

Non-Confidential Business Information (Non-CBI)

Certification Test Report

Hearth & Home Technologies - Colville Pellet-Fired Free standing Room Heater Models: PPC 90, TSC90, PHC 90

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

Prepared by: OMNI-Test Laboratories, Inc.
13327 NE Airport Way
Portland, OR 97230
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Test Period: April 20, 2016

Report Date: May 9, 2016

Report Revision Date: **April 19, 2021**

Report Number: 0061PS093E

All data and information contained in this report are confidential and proprietary to Hearth & Home Technologies - Colville. Its significance is subject to the adequacy and representative character of the samples and to the comprehensiveness of the tests, examinations, or surveys made. The contents of this report cannot be copied or quoted, except in full, without specific, written authorization from Hearth & Home Technologies - Colville and OMNI-Test Laboratories, Inc. No use of the OMNI-Test Laboratories, Inc. name, logo, or registered mark (O-TL) is permitted, except as expressly authorized by OMNI-Test Laboratories, Inc. in writing.

-Document Edition Number (001) 4/19/21 -

Model: PPC 90
Hearth & Home Technologies - Colville
1445 North Highway
Colville, WA. 99114

AUTHORIZED SIGNATORIES

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

Evaluator:

A handwritten signature in black ink, appearing to read "Bruce Davis", written over a horizontal line.

Bruce Davis, Technician
OMNI-Test Laboratories, Inc.

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Section 1

Sampling Procedures and Test Results

INTRODUCTION

Hearth & Home Technologies - Colville retained OMNI-Test Laboratories, Inc. (*OMNI*) to perform U.S. Environmental Protection Agency (EPA) certification testing on the PPC 90. The PPC 90 is a freestanding, pellet-fired room heater.

Testing was performed at *OMNI*'s testing facility in Portland, Oregon; altitude of the laboratory is 30 feet above sea level. The unit was received in good condition and logged in at the *OMNI*'s testing facility on April 19, 2016. It was assigned and labeled with *OMNI* ID #2157. *OMNI* representative Bruce Davis conducted the certification testing and completed all testing by April 20, 2016.

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

SAMPLING PROCEDURE

Pellet stove model PPC 90 was tested in accordance with the U.S. EPA 40 CFR Part 60, Subpart AAA – Standards of Performance for New Residential Wood Heaters using ASTM E2515 and ASTM E2779. Fuel used for certification testing was Lignetics Pres-To-Logs soft wood pellets; this fuel was graded as premium by the Pellet Fuels Institute and was produced at registered mill # 03208. Particulate emissions were measured using dual sampling trains consisting of two sets of filters (front and back). Results of the integrated test run indicate an average particulate emission rate of 1.11 g/hr. Stove model PPC 90 test results are within emission limits of 2.0 grams per hour for affected facilities manufactured on or after May 15, 2020.

Pellet stove model PPC 90 was tested for thermal efficiency and carbon monoxide (CO) emissions in accordance with CSA B415.1-10. The heater has a demonstrated an average overall HHV efficiency of 82.3% using six inch single wall venting. Venting extended 8' above the platform scale, then class A chimney was used to a total system height of 14' 6". Carbon Monoxide emissions of the integrated test run were calculated at 25.7 grams per hour.

RUN DISCUSSION

Run 1 was an integrated test run consisting of burn settings that result in 60 +5/-0 minutes at maximum, 120 +5/-0 minutes at medium (<50% of maximum), and 180 +5/-0 minutes at minimum. Each burn category was achieved, meeting both time and burn rate requirements. No sampling anomalies were discovered in results or observed during testing. Calculated results were found to be acceptable per ASTM E2779 and ASTM 2515, so no further testing is required.

SUMMARY OF RESULTS

Average particulate emission rate over the complete, integrated test run was measured to be 1.11 g/hr.

The average particulate emission factor for the complete, integrated test run was measured to be 1.00 g/dry kg of fuel.

Average overall efficiency for the complete, integrated test run was measured to be 82.30% using six-inch single wall venting.

Calculated particulate emission rate from the one-hour filter was 3.87 g/hr.

Negative filter weights found resulted from filter residue transferring to O-rings and probe assembly, any weight loss on the filters can be seen in positive weights on the probe assembly. There is no indication/evidence of loss of filter material. Tare weight tolerances for filters is ± 0.2 milligrams, negative weights found are within this tolerance.

Tests were operated and sampled correctly and appropriate to the applicable test standards. Tests are therefore found to be valid for inclusion into average emissions and efficiency results.

The proportionality results and sample train agreement for the test run was acceptable. Quality check results for each test run are presented in Section 3 of this report.

SUMMARY TABLES

Table 1.1 – Particulate Emissions

	One-Hour Filter	Integrated Total
Emission Rate (g/hr)	3.87	1.11
Emission Factor (g/dry kg)	1.50	1.00

Table 1.2 – Efficiency and CO

	Burn Rate Segment			Integrated Total
	Maximum	Medium	Minimum	
Time (minutes)	60	120	180	360
Burn Rate (dry kg/hr)	2.59	1.14	0.60	1.11
Heat Input Rate (BTU/hr, HHV)	47,378	20,925	11,055	20,399
Heat Output Rate (BTU/hr, HHV)	39,482	17,186	8,456	16,781
Efficiency (% , HHV)	83.33%	82.13%	76.49%	82.30%
Efficiency (% , LHV)	89.10%	87.82%	81.78%	88.00%
CO Emission Rate (g/hr)	68.38	2.7	29.1	25.7

Table 1.3 – Test Facility Conditions

	Initial	Middle	Final
Room Temperature (°F)	78	78	81
Barometric Pressure (in Hg)	29.93	29.90	29.90
Air Velocity (ft/min)	< 50	< 50	< 50
Induced Draft (in H2O)	0	0	0

Table 1.4 – Fuel Measurement Summary

Segment	Time (min)	Burn Rate (dry kg/hr)	Consumed Fuel Weight (lbs)	Fuel Moisture Content (dry basis - %)
Pretest	70	2.63	7.1	5.26
Maximum	60	2.59	6.0	5.26
Medium	120	1.14	5.3	5.26
Minimum	180	0.60	4.2	5.26
Integrated Total	360	1.11	15.5	5.26

Table 1.5 – Dilution Tunnel and Flue Gas Measurements

Segment	Average Flue Draft (in H₂O)	Average Dilution Tunnel Gas Measurements		
		Velocity (ft/sec)	Flow Rate (dscf/min)	Temperature (°F)
Integrated Total	-0.036	18.83	208.6	89.6

Table 1.6 – Heater Configuration

Segment	Power Level	Trim Setting
Pretest	5	4
Maximum	5	4
Medium	2	0
Minimum	1	-4

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Section 2

Photographs

Appliance Description

Drawings

Model: PPC 90
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Colville, WA. 99114

Hearth & Home Technologies - Colville PPC 90

PHOTOGRAPHS



PPC 90 Front



PPC 90 Back



PPC 90 Left



PPC 90Right

APPLIANCE DESCRIPTION

Appliance Manufacturer: Hearth & Home Technologies - Colville

Pellet Stove Model: PPC 90, TSC 90, PHC 90

Type: Freestanding, air-circulating type, pellet-fired room heater.

The PPC 90's principle elements include a fuel hopper, steel firebox chamber, steel burn pot, and electrical fuel feed, combustion air, and convection air supply systems.

Air is forced by the combustion air blower through holes in the burn pot and combustion products are routed out of the firebox chamber through a 3-inch diameter flue outlet located on the rear of the unit. Additional approved venting is 4" pellet vent and 6" single wall pipe, see installation instructions for additional information.

Fuel is supplied from the hopper to the burn pot via an auger which moves pellets vertically, then dropped through a tube angled downwards. Fuel supply rate is varied by cycling the auger motor on and off as needed.

Ashes fall through the burn pot into a removable ash drawer located at the bottom of the unit. The drawer is accessed through the front firebox door, which also features a 5mm glass viewing window sealed by fiberglass rope gasket

Electrical systems are regulated by a user-operated control board, power levels 1-5 are used for minimum to maximum heat outputs. Trim settings are available for each power level to fine tune air/fuel ratios. Power level one used with trim setting -4 is the minimum available setting, power level 5 with trim setting 5 is maximum. Due to the design of the program it was necessary to bypass the room temperature sensor in the appliance, this sensor adjusts heat output based on a difference between room temperature and the sensor in the stove making it difficult to obtain and hold a medium burn rate. This adjustment did not affect operation at high or minimum settings due to settings used during testing are the maximum and minimum possible settings the appliance can be operated at regardless of room temperature. See design drawings for appliance operation at each setting.

Three stove models (PPC90, TSC90, PHC90) are based on the one firebox design, differences in model design is limited to esthetic features in the outer casting. See design drawings for additional information. No model design differences were determined to affect performance.

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Engineering Drawings **[Redacted]**

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Section 3

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 PPC 90 at Hearth & Home Technologies - Colville 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.

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Model: PPC 90
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Colville, WA. 99114

Sample Analysis
Analysis Worksheets
Moisture Content Worksheet
Fuel Certification Label
Tared Filter, Probe, and O-Ring Data

ASTM E2779 Pellet Heater Run Sheets

Client: Hearth & Home

Project Number: 0061PS093E

Run Number: 1

Model: PPC 90

Tracking Number: 2157

Date: 4/24/16

Test Crew: B. Davis

OMNI Equipment ID numbers: 23, 131, 185, 132, 209, 283A, 335, 336, 410, 420, 559, 592

ASTM E2515 Lab Sheet

Assembled By:

B Davis

Date/Time in Dessicator:

Weighing #1	Weighing #2	Weighing #3	Weighing #4	Weighing #5
Date: <u>4/21/16</u>	Date: <u>4/24/16</u>	Date: <u>4/24/16</u>	Date:	Date:
Time: <u>1610</u>	Time: <u>0810</u>	Time: <u>0907</u>	Time:	Time:
R/H %: <u>19.3</u>	R/H %: <u>12.3</u>	R/H %: <u>14.3</u>	R/H %:	R/H %:
Temp: <u>75.6</u>	Temp: <u>74.2</u>	Temp: <u>73.4</u>	Temp:	Temp:
Audit: <u>99.9981</u>	Audit: <u>99.9981</u>	Audit: <u>99.9980</u>	Audit:	Audit:
Initials: <u>BL</u>	Initials: <u>BL</u>	Initials: <u>BL</u>	Initials:	Initials:

Train	Element	ID #	Tare (mg)	Weight (mg)	Weight (mg)	Weight (mg)	Weight (mg)	Weight (mg)
A	Front Filter (60 min)	C387	120.2	122.8	122.9			
A	Front Filter (Remainder)	C388	120.7	122.5	122.5			
A	Rear Filter	C389	121.1	121.1	121.1			
A	Probe	23	114077.3	114077.0	114077.7	114077.5		
A	O-Ring Set	R399	3334.4	3333.9	3333.9			
B	Front Filter	C390	121.0	125.4	125.6			
B	Rear Filter	C392	119.6	119.1	119.4	119.4		
B	Probe	27	114279.4	114279.6	114280.1	114279.9		
B	O-Ring Set	R402	4165.1	4165.3	4165.2			
BG	Filter	NA						
A	Rear Filter 1st hour	C390	121.0	120.9	120.9			
A	Probe 1st hour	25	114300.1	114300.0	114300.6	114300.4		
A	O-Ring 1st hour	R400	3302.6	3302.6	3302.6			

Technician Signature: B Davis

Date: 4/24/16

Moisture Content Worksheet

Client: Hearth & Home

Model: PPC 90

Project #: 0061PS093E Tracking #: 2157

Sample description: Pres-To-Log softwood Pellets

Weight record:

Prior to Oven-Drying

Balance ID #: OMNI - 00023

Audit ID #: 283 – 100 grams

Date/Time in: 4/20/2016 1330

Audit weight: 99.9980

Container: ID#: 198 / 210

Tare weight: 107.7679 / 109.4398

Total weight: 204.3045 / 200.7010

Material weight (total weight - container tare weight): 96.5366 / 91.2612

Post Oven-Drying

Balance ID #: OMNI - 00023

Date/Time out: 4/21/2016 1400

Audit ID #: _____

Total weight: 199.5630 / 196.0624

Audit weight (if necessary): 99.9980


Material weight (total weight - container tare weight): 91.7951 / 86.6226

Calculations:

$$\text{Dry basis (\%)} = \frac{\text{Initial} - \text{Final}}{\text{Final}} \times 100 \quad 5.165 / 5.355: \text{Avg.} = 5.26$$

$$\text{Wet basis (\%)} = \frac{\text{Initial} - \text{Final}}{\text{Initial}} \times 100 \quad 4.912 / 5.083: \text{Avg.} = 5.00$$

Method: ASTM D4442-92 Method A—Oven-Drying Method

Technician signature:  Date: 4/20/2016

Reviewed by:  Date: 5/9/16



**PFI Densified Fuel Grade: Premium
Mill Registration # 03208**

Grade Requirements:

Bulk Density:	40–46 lbs/ft ³
Diameter:	.230–.285 in/5.84–7.25 mm
Durability:	≥96.5
Fines:	≤0.50%
Ash Content (as received):	≤1%
Length:	≤1% >1.5 in.
Moisture:	≤8.0%
Chlorides:	≤300 ppm

Manufacturers Guaranteed Analysis:

Type of Material:	Softwood
Additives:	None
Minimum Higher Heating Value (as received):	8200 BTU/lb.

Other Manufacturers Guarantees:



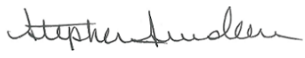


Twin Ports Testing, Inc.
 1301 North 3rd Street
 Superior, WI 54880
 p: 715-392-7114
 p: 800-373-2562
 f: 715-392-7163
 www.twinportstesting.com

Report No: USR:W216-0380-01
Issue No: 1

Analytical Test Report

Client: Hearth & Home Technologies
 1445 N Hwy 395
 Colville, WA 99114
Attention: Ryan Kettner
PO No:

Signed: 
 Stephen Sundeen
 Chemistry Laboratory Manager
Date of Issue: 4/25/2016
THIS DOCUMENT SHALL NOT BE REPRODUCED EXCEPT IN FULL

Sample Details
Sample Log No: W216-0380-01 **Sample Date:**
Sample Designation: The original Pres-to-logs **Sample Time:**
Sample Recognized As: Biomass Pellets **Arrival Date:** 4/20/2016

Test Results

	METHOD	UNITS	MOISTURE FREE	AS RECEIVED
Moisture Total	ASTM E871	wt. %		5.68
Ash	ASTM D1102	wt. %	0.22	0.21
Volatile Matter	ASTM D3175	wt. %		
Fixed Carbon by Difference	ASTM D3172	wt. %		
Sulfur	ASTM D4239	wt. %	0.007	0.006
SO ₂	Calculated	lb/mmbtu		0.015
Net Cal. Value at Const. Pressure	ISO 1928	GJ/tonne	19.14	17.91
Net Cal. Value at Const. Pressure	ISO 1928	J/g	19136	17911
Gross Cal. Value at Const. Vol.	ASTM E711	J/g	20474	19312
Gross Cal. Value at Const. Vol.	ASTM E711	Btu/lb	8803	8303

Carbon	ASTM D5373	wt. %	50.71	47.83
Hydrogen*	ASTM D5373	wt. %	6.15	5.80
Nitrogen	ASTM D5373	wt. %	< 0.20	< 0.19
Oxygen*	ASTM D3176	wt. %	> 42.71	> 40.28

*Note: As received values do not include hydrogen and oxygen in the total moisture.

Chlorine	ASTM D6721	mg/kg		
Fluorine	ASTM D3761	mg/kg		
Mercury	ASTM D6722	mg/kg		

Bulk Density	ASTM E873	lbs/ft ³		
Fines (Less than 1/8")	TPT CH-P-06	wt. %		
Durability Index	Kansas State	PDI		
Sample Above 1.50"	TPT CH-P-06	wt. %		
Maximum Length (Single Pellet)	TPT CH-P-06	inch		
Diameter, Range	TPT CH-P-05	inch		to
Diameter, Average	TPT CH-P-05	inch		
Stated Bag Weight	TPT CH-P-01	lbs		
Actual Bag Weight	TPT CH-P-01	lbs		

Comments

TARE SHEET - FILTERS

Date Placed in Dessicator: 3/4/16

Thermohyrometer ID #: 223 592

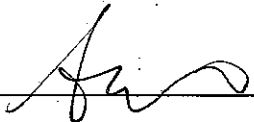
Cleaned By: A. Kowitz

Balance ID #: 23

Audit Weight ID #: 131

Filter ID #	Date: 3/14/16 Time: 1506 RH %: 10.1 T (°F): 70.7 Audit: 500.1	Date: 3/15/16 Time: 1230 RH %: 12.3 T (°F): 64.9 Audit: 500.2	Date: Time: RH %: T (°F): Audit:	Date: Time: RH %: T (°F): Audit:	Date Used	Project Number	Run No.
C383	121.5	121.4			3/22/16	0185PS033E-R1	1
C384	120.0	120.0					
C385	121.0	121.0					
C386	120.8	120.8					
C387	120.2	120.2			4/20/16	0061 PS093E	1
C388	120.8	120.7					
C389	121.0	121.1					
C390	121.0	121.0					
C391	121.0	121.0					
C392	119.7	119.6					
C393	120.8	120.8					
C394	120.9	120.8					
C395	120.9	120.9					
C396	120.3	120.4					
C397	120.9	121.0					
	Initials: <u>A</u>	Initials: <u>A</u>	Initials:	Initials:			

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Final Technician Signature: 

Date: 3/15/16

O-RING TARES

Date Placed in Desiccator: 4/18/16 0810

Technician: B. Daus

Balance ID # OMNI-00023

Thermo/Hygro meter ID #: OMNI-00592

Audit Weight ID # OMNI-00131

(Balance audit mfr. Std.: 500 ± 0.72)

O-Ring Size/ID#	Date: 4/19/16 Time: 0850 RH%: 12.6 T (F): 73.3 Initials: DL	Date: 4/20/16 Time: 0810 RH%: 10.2 T (F): 74.2 Initials: DL	Date: Time: RH%: T (F): Initials:	Date: Time: RH%: T (F): Initials:	Manufacturer	Appliance	Project No.	Run No.
399	3337.6	3334.4 ✓						
400	3302.8	3302.6 ✓						
401	3374.8	3374.3						
402	4165.3	4165.1 ✓						
403	3404.4	3403.7						

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Final Technician signature: B. Daus

Date: 4/24/16

TARE SHEET - PROBES

Date Placed in Dessicator: 4/18/16 0825

Thermohyrometer ID #: OMNE-00592

Cleaned By: B Davis

Balance ID #: OMNE-0023

Audit Weight ID #: OMNE 00283A

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Probe ID #	Date: <u>4/19/16</u>		Date: <u>4/20/16</u>		Date Used	Project Number	Run No.
	Time: <u>0900</u>	Time: <u>0810</u>	Time:	Time:			
	RH %: <u>11.4</u>	RH %: <u>10.8</u>	RH %:	RH %:			
	T (°F): <u>755</u>	T (°F): <u>742</u>	T (°F):	T (°F):			
	Audit: <u>99.9980</u>	Audit: <u>99.9981</u>	Audit:	Audit:			
<u>21</u>	<u>114.3930</u>	<u>114.3940</u>					
<u>23</u>	<u>114.0771</u>	<u>114.0773</u>	/				
<u>25</u>	<u>114.3000</u>	<u>114.3001</u>	/				
<u>27</u>	<u>114.2792</u>	<u>114.2797</u>	/				
Initials: <u>AK</u>	Initials: <u>AK</u>	Initials:	Initials:				

Final Technician Signature:

Date: 4/24/16

Calibrations

EPA Method 28R, ASTM E2515, ASTM E2779

ID #	Lab Name/Purpose	Log Name	Attachment Type
0001	Calibration Dry Gas Meter	Gas Meter Reference Standard	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 Log
185	Platform Scale	Weigh-Tronix Platform Scale	Calibration Certificate
209	Barometer	Barometer – Princo	Equipment Record
283A	Calibration Weights	Troemner Metric Weight Standards	Calibration Certificate
335	Sample Box / Dry Gas Meter	Apex Automated Emissions Sampling Box	Calibration Log
336	Sample Box / Dry Gas Meter	Apex Automated Emissions Sampling Box	Calibration Log
410	Microtector	Dwyer Microtector	Equipment Record
594	Combustion Gas Analyzer	CAI Gas Analyzer	Equipment Record
579	Anemometer	Extech Thermal Anemometer	Calibration Certificate
592	Thermohygrometer	Omega Digital Thermohygrometer	Calibration Log

CERTIFICATE OF CALIBRATION

CUSTOMER:	OMNI TEST LABS INC. PORTLAND OR	CALIBRATION DATE:	11/05/15
PO NUMBER:	OTL-15-051	CALIBRATION DUE:	11/05/16
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 06-2016
SERIAL NUMBER:	684390L	NIST TRACE #' S:	1329407628, 1361269184, 1390386562
RATED UNCERTAINTY:	+/- .5 % RD.	AMBIENT CONDITIONS:	764 mm HGA 53 % RH 70 F
UNCERTAINTY GIVEN:	TOTAL measurement uncertainty: +/- .190 % RD. K=2	CERTIFICATE FILE #:	426663.15
NOTES:	AS RECEIVED/AS LEFT WITHIN SPECS. REFERENCE CONDITIONS ARE: 760 mm HGA 70 F **OMNI-00001**		

TEST POINT NUMBER	UUT INDICATED SCFH	DM.STD. ACTUAL SCFH	CORRECTION FACTOR	K FACTOR
1	0.5514	0.55	0.99748	60.151
2	8.7683	8.75	0.99792	60.125
3	54.3679	54.27	0.99820	60.108
4	101.1836	101.02	0.99838	60.097
5	137.5749	137.38	0.99858	60.085
6	177.1385	176.92	0.99877	60.074
7	212.5234	212.24	0.99867	60.080
8	250.2787	249.92	0.99857	60.086
AVERAGE (Y)=			0.99832083	

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/NCSSL-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

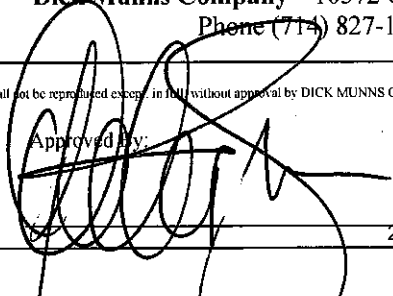
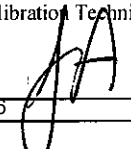
This Calibration Certificate shall not be reproduced except in full without approval by DICK MUNN'S COMPANY. The data shown applies only to the instrument being calibrated and under the stated conditions of calibration.

