# Innovative Hearth Products, LLC

Project # 19-510
Model: Winslow PI40GL
AKA: Winslow PS40GL
Type: Pellet-Fired Room Heater
November 5, 2019
Revised: September 18, 2024

**ASTM E2779 Standard Test Method for Determining Particulate Matter Emissions from Pellet Heaters**

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# Revision History

-November 5, 2019 – Original Issue

-June 16, 2023 – The following revisions were made per a request from EPA:

-Added clarification that conditioning was performed at a medium heat setting by the manufacturer in both the notes section and in the conditioning data found in appendix A, see pages 5 and 19 of the non-CBI report.

-Added laboratory technician notes to Appendix A, see page 54 of the non-CBI report.

-Replaced manual in Appendix B with an updated manual removing language regarding use of alternative fuels.

-Added train precision as a percentage data to the results page in Appendix A, see page 22 of the non-CBI report.

-September 18, 2024 - The following revisions were made per a request from EPA:

-Added analytical balance audit data to Appendix A - See page 53 of Non-CBI

-Added note on page 6 clarifying that NWS data was used for barometric pressure readings, not a local barometer.

# Contents

# Affidavit

PFS-TECO was contracted by Innovative Hearth Products, LLC. (IHP) to provide testing services for the Winslow PI40GL Pellet-Fired Room Heater per ASTM E2779, *Determining PM Emissions from Pellet Heaters*. All testing and associated procedures were conducted at PFS-TECO's Portland Laboratory on 8/16/2019. PFS-TECO's Portland Laboratory is located at 11785 SE Highway 212 – Suite 305, Clackamas, Oregon 97015. Testing procedures followed ASTM E2779. Particulate sampling was performed per ASTM E2515, *Standard Test Method for Determination of Particulate Matter Emissions Collected by a Dilution Tunnel.*

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

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

Aaron Kravitz, Testing Supervisor

# Introduction

IHP of Auburn, WA, contracted with PFS-TECO to perform EPA certification testing on Winslow Pellet-Fired Room Heater. All testing was performed at PFS-TECO's Portland Laboratory. Testing was performed by Mr. Aaron Kravitz.

## Notes

- Prior to start of testing, 50 hours of conditioning was performed by the manufacturer at a medium heat setting, per ASTM E2779
- Prior to start of testing, the dilution tunnel was cleaned with a steel brush.
- Front filters were changed on sample train A at one hour after the test began.
- A single, integrated test run, in accordance with ASTM E2779 was performed:
    - 1 Hour at Maximum Burn Setting
    - 2 Hours at Medium Burn Setting (Defined as <50% of Maximum Burn Rate)
    - 3 Hours at Minimum Burn Setting

# Pellet Heater Identification and Testing

- Appliance Tested: **Winslow PI40GL**
- Serial Number: ***N/A – Prototype Unit; PFS Tracking Number 0036***
- Manufacturer*:* ***Innovative Hearth Products, LLC***
- Catalyst: ***No***
- Heat exchange blower: ***Integral***
- Type: ***Pellet Stove***
- Style: ***Insert or Freestanding***
- Date Received: ***Friday, August 16, 2019***
- Wood Heater Aging: ***August 13-15, 2019***
- Testing Period – Start: ***Friday, August 16, 2019*** Finish: ***Friday, August 16, 2019***
- Test Location: ***PFS-TECO Portland Laboratory, 11785 SE HWY 212 - Suite 305, Clackamas, OR 97015***
- Elevation: ***≈131 Feet above sea level***
- Test Technician(s): ***Aaron Kravitz***
- Observers: ***C. Winslow Howe***

# Test Procedures and Equipment

All Sampling and analytical procedures were performed by Aaron Kravtiz. All procedures used are directly from ASTM E2779 and ASTM E2515. See the list below for equipment used. See Appendix C submitted with this report for calibration data.

Equipment List:

| Equipment ID# | Equipment Description |
|---|---|
| 041 | Rice Lake 3'x3' floor scale w/digital weight indicator |
| 053 | APEX XC-60 Digital Emissions Sampling Box A |
| 054 | APEX XC-60 Digital Emissions Sampling Box B |
| 055 | APEX Ambient sampling box |
| 057 | California Analytical ZRE CO2/CO/O2 IR ANALYZER |
| 109A/B | Troemner 100mg/200mg Audit Weights |
| 107 | Sartorius Analytical Balance |
| 051 | 10 lb audit weight |
| 095 | Anemometer |
| 111 | Microtector |
| CC144992 | Gas Analyzer Calibration Span Gas |
| CC332147 | Gas Analyzer Calibration Mid Gas |
| 090 | Dewalt Tape Measure |

Barometric pressure data was taken from local National Weather Service station KPDX. As PFS and KPDX are at the same altitude, the correction for altitude per ASTM E2515 6.1.2 is 1:1.

# Results

The integrated test run emission rate for test Run 1 was measured to be **1.47 g/hr** with a Higher Heating Values efficiency of **65.2%** and a CO emission rate of **0.34 g/min.** The calculated first hour particulate emission rate was **1.67 g/hr.** The IHP model Winslow Pellet-Fired Room Heater meets the 2020 PM emission standard of ≤ 2.0 g/hr per CFR 40 part 60, §60.532 (b).

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

## Summary Table

**EPA Application Table**

| Run Number | Date | Segments | | Run Time (min) | Heat Output (BTU/hr) | 1st Hr Emissions (g/hr) | Integrated Total (g/hr) | CO Emissions (g/min) | Overall CO Emissions (g/min) | Heating Efficiency (%HHV) | Overall Heating Efficiency (%HHV) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Setting | BR | | | | | | | | |
| 1 | 8/16/2019 | H | 2.27 | 60 | 30916 | 1.67 | 1.47 | 0.24 | 0.34 | 73.2% | 65.2% |
| | | M | 0.97 | 120 | 10817 | | | 0.35 | | 60.1% | |
| | | L | 0.79 | 180 | 8949 | | | 0.35 | | 61.3% | |
| | | OA | 1.09 | 360 | 13257 | | | 0.34 | | 65.2% | |

## Test Run Narrative

### *Run 1*

Run 1 was performed on 8/16/2016 as an attempted integrated test run per ASTM E2779. The overall test duration was 360 minutes. The particulate emissions rate for the integrated test run was 1.47 g/hr. The run had an overall HHV efficiency of 65.2%. The train A front filter was changed at 1 hr. All test results were appropriate and valid and the burn rate requirement for the integrated test run were achieved. There were no anomalies and all criteria were met.

# Test Conditions Summary

Testing conditions for all runs fell within allowable specifications of ASTM E2779 and ASTM E2515. A summary of facility conditions, fuel burned, and run times is listed below.

| Runs | Ambient (°F) | | Relative Humidity (%) | | Average Barometric Pressure (In. Hg.) | Preburn Fuel Weight (lbs) | Test Fuel Weight (lbs) | Test Fuel Moisture (%DB) | Test Run Time (Min) |
|---|---|---|---|---|---|---|---|---|---|
| | Pre | Post | Pre | Post | | | | | |
| 1 | 72 | 76 | 40.3 | 29.6 | 30.14 | 5.5 | 15.6 | 7.75 | 360 |

## Appliance Operation and Test Settings

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

## Settings & Run Notes

| | Pre-Burn | Test Run |
|---|---|---|
| **Run 1** | Heat Setting #5 | High Segment: Max Heat Setting, damper fully open<br>Medium Segment: Heat Setting #2, damper fully open<br>Low Segment: Heat Setting #1, damper fully closed |

# Appliance Description

**Model(s):** Winslow PI40GL, Winslow PS40GL

**Additional Models Discussion:** The two available variants of the Winslow are a freestanding model (the PS40GL) and a fireplace insert (the PI40GL). The two variants are identical in all respects that may affect emissions performance, and only differ in their outer frame geometry. See Appendix D for details.

**Appliance Type:** Pellet-Fired Room Heater

**Air Introduction System:** Air enters the burn chamber by being pulled though the firepot, via the exhaust blower, see air flow diagram in Appendix D.

**Combustion Control:** Feed rate is electronically controlled via user-selectable controls.

**Baffles**: N/A

**Flue Outlet:** 3-inch exhaust outlet located on the bottom rear of the appliance.

## Appliance Dimensions

Winslow Dimensions

| Height | Width | Depth | Firebox Volume |
|---|---|---|---|
| 22 | 22 | 30 | N/A – Pellet Stove |

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

## Appliance Front

## Appliance Left

## Appliance Right

## Appliance Rear

# Test Fuel Properties


Test fuel used was purHeat Wood Pellet Fuel, a PFI Certified Premium Pellet Brand. A sample of pellets was sent to Twin Ports Testing for analysis, see report below.

## Pellet Fuel Analysis

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

### Analytical Test Report

Report No: USR:W218-0433-01
Issue No: 1

Client: PFS-TECO
11785 SE Hwy 212
Clackamas, OR 97015
Attention: Sebastian Button

PO No:

Signed: Katy Mickelson
Katy Mickelson
Senior Chemist
Date of Issue: 5/11/2018



**Sample Details**

| | | | |
|---|---|---|---|
| Sample Log No: | W218-0433-01 | Sample Date: | |
| Sample Designation: | purHeat Hardwood Pellets | Sample Time: | |
| Sample Recognized As: | Wood Pellets | Arrival Date: | 5/7/2018 |

**Test Results**

| | METHOD | UNITS | MOISTURE FREE | AS RECEIVED |
|---|---|---|---|---|
| Moisture Total | ASTM E871 | wt. % | | 5.64 |
| Ash | ASTM D1102 | wt. % | 0.50 | 0.47 |
| Volatile Matter | ASTM D3175 | wt. % | | |
| Fixed Carbon by Difference | ASTM D3172 | wt. % | | |
| Sulfur | ASTM D4239 | wt. % | 0.014 | 0.013 |
| $SO_2$ | Calculated | lb/mmbtu | | 0.033 |
| Net Cal. Value at Const. Pressure | ISO 1928 | GJ/tonne | 18.30 | 17.13 |
| Net Cal. Value at Const. Pressure | ISO 1928 | J/g | 18298 | 17129 |
| Gross Cal. Value at Const. Vol. | ASTM E711 | J/g | 19586 | 18482 |
| Gross Cal. Value at Const. Vol. | ASTM E711 | Btu/lb | 8421 | 7946 |
| Carbon | ASTM D5373 | wt. % | 49.37 | 46.59 |
| Hydrogen* | ASTM D5373 | wt. % | 5.91 | 5.57 |
| Nitrogen | ASTM D5373 | wt. % | < 0.20 | < 0.19 |
| Oxygen* | ASTM D3176 | wt. % | > 44.01 | > 41.52 |
| 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 | | |

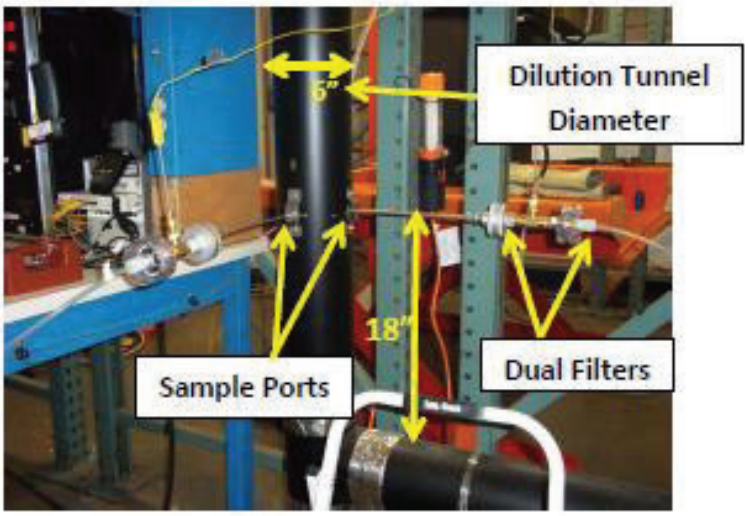
*Note: As received values do not include hydrogen and oxygen in the total moisture.

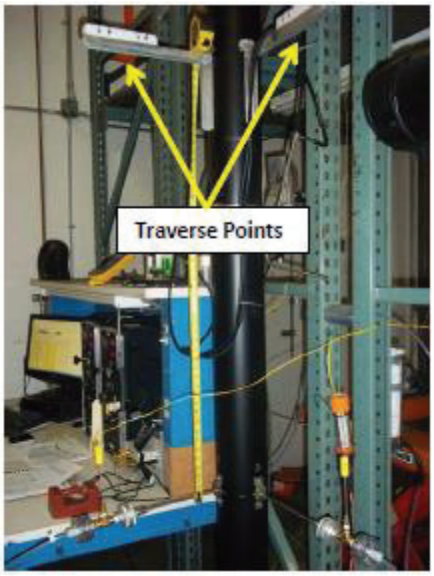
**Comments**

# Sampling Locations and Descriptions

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

## Sample Points



# Sampling Methods

ASTM E2515 was used in collecting particulate samples. The dilution tunnel is 6 inches in diameter. All sampling conditions per ASTM E2515 were followed. No alternate procedures were used.

# Analytical Methods Description

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

# Calibration, Quality Control and Assurances

Calibration procedures and results were conducted per EPA Method 28R, ASTM E2515-11 and ASTM E2780-10. Test method quality control procedures (leak checks, volume meter checks, stratification checks, proportionality results) followed the procedures outlined.

# Appliance Sealing and Storage

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

## Sealing Label

**ATTENTION:**

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

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

**REPORT #**_____ **DATE SEALED**_____

**MANUFACTURER**_____ **MODEL #**_____

## Sealed Unit

# List of Appendices

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

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

Appendix B – Labels and Manuals

Appendix C –Equipment Calibration Records

Appendix D – Design Drawings (CBI Report Only)

Appendix E – Manufacturer QAP (CBI Report Only)

Conditioning Data performed at
Medium Combustion Air Setting

| Hour | Weight | Flue temp |
|---|---|---|
| 0 | 22.0 | 370 |
| 1 | 17.2 | 365 |
| 2 | 14.8 | 280 |
| 3 | 12.3 | 280 |
| 4 | 10.8 | 216 |
| 5 | 9.3 | 212 |
| 6 | 7.7 | 219 |
| 7 | 24.7 | 361 |
| 8 | 19.9 | 366 |
| 9 | 17.8 | 260 |
| 10 | 15.9 | 234 |
| 11 | 14.5 | 217 |
| 12 | 12.9 | 215 |
| 13 | 11.3 | 215 |
| 14 | 22.3 | 354 |
| 15 | 17.6 | 360 |
| 16 | 15.8 | 240 |
| 17 | 13.7 | 249 |
| 18 | 12.2 | 222 |
| 19 | 10.7 | 210 |
| 20 | 9.2 | 214 |
| 21 | 22.6 | 349 |
| 22 | 17.8 | 355 |
| 23 | 15.9 | 239 |
| 24 | 13.9 | 247 |
| 25 | 12.3 | 217 |
| 26 | 10.9 | 202 |
| 27 | 9.3 | 222 |
| 28 | 21.8 | 357 |
| 29 | 17.1 | 365 |
| 30 | 14.7 | 267 |
| 31 | 12.2 | 260 |
| 32 | 10.6 | 216 |
| 33 | 9.1 | 210 |
| 34 | 7.6 | 208 |
| 35 | 21.9 | 341 |
| 36 | 17.2 | 358 |
| 37 | 15.1 | 251 |
| 38 | 13.1 | 255 |
| 39 | 11.6 | 217 |
| 40 | 10.1 | 211 |
| 41 | 8.5 | 222 |
| 42 | 28.2 | 363 |
| 43 | 23.5 | 367 |
| 44 | 21.5 | 244 |
| 45 | 19.4 | 259 |

| | | |
|---|---|---|
| 46 | 17.9 | 215 |
| 47 | 16.4 | 212 |
| 48 | 14.8 | 208 |
| 49 | 17.9 | 361 |
| 50 | 13.2 | 363 |

# PELLET TEST DATA PACKET
# ASTM E2779/E2515

## Run 1 Data Summary

Client: IHP
Model: Winslow
Job #: 19-510
Tracking #: N/A
Test Date: 8/16/2019

Techician Signature

9/17/2019
Date

# TEST RESULTS - ASTM E2779 / ASTM E2515

Client: IHP
Model: Winslow
Run #: 1

Job #: 19-510
Tracking #: N/A
Technician: AK
Date: 8/16/2019

| Burn Rate Summary | | |
|---|---|---|
| High Burn Rate (dry kg/hr) | 2.27 | |
| Medium Burn Rate (dry kg/hr) | 0.97 | 42.6% of High Burn Rate |
| Low Burn Rate (dry kg/hr) | 0.79 | 34.6% of High Burn Rate |
| Overall Burn Rate (dry kg/hr) | 1.09 | |

| | Ambient Sample | Sample Train A | Sample Train B | 1st Hour Filter |
|---|---|---|---|---|
| Total Sample Volume ($ft^3$) | 0.000 | 53.227 | 51.741 | 8.567 |
| Average Gas Velocity in Dilution Tunnel (ft/sec) | 17.9 | | | |
| Average Gas Flow Rate in Dilution Tunnel (dscf/hr) | 11696.2 | | | |
| Average Gas Meter Temperature (°F) | 73.7 | 95.6 | 94.0 | 82.7 |
| Total Sample Volume (dscf) | 0.000 | 51.160 | 49.714 | 8.427 |
| Average Tunnel Temperature (°F) | 102.6 | | | |
| Total Time of Test (min) | 360 | | | |
| Total Particulate Catch (mg) | 0.0 | 7.1 | 5.6 | 1.2 |
| Particulate Concentration, dry-standard (g/dscf) | 0.0000000 | 0.0001388 | 0.0001126 | 0.0001424 |
| Total PM Emissions (g) | 0.00 | 9.74 | 7.91 | 1.67 |
| Particulate Emission Rate (g/hr) | 0.00 | 1.62 | 1.32 | 1.67 |
| Emissions Factor (g/kg) | - | 1.48 | 1.20 | 0.73 |
| Difference from Average Total Particulate Emissions (g) | - | 0.92 | 0.92 | - |
| Difference from Average Total Particulate Emissions (%) | - | 10.4% | 10.4% | - |
| Difference from Average Emissions Factor (g/kg) | - | 0.14 | 0.14 | - |

| Final Average Results | |
|---|---|
| Total Particulate Emissions (g) | 8.82 |
| Particulate Emission Rate (g/hr) | 1.47 |
| Emissions Factor (g/kg) | 1.34 |
| HHV Efficiency (%) | 65.2% |
| LHV Efficiency (%) | 69.8% |
| CO Emissions (g/min) | 0.34 |

| Quality Checks | Requirement | Observed | Result |
|---|---|---|---|
| Dual Train Precision | Each train within 7.5% of average emissions (in grams), or emission factors within 0.5 g/kg | See Above | OK |
| Filter Temps | <90 °F | 82 | OK |
| Face Velocity | < 30 ft/min | 8.2 | OK |
| Leakage Rate | Less than 4% of average sample rate | 0.002 cfm | OK |
| Ambient Temp | 55-90 °F | Min: 71 / Max: 76 | OK |
| Negative Probe Weight Evaluation | <5% of Total Catch | Probe Catch Not Negative | OK |
| Pro-Rate Variation | 90% of readings between 90-110%; none greater than 120% or less than 80% | See Data Tabs | OK |
| Medium Burn Rate | < 50% of High | 42.6% | OK |

# Overall Pellet Test Efficiency Results

**Manufacturer:** IHP
**Model:** Winslow
**Date:** 08/16/19
**Run:** 1
**Control #:** 19-510
**Test Duration:** 360
**Output Category:** Integrated

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

| | HHV Basis | LHV Basis |
|---|---|---|
| **Overall Efficiency** | 65.2% | 69.8% |
| **Combustion Efficiency** | 99.5% | 99.5% |
| **Heat Transfer Efficiency** | 65.5% | 70.2% |

| | | | |
|---|---|---|---|
| **Output Rate (kJ/h)** | 13,975 | 13,257 | **(Btu/h)** |
| **Burn Rate (kg/h)** | 1.09 | 2.41 | **(lb/h)** |
| **Input (kJ/h)** | 21,435 | 20,333 | **(Btu/h)** |

| | | | |
|---|---|---|---|
| **Test Load Weight (dry kg)** | 6.57 | 14.48 | **dry lb** |
| **MC wet (%)** | 7.19 | | |
| **MC dry (%)** | 7.75 | | |
| **Particulate (g )** | 8.82 | | |
| **CO (g)** | 121 | | |
| **Test Duration (h)** | 6.00 | | |

| Emissions | Particulate | CO |
|---|---|---|
| **g/MJ Output** | 0.11 | 1.44 |
| **g/kg Dry Fuel** | 1.34 | 18.38 |
| **g/h** | 1.47 | 20.12 |
| **g/min** | 0.02 | 0.34 |
| **lb/MM Btu Output** | 0.24 | 3.35 |

| | |
|---|---|
| **Air/Fuel Ratio (A/F)** | 33.75 |

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

# Max Burn Rate Segment Efficiency Results

**Manufacturer:** IHP
**Model:** Winslow
**Date:** 08/16/19
**Run:** 1
**Control #:** 19-510
**Test Duration:** 60
**Output Category:** Maximum

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

| | HHV Basis | LHV Basis |
|---|---|---|
| **Overall Efficiency** | 73.2% | 78.4% |
| **Combustion Efficiency** | 99.5% | 99.5% |
| **Heat Transfer Efficiency** | 73.6% | 78.8% |

| | | | |
|---|---|---|---|
| **Output Rate (kJ/h)** | 32,591 | 30,916 | **(Btu/h)** |
| **Burn Rate (kg/h)** | 2.27 | 5.01 | **(lb/h)** |
| **Input (kJ/h)** | 44,519 | 42,231 | **(Btu/h)** |

| | | | |
|---|---|---|---|
| **Test Load Weight (dry kg)** | 2.27 | 5.01 | **dry lb** |
| **MC wet (%)** | 7.19 | | |
| **MC dry (%)** | 7.75 | | |
| **Particulate (g )** | N/A | | |
| **CO (g)** | 14 | | |
| **Test Duration (h)** | 1.00 | | |

| **Emissions** | **Particulate** | **CO** |
|---|---|---|
| **g/MJ Output** | N/A | 0.44 |
| **g/kg Dry Fuel** | N/A | 6.28 |
| **g/h** | N/A | 14.28 |
| **g/min** | N/A | 0.24 |
| **lb/MM Btu Output** | N/A | 1.02 |

| | |
|---|---|
| **Air/Fuel Ratio (A/F)** | 15.41 |

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

# Medium Burn Rate Segment Efficiency Results

**Manufacturer:** IHP
**Model:** Winslow
**Date:** 08/16/19
**Run:** 1
**Control #:** 19-510
**Test Duration:** 120
**Output Category:** Medium

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

| | HHV Basis | LHV Basis |
|---|---|---|
| **Overall Efficiency** | 60.1% | 64.4% |
| **Combustion Efficiency** | 99.5% | 99.5% |
| **Heat Transfer Efficiency** | 60.4% | 64.7% |

| | | | |
|---|---|---|---|
| **Output Rate (kJ/h)** | 11,403 | 10,817 | **(Btu/h)** |
| **Burn Rate (kg/h)** | 0.97 | 2.13 | **(lb/h)** |
| **Input (kJ/h)** | 18,962 | 17,987 | **(Btu/h)** |

| | | | |
|---|---|---|---|
| **Test Load Weight (dry kg)** | 1.94 | 4.27 | **dry lb** |
| **MC wet (%)** | 7.19 | | |
| **MC dry (%)** | 7.75 | | |
| **Particulate (g )** | N/A | | |
| **CO (g)** | 43 | | |
| **Test Duration (h)** | 2.00 | | |

| Emissions | Particulate | CO |
|---|---|---|
| **g/MJ Output** | N/A | 1.87 |
| **g/kg Dry Fuel** | N/A | 21.97 |
| **g/h** | N/A | 21.27 |
| **g/min** | N/A | 0.35 |
| **lb/MM Btu Output** | N/A | 4.34 |

| | |
|---|---|
| **Air/Fuel Ratio (A/F)** | 39.82 |

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

# Minimum Burn Rate Segment Efficiency Results

**Manufacturer:** IHP
**Model:** Winslow
**Date:** 08/16/19
**Run:** 1
**Control #:** 19-510
**Test Duration:** 180
**Output Category:** Minimum

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

| | HHV Basis | LHV Basis |
|---|---|---|
| **Overall Efficiency** | 61.3% | 65.6% |
| **Combustion Efficiency** | 99.5% | 99.5% |
| **Heat Transfer Efficiency** | 61.6% | 66.0% |

| | | | |
|---|---|---|---|
| **Output Rate (kJ/h)** | 9,434 | 8,949 | **(Btu/h)** |
| **Burn Rate (kg/h)** | 0.79 | 1.73 | **(lb/h)** |
| **Input (kJ/h)** | 15,389 | 14,598 | **(Btu/h)** |

| | | | |
|---|---|---|---|
| **Test Load Weight (dry kg)** | 2.36 | 5.20 | **dry lb** |
| **MC wet (%)** | 7.19 | | |
| **MC dry (%)** | 7.75 | | |
| **Particulate (g )** | N/A | | |
| **CO (g)** | 63 | | |
| **Test Duration (h)** | 3.00 | | |

| Emissions | Particulate | CO |
|---|---|---|
| **g/MJ Output** | N/A | 2.21 |
| **g/kg Dry Fuel** | N/A | 26.53 |
| **g/h** | N/A | 20.85 |
| **g/min** | N/A | 0.35 |
| **lb/MM Btu Output** | N/A | 5.14 |

| | |
|---|---|
| **Air/Fuel Ratio (A/F)** | 47.74 |

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

# DILUTION TUNNEL & MISC. DATA - ASTM E2779 / E2515

| | | | |
|---|---|---|---|
| Client: | IHP | Job #: | 19-510 |
| Model: | Winslow | Tracking #: | N/A |
| Run #: | 1 | Technician: | AK |
| Test Start Time: | 9:13 | Date: | 8/16/2019 |

| | |
|---|---|
| High Burn End Time (min): | 60 |
| Medium Burn End Time (min): | 180 |
| Total Sampling Time (min): | 360 |
| Recording Interval (min): | 1 |

| | | |
|---|---|---|
| Meter Box γ Factor: | 0.999 | (A) |
| Meter Box γ Factor: | 0.996 | (B) |
| Meter Box γ Factor: | 0.992 | (Ambient) |

| | | | |
|---|---|---|---|
| Induced Draft Check (in. $H_2O$): | 0 | | |
| Smoke Capture Check (%): | 100% | | |
| Date Flue Pipe Last Cleaned: | 8/16/2019 | | |
| | **Pre-Test** | **Post Test** | **Avg.** |
| Barometric Pressure (in. Hg) | 30.14 | 30.14 | 30.14 |
| Relative Humidity (%) | 40.3 | 29.6 | |
| Room Air Velocity (ft/min) | 0 | 0 | |
| Scale Audit (lbs) | 10.0 | 10.0 | |
| Ambient Sample Volume: | | | $ft^3$ |

**Sample Train Post-Test Leak Checks**

| | | | | |
|---|---|---|---|---|
| (A) | 0.000 | cfm @ | -11 | in. Hg |
| (B) | 0.002 | cfm @ | -9 | in. Hg |
| (Ambient) | N/A | cfm @ | | in. Hg |

## DILUTION TUNNEL FLOW

**Traverse Data**

| Point | dP (in $H_2O$) | Temp (°F) |
|---|---|---|
| 1 | 0.052 | 112 |
| 2 | 0.072 | 112 |
| 3 | 0.070 | 112 |
| 4 | 0.048 | 112 |
| 5 | 0.052 | 112 |
| 6 | 0.074 | 112 |
| 7 | 0.076 | 112 |
| 8 | 0.054 | 112 |
| Center | 0.080 | 112 |

**Static Pressure:** -0.022 in. $H_2O$

| | | |
|---|---|---|
| Dilution Tunnel $H_2O$: | 2.00 | percent |
| Tunnel Diameter: | 6 | inches |
| Pitot Tube Cp: | 0.99 | [unitless] |
| Dilution Tunnel MW(dry): | 29.00 | lb/lb-mole |
| Dilution Tunnel MW(wet): | 28.78 | lb/lb-mole |
| Tunnel Area: | 0.1963 | $ft^2$ |
| $V_{strav}$: | 17.34 | ft/sec |
| $V_{scent}$: | 19.44 | ft/sec |
| $F_p$: | 0.892 | [ratio] |
| Initial Tunnel Flow: | 183.4 | scf/min |

## TEST FUEL PROPERTIES

**Default Fuel Values**

| Fuel Type: | D. Fir | Oak |
|---|---|---|
| HHV (kJ/kg) | 19,810 | 19,887 |
| %C | 48.73 | 50 |
| %H | 6.87 | 6.6 |
| %O | 43.9 | 42.9 |
| %Ash | 0.5 | 0.5 |

**Actual Fuel Used Properties**

| | |
|---|---|
| Pellet Brand: | Purheat |
| Pellet Fuel Grade: | PFI Premium |
| HHV (kJ/kg) | 19,578 |
| %C | 49.4 |
| %H | 6.01 |
| %O | 44.06 |
| %Ash | 0.53 |
| MC (%DB) | 7.75 |

# PELLET STOVE PREBURN DATA - ASTM E2779

Client: IHP
Job #: 19-510
Model: Winslow
Tracking #: N/A
Run #: 1
Technician: AK
Date: 8/16/2019

Recording Interval (min): 1
Run Time (min): 60

| | | Average: | -0.064 | 423 | 71 |
|---|---|---|---|---|---|
| **Elapsed Time (min)** | **Scale Reading (lbs)** | **Weight Change (lbs)** | **Flue Draft (in $H_2O$)** | **Flue (°F)** | **Ambient (°F)** |
| 0 | 40.9 | - | -0.055 | 303 | 71 |
| 1 | 40.8 | -0.1 | -0.058 | 337 | 71 |
| 2 | 40.7 | -0.1 | -0.042 | 365 | 71 |
| 3 | 40.6 | -0.1 | -0.056 | 374 | 71 |
| 4 | 40.5 | -0.1 | -0.060 | 376 | 71 |
| 5 | 40.4 | -0.1 | -0.060 | 385 | 71 |
| 6 | 40.4 | 0 | -0.063 | 387 | 71 |
| 7 | 40.3 | -0.1 | -0.063 | 393 | 71 |
| 8 | 40.2 | -0.1 | -0.077 | 389 | 70 |
| 9 | 40.1 | -0.1 | -0.063 | 400 | 70 |
| 10 | 39.9 | -0.2 | -0.059 | 405 | 70 |
| 11 | 39.9 | 0 | -0.051 | 405 | 70 |
| 12 | 39.8 | -0.1 | -0.056 | 405 | 70 |
| 13 | 39.7 | -0.1 | -0.064 | 410 | 70 |
| 14 | 39.6 | -0.1 | -0.068 | 412 | 70 |
| 15 | 39.5 | -0.1 | -0.070 | 414 | 70 |
| 16 | 39.4 | -0.1 | -0.070 | 416 | 70 |
| 17 | 39.3 | -0.1 | -0.062 | 414 | 70 |
| 18 | 39.2 | -0.1 | -0.068 | 411 | 71 |
| 19 | 39.1 | -0.1 | -0.062 | 417 | 71 |
| 20 | 39.0 | -0.1 | -0.056 | 422 | 71 |
| 21 | 39.0 | 0 | -0.063 | 422 | 71 |
| 22 | 38.8 | -0.2 | -0.066 | 421 | 71 |
| 23 | 38.8 | 0 | -0.066 | 425 | 71 |
| 24 | 38.7 | -0.1 | -0.068 | 428 | 71 |
| 25 | 38.6 | -0.1 | -0.079 | 428 | 71 |
| 26 | 38.5 | -0.1 | -0.064 | 428 | 71 |
| 27 | 38.4 | -0.1 | -0.070 | 429 | 71 |
| 28 | 38.4 | 0 | -0.070 | 428 | 70 |
| 29 | 38.3 | -0.1 | -0.063 | 429 | 70 |
| 30 | 38.2 | -0.1 | -0.068 | 434 | 71 |
| 31 | 38.1 | -0.1 | -0.068 | 435 | 71 |
| 32 | 38.0 | -0.1 | -0.064 | 437 | 71 |
| 33 | 37.9 | -0.1 | -0.069 | 436 | 71 |
| 34 | 37.8 | -0.1 | -0.067 | 437 | 71 |
| 35 | 37.7 | -0.1 | -0.064 | 437 | 71 |
| 36 | 37.6 | -0.1 | -0.064 | 436 | 71 |
| 37 | 37.5 | -0.1 | -0.052 | 438 | 71 |
| 38 | 37.4 | -0.1 | -0.075 | 440 | 71 |
| 39 | 37.3 | -0.1 | -0.059 | 441 | 71 |
| 40 | 37.2 | -0.1 | -0.061 | 442 | 71 |
| 41 | 37.1 | -0.1 | -0.059 | 440 | 71 |
| 42 | 37.2 | 0.1 | -0.069 | 444 | 71 |
| 43 | 37.0 | -0.2 | -0.062 | 442 | 71 |
| 44 | 36.9 | -0.1 | -0.070 | 443 | 71 |
| 45 | 36.8 | -0.1 | -0.073 | 442 | 71 |
| 46 | 36.7 | -0.1 | -0.074 | 447 | 71 |

# PELLET STOVE PREBURN DATA - ASTM E2779

| | | | |
|---|---|---|---|
| Client: | IHP | Job #: | 19-510 |
| Model: | Winslow | Tracking #: | N/A |
| Run #: | 1 | Technician: | AK |
| | | Date: | 8/16/2019 |

| | | | | | |
|---|---|---|---|---|---|
| 47 | 36.6 | -0.1 | -0.053 | 445 | 71 |
| 48 | 36.5 | -0.1 | -0.069 | 446 | 71 |
| 49 | 36.4 | -0.1 | -0.068 | 444 | 71 |
| 50 | 36.4 | 0 | -0.087 | 445 | 71 |
| 51 | 36.2 | -0.2 | -0.065 | 444 | 71 |
| 52 | 36.1 | -0.1 | -0.060 | 446 | 71 |
| 53 | 36.1 | 0 | -0.066 | 446 | 71 |
| 54 | 36.0 | -0.1 | -0.064 | 444 | 71 |
| 55 | 35.9 | -0.1 | -0.060 | 444 | 71 |
| 56 | 35.8 | -0.1 | -0.073 | 446 | 71 |
| 57 | 35.7 | -0.1 | -0.063 | 448 | 71 |
| 58 | 35.6 | -0.1 | -0.067 | 446 | 72 |
| 59 | 35.5 | -0.1 | -0.057 | 443 | 72 |
| 60 | 35.4 | -0.1 | -0.065 | 444 | 72 |

# BOX A TEST DATA - ASTM E2779 / ASTM E2515

Client: IHP
Model: Winslow
Run #: 1

Job #: 19-510
Tracking #: N/A
Technician: AK
Date: 8/16/2019

| | Particulate Sampling Data | | | | | | | Fuel Weight (lb) | | Temperature Data (°F) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Elapsed Time (min) | Gas Meter ($ft^3$) | Sample Rate (cfm) | Dilution Tunnel dP (in $H_2O$) | Orifice dH (in $H_2O$) | Meter Temp (°F) | Meter Vacuum (in Hg) | Pro. Rate (%) | Scale Reading | Weight Change | Dilution Tunnel | Flue | Filter | Ambient |
| 0 | 0.000 | | 0.088 | 0.00 | 77 | -0.08 | | 15.6 | | 114 | 446 | 72 | 72 |
| 1 | 0.132 | 0.132 | 0.085 | 2.27 | 77 | -2.69 | 94 | 15.5 | -0.1 | 113 | 447 | 73 | 72 |
| 2 | 0.275 | 0.143 | 0.088 | 2.21 | 77 | -2.63 | 100 | 15.4 | -0.1 | 114 | 446 | 75 | 72 |
| 3 | 0.423 | 0.148 | 0.076 | 2.21 | 77 | 0 | 111 | 15.3 | -0.1 | 113 | 447 | 75 | 72 |
| 4 | 0.564 | 0.141 | 0.084 | 2.21 | 77 | 0 | 101 | 15.2 | -0.1 | 114 | 446 | 76 | 72 |
| 5 | 0.712 | 0.148 | 0.082 | 2.22 | 77 | -2.18 | 107 | 15.1 | -0.1 | 114 | 446 | 76 | 72 |
| 6 | 0.854 | 0.142 | 0.087 | 2.19 | 77 | -2.58 | 100 | 15.0 | -0.1 | 114 | 448 | 76 | 72 |
| 7 | 0.999 | 0.145 | 0.083 | 2.20 | 77 | -2.61 | 104 | 14.9 | -0.1 | 114 | 444 | 77 | 72 |
| 8 | 1.141 | 0.142 | 0.085 | 2.18 | 77 | -2.18 | 101 | 14.9 | 0.0 | 114 | 444 | 77 | 72 |
| 9 | 1.284 | 0.143 | 0.090 | 2.18 | 77 | -0.23 | 99 | 14.8 | -0.1 | 114 | 446 | 77 | 72 |
| 10 | 1.427 | 0.143 | 0.088 | 2.18 | 77 | -0.26 | 100 | 14.7 | -0.1 | 114 | 446 | 77 | 72 |
| 11 | 1.570 | 0.143 | 0.088 | 2.17 | 77 | -1.26 | 100 | 14.6 | -0.1 | 113 | 443 | 78 | 72 |
| 12 | 1.715 | 0.145 | 0.080 | 2.16 | 78 | -2.46 | 106 | 14.5 | -0.1 | 114 | 444 | 78 | 72 |
| 13 | 1.857 | 0.142 | 0.086 | 2.16 | 78 | -0.84 | 100 | 14.4 | -0.1 | 114 | 443 | 78 | 71 |
| 14 | 2.002 | 0.145 | 0.082 | 2.16 | 78 | 0 | 105 | 14.3 | -0.1 | 114 | 446 | 78 | 72 |
| 15 | 2.142 | 0.140 | 0.085 | 2.15 | 78 | -0.12 | 100 | 14.3 | 0.0 | 114 | 444 | 78 | 72 |
| 16 | 2.288 | 0.146 | 0.085 | 2.14 | 78 | 0 | 104 | 14.2 | -0.1 | 114 | 445 | 78 | 72 |
| 17 | 2.427 | 0.139 | 0.082 | 2.15 | 79 | -2.2 | 100 | 14.1 | -0.1 | 114 | 446 | 79 | 72 |
| 18 | 2.573 | 0.146 | 0.086 | 2.13 | 79 | -0.93 | 103 | 14.0 | -0.1 | 114 | 445 | 79 | 72 |
| 19 | 2.714 | 0.141 | 0.082 | 2.13 | 79 | -1.21 | 102 | 13.9 | -0.1 | 114 | 444 | 79 | 72 |
| 20 | 2.859 | 0.145 | 0.088 | 2.11 | 80 | -2.29 | 101 | 13.8 | -0.1 | 114 | 447 | 79 | 72 |
| 21 | 2.999 | 0.140 | 0.087 | 2.13 | 80 | 0 | 98 | 13.5 | -0.3 | 114 | 447 | 79 | 72 |
| 22 | 3.143 | 0.144 | 0.086 | 2.12 | 80 | -2.61 | 101 | 13.6 | 0.1 | 113 | 446 | 79 | 72 |
| 23 | 3.284 | 0.141 | 0.088 | 2.11 | 80 | -0.77 | 98 | 13.5 | -0.1 | 114 | 446 | 79 | 72 |
| 24 | 3.426 | 0.142 | 0.086 | 2.13 | 81 | -0.98 | 100 | 13.4 | -0.1 | 114 | 448 | 79 | 73 |
| 25 | 3.570 | 0.144 | 0.086 | 2.12 | 81 | -0.34 | 101 | 13.2 | -0.2 | 114 | 446 | 79 | 73 |
| 26 | 3.711 | 0.141 | 0.089 | 2.11 | 81 | -2.27 | 97 | 13.3 | 0.1 | 114 | 446 | 80 | 73 |
| 27 | 3.856 | 0.145 | 0.085 | 2.11 | 82 | -2.41 | 102 | 13.2 | -0.1 | 114 | 448 | 80 | 73 |
| 28 | 3.994 | 0.138 | 0.085 | 2.10 | 82 | 0 | 97 | 13.1 | -0.1 | 114 | 446 | 80 | 73 |
| 29 | 4.140 | 0.146 | 0.091 | 2.10 | 82 | -1.84 | 100 | 13.0 | -0.1 | 114 | 444 | 80 | 73 |
| 30 | 4.279 | 0.139 | 0.089 | 2.10 | 83 | 0 | 96 | 12.9 | -0.1 | 115 | 448 | 80 | 73 |
| 31 | 4.425 | 0.146 | 0.091 | 2.08 | 83 | -1.1 | 99 | 12.8 | -0.1 | 115 | 446 | 80 | 73 |
| 32 | 4.565 | 0.140 | 0.086 | 2.09 | 83 | -2.63 | 98 | 12.7 | -0.1 | 114 | 448 | 80 | 73 |

# BOX A TEST DATA - ASTM E2779 / ASTM E2515

Client: IHP
Model: Winslow
Run #: 1

Job #: 19-510
Tracking #: N/A
Technician: AK
Date: 8/16/2019

| | Particulate Sampling Data | | | | | | | Fuel Weight (lb) | | Temperature Data (°F) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Elapsed Time (min) | Gas Meter ($ft^3$) | Sample Rate (cfm) | Dilution Tunnel dP (in $H_2O$) | Orifice dH (in $H_2O$) | Meter Temp (°F) | Meter Vacuum (in Hg) | Pro. Rate (%) | Scale Reading | Weight Change | Dilution Tunnel | Flue | Filter | Ambient |
| 33 | 4.708 | 0.143 | 0.093 | 2.09 | 83 | -1.22 | 96 | 12.6 | -0.1 | 114 | 448 | 80 | 72 |
| 34 | 4.848 | 0.140 | 0.081 | 2.09 | 84 | -0.23 | 101 | 12.5 | -0.1 | 114 | 448 | 80 | 72 |
| 35 | 4.991 | 0.143 | 0.083 | 2.09 | 84 | -1 | 102 | 12.4 | -0.1 | 114 | 446 | 80 | 72 |
| 36 | 5.134 | 0.143 | 0.086 | 2.11 | 84 | 0 | 100 | 12.3 | -0.1 | 115 | 447 | 80 | 73 |
| 37 | 5.275 | 0.141 | 0.083 | 2.06 | 85 | 0 | 100 | 12.3 | 0.0 | 115 | 447 | 80 | 73 |
| 38 | 5.420 | 0.145 | 0.082 | 2.07 | 85 | -1.57 | 104 | 12.1 | -0.2 | 114 | 449 | 80 | 73 |
| 39 | 5.557 | 0.137 | 0.081 | 2.05 | 85 | -2.44 | 98 | 12.1 | 0.0 | 114 | 449 | 80 | 73 |
| 40 | 5.703 | 0.146 | 0.081 | 2.07 | 85 | -2.3 | 105 | 12.0 | -0.1 | 115 | 448 | 80 | 73 |
| 41 | 5.842 | 0.139 | 0.086 | 2.07 | 86 | 0 | 97 | 11.9 | -0.1 | 114 | 449 | 80 | 73 |
| 42 | 5.988 | 0.146 | 0.088 | 2.07 | 86 | -0.05 | 101 | 11.8 | -0.1 | 115 | 447 | 81 | 73 |
| 43 | 6.128 | 0.140 | 0.089 | 2.07 | 86 | -2.56 | 96 | 11.7 | -0.1 | 115 | 445 | 81 | 73 |
| 44 | 6.270 | 0.142 | 0.083 | 2.06 | 86 | -1.74 | 101 | 11.6 | -0.1 | 114 | 448 | 81 | 73 |
| 45 | 6.411 | 0.141 | 0.087 | 2.07 | 87 | -2.23 | 98 | 11.5 | -0.1 | 115 | 447 | 81 | 73 |
| 46 | 6.552 | 0.141 | 0.089 | 2.03 | 87 | 0 | 96 | 11.4 | -0.1 | 115 | 447 | 81 | 73 |
| 47 | 6.697 | 0.145 | 0.089 | 2.07 | 87 | -0.64 | 99 | 11.4 | 0.0 | 115 | 448 | 81 | 73 |
| 48 | 6.837 | 0.140 | 0.090 | 2.06 | 88 | -0.04 | 95 | 11.3 | -0.1 | 115 | 447 | 81 | 73 |
| 49 | 6.981 | 0.144 | 0.089 | 2.06 | 88 | -1.14 | 98 | 11.2 | -0.1 | 114 | 449 | 81 | 73 |
| 50 | 7.119 | 0.138 | 0.083 | 2.07 | 88 | -2.4 | 98 | 11.1 | -0.1 | 115 | 446 | 81 | 73 |
| 51 | 7.265 | 0.146 | 0.088 | 2.08 | 88 | 0 | 100 | 11.1 | 0.0 | 114 | 445 | 81 | 73 |
| 52 | 7.404 | 0.139 | 0.082 | 2.05 | 88 | -2.66 | 99 | 10.9 | -0.2 | 115 | 445 | 81 | 73 |
| 53 | 7.549 | 0.145 | 0.090 | 2.17 | 89 | -1.29 | 98 | 10.8 | -0.1 | 114 | 447 | 81 | 73 |
| 54 | 7.693 | 0.144 | 0.087 | 2.19 | 89 | -0.52 | 99 | 10.7 | -0.1 | 114 | 449 | 81 | 73 |
| 55 | 7.840 | 0.147 | 0.099 | 2.17 | 89 | -1.24 | 95 | 10.6 | -0.1 | 114 | 447 | 81 | 73 |
| 56 | 7.985 | 0.145 | 0.087 | 2.18 | 89 | -2.73 | 100 | 10.6 | 0.0 | 115 | 445 | 81 | 73 |
| 57 | 8.132 | 0.147 | 0.086 | 2.18 | 89 | -1.38 | 102 | 10.5 | -0.1 | 115 | 448 | 81 | 73 |
| 58 | 8.276 | 0.144 | 0.089 | 2.18 | 90 | -1.46 | 98 | 10.4 | -0.1 | 115 | 449 | 81 | 73 |
| 59 | 8.423 | 0.147 | 0.090 | 2.16 | 90 | -2.7 | 99 | 10.2 | -0.2 | 115 | 448 | 81 | 74 |
| 60 | 8.567 | 0.144 | 0.088 | 2.17 | 90 | 0 | 98 | 10.2 | 0.0 | 115 | 449 | 81 | 73 |
| 61 | 8.717 | 0.150 | 0.091 | 2.22 | 90 | -0.87 | 101 | 10.1 | -0.1 | 114 | 441 | 80 | 73 |
| 62 | 8.864 | 0.147 | 0.089 | 2.26 | 90 | -1.66 | 100 | 10.1 | 0.0 | 113 | 428 | 81 | 73 |
| 63 | 9.013 | 0.149 | 0.084 | 2.25 | 91 | -0.83 | 104 | 10.0 | -0.1 | 113 | 417 | 81 | 74 |
| 64 | 9.159 | 0.146 | 0.085 | 2.25 | 91 | -0.19 | 101 | 10.0 | 0.0 | 112 | 403 | 81 | 73 |
| 65 | 9.310 | 0.151 | 0.082 | 2.24 | 91 | -0.01 | 106 | 10.0 | 0.0 | 111 | 396 | 81 | 73 |

# BOX A TEST DATA - ASTM E2779 / ASTM E2515

Client: IHP
Model: Winslow
Run #: 1

Job #: 19-510
Tracking #: N/A
Technician: AK
Date: 8/16/2019

| | Particulate Sampling Data | | | | | | | Fuel Weight (lb) | | Temperature Data (°F) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Elapsed Time (min) | Gas Meter ($ft^3$) | Sample Rate (cfm) | Dilution Tunnel dP (in $H_2O$) | Orifice dH (in $H_2O$) | Meter Temp (°F) | Meter Vacuum (in Hg) | Pro. Rate (%) | Scale Reading | Weight Change | Dilution Tunnel | Flue | Filter | Ambient |
| 66 | 9.455 | 0.145 | 0.081 | 2.24 | 91 | -2.56 | 103 | 9.9 | -0.1 | 111 | 397 | 81 | 74 |
| 67 | 9.606 | 0.151 | 0.092 | 2.26 | 91 | -0.92 | 100 | 9.9 | 0.0 | 110 | 387 | 81 | 74 |
| 68 | 9.750 | 0.144 | 0.087 | 2.25 | 91 | -0.57 | 98 | 9.9 | 0.0 | 110 | 382 | 81 | 74 |
| 69 | 9.901 | 0.151 | 0.089 | 2.25 | 92 | -0.39 | 102 | 9.8 | -0.1 | 109 | 376 | 81 | 74 |
| 70 | 10.047 | 0.146 | 0.083 | 2.24 | 92 | -1.15 | 102 | 9.7 | -0.1 | 108 | 365 | 81 | 74 |
| 71 | 10.197 | 0.150 | 0.090 | 2.25 | 92 | -0.69 | 100 | 9.7 | 0.0 | 108 | 368 | 81 | 74 |
| 72 | 10.342 | 0.145 | 0.091 | 2.25 | 92 | -2.53 | 97 | 9.7 | 0.0 | 108 | 367 | 81 | 73 |
| 73 | 10.493 | 0.151 | 0.086 | 2.24 | 92 | -1.33 | 103 | 9.6 | -0.1 | 108 | 360 | 81 | 74 |
| 74 | 10.638 | 0.145 | 0.086 | 2.25 | 92 | -0.1 | 99 | 9.6 | 0.0 | 107 | 348 | 81 | 74 |
| 75 | 10.790 | 0.152 | 0.083 | 2.26 | 93 | -0.3 | 106 | 9.6 | 0.0 | 106 | 351 | 81 | 73 |
| 76 | 10.935 | 0.145 | 0.085 | 2.24 | 93 | -0.65 | 100 | 9.6 | 0.0 | 106 | 351 | 81 | 73 |
| 77 | 11.087 | 0.152 | 0.086 | 2.24 | 93 | -1.7 | 104 | 9.5 | -0.1 | 106 | 350 | 81 | 73 |
| 78 | 11.232 | 0.145 | 0.086 | 2.25 | 93 | -2.09 | 99 | 9.6 | 0.1 | 106 | 352 | 81 | 73 |
| 79 | 11.383 | 0.151 | 0.090 | 2.25 | 93 | -1.45 | 101 | 9.5 | -0.1 | 106 | 349 | 80 | 72 |
| 80 | 11.529 | 0.146 | 0.079 | 2.23 | 93 | 0 | 104 | 9.4 | -0.1 | 106 | 342 | 81 | 72 |
| 81 | 11.680 | 0.151 | 0.083 | 2.24 | 93 | -2.3 | 105 | 9.3 | -0.1 | 106 | 346 | 80 | 72 |
| 82 | 11.826 | 0.146 | 0.081 | 2.26 | 93 | -2.38 | 103 | 9.2 | -0.1 | 105 | 342 | 80 | 73 |
| 83 | 11.975 | 0.149 | 0.088 | 2.26 | 94 | -2.07 | 100 | 9.3 | 0.1 | 105 | 340 | 80 | 72 |
| 84 | 12.122 | 0.147 | 0.090 | 2.24 | 94 | -2.1 | 98 | 9.2 | -0.1 | 105 | 338 | 80 | 72 |
| 85 | 12.272 | 0.150 | 0.090 | 2.25 | 94 | -0.49 | 100 | 9.2 | 0.0 | 105 | 334 | 80 | 73 |
| 86 | 12.421 | 0.149 | 0.086 | 2.26 | 94 | -2.4 | 101 | 9.2 | 0.0 | 104 | 335 | 80 | 73 |
| 87 | 12.570 | 0.149 | 0.083 | 2.25 | 94 | -1.99 | 103 | 9.2 | 0.0 | 104 | 331 | 80 | 73 |
| 88 | 12.718 | 0.148 | 0.088 | 2.25 | 94 | -0.08 | 100 | 9.1 | -0.1 | 104 | 327 | 80 | 73 |
| 89 | 12.867 | 0.149 | 0.082 | 2.24 | 94 | -2.65 | 104 | 9.0 | -0.1 | 104 | 334 | 80 | 73 |
| 90 | 13.017 | 0.150 | 0.080 | 2.24 | 94 | 0 | 106 | 9.0 | 0.0 | 104 | 328 | 80 | 73 |
| 91 | 13.165 | 0.148 | 0.086 | 2.23 | 94 | -1.14 | 101 | 9.0 | 0.0 | 104 | 321 | 80 | 73 |
| 92 | 13.314 | 0.149 | 0.083 | 2.26 | 94 | -1.03 | 103 | 8.9 | -0.1 | 104 | 322 | 80 | 72 |
| 93 | 13.461 | 0.147 | 0.086 | 2.25 | 94 | 0 | 100 | 8.9 | 0.0 | 104 | 327 | 80 | 72 |
| 94 | 13.612 | 0.151 | 0.088 | 2.25 | 95 | -0.62 | 101 | 8.8 | -0.1 | 104 | 323 | 80 | 72 |
| 95 | 13.758 | 0.146 | 0.086 | 2.27 | 95 | 0 | 99 | 8.8 | 0.0 | 104 | 322 | 80 | 72 |
| 96 | 13.908 | 0.150 | 0.094 | 2.24 | 95 | -2.55 | 97 | 8.8 | 0.0 | 103 | 320 | 80 | 73 |
| 97 | 14.054 | 0.146 | 0.088 | 2.25 | 95 | -2.57 | 98 | 8.8 | 0.0 | 104 | 323 | 80 | 72 |
| 98 | 14.206 | 0.152 | 0.091 | 2.25 | 95 | -0.39 | 100 | 8.7 | -0.1 | 103 | 318 | 80 | 72 |

# BOX A TEST DATA - ASTM E2779 / ASTM E2515

Client: IHP
Model: Winslow
Run #: 1

Job #: 19-510
Tracking #: N/A
Technician: AK
Date: 8/16/2019

| | Particulate Sampling Data | | | | | | | Fuel Weight (lb) | | Temperature Data (°F) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Elapsed Time (min) | Gas Meter ($ft^3$) | Sample Rate (cfm) | Dilution Tunnel dP (in $H_2O$) | Orifice dH (in $H_2O$) | Meter Temp (°F) | Meter Vacuum (in Hg) | Pro. Rate (%) | Scale Reading | Weight Change | Dilution Tunnel | Flue | Filter | Ambient |
| 99 | 14.351 | 0.145 | 0.086 | 2.25 | 95 | -0.6 | 98 | 8.7 | 0.0 | 103 | 314 | 80 | 72 |
| 100 | 14.502 | 0.151 | 0.089 | 2.26 | 95 | -2.75 | 101 | 8.7 | 0.0 | 103 | 314 | 80 | 72 |
| 101 | 14.649 | 0.147 | 0.085 | 2.26 | 95 | -2.54 | 100 | 8.6 | -0.1 | 103 | 322 | 80 | 72 |
| 102 | 14.803 | 0.154 | 0.085 | 2.25 | 95 | -1.64 | 105 | 8.6 | 0.0 | 103 | 324 | 80 | 73 |
| 103 | 14.948 | 0.145 | 0.094 | 2.24 | 95 | -1.97 | 94 | 8.5 | -0.1 | 103 | 318 | 80 | 73 |
| 104 | 15.100 | 0.152 | 0.085 | 2.26 | 95 | -0.03 | 104 | 8.5 | 0.0 | 103 | 310 | 80 | 73 |
| 105 | 15.246 | 0.146 | 0.085 | 2.25 | 95 | -2.69 | 100 | 8.5 | 0.0 | 103 | 314 | 80 | 73 |
| 106 | 15.397 | 0.151 | 0.088 | 2.23 | 95 | -2.57 | 101 | 8.4 | -0.1 | 103 | 317 | 79 | 73 |
| 107 | 15.544 | 0.147 | 0.097 | 2.25 | 95 | -2.02 | 94 | 8.4 | 0.0 | 103 | 316 | 79 | 73 |
| 108 | 15.694 | 0.150 | 0.086 | 2.26 | 95 | 0 | 102 | 8.4 | 0.0 | 103 | 314 | 79 | 73 |
| 109 | 15.841 | 0.147 | 0.088 | 2.27 | 95 | -0.1 | 99 | 8.4 | 0.0 | 103 | 319 | 80 | 73 |
| 110 | 15.991 | 0.150 | 0.097 | 2.27 | 95 | -1.67 | 96 | 8.3 | -0.1 | 103 | 318 | 80 | 73 |
| 111 | 16.139 | 0.148 | 0.087 | 2.25 | 96 | -2.08 | 100 | 8.2 | -0.1 | 103 | 319 | 80 | 73 |
| 112 | 16.288 | 0.149 | 0.077 | 2.26 | 96 | -0.31 | 107 | 8.2 | 0.0 | 103 | 314 | 80 | 73 |
| 113 | 16.436 | 0.148 | 0.091 | 2.25 | 96 | 0 | 97 | 8.2 | 0.0 | 102 | 311 | 80 | 73 |
| 114 | 16.585 | 0.149 | 0.089 | 2.25 | 96 | 0 | 99 | 8.1 | -0.1 | 102 | 311 | 80 | 72 |
| 115 | 16.735 | 0.150 | 0.092 | 2.24 | 96 | -0.44 | 98 | 8.1 | 0.0 | 102 | 310 | 80 | 73 |
| 116 | 16.883 | 0.148 | 0.099 | 2.25 | 96 | 0 | 93 | 8.0 | -0.1 | 102 | 318 | 79 | 73 |
| 117 | 17.033 | 0.150 | 0.084 | 2.26 | 96 | 0 | 103 | 8.0 | 0.0 | 102 | 319 | 80 | 72 |
| 118 | 17.181 | 0.148 | 0.084 | 2.26 | 96 | -2.74 | 101 | 7.9 | -0.1 | 102 | 318 | 79 | 72 |
| 119 | 17.331 | 0.150 | 0.087 | 2.26 | 96 | -2.55 | 101 | 7.9 | 0.0 | 102 | 313 | 79 | 72 |
| 120 | 17.477 | 0.146 | 0.099 | 2.26 | 96 | -1.26 | 92 | 7.9 | 0.0 | 102 | 303 | 79 | 72 |
| 121 | 17.628 | 0.151 | 0.088 | 2.21 | 96 | -2.23 | 101 | 7.8 | -0.1 | 102 | 309 | 79 | 73 |
| 122 | 17.774 | 0.146 | 0.083 | 2.25 | 96 | 0 | 101 | 7.8 | 0.0 | 102 | 303 | 79 | 73 |
| 123 | 17.925 | 0.151 | 0.093 | 2.25 | 96 | 0 | 98 | 7.8 | 0.0 | 102 | 310 | 79 | 73 |
| 124 | 18.071 | 0.146 | 0.087 | 2.23 | 96 | -1.15 | 98 | 7.7 | -0.1 | 102 | 317 | 79 | 73 |
| 125 | 18.224 | 0.153 | 0.085 | 2.26 | 96 | -2.31 | 104 | 7.7 | 0.0 | 102 | 313 | 79 | 73 |
| 126 | 18.370 | 0.146 | 0.095 | 2.22 | 96 | -2.65 | 94 | 7.6 | -0.1 | 102 | 305 | 79 | 73 |
| 127 | 18.522 | 0.152 | 0.079 | 2.27 | 96 | -0.56 | 107 | 7.6 | 0.0 | 102 | 316 | 79 | 73 |
| 128 | 18.668 | 0.146 | 0.089 | 2.26 | 96 | -1.3 | 97 | 7.6 | 0.0 | 102 | 312 | 79 | 73 |
| 129 | 18.820 | 0.152 | 0.074 | 2.25 | 96 | -1.76 | 111 | 7.5 | -0.1 | 102 | 309 | 79 | 73 |
| 130 | 18.966 | 0.146 | 0.085 | 2.25 | 96 | -2.31 | 99 | 7.4 | -0.1 | 102 | 308 | 79 | 73 |
| 131 | 19.116 | 0.150 | 0.087 | 2.26 | 96 | 0 | 101 | 7.5 | 0.1 | 102 | 299 | 79 | 73 |

# BOX A TEST DATA - ASTM E2779 / ASTM E2515

Client: IHP
Model: Winslow
Run #: 1

Job #: 19-510
Tracking #: N/A
Technician: AK
Date: 8/16/2019

| | Particulate Sampling Data | | | | | | | Fuel Weight (lb) | | Temperature Data (°F) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Elapsed Time (min) | Gas Meter ($ft^3$) | Sample Rate (cfm) | Dilution Tunnel dP (in $H_2O$) | Orifice dH (in $H_2O$) | Meter Temp (°F) | Meter Vacuum (in Hg) | Pro. Rate (%) | Scale Reading | Weight Change | Dilution Tunnel | Flue | Filter | Ambient |
| 132 | 19.263 | 0.147 | 0.087 | 2.22 | 97 | -0.75 | 99 | 7.4 | -0.1 | 102 | 301 | 80 | 73 |
| 133 | 19.413 | 0.150 | 0.087 | 2.24 | 97 | -2.46 | 101 | 7.4 | 0.0 | 102 | 311 | 80 | 73 |
| 134 | 19.561 | 0.148 | 0.087 | 2.25 | 97 | -2.55 | 99 | 7.4 | 0.0 | 102 | 308 | 80 | 73 |
| 135 | 19.710 | 0.149 | 0.087 | 2.25 | 97 | -2.63 | 100 | 7.3 | -0.1 | 102 | 307 | 80 | 73 |
| 136 | 19.860 | 0.150 | 0.082 | 2.25 | 97 | -1.11 | 104 | 7.4 | 0.1 | 102 | 313 | 80 | 73 |
| 137 | 20.008 | 0.148 | 0.093 | 2.22 | 97 | -2.66 | 96 | 7.2 | -0.2 | 102 | 317 | 80 | 73 |
| 138 | 20.158 | 0.150 | 0.077 | 2.23 | 97 | -0.88 | 107 | 7.2 | 0.0 | 102 | 313 | 80 | 73 |
| 139 | 20.306 | 0.148 | 0.083 | 2.25 | 97 | 0 | 102 | 7.2 | 0.0 | 103 | 314 | 80 | 73 |
| 140 | 20.456 | 0.150 | 0.088 | 2.24 | 97 | -2.56 | 100 | 7.1 | -0.1 | 103 | 314 | 80 | 73 |
| 141 | 20.603 | 0.147 | 0.092 | 2.25 | 97 | -0.03 | 96 | 7.0 | -0.1 | 102 | 314 | 80 | 73 |
| 142 | 20.753 | 0.150 | 0.081 | 2.24 | 97 | -0.11 | 104 | 7.0 | 0.0 | 103 | 311 | 80 | 73 |
| 143 | 20.899 | 0.146 | 0.092 | 2.23 | 97 | -2.68 | 95 | 7.0 | 0.0 | 102 | 308 | 80 | 73 |
| 144 | 21.051 | 0.152 | 0.084 | 2.26 | 97 | 0 | 104 | 7.0 | 0.0 | 102 | 307 | 80 | 73 |
| 145 | 21.196 | 0.145 | 0.089 | 2.24 | 97 | -2.66 | 96 | 7.0 | 0.0 | 102 | 312 | 80 | 73 |
| 146 | 21.348 | 0.152 | 0.083 | 2.23 | 97 | -0.06 | 105 | 6.9 | -0.1 | 103 | 313 | 80 | 73 |
| 147 | 21.494 | 0.146 | 0.083 | 2.25 | 97 | -0.99 | 100 | 6.7 | -0.2 | 102 | 310 | 80 | 73 |
| 148 | 21.646 | 0.152 | 0.082 | 2.25 | 97 | -2.63 | 105 | 6.8 | 0.1 | 102 | 310 | 80 | 73 |
| 149 | 21.792 | 0.146 | 0.084 | 2.24 | 97 | -2.7 | 100 | 6.8 | 0.0 | 102 | 311 | 80 | 73 |
| 150 | 21.944 | 0.152 | 0.090 | 2.23 | 97 | -1.77 | 100 | 6.8 | 0.0 | 102 | 306 | 80 | 73 |
| 151 | 22.090 | 0.146 | 0.080 | 2.22 | 97 | -1.22 | 102 | 6.7 | -0.1 | 102 | 310 | 80 | 73 |
| 152 | 22.241 | 0.151 | 0.091 | 2.22 | 98 | -2.18 | 99 | 6.7 | 0.0 | 102 | 305 | 80 | 73 |
| 153 | 22.387 | 0.146 | 0.087 | 2.26 | 98 | -0.11 | 98 | 6.7 | 0.0 | 102 | 300 | 80 | 73 |
| 154 | 22.537 | 0.150 | 0.087 | 2.23 | 98 | -0.07 | 100 | 6.6 | -0.1 | 101 | 289 | 80 | 73 |
| 155 | 22.685 | 0.148 | 0.087 | 2.25 | 98 | -2.37 | 99 | 6.6 | 0.0 | 101 | 301 | 80 | 73 |
| 156 | 22.835 | 0.150 | 0.087 | 2.24 | 98 | -2.62 | 101 | 6.5 | -0.1 | 102 | 311 | 80 | 73 |
| 157 | 22.983 | 0.148 | 0.094 | 2.24 | 98 | -1.48 | 95 | 6.5 | 0.0 | 102 | 308 | 80 | 73 |
| 158 | 23.133 | 0.150 | 0.090 | 2.24 | 98 | -2.22 | 99 | 6.4 | -0.1 | 102 | 311 | 80 | 73 |
| 159 | 23.282 | 0.149 | 0.089 | 2.23 | 98 | 0 | 99 | 6.4 | 0.0 | 102 | 307 | 80 | 73 |
| 160 | 23.431 | 0.149 | 0.084 | 2.24 | 98 | -0.12 | 102 | 6.4 | 0.0 | 102 | 308 | 80 | 73 |
| 161 | 23.581 | 0.150 | 0.088 | 2.23 | 98 | 0 | 100 | 6.3 | -0.1 | 102 | 317 | 80 | 73 |
| 162 | 23.728 | 0.147 | 0.087 | 2.26 | 98 | 0 | 99 | 6.3 | 0.0 | 102 | 313 | 80 | 73 |
| 163 | 23.879 | 0.151 | 0.091 | 2.24 | 98 | 0 | 99 | 6.2 | -0.1 | 102 | 310 | 80 | 73 |
| 164 | 24.025 | 0.146 | 0.088 | 2.23 | 98 | -0.82 | 97 | 6.2 | 0.0 | 102 | 305 | 80 | 73 |

