Train	Element	ID #	Tare (mg)	Weight (mg)	Weight (mg)	Weight (mg)	Weight (mg)	Weight (mg)
A (First Hour)	Front Filter	c234	123 122774.0	123.7	123.9	123.5		
	Rear Filter	C235	121.4	121.5	121.5			
	Probe	1	122774.0	122774.5	122773.9	122774.0		
	O-Ring Set	R348	3474.5	3474.7	3474.6			
A (Remainder)	Front Filter	c236	120.1	121.5	121.5			
	Rear Filter	c237	120.1	120.2	120.2			
	Probe	2	115023.6	115024.1	115023.2	115023.4		
	O-Ring Set	R349	3246.0	3245.9	3245.9			
B	Front Filter	c238	120.3	124.1	124.1			
	Rear Filter	c239	120.3	120.2	120.2			
	Probe	OES 3	114773.6	114773.6	114773.8	114773.2		
	O-Ring Set	R359	3510.1	3510.5	3510.3			
BG	Filter	c233	120.8	120.8	120.7			

Technician Signature: B Davis Date: 11/13/15

OMNI-Test Laboratories, Inc. **ASTM E2780 Wood Heater Run Sheets**

Client: Valley Comfort Project Number: 0142WN016E Run Number: 2

Model: Sirocco SC25 Insert Tracking Number: 2142 Date: 10/21/15

Test Crew: B Davis

OMNI Equipment ID numbers: 00023, 00191, 00233A

ASTM E2515 Lab Sheet

Assembled By:

B Davis

Date/Time in Dessicator:

10/21/15 1605

	Weighing #1	Weighing #2	Weighing #3	Weighing #4	Weighing #5
Date:	10/23/15	10/26/15	10/27/15		
Time:	1045	0930	0850		
R/H %:	12.6	22.7	13.5		
Temp:	72.2	73.4	72.4		
Audit:	100.0000	100.0000	100.0000		
Initials:	AL	AL	AL		

Train	Element	ID #	Tare (mg)	Weight (mg)	Weight (mg)	Weight (mg)	Weight (mg)	Weight (mg)
A (First Hour)	Front Filter	C241	120.7	121.6	121.6			
	Rear Filter	C242	121.4	121.2	121.3			
	Probe	OES 4	114147.6	114147.7	114147.7			
	O-Ring Set	R361	4916.6	4917.2	4917.1	4917.0		
A (Remainder)	Front Filter	C243	120.9	121.2	121.3			
	Rear Filter	C244	120.3	120.1	120.3			
	Probe	4	114866.4	114866.2	114866.4			
	O-Ring Set	R360	3308.6	3309.2	3308.8	3308.7		
B	Front Filter	C245	120.4	121.8	121.8			
	Rear Filter	C246	119.8	119.8	119.8			
	Probe	OES 5	113357.2	113357.2	113357.2			
	O-Ring Set	R362	3379.2	3379.9	3379.9	3379.2		
BG	Filter	C240	120.5	120.3	120.3			

Technician Signature: B Davis Date: 11/13/15

OMNI-Test Laboratories, Inc. **ASTM E2780 Wood Heater Run Sheets**

Client: Valley Comfort Project Number: 0142WN016E Run Number: 3

Model: Sirocco SC25 Insert Tracking Number: 2142 Date: 10/22/15

Test Crew: B Davis

OMNI Equipment ID numbers: 00443, 00391, 00258A

ASTM E2515 Lab Sheet

Assembled By:

B Davis

Date/Time in Dessicator:

10/22/15 1915

	Weighing #1	Weighing #2	Weighing #3	Weighing #4	Weighing #5
Date:	10/26/15	10/28/15	10/29/15		
Time:	0820	0850	0850		
R/H %:	22.7	13.5	20.5		
Temp:	73.4	72.4	74.2		
Audit:	100.0000	100.0000	100.0000		
Initials:	DL	DL	DL		

Train	Element	ID #	Tare (mg)	Weight (mg)	Weight (mg)	Weight (mg)	Weight (mg)	Weight (mg)
A (First Hour)	Front Filter	C248	120.0	121.3	121.2			
	Rear Filter	C249	119.8	119.8	119.8			
	Probe	065 6	113704.5	113704.3	113704.4			
	O-Ring Set	R363	4059.9	4060.3	4060.1			
A (Remainder)	Front Filter	C250	119.9	121.1	121.1			
	Rear Filter	C251	120.9	121.1	121.0			
	Probe	6	115358.4	115358.7	115358.5			
	O-Ring Set	R364	3318.5	3318.7	3318.5			
B	Front Filter	C252	119.8	121.2	121.2			
	Rear Filter	C253	119.9	120.1	120.1			
	Probe	8	115579.4	115598.9	115579.1			
	O-Ring Set	R367	3366.7	3367.2	3366.7	3366.7		
BG	Filter	C247	119.8	119.7	119.8			

Technician Signature: B Davis Date: 11/13/15

OMNI-Test Laboratories, Inc. **ASTM E2780 Wood Heater Run Sheets**

Client: Valley Comfort Project Number: 0142WN016E Run Number: 4

Model: Sirocco SC25 Insert Tracking Number: 2142 Date: 10/23/15

Test Crew: B Davis

OMNI Equipment ID numbers: 00023, 00341, 002324

ASTM E2515 Lab Sheet

Assembled By:

BDavis

Date/Time in Dessicator:

10/23/15 1345

	Weighing #1	Weighing #2	Weighing #3	Weighing #4	Weighing #5
Date:	10/24/15	10/27/15	10/29/15		
Time:	0820	0830	0850		
R/H %:	22.7	21.5	20.5		
Temp:	73.4	72.4	74.2		
Audit:	100.00	100.00	100.00		
Initials:	AL	AL	AL		

Train	Element	ID #	Tare (mg)	Weight (mg)	Weight (mg)	Weight (mg)	Weight (mg)	Weight (mg)
A (First Hour)	Front Filter	C255	119.1	122.7	122.5			
	Rear Filter	C256	117.7	119.9	119.7			
	Probe	7	114986.6	114986.3	114986.6	114 986.5		
	O-Ring Set	R368	3290.7	3297.7	3297.5			
A (Remainder)	Front Filter	C257	120.3	121.0	121.0			
	Rear Filter	C258	119.0	118.9	118.9			
	Probe	11	114194.5	114194.4	114194.7	114194.5		
	O-Ring Set	R369	3292.7	3288.0	3288.8			
B	Front Filter	C259	117.7	123.7	123.6			
	Rear Filter	C260	120.5	120.8	120.7			
	Probe	13	114326.7	114326.7	114326.6			
	O-Ring Set	R370	3339.2	3338.8	3338.5	3338.3		
BG	Filter	C254	120.7	120.6	120.6			

Technician Signature: BDavis Date: 11/3/15

TARE SHEET - FILTERS

Date Placed in Dessicator: 10/14/15

Thermohygrometer ID #: OMNI-00291

Cleaned By: B DAVIS

Balance ID #: OMNI-00023

Audit Weight ID #: OMNI-00231 131

Filter ID #	Date: 10/19/15 Time: 0915 RH %: 19.3 T (°F): 74.7 Audit: .5001	Date: 10/20/15 Time: 0940 RH %: 11.8 T (°F): 73.1 Audit: .5000	Date: Time: RH %: T (°F): Audit:	Date: Time: RH %: T (°F): Audit:	Date Used	Project Number	Run No.
C233	120.7	120.8			10/20/15	0142WN016E	1
C234	121.4	121.3					
C235	121.5	121.4					
C236	120.1	120.1					
C237	120.2	120.1					
C238	120.3	120.3					
C239	120.3	120.3					
C240	120.5	120.5			10/21/15		2
C241	120.8	120.7					
C242	121.5	121.4					
C243	120.9	120.9					
C244	120.4	120.3					
C245	120.4	120.4					
C246	119.9	119.8					
C247	119.3	119.3			10/22/15		3
	Initials: DA	Initials: AM	Initials:	Initials:			

Final Technician Signature: [signature]

Date: 10/26/15

TARE SHEET - FILTERS

Date Placed in Dessicator: 10/16/15

Thermohygrometer ID #: OMNI-00292

Cleaned By: B Davis

Balance ID #: OMNI-00023

Audit Weight ID #: OMNI-00131

Filter ID #	Date: 10/19/15 Time: 0915 RH %: 19.3 T (°F): 74.7 Audit: .5001	Date: 10/24/15 Time: 0940 RH %: 11.8 T (°F): 73.1 Audit: .5000	Date: Time: RH %: T (°F): Audit:	Date: Time: RH %: T (°F): Audit:	Date Used	Project Number	Run No.
C248	120.1	120.0			10/22/15	0142WN016E	3
C249	119.9	119.9					
C250	119.9	119.9					
C251	120.9	120.9					
C252	119.1	119.0					
C253	119.9	119.9					
C254	120.6	120.7			10/23/15		4
C255	119.1	119.1			10/23/15		4
C256	119.8	119.7					
C257	120.5	120.5					
C258	118.9	119.0					
C259	119.8	119.7					
C260	120.6	120.5					
C261	119.7	119.6					
C262	119.6	119.6					
	Initials: AC	Initials: AC	Initials:	Initials:			

Final Technician Signature: BD

Date: 10/24/15

TARE SHEET - PROBES

Date Placed In Dessicator: 10/16/15

Cleaned By: B Davis

Balance ID #: 00023

Thermohygrometer ID #: OMNI-00291

Audit Weight ID #: OMNI-00283A

Probe ID #	Date: 10/19/15 Time: 0915 RH %: 19.3 T (°F): 74.7 Audit: 100.0000	Date: 10/20/15 Time: 0940 RH %: 11.8 T (°F): 73.1 Audit: 100.0000	Date: 10/22/15 Time: 0820 RH %: 12.5 T (°F): 72.2 Audit: 100.0000	Date: Time: RH %: T (°F): Audit:	Date Used	Project Number	Run No.
1	122774.2	122774.0			10/20/15	0142LN016E	1
2	115023.4	115023.6					
OES 3	114773.2	114773.1					
OES 4	114147.5	114147.6			10/21/15		2
4	114866.5	114866.4					
OES 5	113557.2	113557.2					
OES 6	113704.6	113704.5			10/22/15	0	3
6	115358.5	115358.4					
7	114987.2	114986.7	114986.6		10/23/15	0142LN016E	4
8	115597.1	115599.1			10/23/15	0142LN016E	3
11	114194.6	114194.5			10/23/15	0142LN016E	4
13	114326.3	114326.4					4
16	114272.4	114272.5					
17	114566.0	114566.0					
20	114257.0	114256.9					
	Initials: BD	Initials: MM	Initials: BD	Initials			

Final Technician Signature: BD

Date: 10/30/15

O-RING TARES

Date Placed in Desiccator: 10/16/15 Technician: B Davis Balance ID # OMNE-00023

Thermo/Hygro meter ID #: OMNE-00291 Audit Weight ID # OMNE-00283A (Balance audit mfr. Std.: 500 ± 0.72)

O-Ring Size/ID# 47	Date: 10/19/15 50.0005 Time: 0915 RH%: 19.3 T (F): 74.7 Initials: AA	Date: 10/20/15 50.0005 Time: 0940 RH%: 11.8 T (F): 73.1 Initials: AA	Date: Time: RH%: T (F): Initials:	Date: Time: RH%: T (F): Initials:	Manufacturer	Appliance	Project No.	Run No.
R348	3474.5	3474.5			Valley Control	SC25 Insul	0142WWOKE	1
R349	3246.0	3246.0						1
R359	3510.2	3510.2						1
R360	3308.6	3308.6						2
R361	4916.8	4916.6						2
R362	3379.2	3379.2						2
R363	4059.9	4059.9						3
R364	3318.5	3318.5						3
R367	3366.8	3366.7						3
R368	3296.9	3296.9						4
R369	3287.7	3287.7						4
R370	3338.1	3338.2						4
R371	4139.7	4139.6						
R372	3300.0	3299.9						
R373	3333.4	3333.3						

Final Technician signature: BD Date: 11/24/15

Calibrations

Methods EPA 28R, ASTM E2515, ASTM E2780

ID #	Lab Name/Purpose	Log Name	Attachment Type
1	Calibrator Dry Gas Meter	Rockwell Int'l Standard Test Meter	Calibration Certificate
335	Dry Gas Meter	APEX XC-60EP	Calibration certificate
336	Dry gas Meter	APEX XC-60EP	Calibration certificate
23	Scale-Analytical Balance	Mettler Analytical Balance	Calibration Certificate
131	500 mg Weight	Ohaus Weight Standard, 500 mg	Calibration Certificate
132	10 lb Weight	Weight Standard, 10 lb.	Calibration Certificate
185	Platform Scale	Weigh-Tronix Platform Scale	Calibration Certificate
NA	Barometer	Barometer – Princo	Manual Cover
296-T54	Tape Measure	Stanley Tape Measure	Calibration Log
NA	Wood Moisture Meter	Moisture Meter - Delmhorst	See Test Run Notes
291	Thermohygrometer	Omega Digital Thermohygrometer	Calibration Log
NA	Combustion Gas Analyzer	CAI	See Test Run Notes
432	Moisture Meter Calibrator	Delmhorst Moisture Content Calibrator	Calibration Log
NA	Calibration Gas	16.89% CO2, 4.29% CO	Calibration Certificate
439	Stop Watch	Robic stop watch	Calibration Certificate
428B	Dry Gas Meter, Ambient Sample	APEX Instruments	Calibration Certificate
348	Angle Finder	Angle Finder	Calibration Certificate

CERTIFICATE OF CALIBRATION

CUSTOMER:	**OMNI TEST LABS INC.** PORTLAND OR	**CALIBRATION DATE:**	10/23/14
PO NUMBER:	OTL-14-049	**CALIBRATION DUE:**	10/23/15
INST. MANUFACTURER:	ROCKWELL	**PROCEDURE:**	NAVAIR 17-20MG-02
INST. DESCRIPTION:	P.D. METER	**CALIBRATION FLUID:**	AIR @ 14.7 PSIA 70 F
MODEL NUMBER:	S-275	**STANDARD(S) USED:**	A4, A24, A321 DUE 02-2015
SERIAL NUMBER:	684390L	**NIST TRACE #' S:**	1329407628, 1361269184, 1390386562
RATED UNCERTAINTY:	+/- .5 % RD.	**AMBIENT CONDITIONS:**	760 mm HGA 51 % RH 72 F
UNCERTAINTY GIVEN:	FLOW measurement uncertainty: +/- .101 % RD. K=2	**CERTIFICATE FILE #:**	426663.14

NOTES: AS RECEIVED/AS LEFT WITHIN SPECS. REFERENCE CONDITIONS ARE: 760 mm HGA 70 F **OMNI-00001**

TEST POINT NUMBER	UUT INDICATED SCFM	DM.STD. ACTUAL SCFM	CORRECTION FACTOR	K FACTOR
1	0.2603	0.26	0.99888	60.067
2	0.5106	0.51	0.99877	60.074
3	1.0213	1.02	0.99868	60.079
4	1.4921	1.49	0.99858	60.085
5	2.0231	2.02	0.99845	60.093
6	2.4946	2.49	0.99817	60.110
7	3.0253	3.02	0.99823	60.106
8	3.4866	3.48	0.99812	60.113
		AVERAGE (Y)=	0.99848542	

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/NCSL-Z-540.3, and/or MIL-STD-45662A, Test methods: API2530-92 & ASME MFC-3M-1989.

Dick Munns Company • 10572 Calle Lee #130 • Los Alamitos, CA 90720
Phone (714) 827-1215 • Fax (714) 827-0823

Date: 10/23/2014 Approved By: Calibration Technician:

Thermal Metering System Calibration
Y Factor

Manufacturer:	Apex Instruments
Model:	XC-60EP
Serial Number:	606001
OMNI Tracking No.:	OMNI-00335
Calibrated Orifice:	☐ Yes

Average Gas Meter y Factor	Orifice Meter dH@
1.001	N/A

Calibration Date:	06/04/15	
Calibrated by:	A. Kravitz	
Calibration Frequency:	6 Months	
Next Calibration Due:	~~12/4/2016~~ 12/4/15	
Instrument Range:	1.000	cfm
Standard Temp.:	68	oF
Standard Press.:	29.92	"Hg
Barometric Press., Pb:	30.12	"Hg
Signature/Date:	6/4/15	

Previous Calibration Comparision

		Acceptable Deviation (5%)	Deviation
Date	12/3/2014		
y Factor	1.004483232	0.050224162	0.004
Acceptance	Acceptable		

Current Calibration

Acceptable y Deviation	0.020
Maximum y Deviation	0.004
Acceptable dH@ Deviation	N/A
Maximum dH@ Deviation	N/A
Acceptance	Acceptable

Reference Standard *			
Standard Calibrator	Model	Standard Test Meter	
	S/N	OMNI-00001	
	Calib. Date	23-Oct-14	
	Calib. Value	0.9985	y factor (ref)

Calibration Parameters	Run 1	Run 2	Run 3
Reference Meter Pressure ("H2O), Pr	0.00	0.00	0.00
DGM Pressure ("H2O), Pd	2.32	1.15	0.70
Initial Reference Meter	927.984	939.742	945.271
Final Reference Meter	939.742	945.271	950.981
Initial DGM	0	0	0
Final DGM	11.794	5.619	5.835
Temp. Ref. Meter (°F), Tr	70.0	72.0	72.0
Temperature DGM (°F), Td	78.0	83.0	84.0
Time (min)			
Net Volume Ref. Meter, Vr	11.758	5.529	5.710
Net Volume DGM, Vd	11.794	5.619	5.835
Gas Meter y Factor =	1.005	1.000	0.997
Gas Meter y Factor Deviation (from avg.)	0.004	0.001	0.003
Orifice dH@	N/A	N/A	N/A
Orifice dH@ Deviation (from avg.)	N/A	N/A	N/A

where:

1. Deviation = |Average value for all runs - current run value|

** 2. $y = [Vr \times (y \text{ factor (ref)}) \times (Pb + (Pr/13.6)) \times (Td + 460)] / [Vd \times (Pb + (Pd/13.6)) \times (Tr + 460)]$

** 3. $dH@ = 0.0317 \times Pd / (Pb \times (Td + 460)) \times [(Tr + 460) \times time) / Vr]^2$

* Reference calibration is traceable to NIST through NIST Test # 40674, Kimble ASTM E1272, or NIST traceable laboratory

** Equations come from EPA Method 5

The uncertainty of measurement is ±0.14 ft³/min. This is based on the reference standard having a TAR (Test Accuracy Ratio) of at least 4:1.

Thermal Metering System Calibration
Y Factor

Manufacturer:	Apex Instruments
Model:	XC-60EP
Serial Number:	606002
OMNI Tracking No.:	OMNI-00336
Calibrated Orifice:	☐ Yes

Previous Calibration Comparision

Date	12/3/2014	Acceptable Deviation (5%)	Deviation
y Factor	1.007	0.05035	0.004
Acceptance	Acceptable		

Current Calibration

Acceptable y Deviation	0.020
Maximum y Deviation	0.003
Acceptable dH@ Deviation	N/A
Maximum dH@ Deviation	N/A
Acceptance	Acceptable

Average Gas Meter y Factor	Orifice Meter dH@
1.003	N/A

Calibration Date:	06/04/15	
Calibrated by:	A. Kravitz	
Calibration Frequency:	6 Months	
Next Calibration Due:	~~6/4/2016~~ 12/4/15	
Instrument Range:	1.000	cfm
Standard Temp.:	68	oF
Standard Press.:	29.92	"Hg
Barometric Press., Pb:	30.13	"Hg
Signature/Date:		6/4/15

Reference Standard *			
Standard Calibrator	Model	Standard Test Meter	
	S/N	OMNI-00001	
	Calib. Date	23-Oct-14	
	Calib. Value	0.9985	y factor (ref)

Calibration Parameters	Run 1	Run 2	Run 3
Reference Meter Pressure ("H2O), Pr	0.00	0.00	0.00
DGM Pressure ("H2O), Pd	0.60	1.20	2.01
Initial Reference Meter	950.981	956.241	964.189
Final Reference Meter	956.241	964.189	971.642
Initial DGM	0	0	0
Final DGM	5.281	8.036	7.536
Temp. Ref. Meter (°F), Tr	72.0	73.0	73.0
Temperature DGM (°F), Td	79.0	82.0	84.0
Time (min)			
Net Volume Ref. Meter, Vr	5.260	7.948	7.453
Net Volume DGM, Vd	5.281	8.036	7.536
Gas Meter y Factor =	1.006	1.001	1.003
Gas Meter y Factor Deviation (from avg.)	0.003	0.002	0.001
Orifice dH@	N/A	N/A	N/A
Orifice dH@ Deviation (from avg.)	N/A	N/A	N/A

where:

1. Deviation = |Average value for all runs - current run value|

** 2. $y = [Vr \times (y \text{ factor (ref)}) \times (Pb + (Pr/13.6)) \times (Td + 460)] / [Vd \times (Pb + (Pd/13.6)) \times (Tr + 460)]$

** 3. $dH@ = 0.0317 \times Pd / (Pb\ (Td + 460)) \times [(Tr + 460) \times time) / Vr]^2$

* Reference calibration is traceable to NIST through NIST Test # 40674, Kimble ASTM E1272, or NIST traceable laboratory

** Equations come from EPA Method 5

The uncertainty of measurement is ±0.14 ft^3/min. This is based on the reference standard having a TAR (Test Accuracy Ratio) of at least 4:1.

Certificate of Calibration

Certificate Number: **598198**

JJ Calibrations, Inc.
7007 SE Lake Rd
Portland, OR 97267-2105
Phone 503.786.3005
FAX 503.786.2994

OnSite

0723.01
Calibration

Omni-Test Laboratories
13327 NE Airport Way
Portland, OR 97230

PO: OTL-15-020
Order Date: 07/23/2015
Authorized By: N/A

Property #: OMNI-00023
User: N/A
Department: N/A
Make: Mettler
Model: AE200
Serial #: E17657
Description: Scale, 205g
Procedure: DCN 500818/500887
Accuracy: ±0.0004g ±1 LSD

Calibrated on: 07/23/2015
*Recommended Due: 01/23/2016
Environment: 20 °C 40 % RH
* As Received: Out of Tolerance
* As Returned: Within Tolerance
Action Taken: Adjusted
Technician: 111

Remarks: * Many factors may cause the unit to drift out of calibration before the recommended due date. Any reported error is the absolute value between the reference and the unit. Uncertainties include the effects of the unit.

Standards Used

Std ID	Manufacturer	Model	Nomenclature	Due Date	Trace ID
723A	Rice Lake	1mg-200g (Class O)	Mass Set	10/31/2015	569749

Measurement Data

Parameter / Measurement Description	Range Unit	Reference	Min	Max	*Error	UUT	Uncertainty
Before							Accredited = ✓
Force							
	g	0.00100	0.0005	0.0015	0.0000	0.0010 g	5.7E-04 ✓
	g	0.01000	0.0095	0.0105	0.0000	0.0100 g	5.7E-04 ✓
	g	0.10000	0.0995	0.1005	0.0000	0.1000 g	5.7E-04 ✓
	g	0.50000	0.4995	0.5005	0.0000	0.5000 g	5.7E-04 ✓
	g	1.00000	0.9995	1.0005	0.0000	1.0000 g	5.7E-04 ✓
	g	40.00000	39.9995	40.0005	0.0004	40.0004 g	5.7E-04 ✓
	g	80.00000	79.9995	80.0005	0.0006	80.0006 g	5.7E-04 ✓
	g	120.00000	119.9995	120.0005	0.0009	120.0009 g	5.7E-04 ✓
	g	160.00000	159.9995	160.0005	0.0011	160.0011 g	5.8E-04 ✓
	g	200.00000	199.9995	200.0005	0.0015	200.0015 g	5.7E-04 ✓
After		Reference	Min	Max	*Error		Accredited = ✓
	g	0.00100	0.0005	0.0015	0.0002	0.0008 g	5.7E-04 ✓
	g	0.01000	0.0095	0.0105	0.0002	0.0098 g	5.7E-04 ✓
	g	0.10000	0.0995	0.1005	0.0002	0.0998 g	5.7E-04 ✓
	g	0.50000	0.4995	0.5005	0.0001	0.4999 g	5.7E-04 ✓
	g	1.00000	0.9995	1.0005	0.0001	0.9999 g	5.7E-04 ✓
	g	40.00000	39.9995	40.0005	0.0000	40.0000 g	5.7E-04 ✓
	g	80.00000	79.9995	80.0005	0.0000	80.0000 g	5.7E-04 ✓
	g	120.00000	119.9995	120.0005	0.0001	120.0001 g	5.7E-04 ✓
	g	160.00000	159.9995	160.0005	0.0000	160.0000 g	5.8E-04 ✓
	g	200.00000	199.9995	200.0005	0.0000	200.0000 g	5.7E-04 ✓

Certificate of Calibration

Certificate Number: **547339**

JJ Calibrations, Inc.
7007 SE Lake Rd
Portland, OR 97267-2105
Phone 503.786.3005
FAX 503.786.2994

Omni-Test Laboratories
13327 NE Airport Way
Portland, OR 97230

0723.01
Calibration

PO: OTL-13-035
Order Date: 11/19/2013
Authorized By: N/A

Property #: OMNI-00131
User: N/A
Department: N/A
Make: Ohaus
Model: 500mg
Serial #: 27503
Description: Mass
Procedure: DCN 500901
Accuracy: CLASS F (±0.72mg)

Calibrated on: 12/02/2013
*Recommended Due: 12/02/2018
Environment: 20 °C 34 % RH
As Received: Within Tolerance
As Returned: Within Tolerance
Action Taken: Calibrated
Technician: 34

Remarks: * Any number of factors may cause the calibration item to drift out of calibration before the recommended interval has expired

Refer to attachment for measurement results.

Standards Used

Std ID	Manufacturer	Model	Nomenclature	Due Date	Trace ID
432A	Sartorius	C-44	Microbalance 5.1g	03/11/2014	517747
723A	Rice Lake	1mg-200g (Class 0)	Mass Set	09/05/2014	540048

JJ Calibrations, Inc. certifies that this instrument has been calibrated in accordance with the JJ Calibrations Quality Assurance Manual with the stated procedure using standards that are traceable to the National Institute of Standards and Technology (NIST), or other National Measurement Institutes (NMIs), or by using natural physical constants, intrinsic standards or ratio calibration techniques. The quality system and this certificate are in compliance with ANSI/NCSL Z540-1-1994, ISO/IEC 17025-2005, ISO 10012-1, the ISO 9000 family and QS 9000. The expanded uncertainties of measurements for this calibration are based upon 95% (2 sigma) confidence limits. Unless otherwise stated, a test accuracy ratio (TAR) of 4:1, if achievable, is maintained. The results reported herein apply only to the calibration of the item described above. This report may not be reproduced, except in full, without prior written consent of JJ Calibrations, Inc.
JJ Calibrations, Inc. quality system has been assessed and accredited to ISO/IEC 17025:2005.

Reviewer

3 Issued 12/06/2013 Rev # 14

Inspector

OMNI Environmental Services, Inc.
OMNI-Test Laboratories, Inc.

SCALE WEIGHT CALIBRATION DATA SHEET

Weight to be calibrated: 10 lb

ID Number: 132

Standard Calibration Weight: 10 lb

ID Number: 256

Scale Used: MTW-150K

ID Number: 353

Date: 2/19/13 By: A. Kravitz

Standard Weight (A) (Lb.)	Weight Verified (B) (Lb.)	Difference (A - B)	% Error
10.0	10.0	0.0	Ø

*Acceptable tolerance is 1%.

This calibration is traceable to NIST using calibrated standard weights.

Technician signature: [signature] Date: 2/19/13

Established 1974

QUALITY CONTROL SERVICES

LABORATORY EQUIPMENT • SALES • SERVICE • CALIBRATION • REPAIRS
2340 SE 11TH Ave. Portland, Oregon 97214 • Box 14831 Portland, Oregon 97293
(503) 236-2712 • FAX (503) 235-2535 • www.qc-services.com

ACCREDITED
Calibration Services
Certificate Number: 1550.01
Laboratory code: 115953

OMNI-Test Laboratories, Inc.
13327 NE Airport Way
Portland, OR 97230

Report Number: OMNE0321676151027

A2LA ACCREDITED
CERTIFICATE OF CALIBRATION WITH DATA

INSTRUMENT INFORMATION

Item	Make	Model	Serial Number	Customer ID	Location
Scale	Weigh-Tronix	WI-127	21676	185	Lab
Units	**Readability**	**SOP**	**Cal Date**	**Last Cal Date**	**Cal Due Date**
lbs	0.2	QC033	10/27/15	N/A	10/2016

FUNCTIONAL CHECKS

SHIFT TEST	LINEARITY	REPEATABILITY	ENVIRONMENTAL CONDITIONS
Test Wt: 300 Tol: 0.4	Test Wt: HB44 Tol: HB44	Test Wt: 500 Tol: 0.2	☐ Good ☑ Fair ☐ Poor
As-Found: Pass:☑ Fail:☐	As-Found: Pass:☑ Fail:☐	As-Found: Pass:☑ Fail:☐	Temperature: 18.8°C
As-Left: Pass:☑ Fail:☐	As-Left: Pass:☑ Fail:☐	As-Left: Pass:☑ Fail:☐	

CALIBRATION DATA

Standard	As-Found	As-Left	Expanded Uncertainty
1000	1000.0	1000.0	0.16
700	700.0	700.0	0.16
500	500.0	500.0	0.13
200	200.0	200.0	0.13
100	100.0	100.0	0.11
50	50.0	50.0	0.11

CALIBRATION STANDARDS

Item	Make	Model	Serial Number	Cal Date	Cal Due Date	NIST ID
Avoirdupois Cast W	Rice Lake	25 and 50lb	PWO990-CA	10/28/13	10/2015	34XX

Permanent Information Concerning this Equipment:

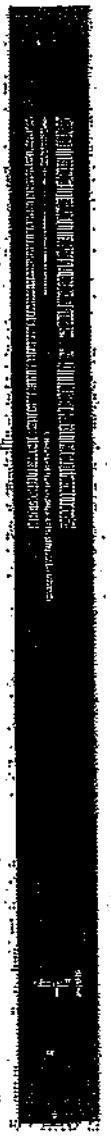
Comments/Information Concerning this Calibration

Report prepared/reviewed by: J. Colacchio **Date:** 10/27/15 **Technician:** J. Colacchio **Signature:**

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 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.

PT ID: OMNE03

Member: National Conference of Standards Laboratories and Weights & Measures



458 National Weather Service Type

Instruction Booklet

for use with

PRINCO

Fortin type mercurial

Barometers

468 NOVA Exhibition Model

Manufactured by

PRINCO INSTRUMENTS, INC.
1020 Industrial Blvd.
Southampton, Pa. 18966-4095
U.S.A.

Phone: 215 355-1500
Fax: 215 355-7766

Tape Measure Calibration Log

Place the calibrated 12" ruler under the tape measure and verify that each ½" (i.e. 1.5", 2", 2.5") between 0 and 36" is within 1/8".

CALIBRATED USING OMNI - 00281

Tape Measure Number	Description	Cal Dates				Technician Initials			
00296 - T32	Stanley FatMax 16'	7/25/12	7/2/13	7/8/14		JC	JC	JC	
00296 - T51	Ace 26' Tape Measure	9/7/12	9/13/13	9/22/14		JC	JC	JC	
-T52	Stanley PowerLock 26'	9/7/12	9/13/13	9/22/14		JC	JC	JC	
-T53	Stanley PowerLock 16'	9/7/12				JC			
-T11	Stanley intermatic Tape Measure (cm)	11/30/12	3/28/14			JC	JC		
-T21	MTH Tape Measure (cm)	11/30/12	11/21/13			JC	JC		
-T30	Workforce Tape Measure	11/30/12				JC			
-T31	Stanley Powerlock Tape Measure	11/30/12	11/21/13	11/18/14		JC	JC	JC	
-T47	Workforce Tape Measure	11/30/12	11/21/13	11/26/14		JC	JC	JC	
-T36	Stanley FatMax 16' Tape Measure	11/30/12	11/21/13	11/18/14		JC	JC	JC	
~~-T42~~ -T40	Stanley FatMax 16' Tape Measure	11/30/12	11/21/13	11/18/14		JC	JC	JC	
-T54	DeWalt 16' Tape Measure	12/20/12	12/17/13			JC	JC		
-T55	DeWalt 16' Tape Measure	12/20/12	12/18/13			JC	JC		
-T56	DeWalt 25' Tape Measure	12/20/12	12/17/13	12/16/14		JC	JC	JC	
-T57	DeWalt 25' Tape Measure	12/20/12	12/17/13	12/16/14		JC	JC	JC	
-T58	DeWalt 25' Tape Measure	12/20/12	12/17/13	12/16/14		JC	JC	JC	
-T59	DeWalt 25' Tape Measure	12/20/12	12/17/13	12/16/14		JC	JC	JC	
-T42	Stanley PowerLock 26' Tape Measure	11/21/13	11/18/14			JC	JC		

Certificate of Calibration

Certificate Number: **580819**

JJ Calibrations, Inc.
7007 SE Lake Rd
Portland, OR 97267-2105
Phone 503.786.3005
FAX 503.786.2994

0723.01
Calibration

Omni-Test Laboratories
13327 NE Airport Way
Portland, OR 97230

PO: OTL-15-001
Order Date: 01/09/2015
Authorized By: N/A

Property #: OMNI-00291
User: N/A
Department: N/A
Make: Omega
Model: RH82
Serial #: 9190156
Description: Thermohygrometer
Procedure: DCN 401013/403410
Accuracy: Refer to Mfg. Specs.

Calibrated on: 01/20/2015
*Recommended Due: 01/20/2016
Environment: 21 °C 40 % RH
* As Received: Within Tolerance
* As Returned: Within Tolerance
Action Taken: Calibrated
Technician: 112

Remarks: * Many factors may cause the unit to drift out of calibration before the recommended due date. Any reported error is the absolute value between the reference and the unit. Uncertainties include the effects of the unit.

Standards Used

Std ID	Manufacturer	Model	Nomenclature	Due Date	Trace ID
464A	General Eastern	M4-RH/D2	HUMIDITY STANDARD	12/14/2015	577811
497A	Hart Scientific	1502A	Precision Digital Thermometer	08/11/2015	568028
601A	Burns Engineering	200G05B085	INDUSTRIAL PRT	02/11/2016	554126

Measurement Data

Parameter / Measurement Description	Range Unit	Reference	Min	Max	Error	UUT	Uncertainty Accredited = ✓
Before/After							
Relative Humidity							
	%	20.00	17.0	23.0	1.8	21.8 %	5.8E-01 ✓
	%	50.00	47.0	53.0	0.7	50.7 %	5.8E-01 ✓
	%	80.00	77.0	83.0	0.5	79.5 %	5.8E-01 ✓
Temperature							
	°C	5.40	4.4	6.4	0.2	5.2 °C	8.1E-02 ✓
	°C	19.10	18.1	20.1	0.2	18.9 °C	8.1E-02 ✓

JJ Calibrations, Inc. certifies that this instrument has been calibrated in accordance with the JJ Calibrations Quality Assurance Manual with the stated procedure using standards that are traceable to the National Institute of Standards and Technology (NIST), or other National Measurement Institutes (NMI's), or by using natural physical constants, intrinsic standards or ratio calibration techniques. The quality system and this certificate are in compliance with ANSI/NCSL Z540-1-1994, ISO/IEC 17025-2005, ISO 10012-1, the ISO 9000 family and QS 9000. The expanded uncertainties of measurements for this calibration are based upon 95% (2 sigma) confidence limits. Unless otherwise stated, a test accuracy ratio (TAR) of 4:1, if achievable, is maintained. The results reported herein apply only to the calibration of the item described above. This report may not be reproduced, except in full, without prior written consent of JJ Calibrations, Inc.
JJ Calibrations, Inc. quality system has been assessed and accredited to ISO/IEC 17025:2005.

Reviewer

3 Issued 01/21/2015 Rev # 16

Inspector

OMNI Environmental, Inc.
OMNI-Test Laboratories, Inc.

WOOD MOISTURE CONTENT CALIBRATION WORKSHEET

Moisture Content Standard OMNI ID #: 00432

Reference Moisture Content Standard: **OMNI # 00430**

Date	Temp.	Barometric Pressure	Fixed Moisture %	Fixed Moisture %	Observed Moisture %		Initials
6/11/10	70	30.44	22%	12%	22.0	12.0	
9/14/10	70	30.12	22%	12%	22.0	12.0	
2/14/11	70	29.7	22%	12%	23.8	12.3	
8/10/11	85	29.2	22%	12%	22%/12%	22%/12%	
11/29/11	66°	~~34.0~~ 30.4	22%	12%	22.0	12.5	
9/19/2012	74	30.20	22%	12%	22.0 %	12.0 %	dc
12/31/2012	67 °F	30.25 in Hg	22%	12%	22.0 %	12.0 %	dc
3/28/2013	71 °F	30.10 in Hg	22%	12%	22.0 %	12.0 %	dc
6/25/2013	82 °F	30.14 in Hg	22%	12%	22.0 %	12.0 %	dc
9/19/2013	75 °F	29.95 in Hg	22%	12%	22.0 %	12.0 %	dc
12/17/2013	70 °F	30.29 in Hg	22%	12%	22.0 %	12.0 %	dc
3/13/2014	65.0 °F	30.23 in Hg	22%	12%	22.0 %	12.0 %	dc
7/2/2014	77.5 °F	30.04 in Hg	22%	12%	22.0 %	12.0 %	dc
10/2/2014	66.0 °F	30.08 in Hg	22%	12%	22.0 %	12.0 %	dc
12/31/2014	71 °F	30.56 in Hg	22%	12%	22.0 %	12.0 %	dc
4/3/2015	72 °F	30.30 in Hg	22%	12%	22.0 %	12.0 %	dc
6/29/2015	79 °F	30.10 in Hg	22%	12%	22.0 %	12.0 %	dc
			22%	12%			

Notes: _____

Technician signature: _____ Date: 12/31/2012

PRAXAIR

Praxair
5700 South Alameda Street
Los Angeles, CA 90058
Tel: (323) 585-2154 Fax:(714) 542-6689
PGVPID: F22015

DocNumber: 000081344

CERTIFICATE OF ANALYSIS / EPA PROTOCOL GAS

Customer & Order Information:

PRAXAIR WHSE VANCOUVER WA
603 SE VICTORY AVE
VANCOUVER WA 986610

Praxair Order Number: 31502729
Customer P. O. Number: 05574704
Customer Reference Number:

Fill Date: 6/15/2015
Part Number: NI CD17CO8E-AS
Lot Number: 109516802
Cylinder Style & Outlet: AS CGA 590
Cylinder Pressure & Volume: 2000 psig 140 cu. ft.

Certified Concentration:

Expiration Date:	6/26/2023	NIST Traceable
Cylinder Number:	CC350241	Analytical Uncertainty:
16.89 %	CARBON DIOXIDE	± 0.3 %
4.29 %	CARBON MONOXIDE	± 0.4 %
16.94 %	OXYGEN	± 0.3 %
Balance	NITROGEN	

Certification Information: *Certification Date:* 6/26/2015 *Term:* 96 Months *Expiration Date:* 6/26/2023

This cylinder was certified according to the 2012 EPA Traceability Protocol, Document #EPA-600/R-12/531, using Procedure G1. Do Not Use this Standard if Pressure is less than 100 PSIG.

O2 responses have been corrected for CO2 interference.

Analytical Data: *(R=Reference Standard, Z=Zero Gas, C=Gas Candidate)*

1. Component: CARBON DIOXIDE

Requested Concentration: 17 %
Certified Concentration: 16.89 %
Instrument Used: Horiba VIA-510 S/N 2907014
Analytical Method: NDIR
Last Multipoint Calibration: 6/15/2015

First Analysis Data:						Date:	6/26/2015
Z:	0	R:	17.89	C:	16.89	Conc:	16.89
R:	17.89	Z:	0	C:	16.88	Conc:	16.88
Z:	0	C:	16.89	R:	17.89	Conc:	16.89
UOM:	%			Mean Test Assay:			16.887 %

Reference Standard Type: GMIS
Ref. Std. Cylinder # : SA14543
Ref. Std. Conc: 17.89%
Ref. Std. Traceable to SRM # : 1675b
SRM Sample # : 6-F-51
SRM Cylinder # : CAL014538

Second Analysis Data:						Date:	
Z:	0	R:	0	C:	0	Conc:	0
R:	0	Z:	0	C:	0	Conc:	0
Z:	0	C:	0	R:	0	Conc:	0
UOM:	%			Mean Test Assay:			0 %

2. Component: CARBON MONOXIDE

Requested Concentration: 4.25 %
Certified Concentration: 4.29 %
Instrument Used: Horiba VIA-510 S/N U89UCSYX
Analytical Method: NDIR
Last Multipoint Calibration: 6/5/2015

First Analysis Data:						Date:	6/26/2015
Z:	0	R:	3.96	C:	4.3	Conc:	4.293
R:	3.97	Z:	0	C:	4.3	Conc:	4.293
Z:	0	C:	4.3	R:	3.97	Conc:	4.293
UOM:	%			Mean Test Assay:			4.293 %

Reference Standard Type: GMIS
Ref. Std. Cylinder # : CC257812
Ref. Std. Conc: 3.96%
Ref. Std. Traceable to SRM # : 2641a
SRM Sample # : 59-C-02
SRM Cylinder # : FF13690

Second Analysis Data:						Date:	
Z:	0	R:	0	C:	0	Conc:	0
R:	0	Z:	0	C:	0	Conc:	0
Z:	0	C:	0	R:	0	Conc:	0
UOM:	%			Mean Test Assay:			0 %

PRAXAIR

Praxair
5700 South Alameda Street
Los Angeles, CA 90058
Tel: (323) 585-2154 Fax:(714) 542-6689
PGVPID: F22015

DocNumber: 000081344

CERTIFICATE OF ANALYSIS / EPA PROTOCOL GAS

3. Component: OXYGEN

Requested Concentration: 17 %
Certified Concentration: 16.94 %
Instrument Used: OXYMAT 5E
Analytical Method: PARAMAGNETIC
Last Multipoint Calibration: 6/5/2015

Reference Standard Type: GMIS
Ref. Std. Cylinder # : SA16022
Ref. Std. Conc: 19.90%
Ref. Std. Traceable to SRM # : 2659a
SRM Sample # : 71-E-19
SRM Cylinder # : FF22331

First Analysis Data: Date: 6/26/2015

Z:	0	R:	19.9	C:	16.94	Conc:	16.94
R:	19.9	Z:	0	C:	16.95	Conc:	16.95
Z:	0	C:	16.94	R:	19.9	Conc:	16.94

UOM: % Mean Test Assay: 16.943 %

Second Analysis Data: Date:

Z:	0	R:	0	C:	0	Conc:	0
R:	0	Z:	0	C:	0	Conc:	0
Z:	0	C:	0	R:	0	Conc:	0

UOM: % Mean Test Assay: 0 %

Analyzed by: Ying Yu

Certified by: Jack Fu

OMNI Environmental, Inc.
OMNI-Test Laboratories, Inc.

NIST Stopwatch Calibration, Time Proficiency Testing Procedure and Data Sheet

Date: 2/12/15 User/Technician: J. Clark ☑ Pass ☐ Fail

NIST traceable stopwatch *OMNI* tracking number: OMNI-00292 Last Cal: 12/16/14

Stopwatch to be tested for time proficiency *OMNI* tracking number: OMNI-00439

1. Start the NIST traceable stopwatch: at a predetermined time (i.e. 1.00 minutes), the technician shall start the watch being tested. When 15.00 seconds have passed (i.e. the NIST traceable stopwatch reads 1 minute, 15 seconds), the technician shall stop the watch being tested. Record the target time interval (i.e. 15.00 seconds). Repeat this step twice and record the data.

2. Repeat step #1 for each of the following target time intervals: 30.00 seconds, 10.00 minutes, and 30 minutes.

3. If the delta between the target time and measured time is less than 5% of the target time interval or 2.00 seconds (whichever is less), then the technician has demonstrated proficiency with the specific instrument utilized in the proficiency test. The proficiency is valid for a period of 12 months.

4. Archive the proficiency test data and information, including the effective date and expiration date of the proficiency, in the equipment record for the instrument involved.

Target time: 15.00 seconds	#1 Measured time:	14.99	#2 Measured time:	14.99	#3 Measured time:	14.99
Target time: 30.00 seconds	#1 Measured time:	30.01	#2 Measured time:	30.03	#3 Measured time:	29.96
Target time: 45.00 seconds	#1 Measured time:	44.98	#2 Measured time:	44.96	#3 Measured time:	45.02
Target time: 60.00 seconds	#1 Measured time:	59.99	#2 Measured time:	59.99	#3 Measured time:	59.97
Target time: 10.00 minutes	#1 Measured time:	10.00.00	#2 Measured time:	9.59.95	#3 Measured time:	9.59.99
Target time: 30.00 minutes	#1 Measured time:	29.59.98	#2 Measured time:	29.59.98	#3 Measured time:	30.00.03

The uncertainty of measurement is ±1 sec. This is based on the reference standard having a TAR (Test Accuracy Ratio) of at least 4:1.

This calibration procedure is confirmed by the manufacturer as a proper method for evaluating the accuracy of timers.

Technician Signature: _____ Date: 2/16/15

Reviewed by: M. Morgan Date: 2-17-15

Thermal Metering System Calibration
Y Factor

Manufacturer:	Apex
Model:	XC-60A-ED-OMNI
Serial Number:	906014
OMNI Tracking No.:	OMNI-00428B
Calibrated Orifice:	☐ Yes

Average Gas Meter y Factor	Orifice Meter dH@
0.988	N/A

Calibration Date:	08/27/15	
Calibrated by:	B. Davis	
Calibration Frequency:	6 Months (Logger only)	
Next Calibration Due:	2/27/2016	
Instrument Range:	1.000	cfm
Standard Temp.:	68	oF
Standard Press.:	29.92	"Hg
Barometric Press., Pb:	30.11	"Hg
Signature/Date:		

Previous Calibration Comparision

		Acceptable Deviation (5%)	Deviation
Date	7/7/2015		
y Factor	0.996	0.0498	0.008
Acceptance	Acceptable		

Current Calibration

Acceptable y Deviation	0.020
Maximum y Deviation	0.004
Acceptable dH@ Deviation	N/A
Maximum dH@ Deviation	N/A
Acceptance	Acceptable

Reference Standard *			
Standard Calibrator	Model	Standard Test Meter	
	S/N	OMNI-00001	
	Calib. Date	23-Oct-11	
	Calib. Value	0.9985	y factor (ref)

Calibration Parameters	Run 1	Run 2	Run 3
Reference Meter Pressure ("H2O), Pr	0.00	0.00	0.00
DGM Pressure ("H2O), Pd	3.60	1.80	0.90
Initial Reference Meter	204.1	217.152	222.244
Final Reference Meter	210.909	222.202	229.607
Initial DGM	0	0	0
Final DGM	6.803	5.093	7.488
Temp. Ref. Meter (°F), Tr	80.0	81.0	84.0
Temperature DGM (°F), Td	80.0	83.0	86.0
Time (min)	35.0	39.0	87.0
Net Volume Ref. Meter, Vr	6.809	5.050	7.363
Net Volume DGM, Vd	6.803	5.093	7.488
Gas Meter y Factor =	**0.991**	**0.989**	**0.983**
Gas Meter y Factor Deviation (from avg.)	0.003	0.002	0.004
Orifice dH@	**N/A**	**N/A**	**N/A**
Orifice dH@ Deviation (from avg.)	N/A	N/A	N/A

where:

1. Deviation = |Average value for all runs - current run value|

** 2. y = [Vr x (y factor (ref)) x (Pb + (Pr/ 13.6)) x (Td + 460)]/ [Vd x (Pb + (Pd / 13.6)) x (Tr + 460)]

** 3. dH@ = 0.0317 x Pd / (Pb (Td + 460)) x [(Tr + 460) x time) / Vr]^2

* Reference calibration is traceable to NIST through NIST Test # 40674, Kimble ASTM E1272, or NIST traceable laboratory

** Equations come from EPA Method 5

The uncertainty of measurement is ±0.14 ft^3/min. This is based on the reference standard having a TAR (Test Accuracy Ratio) of at least 4:1.

