# Non-Confidential Business Information (Non-CBI)

# Certification Test Report

## Hearth & Home Technologies, LLC (Harman)

## Pellet-Fired Free Standing Room Heater

**Model:** Accentra-2

| | |
|---|---|
| **Prepared for**: | Hearth & Home Technologies<br>352 Mountain House Road<br>Halifax, PA 17032 |
| **Prepared by:** | OMNI-Test Laboratories, Inc.<br>13327 NE Airport Way<br>Portland, OR 97230<br>(503) 643-3788 |
| **Test Period:** | May 12, 2015 |
| **Report Date:** | February 2016 |
| **Revised Report Date:** | February 22, 2021 |
| **Report Number:** | 0135PS035E |

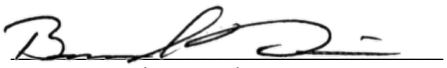


*-Document Edition 003 (02/22/21)-*

# AUTHORIZED SIGNATORIES

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

**Evaluator:**



Bruce Davis, Testing Manager
OMNI-Test Laboratories, Inc.

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# Section 1

## Sampling Procedures and Test Results

## INTRODUCTION

Hearth & Home Technologies retained OMNI-Test Laboratories, Inc. (*OMNI*) to perform U.S. Environmental Protection Agency (EPA) certification testing on the Accentra-2 model freestanding, pellet-fired room heater.

The testing was performed at *OMNI*'s testing facility in Portland, Oregon. The altitude of the laboratory is 30 feet above sea level. The unit was received in good condition and logged in at the *OMNI*'s testing facility on April 15, 2015. It was assigned and labeled with *OMNI* ID #2067. *OMNI* representative Jeremy Clark conducted the certification testing and completed all testing by May 12, 2015.

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

## SAMPLING PROCEDURE

The Accentra-2 was tested in accordance with the U.S. EPA 40 CFR Part 60, Subpart AAA – Standards of Performance for New Residential Wood Heaters using EPA Test Method 28R, ASTM E2515, and ASTM E2779. The fuel used for certification testing was Lignetics "Premium Quality" hardwood pellet fuel; this fuel was graded as Premium by the Pellet Fuels Institute and was produced at registered mill # 03304. Particulate emissions were measured using dual sampling trains consisting of two sets of filters (front and back). The results of the integrated test run indicate an average particulate emission rate of 0.62 g/hr. The Accentra-2 results are within the emission limit of 2.0 g/hr for affected facilities manufactured on or after May 15, 2020.

The model Accentra-2 was tested for thermal efficiency and carbon monoxide (CO) emissions in accordance with CSA B415.1-10. The heater has a demonstrated an average thermal efficiency of 71.2%. The calculated CO emission rate was 4.18 g/hr.

## RUN DISCUSSION

**Run 1** was an attempt at an integrated test run consisting of burn settings that result in 60 +5/-0 minutes at maximum, 120 +5/-0 minutes at medium (<50% of maximum), and 180 +5/-0 minutes at minimum. Each burn category in this run was achieved, meeting both time and burn rate requirements. No sampling anomalies occurred, so this integrated test run is acceptable and valid per ASTM E2779, no further runs are needed.

## SUMMARY OF RESULTS

The average particulate emission rate for the complete, integrated test run was measured to be 0.62 g/hr.

The average particulate emission factor for the complete, integrated test run was measured to be 0.75g/dry kg of fuel.

The average thermal efficiency for the complete, integrated test run was measured to be 71.2%.

The particulate emission rate calculated from the one-hour filter was 1.73 g/hr.

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

No sampling anomalies were noted during this integrated test run, all data was found to be valid and appropriate to sampling procedures specified in ASTM 2515, and ASTM 2779.

## SUMMARY TABLES

### Table 1.1 – Particulate Emissions

| | One-Hour Filter | Integrated Total |
|---|---|---|
| **Emission Rate** (g/hr) | 1.73 | 0.62 |
| **Emission Factor** (g/dry kg) | 0.89 | 0.75 |

### Table 1.2 – Efficiency and CO

| | Burn Rate Segment | | | Integrated Total |
|---|---|---|---|---|
| | **Maximum** | **Medium** | **Minimum** | |
| **Time** (minutes) | 61 | 120 | 182 | 365 |
| **Burn Rate** (dry kg/hr) | 1.95 | 0.80 | 0.46 | 0.82 |
| **Heat Output Rate** (BTU/hr) | 25,210 | 9,050 | 6,253 | 10,346 |
| **Efficiency** (%, HHV) | 69.5 | 67.9 | 75.4 | 71.2 |
| **CO Emission Rate** (g/hr) | 23.75 | 0.64 | 0.00 | 4.18 |

**Table 1.3 – Test Facility Conditions**

| | Initial | Middle | Final |
|---|---|---|---|
| **Room Temperature** (°F) | 69 | 71 | 70 |
| **Barometric Pressure** (in Hg) | 29.95 | 29.95 | 29.95 |
| **Air Velocity** (ft/min) | < 50 | < 50 | < 50 |
| **Induced Draft** (in H2O) | 0 | 0 | 0 |

**Table 1.4 – Fuel Measurement Summary**

| **Segment** | **Time** (min) | **Burn Rate** (dry kg/hr) | **Consumed Fuel Weight** (lbs) | **Fuel Moisture Content** (dry basis - %) |
|---|---|---|---|---|
| Pretest | 61 | 1.95 | 4.6 | 5.05 |
| Maximum | 61 | 1.95 | 4.6 | 5.05 |
| Medium | 120 | 0.80 | 3.7 | 5.05 |
| Minimum | 182 | 0.46 | 3.3 | 5.05 |
| Integrated Total | 365 | 0.82 | 11.6 | 5.05 |

**Table 1.5 – Dilution Tunnel and Flue Gas Measurements**

| Segment | Average Flue Draft (in $H_2O$) | Average Dilution Tunnel Gas Measurements | | |
|---|---|---|---|---|
| | | Velocity (ft/sec) | Flow Rate (dscf/min) | Temperature (°F) |
| Integrated Total | -0.056 | 13.15 | 146.5 | 87 |

**Table 1.6 – Stove Configuration**

| Segment | Temperature Control | Feed Rate | Low Draft Adjustment | Stove Control |
|---|---|---|---|---|
| Pretest | 7.00 | 3.56 | -00V | Constant Burn H |
| Maximum | 7.00 | 3.56 | -00V | Constant Burn H |
| Medium | 2.99 | 1.07 | -20V | Constant Burn H |
| Minimum | 1.00 | 0.18 | -41V | Constant Burn H |

# Section 2

## Photographs
## Appliance Description
## Drawings

# Hearth & Home Technologies
Accentra-2

## PHOTOGRAPHS

| | |
|---|---|
|  |  |
| **Accentra-2 Front** | **Accentra-2 Back** |

| | |
|---|---|
|  |  |
| **Accentra-2 Left** | **Accentra-2 Right** |

## APPLIANCE DESCRIPTION

**Appliance Manufacturer:** Hearth & Home Technologies

**Pellet Stove Model:** Accentra-2

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

The Accentra-2's principle elements include a fuel hopper, steel firebox chamber, steel burn pot, and electrical fuel feed, combustion air, and convection air supply systems.

Air is forced by the combustion air blower through 0.122" diameter holes in the burn pot and combustion products are routed out of the firebox chamber through a three-inch diameter flue outlet located on the bottom-rear of the unit.

Fuel is supplied from the hopper to the burn pot via a corkscrew auger situated perpendicular to the firebox. Fuel supply rate is varied by cycling the auger motor as needed.

Ashes fall through the burn pot into a removable ash drawer located at the bottom of the unit. The drawer is accessed through the front firebox door, which also features a 5mm ceramic glass viewing window sealed with ¼" round fiberglass rope gasket. The door itself is sealed with $^{3}/_{8}$" round fiberglass rope gasket.

The electrical systems are regulated by a user-operated control board. On this board settings such as feed rate and temperature can be adjusted to achieve desired heat output. The unit can also be controlled by an external thermostat system.

# Engineering Drawings
# [Redacted]

# Engineering Drawings (Remainder)

# Section 3

## Quality Assurance/Quality Control

## QUALITY ASSURANCE/QUALITY CONTROL

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

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

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

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

The manufacturing facilities and quality control system for the production of the Accentra-2 at Hearth & Home Technologies were evaluated to determine if sufficient to maintain conformance with OMNI's requirements for product certification. OMNI has concluded that the manufacturing facilities, processes, and quality control system are adequate to produce the appliance congruous with the standards and model codes to which it was evaluated.