Date:

Approved By:

Calibration Technician:

11/5/2015

Certificate of Calibration

Certificate Number: **615462**



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

OnSite

PO: 160070

Order Date: **03/04/2016**

Authorized By: N/A

Calibrated on: **03/04/2016**

*Recommended Due: **09/04/2016**

Environment: **20 °C 40 % RH**

* As Received: **Out of Tolerance**

* As Returned: **Within Tolerance**

Action Taken: **Calibrated**

Technician: **123**



0723.01
Calibration

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**

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	12/01/2016	603626

Parameter

Measurement Data


Measurement Description	Range Unit	Reference	Min	Max	*Error	UUT	Uncertainty
Before							Accredited = ✓
Force							
	g	0.00100	0.0005	0.0015	0.0001	0.0011g	5.7E-04 ✓
	g	0.01000	0.0095	0.0105	0.0002	0.0102g	5.7E-04 ✓
	g	0.10000	0.0995	0.1005	0.0002	0.1002g	5.7E-04 ✓
	g	0.50000	0.4995	0.5005	0.0002	0.5002g	5.7E-04 ✓
	g	1.00000	0.9995	1.0005	0.0002	1.0002g	5.7E-04 ✓
	g	40.00000	39.9995	40.0005	0.0010	40.0010g	5.7E-04 ✓
	g	80.00000	79.9995	80.0005	0.0019	80.0019g	5.7E-04 ✓
	g	120.00000	119.9995	120.0005	0.0028	120.0028g	5.7E-04 ✓
	g	160.00000	159.9995	160.0005	0.0039	160.0039g	5.8E-04 ✓
	g	200.00000	199.9995	200.0005	0.0043	200.0043g	5.7E-04 ✓
After							Accredited = ✓
	g	0.00100	0.0005	0.0015	0.0000	0.0010g	5.7E-04 ✓
	g	0.01000	0.0095	0.0105	0.0000	0.0100g	5.7E-04 ✓
	g	0.10000	0.0995	0.1005	0.0000	0.1000g	5.7E-04 ✓
	g	0.50000	0.4995	0.5005	0.0001	0.4999g	5.7E-04 ✓
	g	1.00000	0.9995	1.0005	0.0000	1.0000g	5.7E-04 ✓
	g	40.00000	39.9995	40.0005	0.0002	40.0002g	5.7E-04 ✓
	g	80.00000	79.9995	80.0005	0.0003	80.0003g	5.7E-04 ✓
	g	120.00000	119.9995	120.0005	0.0002	120.0002g	5.7E-04 ✓
	g	160.00000	159.9995	160.0005	0.0004	160.0004g	5.8E-04 ✓
	g	200.00000	199.9995	200.0005	0.0004	200.0004g	5.7E-04 ✓

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/NCCL 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

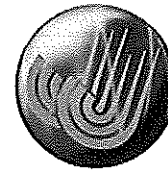
3 Issued 03/07/2016 Rev # 15



Inspector

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

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 ($\pm 0.72\text{mg}$)**

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

<u>Std ID</u>	<u>Manufacturer</u>	<u>Model</u>	<u>Nomenclature</u>	<u>Due Date</u>	<u>Trace ID</u>
432A	Sartorius	C-44	Microbalance 5.1g	03/11/2014	517747
723A	Rice Lake	1mg-200g (Class O)	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

SCALE WEIGHT CALIBRATION DATA SHEET

Weight to be calibrated: 10 lb

ID Number: 132

Standard Calibration Weight: 10 lb

ID Number: 255

Scale Used: MTW-150K

ID Number: 353

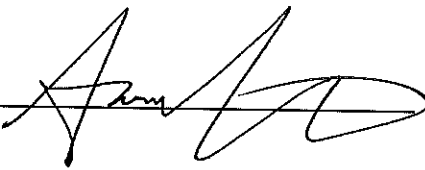
Date: 2/19/13

By: A. Kravitz

Standard Weight (A) (Lb.)	Weight Verified (B) (Lb.)	Difference (A - B)	% Error
10.0	10.0	0.0	0

*Acceptable tolerance is 1%.

This calibration is traceable to NIST using calibrated standard weights.

Technician signature:  Date: 2/19/13



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



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:	Tol:	Test Wt:	Tol:	Test Wt:	Tol:	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
300	0.4	HB44	HB44	500	0.2	Good	Fair	Poor
As-Found:		As-Found:		As-Found:		Temperature: 18.8°C		
Pass: <input checked="" type="checkbox"/>	Fail: <input type="checkbox"/>	Pass: <input checked="" type="checkbox"/>	Fail: <input type="checkbox"/>	Pass: <input checked="" type="checkbox"/>	Fail: <input type="checkbox"/>			
As-Left:		As-Left:		As-Left:				
Pass: <input checked="" type="checkbox"/>	Fail: <input type="checkbox"/>	Pass: <input checked="" type="checkbox"/>	Fail: <input type="checkbox"/>	Pass: <input checked="" type="checkbox"/>	Fail: <input type="checkbox"/>			

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:

THIS CERTIFICATE SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE APPROVAL OF QUALITY CONTROL SERVICES, INC.

The uncertainty is calculated according to the ISO Guide to the Expression of Uncertainty in Measurement and includes the uncertainty of standards used combined with the observed standard deviation 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.

8 AM

Quality Control Services

Report of Services and Calibration

2340 S.E. 11TH AVENUE
PORTLAND, OR 97214
PHONE 503-236-2712

48196

Sold To OMNI-Test Laboratories, Inc. PT ID: OMNE03 P.O. No: OTL-15-042
 Address: PO Box 301367 Contact: Ken Morgan
 City: Portland, OR 97294 Phone: 503-643-3788
 Ship To: 13327 NE Airport Way Portland, OR 97230 Email: kmorgan@omni-test.com

No	Item	Make	Model	Serial Number	Location	Contact	Rate	Date Svc'd	Tech	Cust ID
1	Scale	Weigh-Tronix	WI127	53719	Lab	Ken Morgan	\$140.00	10.27	DAC	356
2	Scale	Weigh-Tronix	WI-127	21676	Lab	Ken Morgan	\$140.00	10.27	DAC	185
3	Scale	Weigh-Tronix	WI-127	42527	Lab	Ken Morgan	\$140.00	10.27	DAC	288
4										
5										
6										
7										
8										
9										
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20										
21										
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23										
24										
25										

Service / Calibration Certificate of Calibration
 Documentation Requirements Calibration with Data
 A2LA Certificate

Received By: *Ken Morgan* Date: 10-27-15

Comments: TRUCK CHARGE \$80.00
1000 LBS.

P A R T S	No.	Description	Part #	Qty.	@	Amt.	No.	Description	Part #	Qty.	@	Amt.

OMNI 00209

Instruction Booklet

for use with

PRINCO

Fortin type mercurial

Barometers

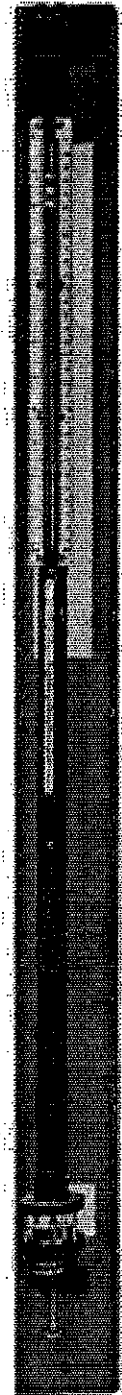
Manufactured by

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

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



453
National
Weather
Service
Type



463
NOVA™
Economy
Model

Certificate of Calibration

Certificate Number: **543402**



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

PO: **OTL-13-031**
Order Date: **09/27/2013**
Authorized By: **N/A**



Property #: **OMNI-00283A**
User: **N/A**
Department: **N/A**
Make: **Troemner Inc**
Model: **1mg-100g (Class F)**
Serial #: **47883**
Description: **Mass Set, 21 Pc.**
Procedure: **DCN 500901**
Accuracy: **Class F**

Calibrated on: **10/09/2013**
*Recommended Due: **10/09/2018**
Environment: **20 °C 41 % RH**
As Received: **Other - See Remarks**
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

Changed set from a Class 4 to a Class F per Jeremy Clark.
Received missing 1g weight.
Refer to attachment for measurement results.

Standards Used

<u>Std ID</u>	<u>Manufacturer</u>	<u>Model</u>	<u>Nomenclature</u>	<u>Due Date</u>	<u>Trace ID</u>
432A	Sartorius	C-44	Microbalance 5.1g	03/11/2014	517747
479A	Sartorius	MC210S	Scale, 210g	02/22/2014	517755
503A	Rice Lake	1mg-200g (Class O)	Mass Set	12/07/2013	517746
723A	Rice Lake	1mg-200g (Class O)	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 (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/NCCL 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 10/11/2013

Rev # 14

Inspector

JJ Calibrations, Inc.

Manufacturer: Troemner Inc.
Model: 1mg-100g (Class F)
Nomenclature: Mass Set, 21 Pc.
Serial: 47883

Certificate #: 543402
Date: 09Oct2013
Technician: 34
Calibration Interval: 60 Months

Parameter		Nominal	JJ Standard	UUT	UUT ± Limit	Uncertainty ±
Mass Verification						
Data in mg		1	0.996	1.048	0.100	0.0115
	dot	2	2.002	1.973	0.120	0.0115
		2	2.002	2.048	0.120	0.0115
		5	4.996	5.033	0.170	0.0115
		10	10.000	10.053	0.210	0.0115
	dot	20	19.999	19.966	0.260	0.0115
		20	19.999	20.069	0.260	0.0115
		50	49.998	50.018	0.350	0.0115
		100	99.998	100.144	0.430	0.0115
	dot	200	199.999	200.045	0.540	0.0115
		200	199.999	199.967	0.540	0.0115
		500	499.996	500.334	0.720	0.0115
Data in grams		1		Missing		
	dot	2	2.000000	1.999888	0.0011	0.0000394
		2	2.000000	2.000335	0.0011	0.0000394
		5	5.000002	4.999996	0.0015	0.0000395
		10	9.99998	9.99984	0.0020	0.0000580
	dot	20	19.99999	20.00100	0.0040	0.0000855
		20	19.99999	20.00079	0.0040	0.0000855
		50	49.99997	49.99949	0.0100	0.0001390
		100	99.99999	99.99802	0.0200	0.0002900

Thermal Metering System Calibration Y Factor

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

Average Gas Meter y Factor
1.001

Orifice Meter dH@
N/A

Calibration Date: 01/07/16
 Calibrated by: B. Davis
 Calibration Frequency: Six month
 Next Calibration Due: 7/6/2016
 Instrument Range: 1.000 cfm
 Standard Temp.: 68 oF
 Standard Press.: 29.92 "Hg
 Barometric Press., Pb: 29.98 "Hg
 Signature/Date: B.D. 1/7/16

Previous Calibration Comparison

Date	6/4/2015	Acceptable Deviation (5%)	Deviation
y Factor	1.001	0.05005	0.000
Acceptance	Acceptable		

Current Calibration

Acceptable y Deviation	0.020
Maximum y Deviation	0.002
Acceptable dH@ Deviation	N/A
Maximum dH@ Deviation	N/A
Acceptance	Acceptable

Reference Standard *		
Standard Calibrator	Model S/N	Standard Test Meter
		OMNI-00001
	Calib. Date	05-Nov-15
	Calib. Value	0.9983 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	1.30	2.22	0.70
Initial Reference Meter	653.7	659.252	666.017
Final Reference Meter	659.162	665.997	671.748
Initial DGM	0	0	0
Final DGM	5.535	6.827	5.861
Temp. Ref. Meter (°F), Tr	68.0	67.0	67.0
Temperature DGM (°F), Td	78.0	79.0	80.0
Time (min)	34.0	32.0	49.0
Net Volume Ref. Meter, Vr	5.462	6.745	5.731
Net Volume DGM, Vd	5.535	6.827	5.861
Gas Meter y Factor =	1.001	1.003	0.999
Gas Meter y Factor Deviation (from avg.)	0.000	0.002	0.002
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. $dH@ = 0.0317 \times Pd / (Pb (Td + 460)) \times [(Tr + 460) \times \text{time}] / Vr^2$

* 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 $\pm 0.14 \text{ ft}^3/\text{min}$. This is based on the reference standard having a TAR (Test Accuracy Ratio) of at least 4:1.

DIFFERENTIAL PRESSURE GAUGE CALIBRATION DATA SHEET

Instrument to be calibrated: Flue draft box 00335

Maximum Range: 0.25" wc

ID Number: OMNI-00335

Calibration Instrument: Digital Manometer

ID Number: OMNI-00896

Date: 1/8/16

By: B. Davis

This form is to be used only in conjunction with Standard Procedure C-SPC.

Range of Calibration Point ("WC)	Digital Manometer Input ("WC)	Pressure Gauge Response ("WC)	Difference (Input - Response)	% Error of Full Span*
0-20% Max. Range <u>0.0 - 0.05</u>	<u>0.035</u>	<u>0.034</u>	<u>0.001</u>	<u>0.4</u>
20-40% Max. Range <u>0.05 - 0.10</u>	<u>0.072</u>	<u>0.064</u>	<u>0.008</u>	<u>3.2</u>
40-60% Max. Range <u>0.10 - 0.15</u>	<u>0.150</u>	<u>0.145</u>	<u>0.005</u>	<u>2.0</u>
60-80% Max. Range <u>0.15 - 0.20</u>	<u>0.200</u>	<u>0.192</u>	<u>0.008</u>	<u>3.2</u>
80-100% Max. Range <u>0.20 - 0.25</u>	<u>0.235</u>	<u>0.226</u>	<u>0.009</u>	<u>3.6</u>

*Acceptable tolerance is 4%.

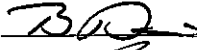
The uncertainty of measurement is $\pm 0.4''$ WC. This is based on the reference standard having a TAR (Test Accuracy Ratio) of at least 4:1.


Technician signature:  Date: 1/8/16

Reviewed by:  Date: 1/11/16

Temperature Calibration EPA Method 28R, ASTM 2515							
BOOTH:	TEMPERATURE MONITOR TYPE:				EQUIPMENT NUMBER:		
E1	National Instruments Type K data logger				OMNI-00335 - OMNI-00336		
REFERENCE METER EQUIPMENT NUMBER:				Calibration Due Date:			
CALIBRATION PERFORMED BY:		DATE:		AMBIENT TEMPERATURE:		BAROMETRIC PRESSURE:	
B. DAVIS		1-8-16		66		30.16	
Input Temperature (F)	Ambient	Meter A					Catalyst
			Meter B	Filter A	Filter B	Tunnel	
0	0	0	0	0	0	-1	0
100	100	100	100	100	100	100	100
300	300	300	300	300	300	300	300
500	500	500	500	500	500	500	500
700	700	700	700	700	700	700	700
1000	1001	1001	1001	1001	1000	1000	1001

Input (F)	FB Top	FB Bottom	FB Back	FB Left	FB Right	Stack
0	0	-1	0	-1	-1	-1
100	100	100	99	100	100	100
300	300	300	300	300	300	300
500	500	500	500	500	500	500
700	700	700	700	700	700	700
1000	1000	1000	1000	1000	1000	1000

Technician signature:  Date: 1/8/16

Reviewed By:  Date: 1/11/16

Thermal Metering System Calibration Y Factor

Manufacturer: APEX Instruments
 Model: XC-60-EP
 Serial Number: 606001
 OMNI Tracking No.: OMNI-00336
 Calibrated Orifice: Yes

Average Gas Meter y Factor
1.001

Orifice Meter dH@
N/A

Calibration Date: 01/07/16
 Calibrated by: B. Davis
 Calibration Frequency: Six month
 Next Calibration Due: 7/6/2016
 Instrument Range: 1.000 cfm
 Standard Temp.: 68 oF
 Standard Press.: 29.92 "Hg
 Barometric Press., Pb: 29.98 "Hg
 Signature/Date: *B. Davis* 1/7/16

Previous Calibration Comparison

Date	6/4/2015	Acceptable Deviation (5%)	Deviation
y Factor	1.003	0.05015	0.002
Acceptance	Acceptable		

Current Calibration

Acceptable y Deviation	0.020
Maximum y Deviation	0.002
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	05-Nov-15
	Calib. Value	0.9983 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	0.51	1.00	1.84
Initial Reference Meter	671.748	679.511	686.563
Final Reference Meter	679.472	686.515	693.337
Initial DGM	0	0	0
Final DGM	7.822	7.133	6.878
Temp. Ref. Meter (°F), Tr	67.0	68.0	68.0
Temperature DGM (°F), Td	77.0	80.0	79.0
Time (min)	66.0	44.0	32.0
Net Volume Ref. Meter, Vr	7.724	7.004	6.774
Net Volume DGM, Vd	7.822	7.133	6.878
Gas Meter y Factor =	1.003	1.000	0.999
Gas Meter y Factor Deviation (from avg.)	0.002	0.001	0.002
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. $dH@ = 0.0317 \times Pd / (Pb (Td + 460)) \times [(Tr + 460) \times \text{time}] / Vr]^2$

* 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 $\pm 0.14 \text{ ft}^3/\text{min}$. This is based on the reference standard having a TAR (Test Accuracy Ratio) of at least 4:1.

DIFFERENTIAL PRESSURE GAUGE CALIBRATION DATA SHEET

Instrument to be calibrated: Tunnel Static box 00336

Maximum Range: 1" WC

ID Number: OMNI-00336

Calibration Instrument: Digital Manometer

ID Number: OMNI-00396

Date: 1/8/16

By: B Davis


This form is to be used only in conjunction with Standard Procedure C-SPC.

Range of Calibration Point ("WC)	Digital Manometer Input ("WC)	Pressure Gauge Response ("WC)	Difference (Input - Response)	% Error of Full Span*
0-20% Max. Range 0.0 - 0.2	0.128	0.133	0.005	0.5
20-40% Max. Range 0.2 - 0.4	0.382	0.387	0.005	0.5
40-60% Max. Range 0.4 - 0.6	0.576	0.574	0.002	0.2
60-80% Max. Range 0.6 - 0.8	0.749	0.747	0.002	0.2
80-100% Max. Range 0.8 - 1.0	0.870	0.864	0.006	0.6

*Acceptable tolerance is 4%.

The uncertainty of measurement is ± 0.4 " WC. This is based on the reference standard having a TAR (Test Accuracy Ratio) of at least 4:1.