Angle Finder Calibration Interval Adjustment

Equipment Number: OMNI-00348

It has been determined via the calibration history (see table below) that the calibration interval for this instrument shall be increased from 12 months to 36 months.

OMNI-00348	
Calibration Date	Average Variance Across Range
8/29/2006	0
8/29/2007	0
11/7/2008	0
11/9/2009	0
11/1/2010	0
12/6/2011	0
2/14/2013	0

Signature: _____

Date: 6/17/2014

Example Calculations

Equations and Sample Calculations – ASTM E2779 & E2515

Manufacturer:	Valley Comfort
Model:	Sirocco SC25 Insert
Run:	2
Category:	2

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_{Sdb} – Weight of test fuel spacers, dry basis, kg

M_{Cdb}– Weight of test fuel crib, excluding nails and spacers, dry basis, kg

D_{Cdb} - Density of fuel crib, excluding spacers and nails, dry basis, lbs/ft^3

M_{FTAdb} - Total weight of fuel crib excluding nails, dry basis, kg

BR – Dry burn rate, kg/hr

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 standard conditions, g/dscf

E_T – Total particulate emissions, g

PR - Proportional rate variation

PM_R – Particulate emissions for test run, g/hr

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

M_{Sdb} – Weight of test fuel spacers, dry basis, kg
ASTM E2780 equation (1)

$$M_{Sdb} = (M_{Swb})(100/(100 + FM_S))$$

Where,

FM_S = average fuel moisture of test fuel spacers, % dry basis

M_{Swb} = weight of test fuel spacers, wet basis, kg

Sample Calculation:

FM_S = 17.7 %

M_{Swb} = 1.7 lbs

0.4536 = Conversion factor from lbs to kg

M_{Sdb} = [(1.7 x 0.4536) (100/(100 + 17.7)

M_{Sdb} = **0.7** kg

M_{Cdb}– Weight of test fuel crib, excluding nails and spacers, dry basis, kg
ASTM E2780 equation (2)

$$M_{Cdb} = \Sigma[(M_{CPnwb})(100/(100 + FM_{CPn}))]$$

Where,

M_{CPnwb} = weight of each test fuel piece n in fuel crib, excluding nails and spacers, wet basis, kg

FM_{CPn} = Average fuel moisture of test fuel n in fuel crib, % dry basis

Sample Calculation (test fuel piece 1):

MC_{Pnwb} = 1.9

FM_{CPn} = 20.5

= 1.9 (100/(100+ 20.5)

= 1.6 lbs

Total crib weight, excluding spacer 11.18 lbs

M_{Cdb} = **5.07** kg

D_{Cdb} - Density of fuel crib, excluding spacers and nails, dry basis, lbs/ft^3
ASTM E2780 equation (3)

$$D_{Cdb} = M_{Cdb}/V_C$$

Where,

V_C = Volume of fuel crib, ft^3

Sample calculation:

V_C = 684.3 in^3

1728 = conversion from in^3 to ft^3

D_{Cdb} = 11.18 / 684 * 1728

= **28.22** lbs/ft^3

M_{FTAdb} - Total weight of fuel crib excluding nails, dry basis, kg
ASTM E2780 equation (4)

$$M_{FTAdb} = M_{Sdb} + M_{Cdb}$$

Sample calculation:

$$M_{FTAdb} = 0.66 + 5.07$$

$$= \mathbf{5.72} \text{ kg}$$

BR – dry burn rate, kg/hr
ASTM E2780 equation (5)

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

Where,

θ = Total length of test run, min

Sample Calculation:

M_{Bdb} = 5.72 kg

θ = 380 min

$$BR = \frac{60 \times 5.72}{380}$$

BR = **0.90** kg/hr

V_s – Average gas velocity in the dilution tunnel, ft/sec
ASTM E2515 equations (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 center of tunnel pitot tube placement, Fp = $\frac{V_{strav}}{V_{scent}}$, ASTM E2515 Equation (1)
v_{scent}	=	Dilution tunnel velocity calculated after the multi-point pitot traverse at the center, ft/sec
v_{strav}	=	Dilution tunnel velocity calculated after the multi-point pitot traverse, ft/sec
k_p	=	Pitot tube constant, 85.49
C_p	=	Pitot tube coefficient: 0.99, unitless
ΔP*	=	Velocity pressure in the dilution tunnel, in H_2O
T_s	=	Absolute average gas temperature in the dilution tunnel, °R; (°R = °F + 460)
P_s	=	Absolute average gas static pressure in diltuion tunnel, = P_{bar} + P_g , in Hg
P_{bar}	=	Barometric pressure at test site, in. Hg
P_g	=	Static pressure of tunnel, in. H_20; (in Hg = in H_20/13.6)
M_s	=	**The dilution tunnel wet molecular weight; M_s = 28.78 assuming a dry weight of 29 lb/lb-mole

Sample calculation:

$$Fp = \frac{18.26}{19.89} = 0.918$$

$$V_s = 0.918 \times 85.49 \times 0.99 \times 0.300 \times \left(\frac{80.8 + 460}{\left(30.19 + \frac{-0.35}{13.6}\right) \times 28.78} \right)^{1/2}$$

V_s = **18.39** 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 Ms as the dry molecular weight. It should be the wet molecular weight as indicated in EPA Method 2.

Q_{sd} – Average gas flow rate in dilution tunnel, dscf/hr
ASTM E2515 equation (3)

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

Where:

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

Sample calculation:

$$Q_{sd} = 3600 \times (1 - 0.02) \times 18.39 \times 0.196 \times \frac{528}{80.8 + 460} \times \frac{30.2 + \frac{-0.35}{13.6}}{29.92}$$

Q_{sd} = **12543.6** dscf/hr

$V_{m(std)}$ – Volume of Gas Sampled Corrected to Dry Standard Conditions, dscf
ASTM E2515 equation (6)

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

Where:

K_1 = 17.64 °R/in. Hg

) V_m = Volume of gas sample measured at the dry gas meter, dcf

Y = Dry gas meter calibration factor, dimensionless

P_{bar} = Barometric pressure at the testing site, in. Hg

ΔH = Average pressure differential across the orifice meter, in. H_2O

T_m = Absolute average dry gas meter temperature, °R

Sample Calculation:

Using equation for Train 1:

$$V_{m(std)} = 17.64 \times 60.975 \times 1.001 \times \frac{\left(30.19 + \frac{1.28}{13.6}\right)}{(82.6 + 460)}$$

$V_{m(std)}$ = **60.100** dscf

Using equation for Train 2:

$$V_{m(std)} = 17.64 \times 60.907 \times 1.003 \times \frac{\left(30.19 + \frac{1.07}{13.6}\right)}{(82.2 + 460)}$$

$V_{m(std)}$ = **60.164** dscf

Using equation for ambient train:

$$V_{m(std)} = 17.64 \times 62.90 \times 0.988 \times \frac{\left(\underline{30.19} + \frac{0.00}{13.6}\right)}{(72.7 + 460)}$$

$V_{m(std)}$ = **62.140** 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 1 (first hour):

m_n = 0.4 + 0.9 + 0.0

m_n = 1.3 mg

Using equation for Train 1 (post-first hour):

m_n = 0.1 + 0.4 + 0.0

m_n = 0.5 mg

Train 1 aggregate:

m_n = 1.3 + 0.5

m_n = **1.8** mg

Using equation for Train 2:

m_n = 0 + 1.4 + 0

m_n = **1.4** mg

C_s - Concentration of particulate matter in tunnel gas, dry basis, corrected to standard condition
ASTM E2515 equation (13)

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

Where:

K_2	=	Constant, 0.001 g/mg
m_n	=	Total mass of particulate matter collected in the sampling train, mg
$V_{m(std)}$	=	Volume of gas sampled corrected to dry standard conditions, dscf

Sample calculation:

For Train 1:

$$C_s = 0.001 \times \frac{1.8}{60.10}$$

C_s = **0.00003** g/dscf

For Train 2

$$C_s = 0.001 \times \frac{1.4}{60.16}$$

C_s = **0.00002** g/dscf

For Ambient Train

$$C_r = 0.001 \times \frac{0.0}{62.14}$$

C_r = **0.000000** g/dscf

ıs, g/dsc E_T – Total Particulate Emissions, g

ASTM E2515 equation (15)

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

Where:

C_s	=	Concentration of particulate matter in tunnel gas, g/dscf
C_r	=	Concentration particulate matter room air, g/dscf
Q_{std}	=	Average dilution tunnel gas flow rate, dscf/hr
θ	=	Total time of test run, minutes

Sample calculation:

For Train 1

E_T = (0.000030 - 0.000000) x 12543.6 x 380 /60

E_T = 2.38 g

For Train 2

E_T = (0.000023 - 0.000000) x 12543.6 x 380 /60

E_T = 1.85 g

Average

E = 2.11 g

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

7.5% of the average = 0.16

Train 1 difference = 0.27

Train 2 difference = 0.27

PR - Proportional Rate Variation
ASTM E2515 equation (16)

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

Where:

θ = Total sampling time, min

θ_i = Length of recording interval, 10 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, ^oR

T_m = Absolute average dry gas meter temperature, ^oR

T_{si} = Absolute average gas temperature in the dilution tunnel during the "ith" time int

T_s = Absolute average gas temperature in the dilution tunnel, ^oR

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

$$PR = \left(\frac{380 \times 1.602 \times 18.39 \times (75.0 + 460) \times (82.6 + 460)}{10 \times 60.98 \times 18.30 \times (80.8 + 460) \times (72.0 + 460)} \right) \times$$

PR = 101 %

PM_R – Particulate emissions for test run, g/hr
ASTM E2780 equation (6)

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

Where,

E_T = Tota particulate emissions, grams

θ = Total length of full intergrated test run, min

Sample Calculation:

E_T (Dual train average) = 2.11 g

θ = 380 min

$PM_R = 60$ x (2.11 / 380)

erval, ^oR

PM_R = **0.33** g/hr

100

PM_F – Particulate emission factor for test run, g/dry kg of fuel burned
ASTM E2780 equation (7)

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

Sample Calculation:

E_T (Dual train average) = 2.11 g

M_{Bdb} = 5.72 kg

PM_F = 2.11 / 5.72

PM_F = **0.37** g/kg

Section 5

Labeling & Owner's Manual

SN -

Tested & Listed By O-T-L Portland Oregon USA C US

OMNI-Test Laboratories, Inc.

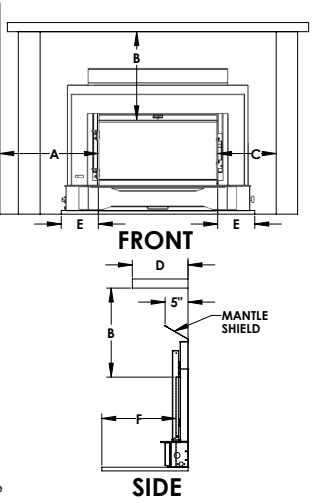
Report #0142WN016E

SIROCCO INSERT - Encastrable Sirocco

BLAZE KING CATALYST STOVE - POÊLE À BOIS ENCASTRABLE
Room heater, solid fuel type. / Appareil de chauffage approuvé pour type de carburant solide.
MODEL / MODÈLE: SC25
Tested to / Testé pour: UL 1482 / ULC S628-93
CERTIFIED IN BOTH UNITED STATES AND CANADA / CERTIFIÉ POUR LES ÉTATS-UNIS ET LE CANADA

PREVENT HOUSE FIRES - Install and use only in accordance with Blaze King's installation and operation instructions. Install and use in a code complying fireplace only. Contact local building or fire officials about restrictions and installation inspection in your area. Stainless steel flue liner is required in Canada and recommended in the United States.
PRÉVENTION DES INCENDIES: SI CE POÊLE ENCASTRABLE N'EST PAS CORRECTEMENT INSTALLÉ, UN INCENDIE PEUT SE PRODUIRE. POUR RÉDUIRE LE RISQUE D'INCENDIE, SUIVRE LES INSTRUCTIONS D'INSTALLATIONS. Ce poêle encastrable convient à l'installation pour l'un ou l'autre: Un poêle encastrable construit en usine approuvé à l'UL 127 ou à l'ULC S628-93. Une cheminée de maçonnerie est approuvée avec une gaine en acier inoxydable. Obligatoire au Canada, recommandé aux États-Unis.

Minimum clearances to combustibles, measured from firebox door flange/ Dégagements minimum requis entre l'appareil à tout matériau combustible à partir chambre à combustion au rebord de porte		
A	Side of door flange to combustible wall. / Du côté du rebord de l'ouverture de porte à tout mur combustible.	13.5" 343 mm
B	Top of door flange to bottom of mantel and combustible facing. (with mantle shield.) / Du dessus du rebord de l'ouverture de porte au bas du manteau et de toute façade combustible. (avec manteau avec protection)	38" / 966 mm (24" / 610 mm)
C	Side of door flange to side combustible facing. / Du côté du rebord de l'ouverture de la porte à toute surface de côté combustible.	10" 254 mm
D	Mantle width maximum. (with mantle shield) / Largeur maximum du manteau. (avec manteau avec protection)	12" / 305 mm (8" / 204 mm)
E	Minimum hearth side extension * / Extension latérale minimum du foyer	8"*
F	Mimimum hearth front extension / Extension frontale minimum du foyer	16" USA 18" CANADA



*** Measured from each side of the fuel loading and ash removal openings / Mesuré à partir de chaque côté de l'ouverture de la porte de chargement et du tiroir de cendre**

FLOOR PROTECTION / PROTECTION DU PLANCHER:
A non-combustible floor protection is required for all installations extending 16" (in USA) or 18" (in Canada) in front of the door and extending 8" to either side of the door opening. In addition to the above requirement that portion of the insert which extends out in front of the fireplace hearth must have a minimum of 1" vertical distance to any combustible material.

Une protection non combustible de plancher est exigée pour toutes les installations se prolongeant de 18" devant la porte et se prolongeant de 8'' à l'un ou l'autre des côtés de l'ouverture de la porte. De plus, la partie du poêle encastrable qui se prolonge au- devant du foyer doit avoir un minimum de 1" de distance verticale de n'importe quel matériau combustible.

Electrical rating: (115 VAC, 60 Hz, 0.58 Amps. Risk of electrical shock. Disconnect power before servicing unit. Do not route power cord in front of or beneath heater). Do not remove bricks or mortar in masonry fireplace. Do not use grate or elevate fire. INSPECT AND CLEAN CHIMNEY FREQUENTLY.
U.S. ENVIRONMENTAL PROTECTION AGENCY - 2015 Standard - certified to comply with 2015 particulate emission standards (EPA test methods 28R and 5G with an emission-rate of 0.90 g/hr). Not approved for sale after May 15, 2020. This wood heater needs periodic inspection and repair for proper operation. Consult the owner's manual for further information. It is against federal regulations to operate this wood heater in a manner inconsistent with the operating instructions in the owner's manual, or if the catalytic element is deactivated or removed. *ONLY OPERATE WITH DOORS CLOSED. Open door to feed fire ONLY. *DO NOT OBSTRUCT COMBUSTION AIR OPENINGS. For Use With Solid Wood Fuel Only - Do not burn other fuels, this may make the catalyst in the combustor inactive. The performance of the catalytic device or its durability has not been evaluated as part of the certification. Metal combustor part number: 115.0335. Provide adequate outside air for combustion. *Replace with only ceramic glass, 5 mm. Thickness.

Estimation électrique: (115 VAC, 60 Hz, 0.58 Amps. Risque d'électrocution débrancher le courant avant de réparer l'unité. Ne pas faire courir le fil l'alimentation en avant ou en dessous de l'appareil de chauffage). Ne pas utiliser une grille pour surélever le feu, établir le feu directement sur les briques dans le fond du poêle. Inspecter et nettoyer VOTRE CHEMINÉE fréquemment.
AGENCE DE PROTECTION DE L'ENVIRONNEMENT U.S.- STANDARD 2015 – certifie conformément aux normes standard d'émissions de particules 2015 (Méthodes de test 28R et 5G EPA avec un taux d'émission de 0.90 gr/hre). Non approuvé pour la vente après le 15 mai 2020. Cet appareil de chauffage au bois nécessite des inspections périodiques et des réparations pour un fonctionnement adéquat. Consulter le manuel du propriétaire pour plus d'informations. Il est contre les règlements fédéraux de faire fonctionner cet appareil de chauffage à l'encontre des instructions d'utilisation fournies dans le manuel du propriétaire, ou si l'élément catalytique a été enlevé ou désactivé. *UTILISER L'appareil UNIQUEMENT AVEC LES PORTES FERMÉES. Ouvrir la porte SEULEMENT pour alimenter le feu. *NE PAS OBSTRUER L'ENTRÉE D'AIR DE COMBUSTION. Fournir l'apport d'air extérieur adéquat pour alimenter la combustion. Utiliser uniquement avec des combustibles solides - ne pas brûler aucun autre combustible, ce qui pourrait désactiver le catalyseur de la chambre à combustion. La performance du catalyseur ou sa longévité n'a pas été évaluée dans le cadre de la certification. Numéro du catalyseur: Z4400G.* Employer seulement un catalyseur en verre en céramique d'une épaisseur de 5mm si le remplacement de celui-ci est nécessaire.

CAUTION: HOT WHILE IN OPERATION. DO NOT TOUCH. KEEP CHILDREN, CLOTHING AND FURNITURE AWAY. CONTACT MAY CAUSE SKIN BURNS. READ THIS LABEL AND INSTRUCTION MANUAL BEFORE OPERATING HEATER
ATTENTION: CHAUD LORS DU FONCTIONNEMENT. GARDEZ LES ENFANTS, VÊTEMENTS ET MEUBLES ÉLOIGNÉS. UN CONTACT AVEC LA PEAU PEUT OCCASIONNER DES BRÛLURES. LIRE CETTE ÉTIQUETTE ET LES INSTRUCTIONS D'INSTALLATION AVANT DE FAIRE FONCTIONNER CET APPAREIL.

MANUFACTURED IN

☐ USA:
Blaze King Industries
146A Street, Walla Walla, WA. 99362

☐ CANADA:
Valley Comfort Systems
1290 Commercial Way, Penticton, B.C. V2A 3H5

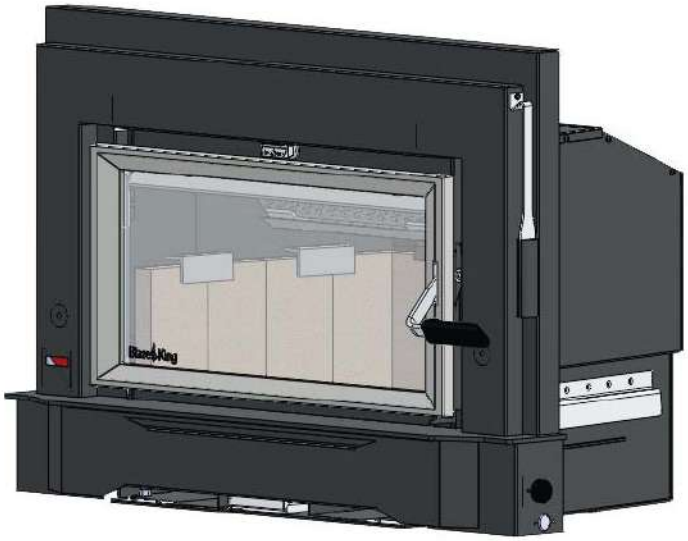
MANUFACTURE DATE

JAN ☐	FEB ☐	MAR ☐	APR ☐	MAY ☐	JUN ☐
JUL ☐	AUG ☐	SEP ☐	OCT ☐	NOV ☐	DEC ☐
2015 ☐	2016 ☐	2017 ☐	2018 ☐	2019 ☐	2020 ☐

170.0228 12 15

SIROCCO SC25

SOLID FUEL WOOD CATALYTIC STOVE



We recommend that our woodburning hearth products be installed and serviced by professionals who are certified in the U.S. by the National Fireplace Institute® (NFI) as NFI Woodburning Specialists or who are certified in Canada by Wood Energy Technical Training (WETT).

This heater meets the 2015 U.S. Environmental Protection Agency's particulate emission limits for wood heaters sold after May 15, 2015.

Tested & Listed By OMNI-Test Laboratories, Inc. Portland Oregon USA

0142WN016E

Installer: Please complete the details on the back cover and leave this manual with the homeowner.
Homeowner: Please SAVE THESE INSTRUCTIONS for future reference.

The authority having jurisdiction (such a municipal building department, fire department, etc.) should be consulted before installation to determine the need to obtain a permit.

OPERATION & INSTALLATION MANUAL

Manufactured By
Valley Comfort Systems Inc., 1290 Commercial Way, Penticton, BC, V2A 3H5, Canada
Phone: 250-493-7444 ◆ Fax: 250-493-5833 ◆ www.blazeking.com ◆ info@blazeking.com

Pour la version française de nos manuels S.V.P. vous référez à notre site web: www.blazeking.com

OM-SC25 E V1.00 December 9, 2015

TABLE OF CONTENTS

⚠WARNING

- **THIS APPLIANCE IS HOT WHEN OPERATED AND CAN CAUSE SEVERE BURNS IF CONTACTED.**
- **ANY CHANGES OR ALTERATIONS TO THIS APPLIANCE OR ITS CONTROLS CAN BE DANGEROUS AND IS PROHIBITED BY FEDERAL AND STATE LAWS.**
- Do not operate appliance before reading and understanding operating instructions. Failure to operate appliance according to operating instructions could cause fire or injury.
- Before installing this appliance, contact the local building or fire authority and follow their guidelines.
- This appliance must be installed by a qualified installer.
- Risk of burns. The appliance should be turned off and cooled before servicing.
- Do not operate without fully assembling all components.
- Do not let the appliance become hot enough for any part to glow red.
- Do not install damaged, incomplete or substitute components.
- Risk of cuts and abrasions. Wear protective gloves and safety glasses during installation. Sheet metal edges may be sharp.
- Children and adults should be alerted to the hazards of high surface temperature and should stay away to avoid burns or clothing ignition.
- Young children should be carefully supervised when they are in the same room as the appliance. Toddlers, young children and others may be susceptible to accidental contact burns. A physical barrier is recommended if there are at risk individuals in the house. To restrict access to an appliance or stove, install an adjustable safety gate to keep toddlers, young children and other at risk individuals out of the room and away from hot surfaces.
- Clothing or other flammable material should not be placed on or near the appliance. Objects placed in front of the appliance must be kept a minimum of 48” away from the front face of the appliance.
- Due to high temperatures, the appliance should be located out of traffic and away from furniture and draperies.
- Ensure you have incorporated adequate safety measure to protect infants / toddlers from touching hot surfaces.
- Even after the appliance is out, all surfaces, including the glass and/or any attachment will remain hot for an extended period of time.
- Check with your local hearth specialty dealer for safety hearth guards to protect children from hot surfaces. These guards must be fastened to a wall and/or to the floor.
- Any safety guard removed for servicing must be replaced prior to operating the appliance.
- Under no circumstances should this appliance be modified.
- This appliance must not be connected to a chimney flue pipe servicing a separate solid fuel burning appliance.
- Do not operate the appliance with the glass door removed, cracked or broken. Replacement of the glass should be done by a licensed or qualified service person.
- Do not strike or slam shut the appliance glass door.
- Operate only with the doors tightly closed.
- Stove will over-fire if door is not shut and latched.
- Only certified doors / optional fronts / and surrounds for inserts with the unit are to be installed on the appliance.
- Keep the packaging material out of reach of children and dispose of the material in a safe manner. As with all plastic bags, these are not toys and should be kept away from children and infants.
- If the appliance is not properly installed, a house fire may result. Do not expose the appliance to the elements (ex. rain, etc.) and keep the appliance dry at all times.
- The chimney must be sound and free of cracks and obstructions. Clean your chimney regularly as required.
- Never use gasoline, gasoline-type 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.
- Your appliance requires periodic maintenance and cleaning. Failure to maintain your appliance may lead to smoke spillage in your home.
- Higher efficiencies and lower emissions will generally result when burning air dried seasoned woods, as compared to wet, green or freshly cut wood. Burning wet unseasoned wood can cause excessive creosote accumulation. When ignited it can cause a chimney fire that may result in a serious house fire.
- The appliance is designed to burn natural wood only. Do not burn treated wood, coal, charcoal, colored paper, cardboard, solvents or garbage.
- Burn wood directly on the firebricks. Do not use a grate or elevate the fire.
- Do not store wood within appliance installation clearances or within the space required for re-fueling and ash removal.
- Ashes must be disposed in a metal container with a tight lid and placed on a non-combustible surface well away from the home or structure until completely cool.

Model	SC25 (catalytic)
Overall height and width (incl. shroud)	27 1/8" x 38 7/8" (689 mm x 987 mm)
Width of firebox enclosure (behind shroud)	27 7/8" (708 mm)
Overall depth and height of firebox	18 3/8" x 21 5/8" (639 mm x 588 mm)
Flue collar size and distance from shroud back	6" I.D., 14 3/8" (366 mm)
Recommended flue draft	.05" water column (on high burn)
Fire door opening	25 1/4" x 10 5/8" (642 mm x 270 mm)
Firebox depth	16 3/4" (426 mm) brick to brick, 18" (457 mm) brick to glass
Firebox width average	20 1/2" (521 mm)
Firebox height	10" (254 mm)
Fire box capacity	2.26 cu. ft.
Recommended Fuel length	16" max. (407 mm)
Wood capacity (approximate):	White oak - 53 lbs. (24.04 kg)
	Fir - 35 lbs. (15.88 kg)
Construction	10 gauge & 1/4" firebox, brick lined.
Shipping Weight (Firebox only)	325 lbs. (148 kg)
Chimney recommendation (Minimum)	15' from stove top to chimney cap: Insulated liner recommended

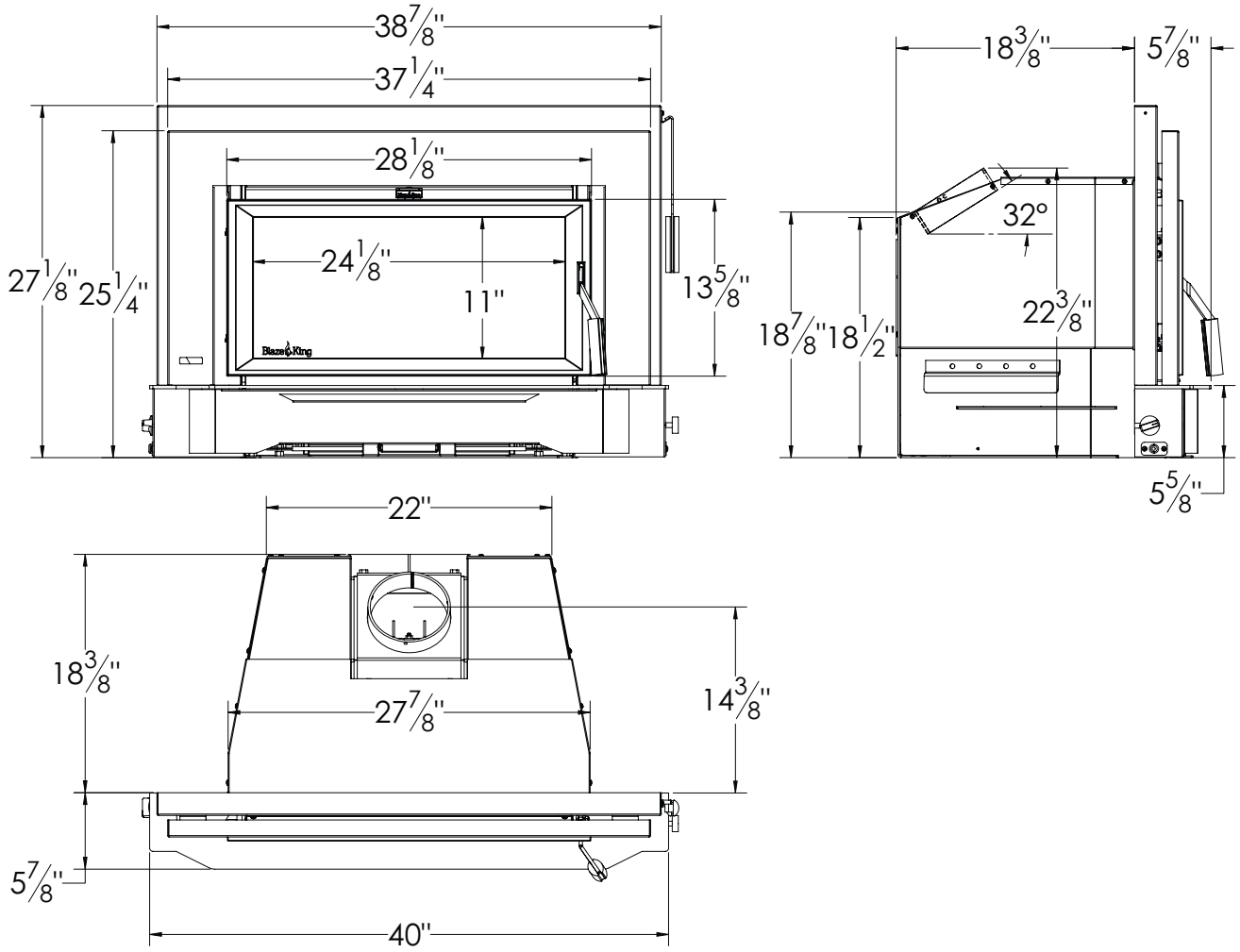
This unit was tested and listed UL 1482 and ULC S628-93 by OMNI-Test Laboratories.
This manual describes the installation and operation of the Sirocco SC25 catalytic equipped wood heater.
This heater is certified to comply with the 2015 U.S. Environmental Protection Agency's particulate emission limits for wood heaters sold after May 15, 2015.

EMISSIONS	CO Average(%)	g/hr
Low Burn	0.05	0.31
Med-low Burn	0.18	0.33
Med-high Burn	0.12	1.48
High Burn	0.08	1.93

Under specific test conditions this heater has been shown to deliver heat at rates ranging from 10097 to 26290 Btu/hr.
This wood heater has a manufacturer-set minimum low burn rate that must not be altered. It is against federal regulations to alter this setting or otherwise operate this wood heater in a manner inconsistent with operating instructions in this manual.
This wood heater contains a catalytic combustor, which needs periodic inspection and replacement for proper operation. It is against federal regulations to operate this wood heater in a manner inconsistent with operating instructions in this manual, or if the catalytic element is deactivated or removed.
The combustor supplied with this heater is a 115.0335 metal combustor. Consult the catalytic combustor warranty also supplied with this wood heater. Warranty claims should be addressed to:

in Canada	in USA
Blaze King Industries / Valley Comfort Systems Warranty Department, 1290 Commercial Way Penticton, BC Canada V2A 3H5, Ph: 250-493-7444	Blaze King Industries Warranty Department, 146A Street Walla, Walla, Washington 99362, Ph: 509-522-2730

APPLIANCE DIMENSIONS—Sirocco SC25



SN -

Tested & Listed By O-TL Portland Oregon USA C US
OMNI-Test Laboratories, Inc.
Report #0142WN016E

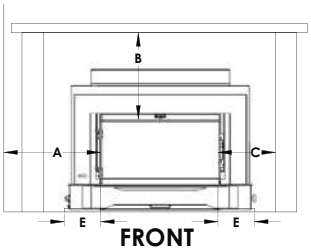
SIROCCO INSERT - Encastrable Sirocco

BLAZE KING CATALYST STOVE - POÊLE À BOIS ENCASTRABLE
Room heater, solid fuel type. / Appareil de chauffage approuvé pour type de carburant solide.
MODEL / MODÈLE: SC25
Tested to / Testé pour: UL 1482 / ULC S628-93
CERTIFIED IN BOTH UNITED STATES AND CANADA / CERTIFIÉ POUR LES ÉTATS-UNIS ET LE CANADA

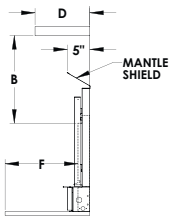
PREVENT HOUSE FIRES - Install and use only in accordance with Blaze King's installation and operation instructions. Install and use in a code complying fireplace only. Contact local building or fire officials about restrictions and installation inspection in your area. Stainless steel flue liner is required in Canada and recommended in the United States.
PRÉVENTION DES INCENDIES: SI CE POÊLE ENCASTRABLE N'EST PAS CORRECTEMENT INSTALLÉ, UN INCENDIE PEUT SE PRODUIRE. POUR RÉDUIRE LE RISQUE D'INCENDIE, SUIVRE LES INSTRUCTIONS D'INSTALLATIONS. Ce poêle encastrable convient à l'installation pour l'un ou l'autre: Un poêle encastrable construit en usine approuvé à l'UL 127 ou à l'ULC S628-93. Une cheminée de maçonnerie est approuvée avec une gaine en acier inoxydable. Obligatoire au Canada, recommandé aux États-Unis.

Minimum clearances to combustibles, measured from firebox door flange/ Dégagements minimum requis entre l'appareil à tout matériau combustible à partir chambre à combustion au rebord de porte		
A	Side of door flange to combustible wall. / Du côté du rebord de l'ouverture de porte à tout mur combustible.	13.5" 343 mm
B	Top of door flange to bottom of mantel and combustible facing. (with mantle shield.) / Du dessus du rebord de l'ouverture de porte au bas du manteau et de toute façade combustible. (avec manteau avec protection)	38" / 966 mm (24" / 610 mm)
C	Side of door flange to side combustible facing. / Du côté du rebord de l'ouverture de la porte à toute surface de côté combustible.	10" 254 mm
D	Mantle width maximum. (with mantle shield) / Largeur maximum du manteau. (avec manteau avec protection)	12" / 305 mm (8" / 204 mm)
E	Minimum hearth side extension * / Extension latérale minimum du foyer	8"*
F	Mimimum hearth front extension / Extension frontale minimum du foyer	16" USA 18" CANADA

* Measured from each side of the fuel loading and ash removal openings / Mesuré à partir de chaque côté de l'ouverture de la porte de chargement et du tiroir de cendre



FRONT



SIDE

FLOOR PROTECTION / PROTECTION DU PLANCHER:
A non-combustible floor protection is required for all installations extending 16" (in USA) or 18" (in Canada) in front of the door and extending 8" to either side of the door opening. In addition to the above requirement that portion of the insert which extends out in front of the fireplace hearth must have a minimum of 1" vertical distance to any combustible material.

Une protection non combustible de plancher est exigée pour toutes les installations se prolongeant de 18'' devant la porte et se prolongeant de 8'' à l'un ou l'autre des côtés de l'ouverture de la porte. De plus, la partie du poêle encastrable qui se prolonge au- devant du foyer doit avoir un minimum de 1" de distance verticale de n'importe quel matériau combustible.

Electrical rating: (115 VAC, 60 Hz, 0.58 Amps. Risk of electrical shock. Disconnect power before servicing unit. Do not route power cord in front of or beneath heater). Do not remove bricks or mortar in masonry fireplace. Do not use grate or elevate fire. INSPECT AND CLEAN CHIMNEY FREQUENTLY.
U.S. ENVIRONMENTAL PROTECTION AGENCY - 2015 Standard - certified to comply with 2015 particulate emission standards (EPA test methods 28R and 5G with an emission-rate of 0.90 g/hr). Not approved for sale after May 15, 2020. This wood heater needs periodic inspection and repair for proper operation. Consult the owner's manual for further information. It is against federal regulations to operate this wood heater in a manner inconsistent with the operating instructions in the owner's manual, or if the catalytic element is deactivated or removed. *ONLY OPERATE WITH DOORS CLOSED. Open door to feed fire ONLY. *DO NOT OBSTRUCT COMBUSTION AIR OPENINGS. For Use With Solid Wood Fuel Only - Do not burn other fuels, this may make the catalyst in the combustor inactive. The performance of the catalytic device or its durability has not been evaluated as part of the certification. Metal combustor part number: 115.0335. Provide adequate outside air for combustion. *Replace with only ceramic glass, 5 mm. Thickness.

Estimation électrique: (115 VAC, 60 Hz, 0.58 Amps. Risque d'électrocution débrancher le courant avant de réparer l'unité. Ne pas faire courir le fil l'alimentation en avant ou en dessous de l'appareil de chauffage). Ne pas utiliser une grille pour surélever le feu, établir le feu directement sur les briques dans le fond du poêle. Inspecter et nettoyer VOTRE CHEMINÉE fréquemment.
AGENCE DE PROTECTION DE L'ENVIRONNEMENT U.S.- STANDARD 2015 – certifie conformément aux normes standard d'émissions de particules 2015 (Méthodes de test 28R et 5G EPA avec un taux d'émission de 0.90 gr/hre). Non approuvé pour la vente après le 15 mai 2020. Cet appareil de chauffage au bois nécessite des inspections périodiques et des réparations pour un fonctionnement adéquat. Consulter le manuel du propriétaire pour plus d'informations. Il est contre les règlements fédéraux de faire fonctionner cet appareil de chauffage à l'encontre des instructions d'utilisation fournies dans le manuel du propriétaire, ou si l'élément catalytique a été enlevé ou désactivé. *UTILISER L'appareil UNIQUEMENT AVEC LES PORTES FERMÉES. Ouvrir la porte SEULEMENT pour alimenter le feu. *NE PAS OBSTRUER L'ENTRÉE D'AIR DE COMBUSTION. Fournir l'apport d'air extérieur adéquat pour alimenter la combustion. Utiliser uniquement avec des combustibles solides - ne pas brûler aucun autre combustible, ce qui pourrait désactiver le catalyseur de la chambre à combustion. La performance du catalyseur ou sa longévité n'a pas été évaluée dans le cadre de la certification. Numéro du catalyseur: Z4400G.* Employer seulement un catalyseur en verre en céramique d'une épaisseur de 5mm si le remplacement de celui-ci est nécessaire.

CAUTION: HOT WHILE IN OPERATION. DO NOT TOUCH. KEEP CHILDREN, CLOTHING AND FURNITURE AWAY. CONTACT MAY CAUSE SKIN BURNS. READ THIS LABEL AND INSTRUCTION MANUAL BEFORE OPERATING HEATER
ATTENTION: CHAUD LORS DU FONCTIONNEMENT. GARDEZ LES ENFANTS, VÊTEMENTS ET MEUBLES ÉLTIGNÉS. UN CONTACT AVEC LA PEAU PEUT OCCASIONNER DES BRÛLURES. LIRE CETTE ÉTIQUETTE ET LES INSTRUCTIONS D'INSTALLATION AVANT DE FAIRE FONCTIONNER CET APPAREIL.

MANUFACTURED IN

☐ USA:
Blaze King Industries
146A Street, Walla Walla, WA. 99362

☐ CANADA:
Valley Comfort Systems
1290 Commercial Way, Penticton, B.C. V2A 3H5

MANUFACTURE DATE

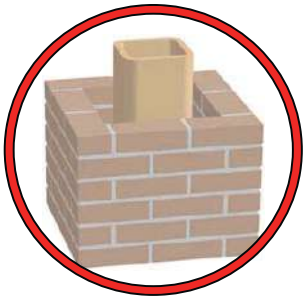
JAN ☐	FEB ☐	MAR ☐	APR ☐	MAY ☐	JUN ☐
JUL ☐	AUG ☐	SEP ☐	OCT ☐	NOV ☐	DEC ☐
2015 ☐	2016 ☐	2017 ☐	2018 ☐	2019 ☐	2020 ☐

170.02281215.indd

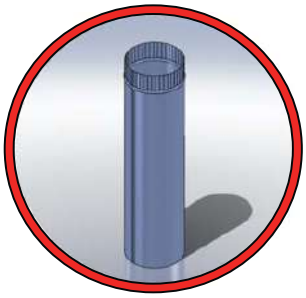
SAFETY PRECAUTIONS

IF THIS BLAZE KING STOVE IS NOT PROPERLY INSTALLED OR OPERATED, A HOUSE FIRE MAY RESULT. TO REDUCE THE RISK OF FIRE, FOLLOW THE INSTALLATION INSTRUCTIONS. CONTACT LOCAL BUILDING OR FIRE OFFICIALS ABOUT RESTRICTIONS AND INSTALLATION INSPECTION REQUIREMENTS IN YOUR AREA.

PLEASE READ THIS ENTIRE MANUAL BEFORE YOU INSTALL AND USE YOUR NEW ROOM HEATER. FAILURE TO FOLLOW INSTRUCTIONS MAY RESULT IN PROPERTY DAMAGE, BODILY INJURY, OR EVEN DEATH.



Chimney and chimney connector must be in good condition and kept clean.
NEVER vent the stove to other rooms of the building. Must be vented to the outside ONLY.
NEVER use a chimney or chimney connector smaller then the stove exhaust, unless approved by your local inspector.
NEVER vent the stove into a “Class B” gas vent chimney.
DO NOT CONNECT IN CONJUNCTION WITH ANY AIR DISTRIBUTION DUCTWORK UNLESS SPECIFICALLY APPROVED FOR SUCH INSTALLATIONS.



Inspect the chimney connector and chimney regularly during each burning season and clean when necessary.
DO NOT CONNECT THIS UNIT TO A CHIMNEY FLUE SERVING ANOTHER APPLIANCE.

NEVER intentionally start a chimney fire to clean the flue.

WARNING: NOT APPROVED FOR INSTALL IN A MOBILE HOME

If the Optional Fan Kit is installed, connect this unit to a properly grounded, 110-volt electrical outlet. Do not route the power cord in front of or under the stove.

Do not make any changes or modifications to an existing masonry fireplace or chimney to install this appliance. Do not make any changes to the appliance to increase combustion air.

Never try to repair or replace any part of this appliance unless instructions are given in this manual. All other work must be done by a trained technician.

Do not place clothing or other flammable items on or near this appliance.

Allow the appliance to cool down before carrying out any maintenance or cleaning.

DO NOT OVER FIRE THIS HEATER. Attempts to achieve heat output rates that exceed heater design specifications can result in permanent damage to the heater and to the catalytic combustor. Over firing the appliance may cause a house fire. Never burn the stove so hot that the stove or chimney connector begins to glow.

Maintain the door and glass seal and keep them in good condition. A leaking door seal will shorten burn times and may harm the combustor.

Avoid placing wood against the glass when loading. Do not slam the door or strike the glass.

Do not use a grate or other device to elevate the fire off of the firebox floor. Burn the fire directly on the bricks.

Do not throw this manual away. This manual has important operating and maintenance instructions that you will need at a later time. Always follow the instructions in this manual.

Ashes should be placed in a steel container with a tightly fitting lid and moved outdoors immediately. 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. Other waste shall not be placed in this container.

It is recommended to install smoke and carbon monoxide detectors where heaters are installed. Install at least one smoke detector on each floor of your home to ensure your safety. It should be located away from the wood stove and close to the sleeping areas. Locating a smoke detector too close to a wood stove can cause the smoke detector alarm to sound if a puff of smoke is emitted while the wood stove door is open during reloading. Follow the smoke detector manufacturers placement, installation, and maintenance instructions.

SAFETY PRECAUTIONS cont.

This appliance is designed and approved for burning cord wood only. DO NOT burn trash, garbage; artificial or paper logs; gift wrappings; coal; lighter fluids; chemical cleaners; chemical starters; treated or painted wood; salt water driftwood or foil-backed paper such as gum wrappers or cigarette packages; lawn clippings or yard waste; materials containing rubber (including tires), plastic, asbestos; waste petroleum products, paints or paint thinners, or asphalt products; construction or demolition debris; railroad ties or pressure-treated wood; manure or animal remains; unseasoned wood or 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 the release of toxic fumes or render the heater ineffective and cause smoke. Burn natural wood only. It will void all warranties and safety listings and may damage the combustor.

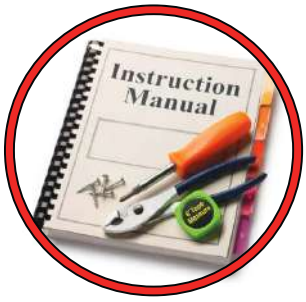
Never burn the stove with the loading door open. Leaving the door cracked open may damage the combustor.

Never block free airflow through vents on this appliance.

Never use gasoline, gasoline-type 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. Some fuels could generate carbon monoxide and are very dangerous.

HOT WHILE IN OPERATION. KEEP CHILDREN, CLOTHING AND FURNITURE AWAY.
CONTACT MAY CAUSE SKIN BURNS.
Do not touch the appliance when it is hot and educate all children of the danger of a high temperature appliance. Young children should be supervised when they are in the same room as the appliance.

Keep furniture, curtains, wood, paper and other combustibles a minimum of 48in (1219mm) away from the front of the appliance. ALSO, DO NOT STORE COMBUSTIBLES UNDER THE APPLIANCE (WOOD, PAPER etc.).



This appliance must be properly installed to prevent the possibility of a house fire. The instructions must be strictly adhered to. Do not use makeshift methods or compromise in the installation.

Contact local building officials to obtain a permit and information on any installation restriction or inspection requirements in your area. Notify your insurance company as well.

⚠WARNING

- **BEFORE INSTALLING THIS APPLIANCE, CONTACT THE LOCAL BUILDING OR FIRE OR OTHER AUTHORITY HAVING JURISDICTION AND FOLLOW THEIR GUIDELINES.**
- **THIS APPLIANCE MUST BE INSTALLED BY A QUALIFIED INSTALLER. FOLLOW THE INSTALLATION DIRECTIONS. DO NOT OPERATE WITHOUT FULLY ASSEMBLING ALL COMPONENTS.**
- **IF THIS APPLIANCE IS NOT PROPERLY INSTALLED, A HOUSE FIRE MAY RESULT.**
- **THIS APPLIANCE IS HOT WHEN OPERATED AND CAN CAUSE SEVERE BURNS IF CONTACTED. CHILDREN AND PETS MUST BE KEPT FROM TOUCHING THE APPLIANCE WHEN IT IS HOT.**
- **COMBUSTIBLE MATERIAL SUCH AS FIRE WOOD, WET CLOTHING, ETC. PLACED TOO CLOSE CAN CATCH FIRE. OBJECTS PLACED IN FRONT OF THE APPLIANCE MUST BE KEPT A MINIMUM OF 48"(1219 MM) FROM THE FRONT OF THE APPLIANCE.**

Blaze King grants no warranty, implied or stated, for the installation or maintenance of the appliance and assumes no responsibility of any consequential damage(s).

NATIONAL FIREPLACE INSTITUTE NFI CERTIFIED www.nficertified.org

We recommend that our products be installed and serviced by professionals who are certified in the U.S. by the National Fireplace Institute® (NFI) as NFI Specialists or who are certified in Canada by Wood Energy Technical Training (WETT).

Wood Energy Technical Training www.wettinc.ca

PARTS INCLUDED WITH THE SIROCCO INSERT
1. Poker
2. Manual Kit (w/ warranty cards, fire starter, labels)
3. Bypass Handle (Z2052)

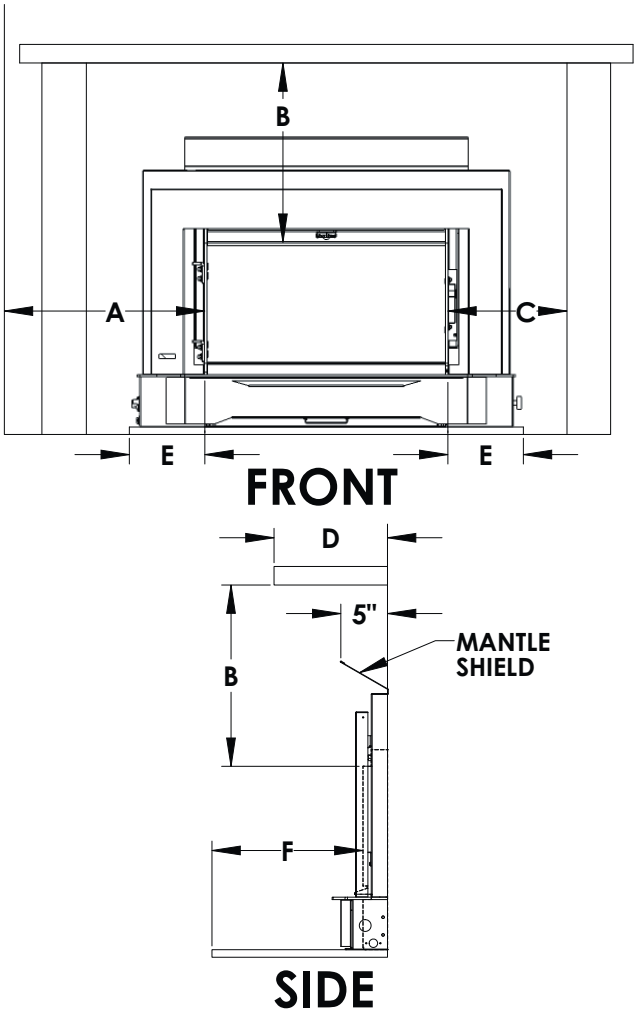
FLOOR PROTECTION

A non-combustible floor protection is required for all installations extending 16" (in USA) or 18" (in Canada) in front of the door and extending 8" to either side of the door opening. In addition to the above requirement that portion of the insert which extends out in front of the fireplace hearth must have a minimum of 1" vertical distance to any combustible material.