# Manufacturer's Quality Assurance Plan
# [Redacted]

# Sample Analysis

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

# Moisture Content Worksheet

Client: Harman Home Heating / Hearth and Home Technologies
Model: Accentra
Project #: 0135PS035E Tracking #: 2067
Sample description: Lignetics Premium Quality Wood Pellet Fuel

**Weight record:**

*Prior to Oven-Drying*

Balance ID #: OMNI - 00128 Audit ID #: OMNI-00283B

Date/Time in: 5/1/15 13:30 Audit weight: 199.9 g

Container: ID#: 247 Tare weight: 94.1 g

Total weight: 235.6 g

Material weight (total weight - container tare weight): 141.5 g

*Post Oven-Drying*

Balance ID #: OMNI - 00128

Date/Time out: 5/6/15 15:00 Audit ID #: OMNI-00283B

Total weight: 228.8 g Audit weight (if necessary): 199.9 g

Material weight (total weight - container tare weight): 134.7 g

Calculations:

Dry basis (%) = $\frac{\text{Initial - Final}}{\text{Final}} \times 100 = \frac{141.5\text{ g} - 134.7\text{ g}}{134.7\text{ g}} \times 100\% = 5.05\ \%$

Wet basis (%) = $\frac{\text{Initial - Final}}{\text{Initial}} \times 100 = \frac{141.5\text{ g} - 134.7\text{ g}}{141.5\text{ g}} \times 100\ \% = 4.81\ \%$

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

Technician signature: _____ Date: 5/7/15

Reviewed by: _____ Date: 5/7/15

# Pellet Heater Lab Data - ASTM E2779 / ASTM E2515

| | | | |
|---|---|---|---|
| Manufacturer: | Harman | Equipment Numbers: | OMNI-00023 |
| Model: | Accentra-2 | | OMNI-00131 |
| Tracking No.: | 2067 | | OMNI-00343 |
| Project No.: | 1035PS035E | | |
| Run #: | 1 | | |
| Date: | 5/12/15 | | |

**TRAIN 1**

| Sample Component | Reagent | Filter, Probe or Dish # | Weights | | |
|---|---|---|---|---|---|
| | | | Final, mg | Tare, mg | Particulate, mg |
| A. Front filter catch (1 hr) | Filter | B762 | 120.0 | 118.6 | 1.4 |
| B. Front filter catch (remainder) | Filter | B766 | 116.5 | 114.8 | 1.7 |
| C. Rear filter catch | Filter | B763 | 115.4 | 115.4 | 0.0 |
| D. Probe catch* | Probe | 11 | 114190.8 | 114190.8 | 0.0 |
| E. Filter seals catch* | Seals | R307 | 3322.2 | 3322.4 | 0.0 |

| Total Particulate, mg: | 3.1 |
|---|---|

**TRAIN 2**

| Sample Component | Reagent | Filter, Probe or Dish # | Weights | | |
|---|---|---|---|---|---|
| | | | Final, mg | Tare, mg | Particulate, mg |
| A. Front filter catch | Filter | B764 | 115.6 | 113.0 | 2.6 |
| B. Rear filter catch | Filter | B765 | 118.9 | 118.8 | 0.1 |
| C. Probe catch* | Probe | 13 | 114325.3 | 114325.1 | 0.2 |
| D. Filter seals catch* | Seals | R308 | 3612.9 | 3612.5 | 0.4 |

| Total Particulate, mg: | 3.3 |
|---|---|

**AMBIENT**

| Sample Component | Reagent | Filter # or Probe # | Weights | | |
|---|---|---|---|---|---|
| | | | Final, mg | Tare, mg | Particulate, mg |
| A. Front filter catch* | Filter | B767 | 112.4 | 112.2 | 0.2 |

| Total Particulate, mg: | 0.2 |
|---|---|

*Any particulate catch that results in a negative number, is assumed to be zero

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

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:W215-0901-01
**Issue No:** 1

**Client:** OMNI-TEST LABORATORIES INC.
13327 NE Airport Way
Portland, OR 97230
**Attention:** Sebastian Button

**PO No:** OTL-15-030

Signed:

Stephen Sundeen
Chemistry Laboratory Manager

Date of Issue: 8/20/2015



## Sample Details

| | | | |
|---|---|---|---|
| **Sample Log No:** | W215-0901-01 | **Sample Date:** | |
| **Sample Designation:** | Lignetics #1 | **Sample Time:** | |
| **Sample Recognized As:** | Pellets | **Arrival Date:** | 8/13/2015 |

## Test Results

| | METHOD | UNITS | MOISTURE FREE | AS RECEIVED |
|---|---|---|---|---|
| **Moisture Total** | ASTM E871 | wt. % | | 5.05 |
| **Ash** | ASTM D1102 | wt. % | 0.83 | 0.79 |
| **Volatile Matter** | ASTM D3175 | wt. % | | |
| **Fixed Carbon by Difference** | ASTM D3172 | wt. % | | |
| **Sulfur** | ASTM D4239 | wt. % | 0.003 | 0.003 |
| **$SO_2$** | Calculated | lb/mmbtu | | 0.007 |
| **Net Cal. Value at Const. Pressure** | ISO 1928 | GJ/tonne | 18.20 | 16.28 |
| **Net Cal. Value at Const. Pressure** | ISO 1928 | J/g | 18196 | 16282 |
| **Gross Cal. Value at Const. Vol.** | ASTM E711 | J/g | 19492 | 18508 |
| **Gross Cal. Value at Const. Vol.** | ASTM E711 | Btu/lb | 8381 | 7957 |
| **Carbon** | ASTM D5373 | wt. % | 49.23 | 46.74 |
| **Hydrogen*** | ASTM D5373 | wt. % | 5.95 | 5.65 |
| **Nitrogen** | ASTM D5373 | wt. % | < 0.20 | < 0.19 |
| **Oxygen*** | ASTM D3176 | wt. % | > 43.79 | > 41.58 |
| **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

# CERTIFICATE OF MEMBERSHIP

**Be it known to all parties that:**

## LIGNETICS OF WEST VIRGINIA
## LINN, WV

Facility #: 03304

Is certified to produce Premium grade fuel and is in good standing with Conway & Robison, LLC's Quality Assurance Program for Densified Fuel Manufacturers which has been approved by the American Lumber Standard Committee (ALSC) Board of Review and is in compliance with the Pellet Fuel Institute's (PFI) Standard Specifications for Residential/Commercial Densified Fuel and the PFI Residential/Commercial Densified Fuel QA/QC Handbook.

10/3/2013

Jason Robison — DATE

**CONWAY & ROBISON, LLC**
P O Box 1508 SHARPSBURG, GA 30277
(678) 642-4036 P (770) 234-5837 F www.cr-inspect.com

## FILTER TARES

Date Placed in Desiccator: 4/13/15 1530 Technician: A. Kravitz Balance ID # 23

Thermo/Hygro meter ID #: 343 Audit Weight ID # 131 (Balance audit mfr. Std.: 500 ± 0.72)

| Filter Size/ID# 102 (47) 110 55 | Date: 5/8/15 Time: 1000 RH%: 10.9 T (F): 72.8 Initials: A | Date: 5/11/15 Time: 9:00 RH%: 9.1 T (F): 74.3 Initials: JC | Date: Time: RH%: T (F): Initials: | Date: Time: RH%: T (F): Initials: | Manufacturer | Appliance | Project No. | Run No. |
|---|---|---|---|---|---|---|---|---|
| B756 | 113.1 | 113.1 | | | [redacted] | [redacted] | [redacted] | [redacted] |
| B757 | 118.1 | 118.1 | | | ↓ | ↓ | ↓ | ↓ |
| B758 | 115.0 | 115.0 | | | | | | |
| B759 | 112.9 | 112.8 | | | | | | |
| B760 | 115.3 | 115.1 | | | | | | |
| B761 | 113.1 | 113.1 | | | | | | |
| B762 | 118.5 | 118.6 | | | Harman | Accentra-2 | 0135P5035E | 1 |
| B763 | 115.3 | 115.4 | | | ↓ | ↓ | ↓ | ↓ |
| B764 | ~~112.9~~ 113.0 | 113.0 | | | | | | |
| B765 | 118.8 | 118.8 | | | | | | |
| B766 | 114.9 | 114.8 | | | | | | |
| B767 | 112.3 | 112.2 | | | | | | |
| B768 | 119.0 | 119.0 | | | | | | |
| B769 | 114.2 | 114.3 | | | | | | |