Technician signature:  Date: 1/8/16

Reviewed by:  Date: 1/11/16

Temperature Calibration EPA Method 28R, ASTM 2515							
BOOTH:	TEMPERATURE MONITOR TYPE:				EQUIPMENT NUMBER:		
E1	National Instruments Type K data logger				OMN-00335 - OMN-00336		
REFERENCE METER EQUIPMENT NUMBER:				Calibration Due Date:			
CALIBRATION PERFORMED BY:			DATE:	AMBIENT TEMPERATURE:		BAROMETRIC PRESSURE:	
B. Davis			1-8-16	66		30.16	
Input Temperature (F)	Ambient	Meter A					Catalyst
			Meter B	Filter A	Filter B	Tunnel	
0	0	0	0	0	0	-1	0
100	100	100	100	100	100	100	100
300	300	300	300	300	300	300	300
500	500	500	500	500	500	500	500
700	700	700	700	700	700	700	700
1000	1001	1001	1001	1001	1000	1000	1001

Input (F)	FB Top	FB Bottom	FB Back	FB Left	FB Right	Stack
0	0	-1	0	-1	-1	-1
100	100	100	99	100	100	100
300	300	300	300	300	300	300
500	500	500	500	500	500	500
700	700	700	700	700	700	700
1000	1000	1000	1000	1000	1000	1000

Technician signature: B. Davis Date: 1/8/16

Reviewed By: [Signature] Date: 1/11/16

Equipment Record

Name: Microtector

Type of Equipment: Hook Gage Liquid Manometer with Micrometer Gage in Inches

Model: 1430

S/N: 115004-00

OMNI ID #: OMNI-00410

Manufacturer: Dwyer Instruments

Vendor/Retailer: Dwyer Instruments

Is Manufacturer's manual available in the equipment file? Yes, if not why? _____

Date Received: December 2007

Date Placed in Service: December 2007

Condition When Received: New Used Reconditioned

Location: shop

Location of Calibration Procedures: Calibrate prior to use using NIST Traceable standard OMNI-00033. "Zeroing" instructions in attached manual.

Location of Dates/Results of Calibrations: N/A

Location of Maintenance Procedures: Maintenance is performed on an "as needed" basis as determined by calibrations.

Dates / Results of Maintenance: Regularly scheduled maintenance is not required. Pre- and post-service maintenance is conducted per QA Manual Section 5.3.5. To date, maintenance has not been required beyond the in-service maintenance prescribed in QA Manual Section 5.3.5.

Any Planned Maintenance? No, if yes what: _____

Equipment History of any damage, malfunction, modification and/or repair (including a statement on the suitability of the equipment for testing): To date, this instrument has not been damaged, modified or repaired, nor has it malfunctioned.

OMNI Track #	OMNI-00594			
Equipment Name/Description	CAI ZRE-4 Gas Analyzer			
Equipment S/N:	N5F0112			
Comments	CO2, O2, and dual range CO gas analyzer.			
Status	Active, calibrate prior to use.			
Part #	ZRE-4			
Reference Standard:	<input type="checkbox"/> YES	<input checked="" type="checkbox"/> X	<input type="checkbox"/> NO	(Check 'X' for answer)
Location of Equipment:	Portable gas cart.			
Calibration Vendor	OMNI in house			
Type of Calibration	Calibrate Prior to use.			
Calibration Period (Months)	N/A			
Date of Last Calibration	N/A			
Date of Next Calibration	N/A			

Do the following:

- 1) Complete Calibration documentation
- 2) Complete top half of this form
- 3) Attach appropriate calibration forms and save in following location
 \\omni-serv\Test Equipment\Equipment\OMNI-XXXXX - Equipment Name
- 4) Repopulate database with updated information
- 5) Print, laminate and adhere calibration tag to equipment

<p>Verify before use OMNI-00594 Gas Analyzer</p>
--

<p>Verify before use OMNI-00594 Gas Analyzer</p>
--

Certificate of Calibration



JJ Calibrations, Inc.

7007 SE Lake Rd
 Portland, OR 97267-2105
 Phone 503.786.3005
 FAX 503.786.2994

Certificate Number: **607778**

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

PO: **150056**

Order Date: **11/20/2015**

Authorized By: **N/A**

Calibrated on: **11/24/2015**

*Recommended Due: **11/24/2016**

Environment: **21 °C 37 % RH**

As Received: **Within Tolerance**

As Returned: **Within Tolerance**

Action Taken: **Calibrated**

Technician: **128**

Property #: **OMNI-00579**

User: **N/A**

Department: **N/A**

Make: **Extech**

Model: **407113**

Serial #: **A012691**

Description: **Anemometer**

Procedure: **400331 / 403614**

Accuracy: **Refer to Mfg. Specs.**

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.

Received and returned with probes, cover, and case.

Standards Used

Std ID	Manufacturer	Model	Nomenclature	Due Date	Trace ID
799	TSI	5815 DP-Calc	Micromanometer	10/15/2016	604458
644A	Thunder Scientific	1200	Two Pressure Humidity Generator	02/13/2016	579240

Measurement Data

Parameter	Measurement Description	Range Unit	Reference	Min	Max	*Error	UUT
Before/After Air Velocity							
		ft/min	656.0	624	688	20	636 ft/min
		ft/min	1017.0	976	1058	3	1014 ft/min
		ft/min	1834.0	1774	1894	7	1841 ft/min
Temperature			22.80	22.0	23.6	0.3	23.1
			15.50	14.7	16.3	0.4	15.9
			29.90	29.1	30.7	0.7	30.6

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/NCCL 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

Issued 11/25/2015

Rev # 15


 Inspector

VWR Temperature Hygrometer Calibration Procedure and Data Sheet

Frequency: Every Two Years

Step 1: Locate NIST traceable standard.

Step 2: Place unit to be calibrated, tracking No. OMNI-00592, inside OMNI desiccator box on the same shelf with the NIST traceable standard.

Step 3: After a period of not less than four hours record the temperature and humidity of both units in the spaces provide below.

Step 4: If the unit to be calibrated matches the NIST standard within $\pm 4\%$, it is acceptable. If not, the unit needs to be sent to a repair company or replaced.

Verification Data:


Date: 1/13/16 Technician: B Davis

Time in desiccator: 10:30 Recording time: 14:30

NIST Standard Temperature: 74.5 °F NIST Standard Humidity: ³⁰21.7 19.2

Test Unit Temperature Reading: 74.4 °F Test Unit Humidity Reading: 16.8

Test unit OMNI- 00592 is or was not within acceptable limits.

Technician Signature: 

Comments: Hygrometer OMNI-00291 was used to verify new unit.
A difference of 2.4% RH was found, this result is within $\pm 4\%$, with a
full scale of 100% for OMNI-00291, and 95% for OMNI-00592

Model: PPC 90
Hearth & Home Technologies - Colville
1445 North Highway
Colville, WA. 99114

Example Calculations

Equations and Sample Calculations – ASTM E2779 & E2515

Manufacturer: Hearth & Home
 Model: PPC 90
 Run: 1
 Category: [Integrated]

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_{Bdb} – Weight of test fuel burned during test run, dry basis, kg

M_{BSidb} – Weight of test fuel burned during test run segment i , dry basis, kg

BR – Average dry burn rate over full integrated test run, kg/hr

BR_{Si} – Average dry burn rate over test run segment i , kg/hr

V_s – Average gas velocity

Q_{sd} – Average gas flow rate

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

m_n – Total Particulate Ma Average dilution tunnel gas velocity, ft/sec

C_s - Concentration of part Particulate concentration, g/dscf

E_T – Total Particulate Err Dilution tunnel gas flow rate, dscf/min

PR - Proportional Rate V_s Particulate emission rate, lbs/hr

PM_R – Average particulat Total particulate emissions, grams

PM_F – Average particulat Average fuel load moisture content, %

M_{Bdb} – Weight of test fuel burned during test run, dry basis, kg

ASTM E2779 equation (1)

$$M_{Bdb} = (M_{Swb} - M_{Ewb})(100/(100 + FM))$$

Where,

FM = average fuel moisture of test fuel, % dry basis

M_{Swb} = weight of test fuel in hopper at start of test run, wet basis, kg

M_{Ewb} = weight of test fuel in hopper at end of test run, wet basis, kg

Sample Calculation:

5.3 %

$M_{Swb} = 33.9$ lbs

$M_{Ewb} = 18.4$ lbs

0.4536 = Conversion factor from lbs to kg

$$M_{Bdb} = [(33.9 \times 0.4536) - (18.4 \times 0.4536)] (100/(100 + 5.26))$$

$$M_{Bdb} = \mathbf{6.7 \text{ kg}}$$

M_{BSidb} – Weight of test fuel burned during test run segment i , dry basis, kg
ASTM E2779 equation (2)

$$M_{BSidb} = (M_{S_{Siwb}} - M_{E_{Siwb}})(100/(100 + FM))$$

Where,

$M_{S_{Siwb}}$ = weight of test fuel in hopper at start of test run segment i , wet basis, kg

$M_{E_{Siwb}}$ = weight of test fuel in hopper at end of test run segment i , wet basis, kg

Sample Calculation (from medium burn rate segment):

$$FM = 5.3 \%$$

$$M_{S_{Siwb}} = 27.9 \text{ lbs}$$

$$M_{E_{Siwb}} = 22.6 \text{ lbs}$$

0.4536 = Conversion factor from lbs to kg

$$M_{BSidb} = [(27.9 \times 0.4536) - (22.6 \times 0.4536)] (100/(100 + 5.3))$$

$$M_{BSidb} = 2.3 \text{ kg}$$

BR – Average dry burn rate over full integrated test run, kg/hr
ASTM E2779 equation (3)

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

Where,

θ = Total length of full intergrated test run, min

Sample Calculation:

$$M_{Bdb} = 6.68 \quad \text{kg}$$

$$\theta = 360 \quad \text{min}$$

$$BR = \frac{60 \times 6.68}{360}$$

$$BR = 1.11 \quad \text{kg/hr}$$

BR_{Si} – Average dry burn rate over test run segment *i*, kg/hr
ASTM E2779 equation (4)

$$BR_{Si} = \frac{60 M_{BSidb}}{\theta_{Si}}$$

Where,

$$\theta_{Si} = \text{Total length of test run segment } i, \text{ min}$$

Sample Calculation (from medium burn rate segment):

$$M_{BSidb} = 2.28 \text{ kg}$$

$$\theta = 120 \text{ min}$$

$$BR = \frac{60 \times 2.28}{120}$$

$$BR = 1.14 \text{ kg/hr}$$

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

ASTM E2515 equations (9)

$$V_s = F_p \times K_p \times C_p \times \left(\sqrt{\Delta P} \right)_{avg} \times \sqrt{\frac{T_s}{P_s \times M_s}}$$

Where:

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

Sample calculation:

$$F_p = \frac{18.93}{20.41} = 0.928$$

$$V_s = 0.928 \times 85.49 \times 0.99 \times 0.300 \times \left(\frac{89.6 + 460}{\left(29.91 + \frac{-0.36}{13.6} \right) \times 28.78} \right)^{1/2}$$

$$V_s = \mathbf{18.83 \text{ ft/s}}$$

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

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

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

ASTM E2515 equation (3)

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

Where:

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

Sample calculation:

$$Q_{sd} = 3600 \times (1 - 0.02) \times 18.83 \times 0.196 \times \frac{528}{89.6 + 460} \times \frac{29.9 + \frac{-0.36}{13.6}}{29.92}$$

Q_{sd} = **12516.4** dscf/hr

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

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

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. H₂O
- T_m = Absolute average dry gas meter temperature, °R

Sample Calculation:

Using equation for Train 1:

$$V_{m(std)} = 17.64 \times 58.692 \times 1.001 \times \frac{\left(29.91 + \frac{1.28}{13.6} \right)}{\left(89.0 + 460 \right)}$$

$$V_{m(std)} = \mathbf{56.637} \text{ dscf}$$

Using equation for Train 2:

$$V_{m(std)} = 17.64 \times 56.877 \times 1.001 \times \frac{\left(29.91 + \frac{1.00}{13.6} \right)}{\left(88.2 + 460 \right)}$$

$$V_{m(std)} = \mathbf{54.931} \text{ dscf}$$

Using equation for ambient train:

$$V_{m(std)} = 17.64 \times 0.00 \times 0 \times \frac{\left(29.91 + \frac{0.00}{13.6} \right)}{\left(79.8 + 460 \right)}$$

$$V_{m(std)} = \mathbf{0.000} \text{ dscf}$$

m_n – Total Particulate Matter Collected, mg

ASTM E2515 Equation (12)

$$m_n = m_p + m_f + m_g$$

Where:

m_p = mass of particulate matter from probe, mg

m_f = mass of particulate matter from filters, mg

m_g = mass of particulate matter from filter seals, mg

Sample Calculation:

Using equation for Train 1 (first hour):

$$m_n = 0.3 + 2.6 + 0.0$$

$$m_n = 2.9 \text{ mg}$$

Using equation for Train 1 (remainder):

$$m_n = 0.2 + 1.8 + 0.0$$

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

Train 1 Aggregate = **4.9 mg**

Using equation for Train 2:

$$m_n = 0.5 + 4.4 + 0.1$$

$$m_n = \mathbf{5.0 \text{ mg}}$$

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

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

Where:

K₂ = 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:

$$C_s = 0.001 \times \frac{4.9}{56.64}$$

$$C_s = \mathbf{0.00009} \text{ g/dscf}$$

For Train 2

$$C_s = 0.001 \times \frac{5.0}{54.93}$$

$$C_s = \mathbf{0.00009} \text{ g/dscf}$$

For Ambient Train

$$C_r = 0.001 \times \frac{0.0}{0.00}$$

$$C_r = \mathbf{0.000000} \text{ g/dscf}$$

E_T – Total Particulate Emissions, g

ASTM E2515 equation (15)

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

Where:

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

Sample calculation:

For Train 1

$$E_T = (\underline{0.000087} - 0.000000) \times \underline{\hspace{1cm}} \times \underline{360} / 60$$
$$E_T = \underline{6.50} \text{ g}$$

For Train 2

$$E_T = (\underline{0.000091} - 0.000000) \times \underline{\hspace{1cm}} \times \underline{360} / 60$$
$$E_T = \underline{6.84} \text{ g}$$

Average

$$E = \underline{6.67} \text{ g}$$

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

$$7.5\% \text{ of the average} = \underline{0.50}$$

$$\text{Train 1 difference} = \underline{0.17}$$

$$\text{Train 2 difference} = \underline{0.17}$$

PR - Proportional Rate Variation

ASTM E2515 equation (16)

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

Where:

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

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

$$PR = \left(\frac{360 \times 1.612 \times 18.83 \times (96.0 + 460) \times (89.0 + 460)}{10 \times 58.69 \times 18.94 \times (89.6 + 460) \times (80.0 + 460)} \right) \times 100$$

$$PR = \underline{101} \%$$

PM_R – Average particulate emissions for full integrated test run, g/hr
ASTM E2779 equation (5)

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

Where,

E_T = Total particulate emissions, grams

θ = Total length of full integrated test run, min

Sample Calculation:

$$E_T (\text{Dual train average}) = 6.67 \text{ g}$$

$$\theta = 360 \text{ min}$$

$$PM_R = 60 \times (6.67 / 360)$$

$$PM_R = 1.11 \text{ g/hr}$$

PM_F – Average particulate emission factor for full integrated test run, g/dry kg of fuel burned
ASTM E2779 equation (6)

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

Where,

E_T = Total particulate emissions, grams

M_{Bdb} = Weight of test fuel burned during test run, dry basis, kg

Sample Calculation:

$$E_T \text{ (Dual train average)} = 6.67 \text{ g}$$

$$M_{Bdb} = 6.68 \text{ kg}$$

$$PM_F = (6.67 / 6.68)$$

$$PM_F = 1.00 \text{ g/kg}$$

Model: PPC 90
Hearth & Home Technologies - Colville
1445 North Highway
Colville, WA. 99114

Section 4

Owner's Manual

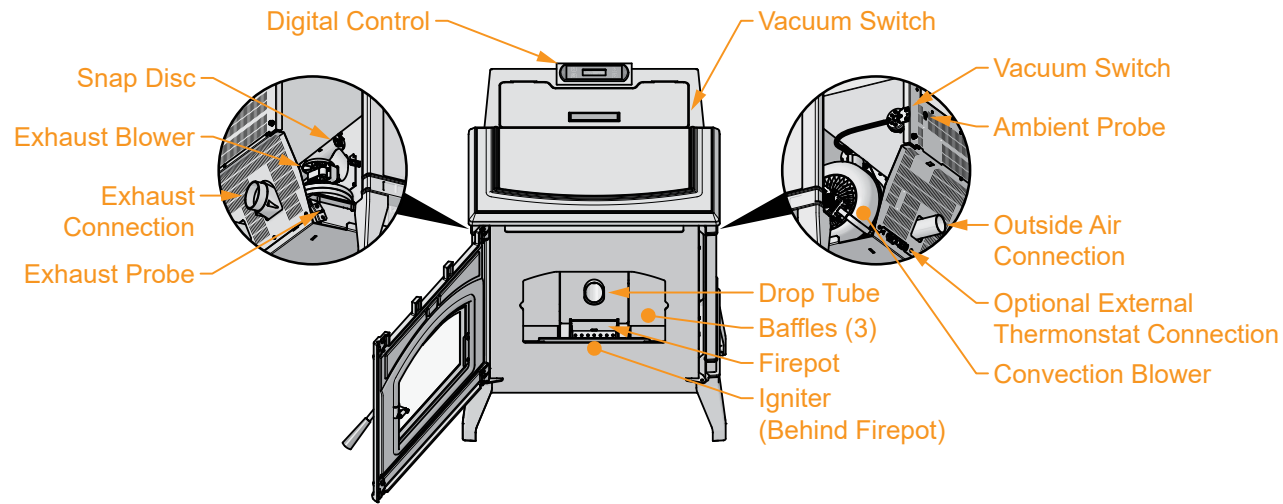


PelPro Cast Iron Pellet Stove

⚠. WARNING! Please read this entire manual before installation and use of this pellet fuel-burning room heater, and save for future reference. Failure to follow these instructions could result in property damage, bodily injury or even death. Contact local building or fire officials about restrictions and installation inspection requirements in your area.

Note: To obtain a French translation of this manual, please contact your dealer or visit www.pelprostoves.com. Pour obtenir une traduction française de ce manuel, s'il vous plait contracter votre revendeur ou visitez www.pelprostoves.com

Get to Know Your PelPro® Stove



Safety First!

Safety Alert Key: It is important to pay attention to alerts you will see throughout this manual to ensure your safety.

- **DANGER!** Indicates a hazardous situation which, if not avoided will result in death or serious injury.
- **WARNING!** Indicates a hazardous situation which, if not avoided could result in death or serious injury.
- **CAUTION!** Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.
- **NOTICE:** Indicates practices which may cause damage to the Stove or to property.
- **Pro Tip:** Indicates additional information to help you better understand your Stove and optimize its performance.

NOTICE:

Fire Risk

Pelpro disclaims any responsibility, and the warranty and agency listing will be voided, by the below actions.

DO NOT:



- Install or operate damaged Stove
- Modify Stove
- Install other than as instructed by the manufacturer
- Operate the Stove without fully assembling all components
- Over fire (burning at higher temperatures than recommended causing permanent damage to the Stove)
- Install any component not approved by the manufacturer
- Install parts or components not listed or approved
- Disable safety switches

Improper installation, adjustment, alteration, service or maintenance can cause injury or property damage. For assistance or additional information, consult a qualified installer, service agency or your dealer.

DANGER!

HOT SURFACES!

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

Hot glass will cause burns.

- Do not touch glass until it is cooled
- NEVER allow children to touch glass
- Keep children away; if you expect that children may come into contact with this Stove, we recommend a barrier such as a decorative screen (see your retailer for suggestions)
- CAREFULLY SUPERVISE children in same room as Stove
- Alert children and adults to hazards of high temperatures

High temperatures may ignite clothing or other flammable materials.