MINIMUM CLEARANCES for SC25

Minimum clearances to combustibles Measured from firebox door flange		
A	Side of door flange to combustible wall.	13.5" 343 mm
B	Top of door flange to bottom of mantel and combustible facing. (with mantle shield.)	38" / 966 mm (24" / 610 mm)
C	Side of door flange to side combustible facing.	10" 254 mm
D	Mantle width maximum. (with mantle shield)	12" / 305 mm (8" / 204 mm)
E	Minimum hearth side extension *	8"*
F	Mimimum hearth front extension	16" USA 18" CANADA

*** Measured from each side of the fuel loading and ash removal openings / mesuré de chaque coté de l'ouverture de la porte de chargement et du tiroir de cendre**



COMBUSTION AIR

Ensure adequate combustion air allowing for all other exhausting type appliances in the dwelling (range hoods, dryers, etc.). In air tight homes and modern constructions, careful considerations must be taken into account when using a wood burning appliance. Heat recovery ventilators (HRV) systems along with constant running pan motors in air handlers must be taken into account when balancing the system. Failure to do so may result in air starvation, smoke spillage and carbon monoxide threats. Consult a HVAC specialist for proper installation. Ensure adequate combustion air allowing for all other exhausting type appliances in the dwelling (range hoods, dryers, etc.). In airtight houses it is recommended to install a fresh air inlet into the room where the stove is located, to prevent air starvation.

DRAFT

Draft in the chimney system is initiated by the air pressure difference between the top and bottom of the chimney. Heat generated within the firebox will rise and accelerate the draft in the chimney. Recommended draft is .05 in. w.c. operated on high. Too little draft results in a sluggish fire and smoke spillage into the room when the stove door is opened. Too much draft (over 0.06 in. w.c.) makes it unsafe to operate the stove and will void manufacturers warranty.

ROLE OF THE CHIMNEY

Without a proper installed chimney, this appliance will not burn correctly.

The role of the chimney is to pull the proper amount of air into the firebox for the purpose of complete combustion. Incomplete combustion will lead to more smoke and pollution of the outside air. A proper operating chimney will allow the user to enjoy peak performance at all burn operating levels from low to high. Blaze King therefore recommends vertical installations with a minimum length of 15’ from stove top to chimney cap. In insert applications Blaze King recommends insulated liners into all existing chimneys.

INSPECT CHIMNEY

Before connecting any wood-burning unit to an existing chimney, inspect the chimney to be sure that it is in good condition. There must be no cracks or holes. The cross-sectional area can differ from the flue collar as long as sufficient draw is maintained and local codes and jurisdiction are observed.. A proper chimney is crucial for safe, satisfactory operation of any wood heating system. Relining or rebuilding may be necessary to make the chimney safe, efficient, and in conformity with local codes.

Masonry Chimneys that have a very large cross-section , particularly exterior chimneys, may experience poor draft and may require relining to reduce the cross-section-and provide a proper draft. This is also an ideal time to clean the existing chimney. For peak efficiency, a clean chimney flue is essential. A qualified professional chimney sweep can perform both inspection and cleaning. If you choose to clean your own chimney use the proper tools. Homemade cleaners may damage your chimney.

PLANNING STOVE PLACEMENT

Check the fireplace and insert dimensions to ensure the insert will fit properly. While planning your installation keep in mind the required clearances as shown on the stove label.

Plan ahead to be certain that furniture will have ample clearance, and that drapes and curtains cannot come in contact with the room heater. Refer to the approval label on the stove for correct clearances to combustibles.

This stove must be connected to a chimney. It must be vented to the outside.

⚠WARNING

NEVER PERMIT YOUR STOVE TO VENTILATE INTO ANY ROOM IN THE BUILDING

Consult the stove label to ensure that you install your stove the proper minimum distances from combustible materials.

Minimum fireplace opening size is 29” x 22” x 19” (W x H x D)

Electrical Power - The stove is equipped with a fan assembly with a seven-foot electrical cord. Do not route the cord in front of the stove.

STOVE ASSEMBLY

Bypass door wedge removal

1. Remove four bolts from wedge assembly. (**Fig. 1**)

Remove wedge and inspect bypass door and gasket to ensure proper seal.

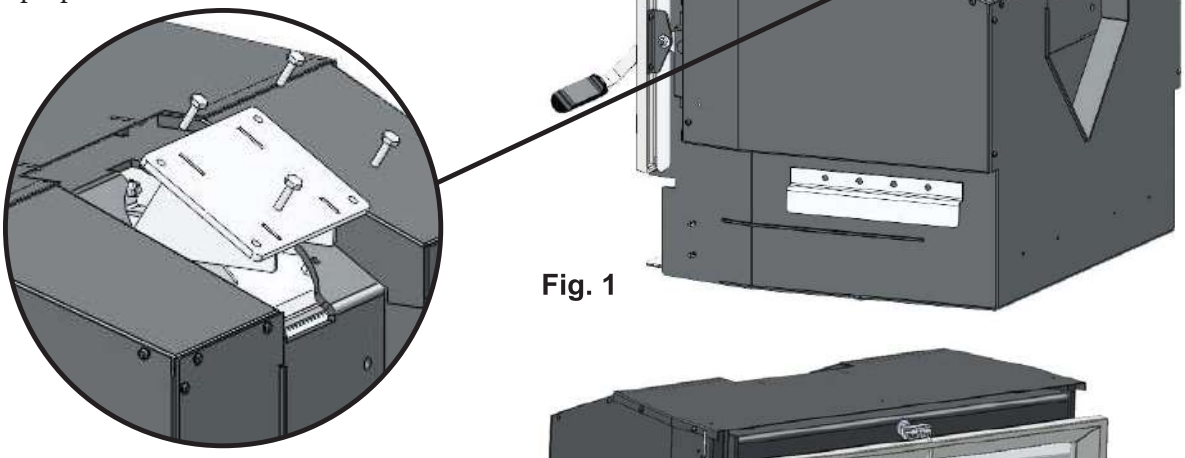


Fig. 1

Lower shroud / ash shelf install

1. Ensure fans have not shifted during transport and are in correct position.
2. Install thermostat rod extension by aligning machined faces and securing with the set collar. (**Fig. 2**)

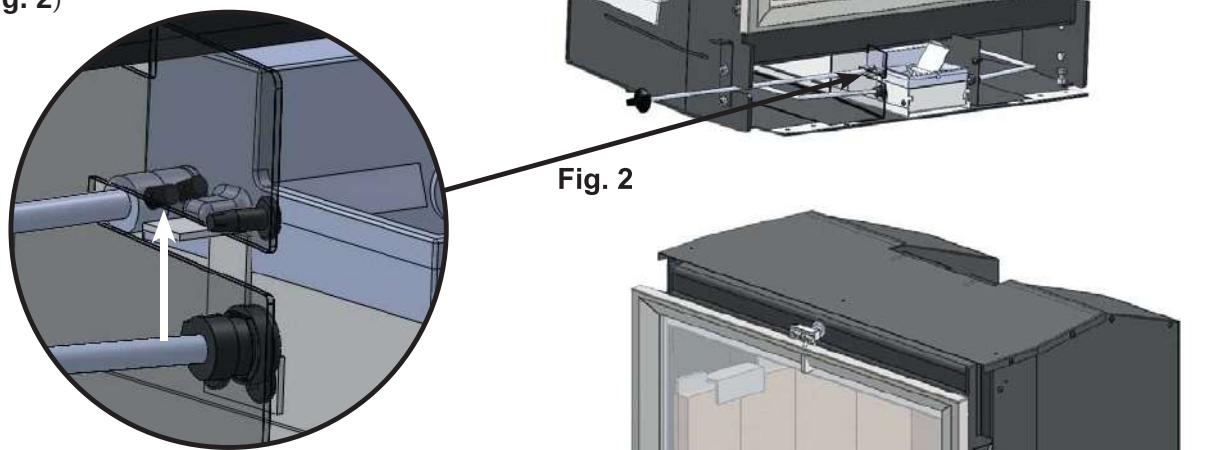


Fig. 2

3. Fasten ash shelf brackets to both sides of the firebox using a 7/16" wrench, two 1/4-20 bolts and two 1/4-20 flange nuts per side. (**Fig. 3**)

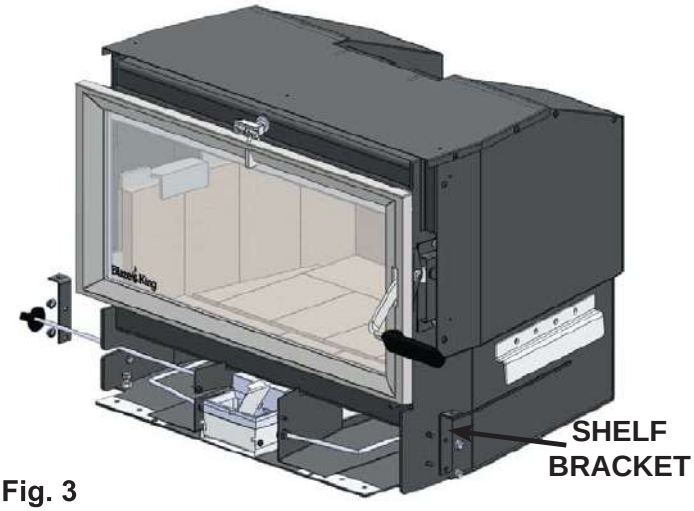


Fig. 3

4. Position lower shroud / ash shelf onto ash shelf brackets. (**Fig. 4**)

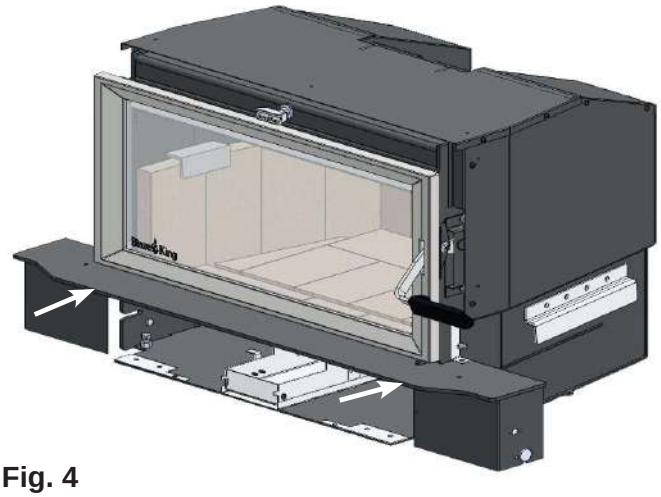


Fig. 4

5. Insert firebox can support brackets. Once aligned, fasten together using a 7/16" wrench, one 1/4-20 bolt and one 1/4-20 flange nut per side. (**Fig. 5**)

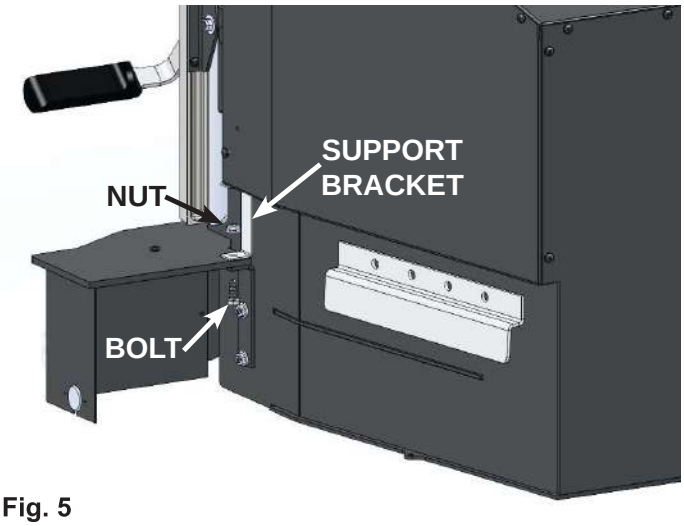


Fig. 5

6. Fasten rheostat housing and secure with rheostat nut, ensure rheostat pins sit in the alignment holes. Install rheostat knob. Fasten ground wire to the hole shown using supplied screw. (**Fig. 6**)

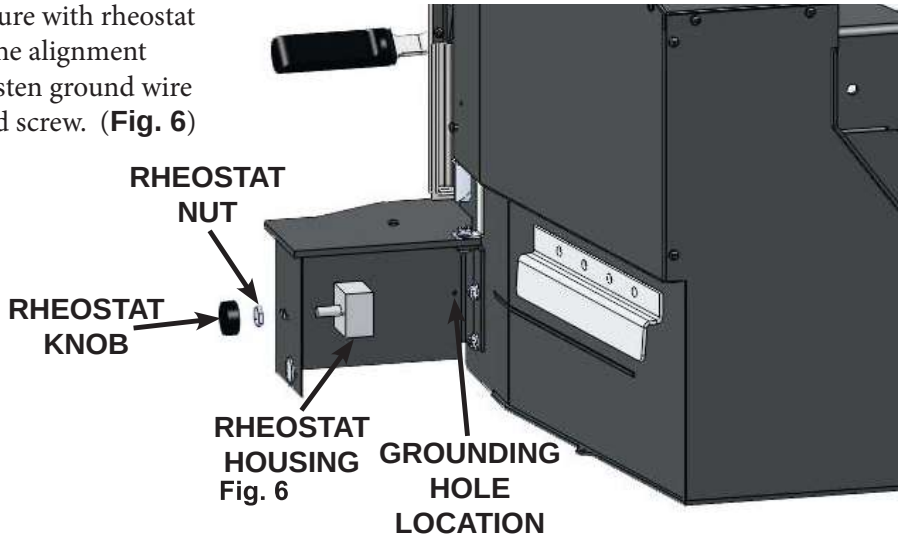


Fig. 6

7. Determine where the nearest electrical outlet is then install strain relieft mount with cord using a #2 Robertson screwdriver. (**Fig. 7**)

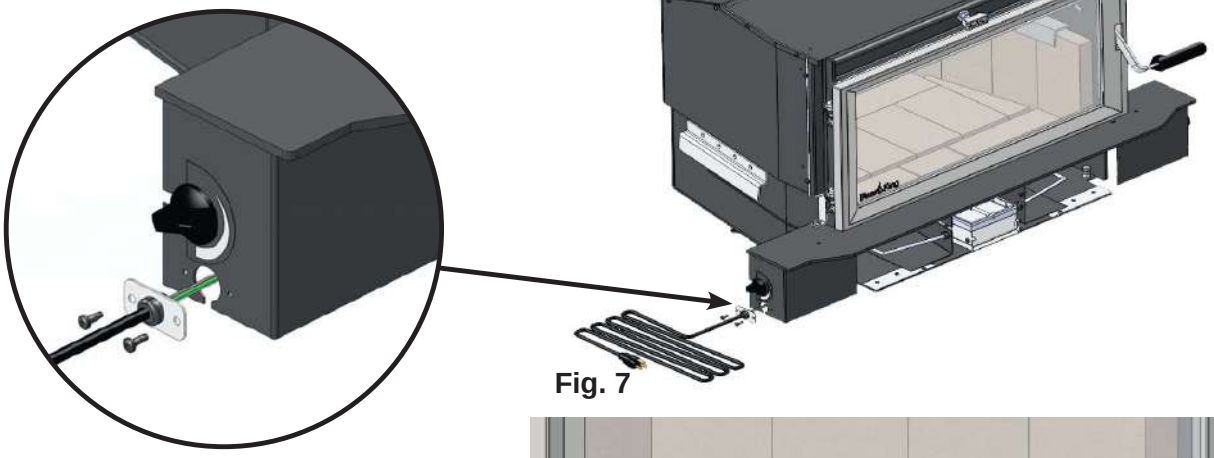


Fig. 7

Ensure wiring is tucked above the protruding flanges. (**Fig. 8**)

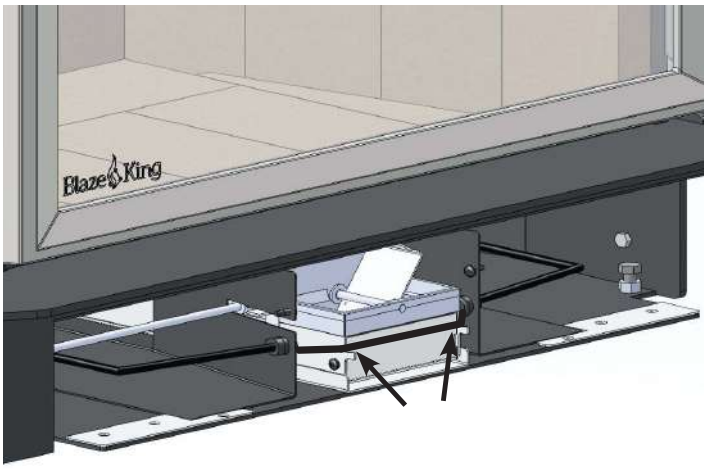


Fig. 8

8. Slide lower shroud cover underneath the lower shroud shelf and fasten using a #2 Robertson screwdriver, two screws. (**Fig. 9**)

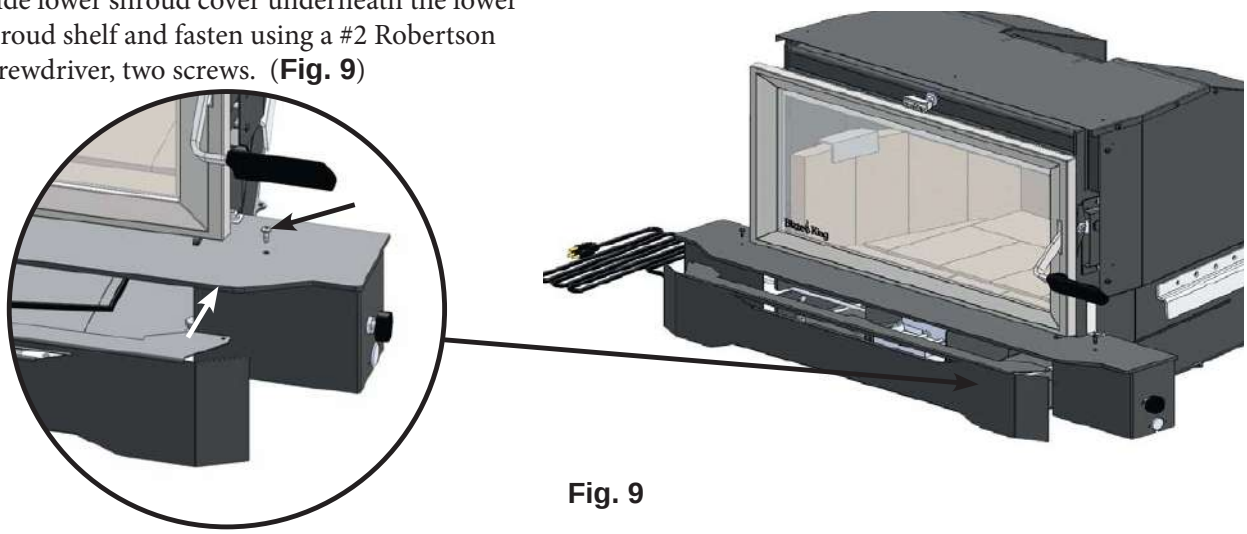


Fig. 9

Upper shroud install

1. With the loading door open, align notches on the left side of the rear shroud with the screws protruding out of the firebox can. Once in position, do the same with the right side of the rear shroud. Push back and downwards on shroud to ensure it is locked in place then tighten all four screws using a #2 Robertson screwdriver. (**Fig. 10**)

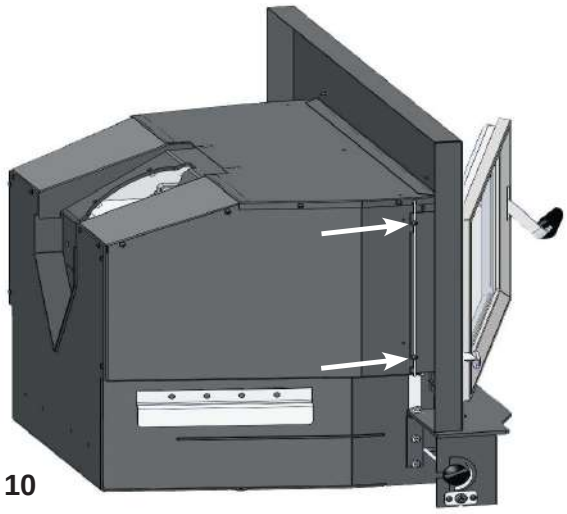


Fig. 10

2. Fasten catalytic thermometer housing to rear shroud using a #2 Robertson screwdriver, two screws. (**Fig. 11**)

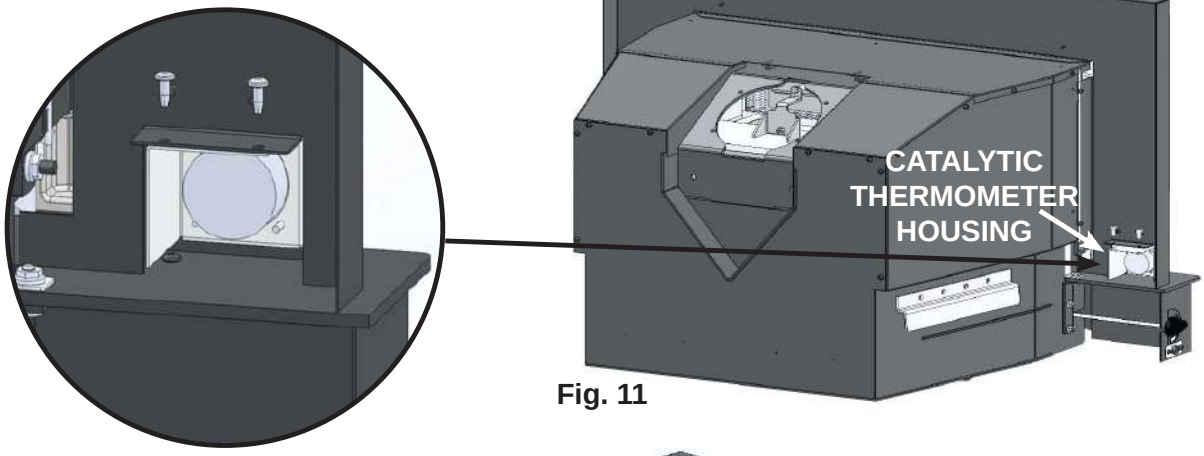


Fig. 11

3. Align outer shroud notches with the protruding screws on the rear shroud, then hang. The bottom of the outer shroud is held in place by magnets.

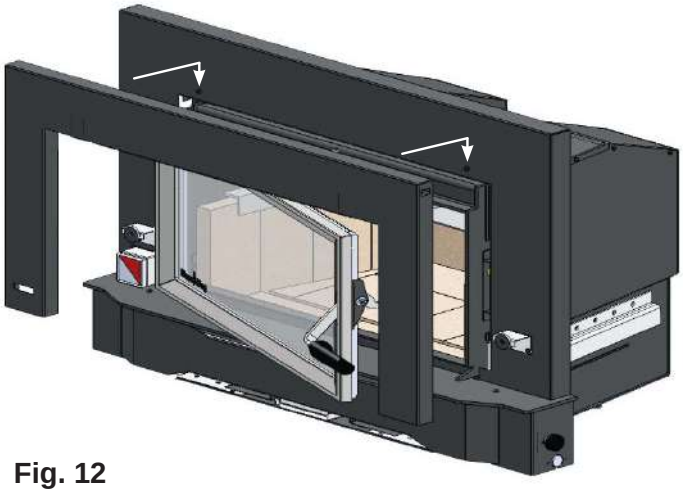


Fig. 12

Flue Collar Installation (comes attached to flue extension)

1. NOTE: For ease of install; once chimney piping is completely installed and attached to the provided flue collar / flue extension, leave flue collar hanging roughly 2 feet above ground. This will enable unit to be pushed back into the fireplace opening without interference and allow for an easy grab through the bypass door opening to install. (**Fig. 13**)

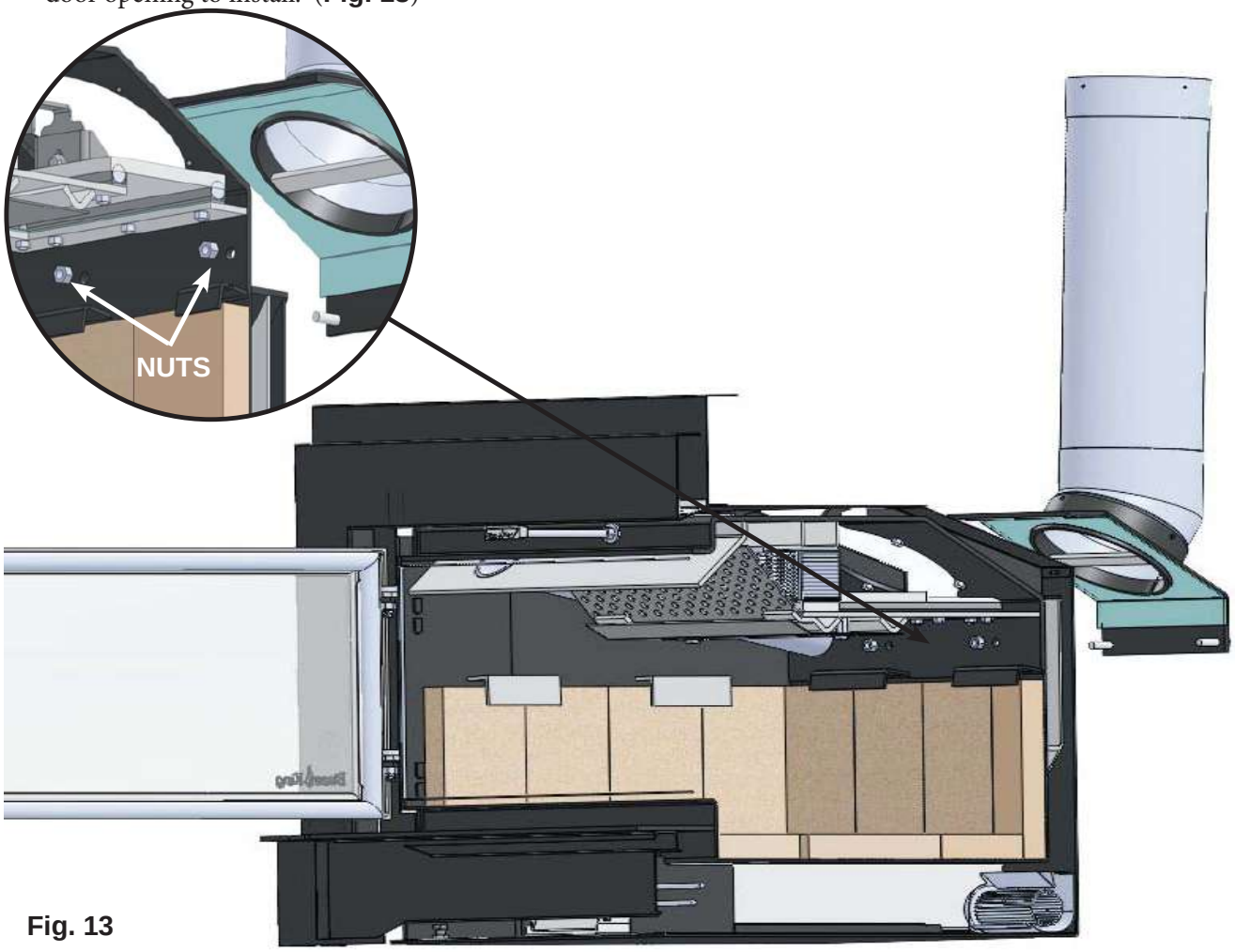


Fig. 13

2. Once unit is in position, open loading door and bypass door then reach up through bypass opening to grab flue collar assembly. Pull down to align bolts with through holes in firebox rear then pull forward. Ensure top surface is mating with firebox top. If so, fasten flue collar assembly to firebox using a 9/16" wrench, stainless steel nuts. (**Fig. 13**)

CHIMNEY

FACTORY-BUILT FIREPLACE

In Canada and in the USA: This insert may be installed into a compliant factory built fireplace providing the chimney is lined from the outlet of the insert to the top of the chimney using an insulated stainless steel liner which meets UL1777 or ULC S635. The liner must be securely attached to both the insert and the chimney top. In both Canada and the U.S.A. the existing fireplace damper must be secured in the open position. If this is not possible the damper must be removed. Any openings between the masonry of the fireplace and the facing masonry must be sealed.

⚠WARNING

THE FIREPLACE CANNOT BE MODIFIED IN ANY WAY TO FIT THE INSERT

GENERAL CHIMNEY INSTALLATION

Connect the venting system to the flue collar of the insert using three sheet metal screws. There are three predrilled holes in the flue collar. Place a bead of furnace cement around the flue collar connection to ensure the flue pipe is properly connected, secured and sealed.

If this stove and its chimney components are not properly installed, a house fire may result. For your safety, follow the installation directions. Contact local building or fire officials about restrictions and installation requirements in your area.

We recommend that the inside your chimney be at least the same diameter as the flue of your stove. If you plan to use an existing masonry chimney, be sure it is free of cracks and loose joints. Gases traveling through a chimney can reach extremely high temperatures. Cracks or loose mortar can allow hot gases to reach the wood portion of the structure surrounding the chimney. These toxic gases can also re-enter the house through cracks and small holes in the chimney, or cause back-puffing which will result in excessive smoking. Be on the safe side and have your chimney inspected by a certified chimney sweep. A 6 inch insulated stainless steel chimney liner with a direct connection to the stove is recommended for masonry chimney installations. A chimney must extend at least three feet above the highest point where it passes through the roof and at least two feet higher than any portion of the building within ten feet of the chimney. Smoke travels up the chimney in a circular, spiraling motion. A 6 inch round insulated stainless steel liner allows the smoke to travel with less resistance. A rough masonry chimney without a good smooth liner can result in the rapid build up creosote.

⚠WARNING

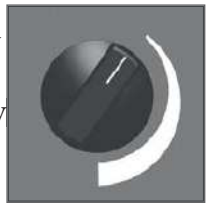
- **BEFORE YOU BEGIN CHECK ALL LOCAL CODES AND REGULATIONS REGARDING YOUR INSTALLATION.**
- **DO NOT CONNECT THIS UNIT TO A CHIMNEY FLUE SERVING ANOTHER APPLIANCE**

YOUR FIRST FIRE!

The following pages contain information on the major components and operation of your heater. Please take time to read about them as it will give you a better understanding of how your stove works. This understanding will help you to operate your stove properly thus will extend the life of your stove and allow you to get the highest efficiencies from your heater.

THERMOSTAT

The thermostat knob is located on the left side of the lower shroud / ash shelf. It controls the burn rate of the stove. Any thermostat position between **LOW**(thin line) and **HIGH**(wide line) will produce the desired clean burning characteristics. However, since each installation is different, you may find it necessary to operate the thermostat to suit your situation. A **HIGH**(wide line) thermostat setting will produce maximum heat which is more than suitable for heating the average size home. All adjustments to the thermostat should be done gradually. When you first light the stove set the thermostat to **HIGH**(wide line) setting for 20-30 minutes, or until the fire is well established. Once the fire is established turn the thermostat to **MED**(middle of line) for 5 minutes and then to a **LOW**(thin line) setting or the desired setting. Too rapid an adjustment may cause the stove to operate improperly. The most common mistake new owners make is continually adjusting the thermostat.



LOW(thin line)

MED(middle of line)

HIGH(wide line)

BYPASS

Most catalytic wood burning appliances have a bypass device to allow the smoke from the fire to temporarily bypass, or go around, the catalytic combustor. The bypass door is located inside the firebox at the top of the stove. The bypass is a steel plate door, and is controlled by the bypass rod and latch above the door in the middle of the stove. Use the bypass handle on the side of the latch (**Fig. 14**) to pull the rod out, then the bypass is open, use the bypass handle on the center of the latch to push the rod in, then the bypass is closed. The bypass handle is hung from the top right-hand side of the outer shroud.

NEVER OPEN THE LOADING DOOR WITHOUT OPENING THE BYPASS DOOR

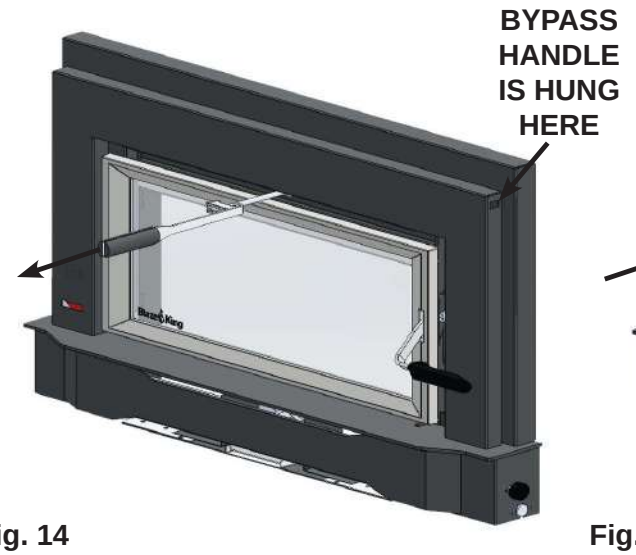


Fig. 14

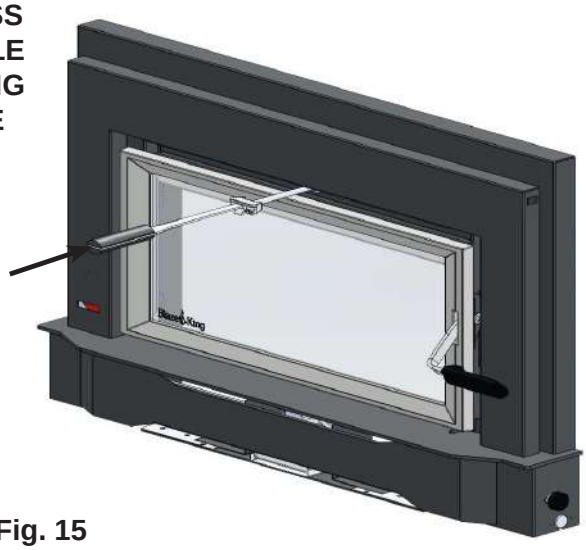


Fig. 15

CATALYTIC THERMOMETER

The catalytic thermometer is located in the lower left-hand corner of the outer shroud. (**Fig. 16**) It's purpose is to show you if the combustor is active. Always operate the stove when the needle is in the active red zone. When the combustor is not active the stove will emit smoke and will not be efficient. For an accurate reading, turn fans off for approximately 10 minutes and then read the thermometer.

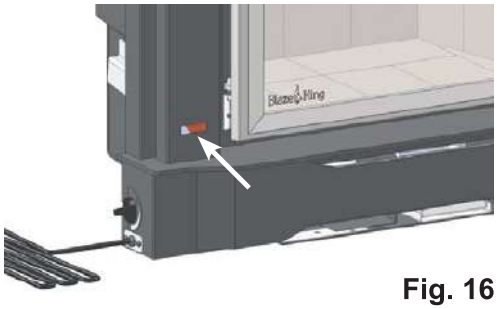


Fig. 16

SELECTING WOOD

⚠WARNING

- **THIS APPLIANCE IS DESIGNED TO BURN NATURAL WOOD ONLY. DO NOT BURN TREATED WOOD, COAL, CHARCOAL, COLORED PAPER, CARDBOARD, SOLVENTS OR GARBAGE.**
- **HIGHER EFFICIENCIES AND LOWER EMISSIONS WILL GENERALLY RESULT WHEN BURNING AIR DRIED SEASONED WOODS, AS COMPARED TO WET, GREEN OR FRESHLY CUT WOODS.**
- **BURNING WET UNSEASONED WOOD CAN CAUSE EXCESSIVE CREOSOTE ACCUMULATION. WHEN IGNITED IT CAN CAUSE A CHIMNEY FIRE THAT MAY RESULT IN A SERIOUS HOUSE FIRE.**

Use dry seasoned wood, split and stacked and protected from rain for at least 24 months with a moisture content of 20% or lower. It takes a great deal of energy to evaporate the moisture contained in green wood and that energy will not be heating your house. Also, green or wet wood will greatly increase creosote problems. The only accurate method to determine moisture content in wood is to use a moisture meter.

Never burn salt-water driftwood. It is very corrosive and will damage the firebox. Burning salty wood also voids the warranty.

This controlled combustion firebox has been designed for high efficiency and long burn times. The proper time to add more wood is when the last charge has been reduced to a glowing charcoal bed and while the catalytic thermometer is still active range. There will be very little smoke at this stage in the burn cycle.

Both hardwood and softwood burn equally well in this appliance but hardwood, which is more dense, will weigh more per cord and burn a little slower and longer.

Firewood should be split and stacked in a manner that air can get to all parts of it and covered in early spring to be ready for burning that fall.

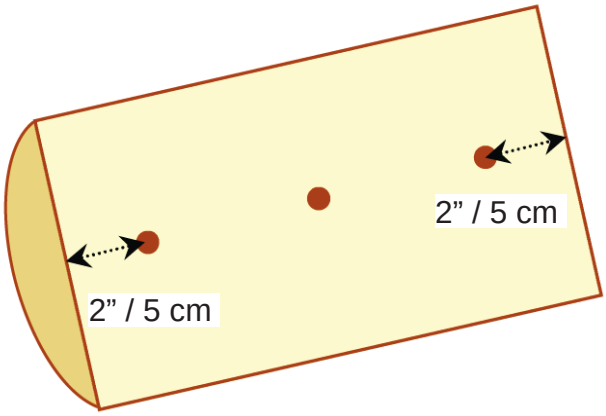
The only accurate way to determine wood moisture is to purchase a moisture meter.

⚠WARNING

- **NEVER START A FIRE UNLESS ALL BRICKS ARE CORRECTLY PLACED INSIDE THE FIREBOX. CHECK THE INSTALLATION INSTRUCTIONS CAREFULLY.**
- **ALWAYS OPEN THE BYPASS DOOR BEFORE OPENING THE LOADING DOOR.**
- **ONCE THE LOADING DOOR IS CLOSED, CLOSE THE BYPASS DOOR DIRECTLY AFTER THE CATALYTIC THERMOSTAT NEEDLE IS IN THE ACTIVE ZONE.**

HOW TO USE MOISTURE METERS

1. Take a random selection of around 3-4 logs per cubic yard or cubic meter.
2. Split each log down the middle.
3. In the center of log push pins of meter along grain - three measurements are taken on the freshly split surface: 2" or 5 cm in from each end of the log and in the middle of the split surface with sufficient contact (see figure).
4. Do this to all the logs and take an average of the readings (this will be only an approximate indication but a good guide).



EFFICIENCY

Efficiency was determined using the method outlined in B415.1-10 test method. It is represented by the Higher Heating Value (HHV) as the fuel used during testing contains between 19% - 25% water moisture included in the total calculated fuel weight. (Other test methods such as LHV or Low Heating Value, does not take the water moisture into account).

Annual Fuel Utilization Efficiency (AFUE) attempts to represent the actual, season long, average efficiency of an appliance. HHV is the actual, calculated average efficiency obtained under test conditions. Using correctly seasoned wood is important when trying to gain efficiency. The more seasoned (dry) the wood, the higher the efficiency (less energy wasted on eliminating moisture during combustion). Operating your Blaze King at lower settings will result in higher efficiencies as the fuel will undergo a more complete combustion.

LIGHTING THE FIRE

NOTE: As you heat up the stove for the first time, the paint will go through a curing process and will give off an odor. To minimize the inconvenience, burn the stove at a low temperature setting for several hours. It is advisable to open a door or window until the odor dissipates. You may also notice a change in color as the paint cures, this is normal and will appear uniform after subsequent firings.

1. **DO NOT USE A GRATE. BUILD THE FIRE DIRECTLY ON THE BRICK IN THE BOTTOM OF THE STOVE.**
2. Set the thermostat to **HIGH** (maximum) position and turn the fan **OFF**.
3. Open both the loading door and the bypass door (bypass latch / rod pulled out using bypass handle).
4. Place 10 balls of non-glossy paper towards the front of the bottom of the firebox, or use a Blaze King fire starter puck, then stack 20 pieces of kindling on top of the paper in a crisscross fashion (leaving air gaps in between sticks).
5. Light the fire and allow it to get a good start while leaving the loading door cracked open (approximately 3 to 5 minutes). **DO NOT LEAVE THE STOVE UNATTENDED.**
6. Once the kindling is fully on fire, place two or three medium size logs onto the fire. Keeping the loading door unlatched, allow the logs to catch fire (approximately 5 minutes). **DO NOT LEAVE THE STOVE UNATTENDED.**
7. Once the logs are burning, latch the loading door shut **BUT** keep the bypass door open. Leaving the loading door open after the fire is well started may cause premature failure of the catalytic combustor.
8. When nearly all of the wood in the firebox is fully burning, finish loading the stove. Lay the wood as far back in the stove as possible. Latch the loading door shut and observe the catalytic thermometer. Once the needle is in the **ACTIVE RED ZONE**, close the bypass door (push the bypass latch / rod in using the bypass handle). Turning the thermostat down to soon may cause the fire to go out.
9. Let the fire burn, with the thermostat in a **HIGH** setting, for 20-30 minutes, or until the fire is well established. At that point, turn the thermostat down to the desired setting. It is good burning practice to burn the stove on **HIGH** for 20 to 30 minutes after every refuelling, this will help to condition the wood load for optimum combustion. The temperature in the stove and the gases entering the combustor must be raised to at least 500° (indicated by the thermometer needle in the active red zone) for catalytic activity to be initiated. During the start-up of a cold stove, a high fire must be maintained for at least 20-30 minutes. This ensures that the stove, catalyst, and fuel are all stabilized at proper operating temperatures. Even though it is possible for flue gas temperatures to reach 600° within 5 minutes of a fire being started. If the fire is allowed to die down immediately (thermostat set to a **LOW** setting too soon), it may go out or the combustor may stop working, indicated by the thermometer needle being in the inactive zone. Once the combustor starts working, heat generated in it, by burning the exhaust smoke, will keep it working.
10. The fan can be turned on when the stove is hot or after the initial warm up period of 20-30 minutes.

Probably the least understood requirement in maintaining a good fire is that of establishing a good base of coals or embers. A good bed of hot coals or embers will maintain a more even temperature as well as getting the new load of wood started easily. Put as much fuel into the stove as it will hold. Don't be afraid to fill it completely. With the Blaze King automatic thermostat, the wood will only burn at the rate set on the thermostat. Once the full load is established, the stove should be left to complete the full burn cycle. This is evident by either a coal bed (ember bed) remaining or the catalyst's thermometer hovers just inside the active zone. This procedure will maximize the efficiency of the combustor as well as limit chimney emissions and smoke spillage.

⚠WARNING

DO NOT USE THE APPLIANCE WITHOUT A COMBUSTOR

RELOADING PROCEDURE (with the catalyst temperature in the active red zone)

1. Have your next load of wood ready before beginning. Turn the thermostat to **HIGH** and turn the fan off. Wait 2 minutes for the air flow to stabilize.
2. Open the bypass door (bypass latch / rod pulled out using bypass handle) and again wait 2 minutes for the air flow to stabilize.
3. Unlatch the loading door and open just a crack to allow the ambient room air to be introduced to the firebox, this may take a few seconds to stabilize.
4. Slowly open the loading door and proceed to reload the firebox. If you experience excessive smoke spillage, slightly close the loading door to re-establish a draft through the chimney.
5. Once loaded, latch the loading door shut and close the bypass door (push the bypass latch / rod in using the bypass handle). Let the fire burn on the **HIGH** thermostat setting for 20 to 30 minutes **OR** until the fire is very well established. At that point, turn the thermostat down to the desired setting. Keep in mind you may not see a large amount of flame activity in the lower thermostat setting. The thermometer needle will remain in the active zone indicating that the burn cycle is continuing.
6. Should you burn the stove on a very low setting for extended periods of time, you will begin to see creosote deposits forming on the glass door. To remove these deposits, simple run the stove on **HIGH** for approximately 30 minutes. The **HIGH** setting will burn off most of the deposits

As every pile of wood is different you will learn, over time, which settings are necessary to achieve the optimal fire. This will be based on the type of wood, installation, weather conditions and the desired room temperature.

RELOADING PROCEDURE (with the catalyst temperature still in the inactive zone)

Follow the procedure for “LIGHTING THE FIRE” on the previous page.

OPTIMAL THERMOSTAT SETTING

Any thermostat position between **LOW** and **HIGH** will produce the desired clean burning characteristics. However, since each application can vary, you may find it necessary to operate the thermostat to suit your application. A thermostat setting on **HIGH** will produce a maximum heat which is more than suitable for heating the average size home and offer the cleanest door glass.

1. Starting the fire. Each stove, home, installation, chimney installation, and homeowner combination works a little differently. The first several times you fuel the stove, it may not react as you expect. A little experimentation may be needed to find the right combination of fuel and thermostat setting to achieve the maximum efficiency. This is one of the joys of burning wood. You, the wood burner, make it work. And you can see what happens as it is working. Be patient, the air / fuel mixture and temperature must be stabilized before maximum combustion efficiency can be achieved.
2. As the combustor temperature (as indicated by the thermometer) passes into the active red zone, further adjustment to achieve the desired room temperature should be made in small increments for the most effective cleaner burning operation. Changes should be made as few times each day as possible. When the thermostat knob is moved from high to low, more gases are produced, so the combustor has more fuel; consequently the combustor thermometer may register a higher heat for several hours after the thermostat is turned down.
3. Keep hot coals active so when you reload the stove you will reduce the time necessary to maintain an active combustor.
4. The thermostat is set at the factory. **DO NOT TAMPER WITH THE THERMOSTAT**, this will result in a malfunctioning thermostat.

FAN OPERATION

The fans are located beneath the firebox of the stove, it recirculates room air up the back and across the top. This design allows the air to travel the farthest distance across the hot surfaces resulting in super heated air, most of which can be felt exiting the top of the stove. The fan should be off until the stove reaches normal operating temperatures. After approximately 30 minutes, the fan speed adjustment should match the thermostat control setting, i.e. if your stove is set at medium then your fan should also be set at medium, low—low, high—high etc. The fan control is on the right-hand side of the lower shroud / ash shelf.

ICE - FORMATION AND PREVENTION

Most of what you see coming from the chimney of a properly operating catalytic stove is water vapor. In extremely cold weather - and with some exterior chimneys - this vapor may freeze in the chimney, to the point of actually blocking the chimney and extinguishing the fire. In such weather, occasionally burn the stove for 4 or 5 minutes with the thermostat setting on **HIGH** to melt any possible ice buildup.

WOOD BURNING IN THE SHOULDER SEASON

There are things to consider if you decide to light a fire in the spring and fall or when the outside temperature is milder, perhaps 55°F to 70°F (13°C to 21°C).

As you light the fire, with the loading door open, you may notice spillage, this is when a small amount of smoke comes back into the living space. When your fire begins to warm the chimney and the draft improves, spillage is greatly reduced. After a short period of time you can adjust the thermostat to a **LOW** setting and maintain a comfortable temperature in your home.

In reducing the thermostat setting you have also reduced the flue temperatures and your chimney begins to cool down. At this time the amount of draft is also decreasing and spillage may occur. The differences between the flue temperature and the outdoor air temperatures causes your chimney to draw and vent the flue gasses to the outside. This air movement, sometimes referred to as Stack Effect, is also influenced by air density and moisture differences. Small temperature differences produce less draw in your chimney system than large temperature differences.

General Rules for burning in the shoulder season:

- Run your stove on high for 30 minutes after start up and reloading.
- Slowly turn the thermostat down to the desired heat setting.
- The heat setting needs to be high enough to keep the thermometer in the active zone.
- If the thermometer does not stay in the active zone turn the thermostat to a higher setting. Wait 15 minutes then confirm that the thermometer remains in the active zone. Repeat as needed.
- If your stove is producing too much heat, start to build smaller hotter fires.