Final Technician signature: A. Kravitz Date: 5/12/15

## PROBE TARES

Date Placed in Desiccator: 4/14/15 Technician: A. Kravitz Balance ID # 23

Thermo/Hygro meter ID #: 343 Audit Weight ID # 131 (Balance audit mfr. Std.: 500 ± 0.72)

| Probe Size/ID# (43) | Date: 4/21/15 Time: 1015 RH%: 18.6 T (F): 74.8 Initials: L | Date: 5/8/15 Time: 1000 RH%: 21.6 T (F): 72.8 Initials: A | Date: Time: RH%: T (F): Initials: | Date: Time: RH%: T (F): Initials: | Manufacturer | Appliance | Project No. | Run No. |
|---|---|---|---|---|---|---|---|---|
| OES 3 | 114767.8 | 114767.8 | | | [redacted] | [redacted] | [redacted] | [redacted] |
| 6 | 115354.3 | 115354.3 | | | ↓ | ↓ | ↓ | ↓ |
| 11 | 114190.9 | 114190.8 | | | Harman | Accentra-2 | 0135PS035E | 1 |
| 13 | 114324.9 | 114325.1 | | | ↓ | ↓ | ↓ | ↓ |
| 14 | 114543.8 | 114543.8 | | | | | | |
| 15 | 114350.9 | 114350.9 | | | | | | |
| 16 | 114272.1 | 114272.2 | | | | | | |
| 17 | 114566.3 | 114556.1 | | | | | | |
| 24 | 114126.4 | 114126.2 | | | | | | |
| 27 | 114276.7 | 114276.9 | | | | | | |
| 28 | 114757.3 | 114757.4 | | | | | | |
| 32 | 114741.4 | 114741.3 | | | | | | |
| 56 | 123071.2 | 123071.3 | | | | | | |
| 62 | 123012.3 | 123012.5 | | | | | | |

Final Technician signature: [signature] Date: 5/8/15

## O-RING TARES

Date Placed in Desiccator: 4/10/15 Technician: A. Kravitz Balance ID # 23

Thermo/Hygro meter ID #: 343 Audit Weight ID # 131 (Balance audit mfr. Std.: 500 ± 0.72)

| O-Ring Size/ID# (47) | Date: 4/16/15 Time: 1506 RH%: 9.9 T (F): 74.8 Initials: A | Date: 4/21/15 Time: 1000 RH%: 12.9 T (F): 74.6 Initials: A | Date: Time: RH%: T (F): Initials: | Date: Time: RH%: T (F): Initials: | Manufacturer | Appliance | Project No. | Run No. |
|---|---|---|---|---|---|---|---|---|
| R295 | 3337.2 | 3337.0 | | | [redacted] | [redacted] | [redacted] | [redacted] |
| R296 | 4167.6 | 4167.4 | | | ↓ | ↓ | ↓ | ↓ |
| R297 | 3286.1 | 3285.9 | | | [redacted] | [redacted] | [redacted] | [redacted] |
| R298 | 3369.3 | 3369.2 | | | ↓ | ↓ | ↓ | ↓ |
| R299 | 3357.0 | 3356.9 | | | [redacted] | [redacted] | [redacted] | [redacted] |
| R300 | 4120.5 | 4120.3 | | | ↓ | ↓ | ↓ | ↓ |
| R301 | 3348.8 | 3348.8 | | | [redacted] | [redacted] | [redacted] | [redacted] |
| R302 | 4154.3 | 4154.1 | | | ↓ | ↓ | ↓ | ↓ |
| R303 | 4891.0 | 4890.8 | | | [redacted] | [redacted] | [redacted] | [redacted] |
| R304 | 3312.0 | 3311.9 | | | ↓ | ↓ | ↓ | ↓ |
| R305 | 3423.6 | 3423.5 | | | [redacted] | [redacted] | [redacted] | [redacted] |
| R306 | 3325.5 | 3325.6 | | | ↓ | ↓ | ↓ | ↓ |
| R307 | 3322.6 | 3322.4 | | | Harman | Accenta-2 | 0135P5035E | 1 |
| R308 | 3612.7 | 3612.5 | | | ↓ | ↓ | ↓ | ↓ |

Final Technician signature: [signature] Date: 4/21/15

# Calibrations

## EPA Method 28R, ASTM E2515, ASTM E2779

| ID # | Lab Name/Purpose | Log Name | Attachment Type |
|---|---|---|---|
| 1 | Calibrator Dry Gas Meter | Rockwell Int'l Standard Test Meter | Calibration Certificate |
| 23 | Scale-Analytical Balance | Mettler Analytical Balance | Calibration Certificate |
| 128 | Scale | Acculab V1200 | Calibration Log |
| 131 | 500 mg Weight | Ohaus Weight Standard, 500 mg | Calibration Certificate |
| 132 | 10 lb Weight | Weight Standard, 10 lb. | Calibration Certificate |
| 185 | Platform Scale | Weigh-Tronix Platform Scale | See Test Run Notes |
| 209 | Barometer | Barometer – Princo | Manual Cover |
| 283B | Calibration Weights | Troemner Metric Weight Standards | Calibration Certificate |
| 296-T54 | Tape Measure | DeWalt 16' Tape Measure | Calibration Log |
| 335 | Sample Box / Dry Gas Meter | Apex Automated Emissions Sampling Box | Calibration Log |
| 336 | Sample Box / Dry Gas Meter | Apex Automated Emissions Sampling Box | Calibration Log |
| 343 | Thermohygrometer | Omega Digital Thermohygrometer | Calibration Log |
| 410 | Microtector | Dwyer Microtector | Manual, Photograph |
| 420 | Flue Gas Analyzer | Infrared Gas Analyzer | See Test Run Notes |
| 559 | Vaneometer | Dwyer Vaneometer | Manual |

# CERTIFICATE OF CALIBRATION

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

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

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

All instruments used in the performance of the shown calibration have traceability to the National Institute of Standards and Technology (NIST). The uncertainty ratio between the calibration standards (DM.STD.) used and the unit under test (UUT) is a minimum of 4:1, unless otherwise noted. Calibration has been performed per the shown procedure number, in accordance with ISO 10012:2003, ISO 17025:2005, ANSI/NCSL-Z-540.3, and/or MIL-STD-45662A. Test methods: API2530-92 & ASME MFC-3M-1989.

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



Date: 10/23/2014

Approved By:

Calibration Technician:

# Certificate of Calibration

Certificate Number: **582510**

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

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

OnSite

PO: **Onsite 1/23/15**
Order Date: **01/23/2015**
Authorized By: **N/A**

A2LA ACCREDITED 0723.01 Calibration

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

Calibrated on: 01/23/2015
*Recommended Due: 07/23/2015
Environment: 22 °C 33 % RH
* As Received: Within Tolerance
* As Returned: Within Tolerance
Action Taken: Calibrated
Technician: 111

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

## Standards Used

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

## Measurement Data

| Parameter / Measurement Description | Range Unit | Reference | Min | Max | [k]Error | UUT | Uncertainty Accredited = ✓ |
|---|---|---|---|---|---|---|---|
| **Before/After** | | | | | | | |
| **Force** | | | | | | | |
| | g | 1.00000 | 0.9995 | 1.0005 | 0.0001 | 0.9999 g | 6.9E-05 ✓ |
| | g | 40.00000 | 39.9995 | 40.0005 | 0.0000 | 40.0000 g | 1.2E-04 ✓ |
| | g | 80.00000 | 79.9995 | 80.0005 | 0.0002 | 79.9998 g | 1.7E-04 ✓ |
| | g | 120.00000 | 119.9995 | 120.0005 | 0.0003 | 119.9997 g | 3E-04 ✓ |
| | g | 160.00000 | 159.9995 | 160.0005 | 0.0004 | 159.9996 g | 3.3E-04 ✓ |
| | g | 200.00000 | 199.9995 | 200.0005 | 0.0004 | 199.9996 g | 5.8E-04 ✓ |



Reviewer

3 Issued 01/29/2015 Rev # 15

Inspector

# ANALYTICAL BALANCE CALIBRATION DATA SHEET

Balance to be calibrated: Acculab V-1200 Electronic Field Balance

ID Number: OMNI-00128

ID Number of Standard Calibration Weights: OMNI-00283 A + B

Date: 2/3/2015 By: J. Clark

| Standard Weight (A) (grams) | Weight Verified (B) (grams) | Difference (A - B) |
|---|---|---|
| 1000.0 | 999.9 | +0.1 |
| 500.0 | 500.0 | 0.0 |
| 200.0 | 199.9 | 0.1 |
| 100.0 | 99.9 | 0.1 |
| 50.0 | 49.9 | 0.1 |
| 20.0 | 19.9 | 0.1 |

*This calibration is traceable to NIST using calibrated standard weights.*

Technician signature: _____ Date: 2/3/2015

# Certificate of Calibration

Certificate Number: **547339**

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

0723.01
Calibration

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

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

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

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

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

Refer to attachment for measurement results.

## Standards Used

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

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

Reviewer _____ 3 Issued 12/06/2013 Rev # 14 Inspector _____

# SCALE WEIGHT CALIBRATION DATA SHEET

Weight to be calibrated: 10 lb

ID Number: 132

Standard Calibration Weight: 10 lb

ID Number: 256

Scale Used: MTW-150K

ID Number: 353

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

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

*Acceptable tolerance is 1%.