# BOX A TEST DATA - ASTM E2779 / ASTM E2515

Client: IHP
Model: Winslow
Run #: 1

Job #: 19-510
Tracking #: N/A
Technician: AK
Date: 8/16/2019

| | Particulate Sampling Data | | | | | | | Fuel Weight (lb) | | Temperature Data (°F) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Elapsed Time (min) | Gas Meter ($ft^3$) | Sample Rate (cfm) | Dilution Tunnel dP (in $H_2O$) | Orifice dH (in $H_2O$) | Meter Temp (°F) | Meter Vacuum (in Hg) | Pro. Rate (%) | Scale Reading | Weight Change | Dilution Tunnel | Flue | Filter | Ambient |
| 165 | 24.176 | 0.151 | 0.088 | 2.26 | 98 | -2.05 | 101 | 6.1 | -0.1 | 102 | 312 | 80 | 73 |
| 166 | 24.322 | 0.146 | 0.086 | 2.24 | 98 | -0.09 | 98 | 6.1 | 0.0 | 102 | 314 | 80 | 73 |
| 167 | 24.474 | 0.152 | 0.078 | 2.24 | 98 | -2.46 | 108 | 6.2 | 0.1 | 102 | 313 | 80 | 73 |
| 168 | 24.620 | 0.146 | 0.083 | 2.24 | 98 | -2.47 | 100 | 6.1 | -0.1 | 102 | 309 | 80 | 73 |
| 169 | 24.772 | 0.152 | 0.087 | 2.25 | 98 | -2.51 | 102 | 6.0 | -0.1 | 102 | 305 | 80 | 73 |
| 170 | 24.919 | 0.147 | 0.084 | 2.23 | 98 | -2.45 | 100 | 6.0 | 0.0 | 102 | 314 | 80 | 73 |
| 171 | 25.070 | 0.151 | 0.086 | 2.23 | 98 | 0 | 102 | 5.9 | -0.1 | 103 | 311 | 80 | 74 |
| 172 | 25.216 | 0.146 | 0.090 | 2.20 | 98 | -2.58 | 96 | 5.9 | 0.0 | 102 | 311 | 80 | 74 |
| 173 | 25.368 | 0.152 | 0.083 | 2.24 | 98 | -1.57 | 104 | 6.0 | 0.1 | 102 | 312 | 80 | 74 |
| 174 | 25.514 | 0.146 | 0.091 | 2.23 | 98 | -0.27 | 96 | 5.8 | -0.2 | 103 | 308 | 80 | 73 |
| 175 | 25.664 | 0.150 | 0.094 | 2.25 | 98 | -0.44 | 97 | 5.7 | -0.1 | 102 | 314 | 80 | 73 |
| 176 | 25.812 | 0.148 | 0.083 | 2.25 | 98 | -2.2 | 102 | 5.8 | 0.1 | 102 | 311 | 80 | 74 |
| 177 | 25.962 | 0.150 | 0.087 | 2.22 | 98 | -1.81 | 101 | 5.7 | -0.1 | 102 | 316 | 80 | 73 |
| 178 | 26.110 | 0.148 | 0.088 | 2.22 | 98 | -1.5 | 99 | 5.7 | 0.0 | 103 | 311 | 80 | 73 |
| 179 | 26.260 | 0.150 | 0.077 | 2.24 | 98 | -2.29 | 107 | 5.7 | 0.0 | 102 | 302 | 80 | 73 |
| 180 | 26.409 | 0.149 | 0.092 | 2.22 | 98 | -2.52 | 97 | 5.6 | -0.1 | 102 | 308 | 80 | 74 |
| 181 | 26.558 | 0.149 | 0.088 | 2.25 | 98 | 0 | 99 | 5.6 | 0.0 | 101 | 307 | 80 | 74 |
| 182 | 26.708 | 0.150 | 0.082 | 2.23 | 98 | -0.03 | 103 | 5.5 | -0.1 | 101 | 298 | 80 | 74 |
| 183 | 26.855 | 0.147 | 0.092 | 2.21 | 98 | -1.22 | 96 | 5.6 | 0.1 | 100 | 298 | 80 | 74 |
| 184 | 27.006 | 0.151 | 0.081 | 2.26 | 99 | -1.16 | 105 | 5.5 | -0.1 | 100 | 300 | 80 | 73 |
| 185 | 27.152 | 0.146 | 0.090 | 2.24 | 99 | -0.74 | 96 | 5.5 | 0.0 | 100 | 292 | 80 | 73 |
| 186 | 27.303 | 0.151 | 0.082 | 2.22 | 99 | -1.52 | 104 | 5.4 | -0.1 | 99 | 295 | 80 | 74 |
| 187 | 27.449 | 0.146 | 0.087 | 2.24 | 99 | -2.67 | 97 | 5.3 | -0.1 | 99 | 297 | 80 | 74 |
| 188 | 27.601 | 0.152 | 0.086 | 2.23 | 99 | -1.31 | 102 | 5.3 | 0.0 | 99 | 293 | 80 | 74 |
| 189 | 27.747 | 0.146 | 0.092 | 2.23 | 99 | 0 | 95 | 5.3 | 0.0 | 99 | 283 | 80 | 74 |
| 190 | 27.900 | 0.153 | 0.080 | 2.23 | 99 | 0 | 106 | 5.3 | 0.0 | 99 | 282 | 80 | 74 |
| 191 | 28.046 | 0.146 | 0.078 | 2.23 | 99 | -0.98 | 103 | 5.2 | -0.1 | 98 | 276 | 80 | 74 |
| 192 | 28.198 | 0.152 | 0.091 | 2.23 | 99 | -2.66 | 99 | 5.2 | 0.0 | 98 | 274 | 79 | 74 |
| 193 | 28.344 | 0.146 | 0.090 | 2.23 | 99 | -2.51 | 96 | 5.2 | 0.0 | 98 | 279 | 79 | 74 |
| 194 | 28.495 | 0.151 | 0.086 | 2.23 | 99 | 0 | 101 | 5.2 | 0.0 | 98 | 287 | 79 | 74 |
| 195 | 28.642 | 0.147 | 0.084 | 2.24 | 99 | -2.61 | 100 | 5.0 | -0.2 | 98 | 285 | 79 | 74 |
| 196 | 28.792 | 0.150 | 0.087 | 2.23 | 99 | -0.08 | 100 | 5.1 | 0.1 | 98 | 288 | 79 | 74 |
| 197 | 28.940 | 0.148 | 0.083 | 2.22 | 99 | -1.85 | 101 | 5.0 | -0.1 | 98 | 287 | 79 | 74 |

# BOX A TEST DATA - ASTM E2779 / ASTM E2515

Client: IHP
Model: Winslow
Run #: 1

Job #: 19-510
Tracking #: N/A
Technician: AK
Date: 8/16/2019

| | Particulate Sampling Data | | | | | | | Fuel Weight (lb) | | Temperature Data (°F) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Elapsed Time (min) | Gas Meter ($ft^3$) | Sample Rate (cfm) | Dilution Tunnel dP (in $H_2O$) | Orifice dH (in $H_2O$) | Meter Temp (°F) | Meter Vacuum (in Hg) | Pro. Rate (%) | Scale Reading | Weight Change | Dilution Tunnel | Flue | Filter | Ambient |
| 198 | 29.089 | 0.149 | 0.086 | 2.24 | 99 | -2.11 | 100 | 4.9 | -0.1 | 98 | 278 | 79 | 74 |
| 199 | 29.238 | 0.149 | 0.091 | 2.22 | 99 | -2.03 | 97 | 4.9 | 0.0 | 98 | 281 | 79 | 74 |
| 200 | 29.388 | 0.150 | 0.084 | 2.24 | 99 | -1.92 | 102 | 4.9 | 0.0 | 98 | 285 | 79 | 73 |
| 201 | 29.538 | 0.150 | 0.083 | 2.23 | 99 | -2.58 | 102 | 4.9 | 0.0 | 98 | 280 | 79 | 74 |
| 202 | 29.686 | 0.148 | 0.082 | 2.23 | 99 | -1.6 | 102 | 4.9 | 0.0 | 98 | 271 | 79 | 74 |
| 203 | 29.836 | 0.150 | 0.087 | 2.22 | 99 | -2.13 | 100 | 4.9 | 0.0 | 98 | 266 | 79 | 74 |
| 204 | 29.984 | 0.148 | 0.077 | 2.22 | 99 | -0.83 | 105 | 4.8 | -0.1 | 98 | 272 | 79 | 74 |
| 205 | 30.134 | 0.150 | 0.079 | 2.23 | 99 | -1.83 | 105 | 4.8 | 0.0 | 98 | 280 | 79 | 74 |
| 206 | 30.280 | 0.146 | 0.086 | 2.24 | 99 | -1.47 | 98 | 4.8 | 0.0 | 98 | 276 | 79 | 74 |
| 207 | 30.432 | 0.152 | 0.091 | 2.21 | 99 | -2.52 | 99 | 4.7 | -0.1 | 98 | 276 | 79 | 74 |
| 208 | 30.578 | 0.146 | 0.080 | 2.22 | 99 | -2.57 | 101 | 4.7 | 0.0 | 98 | 276 | 79 | 73 |
| 209 | 30.730 | 0.152 | 0.080 | 2.23 | 99 | 0 | 106 | 4.7 | 0.0 | 97 | 274 | 79 | 74 |
| 210 | 30.877 | 0.147 | 0.093 | 2.25 | 99 | -0.67 | 95 | 4.7 | 0.0 | 98 | 273 | 79 | 74 |
| 211 | 31.029 | 0.152 | 0.078 | 2.23 | 99 | 0 | 107 | 4.7 | 0.0 | 97 | 272 | 79 | 74 |
| 212 | 31.175 | 0.146 | 0.085 | 2.23 | 99 | -2.67 | 98 | 4.6 | -0.1 | 97 | 270 | 79 | 74 |
| 213 | 31.327 | 0.152 | 0.084 | 2.24 | 99 | -1.2 | 103 | 4.6 | 0.0 | 97 | 276 | 79 | 74 |
| 214 | 31.474 | 0.147 | 0.094 | 2.24 | 99 | -2.6 | 94 | 4.6 | 0.0 | 98 | 275 | 79 | 74 |
| 215 | 31.624 | 0.150 | 0.080 | 2.24 | 99 | -0.71 | 104 | 4.5 | -0.1 | 97 | 272 | 79 | 74 |
| 216 | 31.771 | 0.147 | 0.089 | 2.22 | 99 | -2.35 | 97 | 4.5 | 0.0 | 97 | 275 | 79 | 74 |
| 217 | 31.922 | 0.151 | 0.087 | 2.23 | 99 | -2.34 | 101 | 4.4 | -0.1 | 97 | 271 | 79 | 74 |
| 218 | 32.069 | 0.147 | 0.080 | 2.24 | 99 | -2.58 | 102 | 4.4 | 0.0 | 97 | 272 | 79 | 74 |
| 219 | 32.219 | 0.150 | 0.088 | 2.23 | 99 | 0 | 99 | 4.4 | 0.0 | 97 | 273 | 79 | 74 |
| 220 | 32.369 | 0.150 | 0.084 | 2.22 | 99 | -1.14 | 102 | 4.4 | 0.0 | 98 | 268 | 79 | 74 |
| 221 | 32.518 | 0.149 | 0.089 | 2.22 | 99 | -2.06 | 98 | 4.3 | -0.1 | 97 | 274 | 79 | 74 |
| 222 | 32.668 | 0.150 | 0.083 | 2.23 | 99 | -2.59 | 102 | 4.3 | 0.0 | 97 | 271 | 79 | 74 |
| 223 | 32.815 | 0.147 | 0.089 | 2.23 | 99 | -2.53 | 97 | 4.3 | 0.0 | 97 | 276 | 79 | 74 |
| 224 | 32.967 | 0.152 | 0.092 | 2.24 | 99 | -2.42 | 98 | 4.2 | -0.1 | 97 | 275 | 79 | 74 |
| 225 | 33.113 | 0.146 | 0.085 | 2.24 | 99 | 0 | 98 | 4.2 | 0.0 | 97 | 273 | 79 | 74 |
| 226 | 33.264 | 0.151 | 0.077 | 2.21 | 99 | -2.39 | 107 | 4.2 | 0.0 | 97 | 281 | 79 | 74 |
| 227 | 33.410 | 0.146 | 0.088 | 2.24 | 99 | -1.31 | 97 | 4.1 | -0.1 | 97 | 276 | 79 | 74 |
| 228 | 33.562 | 0.152 | 0.089 | 2.23 | 99 | -2.06 | 100 | 4.1 | 0.0 | 97 | 280 | 79 | 74 |
| 229 | 33.708 | 0.146 | 0.088 | 2.22 | 99 | -1.79 | 97 | 4.0 | -0.1 | 98 | 281 | 79 | 74 |
| 230 | 33.861 | 0.153 | 0.084 | 2.23 | 99 | -0.81 | 104 | 4.0 | 0.0 | 98 | 273 | 79 | 74 |

# BOX A TEST DATA - ASTM E2779 / ASTM E2515

Client: IHP
Model: Winslow
Run #: 1

Job #: 19-510
Tracking #: N/A
Technician: AK
Date: 8/16/2019

| | Particulate Sampling Data | | | | | | | Fuel Weight (lb) | | Temperature Data (°F) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Elapsed Time (min) | Gas Meter ($ft^3$) | Sample Rate (cfm) | Dilution Tunnel dP (in $H_2O$) | Orifice dH (in $H_2O$) | Meter Temp (°F) | Meter Vacuum (in Hg) | Pro. Rate (%) | Scale Reading | Weight Change | Dilution Tunnel | Flue | Filter | Ambient |
| 231 | 34.007 | 0.146 | 0.086 | 2.23 | 100 | -1.56 | 98 | 4.0 | 0.0 | 98 | 271 | 79 | 74 |
| 232 | 34.159 | 0.152 | 0.085 | 2.25 | 100 | -2.54 | 102 | 4.0 | 0.0 | 98 | 269 | 79 | 74 |
| 233 | 34.306 | 0.147 | 0.087 | 2.21 | 100 | -2.56 | 98 | 3.9 | -0.1 | 98 | 275 | 79 | 74 |
| 234 | 34.457 | 0.151 | 0.084 | 2.23 | 100 | 0 | 102 | 3.9 | 0.0 | 98 | 276 | 80 | 74 |
| 235 | 34.603 | 0.146 | 0.085 | 2.24 | 100 | 0 | 98 | 3.9 | 0.0 | 98 | 276 | 79 | 74 |
| 236 | 34.753 | 0.150 | 0.080 | 2.22 | 100 | -2.58 | 104 | 3.8 | -0.1 | 98 | 271 | 79 | 74 |
| 237 | 34.901 | 0.148 | 0.083 | 2.24 | 100 | -2.5 | 101 | 3.8 | 0.0 | 98 | 279 | 79 | 74 |
| 238 | 35.051 | 0.150 | 0.085 | 2.23 | 100 | -0.07 | 101 | 3.8 | 0.0 | 98 | 278 | 79 | 74 |
| 239 | 35.199 | 0.148 | 0.089 | 2.23 | 100 | -2.54 | 97 | 3.8 | 0.0 | 98 | 274 | 79 | 74 |
| 240 | 35.349 | 0.150 | 0.079 | 2.23 | 100 | -2.43 | 105 | 3.8 | 0.0 | 98 | 269 | 79 | 74 |
| 241 | 35.499 | 0.150 | 0.091 | 2.23 | 100 | -0.99 | 98 | 3.8 | 0.0 | 97 | 268 | 79 | 74 |
| 242 | 35.647 | 0.148 | 0.094 | 2.21 | 100 | -2.6 | 95 | 3.7 | -0.1 | 97 | 268 | 79 | 74 |
| 243 | 35.798 | 0.151 | 0.083 | 2.21 | 100 | 0 | 103 | 3.6 | -0.1 | 97 | 273 | 79 | 75 |
| 244 | 35.945 | 0.147 | 0.081 | 2.22 | 100 | -0.83 | 101 | 3.6 | 0.0 | 98 | 279 | 79 | 74 |
| 245 | 36.096 | 0.151 | 0.082 | 2.25 | 100 | -2.59 | 103 | 3.5 | -0.1 | 97 | 274 | 79 | 74 |
| 246 | 36.242 | 0.146 | 0.081 | 2.22 | 100 | -0.96 | 101 | 3.6 | 0.1 | 98 | 279 | 79 | 75 |
| 247 | 36.393 | 0.151 | 0.090 | 2.24 | 100 | -2.25 | 99 | 3.5 | -0.1 | 97 | 272 | 79 | 74 |
| 248 | 36.539 | 0.146 | 0.077 | 2.22 | 100 | -2.29 | 103 | 3.5 | 0.0 | 98 | 274 | 80 | 74 |
| 249 | 36.691 | 0.152 | 0.089 | 2.23 | 100 | -2.51 | 100 | 3.5 | 0.0 | 98 | 275 | 80 | 74 |
| 250 | 36.838 | 0.147 | 0.088 | 2.21 | 100 | -0.54 | 97 | 3.4 | -0.1 | 98 | 273 | 80 | 74 |
| 251 | 36.990 | 0.152 | 0.083 | 2.23 | 100 | -2.3 | 104 | 3.4 | 0.0 | 98 | 275 | 80 | 74 |
| 252 | 37.136 | 0.146 | 0.091 | 2.20 | 100 | -2.68 | 95 | 3.3 | -0.1 | 98 | 280 | 80 | 75 |
| 253 | 37.288 | 0.152 | 0.080 | 2.23 | 100 | -0.19 | 105 | 3.3 | 0.0 | 98 | 274 | 80 | 74 |
| 254 | 37.435 | 0.147 | 0.094 | 2.23 | 100 | 0 | 94 | 3.3 | 0.0 | 98 | 277 | 80 | 74 |
| 255 | 37.585 | 0.150 | 0.084 | 2.25 | 100 | -0.47 | 102 | 3.2 | -0.1 | 98 | 276 | 80 | 74 |
| 256 | 37.732 | 0.147 | 0.089 | 2.24 | 100 | -2.08 | 97 | 3.2 | 0.0 | 98 | 275 | 80 | 74 |
| 257 | 37.883 | 0.151 | 0.075 | 2.23 | 100 | -1.15 | 108 | 3.2 | 0.0 | 98 | 270 | 80 | 74 |
| 258 | 38.031 | 0.148 | 0.090 | 2.23 | 100 | -0.18 | 97 | 3.2 | 0.0 | 97 | 267 | 80 | 74 |
| 259 | 38.180 | 0.149 | 0.088 | 2.21 | 100 | 0 | 98 | 3.2 | 0.0 | 97 | 270 | 80 | 74 |
| 260 | 38.330 | 0.150 | 0.091 | 2.24 | 100 | -2.19 | 98 | 3.1 | -0.1 | 97 | 275 | 80 | 74 |
| 261 | 38.479 | 0.149 | 0.083 | 2.20 | 100 | -2.47 | 101 | 3.1 | 0.0 | 97 | 278 | 80 | 74 |
| 262 | 38.629 | 0.150 | 0.087 | 2.23 | 100 | -1.08 | 100 | 3.1 | 0.0 | 98 | 280 | 79 | 74 |
| 263 | 38.777 | 0.148 | 0.082 | 2.23 | 100 | -2.38 | 101 | 3.0 | -0.1 | 98 | 275 | 79 | 74 |

# BOX A TEST DATA - ASTM E2779 / ASTM E2515

Client: IHP
Model: Winslow
Run #: 1

Job #: 19-510
Tracking #: N/A
Technician: AK
Date: 8/16/2019

| | Particulate Sampling Data | | | | | | | Fuel Weight (lb) | | Temperature Data (°F) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Elapsed Time (min) | Gas Meter ($ft^3$) | Sample Rate (cfm) | Dilution Tunnel dP (in $H_2O$) | Orifice dH (in $H_2O$) | Meter Temp (°F) | Meter Vacuum (in Hg) | Pro. Rate (%) | Scale Reading | Weight Change | Dilution Tunnel | Flue | Filter | Ambient |
| 264 | 38.928 | 0.151 | 0.088 | 2.23 | 100 | -0.68 | 100 | 3.0 | 0.0 | 97 | 271 | 79 | 74 |
| 265 | 39.074 | 0.146 | 0.083 | 2.23 | 100 | -1.52 | 99 | 2.9 | -0.1 | 98 | 271 | 79 | 74 |
| 266 | 39.225 | 0.151 | 0.086 | 2.21 | 100 | 0 | 101 | 2.9 | 0.0 | 98 | 273 | 79 | 74 |
| 267 | 39.372 | 0.147 | 0.082 | 2.22 | 100 | -1.76 | 101 | 2.9 | 0.0 | 98 | 269 | 79 | 74 |
| 268 | 39.523 | 0.151 | 0.087 | 2.23 | 100 | -0.42 | 100 | 2.9 | 0.0 | 98 | 273 | 79 | 74 |
| 269 | 39.669 | 0.146 | 0.088 | 2.22 | 100 | 0 | 97 | 2.9 | 0.0 | 98 | 275 | 79 | 74 |
| 270 | 39.822 | 0.153 | 0.079 | 2.23 | 100 | -0.07 | 107 | 2.8 | -0.1 | 98 | 273 | 80 | 74 |
| 271 | 39.969 | 0.147 | 0.078 | 2.21 | 100 | 0 | 103 | 2.8 | 0.0 | 98 | 279 | 80 | 74 |
| 272 | 40.120 | 0.151 | 0.087 | 2.22 | 100 | 0 | 100 | 2.7 | -0.1 | 98 | 278 | 80 | 75 |
| 273 | 40.267 | 0.147 | 0.089 | 2.20 | 100 | -0.9 | 97 | 2.7 | 0.0 | 98 | 277 | 80 | 74 |
| 274 | 40.418 | 0.151 | 0.083 | 2.23 | 100 | -2.35 | 103 | 2.7 | 0.0 | 98 | 277 | 80 | 75 |
| 275 | 40.565 | 0.147 | 0.084 | 2.24 | 100 | 0 | 100 | 2.7 | 0.0 | 98 | 279 | 80 | 75 |
| 276 | 40.715 | 0.150 | 0.090 | 2.21 | 100 | -0.99 | 98 | 2.7 | 0.0 | 98 | 275 | 80 | 75 |
| 277 | 40.863 | 0.148 | 0.078 | 2.22 | 100 | -2.07 | 104 | 2.6 | -0.1 | 98 | 272 | 80 | 75 |
| 278 | 41.012 | 0.149 | 0.097 | 2.22 | 100 | -0.32 | 94 | 2.6 | 0.0 | 98 | 280 | 80 | 75 |
| 279 | 41.161 | 0.149 | 0.090 | 2.21 | 100 | -2.16 | 97 | 2.5 | -0.1 | 98 | 281 | 80 | 75 |
| 280 | 41.311 | 0.150 | 0.087 | 2.23 | 100 | 0 | 100 | 2.5 | 0.0 | 98 | 273 | 80 | 75 |
| 281 | 41.461 | 0.150 | 0.088 | 2.22 | 100 | -2.38 | 99 | 2.4 | -0.1 | 98 | 275 | 80 | 74 |
| 282 | 41.609 | 0.148 | 0.090 | 2.22 | 100 | -2.43 | 97 | 2.4 | 0.0 | 98 | 277 | 80 | 74 |
| 283 | 41.760 | 0.151 | 0.081 | 2.20 | 100 | -0.37 | 104 | 2.4 | 0.0 | 98 | 278 | 80 | 74 |
| 284 | 41.907 | 0.147 | 0.089 | 2.22 | 100 | 0 | 97 | 2.3 | -0.1 | 98 | 280 | 80 | 74 |
| 285 | 42.057 | 0.150 | 0.087 | 2.23 | 100 | -0.95 | 100 | 2.3 | 0.0 | 98 | 279 | 80 | 75 |
| 286 | 42.204 | 0.147 | 0.090 | 2.21 | 100 | 0 | 96 | 2.3 | 0.0 | 98 | 276 | 80 | 74 |
| 287 | 42.356 | 0.152 | 0.086 | 2.22 | 100 | -0.15 | 102 | 2.2 | -0.1 | 98 | 273 | 80 | 75 |
| 288 | 42.501 | 0.145 | 0.089 | 2.23 | 100 | 0 | 95 | 2.3 | 0.1 | 98 | 273 | 80 | 75 |
| 289 | 42.654 | 0.153 | 0.089 | 2.21 | 100 | -2.45 | 101 | 2.2 | -0.1 | 98 | 281 | 80 | 75 |
| 290 | 42.800 | 0.146 | 0.084 | 2.22 | 100 | -2.45 | 99 | 2.2 | 0.0 | 98 | 269 | 80 | 75 |
| 291 | 42.953 | 0.153 | 0.097 | 2.22 | 100 | -0.02 | 96 | 2.1 | -0.1 | 98 | 267 | 80 | 75 |
| 292 | 43.099 | 0.146 | 0.087 | 2.21 | 100 | -2.41 | 97 | 2.1 | 0.0 | 98 | 275 | 80 | 75 |
| 293 | 43.251 | 0.152 | 0.078 | 2.20 | 100 | 0 | 107 | 2.1 | 0.0 | 98 | 273 | 80 | 75 |
| 294 | 43.397 | 0.146 | 0.078 | 2.22 | 100 | -2.68 | 103 | 2.0 | -0.1 | 98 | 274 | 80 | 75 |
| 295 | 43.548 | 0.151 | 0.081 | 2.21 | 100 | -0.15 | 104 | 2.1 | 0.1 | 98 | 273 | 80 | 75 |
| 296 | 43.695 | 0.147 | 0.083 | 2.21 | 100 | -0.86 | 100 | 2.0 | -0.1 | 98 | 271 | 80 | 75 |

# BOX A TEST DATA - ASTM E2779 / ASTM E2515

Client: IHP
Model: Winslow
Run #: 1

Job #: 19-510
Tracking #: N/A
Technician: AK
Date: 8/16/2019

| | Particulate Sampling Data | | | | | | | Fuel Weight (lb) | | Temperature Data (°F) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Elapsed Time (min) | Gas Meter ($ft^3$) | Sample Rate (cfm) | Dilution Tunnel dP (in $H_2O$) | Orifice dH (in $H_2O$) | Meter Temp (°F) | Meter Vacuum (in Hg) | Pro. Rate (%) | Scale Reading | Weight Change | Dilution Tunnel | Flue | Filter | Ambient |
| 297 | 43.845 | 0.150 | 0.080 | 2.21 | 100 | -2.58 | 104 | 1.9 | -0.1 | 98 | 276 | 80 | 75 |
| 298 | 43.993 | 0.148 | 0.092 | 2.22 | 100 | -2.21 | 96 | 1.9 | 0.0 | 98 | 284 | 80 | 75 |
| 299 | 44.143 | 0.150 | 0.087 | 2.21 | 100 | -0.85 | 100 | 1.9 | 0.0 | 98 | 278 | 80 | 75 |
| 300 | 44.293 | 0.150 | 0.080 | 2.22 | 100 | -1.45 | 104 | 1.9 | 0.0 | 98 | 272 | 80 | 75 |
| 301 | 44.441 | 0.148 | 0.081 | 2.21 | 100 | -1.17 | 102 | 1.8 | -0.1 | 97 | 276 | 80 | 75 |
| 302 | 44.592 | 0.151 | 0.081 | 2.24 | 100 | 0 | 104 | 1.8 | 0.0 | 98 | 279 | 80 | 75 |
| 303 | 44.739 | 0.147 | 0.087 | 2.19 | 100 | -2.53 | 98 | 1.8 | 0.0 | 98 | 275 | 80 | 75 |
| 304 | 44.890 | 0.151 | 0.085 | 2.22 | 100 | -2.04 | 102 | 1.7 | -0.1 | 98 | 272 | 80 | 75 |
| 305 | 45.036 | 0.146 | 0.084 | 2.22 | 100 | -0.4 | 99 | 1.7 | 0.0 | 98 | 273 | 80 | 75 |
| 306 | 45.187 | 0.151 | 0.088 | 2.19 | 100 | -2.49 | 100 | 1.7 | 0.0 | 98 | 275 | 80 | 75 |
| 307 | 45.334 | 0.147 | 0.082 | 2.21 | 100 | 0 | 101 | 1.6 | -0.1 | 98 | 280 | 80 | 75 |
| 308 | 45.485 | 0.151 | 0.078 | 2.21 | 100 | -2.51 | 106 | 1.6 | 0.0 | 98 | 280 | 80 | 75 |
| 309 | 45.631 | 0.146 | 0.094 | 2.21 | 100 | 0 | 93 | 1.6 | 0.0 | 98 | 279 | 80 | 75 |
| 310 | 45.784 | 0.153 | 0.091 | 2.22 | 100 | -2.05 | 100 | 1.6 | 0.0 | 98 | 275 | 80 | 75 |
| 311 | 45.930 | 0.146 | 0.086 | 2.22 | 100 | -2.7 | 98 | 1.5 | -0.1 | 98 | 276 | 80 | 75 |
| 312 | 46.082 | 0.152 | 0.085 | 2.20 | 100 | -1.64 | 102 | 1.5 | 0.0 | 98 | 275 | 80 | 75 |
| 313 | 46.229 | 0.147 | 0.096 | 2.20 | 100 | 0 | 93 | 1.5 | 0.0 | 98 | 268 | 80 | 75 |
| 314 | 46.380 | 0.151 | 0.090 | 2.22 | 100 | -0.01 | 99 | 1.4 | -0.1 | 98 | 274 | 80 | 75 |
| 315 | 46.526 | 0.146 | 0.087 | 2.21 | 100 | -1.11 | 97 | 1.4 | 0.0 | 98 | 275 | 80 | 75 |
| 316 | 46.676 | 0.150 | 0.091 | 2.21 | 100 | 0 | 98 | 1.4 | 0.0 | 98 | 276 | 80 | 75 |
| 317 | 46.824 | 0.148 | 0.090 | 2.22 | 100 | -2.63 | 97 | 1.3 | -0.1 | 98 | 283 | 80 | 75 |
| 318 | 46.974 | 0.150 | 0.089 | 2.20 | 100 | -2.46 | 99 | 1.3 | 0.0 | 98 | 281 | 80 | 75 |
| 319 | 47.122 | 0.148 | 0.091 | 2.21 | 101 | 0 | 96 | 1.3 | 0.0 | 98 | 272 | 80 | 75 |
| 320 | 47.272 | 0.150 | 0.089 | 2.20 | 101 | 0 | 99 | 1.3 | 0.0 | 98 | 267 | 80 | 75 |
| 321 | 47.422 | 0.150 | 0.082 | 2.21 | 101 | -2.41 | 103 | 1.2 | -0.1 | 98 | 264 | 80 | 75 |
| 322 | 47.570 | 0.148 | 0.090 | 2.19 | 100 | -0.72 | 97 | 1.2 | 0.0 | 98 | 268 | 80 | 75 |
| 323 | 47.720 | 0.150 | 0.080 | 2.21 | 101 | -0.18 | 104 | 1.0 | -0.2 | 98 | 274 | 80 | 75 |
| 324 | 47.868 | 0.148 | 0.087 | 2.23 | 101 | -2.37 | 98 | 1.1 | 0.1 | 98 | 276 | 80 | 75 |
| 325 | 48.018 | 0.150 | 0.083 | 2.22 | 101 | -0.96 | 102 | 1.1 | 0.0 | 98 | 283 | 80 | 75 |
| 326 | 48.164 | 0.146 | 0.091 | 2.22 | 101 | -1.52 | 95 | 1.0 | -0.1 | 98 | 281 | 80 | 75 |
| 327 | 48.316 | 0.152 | 0.089 | 2.24 | 101 | 0 | 100 | 1.0 | 0.0 | 98 | 279 | 80 | 75 |
| 328 | 48.462 | 0.146 | 0.092 | 2.21 | 101 | -0.67 | 94 | 1.0 | 0.0 | 98 | 273 | 80 | 75 |
| 329 | 48.613 | 0.151 | 0.094 | 2.20 | 101 | -0.27 | 96 | 1.0 | 0.0 | 98 | 273 | 80 | 75 |

# BOX A TEST DATA - ASTM E2779 / ASTM E2515

Client: IHP
Model: Winslow
Run #: 1

Job #: 19-510
Tracking #: N/A
Technician: AK
Date: 8/16/2019

| | Particulate Sampling Data | | | | | | | Fuel Weight (lb) | | Temperature Data (°F) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Elapsed Time (min) | Gas Meter ($ft^3$) | Sample Rate (cfm) | Dilution Tunnel dP (in $H_2O$) | Orifice dH (in $H_2O$) | Meter Temp (°F) | Meter Vacuum (in Hg) | Pro. Rate (%) | Scale Reading | Weight Change | Dilution Tunnel | Flue | Filter | Ambient |
| 330 | 48.760 | 0.147 | 0.081 | 2.21 | 101 | 0 | 101 | 0.9 | -0.1 | 98 | 275 | 80 | 75 |
| 331 | 48.912 | 0.152 | 0.087 | 2.20 | 101 | -1.65 | 101 | 0.9 | 0.0 | 99 | 283 | 80 | 75 |
| 332 | 49.058 | 0.146 | 0.085 | 2.20 | 101 | 0 | 98 | 0.8 | -0.1 | 99 | 281 | 80 | 75 |
| 333 | 49.210 | 0.152 | 0.090 | 2.21 | 101 | 0 | 99 | 0.9 | 0.1 | 98 | 275 | 80 | 75 |
| 334 | 49.356 | 0.146 | 0.085 | 2.18 | 101 | -2.24 | 98 | 0.8 | -0.1 | 98 | 276 | 80 | 75 |
| 335 | 49.507 | 0.151 | 0.085 | 2.21 | 101 | -2.71 | 102 | 0.8 | 0.0 | 99 | 281 | 80 | 75 |
| 336 | 49.653 | 0.146 | 0.090 | 2.21 | 101 | 0 | 95 | 0.7 | -0.1 | 99 | 281 | 80 | 75 |
| 337 | 49.803 | 0.150 | 0.088 | 2.20 | 101 | 0 | 99 | 0.7 | 0.0 | 99 | 270 | 80 | 75 |
| 338 | 49.951 | 0.148 | 0.085 | 2.22 | 101 | -0.63 | 99 | 0.7 | 0.0 | 98 | 267 | 80 | 75 |
| 339 | 50.101 | 0.150 | 0.088 | 2.22 | 101 | 0 | 99 | 0.6 | -0.1 | 98 | 272 | 80 | 75 |
| 340 | 50.249 | 0.148 | 0.086 | 2.19 | 101 | 0 | 99 | 0.6 | 0.0 | 99 | 274 | 80 | 75 |
| 341 | 50.399 | 0.150 | 0.086 | 2.23 | 101 | 0 | 100 | 0.5 | -0.1 | 98 | 279 | 80 | 75 |
| 342 | 50.548 | 0.149 | 0.087 | 2.18 | 101 | -1.21 | 99 | 0.6 | 0.1 | 98 | 275 | 80 | 75 |
| 343 | 50.696 | 0.148 | 0.085 | 2.21 | 101 | -2.66 | 99 | 0.4 | -0.2 | 98 | 263 | 80 | 76 |
| 344 | 50.847 | 0.151 | 0.089 | 2.22 | 101 | -2.53 | 99 | 0.5 | 0.1 | 98 | 265 | 80 | 76 |
| 345 | 50.994 | 0.147 | 0.087 | 2.20 | 101 | -1.97 | 98 | 0.5 | 0.0 | 98 | 275 | 80 | 76 |
| 346 | 51.145 | 0.151 | 0.094 | 2.20 | 101 | -0.06 | 97 | 0.4 | -0.1 | 99 | 283 | 80 | 75 |
| 347 | 51.291 | 0.146 | 0.085 | 2.22 | 101 | 0 | 98 | 0.4 | 0.0 | 99 | 279 | 80 | 75 |
| 348 | 51.442 | 0.151 | 0.084 | 2.20 | 101 | -2.61 | 102 | 0.4 | 0.0 | 98 | 263 | 80 | 75 |
| 349 | 51.588 | 0.146 | 0.090 | 2.22 | 101 | -2.75 | 95 | 0.3 | -0.1 | 98 | 270 | 80 | 76 |
| 350 | 51.739 | 0.151 | 0.089 | 2.22 | 101 | -0.23 | 99 | 0.4 | 0.1 | 99 | 282 | 80 | 76 |
| 351 | 51.885 | 0.146 | 0.095 | 2.19 | 101 | -2.68 | 93 | 0.3 | -0.1 | 99 | 284 | 80 | 75 |
| 352 | 52.038 | 0.153 | 0.085 | 2.22 | 101 | -1.85 | 103 | 0.2 | -0.1 | 99 | 276 | 80 | 75 |
| 353 | 52.184 | 0.146 | 0.087 | 2.20 | 101 | -2.41 | 97 | 0.2 | 0.0 | 98 | 274 | 80 | 75 |
| 354 | 52.336 | 0.152 | 0.082 | 2.20 | 101 | -2.64 | 104 | 0.2 | 0.0 | 99 | 281 | 80 | 76 |
| 355 | 52.482 | 0.146 | 0.083 | 2.22 | 101 | -1.82 | 99 | 0.1 | -0.1 | 99 | 281 | 80 | 75 |
| 356 | 52.634 | 0.152 | 0.088 | 2.21 | 101 | 0 | 100 | 0.1 | 0.0 | 99 | 279 | 80 | 75 |
| 357 | 52.780 | 0.146 | 0.085 | 2.20 | 101 | -2.68 | 98 | 0.1 | 0.0 | 99 | 279 | 81 | 75 |
| 358 | 52.930 | 0.150 | 0.089 | 2.21 | 101 | -1.81 | 99 | 0.1 | 0.0 | 99 | 273 | 81 | 75 |
| 359 | 53.078 | 0.148 | 0.091 | 2.22 | 101 | 0 | 96 | 0.0 | -0.1 | 98 | 273 | 80 | 76 |
| 360 | 53.227 | 0.149 | 0.088 | 2.21 | 101 | -2.55 | 98 | 0.0 | 0.0 | 98 | 277 | 81 | 76 |
| Avg/Tot | 53.227 | 0.148 | 0.086 | 2.21 | 96 | -1.29 | 100 | | | 103 | 321 | 80 | 74 |

# BOX B TEST DATA - ASTM E2779 / ASTM E2515

Client: IHP
Model: Winslow
Run #: 1

Job #: 19-510
Tracking #: N/A
Technician: AK
Date: 8/16/2019

| | Particulate Sampling Data | | | | | | | Flue Gas Data | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Elapsed Time (min) | Gas Meter ($ft^3$) | Sample Rate (cfm) | Orifice dH (in $H_2O$) | Meter Temp (°F) | Meter Vacuum (in Hg) | Pro. Rate (%) | Filter (°F) | Flue Draft (in $H_2O$) | $CO_2$ (%) | CO (%) |
| 0 | 0.000 | | 0.00 | 76 | -1 | | 74 | 0.000 | 8.01 | 0.04 |
| 1 | 0.128 | 0.128 | 2.21 | 76 | -3.07 | 94 | 72 | -0.070 | 7.82 | 0.05 |
| 2 | 0.269 | 0.141 | 2.22 | 76 | -0.33 | 101 | 75 | -0.070 | 7.21 | 0.03 |
| 3 | 0.416 | 0.147 | 2.21 | 76 | -2.79 | 114 | 76 | -0.070 | 8.19 | 0.05 |
| 4 | 0.558 | 0.142 | 2.20 | 76 | -1.57 | 105 | 76 | -0.060 | 7.10 | 0.05 |
| 5 | 0.704 | 0.146 | 2.21 | 76 | -0.87 | 109 | 77 | -0.070 | 7.90 | 0.02 |
| 6 | 0.846 | 0.142 | 2.23 | 76 | -0.58 | 103 | 77 | -0.060 | 8.28 | 0.03 |
| 7 | 0.990 | 0.144 | 2.20 | 76 | -2.46 | 107 | 78 | -0.070 | 6.87 | 0.02 |
| 8 | 1.132 | 0.142 | 2.19 | 76 | -0.63 | 104 | 78 | -0.080 | 8.51 | 0.07 |
| 9 | 1.274 | 0.142 | 2.18 | 76 | -0.97 | 101 | 78 | -0.070 | 8.11 | 0.06 |
| 10 | 1.418 | 0.144 | 2.19 | 76 | -2.68 | 104 | 79 | -0.070 | 7.76 | 0.03 |
| 11 | 1.559 | 0.141 | 2.19 | 76 | -1.98 | 101 | 79 | -0.050 | 7.47 | 0.05 |
| 12 | 1.705 | 0.146 | 2.19 | 77 | -0.42 | 110 | 79 | -0.060 | 7.62 | 0.03 |
| 13 | 1.846 | 0.141 | 2.19 | 77 | -1.96 | 102 | 79 | -0.070 | 6.82 | 0.05 |
| 14 | 1.991 | 0.145 | 2.18 | 77 | -1.13 | 108 | 79 | -0.070 | 8.48 | 0.04 |
| 15 | 2.130 | 0.139 | 2.17 | 77 | -2.99 | 102 | 79 | -0.050 | 7.85 | 0.03 |
| 16 | 2.276 | 0.146 | 2.17 | 78 | -1.91 | 106 | 79 | -0.060 | 8.18 | 0.03 |
| 17 | 2.417 | 0.141 | 2.17 | 78 | -2.99 | 105 | 80 | -0.070 | 8.57 | 0.05 |
| 18 | 2.562 | 0.145 | 2.17 | 78 | -0.67 | 105 | 80 | -0.070 | 7.78 | 0.02 |
| 19 | 2.703 | 0.141 | 2.18 | 78 | -2.14 | 105 | 80 | -0.070 | 8.01 | 0.03 |
| 20 | 2.846 | 0.143 | 2.16 | 79 | -0.62 | 102 | 80 | -0.070 | 9.08 | 0.02 |
| 21 | 2.988 | 0.142 | 2.16 | 79 | -2.85 | 102 | 80 | -0.070 | 8.02 | 0.02 |
| 22 | 3.130 | 0.142 | 2.15 | 79 | -2.34 | 103 | 80 | -0.070 | 7.98 | 0.05 |
| 23 | 3.274 | 0.144 | 2.16 | 80 | -1.06 | 103 | 80 | -0.070 | 8.87 | 0.08 |
| 24 | 3.416 | 0.142 | 2.16 | 80 | -0.8 | 103 | 80 | -0.050 | 8.17 | 0.04 |
| 25 | 3.560 | 0.144 | 2.15 | 80 | -0.52 | 104 | 80 | -0.070 | 7.53 | 0.05 |
| 26 | 3.701 | 0.141 | 2.15 | 81 | -2.95 | 100 | 81 | -0.060 | 8.31 | 0.04 |
| 27 | 3.845 | 0.144 | 2.14 | 81 | -2.3 | 104 | 81 | -0.060 | 7.77 | 0.05 |
| 28 | 3.986 | 0.141 | 2.15 | 81 | -0.61 | 102 | 81 | -0.070 | 8.58 | 0.03 |
| 29 | 4.131 | 0.145 | 2.15 | 82 | -0.87 | 101 | 81 | -0.080 | 7.37 | 0.06 |
| 30 | 4.272 | 0.141 | 2.15 | 82 | -0.92 | 100 | 81 | -0.060 | 8.07 | 0.07 |
| 31 | 4.416 | 0.144 | 2.15 | 82 | -2.75 | 101 | 81 | -0.070 | 7.70 | 0.04 |

# BOX B TEST DATA - ASTM E2779 / ASTM E2515

Client: IHP
Model: Winslow
Run #: 1

Job #: 19-510
Tracking #: N/A
Technician: AK
Date: 8/16/2019

| | Particulate Sampling Data | | | | | | | Flue Gas Data | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Elapsed Time (min) | Gas Meter ($ft^3$) | Sample Rate (cfm) | Orifice dH (in $H_2O$) | Meter Temp (°F) | Meter Vacuum (in Hg) | Pro. Rate (%) | Filter (°F) | Flue Draft (in $H_2O$) | $CO_2$ (%) | CO (%) |
| 32 | 4.558 | 0.142 | 2.15 | 83 | -1.75 | 102 | 81 | -0.070 | 8.78 | 0.03 |
| 33 | 4.699 | 0.141 | 2.14 | 83 | -1.67 | 97 | 81 | -0.070 | 7.63 | 0.05 |
| 34 | 4.843 | 0.144 | 2.14 | 83 | -2.94 | 107 | 81 | -0.060 | 7.88 | 0.04 |
| 35 | 4.984 | 0.141 | 2.14 | 83 | -0.38 | 103 | 81 | -0.060 | 7.60 | 0.02 |
| 36 | 5.130 | 0.146 | 2.15 | 84 | -0.91 | 105 | 81 | -0.080 | 7.23 | 0.07 |
| 37 | 5.270 | 0.140 | 2.14 | 84 | -1.27 | 102 | 81 | -0.060 | 7.62 | 0.01 |
| 38 | 5.416 | 0.146 | 2.14 | 84 | -3.08 | 107 | 81 | -0.060 | 7.57 | 0.01 |
| 39 | 5.555 | 0.139 | 2.14 | 85 | -0.9 | 102 | 81 | -0.060 | 8.01 | 0.01 |
| 40 | 5.700 | 0.145 | 2.13 | 85 | -2.87 | 107 | 81 | -0.080 | 8.00 | 0.06 |
| 41 | 5.841 | 0.141 | 2.14 | 85 | -1.89 | 101 | 81 | -0.070 | 8.08 | 0.06 |
| 42 | 5.986 | 0.145 | 2.14 | 85 | -3.01 | 103 | 81 | -0.060 | 8.00 | 0.05 |
| 43 | 6.128 | 0.142 | 2.13 | 86 | -0.79 | 100 | 81 | -0.070 | 7.20 | 0.04 |
| 44 | 6.271 | 0.143 | 2.13 | 86 | -0.77 | 104 | 81 | -0.060 | 8.38 | 0.07 |
| 45 | 6.414 | 0.143 | 2.13 | 86 | -2.55 | 102 | 82 | -0.060 | 7.36 | 0.06 |
| 46 | 6.555 | 0.141 | 2.13 | 86 | -0.47 | 99 | 82 | -0.060 | 8.42 | 0.04 |
| 47 | 6.699 | 0.144 | 2.13 | 87 | -0.77 | 101 | 82 | -0.060 | 8.48 | 0.02 |
| 48 | 6.841 | 0.142 | 2.14 | 87 | -2.41 | 99 | 82 | -0.070 | 7.15 | 0.07 |
| 49 | 6.986 | 0.145 | 2.14 | 87 | -0.58 | 102 | 82 | -0.080 | 8.88 | 0.04 |
| 50 | 7.127 | 0.141 | 2.13 | 87 | -2.82 | 102 | 82 | -0.070 | 6.63 | 0.01 |
| 51 | 7.272 | 0.145 | 2.13 | 87 | -2.5 | 102 | 82 | -0.060 | 7.88 | 0.05 |
| 52 | 7.412 | 0.140 | 2.13 | 88 | -0.61 | 102 | 82 | -0.060 | 7.62 | 0.08 |
| 53 | 7.557 | 0.145 | 2.13 | 88 | -1.45 | 101 | 82 | -0.060 | 7.98 | 0.04 |
| 54 | 7.698 | 0.141 | 2.13 | 88 | -0.56 | 100 | 82 | -0.060 | 9.11 | 0.09 |
| 55 | 7.843 | 0.145 | 2.13 | 88 | -2.95 | 96 | 82 | -0.070 | 7.37 | 0.02 |
| 56 | 7.986 | 0.143 | 2.13 | 88 | -0.56 | 101 | 82 | -0.070 | 6.70 | 0.02 |
| 57 | 8.129 | 0.143 | 2.12 | 89 | -1.02 | 102 | 82 | -0.050 | 8.39 | 0.04 |
| 58 | 8.272 | 0.143 | 2.11 | 89 | -3.05 | 100 | 82 | -0.070 | 8.41 | 0.04 |
| 59 | 8.413 | 0.141 | 2.11 | 89 | -3.1 | 98 | 82 | -0.070 | 7.75 | 0.03 |
| 60 | 8.557 | 0.144 | 2.11 | 89 | -2.43 | 101 | 82 | -0.060 | 8.23 | 0.06 |
| 61 | 8.699 | 0.142 | 2.11 | 89 | -2.91 | 98 | 82 | -0.070 | 7.40 | 0.04 |
| 62 | 8.845 | 0.146 | 2.12 | 89 | -1.41 | 102 | 82 | -0.060 | 3.82 | 0.05 |
| 63 | 8.986 | 0.141 | 2.10 | 90 | -2.73 | 101 | 82 | -0.060 | 4.23 | 0.05 |

# BOX B TEST DATA - ASTM E2779 / ASTM E2515

Client: IHP
Model: Winslow
Run #: 1

Job #: 19-510
Tracking #: N/A
Technician: AK
Date: 8/16/2019

| | Particulate Sampling Data | | | | | | | Flue Gas Data | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Elapsed Time (min) | Gas Meter ($ft^3$) | Sample Rate (cfm) | Orifice dH (in $H_2O$) | Meter Temp (°F) | Meter Vacuum (in Hg) | Pro. Rate (%) | Filter (°F) | Flue Draft (in $H_2O$) | $CO_2$ (%) | CO (%) |
| 64 | 9.131 | 0.145 | 2.13 | 90 | -2.06 | 103 | 82 | -0.060 | 2.64 | 0.07 |
| 65 | 9.272 | 0.141 | 2.13 | 90 | -2.99 | 102 | 82 | -0.060 | 2.54 | 0.07 |
| 66 | 9.417 | 0.145 | 2.12 | 90 | -2.43 | 106 | 82 | -0.080 | 4.80 | 0.03 |
| 67 | 9.558 | 0.141 | 2.13 | 90 | -0.68 | 96 | 82 | -0.060 | 3.14 | 0.03 |
| 68 | 9.704 | 0.146 | 2.12 | 90 | -1.7 | 103 | 82 | -0.050 | 2.41 | 0.06 |
| 69 | 9.846 | 0.142 | 2.13 | 91 | -2.91 | 98 | 82 | -0.050 | 2.98 | 0.06 |
| 70 | 9.991 | 0.145 | 2.12 | 91 | -0.99 | 104 | 82 | -0.060 | 2.15 | 0.06 |
| 71 | 10.133 | 0.142 | 2.13 | 91 | -1.34 | 98 | 82 | -0.070 | 3.23 | 0.05 |
| 72 | 10.277 | 0.144 | 2.12 | 91 | -2.6 | 99 | 82 | -0.060 | 4.26 | 0.07 |
| 73 | 10.420 | 0.143 | 2.12 | 91 | -0.47 | 101 | 82 | -0.060 | 3.57 | 0.07 |
| 74 | 10.561 | 0.141 | 2.12 | 91 | -1 | 99 | 82 | -0.070 | 1.77 | 0.10 |
| 75 | 10.707 | 0.146 | 2.12 | 91 | -2.22 | 104 | 82 | -0.060 | 3.45 | 0.05 |
| 76 | 10.848 | 0.141 | 2.12 | 92 | -1.34 | 99 | 82 | -0.060 | 2.72 | 0.06 |
| 77 | 10.995 | 0.147 | 2.12 | 92 | -1.98 | 103 | 81 | -0.060 | 3.22 | 0.05 |
| 78 | 11.136 | 0.141 | 2.10 | 92 | -0.69 | 99 | 81 | -0.060 | 3.88 | 0.03 |
| 79 | 11.282 | 0.146 | 2.12 | 92 | -1.68 | 100 | 81 | -0.050 | 3.22 | 0.05 |
| 80 | 11.423 | 0.141 | 2.11 | 92 | -2.99 | 103 | 81 | -0.060 | 2.14 | 0.10 |
| 81 | 11.568 | 0.145 | 2.11 | 92 | -2.28 | 104 | 81 | -0.050 | 3.42 | 0.04 |
| 82 | 11.709 | 0.141 | 2.12 | 92 | -1.25 | 102 | 81 | -0.060 | 2.96 | 0.05 |
| 83 | 11.856 | 0.147 | 2.12 | 92 | -3.05 | 102 | 81 | -0.050 | 2.95 | 0.08 |
| 84 | 11.997 | 0.141 | 2.13 | 92 | -0.48 | 97 | 81 | -0.050 | 3.40 | 0.01 |
| 85 | 12.143 | 0.146 | 2.12 | 93 | -1.78 | 100 | 81 | -0.050 | 2.35 | 0.06 |
| 86 | 12.286 | 0.143 | 2.12 | 93 | -0.94 | 100 | 81 | -0.060 | 3.24 | 0.06 |
| 87 | 12.430 | 0.144 | 2.12 | 93 | -1.72 | 102 | 81 | -0.060 | 2.53 | 0.08 |
| 88 | 12.574 | 0.144 | 2.13 | 93 | -3.02 | 99 | 81 | -0.060 | 2.10 | 0.09 |
| 89 | 12.717 | 0.143 | 2.13 | 93 | -2.93 | 102 | 81 | -0.050 | 3.81 | 0.04 |
| 90 | 12.861 | 0.144 | 2.13 | 93 | -3.03 | 104 | 81 | -0.050 | 3.07 | 0.04 |
| 91 | 13.004 | 0.143 | 2.12 | 93 | -1.69 | 100 | 81 | -0.050 | 2.14 | 0.07 |
| 92 | 13.149 | 0.145 | 2.11 | 93 | -1.76 | 103 | 81 | -0.050 | 3.44 | 0.02 |
| 93 | 13.291 | 0.142 | 2.13 | 93 | -0.5 | 99 | 81 | -0.050 | 3.34 | 0.03 |
| 94 | 13.438 | 0.147 | 2.13 | 93 | -3.03 | 102 | 81 | -0.060 | 3.14 | 0.05 |
| 95 | 13.579 | 0.141 | 2.12 | 93 | -2.26 | 99 | 81 | -0.060 | 2.79 | 0.03 |

# BOX B TEST DATA - ASTM E2779 / ASTM E2515

Client: IHP
Model: Winslow
Run #: 1

Job #: 19-510
Tracking #: N/A
Technician: AK
Date: 8/16/2019

| | Particulate Sampling Data | | | | | | | Flue Gas Data | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Elapsed Time (min) | Gas Meter ($ft^3$) | Sample Rate (cfm) | Orifice dH (in $H_2O$) | Meter Temp (°F) | Meter Vacuum (in Hg) | Pro. Rate (%) | Filter (°F) | Flue Draft (in $H_2O$) | $CO_2$ (%) | CO (%) |
| 96 | 13.725 | 0.146 | 2.12 | 93 | -1.88 | 98 | 80 | -0.060 | 2.64 | 0.07 |
| 97 | 13.867 | 0.142 | 2.12 | 93 | -0.99 | 98 | 80 | -0.050 | 3.14 | 0.00 |
| 98 | 14.012 | 0.145 | 2.12 | 93 | -2.19 | 98 | 80 | -0.060 | 2.75 | 0.04 |
| 99 | 14.154 | 0.142 | 2.12 | 93 | -2.98 | 99 | 80 | -0.060 | 2.16 | 0.05 |
| 100 | 14.300 | 0.146 | 2.13 | 94 | -2.98 | 100 | 80 | -0.050 | 3.06 | 0.04 |
| 101 | 14.442 | 0.142 | 2.11 | 93 | -0.5 | 100 | 80 | -0.040 | 3.05 | 0.04 |
| 102 | 14.588 | 0.146 | 2.12 | 94 | -1.3 | 102 | 80 | -0.050 | 3.90 | 0.03 |
| 103 | 14.731 | 0.143 | 2.12 | 94 | -2.91 | 95 | 80 | -0.060 | 2.57 | 0.09 |
| 104 | 14.875 | 0.144 | 2.13 | 94 | -2.83 | 101 | 80 | -0.050 | 2.43 | 0.05 |
| 105 | 15.019 | 0.144 | 2.13 | 94 | -1.64 | 101 | 80 | -0.050 | 2.75 | 0.05 |
| 106 | 15.162 | 0.143 | 2.11 | 94 | -2.23 | 99 | 80 | -0.060 | 3.04 | 0.02 |
| 107 | 15.307 | 0.145 | 2.12 | 94 | -0.52 | 95 | 80 | -0.040 | 2.87 | 0.04 |
| 108 | 15.449 | 0.142 | 2.12 | 94 | -0.49 | 99 | 80 | -0.040 | 3.44 | 0.03 |
| 109 | 15.595 | 0.146 | 2.12 | 94 | -2.86 | 101 | 80 | -0.060 | 3.20 | 0.06 |
| 110 | 15.737 | 0.142 | 2.11 | 94 | -0.44 | 93 | 80 | -0.050 | 3.32 | 0.06 |
| 111 | 15.884 | 0.147 | 2.13 | 94 | -3 | 102 | 80 | -0.050 | 3.20 | 0.01 |
| 112 | 16.026 | 0.142 | 2.12 | 94 | -2.58 | 105 | 80 | -0.050 | 2.93 | 0.06 |
| 113 | 16.172 | 0.146 | 2.12 | 94 | -3.02 | 99 | 80 | -0.050 | 2.65 | 0.06 |
| 114 | 16.314 | 0.142 | 2.12 | 94 | -1.15 | 97 | 80 | -0.050 | 2.82 | 0.05 |
| 115 | 16.460 | 0.146 | 2.11 | 94 | -0.71 | 98 | 80 | -0.050 | 2.36 | 0.08 |
| 116 | 16.602 | 0.142 | 2.13 | 94 | -1.33 | 92 | 80 | -0.050 | 3.87 | 0.05 |
| 117 | 16.747 | 0.145 | 2.11 | 94 | -2.42 | 102 | 80 | -0.040 | 3.35 | 0.04 |
| 118 | 16.889 | 0.142 | 2.13 | 94 | -0.49 | 100 | 80 | -0.050 | 3.16 | 0.05 |
| 119 | 17.036 | 0.147 | 2.12 | 94 | -2 | 102 | 80 | -0.040 | 2.82 | 0.05 |
| 120 | 17.178 | 0.142 | 2.12 | 94 | -2.22 | 92 | 80 | -0.050 | 1.70 | 0.11 |
| 121 | 17.324 | 0.146 | 2.12 | 94 | -1.62 | 101 | 80 | -0.060 | 2.99 | 0.02 |
| 122 | 17.467 | 0.143 | 2.13 | 94 | -2.38 | 101 | 80 | -0.050 | 2.72 | 0.05 |
| 123 | 17.612 | 0.145 | 2.13 | 95 | -2.96 | 97 | 80 | -0.050 | 2.65 | 0.04 |
| 124 | 17.755 | 0.143 | 2.12 | 95 | -2.94 | 99 | 80 | -0.050 | 3.42 | 0.05 |
| 125 | 17.899 | 0.144 | 2.10 | 95 | -2.06 | 101 | 80 | -0.050 | 2.98 | 0.03 |
| 126 | 18.043 | 0.144 | 2.11 | 95 | -3.07 | 95 | 80 | -0.070 | 2.53 | 0.06 |
| 127 | 18.186 | 0.143 | 2.14 | 95 | -2.77 | 104 | 80 | -0.050 | 3.52 | 0.06 |

# BOX B TEST DATA - ASTM E2779 / ASTM E2515

Client: IHP
Model: Winslow
Run #: 1

Job #: 19-510
Tracking #: N/A
Technician: AK
Date: 8/16/2019

| | Particulate Sampling Data | | | | | | | Flue Gas Data | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Elapsed Time (min) | Gas Meter ($ft^3$) | Sample Rate (cfm) | Orifice dH (in $H_2O$) | Meter Temp (°F) | Meter Vacuum (in Hg) | Pro. Rate (%) | Filter (°F) | Flue Draft (in $H_2O$) | $CO_2$ (%) | CO (%) |
| 128 | 18.332 | 0.146 | 2.12 | 95 | -0.95 | 100 | 80 | -0.050 | 2.85 | 0.06 |
| 129 | 18.474 | 0.142 | 2.11 | 95 | -0.68 | 106 | 80 | -0.040 | 2.16 | 0.08 |
| 130 | 18.620 | 0.146 | 2.12 | 95 | -0.67 | 102 | 80 | -0.050 | 2.72 | 0.04 |
| 131 | 18.763 | 0.143 | 2.12 | 95 | -0.67 | 99 | 80 | -0.040 | 2.33 | 0.05 |
| 132 | 18.909 | 0.146 | 2.12 | 95 | -2.01 | 101 | 80 | -0.050 | 2.35 | 0.08 |
| 133 | 19.051 | 0.142 | 2.12 | 95 | -3.02 | 98 | 80 | -0.050 | 3.39 | 0.02 |
| 134 | 19.197 | 0.146 | 2.11 | 95 | -2.66 | 101 | 80 | -0.050 | 2.50 | 0.08 |
| 135 | 19.339 | 0.142 | 2.13 | 95 | -2.91 | 98 | 80 | -0.040 | 2.90 | 0.06 |
| 136 | 19.484 | 0.145 | 2.11 | 95 | -0.46 | 103 | 80 | -0.050 | 3.02 | 0.05 |
| 137 | 19.626 | 0.142 | 2.11 | 95 | -1.68 | 95 | 80 | -0.050 | 3.13 | 0.02 |
| 138 | 19.773 | 0.147 | 2.13 | 95 | -3.09 | 108 | 80 | -0.050 | 3.09 | 0.03 |
| 139 | 19.915 | 0.142 | 2.13 | 95 | -2.9 | 101 | 80 | -0.050 | 2.94 | 0.07 |
| 140 | 20.061 | 0.146 | 2.12 | 95 | -0.54 | 100 | 80 | -0.050 | 2.73 | 0.02 |
| 141 | 20.204 | 0.143 | 2.11 | 95 | -2.69 | 96 | 80 | -0.040 | 3.32 | 0.03 |
| 142 | 20.349 | 0.145 | 2.12 | 95 | -2.31 | 104 | 80 | -0.040 | 3.22 | 0.06 |
| 143 | 20.493 | 0.144 | 2.13 | 95 | -1.4 | 97 | 80 | -0.060 | 1.98 | 0.10 |
| 144 | 20.636 | 0.143 | 2.11 | 95 | -2.07 | 101 | 80 | -0.050 | 2.63 | 0.07 |
| 145 | 20.780 | 0.144 | 2.11 | 95 | -2.95 | 98 | 80 | -0.060 | 4.06 | 0.03 |
| 146 | 20.923 | 0.143 | 2.11 | 96 | -1.15 | 101 | 80 | -0.050 | 2.90 | 0.03 |
| 147 | 21.069 | 0.146 | 2.12 | 96 | -0.52 | 103 | 80 | -0.050 | 2.74 | 0.05 |
| 148 | 21.211 | 0.142 | 2.10 | 96 | -1.68 | 101 | 80 | -0.050 | 3.52 | 0.05 |
| 149 | 21.358 | 0.147 | 2.12 | 96 | -1.71 | 103 | 80 | -0.040 | 2.93 | 0.06 |
| 150 | 21.500 | 0.142 | 2.11 | 96 | -2.61 | 96 | 80 | -0.050 | 1.99 | 0.08 |
| 151 | 21.647 | 0.147 | 2.11 | 96 | -2.94 | 106 | 80 | -0.050 | 3.44 | 0.03 |
| 152 | 21.788 | 0.141 | 2.12 | 96 | -2.35 | 95 | 80 | -0.040 | 2.49 | 0.04 |
| 153 | 21.935 | 0.147 | 2.12 | 96 | -1.37 | 101 | 80 | -0.050 | 2.62 | 0.04 |
| 154 | 22.076 | 0.141 | 2.12 | 96 | -3.03 | 97 | 80 | -0.040 | 1.16 | 0.14 |
| 155 | 22.222 | 0.146 | 2.11 | 96 | -0.85 | 101 | 80 | -0.050 | 2.74 | 0.03 |
| 156 | 22.364 | 0.142 | 2.12 | 96 | -0.51 | 98 | 80 | -0.060 | 4.14 | 0.04 |
| 157 | 22.511 | 0.147 | 2.12 | 96 | -1.35 | 98 | 80 | -0.040 | 2.96 | 0.05 |
| 158 | 22.653 | 0.142 | 2.10 | 96 | -0.64 | 96 | 80 | -0.050 | 2.46 | 0.07 |
| 159 | 22.799 | 0.146 | 2.11 | 96 | -3.03 | 100 | 80 | -0.050 | 2.37 | 0.08 |

# BOX B TEST DATA - ASTM E2779 / ASTM E2515

Client: IHP
Model: Winslow
Run #: 1

Job #: 19-510
Tracking #: N/A
Technician: AK
Date: 8/16/2019

| | Particulate Sampling Data | | | | | | | Flue Gas Data | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Elapsed Time (min) | Gas Meter ($ft^3$) | Sample Rate (cfm) | Orifice dH (in $H_2O$) | Meter Temp (°F) | Meter Vacuum (in Hg) | Pro. Rate (%) | Filter (°F) | Flue Draft (in $H_2O$) | $CO_2$ (%) | CO (%) |
| 160 | 22.942 | 0.143 | 2.12 | 96 | -2.91 | 100 | 80 | -0.040 | 2.50 | 0.05 |
| 161 | 23.087 | 0.145 | 2.10 | 96 | -3.07 | 99 | 80 | -0.050 | 4.08 | 0.03 |
| 162 | 23.231 | 0.144 | 2.11 | 96 | -2.61 | 99 | 80 | -0.050 | 3.24 | 0.05 |
| 163 | 23.375 | 0.144 | 2.11 | 96 | -2.05 | 97 | 80 | -0.050 | 2.54 | 0.04 |
| 164 | 23.519 | 0.144 | 2.11 | 96 | -0.89 | 99 | 80 | -0.050 | 2.41 | 0.03 |
| 165 | 23.662 | 0.143 | 2.12 | 96 | -0.53 | 98 | 80 | -0.050 | 2.78 | 0.07 |
| 166 | 23.807 | 0.145 | 2.11 | 96 | -2.78 | 101 | 80 | -0.040 | 3.66 | 0.03 |
| 167 | 23.950 | 0.143 | 2.12 | 96 | -0.76 | 104 | 80 | -0.060 | 2.84 | 0.05 |
| 168 | 24.096 | 0.146 | 2.12 | 96 | -2.71 | 103 | 80 | -0.050 | 2.74 | 0.06 |
| 169 | 24.238 | 0.142 | 2.12 | 96 | -1.47 | 98 | 80 | -0.050 | 2.67 | 0.06 |
| 170 | 24.386 | 0.148 | 2.11 | 96 | -2.7 | 104 | 80 | -0.040 | 2.72 | 0.08 |
| 171 | 24.527 | 0.141 | 2.11 | 96 | -0.75 | 98 | 80 | -0.050 | 3.69 | 0.01 |
| 172 | 24.673 | 0.146 | 2.11 | 97 | -2.67 | 99 | 80 | -0.050 | 2.84 | 0.05 |
| 173 | 24.815 | 0.142 | 2.10 | 96 | -3.01 | 100 | 80 | -0.040 | 2.65 | 0.06 |
| 174 | 24.962 | 0.147 | 2.10 | 97 | -1.76 | 99 | 80 | -0.050 | 2.89 | 0.02 |
| 175 | 25.103 | 0.141 | 2.10 | 97 | -0.76 | 93 | 80 | -0.050 | 2.91 | 0.05 |
| 176 | 25.250 | 0.147 | 2.11 | 97 | -2.87 | 104 | 80 | -0.050 | 3.35 | 0.05 |
| 177 | 25.392 | 0.142 | 2.12 | 97 | -2.14 | 98 | 80 | -0.060 | 2.89 | 0.04 |
| 178 | 25.538 | 0.146 | 2.11 | 97 | -2.42 | 100 | 80 | -0.040 | 3.50 | 0.03 |
| 179 | 25.681 | 0.143 | 2.12 | 97 | -2.99 | 105 | 80 | -0.050 | 2.13 | 0.04 |
| 180 | 25.827 | 0.146 | 2.12 | 97 | -2.71 | 98 | 80 | -0.040 | 2.79 | 0.07 |
| 181 | 25.970 | 0.143 | 2.12 | 97 | -0.64 | 98 | 80 | -0.050 | 3.53 | 0.04 |
| 182 | 26.114 | 0.144 | 2.12 | 97 | -0.52 | 102 | 80 | -0.050 | 1.45 | 0.14 |
| 183 | 26.258 | 0.144 | 2.10 | 97 | -1.62 | 96 | 80 | -0.040 | 2.24 | 0.04 |
| 184 | 26.402 | 0.144 | 2.11 | 97 | -1.85 | 103 | 80 | -0.050 | 3.63 | 0.01 |
| 185 | 26.546 | 0.144 | 2.10 | 97 | -1.44 | 97 | 80 | -0.040 | 2.63 | 0.01 |
| 186 | 26.689 | 0.143 | 2.12 | 97 | -2.13 | 101 | 80 | -0.050 | 2.47 | 0.04 |
| 187 | 26.835 | 0.146 | 2.11 | 97 | -3.04 | 100 | 80 | -0.040 | 3.63 | 0.03 |
| 188 | 26.977 | 0.142 | 2.12 | 97 | -1.12 | 98 | 80 | -0.040 | 2.52 | 0.06 |
| 189 | 27.124 | 0.147 | 2.11 | 97 | -0.55 | 98 | 80 | -0.060 | 2.09 | 0.09 |
| 190 | 27.267 | 0.143 | 2.13 | 97 | -0.54 | 102 | 80 | -0.030 | 1.63 | 0.07 |
| 191 | 27.413 | 0.146 | 2.11 | 97 | -2.34 | 106 | 80 | -0.050 | 2.25 | 0.04 |