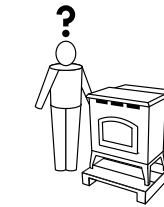
- Keep clothing, furniture, draperies and other flammable materials away

WARNING

This product and the fuels used to operate this product (wood), and the products of combustion of such fuels, can expose you to chemicals including carbon black, which is known to the State of California to cause cancer, and carbon monoxide, which is known to the State of California to cause birth defects or other reproductive harm. For more information go to: WWW.P65Warnings.ca.gov



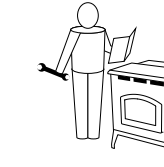
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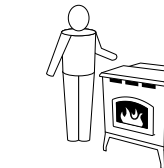
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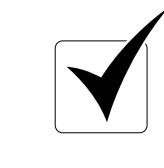
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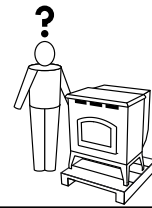
- Stove Certification
- Mobile Home Approved
- Glass Specifications
- Electrical Rating (On High)
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- Warranty



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- Service Part List
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Getting Started



Pallet Removal

There are bolts holding your PelPro Stove in place on the pallet. To remove your Stove from the pallet:



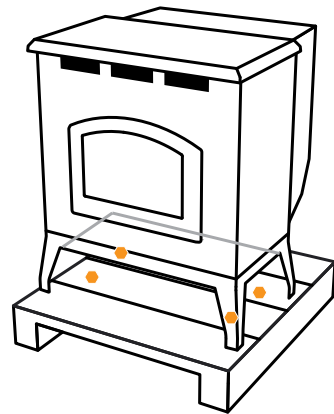
Pallet Removal

Visit pelprostoves.com or scan this code.



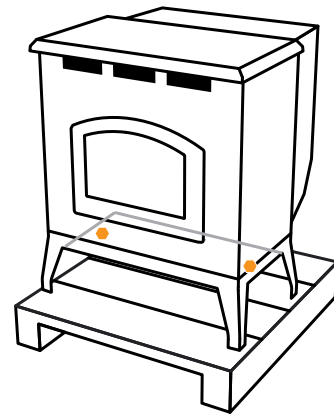
1

Using a 7/16" wrench, remove all four bolts attaching the shipping bracket to pallet.



2

Using a 3/8" wrench, remove each bolt by reaching under your Stove. Tip your Stove to opposite side and push bracket inward; set Stove down and repeat on other side.



WARNING!

Inspect Stove and components for damage. Damaged parts may impair safe operation.

- Do NOT install damaged components.
- Do NOT install incomplete components.
- Do NOT install substitute components.

Report damaged parts to consumer care.

CAUTION!

Risk of cuts, abrasions or flying debris. Wear protective gloves & safety glasses during install. Metal edges are sharp.

What's Included



Owner's manual



Cleaning tool



Power cord



Door handle

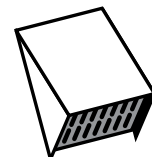


Online Installation & Trouble Shooting Videos

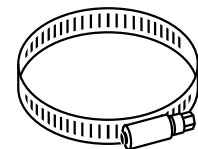
Outside air kit components:



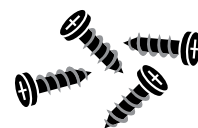
2" Flex hose



Termination Cap

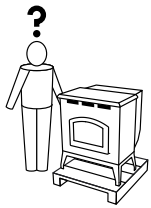


Hose clamp



Screws (4)

Getting Started



What You'll Need

Tools & Supplies

- High temperature silicone (500°F+)
- Level
- Phillips screwdriver
- Plumb line
- Tape measure
- Framing square
- Reciprocating saw
- Electric drill & bits
- Caulking gun
- Stud finder
- Utility knife
- Pliers
- Flashlight
- Hammer

Safety Equipment

Recommended for all installation and maintenance steps.



Gloves



Safety Glasses



Close-toed shoes

Pellet Vent Pipe

Must be an approved 3" or 4" diameter Type "L" or "PL" vent. Use 4" diameter vent if flue height is over 15' or if installation is over 3,000 ft. above sea level.

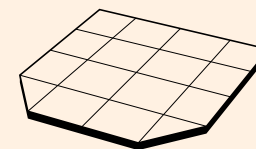


WARNING!

Fire Risk. NO OTHER vent components may be used. Substitute or damaged vent components may impair safe operation.

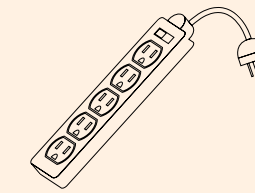
Floor Protection

Non-combustible material (such as a hearth pad) is required underneath your Stove.



Surge Protector

Protect the electrical components of your Stove by using a surge protector.

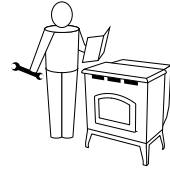


Pellet Fuel

Use only wood pellets in your Stove. For best performance, use premium, low-ash pellets (<1% less than 1.5" in length and avoid the dusty bits and pieces of pellets in the bottom of the bag.



Installing Your Stove



Getting Ready

Pro Tip

We highly recommend your Stove and pellet vent pipe be installed by a professional installer. Your retailer can make recommendations for you. Installation MUST comply with local, regional, state and national codes and regulations. Consult insurance carrier, local building inspector, fire officials or authorities having jurisdiction over restrictions, installation inspection and permits.

Placement

Where you place your Stove can significantly affect its performance and safety.

A Your Home Acts Like a Chimney

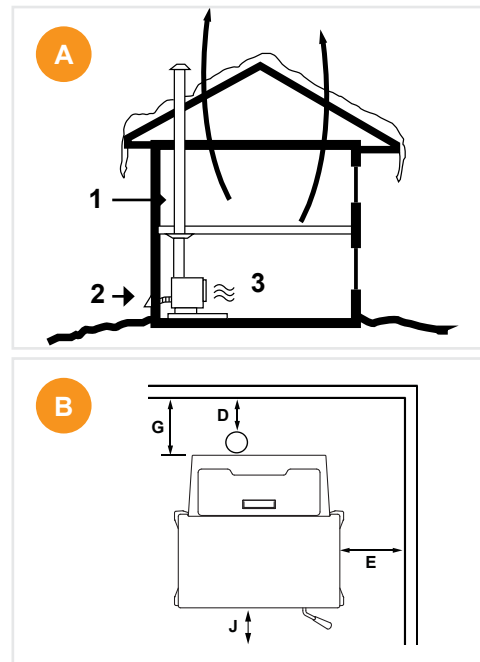
- We recommend that you help your home by:
1. Using a minimum of 5 feet of vertical venting
 2. Use the supplied outside air kit
 3. Install your Stove on a main floor location

This will:

- Help your Stove breathe
- Minimize smoke leakage in the house
- Enhance performance

B Clearance to Combustibles

- The space between your Stove and the items in your home that could burn. Materials such as:
- Wood
 - Sheet rock (drywall)
 - Carpet



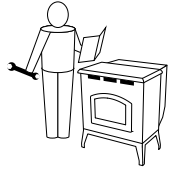
WARNING!

Asphyxiation Risk.

DO NOT INSTALL IN A SLEEPING ROOM. Consumes oxygen in the room.

For Canada, the installation must conform to CAN/CSA-B365

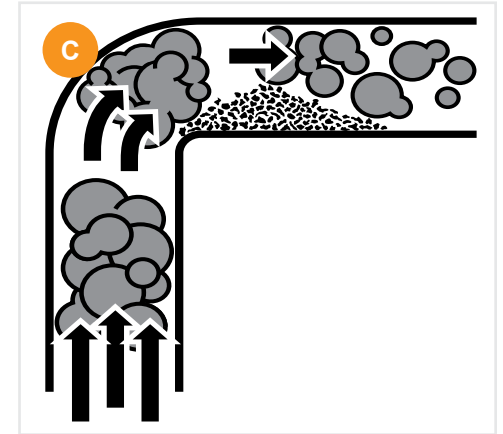
Installing Your Stove



Getting Ready (Continued)

C Pellet Venting

Adding bends in the exhaust path restricts air flow, reduces performance and provides a collection point for ash deposits requiring more frequent cleaning.



CAUTION

- Do not connect to any air distribution duct or system
- Do not install a flue damper in the exhaust venting system of this Stove
- Do not connect this Stove to a chimney flue serving another Stove
- The structural integrity of the manufactured home floor, wall and ceiling/roof must be maintained

REQUIRED:

Use only 3" or 4" type "L" or "PL" pellet pipe.

Pro Tip

This unit can be installed with a 3 to 6 inch (76-152mm) Top Vent Offset Adapter Kit. The 3 to 6 inch (76-152mm) Top Vent Offset Adapter are tested to use 24 gauge single wall flue connector or Listed double wall flue connector to Class A Listed metal chimneys, or masonry chimneys meeting International Conference of Building Officials (ICBO) standards for solid fuel Stoves.

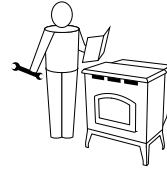
Installation Video



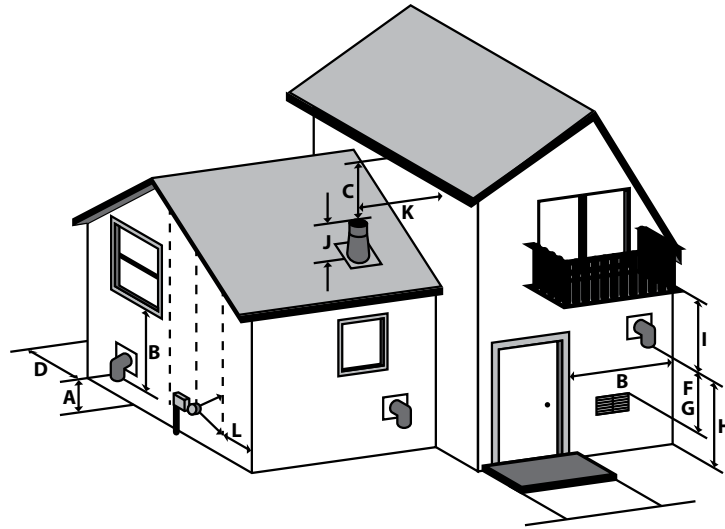
Visit pelprostoves.com or scan this code:



Installing Your Stove



Vent Termination Clearances



	Clearances	
A	12"	Clearance above grade, veranda porch, deck or balcony (Including vegetation and mulch)
B	12" with outside air kit 48" no outside air kit	Clearance beside or below any windows or doors that open
	12**	Clearance above any window or door that opens
C	18"	Vertical clearance to ventilated soffit located above the terminal within a horizontal distance of 2 feet from the center line of the terminal
D	12"	Clearance to an outside corner wall
F	12" with outside air kit 48" no outside air kit	Clearance to a non-mechanical air supply inlet to the building or a combustion air inlet to any other Stove
G	36"	Clearance to a mechanical air supply inlet
H	84***	Clearance above a paved sidewalk or paved driveway located on public property
I	12***	Clearance under a veranda, porch, deck or balcony
J	12"	Clearance above the roof
K	24"	Clearance from an adjacent wall including neighboring buildings
L	36" within a height of 15 feet above the meter / regulator assembly	Clearance to each side of center line extended above natural gas or propane meter / regulator assembly or mechanical vent

*Recommended to prevent condensation on windows and thermal breakage. **This is a recommended distance. For additional requirements check local codes.

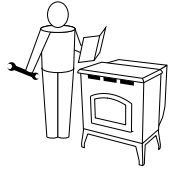
Notice: Do NOT terminate vent:

- In any location that will allow flue gases or soot from entering or staining the building
- In any location which could create a nuisance or hazard
- In any enclosed or semi-enclosed area such as a carport, garage, attic, crawl space, under a sun deck or porch or narrow walkway
- Closely fenced area, or any location that can build up a concentration of fumes such as a stairwell, covered breezeway, etc.

Notice: Do NOT terminate below an air inlet.

- It is recommended that at least 60" (1.52m) of vertical pipe be installed when Stove is vented directly through a wall—this will create a natural draft, which will help prevent the possibility of smoke or odor venting into the home during a power outage
- It will also keep exhaust from causing a nuisance or hazard by exposing people or shrubs to high temperatures
- The safest and preferred venting method is to extend the vent vertically through the roof or above the roof

Installing Your Stove

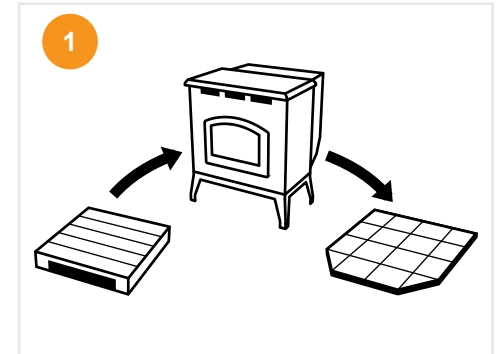


Placing Your Stove

- 1 Stove must be installed on a non-combustible floor. If needed, place floor protection (such as a hearth pad) beneath the Stove. Move Stove from pallet onto your non-combustible surface. Do not operate the Stove while it sits on the pallet.

Notice: Be careful to protect the bottom of the Stove and floor surfaces when moving the Stove. Bottom edges of Stove are sharp and can scratch surfaces.

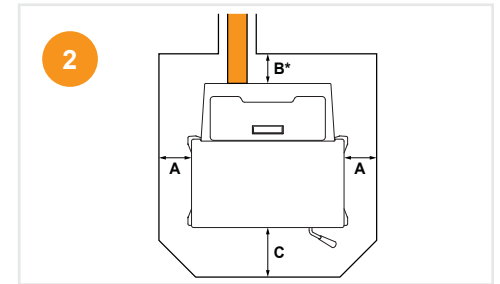
Notice: Clearances may only be reduced by means approved by the regulatory authority having jurisdiction.



- 2 Hearth pad minimum requirements:

USA Hearth Pad Requirements		Inches	mm
A	Sides	2	51
B	Back	2	51
C	Front	6	152

Canada Hearth Pad Requirements		Inches	mm
A	Sides	8	203
B	Back	2	51
C	Front	6	152



Non-combustible floor protection extending beneath the flue pipe is required with horizontal venting or under the top vent adapter with vertical installation.

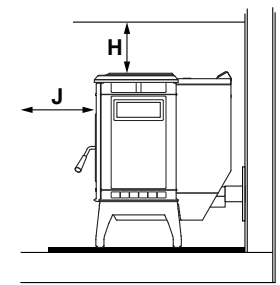
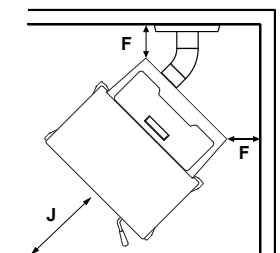
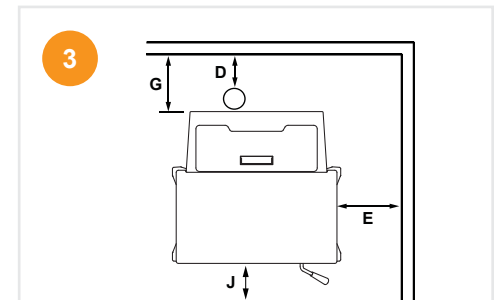
*Non-combustible floor protection must extend 2 inches (51mm) beneath the flue pipe when installed horizontal venting or under the top vent adapter with vertical installation. CANADA REQUIRED, USA RECOMMENDED.

- 3 Confirm required clearances to combustibles:

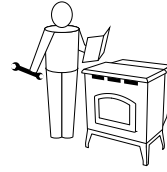
Vertical Installations (Interior Flue)		
Straight back against wall		
D	Back wall to pellet pipe	3 / 76
E	Side wall to Stove	13 / 330

Corner Installation		
Straight back against wall		
F	Walls to Stove	3 / 76

Horizontal Installations		
Straight back against wall		
G	Back wall to Stove	2 / 51
E	Side wall to Stove	13 / 330
H	Clearance to top of Stove	7 / 178
J	Clearance to front of Stove	48 / 1219



Installing Your Stove



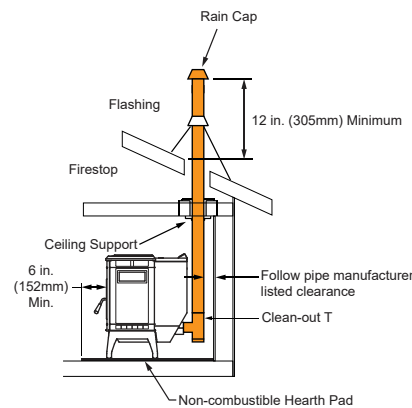
Venting Your Stove

CAUTION!

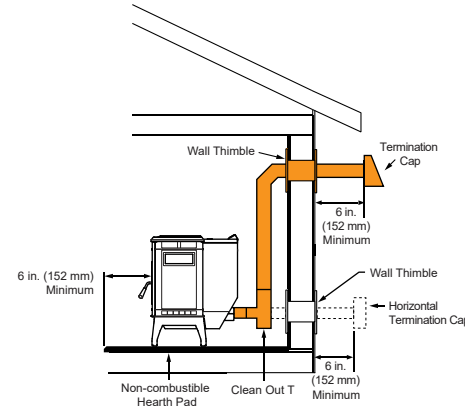
Take appropriate precautions to locate utilities within the wall and avoid contact.

- 1 Mark and cut wall for venting penetration on exterior wall (if needed).
- 2 Install wall thimble (sold separately) per manufacturer requirements.
- 3 Install venting. (For additional installation options visit pelprostoves.com)
- 4 Use silicone to create an effective vapor barrier at the location where the chimney or other component penetrates to the exterior of the structure.

Vertical - Interior, Preferred Installation



Exterior - Optional Installations



NOTE: In Canada when using a factory-built chimney it must be safety listed, Type UL103 HT (2100°F) CLASS "A" or conforming to CAN/ULC-S629M, STANDARD FOR 650°C FACTORY-BUILT CHIMNEYS.

Pro Tips

- See venting manufacturer's required clearances to combustibles
- For horizontal installations, the minimum clearance from exterior to termination cap is 6"—you may want to increase to 18" clearance to minimize soot blow back on home exterior.

Install vent at clearances specified by the manufacturer

WARNING!

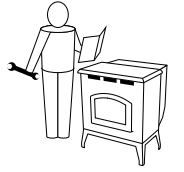
Do not terminate venting in any enclosed or semi-enclosed area such as: a carport, garage, attic, crawl space, under a sun deck or porch, narrow walkway or closely fenced area, or any location that can build up a concentration of fumes such as a stairwell, covered breezeway, etc.

CAUTION!

Ensure that your Stove venting terminates above your Stove. The following may occur:

- Your Stove will not draft properly
- Smoke may seep in your house
- Excessive sooting

Installing Your Stove



Venting Your Stove

The maximum horizontal venting allowed with no vertical venting attached is 48 inches including one 90° elbow or two 45° elbows. Addition of any horizontal venting beyond 48 inches requires a minimum 60 inches of additional vertical vent. Horizontal sections of vent pipe should have a 1/4 inch rise per foot. We recommend using the shortest venting and fewest elbows possible when venting horizontal.

We recommend the use of 4 inch vent with any installation requiring more than two 90° elbows, or more than 15 feet of venting.

WARNING!

Fire Risk.

- Only LISTED venting components may be used
- NO OTHER vent components may be used. Substitute or damaged vent components may impair safe operation.



Notice:

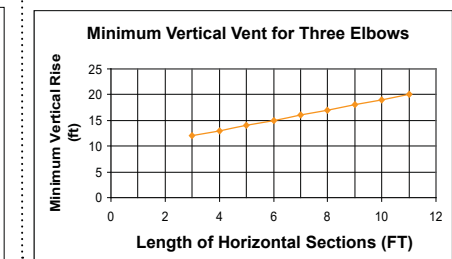
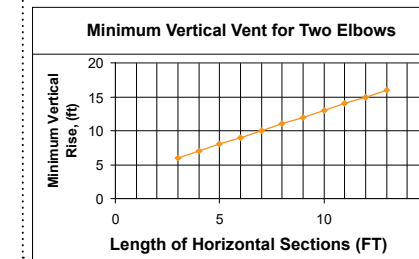
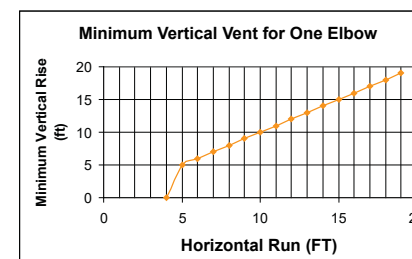
These are guidelines for successful venting of your pellet Stove. The more vertical rise you can obtain in your system, the better it will perform. Horizontal vent runs can accumulate ash and will need to be cleaned more often. Try to keep them as short as possible.