*This calibration is traceable to NIST using calibrated standard weights.*

Technician signature: Date: 2/19/13

ATTN: BRUCE DAVIS

Weigh-Tronix, Inc.
7933-SW Nimbus Ave, #28
Beaverton, OR 97005
503-626-3008
1-800-870-3008

# WEIGH-TRONIX

## SERVICE WORK ORDER

SHIP TO
NAME OMNI ENVIRONMENTAL SERVICES
ADDRESS 5465 SW WESTERN AVE
CITY BEAVERTON STATE OR ZIP 97075
PHONE 503 - 643-3788
FAX
CONTACT Bruce or Richard

JOB No. 111491
CUSTOMER No.
Order Date / /
Start Date / /
Complete Date 1 / 11 / 99

BILL TO
NAME
ADDRESS PO BOX 743
CITY STATE ZIP
ATTN:

P.O. No. 99-007

## EQUIPMENT

| S/N | Location | Type | Cap. | Recommendations and Remarks |
|---|---|---|---|---|
| 5417 | | WI-127 | 1K | 10,000 DIV |
| 21676 | | 3030 | 1K | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

## COMMENTS

Rental 1 Month

Set up calibrated 1000 x 0.1 LB per, cadex tested, good.

## PARTS

2.5

| Qty. | Description | Price | Total |
|---|---|---|---|
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

ZONE _____ VEHICLE _____
TECHNICIAN LD

### SERVICE SUMMARY

| Reg. | Agree. | Pref. | Inst. |
|---|---|---|---|
| _____ Hrs. @ _____ | | | |
| Mileage | | | |
| Parts | | | |
| Shop Supplies | | | |
| Other | | | |
| TOTAL | | | |

THIS IS NOT AN INVOICE

I acknowledge all service has been performed satisfactorily, as stated above. All parts installed are warranted for thirty days from this date.

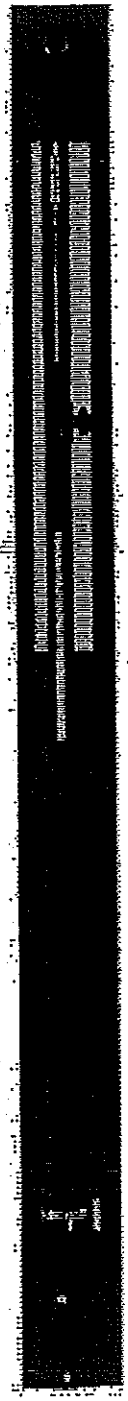
Authorized Signature Bruce Davis

WEIGH-TRONIX
Rental / Sales / Service

Print Name Bruce Davis

DAMAGE TO RENTAL/DEMO EQUIPMENT IS SOLELY THE RESPONSIBILITY OF THE USER WHILE IN THEIR POSSESSION!

DISTRIBUTION: WHITE – OFFICE YELLOW – FILE PINK – CUSTOMER



452
National
Weather
Service
Type

# Instruction Booklet

for use with

# PRINCO

Fortin type mercurial

# Barometers

469
NOVA™
Economy
Model

*Manufactured by*

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

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

# Certificate of Calibration

Certificate Number: 466281

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

0723.01

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

PO: OTL-10-085
Order Date: 12/20/2010
Authorized By: N/A

Property #: OMNI-00283B
User: N/A
Department: N/A
Make: Troemner Inc
Model: 200g-2Kg
Serial #: 47883
Description: Mass Set, 5 pc
Procedure: DCN 500901
Accuracy: Class 4

Calibrated on: 12/21/2010
*Recommended Due: 12/21/2015
Environment: 18 °C 40 % RH
As Received: Within Tolerance
As Returned: Within Tolerance
Action Taken: Calibrated
Technician: 92

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

## Standards Used

| Std ID | Manufacturer | Model | Nomenclature | Due Date | Trace ID |
|---|---|---|---|---|---|
| 383A | Setra | 2000C | Scale, Digital 2 Kgm | 03/25/2011 | 448104 |
| 479A | Sartorius | MC210S | Scale 210g | 11/08/2011 | 461792 |
| 432A | Sartorius | C-44 | Microbalance 5.1g | 11/08/2011 | 461791 |
| 503A | Rice Lake | 1mg-200g (Class O) | Mass Set | 11/08/2011 | 460936 |
| 515A | Sartorius | LA1200S | Balance, Electronic 1200g | 12/13/2011 | 465509 |

## Measurement Data

| Parameter / Measurement Description | Range | Unit | Reference | UUT | Variance | Min | Max | Uncertainty | |
|---|---|---|---|---|---|---|---|---|---|
| **Before/After** | | | | | | | | | Accredited = ✓ |
| **Mass** | | | | | | | | | |
| | | g | 200.00000 | 200.0031 | -0.00314 | 199.99600 | 200.00400 | 0.0003 | ✓ |
| Dot | | g | 200.00000 | 200.0038 | -0.00377 | 199.99600 | 200.00400 | 0.0003 | ✓ |
| | | g | 500.00000 | 500.0056 | -0.00555 | 499.98999 | 500.01001 | 0.0027 | ✓ |
| | | g | 1000.0000 | 1000.017 | -0.0172 | 999.9800 | 1000.0200 | 0.0029 | ✓ |
| | | g | 2000.0000 | 2000.028 | -0.0283 | 1999.9600 | 2000.0400 | 0.036 | ✓ |

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

Carolyn S Johansen
Reviewer

6 Issued 12/22/2010 Rev # 14

Inspector

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

# Tape Measure Calibration Log

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

CALIBRATED USING OMNI - 00281

| Tape Measure Number | Description | Cal Dates | | | | Technician Initials | | | |
|---|---|---|---|---|---|---|---|---|---|
| 00296-T32 | Stanley FatMax 16' | 7/25/12 | 7/2/13 | 7/8/14 | | JC | JC | JC | |
| 00296-T51 | Ace 26' Tape Measure | 9/7/12 | 9/13/13 | 9/23/14 | | JC | JC | JC | |
| -T52 | Stanley PowerLock 26' | 9/7/12 | 9/13/13 | 9/22/14 | | JC | JC | JC | |
| -T53 | Stanley PowerLock 16' | 9/7/12 | | | | JC | | | |
| -T11 | Stanley intermatic Tape Measure (cm) | 11/30/12 | 2/28/14 | | | JC | JC | | |
| -T21 | MTH Tape Measure (cm) | 11/30/12 | 11/21/13 | | | JC | JC | | |
| -T30 | Workforce Tape Measure | 11/30/12 | | | | JC | | | |
| -T31 | Stanley Powerlock Tape Measure | 11/30/12 | 11/21/13 | 11/18/14 | | JC | JC | JC | |
| -T47 | Workforce Tape Measure | 11/30/12 | 11/21/13 | 11/26/14 | | JC | JC | JC | |
| -T36 | Stanley FatMax 16' Tape Measure | 11/30/12 | 11/21/13 | 11/18/14 | | JC | JC | JC | |
| ~~-T42~~ -T40 | Stanley FatMax 16' Tape Measure | 11/30/12 | 11/21/13 | 11/18/14 | | JC | JC | JC | |
| -T54 | DeWalt 16' Tape Measure | 12/20/12 | 12/17/13 | 12/29/14 | | JC | JC | JC | |
| -T55 | DeWalt 16' Tape Measure | 12/20/12 | 12/18/13 | 12/29/14 | | JC | JC | JC | |
| -T56 | DeWalt 25' Tape Measure | 12/20/12 | 12/17/13 | 12/16/14 | | JC | JC | JC | |
| -T57 | DeWalt 25' Tape Measure | 12/20/12 | 12/17/13 | 12/16/14 | | JC | JC | JC | |
| -T58 | DeWalt 25' Tape Measure | 12/20/12 | 12/17/13 | 12/16/14 | | JC | JC | JC | |
| -T59 | DeWalt 25' Tape Measure | 12/20/12 | 12/17/13 | 12/16/14 | | JC | JC | JC | |
| -T42 | Stanley PowerLock 26' Tape Measure | 11/21/13 | 11/18/14 | | | JC | JC | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |

# Thermal Metering System Calibration
# Y Factor

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

| Average Gas Meter y Factor | Orifice Meter dH@ |
|---|---|
| 1.004 | N/A |

| | | |
|---|---|---|
| Calibration Date: | 12/03/14 | |
| Calibrated by: | J. Clark | |
| Calibration Frequency: | 6 months | |
| Next Calibration Due: | 6/3/2015 | |
| Instrument Range: | 1.000 | cfm |
| Standard Temp.: | 68 | oF |
| Standard Press.: | 29.92 | "Hg |
| Barometric Press., Pb: | 29.9 | "Hg |
| Signature/Date: | | 12/3/14 |

**Previous Calibration Comparision**

| | | Acceptable Deviation (5%) | Deviation |
|---|---|---|---|
| Date | 5/20/2014 | | |
| y Factor | 1.006908284 | 0.050345414 | 0.002 |
| Acceptance | Acceptable | | |