# BOX B TEST DATA - ASTM E2779 / ASTM E2515

Client: IHP
Model: Winslow
Run #: 1

Job #: 19-510
Tracking #: N/A
Technician: AK
Date: 8/16/2019

| | Particulate Sampling Data | | | | | | | Flue Gas Data | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Elapsed Time (min) | Gas Meter ($ft^3$) | Sample Rate (cfm) | Orifice dH (in $H_2O$) | Meter Temp (°F) | Meter Vacuum (in Hg) | Pro. Rate (%) | Filter (°F) | Flue Draft (in $H_2O$) | $CO_2$ (%) | CO (%) |
| 192 | 27.554 | 0.141 | 2.10 | 97 | -3.03 | 95 | 80 | -0.040 | 1.94 | 0.04 |
| 193 | 27.701 | 0.147 | 2.10 | 97 | -2 | 99 | 80 | -0.040 | 2.52 | 0.04 |
| 194 | 27.842 | 0.141 | 2.10 | 97 | -1.88 | 97 | 80 | -0.050 | 4.02 | 0.01 |
| 195 | 27.988 | 0.146 | 2.11 | 97 | -0.99 | 102 | 80 | -0.030 | 3.33 | 0.03 |
| 196 | 28.131 | 0.143 | 2.09 | 97 | -1.99 | 98 | 80 | -0.050 | 2.57 | 0.06 |
| 197 | 28.277 | 0.146 | 2.11 | 97 | -1.72 | 103 | 80 | -0.050 | 2.72 | 0.02 |
| 198 | 28.419 | 0.142 | 2.12 | 97 | -0.51 | 98 | 80 | -0.040 | 1.84 | 0.11 |
| 199 | 28.566 | 0.147 | 2.11 | 97 | -0.85 | 99 | 80 | -0.040 | 2.46 | 0.03 |
| 200 | 28.709 | 0.143 | 2.11 | 97 | -0.76 | 100 | 80 | -0.050 | 2.85 | 0.05 |
| 201 | 28.853 | 0.144 | 2.11 | 97 | -1.21 | 101 | 80 | -0.040 | 2.84 | 0.05 |
| 202 | 28.997 | 0.144 | 2.11 | 97 | -0.56 | 102 | 80 | -0.040 | 1.60 | 0.10 |
| 203 | 29.141 | 0.144 | 2.10 | 97 | -1.69 | 99 | 80 | -0.030 | 1.31 | 0.07 |
| 204 | 29.285 | 0.144 | 2.10 | 97 | -1.24 | 105 | 80 | -0.030 | 2.32 | 0.03 |
| 205 | 29.428 | 0.143 | 2.10 | 97 | -1.13 | 103 | 80 | -0.040 | 2.94 | 0.02 |
| 206 | 29.574 | 0.146 | 2.10 | 97 | -0.64 | 101 | 80 | -0.040 | 2.68 | 0.06 |
| 207 | 29.717 | 0.143 | 2.09 | 97 | -1.39 | 96 | 80 | -0.050 | 2.65 | 0.04 |
| 208 | 29.863 | 0.146 | 2.11 | 97 | -0.62 | 104 | 80 | -0.030 | 2.14 | 0.04 |
| 209 | 30.005 | 0.142 | 2.11 | 97 | -2.87 | 102 | 80 | -0.040 | 2.53 | 0.07 |
| 210 | 30.152 | 0.147 | 2.10 | 97 | -2.86 | 98 | 80 | -0.040 | 1.68 | 0.09 |
| 211 | 30.293 | 0.141 | 2.10 | 97 | -2 | 102 | 80 | -0.040 | 2.93 | 0.03 |
| 212 | 30.440 | 0.147 | 2.11 | 97 | -1.63 | 102 | 80 | -0.050 | 1.55 | 0.10 |
| 213 | 30.581 | 0.141 | 2.10 | 97 | -3.04 | 98 | 80 | -0.040 | 2.58 | 0.04 |
| 214 | 30.727 | 0.146 | 2.10 | 97 | -2.84 | 96 | 80 | -0.050 | 3.02 | 0.05 |
| 215 | 30.869 | 0.142 | 2.11 | 97 | -0.57 | 102 | 80 | -0.030 | 1.74 | 0.09 |
| 216 | 31.015 | 0.146 | 2.10 | 97 | -2.22 | 99 | 80 | -0.040 | 2.40 | 0.04 |
| 217 | 31.158 | 0.143 | 2.09 | 97 | -2.95 | 98 | 80 | -0.040 | 2.68 | 0.03 |
| 218 | 31.304 | 0.146 | 2.11 | 97 | -3.09 | 104 | 80 | -0.040 | 2.27 | 0.05 |
| 219 | 31.447 | 0.143 | 2.11 | 97 | -0.51 | 97 | 80 | -0.040 | 2.74 | 0.06 |
| 220 | 31.592 | 0.145 | 2.09 | 97 | -1 | 101 | 80 | -0.040 | 2.00 | 0.07 |
| 221 | 31.736 | 0.144 | 2.10 | 97 | -3.02 | 98 | 80 | -0.050 | 2.34 | 0.07 |
| 222 | 31.880 | 0.144 | 2.10 | 97 | -1.54 | 101 | 80 | -0.040 | 3.13 | 0.02 |
| 223 | 32.024 | 0.144 | 2.11 | 97 | -0.56 | 98 | 80 | -0.050 | 2.65 | 0.04 |

# BOX B TEST DATA - ASTM E2779 / ASTM E2515

Client: IHP
Model: Winslow
Run #: 1

Job #: 19-510
Tracking #: N/A
Technician: AK
Date: 8/16/2019

| | Particulate Sampling Data | | | | | | | Flue Gas Data | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Elapsed Time (min) | Gas Meter ($ft^3$) | Sample Rate (cfm) | Orifice dH (in $H_2O$) | Meter Temp (°F) | Meter Vacuum (in Hg) | Pro. Rate (%) | Filter (°F) | Flue Draft (in $H_2O$) | $CO_2$ (%) | CO (%) |
| 224 | 32.166 | 0.142 | 2.10 | 97 | -0.53 | 95 | 80 | -0.040 | 2.47 | 0.04 |
| 225 | 32.312 | 0.146 | 2.11 | 97 | -3.04 | 101 | 80 | -0.040 | 2.47 | 0.02 |
| 226 | 32.455 | 0.143 | 2.11 | 97 | -0.53 | 104 | 80 | -0.040 | 3.14 | 0.02 |
| 227 | 32.600 | 0.145 | 2.09 | 97 | -2.92 | 99 | 80 | -0.040 | 2.83 | 0.02 |
| 228 | 32.743 | 0.143 | 2.10 | 97 | -2.74 | 97 | 80 | -0.040 | 1.92 | 0.08 |
| 229 | 32.890 | 0.147 | 2.10 | 98 | -0.89 | 100 | 80 | -0.040 | 3.49 | 0.01 |
| 230 | 33.031 | 0.141 | 2.10 | 97 | -1.67 | 98 | 80 | -0.030 | 2.18 | 0.06 |
| 231 | 33.178 | 0.147 | 2.10 | 98 | -2.13 | 101 | 80 | -0.030 | 1.30 | 0.09 |
| 232 | 33.320 | 0.142 | 2.10 | 98 | -3.03 | 98 | 80 | -0.040 | 2.18 | 0.04 |
| 233 | 33.466 | 0.146 | 2.11 | 98 | -2.36 | 100 | 80 | -0.040 | 2.74 | 0.03 |
| 234 | 33.607 | 0.141 | 2.10 | 98 | -2.19 | 98 | 80 | -0.040 | 2.61 | 0.04 |
| 235 | 33.753 | 0.146 | 2.10 | 98 | -2.75 | 101 | 80 | -0.040 | 2.70 | 0.05 |
| 236 | 33.896 | 0.143 | 2.11 | 98 | -0.49 | 102 | 80 | -0.040 | 2.04 | 0.10 |
| 237 | 34.041 | 0.145 | 2.11 | 98 | -2.64 | 102 | 80 | -0.040 | 2.44 | 0.03 |
| 238 | 34.185 | 0.144 | 2.10 | 98 | -0.55 | 100 | 80 | -0.040 | 3.03 | 0.05 |
| 239 | 34.330 | 0.145 | 2.11 | 98 | -2.86 | 98 | 80 | -0.050 | 1.79 | 0.05 |
| 240 | 34.473 | 0.143 | 2.10 | 98 | -2.47 | 103 | 80 | -0.030 | 2.36 | 0.04 |
| 241 | 34.617 | 0.144 | 2.09 | 98 | -0.67 | 96 | 80 | -0.040 | 1.71 | 0.08 |
| 242 | 34.761 | 0.144 | 2.09 | 98 | -1.22 | 95 | 80 | -0.050 | 2.45 | 0.05 |
| 243 | 34.904 | 0.143 | 2.10 | 98 | -3.05 | 100 | 80 | -0.040 | 2.51 | 0.03 |
| 244 | 35.049 | 0.145 | 2.10 | 98 | -1.31 | 103 | 80 | -0.050 | 3.64 | 0.00 |
| 245 | 35.192 | 0.143 | 2.10 | 98 | -1.23 | 101 | 80 | -0.040 | 2.49 | 0.04 |
| 246 | 35.338 | 0.146 | 2.09 | 98 | -3.12 | 104 | 80 | -0.040 | 2.71 | 0.03 |
| 247 | 35.480 | 0.142 | 2.11 | 98 | -3.04 | 96 | 80 | -0.040 | 2.50 | 0.07 |
| 248 | 35.627 | 0.147 | 2.10 | 98 | -2.81 | 107 | 80 | -0.040 | 1.75 | 0.08 |
| 249 | 35.769 | 0.142 | 2.09 | 98 | -1.76 | 96 | 80 | -0.060 | 2.78 | 0.06 |
| 250 | 35.915 | 0.146 | 2.10 | 98 | -1.03 | 99 | 80 | -0.050 | 2.10 | 0.04 |
| 251 | 36.057 | 0.142 | 2.10 | 98 | -0.97 | 100 | 80 | -0.040 | 2.57 | 0.02 |
| 252 | 36.203 | 0.146 | 2.11 | 98 | -0.59 | 98 | 80 | -0.040 | 3.05 | 0.01 |
| 253 | 36.344 | 0.141 | 2.09 | 98 | -1.96 | 101 | 80 | -0.040 | 2.48 | 0.04 |
| 254 | 36.490 | 0.146 | 2.10 | 98 | -0.93 | 96 | 80 | -0.050 | 2.37 | 0.03 |
| 255 | 36.633 | 0.143 | 2.10 | 98 | -0.73 | 100 | 80 | -0.050 | 3.02 | 0.00 |

# BOX B TEST DATA - ASTM E2779 / ASTM E2515

Client: IHP
Model: Winslow
Run #: 1

Job #: 19-510
Tracking #: N/A
Technician: AK
Date: 8/16/2019

| | Particulate Sampling Data | | | | | | | Flue Gas Data | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Elapsed Time (min) | Gas Meter ($ft^3$) | Sample Rate (cfm) | Orifice dH (in $H_2O$) | Meter Temp (°F) | Meter Vacuum (in Hg) | Pro. Rate (%) | Filter (°F) | Flue Draft (in $H_2O$) | $CO_2$ (%) | CO (%) |
| 256 | 36.778 | 0.145 | 2.11 | 98 | -0.93 | 98 | 80 | -0.050 | 2.45 | 0.04 |
| 257 | 36.922 | 0.144 | 2.11 | 98 | -2.97 | 106 | 80 | -0.040 | 2.10 | 0.04 |
| 258 | 37.067 | 0.145 | 2.11 | 98 | -1.27 | 98 | 80 | -0.040 | 1.65 | 0.06 |
| 259 | 37.210 | 0.143 | 2.10 | 98 | -1.47 | 97 | 80 | -0.040 | 2.86 | 0.01 |
| 260 | 37.354 | 0.144 | 2.10 | 98 | -0.55 | 96 | 80 | -0.040 | 2.88 | 0.04 |
| 261 | 37.498 | 0.144 | 2.10 | 98 | -1.25 | 101 | 80 | -0.040 | 3.38 | 0.01 |
| 262 | 37.641 | 0.143 | 2.10 | 98 | -0.52 | 98 | 80 | -0.050 | 3.27 | 0.01 |
| 263 | 37.786 | 0.145 | 2.08 | 98 | -2.29 | 102 | 80 | -0.050 | 2.13 | 0.07 |
| 264 | 37.929 | 0.143 | 2.09 | 98 | -3.06 | 97 | 80 | -0.050 | 1.95 | 0.08 |
| 265 | 38.074 | 0.145 | 2.09 | 98 | -2.22 | 102 | 80 | -0.050 | 1.76 | 0.07 |
| 266 | 38.217 | 0.143 | 2.10 | 98 | -1.09 | 99 | 80 | -0.030 | 2.93 | 0.00 |
| 267 | 38.364 | 0.147 | 2.10 | 98 | -3.06 | 104 | 80 | -0.040 | 1.84 | 0.09 |
| 268 | 38.505 | 0.141 | 2.10 | 98 | -2.34 | 97 | 80 | -0.030 | 2.37 | 0.05 |
| 269 | 38.651 | 0.146 | 2.10 | 98 | -1.43 | 99 | 80 | -0.050 | 2.98 | 0.06 |
| 270 | 38.793 | 0.142 | 2.09 | 98 | -1.73 | 102 | 80 | -0.040 | 2.16 | 0.06 |
| 271 | 38.939 | 0.146 | 2.09 | 98 | -2.62 | 106 | 80 | -0.050 | 2.83 | 0.01 |
| 272 | 39.080 | 0.141 | 2.08 | 98 | -0.78 | 97 | 80 | -0.040 | 3.63 | 0.02 |
| 273 | 39.226 | 0.146 | 2.10 | 98 | -0.51 | 99 | 80 | -0.040 | 2.15 | 0.05 |
| 274 | 39.368 | 0.142 | 2.08 | 98 | -1.43 | 100 | 80 | -0.040 | 2.54 | 0.04 |
| 275 | 39.514 | 0.146 | 2.10 | 98 | -0.7 | 102 | 80 | -0.040 | 2.95 | 0.04 |
| 276 | 39.658 | 0.144 | 2.10 | 98 | -0.58 | 97 | 80 | -0.040 | 2.70 | 0.02 |
| 277 | 39.802 | 0.144 | 2.09 | 98 | -0.52 | 104 | 80 | -0.050 | 1.69 | 0.06 |
| 278 | 39.946 | 0.144 | 2.09 | 98 | -0.7 | 93 | 80 | -0.040 | 2.91 | 0.02 |
| 279 | 40.090 | 0.144 | 2.08 | 98 | -1.88 | 97 | 80 | -0.050 | 2.95 | 0.02 |
| 280 | 40.234 | 0.144 | 2.10 | 98 | -0.58 | 99 | 80 | -0.030 | 2.73 | 0.02 |
| 281 | 40.376 | 0.142 | 2.09 | 98 | -0.82 | 97 | 80 | -0.060 | 1.40 | 0.12 |
| 282 | 40.522 | 0.146 | 2.09 | 98 | -2.36 | 98 | 80 | -0.040 | 3.13 | 0.00 |
| 283 | 40.664 | 0.142 | 2.10 | 98 | -2.1 | 101 | 80 | -0.030 | 2.69 | 0.03 |
| 284 | 40.810 | 0.146 | 2.10 | 98 | -1.39 | 99 | 80 | -0.040 | 3.05 | 0.00 |
| 285 | 40.952 | 0.142 | 2.10 | 98 | -0.48 | 97 | 80 | -0.040 | 2.86 | 0.03 |
| 286 | 41.099 | 0.147 | 2.08 | 98 | -2.64 | 99 | 80 | -0.040 | 2.34 | 0.07 |
| 287 | 41.240 | 0.141 | 2.10 | 98 | -0.71 | 97 | 80 | -0.040 | 2.67 | 0.02 |

# BOX B TEST DATA - ASTM E2779 / ASTM E2515

Client: IHP
Model: Winslow
Run #: 1

Job #: 19-510
Tracking #: N/A
Technician: AK
Date: 8/16/2019

| | Particulate Sampling Data | | | | | | | Flue Gas Data | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Elapsed Time (min) | Gas Meter ($ft^3$) | Sample Rate (cfm) | Orifice dH (in $H_2O$) | Meter Temp (°F) | Meter Vacuum (in Hg) | Pro. Rate (%) | Filter (°F) | Flue Draft (in $H_2O$) | $CO_2$ (%) | CO (%) |
| 288 | 41.387 | 0.147 | 2.09 | 98 | -3.05 | 100 | 80 | -0.030 | 1.96 | 0.07 |
| 289 | 41.528 | 0.141 | 2.10 | 98 | -2.94 | 95 | 80 | -0.040 | 3.46 | 0.05 |
| 290 | 41.674 | 0.146 | 2.07 | 98 | -1.01 | 102 | 80 | -0.050 | 2.29 | 0.06 |
| 291 | 41.816 | 0.142 | 2.09 | 98 | -2.56 | 92 | 80 | -0.050 | 1.19 | 0.10 |
| 292 | 41.962 | 0.146 | 2.10 | 98 | -3.06 | 100 | 80 | -0.040 | 3.26 | 0.03 |
| 293 | 42.104 | 0.142 | 2.10 | 98 | -2.76 | 103 | 80 | -0.040 | 2.44 | 0.05 |
| 294 | 42.250 | 0.146 | 2.10 | 98 | -2.21 | 106 | 80 | -0.050 | 2.40 | 0.04 |
| 295 | 42.393 | 0.143 | 2.10 | 98 | -0.58 | 102 | 80 | -0.040 | 2.90 | 0.01 |
| 296 | 42.537 | 0.144 | 2.09 | 98 | -2.32 | 101 | 80 | -0.040 | 1.84 | 0.05 |
| 297 | 42.681 | 0.144 | 2.08 | 98 | -2.81 | 103 | 80 | -0.050 | 2.39 | 0.04 |
| 298 | 42.824 | 0.143 | 2.09 | 98 | -2.63 | 95 | 80 | -0.050 | 3.92 | 0.00 |
| 299 | 42.969 | 0.145 | 2.08 | 98 | -1.13 | 99 | 80 | -0.040 | 3.45 | 0.00 |
| 300 | 43.111 | 0.142 | 2.09 | 98 | -2.34 | 101 | 80 | -0.020 | 1.25 | 0.11 |
| 301 | 43.257 | 0.146 | 2.09 | 98 | -2.96 | 104 | 80 | -0.050 | 2.54 | 0.06 |
| 302 | 43.399 | 0.142 | 2.11 | 98 | -0.78 | 101 | 80 | -0.050 | 2.84 | 0.00 |
| 303 | 43.546 | 0.147 | 2.10 | 98 | -2.41 | 101 | 80 | -0.040 | 2.53 | 0.05 |
| 304 | 43.688 | 0.142 | 2.10 | 98 | -0.99 | 98 | 80 | -0.040 | 1.73 | 0.08 |
| 305 | 43.834 | 0.146 | 2.08 | 98 | -1.27 | 102 | 80 | -0.040 | 2.62 | 0.01 |
| 306 | 43.975 | 0.141 | 2.09 | 98 | -0.7 | 96 | 80 | -0.030 | 2.12 | 0.07 |
| 307 | 44.121 | 0.146 | 2.09 | 98 | -0.91 | 103 | 80 | -0.030 | 3.23 | 0.03 |
| 308 | 44.262 | 0.141 | 2.08 | 98 | -1.5 | 102 | 80 | -0.070 | 2.36 | 0.04 |
| 309 | 44.408 | 0.146 | 2.09 | 98 | -2.21 | 96 | 80 | -0.050 | 2.76 | 0.05 |
| 310 | 44.551 | 0.143 | 2.09 | 98 | -2.8 | 96 | 80 | -0.040 | 2.45 | 0.03 |
| 311 | 44.696 | 0.145 | 2.09 | 98 | -0.59 | 100 | 81 | -0.040 | 2.27 | 0.05 |
| 312 | 44.839 | 0.143 | 2.10 | 98 | -2.79 | 99 | 81 | -0.040 | 2.51 | 0.03 |
| 313 | 44.985 | 0.146 | 2.09 | 98 | -2.1 | 95 | 81 | -0.040 | 1.77 | 0.08 |
| 314 | 45.127 | 0.142 | 2.08 | 99 | -2.86 | 95 | 81 | -0.040 | 2.48 | 0.06 |
| 315 | 45.272 | 0.145 | 2.07 | 98 | -1.06 | 99 | 81 | -0.050 | 3.04 | 0.05 |
| 316 | 45.415 | 0.143 | 2.09 | 98 | -2.28 | 96 | 81 | -0.050 | 2.69 | 0.00 |
| 317 | 45.557 | 0.142 | 2.09 | 98 | -3.02 | 96 | 81 | -0.040 | 3.37 | 0.03 |
| 318 | 45.703 | 0.146 | 2.09 | 98 | -0.49 | 99 | 81 | -0.030 | 3.42 | 0.00 |
| 319 | 45.846 | 0.143 | 2.10 | 99 | -1.33 | 96 | 81 | -0.040 | 1.89 | 0.06 |

# BOX B TEST DATA - ASTM E2779 / ASTM E2515

Client: IHP
Model: Winslow
Run #: 1

Job #: 19-510
Tracking #: N/A
Technician: AK
Date: 8/16/2019

| | Particulate Sampling Data | | | | | | | Flue Gas Data | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Elapsed Time (min) | Gas Meter ($ft^3$) | Sample Rate (cfm) | Orifice dH (in $H_2O$) | Meter Temp (°F) | Meter Vacuum (in Hg) | Pro. Rate (%) | Filter (°F) | Flue Draft (in $H_2O$) | $CO_2$ (%) | CO (%) |
| 320 | 45.991 | 0.145 | 2.10 | 99 | -2.1 | 98 | 80 | -0.030 | 1.78 | 0.07 |
| 321 | 46.134 | 0.143 | 2.10 | 99 | -2.21 | 101 | 80 | -0.040 | 1.33 | 0.09 |
| 322 | 46.280 | 0.146 | 2.06 | 99 | -0.89 | 98 | 80 | -0.040 | 1.92 | 0.05 |
| 323 | 46.421 | 0.141 | 2.08 | 99 | -2.74 | 101 | 81 | -0.050 | 2.72 | 0.05 |
| 324 | 46.567 | 0.146 | 2.08 | 99 | -2.42 | 100 | 81 | -0.030 | 3.47 | 0.02 |
| 325 | 46.708 | 0.141 | 2.10 | 99 | -2.95 | 99 | 81 | -0.050 | 2.90 | 0.03 |
| 326 | 46.854 | 0.146 | 2.07 | 99 | -3 | 98 | 81 | -0.050 | 3.38 | 0.03 |
| 327 | 46.996 | 0.142 | 2.09 | 99 | -2.36 | 96 | 81 | -0.040 | 2.59 | 0.06 |
| 328 | 47.142 | 0.146 | 2.08 | 99 | -2.99 | 97 | 81 | -0.050 | 2.62 | 0.02 |
| 329 | 47.284 | 0.142 | 2.08 | 99 | -0.97 | 93 | 81 | -0.050 | 1.84 | 0.08 |
| 330 | 47.430 | 0.146 | 2.09 | 99 | -2.38 | 103 | 81 | -0.040 | 2.89 | 0.01 |
| 331 | 47.572 | 0.142 | 2.08 | 99 | -3.04 | 97 | 81 | -0.030 | 3.19 | 0.01 |
| 332 | 47.717 | 0.145 | 2.09 | 99 | -1.36 | 100 | 81 | -0.030 | 3.23 | 0.03 |
| 333 | 47.860 | 0.143 | 2.07 | 99 | -3.03 | 96 | 81 | -0.050 | 1.74 | 0.06 |
| 334 | 48.003 | 0.143 | 2.08 | 99 | -2.24 | 99 | 81 | -0.050 | 2.09 | 0.01 |
| 335 | 48.147 | 0.144 | 2.09 | 99 | -1.42 | 100 | 81 | -0.050 | 3.02 | 0.01 |
| 336 | 48.290 | 0.143 | 2.08 | 99 | -2.47 | 96 | 81 | -0.030 | 3.57 | 0.00 |
| 337 | 48.435 | 0.145 | 2.09 | 99 | -1.24 | 99 | 81 | -0.050 | 1.63 | 0.09 |
| 338 | 48.578 | 0.143 | 2.07 | 99 | -2.98 | 99 | 81 | -0.040 | 1.89 | 0.04 |
| 339 | 48.724 | 0.146 | 2.08 | 99 | -2.38 | 99 | 81 | -0.050 | 2.14 | 0.03 |
| 340 | 48.865 | 0.141 | 2.09 | 99 | -0.54 | 97 | 81 | -0.040 | 3.26 | 0.04 |
| 341 | 49.011 | 0.146 | 2.08 | 99 | -3.04 | 100 | 81 | -0.040 | 2.74 | 0.02 |
| 342 | 49.152 | 0.141 | 2.08 | 99 | -1.74 | 96 | 81 | -0.040 | 2.98 | 0.02 |
| 343 | 49.298 | 0.146 | 2.07 | 99 | -0.78 | 101 | 81 | -0.030 | 0.93 | 0.15 |
| 344 | 49.439 | 0.141 | 2.08 | 99 | -1.46 | 95 | 81 | -0.040 | 1.88 | 0.04 |
| 345 | 49.585 | 0.146 | 2.08 | 99 | -0.87 | 100 | 81 | -0.050 | 3.05 | 0.00 |
| 346 | 49.728 | 0.143 | 2.09 | 99 | -2.79 | 94 | 81 | -0.030 | 3.84 | 0.00 |
| 347 | 49.873 | 0.145 | 2.08 | 99 | -1.11 | 100 | 81 | -0.030 | 3.50 | 0.00 |
| 348 | 50.016 | 0.143 | 2.07 | 99 | -0.62 | 100 | 81 | -0.040 | 0.71 | 0.16 |
| 349 | 50.160 | 0.144 | 2.08 | 99 | -3.13 | 97 | 81 | -0.040 | 1.86 | 0.05 |
| 350 | 50.304 | 0.144 | 2.08 | 99 | -2.89 | 97 | 81 | -0.050 | 3.17 | 0.02 |
| 351 | 50.446 | 0.142 | 2.07 | 99 | -3.11 | 93 | 81 | -0.050 | 3.98 | 0.00 |

# BOX B TEST DATA - ASTM E2779 / ASTM E2515

Client: IHP
Model: Winslow
Run #: 1

Job #: 19-510
Tracking #: N/A
Technician: AK
Date: 8/16/2019

| | Particulate Sampling Data | | | | | | | Flue Gas Data | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Elapsed Time (min) | Gas Meter ($ft^3$) | Sample Rate (cfm) | Orifice dH (in $H_2O$) | Meter Temp (°F) | Meter Vacuum (in Hg) | Pro. Rate (%) | Filter (°F) | Flue Draft (in $H_2O$) | $CO_2$ (%) | CO (%) |
| 352 | 50.591 | 0.145 | 2.08 | 99 | -1 | 100 | 81 | -0.030 | 2.40 | 0.06 |
| 353 | 50.733 | 0.142 | 2.08 | 99 | -1.81 | 97 | 81 | -0.040 | 1.64 | 0.11 |
| 354 | 50.879 | 0.146 | 2.09 | 99 | -0.74 | 103 | 81 | -0.060 | 2.85 | 0.04 |
| 355 | 51.021 | 0.142 | 2.09 | 99 | -1.11 | 99 | 81 | -0.040 | 2.56 | 0.06 |
| 356 | 51.168 | 0.147 | 2.08 | 99 | -1.5 | 100 | 81 | -0.030 | 2.68 | 0.01 |
| 357 | 51.308 | 0.140 | 2.07 | 99 | -2.13 | 97 | 81 | -0.050 | 2.46 | 0.05 |
| 358 | 51.455 | 0.147 | 2.08 | 99 | -0.71 | 99 | 81 | -0.040 | 2.03 | 0.04 |
| 359 | 51.596 | 0.141 | 2.08 | 99 | -2.08 | 94 | 81 | -0.030 | 1.96 | 0.07 |
| 360 | 51.741 | 0.145 | 2.07 | 99 | -2.81 | 99 | 81 | -0.030 | 3.12 | 0.04 |
| Avg/Tot | 51.741 | 0.144 | 2.11 | 94 | -1.80 | 100 | | | 3.58 | 0.05 |

# LAB SAMPLE DATA - ASTM E2515

Client: IHP
Model: Winslow
Run #: 1

Job #: 19-510
Tracking #: N/A
Technician: AK
Date: 8/16/2019

| | Sample ID | Tare, mg | Total, mg | Final, mg | Catch, mg |
|---|---|---|---|---|---|
| **Train A Filters - First Hour** | 3578 | 115.9 | 115.9 | 117.1 | 1.2 |
| | | | | | |
| | | | | | |
| **Train A Filters - Remainder** | 3579 | 123.4 | 246.0 | 249.1 | 3.1 |
| | 3580 | 122.6 | | | |
| | | | | | |
| **Train A Probe** | 3A | 116076.8 | 116076.8 | 116077.0 | 0.2 |
| **Train A O-Rings** | 3A | 3578.5 | 3578.5 | 3581.1 | 2.6 |
| **Train B Filters** | 3581 | 116.8 | 233.0 | 234.7 | 1.7 |
| | 3582 | 116.2 | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| **Train B Probe** | 3B | 116341.4 | 116341.4 | 116342.0 | 0.6 |
| **Train B O-Rings** | 3B | 3566.8 | 3566.8 | 3570.1 | 3.3 |
| **Background Filter** | | | 0.0 | 0.0 | |

| | |
|---|---|
| ***Placed in Dessicator on:*** | 8/16/2019 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Balance Audit** | 200.0 | | 200.0 | | | | | |
| **Train A Filters - First Hour** | 117.2 | 8/19 7:51 | 117.1 | 9/3 15:48 | | | | |
| **Train A Filters - Remainder** | 249.2 | 8/19 7:51 | 249.1 | 9/3 15:49 | | | | |
| **Train A Probe** | 116077.0 | 8/19 7:52 | 116077.0 | 9/3 15:52 | | | | |
| **Train A O-Rings** | 3581.0 | 8/19 7:51 | 3581.1 | 9/3 15:54 | | | | |
| **Train B Filters** | 234.7 | 8/19 7:52 | 234.7 | 9/3 15:49 | | | | |
| **Train B Probe** | 116341.9 | 8/19 7:50 | 116342.0 | 9/3 15:52 | | | | |
| **Train B O-Rings** | 3570.0 | 8/19 7:51 | 3570.1 | 9/3 15:54 | | | | |
| **Background Filter** | | | | | | | | |

| | |
|---|---|
| 1st hour Sub-Total, mg: | 1.2 |
| Remainder Sub-Total, mg: | 5.9 |
| **Train 1 Aggregate, mg:** | **7.1** |
| **Train 2 Aggregate, mg:** | **5.6** |
| Ambient Aggregate, mg: | 0.0 |

# ASTM E2779 Pellet Heater Run Sheets

Client: IHP | Job Number: 19-510 | Tracking #: N/A
Model: Winslow | Run Number: 1 | Test Date: 08/16/2019

**Pellet Heater Control Settings**

High Burn Rate Settings: Heat Setting – 5 / Damper – Fully Open

Medium Burn Rate Settings: Heat Setting – 2 / Damper – Fully Open

Low Burn Rate Settings: Heat Setting – 1 / Damper – Fully Closed

**Preburn Notes**

Preburn Start Time: 8:13

| Time | Notes |
|---|---|
| N/A | N/A |

**Test Notes**

Test Burn Start Time: 9:13

| Time | Notes |
|---|---|
| 60:00 | Changed 1-hr filter, turned down to medium test control settings. |
| 180:00 | Turned down to low test control settings. |
| 360:00 | End of Test. |

Test Burn End Time: 15:13

**Flue Gas Concentration Measurement**

**Calibration Gas Values:** Span Gas $CO_2$ (%): 17.00 CO (%): 4.31

Mid Gas $CO_2$ (%): 10.00 CO (%): 2.51

**Calibration Results:**

| | Pre Test | | | Post Test | | |
|---|---|---|---|---|---|---|
| | Zero | Mid | Span | Zero | Mid | Span |
| Time | 08:15 | 08:18 | 08:16 | 15:25 | 15:28 | 15:27 |
| $CO_2$ | 0.00 | 10.02 | 17.00 | -0.01 | 10.00 | 16.95 |
| CO | 0.000 | 2.517 | 4.310 | -0.002 | 2.502 | 4.299 |

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

Technician Signature:  Date: 8/16/2019

# ASTM E2515 - Glass Filters

| Sample | Weight 1 | Weight 2 | Weigth 3 | Weight 4 | Initial | Project | Run |
|---|---|---|---|---|---|---|---|
| 3577 | 121.4 | 121.5 | – | – | SB | | |
| 3578 | 116.1 | 115.9 | – | – | SB | 19-510 | 1 |
| 3579 | 123.6 | 123.2 | 123.4 | – | SB | ↓ | ↓ |
| 3580 | 122.4 | 122.6 | – | – | SB | | |
| 3581 | 116.7 | 116.8 | – | – | SB | | |
| 3582 | 116.3 | 116.2 | – | – | SB | | |
| 3583 | 124.1 | 124.1 | – | – | SB | 19-511 | 1 |
| 3584 | 116.3 | 116.4 | – | – | SB | ↓ | 1 |
| 3585 | 121.4 | 121.4 | – | – | SB | | 1 |
| 3586 | 124.1 | 124.1 | – | – | SB | | 1 |
| 3587 | 116.4 | 116.4 | – | – | SB | ↓ | 1 |
| 3588 | 115.8 | 115.9 | – | – | SB | 19-501 | 1 |
| 3589 | 123.3 | 123.5 | – | – | SB | ↓ | ↓ |
| 3590 | 121.6 | 122.0 | 121.9 | – | SB | | |
| 3591 | 115.4 | 115.5 | – | – | SB | | |
| 3592 | 116.2 | 116.0 | – | – | SB | ↓ | |
| 3593 | 123.8 | 123.9 | – | – | SB | 19-517 | 1 |
| 3594 | 121.6 | 121.7 | – | – | SB | ↓ | 1 |

| Weight 1 Date/Time: |
|---|
| 7/24 - 8:00 |
| Weight 2 Date/Time: |
| 7/25 - 7:00 |
| Weight 3 Date/Time: |
| 7/26 - 7:45 |
| Weight 4 Date/Time: |
| |

| Sample | Weight 1 | Weight 2 | Weigth 3 | Weight 4 | Initial | Project | Run |
|---|---|---|---|---|---|---|---|
| 3595 | 116.2 | 116.0 | – | – | SB | 19-517 | 1 |
| 3596 | 115.3 | 115.5 | – | – | SB | ↓ | ↓ |
| 3597 | 123.6 | ~~123.8~~ 123.8 | – | – | SB | | |
| 3598 | 116.0 | 115.9 | – | – | SB | ↓ | ↓ |
| 3599 | 121.8 | 121.8 | – | – | SB | 19-524 | #1 |
| 3600 | 124.2 | 124.4 | – | – | SB | ↓ | ↓ |
| 3601 | 115.9 | 116.2 | 116.2 | – | SB | | |
| 3602 | 121.0 | 121.2 | – | – | SB | | |
| 3603 | 115.9 | 116.0 | – | – | SB | | |
| 3604 | 115.5 | 115.9 | 115.9 | – | SB | ↓ | ↓ |
| 3605 | 124.3 | 124.5 | – | – | SB | 19-524 | #2 |
| 3606 | 121.7 | 121.7 | – | – | SB | ↓ | ↓ |
| 3607 | 115.9 | 116.0 | – | – | SB | | |
| 3608 | 116.2 | 116.1 | – | – | SB | | |
| 3609 | 123.1 | 122.9 | – | – | SB | | |
| 3610 | 122.0 | 121.7 | 121.8 | – | SB | ↓ | ↓ |
| 3611 | 115.6 | 115.6 | – | – | SB | 19-524 | #3 |
| 3612 | 116.3 | 116.2 | – | – | SB | ↓ | ↓ |

| Weight 1 Date/Time: |
|---|
| 7/24 - 8:00 |
| Weight 2 Date/Time: |
| 7/25 - 7:00 |
| Weight 3 Date/Time: |
| 7/26 - 7:45 |
| Weight 4 Date/Time: |
| |

# ASTM E2515 - Probes

| Sample | Weight 1 | Weight 2 | Weigth 3 | Weight 4 | Initial | Project | Run |
|---|---|---|---|---|---|---|---|
| 1A | 115639.4 | 115630.6 | - | - | SB | | |
| 1B | 115908.2 | 115904.4 | - | - | SB | 19-509 | #6 |
| 2A | 116241.8 | 116241.7 | - | - | SB | | |
| 2B | 116331.8 | 116331.6 | - | - | SB | 19-509 | #1 |
| 3A | 116076.7 | 116076.8 | - | - | SB | | |
| 3B | 116341.4 | 116341.4 | - | - | SB | 19-510 | #1 |
| 4A | 116184.3 | 116184.2 | - | - | SB | | |
| 4B | 116366.9 | 116366.9 | - | - | SB | 19-502 | 1 |
| 5A | 116769.5 | 116769.4 | - | - | SB | | |
| 5B | 116877.5 | 116877.3 | - | - | SB | 19-502 | 2 |

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

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

Weight 3 Date/Time:

Weight 4 Date/Time:

| Sample | Weight 1 | Weight 2 | Weigth 3 | Weight 4 | Initial | Project | Run |
|---|---|---|---|---|---|---|---|
| 6A | 116545.1 | 116545.2 | - | - | | | |
| 6B | 116118.4 | 116118.3 | - | - | | 19-502 | 3 |
| 7A | 116741.2 | 116741.2 | - | - | | 19-502 | 4 |
| 7B | 117289.3 | 117289.1 | - | - | | ↓ | 4 |
| 8A | 116824.4 | 116824.4 | - | - | | 19-510 | 1 |
| 8B | 116826.3 | 116826.2 | - | - | | ↓ | 1 |
| 9A | 116714.1 | 116714.2 | - | - | | 19-501 | 1 |
| 9B | 117918.9 | 117918.8 | - | - | | ↓ | ↓ |
| 10A | - | 116821.1 | 116821.3 | - | | 19-494 | #1 |
| 10B | - | 117904.7 | 117904.9 | - | | 19-494 | #1 |

Weight 1 Date/Time: 9/15 0800

Weight 2 Date/Time: 8/16 0930

Weight 3 Date/Time: 9/5 15:45

Weight 4 Date/Time:

| Sample | Weight 1 | Weight 2 | Weigth 3 | Weight 4 | Initial | Project | Run |
|---|---|---|---|---|---|---|---|
| 11A | 117036.9 | 117036.7 | - | - | SB | 19-494 | #2 |
| 11B | 117490.9 | 117490.5 | 117490.7 | - | SB | 19-494 | #2 |
| 12A | 116889.6 | 116889.4 | - | - | SB | 19-494 | #3 |
| 12B | 117957.6 | 117957.5 | - | - | SB | 19-494 | #3 |
| 13A | 117456.4 | 117456.3 | - | - | SB | 19-494 | #4 |
| 13B | 117055.1 | 117055.2 | - | - | SB | 19-494 | #4 |
| 14A | 116818.4 | - | 116818.2 | - | SB | 19-494 | #5 |
| 14B | 116772.2 | - | 116772.0 | - | SB | 19-494 | #5 |
| 15A | 117419.0 | - | | | | | |
| 15B | 116905.8 | - | | | | | |

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

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

Weight 3 Date/Time: 9/10 - 1400

Weight 4 Date/Time:

# ASTM E2515 - O-Rings

| Sample | Weight 1 | Weight 2 | Weigth 3 | Weight 4 | Initial | Project | Run |
|---|---|---|---|---|---|---|---|
| 1A | 3565.5 | 3565.4 | – | – | SB | 19-509 | #C |
| 1B | 3553.9 | 3554.1 | – | – | SB | | |
| 2A | 3551.2 | 3551.4 | – | – | SB | 19-509 | #7 |
| 2B | 3569.8 | 3570.0 | – | – | SB | | |
| 3A | 3578.3 | 3578.5 | – | – | SB | 19-510 | #1 |
| 3B | 3566.7 | ~~3565.3~~ → 3566.8 | – | – | SB | | |
| 4A | 3591.2 | 3591.3 | – | – | SB | 19-502 | 1 |
| 4B | 3578.6 | 3578.8 | – | – | SB | | |
| 5A | 3532.9 | 3533.1 | – | – | SB | 19-502 | 2 |
| 5B | 3529.3 | 3529.5 | – | – | SB | | |

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

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

| Weight 1 Date/Time: |
|---|
| 7/22 - 7:15 |

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

| Weight 3 Date/Time: |
|---|
| |

| Weight 4 Date/Time: |
|---|
| |

| Weight 1 Date/Time: |
|---|
| 8/15 0800 |

| Weight 2 Date/Time: |
|---|
| 8/16 0930 |

| Weight 3 Date/Time: |
|---|
| |

| Weight 4 Date/Time: |
|---|
| |

| Weight 1 Date/Time: |
|---|
| 9/5/19 16:00 |

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

| Weight 3 Date/Time: |
|---|
| |

| Weight 4 Date/Time: |
|---|
| |

# Equations and Sample Calculations – ASTM E2779 & E2515

Client: IHP
Model: Winslow
Tracking #: N/A
Run: 1

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

$M_{Bdb}$ – 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 in the dilution tunnel, ft/sec

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

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

$m_n$ – Total Particulate Matter Collected, mg

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

$E_T$ – Total Particulate Emissions, g

PR - Proportional Rate Variation

$PM_R$ – Average particulate emissions for full integrated test run, g/hr

$PM_F$ – Average particulate emission factor for full integrated test run, g/dry kg of fuel burned

**$M_{Bdb}$ – 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:

FM = 7.75 %
$M_{Swb}$ = 15.6 lbs
$M_{Ewb}$ = 0.0 lbs
0.4536 = Conversion factor from lbs to kg

$M_{Bdb}$ = [( 15.6 x 0.4536) - ( 0.0 x 0.4536)] (100/(100 + 7.747 )

$M_{Bdb}$ = **6.57** kg

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

$$M_{BSidb} = (MS_{Siwb} - M_{ESiwb})(100/(100 + FM))$$

Where,

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

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

Sample Calculation (from medium burn rate segment):

FM = 7.75 %

$M_{SSiwb}$ = 10.2 lbs

$M_{ESiwb}$ = 5.6 lbs

0.4536 = Conversion factor from lbs to kg

$M_{BSidb}$ = [( 10.2 x 0.4536) - ( 5.6 x 0.4536)] (100/(100 + 8 )

$M_{BSidb}$ = **1.94** kg

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

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

Where,

$\theta$ = Total length of full integrated test run, min

Sample Calculation:

$M_{Bdb}$ = 6.57 kg
$\theta$ = 360 min

$$BR = \frac{60 \times 6.57}{360}$$

BR = **1.09** 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,

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

Sample Calculation (from medium burn rate segment):

$M_{BSidb}$ = 1.94 kg
$\theta$ = 120 min

$$BR = \frac{60 \times 1.94}{120}$$

BR = **0.97** 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, Fp = $\frac{V_{strav}}{V_{scent}}$, ASTM E2515 Equation (1)

$v_{scent}$ = Dilution tunnel velocity calculated after the multi-point pitot traverse at the center, ft/sec

$v_{strav}$ = Dilution tunnel velocity calculated after the multi-point pitot traverse, ft/sec

$k_p$ = Pitot tube constant, 85.49

$C_p$ = Pitot tube coefficient: 0.99, unitless

$\Delta P$* = Velocity pressure in the dilution tunnel, in $H_2O$

$T_s$ = Absolute average gas temperature in the dilution tunnel, °R; (°R = °F + 460)

$P_s$ = Absolute average gas static pressure in dilution tunnel, = $P_{bar} + P_g$, in Hg

$P_{bar}$ = Barometric pressure at test site, in. Hg

$P_g$ = Static pressure of tunnel, in. $H_20$; (in Hg = in $H_20$/13.6)

$M_s$ = **The dilution tunnel wet molecular weight; $M_s$ = 28.78 assuming a dry weight of 29 lb/lb-mole

Sample calculation:

$$Fp = \frac{17.34}{19.44} = 0.892$$

$$V_s = 0.892 \times 85.49 \times 0.99 \times 0.294 \times \left( \frac{102.6 + 460}{\left(30.14 + \frac{-0.02}{13.6}\right) \times 28.78} \right)^{1/2}$$

$V_s$ = **17.86** ft/s

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

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

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

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

Where:

| | | |
|---|---|---|
| 3600 | = | Conversion from seconds to hours (ASTM method uses 60 to convert in minutes) |
| $B_{ws}$ | = | Water vapor in gas stream, proportion by volume; assume 2% |
| A | = | Cross sectional area of dilution tunnel, $ft^2$ |
| $T_{std}$ | = | Standard absolute temperature, 528 °R |
| $P_s$ | = | Absolute average gas static pressure in 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:

$$Q_{sd} = 3600 \times (1 - 0.02) \times 17.86 \times 0.1963 \times \frac{528}{102.6 + 460} \times \frac{30.14 + \frac{-0.02}{13.6}}{29.92}$$

$Q_{sd}$ = **11696.2** 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. $H_2O$ |
| $T_m$ | = | Absolute average dry gas meter temperature, °R |

Sample Calculation:

Using equation for Train A:

$$V_{m(std)} = 17.64 \times 53.227 \times 0.999 \times \frac{\left(30.14 + \frac{2.21}{13.6}\right)}{(95.6 + 460)}$$

$V_{m(std)}$ = **51.160** dscf

Using equation for Train B:

$$V_{m(std)} = 17.64 \times 51.741 \times 0.996 \times \frac{\left(30.14 + \frac{2.11}{13.6}\right)}{(94.0 + 460)}$$

$V_{m(std)}$ = **49.714** dscf

Using equation for ambient train:

$$V_{m(std)} = 17.64 \times 0.00 \times 0.992 \times \frac{\left(30.14 + \frac{0.00}{13.6}\right)}{(73.7 + 460)}$$

$V_{m(std)}$ = **0.000** dscf

**$m_n$ – Total Particulate Matter Collected, mg**
ASTM E2515 Equation (12)

$$m_n = m_p + m_f + m_g$$

Where:

$m_p$ = mass of particulate matter from probe, mg

$m_f$ = mass of particulate matter from filters, mg

$m_g$ = mass of particulate matter from filter seals, mg

Sample Calculation:

Using equation for Train A (first hour):

$m_n$ = 0.0 + 1.2 + 0.0

$m_n$ = 1.2 mg

Using equation for Train A (remainder):

$m_n$ = 0.2 + 3.1 + 2.6

$m_n$ = 5.9 mg

Train A Aggregate = **7.1** mg

Using equation for Train B:

$m_n$ = 0.6 + 1.7 + 3.3

$m_n$ = **5.6** mg

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

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

Where:

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

Sample calculation:

For Train A:

$$C_s = 0.001 \times \frac{7.1}{51.16}$$

$C_s$ = **0.00014** g/dscf

For Train B:

$$C_s = 0.001 \times \frac{5.6}{49.71}$$

$C_s$ = **0.00011** g/dscf

For Ambient Train

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

$C_r$ = **0.000000** 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 A

$E_T$ = ( 0.000139 - 0.000000 ) x 11696.2 x 360 /60

$E_T$ = 9.74 g

For Train B

$E_T$ = ( 0.000113 - 0.000000 ) x 11696.2 x 360 /60

$E_T$ = 7.91 g

Average

E = 8.82 g

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

| | |
|---|---|
| 7.5% of the average = | 0.66 |
| Train A difference = | 0.92 |
| Train B difference = | 0.92 |

**PR - Proportional Rate Variation**

ASTM E2515 equation (16)

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

Where:

$\theta$ = Total sampling time, min

$\theta_i$ = Length of recording interval, min

$V_{mi}$ = Volume of gas sample measured by the dry gas meter during the “ith” time interval, dcf

$V_m$ = Volume of gas sample as measured by dry gas meter, dcf

$V_{si}$ = Average gas velocity in the dilution tunnel during the "ith" time interval, ft/sec

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

$T_{mi}$ = Absolute average dry gas meter temperature during the "ith" time interval, $^oR$

$T_m$ = Absolute average dry gas meter temperature, $^oR$

$T_{si}$ = Absolute average gas temperature in the dilution tunnel during the "ith" time interval, $^oR$

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

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

$$PR = \left( \frac{360 \times 0.132 \times 17.86 \times (95.6 + 460) \times (\#\#\#\# + 460)}{1 \times 53.227 \times 17.89 \times (102.6 + 460) \times (77.0 + 460)} \right) \times 100$$

PR = 94 %

**$PM_R$ – 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

$\theta$ = Total length of full integrated test run, min

Sample Calculation:

$E_T$ (Dual train average) = 8.82 g

$\theta$ = 360 min

$$PM_R = 60 \times ( 8.82 / 360 )$$

$PM_R$ = **1.47** 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:

$E_T$ (Dual train average) = 8.82 g

$M_{Bdb}$ = 6.57 kg

$PM_F$ = 8.82 / 6.57 )

$PM_F$ = **1.34** g/kg

IRONSTRIKE®
HEAT FOR LIFE

Manufactured by/Fabriqué par:
INNOVATIVE HEARTH PRODUCTS
1502 14TH ST NW
AUBURN, WA., USA 98001

Tested to: ASTM E2779 & ASTM E2515 standards, 2020 NSPS Compliant
Certification test emissions value 1.47 g/hr per EPA Method 28R
This wood heater needs periodic inspection and repair for proper operation. Consult the owner's manual for further information. It is against federal regulations to operate this wood heater in a manner inconsistent with the operating instructions in the owner's manual.
Inspect and clean exhaust venting system frequently.
Install and use only in accordance with PS40GL installation and operating instructions.
Refer to local building codes and the installation manual for precautions required for passing the exhaust venting system through a combustible wall or ceiling.
Exhaust vent type is listed type "L" or "PL".
Contact local building or fire officials, or authority having jurisdiction, about restrictions and installation inspection in your area.
For use with only wood pellet fuel or a 50/50 wood pellet fuel/corn kernel mixture.
Do not connect this unit to a chimney serving another appliance.
Keep viewing and ash removal doors tightly closed during operation.
Input rating: 4.5 pounds per hour.
Electrical rating: 115 VAC, 60 Hz.
Route power cord away from unit. Do not route cord under or in front of appliance.
DANGER: Risk of electric shock. Disconnect power before servicing unit.
Replace glass only with ceramic glass.
Alcove Dimensions: Minimum alcove height is 41", minimum width is 42.25" and maximum depth is 48".
For Vertical and Alternative Installations See the PS40GL Installation and Operating Instructions.

Testé selon: ASTM E2779 et ASTM E2515, 2020 NSPS
Valeur d'émission du test d'homologation 1,47 g/h (EPA Method 28R).
Cet appareil de chauffage au bois doit être inspecté et entretenu périodiquement pour fonctionner correctement. Voir le manuel du propriétaire pour plus d'information. L'utilisation de cet appareil de chauffage au bois de manière incompatible avec les instructions du manuel du propriétaire constitue une infraction aux régulations fédérales.
Examinez et nettoyez souvent le système de ventilation du gaz d'échappement.
N'installez, ni utilisez que selon les instructions d'installation et de fonctionnement PS40GL.
Voyez les règlements de bâtiment dans votre région et les instructions du fabricant pour les précautions éxigées pour faire passer une cheminée dans un mur ou un plafond combustible.
Le système de ventilation du gaz d'échappement est classé type "L" ou "PL".
Contactez vos autorités de batiment ou vos pompiers, ou l'autorité en titre, à propos des limitations et l'inspection de l'installation dans votre région.
N'utilisez qu'avec les boulettes de combustible en bois, ou avec un mélange 50/50 des boulettes de combustible en bois et les grains de mais.
Ne liez pas cette unité à une cheminée qui aliment un autre appareil électrique.
Tenez la porte de vue bien fermée pendant l'operation.
Tenez les portes de vue et d'enlèvement des cendres bien fermées pendant l'operation.
Classement d'alimentation: 4.5 livres par heure.
Classement électrique: 115 VAC, 60 Hz.
Faites passer le cordon d'électricité de l'unité. Ne faites pas passer le cordon sous ou devant l'appareil.
AVERTISSEMENT: Risque de choc électrique.
Débranchez le courant avant de faire réviser l'unité.
Ne remplacez la verre qu'avec la verre céramique.
Dimensions de renfoncement: L'hauteur minimum du renfoncement est 41", le largeur minimum est 42.25", et la profondeur maximum est 48".
Pour des installations verticales et alternatives, voyez les instructions d'installation et de fonctionnement PS40GL.

Date of Manufacture / Date De Fabrication

| 2019 | 2020 | 2021 | JAN<br>JANV | FEB<br>FEVR | MAR<br>MARS | APR<br>AVR | MAY<br>MAI | JUN<br>JUIN | JUL<br>JUIL | AUG<br>AOÛT | SEP<br>SEPT | OCT<br>OCT | NOV<br>NOV | DEC<br>DEC |
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U.S. ENVIRONMENTAL PROTECTION AGENCY
Certified to comply with 2020 particulate emission standards using crib wood.

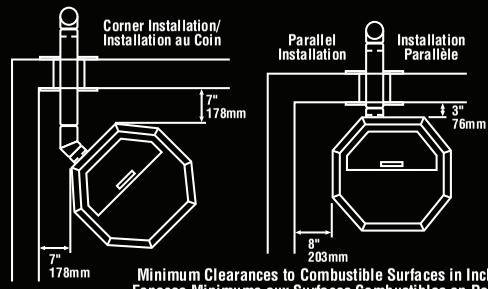
Part No./ No. pièce #900429-00 Rev. 1, 10/2019 DO NOT REMOVE THIS LABEL Made in U.S.A.

Room Heater, Pellet Fuel-Burning Type, Also For Use In Mobile Homes
Radiateur de chambre, type boulette de combustible, à utiliser aussi dans les mobile homes.

Model/Modèle: Winslow™ PS40

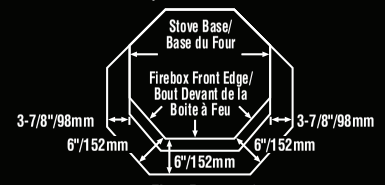
Serial Number / Numéro de Série: PS40GL-

PFS® C US
Report No./Numéro de Rapport 14-187



Minimum Clearances to Combustible Surfaces in Inches/
Espaces Minimums aux Surfaces Combustibles en Pouces

Floor Protector must be non-combustible and of the minimum size indicated./
Protecteur du plancher doit être non-combustible et de la taille minimum indiquée.



Floor Protector/
Protecteur de Plancher

**CAUTION:** HOT WHILE IN OPERATION. DO NOT TOUCH, KEEP CHILDREN, CLOTHING AND FURNITURE AWAY. CONTACT MAY CAUSE SKIN BURNS. SEE NAMEPLATE AND INSTRUCTIONS. DO NOT OVERFIRE. IF HEATER OR CHIMNEY CONNECTOR GLOWS, YOU ARE OVERFIRING. INSPECT AND CLEAN CHIMNEY AND CONNECTOR FREQUENTLY. UNDER CERTAIN CONDITIONS OF USE, CREOSOTE BUILDUP MAY OCCUR RAPIDLY. DO NOT USE GRATE OR ELEVATE FIRE - BUILD WOOD FIRE DIRECTLY ON HEARTH. FEED DOOR MUST BE CLOSED DURING FIRING EXCEPT WHEN ADDING FUEL. KEEP ASH DOOR CLOSED TO AVOID EXCESS HEAT. DANGER: RISK OF ELECTRICAL SHOCK. DISCONNECT POWER BEFORE SERVICING UNIT. FOR USE WITH SOLID WOOD FUEL ONLY.

**ATTENTION:** L'APPAREIL EST CHAUD LORS DE L'OPÉRATION. NE PAS Y TOUCHER. RISQUE DE BRÛLURES CUTANÉES. TENIR LES ENFANTS, LES MATÉRIAUX COMBUSTIBLES, LES VÊTEMENTS ET LES MEUBLES ELOIGNÉS DE L'APPAREIL. VOIR LA PLAQUE SIGNALÉTIQUE ET LES DIRECTIVES. NE PAS SURCHAUFFER L'APPAREIL. SI L'APPAREIL OU LE TUYAU DE CHEMINÉE ROUGIT, VOUS SURCHAUFFEZ. INSPECTER ET NETTOYER LA CHEMINÉE ET LE TUYAU CONNECTEUR FRÉQUEMMENT. SOUS CERTAINES CONDITIONS, IL SE PEUT QUE LE CRÉOSOTE S'ACCUMULE RAPIDEMENT. NE SURÉLEVER PAS LE FEU À L'AIDE D'UN CHENET. DÉPOSER LES BÛCHES DE BOIS DIRECTEMENT SUR L'ÂTRE. LA PORTE DOIT ÊTRE FERMÉE PENDANT L'USAGE SAUF POUR ALIMENTER LE FEU. GARDER LA PORTE "BY-PASS" (CENDRES) FERMÉE POUR ÉVITER DE SURCHAUFFER. DANGER: RISQUES DE DÉCHARGE ÉLECTRIQUE. DÉCONNECTER LE FIL ÉLECTRIQUE DE LA PRISE DE CONTACT AVANT LE SERVICE. NE PAS FAIRE PASSER LE FIL ÉLECTRIQUE SOUS OU EN AVANT DE L'APPAREIL. POUR USAGE AVEC LE BOIS SEULEMENT.

IRONSTRIKE
HEAT FOR LIFE

**Manufactured by/Fabriqué par:**
**INNOVATIVE HEARTH PRODUCTS**
**1502 14TH ST NW**
**AUBURN, WA., USA 98001**

**Room Heater, Pellet Fuel-Burning Type, Also For Use In Mobile Homes/**
**Radiateur de chambre, type boulette de combustible,**
**à utiliser aussi dans les mobile homes.**

## Model/Modèle: Winslow™ PI40GL

Certification test emissions value 1.47 g/hr per EPA Method 28R.

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

Inspect and clean exhaust venting system frequently

Install and use only in accordance with PI40GL installation and operating instructions.

Refer to local building codes and the installation manual for precautions required for passing the exhaust venting system through a combustible wall or ceiling.

Exhaust vent type is listed type "L", "PL", or Flex.

Contact local building or fire officials, or authority having jurisdiction, about restrictions and installation inspection in your area.

For use with only wood pellet fuel or a 50/50 wood pellet fuel/corn kernel mixture.

Do not connect this unit to a chimney serving another appliance.

Keep viewing door tightly closed during operation.

Input rating: 4.5 pounds per hour.

Electrical rating: 115 VAC, 60 Hz., 5.8 Amps

Route power cord away from unit. Do not route cord under or in front of appliance.

DANGER: Risk of electric shock. Disconnect power before servicing unit.

Replace glass only with ceramic glass.

For Alternative Installations See the PI40GL Installation and Operating Instructions.

Valeur d'émission du test d'homologation 1,47 g/h (EPA Method 28R)..

Cet appareil de chauffage au bois doit être inspecté et entretenu périodiquement pour fonctionner correctement. Voir le manuel du propriétaire pour plus d'information. L'utilisation de cet appareil de chauffage au bois de manière incompatible avec les instructions du manuel du propriétaire constitue une infraction aux régulations fédérales.

Examinez et nettoyez souvent le système de ventilation du gaz d'échappement.

N'installez, ni utilisez que selon les instructions d'installation et de fonctionnement PI40GL.

Voyez les règlements de bâtiment dans votre région et les instructions du fabricant pour les précautions éxigées pour faire passer une cheminée dans un mur ou un plafond combustible.

Le système de ventilation du gaz d'échappement est classé type "L", "PL" ou flex.

Contactez vos autorités de batiment ou vos pompiers, ou l'autorité en titre, à propos des limitations et l'inspection de l'installation dans votre région.

N'utilisez qu'avec les boulettes de combustible en bois, ou avec un mélange 50/50 des boulettes de combustible en bois et les grains de maïs.

Ne liez pas cette unité à une cheminée qui aliment un autre appareil électrique.

Tenez la porte de vue bien fermée pendant l'operation.

Classement d'alimentation: 4.5 livres par heure.

Classement électrique: 115 VAC, 60 Hz., 5.8 Amps.

Faites passer le cordon d'électricité de l'unité. Ne faites pas passer le cordon sous ou devant l'appareil.

AVERTISSEMENT: Risque de choc électrique.

Ne remplacez la verre qu'avec la verre céramique.

Pour des installations alternatives, voyez les instructions d'installation et de fonctionnement PI40GL.

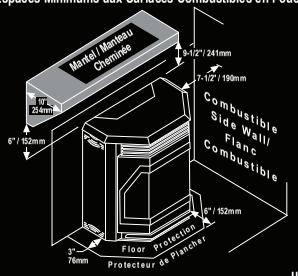
**Part No./ No. pièce #900430-00 Rev. 1, 10/2019**

**DO NOT REMOVE THIS LABEL**

**Made in U.S.A.**

Serial Number
Numéro de Série **PI40GL-**

**Minimum Clearances to Combustible Surfaces in Inches**
**Espaces Minimums aux Surfaces Combustibles en Pouces**




**Date of Manufacture/Date de Fabrication**

| 2019 | 2020 | 2021 | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
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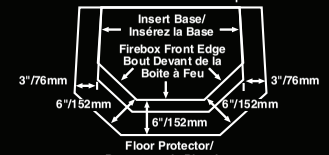
PFS
C US

**Report No. 14-188**
**Tested to: ASTM E2779 & ASTM E2515 standards, 2020 NSPS Compliant**
**Testé selon: ASTM E2779 et ASTM E2515, 2020 NSPS**
**Floor Protector must be non-combustible and of the minimum size indicated/**
**Protecteur du plancher doit être non-combustible et de la taille minimum indiquée.**




**Floor Protector/**
**Protecteur de Plancher**

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

**CAUTION:** HOT WHILE IN OPERATION. DO NOT TOUCH. KEEP CHILDREN, CLOTHING, AND FURNITURE AWAY. CONTACT MAY CAUSE SKIN BURNS. SEE NAMEPLATE AND INSTRUCTIONS. OPERATE THIS UNIT ONLY WITH THE FUEL HOPPER LID CLOSED. FAILURE TO DO SO MAY RESULT IN EMISSION OF PRODUCTS OF COMBUSTION FROM THE HOPPER UNDER CERTAIN CONDITIONS. MAINTAIN HOPPER SEAL IN GOOD CONDITION. DO NOT OVERFILL HOPPER.

**ATTENTION:** CET APPAREIL EST CHAUD EN MARCHANT– NE TOUCHEZ PAS. TENEZ HORS DE LA PORTÉE DES ENFANTS. NE PERMETTEZ PAS LES HABITS A TOUCHER L'APPAREIL. LE CONTACT PEUT CAUSER DES BRULURES DE LA PEAU. VOYEZ LA PLAQUE ET LES AUTRES INSTRUCTIONS. FAITES MARCHER CETTE UNITE SEULEMENT AVEC LE CHAPEAU DE LA TREMIE DE COMBUSTIBLE FERMEE. EN CAS DE DEFAILLANCE, LES PRODUITS DE COMBUSTION POURRAIT ETRE EMIS DE LA TREMIE SOUS CERTAINES CONDITIONS. TENEZ LE PLOMB DE LA TREMIE EN BONNE CONDITION. NE REMPLISSEZ TROP LA TREMIE.

IRONSTRIKE®
HEAT FOR LIFE

# INSTALLATION AND OPERATION MANUAL

## Pellet-Fired Fireplace Insert

**Save These Instructions For Future Reference**

**P/N 900139-00, Rev. E, 06/2023**

P900139-00

## Pellet Insert Model Winslow™ (PI40GL)

PFS® C US

Report No. 14-188

NATIONAL FIREPLACE INSTITUTE NFI CERTIFIED

www.nficertified.org

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

Wood Energy Technical Training www.wettinc.ca

**A French manual is available upon request. Order P/N 900140-00.**

**Ce manuel d'installation est disponible en francais, simplement en faire la demande. Numéro de la pièce 900140-00.**

**This appliance must be properly installed and operated in order to prevent the possibility of a house fire. Please read this entire manual before installation and use of this pellet fuel-burning room heater. Failure to follow these instructions could result in property damage, bodily injury or even death. Contact your local building or fire officials to obtain a permit and information on any installation requirements and inspection requirements in your area.**

### ⚠ WARNING

- **Hot! Do not touch! The glass and surfaces of this appliance will be hot during operation and will retain heat for a while after shutting off the appliance. Severe burns may result.**
- **Carefully supervise children in the same room as appliance.**
- **IHP pellet-burning appliances are designed for use as a supplemental heater. They are not intended for continuous use as a primary heat source.**

## CONGRATULATIONS!

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

**Thank you for selecting an Innovative Hearth Products (IHP) pellet fireplace insert as the answer to your home heating needs.**

## TABLE OF CONTENTS



### USING THIS MANUAL

Please read and carefully follow all of the instructions found in this manual. Please pay special attention to the safety instructions provided in this manual.

**PRODUCT IS SUBJECT TO CHANGE WITHOUT NOTICE**

## IMPORTANT SAFETY AND WARNING INFORMATION

**READ THIS MANUAL IN ITS ENTIRETY AND UNDERSTAND THESE RULES TO FOLLOW FOR SAFETY.**

### ⚠ WARNING

**Improper installation, adjustment, alteration, service or maintenance can cause injury or property damage. Refer to this manual. For assistance or additional information consult a qualified installer, service agency or the gas supplier.**

### ⚠ WARNING

**Do not attempt to alter or modify the construction of the appliance or its components. Any modification or alteration may void the warranty, certification and listings of this unit.**

1. DO NOT CONNECT THIS UNIT TO A CHIMNEY FLUE SERVING ANOTHER APPLIANCE.
2. Do not connect this appliance to air ducts or any air distribution system.
3. DO NOT INSTALL A FLUE DAMPER IN THE EXHAUST VENTING SYSTEM OF THIS UNIT.
4. Do not use class B venting intended for gas appliances as a chimney or connector pipe on a pellet-fired appliance.
5. The minimum clearances must be maintained for all combustible surfaces and materials including; furniture, carpet, drapes, clothing, wood, papers, etc. Do not store combustibles within this clearance space (see *Clearances* on *Page 9)*.
6. INSTALLATION DISCLAIMER - It is imperative that the exhaust venting system be installed correctly and sealed gas-tight (not allowing exhaust to leak). Follow the vent manufacturer's instructions for proper installation. Since IHP has no control over the installation of your fireplace insert, IHP grants no warranty, implied or stated for the installation or maintenance of your insert, and assumes no responsibility for any consequential damage(s).
7. Burning any kind of fuel consumes oxygen. If outside air is not ducted to the appliance, ensure that there is an adequate source of fresh air available to the room where the appliance is installed.
8. The appliance will not operate using natural draft, nor without a power source for the blower and fuel feeding systems.
9. Never use gasoline, gasoline-type lantern fuel, kerosene, charcoal lighter fluid, or similar liquids to start or "freshen up" a fire in this heater. Keep all such liquids well away from the heater while it is in use.
10. The authority having jurisdiction such as municipal building department, fire department, fire prevention bureau, etc should be consulted before installation to determine the need to obtain a permit.
11. APPROVED FUEL: This appliance is designed specifically for use only with pelletized wood pellets. This appliance is designed and approved for the burning of wood residue pellets with up to 2% ash content. This appliance is NOT approved to burn cardboard, nut hulls, cherry pits, etc. regardless if it is in pellet form. Failure to comply with this restriction will void all warranties and the safety listing of the stove. Consult with your IHP dealer for more information on approved pellet fuels.
12. These appliances are designed as supplemental heaters. Therefore, it is advisable to have an alternate heat source when installed in a dwelling.
13. CONTINUOUS OPERATION: When operated correctly, this appliance cannot be overfired. Continuous operation at a maximum burn can, however, shorten the life of the electrical components (blowers, motors, and electronic controls), and is not recommended. Typical approved operation would include running at the low to mid range setting with occasional running on the maximum setting during the coldest periods of the winter. DO NOT OVER-FIRE THIS INSERT. Follow all instructions regarding the proper use of this insert.
14. CAUTION: NEVER PUT FINGERS NEAR AUGER. This appliance is equipped with a hopper lid switch, which is designed to stop the auger when the hopper lid is opened. NEVER DISCONNECT OR BYPASS THIS SWITCH FOR ANY REASON. Pellet fuel is fed to the Burn Pot by a screw auger. This auger is driven by a high torque motor. The auger is capable of causing serious harm to fingers. Keep pellets in the hopper at all times and keep fingers away from auger. The auger can start and stop automatically at any time while the stove is running.
15. CAUTION: HOT WHILE IN OPERATION. An appliance hot enough to warm your home can severely burn anyone touching it. Keep children, pets, clothing and furniture away. Contact may cause skin burns. Do not let children touch the appliance. Train them to stay a safe distance from the appliance.
16. FLY ASH BUILD-UP: For all wood pellet fuel-burning heaters, the combustion gases will contain small particles of fly-ash. This will vary due to the ash content of the fuel being burned. Over time, the fly-ash will collect in the exhaust venting system and restrict the flow of the flue gases. The exhaust venting system should be inspected regularly and cleaned as necessary.
17. SOOT FORMATION: Incomplete combustion, such as occurs during startup, shutdown, or incorrect operation of the room heater will lead to some soot formation which will collect in the exhaust venting system. A precautionary inspection on a regular basis is advisable to determine the necessity of cleaning. The exhaust venting system should be inspected regularly and cleaned as necessary.
18. DISPOSAL OF ASHES: Ashes should be placed in a steel container with a tight fitting lid and moved outdoors immediately. The closed container of ashes should be placed on a noncombustible floor or on the ground, well away from all combustible materials, outside of the dwelling pending final disposal. If the ashes are disposed of by burial in soil or otherwise locally dispersed, they should be retained in the closed container until all cinders have been thoroughly cooled.
19. The instructions must be strictly adhered to. Do not use makeshift methods or compromise in the installation.
20. Do not abuse the door glass by striking, slamming or similar trauma. Do not operate the insert with the glass removed, cracked or broken.
21. SAVE THESE INSTRUCTIONS.
22. See the listing label on the appliance.