- 45° elbow is equivalent to 1 foot of straight pipe
- 90° elbow is equivalent to 3 feet of straight pipe

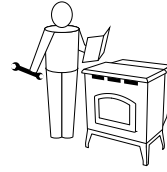
ONE 90° ELBOW		
Total Horizontal	Minimum Vertical	Vent Diameter
4	0	3
5	5	3
6	6	3
7	7	3
8	8	4
9	9	4
10	10	4
11	11	4
12	12	4
13	13	4
14	14	4
15	15	4
16	16	4
17	17	4
18	18	4
19	19	4

TWO 90° ELBOWS		
Total Horizontal	Minimum Vertical	Vent Diameter
2	5	3
3	6	3
4	7	3
5	8	3
6	9	3
7	10	4
8	11	4
9	12	4
10	13	4
11	14	4
12	15	4
13	16	4
14	17	4
15	18	4

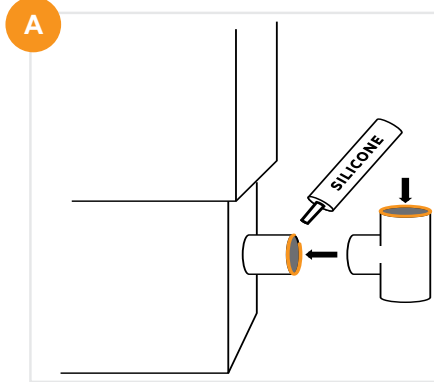
THREE 90° ELBOWS		
Total Horizontal	Minimum Vertical	Vent Diameter
2	11	4
3	12	4
4	13	4
5	14	4
6	15	4
7	16	4
8	17	4
9	18	4
10	19	4
11	20	4



Installing Your Stove



- 5** Install pellet venting through wall and connect vent/pipe to Stove **A**
- Some venting manufacturers offer pellet Stove adapters for their venting for easier installation
 - Seal all pipe joints using high-temp silicone (500°+)
 - Secure exhaust venting system to the Stove with at least 3 screws or rivets per the pipe manufacturer's instructions. Also secure all connector pipe joints with at least 3 screws through each joint.
 - Install termination cap
 - Confirm all required Stove clearances to combustibles



Pro Tip

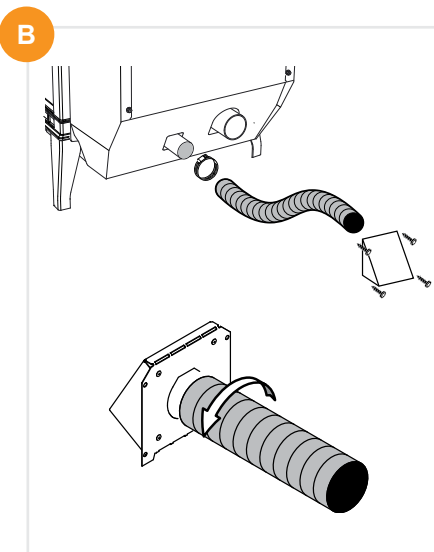
Installing a clean-out "T" (sold separately) to the rear of your Stove, when venting vertically can save time during cleaning.

- 6** **Install outside air kit (included)**
For optimal performance, PelPro recommends the outside air kit for all installations. Outside air kit is required for all mobile/manufactured home installations.

Install through wall **B**

- Maintain clearances from exhaust
- Remove knock out in the rear of Stove
 - Attach flex pipe to outside air connection on Stove
 - Use hose clamp
 - Route tube outside the structure
 - Attach cap
 - Secure to outside wall with appropriate fasteners

Take a Break



Inspect your work:

- Confirm clearances to combustibles are maintained
- Pipe joints are secure and properly sealed
- Outside air kit installed properly
- Confirm termination clearances



⚠ CAUTION!

Never draw outside combustion air from:

- Wall, floor or ceiling cavity
- Enclosed space such as an attic, garage or crawl space.

Using Your Stove



Fuel Tips

Fuel Material and Fuel Storage

Pellet fuel quality can greatly fluctuate. We recommend that you buy fuel in multi-ton lots whenever possible. However, we do recommend trying various brands before purchasing multi-ton lots to ensure your satisfaction. Store fuel in dry location not within clearances to combustibles of your Stove.

Fuel Material

- Made from sawdust or wood by-products
- Depending on the source material it may have a high or low ash content.

Higher Ash Content Material

- Hardwoods with a high mineral content
- Fuel that contains bark
- Standard grade pellets or high ash pellets

Lower Ash Content Material

- Most softwoods
- Fuels with low mineral content
- Most premium grade pellets

Pro Tip

We recommend the use of Pellet Fuels Institute certified pellet fuel with this product.



Your Stove has a manufacture-set minimum low burn rate that must not be altered. It is against federal regulations to alter this setting or otherwise operate your Stove in a manner inconsistent with operation instructions in this manual.

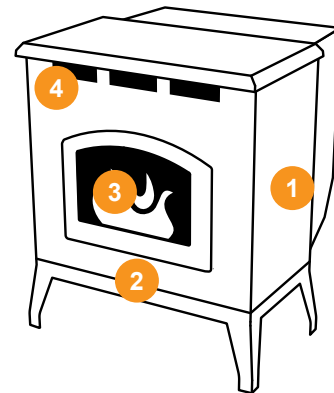
Using Your Stove



Starting your Stove the first time

What to Expect

- 1 Combustion blower will turn on
- 2 Igniter will turn on
- 3 Pellets will drop, smoke may occur in firebox but will evacuate, and flame will appear in fire pot.
- 4 Convection blower will automatically turn on after the Stove heats up. Convection blower will continue to run even after your Stove has been shut down.



Pro Tips

- Odors and vapors are released during initial startup after purchase; burning your Stove on HI for 30 minutes will allow the paint to cure. Open windows or doors for air circulation until burn off is complete.
- During start up and normal operation your Stove's front door must be closed
- Priming is only required the first time your Stove is lit, or after a FUEL FEED ALARM.

⚠ WARNING!

Fire Risk

Keep combustible materials, gasoline and other flammable vapors and liquids clear of Stove.

- Do NOT operate Stove with door open
- Do NOT operate Stove with fire pot floor open
- Do NOT store flammable materials in the Stove's vicinity
- Do NOT use gasoline, lantern fuel, kerosene, charcoal lighter fluid or similar liquids or gels to start or "freshen up" a fire in this Stove

Keep all such liquids well away from the Stove while it is in use as combustible materials may ignite.



⚠ WARNING!

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

Hot glass will cause burns.



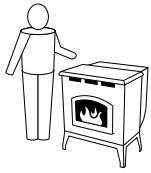
- Do not touch glass until it is cooled
- NEVER allow children to touch glass
- Keep children away
- CAREFULLY SUPERVISE children in same room as fireplace
- Alert children and adults to hazards of high temperatures
- High temperatures may ignite clothing or other flammable materials
- Keep clothing,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



WARNING

This product and the fuels used to operate this product (wood), and the products of combustion of such fuels, can expose you to chemicals including carbon black, which is known to the State of California to cause cancer, and carbon monoxide, which is known to the State of California to cause birth defects or other reproductive harm. For more information go to: WWW.P65Warnings.ca.gov

Using Your Stove



Use and Care

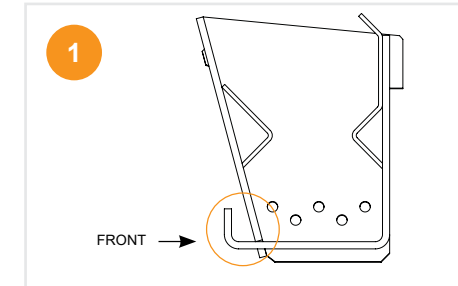
Visit pelprostoves.com or scan this code:



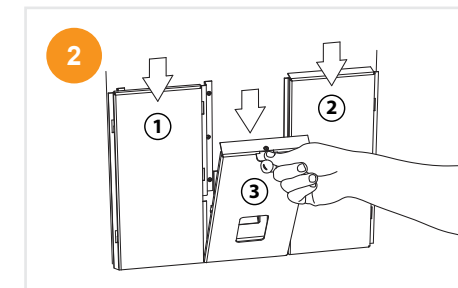
Important:

Allow up to 20 minutes for your Stove to start.

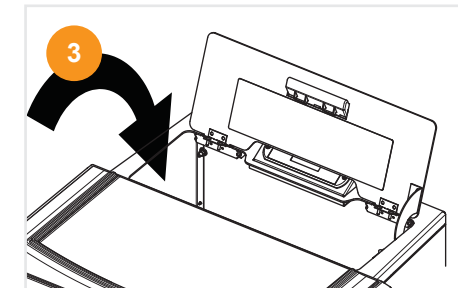
- 1 Confirm fire pot is properly positioned



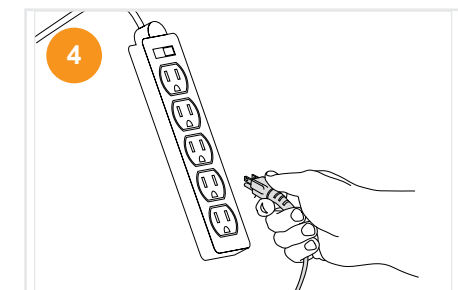
- 2 Confirm three baffles inside firebox are secure, placing the side baffles before the center



- 3 Add some pellets to hopper and fully close lid



- 4 Plug in your Stove



⚠ WARNING! Shock hazard.

- Plug directly into properly grounded 3 prong receptacle
- Do NOT route cord under or in front of Stove
- Recommend the use of a surge protector

Using Your Stove

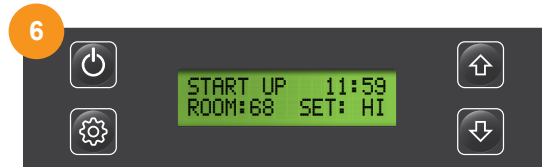


Starting your Stove from an empty hopper

- 5 Prime your Stove:**
- 1) From "OFF" press
 - 2) Press and hold until display reads "FEEDING."
- The feed motor will run about 2 minutes.



- 6** Once feeding stops press power button.



CAUTION:

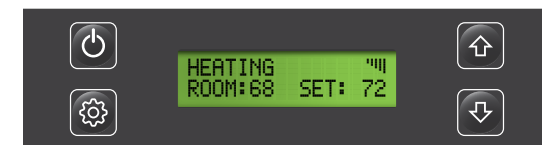
- During this process DO NOT:
- Try to restart, manually add pellets or use any type of accelerant

Pro Tip

For all menu items press after making your selection to store value.

Comfort Settings

Control your comfort:



- **POWER button** - Used to turn your Stove on, off and to reset.
- **Adjust temperature** – Set to your desired temperature level. Once the desired temperature level is achieved the Stove will automatically shut down. When the temperature in the room drops below the desired temperature level, your Stove will automatically restart.
 - **LO setting** – Your Stove will continue to run on low regardless of room temperature.
 - **HI setting** - Your Stove will continue to run on high regardless of room temperature.

Pro Tip

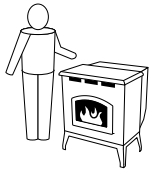
If your Stove is turned to the off position and then back on, even if by mistake, your Stove will go through the shutdown process (approximately 15 minutes) and restart.

Thermostat

Your PelPro Stove comes with a built-in thermostat system that provides easy temperature adjustments. An external thermostat is available as an option (sold separately). To use an external thermostat:

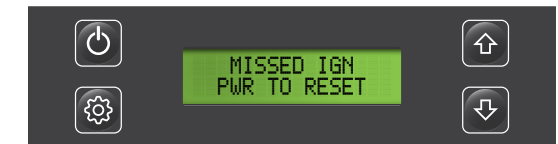
- 1 Install according to the manufacturer's instructions and connect to the back of your Stove.
- 2 Set THERMOSTAT to EXTERNAL in settings menu on the digital display.
- 3 Turn Stove on and set desired power setting.

Using Your Stove



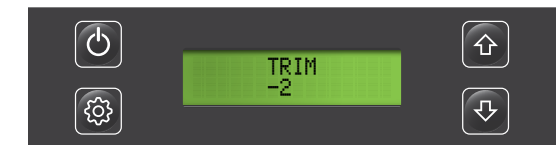
If your Stove tries to start but fails on the initial burn, it will display **MISSED IGNITION**.

1. Turn your Stove to off, remove and clean the fire pot
2. Confirm fire pot is properly positioned
3. Ensure there are enough pellets in the hopper.
4. Prime your Stove per previous instructions



Trim Adjustment

Trim adjustment is located in the menu. This feature will adjust the air/fuel ratio and below are examples of when to use it:



- If the fire is too large, lazy or producing black soot, adjust trim down one level at a time and allow 15 minutes for stabilization before making another adjustment
- If your fire is too small and sometimes goes out when there are pellets in the hopper, adjust the trim up one level at a time and allow 15 minutes for stabilization before making another adjustment.

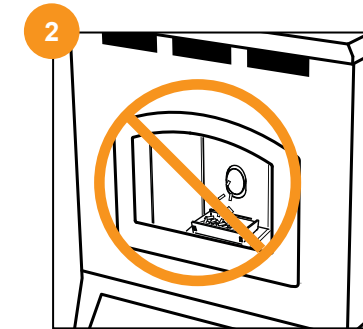


WARNING!

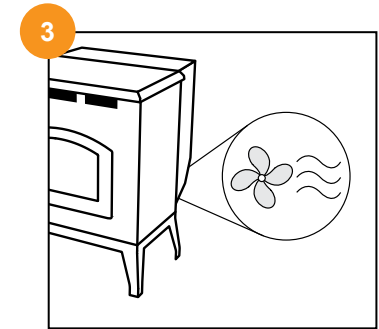
This wood heater needs periodic inspection and repair for proper operation. It is against federal regulations to operate this wood heater in a manner inconsistent with operating instructions in this manual.

Turning Your Stove Off

- 1 Press and hold power button for 3 seconds



Auger stops feeding pellets.



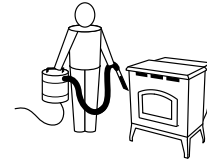
Blowers continue to run until after the exhaust temperature has cooled.



CAUTION! Smoke Hazard

- Press power button on display to OFF, let Stove completely cool and exhaust blower must be off. Now you can unplug Stove before servicing
- Smoke spillage into room can occur if Stove is not cool before unplugging


Maintaining Your Stove




Cleaning & Maintenance

Important:

Regular cleaning helps to assure optimal performance of your Stove. Please refer to page 29 to log your maintenance and cleaning.

 **Cleaning your Stove**
Visit pelprostoves.com or scan this code:



 **Maintaining your Stove**
Visit pelprostoves.com or scan this code:



What You'll Need



Cleaning tool



Phillips head screwdriver



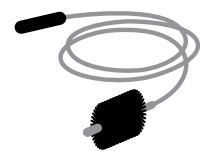
Safety glasses



Gloves



Ceramic glass cleaner & non-abrasive cloth



Flue cleaning brush



Metal container with lid

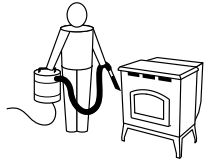


Drop cloth



Ash vacuum

Maintaining Your Stove



Where, When and How

Disposal of Ashes

Ashes should be placed in a metal container with a tight fitting lid. The closed container of ashes should be placed on a non-combustible surface or on the ground, well away from all combustible materials, pending final disposal. If the ashes are to be disposed of by burial in soil or otherwise locally dispersed, they should be retained in the closed container until all embers have been thoroughly cooled.



WARNING!

Disconnect Stove from power supply before servicing

Zone 1 - Firebox

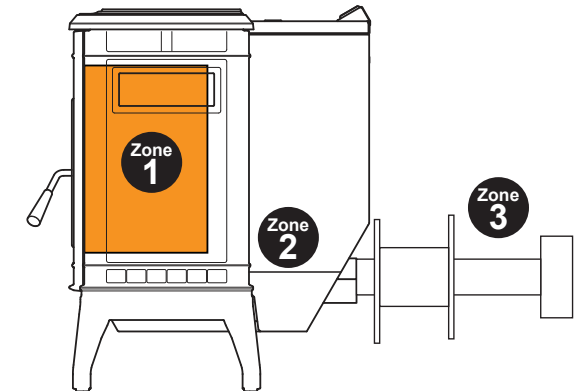
WEEKLY OR AS NEEDED

Fire pot

- Remove the fire pot
- Scrape clean and remove ashes
- Replace fire pot

Firebox

- Remove baffles and vacuum residual ash
- Remove ashes from firebox floor



WARNING!

If using a vacuum to clean Stove, be sure embers are thoroughly cooled to prevent a fire in the vacuum.

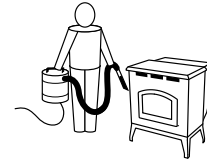
Glass

- Apply ceramic glass cleaner
- Use non-abrasive cloth to remove residue

Door Inspection

- The gasket between the glass and firebox should be inspected periodically to make sure there is a good seal.

Maintaining Your Stove



Pro Tip

The type of fuel you are burning will dictate how often you have to clean your fire pot.

If the fuel you are burning has a high dirt or ash content, it may be necessary to clean the fire pot more than once a day.

Poor quality fuel will cause clinkers to form in the fire pot. Clinkers are formed when dirt, ash or a non-burnable substance is heated to 2000 deg. F (1093 deg. C) and becomes glass-like.

Always burn dry fuel. Burning fuel with high moisture content take heat from the fuel and tends to cool the Stove, robbing heat from your home.

Damp pellet fuel can clog the feed system.

CAUTION!

Handle glass assembly with care and refer to maintenance instructions. **When cleaning glass:**

- Avoid striking, scratching or slamming glass.
- Do NOT clean glass when hot
- Do NOT use abrasive cleaners
- Do NOT operate with glass cracked, broken or scratched



WARNING!

Glass is 5mm thick high temperature heat resistant ceramic glass.

- DO NOT REPLACE with any other material
- Alternate material may shatter and cause injury

Zone 2 - Stove Body

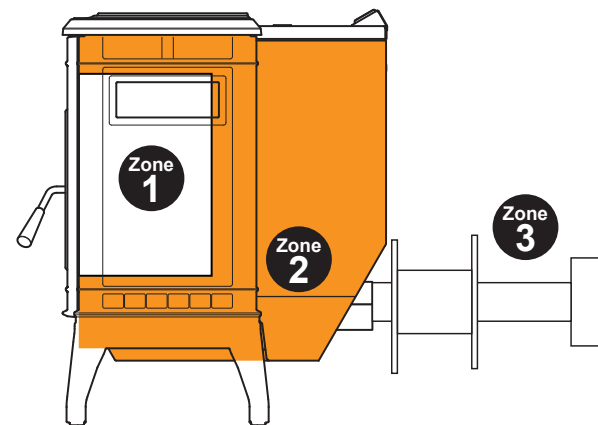
MONTHLY OR AS NEEDED

Convection Blower

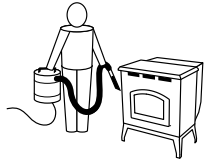
- Remove right side panel to access and remove convection blower
- Vacuum any debris from the fan blades and blower housing

Hopper

- Empty hopper of any pellets
- Vacuum any remaining pellets/debris from the hopper



Maintaining Your Stove



Electrical Components

- Identify and remove any debris
- Verify all connections are secure

ANNUALLY OR AS NEEDED

Exhaust Blower

- Remove left side panel to access and remove exhaust blower
- Vacuum any debris from the fan blades and blower housing

Zone 3 - Venting

ANNUALLY OR AS NEEDED

Termination Cap

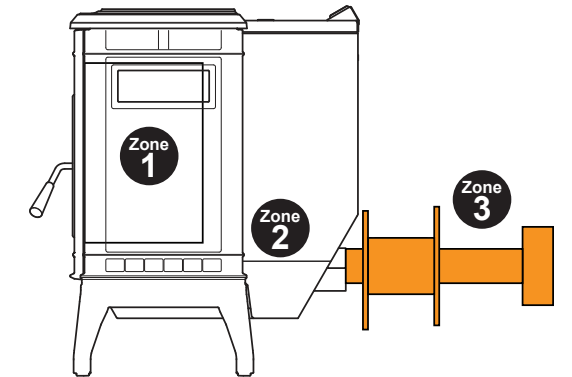
- Remove termination cap
- Brush out to remove dust and hard buildup

Vent Components

- Soot, creosote, and fly ash will collect in the exhaust venting system and restrict the flow of the flue gases. This build up will occur more quickly in horizontal sections and elbows.
- Use the appropriate sized chimney brush to remove ash and buildup from the venting

Outside Air Kit

- Ensure there are no obstructions in the outside air kit cap



Having Trouble?

Visit the Troubleshooting section of this manual.

Caution!

When wood pellets are burned at a low temperature, they produce organic vapors which combine with moisture to form creosote vapors.

Creosote vapors condense in the relatively cool chimney flue of a newly-started or a low-temperature fire. As a result, creosote residue accumulates on the flue lining. When more heat is called for, this residue can be ignited, which creates an extremely hot fire in the chimney flue; this may damage the chimney or even destroy your home.

Your chimney should be inspected once every few months during the heating season to determine if a creosote or soot buildup has occurred. If creosote or soot has accumulated, it should be removed to reduce the risk of a chimney fire.