**Current Calibration**

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

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

| Calibration Parameters | Run 1 | Run 2 | Run 3 |
|---|---|---|---|
| Reference Meter Pressure ("H2O), Pr | 0.00 | 0.00 | 0.00 |
| DGM Pressure ("H2O), Pd | 1.71 | 2.36 | 0.72 |
| Initial Reference Meter | 429.564 | 437.67 | 444.204 |
| Final Reference Meter | 437.612 | 444.184 | 451.477 |
| Initial DGM | 0 | 0 | 0 |
| Final DGM | 8.127 | 6.577 | 7.435 |
| Temp. Ref. Meter (°F), Tr | 63.5 | 65.2 | 66.5 |
| Temperature DGM (°F), Td | 75.0 | 78.0 | 80.0 |
| Time (min) | 44.0 | 30.0 | 62.0 |
| Net Volume Ref. Meter, Vr | 8.048 | 6.514 | 7.273 |
| Net Volume DGM, Vd | 8.127 | 6.577 | 7.435 |
| Gas Meter y Factor = | 1.006 | 1.007 | 1.000 |
| Gas Meter y Factor Deviation (from avg.) | 0.002 | 0.003 | 0.004 |
| Orifice dH@ | N/A | N/A | N/A |
| Orifice dH@ Deviation (from avg.) | N/A | N/A | N/A |

where:

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

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

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

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

** Equations come from EPA Method 5

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

# Temperature Calibration
# EPA Method 28 and 5G

| Booth: | Temperature Monitor Type: | Identification Number: |
|---|---|---|
| E1 | Type K Thermocouple | OMNI-00335 |

| Reference Temperature Monitor Type: | Identification Number: |
|---|---|
| OMEGA Calibrator Model CL20 | OMNI-00373 |

| Calibration Performed By: | Date: | Ambient Temperature: | Barometric Pressure: |
|---|---|---|---|
| J. Clark | 12/3/14 | 65 °F | 29.88 in Hg |

| Reference Point Source | Temperature Monitor (EF) | | | | | |
|---|---|---|---|---|---|---|
| | Method 28 Room | Method 5G Dilution Tunnel | | | | |
| OMEGA Thermocouple Simulator | | Meter (Tm) | Filters (Tf) | Tunnel (Tt) | Stack (Ts) | DB |
| 0 | 0 | 0 | 1 | 0 | 0 | N/A |
| 100 | 100 | 100 | 100 | 100 | 100 | |
| 300 | 300 | 300 | 300 | 300 | 300 | |
| 500 | 501 | 500 | 501 | 500 | 500 | |
| 700 | 701 | 700 | 701 | 700 | 700 | |

Technician signature: _____ Date: 12/3/14

# DIFFERENTIAL PRESSURE GAUGE CALIBRATION DATA SHEET
## 0-1" Magnehelic Gauge

Range: 0-1" WC ID Number: OMNI-00335 (B)

Calibration Instrument: Digital Manometer (A) ID Number: OMNI-00395

Date: 12/3/14 By: J. Clark

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

| Range of Calibration Point ("WC) | Digital Manometer (A) ("WC) | Magnehelic Gauge (B) ("WC) | Difference (A - B) | % Error of Full Span* |
|---|---|---|---|---|
| 0.0 – 0.2 | 0.20 | 0.202 | -0.002 | -0.20 |
| 0.2 – 0.4 | 0.36 | 0.363 | -0.003 | -0.30 |
| 0.4 – 0.6 | 0.52 | 0.519 | 0.001 | 0.10 |
| 0.6 – 0.8 | 0.79 | 0.794 | -0.004 | -0.40 |
| 0.8 – 1.0 | 0.99 | 0.984 | 0.006 | 0.60 |

*Acceptable tolerance is 4%.

The uncertainty of measurement is ±0.1" WC. This is based on the reference standard having a TAR (Test Accuracy Ratio) of at least 4:1.

Technician signature: _____ Date: 12/3/14

Reviewed by: _____ Date: 12-03-14

# Thermal Metering System Calibration
# Y Factor

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

| Average Gas Meter y Factor | Orifice Meter dH@ |
|---|---|
| 1.007 | N/A |

| | | |
|---|---|---|
| Calibration Date: | 12/03/14 | |
| Calibrated by: | J. Clark | |
| Calibration Frequency: | 6 months | |
| Next Calibration Due: | 6/3/2015 | |
| Instrument Range: | 1.000 | cfm |
| Standard Temp.: | 68 | oF |
| Standard Press.: | 29.92 | "Hg |
| Barometric Press., Pb: | 29.88 | "Hg |
| Signature/Date: | | 12/3/14 |

**Previous Calibration Comparision**

| | | Acceptable Deviation (5%) | Deviation |
|---|---|---|---|
| Date | 5/20/2014 | | |
| y Factor | 1.014494292 | 0.050724715 | 0.008 |
| Acceptance | Acceptable | | |

**Current Calibration**

| | |
|---|---|
| Acceptable y Deviation | 0.020 |
| Maximum y Deviation | 0.005 |
| Acceptable dH@ Deviation | N/A |
| Maximum dH@ Deviation | N/A |
| Acceptance | Acceptable |

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

| Calibration Parameters | Run 1 | Run 2 | Run 3 |
|---|---|---|---|
| Reference Meter Pressure ("H2O), Pr | 0.00 | 0.00 | 0.00 |
| DGM Pressure ("H2O), Pd | 1.75 | 2.22 | 0.78 |
| Initial Reference Meter | 451.511 | 458.531 | 465.879 |
| Final Reference Meter | 458.531 | 465.847 | 474.223 |
| Initial DGM | 0 | 0 | 0 |
| Final DGM | 7.015 | 7.342 | 8.428 |
| Temp. Ref. Meter (°F), Tr | 65.9 | 65.9 | 67.7 |
| Temperature DGM (°F), Td | 73.0 | 77.0 | 76.0 |
| Time (min) | 34.0 | 32.0 | 60.0 |
| Net Volume Ref. Meter, Vr | 7.020 | 7.316 | 8.344 |
| Net Volume DGM, Vd | 7.015 | 7.342 | 8.428 |
| Gas Meter y Factor = | 1.008 | 1.010 | 1.002 |
| Gas Meter y Factor Deviation (from avg.) | 0.001 | 0.003 | 0.005 |
| Orifice dH@ | N/A | N/A | N/A |
| Orifice dH@ Deviation (from avg.) | N/A | N/A | N/A |

where:

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

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

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

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

** Equations come from EPA Method 5

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

# Temperature Calibration
# EPA Method 28 and 5G

| BOOTH: | TEMPERATURE MONITOR TYPE: | IDENTIFICATION NUMBER: |
|---|---|---|
| E1 | Type K Thermocouple | OMNI-00336 |

| REFERENCE TEMPERATURE MONITOR TYPE: | IDENTIFICATION NUMBER: |
|---|---|
| OMEGA Calibrator Model CL20 | OMNI-00373 |

| CALIBRATION PERFORMED BY: | DATE: | AMBIENT TEMPERATURE: | BAROMETRIC PRESSURE: |
|---|---|---|---|
| J. Clark | 12/3/14 | 65 °F | 29.88 in Hg |

| Reference Point Source | Temperature Monitor (EF) | | | | | |
|---|---|---|---|---|---|---|
| | Method 28 Room | Method 5G Dilution Tunnel | | | | |
| OMEGA Thermocouple Simulator | | Meter (Tm) | Filters (Tf) | Tunnel (Tt) | Stack (Ts) | DB |
| 0 | 0 | 0 | 1 | 0 | 0 | N/A |
| 100 | 100 | 100 | 101 | 100 | 100 | |
| 300 | 300 | 300 | 301 | 300 | 300 | |
| 500 | 500 | 500 | 501 | 500 | 500 | |
| 700 | 700 | 700 | 701 | 700 | 700 | |

Technician signature: _____ Date: 12/3/14

# DIFFERENTIAL PRESSURE GAUGE CALIBRATION DATA SHEET
## 0-1" Magnehelic Gauge

Range: 0-1" WC ID Number: OMNI-00336 (B)

Calibration Instrument: Digital Manometer (A) ID Number: OMNI-00395

Date: 12/3/14 By: J. Clark

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

| Range of Calibration Point ("WC) | Digital Manometer (A) ("WC) | Magnehelic Gauge (B) ("WC) | Difference (A - B) | % Error of Full Span* |
|---|---|---|---|---|
| 0.0 – 0.2 | 0.16 | 0.159 | 0.001 | 0.10% |
| 0.2 – 0.4 | 0.32 | 0.317 | 0.003 | 0.30% |
| 0.4 – 0.6 | 0.49 | 0.507 | -0.008 | -0.80% |
| 0.6 – 0.8 | 0.72 | 0.723 | -0.003 | -0.30% |
| 0.8 – 1.0 | 1.00 | 1.003 | -0.003 | -0.30% |

*Acceptable tolerance is 4%.

The uncertainty of measurement is ±0.1" WC. This is based on the reference standard having a TAR (Test Accuracy Ratio) of at least 4:1.

Technician signature: _____ Date: 12/3/14

Reviewed by: _____ Date: 12-03-14

# VWR Temperature Hygrometer Calibration Procedure and Data Sheet

Frequency: Every Two Years

Step 1: Locate NIST traceable standard.