It is important to periodically monitor the operation of the catalytic combustor to ensure that it is functioning properly. A non-functioning combustor will result in a loss of heating efficiency, and an increase in creosote and emissions. Following is a list of items that should be checked on a periodic basis:

- Combustors should be visually inspected at least three times during the heating season to determine if physical degradation has occurred. Actual removal of the combustor is not recommended unless more detailed inspection is warranted because of decreased performance. Refer to "CATALYTIC COMBUSTOR TROUBLESHOOTING" on next page.
- This catalytic heater is equipped with a temperature probe to monitor catalyst operation. Properly functioning combustors typically maintain temperatures in excess of 500°F (indicated by the thermometer needle in the active zone), and often reach temperatures in excess of 1000°F. If catalyst temperatures fall below 500°F (indicated by the thermometer needle in the inactive zone), refer to next step and to "CATALYTIC COMBUSTOR, TESTING" below.
- You can get an indication of whether the catalyst is working by comparing the amount of smoke leaving the chimney when the smoke is going through the combustor and catalyst light-off has been achieved, to the amount of smoke leaving the chimney when smoke is not routed through the combustor (bypass mode):
  - Light the stove as per the lighting instructions "LIGHTING THE FIRE". With smoke routed through the catalyst, go outside and observe the emissions leaving the chimney.
  - Open the bypass mechanism, wait approximately 15 minutes, and again observe the emissions leaving the chimney. Significantly more smoke will be seen when the exhaust is not routed through the combustor (bypass mode). Some smoke may be visible shortly after you start the fire and shortly after reloading the fire. Allow 20 to 30 minutes for the fire to stabilize before making observations.

CATALYTIC COMBUSTOR, TESTING

Light the fire as per the lighting instructions (see LIGHTING THE FIRE). Then set the thermostat knob on a **MED** setting. When the fire is well established (within one to three hours) turn the thermostat knob between **LOW** and **MED**. A properly operating combustor will remain active, and the combustor thermometer will remain in the "active" zone until the wood load is mostly consumed. A "tired" or "dead" combustor will, with the thermostat on **MED** or lower, go out completely, and the thermometer needle will fall into the "inactive" zone. Repeat this procedure several times over several days (Remember that the combustor thermometer has a built-in lag of 4-8 minutes.) If, after several test burns, the thermometer will not indicate an "active" combustor, it may require cleaning or replacement. It is also possible that the thermometer, itself, may not be reading accurately. Before condemning the combustor, read "THERMOMETER". If, after cleaning has been performed, your combustor is still not working you can Contact Blaze King for a replacement combustor. Please read "REPLACEMENT PARTS" section in this owners' manual.

CATALYTIC COMBUSTOR, CLEANING

Under certain conditions, ash particles may become attached to the face of the combustor. These may be seen while the combustor is in the glowing stage, or when the fire is out. Any deposit on the visible face of the combustor should be removed. Wait until the fire is out and the stove is cold before performing any cleaning. Brushing the combustor with a soft bristle paint brush will remove some deposits. Passing a vacuum cleaner wand or brush near the face of the combustor will remove most deposits. (Hot ash in a vacuum cleaner bag will burn, may melt the vacuum or cause a house fire. Exercise caution and never clean the stove when the stove or ashes are hot.) Never scrape the combustor with any hard tool or brush. Never run pipe cleaner through the individual cells of the combustor. This is not needed, and may do more harm than good. Limit cleaning to the face of the combustor. **NOTE: Never remove a combustor without approved combustor gasket in hand as original gasket will fall apart when removed from stove**. Remember to re-install the Flame Shield (the perforated plate) in same position it was found.

TIP: A hot fire will usually prove to be the best method of cleaning the combustor of deposits.

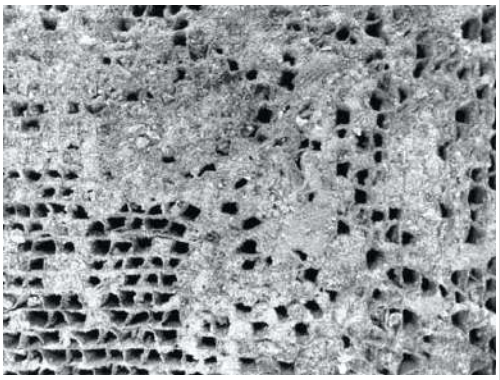
CATALYTIC COMBUSTOR, TROUBLESHOOTING

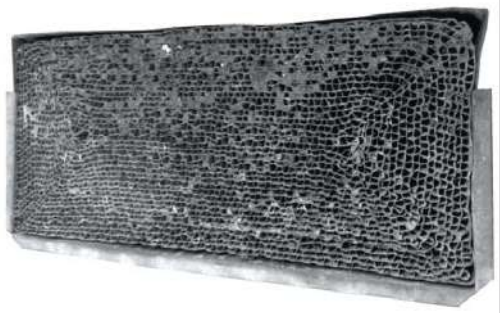
PROBLEM - CREOSOTE PLUGGING

Possible Cause: Burning materials that produce a lot of char and fly-ash.
Solution: Do not burn materials such as garbage, gift wrap, or cardboard.

Possible Cause: Burning wet, pitchy woods or burning large loads of small diameter wood with the combustor in the operating position without the thermostat needle in the active zone.
Solution: Burn dry, seasoned wood, don't engage the bypass until the temperatures are high enough to initiate light-off (indicated by the thermostat needle in the active zone).

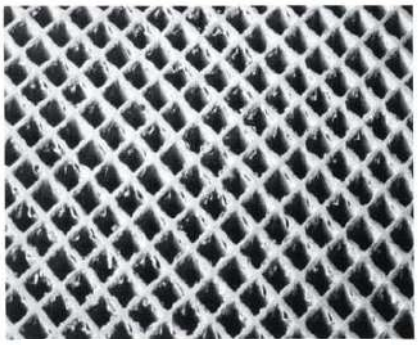
Possible Cause: Combustor not functioning. If proper burning procedures have been followed to no avail, the combustor is not functioning.
Solution: Replace the combustor with a genuine Blaze King combustor (failure to do so will void your warranty).





PROBLEM - CATALYST PEELING

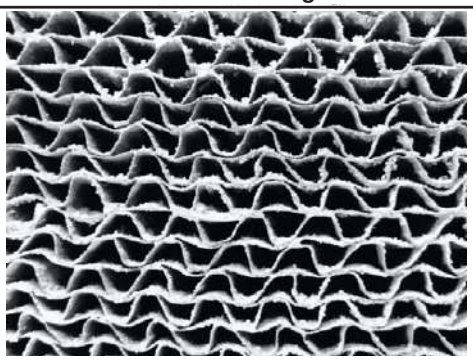
Possible Cause: Extreme temperatures (above 1800°F, or 1000°C.) at combustor surface can cause the catalysts to peel. Over firing and flame impingement on the combustor are primary causes. Minor peeling photo shows minor peeling that is normal and does not affect function. Severe peeling photo shows that are closed or plugged.
Solution: Avoid extreme temperatures and flame impingement. If peeling is severe, remove and replace combustor.



Minor Peeling

PROBLEM - CATALYST DEACTIVATION

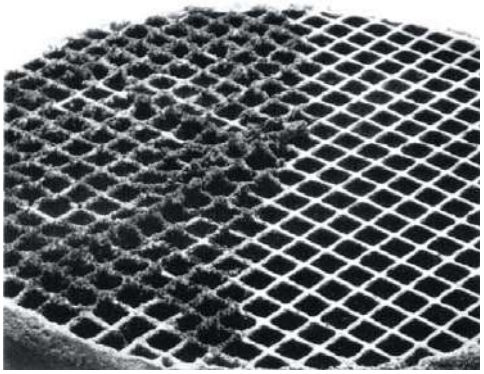
Possible Cause: Burning large quantities of trash, pressure-treated lumber, or painted woods.
Solution: Burn quality woods available in your area. If you decide the catalyst has been deactivated, replace combustor with a genuine Blaze King combustor (failure to do so will void your warranty).



Severe Peeling

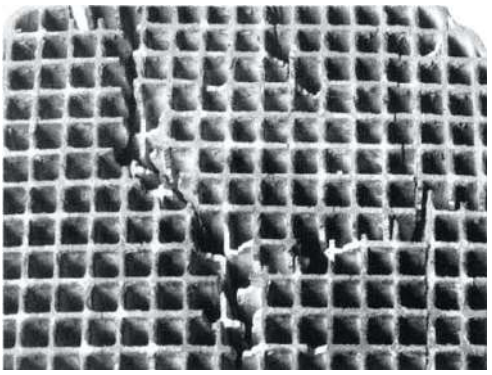
PROBLEM - CATALYST MASKING
(The catalyst is coated with a layer of fly-ash or soot which prevents catalytic activity)

Possible Cause: Accumulation of fly-ash
Solution: Brush cooled combustor with a soft-bristled brush or vacuum lightly at least once per burning season.



PROBLEM - THERMAL CRACKING

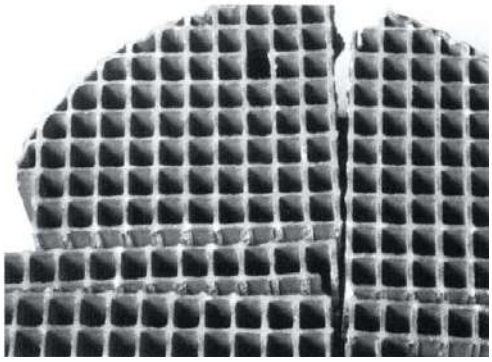
Possible Cause: Normal operation, as long as the combustor remains intact.
Solution: If cracking causes large pieces to fall out, replace the combustor.



PROBLEM - MECHANICAL CRACKING

Possible Cause: Mishandling, abuse, or operating without a properly gasket sealed combustor.
Solution: Handle with care

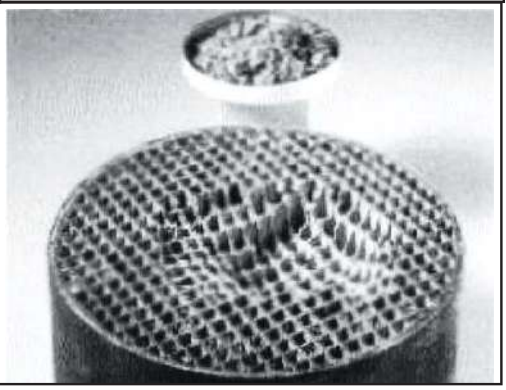
Possible Cause: Distortion of holding collar.
Solution: Combustor should be held firmly in its can. It should slide easily into and out of the holding collar of the stove. If severe cracking has resulted in loss of large chunks of combustor, replace combustor. Also replace any warped stove parts.



PROBLEM - CRUMBLING

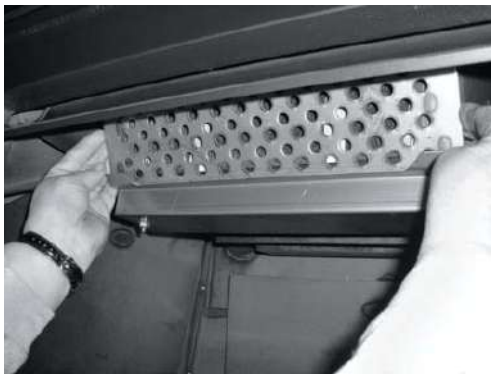
Possible Cause: Air leaks
Solution: Inspect door gasket, see "MAINTENANCE cont." on page 36.

Possible Cause: High draft
Solution: Do not exceed .06" of water draft.

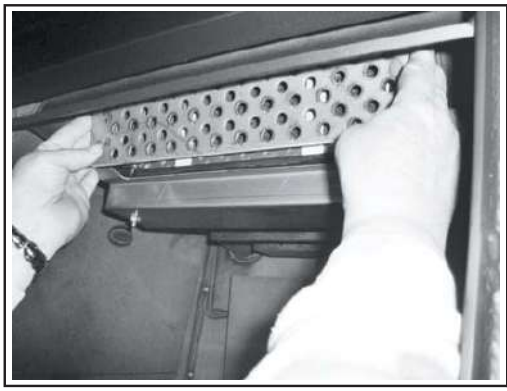


CATALYTIC COMBUSTOR, REPLACEMENT
BLAZE KING RECOMMENDS YOUR DEALER PERFORM THIS TASK

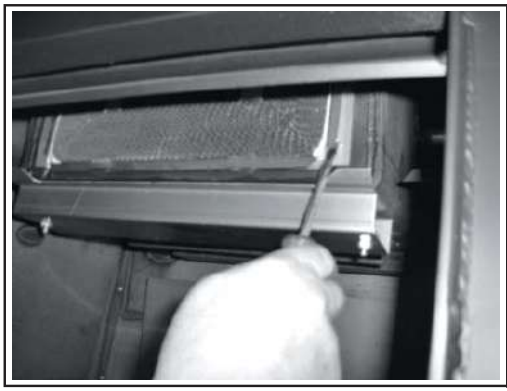
The catalytic thermometer on lower left-hand side of the stove should read in the active zone after the stove has been in operation for several hours. If the thermometer's indicator needle does not stay in the active zone, even with a hot fire, over a 7-10 day period of regular use, the combustor may need replacement or cleaning, see "CATALYST MONITORING" on page 28. If the combustor needs replacing then discontinue use of the appliance until the combustor is replaced. If the combustor must be examined or replaced contact your Blaze King dealer.



1. The removal of a Blaze King Catalytic combustor requires a small flat blade screwdriver or pocket knife. The stove fire must be out for at least 12 hours prior to the removal process. A combustor can reach 1400°F and hold high temperatures for several hours even after the fire is out. After waiting 12 hours, first remove the flame shield by simply lifting the shield off the two tabs at either side.



2. Once you remove the flame shield, you'll find the combustor. The honeycomb combustor can be made of different materials such as cordierite, mulite or even stainless steel. They are all the same with regard to removal and caution should be taken so as to not drop or damage the combustor. If your combustor has never been cleaned according the manufacturers directions, you may wish to clean the combustor before replacing it with a new combustor, see "CATALYTIC COMBUSTOR CLEANING" on page 28.

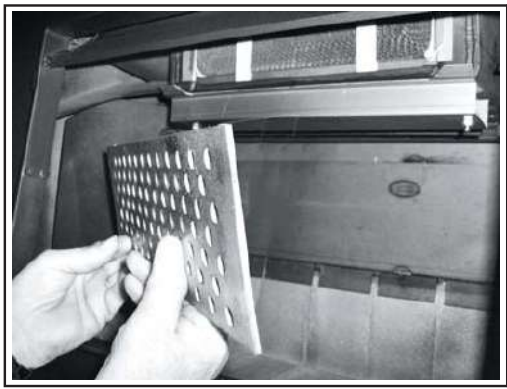


3. The combustor has a metal tab across the bottom and on each side of the combustor. Using a flat blade screwdriver or pocket knife blade, slide the blade behind the metal tab and the heavy steel dome of the stove. The dome is the housing that surrounds the combustor. Apply slight pressure until the combustor begins to move forward, about 1/4". Repeat the process on the opposite end tab. By working back and forth the combustor will work free of the dome housing. It is normal for the gasket surrounding the metal band to fall apart during this process. New combustors are shipped with a new gasket.

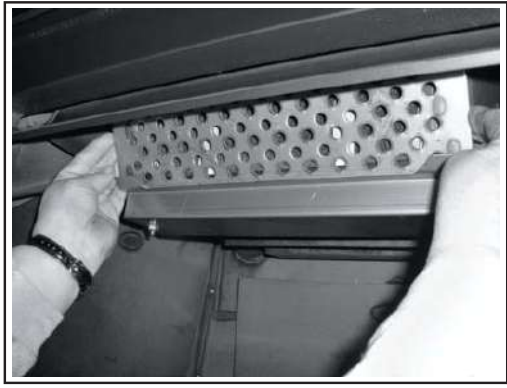
4. Using the same screwdriver or pocket knife, scrape any old gasket from the surface areas of the dome. The dome is the housing that surrounds the combustor. If you clean your existing combustor, you'll need to order replacement combustor gasket. It is always a good idea to have a spare combustor gasket on hand prior to performing any maintenance. If you purchase a new combustor a new gasket will already be applied to the combustor.

5. This new combustor already has the gasket installed. Note the 1" wide masking tape. This tape will help to keep the leading edge of the gasket from snagging during installation. If you've cleaned your combustor, wrap the combustor gasket as you see here and use the 1" masking tape around the perimeter front and rear. During the first fire the masking tape will burn off and the combustor gasket will swell providing a tight seal. It is this tight seal that improves efficiency and performance. You should never burn your stove without a combustor gasket installed.

6. Since the combustor is only 2" deep, there is ample room to lift the new combustor into place. **REMEMBER TO HAVE THE TAB ACROSS THE BOTTOM EDGE OF THE COMBUSTOR AS IT IS INSTALLED**. Slowly push the combustor in at the top apply even pressure to the left and right corners. This will allow for a better view of the bottom edge for the final fitting. **DO NOT FORCE THE COMBUSTOR INTO THE DOME. TAKE YOUR TIME AND WORK IT INTO PLACE SLOWLY.**



7. Once the combustor is installed completely so that all three tabs at touching the face of the dome, replace the flame shield. Never operate your stove without the flame shield in place. The flame shield will protect the face of the combustor against damages from wood when loading and other possible damages that can occur during the cleaning process.



8. The flame shield will rest on the two tabs located on the dome guard and lean slightly forward onto two bolts. Now that your combustor has been installed you can relight your stove. You will continue to receive excellent efficiency and clean burning for years to come. A few reminders, never burn anything other than dry, seasoned cordwood. Burning anything else may contaminate or ruin your new combustor. Also remember to keep your front loading door gasket seal properly adjusted, see "LOADING DOOR TENSION ADJUSTMENT" on page 40. Doing so will improve burn times and extend combustor life span.

The combustor supplied with this heater is a 115.0335 metal combustor. Consult the catalytic combustor warranty also supplied with this wood heater. Warranty claims should be addressed to:

in Canada	in USA
Blaze King Industries / Valley Comfort Systems Warranty Department, 1290 Commercial Way Penticton, BC Canada V2A 3H5, Ph: 250-493-7444	Blaze King Industries Warranty Department, 146A Street Walla, Walla, Washington 99362, Ph: 509-522-2730

RUN-AWAY OR CHIMNEY FIRE

⚠WARNING

A CHIMNEY FIRE CAN PERMANENTLY DAMAGE YOUR CHIMNEY SYSTEM. THIS DAMAGE CAN ONLY BE REPAIRED BY REPLACING THE DAMAGED COMPONENT PARTS. CHIMNEY FIRE DAMAGE IS NOT COVERED BY THE LIMITED WARRANTY.

CAUSES:

1. Using incorrect fuel, or small fuel pieces which would normally be used as kindling.
2. Leaving the door ajar too long and creating extreme temperatures as the air rushes in the open door.
3. Improperly installed or worn gaskets.
4. Creosote build up in the chimney.

SOLUTIONS:

1. Do not burn treated or processed wood, coal, charcoal, colored paper or cardboard.
2. Be careful not to over fire the appliance by leaving the door open too long after the initial start-up.
3. Replace worn, dried out (inflexible) gaskets.
4. Have your chimney cleaned regularly.

WHAT TO DO IF A RUN-AWAY OR CHIMNEY FIRE STARTS:

1. Close the draft fully (lowest position) by shutting off thermostat, and make sure firebox is closed tightly.
2. Call the local fire department.
3. Examine the chimney, attic and roof of the house, to see if any part has become hot enough to catch fire. If necessary spray with a fire extinguisher or water from a garden hose.
4. Do not operate the appliance again until you are certain the chimney has not been damaged.

CREOSOTE FORMATION AND REMOVAL

When wood is burned slowly, it produces tar and other organic vapors which combine with expelled moisture to form creosote. These vapors condense in the relatively cooler chimney flue of a slow burning fire and when ignited, make an extremely hot fire. Check your chimney for creosote and soot regularly, until a safe frequency for cleaning is established. The chimney connector and chimney should be inspected regularly during the heating season to determine if a creosote build up has occurred. Be aware that the hotter the fire, the less creosote is deposited.

If accumulation is excessive, clean the chimney. You may want to call a professional chimney sweep to clean it. Both the chimney and the appliance have to be cleaned at least once a year or as often as necessary.

Have a clearly understood plan to handle a chimney fire.

CHIMNEY MAINTENANCE

The most efficient method to sweep the chimney is using a hard brush. Brush downwards so soot and creosote residues will come off the inner surface and fall to the bottom of the chimney where they can be removed easily. The chimney must be checked regularly and if creosote has accumulated, it must be removed without delay. Cleaning on a regular basis should be sufficient during the coldest months. **ENSURE THE BYPASS DOOR IS OPEN PRIOR TO CLEANING THE CHIMNEY SO THE SOOT AND CREOSOTE FALLS INTO THE FIREBOX.**

Smoke Flue Inspection:

1. The chimney should be inspected regularly during the heating season.
2. If possible, the chimney should be dismantled and cleaned.
3. The chimney should be inspected for possible damage.
4. If it is in good condition, put the chimney back in place; otherwise, it must be replaced.

FIRE EXTINGUISHERS AND SMOKE DETECTORS

All homes with a solid fuel burning appliance should have at least one fire extinguisher in a central location, known to all, and at least one smoke detector in the room containing the appliance. If it sounds an alarm, correct the cause but do not de-activate or relocate the smoke detector.

ASH REMOVAL

This appliance is required to be cleaned frequently because soot, creosote and ash may accumulate. Wait until the stove is fully cooled off before the removal of ashes. **ALWAYS REMOVE THE ASH BUCKET IMMEDIATELY AFTER FILLING**. Ashes should be removed any time they come within one inch of the door opening. It is not necessary or advisable to completely remove all of the ashes when cleaning this stove. Wood burns best in a bed of ashes 1/2" thick. Ashes should be placed in a metal container with a tight fitting lid. The closed container of ashes should be placed on a noncombustible floor or on the ground (outside), 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. Other waste shall not be placed in this container.

⚠WARNING

NEVER STORE HOT ASHES IN A GARAGE OR BASEMENT. HOT ASHES WILL GENERATE CARBON MONOXIDE AND / OR FLAMMABLE GASES. THESE GASES MAY CAUSE SUFFOCATION AND POSSIBLE DEATH.

LOADING DOOR GASKET INSPECTION

Inspect the door gasket for physical deterioration, missing sections or obvious leakage. The stove front should make a groove in the gasket material - one side of the groove (toward the inside) will often be dark or black, and the other side (toward the outside) should be light or white. Dark smudges on the outside of the groove may indicate an air leak. If the groove is very shallow or missing, or if there is a heavy ash or creosote deposit along the bottom edge of the gasket, it may need to be replaced. Frayed or broken gasket material, or a gasket that is hard and unyielding, will also indicate need for replacement. Any time a piece of gasket is missing or is broken anywhere, the entire gasket must be replaced.

To check the gasket further, wait until the stove is cooled and insert a piece of paper (a dollar bill will work) into the door opening and close and latch the door. Obvious resistance should be felt when pulling the paper out Repeat this check several times around the perimeter of the door.

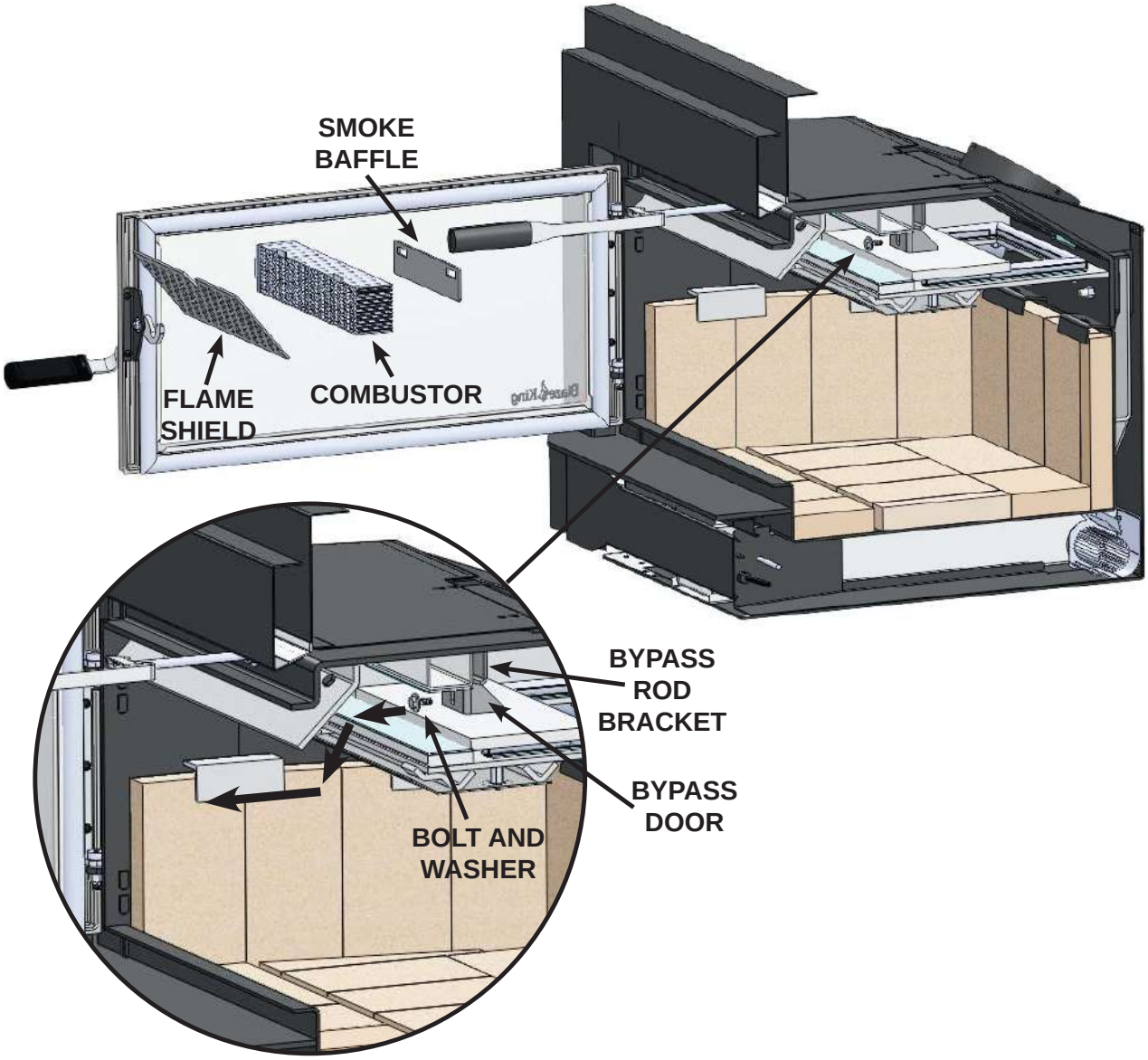
LOADING DOOR GASKET REPLACEMENT

BLAZE KING RECOMMENDS YOUR DEALER PERFORM THIS TASK

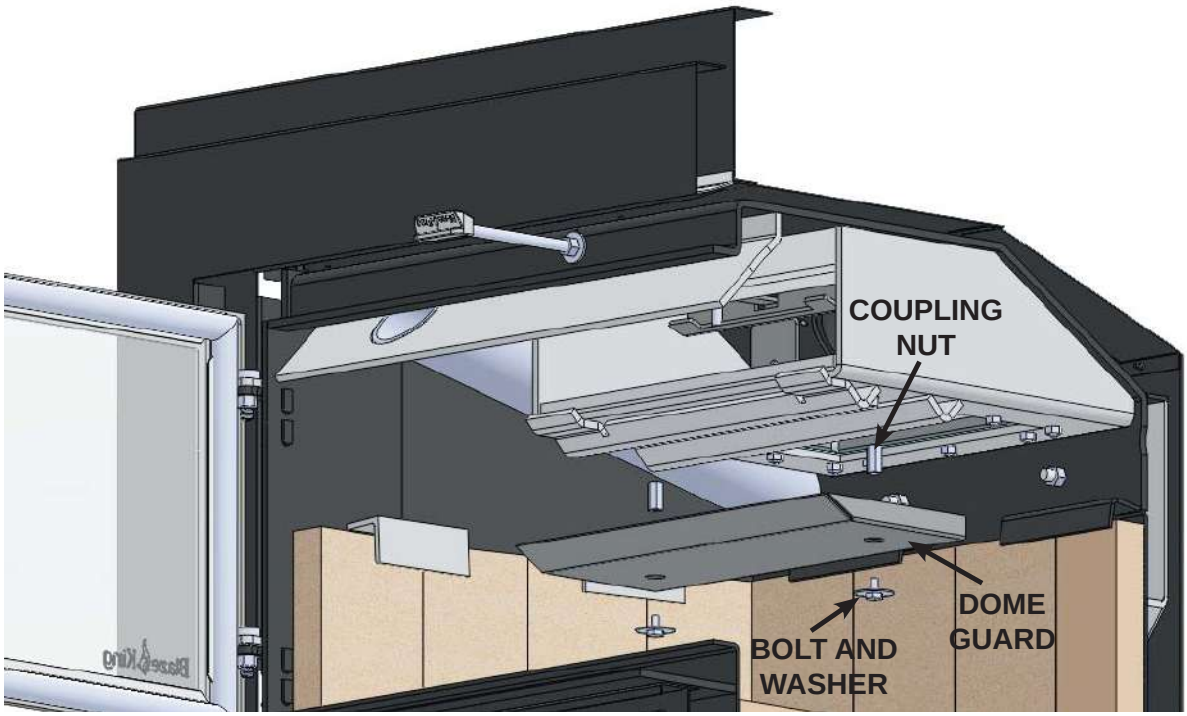
1. If the door gasket is to be replaced, be sure you have Blaze King 7/8" fiber glass gasket ready to re-install, as well as high temperature adhesive. See your Blaze King dealer.
2. Be sure the fire is out and the stove has cooled down. The door does not have to be removed from the stove.
3. With a pair of pliers, pull the old door gasket out of the channel and dispose of it.
4. Thoroughly clean out the channel so the new silicone adhesive will adhere and the gasket will fit smoothly.
5. Dry fit the new gasket first to ensure proper fit. Do not stretch or cut the gasket. Distribute the gasket evenly around the frame.
6. Run a small bead of a high temperature silicone adhesive along the center of the channel. **DO NOT USE HOUSEHOLD SILICONE CAULKING**. High temperature silicone may be obtained from wood stove dealer.
7. Start the new gasket in the lower right corner. Do not stretch or cut the gasket. Distribute the gasket evenly around the frame.
8. Allow the adhesive to dry before closing the loading door. The loading door tension may need to be adjusted, see "LOADING DOOR TENSION ADJUSTMENT" on page 40.
9. Check the fit of the door gasket. Insert a narrow strip of paper into the door opening and close and latch the door. Obvious resistance should be felt when pulling the paper out. Repeat this check several times around the perimeter of the door. If no resistance is felt, adjust door latch catch, see "LOADING DOOR TENSION ADJUSTMENT" on page 40.
10. A tight sealing door extends the burn times & protects the combustor.

BYPASS DOOR GASKET RETAINER REPLACEMENT #Z2022

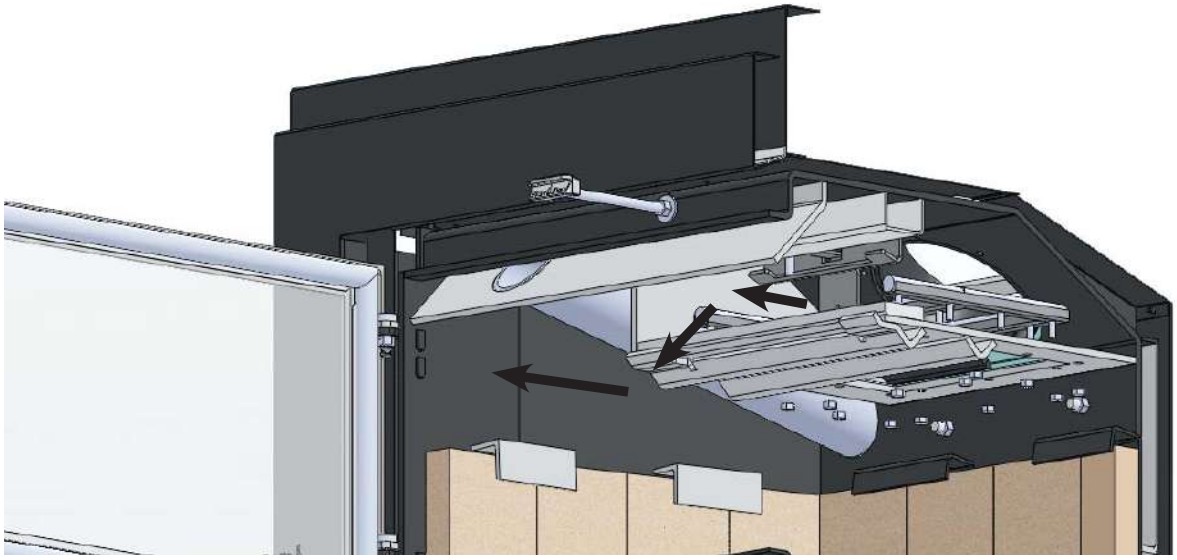
1. Remove flame shield. (see CATALYTIC COMBUSTOR REPLACEMENT step 1)
2. Remove the combustor. (see CATALYTIC COMBUSTOR REPLACEMENT step 2-4)
3. Remove hanging smoke baffle.
4. Open bypass door (slide it all the way forward) and unthread/remove the 1/4-20 bolt and washer that fastens the bypass door to the bypass rod bracket. Remove the bypass door through the combustor opening once detached.



5. Remove the two 1/4-20 bolts and washers that hold the dome guard in place, be sure to support the dome guard during this process is it will come loose. Once the dome guard is removed, unthread the two 1/4-20 coupling nuts that spaced the dome guard from the dome bottom.



6. Remove the twelve remaining 1/4-20 nuts from the dome bottom. Lift the bypass door gasket retainer assembly upwards (enough to clear the threaded posts from the dome) and remove through the combustor opening. Once removed, ensure all debris is cleared from the inner surface of the dome.



7. Once the inner dome surface has been cleared, insert the new bypass door gasket retainer assembly and follow the above instructions in reverse to ensure complete install. Ensure that 1/8" ceramic paper is in between the gasket retainer assembly and inner dome surface. Also ensure that all nuts are completely fastened up to the dome bottom. When tightening the 1/4-20 bolt through the bypass door into the bypass rod bracket, do not over tighten. Simply finger tighten the bolt as this allows the bypass door to move down as the gasket begins to seat after the first few fires.
8. When reinstalling the combustor, ensure it has been rewrapped with new expanding gasket that was supplied with the replacement kit. Do not install combustor without gasket.

DOOR GLASS GASKET INSPECTION

When the stove is cold, hold the glass by placing the palm of each hand on either side of the glass. Press firmly and try to move the glass. If the glass moves the door glass retainers may need to be tightened or the door glass gasket may need to be replaced.

1. Inspect the door glass gasket. If the gasket is frayed or missing sections replace the gasket.
2. Inspect the glass retainers and ensure the screws holding the retainers in place are tight. Hand tighten plus 1/4 turn. Do not over tighten.

DOOR GLASS GASKET REPLACEMENT

BLAZE KING RECOMMENDS YOUR DEALER PERFORM THIS TASK

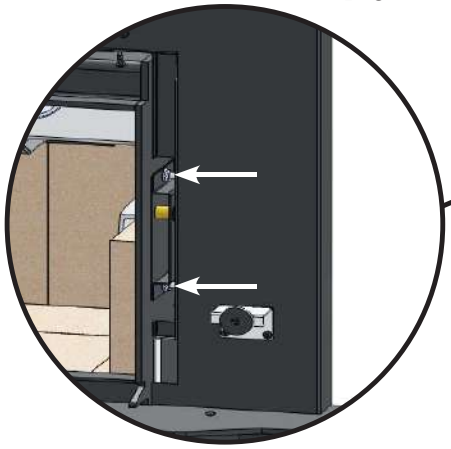
1. You will require Blaze King glass gasket and Blaze King door gasket. Please see your Blaze King dealer.
2. Remove the old glass gasket.
3. Starting at the corner opposite of the "Blaze King" logo, carefully wrap the gasket around the edges, pressing firmly onto the sides of the glass with the gasket centered on the edge. Finish the wrapping with a 1/2" overlap. Ensure the thickness of the gasket remains consistent and uniform.
4. Install glass with the "Blaze King" logo to the lower left corner of the door. Install the glass retainers with original fasteners. Ensure the glass is parallel to the frame and tighten the fasteners evenly.
5. Follow steps on page 38, "**LOADING DOOR GASKET REPLACEMENT**".

DOOR GLASS, CLEANING

The best way to keep the glass clean is to leave the stove on high burn for a period of time after each reloading The moisture which is driven from a new load of wood contributes much of the creosote on the inside of the glass. Removing that moisture at the beginning of the burn cycle helps to keep the glass clean. Leaving the thermostat on a higher setting for 30 minutes to an hour before turning to low for an overnight burn will also help. Heavier deposits may require hand cleaning. Manual glass cleaning should be done when the stove and glass are cool. **DO NOT CLEAN THE GLASS WHILE IT IS HOT**. **WARNING: Do not use abrasive cleaners to clean the glass**. Use a soft cloth. After using any cleaner, thoroughly rinse the glass with water to remove any deposits left by the cleaner. Failure to remove all traces of glass cleaner will result in the glass cleaner residue baking on. This residue may be very difficult to remove.

LOADING DOOR TENSION ADJUSTMENT

1. Lift the outer shroud up and off of magnets and top screws.
2. Open the door.
3. To tighten the door tension use a 7/16" wrench to loosen the two nuts on the latch cover. Slide the latch cover towards the back of the stove and tighten nuts.(**Fig. 17**) Repeat paper test (see "LOADING DOOR GASKET INSPECTION" on page 36).



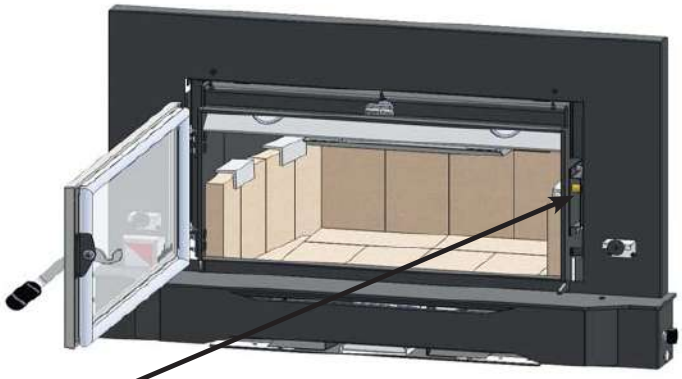


Fig. 17

⚠WARNING

DO NOT OPERATE THIS WOOD STOVE IF THE DOOR GASKET IS MISSING OR DAMAGED DANGEROUS OVER FIRING CAN OCCUR WHICH CAN DAMAGE THE APPLIANCE OR IGNITE CREOSOTE IN THE CHIMNEY, POSSIBLY CAUSING A HOUSE FIRE. IF ANY PART OF THE WOODSTOVE OR FLUE SYSTEM IS GLOWING THE STOVE IS BEING OVER FIRED.

LOADING DOOR HINGE ADJUSTMENT

1. Open the door to 90°.
2. Hold bottom nuts using a 9/16" wrench. Use a 1/4" Allen head screwdriver to back nuts off the bolts. (**Fig. 18**)
3. Remove the door by lifting up and out.

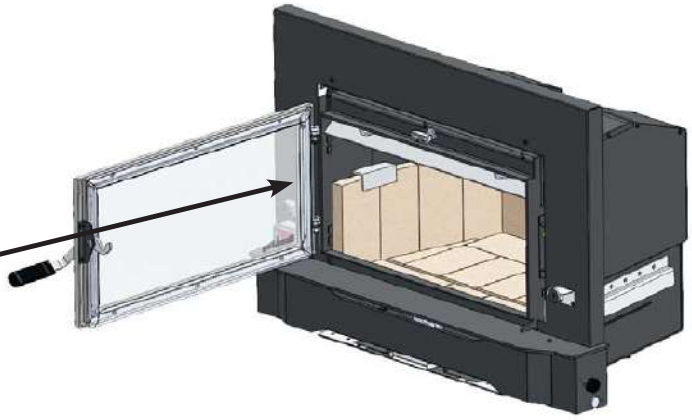


Fig. 18

4. Loosen the four door hinge nuts using a 7/16" wrench. Slide door hinges in to tighten door seal and out to loosen door seal. (**Fig. 19**)

5. Put door back on using nuts and bolts.
6. Repeat paper test (see "LOADING DOOR GASKET INSPECTION" on page 36).

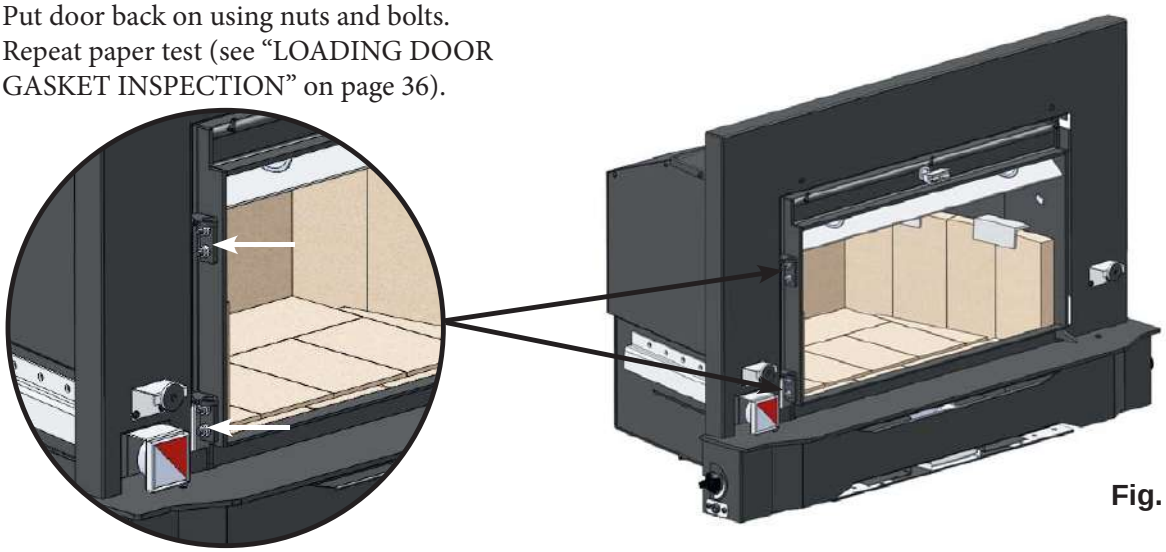


Fig. 19

CHIMNEY DRAFTS

Draft is the force which moves air into the appliance and up through the chimney. The amount of draft in your chimney depends on the length of the chimney, local geography, nearby obstructions and other factors. Too much draft may cause excessive temperatures in the appliance and may damage the catalytic combustor. Inadequate draft may cause back puffing into the room and 'plugging' of the chimney or the catalyst.

Inadequate draft will cause the appliance to leak smoke into the room through appliance and chimney connector joints. An uncontrollable burn or excessive temperature indicates excessive draft.

If you suspect a draft problem in an existing chimney, determine the draft by using a water manometer (or digital draft gauge). The draft should be measured with the stove at **medium burn and high burn**. After the measurement is completed, fill any holes that were made in the chimney connector by using a sheet metal screw of proper size. Recommended draft is **.02 -.03 in. w.c. at medium fire and .05 in. on high burn**. Too little draft results in a sluggish fire and smoke spillage when the stove door is opened. Too much draft (over 0.06 in. w.c. on high burn) makes it unsafe to operate the stove and will void manufacturers warranty.

FAN ASSEMBLY

Routine maintenance of the fan assembly on the side of the stove is not required. However, should it become necessary to replace an individual fan or rheostat, contact your local dealer.

THERMOMETER

The combustor thermometer tells you what was happening 4-8 minutes ago, and remember, it is only an indication of the temperatures of the gasses after they pass through the combustor. The thermometer probe, the part that fits into the stove, must be cleaned at least once a year. Lift it from the stove (be careful, it may be hot) and wipe or scrape it clean. At room temperature, away from the stove, the indicator should point near the bottom of the "Inactive" zone. If, after several years use, you find that the needle no longer points to the bottom of the "Inactive" zone when the thermometer has been at room temperature for 10 minutes or longer, it may need adjustment. Holding the probe with a pair of pliers, loosen the bolt on the top of the dial. Turn the dial to align the pointer with the bottom of the "Inactive" zone, then retighten the bolt.

NOTE: IF YOUR BLAZE KING IS EQUIPPED WITH FANS, TURN OFF FANS AND WAIT 10 MINUTES PRIOR TO READING CATALYTIC THERMOMETER INDICATOR. AIR MOVEMENT ACROSS THE TOP OF THE STOVE MAY PROVIDE FALSE READING.

THERMOSTAT

The thermostat is set at the factory and should not be tampered with. If the thermostat malfunctions contact your dealer for replacement by a qualified installer.

Your Blaze King is designed to allow a wide selection of heat output levels. If you begin to lose control of the amount of heat the stove is emitting, determine the cause early so that major problems may be avoided.
The six major needs of a well-controlled fire are:

1. Knowledgeable operator.
2. Adequate air supply.
3. Firewood of good quality and proper size.
4. Catalytic combustor in good condition.
5. Clean chimney, properly sized and installed.
6. Door gasket tight and firm.

Considering all of the above, number one is the most important for safe and efficient operation of any woodstove. Please study the operation instructions carefully. Consult your BLAZE KING dealer or call the Customer Service Department at Blaze King in the U.S.A. at 509-522-2730 or in Canada at 250-493-7444 if you have any questions not answered in this manual.

All of the six above mentioned needs are interrelated. A deficiency in any one will affect all of the others. If you encounter a problem, determine the source of the problem and then follow-up by checking the other needs as possible contributing factors.

PROBLEM: Chimney Fire	
CAUSE Act immediately regardless of cause	**SOLUTION** Turn the thermostat to lowest setting, check loading door to be sure it is tightly closed. **Call Fire Department.**
After the fire is out, have your chimney and flue connector inspected by a certified chimney sweep. A damaged masonry chimney should be repaired or rebuilt. A prefabricated chimney (factory built) that is damaged should be replaced. Any damage to the flue connector should be corrected before the system is used again. Possible causes of a chimney fire, and remedies for those causes, can be found further in this section: “Excessive Creosote Formation”, and “Spots of Creosote Accumulation in Chimney or Flue Connector”.	

PROBLEM: Not enough heat.	
CAUSE Green or wet wood. Not enough fuel in stove.	**SOLUTION** Use seasoned wood. Don’t be afraid to FULLY load the stove. A FULL load of wood won’t burn any hotter than the thermostat is set.
Obstruction in chimney or cap screen. Combustor plugged or coated.	Remove obstruction. See “COMBUSTOR, TESTING” See “COMBUSTOR, CLEANING”
Combustor not functioning.	See “COMBUSTOR, TESTING”. If needed, replace combustor, See”“COMBUSTOR, REPLACING”.
Thermostat set too low.	Raise thermostat setting.
Thermostat not operating properly.	Consult your Blaze King dealer.
Poor draft caused by an oversize flue	Measure draft with Manometer. See “CHIMNEY DRAFTS” Consult your Blaze King dealer or a chimney sweep.
Strong, gusting winds causing downdraft in chimney	Install wind-resistant chimney cap. Directional caps may not stay freely rotating. If you have a directional cap, check it frequently.
Tightly sealed house, inadequate air supply.	Slightly open a window, near the stove.
Reloading too much wood on top of too few coals.	Allow a larger bed of coals to build up.

PROBLEM: Too much heat.	
CAUSE	**SOLUTION**
By-Pass door left open.	Close the by-pass door.
Thermostat set too high.	Lower thermostat setting.
Loading door gasket leaking, admitting excess air into firebox.	Replace door gasket and/or adjust door. See “GASKET INSPECTION”
Excessive draft in the chimney.	Measure draft with a Manometer. See “DRAFTS”. Consult your Blaze King dealer or a chimney sweep. Install a cap.
Thermostat not operating properly.	Consult your Blaze King dealer.
Wood is too small.	Use larger pieces.