**⚠ WARNING**

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

## PLANNING YOUR INSTALLATION

### Questions To Ask Local Building Official

A correct installation is critical and imperative for reducing fire hazards and perilous conditions that can arise when wood pellet burning appliances are improperly installed. The installer must follow all of the manufacturers' instructions.

**⚠ WARNING**

**Check all local building and safety codes before installation. The installation instructions and appropriate code requirements must be followed exactly and without compromise. Alterations to the stove are not allowed. Do not connect the stove to a chimney system serving another stove, appliance, or any air distribution duct. Failure to follow these instructions will void the manufacturers warranty.**

The installation of this appliance must conform to local codes and applicable state and federal requirements. Familiarity with these requirements before installation is essential. Important considerations to discuss with local building officials include:

1. **Applicable codes** (i.e. Uniform Mechanical Code, State or Regional Codes).
   **Electrical codes:**
   In USA, NEC, ANSI/NFPA 70 – Latest Edition
   In Canada, CSA C22.1 – Latest Edition
2. Local amendments
3. Is a permit required - cost. You may wish to contact your insurance company to ask if they require this.
4. If outside combustion air is required
5. Rooms where the installation is not allowed

### Power Supply Requirements

The power cord must be plugged into a standard, 120 volt, 60 Hz grounded electrical outlet. The power supply cord must be routed to avoid contact with any of the hot or sharp exterior surface areas of the stove. When installed in a manufactured home, the appliance must be electrically grounded to the steel chassis of the manufactured home (see *Mobile Home Installations* on ***Page 13***, for additional requirements). These requirements must be met unless otherwise specified by state or local authorities.

### Electrical

- The fireplace insert requires 120 volts AC for operation.
- Maximum wattage is 700.
- Igniter wattage is 400.
- Normal operating wattage is 300.

### Electrical Generator Operation

Your Winslow™ PI40GL insert can be powered with a gas driven electrical generator. However, the generator's electrical regulator may not be compatible with the insert's electronics. The higher the quality of the generator, the greater the chance that it is compatible with the insert.

**⚠ WARNING**

**Electrical grounding instructions: This appliance is equipped with a three-prong (grounding) plug for your protection against shock hazard and should be plugged directly into a properly grounded three-prong receptacle. Do not cut or remove the grounding prong from this plug. Do not route power cord under or in front of appliance.**

### Smoke Detector Recommended

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

### Carbon Monoxide Monitor Recommended

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

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

### Surge Protectors

A surge protector is recommended to ensure the stove's electrical components are not damaged due to a surge in the electrical supply. Only high quality protectors listed to UL1449 should be used - low quality protectors do not provide the protection needed.

### Installation / Maintenance Standards

National Fire Protection Association – The primary NFPA standard that refers to installation and maintenance of pellet stoves and venting is NFPA 211 – Latest Edition: Chimneys, Fireplaces, Vents, and Solid Fuel appliances.

## SELECTING A LOCATION

The design of your home and where you place your stove will determine its value as a source of heat. This type of appliance depends primarily on air circulation (convection) to disperse its heat, and therefore, a central location is often best. There are other practical considerations, which must be considered before a final selection of locations is made. Some of which includes:

- Existing Chimneys
- Pellet Fuel Storage
- Aesthetic Considerations
- Roof Design (rafter locations & roof pitch)
- Room Traffic
- Proximity to Combustibles
- Electrical Wiring

**⚠ CAUTION**

**The body of these appliances are very heavy. The use of a heavy duty escalara (stair step hand truck) is recommended for lifting the appliance body.**

### NEGATIVE PRESSURE WARNING

This appliance is not designed to be operated in a negative pressure environment. In very airtight homes with large kitchen exhaust fans, furnace cold air returns, fresh air exchange systems and any other air system in close proximity to the heating appliance may create a negative pressure in the same room as the heating appliance. This can create dangerous condition, drawing combustion by-products into the home. Be sure your home has adequate makeup air to eliminate negative pressures caused by the above-mentioned sources. Outside air connected to the appliance probably will not resolve such a problem as the stove is not the source of negative pressure. IHP accepts no liability for damages resulting from negative pressures described here.

**Ventilation Requirements -** Provide adequate air for combustion. The fresh air requirements of this appliance must be met within the space where it will be installed. Ventilation is essential when using a solid-fuel-burning heater. In well insulated and weather tight homes, it may inhibit the rate the exhaust flows through the venting system (caused by a shortage of air in the home). The lack of air is caused by many common household appliances which exhaust air from the home (such as a furnace, heat pump, air conditioner, clothes dryer, exhaust fans, fireplaces, and other fuel burning appliances). Also, the combustion process of this heater uses oxygen from inside the dwelling. If the available fresh air delivery in the dwelling is insufficient to support the demands of these appliances, problems can result (i.e. excessive negative pressure will result in performance problems. To correct this problem it may help to open a window (preferably on the windward side of the house) or install an outside combustion air duct to the appliance.

## FEATURES AND SPECIFICATIONS

### Installation Options
- Residential
- Vented vertical and horizontal (see venting instructions)
- Manufactured home and mobile home
- Thermostat or manual operation
- Bedrooms

### Heating
- Max. feed rate is 4.5 pounds/hour or 37,500 BTU/hour
- Min. feed rate is 1.8 pounds/hour or 15,120 BTU/hour

### Venting
This fireplace insert is approved for venting with Type L and Type PL pellet vent pipe or listed pellet flex liner. The flue collar on the fireplace insert accepts 3" diameter pipe. The vent pipe can be installed vertically or horizontally (see Venting section for recommended installations).

The combustion air for this fireplace insert is drawn through a pipe at the lower rear of the fireplace insert. For mobile home installations a 2" ID flex line or pipe can be attached to the fireplace insert's air intake to draw air from outside the house.

***NOTE:*** *When installing this stove at altitudes of 4000 feet and above, we suggest the use of 4" pellet vent.*

### Thermostat
This fireplace insert can be operated manually or with a thermostat.

### Lighting
This fireplace insert is equipped with an electric self ignitor for ease of ignition.

**Weight** - 270 pounds

### Hopper Capacity
55 pounds (adjustable down to 40 pounds to fit into small fireplaces)

### Listing Information
The Winslow™ PI40GL insert is safety listed with the following agencies:
- PFS TECO to ASTM E 1509
- US EPA List of Approved Wood Heating Appliances
- Colorado Approved Pellet Stoves

### Appearance Options
The Winslow PI40GL insert can be ordered with the following door trims, grills, surround (flange) assemblies, and brick panel options :

| **Door Trim Kits** | | **Grill Kits** | |
|---|---|---|---|
| Black | 79038 | Black | 79000 |
| Nickel | 79037 | Nickel | 79002 |
| Brush Nickel | 79035 | Brush Nickel | 79022 |
| Black Nickel | 79036 | Black Nickel | 79039 |

**Surround Kits**

| | |
|---|---|
| 29" Ht. x 41" Wd. Black Trim | 79004 |
| 29" Ht. x 48" Wd. Black Trim | 79005 |
| 33" Ht. x 41" Wd. Black Trim | 79006 |
| 33" Ht. x 48" Wd. Black Trim | 79007 |

**32" ZC Surround Kit ***

| | |
|---|---|
| 29" Ht. x 41" Wd. x 3" Deep | H7232 |

* This black surround kit positions the insert 3" forward so that it will allow the insert to fit into a fireplace with a narrower width in the front (32" min.). *NOTE: No trim kits are available for this kit at this time.*

**Surround Trim Kits**

| | |
|---|---|
| Trim/Black 29" Ht. x 41" Wd. | H5143 |
| Trim/Black 29" Ht. x 48" Wd. | H5145 |
| Trim/Black 33" Ht. x 41" Wd. | H5144 |
| Trim/Black 33" Ht. x 48" Wd. | H5146 |
| Trim/Nickel 29" Ht. x 41" Wd. | 75037 |
| Trim/Nickel 29" Ht. x 48" Wd. | 75039 |
| Trim/Nickel 33" Ht. x 41" Wd. | 75041 |
| Trim/Nickel 33" Ht. x 48" Wd. | 75043 |

**Brick Panel Kit** 79030

## FUEL

**⚠ CAUTION**

**The use of unapproved, dirty, wet and / or high salt content fuel will void the warranty!**

This insert is designed to burn wood pellet fuel. Burning any other fuel that is not approved for use with this appliance will void the appliance warranty.

**Wood Pellet Specifications**
This appliance has been designed to burn wood residue pellets with up to 2% ash content. Dirty fuel will adversely affect the performance of the stove. Any questions regarding pellet fuel can be answered at the Pellet Fuels Institute (PFI), www.pelletheat.org.

Pellet fuel is made from sawdust and scrap wood from many different species of wood. Pellets are either 1/4" or 5/16" in diameter and vary in length. The PI40GL insert will burn either diameter pellets. Pellets made from hardwoods contain more ash than those made from softwoods. Minerals from ash and sand in the pellets form clinkers under the extreme temperatures in the Burn-Pot. Try burning various brands of pellets until you find one that burns with minimum ash and clinkers. Once you find a pellet brand that burns well, continue using this brand. High ash fuel increases the frequency of stove cleaning. Fuel with an excessive moisture content may jam the auger assembly.

**Clinkering** - Silica (or sand) in the fuel, along with other impurities, can cause clinkering. A clinker is a hard mass of silica formed in the burning process. Clinkering is a function of the fuel, (not the stove), but adversely affects the performance of the stove by blocking off the air passages in the Burn-Pot. Even P.F.I. approved pellet fuel may tend to clinker. See *Maintenance* for more information on cleaning.

**Pellet Fuel Storage -**
- **Store your wood pellets in a dry place to prevent them from absorbing excess moisture.**
- **Do Not store your wood pellets within the clearance zone of the stove.**
- **Do Not store your wood pellets in a place that would block access to refueling the hopper.**

Wood pellets manufactured to the pellet fuels institute (P.F.I.) certification standard are available in two grades, Standard and Premium. The primary difference between the two is the ash content of the pellets.

The P.F.I. specification for standard grade and premium grade residential and commercial pellet fuel is as follows:
- CHLORIDES (Salt): Less than 300 p.p.m. to avoid stove and vent rusting.
- BULK DENSITY: 38 to 40 lb. / Cu. Ft. minimum
- MOISTURE CONTENT: 8% to 10% maximum
- ASH CONTENT: < 2% maximum (standard grade) < 1% maximum (premium grade)
- FINES: 0.5% to 1% maximum through a 1/8" screen
- BTU CONTENT: There are a number of variations in pellet fuels that are not included in PFI standards. For example, BTU (heat value) content may range from just under 8,000 to almost 9,000 Btu, depending upon species and region of the country and other variables.

## INSERT DIMENSIONS

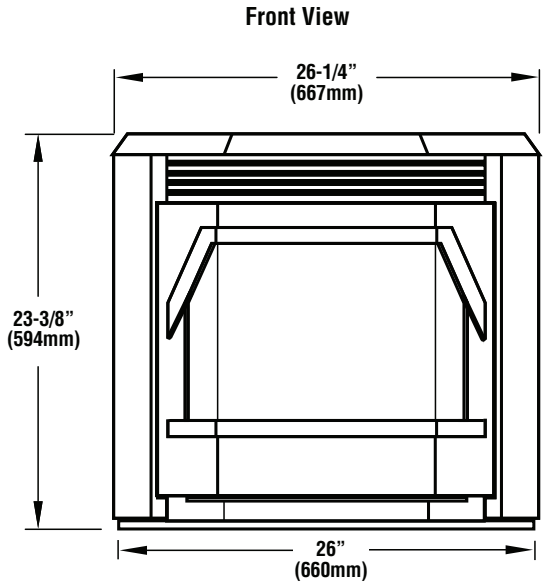



*Figure 1*

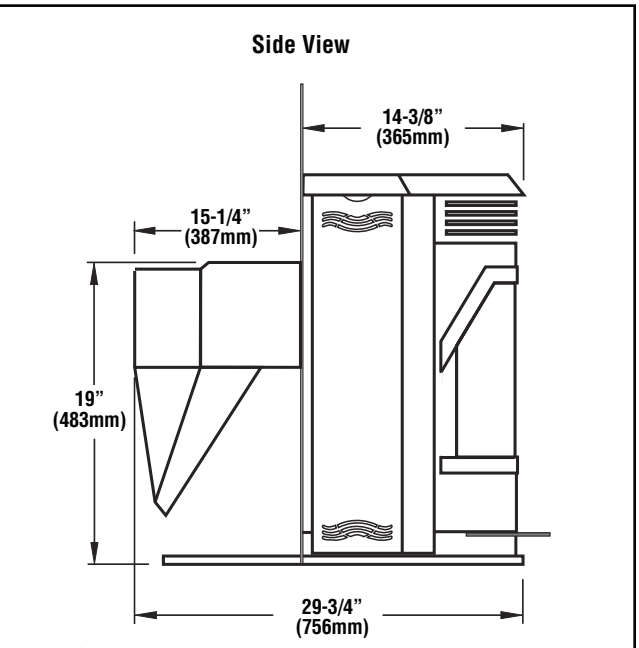
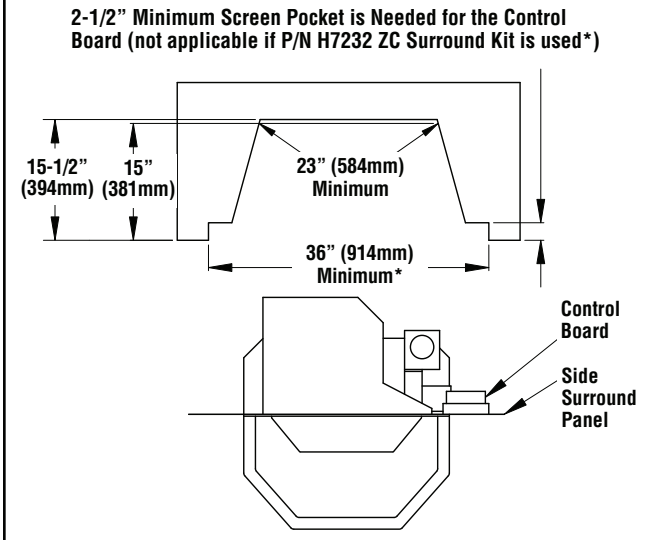



*Figure 2*

## MINIMUM FIREPLACE SIZE

***Figures 3 and 5*** shows the minimum sized fireplace required for the Winslow™ PI40GL insert when any of the four non-extended surround sizes are used.

With the hopper at its largest size (as shipped from the factory), the fireplace needs to be a minimum of 22-1/2" (572 mm) high. When the hopper is adjusted to its smallest size (see "Adjustable Hopper"), the fireplace needs to be a minimum of 19" (483 mm) high.




** This fireplace insert can fit into a fireplace with a narrower width in the front (32" min. instead of 36" min.) when the 3" Deep ZC Surround Kit is used (P/N H7232). See Figure 11C on Page 13 for more information. Please take note that because the appliance will be positioned in a more forward position on the existing hearth, additional floor protection may need to be added to the front of the appliance (see Figure 7).*

*Figure 3*

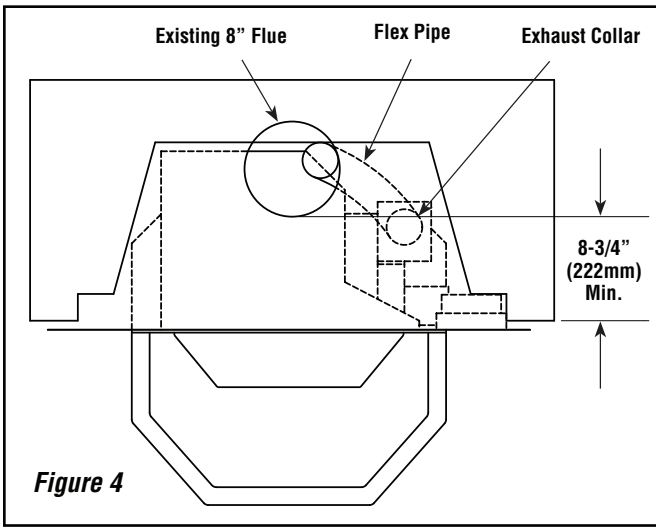



*Figure 4*

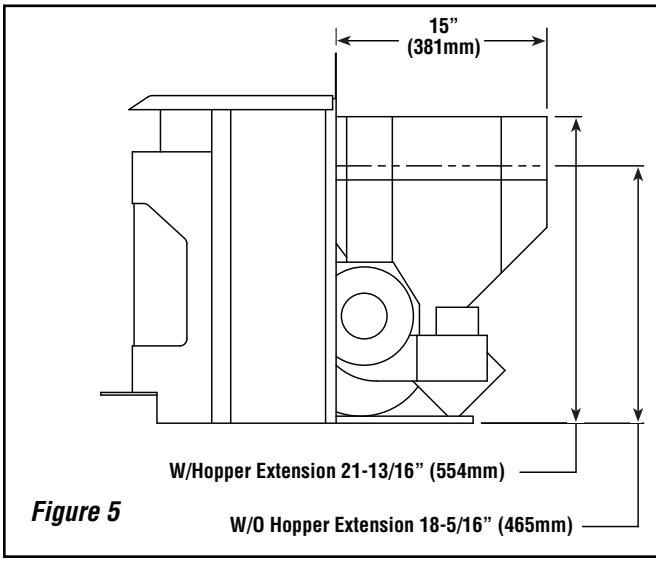



*Figure 5*



NOTE: DIAGRAMS & ILLUSTRATIONS ARE NOT TO SCALE.

## CLEARANCES TO COMBUSTIBLES

### ⚠ IMPORTANT

- ***Minimum clearances specified may not allow for ease of operation and maintenance (please take this in to account when planning the installation).***
- ***Recommended clearance zone from the front of the appliance to combustibles is 4 feet minimum.***
- ***Clearances to combustibles for the appliance can only be reduced by means approved by the regulatory authority.***

**INSTALL VENT AT CLEARANCES SPECIFIED BY THE VENT MANUFACTURER.**

**Important:** The control board attaches to the back of the right side surround panel. Therefore, the width of the fireplace firebox needs to be 36" (914 mm) wide at the front if the insert with control board is to slide into the firebox. Extended surround panels are available to accommodate narrower fireboxes.

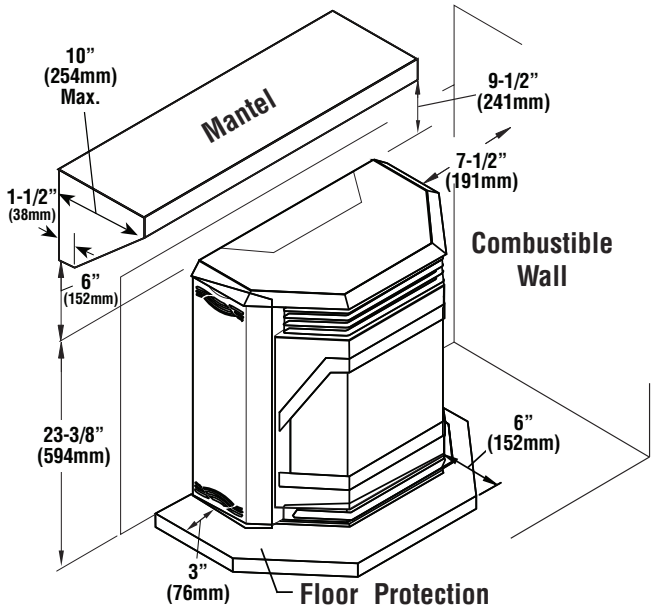



*Figure 6*

## HEARTH PROTECTION

The floor protector must be a non-combustible material extending beneath the insert from the surround panels forward and to the front and sides as shown in ***Figure 7***. **Important, if anything other than a masonry hearth is used in the installation you must use the Heat Kit (Cat. No. 79024).**

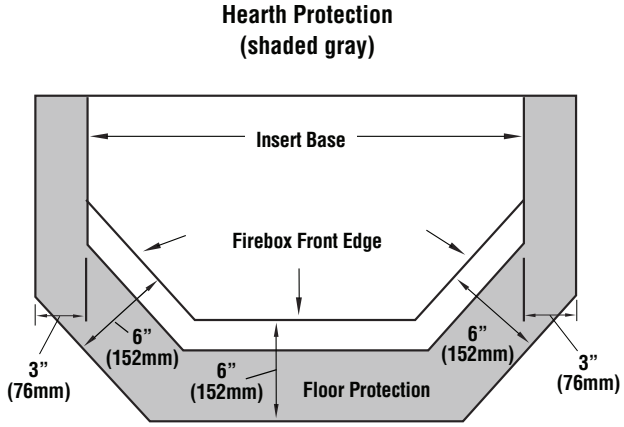



*Figure 7*

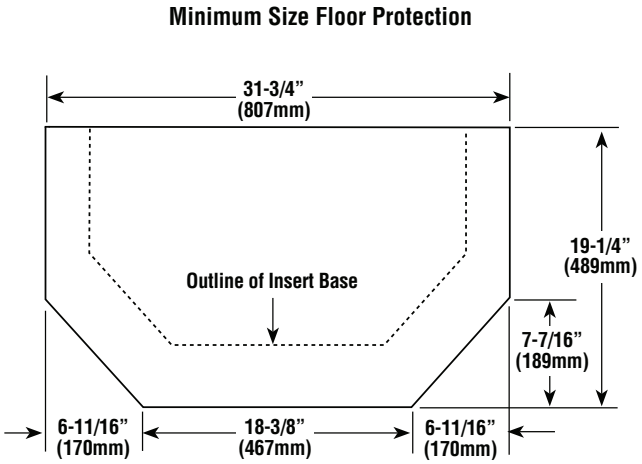



*Figure 8*

### Zero Clearance Kit and Heat Kit Installation

The Winslow™ PI40GL insert has a Zero Clearance Kit (Cat. No. 79025) and a Heat Kit (Cat. No. 79024) approved for new construction or remodel installations. See Zero Clearance and Heat kit installation instructions at the back of this manual for requirements. Both kits have been tested and approved through PFS TECO.



NOTE: DIAGRAMS & ILLUSTRATIONS ARE NOT TO SCALE.

## INSTALLATION

### Control Board Installation

The Winslow PI40GL insert is shipped with the control board wrapped and placed behind the firebox. To install the control board, unwrap it and the right side surround panel found in the surround kit. There are four prongs protruding from the surround. Place the two slots in the bottom and the two holes in the top of the control board over the four prongs on the surround panel. Install the surround panels following the instructions on ***Page 12***.

### Venting

This fireplace insert is approved for venting with Type L and Type PL pellet vent pipe (listed to UL 641 and ULC S609) or listed pellet flex liner (2100HT [degree F.] liner listed to UL 1777 or ULC S635). The insert's flue collar is 3" in diameter. The insert's combustion blower pressurizes and pushes flue gases out the pellet pipe. All pipe joints should be locked together or screwed with three screws if the pipe does not have a locking system. The pipe joints can be sealed with high temperature silicone if there is a possibility of flue gases leaking into the living area. The pipe should be fastened with three screws to the insert's flue collar. The longer the run of pipe and the more elbows used, the greater the resistance to the flow of flue gases. Four inch diameter pellet pipe is recommended for pipe runs greater than 15 feet or when a number of elbows are used. A 3-4" increaser can be used to connect the 4" pipe to the 3" flue collar. The outside air pipe may run up the chimney, horizontally, or down provided the structural integrity of the fireplace and chimney system are maintained. **DO NOT INSTALL A FLUE DAMPER IN THE EXHAUST VENTING SYSTEM OF THIS UNIT. DO NOT CONNECT THIS UNIT TO A CHIMNEY FLUE SERVING ANOTHER APPLIANCE.**

### Vent Termination Requirements:

If the insert is not vented vertically, the following apply:

1. Do not terminate the vent in any enclosed or semi-enclosed areas such as a carport, garage, attic, crawlspace, narrow walkway, closely fenced area, under a sundeck or porch, or any location that can build up a concentration of fumes such as stairwells, covered breezeway, etc.

2. Vent surfaces can become hot enough to cause burns if touched. Non-combustible shielding or guards may be required.

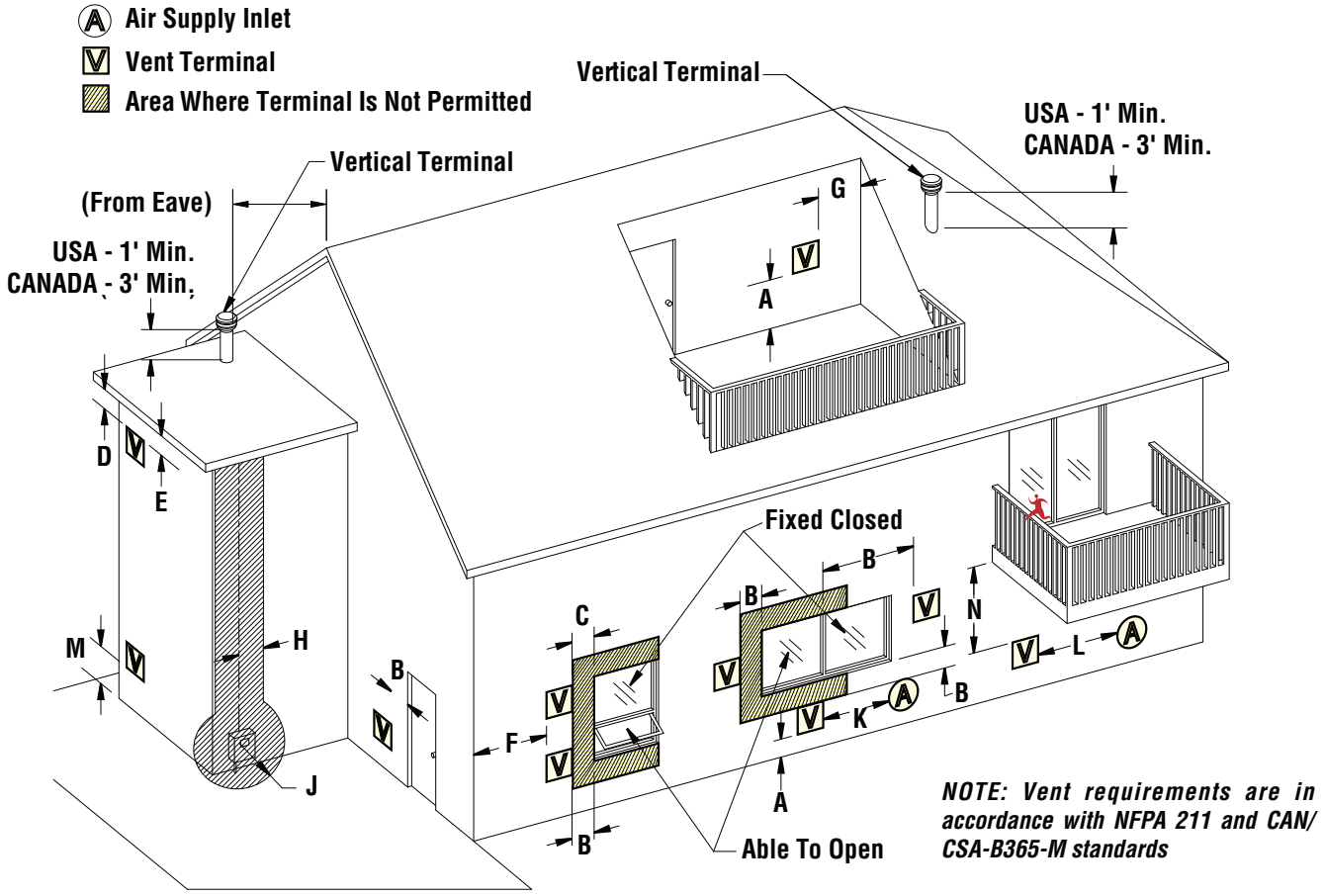
3. Termination must exhaust above the inlet elevation. It is recommended that at least five feet of vertical pipe be installed outside when the insert is vented directly through a wall. This will create a natural draft to prevent the possibility of smoke or odor during appliance shut down or power failure and avoid exposing people or shrubs to high temperatures.

4. The vent should terminate no less than four feet below, no less than four feet horizontally from, and no less than one foot above doors and windows, or gravity/ventilation air inlets into the building.

5. The distance from the bottom of termination to grade is 12" (305 mm) minimum unless otherwise specified by the vent manufacturer. The distance between the bottom of the termination and a public walkway should be a minimum of seven feet.

6. Locate the vent termination at least two feet away from combustible materials such as shrubs, plants, grass, fences, roof overhangs, and adjacent buildings.

## Vent Termination Locations




A = Refer to vent manufacturer's installation instructions for the required clearance above grade, veranda, porch, deck, or balcony.

B = Clearance to window or door that may be opened (min. 12”/30cm above - 48”/1.2m below and to the side)

C = Clearance to permanently closed window *(min. 12”/30cm)

D = Vertical clearance to ventilated soffit located above the terminal within a horizontal distance of *(min. 24”/60cm) from the centerline of the terminal (min. 22”/55cm) check with local code.

E = Clearance to unventilated soffit *(min. 12”/30cm)

F = Clearance to outside corner *(min. 12”/30cm)

G = Clearance to inside corner *(min. 12”/30cm)

H = Not to be installed above a meter/regulator assembly within *(min. 36”/90cm) horizontally from the centerline of the regulator.

J = Clearance to service regulator vent outlet *(min. 72”/1.8m)

K = Clearance to non-mechanical air supply inlet to building or the combustion air inlet to any other appliance *(min. 48”/1.2m)

L = Clearance to a mechanical air supply inlet *(min. 120”/3.1m)

M = **Clearance above paved sidewalk or a paved driveway located on public property *(min. 84”/2.1m)

N = ***Clearance under veranda, porch, deck, or balcony (min. 12”/30cm)

**NOTE:**

* Local codes or regulations may require different clearances.

** A vent shall not terminate directly above a sidewalk or paved driveway which is located between two single family dwellings and serves both dwellings.

*** Only permitted if veranda, porch, deck, or balcony is fully open on a minimum of two sides beneath the floor.

***Figure 9***



NOTE: DIAGRAMS & ILLUSTRATIONS ARE NOT TO SCALE.

The recommended pipe installation is running the pellet pipe from the insert all the way to the top of the chimney. However, the pipe may terminate inside the chimney above the damper if the chimney is sealed below the pellet pipe termination with a block off panel (see ***Figure 10***). The insert can also be vented horizontally out the back of the fireplace, but a listed pellet pipe thimble must be used if the pipe goes through a combustible wall and the structural integrity of the fireplace and chimney system must be maintained.

### Insert Leveling

Inside the firebox is a bag of hardware with four 4"x 3/8" carriage bolts. If the insert needs to be leveled, install one of these bolts (from the bottom side) in the nuts at the left and right rear of the base of the insert. Open the front door and remove the bolts screwed into the nuts at the left and right front of the firebox floor.

From the bottom outside of the insert, install the remaining two carriage bolts in the nuts from which the bolts were just removed. A zero clearance front support is available to fill the space between the insert and hearth.

### Surround (Flange) Installation

To install the surround panels:

1. Remove the side doors (see ***Page 24***) to access the surround mounting brackets. Remove the speed nuts from the parts bag found in the firebox. Install the six speed nuts (with the flat surface forward) on the six surround mounting bracket holes, three on each side of the insert. A flat-bladed screwdriver may help in installing the nuts. See the expanded view in ***Figure 11A***.
2. Screw the six 1/4" truss head screws partially into the speed nuts (see A in ***Figure 11A***).
3. The side surround panel with the small access door for the control board goes on the right side of the insert (see ***Figures 11B and 11C***). Slide the slots in the side surround panels and top surround panels behind the heads of the truss screws. Tighten all six truss screws after shifting surround panels to eliminate space between the side and top surround panels.
4. Install two spring clips approximately five inches from each end of each of the three trim pieces. The spring clips should be installed in the channel of the trim with the curved portion of the clip to the front toward the rounded surface of the trim.
5. Place the longest trim piece with the rounded surface out along the edge of the top surround panel with the spring clips slightly behind the surround panel. Pull the trim forward, compressing the spring clips, and slide the trim down onto the surround.
6. Insert the elbowed retainer in the mitred end of the side trim pieces and fasten with flat screwdriver. Insert the other end of the retainer in the end of the already installed top surround trim and slide side trim onto the edge of the side surround compressing the spring clips in the process. Repeat the same steps for the other side trim. Fasten the elbowed retainer securely in the top surround making a nice mitred corner.

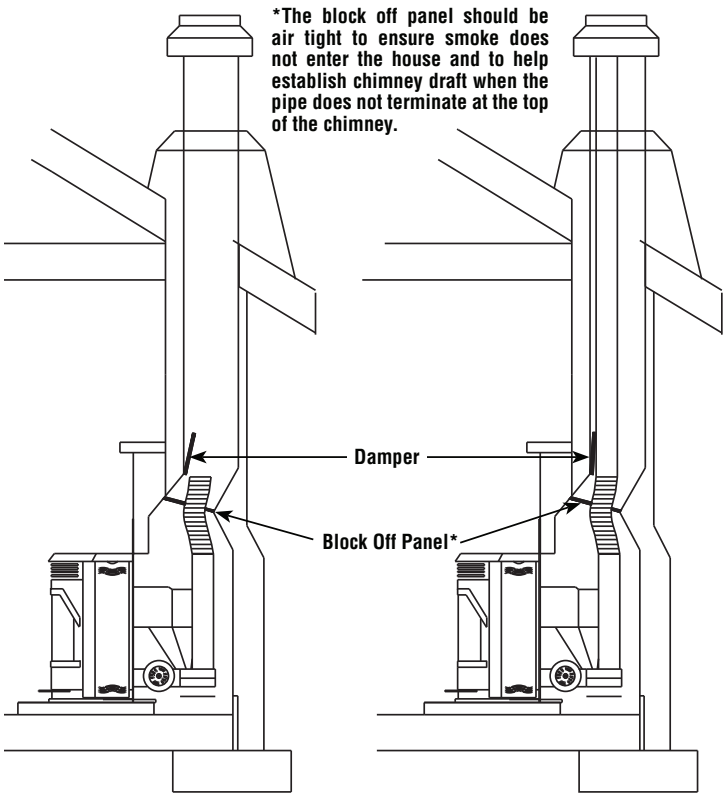



***Figure 10***

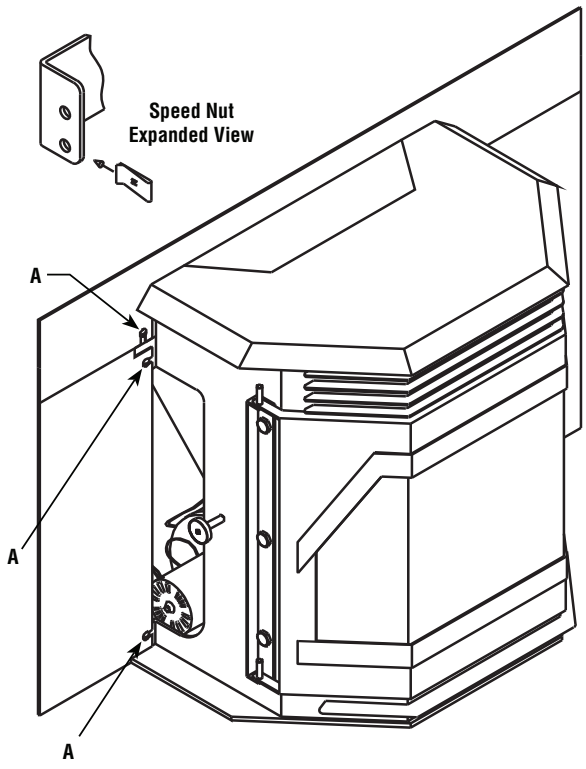



***Figure 11A***



NOTE: DIAGRAMS & ILLUSTRATIONS ARE NOT TO SCALE.

## Fireplace Installation Using Standard Surround Kits (P/N 79004, 79005, 79006 and 79007)

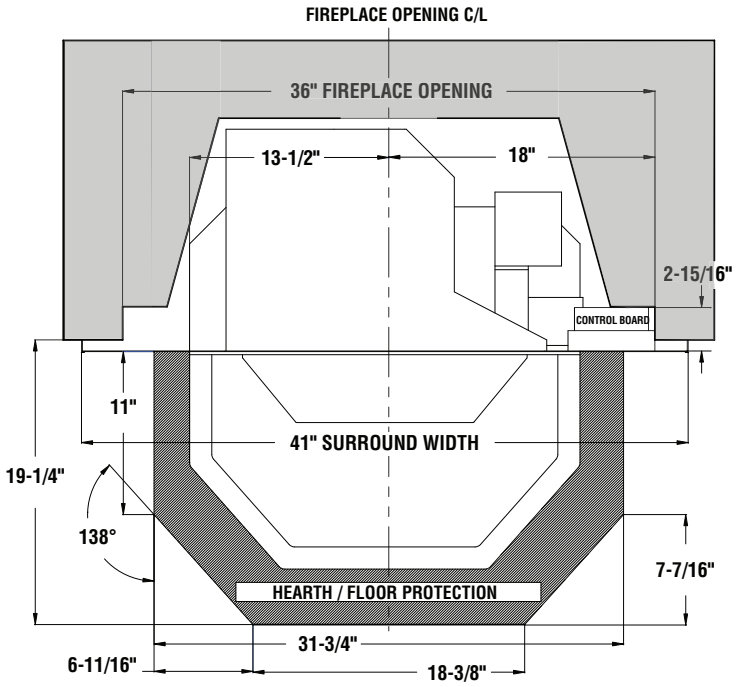
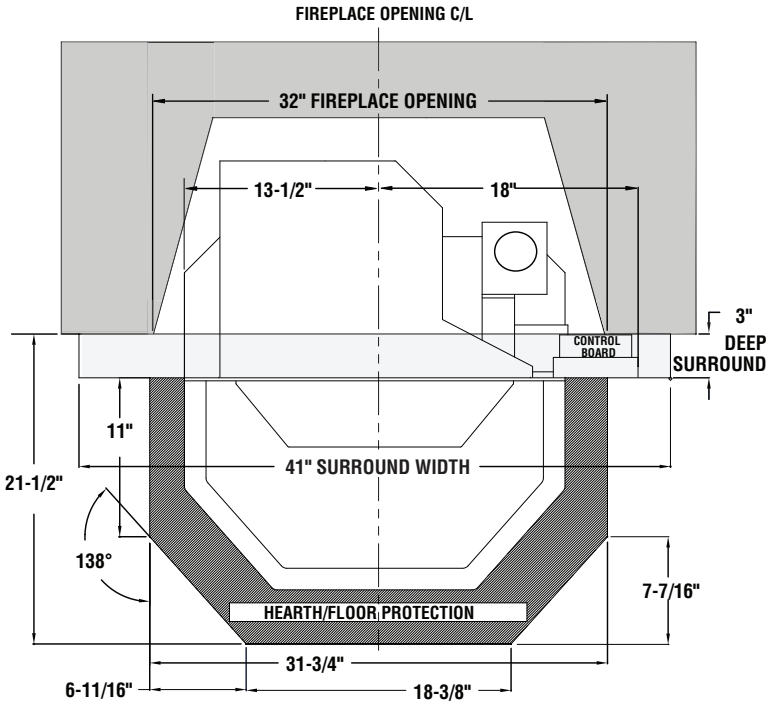



*Figure 11B*

## Fireplace Installation Using 3 Inch Deep ZC Surround Kit (P/N H7232 *)




** This black surround kit positions the insert 3" forward so that it will allow the insert to fit into a fireplace with a narrower width in the front (32" min.). NOTE: No trim kits are available for this kit at this time. See instruction sheet P/N 506033-05 for more information.*

*Figure 11C*

## Manufactured (Mobile) Home Installations

In addition to the standard installation instructions, the following instructions may be required by local, state or federal building codes. See ***Figure 12***.

- Installation should be in accordance with the Manufactured Home and Safety Standard (HUD), CFR 3280, Part 24.
- Connecting the Winslow PI40GL insert to outside combustion air is required in manufactured home installations and when required by local building codes. The insert's air intake will accept 2" ID pipe to accommodate outside air installations. The air intake on the exterior of the home should always be located a minimum of 18" below the flue termination and must remain free of obstruction. The inlet must also have a screen with openings not larger than 1/4" to prevent rodents from entering.
- The insert must be fastened to the hearth/floor using lag screws. The screws can be inserted through the holes in the base located behind the side doors. If the hearth is concrete or masonry, use proper lag bolts and methods designed for anchoring to masonry or concrete.
- The insert must be grounded with a #8 or larger copper wire.

**WARNING: DO NOT INSTALL THIS INSERT IN A SLEEPING ROOM IN A MANUFACTURED HOME.**

**CAUTION: THE STRUCTURAL INTEGRITY OF THE MANUFACTURED HOME FLOOR, WALL, AND CEILING/ROOF MUST BE MAINTAINED.**

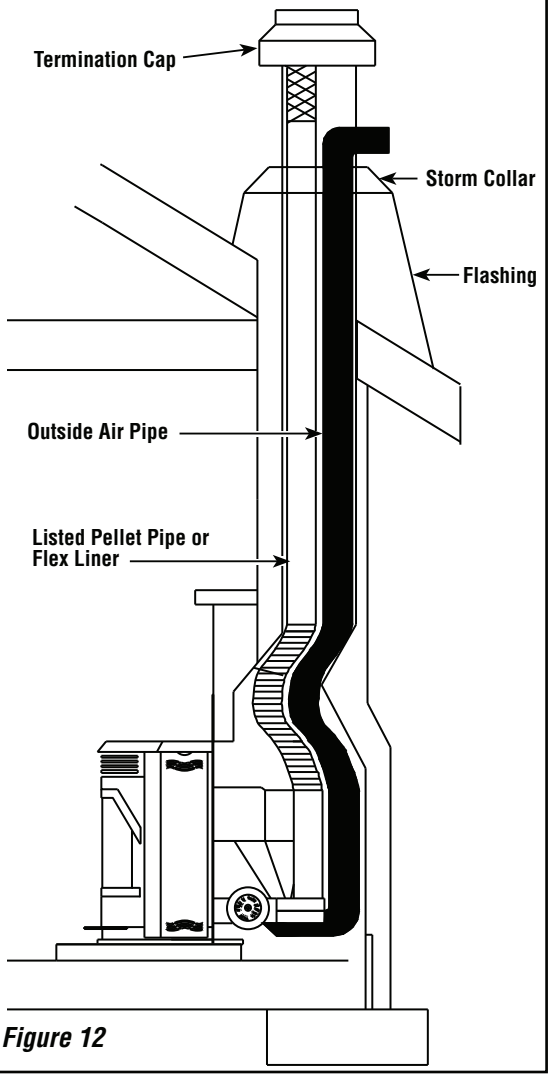



*Figure 12*



NOTE: DIAGRAMS & ILLUSTRATIONS ARE NOT TO SCALE.

## Outside Air Installations

Connecting the Winslow PI40GL insert to outside combustion air is required in manufactured home installations and when required by local building codes. The fireplace insert's air intake will accept 2" ID pipe to accommodate outside air installations. The air intake on the exterior of the home should always be located a minimum of 18" below the flue termination and must remain free of obstruction. The inlet must also have a screen with openings not larger than 1/4" to prevent rodents from entering. The outside air pipe may run up the chimney, horizontally, or down provided the structural integrity of the fireplace and chimney system are maintained.

## Thermostat installation

The Winslow PI40GL insert can be operated manually or by thermostat. The insert comes from the factory wired to operate manually, see control board operation on ***Page 19***. A low voltage thermostat can be installed on the insert. To install the thermostat:

1. Unplug the insert from the electrical outlet. Open the right side door and lift out the control board from its retaining brackets. Locate the light green wiring block at the bottom back of the board (see ***Figure 13***), loosen the two screws B at the back of the block, and remove the U shaped jumper wire A protruding from the block.

2. Insert a wire from the thermostat into one of the slots from which the jumper wire was removed. Repeat this process for the other thermostat wire.

Retain the jumper wire for future reinstallation. See ***Page 19*** for thermostat operation instructions.

**IMPORTANT NOTE: Install the thermostat per the manufacturers instructions, provided with the thermostat. Failure to follow manufacturers instructions could result in a malfunction. Pay special attention to the thermostat location requirements. If the location requirements are not adhered to the appliance, erratic operation or failure may occur.**

**Do not mount the thermostat where it may be affected by:**

- **Radiant heat from the insert, fireplaces, sun or other heat sources.**
- **Drafts or dead spots behind doors or in corners.**
- **Hot or cold air from ducts.**

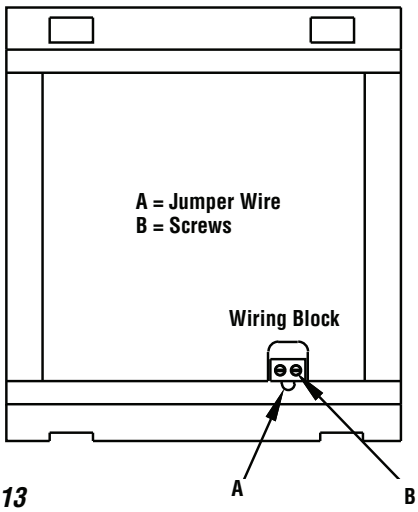



***Figure 13***

## Door Trim Installation Instructions
***(ref. form # 775274M)***

**Parts List (A)**
Qty
(2) Trim Pieces (Black, Gold, Nickel, Brushed Nickel or Black Nickel)
(6) #10 Nuts
(6) #10 Washers

**Tools Needed**
3/8" Nut Driver or Socket Wrench

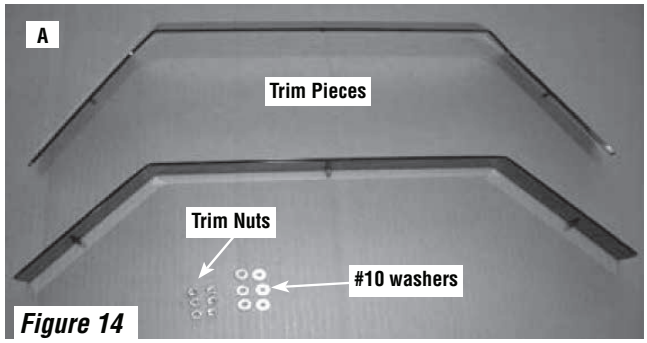



***Figure 14***

**IMPORTANT**

**If you have a gold or nickel trim, be sure to clean them with a soft cloth and household glass cleaner prior to burning the insert. Fingerprints left on the plated surfaces while burning will usually remain on the finish permanently.**

**To Install Door Trim:**

1. Remove the trim pieces and hardware from its packaging and ensure that all pieces are present before beginning installation. Take care not to scratch finished surfaces.
2. Open right and left side door. The side doors swivel open towards the back of the insert. See ***Figure 16***.
3. Open front door. Put door trim in place by inserting trim studs into the corresponding holes in the front door ***(Figures 14 and 15)***. The upper door trim will only fit in one direction, but the lower door trim can be installed incorrectly. When placing the lower door trim, make sure that the distance between the top edge of the lower door trim to the glass in the door is 9/16" (see ***Figure 18***).

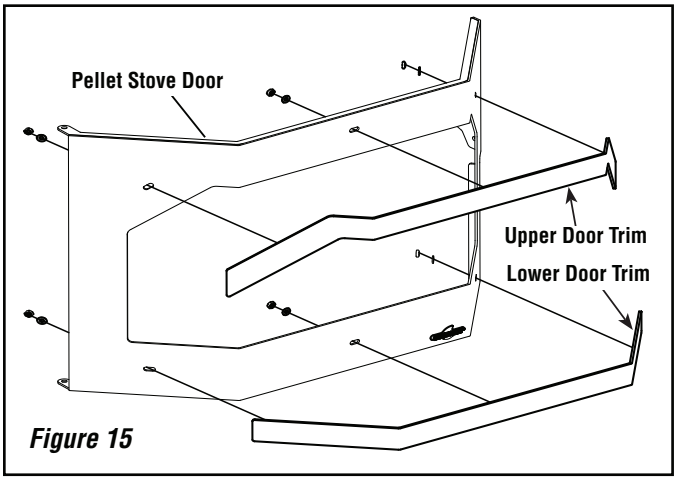



***Figure 15***



NOTE: DIAGRAMS & ILLUSTRATIONS ARE NOT TO SCALE.

4. Place one washer on each stud. Using a 3/8” nut driver, snug up the nuts on each piece of trim. Do not finish tightening the nuts yet. See ***Figure 19***.

5. There should be approximately a 7/8” (22 mm) gap between the top edge of the upper door trim and the top edge of the front door and a 1-1/2” (38 mm) gap between the lower door trim to the bottom of the front door. Visually inspect the alignment of the trim and adjust if necessary. See ***Figure 20***.

6. Finish tightening nuts. **CAUTION - DO NOT OVER-TIGHTEN NUTS, DIMPLING OF THE TRIM WILL OCCUR!!!**

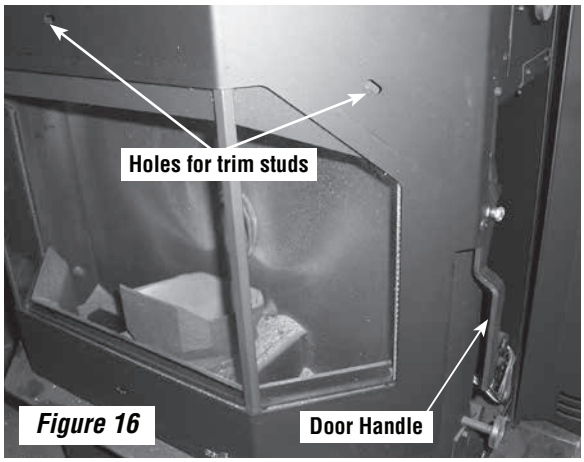


***Figure 16***

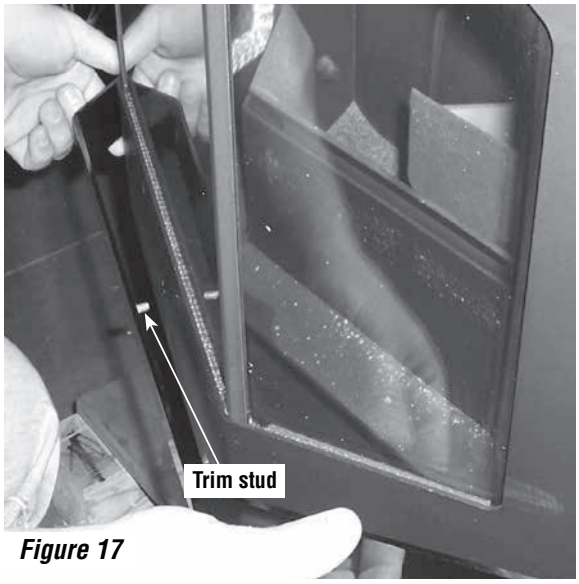


***Figure 17***

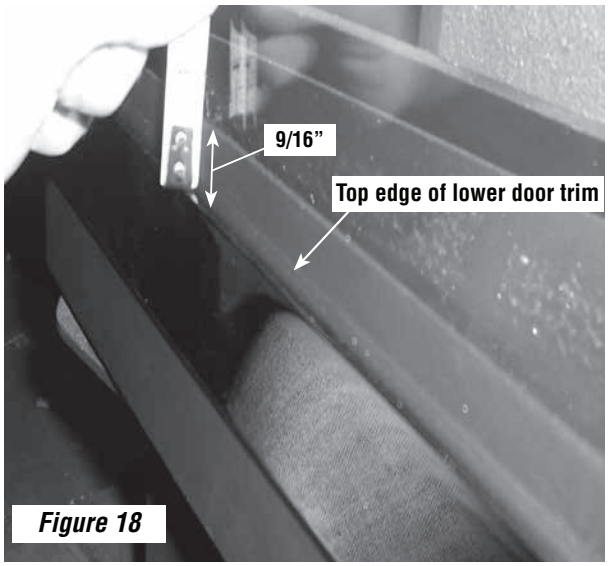


***Figure 18***

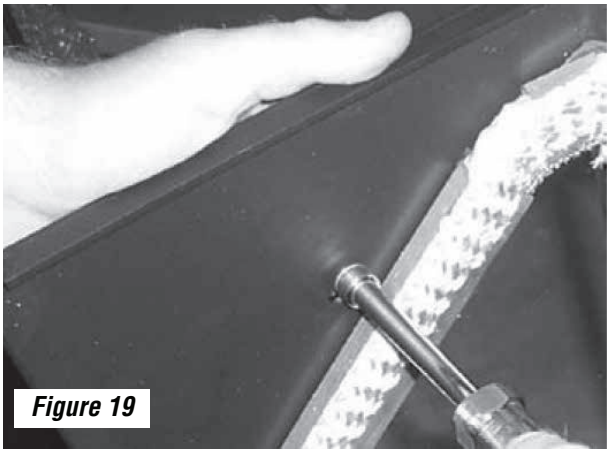


***Figure 19***

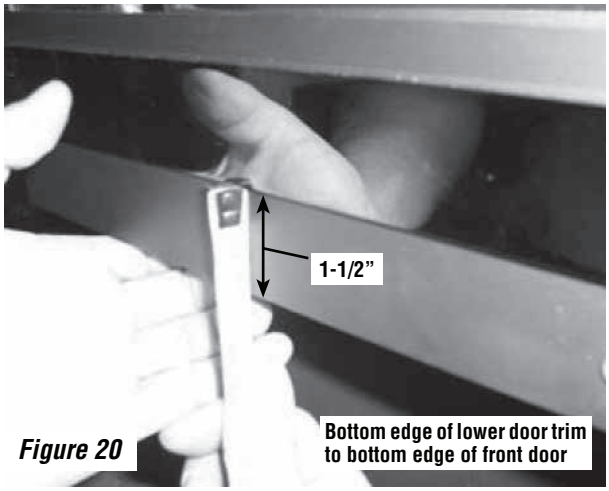


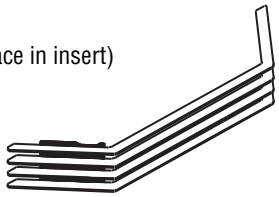
***Figure 20***



NOTE: DIAGRAMS & ILLUSTRATIONS ARE NOT TO SCALE.

## Door Grill Installation Instructions
***(ref. form # 775273M)***

**Parts Needed**
Qty
(4) Button Head Screws (already in place in insert)



**Tools Required:**
1/8" allen wrench

**To install the Grill:**
1. Remove the four button head screws from body of the insert with a 1/8" allen wrench. See ***Figure 21***.

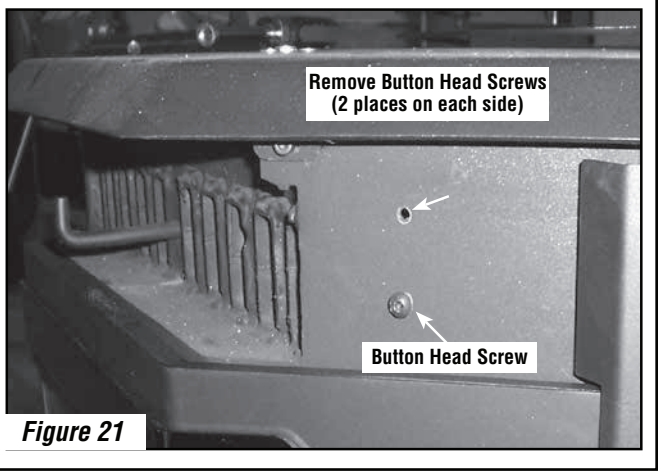



***Figure 21***

2. Pull the scraper rod out, rotate the grill vertically, (with the notch to the left) and slide the grill over the scraper rod (slide the rod between the third and fourth bar). See ***Figure 22***.

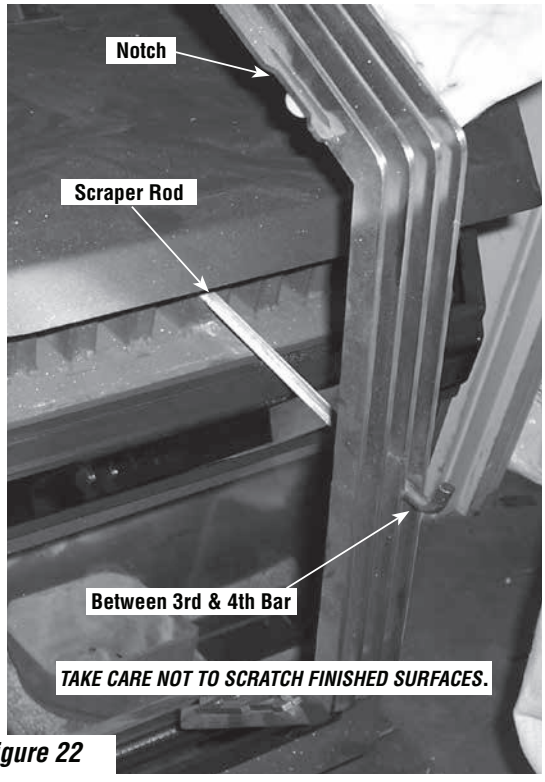



***Figure 22***

3. Rotate the grill back to the horizontal position, then using 1/8" allen wrench or t-handle wrench, re-install the four button head screws through the two holes at each end of the grill and into the stove body. See ***Figures 23 and 24***.


***Figure 23***

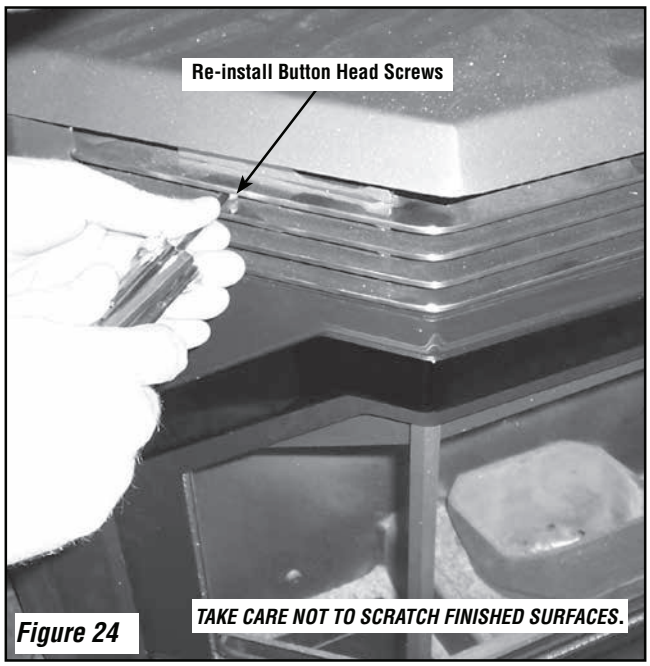



***Figure 24***

**⚠ IMPORTANT**

**If you have a gold or nickel grills, be sure to clean them with a soft cloth and household glass cleaner prior to burning the insert. Fingerprints left on the plated surfaces while burning will usually remain on the finish permanently.**



NOTE: DIAGRAMS & ILLUSTRATIONS ARE NOT TO SCALE.

## Brick Panel Installation

**Option: Part #79030**

**Kit Contents**
Brick Panel (A)
4 Tap Tights (B)

**Tools Required**
Drill (90° drill recommended)
#18 drill bit
5/32 allen wrench

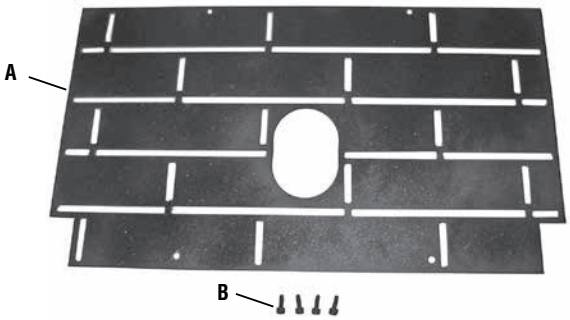



***Figure 25***

***NOTE: The brick panel comes pre-painted with Metallic Black paint. The brick panel may be painted with any color of high-temp paint (paint may discolor with use).***

1. Remove the front door of the pellet insert. To remove the front door, open the two side panels, swing open the front door, and lift it up and off of its hinges. Remove the optional log set, if present, and the Burn-Pot.

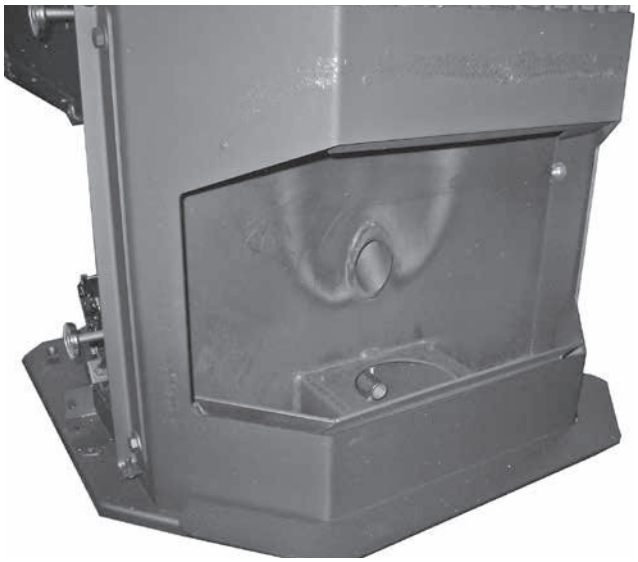


***Figure 26***

2. Remove all pellets and ash from the firebox to ensure a proper fit for the brick panel.

3. Insert the brick panel, top first, as shown in ***Figure 27***. The two cut out corners should be at the bottom.

***Figure 27***

4. Make sure that the brick panel is centered, with equal space on either side of the auger tube. While holding the panel in place, use the drill with a #18 drill bit to drill out the four holes in the back of the firebox, as shown in ***Figure 28***.

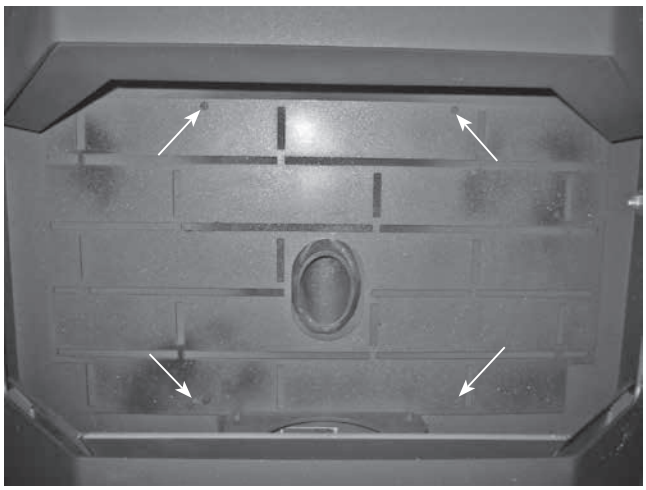


***Figure 28***

5. Screw in the four tap tights, included with this kit, using a 5/32 allen wrench.

***Figure 29***

6. Replace the Burn-Pot and check that it is firmly in place (if you can rotate the Burn-Pot it is not installed correctly). If present, install the optional log set according to the log set installation instructions (included with your log set).

7. Re-hang the door by reversing the instructions in step 1.

## OPERATION

### Control Board

The control board regulates all functions of the insert. The following is a list of the board's components:

- **Feeding light** - lights up when the auger is feeding pellets into the Burn-Pot.
- **Ready Light** - lights up when insert is ready to operate.

  Igniting Light - lights up when the insert is in the ignition sequence.
- **Start Button** - is pushed to start the ignition sequence after the heat selector knob is turned from off.

  Heat Selector Knob - is turned to off to shut the insert off or turned to a setting from 1 to high to regulate the burn rate.
- **Igniter Fuse** - six amp fuse to protect igniter heating element.
- **Control Fuse** - three amp fuse to protect the control board.

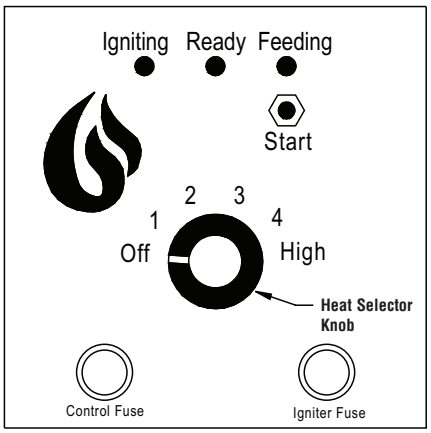



*Figure 34*

### Filling the Hopper

The hopper can be accessed by lifting the lid at the rear of the top of the insert. The hopper will hold 60 pounds of pellets. Remove any contents from the hopper and fill with pellets.

**To fill the hopper when stove is off:**

1. Lift the hopper lid to its full opened position.
2. Fill the hopper with pellets.
3. Check to make sure there are no remaining pellets on top of the hopper that may prevent the hopper lid from fully closing.
4. Close Hopper lid.

**To fill the hopper when stove is in operation:**

1. Repeat steps 1 thru 4 above.
2. When finished, check the burn pot to assure there is substantial combustion taking place to light the pellets once the pellets start feeding after refueling.
3. If combustion is not present in the burn pot then the unit will need to be restarted. This can be done by turning the heat setting dial to off and back to the desired heat setting 1 thru 5. You will then have to press the start button to initiate ignition.

**CAUTION: Failure to confirm pellets in the Burn Pot remain burning after re-fueling may result in smoke escaping from the unit. Smoke escaping the unit can also be a result of ignition of the unit with excessive pellets located inside the burn pot.**

### Lighting

1. Turn the heat selector knob (see ***Figure 34***) to the heat level desired - 1 through high - and the ready light will turn green.
2. Push the start button and the ignite and feeding lights will come on and the lighting sequence will begin. For about the next 15 minutes the insert will feed pellets cyclically into the Burn-Pot, the combustion fan will come on, and the igniter will heat up. During this sequence, some smoke in the firebox is to be expected. After the igniting sequence is complete, the insert will begin burning at the level indicated by the heat selector knob.

***NOTE:*** *Upon the insert's initial light up, or if the insert has previously run out of pellets, the auger feed tube may not contain a sufficient number of pellets to allow the insert to continue burning after the ignition sequence. It may be necessary to push the start button a second time to run the start sequence again. It is important to always empty (when cool) the Burn-Pot of pellets before pushing the start button a second time.*

### ⚠ WARNING

- **Never empty pellets from the Burn-Pot into the hopper. Pellets that may appear to be cool may retain enough heat to ignite other pellets resulting in smoke or fire damage.**
- **DO NOT OVERFIRE THIS STOVE. This may cause serious damage to your stove and void your warranty. It also may create a fire hazard in your home. IF ANY EXTERNAL PART OF THE UNIT BEGINS TO GLOW, YOU ARE OVERFIRING. Immediately slide the knob to the "OFF" position on the control board.**

### Manual Operation

After the insert is burning (see Lighting on this page), the heat selector knob controls the pellet burn rate and the insert's heat output. Turning the knob to setting 1 allows the insert to burn about 1.8 pounds of pellets per hour - about 8,500 BTUs per hour. Turning the knob to high allows the insert to burn 4.7 pounds of pellets per hour - about 39,000 BTUs per hour. Once set, the insert will continue to burn at this rate until shut off.