Step 2: Place unit to be calibrated, tracking No. OMNI-00343, inside OMNI desiccate box on the same shelf with the NIST traceable standard.

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

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

**Verification Data:**

Date: 9/16/13 Technician: J. Clark

Time in desiccate: 16:30 9/12/13 Recording time: 12:30 9/16/13

NIST Standard Temperature: 76.9 °F NIST Standard Humidity: 11.8 %

Test Unit Temperature Reading: 77.0 °F Test Unit Humidity Reading: 10.0 %

Test unit OMNI- 00343 is ✓ or was not ___ within acceptable limits.

Technician Signature: _____

Comments: _____

### Negative Pressure or Vacuum Measurement

ro the gage. Connect the source of cuum or negative pressure to the right e gage connection (5) and proceed as scribed under Positive Pressure Mea-rement Section above. Remember that e pressure measured in this way is gative.

### Differential Pressure Measurement

fferential pressures may be measured connecting the higher (more positive) ssure to the left connection (2) and e lower pressure to the right connection ).

### Storage

rn meter circuit switch to "off" posi-n and withdraw "hook" point well ar of fluid (by turning Micrometer unter-clockwise) when gage is not in e. This will conserve the batteries and nimize build-up of oxides, etc., on the ook." Keep the unit covered and in an a free of strong solvent fumes.

### Maintenance

hen the meter reading becomes reduced the pointer movement gets sluggish ith circuit on and "hook" point in uid), the following should be done:

Remove the hook point (by unscrew-ing) and clean the tip lightly using fine crocus cloth. Wipe off all grit and dirt with a clean rag, reassemble and recheck meter operation.

If the meter operation continues to be sluggish, replace the size AA, 1½ volt battery. (Replace the battery at least once a year to avoid deteriora-tion of battery and damage to gage. Leakproof alkaline battery is recom-mended.)

o replace the battery, remove center rew (10) located in the back of the electronic enclosure. Cover (9) will come off exposing the battery. Pull the old battery out and push a new battery into the battery holder with the positive (cen-ter) terminal to the right (to the end marked with a + on the holder).

If the fluid becomes contaminated and requires replacement; empty old fluid from gage; flush out with clear water and replace with distilled water and Dwyer A126 Fluorescein Green Color Concen-trate mixed 3/4 oz. concentrate to each quart of water. (CAUTION: Do not substitute other gage fluids as proper gage operation depends on use of the specified gage fluid to provide proper surface tension, wetting ability and electrolyte capability with unity specific gravity.)

If the gage bore is very dirty, a mild soap solution may be used to aid in cleaning prior to flushing with clear water. (CAUTION; Do not clean with liquid soaps, special solvents, degreasers, aro-matic hydro-carbons, etc. Such cleaners and solvents frequently contain chlorine, fluorine, acetone and related compounds which will permanently damage the gage, and prevent proper operation.)

If meter becomes inoperative and cannot be made to operate properly by cleaning "hook" tip or replacing battery, return the entire gage to Dwyer Instruments, Inc., for service.

*"Microtector" ®*
*A Product From*
*Dwyer Instruments, Inc.*
*"The Low Pressure People"*

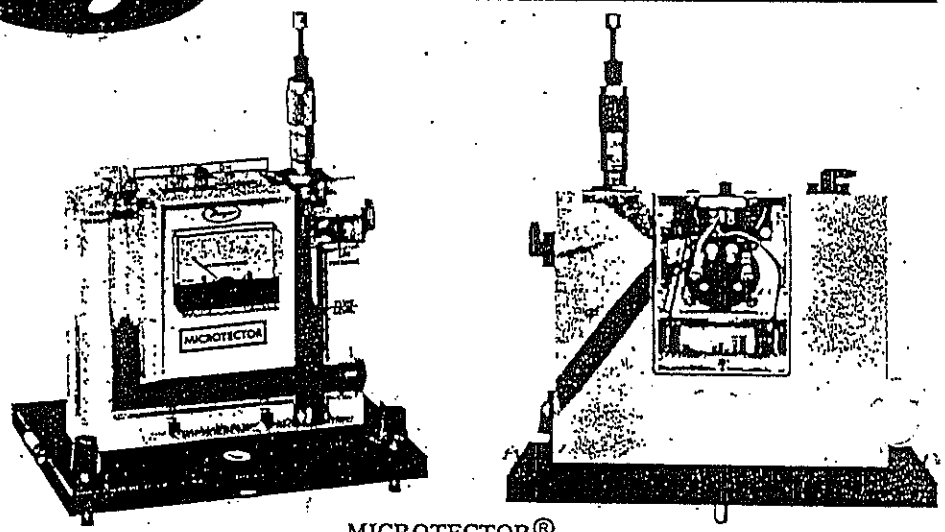


38-440190-00

DWYER INSTRUMENTS, INC.
P. O. Box 373 Michigan City, Indiana 46360 U.S.A.
Phone: Area 219/872-9141
Direct Chicago Line: Area 312/733-7883

# MICROTECTOR®

## Operating and Maintenance Instructions



## MICROTECTOR®
## Specifications and Features*

Time Proven Hook Gage Manometer Combined with Modern Electronics For Easier, Faster, more Accurate Precision Pressure Measurements.

~~Accurate and Repeatable to ±.0002 inches water column (.000009 P.S.I.).~~

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 Dwyer Color and Wetting Agent Concentrate.

Convenient, Portable, Light Weight, and Self-Contained, the Unit Requires No External Power Connections and is Operated by a 1½ Volt Penlight Cell.

A.C. Detector Current Eliminates Hook Plating, Fouling and Erosion.

Micrometer Complies with Federal Specification GGG-C-105A and is Traceable to a Master at the National Bureau of Standards.

Three Point Mounting with Dual Leveling Adjustment and Circular Level Assure Rapid Set Up.

Durablock® Precision Machined Acrylic Plastic Gage Body.

Sensitive 0-50 Microamp D.C. Meter Acts as Detector and Also Indicates Battery and Hook Probe Condition.

Heavy One Half Inch Thick Steel Base Plate Provides Steady Mounting.

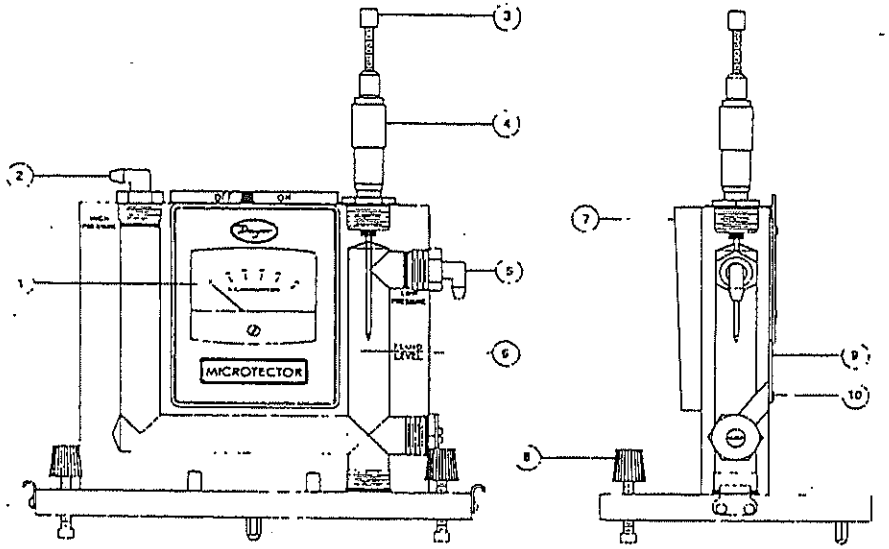
Top Quality Glass Epoxy Circuit Board and Solid State-Integrated Circuit Electronics.

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 Fluorscein Green Color Concentrate with Wetting Agent.

**Patent Applied For*




## MICROTECTOR® GAGE

### Precision Pressure Measurement

The Dwyer Microtector® combines the time proven principles of the Hook Gage type manometer and modern solid state integrated circuit electronics. It provides an inexpensive means of achieving accuracy and repeatability within ± .00025 inches water column throughout its 0 to 2 inches w.c. range. It is truly a new standard in precision pressure measuring devices.

### Principles of Operation

A pressure to be measured is applied to the manometer fluid which is displaced in each leg of the manometer by an amount equal to ½ the applied pressure. A micrometer mounted point is then lowered until contacts the manometer gage fluid. The instant of contact is detected by completion of a low power A.C. circuit. Current for this circuit is supplied by a 1½ volt penlight cell feeding two semiconductor amplifiers which act as a free-running multivibrator operating at a frequency of approximately two kilohertz. Completion of the A.C. circuit activates a bridge rectifier which provides the signal for indication on a sensitive (0 to 50 microamps) D.C. microammeter.

On indication of contact the operator stops lowering the point and reads the micrometer which indicates one half the applied pressure. By interpolating eight divisions, (each being .000125" w.c.) between .001 micrometer graduations, a total accuracy of .00025 can easily be achieved. The micrometer complies with Federal Specification GGG-C-105A and is traceable to a master at the National Bureau of Standards.