Replacement Parts



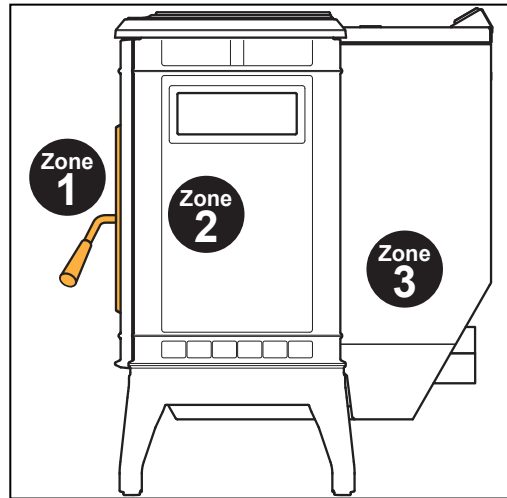
Replacement part for your Stove
Visit pelprostoves.com

Zone 1 - Front of Stove

Glass

1. Open the door from the appliance by lifting door off of hinge pins and lay on a flat surface face down.
2. Using a Phillips head screwdriver, remove the 3 brackets and set aside.
3. Remove old glass and gasket from door.
4. Replace gasket to door and add glass.
5. Re-install the brackets using the same screws.

Glass replacement kit: SRV7081-173
Door assembly replacement kit: SRV7086-021



WARNING!

Glass is 5mm thick high temperature heat resistant ceramic glass.

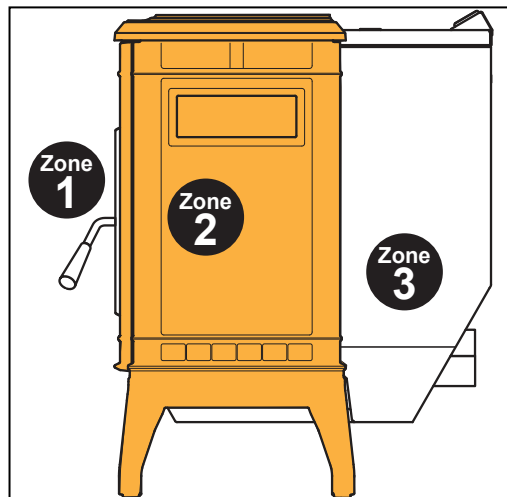
- DO NOT REPLACE with any other material
- Alternate material may shatter and cause injury

Zone 2 - Firebox

Baffles

1. Turn the dial control to the off position. Make sure the appliance is cool.
2. Remove the center baffle first by using the handle at the top of the baffle and pull up and then towards you. The hooks on the baffle will slide out of the slots in the bracket.
3. Remove the left baffle and then the right baffle by pulling up and then towards you. The left and right baffles have similar hooks and slots as the center baffle.

Replacement kit: SRV7079-006



Replacement Parts

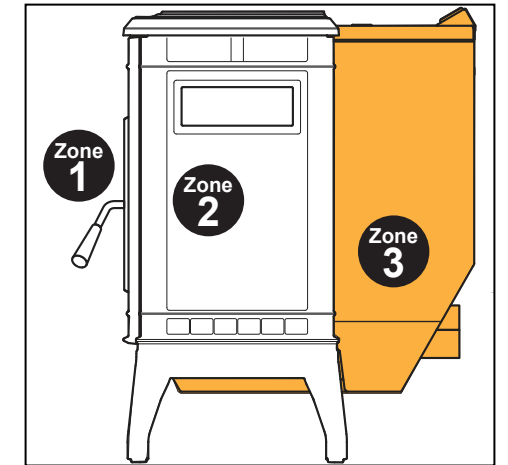


Zone 3 - Back of Stove

Combustion Blower

1. Turn the dial control to the off position. Unplug the power to the appliance.
2. The convection blower is located in the rear of the appliance.
3. Using a Phillips head screwdriver, loosen the bolts on the rear of the appliance holding on the side panels. You do not need to remove the screws. Removed side panels by lifting up and out.
4. Remove the two screws holding the convection blower housing to the sheet metal plenum. Using a slight twisting motion, rotate the blower back and it will release.

Replacement kit: KS-5020-1052

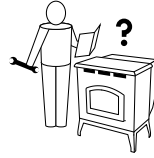


Exhaust Blower

1. Turn the dial control to the off position. Unplug the power to the appliance.
2. Remove the left side panel by loosening the three screws attaching it to the back of the appliance.
3. Disconnect 2 white wires from the white and blue wires of the exhaust blower.
4. Remove the blower motor attached to a removable plate to the exhaust blower. Depending on the model, use a 1/4 inch socket, or 1/4 inch nut driver or Phillips head screwdriver to loosen the 6 screws in the keyhole shaped holes and rotate the plate. It is only necessary to loosen screws.
5. Remove the exhaust blower and gasket.
6. Check for degradation on the gasket and replace if necessary using the gasket included in the kit.
7. Re-install in reverse order.

Replacement kit: 812-4400

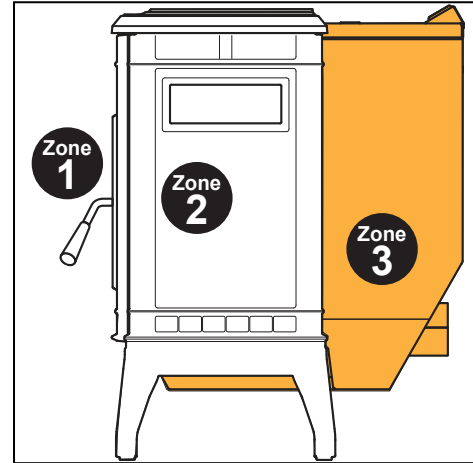
Replacement Parts



Snap Disc

1. Turn the dial control to the off position. Unplug the power to the appliance.
2. Using Phillips head screwdriver, loosen the bolts on the rear of the appliance holding on the left side panel (you do not need to remove the screws). Remove side panels by lifting up and out.
3. Locate the snap disc on the top side of the feed tube where it meets to the hopper. Disconnect the wire leads from the snap disc.
4. Using a Phillips head screwdriver, remove two screws retaining the snap disc on the side of the feed tube.
5. Using the same screws, attach the new snap disc; attach wire leads.
6. Restore power.

Replacement kit: SRV230-0080



Igniter

1. Turn the dial control to the off position. Unplug the power to the appliance.
2. Unplug the wire leads to the igniter.
3. Remove the screw in the side of the igniter chamber. Pinch the ends of the bracket together and pull the igniter straight out of the igniter chamber.
4. If there is difficulty in removing the igniter from the chamber, the chamber can be removed from the rear of the firebox by removing the 1/4-20 bolts.
5. Re-install the new igniter into the chamber using the bracket.
6. Inspect the igniter from the front of the appliance by removing the firepot and looking into the end of the chamber (MAKE SURE The IGNITER IS CENTERED IN THE CHAMBER).

Replacement kit: SRV7000-660

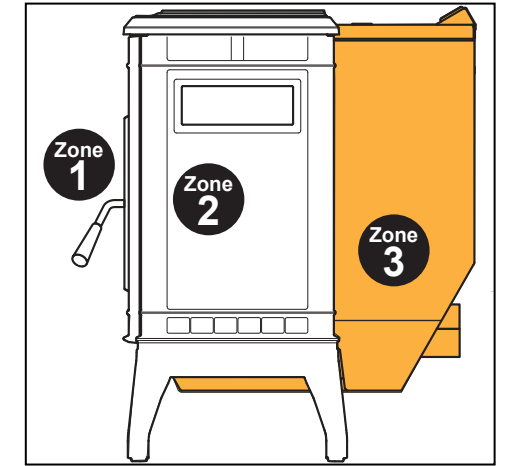
Replacement Parts



Control Board

1. Turn the dial control to the off position. Unplug the power to the appliance.
2. Unplug the wires from the control board. The connectors are locking connectors. Pinch the release tab on each connector and gently tug and rock loose.
3. Pinch the 4 plastic pins from the rear of the appliance to release the control board connectors.
4. Install new board following the steps in reverse.

Replacement kit: SRV7093-050



Feed Motor Assembly

1. Turn the dial control to the off position and unplug the appliance. Remove the right side panel and feed motor cover plate in the rear of the appliance.
2. Remove the 4 screws and cover plate.
3. Remove remaining pellets in feed assembly.
4. Unplug feed motor from wire harness.
5. Remove silicone from around busing end cap. Using Phillips head screwdriver remove 2 screws retaining the end cap to the feed tube.
6. From inside the hopper, lightly tap on the end cap alternating side to side to remove feed assembly from feed tube.
7. Re-install new feed assembly in reverse order; ensuring that the top of the feed bushing is in place and the busing end cap is symmetrical in the feed tube chamber prior to final tightening of the retaining screws. Silicone the end cap to the feed tube.
8. Plug the feed motor leads back in and restore power.

Replacement kit: SRV7077-014

Troubleshooting



Troubleshooting your Stove
Visit pelprostoves.com or scan this code:



Power Related

In the event of a power outage:

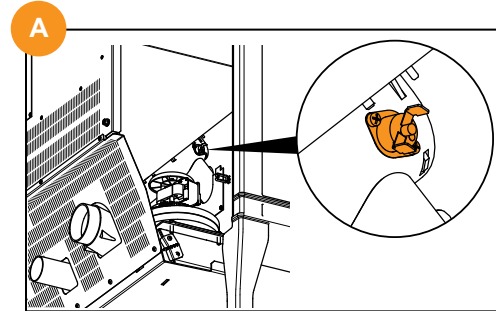
- If using a generator, Pelpro recommends a steady state generator for best Stove performance.
- This Stove needs 110v to run properly. This Stove has not been tested for use with a third party battery backup.

Pro Tip

Check passages to assure they are clear of ash and obstructions. Poor airflow leads to poor performance of your Stove.

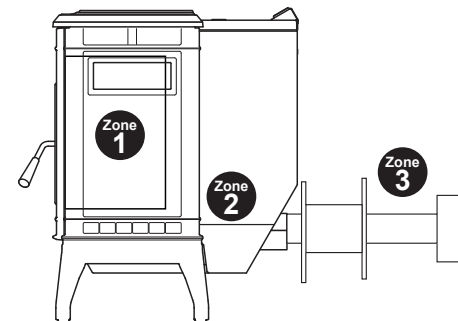
Stove plugged in but no response

- Check your home's circuit breaker
- Reset snap disc (located between drop tube and hopper (Zone 2) **A**)
- Visually inspect wires, blowers and power cord for breaks or wear to find cause of possible short circuit (Zone 2)



Component (i.e. blower) fails to start or fails to turn off

- Check all connections and power plugs are secure
- Visually inspect wires, blowers and power cord to find cause of possible short circuit



Troubleshooting

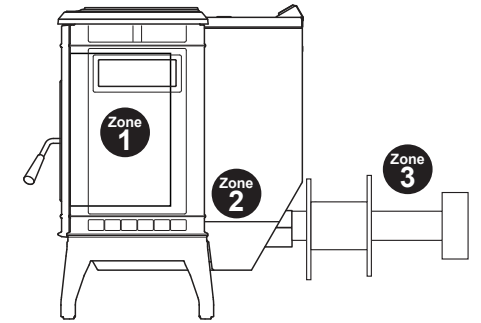


Blockage Related



Black soot on outside of house

- Confirm exhaust path is clean and clear (Zone 3)
 - Adjust air/fuel ratio using trim adjustment dial (See page 21 for trim adjustment instructions)
- Ensure termination cap has at least 18" clearance to reduce the effects of soot blow-back on home exterior (ie. siding)—if not able, refer to page 10 for alternate installation options



Rumbling/whistling noise during operation

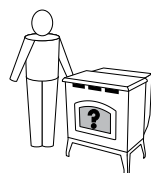
- Confirm exhaust path is clean and clear (Zone 3)
 - Adjust air/fuel ratio using trim adjustment dial (See page 17 for trim adjustment instructions)



Stove will not light

- Confirm fire pot holes are clean and clear (Zone 1)
 - Igniter is getting hot (glows orange)
- Inspect Stove body (Zone 2)
 - Confirm fuel is in hopper, close lid securely
 - Remove right side panel to access and confirm vacuum switch is clear and connected at both ends
 - Confirm all exhaust blower connections secure
 - Confirm the feed assembly and motor are clean and clear of debris
- Confirm exhaust path is clean and clear (Zone 3)

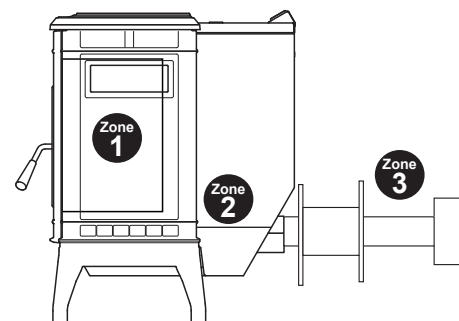
Troubleshooting



Blockage Related

Fire starts but goes out

- Confirm firebox is clean and clear (Zone 1)
 - Ensure fire pot holes are clear
- Inspect Stove body (Zone 2)
 - Confirm exhaust probe is connected
 - Inspect and clean the exhaust outlet
- Confirm exhaust path is clean and clear (Zone 3)



Starts and stops frequently in automatic mode

- Determine if your room is experiencing varying temperatures due to repeated opening/closing of doors or windows—correct if necessary
- Examine Stove body (Zone 2)
 - Inspect ambient probe and confirm that at least 2" is exposed outside of Stove body

Slow or smoky start-up and/or lazy flame

- Confirm exhaust path is clean and clear; clean your fire pot and behind your baffles inside your firebox (Zone 3)
- Examine Stove body (Zone 2)
 - Align igniter so it is properly placed and centered
 - Review fuel quality (see Pellet Fuel information on page 13)

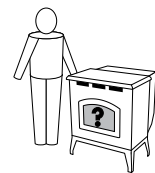
Troubleshooting



Following correction of any alarm, press power button to clear the alarm, wait 10 seconds and turn the Stove back ON.

Alarm	Possible Cause	Corrective Action
Fuel Feed Alarm Error Number 1	No fuel is delivered to the fire pot to sustain flame Hopper empty (most likely) Auger Jam (next likely) No vacuum Hopper lid open	Fill the hopper, inspect the feed tube for jams, inspect the venting and firebox for obstructions and clean if necessary, inspect the exhaust blower to make sure it runs, or close the hopper lid.
Error Number 2 <i>The exhaust probe senses an abnormal temperature.</i>	The exhaust temperature is above or below the acceptable range. Exhaust Probe Failure Not plugged in Failed component	Inspect and clean the exhaust outlet, firebox, fire pot, and behind the baffles. Inspect the exhaust probe to see if it is securely attached to the side of the exhaust outlet. Plug the probe into the board. Replace the component.
Error Number 3 <i>The ambient probe senses an abnormal temperature.</i>	The ambient temperature is above or below the acceptable range. Ambient Probe Failure Not plugged in Failed component	Plug the probe into the board. Replace the component.
Missed Ignition Error Number 4 <i>During the ignition sequence the load does not ignite. The unit will automatically retry once from the first failed attempt.</i>	Fuel No fuel Hopper Empty Feed Jam Feed doesn't turn Feed motor disconnected or failed Fire pot Fire pot Dirty so fuel is not near ignition hole in the fire pot Igniter No power Debris in the end of the igniter chamber	Fill the hopper Inspect and clear jam in the feed tube Inspect the feed motor circuit (hopper lid must be closed, vacuum switch must be closed (ie exhaust blower on), and feed motor must be plugged in). Clean the fire pot. Check leads and see if the igniter works. Clean the end of the igniter chamber from inside the firebox (removal of the fire pot required for this step).
Error Number 5 Communication Error	The Digital Display is not communicating correctly with the Stove control board.	Inspect the cable for breaks or cuts and check the connection between the Digital Control and Control board. Replace the component.
Error Number 7 Exhaust Over Temperature <i>The exhaust temperature has exceeded the allowable temperature.</i>	Fuel Feed Motor Locked On Non-approved fuel used Convection blower Dirty Failed Installation Installation configuration is tight allowing for limited air circulation around the unit.	If the feed motor does not turn off, replace the control board. Review the fuel being used. Clean Replace Review the installation and move if necessary.

Troubleshooting




? Still having trouble?

Access additional resources at:
pelprostoves.com/troubleshooting



Warranty

 If replacement parts are needed, please note warranty coverage begins on the date of purchase. Retain your original receipt as proof of purchase. The warranty period for covered components is as follows:

Components Covered	Warranty Period (Parts only, Labor not included)
Electrical	1 Year
Steel Parts (excluding fire pot)	5 Years
All replacement parts are covered for remainder of original warranty period or 90 days, whichever is longer	90 Days

Additional terms and limitations apply. See page 30 for complete warranty information.

Support



Please review the “Maintaining Your Stove” and “Troubleshooting” sections in this manual.



Visit pelprostoves.com to access:

- Order replacement parts
- Installation videos
- Troubleshooting videos
- Use and care videos
- Manuals and more

Listings and Certifications



Stove Certification

Series	PPC90/TSC90
Laboratory	OMNI-Test Laboratories, Inc.
Report No.	0061PS093S
Type	Solid Fuel Room Heater/Pellet Fuel Burning Type
Standard	ASTM E2779-10, ASTM E1509-12 and ULC S627-00, Room Heater Pellet Fuel Burning type and (UM) 84-HUD, Mobile Home Approved.



Note

This installation must conform with local codes. In the absence of local codes you must comply with **ASTM E1509-12, ULC S627-00, (UM) 84-HUD**

WARNING!

- It is critical to have a working smoke detector installed in the home of unit operation.
- Smoke alarms that are properly installed and maintained play a vital role in reducing fire deaths and injuries. Having a working smoke alarm reduces the chance of fire related injuries.
- Install at least one carbon monoxide detector on each floor of your home.



WARNING! Asphyxiation Risk. DO NOT INSTALL IN A SLEEPING ROOM. Your Stove consumes oxygen in the room.

Note

This wood stove needs periodic inspection and repair for proper operation. It is against federal regulations to operate this wood heater in a manner inconsistent with operating instructions in this manual.

Mobile Home Approved

This Stove is approved for mobile home Installations **when not installed in a sleeping room and when an outside combustion air inlet is provided.**

- The structural integrity of the mobile home floor, ceiling, and walls must be maintained
- The Stove must be properly grounded to the frame of the mobile home with #8 copper ground wire, and use only listed double-wall connector pipe
- Outside Air Kit provided with each Stove must be installed in a mobile home installation and must remain clear of leaves, debris, ice and/or snow. It must be unrestricted while the Stove is in use to prevent room air starvation which causes smoke spillage.
- The Stove must be secured to the mobile home structure by bolting it to the floor through holes provided at bottom of your cast legs on your Stove.

Listings and Certifications



Glass Specifications

This Stove is equipped with 5mm ceramic glass. Replace glass only with 5mm ceramic glass. Please contact PelPro for replacement glass.