### Thermostat Operation

This insert will operate with a low voltage thermostat. See ***Page 14*** for instructions on installing the thermostat. Once installed, the thermostat will control the operation of the insert. Important: When connected to a thermostat, it is necessary to push the ignite button for the initial burn, when the electrical flow to the insert is interrupted, if the selector knob is turned to off (and then back on), or if the insert runs out of pellets and therefore shuts off. After the initial ignition sequence, when the thermostat calls for heat (the room temperature is less than the temperature set on the thermostat) and the heat selector knob is not in the off position, the insert will burn at the heat selector knob setting. The higher the setting, the quicker the room will heat up. Once the thermostat no longer calls for heat (the room is up to the desired temperature), the insert will continue to burn for one additional hour at the lowest setting. If the thermostat does not call for heat again during that hour, the insert will shut off. During that hour, if the thermostat calls for heat again, the insert will again burn at the heat selector knob setting until the thermostat no longer calls for heat. If the insert shuts off after that hour it will relight when the thermostat calls for heat.

### Shut Down

**Normal** - To turn the insert off, turn the heat selector knob to off. The fans will continue to operate until the control board completes the shut down cycle.

**Power Outage** - If the insert loses electrical power for less than 10 seconds it will continue to operate. If the power loss is greater than 10 seconds, the insert will go into the ignition sequence and normal operation when the power is restored. If the insert is connected to a thermostat, the insert will not start the ignition sequence until the thermostat calls for heat.

### Paint Curing

This insert has been painted with a high temperature metallic paint. It leaves the factory dry to the touch, but completes the curing process as the insert is used. The paint will cure during the first few times the insert is burned. Also some parts of the appliance may be lightly coated with machining oil. Ventilate the house during these first firings as the paint and oil give off carbon dioxide and unpleasant odors. It is recommended that persons sensitive to an imbalance in the indoor air quality avoid the insert during the curing process.

### Convection Blower Operation

Your Winslow™ PI40GL insert comes equipped with a temperature activated convection blower that extracts heat from the insert. After the insert warms up, a heat activated switch will turn the fan on. The speed of the fan varies with the burn rate of the insert. The fan will continue to extract heat after the insert shuts off and until it is cooled down.

### Operating Sounds

As the Winslow PI40GL insert is burning, a number of normal operational sounds may be heard. Pellets can be heard sliding down the auger tube and into the Burn-Pot. Also, the motor powering the auger can be heard as the control board calls for pellets. Occasionally a loud noise can be heard as the auger cuts a pellet in half. When the blowers come on, the sound of rushing air may be heard. The lower the burn rate the slower the fan operates. Hourly, the combustion fan will blow at a high speed to clean ash from the Burn-Pot.

### Pellet Fuel

Pellet fuel is made from sawdust and scrap wood from many different species of wood. Pellets are either 1/4" or 5/16" in diameter and vary in length (see *Fuel Specifications* on ***Page 7***). The Winslow PI40GL insert will burn either diameter pellets. Pellets made from hardwoods contain more ash than those made from softwoods. Minerals from ash and sand in the pellets form clinkers under the extreme temperatures in the Burn-Pot. Try burning various brands of pellets until you find one that burns with minimum ash and clinkers.

Once you find a pellet brand that burns well, continue using this brand. High ash fuel increases the frequency of insert cleaning. Fuel with an excessive moisture content may jam the auger assembly.

### CAUTIONS

**INSTALLATION AND REPAIR SHOULD ONLY BE PERFORMED BY A QUALIFIED SERVICE TECHNICIAN. DO NOT ATTEMPT TO SERVICE THE APPLIANCE YOURSELF.**

**Avoid overfiring the insert - do not hand feed pellets to the appliance.**

**Never use gasoline, gasoline-type lantern fuel, kerosene, charcoal lighter fluid, or similar liquids to start or fresh up a fire in this heater. Keep all such liquids well away from the heater while it is in use.**

**For your safety, do not install or operate your Winslow PI40GL insert without first reading and understanding this manual. Any installation or operation of the appliance deviating from that which is stated in this instruction manual WILL void the warranty and may be hazardous.**

**Due to high temperatures, the insert should be located out of traffic areas and away from furniture and draperies. Children and adults should be alerted to the hazards of high surface temperature and should stay away to avoid burns or clothing ignition. Young children should be carefully supervised when they are in the same room as the Winslow PI40GL insert. Clothing or any other flammable material should not be placed on or near the insert. Any grill, panel, or glass removed for service MUST be replaced prior to operating the insert.**

**Do not operate appliance with the glass front removed, cracked, or broken. Replacement of the glass should be done by a qualified service technician.**

**IHP, its employees, or any of its representatives assume no responsibility for any damages caused by an inoperable, inadequate, or unsafe condition as a result of any improper operation, service, or installation procedures, whether direct or indirect.**

**The appliance, when installed, must be electrically grounded in accordance with local codes or, in the absence of local codes, with the National Electrical Code, ANSI/NFPA 70-latest edition.**



NOTE: DIAGRAMS & ILLUSTRATIONS ARE NOT TO SCALE.

## CLEANING AND MAINTENANCE

**IMPORTANT CAUTIONS:**

- **UNPLUG POWER CORD AND ENSURE APPLIANCE IS COLD BEFORE PERFORMING ANY MAINTENANCE WORK.**
- **Some brands of pellets produce more ash and clinkers than others. Therefore the frequency of performing the following cleaning procedures depends to a great degree on the quality of the pellets burned.**
- **Not cleaning this unit will cause it to burn poorly and will void your warranty for this appliance.**
- **When removing ash build-up, use an approved ash vacuum only. A cleaning brush can be used to loosen any ash build-up before vacuuming. DO NOT USE A STANDARD HOUSEHOLD VACUUM OR "SHOP VAC" AS THE FILTERS WILL LEAK THE FINE PARTICLES OF ASH INTO THE HOME.**
- **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.**

**Required Cleaning Schedule After Number Of Bags Burned:**

Burn-Pot = 10 bags
Flue passageways = 50 bags
Flue Fan = 100 bags
Blower = 100 bags

***NOTES*:**
- ***Cleaning schedule will vary depending on quality of pellets used. Burning high ash pellets will require more frequent cleaning.***
- *Using a drop cloth is recommended as some ash may spill onto the floor during the cleaning process*

### Burn-Pot Cleaning
**(Recommended Frequency of 1 – 7 days*)**

The combustion fan comes on at high speed once an hour to blow the byproducts of combustion out of the Burn-Pot. However, the Burn-Pot should be cleaned more thoroughly after burning about 10 bags of pellets. The Burn-Pot has a number of holes in the bottom and sides that provide combustion air to the pellets. The extreme temperatures in the Burn-Pot can cause the impurities in the pellets to form ash and clinkers. When the insert is cool, open the front door and lift out the cast iron Burn-Pot. Scrape the inner bottom and sides of the pot with a screwdriver to remove all ash and clinkers from these surfaces. Make sure all the holes in the pot are open. Place the Burn-Pot in the hole from which it was removed. Make sure the high side of the pot is rotated toward the front of the insert (see ***Figure 35***). Push the Burn-Pot down so surface A is tight against the steel supporting the pot. Do not substitute any other grate or pot for use in this insert.

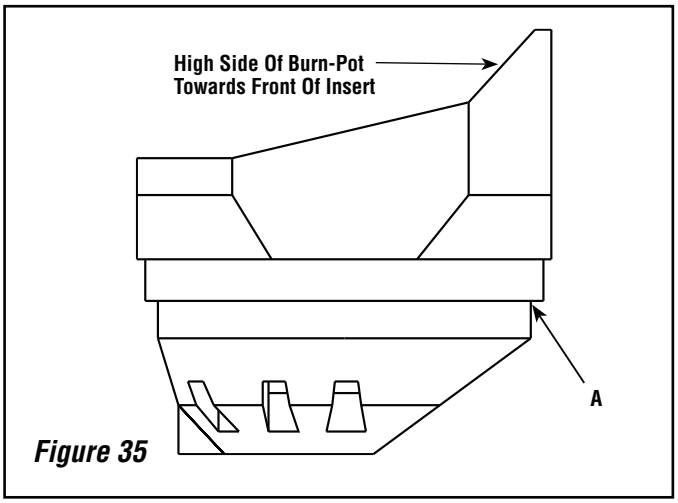


***Figure 35***

### Cleaning Glass

**CAUTION: Do not open the front door when the fireplace insert is hot. To open the door, follow the first two steps listed in Front Door Removal on *Page 24*. Clean the glass using a soft cloth or paper towel and a household glass cleaner or gas stove window cleaner. A commercial glass cleaner designed for stoves is recommended. Do not use abrasive cleaners. A damp cloth with a small amount of ash from the firebox can also be used to clean the glass.**

### Inspect Gaskets

Inspect the condition of the rope gasket around the door and window periodically, and replace if necessary. Inspect the die-cut gaskets on the access covers (B and C in ***Figure 46A***) and replace if necessary.

### Cleaning the Heat Exchanger
**(Recommended Frequency of 2 days to 2 weeks*)**

**CAUTION: Do not operate the heat exchange scraper when the insert is hot. Located at the center of the Grill on the top front of the insert is a bent rod that is attached to a scraper on the heat exchange tubes. To remove ash build-up and maintain efficient heat extraction from the insert, this rod should be pulled in and out at least weekly.**

### Cleaning the Flue Gas Passageways
**(Recommended Frequency of Yearly*)**

Cleaning the flue gas passageways should be done at least once a year. Burning high ash pellets may require this cleaning to be done more often. Clean these passageways only when the insert and ash are cold, do not start a fire in the vacuum cleaner by vacuuming up hot ash.

On each side of the insert there are two access covers (see B and C in ***Figures 36A and 36B***) that can be removed by unscrewing the two 5/32" allen head screws. Insert a cleaning brush in the openings to loosen any ash build-up and use an approved ash vacuum cleaner to remove the loosened ash. Reinstall the covers when cleaning is complete.

**Burning fuel with a high ash content or an improperly adjusted damper may require more frequent cleaning and stove maintenance.*

**Flue Passageways Cleaning Procedure**
**(Recommended Frequency of Yearly*)**

1. Open both the right and left side door to locate side flue passageways (see ***Figure 36A***).
2. There is one upper and one lower, 1" x 2", flue passageways on both the left and right sides (see ***Figures 36A, 36B and 36C***).
3. Using a 5/32" allen remove allen head screws on each cover to access the flue passage way cavities.
4. Using an ash vac, clean out both flue passageways on both the left and right side of the insert starting at the top then going to the lower.
5. Once the flue passageways are clear of ash build-up, reinstall the four cover plates.

**⚠ WARNING**

**DO NOT USE BRUSH ON HOT STOVE**

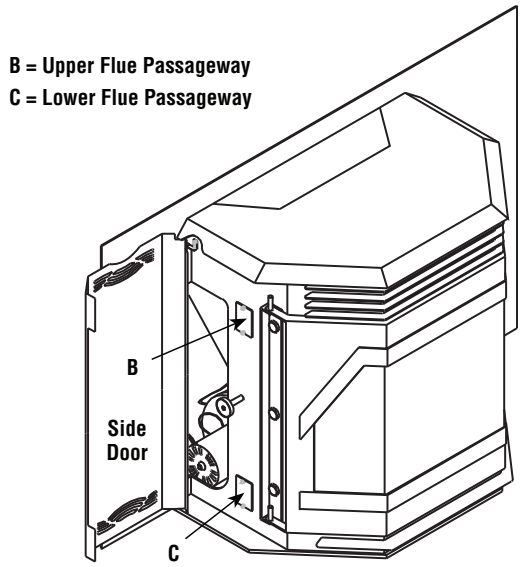



***Figure 36A***

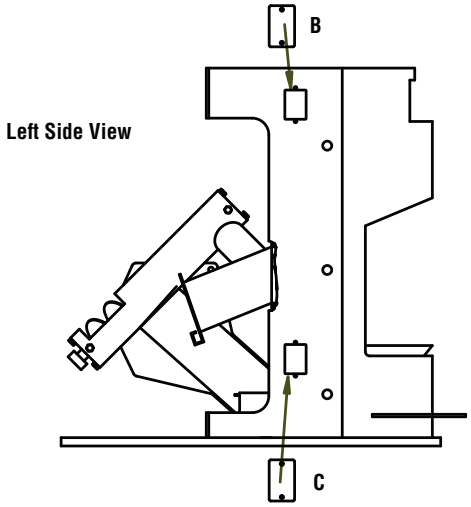



***Figure 36B***

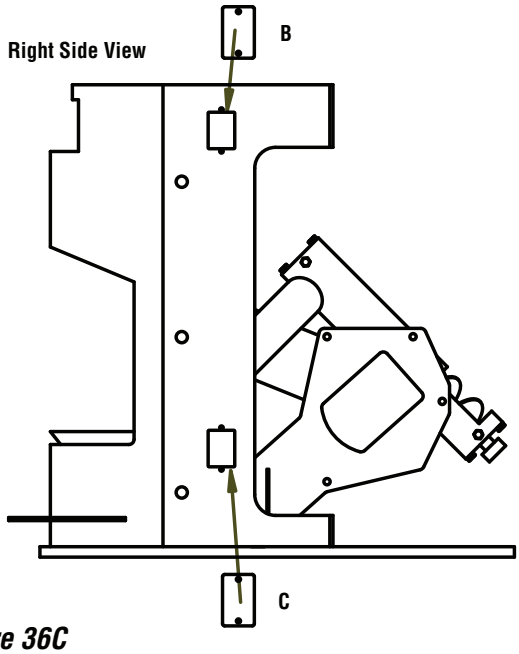



***Figure 36C***

## Cleaning the Combustion Blower

**(Recommended Frequency of 1 year or after every 100 bags of fuel used*)**

To clean the combustion blower, unplug the insert from the power source and remove the six nuts labeled A in ***Figure 37*** with an 11/32" wrench. After removing these nuts, the motor with fan attached can be pulled from the fan housing. The fan blades and the fan housing can be vacuumed once the motor is removed. When reinstalling the motor, a new gasket may need to be installed between the motor and the fan housing. To complete the reinstallation, place the motor back on the fan housing and reinstall the six nuts. Make sure the motor's green ground wire is secured under one of the nuts.

## Cleaning the Vent Pipe

**(Recommended Frequency of Yearly*)**

**Soot and Flyash: Formation and Need for Removal**

The products of combustion will contain small particles of flyash. The flyash will collect in the exhaust venting system and restrict the flow of the flue gases. Incomplete combustion, such as occurs during start-up, shutdown, or incorrect operation of the room heater will lead to some soot formation which will collect in the exhaust venting system. The exhaust venting system should be inspected at least once every year to determine if cleaning is necessary. Sweep the pipe as needed.

The insert has a clean-out box to which the flue pipe or flex pipe is attached. To access the clean-out box, remove the right side surround panel and right door. ***Figure 37*** shows the box in the upright position attached to the flue fan. ***Figure 38*** shows the box from the bottom, revealing the latch securing the box door. Pull the latch down to open the box. When the ash is cold, use a vacuum cleaner to remove the ash from the box. Refasten the box door by rotating the latch handle up.

**Burning fuel with a high ash content or an improperly adjusted damper may require more frequent cleaning and stove maintenance.*



NOTE: DIAGRAMS & ILLUSTRATIONS ARE NOT TO SCALE.

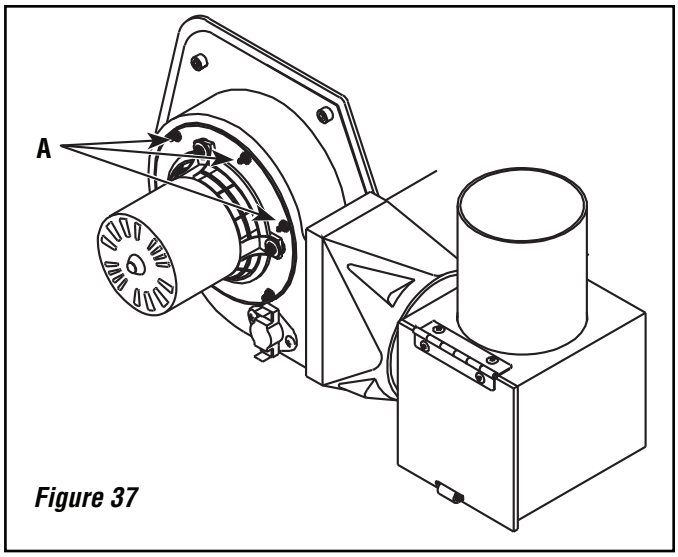



*Figure 37*

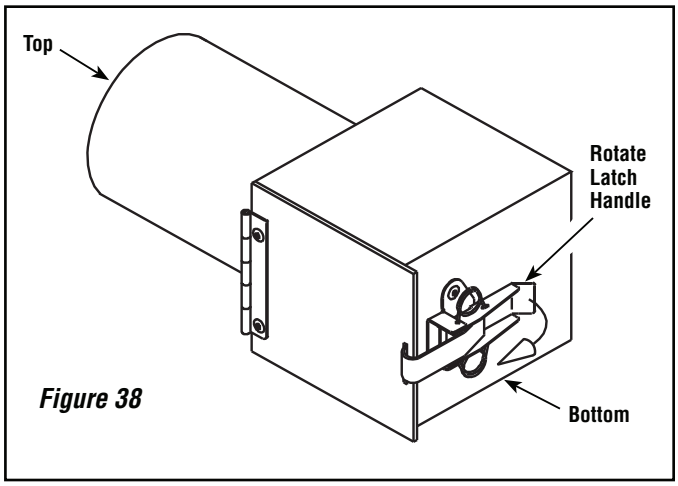



*Figure 38*

### Removing the Ash from the Firebox
**(Recommended Frequency of 2 days to 2 weeks*)**

**CAUTION: Do not remove the ash when the appliance or ash is hot. To remove the ash, swing open the left and right side doors and open the front door. Vacuum or scoop out the ash on the bottom and side of the firebox.**

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

### Cleaning the Convection Blower

To clean the convection blower, remove the left side door (see the following page). Disconnect the insert power cord from the electrical outlet. Loosen the two screws (A in ***Figure 39***) securing the blower to the blower duct. Slide the blower toward the outside of the insert - disengaging it from the blower duct. A vacuum can be used to remove any dust accumulation on the blower's blades or inside the blower duct. Caution should be used not to damage the blower's blades during cleaning. Before reinstalling, vacuum out the blower housing and flue passageway leading to the combustion blower To reinstall the blower, slide the blower back into the retaining lip B and retighten screws A.

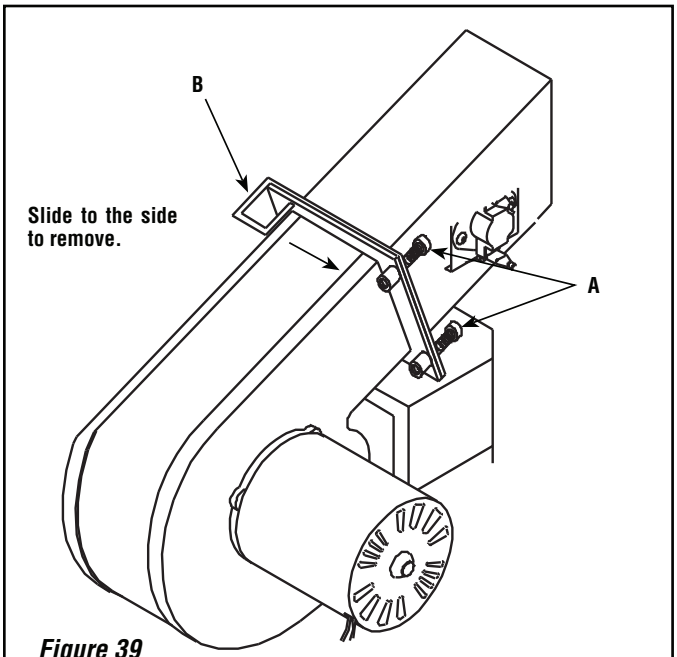



*Figure 39*

### Proof of Fire Switch
**(Recommended Frequency of 1 year or after every 100 bags of fuel used*)**

This switch needs to be removed and cleaned after every 100 bags of fuel burned.

**Cleaning Procedure:**

1. **UNPLUG STOVE!**
2. Locate the switch on the combustion blower (see ***Figure 44***).
3. Using a flat-head screwdriver, remove the 2 screws which secures the switch to the blower housing.
4. Using a dry cloth, wipe off any flyash build-up on the sensor portion of the switch.
5. Reinstall switch. Ensure wires are properly connected to the switch and the connectors are not making contact with the blower housing. Close side panel.

***NOTE: Failure to clean the proof of fire switch when needed may result in nuisance shut-downs. When heavy ash, creosote or soot are built up on the proof of fire switch, it may require cleaning with a medium abrasive pad or sheet. These heavy build ups insulate the heat sensing area of the switch and keep the switch from functioning as intended.***

### Adjustable Hopper

The Winslow™ PI40GL insert is shipped with the 55 pound hopper. With the larger hopper installed, that part of the insert that slides into the fireplace is 22-1/2" (572 mm) high. For installations in smaller fireboxes, the hopper is adjustable down to a height of 19" (483 mm). To adjust the hopper to its lowest height of 19" (483 mm), remove screws C around the hopper lid and lift the lid off. Next, remove the screws D around the hopper extension and remove the extension. Place the lid back over the hopper and reinstall the screws securing the lid.

To adjust the hopper height between the maximum and the minimum, remove screws D and slide the hopper extension (with lid attached) down around the hopper bottom to the height desired. The extension can be lowered at most 2-1/2" (64 mm). Reinstall the self-tapping screws through the holes in the extension (creating new holes in the hopper bottom).

**Burning fuel with a high ash content or an improperly adjusted damper may require more frequent cleaning and stove maintenance.*

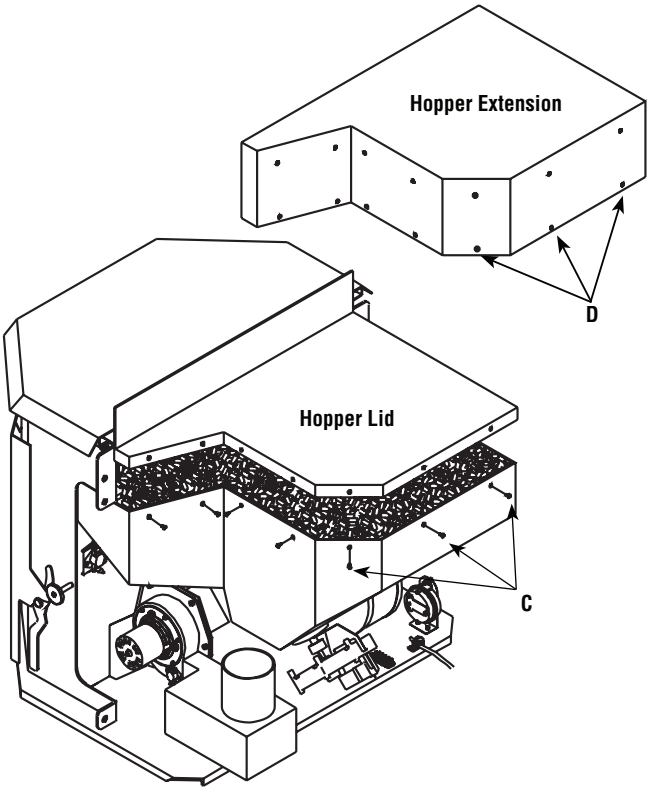



*Figure 40*

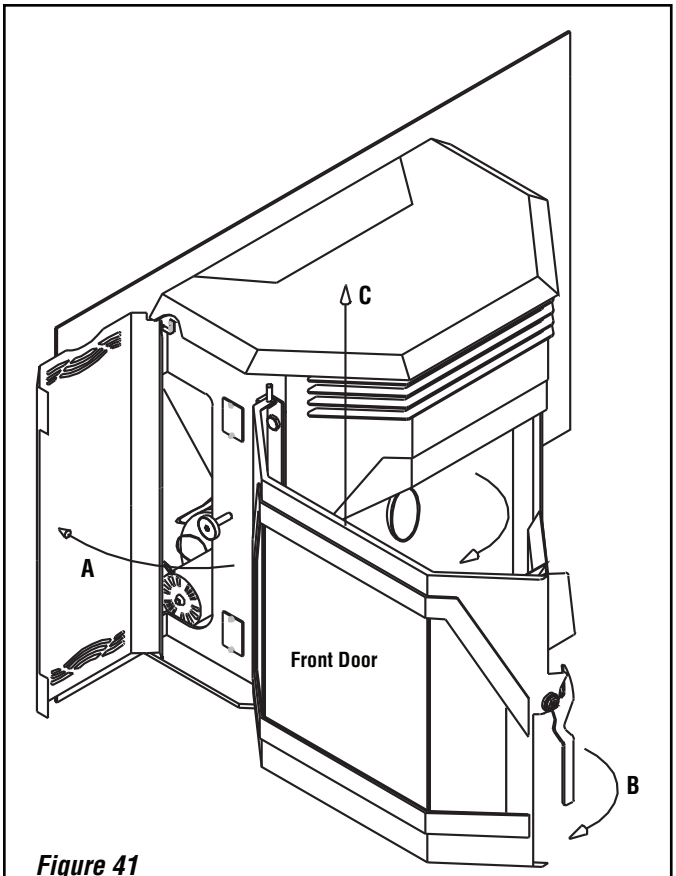



*Figure 41*

### Front Door Opening and Removal

**CAUTION: Do not open the front door when the insert is hot.**

To remove the door, swing the left and right side doors A open. Pull the front door handle B to the front and swing the front door open. Lift the front door up and off the hinges as shown in ***Figure 41*** (see C). To reinstall the door repeat the steps in reverse order.

### Side Door Removal

To remove the door,

1. Swing the door open
2. Lift the door up, and
3. Pull the bottom of the door out and down - pulling the top hinge pin out of the retaining hole in the top hinge bracket.

To reinstall the door, slide the pin on the top of the door up and into the hole in the upper hinge bracket. Slide the pin on the bottom of the door into the hole in the pedestal base and rotate the door closed.

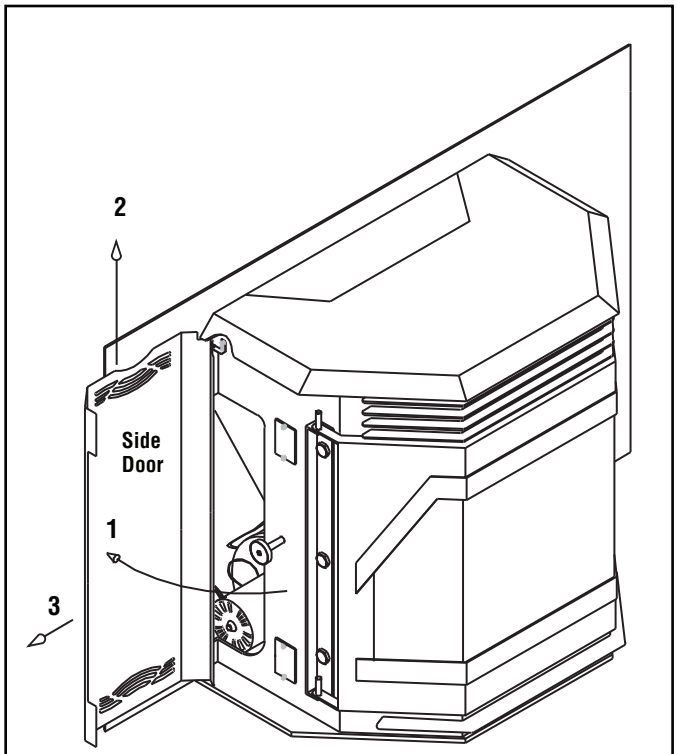



*Figure 42*



NOTE: DIAGRAMS & ILLUSTRATIONS ARE NOT TO SCALE.

## COMPONENT INFORMATION

The following is a list of components and their functions.

**Igniter -** The Winslow™ PI40GL insert comes equipped with an automatic igniter for lighting the fuel when the insert is in the lighting mode. The igniter superheats air that is pulled through the Burn-Pot by the combustion blower to light the fuel. The igniter remains energized for the first seven minutes of the lighting sequence.

**Vacuum Switch -** The Winslow PI40GL insert has a vacuum switch located behind the left door, fastened to the base (see A in ***Figure 45***). If there is a leak in the firebox created by the front door being ajar or a blocked flue, the vacuum switch will sense it and cause the insert to go into a shutdown mode.

**Auger and Auger Motor -** The 1.25 RPM auger motor (B in ***Figure 22***) turns the auger lifting pellets up the auger tube. The pellets are then dropped down a tube and into the firepot. The auger is controlled by the control board.

**Over Temperature Snap Switch -** (Opens at 225° F) This switch is installed on the convection blower (see C in ***Figure 45***) and shuts the insert down if it senses excessive temperatures. This snap switch has a reset button on it and will not allow the insert to start up until the reset button has been pushed.

**Proof of Fire Snap Switch -** (Closes at 140° F) This switch is installed on the combustion blower and shuts the insert down if it does not detect fire in the Burn-Pot.

**Convection Blower Snap Switch -** (Closes at 120° F) This switch is installed on the right rear of the firebox and turns the convection blower on when the insert gets up to temperature.

**Hopper Lid Switch** - It is located as shown in ***Figure 43***, on the back left side of the hopper (on the inside of the hopper). It detects whether the hopper lid is open and will turn off the auger motor if the hopper lid is not properly closed. When opening the hopper when refueling, do not allow the hopper lid to remain open too long or the fire may extinguish. **NEVER DISCONNECT OR BYPASS THIS SWITCH FOR ANY REASON.**

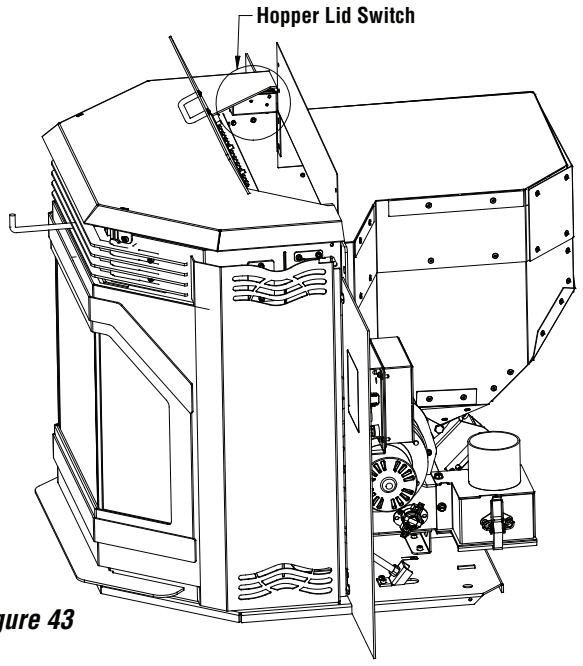



***Figure 43***

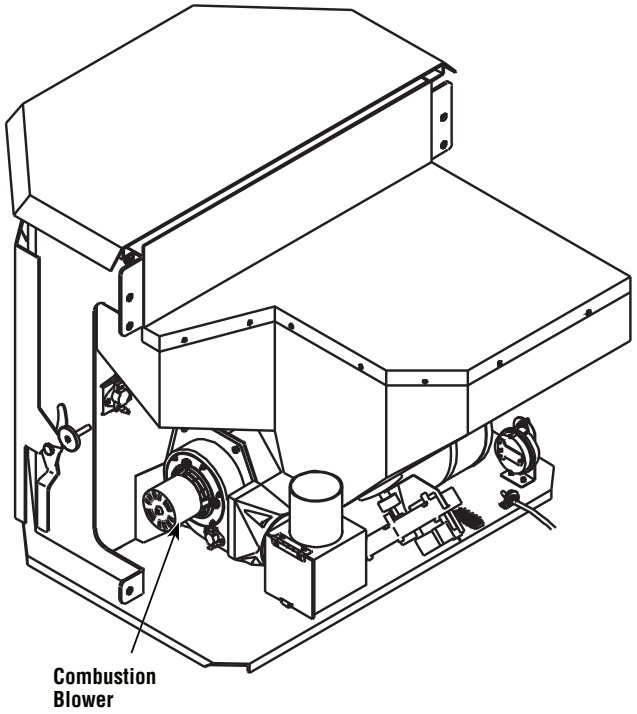



***Figure 44***

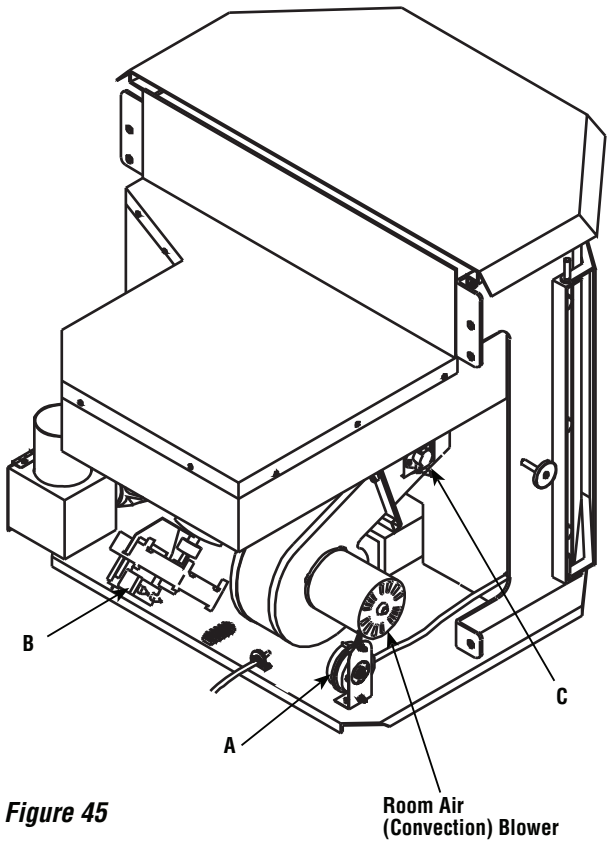



***Figure 45***



NOTE: DIAGRAMS & ILLUSTRATIONS ARE NOT TO SCALE.

## Draft Adjuster - Adjustment Procedure

The Winslow™ PI40GL insert has a draft adjuster located at the right side of the insert directly in front of the combustion blower. Should the insert installation require long runs of vent pipe, a situation may be created where excessive combustion air is flowing through the firebox and causing the fuel to burn faster than it can be delivered to the Burn-Pot. Should this happen, the draft can be slowed down by the adjuster. The insert is shipped with the adjuster in the fully open position. To slow the draft down, loosen the 5/32" allen head screw (A in ***Figure 46***) and move the adjuster handle toward the center of the insert. Retighten the screw when the desired adjustment is reached.

## Draft Adjuster

The draft adjuster controls the amount of combustion air that is delivered to the firebox (see ***Figure 46***).

It will be necessary to monitor the appearance of the flame during the first 4-8 bags of pellets. If the flame is smoky red or orange with evidence of soot at the top of the flame, the draft adjuster will need to be adjusted to deliver more combustion air. If the flame is "short" at the higher burn rates, and appears to burn the pellets out of the pot faster than they can be resupplied, or there are significant variations of flame height within a single burn setting, the draft adjuster may need to be adjusted to deliver less combustion air.

After the draft adjuster is adjusted, re-evaluate the appearance of the flame. It may be necessary to continue adjusting it in increments until proper combustion is achieved (the flame should become a brighter yellow and begin to "dance").

Once the draft adjuster has been properly set, and if the routine maintenance is performed as needed, the draft adjuster should not require readjustment unless you are changing from a premium grade pellet to a standard or high ash pellet, in which case the draft adjuster may need to be moved outward from center of the stove to help prevent the accumulation of ash or clinkers in the Burn-Pot.

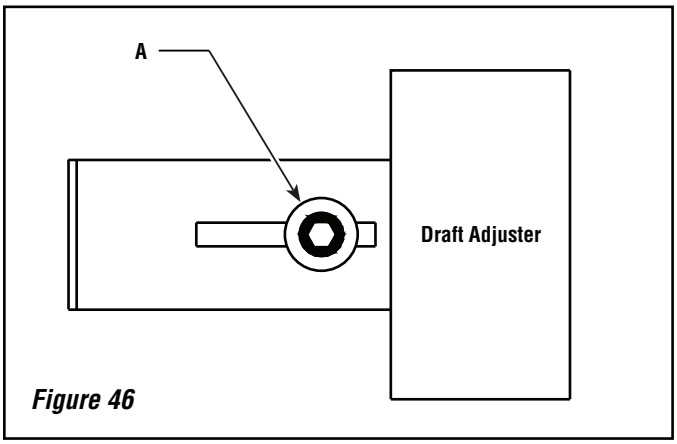



*Figure 46*

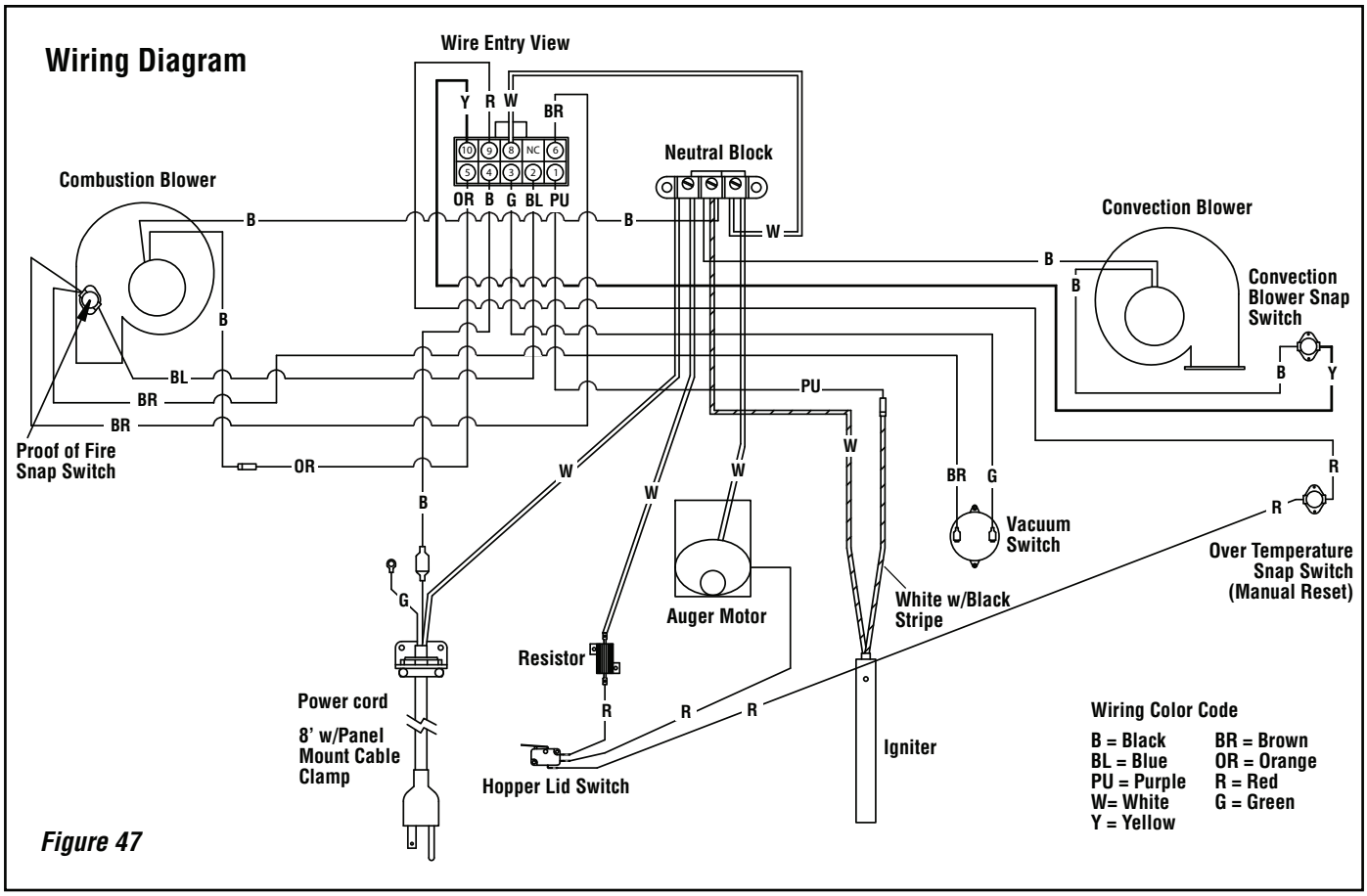



*Figure 47*



NOTE: DIAGRAMS & ILLUSTRATIONS ARE NOT TO SCALE.

## DIAGNOSTIC CODES

If the insert operates abnormally, the ready light on the control board will signal the nature of the abnormal operation. The following is a list of possible signals or codes:

**Ready light is constant red**
**Ready light flashes red 1 short and 1 long blink**
**Ready light flashes red 2 short blinks**
**Ready light flashes red 2 long blinks**

**Ignition Failure**
**Vacuum Switch Open**
**Proof of Fire Snap Switch Open**
**Over Temperature Snap Switch Open**

### Troubleshooting

| **Ignition Failure -** Code - Ready light is constant red and ignite light flashes two short blinks | |
|---|---|
| **Possible Problem** | **Solution** |
| Hopper is out of pellets | Fill the hopper with pellets |
| Auger tube was not full of pellets when start button was pushed | When cool, empty pellets in Burn-Pot and push start button again |
| Burn-Pot dirty - holes plugged | Clean the Burn-Pot |
| Igniter not functioning | Replace the igniter |
| Igniter fuse blown | Replace 6 amp fuse located on front of the control board |

| **Control Board has no Power -** When selector knob is turned no lights light up | |
|---|---|
| **Possible Problem** | **Solution** |
| Power cord is not plugged in | Plug in power cord |
| Board fuse blown | Replace 3 amp fuse located on front of control board |
| Wall outlet not energized | Check circuit breaker panel |
| Board broken, damaged, or defective | Replace the control board |

| **Vacuum Switch Shuts Insert Down -** Code - Ready light flashes red 1 short and 1 long blink | |
|---|---|
| **Possible Problem** | **Solution** |
| Front door is not sealing | Latch or adjust the front door or replace door gasket |
| Flue gas passageways restricted | Clean the passageways (see ***Page 21***) |
| Vent pipe restricted | Clean the vent pipe (see ***Page 22***) |
| Vacuum hose plugged | Clean or replace the vacuum hose |
| Vacuum switch defective | Replace the vacuum switch |

| **Proof of Fire Snap Switch Shuts Insert Down -** Code - Ready light flashes red 2 short blinks | |
|---|---|
| **Possible Problem** | **Solution** |
| Hopper is out of pellets | Fill the hopper with pellets |
| Auger tube was not full of pellets when start button was pushed | When cool, empty pellets in Burn-Pot and push start button again |
| Snap switch* defective | Replace the snap switch |
| “Proof of fire” switch is dirty | Clean switch per instructions on ***Page 23*** |

| **Over Temperature Snap Switch Shuts Insert Down -** Code - Ready light flashes red 2 long blinks | |
|---|---|
| **Possible Problem** | **Solution** |
| Convection blower not running | Blower dirty, blower snap switch bad, or blower broken |
| Flue passageways or vent restricted | Clean passageways or vent pipe (see ***Pages 21 and 22***) |
| Snap switch* defective | Replace the snap switch* |
| * NOTE: The snap switch has a reset button that must be pushed before insert will function (see ***Page 25***). | |

| **Orange Sooty Flames** - Glass turns Black | |
|---|---|
| **Possible Problem** | **Solution** |
| Burn-Pot is dirty | Clean the Burn-Pot |
| Vent pipe restricted | Clean the vent pipe |
| Flue gas passageways restricted | Clean the passageways |
| Combustion blower dirty | Clean the combustion blower |
| Burning improper fuel | Burn only wood pellet fuel |

| **Pellets not Feeding** | |
|---|---|
| **Possible Problem** | **Solution** |
| Hopper empty | Fill the hopper |
| Auger jammed | Call service technician |
| Flue gas passageways restricted | Call service technician |
| Auger motor not operating | Call service technician |
| Hopper lid is open | Close Hopper Lid |
| Hopper lid switch is faulty | Replace hopper lid switch if determined to be faulty |

## REPLACEMENT PARTS - WINSLOW™ PI40GL

**Contact an IHP dealer to obtain any of these parts. Never use substitute materials. Use of non-approved parts can result in poor performance and safety hazards.**

### Winslow™ PI40GL insert

| Cat. No. | Description |
|---|---|
| H6006 | Adjustable Latch Pin |
| H3111 | Ash Clean Out Cover, 2 Per Insert |
| H5886 | Auger Motor |
| H5921 | Auger w/lower Bearing |
| H5875 | Blower Snap Switch |
| H5856 | Cast Burn-Pot |
| H5899 | Clean-out Cover Gasket |
| H6019 | Combustion Blower |
| H5900 | Combustion Gasket Housing To Insert |
| H5903 | Combustion Gasket Motor To Housing |
| H5917 | Control Board Access Latch |
| H5978 | Control Board |
| 79020 | Control Board Fuse 3 Amp, 5 Pack |
| H5888 | Convection Blower |
| H5902 | Convection Blower Gasket |
| H5984 | Decorative Nickel Bars / Upper Body |
| H3112 | Door Handle Assembly |
| 79040 | Door w/glass (No Trim) |
| H6021 | Flue Clean Out Box |
| H5988 | Hardware Package |
| H5911 | Hopper Door Wire |
| 79021 | Igniter Fuse 6 Amp, 5 Pack |
| H6005 | Igniter W/hose Clamp |
| H5891 | Overtemp Switch |
| H6004 | Power Cord |
| H5887 | Proof Of Fire Switch |
| H3128 | Right Flange W/controls Access Door 40” |
| H6020 | Right Flange W/controls Access Door 48” |
| H5898 | Vacuum Line 12” Piece |
| H5889 | Vacuum Switch |
| H5976 | Wiring Harness |
| H8278 | Hopper Switch w/ Bracket |
| H8279 | Hopper Switch Wires w/ Resister |
| H8281 | Outer Top for Hopper Lid Switch |

## ACCESSORIES

| Cat. No. | Model | Description |
|---|---|---|
| F4348 | PI40GL | Winslow GL Pellet Fireplace Insert |

| Surround Panel Kits (required - sold separately) *(ref. Form # 775279M)* | | |
|---|---|---|
| **Cat. No.** | **Model** | **Description** |
| 79004 | PI40-FPK2941 | 29” Ht. x 41” Wd. Black Trim |
| 79005 | PI40-FPK2948 | 29” Ht. x 48” Wd. Black Trim |
| 79006 | PI40-FPK3341 | 33” Ht. x 41” Wd. Black Trim |
| 79007 | PI40-FPK3348 | 33” Ht. x 48” Wd. Black Trim |
| H7232 | PI40-32ZCFK | 29” Ht. x 41” Wd. 3” Deep * |

**** The three inch deep surround assembly positions the Winslow™ pellet insert three inches forward onto the hearth which allows the insert to fit into a fireplace with a narrower front width (32” minimum). Using the other standard surround sizes require a minimum front fireplace width of 36”.***

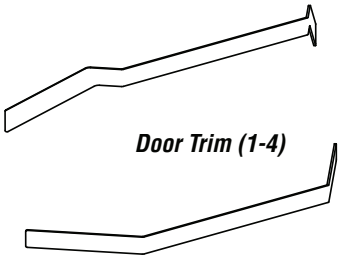
| Pellet Heat Kits | | |
|---|---|---|
| 79024 | PI40-HK | Pellet Heat Kit *(ref. Form # 506033-01)* |
| 79026 | PI40-HK30411 | 30-5/8” Ht. x 41” Wd. Surround Panels |
| 79027 | PI40-HK3048F | 30-5/8” Ht. x 48” Wd. Surround Panels |
| 79028 | PI40-HK3441F41 | 34-5/8” Ht. x 41” Wd. Surround Panels |
| 79029 | PI40-HK3448F | 34-5/8” Ht. x 48” Wd. Surround Panels |
| 75251 | GFHKET-B | Extended Side Trim Kit, Black *(775208M)* |
| 75063 | GFHKET-N | Extended Side Trim Kit, Nickel *(775208M)* |

| Surround Trim *(ref. Form # 775279M)* | | |
|---|---|---|
| H5143 | GFT2941-B | Trim/Black 29” Ht. x 41” Wd. |
| H5145 | GFT2948-B | Trim/Black 29” Ht. x 48” Wd. |
| H5144 | GFT3341-B | Trim/Black 33” Ht. x 41” Wd. |
| H5146 | GFT3348-B | Trim/Black 33” Ht. x 48” Wd. |
| 75037 | GFT2941-N | Trim/Nickel 29” Ht. x 41” Wd. |
| 75039 | GFT2948-N | Trim/Nickel 29” Ht. x 48” Wd. |
| 75041 | GFT3341-N | Trim/Nickel 33” Ht. x 41” Wd. |
| 75043 | GFT3348-N | Trim/Nickel 33” Ht. x 48” Wd. |

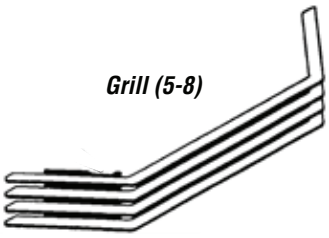
| Zero Clearance Kit | | |
|---|---|---|
| **Cat. No.** | **Model** | **Description** |
| 79025 | PI40-ZCK | Zero Clearance Kit *(ref. Form # 775277M)* |
| H5147 | PI10-ZCHPA | Rear Vent adaptor *(Required for Horizontal Vent)* |

| Door Trim (required - sold separately) *(ref. Form # 775274M)* | | | |
|---|---|---|---|
| **Item No.** | **Cat. No.** | **Model** | **Description** |
| 1 | 79038 | P40DT-B | Black |
| 2 | 79037 | P40DT-N | Nickel |
| 3 | 79035 | P40DT-BRN | Brushed Nickel |
| 4 | 79036 | P40DT-BLN | Black Nickel |

| Grill Finish *(ref. Form # 775273M)* | | | |
|---|---|---|---|
| 5 | 79000 | P40G-B | Black |
| 6 | 79002 | P40G-N | Nickel |
| 7 | 79022 | P40G-BN | Brushed Nickel |
| 8 | 79039 | P40G-BLN | Black Nickel |



***Door Trim (1-4)***



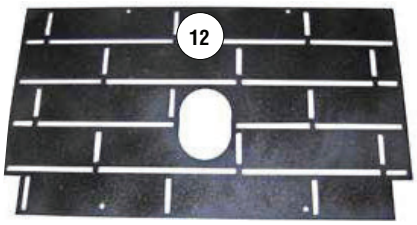
***Grill (5-8)***



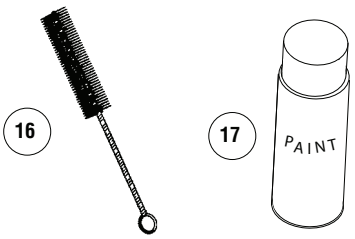
NOTE: DIAGRAMS & ILLUSTRATIONS ARE NOT TO SCALE.

| Common Accessories | | | |
|---|---|---|---|
| **Item** | **Cat. No.** | **Model** | **Description** |
| ------ | 79003 | PI40FS | Front Support 41-48" Width/0-8" Height *(ref. Form # 775296M)* |
| 12 | 79030 | P40BRICK | Standard Brick Panel *(ref. Form # 775276M)* |
| 13a | H8860 | RC-S-1 | Remote, Two Button, Timer, On/Off or Timer Mode |
| 13b | H8861 | RCL-S-STAT | Remote, LCD Stat, Thermostat, On/Off |
| 13c | H8865 | RC-S-TOUCH | Remote, Touch Screen, Thermostat, On/Off |
| 13d | F2236 | RCKit4001 | Remote, Simple On/Off |
| 14a | H8863 | WS-S-TMR | Wall Switch, Countdown Timer |
| 14b | H8864 | WS-S-TSTAT | Wall Switch, Thermostat |
| 15 | H6907 | P40DIAG40 | Diagnostic Tool *(ref. Form # 775293M)* |
| 16 | 12050004 | ------ | Cleaning Brush *(ref. Form # 14720036)* |
| 17 | H8159 | TSPK-B | Touch-up Spray Paint Kit, Black |

***NOTE: The form numbers referenced are the part numbers of the instruction sheets included in kits.***
















NOTE: DIAGRAMS & ILLUSTRATIONS ARE NOT TO SCALE.

## Heat Kit Instructions
***(ref. form # 506033-01)***

## Kit Contents
**(Refer to *Figure 48)***

1 ea. 2" lower trim piece (A)
1 ea. 1" Insulation Board (B)
2 ea. 1/2" x 10-24" screws (C)
1 ea. Instruction Sheet

| Pellet Heat Kit | | |
|---|---|---|
| **Cat. No.** | **Model** | **Description** |
| **79024** | **PI40-HK** | **Pellet Heat Kit** |

***NOTES***
- *This kit can be used in conjunction with a Zero Clearance Kit (Cat. No. 79025).*
- *The heat kit also requires the use of the surround panels and trim pieces listed below (sold separately).*

| Pellet Heat Surround and Trim Kits *(sold separately)* | | |
|---|---|---|
| **79026** | **PI40-HK30411** | **30-5/8" Ht. x 41" Wd. Surround Panels** |
| **79028** | **PI40-HK3441F41** | **34-5/8" Ht. x 41" Wd. Surround Panels** |
| **79029** | **PI40-HK3448F** | **34-5/8" Ht. x 48" Wd. Surround Panels** |
| **75251** | **GFHKET-B** | **Extended Side Trim Kit, Black** *(775208M)* |

## Tools Required
5/32 allen wrench

1. **Install the 2" lower trim piece** - Fasten the 2" trim piece underneath the base of the front of the insert as follows; use a 5/32" allen wrench or T-handle wrench to secure the 2 screws (see C in ***Figure 48)*** provided, one at the left side and one at the right side base of the insert. ***NOTE:*** *This process will be simplified by very cautiously tilting the insert back (see* ***Figure 49****).*
2. Install your four leveling bolts (provided with the appliance). Open the main front door and remove the two bolts in the front right and front left of the bottom of the fire box see ***Figure 50***. ***NOTE:*** *Placing a level on the insert top is recommended to ensure your insert is level. Again with the insert very cautiously tilted back, insert your four leveling bolts approximately 2-1/16" (52 mm) into the holes provided at the bottom of the insert (see* ***Figure 51****).*
3. Set the insert on the insulation board. Now that the insert is level, place your insulation board in place where the insert will be installed and set the PI40GL insert over the insulation board so the two front leveling legs line up with the two cut-outs in the front of the insulation board (see ***Figure 52****).* Your PI40GL heat kit is now installed.

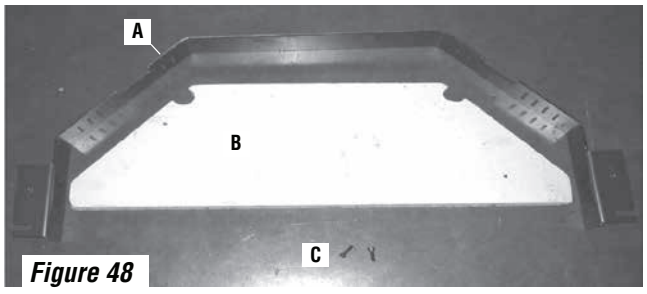


***Figure 48***

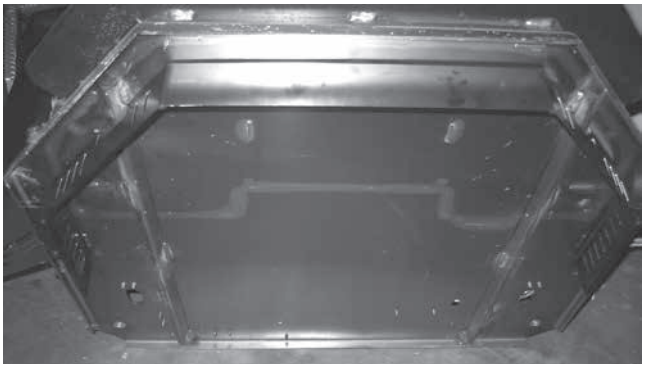


***Figure 49***

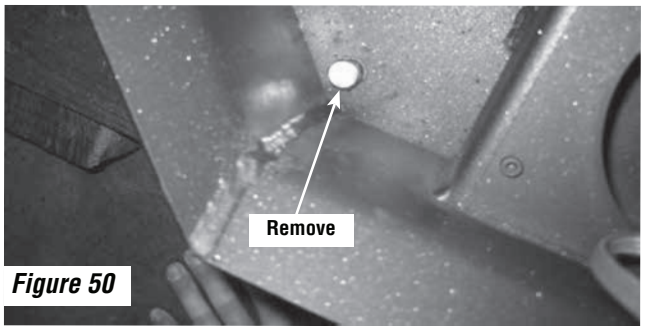


***Figure 50***

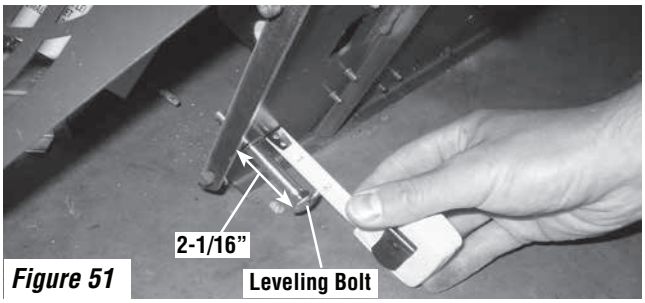
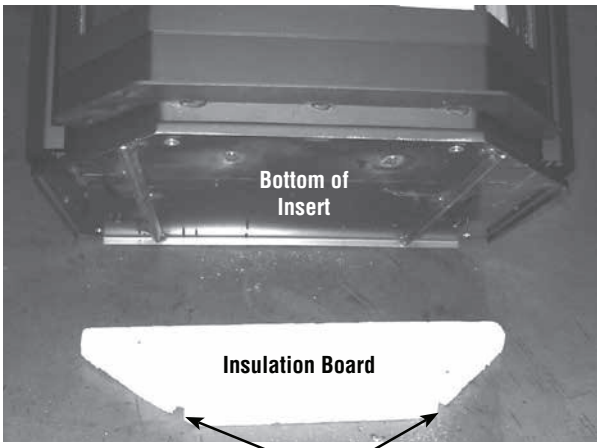


***Figure 51***



**There are 2 cut-outs which provide clearance for leveling legs.**

***Figure 52***



NOTE: DIAGRAMS & ILLUSTRATIONS ARE NOT TO SCALE.

## Pellet Insert ZC Kit Assembly

***(ref. form # 775277M)***

### Kit Contents

**(refer to *Figure 53)***

1 ea. Back panel (A)
1 ea. Left side panel (B)
1 ea. Right side panel (C)
1 ea. Top panel (D)
1 ea. Access panel (E)
1 ea. Flue block off plate (F)
2 ea. Standoff brackets (G) - *marked S*
2 ea. Standoff brackets (H) - *marked T*
1 ea. Back Stand-off Bracket (I) - *marked B*
26 ea. 1/8" x 1/2" Screws (J)
4 ea. Door Washers (K)
1 ea. Rear Vent Adaptor (L)*

* *The rear vent adaptor (cat. no. H5147) is only required for rear vent applications and must be ordered separately.*

| Cat. No. | Model | Description |
|---|---|---|
| 79025 | PI40-ZCK | PI40GL Pellet ZC Kit |

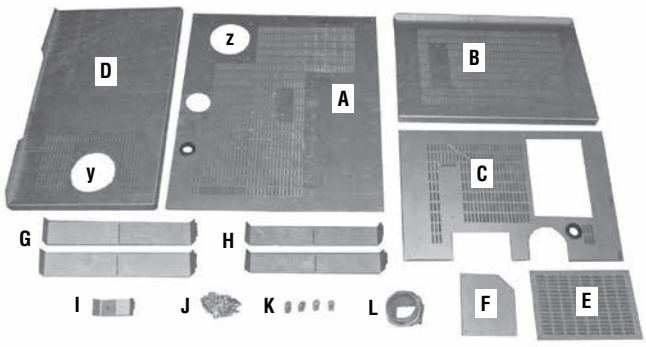



***Figure 53 - Kit Contents***

### Tools Required

1/4" Nut Driver, 1/8" Drill

**IMPORTANT NOTE: ALL THE STAND-OFFS PROVIDED IN THIS KIT MUST BE INSTALLED ON THE PANELS PER THESE INSTRUCTIONS. THEY ARE REQUIRED TO ENSURE PROPER CLEARANCES.**

**BEFORE INSTALLING THE APPLIANCE REVIEW ALL REQUIREMENTS IN THIS MANUAL PROVIDED WITH THE APPLIANCE. ALL WARNINGS AND PRECAUTIONS IN THIS MANUAL APPLY TO THESE INSTRUCTIONS.**

**DETERMINE THE VENT CONFIGURATION. FOLLOW INSTRUCTIONS IN THE INSTALLATION AND OPERATION MANUAL AND VENT MANUFACTURER'S INSTRUCTIONS.**

**DETERMINE THE FLOOR PROTECTION REQUIREMENTS. FOLLOW INSTRUCTIONS IN THE INSTALLATION AND OPERATION MANUAL. IF ANYTHING OTHER THAN A MASONRY HEARTH IS USED WITH THE WINSLOW FIREPLACE INSERT, YOU MUST USE HEAT KIT, CAT. NO. 79024 - SOLD SEPARATELY. IF A MASONRY HEARTH IS USED IT MUST EXTEND THE FULL WIDTH AND DEPTH OF THE ENCLOSURE AND TO THE FRONT AS SPECIFIED IN THE INSTALLATION AND OPERATION MANUAL.**

***NOTE:** Top or rear vent? If you will be venting out the top then you will install the block off plate (F in **Figure 53**) onto the lower back panel (A) in the spot that is marked "z" in **Figure 53**. If you are venting out the back you will install the block off plate (F) onto the top panel (D) in the spot that is marked "y" in **Figure 53**. You will use four of the sheet metal screws provided to attach the block off plate (F).*

### Installation Instructions

1. For a rear vent termination, remove the flue clean out box on the PI40GL pellet insert by removing the three screws (1 on top and 1 on both the right and left side) that hold it in place. Using these same screws, install the rear vent adaptor (L) in place of the flue clean out box (see ***Figure 54***).

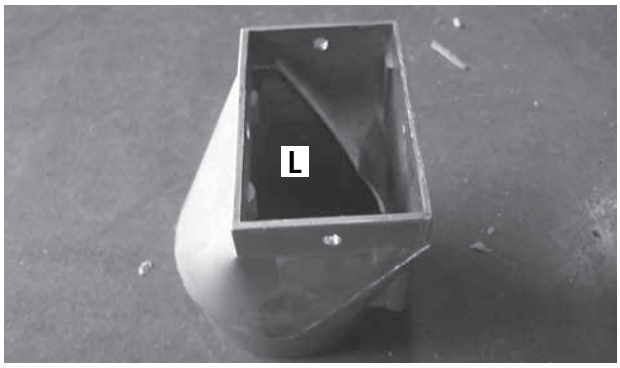



***Figure 54***

2. When installing the rear vent adaptor (L), ensure that the flat edge is directed towards the inside of the stove (see ***Figure 55***).

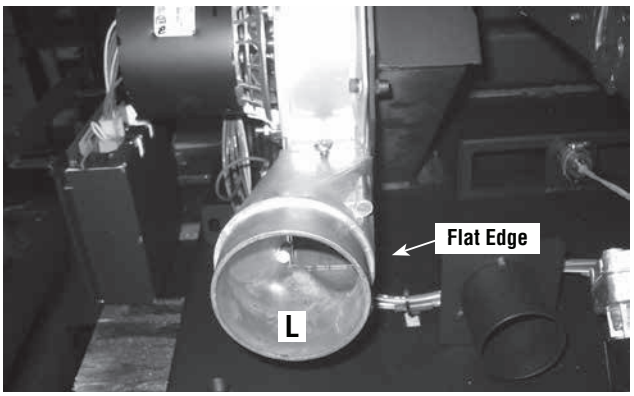



***Figure 55***

3. **Assemble the perimeter (see *Figure 56)* -** Using only the bottom 2 holes on each side, screw the left side panel (B) and the right side panel (C) to the back panel (A).

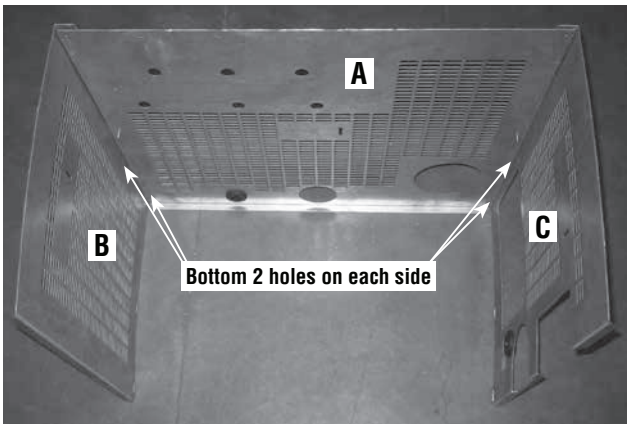



*Figure 56*

4. Install the top panel (D). Place the top panel (D) on top of the perimeter panels (A, B, and C). **Using only the three holes along the left and right side of the top panel (D)**, screw panel (D) onto the side panels (A and B). The 3 remaining holes along the back of the top panel (D) will be used in Step 7.

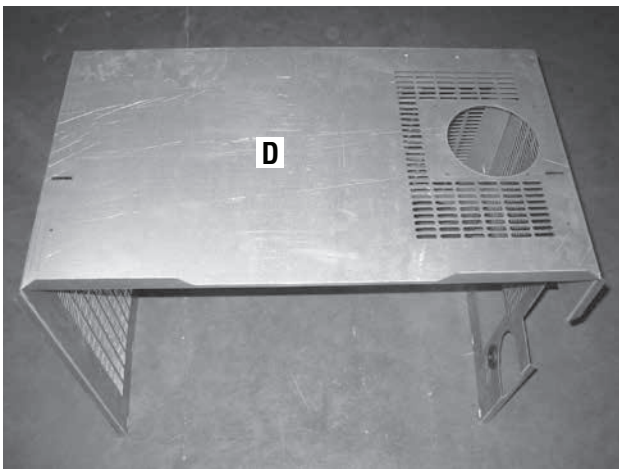



*Figure 57*

5. Install the top stand-offs (G). There are 2 standoffs on the top panel (D). Install them by taking the lip of the standoff and sliding them into the slots (a and b) then bend them down. Using the sheet metal screws provided, screw the standoffs (G) into the holes provided.

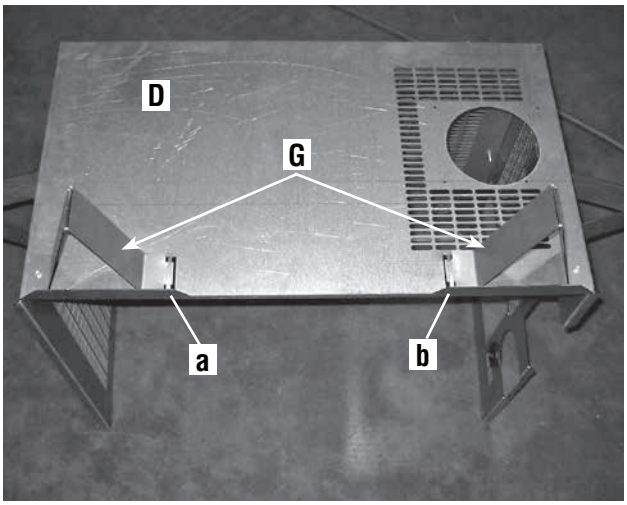



*Figure 58*

6. Install the side stand-off brackets (H) and rear stand-off bracket (I) in the same manner ex-plained above. ***Figure 59*** below shows these stand-offs installed.