### Locating and Opening

Stand the Microtector® and case on a firm flat level surface. Remove the cover by releasing the latches and lifting straight up. If it is necessary to move the gage without case, handle only the base plate or clear acrylic block. (CAUTION: Do not handle gage by grasping meter-electronic package housing Item 7 on drawing.)



### Fluid Level

Level the gage by adjusting the two front leveling screws (Item 8 on drawing) until the bubble in the spirit level is centered in the small circle. After leveling the gage, open both rapid shut off valve tube connectors (2 and 5). Back off the Micrometer (4), if necessary, to make sure that the point is not immersed in the gage fluid. The fluid level in the gage should now coincide with the mark on the right hand bore plus or minus approximately 1/32 inch (6). If the level of fluid is too high, fluid can be removed with an eye dropper pipette or carefully poured out of the right connection (5). If the level is too low, remove the top left rapid shut off valve tube connector (2), and add distilled water pre-mixed with the proper amount of Dwyer green concentrate. (See maintenance instruction for proportions.) After correcting the fluid level, reinstall the rapid shut off connectors and with them in the open position, relevel the Microtector.® The gage is now ready to be zeroed.

### Zeroing

Turn the Micrometer barrel (4) until its lower end just coincides with the zero mark on the internal vertical scale *and* the zero on the barrel scale coincides with the vertical line on the internal scale. Note that the internal scale is graduated every .025" from 0 to 1.00 inch and the barrel scale is graduated in one thousandths from 0 to .025." Turn the meter circuit switch at the top of gage to the "on" position. While holding the barrel at the zero position (and with the gage level), raise or lower the point by turning the top knurled knob (3) until the point is above, but near the fluid.

Check to be sure that the meter (1) registers zero. Watch the meter, hold the barrel (4) and lower the point slowly by turning the top knurled knob (3). As the knob is turned, the point will contact the fluid and the meter pointer will move from zero to some upscale position. After making contact, turn the point out of the fluid by turning the Micrometer barrel counter-clockwise to a reading of .010 or more. Again watch the meter and, this time, lower the point by turning the Micrometer barrel. The point position where the meter pointer begins to move up scale is the zero position. This position should correspond to zero reading on the Micrometer. Adjust the point in relation to the Micrometer barrel by turning the top knob while holding the barrel steady. Repeat lowering the point, watching the meter for contact, and adjusting the point until the zero position and zero reading exactly coincide. The gage is now zeroed and should not be moved.

An alternate method of zeroing and reading can be used wherein, instead of zeroing the gage completely, a zero correction reading is taken and recorded then subtracted from the final read. Comparable results can be obtained with either method.

### Positive Pressure Measurement

With the fluid at its proper level, a pressure of 2.0" water column maximum can be measured. Positive pressure should be applied to the top left connection (2) with the Micrometer zeroed as described above. This will permit simple direct reading to be taken.

After an unknown pressure has been applied at the top left connection, the fluid level will drop in the left bore and rise over the point in the right bore. Note the indicating meter point has moved upscale because the point is immersed in the fluid. Turn the Micrometer counter-clockwise until the point leaves the fluid as indicated by the meter pointer dropping to zero or scale. Then slowly turn the Micrometer down until its point just touches the fluid surface causing movement of the meter pointer. Withdraw the point and repeat several times noting each time the Micrometer reading where the meter pointer movement begins. The average of these readings multiplied by two is the pressure applied to the gage. (Avg. reading x 2 = pressure applied in inches w.c. The degree of uncertainty for the operator and instrument is indicated by the difference in these readings.)

When the readings are complete the pressure should be removed and the zero-setting of the Microtector® rechecked. Any change in the zero position will indicate inaccurate readings. Should this happen the zero-set and pressure measurement procedure should be repeated.

BULLETIN NO. H-11

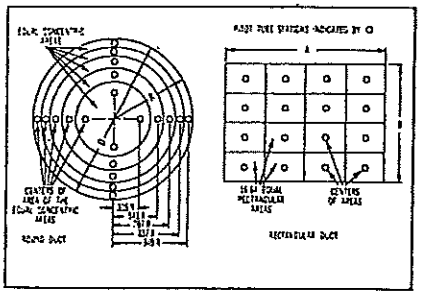
# AIR VELOCITIES WITH THE DWYER PITOT TUBE

## AIR VELOCITY

The total pressure of an air stream flowing in a duct is the sum of the static or bursting pressure exerted upon the sidewalls of the duct and the impact or velocity pressure of the moving air. Through the use of a pitot tube connected differentially to a manometer, the velocity pressure alone is indicated and the corresponding air velocity determined.

For accuracy of plus or minus 2%, as in laboratory applications, extreme care is required and the following precautions should be observed:

1. Duct diameter 4" or greater.
2. Make an accurate traverse per sketch at right, calculate the velocities and average the readings.
3. Provide smooth, straight duct sections a minimum of 8½ diameters in length upstream and 1½ diameters downstream from the pitot tube.
4. Provide an egg crate type straightener upstream from the pitot tube.



In making an air velocity check select a location as suggested above, connect tubing leads from both pitot tube connections to the manometer and insert in the duct with the tip directed into the air stream. If the manometer shows a minus indication reverse the tubes. With a direct reading manometer, air velocities will now be shown in feet per minute. In other types, the manometer will read velocity pressure in inches of water and the corresponding velocity will be found from the curves in this bulletin. If circumstances do not permit an accurate traverse, center the pitot tube in the duct, determine the center velocity and multiply by a factor of .9 for the approximate average velocity. Field tests run in this manner should be accurate within plus or minus 5%.

The velocity indicated is for dry air at 70°F., 29.9" Barometric Pressure and a resulting density of .075#/cu. ft. For air at a temperature other than 70°F. refer to the curves in this bulletin. For other variations from these conditions, corrections may be based upon the following data:

$$\text{Air Velocity} = 1096.2 \sqrt{\frac{Pv}{D}}$$

where Pv = velocity pressure in inches of water
D = Air density in #/cu. ft.

$$\text{Air Density} = 1.325 \times \frac{P_B}{T}$$

where $P_B$ = Barometric Pressure in inches of mercury
T = Absolute Temperature (indicated temperature °F plus 460)

Flow in cu. ft. per min. = Duct area in square feet x air velocity in ft. per min.