Electrical Rating (On High)

PPC90/TSC90 Series: 115 VAC, 60 Hz, Start 2.6 Amps, Run 0.9 Amps

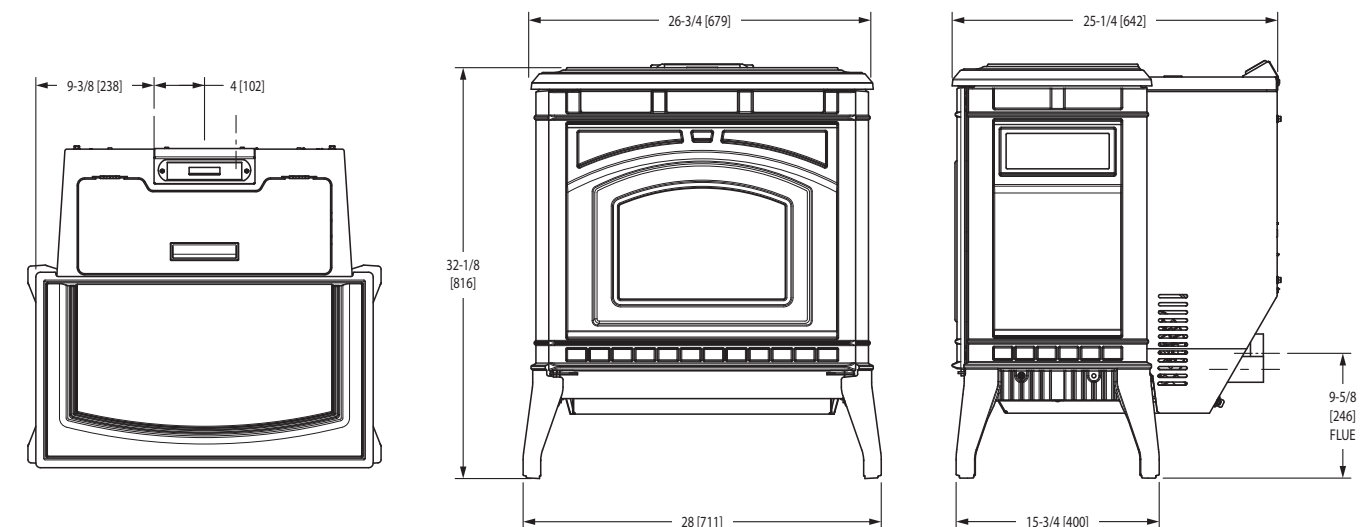
BTU & Efficiency Specifications

Report Number:	0061PS093E
EPA Certification Number:	Number: 52-16
EPA Certified Emissions:	1.11 grams per hour
*LHV Tested Efficiency:	88.0%
**HHV Test Efficiency:	82.3%
***EPA BTU Output:	8,500 to 39,500 / hr
****BTU Input:	11,100 to 47,400 / hr
*****Heating Capacity:	Up to 2,200 sq. ft. depending on climate zone
Vent Size:	3" or 4" L or PL
Hopper Capacity:	90 lbs (Approximate)
Fuel:	Wood pellets
Shipping Weight:	340 lbs



*Weighted average LHV efficiency using data collected during EPA emissions test.
 **Weighted average HHV efficiency using data collected during EPA emissions test.
 ***Maximum BTU output based on HHV efficiency and the high burn section of the EPA emissions test.
 ****Maximum BTU input based on the high burn section of the EPA emissions test.
 *****Heating capacity depends on climate zone, structure layout, insulation, windows, etc.

Stove Dimensions



Listing and Code Approvals

Listing and Code Approvals

Listings and Certifications



Hearth & Home Technologies, Inc. - PelPro Limited Warranty

Hearth & Home Technologies, Inc. (HHT), on behalf of its PelPro brand, extends the following warranty for PelPro Stoves purchased from an authorized retailer.

If you experience issues with your PelPro Stove, Consumer Care is available to assist you with troubleshooting technical issues.

This warranty covers components of the PelPro Stoves as listed in the table below.

Warranty Coverage:

Subject to the table below, HHT warrants to the owner of the PelPro Stove that the Stove will be free from defects in materials and workmanship at the time of manufacture. After installation, if covered components are found to be defective in materials or workmanship during the applicable warranty period, HHT will replace the covered components.

HHT, at its own discretion, may fully discharge all of its obligations under such warranties by replacing the product itself or refunding the verified purchase price of the product itself. The maximum amount recoverable under this warranty is limited to the purchase price of the product. This warranty is subject to conditions, exclusions, and limitations as described below.

Warranty Period:

Warranty coverage begins on the date of original purchase. The warranty period for covered components is as follows:

Components Covered	Warranty Period (Parts only, Labor not included)
Electrical	1 Year
Steel Parts (excluding fire pot)	5 Years
All replacement parts are covered for remainder of original warranty period or 90 days, whichever is longer	90 Days

Parts Service & Returns:

HHT is proud to offer the best technical and sales support in the industry. If you have any questions about how to operate your Stove or if you need service parts, please visit PelProstoves.com.

Warranty Exclusions:

Warranty does not cover damage or breakage due to misuse, improper handling or modifications. There is no warranty on the paint, glass, fire pot, fire brick, or any gaskets, or against damage caused from corrosion. There is no expressed or implied performance warranty on PelPro units as HHT has no control over the installation, operation, cleaning, maintenance, or type of fuel burned.

Some states do not allow exclusion or limitation of incidental or consequential damages, or limitations of implied warranties, so the limitations or exclusions set forth in this limited warranty may not apply to you. This limited warranty gives you specific legal rights and you may have other rights, which vary from state to state. Warranty is void if the PelPro Stove has not been installed, operated, cleaned and maintained in strict accordance with HHT's instructions.

NEITHER HHT NOR THE RETAILER FROM WHO YOU PURCHASED YOUR PELPRO UNIT SHALL BE RESPONSIBLE, LEGALLY OR OTHERWISE, FOR THE INCIDENTAL OR CONSEQUENTIAL DAMAGE TO PROPERTY OR PERSONS RESULTING FROM THE USE OF THIS PRODUCT. ANY WARRANTY IMPLIED BY LAW, INCLUDING BUT NOT LIMITED TO IMPLIED WARRANTIES OF THE MERCHANTABILITY OR FITNESS, SHALL BE LIMITED TO ONE (1) YEAR ON THE BREACH OF THIS WARRANTY OR ANY TYPE OF WARRANTY EXPRESSED OR IMPLIED BY LAW. HHT SHALL IN NO EVENT BE LIABLE FOR ANY SPECIAL, INDIRECT, CONSEQUENTIAL OR OTHER DAMAGES OF ANY NATURE WHATSOEVER IN EXCESS OF THE ORIGINAL PURCHASE PRICE OF THIS PRODUCT. ALL WARRANTIES BY HHT ARE SET FORTH HEREIN AND NO CLAIM SHALL BE MADE AGAINST HHT ON ANY ORAL WARRANTY OR REPRESENTATION.

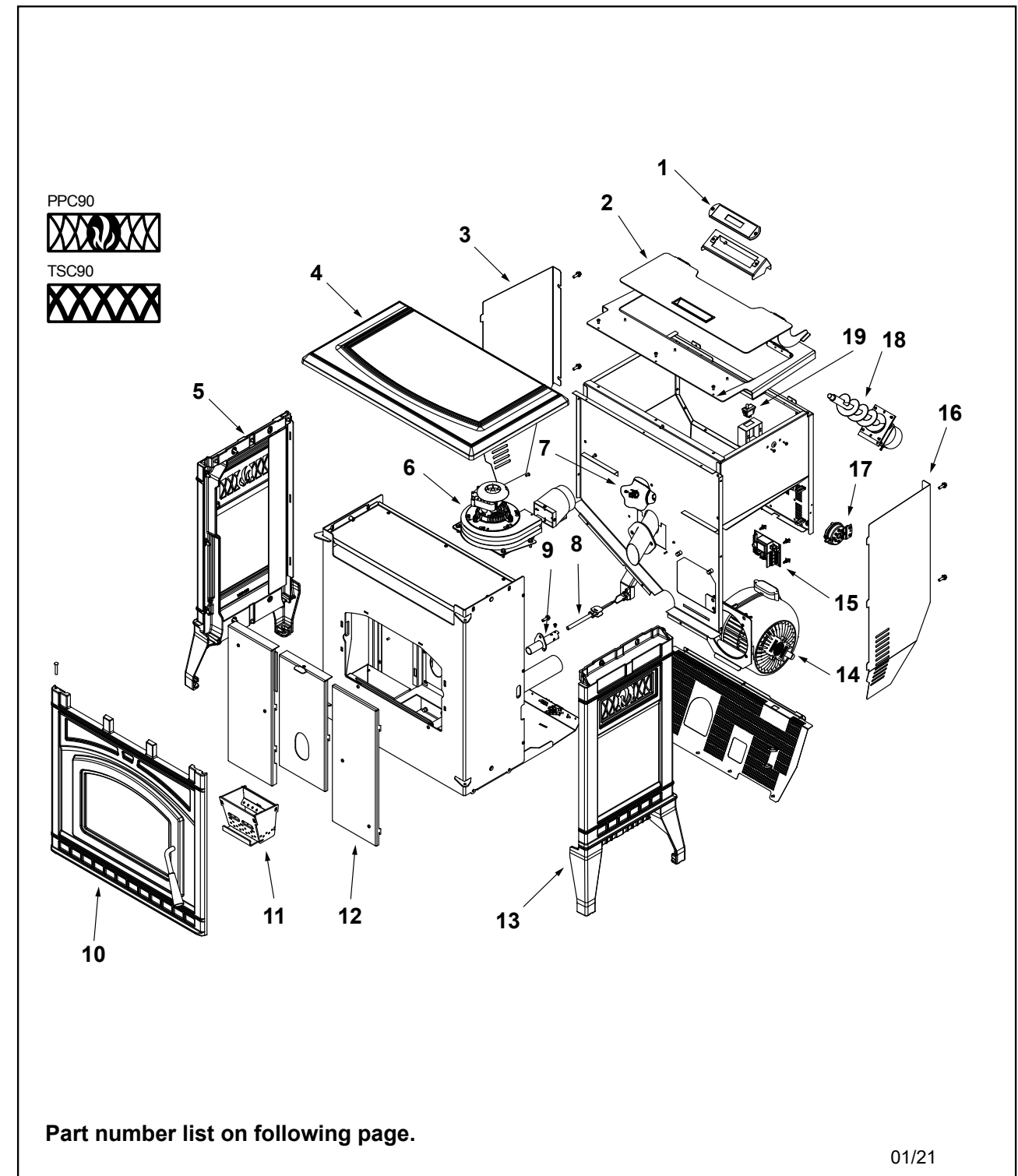
Reference Materials



Service Parts

PPC90/TSC90

Beginning Manufacturing Date: July 2016
Ending Manufacturing Date: Active



Reference Materials



Reference Materials



Service Parts

PPC90/TSC90

Pellet Stove

Beginning Manufacturing Date: July 2016
Ending Manufacturing Date: Active

IMPORTANT: THIS IS DATED INFORMATION. When requesting service or replacement parts for your appliance please provide model number and serial number.



Stocked at Depot

ITEM	DESCRIPTION	COMMENTS	PART NUMBER	
1	Digital Control	Includes cable	SRV7093-036	Y
2	Hopper Lid Assembly		SRV7093-019-1	
3	Side Curtain, Left Hand		SRV7093-154	
4	Cast Top		7093-201MBK	
5	Cast Side Assembly, Left Hand	PPC90	7093-046-1MBK	
		TSC90	7093-046-3MBK	
6	Exhaust Combustion Blower		812-4400	Y
	Gasket, Between Blower Housing and Motor		812-4710	Y
	Gasket, Between Blower Housing and Stove		SRV240-0812	Y
7	Snap Disc Manual Reset		SRV230-0080	Y
8	Igniter Kit		SRV7000-660	
9	Igniter Chamber Kit		SRV7077-110	
10	Face Assembly		See following Pages	
11	Firepot		SRV7077-003	
12	Baffle Kit		SRV7079-006	
13	Cast Side Assembly, Right Hand	PPC90	7093-045-1MBK	
		TSC90	7093-045-3MBK	
14	Convection Blower		KS-5020-1052	
	Convection Blower Brakcet		SRV7081-210	
	Convection Blower Gasket		SRV7081-195	
15	Control Board		SRV7093-050	Y
	Wire Harness		SRV7093-184	Y
16	Side Curtain, Right Hand		SRV7093-153	
17	Vacuum Switch		SRV7000-531	Y
18	Feed Assembly Kit		See following Pages	
19	Hopper Switch		SRV7000-612	Y
	Ambiant Probe		SRV7000-668	
	Ash Bucket Assembly	Pkg of 2	SRV7093-034	
	Component Pack		SRV7093-028-1	
	Exhaust Probe		SRV7000-669	
	Hose, Barb Assembly		SRV229-0920	
	Hose, Vacuum, 5/32 Id	3 Ft	SRV240-0450	Y
	Wire Clip	Pkg of 10	7000-400/10	Y
	Wire Harness		SRV7093-184	
	Wire Harness Thermostat Block		SRV7080-152	

See Following page for additional servcie parts

1/21

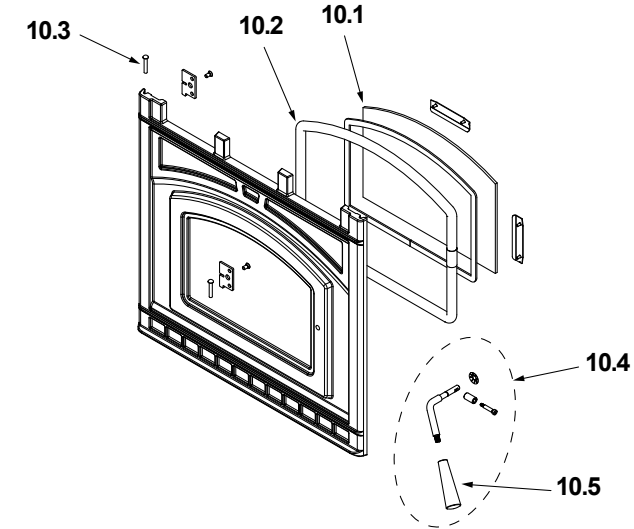


Service Parts

PPC90/TSC90

Beginning Manufacturing Date: July 2016
Ending Manufacturing Date: Active

#10 Door Assembly

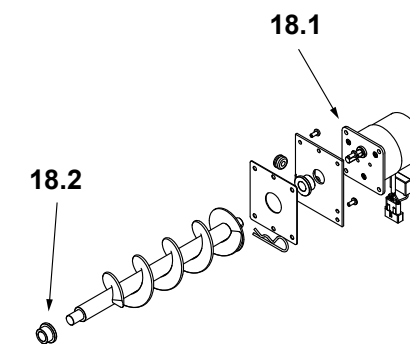


IMPORTANT: THIS IS DATED INFORMATION. When requesting service or replacement parts for your appliance please provide model number and serial number.

Stocked at Depot

ITEM	DESCRIPTION	COMMENTS	PART NUMBER	
10	Face Assembly		7093-041-1MBK	
10.1	Glass Assembly		SRV7093-023	Y
10.2	Rope, Door, 3/4" x 84"		832-1680	Y
10.3	Hinge Pin	Pkg of 2	433-1590/2	
10.4	Door Handle Kit	Includes Black Handle	SRV7093-024	Y
10.5	Handle, Black Phenolic Kit		KS-5140-1442	Y

#18 Feeder Assembly



18	Feed Assembly Kit		SRV7077-014	Y
18.1	Feed Motor		SRV7000-670	Y
18.2	Feed Shaft Bushing	Pkg of 2	7000-600/2	

Reference Materials



We recommend that you record the following information for your heating stove:

Date Purchased / installed: _____
(Attach Proof of Purchase)

Serial Number: _____ Location on Stove: _____

Store Purchased From: _____

Store Location: _____

Maintenance Log:

Lined area for recording maintenance log entries.

Reference Materials



Maintenance Log:

Lined area for recording maintenance log entries.



Model: PPC 90
Hearth & Home Technologies - Colville
1445 North Highway
Colville, WA. 99114

Section 5

Test Data by Run

Date	Time (Hour)	Fuel Loss (lb)	Wt. Left (lb)	Fuel Added (lb)	Stack temp 8'
4/7/2016	0.00	0.00	90.00	90.00	273.35
4/7/2016	1.00	4.40	85.60		266.34
4/7/2016	2.00	4.21	81.39		270.78
4/7/2016	3.00	4.31	77.08		271.03
4/7/2016	4.00	4.24	72.84		271.05
4/7/2016	5.00	4.27	68.57		272.28
4/7/2016	6.00	4.23	64.34		274.30
4/7/2016	7.00	4.11	60.23		265.38
4/7/2016	8.00	4.21	56.02		266.45
4/8/2016	9.00	4.14	51.88		266.78
4/8/2016	10.00	4.09	47.79		263.67
4/8/2016	11.00	4.04	43.75		263.69
4/8/2016	12.00	4.09	39.66		263.79
4/8/2016	13.00	4.20	35.46		253.25
4/8/2016	14.00	4.48	30.98		258.56
4/8/2016	15.00	4.39	26.59		260.30
4/8/2016	16.00	4.24	22.35		258.94
4/8/2016	17.00	4.32	18.03	40.00	260.46
4/8/2016	18.00	4.24	58.03		257.58
4/9/2016	19.00	4.21	53.82		255.16
4/9/2016	20.00	4.22	49.60		257.05
4/9/2016	21.00	4.24	45.36		257.33
4/9/2016	22.00	4.31	41.05		255.70
4/9/2016	23.00	4.08	36.97		253.57
4/9/2016	24.00	3.50	33.47		260.59
4/9/2016	25.00	3.66	29.81		263.26
4/9/2016	26.00	3.98	25.83		264.74
4/10/2016	27.00	4.06	21.77		264.67
4/10/2016	28.00	4.11	17.66		266.43
4/10/2016	29.00	4.11	13.55		258.88
4/10/2016	30.00	4.13	89.42	80.00	258.93
4/10/2016	31.00	4.07	85.35		260.04
4/10/2016	32.00	4.05	81.30		260.15
4/10/2016	33.00	4.08	77.22		261.73
4/10/2016	34.00	3.94	73.28		261.09
4/11/2016	35.00	3.77	69.51		256.47
4/11/2016	36.00	3.59	65.92		256.75
4/11/2016	37.00	4.04	61.88		262.37
4/11/2016	38.00	4.08	57.80		263.56
4/11/2016	39.00	3.97	53.83		260.13
4/11/2016	40.00	4.05	49.78		261.65
4/11/2016	41.00	4.08	45.70		262.37
4/11/2016	42.00	4.06	41.64		259.72
4/12/2016	43.00	4.10	37.54		256.08
4/12/2016	44.00	4.09	33.45		254.27
4/12/2016	45.00	3.95	29.50		250.08
4/12/2016	46.00	3.74	25.76		243.90
4/12/2016	47.00	3.69	22.07		249.12
4/12/2016	48.00	3.64	18.43		245.08
4/12/2016	49.00	3.69	14.74		241.84
4/12/2016	50.00	3.58	11.16		240.43

Model: PPC 90
Hearth & Home Technologies - Colville
1445 North Highway
Colville, WA. 99114

Run 1

Manufacturer: Hearth & Home
 Model: PPC 90
 Tracking No.: 2157
 Project No.: 0061PS093E
 Test Date: 20-Apr-16



ET (min)	Scale (LBS)	Weight Change	Stack (oF)	AMB (oF)	Draft In-H2O	CO2 (%)	CO (%)	
0	41	0	242	75	-0.044	9.55	0	
10	40	-0.997	275	75	-0.049	11.45	0.04	
20	39	-0.976	277	76	-0.05	10.38	0	
30	38	-1.026	283	76	-0.051	12.52	0.69	
40	36.9	-1.062	287	77	-0.052	16.89	4.29	Calibration gas response
50	36	-0.952	281	76	-0.05	11.29	0.11	
60	34.9	-1.054	286	76	-0.052	11.03	0.08	
70	33.9	-1.028	287	78	-0.051	10.46	0.02	

Pellet Heater Test Data - ASTM E2779 / ASTM E2515

Run: 1

Manufacturer: Hearth & Home High Burn End Time: 60
 Model: PPC 90 Medium Burn End Time: 180
 Tracking No.: 2157 Total Sampling Time: 360 min
 Project No.: 0061PS093E Recording Interval: 10 min
 Test Date: 20-Apr-16
 Beginning Clock Time: 10:03 Background Sample Volume: 0 cubic feet

Meter Box Y Factor: 1.001 (1) 1.001 (2) 0 (Amb)

Barometric Pressure: Begin Middle End Average
29.93 29.9 29.9 29.91 "Hg

OMNI Equipment Numbers: 335, 336, 410, 594, 209, 185, 132, 579

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: -0.360 "H2O
 Tunnel Area: 0.19635 ft²
 Pitot Tube Cp: 0.99

Avg. Tunnel Velocity: 18.83 ft/sec.
 Initial Tunnel Flow: 205.4 scfm
 Average Tunnel Flow: 208.6 scfm
 Post-Test Leak Check (1): 0.000 cfm @ 3 in. Hg
 Post-Test Leak Check (2): 0.000 cfm @ 3 in. Hg
 Fuel Moisture: 5.3 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	0.090	0.086	0.066	0.060	0.090	0.088	0.072	0.090
Temp:	96	96	96	96	96	96	96	96	96
	V _{strav} <u>18.93</u> ft/sec		V _{scent} <u>20.41</u> ft/sec		F _p <u>0.928</u>				