PROBLEM: One or both fans will not run, or there is no adjustment for fan speed.	
CAUSE	**SOLUTION**
Fans mounted improperly.	Check that fan blade’s not touch edges of hole.
Fan speed control.	Consult your Blaze King dealer for replacement.

PROBLEM: Fans minimum speed too fast or maximum speed too slow.	
CAUSE	**SOLUTION**
Fan speed control out of adjustment.	Consult your Blaze King Dealer.

PROBLEM: Excessive creosote formation in chimney and chimney Connector.	
CAUSE	**SOLUTION**
By-pass door left open.	Close by-pass door.
By-pass door not sealing tightly.	Inspect by-pass door and seal for warping. Ash or creosote buildup may occur on door or seat. With stove cold scrape and vacuum area around by-pass. Be sure all mating steel surfaces are clean and smooth.
Improper operation.	Check thermostat setting and operating procedures. See “THERMOSTAT & OPTIMAL THERMOSTAT SETTING”
Wood too green or wet.	Use seasoned wood. Use a moisture meter to confirm.
Catalytic combustor not operating properly.	Inspect the combustor. See “CATALYTIC COMBUSTOR, TESTING”
Poor draft caused by an oversize or short flue, etc.	Measure draft with Manometer. See “DRAFTS”. Consult your Blaze King dealer or a chimney sweep.
Chimney too cold or poorly insulated.	Upgrade chimney system. Consult your Blaze King dealer or a chimney sweep.

PROBLEM: Catalytic combustor thermometer (on top of stove) does not go into "Active" zone, or does not stay there for long. (Fans must be in “off” position for 10 minutes prior to checking)	
CAUSE	**SOLUTION**
Improper operation.	Check thermostat setting and operating procedures. See “THERMOSTAT & OPTIMAL THERMOSTAT SETTING”
Obstruction in chimney or cap.	Clean chimney, remove obstructions.
Faulty combustor thermometer.	Replace thermometer and Recheck combustor operating Temperature.
Wood too green or wet.	Use seasoned wood.

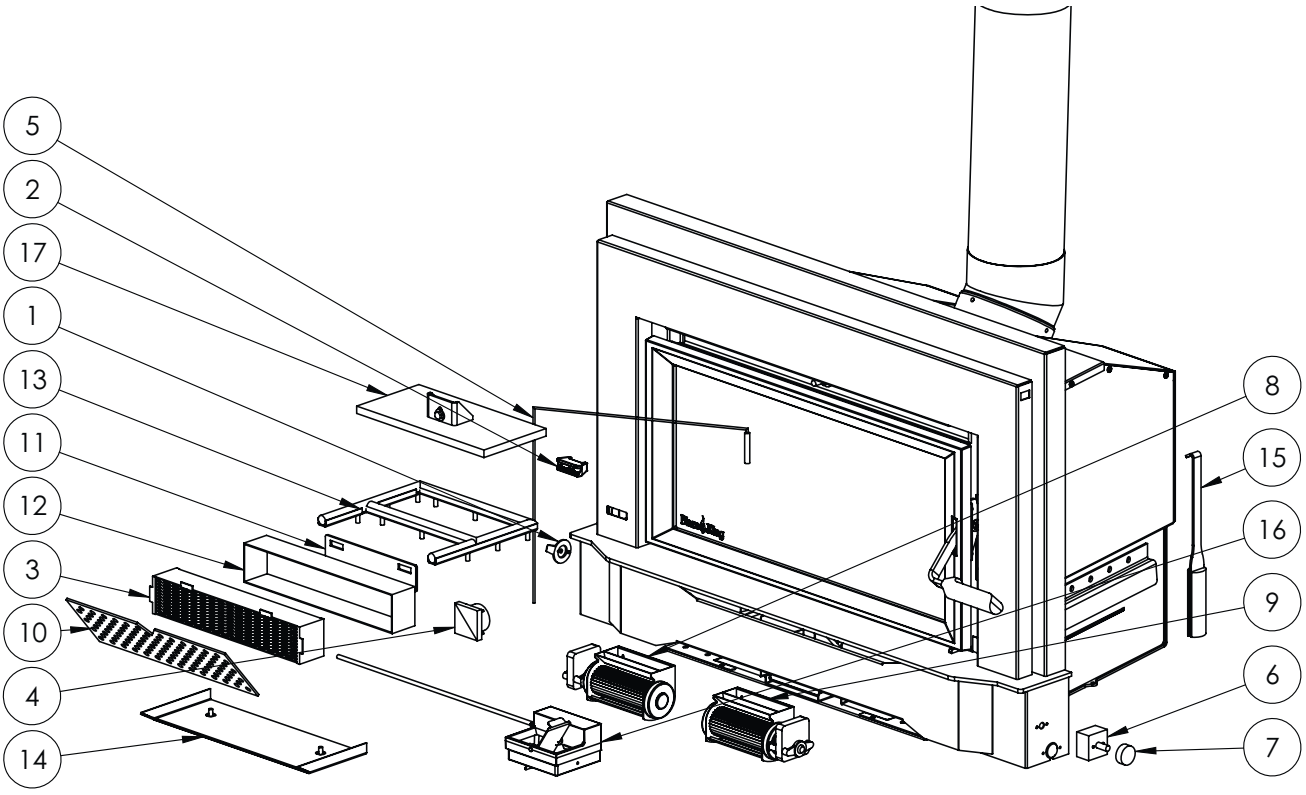
Combustor plugged or coated.	Clean combustor. See “CATALYTIC COMBUSTOR TESTING”
Combustor not functioning.	Check and test combustor. If needed replace combustor. See “CATALYTIC COMBUSTOR, REPLACING”
Thermostat not operating properly.	Consult your blaze King Dealer.
By-pass door leaking or not closing completely.	Inspect and clean area around by-pass doors. Adjust or replace gasket if necessary. Consult your Blaze King Dealer.

PROBLEM: Spots of creosote accumulation in chimney or chimney connector.	
CAUSE Air leaks in chimney or chimney connector.	**SOLUTION** Inspect chimney and / or chimney connector. Repair or replace as necessary. Check to be sure that the chimney connector is installed correctly.
CAUTION: a leaking chimney connector is a fire hazard and demands immediate attention.	
Poor draft caused by an oversize flue, single wall pipe, to many elbows, etc.	Measure draft with Manometer. See “DRAFTS”. Consult your Blaze King dealer or a chimney sweep.

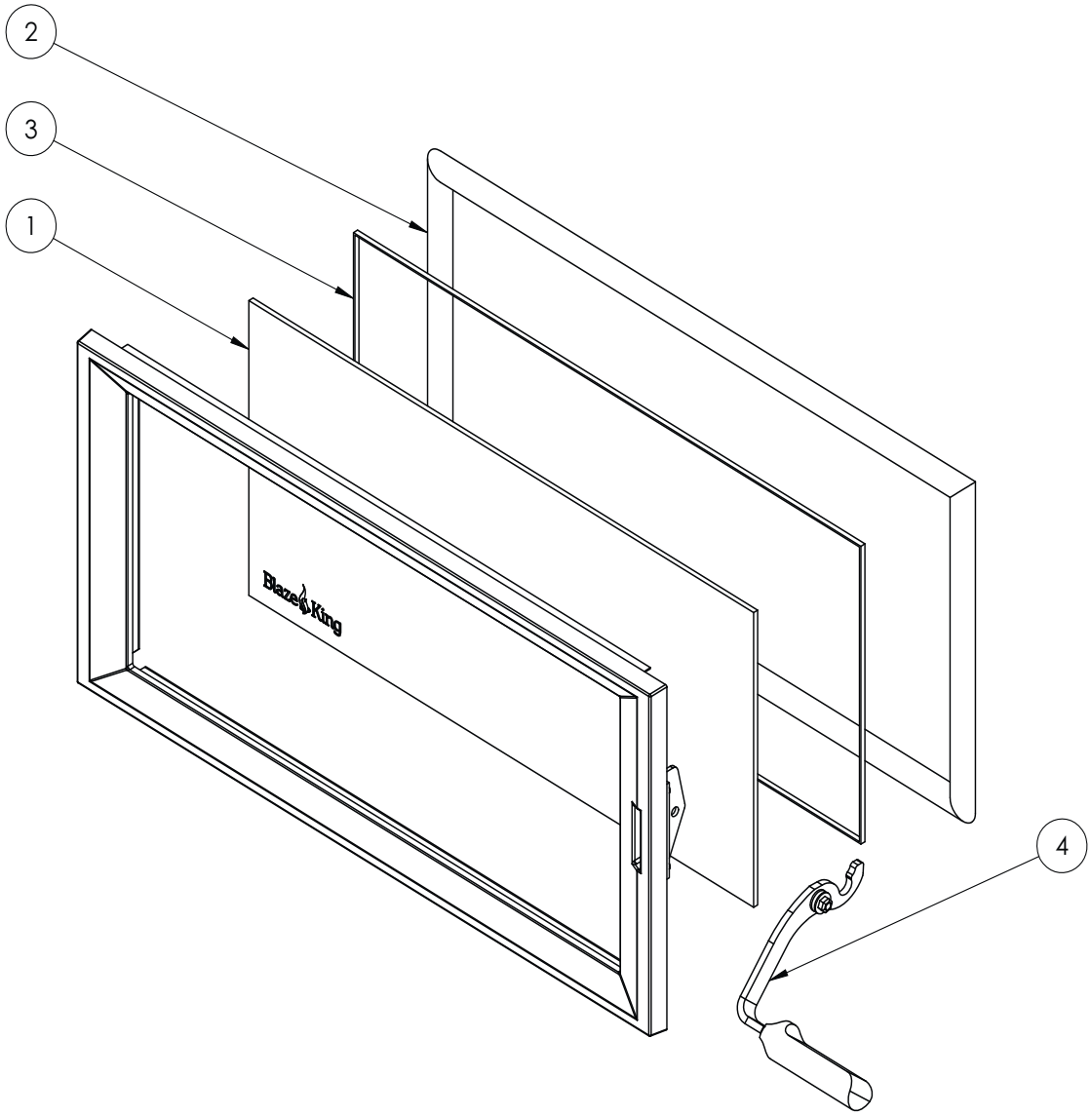
PROBLEM: Door glass quickly becomes coated with creosote.	
CAUSE Low thermostat setting or lowering the thermostat setting too far, too quickly.	**SOLUTION** Turn the thermostat to the warmest setting during the first 20-30 minutes or until the fire is well established after each reloading.
Poor draft caused by an oversize or short flue, etc.	Measure draft with Manometer. See “DRAFTS”. Consult your Blaze King dealer or a chimney sweep.
Obstruction in chimney or cap screen.	Remove obstruction. Clean chimney and/or cap screen.
Strong, gusting winds causing downdraft in chimney.	Install wind-resistant chimney cap.
Tightly sealed house, inadequate air supply.	Open a window, slightly, near the stove.
Burning poorly seasoned wet wood, or wood with high pitch content.	Use seasoned wood with low pitch content, such as some types of pine.

PROBLEM: The combustor temperature cannot be controlled. Turning the thermostat down often makes the combustor temperature go up.
CAUSE Turning the thermostat down, particularly in the first half of the burn cycle, causes the fire to emit more smoke, which is fuel for the combustor. The combustor temperature therefore climbs for up to several hours. This is normal, and is of no concern. As long as only the combustor temperature is elevated, there is nothing to worry about.

PROBLEM: Smoke spills from door opening when loading fuel	
CAUSE Spark arrestor screen on cap plugged.	**SOLUTION** Clean spark arrestor screen to bare metal wire.
Chimney too cold.	Make certain insulated liner is used in installation.
Not enough vertical rise.	Make certain sufficient vertical rise is observed.
Chimney not drafting.	Turn thermostat to highest setting, open bypass, leave loading door closed and wait 5-10 minutes to increase chimney or flue temperature.

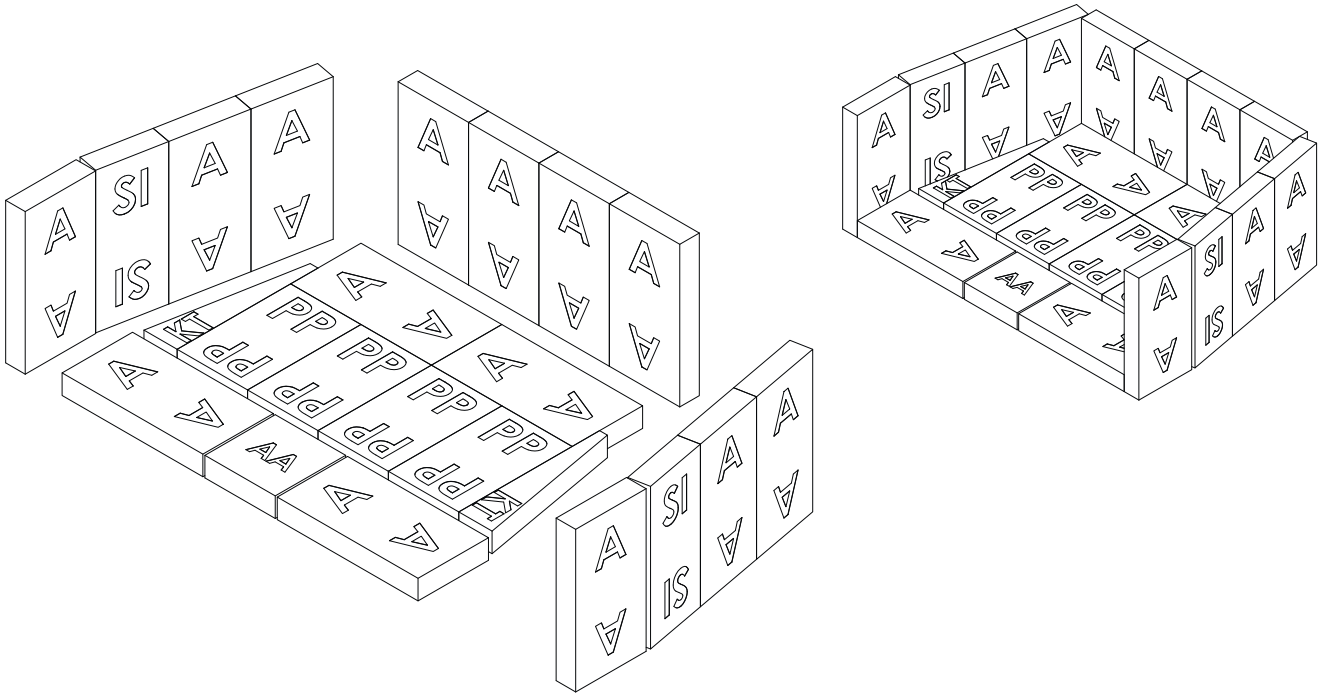


ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	0102	KNOB BLACK 1.5DX.75 HIGH	1
2	110.2060	CAST BYPASS LATCH	1
3	115.0335	METAL COMBUSTOR 2.48x13x2 LL+	1
4	120.0800	ANALOG CAT THERM	1
5	120.0800.1	2" x 36"L THERM PROBE	1
6	0136	RHEOSTAT WITH OFF SWITCH	1
7	0137	RHEOSTAT KNOB SILVER INLAY	1
8	150.0710.L	FAN CROSSFLW 120x47MM LEFT	1
9	150.0710.R	FAN CROSSFLOW 120x47MM RIGHT	1
10	2030	FLAME SHEILD GRATER 13.5 x 4	1
11	2049	SMOKE BAFFLE	1
12	2056	25 INSERT COMBUSTOR GASKET	1
13	Z2022	BYPASS GASKET RETAINER ASM	1
14	Z2050	DOME GUARD KIT	1



ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	130.0270	5MM PYROCERAM CERAMIC GLASS	1
2	155.0186-8ft-25i	DOOR GASKET	1
3	155.0254AS-25i	SC25 DOOR GLASS GASKET	1
4	Z2044	SC25 DOOR HANDLE	1

Brick Layout



ITEM NO.	PART NUMBER	QTY.
1	A Size Brick	14
2	AA Size Brick	1
3	KT Size Brick	2
4	PP Size Brick	4
5	SI Size Brick	2

BLAZE KING WOOD LIMITED WARRANTY

Blaze King and Valley Comfort's respective brands extend the following warranty for wood fired appliances purchased from an authorized Blaze King / Valley Comfort dealer and installed in the United States of America or Canada. Warranty starts with date of purchase by the original owner (End User) except as noted for replacement parts.

Warranty Period		Components Covered	
Parts	Labor	Wood	
1 Year		X	All parts, materials and surface finishes (flaking and peeling) Subject to Conditions, Exclusion, and Limitations listed.
2 Years		X	Fan assemblies and motors, thermal sensors, catalytic thermometer, bi-metallic thermostat assembly, door handle metal components.
5 Years	2 Years	X	Firebox & Heat Exchanger, Bypass Door Steel Components
6 Years		X	Catalyst Combustor (see Conditions, Exclusions, and Limitations)
1 Year		X	Other Replacement Parts
See Conditions, Exclusions, and Limitations			

Blaze King Wood Limited 5 Year Warranty

Blaze King is the manufacturer of the Blaze King line of heating products. At Blaze King, our commitment to the highest level of quality and customer service is the most important thing we do. Each Blaze King stove is built on a tradition of using only the finest materials and is backed by our limited warranty to the original purchaser. With Blaze King, you're not just buying a stove; you're buying a company with years of unequalled performance and quality.

Limited Six (6) Year Warranty:
The CATALYTIC COMBUSTOR is under warranty by Blaze King for six (6) years from the date of original retail purchase. The purchaser shall pay the following share of the then current retail price for the combustor: The first three (3) years no charge, 4th year 60%; 5th year 70%, 6th year 80%. The Combustor must be returned to your dealer along with a completed COMBUSTOR FAILURE REPORT and original proof of purchase document.

Limited (5) Year Warranty:
Under this warranty, Blaze King covers the stove body and accessories against defects in materials and workmanship, for part repair or replacement for the first five (5) years *** to the original purchaser. This Warranty covers: All Steel firebox components against defects in material and workmanship. Please see the exclusions and limitation section below as certain restrictions and exclusions apply this warranty.

Limited Two (2) Year Warranty:
Under this warranty, Blaze King covers, fan assemblies , modular thermostat and door handle steel components against defects in materials and workmanship, for part repair or replacement and limited labor for the first two (2) years to the original purchaser. Please see the exclusions and limitation section below as certain restrictions and exclusions apply to this warranty.

Limited One (1) Year Warranty:
Under this warranty, Blaze King covers all parts and materials against defects in materials and workmanship including exterior paint finishes, for part repair or replacement and limited labor for the first year to the original purchaser. Please see the exclusions and limitation section below as certain restrictions and exclusions apply to this warranty.

How the Warranty Works

1. All warranties by the manufacturer are set herein and no claim shall be made against the manufacturer on any oral warranty or representation. All claims under this Limited Warranty must be made in writing by your dealer.
2. Any stove or part thereof that is repaired or replaced during the Limited Warranty period will be warranted under the terms of the Limited Warranty for a period not exceeding the remaining term of the original Limited Warranty or six (6) months, whichever is longer.
3. For any part or parts of this stove, which in our judgment show evidence of defects, Blaze King reserves the option to repair or to replace the defective part(s) through an accredited distributor or agent, provided the defective part is returned to the distributor or agent, transportation prepaid, if requested.
4. If you discover a problem that you think may be covered by the Limited Warranty, you MUST REPORT it to your Blaze King dealer WITHIN 30 DAYS from the date the problem was first detected, giving them proof of purchase and the date of purchase. The dealer will investigate the problem and work with Blaze King to determine whether the problem:
   a) Is covered by the Limited Warranty or
   b) Can be fixed in your home or does the product need to be returned to Blaze King for repair.
5. If Blaze King determines that the stove needs to be returned to Blaze King for repair, the customer has the responsibility and the expense of removing it from their home and shipping it to Blaze King. If the problem is covered by the Warranty, Blaze King will repair or replace the item at their discretion and the customer will be responsible for return shipping and re-installation in their home.
6. If the problem is not covered by the Limited Warranty, the customer will be responsible for all repair costs, as well as all storage, shipping and the cost of removing and re-installing the stove.
   If you are not satisfied with the service provided by the Blaze King dealer, write to Blaze King at the address listed on the last page of the Owner's Manual. Include a copy of the original purchase invoice and a description of the problem.

Exclusions and Limitations:

1. This Warranty does not cover tarnish, discoloration or wear on the plated surfaces Painted finishes will change color after initial firing and will continue to change through the lifetime of the stove. This is normal occurrence for all high temperature coatings.
2. This Warranty does not cover gasket material or firebrick.
3. Blaze King strongly recommends installation by a certified installer. Failure to comply may adversely affect coverage under the terms of this warranty. This Limited Warranty covers defects in materials and workmanship only if the product has been installed in accordance with local building and fire codes; in their absence refer to the owner's manual. If the product is damaged or broken as a result of any alteration, wilful abuse, mishandling, accident, neglect, or misuse of the product, the Limited Warranty does not apply.
4. The stove must be operated and maintained at all times in accordance with the instructions in the Owner's Manual. If the unit shows signs of neglect or misuse, it is not covered under the terms of this Warranty policy. Performance problems due to operator error will not be covered by the Limited Warranty policy.
   Some minor expansion, contraction, or movement of certain parts and resulting noise, is normal and not a defect and, therefore, is not covered under this Limited Warranty.
5. Misuse includes over-firing. Over-firing can be identified later by warped plates and paint pigment being burnt off. Over-firing this appliance can cause serious damage and will nullify the Limited Warranty.
6. The Limited Warranty will cover glass thermal breakage only and will not cover misuse of the stove glass, including but not limited to:
   a) Glass that is struck, has surface contaminates or has had harsh or abrasive cleaners used on it.
   b) If the door is slammed or is closed while wood in the firebox is protruding out the stove opening thus striking the glass.
7. This warranty does not cover products made or provided by other manufacturers and used in conjunction with the operation of this stove without prior authorization from Blaze King The use of such products may nullify the Limited Warranty on this stove. If unsure as to the extent of this Limited Warranty, contact your authorized Blaze King dealer before installation.
8. Blaze King will not be responsible for inadequate performance caused by environmental conditions.
9. The Limited Warranty does not cover installation and operational related problems such as use of downdrafts or spillage caused by environmental conditions. Environmental conditions include but are not limited to nearby trees, buildings, roof tops, wind, hills, mountains, inadequate venting or ventilation, excessive offsets, negative air pressures or other influences caused by mechanical systems such as furnaces, fans, clothes dryers etc.
10. The Limited Warranty does not cover damage caused by burning salt-saturated wood, corrosive driftwood, chemically treated wood or any fuel not recommended in the Owner's Manual (use cord wood only).
11. The Limited Warranty is void if:
    a) The stove has been operated in atmospheres contaminated by chlorine, fluorine or other damaging chemicals.
    b) The stove is subject to submersion in water or prolonged periods of dampness or condensation.
    c) Any damage to the unit, combustion chamber or other components due to water, or weather damage which is the result of, but not limited to, improper chimney/venting installation.
    d) Salt air in coastal areas or high humidity can be corrosive to the finish; these environmental conditions can cause rusting. Damage caused by salt air or high humidity is not covered by the Limited Warranty.
12. Exclusions to the Limited Warranty include: injury, loss of use, damage, failure to function due to accident, negligence, misuse, improper installation, alteration or adjustment of the manufacturer's settings of components, lack of proper and regular maintenance, alteration, or act of God.
13. The Limited Warranty does not cover damage caused to the stove while in transit. If this occurs, do not operate the stove and contact your courier and/or dealer.
14. The Limited Warranty does not extend to or include paint, door or glass gaskets or firebricks damage caused by normal wear and tear, such as paint discoloration or chipping, worn or torn gaskets, chipped or cracked firebrick, etc.
15. The Limited Warranty does not include damage to the unit caused by abuse, improper installation, or modification of the unit.
16. Damage to plated surfaces caused by fingerprints, scratches, melted items, or other external scores and residues left on the plated surfaces from the use of abrasive cleaners or polishes is not covered in this warranty.
17. Blaze King is free of liability for any damages caused by the stove, as well as inconvenience expenses and materials. The Limited Warranty does not cover incidental or consequential damages.

18. The Limited Warranty does not cover any loss or damage incurred by the use or removal of any component or apparatus to or from the Blaze King stove without the express written permission of Blaze King and bearing a Blaze King label of approval.
19. Any statement or representation of Blaze King Products and their performance contained in Blaze King advertising, packaging literature, or printed material is not part of the Limited Warranty.
20. The Limited Warranty is automatically voided if the stove's serial number has been removed or altered in any way. If the stove is used for commercial purposes, it is excluded from the Limited Warranty.
21. No dealer, distributor, or similar person has the authority to represent or warrant Blaze King Products beyond the terms contained within the Limited Warranty. Blaze King assumes no liability for such warranties or representations.
22. Blaze King will not cover the cost of the removal or re-installation of the stove, hearth, facing, mantels, venting or other components.
23. Labor to replace or repair items under this Limited Warranty will be covered per our warranty service fee reimbursement and labor rates are set per component schedule. Labor rates vary from location to location and as such total labor costs may not be covered. Please consult with your dealer or service technician for any additional charges such as travel time or additional labor charges that may apply.
24. For parts of the Blaze King woodstove or fireplace insert warranted beyond the first year, the five year limited warranty will have the same obligations as described in this document, provided, however that the purchaser shall pay the following percentage of the then current retail cost of the repair or the replacement, according to the year after purchase in the which the defect is brought to the attention of Blaze King.*** During the 2nd year----purchaser pays 20%. 3rd year ----purchaser pays 40%. 4th year -----purchaser pays 60%. 5th year---- purchaser pays 80%.
25. If a defect or problem is determined by Blaze King to be non warrantable, Blaze King is not liable for travel costs for service work. In the event of in-home repair work, the customer will pay any in-home travel fees or service charges required by the Authorized Dealer.
26. At no time will Blaze King be liable for any consequential damages which exceed the purchase price of the unit. Blaze King has no obligation to enhance or modify any stove once manufactured (example: as a stove model evolves, field modifications or upgrades will not be performed).
27. This Limited Warranty is applicable only to the original purchaser and it is nontransferable.
28. This warranty only covers Blaze King Products that are purchased through an authorized Blaze King dealer.
29. If for any reason any section of the Limited Warranty is declared invalid, the balance of the warranty remains in effect and all other clauses shall remain in effect.
30. The Limited Warranty is the only warranty supplied by Blaze King, the manufacturer of the stove. All other warranties, whether express or implied, are hereby expressly disclaimed and the purchaser's recourse is expressly limited to the Limited Warranty.
31. Blaze King and its employees or representatives will not assume any liability for damages, either directly or indirectly, caused by improper usage, operation, installation, servicing or maintenance of this stove.
32. Blaze King reserves the right to make changes without notice. Please complete and mail the warranty registration card and have the installer fill in the installation data sheet in the back of the manual for warranty and future reference.
33. Blaze King is responsible for stocking parts for a maximum of seven (7) years after discontinuing the manufacture or incorporation of the item into its products. An exception to this would be if an OEM supplier is not able to supply a part.

NOTES

Installer: Please complete the following information

Dealer Name & Address:_____

_____

Installer (print): _____

Installer (sign): _____

Phone #: _____

Date Installed:_____

Serial No.: _____

Oct 15, 2015
Prepared by Ashnil Reddy
Product Development, Blaze King Industries

Blaze King Sirocco SC25 EPA Test Burn Instructions

The following literature shall be used as a guideline when operating a Blaze King Sirocco SC25 during an EPA 5G Wood Heater Test.

** before starting any test run ensure unit is clean; use vacuum to remove any material left from previous burns and zero scale**

Kindling Load

- prepare 10 lbs of dry Douglas Fir (cordwood or cribwood @ < 15% M.C.)
- load into the stove in a crib fashion, leaving gaps for airflow
- with the thermostat set to high and the bypass door open, light the fire
- leave the loading door cracked open until fire is well established
- once loading door is closed and combustor temperature begins to climb, close the bypass door, turn fan on to high
- during the burn it may be necessary to open loading door and stir up wood load to ensure thorough burn
- once load has burned down to 2.0 lbs, open loading door and break down remaining kindling load into chunks of coal
- scoop out coals (as much as possible) and zero scale reading to eliminate any weight from moisture loss accumulated in unit/stack before fire was lit
- place coals back in unit and flatten to make an even coal bed.
- close loading door and prepare to load preburn.

Preburn Load

- consists of ripped 2x4's cut to 11 1/2" - 12" long (x4) and 16 1/2" - 17" long (x4). The ideal preburn wood load should have 19-22% moisture content and weigh 12 lb.
- when ready to load preburn ensure thermostat is set to high, turn fan off, open bypass door then loading door and place 4 pieces (12" long) onto coal bed in a front-to-back orientation, evenly spaced. Then place 4 pieces (17" long) on top in a side-to-side orientation, evenly spaced, keeping the load towards the front of the unit. Leave the loading door slightly cracked for 4 minutes (or until good fire is established) and then latch shut. Leave the bypass door open for 3 minutes (or until good fire is established) and then slide shut. Turn fan back on to high. Keep loading time to a minimum.
- let unit burn until the following weights are reached for their respective turn down settings:
    - low burn = 4.5 lbs
    - medium low burn = 7.0 lbs
    - medium high burn = 11.0 lbs
    - high burn = no turn down
    - **note: turn down weight is based on fuel load weight (subject to change)
- at turn down time, fan speed is also reduced respectively:
    - low burn = rheostat knob at lowest point
    - medium low burn = rheostat knob 1/3 open
    - medium high burn = rheostat knob 2/3 open
    - high burn = rheostat knob fully open
- once load has burned down to desired coal bed weight (60-80 min after turndown), and keeping the bypass door closed, open the loading door and flatten down preburn load into a coal bed. Close loading door and prepare to load test fuel. Once again, keep time the loading door is open to a minimum.

Test Load

- consists of ripped 2x4's (x3) cut to 16 3/4" - 17" long and 4x4's (x2) cut to 16 3/4" - 17" long. The ideal test wood load should have 19-23% moisture content and weigh 15.8 lb.
- when ready to load; turn thermostat knob to high, turn fan off, open bypass door, open loading door and load test fuel (three 2x4's and two 4x4's). Leave the loading door slightly cracked for 4 minutes (or until good fire is established) and then latch shut. Leave the bypass door open for 3 minutes (or until good fire is established) and then slide shut.
- for low, medium low, and medium high burns, leave the thermostat set to high for the full 5 minutes of the beginning of the test before turning it down to its respective burn category setting. After the test has run for 30 minutes, turn the fan on to its respective burn category speed (as previously listed).

Appendix A

Ashford 25 (AF25) Drawings, Label, and Manuals

AF 25 Drawings
[Redacted]

AF 25 Label

SN -

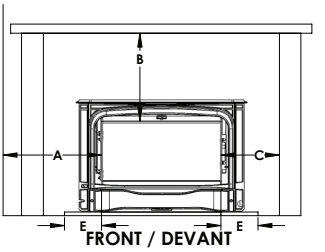
Tested & Listed By O-T-L Portland Oregon USA C US
OMNI-Test Laboratories, Inc.
Report #0142WN016E

ASHFORD INSERT - Encastrable Ashford

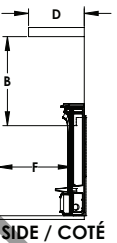
BLAZE KING CATALYST STOVE - BLAZE KING ENCASTRABLE CATALYTIQUE
Room heater, solid fuel type. / Appareil de chauffage approuvé pour type de carburant solide.
MODEL / MODÈLE: AF25
Tested to / Testé pour: UL 1482, Ed 7 2011 / ULC S628-93
CERTIFIED IN BOTH UNITED STATES AND CANADA / CERTIFIÉ POUR LES ÉTATS-UNIS ET LE CANADA

PREVENT HOUSE FIRES - Install and use only in accordance with Blaze King's installation and operation instructions. Install and use in a code complying fireplace only. Contact local building or fire officials about restrictions and installation inspection in your area. Do not remove bricks or mortar in masonry fireplace. Do not use grate or elevate fire. Inspect and clean chimney frequently - under certain conditions of use, creosote buildup may occur rapidly. CHIMNEYS: Do not connect this unit to a chimney flue serving another appliance. Do not over fire - if heater or chimney glows, you are over firing. COMPONENTS REQUIRED FOR INSTALLATION: 6" stainless steel liner - listed to: UL 1777, ULCS635 OR ULCS640, and part #2054 flue extension.
PRÉVENTION DES INCENDIES- Installer et utiliser cet appareil conformément aux instructions d'installation et du mode de fonctionnement de Blaze King. Installer et utiliser seulement selon le code conforme, concernant les foyers. Contacter le code du bâtiment local ou le département des incendies à propos des restrictions et des inspections des installations de votre région. Ne pas retirer les briques ou le mortier dans votre foyer de maçonnerie. Ne pas utiliser de grille et ne pas surélever le feu. Inspecter et nettoyer votre cheminée fréquemment- dans certaines conditions d'utilisation, une accumulation de créosote peut se produire rapidement. Cheminées : Ne pas raccorder cet appareil à un conduit de cheminée desservant un autre appareil. Ne pas surchauffer- si l'appareil ou les conduits deviennent rougeoyant, vous êtes en surchauffe. Composantes requises pour l'installation : Gaine de 6po en acier inoxydable inscrite sous : UL 1777, ULCS635 Ou ULCS640, et pièce #2054 extension de conduit.

Minimum clearances to combustibles, measured from firebox door flange / Dégagements minimum requis entre l'appareil à tout matériau combustible à partir du rebord de l'ouverture de porte de la chambre à combustion.		
A	Side of door flange to combustible wall. / Du côté du rebord de l'ouverture de porte à tout mur combustible.	13.5" 343 mm
B	Top of door flange to bottom of mantel and combustible facing. (with mantle shield.) / Du dessus du rebord de l'ouverture de porte au bas du manteau et de toute façade combustible. (avec manteau avec protection)	38" / 966 mm (24" / 610 mm)
C	Side of door flange to side combustible facing. / Du côté du rebord de l'ouverture de la porte à toute surface de côté combustible.	10" 254 mm
D	Mantle width maximum. (with mantle shield part #2067) / Largeur maximum du manteau. (avec protection de manteau pièce #2067)	12" / 305 mm (8" / 204 mm)
E	Minimum hearth side extension * / Extension latérale minimum du foyer	8"*
F	Mimimum hearth front extension / Extension frontale minimum du foyer	16" USA 18" CANADA



FRONT / DEVANT



SIDE / COTÉ

*** Measured from each side of the fuel loading and sash removal openings / Mesuré à partir de chaque côté de l'ouverture de la porte de chargement et du tiroir de cendre**

FLOOR PROTECTION / PROTECTION DU PLANCHER:
A non-combustible (UL1618 type 1) floor protection is required for all installations extending 16" (in USA) or 18" (in Canada) in front of the door and extending 8" to either side of the door opening. With the floor flush with the bottom of the appliance and to an elevation of 5" below the firebox bottom, a 1/2" layer of thermal protection where R=1.06 is required. Anything 0 to 5" below the firebox bottom requires a (UL 1682 type 2) thermal protection where R=1.06 is required.
Une protection de plancher non combustible est requise (UL1618 type 1) pour toutes les installations s'étendant de 16 po (aux USA) ou de 18 po (au Canada) en avant de la porte et s'étendant de 8 po de chaque côté de l'ouverture de porte. Avec le plancher au même niveau du fond de l'appareil et à une élévation de 5 po en dessous du fond de la chambre à combustion, une couche de protection thermique de 1/2" où R = 1,06 est nécessaire. Tout de 0 à 5 "en dessous du fond de la chambre à combustion nécessite une (UL 1,682 type 2) protection thermique R = 1,06 est nécessaire.

Electrical rating: (115 VAC, 60 Hz, 0.58 Amps. Risk of electrical shock. Disconnect power before servicing unit. Do not route power cord in front of or beneath heater).
U.S. ENVIRONMENTAL PROTECTION AGENCY - 2015 Standard - certified to comply with 2015 particulate emission standards (EPA test methods 28R and 5G with an emission-rate of 0.90 g/hr). Not approved for sale after May 15, 2020. This wood heater needs periodic inspection and repair for proper operation. Consult the owner's manual for further information. It is against federal regulations to operate this wood heater in a manner inconsistent with the operating instructions in the owner's manual, or if the catalytic element is deactivated or removed. Only operate with doors closed. Open door to feed fire ONLY. Open the bypass before opening the door. Do not obstruct combustion air openings. For Use With Solid Wood Fuel Only - Do not burn other fuels, this may make the catalyst in the combustor inactive. The performance of the catalytic device or its durability has not been evaluated as part of the certification. Metal combustor part number: 115.0335. Provide adequate outside air for combustion. *Replace with only ceramic glass, 5 mm. Thickness.

Estimation électrique: (115 VAC, 60 Hz, 0.58 Amps. Risque d'électrocution débrancher le courant avant de réparer l'unité. Ne pas faire courir le fil l'alimentation en avant ou en dessous de l'appareil de chauffage).
AGENCE DE PROTECTION DE L'ENVIRONNEMENT U.S.- STANDARD 2015 – certifie conformément aux normes standard d'émissions de particules 2015 (Méthodes de test 28R et 5G EPA avec un taux d'émission de 0.90 gr/hre). Non apprové pour la vente après le 15 mai 2020. Cet appareil de chauffage au bois nécessite des inspections périodiques et des réparations pour un fonctionnement adéquat. Consulter le manuel du propriétaire pour plus d'informations. Il est contre les règlements fédéraux de faire fonctionner cet appareil de chauffage à l'encontre des instructions d'utilisation fournies dans le manuel du propriétaire, ou si l'élément catalytique a été enlevé ou désactivé. *UTILISER L'appareil UNIQUEMENT AVEC LES PORTES FERMÉES. Ouvrir la porte SEULEMENT pour alimenter le feu. *NE PAS OBSTRUER L'ENTRÉE D'AIR DE COMBUSTION. Fournir l'apport d'air extérieur adéquat pour alimenter la combustion. Utiliser uniquement avec des combustibles solides - ne pas brûler aucun autre combustible, ce qui pourrait désactiver le catalyseur de la chambre à combustion. La performance du catalyseur ou sa longévité n'a pas été évaluée dans le cadre de la certification. Numéro du catalyseur: Z4400G.* Employer seulement un catalyseur en verre en céramique d'une épaisseur de 5mm si le remplacement de celui-ci est nécessaire.

CAUTION: HOT WHILE IN OPERATION. DO NOT TOUCH. KEEP CHILDREN, CLOTHING AND FURNITURE AWAY. CONTACT MAY CAUSE SKIN BURNS. READ THIS LABEL AND INSTRUCTION MANUAL BEFORE OPERATING HEATER
ATTENTION: CHAUD LORS DU FONCTIONNEMENT. GARDEZ LES ENFANTS, VÊTEMENTS ET MEUBLES ÉLOIGNÉS. UN CONTACT AVEC LA PEAU PEUT OCCASIONNER DES BRÛLURES. LIRE CETTE ÉTIQUETTE ET LES INSTRUCTIONS D'INSTALLATION AVANT DE FAIRE FONCTIONNER CET APPAREIL.

MANUFACTURED IN:

☐ USA: Blaze King Industries
146A Street, Walla Walla, WA. 99362

☐ CANADA: Valley Comfort Systems
1290 Commercial Way, Penticton, B.C. V2A 3H5

MANUFACTURE DATE

JAN ☐	FEB ☐	MAR ☐	APR ☐	MAY ☐	JUN ☐
JUL ☐	AUG ☐	SEP ☐	OCT ☐	NOV ☐	DEC ☐
2015 ☐	2016 ☐	2017 ☐	2018 ☐	2019 ☐	2020 ☐

170.0229 12 15

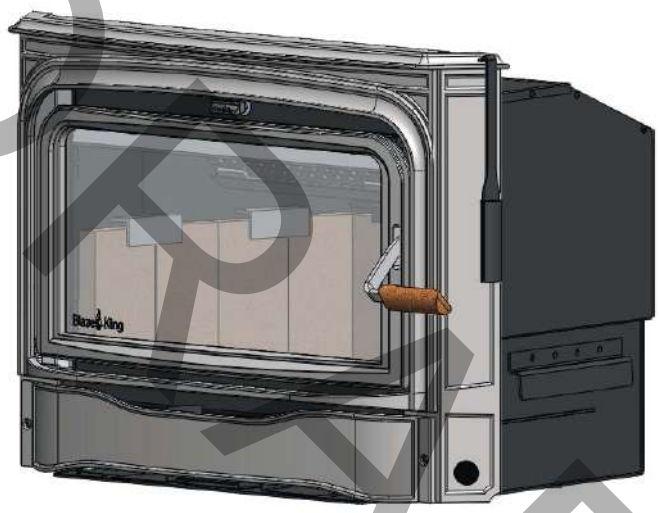
Model: Sirocco SC 25
Valley Comfort Systems Inc.
1290 commercial Way
Penticton, BC V2A 3H5

AF25 Manual

OMNI-Test Laboratories, Inc.

ASHFORD AF25

SOLID FUEL WOOD CATALYTIC STOVE



We recommend that our woodburning hearth products be installed and serviced by professionals who are certified in the U.S. by the National Fireplace Institute® (NFI) as NFI Woodburning Specialists or who are certified in Canada by Wood Energy Technical Training (WETT).

This heater meets the 2015 U.S. Environmental Protection Agency's particulate emission limits for wood heaters sold after May 15, 2015.

Tested & Listed By O-TL Portland Oregon USA
OMNI-Test Laboratories, Inc.
0142WN016E

Installer: Please complete the details on the back cover and leave this manual with the homeowner.
Homeowner: Please SAVE THESE INSTRUCTIONS for future reference.

The authority having jurisdiction (such a municipal building department, fire department, etc.) should be consulted before installation to determine the need to obtain a permit.

OPERATION & INSTALLATION MANUAL

Manufactured By
Valley Comfort Systems Inc., 1290 Commercial Way, Penticton, BC, V2A 3H5, Canada
Phone: 250-493-7444 ◆ Fax: 250-493-5833 ◆ www.blazeking.com ◆ info@blazeking.com

Pour la version française de nos manuels S.V.P. vous référez à notre site web: www.blazeking.com

OM-AF25 E V1.00 December 28, 2015

TABLE OF CONTENTS

⚠WARNING

- **THIS APPLIANCE IS HOT WHEN OPERATED AND CAN CAUSE SEVERE BURNS IF CONTACTED.**
- **ANY CHANGES OR ALTERATIONS TO THIS APPLIANCE OR ITS CONTROLS CAN BE DANGEROUS AND IS PROHIBITED BY FEDERAL AND STATE LAWS.**
- Do not operate appliance before reading and understanding operating instructions. Failure to operate appliance according to operating instructions could cause fire or injury.
- Before installing this appliance, contact the local building or fire authority and follow their guidelines.
- This appliance must be installed by a qualified installer.
- Risk of burns. The appliance should be turned off and cooled before servicing.
- Do not operate without fully assembling all components.
- Do not let the appliance become hot enough for any part to glow red.
- Do not install damaged, incomplete or substitute components.
- Risk of cuts and abrasions. Wear protective gloves and safety glasses during installation. Sheet metal edges may be sharp.
- Children and adults should be alerted to the hazards of high surface temperature and should stay away to avoid burns or clothing ignition.
- Young children should be carefully supervised when they are in the same room as the appliance. Toddlers, young children and others may be susceptible to accidental contact burns. A physical barrier is recommended if there are at risk individuals in the house. To restrict access to an appliance or stove, install an adjustable safety gate to keep toddlers, young children and other at risk individuals out of the room and away from hot surfaces.
- Clothing or other flammable material should not be placed on or near the appliance. Objects placed in front of the appliance must be kept a minimum of 48” away from the front face of the appliance.
- Due to high temperatures, the appliance should be located out of traffic and away from furniture and draperies.
- Ensure you have incorporated adequate safety measure to protect infants / toddlers from touching hot surfaces.
- Even after the appliance is out, all surfaces, including the glass and/or any attachment will remain hot for an extended period of time.
- Check with your local hearth specialty dealer for safety hearth guards to protect children from hot surfaces. These guards must be fastened to a wall and/or to the floor.
- Any safety guard removed for servicing must be replaced prior to operating the appliance.
- Under no circumstances should this appliance be modified.
- This appliance must not be connected to a chimney flue pipe servicing a separate solid fuel burning appliance.
- Do not operate the appliance with the glass door removed, cracked or broken. Replacement of the glass should be done by a licensed or qualified service person.
- Do not strike or slam shut the appliance glass door.
- Operate only with the doors tightly closed.
- Stove will over-fire if door is not shut and latched.
- Only certified doors / optional fronts / and surrounds for inserts with the unit are to be installed on the appliance.
- Keep the packaging material out of reach of children and dispose of the material in a safe manner. As with all plastic bags, these are not toys and should be kept away from children and infants.
- If the appliance is not properly installed, a house fire may result. Do not expose the appliance to the elements (ex. rain, etc.) and keep the appliance dry at all times.
- The chimney must be sound and free of cracks and obstructions. Clean your chimney regularly as required.
- Never use gasoline, gasoline-type 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.
- Your appliance requires periodic maintenance and cleaning. Failure to maintain your appliance may lead to smoke spillage in your home.
- Higher efficiencies and lower emissions will generally result when burning air dried seasoned woods, as compared to wet, green or freshly cut wood. Burning wet unseasoned wood can cause excessive creosote accumulation. When ignited it can cause a chimney fire that may result in a serious house fire.
- The appliance is designed to burn natural wood only. Do not burn treated wood, coal, charcoal, colored paper, cardboard, solvents or garbage.
- Burn wood directly on the firebricks. Do not use a grate or elevate the fire.
- Do not store wood within appliance installation clearances or within the space required for re-fueling and ash removal.
- Ashes must be disposed in a metal container with a tight lid and placed on a non-combustible surface well away from the home or structure until completely cool.

Model	AF25 (catalytic)
Height and width without shroud	24 1/8" x 35 3/8" (613 mm x 899 mm)
Width of firebox enclosure (behind shroud)	27 7/8" (708 mm)
Overall depth and height of firebox	18" x 21 5/8" (458 mm x 588 mm)
Flue collar size and distance from shroud back	6" I.D., 14 3/8" (366 mm)
Recommended flue draft	.05" water column (on high burn)
Fire door opening	25 1/4" x 10 5/8" (642 mm x 270 mm)
Firebox depth	16 3/4" (426 mm) brick to brick, 18" (457 mm) brick to glass
Firebox width average	20 1/2" (521 mm)
Firebox height	10" (254 mm)
Fire box capacity	2.3 cu. ft.
Recommended Fuel length	16" max. (407 mm)
Wood capacity (approximate):	White oak - 53 lbs. (24.04 kg)
	Fir - 35 lbs. (15.88 kg)
Construction	10 gauge & 1/4" firebox, refractory brick lined. Cast iron outer shell.
Shipping Weight (Firebox only)	325 lbs. (148 kg)
Chimney recommendation (Minimum)	15' from stove top to chimney cap: Insulated liner recommended

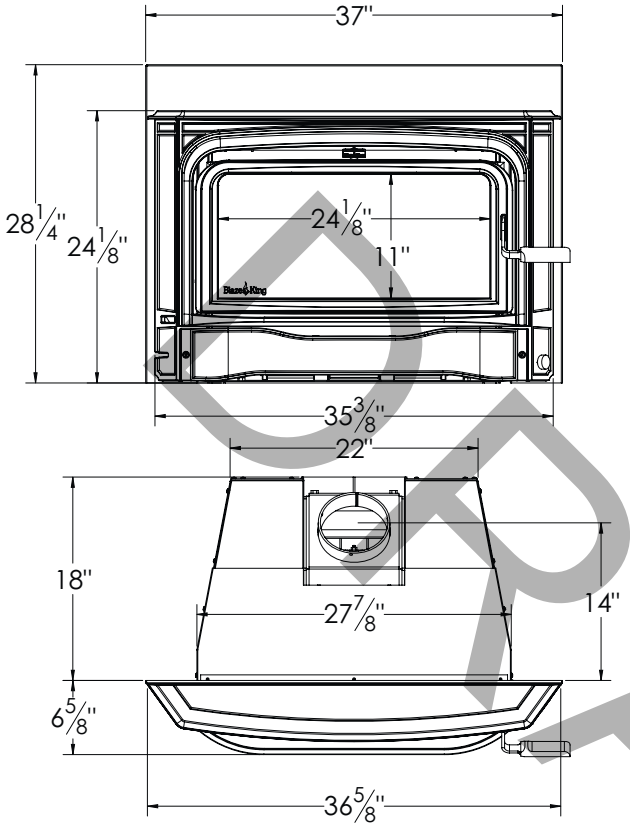
This unit was tested and listed UL 1482, Ed 7 2011 and ULC S628-93 by OMNI-Test Laboratories.
This manual describes the installation and operation of the Ashford AF25 catalytic equipped wood heater.
This heater is certified to comply with the 2015 U.S. Environmental Protection Agency's particulate emission limits for wood heaters sold after May 15, 2015.