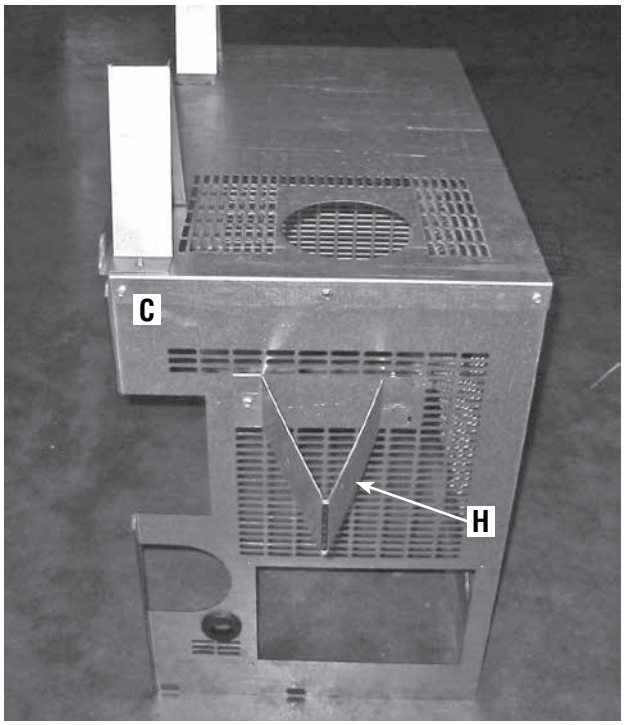



*Figure 59*



NOTE: DIAGRAMS & ILLUSTRATIONS ARE NOT TO SCALE.

7. Remove the 3 screws located across the top of the pellet hopper (see ***Figure 60***).

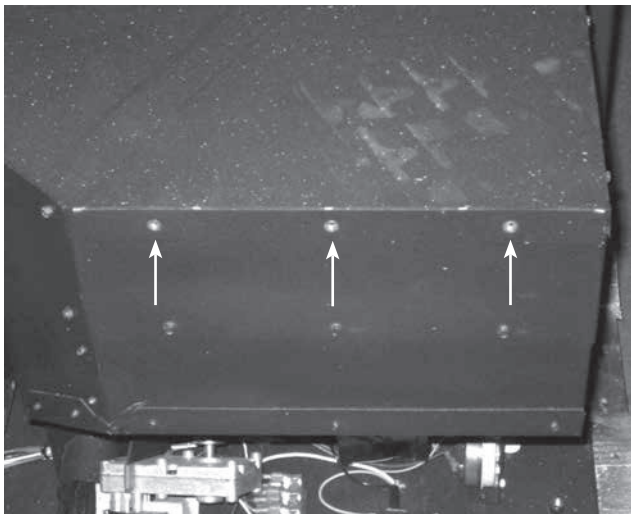


***Figure 60***

8. Set the assembled ZC box near the back of the stove and pull the power cord, located in the lower rear of the stove, through the rubber grommet at the bottom of the back panel (A). Now, pull the wiring harness through the rubber grommet located towards the bottom of the right side panel (C) (see ***Figure 61***). Slide the ZC box against the back of the stove and reinstall the 3 screws removed in Step 7 through top panel (D) and into the stove.

***Figure 61***

9. Install the access panel (E) by screwing it onto the right side panel (C), using four of the sheet metal screws provided.

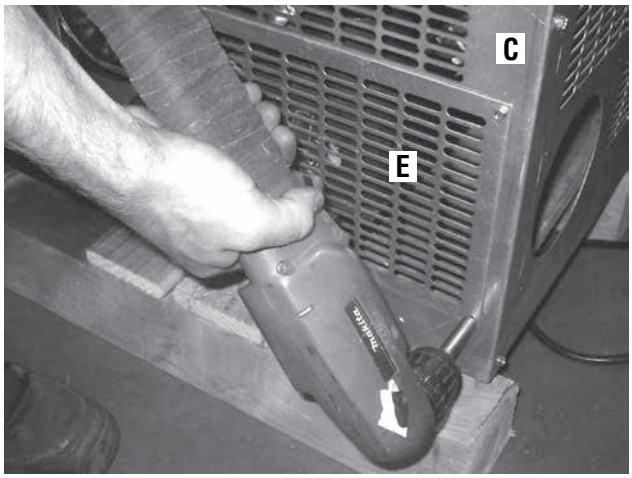



***Figure 62***

10. Final step: Install the 4 door washers (K), using 4 of the sheet metal screws provided, insert two on each lower side of your ZC box (shown in the ***Figure 63***). You are now ready to install your PI40GL pellet insert. **Follow all vent clearances stated in your Installation and Operation Manual and the vent manufacturers instructions.**

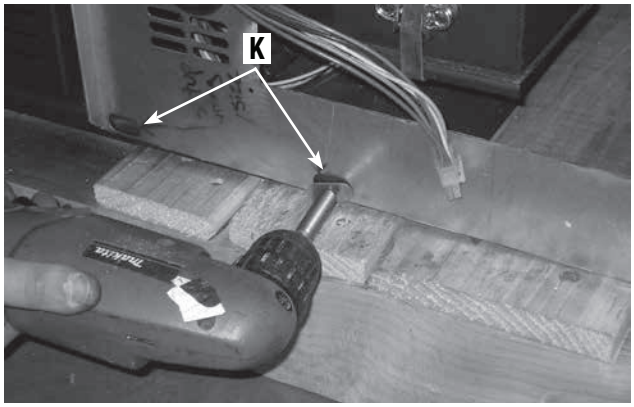



***Figure 63***



NOTE: DIAGRAMS & ILLUSTRATIONS ARE NOT TO SCALE.

## ZC Framing Dimensions for Combustible / Floor

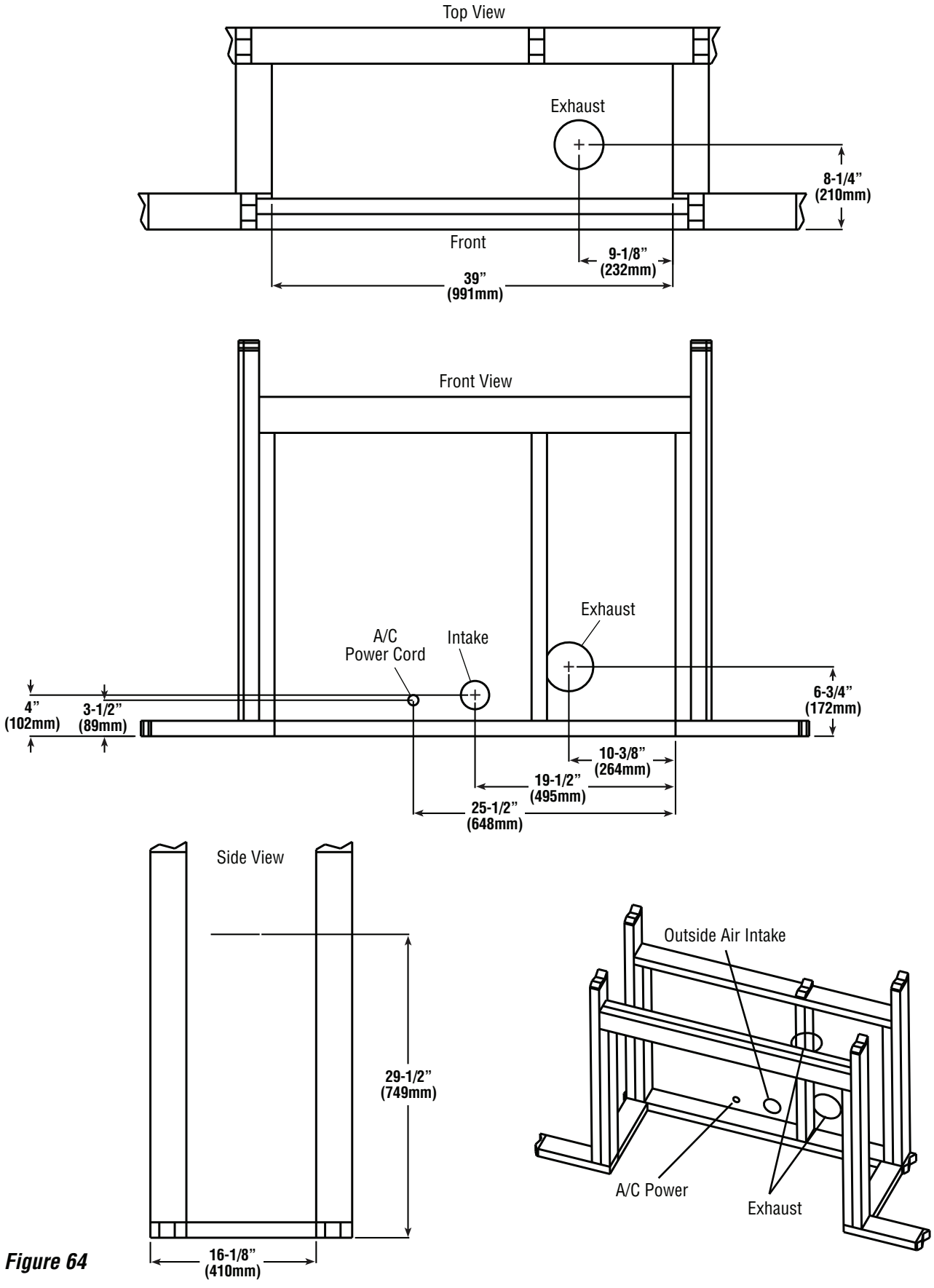



***Figure 64***



NOTE: DIAGRAMS & ILLUSTRATIONS ARE NOT TO SCALE.

## ZC Framing Dimensions for Non-Combustible Hearth / Floor

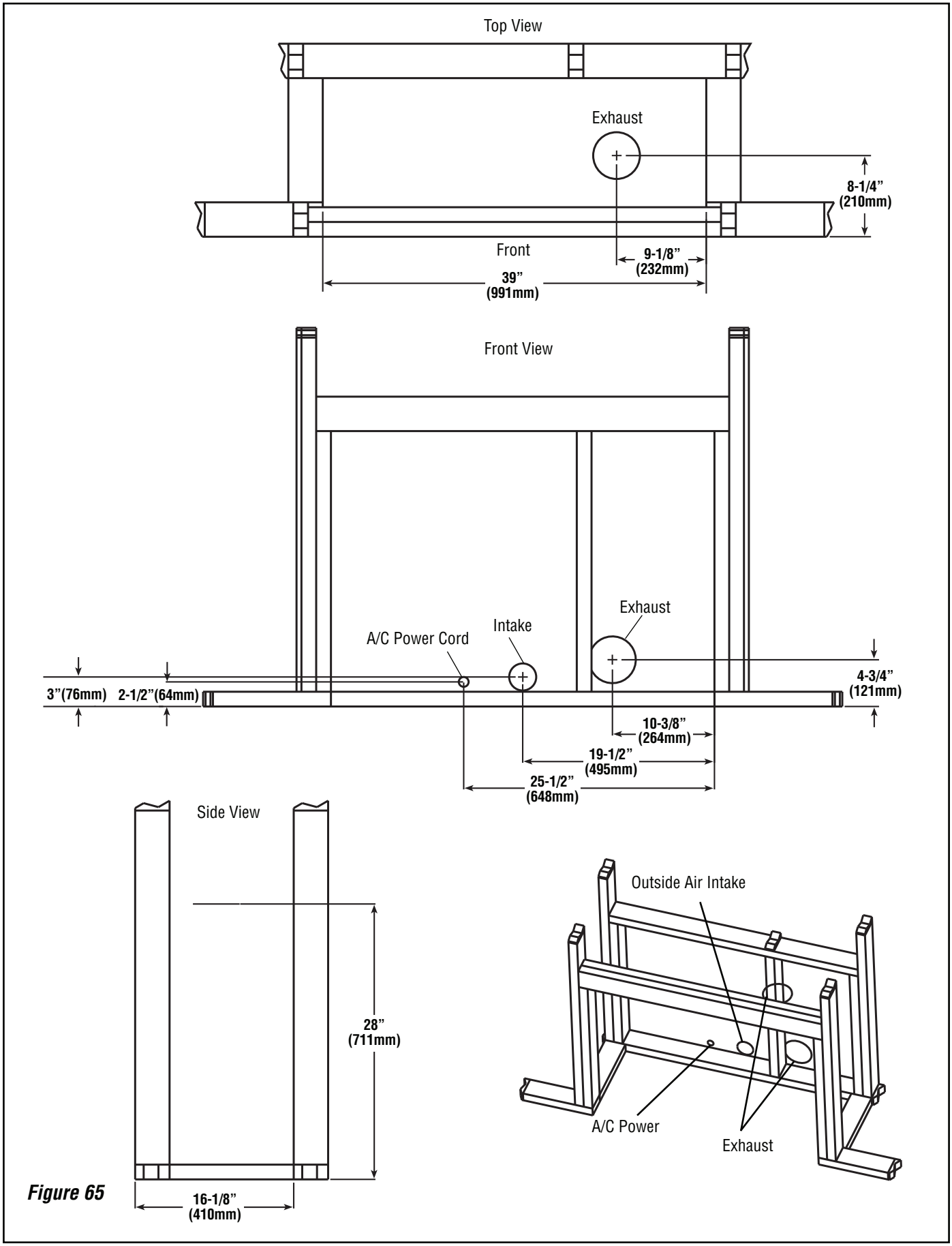



***Figure 65***



NOTE: DIAGRAMS & ILLUSTRATIONS ARE NOT TO SCALE.

## SAFETY LISTING / RATING PLATE - MODEL PI40GL

IRONSTRIKE® HEAT FOR LIFE

**Manufactured by/Fabriqué par:**
**INNOVATIVE HEARTH PRODUCTS**
**1502 14TH ST NW**
**AUBURN, WA., USA 98001**

**Room Heater, Pellet Fuel-Burning Type, Also For Use In Mobile Homes/**
**Radiateur de chambre, type boulette de combustible,**
**à utiliser aussi dans les mobile homes.**

### Model/Modèle: Winslow™ PI40GL

Certification test emissions value 1.47 g/hr per EPA Method 28R.

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

Inspect and clean exhaust venting system frequently

Install and use only in accordance with PI40GL installation and operating instructions.

Refer to local building codes and the installation manual for precautions required for passing the exhaust venting system through a combustible wall or ceiling.

Exhaust vent type is listed type "L", "PL", or Flex.

Contact local building or fire officials, or authority having jurisdiction, about restrictions and installation inspection in your area.

For use with only wood pellet fuel or a 50/50 wood pellet fuel/corn kernel mixture.

Do not connect this unit to a chimney serving another appliance.

Keep viewing door tightly closed during operation.

Input rating: 4.5 pounds per hour.

Electrical rating: 115 VAC, 60 Hz., 5.8 Amps

Route power cord away from unit. Do not route cord under or in front of appliance.

DANGER: Risk of electric shock. Disconnect power before servicing unit.

Replace glass only with ceramic glass.

For Alternative Installations See the PI40GL Installation and Operating Instructions.

Valeur d'émission du test d'homologation 1,47 g/h (EPA Method 28R)..

Cet appareil de chauffage au bois doit être inspecté et entretenu périodiquement pour fonctionner correctement. Voir le manuel du propriétaire pour plus d'information. L'utilisation de cet appareil de chauffage au bois de manière incompatible avec les instructions du manuel du propriétaire constitue une infraction aux régulations fédérales.

Examinez et nettoyez souvent le système de ventilation du gaz d'échappement.

N'installez, ni utilisez que selon les instructions d'installation et de fonctionnement PI40GL.

Voyez les règlements de bâtiment dans votre région et les instructions du fabricant pour les précautions éxigées pour faire passer une cheminée dans un mur ou un plafond combustible.

Le système de ventilation du gaz d'échappement est classé type "L", "PL" ou flex.

Contactez vos autorités de batiment ou vos pompiers, ou l'autorité en titre, à propos des limitations et l'inspection de l'installation dans votre région.

N'utilisez qu'avec les boulettes de combustible en bois, ou avec un mélange 50/50 des boulettes de combustible en bois et les grains de mais.

Ne liez pas cette unité à une cheminée qui aliment un autre appareil électrique.

Tenez la porte de vue bien fermée pendant l'operation.

Classement d'alimentation: 4.5 livres par heure.

Classement électrique: 115 VAC, 60 Hz., 5.8 Amps.

Faites passer le cordon d'électricité de l'unité. Ne faites pas passer le cordon sous ou devant l'appareil.

AVERTISSEMENT: Risque de choc électrique.

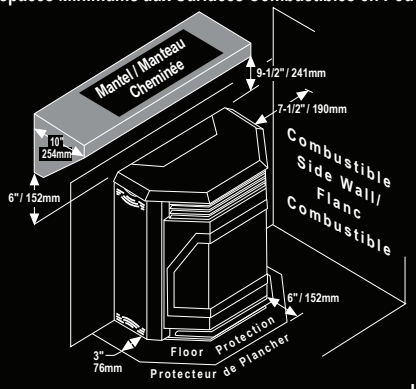
Ne remplacez la verre qu'avec la verre céramique.

Pour des installations alternatives, voyez les instructions d'installation et de fonctionnement PI40GL.

**Part No./ No. pièce #900430-00 Rev. 1, 10/2019** **DO NOT REMOVE THIS LABEL** **Made in U.S.A.**

**Serial Number**
**Numéro de Série** **PI40GL-**

**Minimum Clearances to Combustible Surfaces in Inches**
**Espaces Minimums aux Surfaces Combustibles en Pouces**




PFS® C US

**Report No. 14-188**
**Tested to ASTM E1509, ULC S628 &**
**ULC/ORD C1482-M1990**

**Floor Protector must be non-combustible and of the minimum size indicated/**
**Protecteur du plancher doit être non-combustible et de la taille minimum indiquée.**


**Floor Protector/**
**Protecteur de Plancher**

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

**Date of Manufacture/Date de Fabrication**

2023 2024 2025 Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec

**CAUTION:** HOT WHILE IN OPERATION. DO NOT TOUCH. KEEP CHILDREN, CLOTHING, AND FURNITURE AWAY. CONTACT MAY CAUSE SKIN BURNS. SEE NAMEPLATE AND INSTRUCTIONS. OPERATE THIS UNIT ONLY WITH THE FUEL HOPPER LID CLOSED. FAILURE TO DO SO MAY RESULT IN EMISSION OF PRODUCTS OF COMBUSTION FROM THE HOPPER UNDER CERTAIN CONDITIONS. MAINTAIN HOPPER SEAL IN GOOD CONDITION. DO NOT OVERFILL HOPPER.

**ATTENTION:** CET APPAREIL EST CHAUD EN MARCHANT– NE TOUCHEZ PAS. TENEZ HORS DE LA PORTÉE DES ENFANTS. NE PERMETTEZ PAS LES HABITS A TOUCHER L'APPAREIL. LE CONTACT PEUT CAUSER DES BRULURES DE LA PEAU. VOYEZ LA PLAQUE ET LES AUTRES INSTRUCTIONS. FAITES MARCHER CETTE UNITE SEULEMENT AVEC LE CHAPEAU DE LA TREMIE DE COMBUSTIBLE FERMEE. EN CAS DE DEFAILLANCE, LES PRODUITS DE COMBUSTION POURRAIT ETRE EMIS DE LA TREMIE SOUS CERTAINES CONDITIONS. TENEZ LE PLOMB DE LA TREMIE EN BONNE CONDITION. NE REMPLISSEZ TROP LA TREMIE.



NOTE: DIAGRAMS & ILLUSTRATIONS ARE NOT TO SCALE.

# Innovative Hearth Products
# IronStrike® Pellet Stove and Insert
# Limited Lifetime Warranty

### THE WARRANTY
Innovative Hearth Products ("IHP") Limited Lifetime Warranty warrants your IronStrike® brand pellet fueled stove or insert ("Product") to be free from defects in materials and workmanship at the time of manufacture. The Product body, heat exchange tubes and ceramic glass carry the Limited Lifetime Warranty. Ceramic glass carries the Limited Lifetime Warranty against thermal breakage only. After installation, if covered components manufactured by IHP are found to be defective in materials or workmanship during the Limited Lifetime Warranty period and while the Product remains at the site of the original installation, IHP will, at its option, repair or replace the covered components. If repair or replacement is not commercially practical, IHP will, at its option, refund the purchase price or the wholesale price of the IHP Product, whichever is applicable.

IHP will also pay IHP prevailing labor rates, as determined in its sole discretion, incurred in repairing or replacing such components for up to five years. THERE ARE EXCLUSIONS AND LIMITATIONS to this Limited Lifetime Warranty as described herein.

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

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

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

**Accessories** – Repair or replacement for 90 days from the date of installation
**Cast iron burn pot** - Replacement for five years from the date of installation
**Electrical components** – Repair or replacement for two years from the date of installation
**Firebrick/refractory** – Replacement for 90 days from the date of installation
**Gaskets** – Repair or replacement for one year from the date of installation
**Gold & nickel plating** - Replacement for two years from date of installation. Excludes tarnishing
**Steel burn grate** - Replacement for two years from the date of installation
**Logs** – Replacement for 90 days from the date of installation
**Labor** – Prevailing IHP labor rates apply for the warranty period of the component

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

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

IHP will not be responsible for: (a) damages caused by normal wear and tear, accident, riot, fire, flood or acts of God; (b) damages caused by abuse, negligence, misuse, or unauthorized alteration or repair of the Product affecting its stability or performance (The Product must be subjected to normal use. The use of fuels other than those outlined in the operation manual provided with the Product will void all warranties and liabilities.); (c) damages caused by failing to provide proper maintenance and service in accordance with the instructions provided with the Product; (d) damages, repairs or inefficiency resulting from faulty installation or application of the Product.

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

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

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

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

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

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

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

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

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




**P/N 900215-00, Rev. B 02/2018**

**Innovative Hearth Products**
**1769 East Lawrence Street • Russellville, AL 35654**

## WARRANTY

Your pellet insert is covered by a limited warranty (provided with appliance). Please read the warranty to be familiar with its coverage.

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

## PRODUCT REFERENCE INFORMATION

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

## REPLACEMENT PARTS

See ***Page 29*** for a complete replacement parts list. Use only parts supplied from the manufacturer.

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

When ordering repair parts, always give the following information:

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

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

**IHP**
**1769 East Lawrence Street**
**Russellville, AL 35654**
**visit us at IronStrike.us.com**

Model Number _____

Serial Number _____

Installation Date _____

Dealer's Name _____

Dealer's Phone Number _____

NATIONAL FIREPLACE INSTITUTE NFI CERTIFIED www.nficertified.org

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

Wood Energy Technical Training www.wettinc.ca

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

INNOVATIVE HEARTH PRODUCTS





P900139-00

IRONSTRIKE®
HEAT FOR LIFE

# INSTALLATION AND OPERATION MANUAL

## Free-Standing Pellet Stove

**Save These Instructions For Future Reference**

**P/N 900141-00, Rev. E, 06/2023**

P900141-00

## Pellet Stoves
## Model Winslow™ (PS40GL)

PFS C US

**Report No. 14-187**

**A French manual is available upon request. Order P/N 900142-00.**

**Ce manuel d'installation est disponible en francais, simplement en faire la demande. Numéro de la pièce 900142-00.**

**This appliance must be properly installed and operated in order to prevent the possibility of a house fire. Please read this entire manual before installation and use of this pellet fuel-burning room heater. Failure to follow these instructions could result in property damage, bodily injury or even death. Contact your local building or fire officials to obtain a permit and information on any installation requirements and inspection requirements in your area.**

NATIONAL FIREPLACE INSTITUTE NFI CERTIFIED

**www.nficertified.org**

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

Wood Energy Technical Training www.wettinc.ca

### ⚠ WARNING

- **Hot! Do not touch! The glass and surfaces of this appliance will be hot during operation and will retain heat for a while after shutting off the appliance. Severe burns may result.**
- **Carefully supervise children in the same room as appliance.**
- **IHP pellet-burning appliances are designed for use as a supplemental heater. They are not intended for continuous use as a primary heat source.**

## CONGRATULATIONS!

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

**It is our goal at IHP to provide you, our valued customer, with an appliance that will ensure you years of trouble-free warmth and pleasure.**

**Thank you for selecting an Innovative Hearth Products (IHP) stove as the answer to your home heating needs.**

## TABLE OF CONTENTS



### USING THIS MANUAL

Please read and carefully follow all of the instructions found in this manual. Please pay special attention to the safety instructions provided in this manual.

**PRODUCT IS SUBJECT TO CHANGE WITHOUT NOTICE**

## IMPORTANT SAFETY AND WARNING INFORMATION

**READ THIS MANUAL IN ITS ENTIRETY AND UNDERSTAND THESE RULES TO FOLLOW FOR SAFETY.**

### ⚠ WARNING

**Improper installation, adjustment, alteration, service or maintenance can cause injury or property damage. Refer to this manual. For assistance or additional information consult a qualified installer, service agency or the gas supplier.**

### ⚠ WARNING

**Do not attempt to alter or modify the construction of the appliance or its components. Any modification or alteration may void the warranty, certification and listings of this unit.**

1. DO NOT CONNECT THIS UNIT TO A CHIMNEY FLUE SERVING ANOTHER APPLIANCE.
2. Do not connect this appliance to air ducts or any air distribution system.
3. DO NOT INSTALL A FLUE DAMPER IN THE EXHAUST VENTING SYSTEM OF THIS UNIT.
4. Do not use class B venting intended for gas appliances as a chimney or connector pipe on a pellet-fired appliance.
5. The minimum clearances must be maintained for all combustible surfaces and materials including; furniture, carpet, drapes, clothing, wood, papers, etc. Do not store combustibles within this clearance space (see *Clearances* on *Pages 8 and 9)*.
6. INSTALLATION DISCLAIMER - It is imperative that the exhaust venting system be installed correctly and sealed gas-tight (not allowing exhaust to leak). Follow the vent manufacturer's instructions for proper installation. Since IHP has no control over the installation of your stove, IHP grants no warranty, implied or stated for the installation or maintenance of your stove and assumes no responsibility for any consequential damage(s).
7. Burning any kind of fuel consumes oxygen. If outside air is not ducted to the appliance, ensure that there is an adequate source of fresh air available to the room where the appliance is installed.
8. The appliance will not operate using natural draft, nor without a power source for the blower and fuel feeding systems.
9. Never use gasoline, gasoline-type lantern fuel, kerosene, charcoal lighter fluid, or similar liquids to start or "freshen up" a fire in this heater. Keep all such liquids well away from the heater while it is in use.
10. The authority having jurisdiction such as municipal building department, fire department, fire prevention bureau, etc should be consulted before installation to determine the need to obtain a permit.
11. APPROVED FUEL: This appliance is designed specifically for use only with pelletized wood pellets. This appliance is designed and approved for the burning of wood residue pellets with up to 2% ash content. This appliance is NOT approved to burn cardboard, nut hulls, cherry pits, etc. regardless if it is in pellet form. Failure to comply with this restriction will void all warranties and the safety listing of the stove. Consult with your IHP dealer for more information on approved pellet fuels.
12. These appliances are designed as supplemental heaters. Therefore, it is advisable to have an alternate heat source when installed in a dwelling.
13. CONTINUOUS OPERATION: When operated correctly, this appliance cannot be overfired. Continuous operation at a maximum burn can, however, shorten the life of the electrical components (blowers, motors and electronic controls) and is not recommended. Typical approved operation would include running at the low to mid range setting with occasional running on the maximum setting during the coldest periods of the winter. DO NOT OVER-FIRE THIS STOVE. Follow all instructions regarding the proper use of this stove.
14. CAUTION: NEVER PUT FINGERS NEAR AUGER. This appliance is equipped with a hopper lid switch, which is designed to stop the auger when the hopper lid is opened. NEVER DISCONNECT OR BYPASS THIS SWITCH FOR ANY REASON. Pellet fuel is fed to the Burn-Pot by a screw auger. This auger is driven by a high torque motor. The auger is capable of causing serious harm to fingers. Keep pellets in the hopper at all times and keep fingers away from auger. The auger can start and stop automatically at any time while the stove is running.
15. CAUTION: HOT WHILE IN OPERATION. An appliance hot enough to warm your home can severely burn anyone touching it. Keep children, pets, clothing and furniture away. Contact may cause skin burns. Do not let children touch the appliance. Train them to stay a safe distance from the appliance.
16. FLY ASH BUILD-UP: For all wood pellet fuel-burning heaters, the combustion gases will contain small particles of fly-ash. This will vary due to the ash content of the fuel being burned. Over time, the fly-ash will collect in the exhaust venting system and restrict the flow of the flue gases. The exhaust venting system should be inspected regularly and cleaned as necessary.
17. SOOT FORMATION: Incomplete combustion, such as occurs during startup, shutdown, or incorrect operation of the room heater will lead to some soot formation which will collect in the exhaust venting system. A precautionary inspection on a regular basis is advisable to determine the necessity of cleaning. The exhaust venting system should be inspected regularly and cleaned as necessary.
18. DISPOSAL OF ASHES: Ashes should be placed in a steel container with a tight fitting lid and moved outdoors immediately. The closed container of ashes should be placed on a noncombustible floor or on the ground, well away from all combustible materials, pending final disposal. If the ashes are disposed of by burial in soil or otherwise locally dispersed, they should be retained in the closed container until all cinders have been thoroughly cooled.
19. The instructions must be strictly adhered to. Do not use makeshift methods or compromise in the installation.
20. Do not abuse the door glass by striking, slamming or similar trauma. Do not operate the stove with the glass removed, cracked or broken.
21. SAVE THESE INSTRUCTIONS.
22. See the listing label on the appliance.



NOTE: DIAGRAMS & ILLUSTRATIONS ARE NOT TO SCALE.

## ⚠ WARNING

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

## PLANNING YOUR INSTALLATION

**Questions To Ask Local Building Official**
A correct installation is critical and imperative for reducing fire hazards and perilous conditions that can arise when wood pellet burning appliances are improperly installed. The installer must follow all of the manufacturers' instructions.

## ⚠ WARNING

**Check all local building and safety codes before installation. The installation instructions and appropriate code requirements must be followed exactly and without compromise. Alterations to the stove are not allowed. Do not connect the stove to a chimney system serving another stove, appliance, or any air distribution duct. Failure to follow these instructions will void the manufacturers warranty.**

The installation of this appliance must conform to local codes and applicable state and federal requirements. Familiarity with these requirements before installation is essential. Important considerations to discuss with local building officials include:

1. **Applicable codes** (i.e. Uniform Mechanical Code, State or Regional Codes).
   **Electrical codes:**
   In USA, NEC, ANSI/NFPA 70 – Latest Edition
   In Canada, CSA C22.1 – Latest Edition
2. Local amendments
3. Is a permit required - cost. You may wish to contact your insurance company to ask if they require this.
4. If outside combustion air is required
5. Rooms where the installation is not allowed

**Power Supply Requirements**
The power cord must be plugged into a standard, 120 volt, 60 Hz grounded electrical outlet. The power supply cord must be routed to avoid contact with any of the hot or sharp exterior surface areas of the stove. When installed in a manufactured home, the appliance must be electrically grounded to the steel chassis of the manufactured home (see ***Page 13***, Manufactured Home Requirements for additional requirements). These requirements must be met unless otherwise specified by state or local authorities.

**Electrical**
- The stove requires 120 volts AC for operation.
- Maximum wattage is 700.
- Igniter wattage is 400.
- Normal operating wattage is 300.

**Electrical Generator Operation**
Your Winslow™ PS40GL stove can be powered with a gas driven electrical generator. However, the generator's electrical regulator may not be compatible with the stove's electronics. The higher the quality of the generator, the greater the chance that it is compatible with the stove.

## ⚠ WARNING

**Electrical grounding instructions: This appliance is equipped with a three-prong (grounding) plug for your protection against shock hazard and should be plugged directly into a properly grounded three-prong receptacle. Do not cut or remove the grounding prong from this plug. Do not route power cord under or in front of appliance.**

**Smoke Detector Recommended**

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

**Carbon Monoxide Monitor Recommended**

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

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

**Surge Protectors**

A surge protector is recommended to ensure the stove's electrical components are not damaged due to a surge in the electrical supply. Only high quality protectors listed to UL1449 should be used - low quality protectors do not provide the protection needed.

**Installation / Maintenance Standards**

National Fire Protection Association – The primary NFPA standard that refers to installation and maintenance of pellet stoves and venting is NFPA 211 – Latest Edition: Chimneys, Fireplaces, Vents, and Solid Fuel appliances.

## SELECTING A LOCATION

The design of your home and where you place your stove will determine its value as a source of heat. This type of appliance depends primarily on air circulation (convection) to disperse its heat, and therefore, a central location is often best. There are other practical considerations, which must be considered before a final selection of locations is made. Some of which includes:

- Existing Chimneys
- Pellet Fuel Storage
- Aesthetic Considerations
- Roof Design (rafter locations & roof pitch)
- Room Traffic
- Proximity to Combustibles
- Electrical Wiring

**⚠ CAUTION**

**The body of these appliances are very heavy. The use of a heavy duty escalara (stair step hand truck) is recommended for lifting the appliance body.**

### NEGATIVE PRESSURE WARNING

This appliance is not designed to be operated in a negative pressure environment. In very airtight homes with large kitchen exhaust fans, furnace cold air returns, fresh air exchange systems and any other air system in close proximity to the heating appliance may create a negative pressure in the same room as the heating appliance. This can create dangerous condition, drawing combustion by-products into the home. Be sure your home has adequate makeup air to eliminate negative pressures caused by the above-mentioned sources. Outside air connected to the appliance probably will not resolve such a problem as the stove is not the source of negative pressure. IHP accepts no liability for damages resulting from negative pressures described here.

**Ventilation Requirements -** Provide adequate air for combustion. The fresh air requirements of this appliance must be met within the space where it will be installed. Ventilation is essential when using a solid-fuel-burning heater. In well insulated and weather tight homes, it may inhibit the rate the exhaust flows through the venting system (caused by a shortage of air in the home). The lack of air is caused by many common household appliances which exhaust air from the home (such as a furnace, heat pump, air conditioner, clothes dryer, exhaust fans, fireplaces, and other fuel burning appliances). Also, the combustion process of this heater uses oxygen from inside the dwelling. If the available fresh air delivery in the dwelling is insufficient to support the demands of these appliances, problems can result (i.e. excessive negative pressure will result in performance problems. To correct this problem it may help to open a window (preferably on the windward side of the house) or install an outside combustion air duct to the appliance.

## FEATURES AND SPECIFICATIONS

### Installation Options
- Residential and Commercial
- Vented vertical and horizontal (see venting instructions)
- Manufactured home and mobile home
- Thermostat or manual operation
- Bedrooms

### Heating
- Max. feed rate is 4.7 pounds/hour or 39,500 BTU/hour
- Min. feed rate is 1.8 pounds/hour or 15,120 BTU/hour

### Venting
This stove is approved for venting with Type L and Type PL pellet vent pipe listed to UL 641 and ULC S609. The flue collar on the stove accepts 3" diameter pipe.

The combustion air for this stove is drawn through a pipe at the lower rear of the stove. For mobile home installations a 3" ID flex line or pipe must be attached to the stove's air intake to draw air from outside the house. The vent pipe can be installed vertically or horizontally (see Venting section for recommended installations).

***NOTE:*** *When installing this stove at altitudes of 4000 feet and above, we suggest the use of 4" pellet vent.*

### Thermostat
This stove can be operated manually or with a thermostat.

### Lighting
This stove is equipped with an electric self igniter for ease of ignition.

### Weight - 305 pounds

### Hopper Capacity - 60 pounds

### Listing information
The Winslow™ PS40GL stove is safety tested and listed with the following agencies;
- PFS TECO to ASTM E 1509
- US EPA List of Approved Wood Heating Appliances
- List of Colorado Approved Pellet Stoves

### Appearance Choices
The Winslow PS40GL stove can be ordered with the following door trims and grills, and brick panel options:

| Door Trim Kits | | Grill Kits | |
|---|---|---|---|
| Black | 79038 | Black | 79000 |
| Nickel | 79037 | Nickel | 79002 |
| Brushed Nickel | 79035 | Brushed Nickel | 79022 |
| Black Nickel | 79036 | Black Nickel | 79039 |

**Brick Panel Kit** ..... 79030

## FUEL

**⚠ CAUTION**

**The use of unapproved, dirty, wet and / or high salt content fuel will void the warranty!**

This stove is designed to burn wood pellet fuel. Burning any other fuel that is not approved for use with this appliance will void the appliance warranty.

**Wood Pellet Specifications**
This appliance has been designed to burn wood residue pellets with up to 2% ash content. Dirty fuel will adversely affect the performance of the stove. Any questions regarding pellet fuel can be answered at the Pellet Fuels Institute (PFI), pelletheat.org.

Pellet fuel is made from sawdust and scrap wood from many different species of wood. Pellets are either 1/4" or 5/16" in diameter and vary in length. The PS40GL stove will burn either diameter pellets. Pellets made from hardwoods contain more ash than those made from softwoods. Minerals from ash and sand in the pellets form clinkers under the extreme temperatures in the Burn-Pot. Try burning various brands of pellets until you find one that burns with minimum ash and clinkers. Once you find a pellet brand that burns well, continue using this brand. High ash fuel increases the frequency of stove cleaning. Fuel with an excessive moisture content may jam the auger assembly.

**Clinkering** - Silica (or sand) in the fuel, along with other impurities, can cause clinkering. A clinker is a hard mass of silica formed in the burning process. Clinkering is a function of the fuel, (not the stove), but adversely affects the performance of the stove by blocking off the air passages in the Burn-Pot. Even P.F.I. approved pellet fuel may tend to clinker. See *Maintenance* for more information on cleaning.

**Pellet Fuel Storage -**
- **Store your wood pellets in a dry place to prevent them from absorbing excess moisture.**
- **Do Not store your wood pellets within the clearance zone of the stove.**
- **Do Not store your wood pellets in a place that would block access to refueling the hopper.**

Wood pellets manufactured to the pellet fuels institute (P.F.I.) certification standard are available in two grades, Standard and Premium. The primary difference between the two is the ash content of the pellets.

The P.F.I. specification for standard grade and premium grade residential and commercial pellet fuel is as follows:
- CHLORIDES (Salt): Less than 300 p.p.m. to avoid stove and vent rusting.
- BULK DENSITY: 38 to 40 lb. / Cu. Ft. minimum
- MOISTURE CONTENT: 8% to 10% maximum
- ASH CONTENT: < 2% maximum (standard grade) < 1% maximum (premium grade)
- FINES: 0.5% to 1% maximum through a 1/8" screen
- BTU CONTENT: There are a number of variations in pellet fuels that are not included in PFI standards. For example, BTU (heat value) content may range from just under 8,000 to almost 9,000 Btu, depending upon species and region of the country and other variables.

## STOVE DIMENSIONS

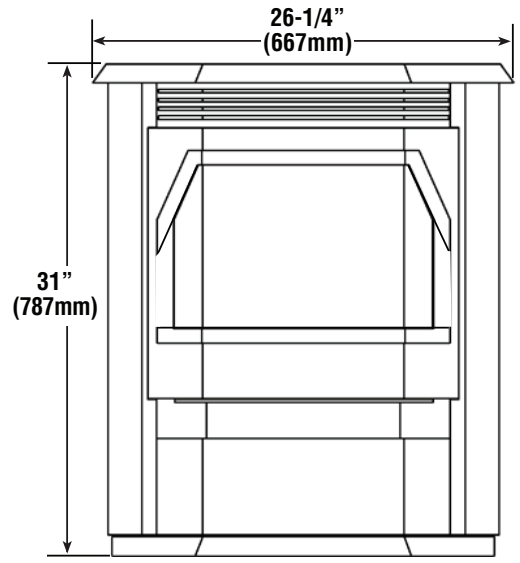



*Figure 1* Front View

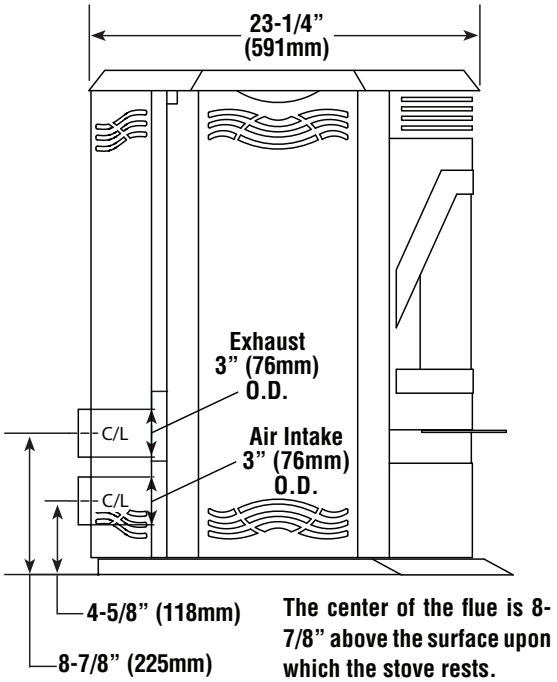



*Figure 2A* Side View

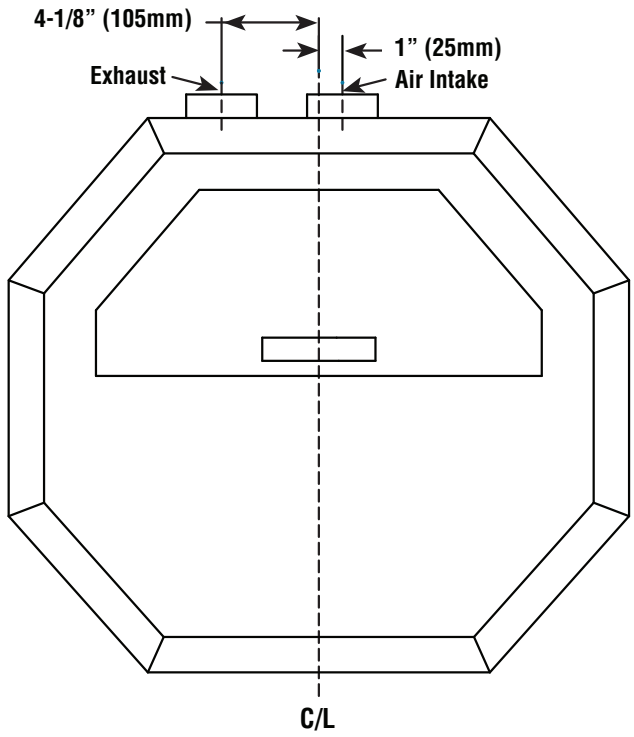



*Figure 2B* Top View

## CLEARANCES TO COMBUSTIBLES

### ⚠ IMPORTANT

- ***Minimum clearances specified may not allow for ease of operation and maintenance (please take this in to account when planning the installation). If installed to the minimum clearances, removal of the appliance may be necessary for servicing.***
- ***Recommended clearance zone from the front of the appliance to combustibles is 4 feet minimum.***
- ***Clearances to combustibles for the appliance can only be reduced by means approved by the regulatory authority.***

**INSTALL VENT AT CLEARANCES SPECIFIED BY THE VENT MANUFACTURER.**



NOTE: DIAGRAMS & ILLUSTRATIONS ARE NOT TO SCALE.

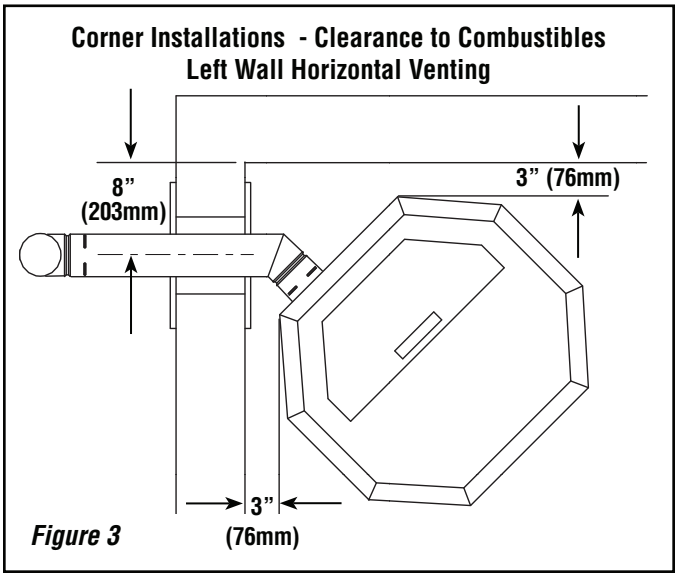



*Figure 3*

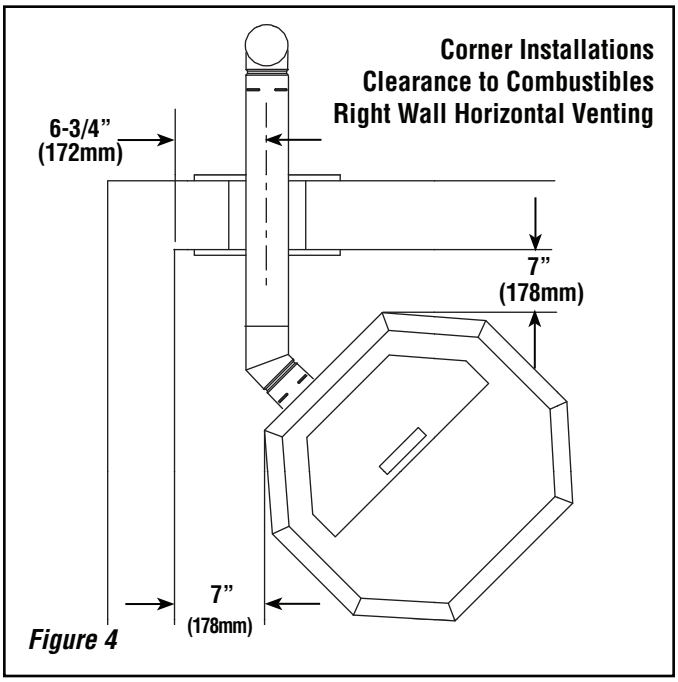



*Figure 4*

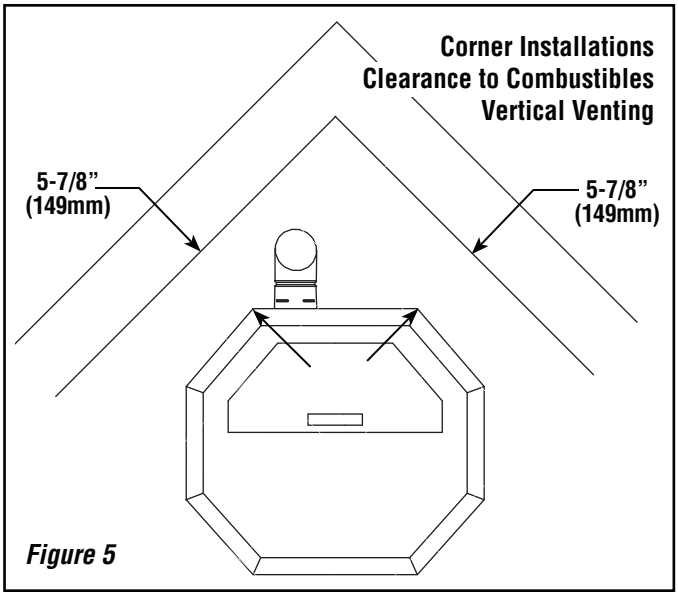



*Figure 5*

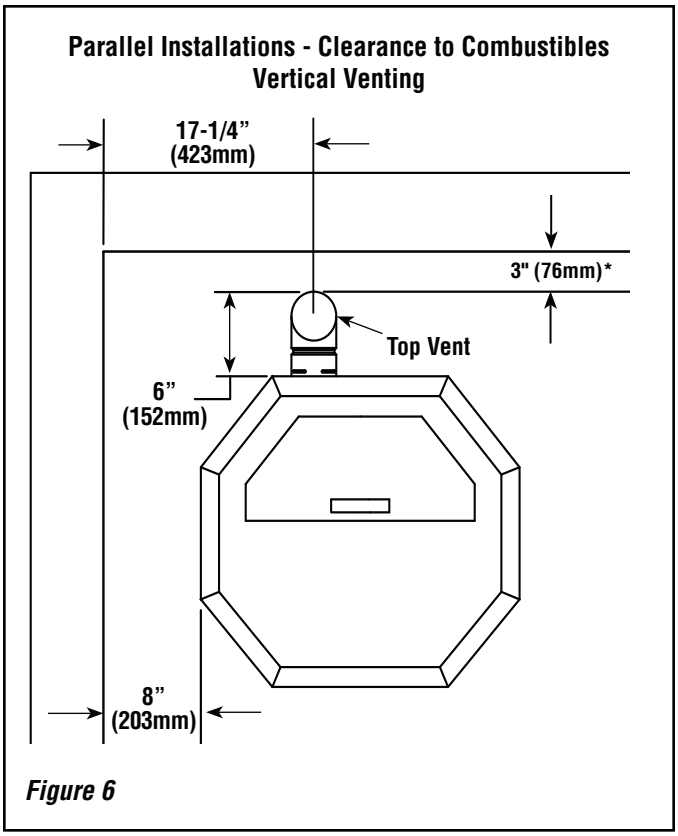



*Figure 6*

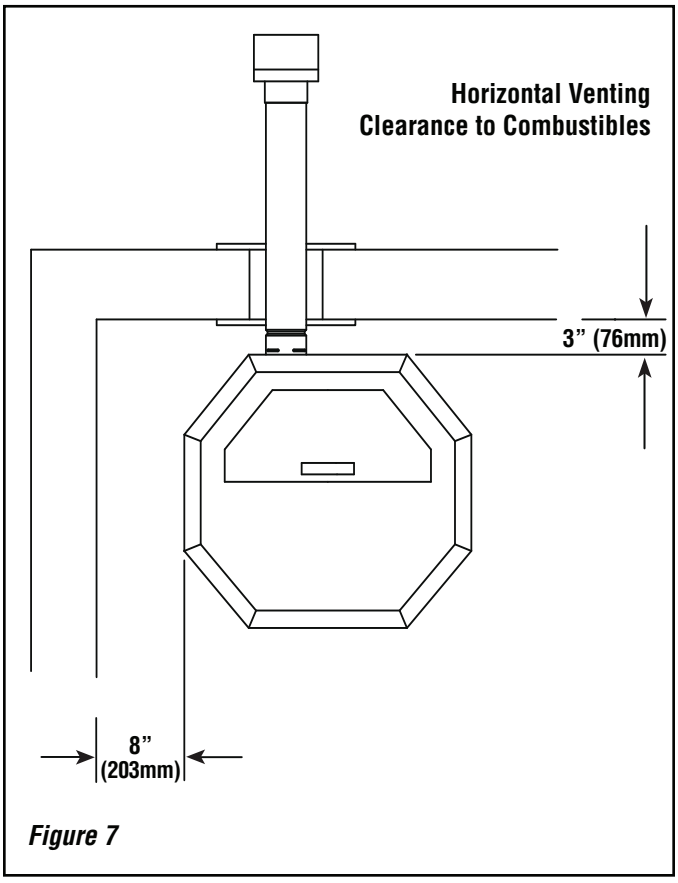



*Figure 7*

** Refer to pipe Manufacturer's installation instructions for minimum pipe clearances.*



NOTE: DIAGRAMS & ILLUSTRATIONS ARE NOT TO SCALE.

### Alcove Installations

Minimum alcove height is 41" (1041 mm), minimum width is 42-1/4" (1073 mm) and maximum depth is 48" (1219 mm). Note, it is quite difficult to load pellets into the hopper when installed in an alcove only 41" (1041 mm) high. For alcove wall clearances see parallel clearances below.

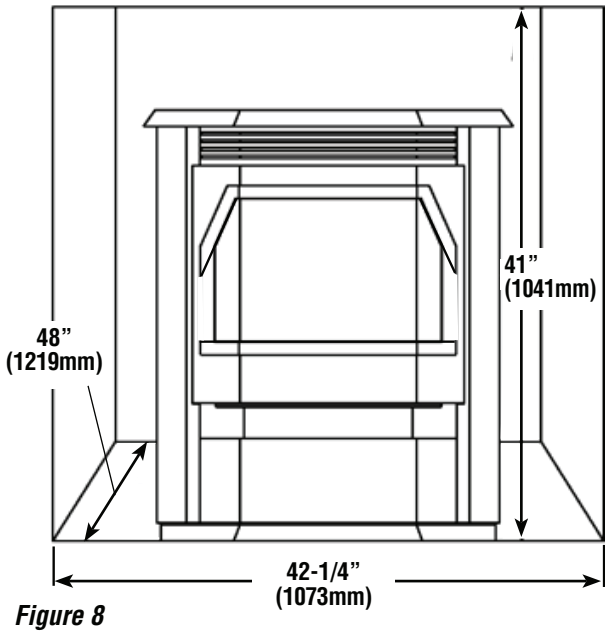



*Figure 8*

## HEARTH PROTECTION

This appliance requires noncombustible floor protection **(the hearth pad or alternate floor protection material does not require a thermal rating).**

A noncombustible floor protector must fully cover the area beneath the appliance as illustrated in ***Figure 9***.

If the floor protection is to be stone, tile, brick, etc., it must be mortared or grouted to form a continuous noncombustible surface. In Canada, if a chimney connector / venting extends horizontally over the floor, protection must also cover the floor under the connector / venting and at least 2" (51 mm) to either side (recommended but not required in the US).

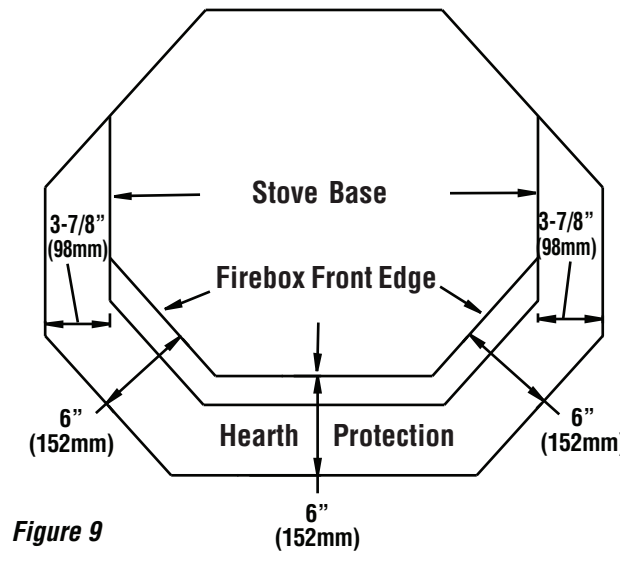



*Figure 9*

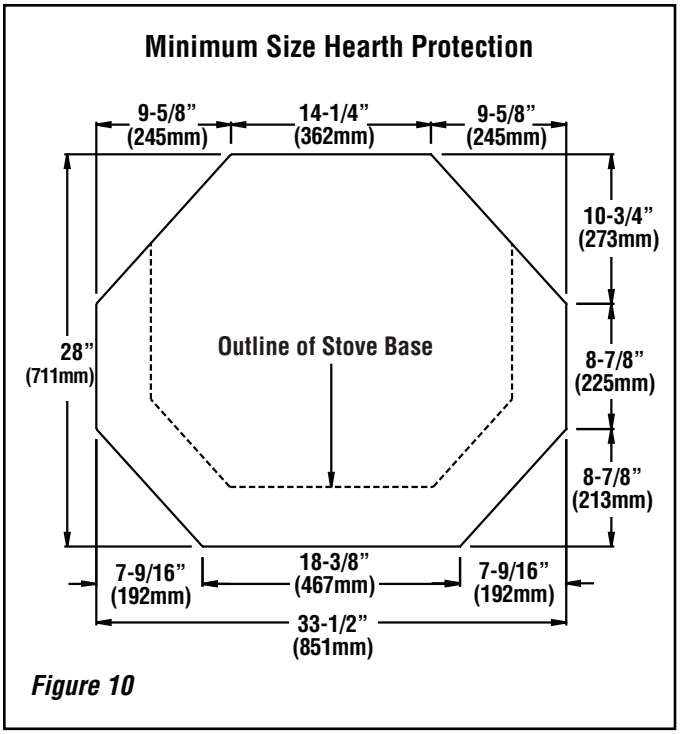



*Figure 10*

## VENT TERMINATION REQUIREMENTS

1. Do not terminate the vent in any enclosed or semi-enclosed areas such as a carport, garage, attic, crawlspace, narrow walkway, closely fenced area, under a sundeck or porch, or any location that can build up a concentration of fumes such as stairwells, covered breezeway, etc.

2. Vent surfaces can become hot enough to cause burns if touched. Non-combustible shielding or guards may be required.

3. Termination must exhaust above the inlet elevation. It is recommended that at least five feet of vertical pipe be installed outside when the stove is vented directly through a wall. This will create a natural draft to prevent the possibility of smoke or odor during appliance shut down or power failure and avoid exposing people or shrubs to high temperatures.

4. The vent should terminate no less than four feet below, no less than four feet horizontally from and no less than one foot above doors and windows, or gravity/ventilation air inlets into the building.

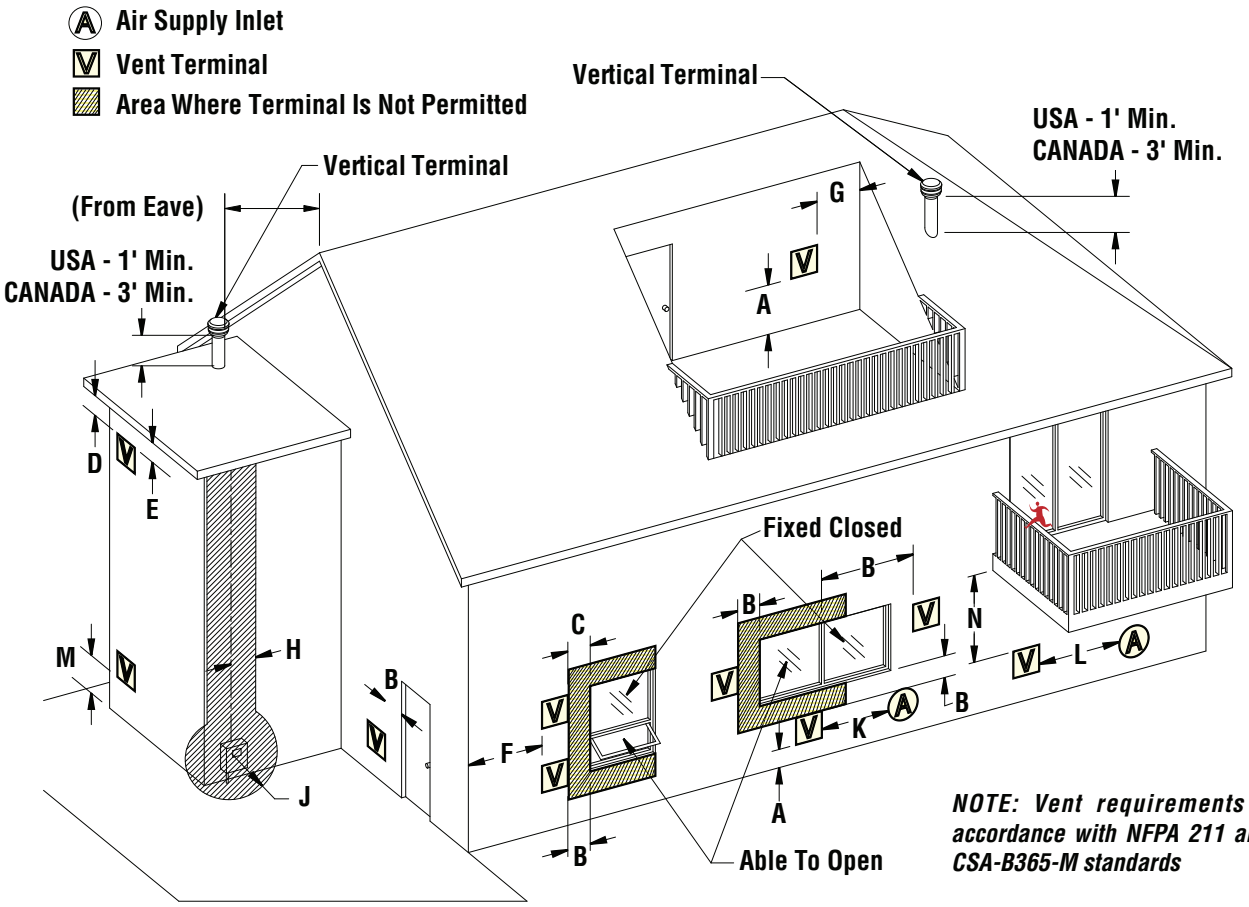
5. The distance from the bottom of termination to grade is 12" (305 mm) minimum unless otherwise specified by the vent manufacturer. The distance between the bottom of the termination and a public walkway should be a minimum of seven feet.

6. Locate the vent termination at least two feet away from combustible materials such as shrubs, plants, grass, fences, roof overhangs and adjacent buildings.



NOTE: DIAGRAMS & ILLUSTRATIONS ARE NOT TO SCALE.

## VENT TERMINATION LOCATIONS




***NOTE: Vent requirements are in accordance with NFPA 211 and CAN/ CSA-B365-M standards***

A = Refer to vent manufacturer's installation instructions for the required clearance above grade, veranda, porch, deck, or balcony.

B = Clearance to window or door that may be opened (min. 12”/30cm above - 48”/1.2m below and to the side)

C = Clearance to permanently closed window *(min. 12”/30cm)

D = Vertical clearance to ventilated soffit located above the terminal within a horizontal distance of *(min. 24”/60cm) from the centerline of the terminal (min. 22”/55cm) check with local code.

E = Clearance to unventilated soffit *(min. 12”/30cm)

F = Clearance to outside corner *(min. 12”/30cm)

G = Clearance to inside corner *(min. 12”/30cm)

H = Not to be installed above a meter/regulator assembly within *(min. 36”/90cm) horizontally from the centerline of the regulator.

J = Clearance to service regulator vent outlet *(min. 72”/1.8m)

K = Clearance to non-mechanical air supply inlet to building or the combustion air inlet to any other appliance *(min. 48”/1.2m)

L = Clearance to a mechanical air supply inlet *(min. 120”/3.1m)

M = **Clearance above paved sidewalk or a paved driveway located on public property *(min. 84”/2.1m)

N = ***Clearance under veranda, porch, deck, or balcony (min. 12”/30cm)

***NOTES:***

* *Local codes or regulations may require different clearances.*

** *A vent shall not terminate directly above a sidewalk or paved driveway which is located between two single family dwellings and serves both dwellings.*

*** *Only permitted if veranda, porch, deck, or balcony is fully open on a minimum of two sides beneath the floor.*

***Figure 11***



NOTE: DIAGRAMS & ILLUSTRATIONS ARE NOT TO SCALE.

## INSTALLATION

### Venting

This stove is approved for venting with Type L and Type PL pellet vent pipe listed to UL 641 and ULC S609. Single wall pipe cannot be used with this pellet stove. The stove's flue collar is 3" in diameter. An approved wall thimble or approved ceiling firestop must be used when the pellet pipe passes through a combustible wall or ceiling. The stove's combustion blower pressurizes and pushes flue gases out the pellet pipe. As a result, all pipe joints should be locked together or screwed with three screws if the pipe does not have a locking system and sealed with high temperature silicone. The pipe should be siliconed and fastened with three screws to the stove's flue collar.

In Canada, where the venting may pass through a wall, or partition of combustible materials, the installation shall conform to CAN/CSA-B365. When installing the wall thimble and other venting components, follow the vent manufacturers instructions. Maintain an effective vapor barrier at the location where the chimney or other component penetrates to the exterior of the structure.

The longer the run of pipe and the more elbows used, the greater the resistance to the flow of flue gases. Four inch diameter pellet pipe is recommended for pipe runs greater than 15 feet or when a number of elbows are used.

To aid in cleaning, whenever possible, the venting system should include a tee with clean out attached to the flue collar on the stove. **Do not install back to back elbows right off the back of the stove in any installation**.

**DO NOT INSTALL A FLUE DAMPER IN THE EXHAUST VENTING SYSTEM OF THIS UNIT. DO NOT CONNECT THIS UNIT TO A CHIMNEY FLUE SERVING ANOTHER APPLIANCE.**

**Horizontal installations** that terminate without any vertical sections of pipe are approved; however, wind may direct flue gases toward the house causing discoloring problems. For this reason, horizontal and up 5 feet or horizontal and through the eave installations are recommended.

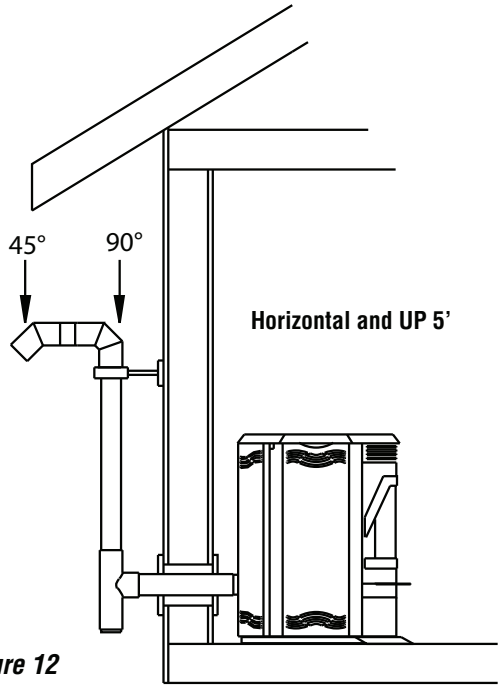



*Figure 12*

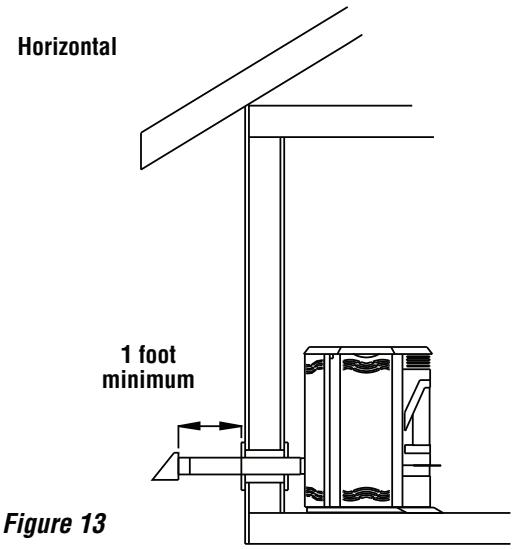



*Figure 13*

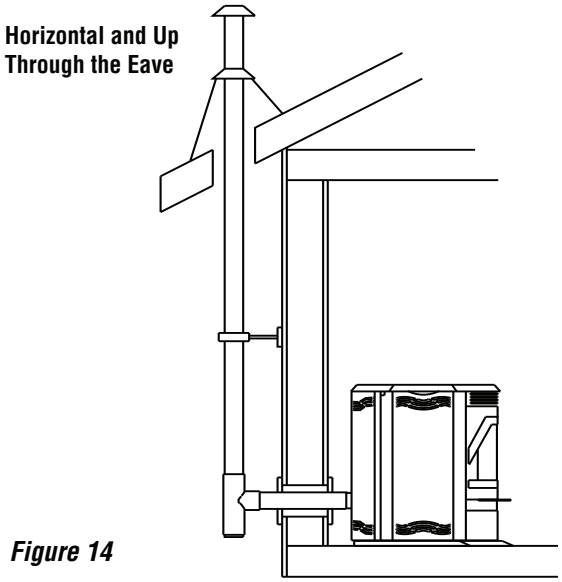



*Figure 14*

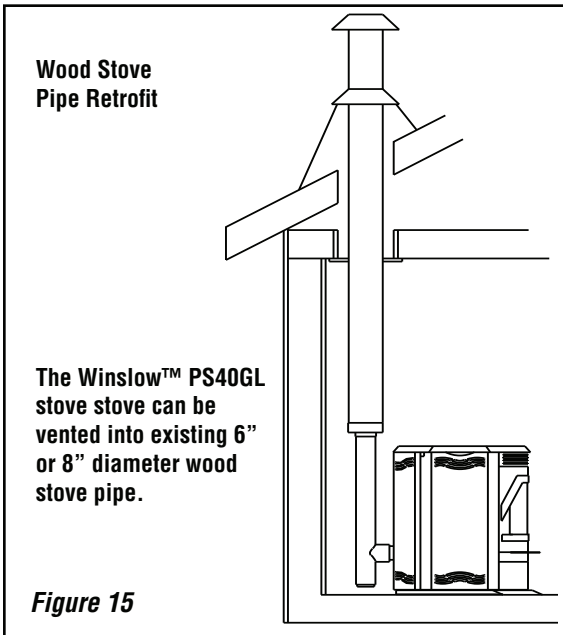



*Figure 15*



NOTE: DIAGRAMS & ILLUSTRATIONS ARE NOT TO SCALE.