Elapsed Time (min)	Particulate Sampling Data												Fuel Weight (lb)		Temperature Data (°F)				Stack Gas Data				
	Gas Meter 1 (ft ³)	Gas Meter 2 (ft ³)	Sample Rate 1 (cfm)	Sample Rate 2 (cfm)	Orifice dH 1 ("H ₂ O)	Meter Temp 1 (°F)	Meter Vacuum 1 ("Hg)	Orifice dH 2 ("H ₂ O)	Meter Temp 2 (°F)	Meter Vacuum 2 ("Hg)	Dilution Tunnel (°F)	Dilution Tunnel Center dP	Pro. Rate 1	Pro. Rate 2	Scale Reading	Weight Change	Stack	Filter 1	Filter 2	Ambient	Draft ("H ₂ O)	CO ₂ (%)	CO (%)
0	0.000	0.000			1.20	79	2.35	0.86	79	1.2	96	0.090			33.9		289	74	75	78	-0.051	12.6	0.17
10	1.612	1.554	0.16	0.16	1.27	80	2.4	1.00	79	1.2	96	0.090	101	101	32.9	-1	281	74	78	78	-0.051	11.1	0.0391
20	3.226	3.132	0.16	0.16	1.28	81	2.5	1.02	81	1.3	96	0.090	101	102	31.9	-1	283	74	79	78	-0.051	12.9	0.527
30	4.835	4.714	0.16	0.16	1.30	83	2.62	1.01	82	1.3	96	0.090	100	102	30.9	-1	285	79	79	78	-0.051	10.9	0.048
40	6.461	6.289	0.16	0.16	1.28	84	2.67	1.01	84	1.4	96	0.090	101	101	29.9	-1	281	79	79	78	-0.050	13.1	0.489
50	8.080	7.862	0.16	0.16	1.28	85	2.67	1.00	85	1.4	95	0.090	101	101	28.9	-1	281	79	79	78	-0.051	11.9	0.391
60	9.714	9.427	0.16	0.16	1.30	86	2.78	0.98	85	1.4	95	0.090	101	100	27.9	-1	285	79	80	79	-0.052	11.5	0.228
70	11.356	10.988	0.16	0.16	1.28	87	2.35	0.98	86	1.4	92	0.090	101	99	27.3	-0.6	244	77	80	79	-0.045	5	0.0065
80	12.982	12.551	0.16	0.16	1.28	87	2.36	0.98	87	1.4	90	0.090	100	99	26.9	-0.4	220	78	79	79	-0.040	5.7	0.0044
90	14.607	14.115	0.16	0.16	1.28	88	2.35	0.98	87	1.4	88	0.090	100	99	26.4	-0.5	215	78	79	78	-0.039	5.6	0.0034
100	16.234	15.679	0.16	0.16	1.28	88	2.36	0.98	87	1.4	88	0.090	100	99	26.0	-0.4	217	78	79	78	-0.038	3.7	0.0152
110	17.861	17.242	0.16	0.16	1.28	88	2.36	0.98	87	1.4	87	0.090	100	99	25.6	-0.4	207	78	79	78	-0.037	4.8	0.0059
120	19.489	18.806	0.16	0.16	1.28	88	2.37	0.98	88	1.4	87	0.090	100	99	25.1	-0.5	207	78	79	78	-0.037	5.6	0.0027
130	21.116	20.370	0.16	0.16	1.28	89	2.37	0.98	88	1.4	89	0.090	100	99	24.7	-0.4	225	78	79	79	-0.040	3.9	0.0238
140	22.745	21.933	0.16	0.16	1.27	89	2.38	0.98	88	1.4	88	0.090	100	99	24.3	-0.4	206	79	79	79	-0.037	5.3	0.0041
150	24.384	23.511	0.16	0.16	1.30	89	2.4	1.00	88	1.5	88	0.090	100	100	23.9	-0.4	205	79	79	79	-0.037	5.6	0.013
160	26.026	25.092	0.16	0.16	1.30	89	2.4	1.00	88	1.5	90	0.090	101	100	23.4	-0.5	213	79	80	80	-0.040	7.7	0.0039
170	27.669	26.671	0.16	0.16	1.31	90	2.41	1.00	89	1.5	90	0.090	101	100	23.0	-0.4	208	80	80	80	-0.037	7.8	0.0037
180	29.312	28.250	0.16	0.16	1.30	90	2.41	1.00	89	1.5	89	0.090	101	100	22.6	-0.4	207	80	80	80	-0.037	3.8	0.0567
190	30.955	29.829	0.16	0.16	1.30	90	2.41	1.00	89	1.5	90	0.090	101	100	22.4	-0.2	198	80	80	81	-0.034	2.1	0.115
200	32.597	31.412	0.16	0.16	1.30	91	2.43	1.03	90	1.5	89	0.090	100	100	22.1	-0.3	185	80	81	81	-0.032	1.7	0.185
210	34.240	33.018	0.16	0.16	1.30	91	2.45	1.02	90	1.5	87	0.090	100	101	21.9	-0.2	175	80	81	80	-0.029	2.1	0.063
220	35.884	34.621	0.16	0.16	1.29	91	2.46	1.03	90	1.5	87	0.090	100	101	21.7	-0.2	174	80	81	80	-0.028	3.3	0.0311
230	37.527	36.224	0.16	0.16	1.29	91	2.47	1.02	90	1.6	87	0.090	100	101	21.5	-0.2	175	80	80	81	-0.029	1.9	0.091
240	39.170	37.825	0.16	0.16	1.30	91	2.48	1.02	90	1.6	87	0.090	100	101	21.2	-0.3	174	80	81	81	-0.028	4.8	0.0119
250	40.813	39.424	0.16	0.16	1.30	92	2.49	1.02	91	1.6	87	0.090	100	100	21.0	-0.2	173	80	81	80	-0.028	2.3	0.079
260	42.457	41.022	0.16	0.16	1.29	92	2.49	1.02	91	1.6	87	0.090	100	100	20.8	-0.2	175	81	81	81	-0.028	1.9	0.188
270	44.087	42.616	0.16	0.16	1.26	92	2.47	1.02	91	1.6	88	0.090	99	100	20.5	-0.3	175	81	81	81	-0.029	2.6	0.0564
280	45.711	44.210	0.16	0.16	1.26	92	2.49	1.01	91	1.6	87	0.090	99	100	20.3	-0.2	172	81	81	81	-0.027	1.9	0.092
290	47.334	45.800	0.16	0.16	1.26	92	2.49	1.00	91	1.6	88	0.090	99	100	20.1	-0.2	173	81	81	81	-0.028	2.5	0.0802
300	48.956	47.388	0.16	0.16	1.26	92	2.5	1.01	91	1.6	88	0.090	99	100	19.8	-0.3	177	81	81	81	-0.029	2	0.0895
310	50.580	48.975	0.16	0.16	1.26	92	2.5	1.01	91	1.6	88	0.090	99	100	19.6	-0.2	176	81	81	81	-0.028	2	0.152
320	52.202	50.559	0.16	0.16	1.26	93	2.52	1.00	92	1.6	88	0.090	99	99	19.4	-0.2	174	81	82	82	-0.028	2.6	0.0575
330	53.825	52.141	0.16	0.16	1.26	93	2.53	0.99	92	1.6	88	0.090	99	99	19.1	-0.3	172	82	82	82	-0.027	1.4	0.092
340	55.448	53.721	0.16	0.16	1.26	93	2.55	0.99	92	1.6	88	0.090	99	99	18.9	-0.2	174	82	82	81	-0.028	2.2	0.102
350	57.070	55.299	0.16	0.16	1.26	93	2.56	0.99	92	1.6	89	0.090	99	99	18.6	-0.3	180	82	82	82	-0.030	3	0.0511

Pellet Heater Test Data - ASTM E2779 / ASTM E2515

Run: 1

Manufacturer: Hearth & Home High Burn End Time: 60
 Model: PPC 90 Medium Burn End Time: 180
 Tracking No.: 2157 Total Sampling Time: 360 min
 Project No.: 0061PS093E Recording Interval: 10 min
 Test Date: 20-Apr-16
 Beginning Clock Time: 10:03 Background Sample Volume: 0 cubic feet

Meter Box Y Factor: 1.001 (1) 1.001 (2) 0 (Amb)

Barometric Pressure: Begin Middle End Average
29.93 29.9 29.9 29.91 "Hg

OMNI Equipment Numbers: 335, 336, 410, 594, 209, 185, 132, 579

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: -0.360 "H2O
 Tunnel Area: 0.19635 ft²
 Pitot Tube Cp: 0.99

Avg. Tunnel Velocity: 18.83 ft/sec.
 Initial Tunnel Flow: 205.4 scfm
 Average Tunnel Flow: 208.6 scfm
 Post-Test Leak Check (1): 0.000 cfm @ 3 in. Hg
 Post-Test Leak Check (2): 0.000 cfm @ 3 in. Hg
 Fuel Moisture: 5.3 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	0.090	0.086	0.066	0.060	0.090	0.088	0.072	0.090
Temp:	96	96	96	96	96	96	96	96	96
	V _{strav} <u>18.93</u> ft/sec			V _{scnt} <u>20.41</u> ft/sec			F _p <u>0.928</u>		

Elapsed Time (min)	Particulate Sampling Data											Fuel Weight (lb)		Temperature Data (°F)				Stack Gas Data					
	Gas Meter 1 (ft ³)	Gas Meter 2 (ft ³)	Sample Rate 1 (cfm)	Sample Rate 2 (cfm)	Orifice dH 1 ("H ₂ O)	Meter Temp 1 (°F)	Meter Vacuum 1 ("Hg)	Orifice dH 2 ("H ₂ O)	Meter Temp 2 (°F)	Meter Vacuum 2 ("Hg)	Dilution Tunnel (°F)	Dilution Tunnel Center dP	Pro. Rate 1	Pro. Rate 2	Scale Reading	Weight Change	Stack	Filter 1	Filter 2	Ambient	Draft ("H ₂ O)	CO ₂ (%)	CO (%)
360	58.692	56.877	0.16	0.16	1.25	93	2.56	0.98	92	1.7	88	0.090	99	99	18.4	-0.2	172	82	82	82	-0.027	2.3	0.0825
Avg/Tot	58.692	56.877	0.16	0.16	1.28	89	/	1.00	88	/	90	0.090	100	100	/	/	/	79	80	80	-0.036	/	/

Pellet Heater Lab Data - ASTM E2779 / ASTM E2515

Manufacturer: <u>Hearth & Home</u>	Equipment Numbers: <u>23, 283A, 592</u>
Model: <u>PPC 90</u>	
Tracking No.: <u>2157</u>	
Project No.: <u>0061PS093E</u>	
Run #: <u>1</u>	
Date: <u>4/20/16</u>	

TRAIN 1 (First Hour emissions)

Sample Component	Reagent	Filter, Probe or Dish #	Weights		
			Final, mg	Tare, mg	Particulate, mg
A. Front filter catch	Filter	C387	122.9	120.2	2.7
B. Rear filter catch	Filter	C390	120.9	121.0	-0.1
C. Probe catch*	Probe	25	114300.4	114300.1	0.3
D. Filter seals catch*	Seals	R400	3302.6	3302.6	0.0

Sub-Total	Total Particulate, mg:	2.9
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TRAIN 1 (Remainder of Test)

Sample Component	Reagent	Filter, Probe or Dish #	Weights		
			Final, mg	Tare, mg	Particulate, mg
A. Front filter catch	Filter	C388	122.5	120.7	1.8
B. Rear filter catch	Filter	C389	121.1	121.1	0.0
C. Probe catch*	Probe	23	114077.5	114077.3	0.2
D. Filter seals catch*	Seals	R399	3333.9	3334.4	0.0

Sub-Total	Total Particulate, mg:	2.0
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Train 1 Aggregate	Total Particulate, mg:	4.9
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TRAIN 2

Sample Component	Reagent	Filter, Probe or Dish #	Weights		
			Final, mg	Tare, mg	Particulate, mg
A. Front filter catch	Filter	C391	125.6	121	4.6
B. Rear filter catch	Filter	C392	119.4	119.6	-0.2
C. Probe catch*	Probe	27	114279.9	114279.4	0.5
D. Filter seals catch*	Seals	R402	4165.2	4165.1	0.1

Total Particulate, mg:	5.0
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AMBIENT

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

Pellet Heater Test Results - ASTM E2779 / ASTM E2515

Manufacturer: Hearth & Home
 Model: PPC 90
 Project No.: 0061PS093E
 Tracking No.: 2157
 Run: 1
 Test Date: 04/20/16

Burn Rate (Composite)	1.11 kg/hr dry
Average Tunnel Temperature	90 degrees F
Average Gas Velocity in Dilution Tunnel - vs	18.83 feet/second
Average Gas Flow Rate in Dilution Tunnel - Qsd	12516.4 dscf/hour
Average Delta p	0.090 inches H2O
Average Delta H	1.28 inches H2O
Total Time of Test	360 minutes

Burn Rate (High)	2.59 kg/hr dry
Burn Rate (Med)	1.14 kg/hr dry 44.2% of High
Burn Rate (Low)	0.60 kg/hr dry 23.3% of High

	AMBIENT	SAMPLE TRAIN 1	SAMPLE TRAIN 2	1 st HR FILTER (TRAIN 1)
Total Sample Volume - Vm	0.000 cubic feet	58.692 cubic feet	56.877 cubic feet	9.714 cubic feet
Average Gas Meter Temperature	80 degrees F	89 degrees F	88 degrees F	89 degrees F
Total Sample Volume (Standard Conditions) - Vmstd	0.000 dscf	56.637 dscf	54.931 dscf	9.374 dscf
Total Particulates - m _n	0 mg	4.9 mg	5 mg	2.9 mg
Particulate Concentration (dry-standard) - C _i /C _s	0.000000 grams/dscf	0.00009 grams/dscf	0.00009 grams/dscf	0.00031 grams/dscf
Total Particulate Emissions - E _T	0.00 grams	6.50 grams	6.84 grams	3.87 grams
Particulate Emission Rate	0.00 grams/hour	1.08 grams/hour	1.14 grams/hour	3.87 grams/hour
Emissions Factor		0.97 g/kg	1.02 g/kg	1.50 g/kg
Difference from Average Total Particulate Emissions		0.17 grams	0.17 grams	
Dual Train Comparison Results Are Acceptable				

FINAL AVERAGE RESULTS

Integrated Test Run	
Total Particulate Emissions - E _T	6.67 grams
Particulate Emission Rate	1.11 grams/hour
Emissions Factor	1.00 grams/kg
Train Precision ≤ 75%	2.5
First Hour Emissions	
Total Particulate Emissions - E _T	3.87 grams
Particulate Emission Rate	3.87 grams/hour
Emissions Factor	1.50 grams/kg

OMNI-Test Laboratories

Manufacturer: Hearth & Home
Model: PPC 90
Date: 04/20/16
Run: 1
Control #: 0061PS093E
Test Duration: 360
Output Category: Integrated

Technicians: *B. W. J.*

Test Results in Accordance with CSA B415.1-09

	HHV Basis	LHV Basis
Overall Efficiency	82.3%	88.0%
Combustion Efficiency	99.2%	99.2%
Heat Transfer Efficiency	83%	88.6%

Output Rate (kJ/h)	17,690	16,781	(Btu/h)
Burn Rate (kg/h)	1.11	2.45	(lb/h)
Input (kJ/h)	21,504	20,399	(Btu/h)

Test Load Weight (dry kg)	6.68	14.73	dry lb
MC wet (%)	5		
MC dry (%)	5.26		
Particulate (g)	5.86		
CO (g)	154		
Test Duration (h)	6.00		

Emissions	Particulate	CO
g/MJ Output	0.06	1.45
g/kg Dry Fuel	0.88	23.08
g/h	0.98	25.70
lb/MM Btu Output	0.13	3.38

Air/Fuel Ratio (A/F)	23.27
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VERSION:

2.2

12/14/2009

ASTM E2779 Pellet Heater Run Sheets

Client: Hearth & Home Project Number: 0061PS093E Run Number: 1
 Model: PPC 90 Tracking Number: 2157 Date: 4/29/16
 Test Crew: B. Davis
 OMNI Equipment ID numbers: 23, 131, 185, 132, 209, 283A, 335, 336, 410, 420, 559, 592
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Pellet Heater Run Notes

Air Control Settings

High Burn Rate Target: 100% @ 0-60 min
 Settings: Power level 5, Trim 4

Medium Burn Rate Target: <50% @ 60 min - 180 min
 Settings: Power level 2, Trim 0

Low Burn Rate Target: Minimum Setting 180-360 minutes
 Settings: Power level 1, Trim -4

Additional Settings Notes:

Preburn Notes

Time	Notes
0	Set to power level 5, Trim 4.

Test Notes

Time	Notes
0	1st hour operated at power level 5, Trim 4.
60	changed control setting to Power level 2, Trim 0.
180	changed control setting to Power level 1, Trim -4.

Pellet Moisture Content: 5.26

Technician Signature: B. Davis Date: 4/29/16

ASTM E2779 Pellet Heater Run Sheets

Client: Hearth & Home Project Number: 0061PS093E Run Number: 1
 Model: PPC 90 Tracking Number: 2157 Date: 4/20/16
 Test Crew: B. Davis
 OMNI Equipment ID numbers: 23, 131, 185, 132, 209, 283A, 335, 336, 410, 420, 559, 592

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Pellet Heater Supplemental Data

Start Time: 10:03 Booth #: E1

Stop Time: 16:03

Stack Gas Leak Check:

Initial: good Final: _____

Sample Train Leak Check:

A: 0.0 @ 3 "Hg
 B: 0.0 @ 3 "Hg

Calibrations: Span Gas CO₂: 16.89 CO: 4.29 / 50 ppm CO

	Pre Test		Post Test	
	Zero	Span	Zero	Span
Time	0929	0929	1604	1604
CO ₂ %	0.00	16.89	0.00	16.79
CO %	0.000	4.29	0.006	4.28

CO ppm 0 57 0 50

Post Test only
 501 ppm CO = 496

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

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

Pitot Tube Leak Test: Initial: good Final: good

Stack Diameter (in): 6" w/ 3 to 6" Adaptor

Induced Draft: 0.0

% Smoke Capture: 100%

Flue Pipe Cleaned Prior to First Test in Series:

Date: 4/19/16 Initials: BA

	Initial	Middle	Ending
P _b (in/Hg)	29.93	29.90	29.50
Ambient (°F)	78	78	81

Tunnel Traverse		
Microtector Reading	dP (in H ₂ O)	T(°F)
1	0.36	99
2	0.44	99
3	0.42	99
4	0.36	99
5	0.57	99
6	0.42	99
7	0.46	99
8	0.38	99
Center: <u>top half of flow</u>		
1	0.46	
Static:		
	-0.19	

.60 96
 .090 96
 .086 96
 .066 96
 .060 96
 .090 96
 .088 96
 .072 96
 .090
 .080 96
 -.86

Background Filter Volume: NA

205.5

Technician Signature: BD

Date: 4/26/16



Test Instruction Recommendations: PPC 90/PHC 90/TSC 90

Created on/by: 04/14/16; C. Winslow Howe – HHT Design Engineer

Purpose: To alleviate excessive testing by providing heat output settings to the test agency.

History: HHT ran a series of tests to determine the optimal setting to achieve burn rates required for emissions testing.

Note: Due to the nature of the unit's programming, the unit's heat output is determined by the difference between a set temperature (chosen by the user) and the unit's ambient probe. This causes problems for testing as the ambient probe must be kept at a certain temp during the duration of the test to achieve the burn rates laid out in the standard. To remedy this problem, the ambient probe on this unit has been disabled and unit itself has been set up to run in a discrete setting which it will maintain a heat setting based on the user interface. It must be mentioned that the feed motor and blower parameters of the unit have **not** been changed by this process.

Note: Settings for PPC 90/PHC 90/TSC 90 are controlled by the user interface located on the top of the hopper. Power level is set at the main screen using the arrow buttons. Trim is set in the options menu. To access options hold the "set" button. Press the "set" button to scroll through options to reach trim. Set trim using the arrow buttons. Press "set" to finalize trim, and repeatedly press "set" to scroll back to the main screen.

Optimum Settings:

1. High Setting: Power level 5, Trim 4
2. Medium Setting: Power Level 2, Trim 0
3. Low setting: Power Level 1, Trim -4

Photos:



High Setting



Medium Setting



Low Setting

Model: PPC 90
Hearth & Home Technologies - Colville
1445 North Highway
Colville, WA. 99114

Appendix A

Revision History

Date	Project No.	Tech. & Evaluator	Report Sect.	Summary of Changes
5/9/16	0061PS093E	Bruce Davis	All	Original report generated.
4/20/21	0061PS093E Edition 001	Bruce Davis	Cover	Report revision date and edition number added.
			Preface	Signatories and table of content edited for new addition.
			1	Emission limit and certification dates changed to reflect 2020 requirements in Sampling Procedure. Summary of results edited to show negative filter weight discussion and added narrative on sampling appropriateness and validity.
			4	Updated manual and label replaced previous version.
			5	Conditioning data was updated on page 82. Train precision added to results page for run 1 on page 88.
			Appendix A	Revision history table added.