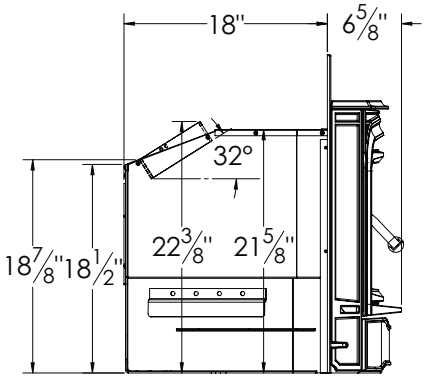
EMISSIONS	CO Average(%)	g/hr
Low Burn	0.05	0.31
Med-low Burn	0.18	0.33
Med-high Burn	0.12	1.48
High Burn	0.08	1.93

Under specific test conditions this heater has been shown to deliver heat at rates ranging from 10097 to 26290 Btu/hr.
This wood heater has a manufacturer-set minimum low burn rate that must not be altered. It is against federal regulations to alter this setting or otherwise operate this wood heater in a manner inconsistent with operating instructions in this manual.
This wood heater contains a catalytic combustor, which needs periodic inspection and replacement for proper operation. It is against federal regulations to operate this wood heater in a manner inconsistent with operating instructions in this manual, or if the catalytic element is deactivated or removed.
The combustor supplied with this heater is a 115.0335 metal combustor. Consult the catalytic combustor warranty also supplied with this wood heater. Warranty claims should be addressed to:

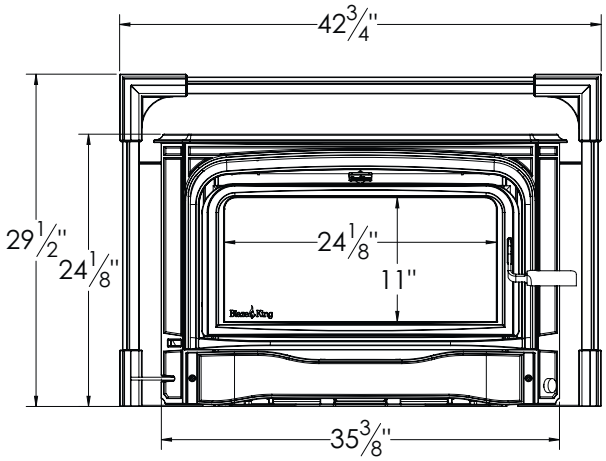
in Canada	in USA
Blaze King Industries / Valley Comfort Systems Warranty Department, 1290 Commercial Way Penticton, BC Canada V2A 3H5, Ph: 250-493-7444	Blaze King Industries Warranty Department, 146A Street Walla, Walla, Washington 99362, Ph: 509-522-2730

DIMENSIONS—#Z2090 Small Backing Shroud

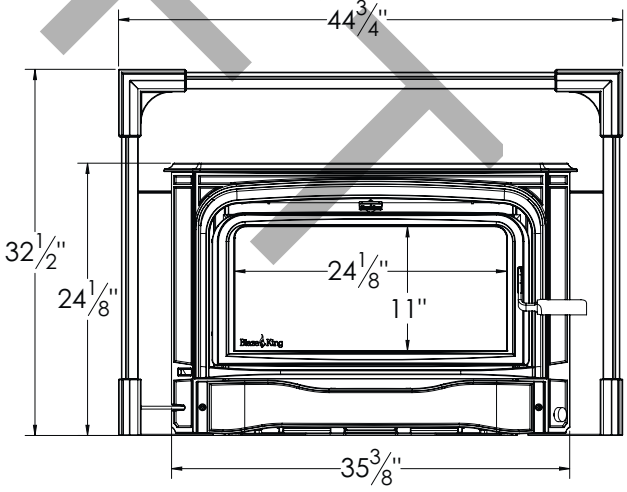




DIMENSIONS—#Z2091 Medium Cast Shroud



DIMENSIONS—#Z2092 Large Cast Shroud



SN -

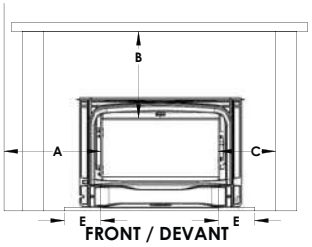
Tested & Listed By O-TL Portland Oregon USA C US
OMNI-Test Laboratories, Inc.
Report #0142WN016E

ASHFORD INSERT - Encastrable Ashford

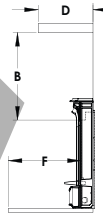
BLAZE KING CATALYST STOVE - BLAZE KING ENCASTRABLE CATALYTIQUE
Room heater, solid fuel type. / Appareil de chauffage approuvé pour type de carburant solide.
MODEL / MODÈLE: AF25
Tested to / Testé pour: UL 1482, Ed 7 2011 / ULC S628-93
CERTIFIED IN BOTH UNITED STATES AND CANADA / CERTIFIÉ POUR LES ÉTATS-UNIS ET LE CANADA

PREVENT HOUSE FIRES - Install and use only in accordance with Blaze King's installation and operation instructions. Install and use in a code complying fireplace only. Contact local building or fire officials about restrictions and installation inspection in your area. Do not remove bricks or mortar in masonry fireplace. Do not use grate or elevate fire. Inspect and clean chimney frequently - under certain conditions of use, creosote buildup may occur rapidly. CHIMNEYS: Do not connect this unit to a chimney flue serving another appliance. Do not over fire - if heater or chimney glows, you are over firing. COMPONENTS REQUIRED FOR INSTALLATION: 6" stainless steel liner - listed to: UL 1777, ULCS635 OR ULCS640, and part #2054 flue extension.
PRÉVENTION DES INCENDIES- Installer et utiliser cet appareil conformément aux instructions d'installation et du mode de fonctionnement de Blaze King. Installer et utiliser seulement selon le code conforme, concernant les foyers. Contacter le code du bâtiment local ou le département des incendies à propos des restrictions et des inspections des installations de votre région. Ne pas retirer les briques ou le mortier dans votre foyer de maçonnerie. Ne pas utiliser de grille et ne pas surélever le feu. Inspecter et nettoyer votre cheminée fréquemment- dans certaines conditions d'utilisation, une accumulation de créosote peut se produire rapidement. Cheminées : Ne pas raccorder cet appareil à un conduit de cheminée desservant un autre appareil. Ne pas surchauffer- si l'appareil ou les conduits deviennent rougeoyants, vous êtes en surchauffe. Composantes requises pour l'installation : Gaine de 6po en acier inoxydable inscrite sous : UL 1777, ULCS635 Ou ULCS640, et pièce #2054 extension de conduit.

Minimum clearances to combustibles, measured from firebox door flange / Dégagements minimum requis entre l'appareil à tout matériau combustible à partir du rebord de l'ouverture de porte de la chambre à combustion.		
A	Side of door flange to combustible wall. / Du côté du rebord de l'ouverture de porte à tout mur combustible.	13.5" 343 mm
B	Top of door flange to bottom of mantel and combustible facing. (with mantle shield.) / Du dessus du rebord de l'ouverture de porte au bas du manteau et de toute façade combustible. (avec manteau avec protection)	38" / 966 mm (24" / 610 mm)
C	Side of door flange to side combustible facing. / Du côté du rebord de l'ouverture de la porte à toute surface de côté combustible.	10" 254 mm
D	Mantle width maximum. (with mantle shield part #2067) / Largeur maximum du manteau. (avec protection de manteau pièce #2067)	12" / 305 mm (8" / 204 mm)
E	Minimum hearth side extension * / Extension latérale minimum du foyer	8"*
F	Mimimum hearth front extension / Extension frontale minimum du foyer	16" USA 18" CANADA



FRONT / DEVANT



SIDE / COTÉ

*** Measured from each side of the fuel loading and ash removal openings / Mesuré à partir de chaque côté de l'ouverture de la porte de chargement et du tiroir de cendre**

FLOOR PROTECTION / PROTECTION DU PLANCHER:
A non-combustible (UL1618 type 1) floor protection is required for all installations extending 16" (in USA) or 18" (in Canada) in front of the door and extending 8" to either side of the door opening. With the floor flush with the bottom of the appliance and to an elevation of 5" below the firebox bottom, a 1/2" layer of thermal protection where R=1.06 is required. Anything 0 to 5" below the firebox bottom requires a (UL 1682 type 2) thermal protection where R=1.06 is required.
Une protection de plancher non combustible est requise (UL1618 type 1) pour toutes les installations s'étendant de 16 po (aux USA) ou de 18 po (au Canada) en avant de la porte et s'étendant de 8 po de chaque côté de l'ouverture de porte. Avec le plancher au même niveau du fond de l'appareil et à une élévation de 5 po en dessous du fond de la chambre à combustion, une couche de protection thermique de 1/2" où R = 1,06 est nécessaire. Tout de 0 à 5 "en dessous du fond de la chambre à combustion nécessite une (UL 1,682 type 2) protection thermique R = 1,06 est nécessaire.

Electrical rating: (115 VAC, 60 Hz, 0.58 Amps. Risk of electrical shock. Disconnect power before servicing unit. Do not route power cord in front of or beneath heater).
U.S. ENVIRONMENTAL PROTECTION AGENCY - 2015 Standard - certified to comply with 2015 particulate emission standards (EPA test methods 28R and 5G with an emission-rate of 0.90 g/hr). Not approved for sale after May 15, 2020. This wood heater needs periodic inspection and repair for proper operation. Consult the owner's manual for further information. It is against federal regulations to operate this wood heater in a manner inconsistent with the operating instructions in the owner's manual, or if the catalytic element is deactivated or removed. Only operate with doors closed. Open door to feed fire ONLY. Open the bypass before opening the door. Do not obstruct combustion air openings. For Use With Solid Wood Fuel Only - Do not burn other fuels, this may make the catalyst in the combustor inactive. The performance of the catalytic device or its durability has not been evaluated as part of the certification. Metal combustor part number: 115.0335. Provide adequate outside air for combustion. *Replace with only ceramic glass, 5 mm. Thickness.

Estimation électrique: (115 VAC, 60 Hz, 0.58 Amps. Risque d'électrocution débrancher le courant avant de réparer l'unité. Ne pas faire courir le fil l'alimentation en avant ou en dessous de l'appareil de chauffage).
AGENCE DE PROTECTION DE L'ENVIRONNEMENT U.S.- STANDARD 2015 – certifie conformément aux normes standard d'émissions de particules 2015 (Méthodes de test 28R et 5G EPA avec un taux d'émission de 0.90 gr/hre). Non approuvé pour la vente après le 15 mai 2020. Cet appareil de chauffage au bois nécessite des inspections périodiques et des réparations pour un fonctionnement adéquat. Consulter le manuel du propriétaire pour plus d'informations. Il est contre les règlements fédéraux de faire fonctionner cet appareil de chauffage à l'encontre des instructions d'utilisation fournies dans le manuel du propriétaire, ou si l'élément catalytique a été enlevé ou désactivé. *UTILISER L'appareil UNIQUEMENT AVEC LES PORTES FERMÉES. Ouvrir la porte SEULEMENT pour alimenter le feu. *NE PAS OBSTRUER L'ENTRÉE D'AIR DE COMBUSTION. Fournir l'apport d'air extérieur adéquat pour alimenter la combustion. Utiliser uniquement avec des combustibles solides - ne pas brûler aucun autre combustible, ce qui pourrait désactiver le catalyseur de la chambre à combustion. La performance du catalyseur ou sa longévité n'a pas été évaluée dans le cadre de la certification. Numéro du catalyseur: Z4400G.* Employer seulement un catalyseur en verre en céramique d'une épaisseur de 5mm si le remplacement de celui-ci est nécessaire.

CAUTION: HOT WHILE IN OPERATION. DO NOT TOUCH. KEEP CHILDREN, CLOTHING AND FURNITURE AWAY. CONTACT MAY CAUSE SKIN BURNS. READ THIS LABEL AND INSTRUCTION MANUAL BEFORE OPERATING HEATER
ATTENTION: CHAUD LORS DU FONCTIONNEMENT. GARDEZ LES ENFANTS, VÊTEMENTS ET MEUBLES ÉLOIGNÉS. UN CONTACT AVEC LA PEAU PEUT OCCASIONNER DES BRÛLURES. LIRE CETTE ÉTIQUETTE ET LES INSTRUCTIONS D'INSTALLATION AVANT DE FAIRE FONCTIONNER CET APPAREIL.

MANUFACTURED IN:

☐ USA: Blaze King Industries
146A Street, Walla Walla, WA. 99362

☐ CANADA: Valley Comfort Systems
1290 Commercial Way, Penticton, B.C. V2A 3H5

MANUFACTURE DATE

JAN ☐	FEB ☐	MAR ☐	APR ☐	MAY ☐	JUN ☐
JUL ☐	AUG ☐	SEP ☐	OCT ☐	NOV ☐	DEC ☐
2015 ☐	2016 ☐	2017 ☐	2018 ☐	2019 ☐	2020 ☐

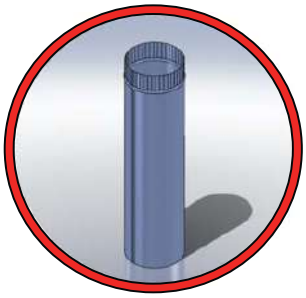
170.02291215.indd

SAFETY PRECAUTIONS

IF THIS BLAZE KING STOVE IS NOT PROPERLY INSTALLED OR OPERATED, A HOUSE FIRE MAY RESULT. TO REDUCE THE RISK OF FIRE, FOLLOW THE INSTALLATION INSTRUCTIONS. CONTACT LOCAL BUILDING OR FIRE OFFICIALS ABOUT RESTRICTIONS AND INSTALLATION INSPECTION REQUIREMENTS IN YOUR AREA.

PLEASE READ THIS ENTIRE MANUAL BEFORE YOU INSTALL AND USE YOUR NEW ROOM HEATER. FAILURE TO FOLLOW INSTRUCTIONS MAY RESULT IN PROPERTY DAMAGE, BODILY INJURY, OR EVEN DEATH.

Chimney and chimney connector must be in good condition and kept clean.
NEVER vent the stove to other rooms of the building. Must be vented to the outside ONLY.
NEVER use a chimney or chimney connector smaller then the stove exhaust, unless approved by your local inspector.
NEVER vent the stove into a “Class B” gas vent chimney.
DO NOT CONNECT IN CONJUNCTION WITH ANY AIR DISTRIBUTION DUCTWORK UNLESS SPECIFICALLY APPROVED FOR SUCH INSTALLATIONS.



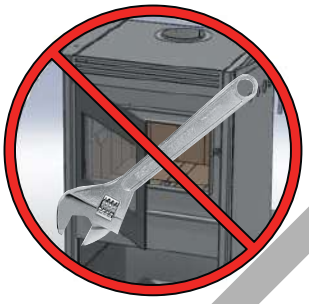
Inspect the chimney connector and chimney regularly during each burning season and clean when necessary.
DO NOT CONNECT THIS UNIT TO A CHIMNEY FLUE SERVING ANOTHER APPLIANCE.

NEVER intentionally start a chimney fire to clean the flue.

WARNING: NOT APPROVED FOR INSTALL IN A MOBILE HOME

If the Optional Fan Kit is installed, connect this unit to a properly grounded, 110-volt electrical outlet. Do not route the power cord in front of or under the stove.

Do not make any changes or modifications to an existing masonry fireplace or chimney to install this appliance. Do not make any changes to the appliance to increase combustion air.



Never try to repair or replace any part of this appliance unless instructions are given in this manual. All other work must be done by a trained technician.

Allow the appliance to cool down before carrying out any maintenance or cleaning.

Maintain the door and glass seal and keep them in good condition. A leaking door seal will shorten burn times and may harm the combustor.

Avoid placing wood against the glass when loading. Do not slam the door or strike the glass.

Do not throw this manual away. This manual has important operating and maintenance instructions that you will need at a later time. Always follow the instructions in this manual.

It is recommended to install smoke and carbon monoxide detectors where heaters are installed. Install at least one smoke detector on each floor of your home to ensure your safety. It should be located away from the wood stove and close to the sleeping areas. Locating a smoke detector too close to a wood stove can cause the smoke detector alarm to sound if a puff of smoke is emitted while the wood stove door is open during reloading. Follow the smoke detector manufacturers placement, installation, and maintenance instructions.

Do not place clothing or other flammable items on or near this appliance.

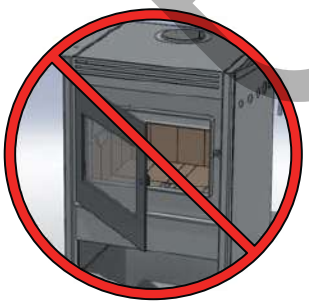
DO NOT OVER FIRE THIS HEATER. Attempts to achieve heat output rates that exceed heater design specifications can result in permanent damage to the heater and to the catalytic combustor. Over firing the appliance may cause a house fire. Never burn the stove so hot that the stove or chimney connector begins to glow.

Do not use a grate or other device to elevate the fire off of the firebox floor. Burn the fire directly on the bricks.

Ashes should be placed in a steel container with a tightly fitting lid and moved outdoors immediately. 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. Other waste shall not be placed in this container.

SAFETY PRECAUTIONS cont.

This appliance is designed and approved for burning cord wood only. DO NOT burn trash, garbage; artificial or paper logs; gift wrappings; coal; lighter fluids; chemical cleaners; chemical starters; treated or painted wood; salt water driftwood or foil-backed paper such as gum wrappers or cigarette packages; lawn clippings or yard waste; materials containing rubber (including tires), plastic, asbestos; waste petroleum products, paints or paint thinners, or asphalt products; construction or demolition debris; railroad ties or pressure-treated wood; manure or animal remains; unseasoned wood or 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 the release of toxic fumes or render the heater ineffective and cause smoke. Burn natural wood only. It will void all warranties and safety listings and may damage the combustor.



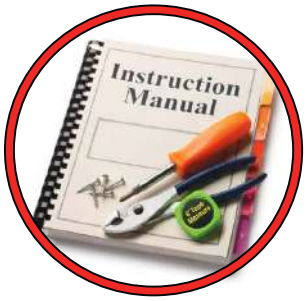
Never burn the stove with the loading door open. Leaving the door cracked open may damage the combustor.

Never block free airflow through vents on this appliance.

Never use gasoline, gasoline-type 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. Some fuels could generate carbon monoxide and are very dangerous.

HOT WHILE IN OPERATION. KEEP CHILDREN, CLOTHING AND FURNITURE AWAY.
CONTACT MAY CAUSE SKIN BURNS.
Do not touch the appliance when it is hot and educate all children of the danger of a high temperature appliance. Young children should be supervised when they are in the same room as the appliance.

Keep furniture, curtains, wood, paper and other combustibles a minimum of 48in (1219mm) away from the front of the appliance. ALSO, DO NOT STORE COMBUSTIBLES UNDER THE APPLIANCE (WOOD, PAPER etc.).



This appliance must be properly installed to prevent the possibility of a house fire. The instructions must be strictly adhered to. Do not use makeshift methods or compromise in the installation.

Contact local building officials to obtain a permit and information on any installation restriction or inspection requirements in your area. Notify your insurance company as well.

⚠WARNING

- **BEFORE INSTALLING THIS APPLIANCE, CONTACT THE LOCAL BUILDING OR FIRE OR OTHER AUTHORITY HAVING JURISDICTION AND FOLLOW THEIR GUIDELINES.**
- **THIS APPLIANCE MUST BE INSTALLED BY A QUALIFIED INSTALLER. FOLLOW THE INSTALLATION DIRECTIONS. DO NOT OPERATE WITHOUT FULLY ASSEMBLING ALL COMPONENTS.**
- **IF THIS APPLIANCE IS NOT PROPERLY INSTALLED, A HOUSE FIRE MAY RESULT.**
- **THIS APPLIANCE IS HOT WHEN OPERATED AND CAN CAUSE SEVERE BURNS IF CONTACTED. CHILDREN AND PETS MUST BE KEPT FROM TOUCHING THE APPLIANCE WHEN IT IS HOT.**
- **COMBUSTIBLE MATERIAL SUCH AS FIRE WOOD, WET CLOTHING, ETC. PLACED TOO CLOSE CAN CATCH FIRE. OBJECTS PLACED IN FRONT OF THE APPLIANCE MUST BE KEPT A MINIMUM OF 48"(1219 MM) FROM THE FRONT OF THE APPLIANCE.**

Blaze King grants no warranty, implied or stated, for the installation or maintenance of the appliance and assumes no responsibility of any consequential damage(s).

We recommend that our products be installed and serviced by professionals who are certified in the U.S. by the National Fireplace Institute® (NFI) as NFI Specialists or who are certified in Canada by Wood Energy Technical Training (WETT).

PARTS INCLUDED WITH THE ASFORD INSERT	
1. Poker	
2. Manual Kit (w/ warranty cards, fire starter, labels)	
3. Bypass Handle (Z2052)	
4. Part #2054 Flue Extension	
REQUIRED SHROUD OPTIONS	
Z2090 Small Backing Shroud	Z2091 Medium Cast Shroud
Z2093 Large Cast Shroud	

FLOOR PROTECTION

A non-combustible (UL1618 type 1) floor protection is required for all installations extending 16" (in USA) or 18" (in Canada) in front of the door and extending 8" to either side of the door opening. With the floor flush with the bottom of the appliance and to an elevation of 5" below the firebox bottom, a 1/2" layer of thermal protection where R=1.06 is required. Anything 0 to 5" below the firebox bottom requires a (UL 1682 type 2) thermal protection where R=1.06 is required.

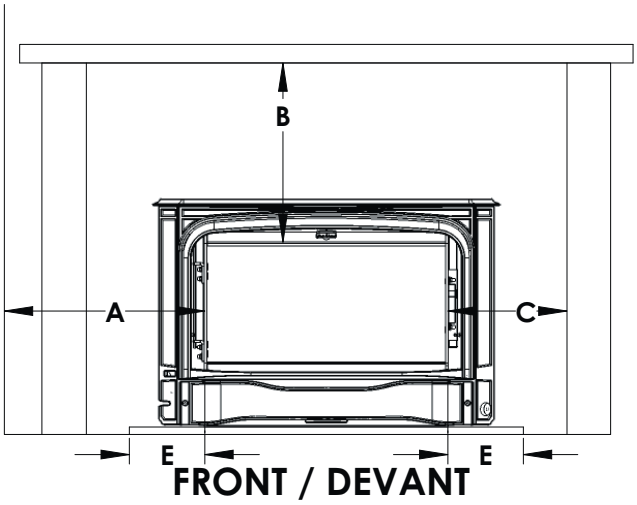
COMPONENTS REQUIRED

6" stainless steel liner - listed to: UL 1777, ULCS35 OR ULCS640, and part #2054 flue extension.

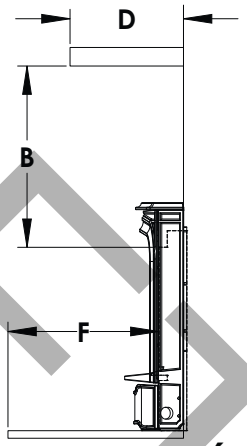
MINIMUM CLEARANCES for AF25

Minimum clearances to combustibles Measured from firebox door flange		
A	Side of door flange to combustible wall.	13.5" 343 mm
B	Top of door flange to bottom of mantel and combustible facing. (with mantle shield.)	38" / 966 mm (24" / 610 mm)
C	Side of door flange to side combustible facing.	10" 254 mm
D	Mantle width maximum. (with mantle shield part #2067)	12" / 305 mm (8" / 204 mm)
E	Minimum hearth side extension *	8"*
F	Mimimum hearth front extension	16" USA 18" CANADA

*** Measured from each side of the fuel loading and ash removal openings / mesuré de chaque coté de l'ouverture de la porte de chargement et du tiroir de cendre**



FRONT / DEVANT



SIDE / COTÉ

COMBUSTION AIR

Ensure adequate combustion air allowing for all other exhausting type appliances in the dwelling (range hoods, dryers, etc.). In air tight homes and modern constructions, careful considerations must be taken into account when using a wood burning appliance. Heat recovery ventilators (HRV) systems along with constant running pan motors in air handlers must be taken into account when balancing the system. Failure to do so may result in air starvation, smoke spillage and carbon monoxide threats. Consult a HVAC specialist for proper installation. Ensure adequate combustion air allowing for all other exhausting type appliances in the dwelling (range hoods, dryers, etc.). In airtight houses it is recommended to install a fresh air inlet into the room where the stove is located, to prevent air starvation.

DRAFT

Draft in the chimney system is initiated by the air pressure difference between the top and bottom of the chimney. Heat generated within the firebox will rise and accelerate the draft in the chimney. Recommended draft is .05 in. w.c. operated on high. Too little draft results in a sluggish fire and smoke spillage into the room when the stove door is opened. Too much draft (over 0.06 in. w.c.) makes it unsafe to operate the stove and will void manufacturers warranty.

ROLE OF THE CHIMNEY

Without a proper installed chimney, this appliance will not burn correctly.

The role of the chimney is to pull the proper amount of air into the firebox for the purpose of complete combustion. Incomplete combustion will lead to more smoke and pollution of the outside air. A proper operating chimney will allow the user to enjoy peak performance at all burn operating levels from low to high. Blaze King therefore recommends vertical installations with a minimum length of 15' from stove top to chimney cap. In insert applications Blaze King recommends insulated liners into all existing chimneys.

INSPECT CHIMNEY

Before connecting any wood-burning unit to an existing chimney, inspect the chimney to be sure that it is in good condition. There must be no cracks or holes. The cross-sectional area can differ from the flue collar as long as sufficient draw is maintained and local codes and jurisdiction are observed.. A proper chimney is crucial for safe, satisfactory operation of any wood heating system. Relining or rebuilding may be necessary to make the chimney safe, efficient, and in conformity with local codes.

Masonry Chimneys that have a very large cross-section , particularly exterior chimneys, may experience poor draft and may require relining to reduce the cross-section-and provide a proper draft. This is also an ideal time to clean the existing chimney. For peak efficiency, a clean chimney flue is essential. A qualified professional chimney sweep can perform both inspection and cleaning. If you choose to clean your own chimney use the proper tools. Homemade cleaners may damage your chimney.

PLANNING STOVE PLACEMENT

Check the fireplace and insert dimensions to ensure the insert will fit properly. While planning your installation keep in mind the required clearances as shown on the stove label.

Plan ahead to be certain that furniture will have ample clearance, and that drapes and curtains cannot come in contact with the room heater. Refer to the approval label on the stove for correct clearances to combustibles.

This stove must be connected to a chimney. It must be vented to the outside.

⚠WARNING

NEVER PERMIT YOUR STOVE TO VENTILATE INTO ANY ROOM IN THE BUILDING

Consult the stove label to ensure that you install your stove the proper minimum distances from combustible materials.

Minimum fireplace opening size is 29” x 22” x 19” (W x H x D)

Electrical Power - The stove is equipped with a fan assembly with a seven-foot electrical cord. Do not route the cord in front of the stove.

STOVE ASSEMBLY

Bypass door wedge removal

1. Remove four bolts from wedge assembly. (**Fig. 1**)

Remove wedge and inspect bypass door and gasket to ensure proper seal.

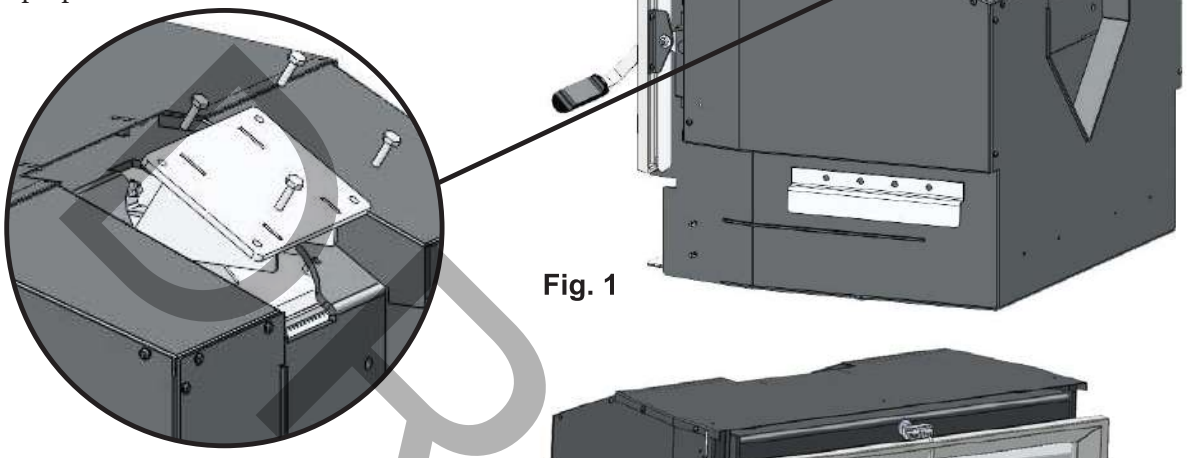


Fig. 1

Lower shroud / ash shelf install

1. Ensure fans have not shifted during transport and are in correct position.
2. Install thermostat rod extension by aligning machined faces and securing with the set collar. (**Fig. 2**)

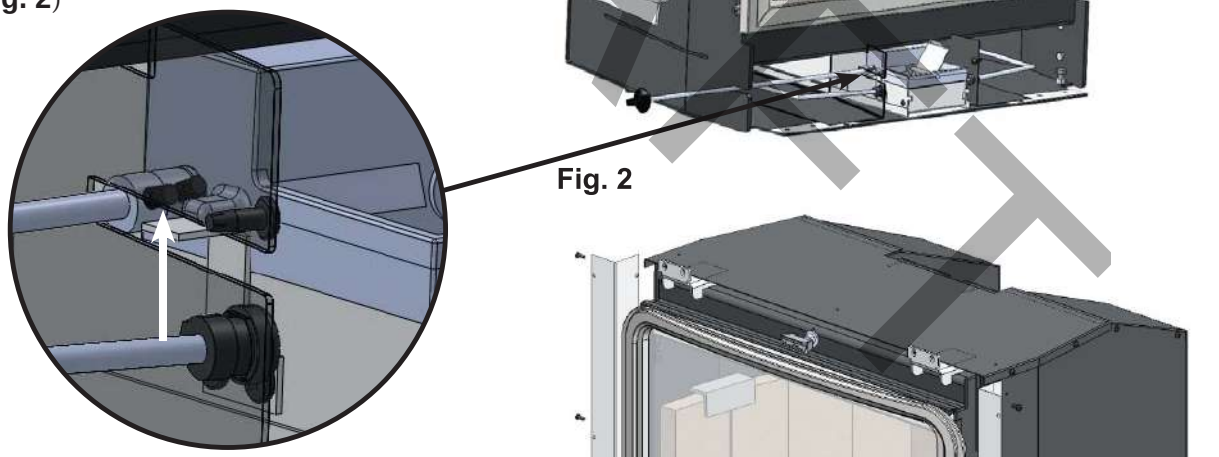


Fig. 2

3. Screw inner side panels to both sides of the firebox using a #2 Robertson screwdriver, four screws (**Fig. 3**)

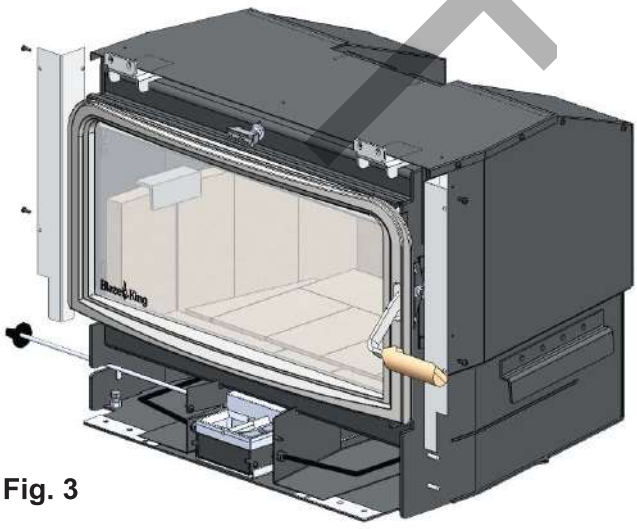


Fig. 3

4. With loading door open, align lower brackets of cast assembly with the two threaded posts on each side of the firebox. Align upper threaded posts on cast assembly with the two brackets on the firebox. Begin to slide the assembly onto firebox. (**Fig. 4**)

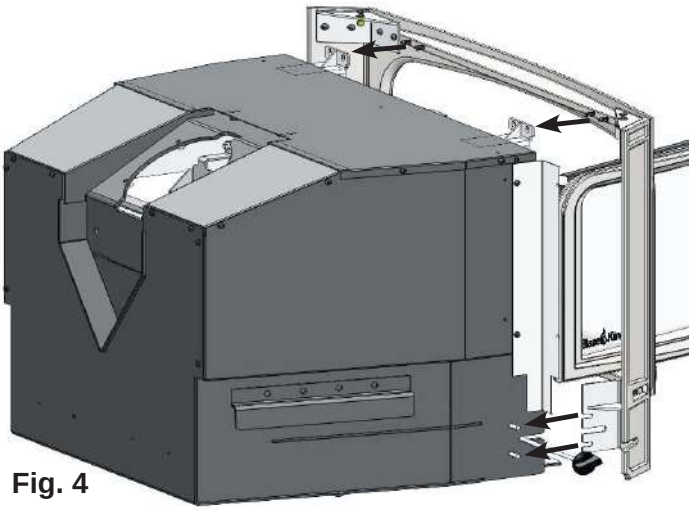


Fig. 4

5. Once in position, fasten flange nuts onto threaded posts using a 7/16" wrench. (**Fig. 5**)

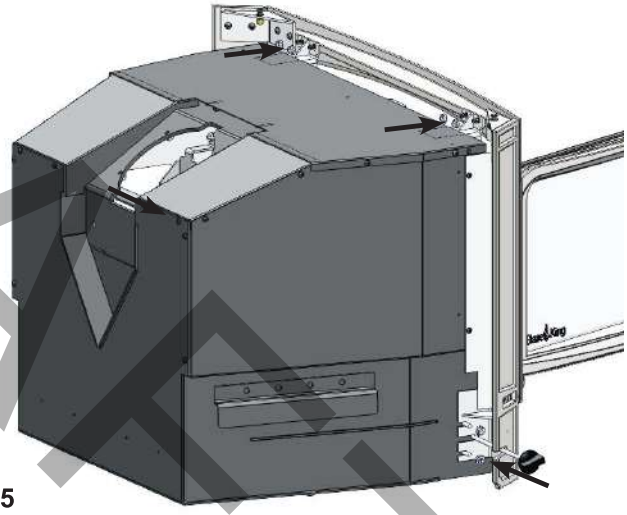
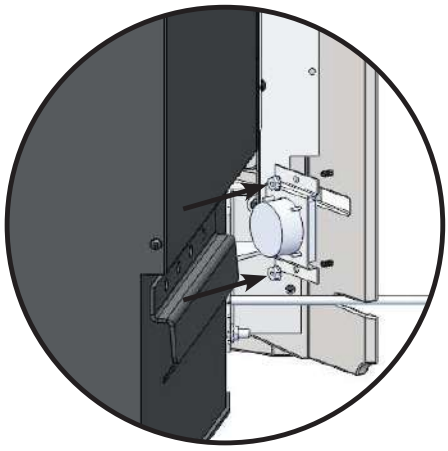


Fig. 5

6. Fasten catalytic thermometer housing to the left side of the cast facing using a 7/16" wrench, two flange nuts. (**Fig. 6**)



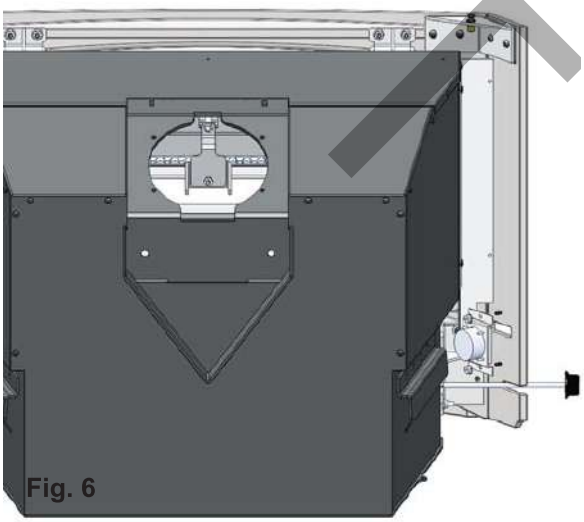


Fig. 6

7. Fasten rheostat housing and secure with rheostat nut, ensure rheostat pins sit in the alignment holes. Install rheostat knob. Fasten ground wire to the plate using supplied screw. (**Fig. 7**)

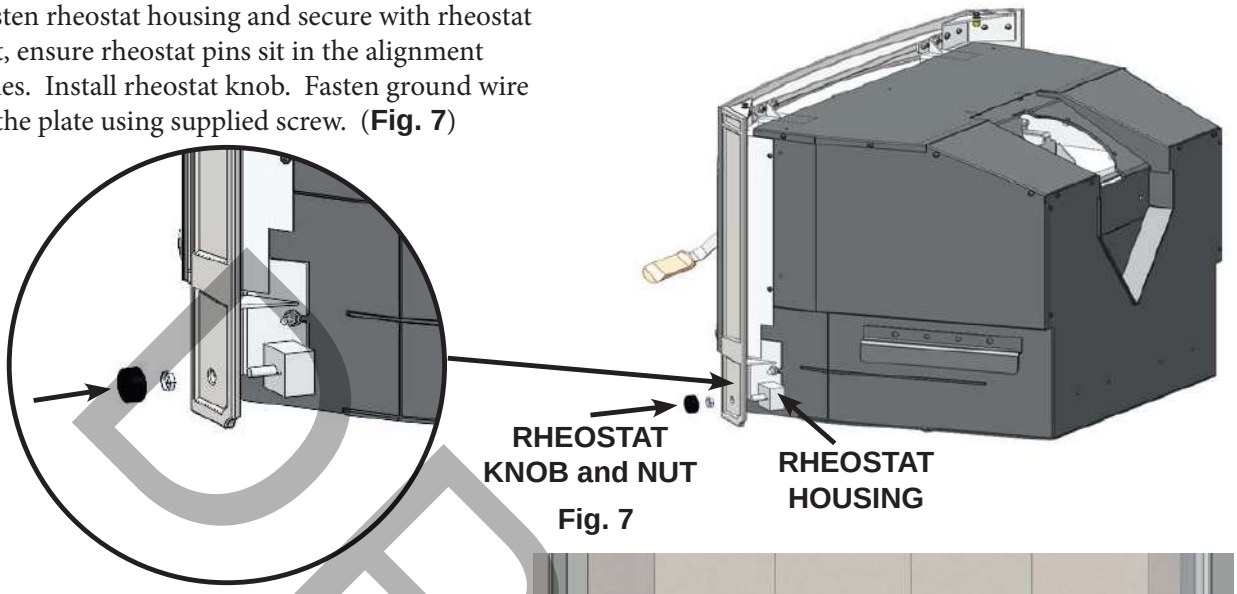


Fig. 7

8. Determine where the nearest electrical outlet is then feed electrical cable through lower back corner of cast facing. Ensure wiring is tucked above the protruding flanges. (**Fig. 8**)

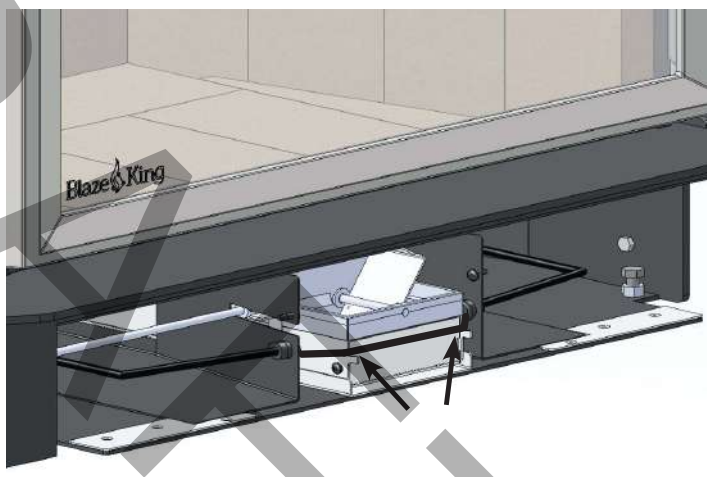


Fig. 8

9. Fasten lower cast cover to cast face using an alen key, two screws. (**Fig. 9**)

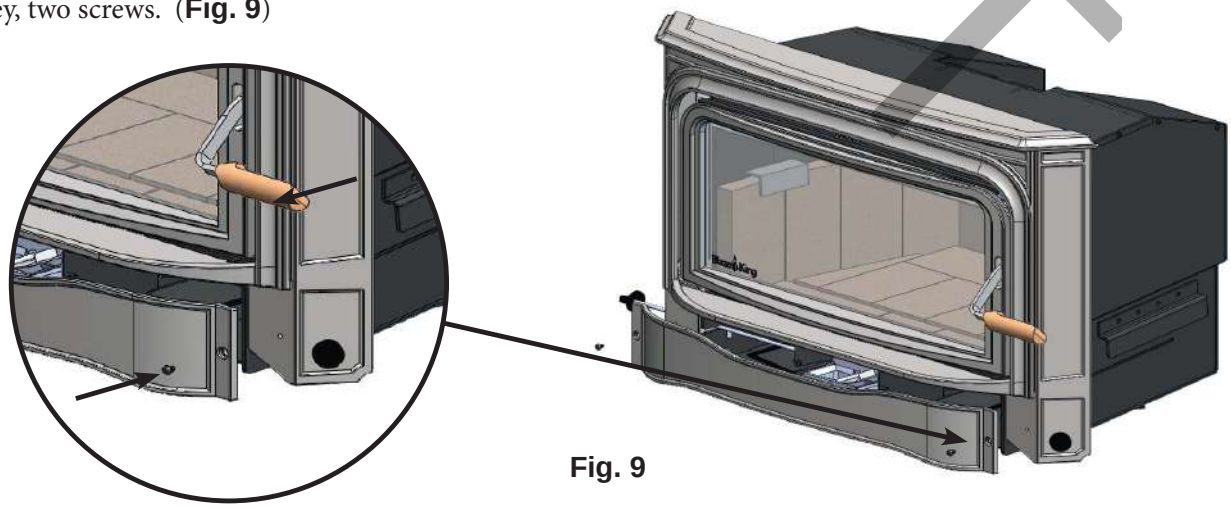


Fig. 9

Flue Collar Installation (comes attached to flue extension)

1. NOTE: For ease of install; once chimney piping is completely installed and attached to the provided flue collar / flue extension, leave flue collar hanging roughly 2 feet above ground. This will enable unit to be pushed back into the fireplace opening without interference and allow for an easy grab through the bypass door opening to install. (**Fig. 13**)

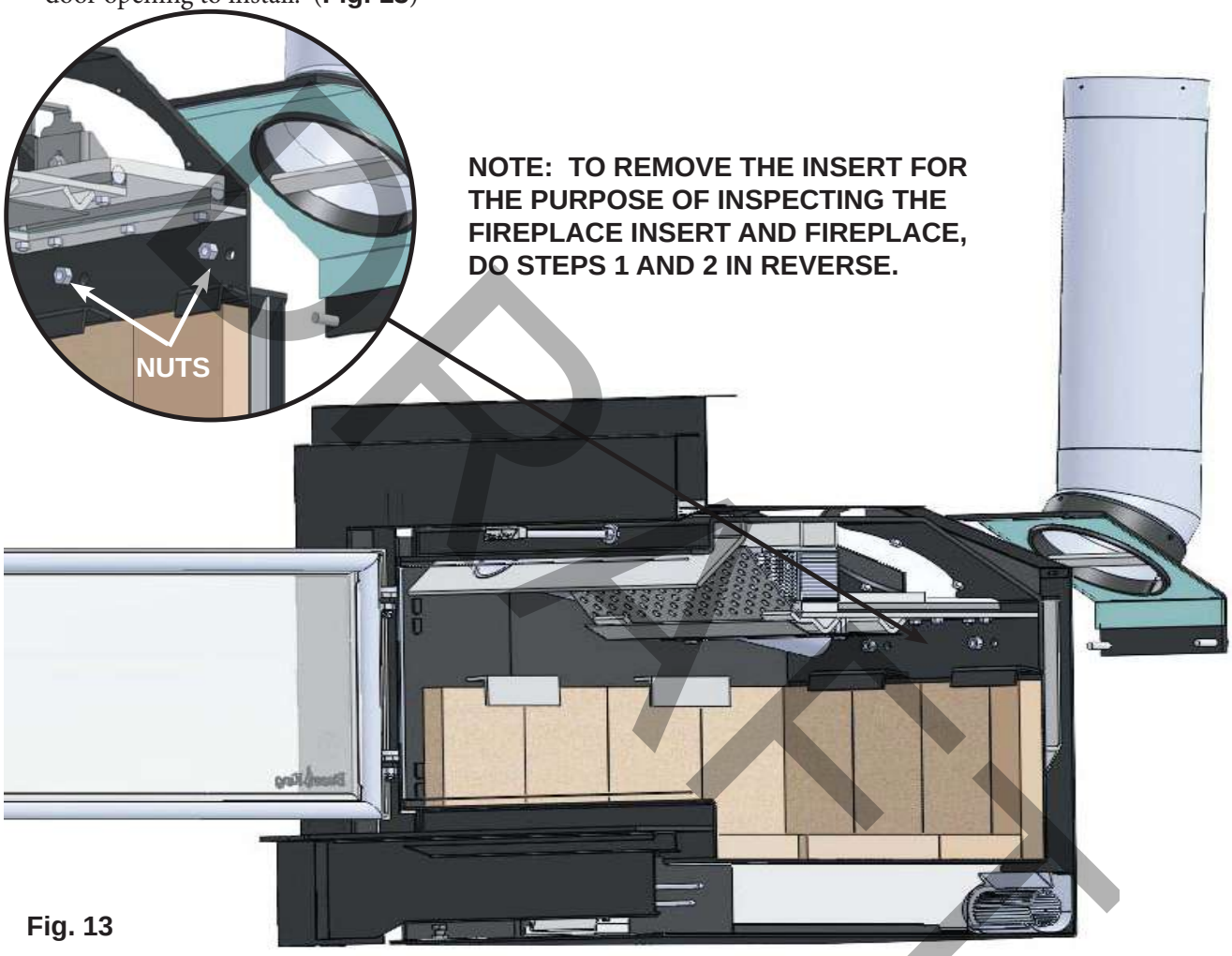


Fig. 13

2. Once unit is in position, open loading door and bypass door then reach up through bypass opening to grab flue collar assembly. Pull down to align bolts with through holes in firebox rear then pull forward. Ensure top surface is mating with firebox top. If so, fasten flue collar assembly to firebox using a 9/16" wrench, stainless steel nuts. (**Fig. 13**)

CHIMNEY

FACTORY-BUILT FIREPLACE

In Canada and in the USA: This insert may be installed into a compliant factory built fireplace providing the chimney is lined from the outlet of the insert to the top of the chimney using an insulated stainless steel liner which meets UL1777 or ULC S635. The liner must be securely attached to both the insert and the chimney top. In both Canada and the U.S.A. the existing fireplace damper must be secured in the open position. If this is not possible the damper must be removed. Any openings between the masonry of the fireplace and the facing masonry must be sealed.