### Masonry Chimney

When venting into a masonry chimney, the pellet pipe can terminate just inside the chimney. However, it is recommended to run the pellet pipe to the top of the chimney.

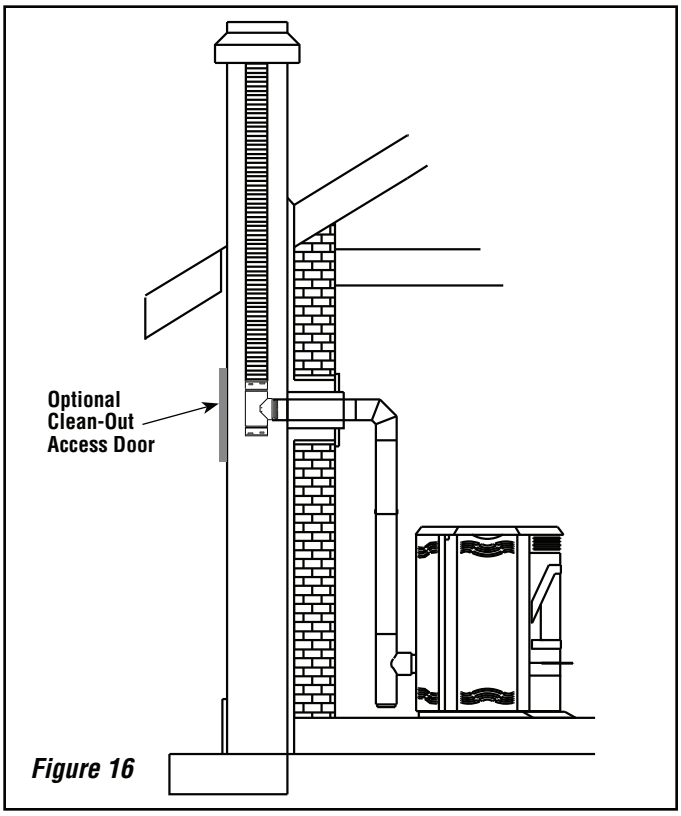



*Figure 16*

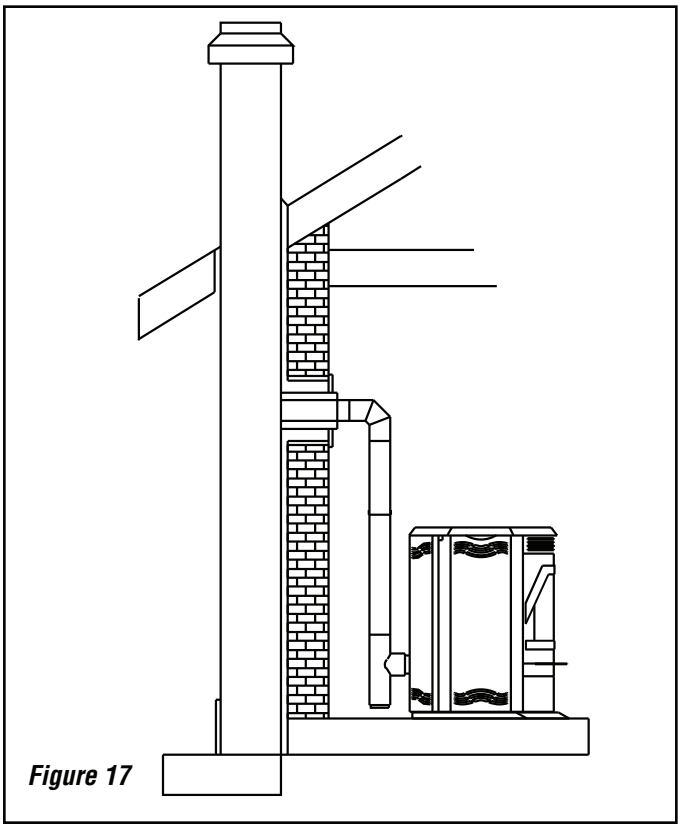


*Figure 17*

### Fireplace

When venting into a fireplace chimney, the pellet pipe can terminate just above the damper. However, it is recommended to run the pellet pipe to the top of the chimney.

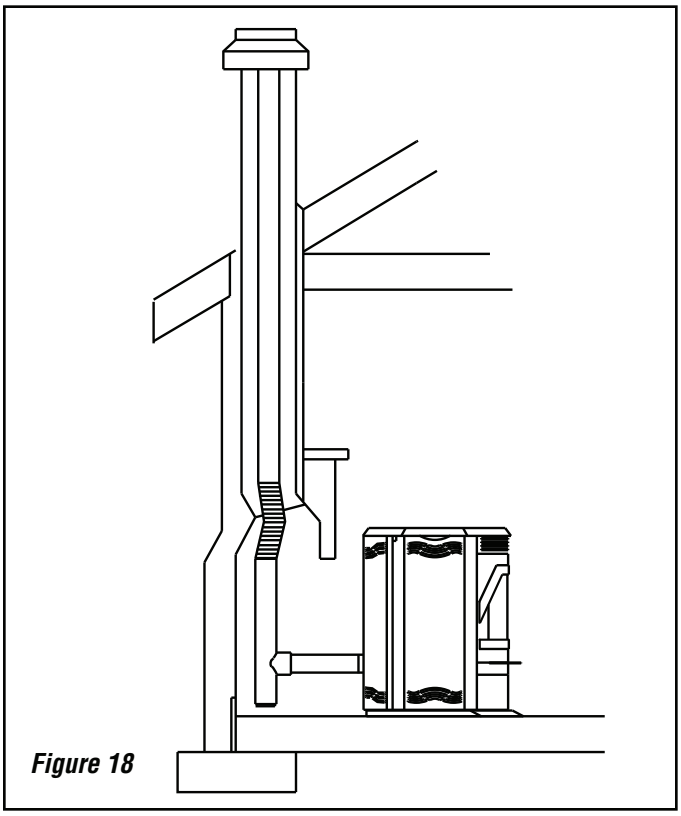


*Figure 18*

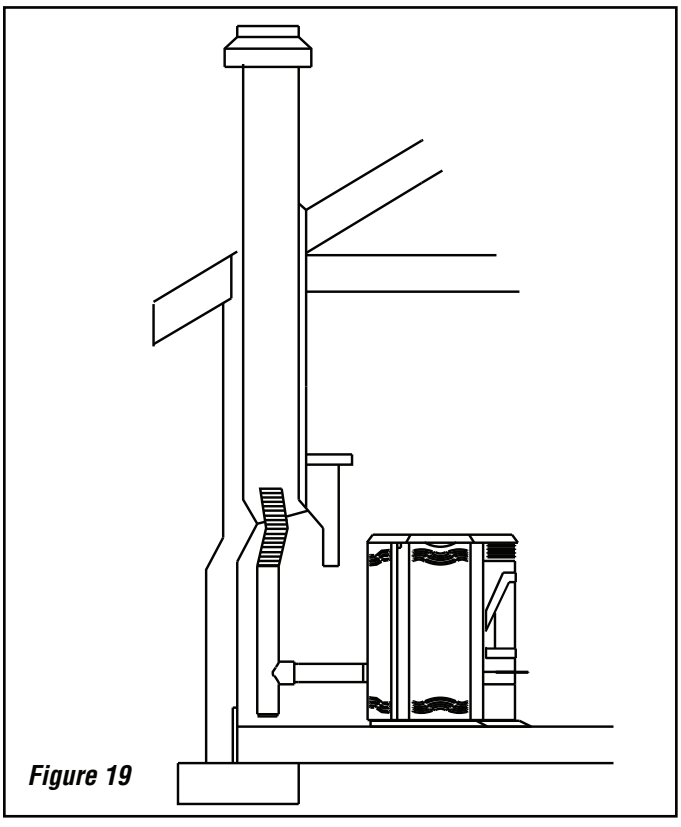


*Figure 19*



NOTE: DIAGRAMS & ILLUSTRATIONS ARE NOT TO SCALE.

### Vertical

If the length of pipe exceeds 15 feet, 4 inch pipe rather than 3 inch vent pipe should be used.

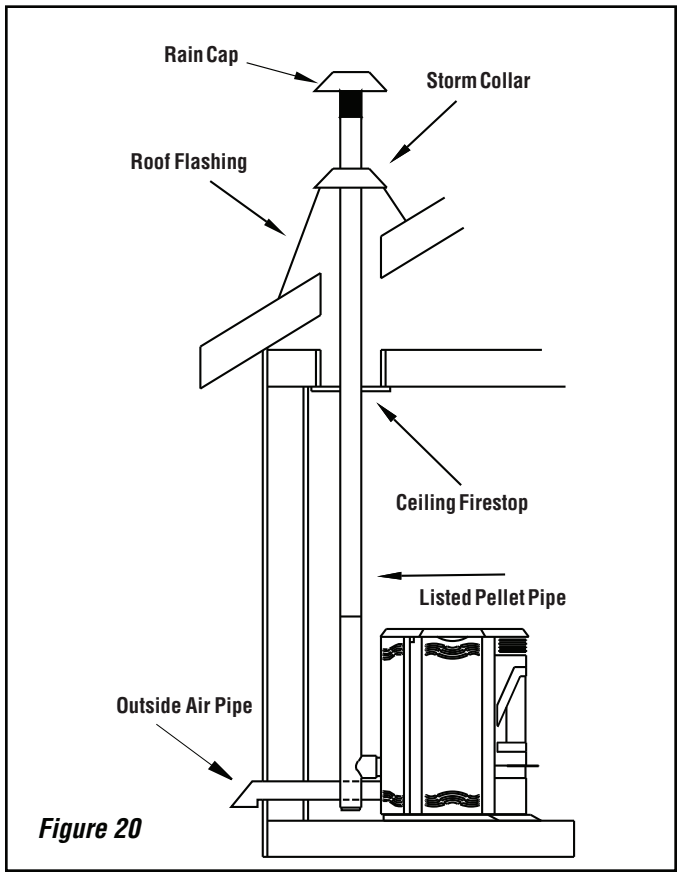



*Figure 20*

### Mobile Home Installations

In addition to the standard installation instructions, the following instructions may be required by local, state or federal building codes.

- Installation should be in accordance with the Manufactured Home and Safety Standard (HUD), CFR 3280, Part 24.
- The stove must be permanently bolted to the floor using 1/4" diameter lag screws. The screws can be inserted through the holes in the pedestal located behind the side doors. The lag screws must be an adequate length to extend through the hearth pad and into the floor. A minimum of two lag screws must be used.
- Connecting the Winslow™ PS40GL stove to outside combustion air is required in manufactured home installations and when required by local building codes. An outside air inlet must be provided for combustion and be unrestricted while unit is in use. Use a galvanized or stainless steel pipe for the duct (the outside air inlet on the stove is 3" diameter). The air intake on the exterior of the home should always be located a minimum of 18" below the flue termination. The Inlet shall remain free of obstruction while unit is in operation and constructed in a manner so as to prevent material from dropping into the inlet or into the area beneath the dwelling. The inlet shall also have a screen with openings not larger than 1/4" to prevent rodents from entering.
- The stove must be permanently electrically grounded to the steel chassis of the manufactured home using a 8 GA copper wire and a serrated or star washer (to penetrate paint or protective coating to ensure grounding). The location selected for ground attachment to the stove must be dedicated for this purpose. Grounding must comply with NFPA-70-latest edition standards, CSA C22.1-latest edition in Canada, as well as any local codes.

**WARNING: DO NOT INSTALL THIS STOVE IN A SLEEPING ROOM IN A MANUFACTURED HOME.**

**CAUTION: THE STRUCTURAL INTEGRITY OF THE MANUFACTURED HOME FLOOR, WALL AND CEILING/ROOF MUST BE MAINTAINED.**

### Outside Air Installations

Connecting the Winslow PS40GL stove to outside combustion air is required in manufactured home installations and when required by local building codes. The stove's air intake will accept 3" ID pipe to accommodate outside air installations. The air intake on the exterior of the home should always be located a minimum of 18" below the flue termination and must remain free of obstruction. The inlet must also have a screen with openings not larger than 1/4" to prevent rodents from entering.

### Thermostat installation

The Winslow PS40GL stove can be operated manually or by thermostat. The stove comes from the factory wired to operate manually - see control board operation on ***Page 19***. A low voltage thermostat can be installed on the stove. To install the thermostat:

1) Unplug the stove from the electrical outlet. Open the right side door and lift out the control board from its retaining brackets. Locate the light green wiring block at the bottom back of the board (see ***Figure 21***), loosen the two screws B at the back of the block and remove the U shaped jumper wire A protruding from the block.
2) Insert a wire from the thermostat into one of the slots from which the jumper wire was removed. Repeat this process for the other thermostat wire.

Retain the jumper wire for future reinstallation. See ***Page 19*** for thermostat operation instructions.

***IMPORTANT NOTE: Install the thermostat per the manufacturers instructions, provided with the thermostat. Failure to follow manufacturers instructions could result in a malfunction. Pay special attention to the thermostat location requirements. If the location requirements are not adhered to the appliance, erratic operation or failure may occur.***

**Do not mount the thermostat where it may be affected by:**

- **Radiant heat from the stove, fireplaces, sun or other heat sources.**
- **Drafts or dead spots behind doors or in corners.**
- **Hot or cold air from ducts.**

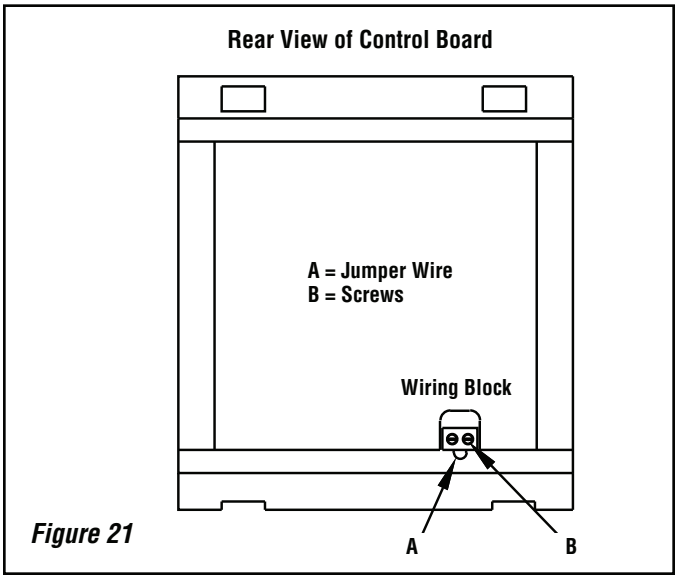



*Figure 21*



NOTE: DIAGRAMS & ILLUSTRATIONS ARE NOT TO SCALE.

## Door Trim Installation Instructions
***(ref. form # 775274M)***

**Parts List (A):**
Qty
(2) Trim Pieces (Gold, Nickel, Brushed Nickel or Black Nickel)
(6) #10 nuts
(6) #10 washers

**Tools Needed:**
Qty
(1) 3/8" nut driver or socket wrench

**CAUTION: Always ensure that plated surfaces are clean and free of fingerprints before lighting stove. Fingerprints will leave permanent blemishes if left on plated surface when lit. When installation is complete, the trim should be gently cleaned with soft cloth and either alcohol or glass cleaner. Do not overtighten nuts, overtightening can create visible dimples on the plated surface.**

**To install Door Trim:**

1. Remove the trim pieces and hardware from its packaging and ensure that all pieces are present before beginning installation. Take care not to scratch finished surfaces.

2. Open right and left side door. The side doors swivel open towards the back of the stove. See ***Figure 24***.

3. Open front door. Put trim in place by inserting trim studs into the corresponding holes in the door *(**Figures 22 and 25**)*. The top piece of trim will only fit in one direction, but the bottom piece can be installed incorrectly. When placing the bottom piece of trim, make sure there is a 9/16" gap between the top of the trim piece and the glass in the door (see ***Figure 26***).

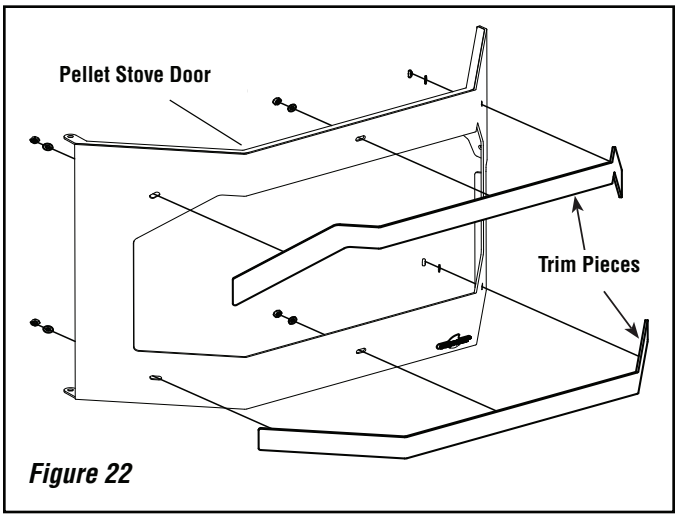


***Figure 22***

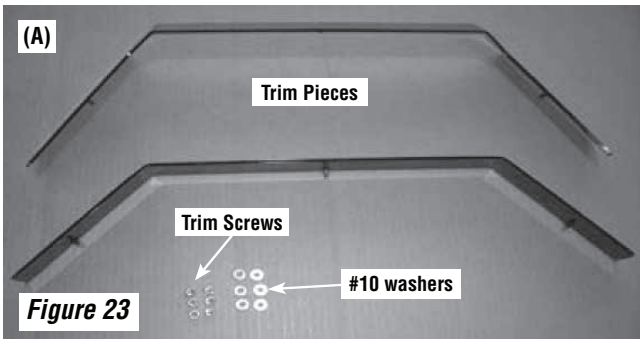


***Figure 23***

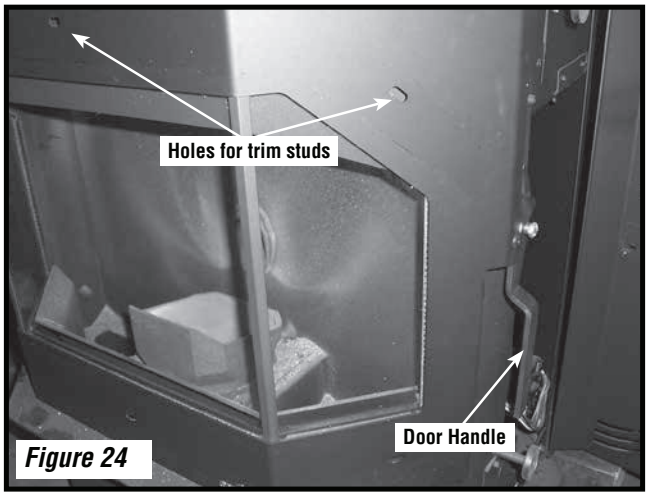


***Figure 24***

***Figure 25***

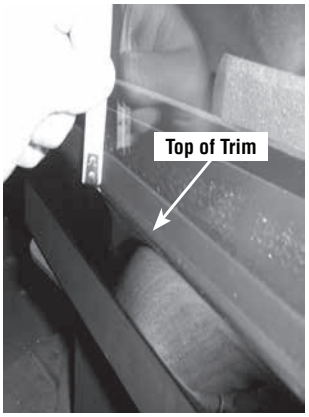


***Figure 26***



NOTE: DIAGRAMS & ILLUSTRATIONS ARE NOT TO SCALE.

4. Place one washer on each stud. Using a 3/8" nut driver, snug up the nuts on each piece of trim. Do not finish tightening the nuts yet. See ***Figure 27***.

5. There should be approximately a 7/8" (22 mm) gap between the top edge of the upper trim and the top edge of the door and a 1-1/2" (38 mm) gap between the bottom trim to the bottom of the door. Visually inspect the alignment of the trim and adjust if necessary. See ***Figure 28***.

6. Finish tightening nuts. **CAUTION - DO NOT OVER-TIGHTEN NUTS, DIMPLING OF THE TRIM WILL OCCUR!!!**

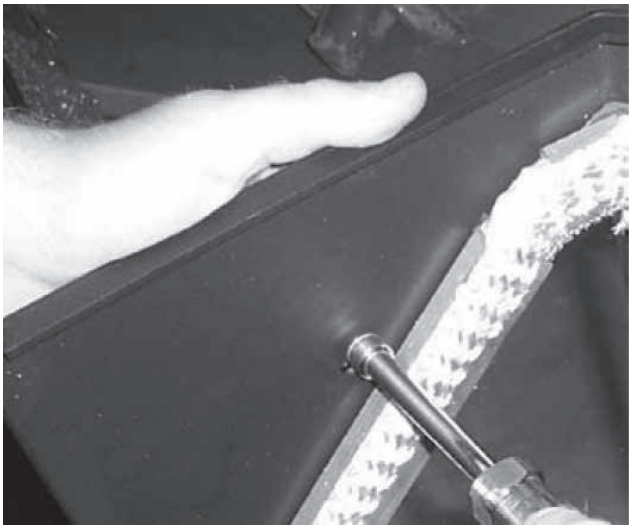


***Figure 27***

***Figure 28***

## Door Grill Installation Instructions
***(ref. form # 775273M)***

**Parts Needed:**
Qty
(4) Button Head Screws (already in place in stove)

**Tools Required:**
Qty
(1) 1/8" allen wrench

**To install the Grill:**
1. Remove the four button head screws from body of the stove with a 1/8" allen wrench. See ***Figure 29***.

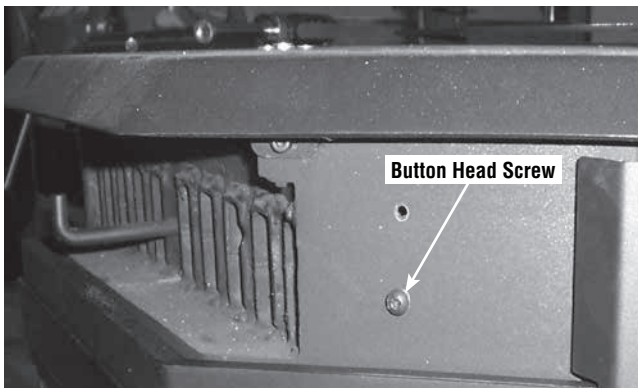



***Figure 29***

2. Pull the scraper rod out, rotate the grill vertically, (with the notch to the left) and slide the grill over the scraper rod (slide the rod between the third and fourth bar). See ***Figure 30***.

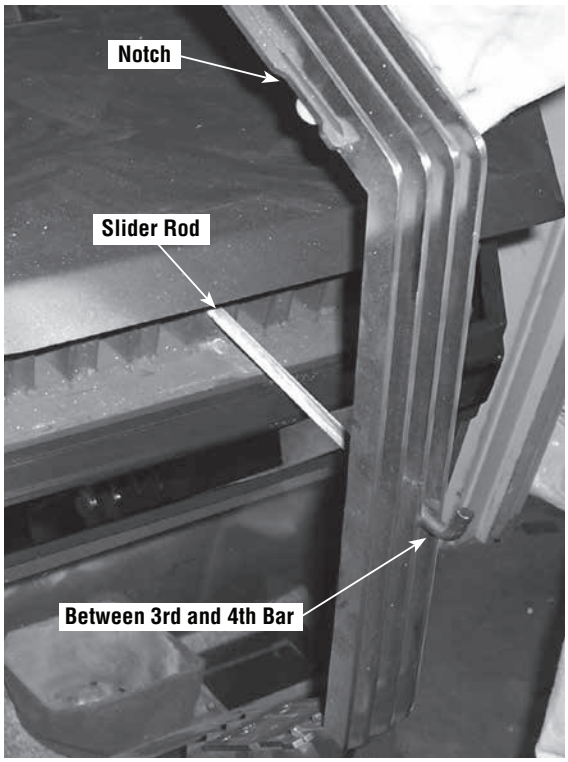



***Figure 30***

3. Rotate the grill back to the horizontal position and re-install the four button head screws through the two holes at each end of the grill and into the stove body. See ***Figure 31***.

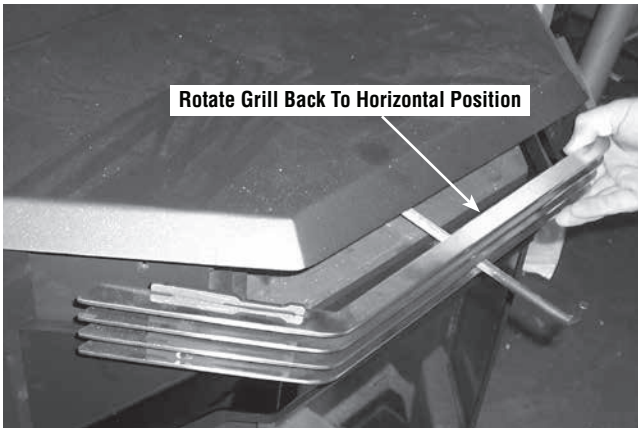



***Figure 31***

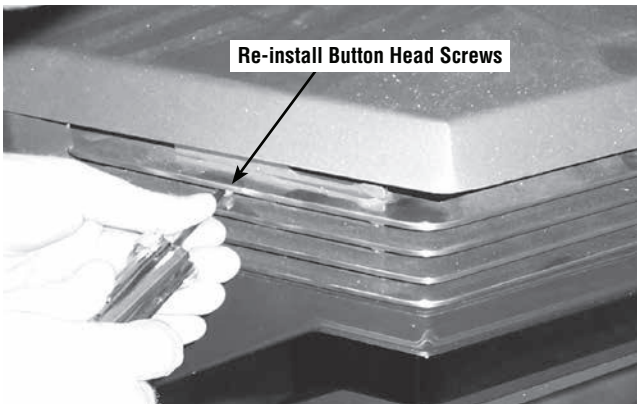



***Figure 32***



NOTE: DIAGRAMS & ILLUSTRATIONS ARE NOT TO SCALE.

## Brick Panel Installation

**Option: Part #79030**

**Kit Contents:**
- Brick Panel (A)
- 4 Tap Tights (B)

**Tools Required:**
- Drill (90° drill recommended)
- #18 drill bit
- 5/32 allen wrench

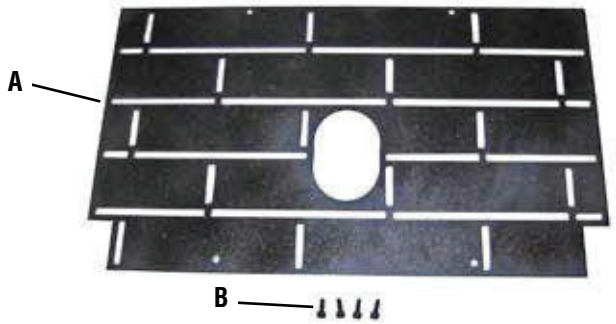



*Figure 33*

***NOTE: The brick panel comes pre-painted with Metallic Black paint. The brick panel may be painted with any color of high-temp paint (paint may discolor with use).***

1. Remove the front door of the pellet stove. To remove the front door, open the two side panels, swing open the front door and lift it up and off of its hinges. Remove the optional log set, if present and the Burn-Pot.

*Figure 34*

2. Remove all pellets and ash from the firebox to ensure a proper fit for the brick panel.

3. Insert the brick panel, top first, as shown in ***Figure 35***. The two cut out corners should be at the bottom.

*Figure 35*

4. Make sure that the brick panel is centered, with equal space on either side of the auger tube. While holding the panel in place, use the drill with a #18 drill bit to drill out the four holes in the back of the firebox, as shown in ***Figure 36***.

*Figure 36*

5. Screw in the four tap tights, included with this kit, using a 5/32 allen wrench.

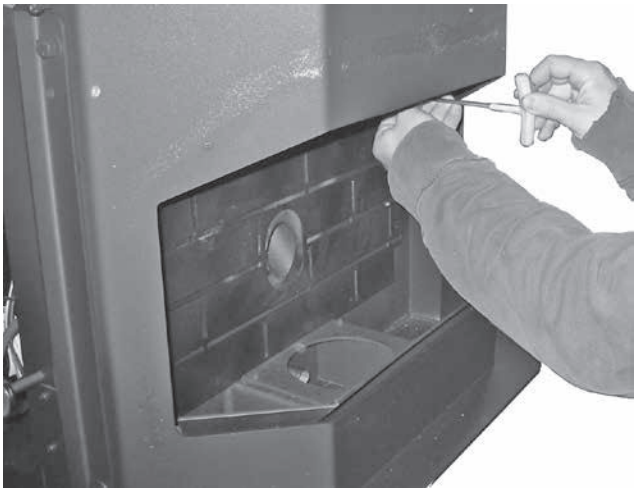


***Figure 37***

6. Replace the Burn-Pot and check that it is firmly in place (if you can rotate the Burn-Pot it is not installed correctly). If present, install the optional log set according to the log set installation instructions (included with your log set).

7. Re-hang the door by reversing the instructions in step 1.

## OPERATION

### Control Board

The control board regulates all functions of the stove. The following is a list of the board's components:

- **Feeding light** - lights up when the auger is feeding pellets into the Burn-Pot.
- **Ready Light** - lights up when stove is ready to operate.
  Igniting Light - lights up when the stove is in the ignition sequence.
- **Start Button** - is pushed to start the ignition sequence after the heat selector knob is turned from off.
  Heat Selector Knob - is turned to off to shut the stove off or turned to a setting from 1 to high to regulate the burn rate.
- **Igniter Fuse** - six amp fuse to protect igniter heating element.
- **Control Fuse** - three amp fuse to protect the control board.

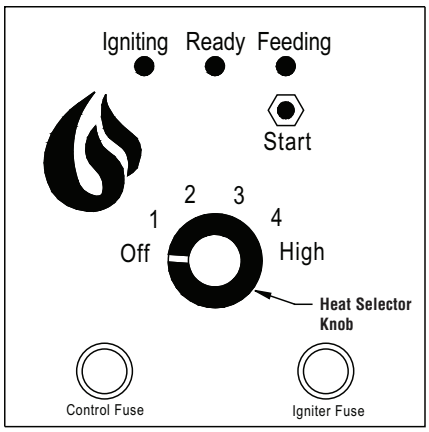



*Figure 42*

### Filling the Hopper

The hopper can be accessed by lifting the lid at the rear of the top of the stove. The hopper will hold 60 pounds of pellets. Remove any contents from the hopper and fill with pellets as follows:

**To fill the hopper when stove is off:**

1. Lift the hopper lid to its full opened position.
2. Fill the hopper with pellets.
3. Check to make sure there are no remaining pellets on top of the hopper that may prevent the hopper lid from fully closing.
4. Close Hopper lid.

**To fill the hopper when stove is in operation:**

1. Repeat steps 1 thru 4 above.
2. When finished, check the burn pot to assure there is substantial combustion taking place to light the pellets once the pellets start feeding after refueling.
3. If combustion is not present in the burn pot then the unit will need to be restarted. This can be done by turning the heat setting dial to off and back to the desired heat setting 1 thru 5. You will then have to press the start button to initiate ignition.

**CAUTION: Failure to confirm pellets in the Burn Pot remain burning after re-fueling may result in smoke escaping from the unit. Smoke escaping the unit can also be a result of ignition of the unit with excessive pellets located inside the burn pot.**

### Lighting

1. Turn the heat selector knob (see ***Figure 42)*** to the heat level desired - 1 through high - and the ready light will turn green.
2. Push the start button and the ignite and feeding lights will come on and the lighting sequence will begin. For about the next 15 minutes the stove will feed pellets cyclically into the Burn-Pot, the combustion blower will come on and the igniter will heat up. During this sequence, some smoke in the firebox is to be expected. After the igniting sequence is complete, the stove will begin burning at the level indicated by the heat selector knob.

***NOTE:*** *Upon the stove's initial light up, or if the stove has previously run out of pellets, the auger feed tube may not contain a sufficient number of pellets to allow the stove to continue burning after the ignition sequence. It may be necessary to push the start button a second time to run the start sequence again. It is important to always empty (when cool) the Burn-Pot of pellets before pushing the start button a second time.*

**⚠ WARNING**

**• Never empty pellets from the Burn-Pot into the hopper. Pellets that may appear to be cool may retain enough heat to ignite other pellets resulting in smoke or fire damage.**

**• DO NOT OVERFIRE THIS STOVE. This may cause serious damage to your stove and void your warranty. It also may create a fire hazard in your home. IF ANY EXTERNAL PART OF THE UNIT BEGINS TO GLOW, YOU ARE OVERFIRING. Immediately slide the knob to the "OFF" position on the control board.**

### Manual Operation

After the stove is burning (see lighting above), the heat selector knob controls the pellet burn rate and the stove's heat output. Turning the knob to setting 1 allows the stove to burn about 1.8 pounds of pellets per hour - about 8,500 BTUs per hour. Turning the knob to high allows the stove to burn 4.7 pounds of pellets per hour - about 39,000 BTUs per hour. Once set, the stove will continue to burn at this rate until shut off.

### Thermostat Operation

This stove will operate with a low voltage thermostat. See ***Page 13*** for instructions on installing the thermostat. Once installed, the thermostat will control the operation of the stove. Important: When connected to a thermostat, it is necessary to push the ignite button for the initial burn, when the electrical flow to the stove is interrupted, if the selector knob is turned to off (and then back on), or if the stove runs out of pellets and therefore shuts off. After the initial ignition sequence, when the thermostat calls for heat (the room temperature is less than the temperature set on the thermostat) and the heat selector knob is not in the off position, the stove will burn at the heat selector knob setting. The higher the setting, the quicker the room will heat up. Once the thermostat no longer calls for heat (the room is up to the desired temperature), the stove will continue to burn for one additional hour at the lowest setting. If the thermostat does not call for heat again during that hour, the stove will shut off. During that hour, if the thermostat calls for heat again, the stove will again burn at the heat selector knob setting until the thermostat no longer calls for heat. If the stove shuts off after that hour it will relight when the thermostat calls for heat.

### Shut Down

**Normal** - To turn the stove off, turn the heat selector knob to off. The fans will continue to operate until the control board completes the shut down cycle.

**Power Outage** - If the stove loses electrical power for less than 10 seconds it will continue to operate. If the power loss is greater than 10 seconds, the stove will go into the ignition sequence and normal operation when the power is restored. If the stove is connected to a thermostat, the stove will not start the ignition sequence until the thermostat calls for heat.

### Paint Curing

This stove has been painted with a high temperature metallic paint. It leaves the factory dry to the touch, but completes the curing process as the stove is used. The paint will cure during the first few times the stove is burned. Also some parts of the appliance may be lightly coated with machining oil. Ventilate the house during these first firings as the paint and oil give off carbon dioxide and unpleasant odors. It is recommended that persons sensitive to an imbalance in the indoor air quality avoid the stove during the curing process.

### Convection Blower Operation

Your Winslow™ PS40GL stove comes equipped with a temperature activated convection blower that extracts heat from the stove. After the stove warms up, a heat activated switch will turn the fan on. The speed of the fan varies with the burn rate of the stove. The fan will continue to extract heat after the stove shuts off and until it is cooled down.

### Operating Sounds

As the Winslow PS40GL stove is burning, a number of normal operational sounds may be heard. Pellets can be heard sliding down the auger tube and into the Burn-Pot. Also, the motor powering the auger can be heard as the control board calls for pellets. Occasionally a loud noise can be heard as the auger cuts a pellet in half. When the blowers come on, the sound of rushing air may be heard. The lower the burn rate the slower the fan operates. Hourly, the combustion blower will blow at a high speed to clean ash from the Burn-Pot.

### Pellet Fuel

Pellet fuel is made from sawdust and scrap wood from many different species of wood. Pellets are either 1/4" or 5/16" in diameter and vary in length (see Fuel Specifications on ***Page 6***). The Winslow PS40GL stove will burn either diameter pellets. Pellets made from hardwoods contain more ash than those made from softwoods. Minerals from ash and sand in the pellets form clinkers under the extreme temperatures in the Burn-Pot. Try burning various brands of pellets until you find one that burns with minimum ash and clinkers.

Once you find a pellet brand that burns well, continue using this brand. High ash fuel increases the frequency of stove cleaning. Fuel with an excessive moisture content may jam the auger assembly.

### CAUTIONS

**INSTALLATION AND REPAIR SHOULD ONLY BE PERFORMED BY A QUALIFIED SERVICE TECHNICIAN. DO NOT ATTEMPT TO SERVICE THE APPLIANCE YOURSELF.**

**Avoid overfiring the stove - do not hand feed pellets to the appliance.**

**Never use gasoline, gasoline-type lantern fuel, kerosene, charcoal lighter fluid, or similar liquids to start or fresh up a fire in this heater. Keep all such liquids well away from the heater while it is in use.**

**For your safety, do not install or operate your Winslow PS40GL stove without first reading and understanding this manual. Any installation or operation of the appliance deviating from that which is stated in this instruction manual WILL void the warranty and may be hazardous.**

**Due to high temperatures, the stove should be located out of traffic areas and away from furniture and draperies. Children and adults should be alerted to the hazards of high surface temperature and should stay away to avoid burns or clothing ignition. Young children should be carefully supervised when they are in the same room as the Winslow PS40GL stove. Clothing or any other flammable material should not be placed on or near the stove. Any grill, panel, or glass removed for service MUST be replaced prior to operating the stove.**

**Do not operate appliance with the glass front removed, cracked, or broken. Replacement of the glass should be done by a qualified service technician.**

**IHP, its employees, or any of its representatives assume no responsibility for any damages caused by an inoperable, inadequate, or unsafe condition as a result of any improper operation, service, or installation procedures, whether direct or indirect.**

**The appliance, when installed, must be electrically grounded in accordance with local codes or, in the absence of local codes, with the National Electrical Code, ANSI/NFPA 70.**



NOTE: DIAGRAMS & ILLUSTRATIONS ARE NOT TO SCALE.

## CLEANING AND MAINTENANCE

**IMPORTANT CAUTIONS:**

- **UNPLUG POWER CORD AND ENSURE APPLIANCE IS COLD BEFORE PERFORMING ANY MAINTENANCE WORK.**
- **Some brands of pellets produce more ash and clinkers than others. Therefore the frequency of performing the following cleaning procedures depends to a great degree on the quality of the pellets burned.**
- **Not cleaning this unit will cause it to burn poorly and will void your warranty for this appliance.**
- **When removing ash build-up, use an approved ash vacuum only. A cleaning brush can be used to loosen any ash build-up before vacuuming. DO NOT USE A STANDARD HOUSEHOLD VACUUM OR "SHOP VAC" AS THE FILTERS WILL LEAK THE FINE PARTICLES OF ASH INTO THE HOME.**
- **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.**

**Required Cleaning Schedule After Number Of Bags Burned:**

Burn-Pot = 10 bags
Ash Drawer = 20 bags
Flue passageways = 50 bags
Combustion Blower = 100 bags
Blower = 100 bags

***NOTES*:**

- ***Cleaning schedule will vary depending on quality of pellets used. Burning high ash pellets will require more frequent cleaning.***
- *Using a drop cloth is recommended as some ash may spill onto the floor during the cleaning process*

### Burn-Pot Cleaning

**(Recommended Frequency of 1 – 7 days*)**

The combustion blower comes on at high speed once an hour to blow the by-products of combustion out of the Burn-Pot. However, the Burn-Pot should be cleaned more thoroughly after burning about 10 bags of pellets. The Burn-Pot has a number of holes in the bottom and sides that provide combustion air to the pellets. The extreme temperatures in the Burn-Pot can cause the impurities in the pellets to form ash and clinkers. When the stove is cool, open the front door and lift out the cast iron Burn-Pot. Scrape the inner bottom and sides of the pot with a screwdriver to remove all ash and clinkers from these surfaces. Make sure all the holes in the pot are open. Place the Burn-Pot in the hole from which it was removed. Make sure the high side of the pot is rotated toward the front of the stove (see ***Figure 43***). Push the Burn-Pot down so surface A is tight against the steel supporting the pot. Do not substitute any other grate or pot for use in this stove.

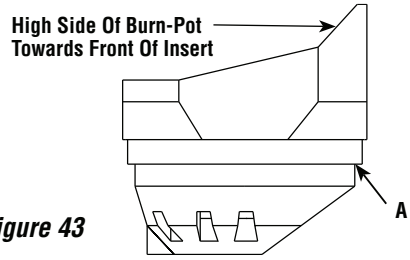



***Figure 43***

### Cleaning Glass

**CAUTION: Do not open the front door when the stove is hot. To open the door, follow the first two steps listed in Front Door Removal (see *Page 24).* Clean the glass using a soft cloth or paper towel and household glass cleaner or wood stove window cleaner. A commercial glass cleaner designed for stoves is recommended. Do not use abrasive cleaners. A damp cloth with a small amount of ash from the firebox can also be used to clean the glass.**

**CAUTION: BE CAREFUL NOT TO ABUSE THE DOOR ASSEMBLY BY STRIKING OR SLAMMING IT. IF THE DOOR ASSEMBLY OR GLASS IS BROKEN OR DAMAGED, THEY MUST BE REPLACED BEFORE HEATER CAN BE SAFELY OPERATED. USE ONLY COMPONENTS PROVIDED BY THE MANUFACTURER AS REPLACEMENT PARTS.**

### Ash Drawer Removal and Cleaning

**(Recommended Frequency of 2 days to 2 weeks*)**

**CAUTION: Do not remove the ash drawer when the stove is hot. To remove the ash drawer, swing open the left and right side doors. Rotate the lever on latch B (see *Figure 44)* out from the stove to release the ash drawer. Do the same with the latch on the right side of the stove. Pull the ash drawer forward and away from the stove.**

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

Reinstall the ash drawer by inserting the drawer in the stove and refastening the left and right latches securely. Note that if the ash drawer does not seal tightly to the stove, the control board may detect a leak and shut the stove down.

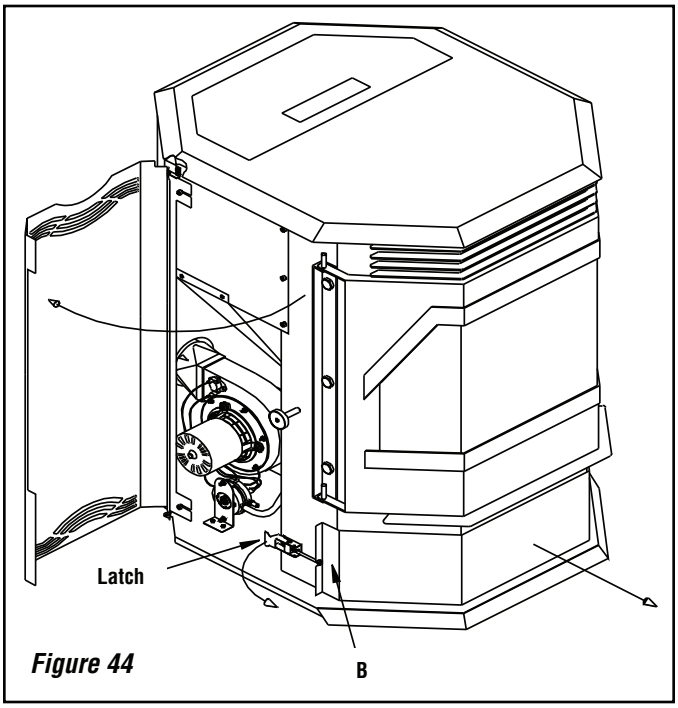



***Figure 44***

**Burning fuel with a high ash content or an improperly adjusted damper may require more frequent cleaning and stove maintenance.*

### Inspect Gaskets

Inspect the condition of the rope gasket around the door, window and ash drawer, periodically, and replace if necessary. Inspect the die-cut gaskets on the access covers (B and C in ***Figure 45A***) and replace if necessary.

### Cleaning the Heat Exchanger

**(Recommended Frequency of 2 days to 2 weeks*)**

**CAUTION: Do not operate the heat exchange scraper when the stove is hot. Located at the center of the grill on the top front of the stove is a bent rod that is attached to a scraper on the heat exchange tubes. To remove ash build-up and maintain efficient heat extraction from the stove, this rod should be pulled in and out.**

### Cleaning the Flue Gas Passageways

**(Recommended Frequency of Yearly*)**

Cleaning the flue gas passageways should be done at least once a year. Burning high ash pellets may require this cleaning to be done more often. Clean these passageways only when the stove and ash are cold - do not start a fire in the vacuum cleaner by vacuuming up hot ash. On each side of the stove there are two access covers (see B and C in ***Figure 47***) that can be removed by unscrewing the two 5/32" allen head screws. Insert a cleaning brush in the openings to loosen any ash build-up and use an approved ash vacuum cleaner to remove the loosened ash. Reinstall the covers when cleaning is complete.

There are also two more access holes located behind the ash drawer. Remove the ash drawer (see previous page) and loosen the two 5/16" screws with a 1/2" socket or wrench, the screws are shown as D in ***Figure 46A and 46B*** *on* ***Page 23***. Rotate the covers over the access holes and use a brush and vacuum to clean the ash. Rotate the covers back over the holes and tighten the screws.

**⚠ WARNING**

**DO NOT USE BRUSH ON HOT STOVE**

**Flue Passageways Cleaning Procedure**

**(Recommended Frequency of Yearly*)**

1. Open both the right and left side door to locate side clean-out covers (see B and C in ***Figure 45A***).
2. There is one upper and one lower, 1" x 2", clean-out covers on both the left and right sides (see B and C in ***Figures 45A, 45B and 45C***).
3. Using a 5/32" allen remove allen head screws on each cover to access the flue passage way cavities.
4. Using an ash vac, clean out both flue passageways on both the left and right side of the stove starting at the top then going to the lower.
5. Once the flue passageways are clear of ash build-up, reinstall the four cover plates.
6. Remove the ash drawer (see ***Figures 44***) to locate the lower left and right tear drop shaped flue passageways (see D in ***Figures 46A and 46B***).
7. Using a 3/8" open end wrench or ratchet with 3/8" socket, loosen the screws at the top of each cover.
8. Rotate the clean-out covers off to the side to access the flue passage way cavity (see D in ***Figure 46B***). Using an ash vac, clean out all ash build-up.
9. Rotate the covers back to original position and tighten the screws.

**Burning fuel with a high ash content or an improperly adjusted damper may require more frequent cleaning and stove maintenance.*

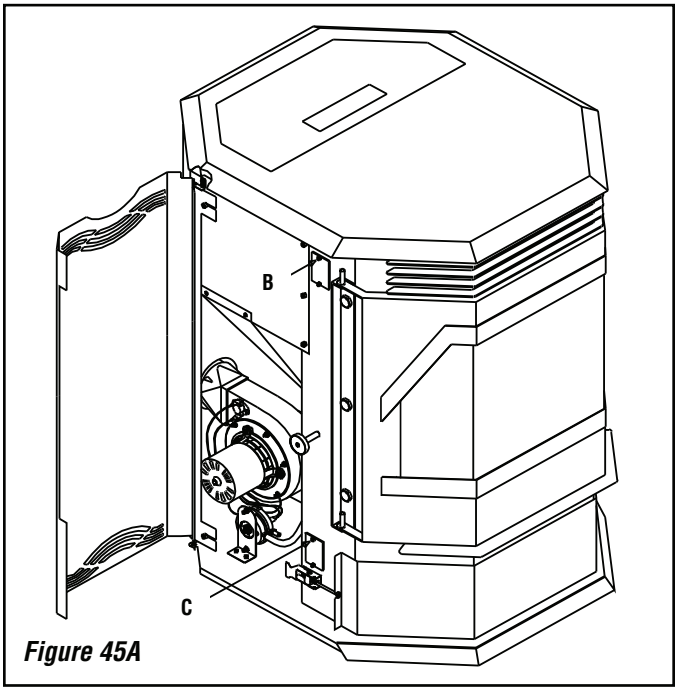



***Figure 45A***

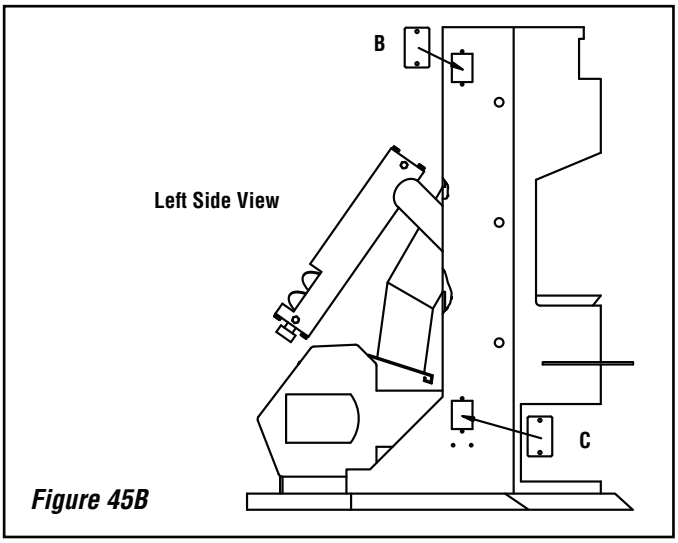



***Figure 45B***

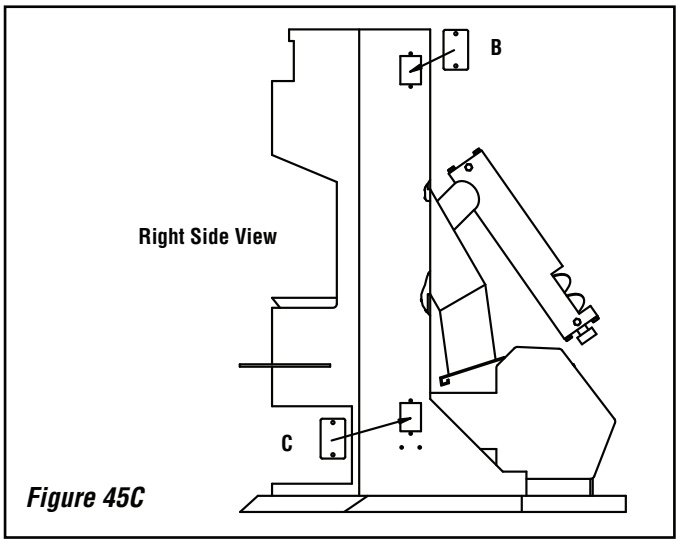



***Figure 45C***



NOTE: DIAGRAMS & ILLUSTRATIONS ARE NOT TO SCALE.

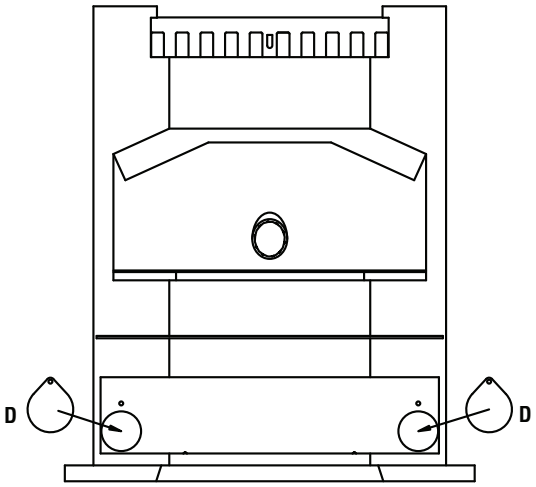



*Figure 46A*

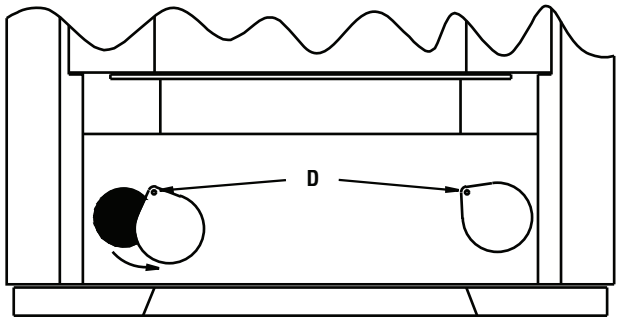



*Figure 46B* **Front View Looking into the Ash Drawer Cavity with the Ash Drawer Removed**

## Cleaning the Combustion Blower

**(Recommended Frequency of 1 year or after every 100 bags of fuel used*)**

To clean the combustion blower, remove the six nuts labeled A in ***Figure 47*** with an 11/32" wrench. After removing these nuts, the motor with fan attached can be pulled from the fan housing. The fan blades and the fan housing can be vacuumed once the motor is removed. Before reinstalling, vacuum out the blower housing and flue passageway leading to the combustion blower. When reinstalling the motor, a new gasket may need to be installed between the motor and the fan housing. To complete the reinstallation, place the motor back on the fan housing and reinstall the six nuts. Make sure the motor's green ground wire is secured under one of the nuts.

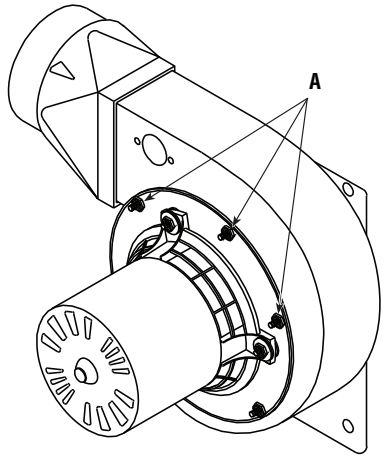



*Figure 47*

## Cleaning the Vent Pipe

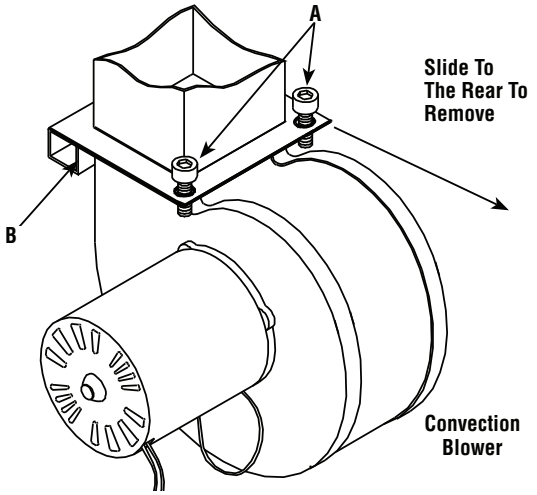
**(Recommended Frequency of Yearly*)**

**Soot and Fly-Ash: Formation and Need for Removal -** The products of combustion will contain small particles of fly-ash. The fly-ash will collect in the exhaust venting system and restrict the flow of the flue gases. Incomplete combustion, such as occurs during start-up, shutdown, or incorrect operation of the room heater will lead to some soot formation which will collect in the exhaust venting system. The exhaust venting system should be inspected at least once every year to determine if cleaning is necessary. Sweep the pipe as needed. A tee and clean-out in the vent system attached to the stove's flue collar will facilitate this cleaning.

## Cleaning the Convection Blower

**(Recommended Frequency of Yearly*)**

To clean the convection blower, remove the right side door (see the following page). Disconnect the stove power cord from the electrical outlet. Using a 5/32" allen wrench loosen the two screws (A in ***Figure 48)*** securing the blower to the blower duct (loosen screws only - do not remove). Slide the blower to the rear - disengaging it from the blower duct. A vacuum can be used to remove any dust accumulation on the blower's blades or inside the blower duct. Caution should be used not to damage the blower's blades during cleaning. To reinstall the blower, slide the blower back into the retaining lip (B) and tighten screws (A).



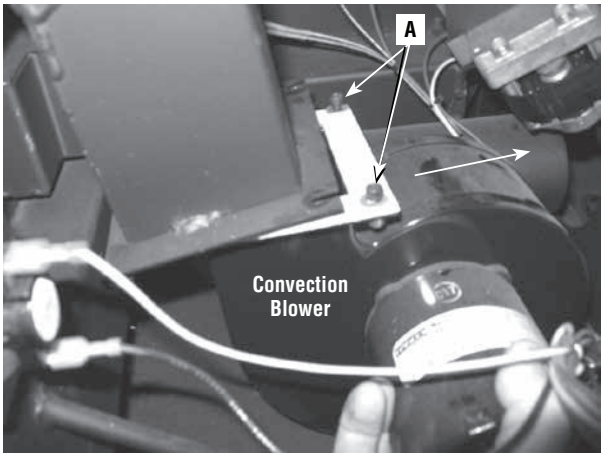




*Figure 48*

**Burning fuel with a high ash content or an improperly adjusted damper may require more frequent cleaning and stove maintenance.*



NOTE: DIAGRAMS & ILLUSTRATIONS ARE NOT TO SCALE.

## Proof of Fire Switch

**(Recommended Frequency of 1 year or after every 100 bags of fuel used*)**

This switch needs to be removed and cleaned after every 100 bags of fuel burned.

**Cleaning Procedure:**

1. **UNPLUG STOVE!**
2. Locate the switch on the combustion blower (see ***Figure 52***).
3. Using a flat-head screwdriver, remove the 2 screws which secures the switch to the blower housing.
4. Using a dry cloth, wipe off any flyash build-up on the sensor portion of the switch.
5. Reinstall switch. Ensure wires are properly connected to the switch and the connectors are not making contact with the blower housing. Close side panel.

***NOTE: Failure to clean the proof of fire switch when needed may result in nuisance shut-downs. When heavy ash, creosote or soot are built up on the proof of fire switch, it may require cleaning with a medium abrasive pad or sheet. These heavy build ups insulate the heat sensing area of the switch and keep the switch from functioning as intended.***

## Front Door Removal

**CAUTION: Do not open the front door when the stove is hot.**

To remove the door, swing the left and right side doors A open. Pull the front door handle B to the front and swing the front door open. Lift the front door up and off the hinges as shown in C in ***Figure 49***. To reinstall the door repeat the steps in reverse order.

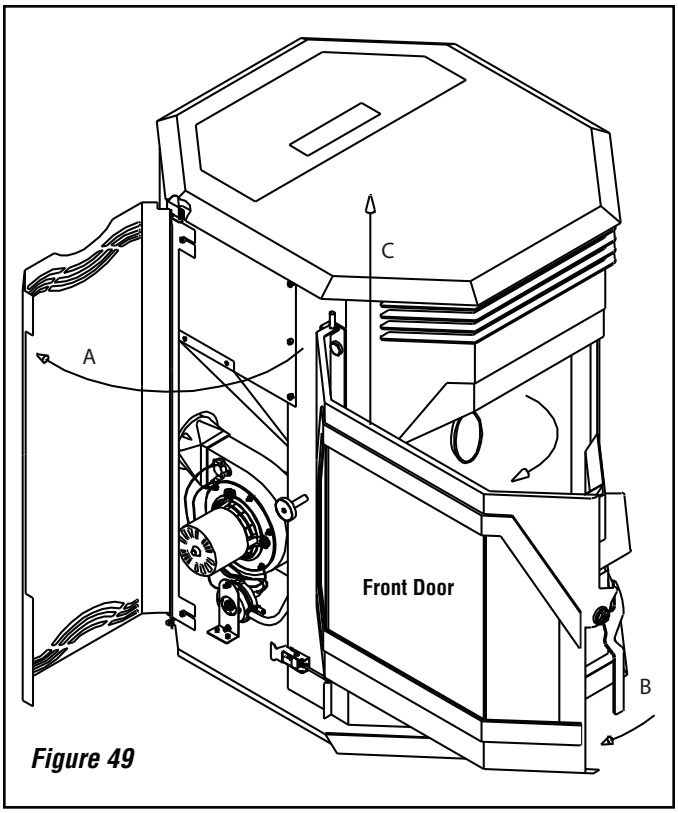



***Figure 49***

## Side Door Removal

To remove the door,

1 Swing the door open,

2 Lift the door up and

3. Pull the bottom of the door out and down - pulling the top hinge pin out of the retaining hole in the top hinge bracket.

To reinstall the door, slide the pin on the top of the door up and into the hole in the upper hinge bracket. Slide the pin on the bottom of the door into the hole in the pedestal base and rotate the door closed.

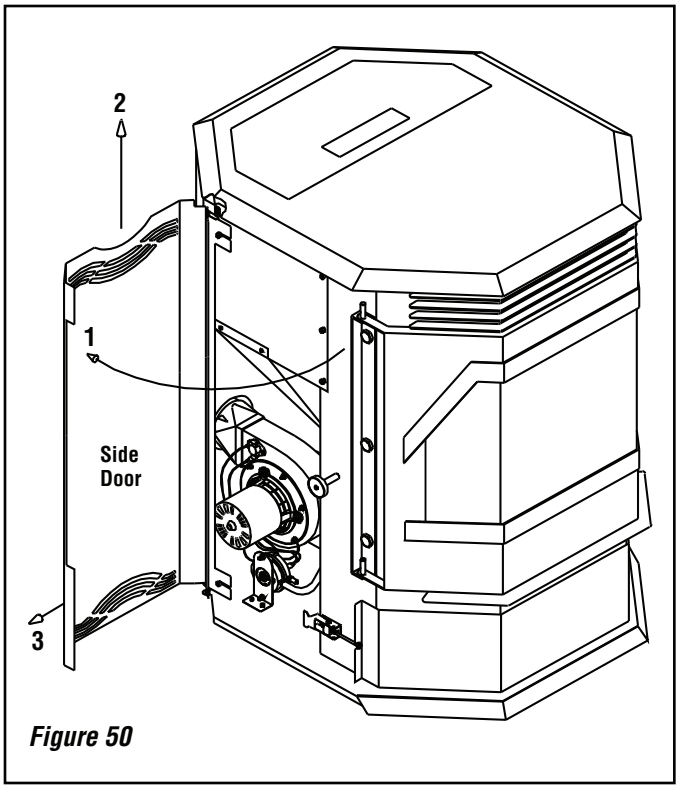



***Figure 50***

## Back Removal and Lower Cover Plate

**To remove the back:**

1. Remove the left and right side panels (see the previous page).
2. If the stove is connected to the vent pipe, loosen the four 5/32" allen head screws (see A in ***Figure 51***) securing the lower cover plate beneath the flue outlet, lift the plate slightly and pull the plate off.
3. Loosen the two screws B and C shown in ***Figure 52*** and the corresponding two screws on the other side of the stove. The back can now be pulled to the rear and off of the stove.

To reinstall the back, follow the steps just listed - but in the reverse order.

**Burning fuel with a high ash content or an improperly adjusted damper may require more frequent cleaning and stove maintenance.*



NOTE: DIAGRAMS & ILLUSTRATIONS ARE NOT TO SCALE.

## COMPONENT INFORMATION

The following is a list of components and their functions.

### Igniter
The Winslow™ PS40GL stove comes equipped with an automatic igniter for lighting the fuel when the stove is in the lighting mode. The igniter superheats air that is pulled through the Burn-Pot by the combustion blower to light the fuel. The igniter remains energized for the first seven minutes of the lighting sequence.

### Vacuum Switch
The Winslow PS40GL stove has a vacuum switch located behind the left door, fastened to the pedestal base (see D in ***Figure 52***). If a low pressure is created in the firebox by a leak, opening the front door, a blocked flue, or unsealed ash drawer, the vacuum switch will sense it and cause the stove to go into a shutdown mode.

### Auger and Auger Motor
The 1.25 RPM auger motor turns the auger, lifting pellets up the auger tube. The pellets are then dropped down a tube and into the burn-pot. The auger is controlled by the control board.

### Over Temperature Snap Switch (Manual Reset)
(Opens at 225° F) This switch is installed on the convection blower (see F in ***Figure 53***) and shuts the stove down if it senses excessive temperatures. This snap switch has a reset button on it and will not allow the stove to start up until the reset button has been pushed.

### Proof of Fire Snap Switch
(Closes at 140°F) This switch is installed on the combustion blower (see E in ***Figure 52***) and shuts the stove down if it senses no fire in the Burn-Pot.

### Convection Blower Snap Switch
(Closes at 120°F) This switch is installed on the right rear of the firebox and turns the convection blower on when the stove gets up to temperature.

### Hopper Lid Switch
It is located on the back right side of the hopper (on the outside of the hopper). It detects whether the hopper lid is open and will turn off the auger motor if the hopper lid is not properly closed. When opening the hopper when refueling, do not allow the hopper lid to remain open too long or the fire may extinguish. **NEVER DISCONNECT OR BYPASS THIS SWITCH FOR ANY REASON.**

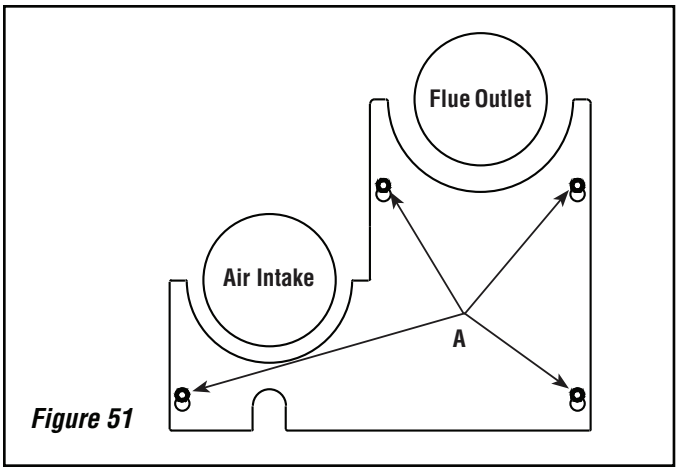


*Figure 51*

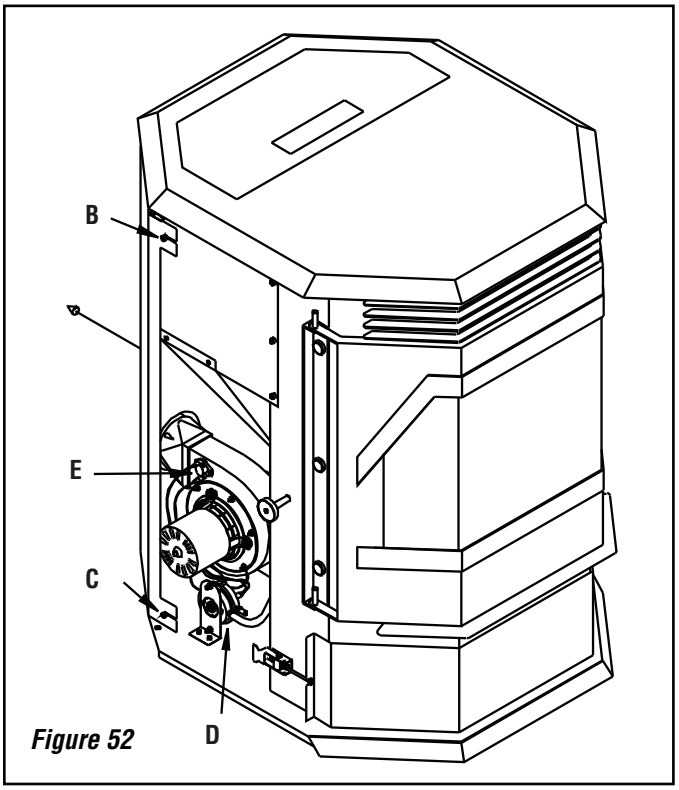


*Figure 52*

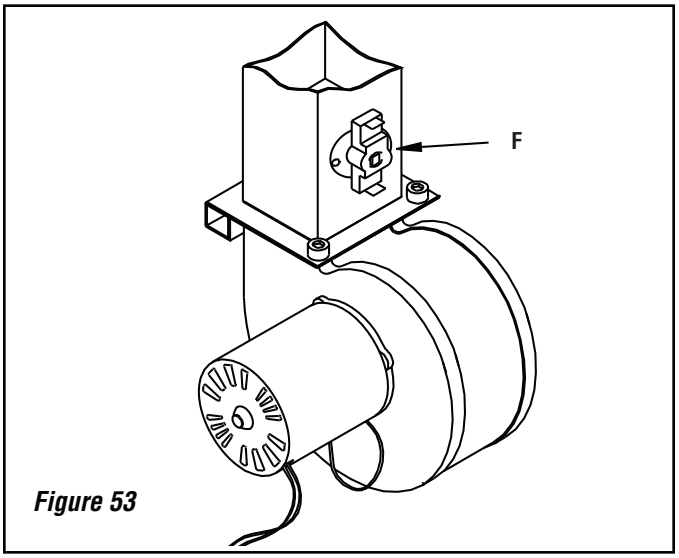


*Figure 53*



NOTE: DIAGRAMS & ILLUSTRATIONS ARE NOT TO SCALE.