⚠WARNING

THE FIREPLACE CANNOT BE MODIFIED IN ANY WAY TO FIT THE INSERT

GENERAL CHIMNEY INSTALLATION

Connect the venting system to the flue collar of the insert using three sheet metal screws. There are three predrilled holes in the flue collar. Place a bead of furnace cement around the flue collar connection to ensure the flue pipe is properly connected, secured and sealed.

If this stove and its chimney components are not properly installed, a house fire may result. For your safety, follow the installation directions. Contact local building or fire officials about restrictions and installation requirements in your area.

We recommend that the inside your chimney be at least the same diameter as the flue of your stove. If you plan to use an existing masonry chimney, be sure it is free of cracks and loose joints. Gases traveling through a chimney can reach extremely high temperatures. Cracks or loose mortar can allow hot gases to reach the wood portion of the structure surrounding the chimney. These toxic gases can also re-enter the house through cracks and small holes in the chimney, or cause back-puffing which will result in excessive smoking. Be on the safe side and have your chimney inspected by a certified chimney sweep. A 6 inch insulated stainless steel chimney liner with a direct connection to the stove is recommended for masonry chimney installations. A chimney must extend at least three feet above the highest point where it passes through the roof and at least two feet higher than any portion of the building within ten feet of the chimney. Smoke travels up the chimney in a circular, spiraling motion. A 6 inch round insulated stainless steel liner allows the smoke to travel with less resistance. A rough masonry chimney without a good smooth liner can result in the rapid build up creosote.

⚠WARNING

- **BEFORE YOU BEGIN CHECK ALL LOCAL CODES AND REGULATIONS REGARDING YOUR INSTALLATION.**
- **DO NOT CONNECT THIS UNIT TO A CHIMNEY FLUE SERVING ANOTHER APPLIANCE**

YOUR FIRST FIRE!

The following pages contain information on the major components and operation of your heater. Please take time to read about them as it will give you a better understanding of how your stove works. This understanding will help you to operate your stove properly thus will extend the life of your stove and allow you to get the highest efficiencies from your heater.

THERMOSTAT

The thermostat knob is located on the left side of the lower shroud / ash shelf. It controls the burn rate of the stove. Any thermostat position between **LOW**(thin line) and **HIGH**(wide line) will produce the desired clean burning characteristics. However, since each installation is different, you may find it necessary to operate the thermostat to suit your situation. A **HIGH**(wide line) thermostat setting will produce maximum heat which is more than suitable for heating the average size home. All adjustments to the thermostat should be done gradually. When you first light the stove set the thermostat to **HIGH**(wide line) setting for 20-30 minutes, or until the fire is well established. Once the fire is established turn the thermostat to **MED**(middle of line) for 5 minutes and then to a **LOW**(thin line) setting or the desired setting. Too rapid an adjustment may cause the stove to operate improperly. The most common mistake new owners make is continually adjusting the thermostat.

LOW(thin line) **MED**(middle of line) **HIGH**(wide line)

BYPASS

Most catalytic wood burning appliances have a bypass device to allow the smoke from the fire to temporarily bypass, or go around, the catalytic combustor. The bypass door is located inside the firebox at the top of the stove. The bypass is a steel plate door, and is controlled by the bypass rod and latch above the door in the middle of the stove. Use the bypass handle on the side of the latch (**Fig. 14**) to pull the rod out, then the bypass is open, use the bypass handle on the center of the latch to push the rod in, then the bypass is closed. The bypass handle is hung from the top right-hand side of the outer shroud.

NEVER OPEN THE LOADING DOOR WITHOUT OPENING THE BYPASS DOOR

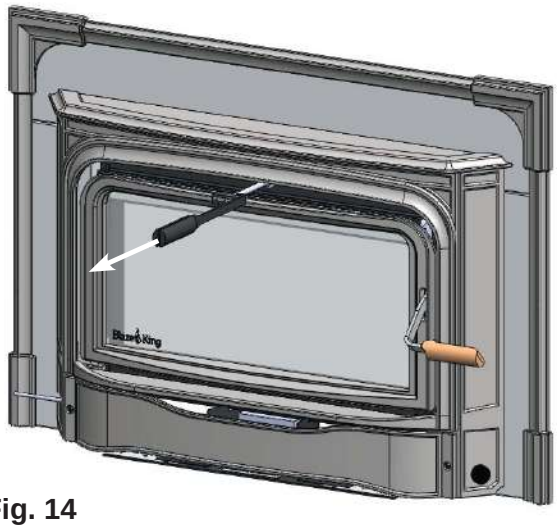


Fig. 14

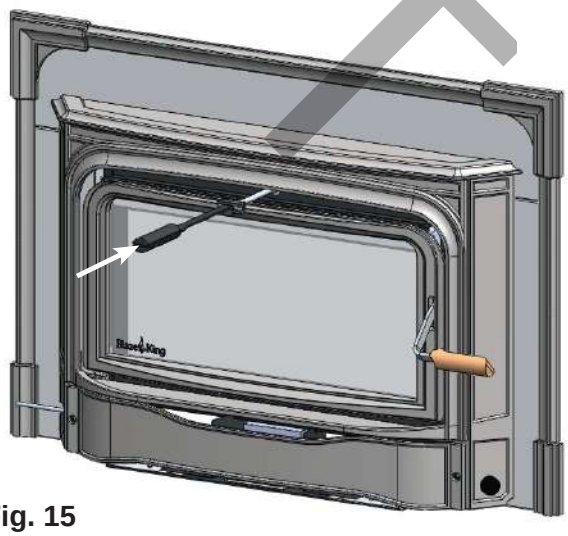


Fig. 15

CATALYTIC THERMOMETER

The catalytic thermometer is located in the lower left-hand corner of the cast surround. (**Fig. 16**) It's purpose is to show you if the combustor is active. Always operate the stove when the needle is in the active red zone. When the combustor is not active the stove will emit smoke and will not be efficient. For an accurate reading, turn fans off for approximately 10 minutes and then read the thermometer.

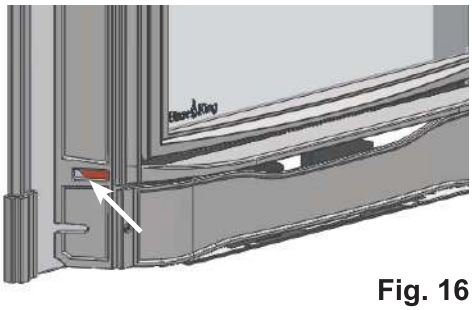


Fig. 16

SELECTING WOOD

⚠WARNING

- **THIS APPLIANCE IS DESIGNED TO BURN NATURAL WOOD ONLY. DO NOT BURN TREATED WOOD, COAL, CHARCOAL, COLORED PAPER, CARDBOARD, SOLVENTS OR GARBAGE.**
- **HIGHER EFFICIENCIES AND LOWER EMISSIONS WILL GENERALLY RESULT WHEN BURNING AIR DRIED SEASONED WOODS, AS COMPARED TO WET, GREEN OR FRESHLY CUT WOODS.**
- **BURNING WET UNSEASONED WOOD CAN CAUSE EXCESSIVE CREOSOTE ACCUMULATION. WHEN IGNITED IT CAN CAUSE A CHIMNEY FIRE THAT MAY RESULT IN A SERIOUS HOUSE FIRE.**

Use dry seasoned wood, split and stacked and protected from rain for at least 24 months with a moisture content of 20% or lower. It takes a great deal of energy to evaporate the moisture contained in green wood and that energy will not be heating your house. Also, green or wet wood will greatly increase creosote problems. The only accurate method to determine moisture content in wood is to use a moisture meter.

Never burn salt-water driftwood. It is very corrosive and will damage the firebox. Burning salty wood also voids the warranty.

This controlled combustion firebox has been designed for high efficiency and long burn times. The proper time to add more wood is when the last charge has been reduced to a glowing charcoal bed and while the catalytic thermometer is still active range. There will be very little smoke at this stage in the burn cycle.

Both hardwood and softwood burn equally well in this appliance but hardwood, which is more dense, will weigh more per cord and burn a little slower and longer.

Firewood should be split and stacked in a manner that air can get to all parts of it and covered in early spring to be ready for burning that fall.

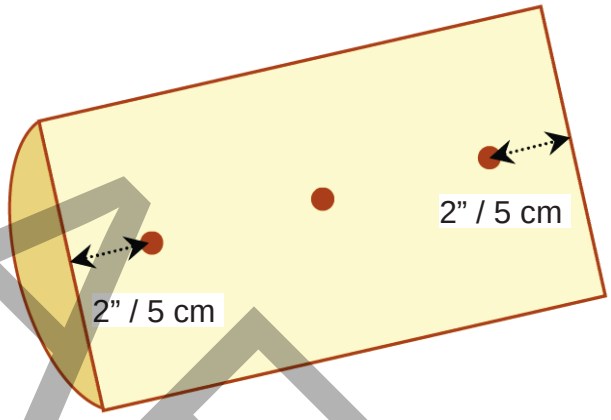
The only accurate way to determine wood moisture is to purchase a moisture meter.

⚠WARNING

- **NEVER START A FIRE UNLESS ALL BRICKS ARE CORRECTLY PLACED INSIDE THE FIREBOX. CHECK THE INSTALLATION INSTRUCTIONS CAREFULLY.**
- **ALWAYS OPEN THE BYPASS DOOR BEFORE OPENING THE LOADING DOOR.**
- **ONCE THE LOADING DOOR IS CLOSED, CLOSE THE BYPASS DOOR DIRECTLY AFTER THE CATALYTIC THERMOSTAT NEEDLE IS IN THE ACTIVE ZONE.**

HOW TO USE MOISTURE METERS

1. Take a random selection of around 3-4 logs per cubic yard or cubic meter.
2. Split each log down the middle.
3. In the center of log push pins of meter along grain - three measurements are taken on the freshly split surface: 2" or 5 cm in from each end of the log and in the middle of the split surface with sufficient contact (see figure).
4. Do this to all the logs and take an average of the readings (this will be only an approximate indication but a good guide).



EFFICIENCY

Efficiency was determined using the method outlined in B415.1-10 test method. It is represented by the Higher Heating Value (HHV) as the fuel used during testing contains between 19% - 25% water moisture included in the total calculated fuel weight. (Other test methods such as LHV or Low Heating Value, does not take the water moisture into account).

Annual Fuel Utilization Efficiency (AFUE) attempts to represent the actual, season long, average efficiency of an appliance. HHV is the actual, calculated average efficiency obtained under test conditions. Using correctly seasoned wood is important when trying to gain efficiency. The more seasoned (dry) the wood, the higher the efficiency (less energy wasted on eliminating moisture during combustion). Operating your Blaze King at lower settings will result in higher efficiencies as the fuel will undergo a more complete combustion.

LIGHTING THE FIRE

NOTE: As you heat up the stove for the first time, the paint will go through a curing process and will give off an odor. To minimize the inconvenience, burn the stove at a low temperature setting for several hours. It is advisable to open a door or window until the odor dissipates. You may also notice a change in color as the paint cures, this is normal and will appear uniform after subsequent firings.

1. **DO NOT USE A GRATE. BUILD THE FIRE DIRECTLY ON THE BRICK IN THE BOTTOM OF THE STOVE.**
2. Set the thermostat to **HIGH** (maximum) position and turn the fan **OFF**.
3. Open both the loading door and the bypass door (bypass latch / rod pulled out using bypass handle).
4. Place 10 balls of non-glossy paper towards the front of the bottom of the firebox, or use a Blaze King fire starter puck, then stack 20 pieces of kindling on top of the paper in a crisscross fashion (leaving air gaps in between sticks).
5. Light the fire and allow it to get a good start while leaving the loading door cracked open (approximately 3 to 5 minutes). **DO NOT LEAVE THE STOVE UNATTENDED.**
6. Once the kindling is fully on fire, place two or three medium size logs onto the fire. Keeping the loading door unlatched, allow the logs to catch fire (approximately 5 minutes). **DO NOT LEAVE THE STOVE UNATTENDED.**
7. Once the logs are burning, latch the loading door shut **BUT** keep the bypass door open. Leaving the loading door open after the fire is well started may cause premature failure of the catalytic combustor.
8. When nearly all of the wood in the firebox is fully burning, finish loading the stove. Lay the wood as far back in the stove as possible. Latch the loading door shut and observe the catalytic thermometer. Once the needle is in the **ACTIVE RED ZONE**, close the bypass door (push the bypass latch / rod in using the bypass handle). Turning the thermostat down to soon may cause the fire to go out.
9. Let the fire burn, with the thermostat in a **HIGH** setting, for 20-30 minutes, or until the fire is well established. At that point, turn the thermostat down to the desired setting. It is good burning practice to burn the stove on **HIGH** for 20 to 30 minutes after every refuelling, this will help to condition the wood load for optimum combustion. The temperature in the stove and the gases entering the combustor must be raised to at least 500° (indicated by the thermometer needle in the active red zone) for catalytic activity to be initiated. During the start-up of a cold stove, a high fire must be maintained for at least 20-30 minutes. This ensures that the stove, catalyst, and fuel are all stabilized at proper operating temperatures. Even though it is possible for flue gas temperatures to reach 600° within 5 minutes of a fire being started. If the fire is allowed to die down immediately (thermostat set to a **LOW** setting too soon), it may go out or the combustor may stop working, indicated by the thermometer needle being in the inactive zone. Once the combustor starts working, heat generated in it, by burning the exhaust smoke, will keep it working.
10. The fan can be turned on when the stove is hot or after the initial warm up period of 20-30 minutes.

Probably the least understood requirement in maintaining a good fire is that of establishing a good base of coals or embers. A good bed of hot coals or embers will maintain a more even temperature as well as getting the new load of wood started easily. Put as much fuel into the stove as it will hold. Don't be afraid to fill it completely. With the Blaze King automatic thermostat, the wood will only burn at the rate set on the thermostat. Once the full load is established, the stove should be left to complete the full burn cycle. This is evident by either a coal bed (ember bed) remaining or the catalyst's thermometer hovers just inside the active zone. This procedure will maximize the efficiency of the combustor as well as limit chimney emissions and smoke spillage.

⚠WARNING

DO NOT USE THE APPLIANCE WITHOUT A COMBUSTOR

RELOADING PROCEDURE (with the catalyst temperature in the active red zone)

1. Have your next load of wood ready before beginning. Turn the thermostat to **HIGH** and turn the fan off. Wait 2 minutes for the air flow to stabilize.
2. Open the bypass door (bypass latch / rod pulled out using bypass handle) and again wait 2 minutes for the air flow to stabilize.
3. Unlatch the loading door and open just a crack to allow the ambient room air to be introduced to the firebox, this may take a few seconds to stabilize.
4. Slowly open the loading door and proceed to reload the firebox. If you experience excessive smoke spillage, slightly close the loading door to re-establish a draft through the chimney.
5. Once loaded, latch the loading door shut and close the bypass door (push the bypass latch / rod in using the bypass handle). Let the fire burn on the **HIGH** thermostat setting for 20 to 30 minutes **OR** until the fire is very well established. At that point, turn the thermostat down to the desired setting. Keep in mind you may not see a large amount of flame activity in the lower thermostat setting. The thermometer needle will remain in the active zone indicating that the burn cycle is continuing.
6. Should you burn the stove on a very low setting for extended periods of time, you will begin to see creosote deposits forming on the glass door. To remove these deposits, simple run the stove on **HIGH** for approximately 30 minutes. The **HIGH** setting will burn off most of the deposits

As every pile of wood is different you will learn, over time, which settings are necessary to achieve the optimal fire. This will be based on the type of wood, installation, weather conditions and the desired room temperature.

RELOADING PROCEDURE (with the catalyst temperature still in the inactive zone)

Follow the procedure for “LIGHTING THE FIRE” on the previous page.

OPTIMAL THERMOSTAT SETTING

Any thermostat position between **LOW** and **HIGH** will produce the desired clean burning characteristics. However, since each application can vary, you may find it necessary to operate the thermostat to suit your application. A thermostat setting on **HIGH** will produce a maximum heat which is more than suitable for heating the average size home and offer the cleanest door glass.

1. Starting the fire. Each stove, home, installation, chimney installation, and homeowner combination works a little differently. The first several times you fuel the stove, it may not react as you expect. A little experimentation may be needed to find the right combination of fuel and thermostat setting to achieve the maximum efficiency. This is one of the joys of burning wood. You, the wood burner, make it work. And you can see what happens as it is working. Be patient, the air / fuel mixture and temperature must be stabilized before maximum combustion efficiency can be achieved.
2. As the combustor temperature (as indicated by the thermometer) passes into the active red zone, further adjustment to achieve the desired room temperature should be made in small increments for the most effective cleaner burning operation. Changes should be made as few times each day as possible. When the thermostat knob is moved from high to low, more gases are produced, so the combustor has more fuel; consequently the combustor thermometer may register a higher heat for several hours after the thermostat is turned down.
3. Keep hot coals active so when you reload the stove you will reduce the time necessary to maintain an active combustor.
4. The thermostat is set at the factory. **DO NOT TAMPER WITH THE THERMOSTAT**, this will result in a malfunctioning thermostat.

FAN OPERATION

The fans are located beneath the firebox of the stove, it recirculates room air up the back and across the top. This design allows the air to travel the farthest distance across the hot surfaces resulting in super heated air, most of which can be felt exiting the top of the stove. The fan should be off until the stove reaches normal operating temperatures. After approximately 30 minutes, the fan speed adjustment should match the thermostat control setting, i.e. if your stove is set at medium then your fan should also be set at medium, low—low, high—high etc. The fan control is on the right-hand side of the lower shroud / ash shelf.

ICE - FORMATION AND PREVENTION

Most of what you see coming from the chimney of a properly operating catalytic stove is water vapor. In extremely cold weather - and with some exterior chimneys - this vapor may freeze in the chimney, to the point of actually blocking the chimney and extinguishing the fire. In such weather, occasionally burn the stove for 4 or 5 minutes with the thermostat setting on **HIGH** to melt any possible ice buildup.

WOOD BURNING IN THE SHOULDER SEASON

There are things to consider if you decide to light a fire in the spring and fall or when the outside temperature is milder, perhaps 55°F to 70°F (13°C to 21°C).

As you light the fire, with the loading door open, you may notice spillage, this is when a small amount of smoke comes back into the living space. When your fire begins to warm the chimney and the draft improves, spillage is greatly reduced. After a short period of time you can adjust the thermostat to a **LOW** setting and maintain a comfortable temperature in your home.

In reducing the thermostat setting you have also reduced the flue temperatures and your chimney begins to cool down. At this time the amount of draft is also decreasing and spillage may occur. The differences between the flue temperature and the outdoor air temperatures causes your chimney to draw and vent the flue gasses to the outside. This air movement, sometimes referred to as Stack Effect, is also influenced by air density and moisture differences. Small temperature differences produce less draw in your chimney system than large temperature differences.

General Rules for burning in the shoulder season:

- Run your stove on high for 30 minutes after start up and reloading.
- Slowly turn the thermostat down to the desired heat setting.
- The heat setting needs to be high enough to keep the thermometer in the active zone.
- If the thermometer does not stay in the active zone turn the thermostat to a higher setting. Wait 15 minutes then confirm that the thermometer remains in the active zone. Repeat as needed.
- If your stove is producing too much heat, start to build smaller hotter fires.

It is important to periodically monitor the operation of the catalytic combustor to ensure that it is functioning properly. A non-functioning combustor will result in a loss of heating efficiency, and an increase in creosote and emissions. Following is a list of items that should be checked on a periodic basis:

- Combustors should be visually inspected at least three times during the heating season to determine if physical degradation has occurred. Actual removal of the combustor is not recommended unless more detailed inspection is warranted because of decreased performance. Refer to "CATALYTIC COMBUSTOR TROUBLESHOOTING" on next page.
- This catalytic heater is equipped with a temperature probe to monitor catalyst operation. Properly functioning combustors typically maintain temperatures in excess of 500°F (indicated by the thermometer needle in the active zone), and often reach temperatures in excess of 1000°F. If catalyst temperatures fall below 500°F (indicated by the thermometer needle in the inactive zone), refer to next step and to "CATALYTIC COMBUSTOR, TESTING" below.
- You can get an indication of whether the catalyst is working by comparing the amount of smoke leaving the chimney when the smoke is going through the combustor and catalyst light-off has been achieved, to the amount of smoke leaving the chimney when smoke is not routed through the combustor (bypass mode):
  - Light the stove as per the lighting instructions "LIGHTING THE FIRE". With smoke routed through the catalyst, go outside and observe the emissions leaving the chimney.
  - Open the bypass mechanism, wait approximately 15 minutes, and again observe the emissions leaving the chimney. Significantly more smoke will be seen when the exhaust is not routed through the combustor (bypass mode). Some smoke may be visible shortly after you start the fire and shortly after reloading the fire. Allow 20 to 30 minutes for the fire to stabilize before making observations.

CATALYTIC COMBUSTOR, TESTING

Light the fire as per the lighting instructions (see LIGHTING THE FIRE). Then set the thermostat knob on a **MED** setting. When the fire is well established (within one to three hours) turn the thermostat knob between **LOW** and **MED**. A properly operating combustor will remain active, and the combustor thermometer will remain in the "active" zone until the wood load is mostly consumed. A "tired" or "dead" combustor will, with the thermostat on **MED** or lower, go out completely, and the thermometer needle will fall into the "inactive" zone. Repeat this procedure several times over several days (Remember that the combustor thermometer has a built-in lag of 4-8 minutes.) If, after several test burns, the thermometer will not indicate an "active" combustor, it may require cleaning or replacement. It is also possible that the thermometer, itself, may not be reading accurately. Before condemning the combustor, read "THERMOMETER". If, after cleaning has been performed, your combustor is still not working you can Contact Blaze King for a replacement combustor. Please read "REPLACEMENT PARTS" section in this owners' manual.

CATALYTIC COMBUSTOR, CLEANING

Under certain conditions, ash particles may become attached to the face of the combustor. These may be seen while the combustor is in the glowing stage, or when the fire is out. Any deposit on the visible face of the combustor should be removed. Wait until the fire is out and the stove is cold before performing any cleaning. Brushing the combustor with a soft bristle paint brush will remove some deposits. Passing a vacuum cleaner wand or brush near the face of the combustor will remove most deposits. (Hot ash in a vacuum cleaner bag will burn, may melt the vacuum or cause a house fire. Exercise caution and never clean the stove when the stove or ashes are hot.) Never scrape the combustor with any hard tool or brush. Never run pipe cleaner through the individual cells of the combustor. This is not needed, and may do more harm than good. Limit cleaning to the face of the combustor. **NOTE: Never remove a combustor without approved combustor gasket in hand as original gasket will fall apart when removed from stove**. Remember to re-install the Flame Shield (the perforated plate) in same position it was found.

TIP: A hot fire will usually prove to be the best method of cleaning the combustor of deposits.

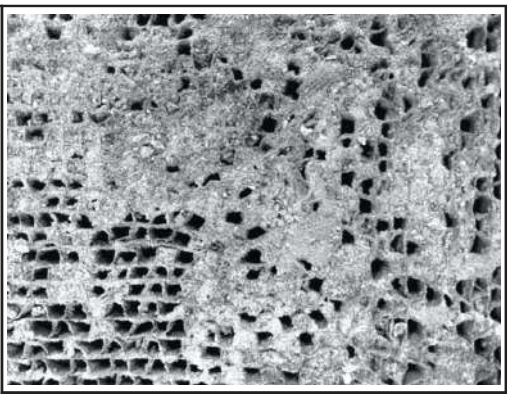
CATALYTIC COMBUSTOR, TROUBLESHOOTING

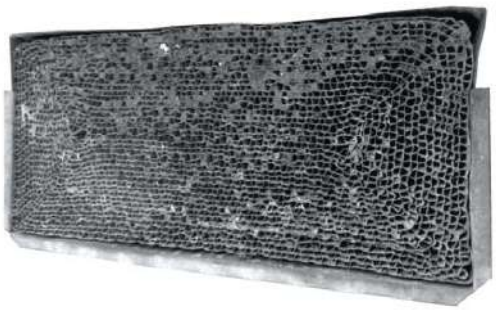
PROBLEM - CREOSOTE PLUGGING

Possible Cause: Burning materials that produce a lot of char and fly-ash.
Solution: Do not burn materials such as garbage, gift wrap, or cardboard.

Possible Cause: Burning wet, pitchy woods or burning large loads of small diameter wood with the combustor in the operating position without the thermostat needle in the active zone.
Solution: Burn dry, seasoned wood, don't engage the bypass until the temperatures are high enough to initiate light-off (indicated by the thermostat needle in the active zone).

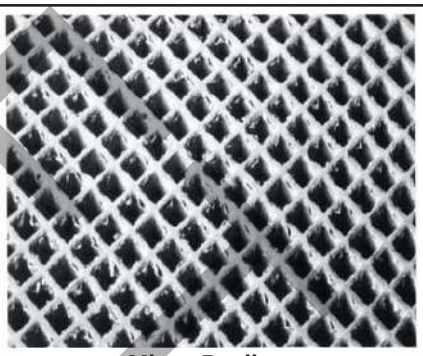
Possible Cause: Combustor not functioning. If proper burning procedures have been followed to no avail, the combustor is not functioning.
Solution: Replace the combustor with a genuine Blaze King combustor (failure to do so will void your warranty).





PROBLEM - CATALYST PEELING

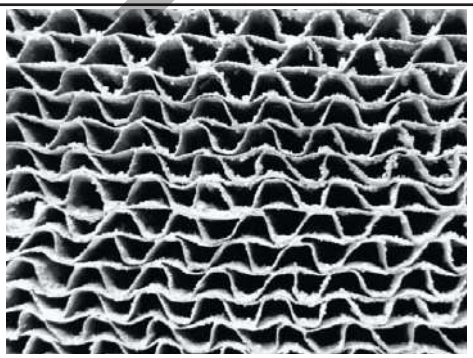
Possible Cause: Extreme temperatures (above 1800°F, or 1000°C.) at combustor surface can cause the catalysts to peel. Over firing and flame impingement on the combustor are primary causes. Minor peeling photo shows minor peeling that is normal and does not affect function. Severe peeling photo shows that are closed or plugged.
Solution: Avoid extreme temperatures and flame impingement. If peeling is severe, remove and replace combustor.



Minor Peeling

PROBLEM - CATALYST DEACTIVATION

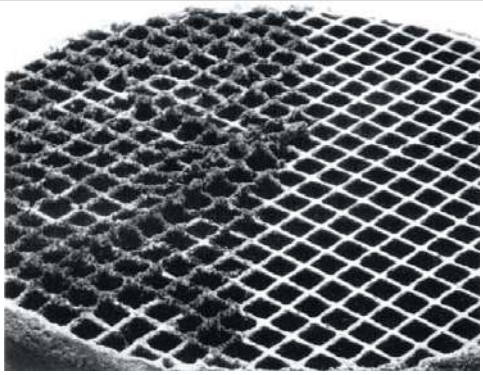
Possible Cause: Burning large quantities of trash, pressure-treated lumber, or painted woods.
Solution: Burn quality woods available in your area. If you decide the catalyst has been deactivated, replace combustor with a genuine Blaze King combustor (failure to do so will void your warranty).



Severe Peeling

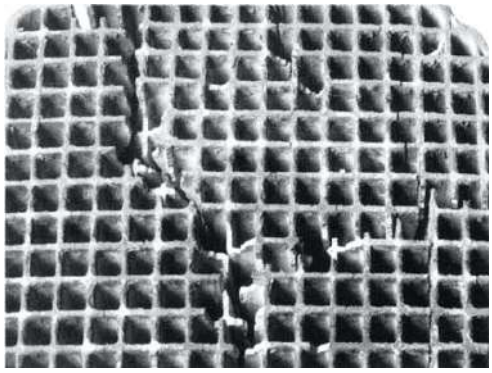
PROBLEM - CATALYST MASKING
(The catalyst is coated with a layer of fly-ash or soot which prevents catalytic activity)

Possible Cause: Accumulation of fly-ash
Solution: Brush cooled combustor with a soft-bristled brush or vacuum lightly at least once per burning season.



PROBLEM - THERMAL CRACKING

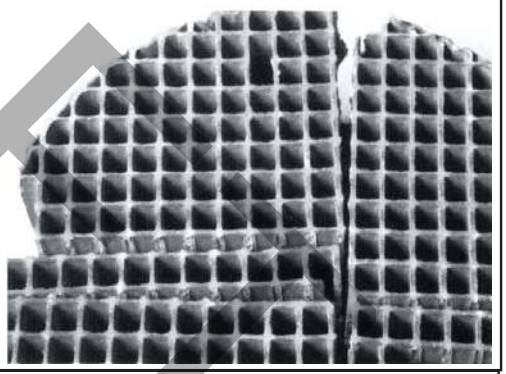
Possible Cause: Normal operation, as long as the combustor remains intact.
Solution: If cracking causes large pieces to fall out, replace the combustor.



PROBLEM - MECHANICAL CRACKING

Possible Cause: Mishandling, abuse, or operating without a properly gasket sealed combustor.
Solution: Handle with care

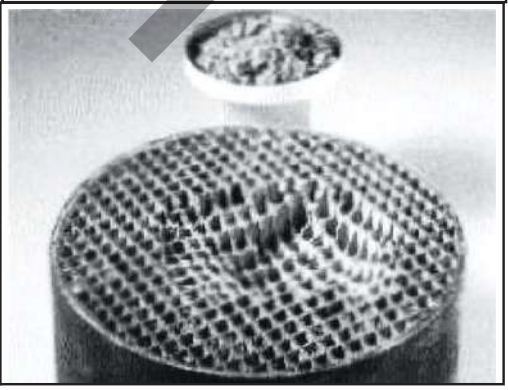
Possible Cause: Distortion of holding collar.
Solution: Combustor should be held firmly in its can. It should slide easily into and out of the holding collar of the stove. If severe cracking has resulted in loss of large chunks of combustor, replace combustor. Also replace any warped stove parts.



PROBLEM - CRUMBLING

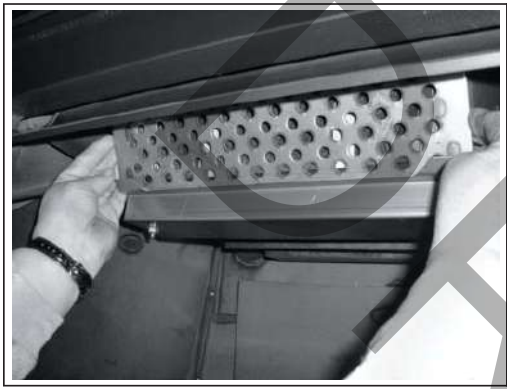
Possible Cause: Air leaks
Solution: Inspect door gasket, see “MAINTENANCE cont.” on page 36.

Possible Cause: High draft
Solution: Do not exceed .06” of water draft.



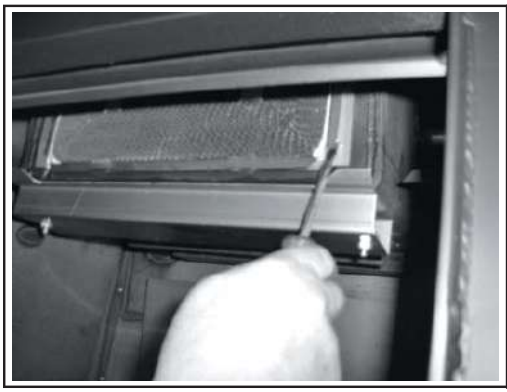
CATALYTIC COMBUSTOR, REPLACEMENT
BLAZE KING RECOMMENDS YOUR DEALER PERFORM THIS TASK

The catalytic thermometer on lower left-hand side of the stove should read in the active zone after the stove has been in operation for several hours. If the thermometer's indicator needle does not stay in the active zone, even with a hot fire, over a 7-10 day period of regular use, the combustor may need replacement or cleaning, see "CATALYST MONITORING" on page 28. If the combustor needs replacing then discontinue use of the appliance until the combustor is replaced. If the combustor must be examined or replaced contact your Blaze King dealer.



1. The removal of a Blaze King Catalytic combustor requires a small flat blade screwdriver or pocket knife. The stove fire must be out for at least 12 hours prior to the removal process. A combustor can reach 1400°F and hold high temperatures for several hours even after the fire is out. After waiting 12 hours, first remove the flame shield by simply lifting the shield off the two tabs at either side.

2. Once you remove the flame shield, you'll find the combustor. The honeycomb combustor can be made of different materials such as cordierite, mulite or even stainless steel. They are all the same with regard to removal and caution should be taken so as to not drop or damage the combustor. If your combustor has never been cleaned according the manufacturers directions, you may wish to clean the combustor before replacing it with a new combustor, see "CATALYTIC COMBUSTOR CLEANING" on page 28.

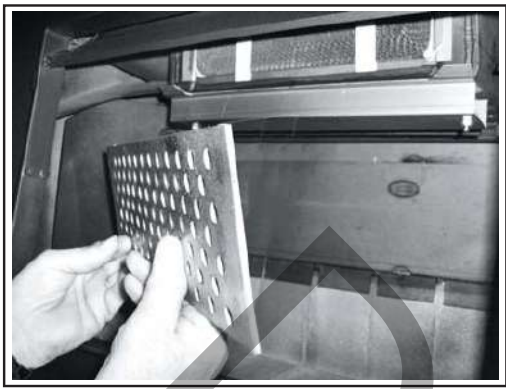


3. The combustor has a metal tab across the bottom and on each side of the combustor. Using a flat blade screwdriver or pocket knife blade, slide the blade behind the metal tab and the heavy steel dome of the stove. The dome is the housing that surrounds the combustor. Apply slight pressure until the combustor begins to move forward, about 1/4". Repeat the process on the opposite end tab. By working back and forth the combustor will work free of the dome housing. It is normal for the gasket surrounding the metal band to fall apart during this process. New combustors are shipped with a new gasket.

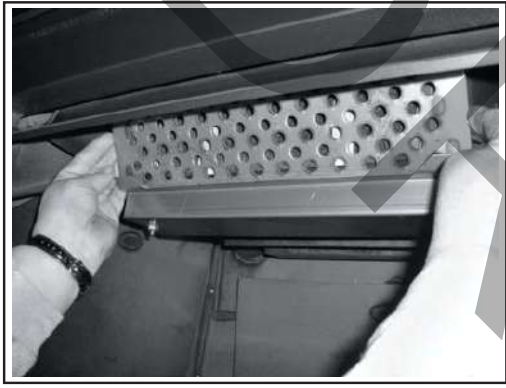
4. Using the same screwdriver or pocket knife, scrape any old gasket from the surface areas of the dome. The dome is the housing that surrounds the combustor. If you clean your existing combustor, you'll need to order replacement combustor gasket. It is always a good idea to have a spare combustor gasket on hand prior to performing any maintenance. If you purchase a new combustor a new gasket will already be applied to the combustor.

5. This new combustor already has the gasket installed. Note the 1" wide masking tape. This tape will help to keep the leading edge of the gasket from snagging during installation. If you've cleaned your combustor, wrap the combustor gasket as you see here and use the 1" masking tape around the perimeter front and rear. During the first fire the masking tape will burn off and the combustor gasket will swell providing a tight seal. It is this tight seal that improves efficiency and performance. You should never burn your stove without a combustor gasket installed.

6. Since the combustor is only 2" deep, there is ample room to lift the new combustor into place. **REMEMBER TO HAVE THE TAB ACROSS THE BOTTOM EDGE OF THE COMBUSTOR AS IT IS INSTALLED**. Slowly push the combustor in at the top apply even pressure to the left and right corners. This will allow for a better view of the bottom edge for the final fitting. **DO NOT FORCE THE COMBUSTOR INTO THE DOME. TAKE YOUR TIME AND WORK IT INTO PLACE SLOWLY.**



7. Once the combustor is installed completely so that all three tabs at touching the face of the dome, replace the flame shield. Never operate your stove without the flame shield in place. The flame shield will protect the face of the combustor against damages from wood when loading and other possible damages that can occur during the cleaning process.



8. The flame shield will rest on the two tabs located on the dome guard and lean slightly forward onto two bolts. Now that your combustor has been installed you can relight your stove. You will continue to receive excellent efficiency and clean burning for years to come. A few reminders, never burn anything other than dry, seasoned cordwood. Burning anything else may contaminate or ruin your new combustor. Also remember to keep your front loading door gasket seal properly adjusted, see "LOADING DOOR TENSION ADJUSTMENT" on page 39. Doing so will improve burn times and extend combustor life span.

The combustor supplied with this heater is a 115.0335 metal combustor. Consult the catalytic combustor warranty also supplied with this wood heater. Warranty claims should be addressed to:

in Canada	in USA
Blaze King Industries / Valley Comfort Systems Warranty Department, 1290 Commercial Way Penticton, BC Canada V2A 3H5, Ph: 250-493-7444	Blaze King Industries Warranty Department, 146A Street Walla, Walla, Washington 99362, Ph: 509-522-2730

RUN-AWAY OR CHIMNEY FIRE

⚠WARNING

A CHIMNEY FIRE CAN PERMANENTLY DAMAGE YOUR CHIMNEY SYSTEM. THIS DAMAGE CAN ONLY BE REPAIRED BY REPLACING THE DAMAGED COMPONENT PARTS. CHIMNEY FIRE DAMAGE IS NOT COVERED BY THE LIMITED WARRANTY.

CAUSES:

1. Using incorrect fuel, or small fuel pieces which would normally be used as kindling.
2. Leaving the door ajar too long and creating extreme temperatures as the air rushes in the open door.
3. Improperly installed or worn gaskets.
4. Creosote build up in the chimney.

SOLUTIONS:

1. Do not burn treated or processed wood, coal, charcoal, colored paper or cardboard.
2. Be careful not to over fire the appliance by leaving the door open too long after the initial start-up.
3. Replace worn, dried out (inflexible) gaskets.
4. Have your chimney cleaned regularly.

WHAT TO DO IF A RUN-AWAY OR CHIMNEY FIRE STARTS:

1. Close the draft fully (lowest position) by shutting off thermostat, and make sure firebox is closed tightly.
2. Call the local fire department.
3. Examine the chimney, attic and roof of the house, to see if any part has become hot enough to catch fire. If necessary spray with a fire extinguisher or water from a garden hose.
4. Do not operate the appliance again until you are certain the chimney has not been damaged.

CREOSOTE FORMATION AND REMOVAL

When wood is burned slowly, it produces tar and other organic vapors which combine with expelled moisture to form creosote. These vapors condense in the relatively cooler chimney flue of a slow burning fire and when ignited, make an extremely hot fire. Check your chimney for creosote and soot regularly, until a safe frequency for cleaning is established. The chimney connector and chimney should be inspected regularly during the heating season to determine if a creosote build up has occurred. Be aware that the hotter the fire, the less creosote is deposited.

If accumulation is excessive, clean the chimney. You may want to call a professional chimney sweep to clean it. Both the chimney and the appliance have to be cleaned at least once a year or as often as necessary.

Have a clearly understood plan to handle a chimney fire.

CHIMNEY MAINTENANCE

The most efficient method to sweep the chimney is using a hard brush. Brush downwards so soot and creosote residues will come off the inner surface and fall to the bottom of the chimney where they can be removed easily. The chimney must be checked regularly and if creosote has accumulated, it must be removed without delay. Cleaning on a regular basis should be sufficient during the coldest months. **ENSURE THE BYPASS DOOR IS OPEN PRIOR TO CLEANING THE CHIMNEY SO THE SOOT AND CREOSOTE FALLS INTO THE FIREBOX.**

Smoke Flue Inspection:

1. The chimney should be inspected regularly during the heating season.
2. If possible, the chimney should be dismantled and cleaned.
3. The chimney should be inspected for possible damage.
4. If it is in good condition, put the chimney back in place; otherwise, it must be replaced.

FIRE EXTINGUISHERS AND SMOKE DETECTORS

All homes with a solid fuel burning appliance should have at least one fire extinguisher in a central location, known to all, and at least one smoke detector in the room containing the appliance. If it sounds an alarm, correct the cause but do not de-activate or relocate the smoke detector.

ASH REMOVAL

This appliance is required to be cleaned frequently because soot, creosote and ash may accumulate. Wait until the stove is fully cooled off before the removal of ashes. **ALWAYS REMOVE THE ASH BUCKET IMMEDIATELY AFTER FILLING**. Ashes should be removed any time they come within one inch of the door opening. It is not necessary or advisable to completely remove all of the ashes when cleaning this stove. Wood burns best in a bed of ashes 1/2" thick. Ashes should be placed in a metal container with a tight fitting lid. The closed container of ashes should be placed on a noncombustible floor or on the ground (outside), 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. Other waste shall not be placed in this container.

⚠WARNING

NEVER STORE HOT ASHES IN A GARAGE OR BASEMENT. HOT ASHES WILL GENERATE CARBON MONOXIDE AND / OR FLAMMABLE GASES. THESE GASES MAY CAUSE SUFFOCATION AND POSSIBLE DEATH.

LOADING DOOR GASKET INSPECTION

Inspect the door gasket for physical deterioration, missing sections or obvious leakage. The stove front should make a groove in the gasket material - one side of the groove (toward the inside) will often be dark or black, and the other side (toward the outside) should be light or white. Dark smudges on the outside of the groove may indicate an air leak. If the groove is very shallow or missing, or if there is a heavy ash or creosote deposit along the bottom edge of the gasket, it may need to be replaced. Frayed or broken gasket material, or a gasket that is hard and unyielding, will also indicate need for replacement. Any time a piece of gasket is missing or is broken anywhere, the entire gasket must be replaced.

To check the gasket further, wait until the stove is cooled and insert a piece of paper (a dollar bill will work) into the door opening and close and latch the door. Obvious resistance should be felt when pulling the paper out Repeat this check several times around the perimeter of the door.

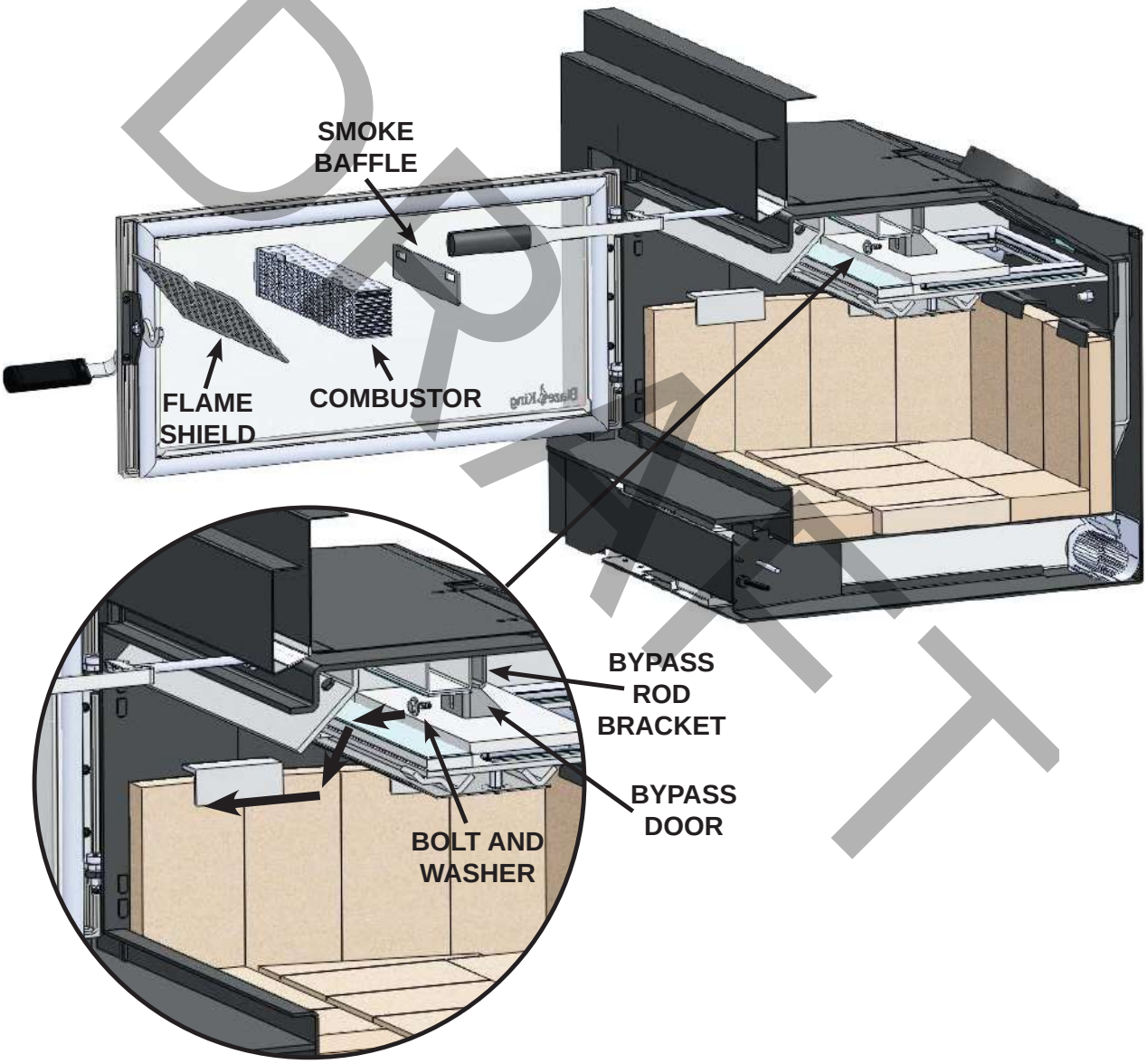
LOADING DOOR GASKET REPLACEMENT

BLAZE KING RECOMMENDS YOUR DEALER PERFORM THIS TASK

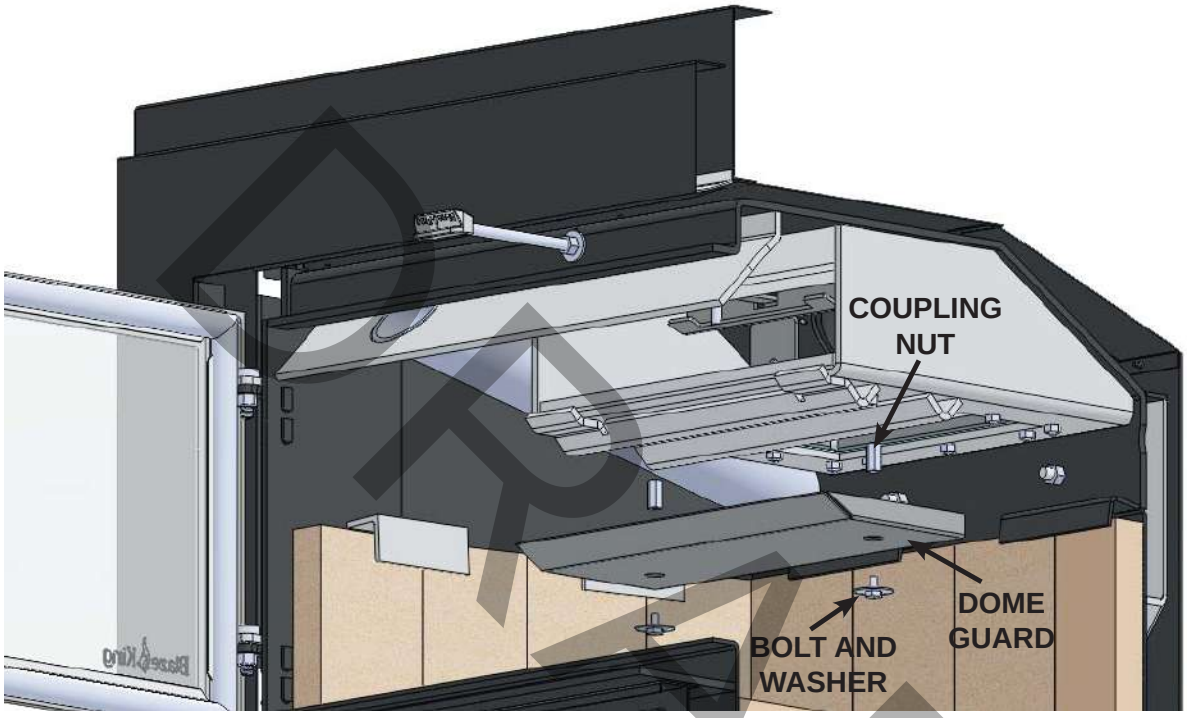
1. If the door gasket is to be replaced, be sure you have Blaze King 7/8" fiber glass door gasket ready to re-install, as well as high temperature adhesive. See your Blaze King dealer.
2. Be sure the fire is out and the stove has cooled down. The door does not have to be removed from the stove.
3. With a pair of pliers, pull the old door gasket out of the channel and dispose of it.
4. Thoroughly clean out the channel so the new silicone adhesive will adhere and the gasket will fit smoothly.
5. Dry fit the new gasket first to ensure proper fit. Do not stretch or cut the gasket. Distribute the gasket evenly around the frame.
6. Run a small bead of a high temperature silicone adhesive along the center of the channel. **DO NOT USE HOUSEHOLD SILICONE CAULKING**. High temperature silicone may be obtained from wood stove dealer.
7. Start the new gasket in the lower right corner. Do not stretch or cut the gasket. Distribute the gasket evenly around the frame.
8. Allow the adhesive to dry before closing the loading door. The loading door tension may need to be adjusted, see "LOADING DOOR TENSION ADJUSTMENT" on page 40.
9. Check the fit of the door gasket. Insert a narrow strip of paper into the door opening and close and latch the door. Obvious resistance should be felt when pulling the paper out. Repeat this check several times around the perimeter of the door. If no resistance is felt, adjust door latch catch, see "LOADING DOOR TENSION ADJUSTMENT" on page 40.
10. A tight sealing door extends the burn times & protects the combustor.

BYPASS DOOR GASKET RETAINER REPLACEMENT #Z2022

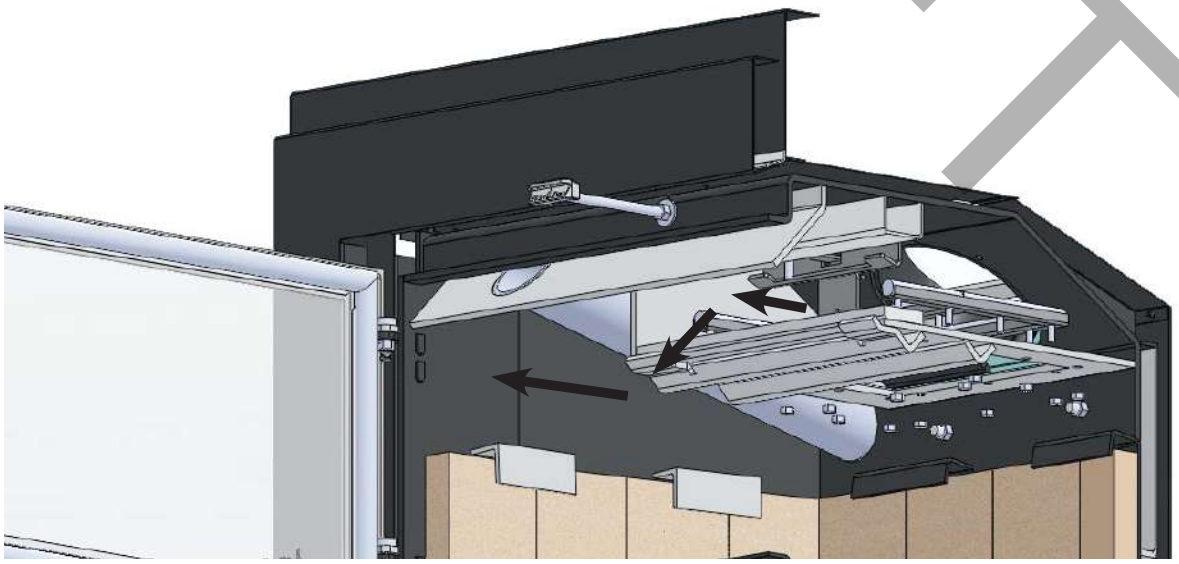
1. Remove flame shield. (see CATALYTIC COMBUSTOR REPLACEMENT step 1)
2. Remove the combustor. (see CATALYTIC COMBUSTOR REPLACEMENT step 2-4)
3. Remove hanging smoke baffle.
4. Open bypass door (slide it all the way forward) and unthread/remove the 1/4-20 bolt and washer that fastens the bypass door to the bypass rod bracket. Remove the bypass door through the combustor opening once detached.



5. Remove the two 1/4-20 bolts and washers that hold the dome guard in place, be sure to support the dome guard during this process is it will come loose. Once the dome guard is removed, unthread the two 1/4-20 coupling nuts that spaced the dome guard from the dome bottom.



6. Remove the twelve remaining 1/4-20 nuts from the dome bottom. Lift the bypass door gasket retainer assembly upwards (enough to clear the threaded posts from the dome) and remove through the combustor opening. Once removed, ensure all debris is cleared from the inner surface of the dome.



7. Once the inner dome surface has been cleared, insert the new bypass door gasket retainer assembly and follow the above instructions in reverse to ensure complete install. Ensure that 1/8" ceramic paper is in between the gasket retainer assembly and inner dome surface. Also ensure that all nuts are completely fastened up to the dome bottom. When tightening the 1/4-20 bolt through the bypass door into the bypass rod bracket, do not over tighten. Simply finger tighten the bolt as this allows the bypass door to move down as the gasket begins to seat after the first few fires.
8. When reinstalling the combustor, ensure it has been rewrapped with new expanding gasket that was supplied with the replacement kit. Do not install combustor without gasket.

DOOR GLASS GASKET INSPECTION

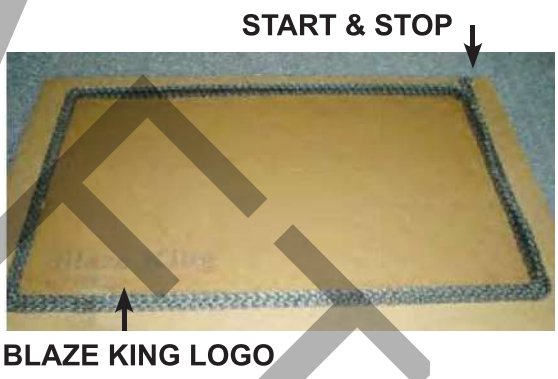
When the stove is cold, hold the glass by placing the palm of each hand on either side of the glass. Press firmly and try to move the glass. If the glass moves the door glass retainers may need to be tightened or the door glass gasket may need to be replaced.

1. Inspect the door glass gasket. If the gasket is frayed or missing sections replace the gasket.
2. Inspect the glass retainers and ensure the screws holding the retainers in place are tight. Hand tighten plus 1/4 turn. Do not over tighten.

DOOR GLASS GASKET REPLACEMENT

BLAZE KING RECOMMENDS YOUR DEALER PERFORM THIS TASK

1. You will require Blaze King glass gasket and Blaze King door gasket. Please see your Blaze King dealer.
2. Remove the old glass gasket.
3. Starting at the corner opposite of the "Blaze King" logo, carefully wrap the gasket around the edges, pressing firmly onto the sides of the glass with the gasket centered on the edge. Finish the wrapping with a 1/2" overlap. Ensure the thickness of the gasket remains consistent and uniform.
4. Install glass with the "Blaze King" logo to the lower left corner of the door. Install the glass retainers with original fasteners. Ensure the glass is parallel to the frame and tighten the fasteners evenly.
5. Follow steps on page 38, "**LOADING DOOR GASKET REPLACEMENT**".



DOOR GLASS, REPLACEMENT

Should the door glass become broken and/or damaged, please see your Blaze King dealer for replacement and installation. Replace only with ceramic glass, 5 mm. thickness. Follow steps 4 and 5 in "**DOOR GLASS GASKET REPLACEMENT**" to install the new glass.

DOOR GLASS, CLEANING

The best way to keep the glass clean is to leave the stove on high burn for a period of time after each reloading The moisture which is driven from a new load of wood contributes much of the creosote on the inside of the glass. Removing that moisture at the beginning of the burn cycle helps to keep the glass clean. Leaving the thermostat on a higher setting for 30 minutes to an hour before turning to low for an overnight burn will also help. Heavier deposits may require hand cleaning. Manual glass cleaning should be done when the stove and glass are cool. **DO NOT CLEAN THE GLASS WHILE IT IS HOT**. **WARNING: Do not use abrasive cleaners to clean the glass**. Use a soft cloth. After using any cleaner, thoroughly rinse the glass with water to remove any deposits left by the cleaner. Failure to remove all traces of glass cleaner will result in the glass cleaner residue baking on. This residue may be very difficult to remove.

LOADING DOOR TENSION ADJUSTMENT

1. Open the door.
2. To tighten the door tension use a 7/16" wrench to loosen the two nuts on the latch cover. Slide the latch cover towards the back of the stove and tighten nuts.(**Fig. 17**) Repeat paper test (see "LOADING DOOR GASKET INSPECTION" on page 36).

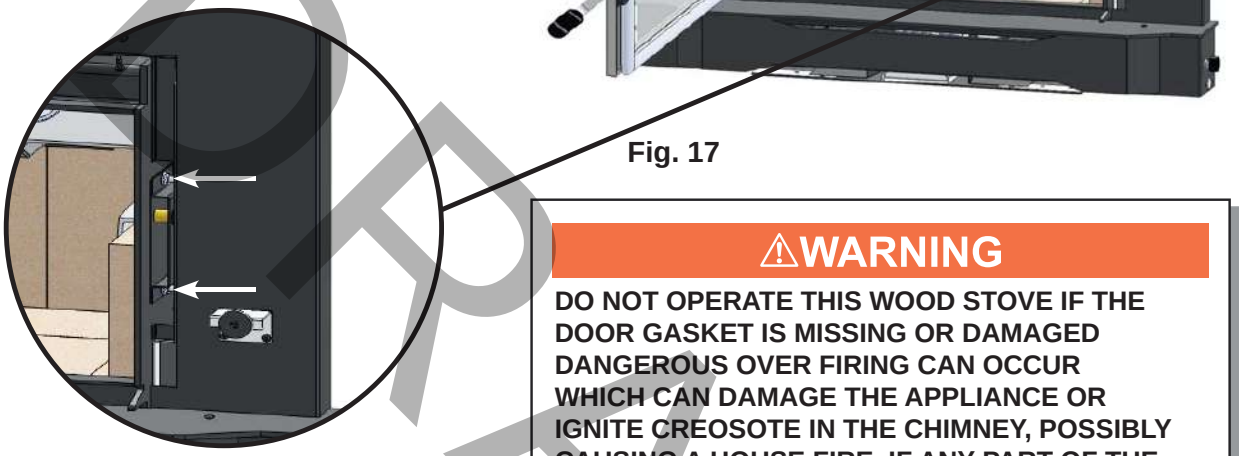


Fig. 17

⚠WARNING

DO NOT OPERATE THIS WOOD STOVE IF THE DOOR GASKET IS MISSING OR DAMAGED DANGEROUS OVER FIRING CAN OCCUR WHICH CAN DAMAGE THE APPLIANCE OR IGNITE CREOSOTE IN THE CHIMNEY, POSSIBLY CAUSING A HOUSE FIRE. IF ANY PART OF THE WOODSTOVE OR FLUE SYSTEM IS GLOWING THE STOVE IS BEING OVER FIRED.

LOADING DOOR HINGE ADJUSTMENT

1. Open the door to 90°.
2. Hold bottom nuts using a 9/16" wrench. Use a 1/4" Allen head screwdriver to back nuts off the bolts. (**Fig. 18**)
3. Remove the door by lifting up and out.

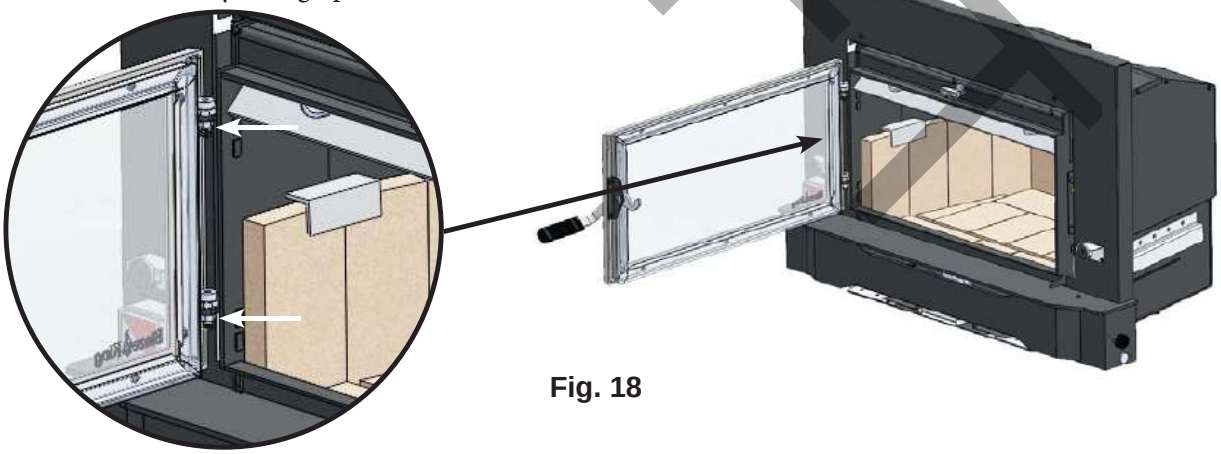


Fig. 18

4. Loosen the four door hinge nuts using a 7/16" wrench. Slide door hinges in to tighten door seal and out to loosen door seal. (**Fig. 19**)

5. Put door back on using nuts and bolts.
6. Repeat paper test (see "LOADING DOOR GASKET INSPECTION" on page 36).

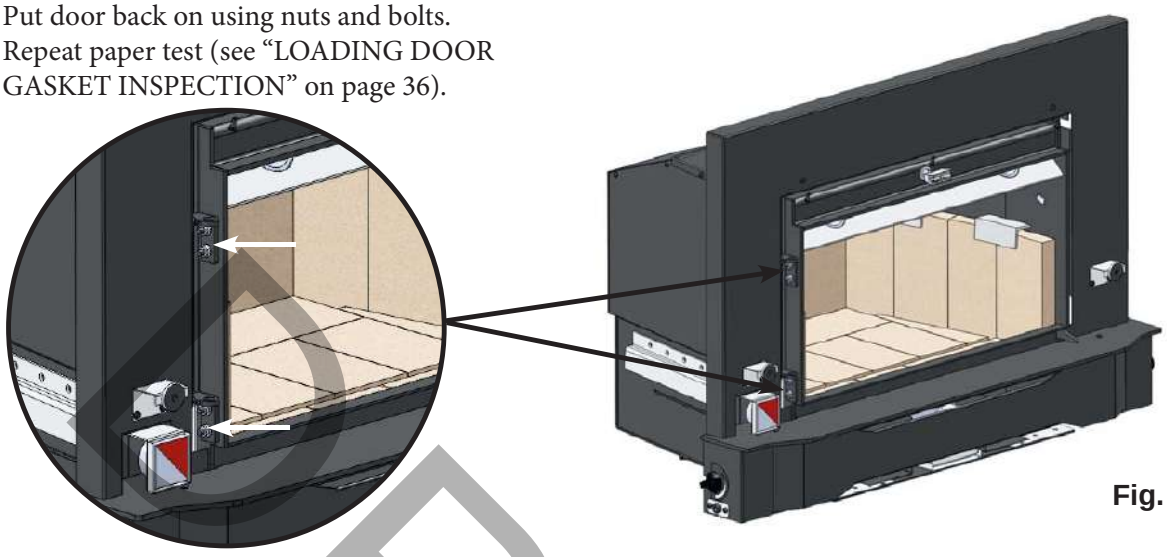


Fig. 19

CHIMNEY DRAFTS

Draft is the force which moves air into the appliance and up through the chimney. The amount of draft in your chimney depends on the length of the chimney, local geography, nearby obstructions and other factors. Too much draft may cause excessive temperatures in the appliance and may damage the catalytic combustor. Inadequate draft may cause back puffing into the room and 'plugging' of the chimney or the catalyst.

Inadequate draft will cause the appliance to leak smoke into the room through appliance and chimney connector joints. An uncontrollable burn or excessive temperature indicates excessive draft.

If you suspect a draft problem in an existing chimney, determine the draft by using a water manometer (or digital draft gauge). The draft should be measured with the stove at **medium burn and high burn**. After the measurement is completed, fill any holes that were made in the chimney connector by using a sheet metal screw of proper size. Recommended draft is **.02 -.03 in. w.c. at medium fire and .05 in. on high burn**. Too little draft results in a sluggish fire and smoke spillage when the stove door is opened. Too much draft (over 0.06 in. w.c. on high burn) makes it unsafe to operate the stove and will void manufacturers warranty.

FAN ASSEMBLY

Routine maintenance of the fan assembly on the side of the stove is not required. However, should it become necessary to replace an individual fan or rheostat, contact your local dealer.

THERMOMETER

The combustor thermometer tells you what was happening 4-8 minutes ago, and remember, it is only an indication of the temperatures of the gasses after they pass through the combustor. The thermometer probe, the part that fits into the stove, must be cleaned at least once a year. Lift it from the stove (be careful, it may be hot) and wipe or scrape it clean. At room temperature, away from the stove, the indicator should point near the bottom of the "Inactive" zone. If, after several years use, you find that the needle no longer points to the bottom of the "Inactive" zone when the thermometer has been at room temperature for 10 minutes or longer, it may need adjustment. Holding the probe with a pair of pliers, loosen the bolt on the top of the dial. Turn the dial to align the pointer with the bottom of the "Inactive" zone, then retighten the bolt.

NOTE: IF YOUR BLAZE KING IS EQUIPPED WITH FANS, TURN OFF FANS AND WAIT 10 MINUTES PRIOR TO READING CATALYTIC THERMOMETER INDICATOR. AIR MOVEMENT ACROSS THE TOP OF THE STOVE MAY PROVIDE FALSE READING.

THERMOSTAT

The thermostat is set at the factory and should not be tampered with. If the thermostat malfunctions contact your dealer for replacement by a qualified installer.

Your Blaze King is designed to allow a wide selection of heat output levels. If you begin to lose control of the amount of heat the stove is emitting, determine the cause early so that major problems may be avoided.
The six major needs of a well-controlled fire are:

1. Knowledgeable operator.
2. Adequate air supply.
3. Firewood of good quality and proper size.
4. Catalytic combustor in good condition.
5. Clean chimney, properly sized and installed.
6. Door gasket tight and firm.

Considering all of the above, number one is the most important for safe and efficient operation of any woodstove. Please study the operation instructions carefully. Consult your BLAZE KING dealer or call the Customer Service Department at Blaze King in the U.S.A. at 509-522-2730 or in Canada at 250-493-7444 if you have any questions not answered in this manual.

All of the six above mentioned needs are interrelated. A deficiency in any one will affect all of the others. If you encounter a problem, determine the source of the problem and then follow-up by checking the other needs as possible contributing factors.

PROBLEM: Chimney Fire	
CAUSE Act immediately regardless of cause	**SOLUTION** Turn the thermostat to lowest setting, check loading door to be sure it is tightly closed. **Call Fire Department.**
After the fire is out, have your chimney and flue connector inspected by a certified chimney sweep. A damaged masonry chimney should be repaired or rebuilt. A prefabricated chimney (factory built) that is damaged should be replaced. Any damage to the flue connector should be corrected before the system is used again. Possible causes of a chimney fire, and remedies for those causes, can be found further in this section: “Excessive Creosote Formation”, and “Spots of Creosote Accumulation in Chimney or Flue Connector”.	

PROBLEM: Not enough heat.	
CAUSE Green or wet wood. Not enough fuel in stove.	**SOLUTION** Use seasoned wood. Don’t be afraid to FULLY load the stove. A FULL load of wood won’t burn any hotter than the thermostat is set.
Obstruction in chimney or cap screen. Combustor plugged or coated.	Remove obstruction. See “COMBUSTOR, TESTING” See “COMBUSTOR, CLEANING”
Combustor not functioning.	See “COMBUSTOR, TESTING”. If needed, replace combustor, See”“COMBUSTOR, REPLACING”.
Thermostat set too low.	Raise thermostat setting.
Thermostat not operating properly.	Consult your Blaze King dealer.
Poor draft caused by an oversize flue	Measure draft with Manometer. See “CHIMNEY DRAFTS” Consult your Blaze King dealer or a chimney sweep.
Strong, gusting winds causing downdraft in chimney	Install wind-resistant chimney cap. Directional caps may not stay freely rotating. If you have a directional cap, check it frequently.
Tightly sealed house, inadequate air supply.	Slightly open a window, near the stove.
Reloading too much wood on top of too few coals.	Allow a larger bed of coals to build up.

PROBLEM: Too much heat.	
CAUSE	**SOLUTION**
By-Pass door left open.	Close the by-pass door.
Thermostat set too high.	Lower thermostat setting.
Loading door gasket leaking, admitting excess air into firebox.	Replace door gasket and/or adjust door. See “GASKET INSPECTION”
Excessive draft in the chimney.	Measure draft with a Manometer. See “DRAFTS”. Consult your Blaze King dealer or a chimney sweep. Install a cap.
Thermostat not operating properly.	Consult your Blaze King dealer.
Wood is too small.	Use larger pieces.

PROBLEM: One or both fans will not run, or there is no adjustment for fan speed.	
CAUSE	**SOLUTION**
Fans mounted improperly.	Check that fan blade’s not touch edges of hole.
Fan speed control.	Consult your Blaze King dealer for replacement.

PROBLEM: Fans minimum speed too fast or maximum speed too slow.	
CAUSE	**SOLUTION**
Fan speed control out of adjustment.	Consult your Blaze King Dealer.

PROBLEM: Excessive creosote formation in chimney and chimney Connector.	
CAUSE	**SOLUTION**
By-pass door left open.	Close by-pass door.
By-pass door not sealing tightly.	Inspect by-pass door and seal for warping. Ash or creosote buildup may occur on door or seat. With stove cold scrape and vacuum area around by-pass. Be sure all mating steel surfaces are clean and smooth.
Improper operation.	Check thermostat setting and operating procedures. See “THERMOSTAT & OPTIMAL THERMOSTAT SETTING”
Wood too green or wet.	Use seasoned wood. Use a moisture meter to confirm.
Catalytic combustor not operating properly.	Inspect the combustor. See “CATALYTIC COMBUSTOR, TESTING”
Poor draft caused by an oversize or short flue, etc.	Measure draft with Manometer. See “DRAFTS”. Consult your Blaze King dealer or a chimney sweep.
Chimney too cold or poorly insulated.	Upgrade chimney system. Consult your Blaze King dealer or a chimney sweep.

PROBLEM: Catalytic combustor thermometer (on top of stove) does not go into "Active" zone, or does not stay there for long. (Fans must be in “off” position for 10 minutes prior to checking)	
CAUSE	**SOLUTION**
Improper operation.	Check thermostat setting and operating procedures. See “THERMOSTAT & OPTIMAL THERMOSTAT SETTING”
Obstruction in chimney or cap.	Clean chimney, remove obstructions.
Faulty combustor thermometer.	Replace thermometer and Recheck combustor operating Temperature.
Wood too green or wet.	Use seasoned wood.

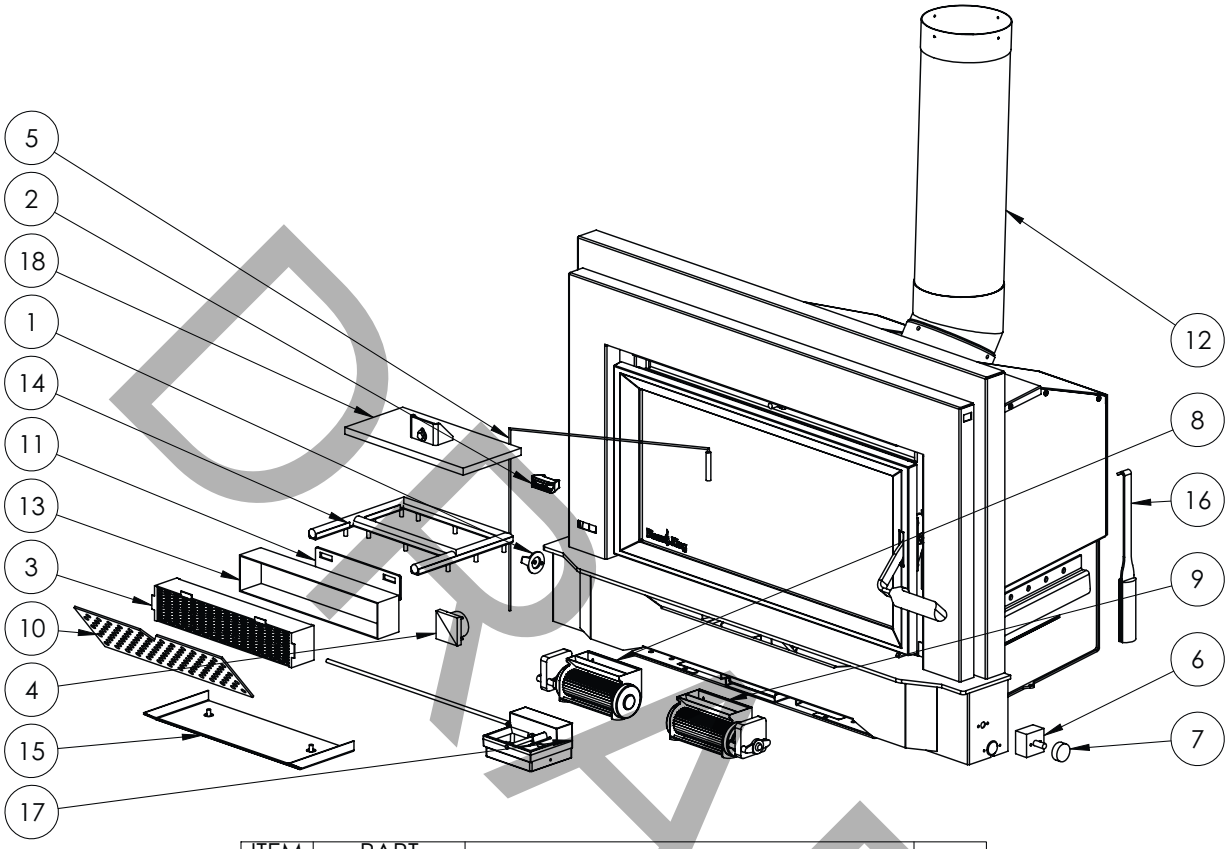
Combustor plugged or coated.	Clean combustor. See “CATALYTIC COMBUSTOR TESTING”
Combustor not functioning.	Check and test combustor. If needed replace combustor. See “CATALYTIC COMBUSTOR, REPLACING”
Thermostat not operating properly.	Consult your blaze King Dealer.
By-pass door leaking or not closing completely.	Inspect and clean area around by-pass doors. Adjust or replace gasket if necessary. Consult your Blaze King Dealer.

PROBLEM: Spots of creosote accumulation in chimney or chimney connector.	
CAUSE Air leaks in chimney or chimney connector.	**SOLUTION** Inspect chimney and / or chimney connector. Repair or replace as necessary. Check to be sure that the chimney connector is installed correctly.
CAUTION: a leaking chimney connector is a fire hazard and demands immediate attention.	
Poor draft caused by an oversize flue, single wall pipe, to many elbows, etc.	Measure draft with Manometer. See “DRAFTS”. Consult your Blaze King dealer or a chimney sweep.

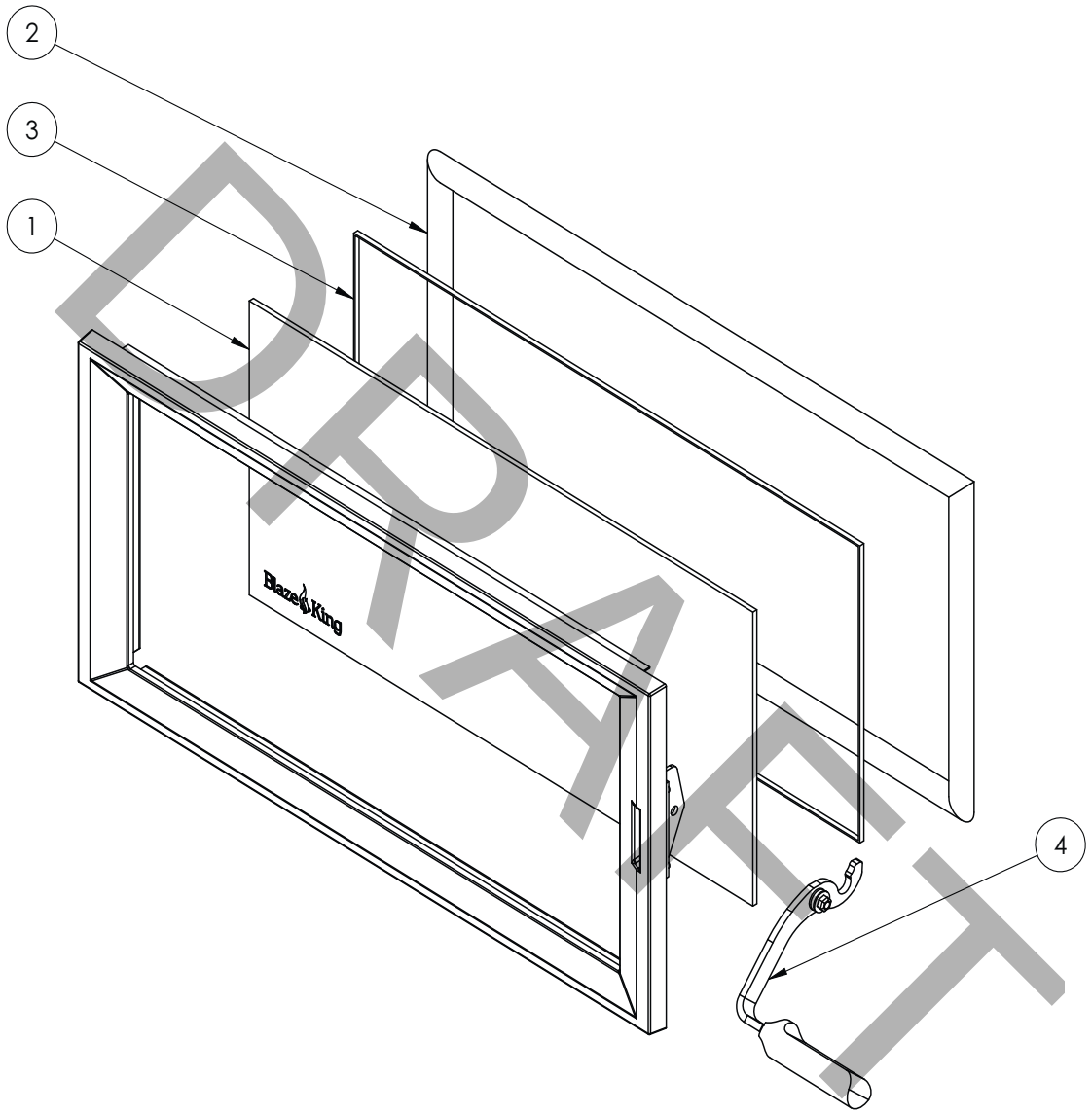
PROBLEM: Door glass quickly becomes coated with creosote.	
CAUSE Low thermostat setting or lowering the thermostat setting too far, too quickly.	**SOLUTION** Turn the thermostat to the warmest setting during the first 20-30 minutes or until the fire is well established after each reloading.
Poor draft caused by an oversize or short flue, etc.	Measure draft with Manometer. See “DRAFTS”. Consult your Blaze King dealer or a chimney sweep.
Obstruction in chimney or cap screen.	Remove obstruction. Clean chimney and/or cap screen.
Strong, gusting winds causing downdraft in chimney.	Install wind-resistant chimney cap.
Tightly sealed house, inadequate air supply.	Open a window, slightly, near the stove.
Burning poorly seasoned wet wood, or wood with high pitch content.	Use seasoned wood with low pitch content, such as some types of pine.

PROBLEM: The combustor temperature cannot be controlled. Turning the thermostat down often makes the combustor temperature go up.
CAUSE Turning the thermostat down, particularly in the first half of the burn cycle, causes the fire to emit more smoke, which is fuel for the combustor. The combustor temperature therefore climbs for up to several hours. This is normal, and is of no concern. As long as only the combustor temperature is elevated, there is nothing to worry about.

PROBLEM: Smoke spills from door opening when loading fuel	
CAUSE Spark arrestor screen on cap plugged.	**SOLUTION** Clean spark arrestor screen to bare metal wire.
Chimney too cold.	Make certain insulated liner is used in installation.
Not enough vertical rise.	Make certain sufficient vertical rise is observed.
Chimney not drafting.	Turn thermostat to highest setting, open bypass, leave loading door closed and wait 5-10 minutes to increase chimney or flue temperature.

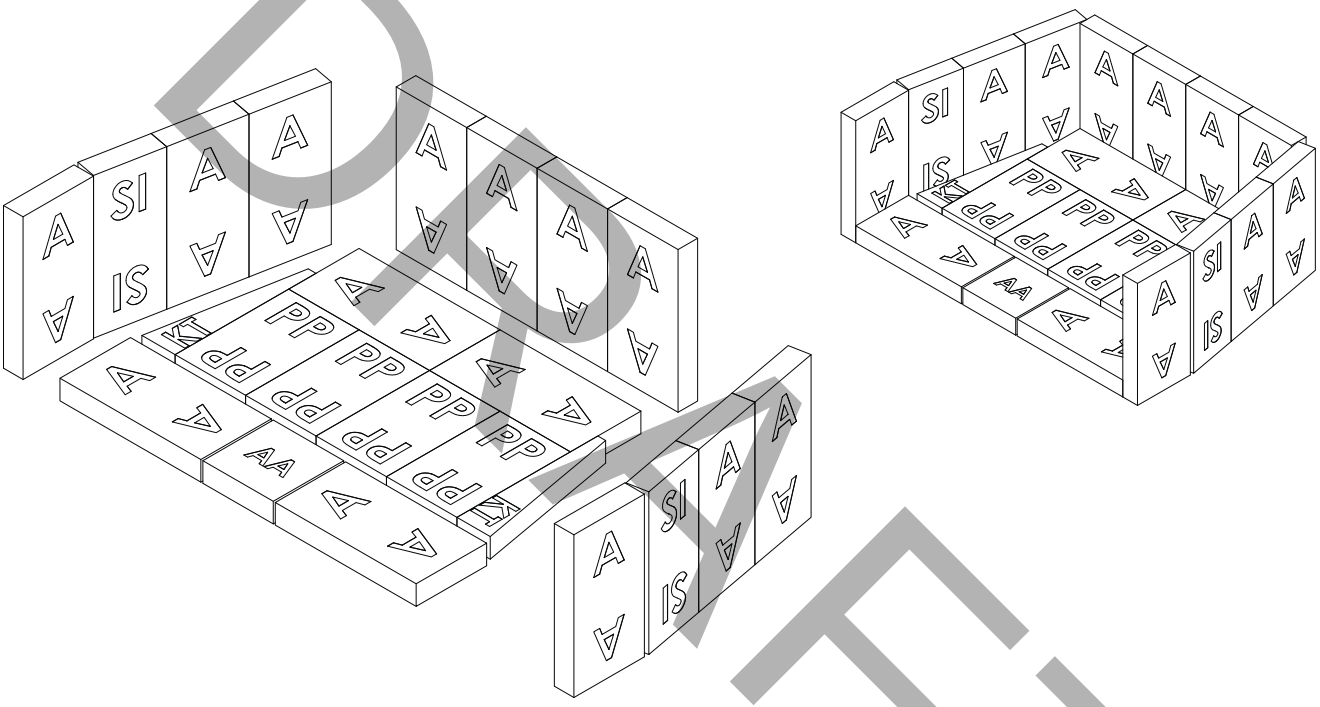


ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	0102	KNOB BLACK 1.5DX.75 HIGH	1
2	110.2060	CAST BYPASS LATCH	1
3	115.0335	METAL COMBUSTOR 2.48x13x2 LL+	1
4	120.0800	ANALOG CAT THERM	1
5	120.0800.1	2" x 36"L THERM PROBE	1
6	0136	RHEOSTAT WITH OFF SWITCH	1
7	0137	RHEOSTAT KNOB SILVER INLAY	1
8	150.0710.L	FAN CROSSFLW 120x47MM LEFT	1
9	150.0710.R	FAN CROSSFLOW 120x47MM RIGHT	1
10	2030	FLAME SHEILD GRATER 13.5 x 4	1
11	2049	SMOKE BAFFLE	1
12	2054	25i FLUE EXTENSION	1
13	2056	25 INSERT COMBUSTOR EXPNADING GASKET 1/16	1
14	Z2022	BYPASS GASKET RETAINER ASM	1
15	Z2050	DOME GUARD KIT	1
16	Z2052	25 INSERT BYPASS HANDLE	1
17	Z3030	25 INSERT THERMOSTAT	1
18	Z4462E	BYPASS DOOR ASM	1



ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	130.0270	5MM PYROCERAM CERAMIC GLASS	1
2	155.0186-8ft-25i	7/8" ROPE DOOR GASKET	1
3	155.0254AS-25i	SC25 DOOR GLASS GASKET	1
4	Z2044	SC25 DOOR HANDLE	1

Refractory Brick Layout



ITEM NO.	PART NUMBER	QTY.
1	A Size Brick	14
2	AA Size Brick	1
3	KT Size Brick	2
4	PP Size Brick	4
5	SI Size Brick	2

BLAZE KING WOOD LIMITED WARRANTY

Blaze King and Valley Comfort's respective brands extend the following warranty for wood fired appliances purchased from an authorized Blaze King / Valley Comfort dealer and installed in the United States of America or Canada. Warranty starts with date of purchase by the original owner (End User) except as noted for replacement parts.

Warranty Period		Components Covered	
Parts	Labor	Wood	
1 Year		X	All parts, materials and surface finishes (flaking and peeling) Subject to Conditions, Exclusion, and Limitations listed.
2 Years		X	Fan assemblies and motors, thermal sensors, catalytic thermometer, bi-metallic thermostat assembly, door handle metal components.
5 Years	2 Years	X	Firebox & Heat Exchanger, Bypass Door Steel Components
6 Years		X	Catalyst Combustor (see Conditions, Exclusions, and Limitations)
1 Year		X	Other Replacement Parts
See Conditions, Exclusions, and Limitations			

Blaze King Wood Limited 5 Year Warranty

Blaze King is the manufacturer of the Blaze King line of heating products. At Blaze King, our commitment to the highest level of quality and customer service is the most important thing we do. Each Blaze King stove is built on a tradition of using only the finest materials and is backed by our limited warranty to the original purchaser. With Blaze King, you're not just buying a stove; you're buying a company with years of unequalled performance and quality.

Limited Six (6) Year Warranty:
The CATALYTIC COMBUSTOR is under warranty by Blaze King for six (6) years from the date of original retail purchase. The purchaser shall pay the following share of the then current retail price for the combustor: The first three (3) years no charge, 4th year 60%; 5th year 70%, 6th year 80%. The Combustor must be returned to your dealer along with a completed COMBUSTOR FAILURE REPORT and original proof of purchase document.

Limited (5) Year Warranty:
Under this warranty, Blaze King covers the stove body and accessories against defects in materials and workmanship, for part repair or replacement for the first five (5) years *** to the original purchaser. This Warranty covers: All Steel firebox components against defects in material and workmanship. Please see the exclusions and limitation section below as certain restrictions and exclusions apply this warranty.

Limited Two (2) Year Warranty:
Under this warranty, Blaze King covers, fan assemblies , modular thermostat and door handle steel components against defects in materials and workmanship, for part repair or replacement and limited labor for the first two (2) years to the original purchaser. Please see the exclusions and limitation section below as certain restrictions and exclusions apply to this warranty.

Limited One (1) Year Warranty:
Under this warranty, Blaze King covers all parts and materials against defects in materials and workmanship including exterior paint finishes, for part repair or replacement and limited labor for the first year to the original purchaser. Please see the exclusions and limitation section below as certain restrictions and exclusions apply to this warranty.

How the Warranty Works

1. All warranties by the manufacturer are set herein and no claim shall be made against the manufacturer on any oral warranty or representation. All claims under this Limited Warranty must be made in writing by your dealer.
2. Any stove or part thereof that is repaired or replaced during the Limited Warranty period will be warranted under the terms of the Limited Warranty for a period not exceeding the remaining term of the original Limited Warranty or six (6) months, whichever is longer.
3. For any part or parts of this stove, which in our judgment show evidence of defects, Blaze King reserves the option to repair or to replace the defective part(s) through an accredited distributor or agent, provided the defective part is returned to the distributor or agent, transportation prepaid, if requested.
4. If you discover a problem that you think may be covered by the Limited Warranty, you MUST REPORT it to your Blaze King dealer WITHIN 30 DAYS from the date the problem was first detected, giving them proof of purchase and the date of purchase. The dealer will investigate the problem and work with Blaze King to determine whether the problem:
   a) Is covered by the Limited Warranty or
   b) Can be fixed in your home or does the product need to be returned to Blaze King for repair.
5. If Blaze King determines that the stove needs to be returned to Blaze King for repair, the customer has the responsibility and the expense of removing it from their home and shipping it to Blaze King. If the problem is covered by the Warranty, Blaze King will repair or replace the item at their discretion and the customer will be responsible for return shipping and re-installation in their home.
6. If the problem is not covered by the Limited Warranty, the customer will be responsible for all repair costs, as well as all storage, shipping and the cost of removing and re-installing the stove.
   If you are not satisfied with the service provided by the Blaze King dealer, write to Blaze King at the address listed on the last page of the Owner's Manual. Include a copy of the original purchase invoice and a description of the problem.

Exclusions and Limitations:

1. This Warranty does not cover tarnish, discoloration or wear on the plated surfaces Painted finishes will change color after initial firing and will continue to change through the lifetime of the stove. This is normal occurrence for all high temperature coatings.
2. This Warranty does not cover gasket material or firebrick.
3. Blaze King strongly recommends installation by a certified installer. Failure to comply may adversely affect coverage under the terms of this warranty. This Limited Warranty covers defects in materials and workmanship only if the product has been installed in accordance with local building and fire codes; in their absence refer to the owner's manual. If the product is damaged or broken as a result of any alteration, wilful abuse, mishandling, accident, neglect, or misuse of the product, the Limited Warranty does not apply.
4. The stove must be operated and maintained at all times in accordance with the instructions in the Owner's Manual. If the unit shows signs of neglect or misuse, it is not covered under the terms of this Warranty policy. Performance problems due to operator error will not be covered by the Limited Warranty policy.
   Some minor expansion, contraction, or movement of certain parts and resulting noise, is normal and not a defect and, therefore, is not covered under this Limited Warranty.
5. Misuse includes over-firing. Over-firing can be identified later by warped plates and paint pigment being burnt off. Over-firing this appliance can cause serious damage and will nullify the Limited Warranty.
6. The Limited Warranty will cover glass thermal breakage only and will not cover misuse of the stove glass, including but not limited to:
   a) Glass that is struck, has surface contaminates or has had harsh or abrasive cleaners used on it.
   b) If the door is slammed or is closed while wood in the firebox is protruding out the stove opening thus striking the glass.
7. This warranty does not cover products made or provided by other manufacturers and used in conjunction with the operation of this stove without prior authorization from Blaze King The use of such products may nullify the Limited Warranty on this stove. If unsure as to the extent of this Limited Warranty, contact your authorized Blaze King dealer before installation.
8. Blaze King will not be responsible for inadequate performance caused by environmental conditions.
9. The Limited Warranty does not cover installation and operational related problems such as use of downdrafts or spillage caused by environmental conditions. Environmental conditions include but are not limited to nearby trees, buildings, roof tops, wind, hills, mountains, inadequate venting or ventilation, excessive offsets, negative air pressures or other influences caused by mechanical systems such as furnaces, fans, clothes dryers etc.
10. The Limited Warranty does not cover damage caused by burning salt-saturated wood, corrosive driftwood, chemically treated wood or any fuel not recommended in the Owner's Manual (use cord wood only).
11. The Limited Warranty is void if:
    a) The stove has been operated in atmospheres contaminated by chlorine, fluorine or other damaging chemicals.
    b) The stove is subject to submersion in water or prolonged periods of dampness or condensation.
    c) Any damage to the unit, combustion chamber or other components due to water, or weather damage which is the result of, but not limited to, improper chimney/venting installation.
    d) Salt air in coastal areas or high humidity can be corrosive to the finish; these environmental conditions can cause rusting. Damage caused by salt air or high humidity is not covered by the Limited Warranty.
12. Exclusions to the Limited Warranty include: injury, loss of use, damage, failure to function due to accident, negligence, misuse, improper installation, alteration or adjustment of the manufacturer's settings of components, lack of proper and regular maintenance, alteration, or act of God.
13. The Limited Warranty does not cover damage caused to the stove while in transit. If this occurs, do not operate the stove and contact your courier and/or dealer.
14. The Limited Warranty does not extend to or include paint, door or glass gaskets or firebricks damage caused by normal wear and tear, such as paint discoloration or chipping, worn or torn gaskets, chipped or cracked firebrick, etc.
15. The Limited Warranty does not include damage to the unit caused by abuse, improper installation, or modification of the unit.
16. Damage to plated surfaces caused by fingerprints, scratches, melted items, or other external scores and residues left on the plated surfaces from the use of abrasive cleaners or polishes is not covered in this warranty.
17. Blaze King is free of liability for any damages caused by the stove, as well as inconvenience expenses and materials. The Limited Warranty does not cover incidental or consequential damages.

18. The Limited Warranty does not cover any loss or damage incurred by the use or removal of any component or apparatus to or from the Blaze King stove without the express written permission of Blaze King and bearing a Blaze King label of approval.
19. Any statement or representation of Blaze King Products and their performance contained in Blaze King advertising, packaging literature, or printed material is not part of the Limited Warranty.
20. The Limited Warranty is automatically voided if the stove's serial number has been removed or altered in any way. If the stove is used for commercial purposes, it is excluded from the Limited Warranty.
21. No dealer, distributor, or similar person has the authority to represent or warrant Blaze King Products beyond the terms contained within the Limited Warranty. Blaze King assumes no liability for such warranties or representations.
22. Blaze King will not cover the cost of the removal or re-installation of the stove, hearth, facing, mantels, venting or other components.
23. Labor to replace or repair items under this Limited Warranty will be covered per our warranty service fee reimbursement and labor rates are set per component schedule. Labor rates vary from location to location and as such total labor costs may not be covered. Please consult with your dealer or service technician for any additional charges such as travel time or additional labor charges that may apply.
24. For parts of the Blaze King woodstove or fireplace insert warranted beyond the first year, the five year limited warranty will have the same obligations as described in this document, provided, however that the purchaser shall pay the following percentage of the then current retail cost of the repair or the replacement, according to the year after purchase in the which the defect is brought to the attention of Blaze King.*** During the 2nd year----purchaser pays 20%. 3rd year ----purchaser pays 40%. 4th year -----purchaser pays 60%. 5th year---- purchaser pays 80%.
25. If a defect or problem is determined by Blaze King to be non warrantable, Blaze King is not liable for travel costs for service work. In the event of in-home repair work, the customer will pay any in-home travel fees or service charges required by the Authorized Dealer.
26. At no time will Blaze King be liable for any consequential damages which exceed the purchase price of the unit. Blaze King has no obligation to enhance or modify any stove once manufactured (example: as a stove model evolves, field modifications or upgrades will not be performed).
27. This Limited Warranty is applicable only to the original purchaser and it is nontransferable.
28. This warranty only covers Blaze King Products that are purchased through an authorized Blaze King dealer.
29. If for any reason any section of the Limited Warranty is declared invalid, the balance of the warranty remains in effect and all other clauses shall remain in effect.
30. The Limited Warranty is the only warranty supplied by Blaze King, the manufacturer of the stove. All other warranties, whether express or implied, are hereby expressly disclaimed and the purchaser's recourse is expressly limited to the Limited Warranty.
31. Blaze King and its employees or representatives will not assume any liability for damages, either directly or indirectly, caused by improper usage, operation, installation, servicing or maintenance of this stove.
32. Blaze King reserves the right to make changes without notice. Please complete and mail the warranty registration card and have the installer fill in the installation data sheet in the back of the manual for warranty and future reference.
33. Blaze King is responsible for stocking parts for a maximum of seven (7) years after discontinuing the manufacture or incorporation of the item into its products. An exception to this would be if an OEM supplier is not able to supply a part.

NOTES

INSTALLER NOTES

Installer: Please complete the following information

Dealer Name & Address:_____

_____

Installer (print): _____

Installer (sign): _____

Phone #: _____

Date Installed:_____

Serial No.: _____