**Draft Adjuster - Adjustment Procedure**

The Winslow™ PS40GL stove has a draft adjuster located at the left side of the stove directly in front of the combustion blower. Should the stove installation require long runs of vent pipe, a situation may be created where excessive combustion air is flowing through the firebox and causing the fuel to burn faster than it can be delivered to the Burn-Pot. Should this happen, the draft can be slowed down by the adjuster. The stove is shipped with the adjuster in the fully open position. To slow the draft down, loosen the 5/32" allen head screw (A in ***Figure 54***) and move the adjuster handle toward the center of the stove. Retighten the screw when the desired adjustment is reached.

## Draft Adjuster

The draft adjuster controls the amount of combustion air that is delivered to the firebox (see ***Figure 54***).

It will be necessary to monitor the appearance of the flame during the first 4-8 bags of pellets. If the flame is smoky red or orange with evidence of soot at the top of the flame, the draft adjuster will need to be adjusted to deliver more combustion air. If the flame is "short" at the higher burn rates, and appears to burn the pellets out of the pot faster than they can be resupplied, or there are significant variations of flame height within a single burn setting, the draft adjuster may need to be adjusted to deliver less combustion air.

After the draft adjuster is adjusted, re-evaluate the appearance of the flame. It may be necessary to continue adjusting it in increments until proper combustion is achieved (the flame should become a brighter yellow and begin to "dance").

Once the draft adjuster has been properly set, and if the routine maintenance is performed as needed, the draft adjuster should not require readjustment unless you are changing from a premium grade pellet to a standard or high ash pellet, in which case the draft adjuster may need to be moved outward from center of the stove to help prevent the accumulation of ash or clinkers in the Burn-Pot.

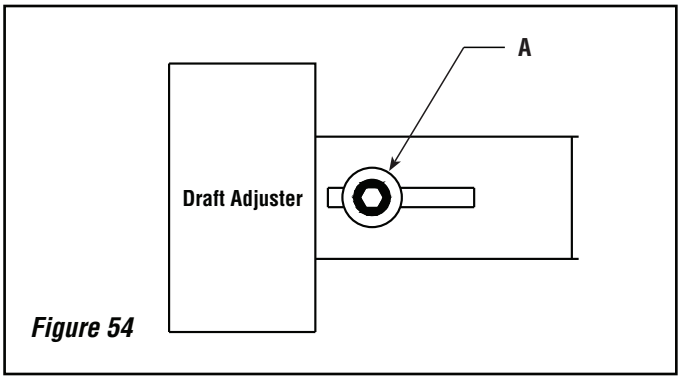



*Figure 54*

## Wiring Diagram

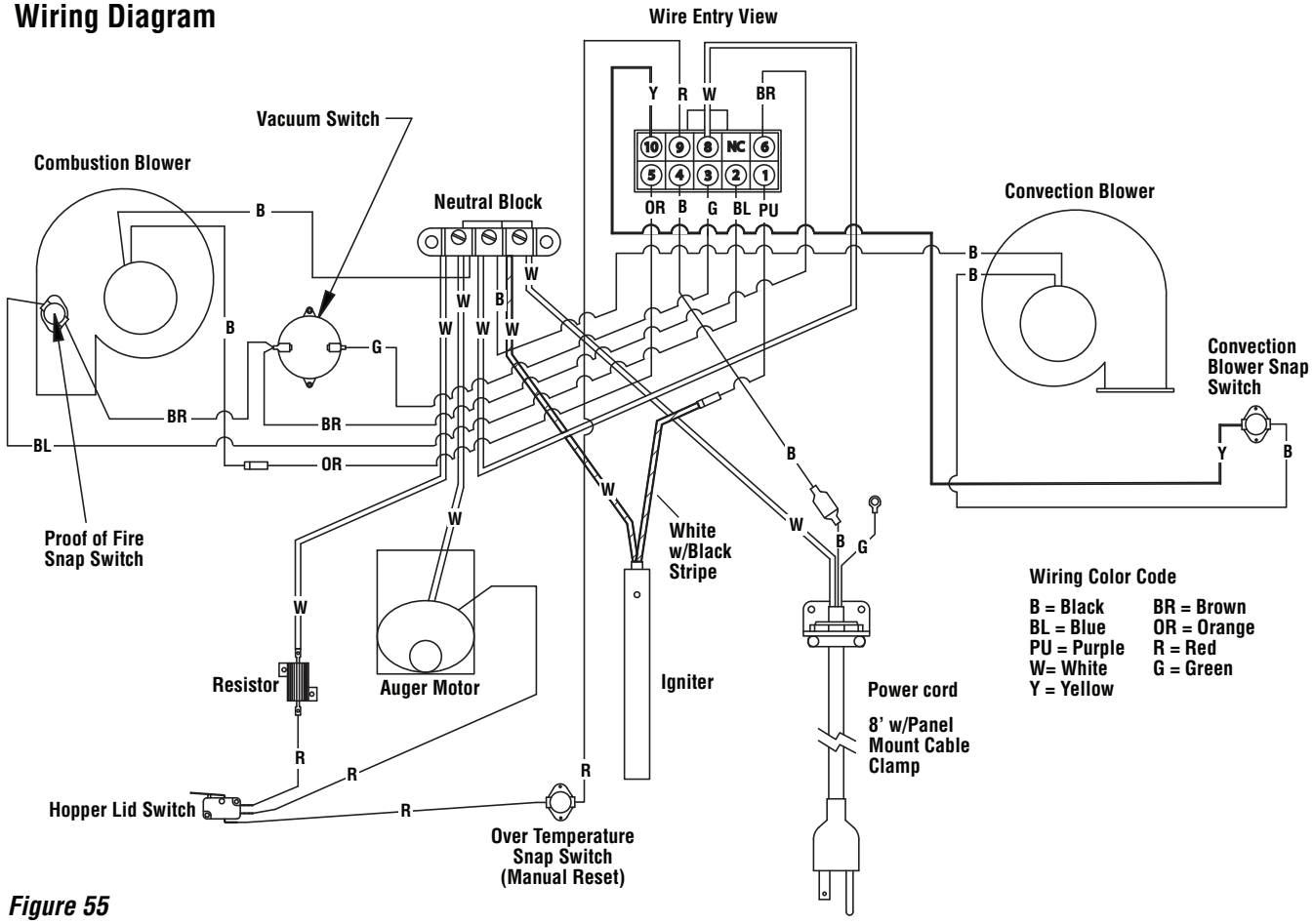



*Figure 55*



NOTE: DIAGRAMS & ILLUSTRATIONS ARE NOT TO SCALE.

## DIAGNOSTIC CODES

If the stove operates abnormally, the ready light on the control board will signal the nature of the abnormal operation. The following is a list of possible signals or codes:

**Ready light is constant red**
**Ready light flashes red 1 short and 1 long blink**
**Ready light flashes red 2 short blinks**
**Ready light flashes red 2 long blinks**

**Ignition Failure**
**Vacuum Switch Open**
**Proof of Fire Snap Switch Open**
**Over Temperature Snap Switch Open**

### Troubleshooting

| **Ignition Failure -** Code - Ready light is constant red and ignite light flashes two short blinks | |
|---|---|
| **Possible Problem** | **Solution** |
| Hopper is out of pellets | Fill the hopper with pellets |
| Auger tube was not full of pellets when start button was pushed | When cool, empty pellets in Burn-Pot and push start button again |
| Burn-Pot dirty - holes plugged | Clean the Burn-Pot |
| Igniter not functioning | Replace the igniter |
| Igniter fuse blown | Replace 6 amp fuse located on front of the control board |

| **Control Board has no Power -** When selector knob is turned no lights light up | |
|---|---|
| **Possible Problem** | **Solution** |
| Power cord is not plugged in | Plug in power cord |
| Board fuse blown | Replace 3 amp fuse located on front of control board |
| Wall outlet not energized | Check circuit breaker panel |
| Board broken, damaged, or defective | Replace the control board |

| **Vacuum Switch Shuts Stove Down -** Code - Ready light flashes red 1 short and 1 long blink | |
|---|---|
| **Possible Problem** | **Solution** |
| Front door is not sealing | Latch or adjust the front door or replace door gasket |
| Ash drawer is not sealing | Close latches, adjust latches, or replace drawer gaskets |
| Flue gas passageways restricted | Clean the passageways (see ***Page 22***) |
| Vent pipe restricted | Clean the vent pipe (see ***Page 23***) |
| Vacuum hose plugged | Clean or replace the vacuum hose |
| Vacuum switch defective | Replace the vacuum switch |

| **Proof of Fire Snap Switch Shuts Stove Down -** Code - Ready light flashes red 2 short blinks | |
|---|---|
| **Possible Problem** | **Solution** |
| Hopper is out of pellets | Fill the hopper with pellets |
| Auger tube was not full of pellets when start button was pushed | When cool, empty pellets in Burn-Pot and push start button again |
| Snap switch* defective | Replace the snap switch |
| “Proof of fire” switch is dirty | Clean switch per instructions on ***Page 24*** |

| Over Temperature Snap Switch Shuts Stove Down - Code - Ready light flashes red 2 long blinks | |
|---|---|
| **Possible Problem** | **Solution** |
| Convection blower not running | Blower dirty, blower snap switch bad, or blower broken |
| Flue passageways or vent restricted | Clean passageways or vent pipe (see ***Pages 22 and 23***) |
| Snap switch* defective | Replace the snap switch* |
| * ***NOTE: The snap switch has a reset button that must be pushed before stove will function (see Page 25).*** | |

| Orange Sooty Flames - Glass Turns Black | |
|---|---|
| **Possible Problem** | **Solution** |
| Burn-Pot is dirty | Clean the Burn-Pot |
| Vent pipe restricted | Clean the vent pipe |
| Flue gas passageways restricted | Clean the passageways |
| Combustion blower dirty | Clean the combustion blower |
| Burning improper fuel | Burn only wood pellet fuel |

| Pellets Not Feeding | |
|---|---|
| **Possible Problem** | **Solution** |
| Hopper empty | Fill the hopper |
| Auger jammed | Call service technician |
| Flue gas passageways restricted | Call service technician |
| Auger motor not operating | Call service technician |
| Hopper lid is open | Close Hopper Lid |
| Hopper lid switch is faulty | Replace hopper lid switch if determined to be faulty |

## REPLACEMENT PARTS - WINSLOW™ PS40GL

**Contact an IHP dealer to obtain any of these parts. Never use substitute materials. Use of non-approved parts can result in poor performance and safety hazards.**

| Cat. No. | Description |
|---|---|
| H6006 | Adjustable Latch Pin |
| H3111 | Ash Clean Out Cover, 2 Per Stove |
| H3113 | Ash Drawer |
| H5912 | Ash Drawer Latch W/hardware 2 Per Stove |
| H5886 | Auger Motor |
| H5921 | Auger W/lower Bearing |
| H5875 | Blower Snap Switch |
| H5856 | Cast Burn-Pot |
| H5899 | Clean-out Cover Gasket |
| H6018 | Combustion Blower |
| H5900 | Combustion Gasket Housing To Stove |
| H5903 | Combustion Gasket Motor To Housing |
| H5917 | Control Board Access Latch |
| H5978 | Control Board |
| 79020 | Control Board Fuse 3amp, 5pk |
| H5884 | Convection Blower |
| H5902 | Convection Blower Gasket |
| H5904 | Door Gasket 1 Ft (7ft Per Door) |
| H3112 | Door Handle Assembly |
| 79040 | Door W/glass (No Trim) |
| H6037 | Flue Restrictor W/hardware |
| H5911 | Hopper Door Wire |
| 79021 | Igniter Fuse 6amp, 5pk |
| H6005 | Igniter W/hose Clamp |
| H5891 | Overtemp Switch |
| H5660 | Power Cord |
| H5887 | Proof Of Fire Switch |
| H3114 | Side Ash Cover Clean Out |
| H6174 | Side Door, Left |
| H5916 | Side Door Magnet |
| H5833 | Side Door W/control Access, Right |
| H5832 | Stove Back |
| H6035 | Stove Back Cover Plate |
| H6036 | Top Side Door Bracket, Right |
| H6175 | Top Side Door Bracket, Left |
| H5898 | Vacuum Line 12” Piece |
| H5889 | Vacuum Switch |
| H5892 | Wiring Harness |
| H8276 | Hopper Switch w/ Bracket |
| H8277 | Hopper Switch Wires w/ Resister |
| H8280 | Outer Top For Hopper Lid Switch |

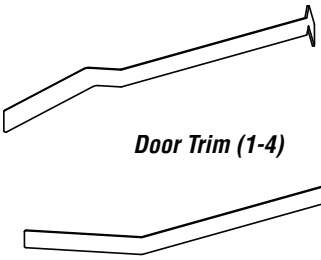
## ACCESSORIES

| Cat. No. | Model | Description |
|---|---|---|
| F4349 | PS40GL | Winslow GL Pellet Stove |

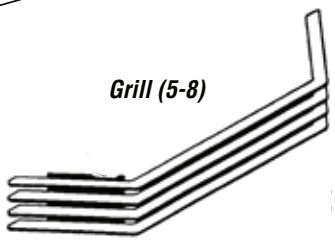
| Door Trim (required - sold separately) *(ref. Form # 775274M)* | | | |
|---|---|---|---|
| **Item No.** | **Cat. No.** | **Model** | **Description** |
| **1** | **79038** | **P40DT-B** | **Black** |
| **2** | **79037** | **P40DT-N** | **Nickel** |
| **3** | **79035** | **P40DT-BRN** | **Brushed Nickel** |
| **4** | **79036** | **P40DT-BLN** | **Black Nickel** |

| Grill Kits (required - sold separately) *(ref. Form # 775273M)* | | | |
|---|---|---|---|
| **5** | **79000** | **P40G-B** | **Black** |
| **6** | **79002** | **P40G-N** | **Nickel** |
| **7** | **79022** | **P40G-BN** | **Brushed Nickel** |
| **8** | **79039** | **P40G-BLN** | **Black Nickel** |

***NOTE: The form numbers referenced are the part numbers of the instruction sheets included in kits.***



***Door Trim (1-4)***



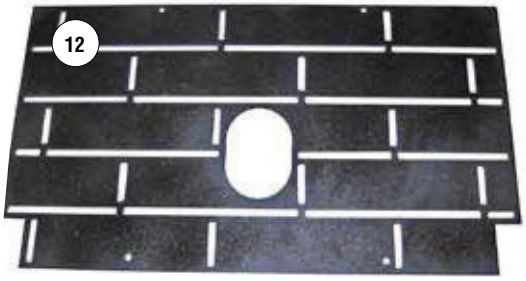
***Grill (5-8)***



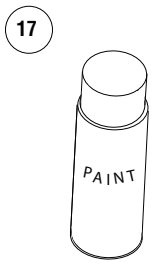
NOTE: DIAGRAMS & ILLUSTRATIONS ARE NOT TO SCALE.

## ACCESSORIES

| Common Accessories | | | |
|---|---|---|---|
| Item# | Cat. No. | Model | Description |
| 12 | 79030 | P40BRICK | Brick Panel *(ref. Form # 775276M)* |
| 13a | H8860 | RC-S-1 | Remote, Two Button, Timer, On/Off or Timer Mode |
| 13b | H8861 | RCL-S-STAT | Remote, LCD Stat, Thermostat, On/Off |
| 13c | H8865 | RC-S-TOUCH | Remote, Touch Screen, Thermostat, On/Off |
| 13d | F2236 | RCKit4001 | Remote, Simple On/Off |
| 14a | H8863 | WS-S-TMR | Wall Switch, Countdown Timer |
| 14b | H8864 | WS-S-TSTAT | Wall Switch, Thermostat |
| 15 | H6907 | P40DIAG | Diagnostic Tool *(ref. Form # 775293M)* |
| 16 | 12050004 | ------ | Cleaning Brush *(ref. Form # 14720036)* |
| 17 | H8159 | TSPK – B | Touch-up Paint Kit, Metallic Black, 12 oz Spray Can |











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IRONSTRIKE® HEAT FOR LIFE

Manufactured by/Fabriqué par:
INNOVATIVE HEARTH PRODUCTS
1502 14TH ST NW
AUBURN, WA., USA 98001

Tested to: ASTM E2779 & ASTM E2515 standards, 2020 NSPS Compliant
Certification test emissions value 1.47 g/hr per EPA Method 28R
This wood heater needs periodic inspection and repair for proper operation. Consult the owner's manual for further information. It is against federal regulations to operate this wood heater in a manner inconsistent with the operating instructions in the owner's manual.
Inspect and clean exhaust venting system frequently.
Install and use only in accordance with PS40GL installation and operating instructions.
Refer to local building codes and the installation manual for precautions required for passing the exhaust venting system through a combustible wall or ceiling.
Exhaust vent type is listed type "L" or "PL".
Contact local building or fire officials, or authority having jurisdiction, about restrictions and installation inspection in your area.
For use with only wood pellet fuel or a 50/50 wood pellet fuel/corn kernel mixture.
Do not connect this unit to a chimney serving another appliance.
Keep viewing and ash removal doors tightly closed during operation.
Input rating: 4.5 pounds per hour.
Electrical rating: 115 VAC, 60 Hz.
Route power cord away from unit. Do not route cord under or in front of appliance.
DANGER: Risk of electric shock. Disconnect power before servicing unit.
Replace glass only with ceramic glass.
Alcove Dimensions: Minimum alcove height is 41", minimum width is 42.25" and maximum depth is 48".
For Vertical and Alternative Installations See the PS40GL Installation and Operating Instructions.

Testé selon: ASTM E2779 et ASTM E2515, 2020 NSPS
Valeur d'émission du test d'homologation 1,47 g/h (EPA Method 28R).
Cet appareil de chauffage au bois doit être inspecté et entretenu périodiquement pour fonctionner correctement. Voir le manuel du propriétaire pour plus d'information. L'utilisation de cet appareil de chauffage au bois de manière incompatible avec les instructions du manuel du propriétaire constitue une infraction aux régulations fédérales.
Examinez et nettoyez souvent le système de ventilation du gaz d'échappement.
N'installez, ni utilisez que selon les instructions d'installation et de fonctionnement PS40GL.
Voyez les règlements de bâtiment dans votre région et les instructions du fabricant pour les précautions éxigées pour faire passer une cheminée dans un mur ou un plafond combustible.
Le système de ventilation du gaz d'échappement est classé type "L" ou "PL".
Contactez vos autorités de batiment ou vos pompiers, ou l'autorité en titre, à propos des limitations et l'inspection de l'installation dans votre région.
N'utilisez qu'avec les boulettes de combustible en bois, ou avec un mélange 50/50 des boulettes de combustible en bois et les grains de maïs.
Ne liez pas cette unité à une cheminée qui aliment un autre appareil électrique.
Tenez la porte de vue bien fermée pendant l'operation.
Tenez les portes de vue et d'enlèvement des cendres bien fermées pendant l'operation.
Classement d'alimentation: 4.5 livres par heure.
Classement électrique: 115 VAC, 60 Hz.
Faites passer le cordon d'électricité de l'unité. Ne faites pas passer le cordon sous ou devant l'appareil.
AVERTISSEMENT: Risque de choc électrique.
Débranchez le courant avant de faire réviser l'unité.
Ne remplacez le verre qu'avec la verre céramique.
Dimensions de renfoncement: L'hauteur minimum du renfoncement est 41", le largeur minimum est 42.25", et la profondeur maximum est 48".
Pour des installations verticales et alternatives, voyez les instructions d'installation et de fonctionnement PS40GL.

Date of Manufacture / Date De Fabrication

| 2023 | 2024 | 2025 | JAN JANV | FEB FEVR | MAR MARS | APR AVR | MAY MAI | JUN JUIN | JUL JUIL | AUG AOÛT | SEP SEPT | OCT OCT | NOV NOV | DEC DEC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ |

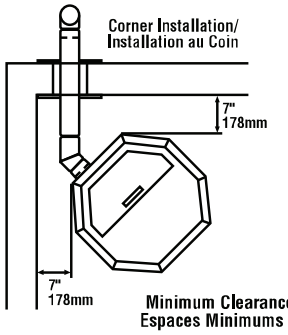
U.S. ENVIRONMENTAL PROTECTION AGENCY
Certified to comply with 2020 particulate emission standards using crib wood.

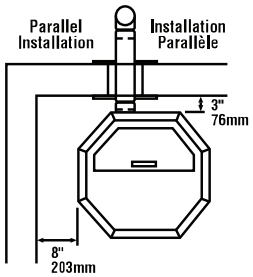
Part No./ No. pièce #900429-00 Rev. 1. 02/2020 DO NOT REMOVE THIS LABEL Made in U.S.A.

Room Heater, Pellet Fuel-Burning Type, Also For Use In Mobile Homes
Radiateur de chambre, type boulette de combustible, à utiliser aussi dans les mobile homes.

Model/Modèle: Winslow ™ PS40GL
Serial Number Numé ro de Série PS40GL-

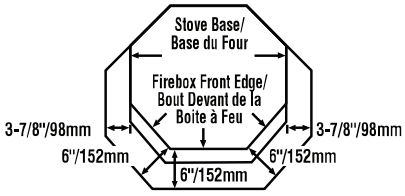
PFS C US
Report No./Numéro de Rapport 14-187




Minimum Clearances to Combustible Surfaces in Inches/
Espaces Minimums aux Surfaces Combustibles en Pouces

Floor Protector must be non-combustible and of the minimum size indicated./
Protecteur du plancher doit être non-combustible et de la taille minimum indiquée.




Floor Protector/
Protecteur de Plancher

**CAUTION:** HOT WHILE IN OPERATION. DO NOT TOUCH, KEEP CHILDREN, CLOTHING AND FURNITURE AWAY. CONTACT MAY CAUSE SKIN BURNS. SEE NAMEPLATE AND INSTRUCTIONS. DO NOT OVERFIRE. IF HEATER OR CHIMNEY CONNECTOR GLOWS, YOU ARE OVERFIRING. INSPECT AND CLEAN CHIMNEY AND CONNECTOR FREQUENTLY. UNDER CERTAIN CONDITIONS OF USE, CREOSOTE BUILDUP MAY OCCUR RAPIDLY. DO NOT USE GRATE OR ELEVATE FIRE - BUILD WOOD FIRE DIRECTLY ON HEARTH. FEED DOOR MUST BE CLOSED DURING FIRING EXCEPT WHEN ADDING FUEL. KEEP ASH DOOR CLOSED TO AVOID EXCESS HEAT. DANGER: RISK OF ELECTRICAL SHOCK. DISCONNECT POWER BEFORE SERVICING UNIT. FOR USE WITH SOLID WOOD FUEL ONLY.

**ATTENTION:** L'APPAREIL EST CHAUD LORS DE L'OPÉRATION. NE PAS Y TOUCHER. RISQUE DE BRÛLURES CUTANÉES. TENIR LES ENFANTS, LES MATÉRIAUX COMBUSTIBLES, LES VÊTEMENTS ET LES MEUBLES ELOIGNÉS DE L'APPAREIL. VOIR LA PLAQUE SIGNALÉTIQUE ET LES DIRECTIVES. NE PAS SURCHAUFFER L'APPAREIL. SI L'APPAREIL OU LE TUYAU DE CHEMINÉE ROUGIT, VOUS SURCHAUFFEZ. INSPECTER ET NETTOYER LA CHEMINÉE ET LE TUYAU CONNECTEUR FRÉQUEMMENT. SOUS CERTAINES CONDITIONS, IL SE PEUT QUE LE CRÉOSOTE S'ACCUMULE RAPIDEMENT. NE SURÉLEVER PAS LE FEU À L'AIDE D'UN CHENET. DÉPOSER LES BÛCHES DE BOIS DIRECTEMENT SUR L'ÂTRE. LA PORTE DOIT ÊTRE FERMÉE PENDANT L'USAGE SAUF POUR ALIMENTER LE FEU. GARDER LA PORTE "BY-PASS" (CENDRES) FERMÉE POUR ÉVITER DE SURCHAUFFER. DANGER: RISQUES DE DÉCHARGE ÉLECTRIQUE. DÉCONNECTER LE FIL ÉLECTRIQUE DE LA PRISE DE CONTACT AVANT LE SERVICE. NE PAS FAIRE PASSER LE FIL ÉLECTRIQUE SOUS OU EN AVANT DE L'APPAREIL. POUR USAGE AVEC LE BOIS SEULEMENT



NOTE: DIAGRAMS & ILLUSTRATIONS ARE NOT TO SCALE.

# Innovative Hearth Products
# IronStrike® Pellet Stove and Insert
# Limited Lifetime Warranty

**THE WARRANTY**
Innovative Hearth Products ("IHP") Limited Lifetime Warranty warrants your IronStrike® brand pellet fueled stove or insert ("Product") to be free from defects in materials and workmanship at the time of manufacture. The Product body, heat exchange tubes and ceramic glass carry the Limited Lifetime Warranty. Ceramic glass carries the Limited Lifetime Warranty against thermal breakage only. After installation, if covered components manufactured by IHP are found to be defective in materials or workmanship during the Limited Lifetime Warranty period and while the Product remains at the site of the original installation, IHP will, at its option, repair or replace the covered components. If repair or replacement is not commercially practical, IHP will, at its option, refund the purchase price or the wholesale price of the IHP Product, whichever is applicable.

IHP will also pay IHP prevailing labor rates, as determined in its sole discretion, incurred in repairing or replacing such components for up to five years. THERE ARE EXCLUSIONS AND LIMITATIONS to this Limited Lifetime Warranty as described herein.

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

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

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

**Accessories** – Repair or replacement for 90 days from the date of installation
**Cast iron burn pot** - Replacement for five years from the date of installation
**Electrical components** – Repair or replacement for two years from the date of installation
**Firebrick/refractory** – Replacement for 90 days from the date of installation
**Gaskets** – Repair or replacement for one year from the date of installation
**Gold & nickel plating** - Replacement for two years from date of installation. Excludes tarnishing
**Steel burn grate** - Replacement for two years from the date of installation
**Logs** – Replacement for 90 days from the date of installation
**Labor** – Prevailing IHP labor rates apply for the warranty period of the component

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

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

IHP will not be responsible for: (a) damages caused by normal wear and tear, accident, riot, fire, flood or acts of God; (b) damages caused by abuse, negligence, misuse, or unauthorized alteration or repair of the Product affecting its stability or performance (The Product must be subjected to normal use. The use of fuels other than those outlined in the operation manual provided with the Product will void all warranties and liabilities.); (c) damages caused by failing to provide proper maintenance and service in accordance with the instructions provided with the Product; (d) damages, repairs or inefficiency resulting from faulty installation or application of the Product.

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

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

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

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

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

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

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

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

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




**P/N 900215-00, Rev. B 02/2018**

**Innovative Hearth Products**
**1769 East Lawrence Street • Russellville, AL 35654**

## WARRANTY

Your pellet stove is covered by a limited warranty (provided with appliance). Please read the warranty to be familiar with its coverage.

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

## PRODUCT REFERENCE INFORMATION

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

## REPLACEMENT PARTS

See ***Page 29*** for a complete replacement parts list. Use only parts supplied from the manufacturer.

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

When ordering repair parts, always give the following information:

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

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

**IHP**
**1769 East Lawrence Street**
**Russellville, AL 35654**
**visit us at IronStrike.us.com**

Model Number _____

Serial Number _____

Date Installed _____

Dealer's Name _____

Dealer's Phone Number _____

NATIONAL FIREPLACE INSTITUTE NFI CERTIFIED www.nficertified.org

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

Wood Energy Technical Training www.wettinc.ca

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

INNOVATIVE HEARTH PRODUCTS





P900141-00

Established 1974

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A2LA ACCREDITED
CERTIFICATE #1550.01

PFS Teco
11785 SE Hwy 212 STE#305
Clackamas, OR 97015

Report Number: DIRI01A05026181218

## A2LA ACCREDITED
## CERTIFICATE OF CALIBRATION WITH DATA

### INSTRUMENT INFORMATION

| Item | Make | Model | Serial Number | Customer ID | Location |
|---|---|---|---|---|---|
| Scale | Rice Lake | IQ+355E-2A x 100( | A05026 | #041 | Lab |
| **Units** | **Readability** | **SOP** | **Cal Date** | **Last Cal Date** | **Cal Due Date** |
| lbs | 0.1 | QC033 | 12/18/18 | 6/13/18 | 12/2019 |

### FUNCTIONAL CHECKS

| SHIFT TEST | LINEARITY | REPEATABILITY | ENVIRONMENTAL CONDITIONS |
|---|---|---|---|
| Test Wt: 250 Tol: 1 | Test Wt: HB44 Tol: HB44 | Test Wt: 100 Tol: 1 | ☐ Good ☑ Fair ☐ Poor |
| As-Found: Pass:☑ Fail:☐ | As-Found: Pass:☑ Fail:☐ | As-Found: Pass:☑ Fail:☐ | Temperature: 16.9°C |
| As-Left: Pass:☑ Fail:☐ | As-Left: Pass:☑ Fail:☐ | As-Left: Pass:☑ Fail:☐ | |

### CALIBRATION DATA

| Standard | As-Found | As-Left | Expanded Uncertainty |
|---|---|---|---|
| 1000 | 999.3 | 1000.2 | 0.12 |
| 700 | 699.7 | 700.1 | 0.12 |
| 500 | 499.7 | 500.1 | 0.08 |
| 300 | 299.8 | 300.1 | 0.08 |
| 100 | 99.9 | 100.0 | 0.05 |
| 50 | 50.0 | 50.0 | 0.05 |

### CALIBRATION STANDARDS

| Item | Make | Model | Serial Number | Cal Date | Cal Due Date | NIST ID |
|---|---|---|---|---|---|---|
| Avoirdupois Cast W | Rice Lake | 25 and 50lb | PWO990-CA | 11/24/17 | 11/2019 | 20172265 |

**Permanent Information Concerning this Equipment:**
12 month calibration cycle. 2000lb platform.

**Comments/Information Concerning this Calibration**
12/18 - RH = 67%. Adjusted span.

**Report prepared/reviewed by:** ServiceTechDC **Date:** 12/28/18 **Technician:** R.Kauble **Signature:**



The uncertainty is calculated according to the ISO Guide to the Expression of Uncertainty in Measurement and includes the uncertainty of standards used combined with the observed standard deviation of the unit under test. The uncertainty is expanded with a k factor of 2 for an approximate 95% level of confidence. Instruments listed above were calibrated using standards traceable to the National Institute of Standards and Technology (NIST). Calibration data reflect results at the time and location of calibration. Calibration data should be reviewed to insure that the instrument is performing to its required accuracy.

# Dry Gas Meter Calibration

| | |
|---|---|
| Meter Manufacturer: | Apex |
| Model: | XC-60-ED |
| Lab ID #: | 53 |
| Serial #: | 1902130 |
| Calibration Date: | 6/14/2019 |
| Calibration Expiration: | 12/14/2019 |
| Barometric Pressure: | 29.97 in. Hg |

| Reference Standard DGM | |
|---|---|
| Manufacturer: | Apex |
| Model: | SK25DA |
| Lab ID#: | 47 |
| Serial #: | 1101001 |
| Calibration Expiration Date: | 3/13/2020 |
| Calibration γ Factor: | 0.998 |

| Unit Under Test Previous Calibration | |
|---|---|
| Date | 12/17/2018 |
| γ Factor: | 1.004 |
| Allowable Deviation (±5%): | 0.0502 |
| Actual Deviation: | 0.01 |
| Result: | PASS |

| Calibration Data | Run 1 | Run 2 | Run 3 |
|---|---|---|---|
| Standard DGM Initial Volume (L) | 0.000 | 0.000 | 0.000 |
| Standard DGM Final Volume (L) | 147.373 | 142.005 | 143.359 |
| Standard DGM Temperature (°F) | 71.0 | 72.0 | 72.0 |
| Standard DGM Pressure (in $H_2O$) | 0.00 | 0.00 | 0.0 |
| DGM Initial Volume ($ft^3$) | 0.000 | 0.000 | 0.000 |
| DGM Final Volume ($ft^3$) | 5.227 | 5.114 | 5.224 |
| DGM Temperature (°F) | 78.0 | 85.0 | 91.0 |
| DGM Pressure (in $H_2O$) | 2.67 | 2.00 | 1.5 |
| Time (min) | 33.0 | 36.0 | 42.0 |
| Net Volume for Standard DGM ($ft^3$) | 5.204 | 5.015 | 5.063 |
| Net Volume for DGM ($ft^3$) | 5.227 | 5.114 | 5.224 |

| | | | |
|---|---|---|---|
| Dry Gas Meter γ Factor | 1.000 | 0.998 | 0.998 |
| γ Factor Deviation From Average | 1.000 | 0.998 | 0.998 |

Average Gas Meter γ Factor: 0.999

Calculations:

1. Deviation = |Average value for all runs - current run value|
2. $\gamma = [V_{std} \times (\gamma_{Std}) \times (P_{bar}+P_{std}/13.6) \times (T_{DGM} + 460)] / [V_{DGM} \times (T_{std} + 460) \times (P_{bar} + P_{DGM}/ 13.6)]$

Standard Reference Meter is calibrated to NIST traceable standards. Uncertainty of measurement is ±0.5%.

# Dry Gas Meter Calibration

| | |
|---|---|
| Meter Manufacturer: | Apex |
| Model: | XC-60-ED |
| Lab ID #: | 54 |
| Serial #: | 1902133 |
| Calibration Date: | 6/14/2019 |
| Calibration Expiration: | 12/14/2019 |
| Barometric Pressure: | 29.97 in. Hg |

| Reference Standard DGM | |
|---|---|
| Manufacturer: | Apex |
| Model: | SK25DA |
| Lab ID#: | 47 |
| Serial #: | 1101001 |
| Calibration Expiration Date: | 3/13/2020 |
| Calibration γ Factor: | 0.998 |

| Unit Under Test Previous Calibration | |
|---|---|
| Date | 12/17/2018 |
| γ Factor: | 1.000 |
| Allowable Deviation (±5%): | 0.05 |
| Actual Deviation: | 0.00 |
| Result: | PASS |

| Calibration Data | Run 1 | Run 2 | Run 3 |
|---|---|---|---|
| Standard DGM Initial Volume (L) | 0.000 | 0.000 | 0.000 |
| Standard DGM Final Volume (L) | 139.967 | 143.359 | 139.656 |
| Standard DGM Temperature (°F) | 72.0 | 73.0 | 75.0 |
| Standard DGM Pressure (in $H_2O$) | 0.00 | 0.00 | 0.0 |
| DGM Initial Volume ($ft^3$) | 0.000 | 0.000 | 0.000 |
| DGM Final Volume ($ft^3$) | 5.098 | 5.242 | 5.114 |
| DGM Temperature (°F) | 92.0 | 93.0 | 95.0 |
| DGM Pressure (in $H_2O$) | 2.99 | 2.02 | 1.3 |
| Time (min) | 30.0 | 37.0 | 45.0 |
| Net Volume for Standard DGM ($ft^3$) | 4.943 | 5.063 | 4.932 |
| Net Volume for DGM ($ft^3$) | 5.098 | 5.242 | 5.114 |

| | | | |
|---|---|---|---|
| Dry Gas Meter γ Factor | 0.997 | 0.995 | 0.995 |
| γ Factor Deviation From Average | 0.997 | 0.995 | 0.995 |

Average Gas Meter γ Factor: 0.996

Calculations:

1. Deviation = |Average value for all runs - current run value|
2. $\gamma = [V_{std} \times (\gamma_{Std}) \times (P_{bar}+P_{std}/13.6) \times (T_{DGM} + 460)] / [V_{DGM} \times (T_{std} + 460) \times (P_{bar} + P_{DGM}/ 13.6)]$

Standard Reference Meter is calibrated to NIST traceable standards. Uncertainty of measurement is ±0.5%.

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Calibration Services

Certificate Number: 1550.01

Laboratory code: 115953

# *Report of Calibration*

Firm: Dirigo Laboratories
Address: 11785 SE Hwy 212, Ste 305
City/State/Zip: Clackamas, OR 97015

Test Completed: 03/21/17
Submitted By: John Steiner
Traceable Number: 20170468

Test Item: 200mg and 100mg Individual Weights
Serial No.: Listed in Table

Manufacturer: Troemner

| Material | Assumed Density | Range | Tolerance Class |
|---|---|---|---|
| Stainless Steel | 7.95 g/cm$^3$ | 200mg & 100mg | ASTM Class 1 |

**Method and Traceability**
The procedure used for this calibration is NIST IR 6969 SOP 4 Double Substitution Weighing Design. Standards used for comparison are traceable to the National Institute of Standards and Technology (reports on file) and are part of a comprehensive measurement assurance program for ensuring continued accuracy and traceability within the level of uncertainty reported. The Traceable Number listed above is Traceable to National Standards through an unbroken chain of comparison each having stated uncertainties.

**Standards Used:**
100g to 1mg Working Standards Were Calibrated: 03/03/17 Due: 03/31/18 Standards ID: 723318
**Mass Comparators Used:** MET-05 **Tested by:** D. Thompson

**Conventional Mass:** "The conventional value of the result of weighing a body in air is equal to the mass of a standard, of conventionally chosen density, at a conventionally chosen temperature, which balances this body at this reference temperature in air of conventionally chosen density. International Recommendation 33 (OIML IR 33 1973, 1979). "Conventional Value of the Result of Weighing in Air" **(Previously known as "Apparent Mass vs. 8.0g/cm$^3$).**

**Uncertainty Statement:** The uncertainty conforms to the ISO Guide to the Expressions of Uncertainty in Measurement. Uncertainty as reported is based on a coverage factor k=2 for an approximate 95 percent level of uncertainty. Uncertainty components include the standard deviation of the process, the uncertainty of the standard used, an uncertainty component associated with the potential drift of the standard used, and the estimated uncertainty related to measuring and determining the air buoyancy effect.

**Conventional Mass Values are listed on page 2 of this report.**



**Quality Control Services, Inc.**
**Metrology Laboratory Manager**
E-mail dthompson@qc-services.com

Date: 03/21/17

Signature David S. Thompson

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Calibration Services

Certificate Number: 1550.01

Laboratory code: 115953

# *Report of Calibration*

Firm: Dirigo Laboratories
Address: 11785 SE Hwy 212, Ste 305
City/State/Zip: Clackamas, OR 97015

Test Completed: 03/21/17
Submitted By: John Steiner
Traceable Number: 20170468

Test Item: 200mg and 100mg Individual Weights
Serial No.: Listed in Table

Manufacturer: Troemner

Laboratory Environment at time of test

| Temperature °C | Pressure mmHg | Humidity %RH |
|---|---|---|
| 21.967 | 753.44 | 49.44 |

**Conventional Mass Value**

| Nominal Value | As Found grams | As Found Correction* (mg) | Uncertainty (mg) | Tolerance (mg) |
|---|---|---|---|---|
| 200mg SN 1000101395 | 0.2000061 | 0.0061 | 0.0026 | 0.01 |
| 100mg SN 1000126267 | 0.1000046 | 0.0046 | 0.0028 | 0.01 |

*Correction is the difference between the conventional mass value of a weight and its nominal value.

**Comments:** These weights were new from the manufacturer and were within ASTM Class 1 tolerances As Found. No adjustments or changes were made so As Found values should be considered to be As Left values.

**Accredited by the American Association for Laboratory Accreditation (A2LA) under Calibration Laboratory Code 115953 and Certificate Number 1550.01. This laboratory meets the requirements of ISO/IEC 17025:2005 *General Requirements for the Competence of Testing and Calibration Laboratories.* This laboratory also meets the requirements of ANSI/NCSL Z540-1-1994 and any additional program requirements in the field of calibration.**



**Quality Control Services, Inc.**
**Metrology Laboratory Manager**
E-mail dthompson@qc-services.com

Date: 03/21/17

Signature David S. Thompson

Established 1974

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ACCREDITED
Calibration Services
Certificate Number: 1550.01
Laboratory code: 115953

## *Report of Calibration*

Firm: Dirigo Laboratories
Address: 11785 SE Hwy 212, Ste 305
City/State/Zip: Clackamas, OR 97015

Test Completed: 01/15/16
Purchase Order: 1001
Traceable Number: 20152489

Test Item: 20lb and 10lb Individual Grip Handle Weights
Serial No.: Listed in Table

Manufacturer: Unknown

Laboratory Environment at time of test

| Temperature °C | Pressure mmHg | Humidity %RH |
|---|---|---|
| 21.448 | 760.64 | 44.58 |

**Conventional Mass Value**

| Nominal Value | As Found pounds | As Found Correction* (mg) | Uncertainty (mg) | Tolerance (mg) |
|---|---|---|---|---|
| 20lb #098 | 19.9995450 | -206.4 | 6.4 | 910 |
| 10lb #097 | 10.0006510 | 295.3 | 5.1 | 450 |
| 10lb #051 | 10.0003421 | 155.2 | 5.1 | 450 |

*Correction is the difference between the conventional mass value of a weight and its nominal value.

**Comments:** These weights were received in good condition and were within NIST Handbook 105-1 Class F tolerances As Found. No adjustments or changes were made so As Found values should be considered to be As Left values.

**Accredited by the American Association for Laboratory Accreditation (A2LA) under Calibration Laboratory Code 115953 and Certificate Number 1550.01. This laboratory meets the requirements of ISO/IEC 17025:2005 *General Requirements for the Competence of Testing and Calibration Laboratories.* This laboratory also meets the requirements of ANSI/NCSL Z540-1-1994 and any additional program requirements in the field of calibration.**



**Quality Control Services, Inc.**
**Metrology Laboratory Manager**
E-mail dthompson@qc-services.com

Date: 01/15/16

Signature David S. Thompson

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# QUALITY CONTROL SERVICES

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ACCREDITED
CERTIFICATE #1550.01

PFS Teco
11785 SE Hwy 212 STE#305
Clackamas, OR 97015

Report Number: DIRI0134307497181218

## A2LA ACCREDITED
## CERTIFICATE OF CALIBRATION WITH DATA

### INSTRUMENT INFORMATION

| Item | Make | Model | Serial Number | Customer ID | Location |
|---|---|---|---|---|---|
| Balance | Sartorius | ENTRIS224-1S | 34307497 | #107 | Lab |
| **Units** | **Readability** | **SOP** | **Cal Date** | **Last Cal Date** | **Cal Due Date** |
| g | 0.0001 | QC012 | 12/18/18 | 6/13/18 | 12/2019 |

### FUNCTIONAL CHECKS

**ECCENTRICITY**
Test Wt: 100 Tol: 0.0003
As-Found: Pass: ☑ Fail: ☐
As-Left: Pass: ☑ Fail: ☐

**LINEARITY**
Test Wt: 50 x 4 Tol: 0.0002
As-Found: Pass: ☑ Fail: ☐
As-Left: Pass: ☑ Fail: ☐

**STANDARD DEVIATION**
Test Wt: 100 Tol: 0.0001

| | | |
|---|---|---|
| 1. 100.0001 | 5. 100.0002 | 9. 100.0001 |
| 2. 100.0001 | 6. 100.0001 | 10. 100.0001 |
| 3. 100.0001 | 7. 100.0001 | **Result** |
| 4. 100.0001 | 8. 100.0002 | 0.00004 |

**ENVIRONMENTAL CONDITIONS**
☐ Good ☑ Fair ☐ Poor
Temperature: 21.3°C

### A2LA ACCREDITED SECTION OF REPORT

| Standard | As-Found | As-Left | Expanded Uncertainty |
|---|---|---|---|
| 200 | 200.0002 | 200.0001 | 0.00014 |
| 100 | 100.0001 | 100.0001 | 0.00014 |
| 50 | 50.0003 | 50.0001 | 0.00014 |
| 20 | 20.0001 | 20.0001 | 0.00014 |
| 1 | 1.0001 | 1.0000 | 0.00014 |
| 0.1 | 0.1000 | 0.1000 | 0.00014 |

### CALIBRATION STANDARDS

| Item | Make | Model | Serial Number | Cal Date | Cal Due Date | NIST ID |
|---|---|---|---|---|---|---|
| Weight Set | R.L./Troemner | 10kg to 1mg | G782 | 1/3/18 | 1/2019 | 20172421 |

**Permanent Information Concerning this Equipment:**
12 month calibration cycle.

**Comments/Info Concerning this Calibration:**
12/18 - RH = 56%. Adjusted span.

**Report prepared/reviewed by:** ServiceTech JC **Date:** 12/28/18 **Technician:** R.Kauble

**Signature:**



The uncertainty is calculated according to the ISO Guide to the Expression of Uncertainty in Measurement and includes the uncertainty of standards used combined with the observed standard deviation and readability of the unit under test. The uncertainty is expanded with a k factor of 2 for an approximate 95% level of confidence. Instruments listed above were calibrated using standards traceable to the National Institute of Standards and Technology (NIST). Calibration data reflect results at the time and location of calibration. Calibration data should be reviewed to insure that the instrument is performing to its required accuracy. Calibrations comply with ISO/IEC 17025 and ANSI/Z540-1-1994 quality standards.

DICK MUNNS COMPANY
LIQUID & GAS FLOW CALIBRATION

ISO 17025 IAS ACCREDITED
CL-122

# CERTIFICATE OF CALIBRATION

| | | | |
|---|---|---|---|
| **CUSTOMER:** | **PFS-TECO :** CLACKAMAS, OR | **CALIBRATION DATE:** | 03/14/2019 |
| **PO NUMBER:** | N/A | **CALIBRATION DUE:** | 03/14/2020 |
| **INST. MANUFACTURER:** | DWYER | **PROCEDURE:** | T.O.33K6-4-1769-1 |
| **INST. DESCRIPTION:** | VELOMETER | **CALIBRATION FLUID:** | AIR @ 14.7 PSIA 70°F |
| **MODEL NUMBER:** | 471 | **RECEIVED CONDITION:** | WITHIN MFG. SPECS. |
| **SERIAL NUMBER:** | CP288559 (ID# 095) | **LEFT CONDITION:** | WITHIN MFG. SPECS. |
| **RATED UNCERTAINTY:** | SEE NOTES BELOW. | **AMBIENT CONDITIONS:** | 762 mm HGA 43% RH 69°F |
| **UNCERTAINTY GIVEN:** | ± .20% RD ; k=2 | **CERTIFICATE FILE #:** | 490265.2019 |

**NOTES:** ± 3% FS (0-500 / 0-1500) *** ± 4% F.S. (0-5000) ***± 5% F.S. (0-15000) *** ± 2 °F

**NOTES CONT. : Q.MANUAL IM 1.5 REV 2017.1 DATED 7-18-2017**

| UUT INDICATED FT/MIN | DM.STD. ACTUAL FT/MIN | UUT INDICATED DEG. F | DM STD. ACTUAL DEG. F |
|---|---|---|---|
| 64 | 65 | 0 TO 200°F | 0 TO 200°F |
| 110 | 112 | 43.4 | 43.5 |
| 206 | 210 | 69.0 | 68.9 |
| 498 | 509 | 99.4 | 99.2 |
| 503 | 505 | | |
| 1049 | 1058 | | |
| 1497 | 1514 | | |
| 509 | 513 | | |
| 3419 | 3460 | | |
| 4992 | 5068 | | |
| 5136 | 5235 | | |
| 13928 | 14232 | | |

| STANDARDS USED: | | |
|---|---|---|
| A220: 12" WIND TUNNEL 0 - 8000 FPM \| CMC ± .203% RD \| TRACE# 1520423238 | DUE | 05/23/2019 |
| A24: HART SCIENTIFIC TEMP. STANDARD \| ±.024 F \| TRACE# 1520423238 | DUE | 03/07/2020 |

All instruments used in the performance of the shown calibration have traceability to the National Institute of Standards and Technology (NIST). The uncertainty ratio between the calibration standards (DM.STD.) used and the unit under test (UUT) is a minimum of 4:1, unless otherwise noted. Calibration has been performed per the shown procedure number, in accordance with ISO 10012:2003, ISO 17025:2005, ANSI/NCSL-Z-540.3, and/or MIL-STD-45662A. Test methods: API2530-92 & ASME MFC-3M-1989.

**Dick Munns Company** • 11133 Winners Circle • Los Alamitos, CA 90720
Phone (714) 827-1215 • Fax (714) 827-0823



Date: 3/14/2019

Approved By:

Calibration Technician:

Bulletin D-57

# Model 1430 Microtector® Electronic Point Gage

## Installation and Operating Instructions

**Model 1430 Microtector® Portable Electronic Point Gage** combines modern, solid-state integrated circuit electronics with a time-proven point gage manometer to provide fast, accurate pressure measurements.

### SPECIFICATIONS AND FEATURES

- Accurate and repeatable to ± .00025 inches water column
- Pressure range: 0 - 2″ w.c., positive, negative, or differential pressures
- Non-toxic and inexpensive gage fluid consists of distilled water mixed with a small amount of fluorescein green color concentrate
- Convenient, portable, lightweight and self-contained, the unit requires no external power connections and is operated by a 1.5 volt penlight cell
- A.C. detector current eliminates point plating, fouling and erosion
- Micrometers are manufactured in accordance with ASME B89.1.13-2001, and are traceable to a standard at the National Institute of Standards and Technology
- Three-point mounting, dual leveling adjustment, and circular level vial assure rapid setup
- Durablock® precision-machined acrylic plastic gage body
- Sensitive 0 - 50 microamp D.C. meter acts as a detector and also indicates battery and probe condition
- Heavy 2″ thick steel base plate provides steady mounting
- Top-quality glass epoxy circuit board and solid-state, integrated circuit electronics
- Electronic enclosure of tough, molded styrene acrylonitrile provides maximum protection to components yet allows easy access to battery compartment
- Rugged sheet steel cover and carrying case protects the entire unit when not in use
- Accessories included are (2) 3-foot lengths Tygon® tubing, (2) 1/8″ pipe thread adapters and 3/4 oz. bottle of fluorescein green color concentrate with wetting agent

**Maximum pressure: 100 psig with optional pipe thread connections.**

Tygon® is a registered trademark of Saint-Gobain Corporation

**DWYER INSTRUMENTS, INC.**
P.O. BOX 373
MICHIGAN CITY, INDIANA 46361,U.S.A

Phone: 219/879-8000
Fax: 219/872-9057

www.dwyer-inst.com
e-mail: info@dwyer-inst.com

PRAXAIR
*Making our planet more productive*

**DocNumber: 225861**

**Praxair Distribution, Inc.**
**5700 S. Alameda Street**
**Los Angeles CA 90058**
**Tel: 323-585-2154**
**Fax: 714-542-6689**
**PGVP ID: F22018**

# CERTIFICATE OF ANALYSIS / EPA PROTOCOL GAS

***Customer & Order Information***

PXPKG TUALATIN OR H
10450 SW TUALATIN SHERWOOD ROAD
TUALATIN OR 97062

*Certificate Modification Date:* 10/01/2018
*Praxair Order Number:* 70743165
*Part Number:* NI CD17CO8E-AS

*Fill Date:* 09/26/2018
*Lot Number:* 70086826911
*Cylinder Style & Outlet.* AS CGA 590
*Cylinder Pressure and Volume.* 1290 psig 140 ft3

## *Certified Concentration*

***ProSpec EZ Cert***

| Expiration Date: | 10/01/2026 | NIST Traceable |
|---|---|---|
| Cylinder Number: | SA17187 | Expanded Uncertainty |
| 17.00 % | Carbon dioxide | ± 0.3 % |
| 4.31 % | Carbon monoxide | ± 0.6 % |
| 16.99 % | Oxygen | ± 0.2 % |
| Balance | Nitrogen | |

## *Certification Information:*

*Certification Date:* 10/01/2018 *Term:* 96 Months *Expiration Date:* 10/01/2026

This cylinder was certified according to the 2012 EPA Traceability Protocol, Document #EPA-600/R-12/531, using Procedure G1.
Do Not Use this Standard if Pressure is less than 100 PSIG.
CO2 responses have been corrected for Oxygen IR Broadening effect. O2 responses have been corrected for CO2 interference.

## *Analytical Data:*

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

1. ***Component:*** **Carbon dioxide**

Requested Concentration: 17 %
Certified Concentration: 17.00 %
Instrument Used: Horiba VIA-510 S/N 20C194WK
Analytical Method: NDIR
Last Multipoint Calibration: 09/21/2018

**First Analysis Data:** **Date** 10/01/2018

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Z: | 0 | R: | 20.1 | C: | 17 | Conc: | 17 |
| R: | 20.1 | Z: | 0 | C: | 17 | Conc: | 17 |
| Z: | 0 | C: | 17.01 | R: | 20.11 | Conc: | 17.01 |

UOM: % **Mean Test Assay:** 17 %

**Reference Standard:** Type / Cylinder #: GMIS / CC187238
Concentration / Uncertainty: 20.10 % ±0.24%
Expiration Date: 06/07/2026
**Traceable to:** SRM # / Sample # / Cylinder #: RGM#CC193512 / N/A / RGM#CC193512
SRM Concentration / Uncertainty: 26.99% / ±0.05%
SRM Expiration Date: 05/15/2023

**Second Analysis Data:** **Date**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Z: | 0 | R: | 0 | C: | 0 | Conc: | 0 |
| R: | 0 | Z: | 0 | C: | 0 | Conc: | 0 |
| Z: | 0 | C: | 0 | R: | 0 | Conc: | 0 |

UOM: % **Mean Test Assay:** %

2. ***Component:*** **Carbon monoxide**

Requested Concentration: 4.25 %
Certified Concentration: 4.31 %
Instrument Used: Horiba VIA-510 S/N UB9UCSYX
Analytical Method: NDIR
Last Multipoint Calibration: 09/21/2018

**First Analysis Data:** **Date** 10/01/2018

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Z: | 0 | R: | 5 | C: | 4.31 | Conc: | 4.31 |
| R: | 5 | Z: | 0 | C: | 4.3 | Conc: | 4.3 |
| Z: | 0 | C: | 4.32 | R: | 5.01 | Conc: | 4.32 |

UOM: % **Mean Test Assay:** 4.31 %

**Reference Standard:** Type / Cylinder #: GMIS / CC242633
Concentration / Uncertainty: 5.00 % ±0.543%
Expiration Date: 04/03/2025
**Traceable to:** SRM # / Sample # / Cylinder #: SRM 2642a / 51-D-23 / FF23106
SRM Concentration / Uncertainty: 7.859% / ±0.039%
SRM Expiration Date: 07/15/2019

**Second Analysis Data:** **Date**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Z: | 0 | R: | 0 | C: | 0 | Conc: | 0 |
| R: | 0 | Z: | 0 | C: | 0 | Conc: | 0 |
| Z: | 0 | C: | 0 | R: | 0 | Conc: | 0 |

UOM: % **Mean Test Assay:** %

3. ***Component:*** **Oxygen**

Requested Concentration: 17 %
Certified Concentration: 16.99 %
Instrument Used: OXYMAT 5E
Analytical Method: Paramagnetic
Last Multipoint Calibration: 09/04/2018

**First Analysis Data:** **Date** 10/01/2018

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Z: | 0 | R: | 20.86 | C: | 16.99 | Conc: | 16.99 |
| R: | 20.86 | Z: | 0 | C: | 16.99 | Conc: | 16.99 |
| Z: | 0 | C: | 16.99 | R: | 20.86 | Conc: | 16.99 |

UOM: % **Mean Test Assay:** 16.99 %

**Reference Standard:** Type / Cylinder #: GMIS / CC75874
Concentration / Uncertainty: 20.86 % ±0.111%
Expiration Date: 11/07/2025
**Traceable to:** SRM # / Sample # / Cylinder #: SRM 2659a / 71-E-19 / FF22331
SRM Concentration / Uncertainty: 20.863% / ±0.021%
SRM Expiration Date: 08/23/2021

**Second Analysis Data:** **Date**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Z: | 0 | R: | 0 | C: | 0 | Conc: | 0 |
| R: | 0 | Z: | 0 | C: | 0 | Conc: | 0 |
| Z: | 0 | C: | 0 | R: | 0 | Conc: | 0 |

UOM: % **Mean Test Assay:** %

Analyzed By **Jose Vasquez**

Certified By **Danielle Burns**

PRAXAIR
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**DocNumber: 223791**

**Praxair Distribution, Inc.**
**5700 S. Alameda Street**
**Los Angeles CA 90058**
**Tel: 323-585-2154**
**Fax: 714-542-6689**
**PGVP ID: F22018**

# CERTIFICATE OF ANALYSIS / EPA PROTOCOL GAS

***Customer & Order Information***

PXPKG TUALATIN OR H
10450 SW TUALATIN SHERWOOD ROAD
TUALATIN OR 97062

*Certificate Modification Date:* 09/05/2018
*Praxair Order Number:* 70716136
*Part Number:* NI CD10CO33E-AS

*Fill Date:* 08/31/2018
*Lot Number:* 70086824308
*Cylinder Style & Outlet:* AS CGA 590
*Cylinder Pressure and Volume:* 2000 psig 140 ft3

## *Certified Concentration*

***ProSpec EZ Cert***

| Expiration Date: | 09/05/2026 | NIST Traceable |
|---|---|---|
| Cylinder Number: | CC170624 | Expanded Uncertainty |
| 10.00 % | Carbon dioxide | ± 0.3 % |
| 2.51 % | Carbon monoxide | ± 0.7 % |
| 10.50 % | Oxygen | ± 0.6 % |
| Balance | Nitrogen | |

## *Certification Information:*

*Certification Date:* 09/05/2018 *Term:* 96 Months *Expiration Date:* 09/05/2026

This cylinder was certified according to the 2012 EPA Traceability Protocol, Document #EPA-600/R-12/531, using Procedure G1.

Do Not Use this Standard if Pressure is less than 100 PSIG.

CO responses have been corrected for CO2 interference. CO2 responses have been corrected for Oxygen IR Broadening effect. O2 responses have been corrected for CO2 interference.

## *Analytical Data:*

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

1. ***Component:*** **Carbon dioxide**

Requested Concentration: 10 %
Certified Concentration: 10.00 %
Instrument Used: Horiba VIA-510 S/N 20C194WK
Analytical Method: NDIR
Last Multipoint Calibration: 08/20/2018

| First Analysis Data: | | | | | | Date | 09/05/2018 |
|---|---|---|---|---|---|---|---|
| Z: 0 | R: 14.02 | C: 10 | Conc: 10 | | | | |
| R: 14.02 | Z: 0 | C: 10 | Conc: 10 | | | | |
| Z: 0 | C: 10 | R: 14.02 | Conc: 10 | | | | |
| UOM: % | | | Mean Test Assay: | 10 | % | | |

**Reference Standard:** Type / Cylinder #: GMIS / CC141375
Concentration / Uncertainty: 14.02 % ±0.3%
Expiration Date: 06/11/2026
**Traceable to:** SRM # / Sample # / Cylinder #: SRM 1675b / 6-F-51 / CAL014538
SRM Concentration / Uncertainty: 13.963% / ±0.034%
SRM Expiration Date: 05/16/2022

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

2. ***Component:*** **Carbon monoxide**

Requested Concentration: 2.5 %
Certified Concentration: 2.51 %
Instrument Used: Horiba VIA-510 S/N UB9UCSYX
Analytical Method: NDIR
Last Multipoint Calibration: 08/20/2018

| First Analysis Data: | | | | | | Date | 09/05/2018 |
|---|---|---|---|---|---|---|---|
| Z: 0 | R: 2.48 | C: 2.51 | Conc: 2.51 | | | | |
| R: 2.48 | Z: 0 | C: 2.51 | Conc: 2.51 | | | | |
| Z: 0 | C: 2.51 | R: 2.48 | Conc: 2.51 | | | | |
| UOM: % | | | Mean Test Assay: | 2.51 | % | | |

**Reference Standard:** Type / Cylinder #: GMIS / CC102045
Concentration / Uncertainty: 2.48 % ±0.448%
Expiration Date: 04/03/2025
**Traceable to:** SRM # / Sample # / Cylinder #: SRM 2641a / 52-D-30 / CAL017193
SRM Concentration / Uncertainty: 4.009% / ±0.017%
SRM Expiration Date: 07/15/2019

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

3. ***Component:*** **Oxygen**

Requested Concentration: 10.5 %
Certified Concentration: 10.50 %
Instrument Used: OXYMAT 5E
Analytical Method: Paramagnetic
Last Multipoint Calibration: 09/04/2018

| First Analysis Data: | | | | | | Date | 09/05/2018 |
|---|---|---|---|---|---|---|---|
| Z: 0 | R: 9.88 | C: 10.49 | Conc: 10.49 | | | | |
| R: 9.88 | Z: 0 | C: 10.5 | Conc: 10.5 | | | | |
| Z: 0 | C: 10.5 | R: 9.88 | Conc: 10.5 | | | | |
| UOM: % | | | Mean Test Assay: | 10.5 | % | | |

**Reference Standard:** Type / Cylinder #: NTRM / DT0010402
Concentration / Uncertainty: 9.88 % ±0.4%
Expiration Date: 11/18/2022
**Traceable to:** SRM # / Sample # / Cylinder #: NTRM #170701 / N/A / NTRM #DT0010402
SRM Concentration / Uncertainty: 9.875% / ±0.040%
SRM Expiration Date: 11/18/2022

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

Analyzed By: Danielle Burns

Certified By: Jose Vasquez

# Verification of Standardization

of

# Tape Measure

by

Advanced Calibration Technologies
28111 S.E. Wally Road
Boring, OR 97009
1-800-259-5058

ACCREDITED
Calibration
Cert# 1342.01

| | | | |
|---|---|---|---|
| Customer: | PFS Teco, Inc | Street: | 11785 Southeast Highway 212 Suite 305 |
| City: | Clackamas State: OR | Zip: | 97015 Location: In House |
| Machine Manufacturer: | Dewalt | Model: | 16' Tape Measure |
| Capacity: | 0.000 - 192.000 inches 0.125 Divisions | Serial #: | 090 |
| Calibration Cycle: | 12 Months | Lab ID#: | #090 |
| Previous Calibration Date: | January 2019 | Calibration Procedure: | Ad-Tek SR |
| Equipment Used: | Gauge Blocks S/N: ADGB002 | Action Recommended: | |
| If Other, Explain: | | | |

## Verification Data

Purpose:

This method provides instructions for checking the critical dimensions of the equipment.

Tolerance:

Equipment shall meet the dimensional tolerances specified in the applicable test method.

Procedure:

Verified using manufacturer's procedures.

| Actual Dimensions (inches) | Unit Under Test As Found (inches) | Unit Under Test As Left (inches) | Difference (inches) |
|---|---|---|---|
| 0.0000 | 0.000 | 0.000 | 0.000 |
| 0.1250 | 0.050 | 0.050 | -0.075 |
| 0.2500 | 0.250 | 0.250 | 0.000 |
| 0.5000 | 0.500 | 0.500 | 0.000 |
| 0.7500 | 0.750 | 0.750 | 0.000 |
| 1.0000 | 1.000 | 1.000 | 0.000 |
| 3.0000 | 3.000 | 3.000 | 0.000 |
| 5.0000 | 5.000 | 5.000 | 0.000 |
| 7.0000 | 7.000 | 7.000 | 0.000 |
| 9.0000 | 9.000 | 9.000 | 0.000 |
| 12.0000 | 12.000 | 12.000 | 0.000 |

| | |
|---|---|
| The overall condition of the device as found: | Within Specification |
| The overall condition of the device as left: | Within Specification |
| The measurement of uncertainty (MU) was calculated to be: | 0.00060 |

File No: PFS-101666-0119D0120-AH-SR-090

Temperature: 72.1°F Humidity: 41.1%

The equipment used in the verification of this instrument has been calibrated and is NIST traceable.
The uncertainty of calibration was estimated at the 95% confidence level, coverage factor (k=2).

Remarks:

This certificate of verification is issued as a statement of fact that on the date of verification the above instrument had an accuracy as indicated and was calibrated to meet the requirements of the manufacturer's specifications. This certificate should not be construed or regarded as a guarantee or warranty of any kind that the instrument will retain the same percentage of accuracy as determined on the date when the verification was performed and reported. Ad-Tek, Inc. hereby expressly disclaims any and all liability for damage or loss by all parties arising or resulting from deterioration, obsolescence, malfunction, subsequent calibration performed by another agency or substandard performance of said instrument.



Service Technician: Alisa Houser Date of Service: January 16, 2019

Technical Manager: Nicole Ostrowski Date Next Due: January 2020

**We sincerely appreciate your business and thank you for selecting Advanced Calibration Technologies, Inc. for servicing your equipment.**
**To reschedule, please call (800) 259-5058. Thank You.**

# Verification of Standardization

of

# Calipers

by

Advanced Calibration Technologies
28111 S.E. Wally Road
Boring, OR 97009
1-800-259-5058

ACCREDITED
Calibration
Cert# 1342.01

| | | | |
|---|---|---|---|
| Customer: | PFS Teco, Inc | Street: | 11785 Southeast Highway 212 Suite 305 |
| City: | Clackamas State: OR | Zip: | 97015 Location: In House |
| Machine Manufacturer: | General | Model: | 6" Digital Caliper |
| Capacity: | 0.0000 - 6.0000 inches 0.0005 Divisions | Serial #: | 092 |
| Calibration Cycle: | 12 Months | Lab ID#: | 092 |
| Previous Calibration Date: | January 2018 | Calibration Procedure: | Ad-Tek DC |
| Equipment Used: | Gauge Blocks S/N: ADGB002 | Action Recommended: | |
| If Other, Explain: | | | |

## Verification Data

Purpose:

This method provides instructions for checking the critical dimensions of the inside diameter of the equipment.

Tolerance:

Equipment shall meet the dimensional tolerances specified by the manufacturer for the inside diameter.

Procedure:

Verified using the procedure to meet manufacturer's tolerance for inside diameter.

| Actual Dimensions (inches) | Unit Under Test As Found (inches) | Unit Under Test As Left (inches) | Difference (inches) |
|---|---|---|---|
| 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| 0.0500 | 0.0500 | 0.0500 | 0.0000 |
| 0.1000 | 0.1000 | 0.1000 | 0.0000 |
| 0.1010 | 0.1010 | 0.1010 | 0.0000 |
| 0.1050 | 0.1050 | 0.1050 | 0.0000 |
| 0.1100 | 0.1100 | 0.1100 | 0.0000 |
| 0.1500 | 0.1500 | 0.1500 | 0.0000 |
| 0.5000 | 0.5000 | 0.5000 | 0.0000 |
| 1.0000 | 1.0000 | 1.0000 | 0.0000 |
| 3.0000 | 2.9995 | 2.9995 | -0.0005 |
| 5.0000 | 4.9990 | 4.9990 | -0.0010 |

| | |
|---|---|
| The overall condition of the device as found: | Within Specification |
| The overall condition of the device as left: | Within Specification |
| The measurement of uncertainty (MU) was calculated to be: | 0.00062 |

This certificate does not reflect meausrements for inside jaws, step height, or depth.

File No: PFS-101666-0119D0120-AH-DC-092

Temperature: 68.2°F Humidity: 41.6%

The equipment used in the verification of this instrument has been calibrated and is NIST traceable.
The uncertainty of calibration was estimated at the 95% confidence level, coverage factor (k=2).

Remarks:

This certificate of verification is issued as a statement of fact that on the date of verification the above instrument had an accuracy as indicated and was calibrated to meet the requirements of the manufacturer's specifications. This certificate should not be construed or regarded as a guarantee or warranty of any kind that the instrument will retain the same percentage of accuracy as determined on the date when the verification was performed and reported. Ad-Tek, Inc. hereby expressly disclaims any and all liability for damage or loss by all parties arising or resulting from deterioration, obsolescence, malfunction, subsequent calibration performed by another agency or substandard performance of said instrument.



Service Technician: Alisa Houser Date of Service: January 15, 2019

Technical Manager: Nicole Ostrowski Date Next Due: January 2020

**We sincerely appreciate your business and thank you for selecting Advanced Calibration Technologies, Inc. for servicing your equipment. To reschedule, please call (800) 259-5058. Thank You.**