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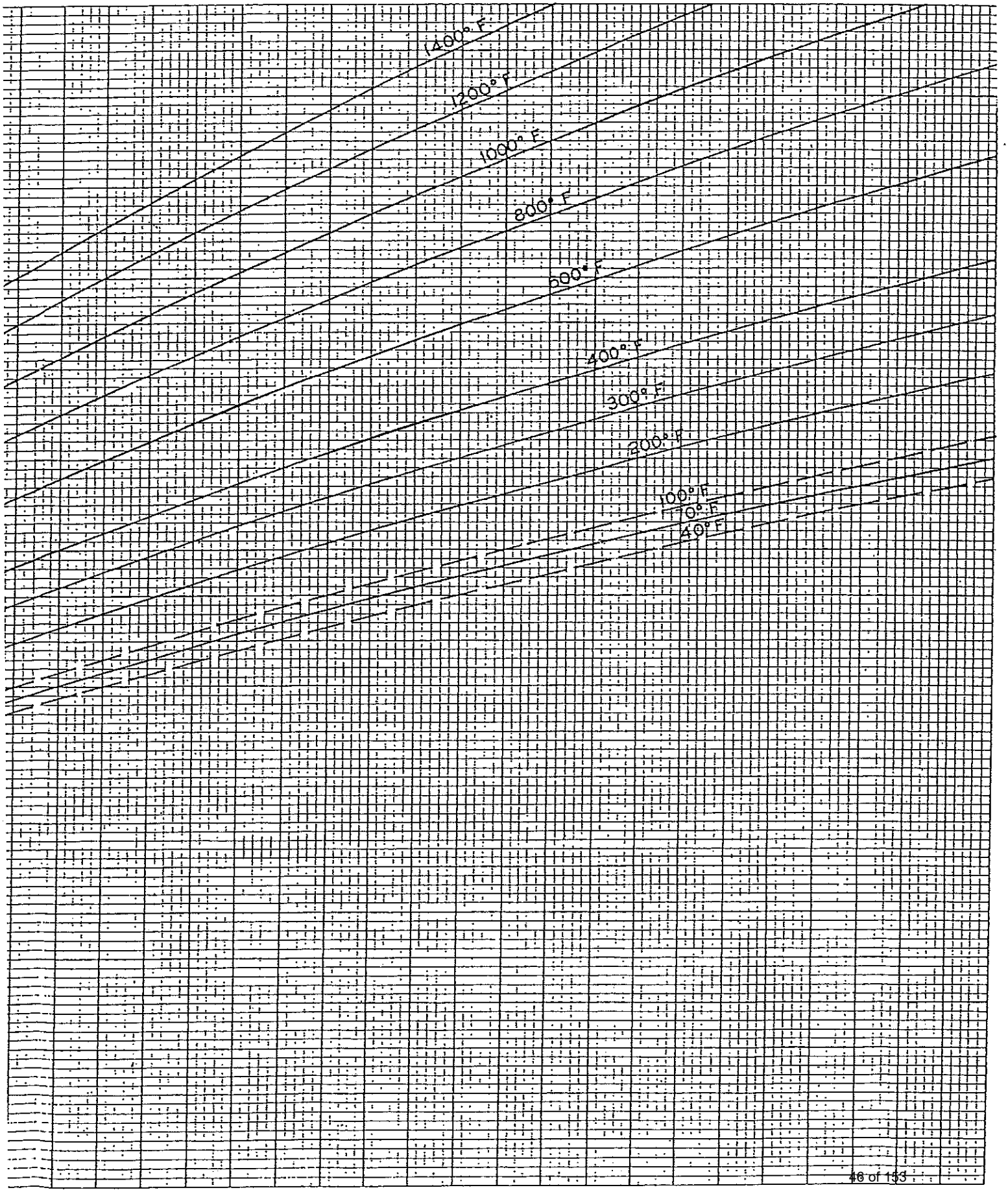
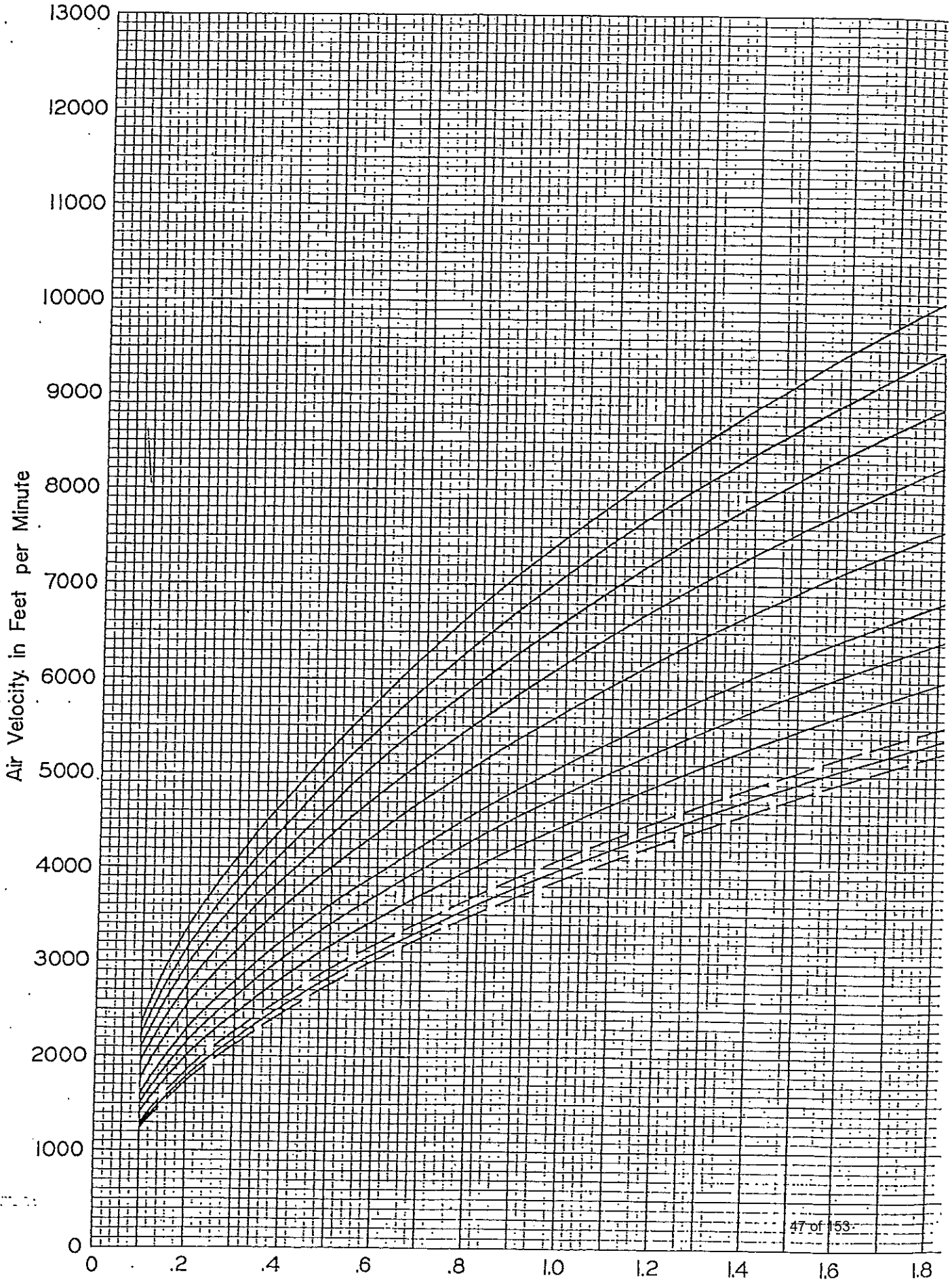
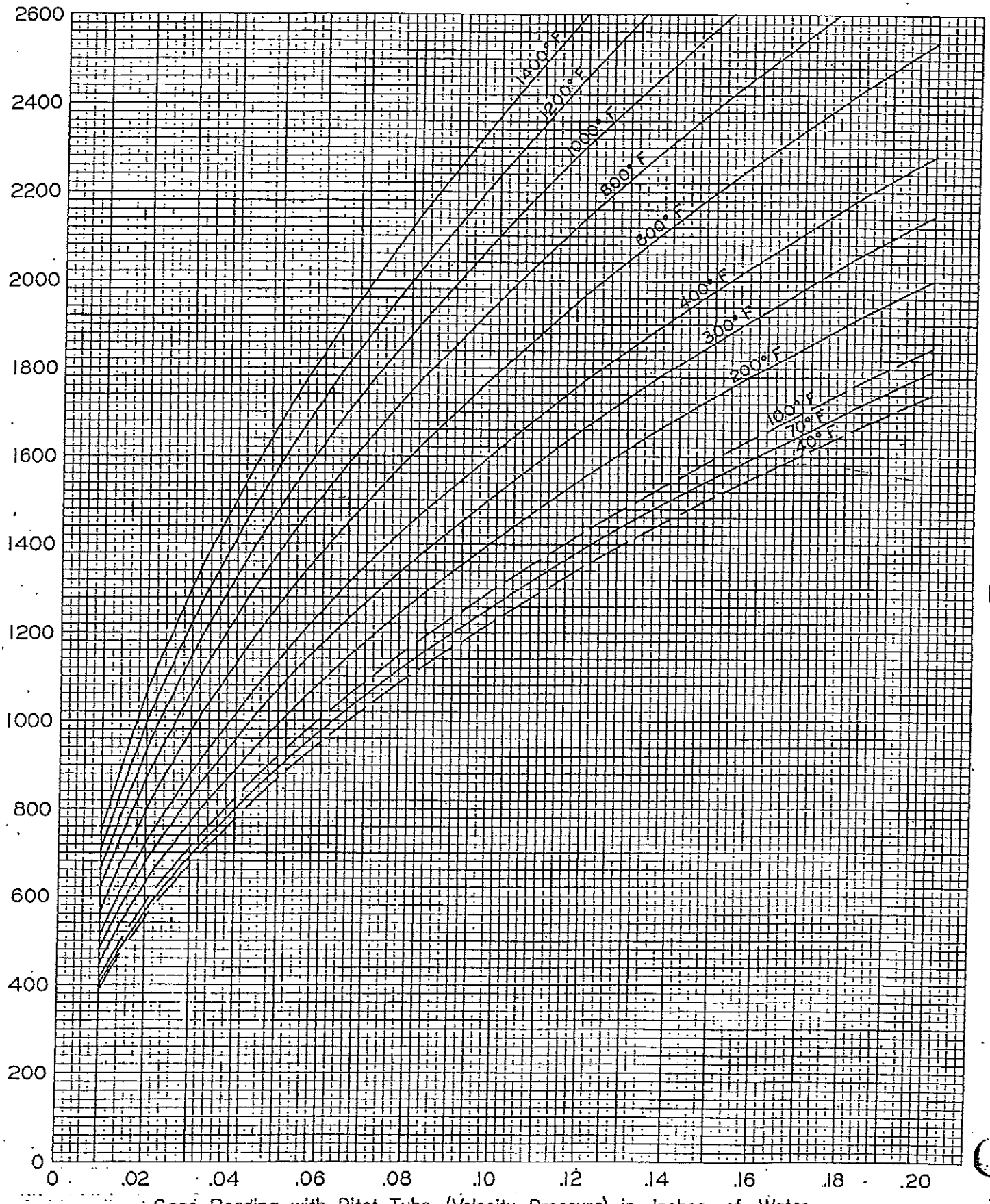
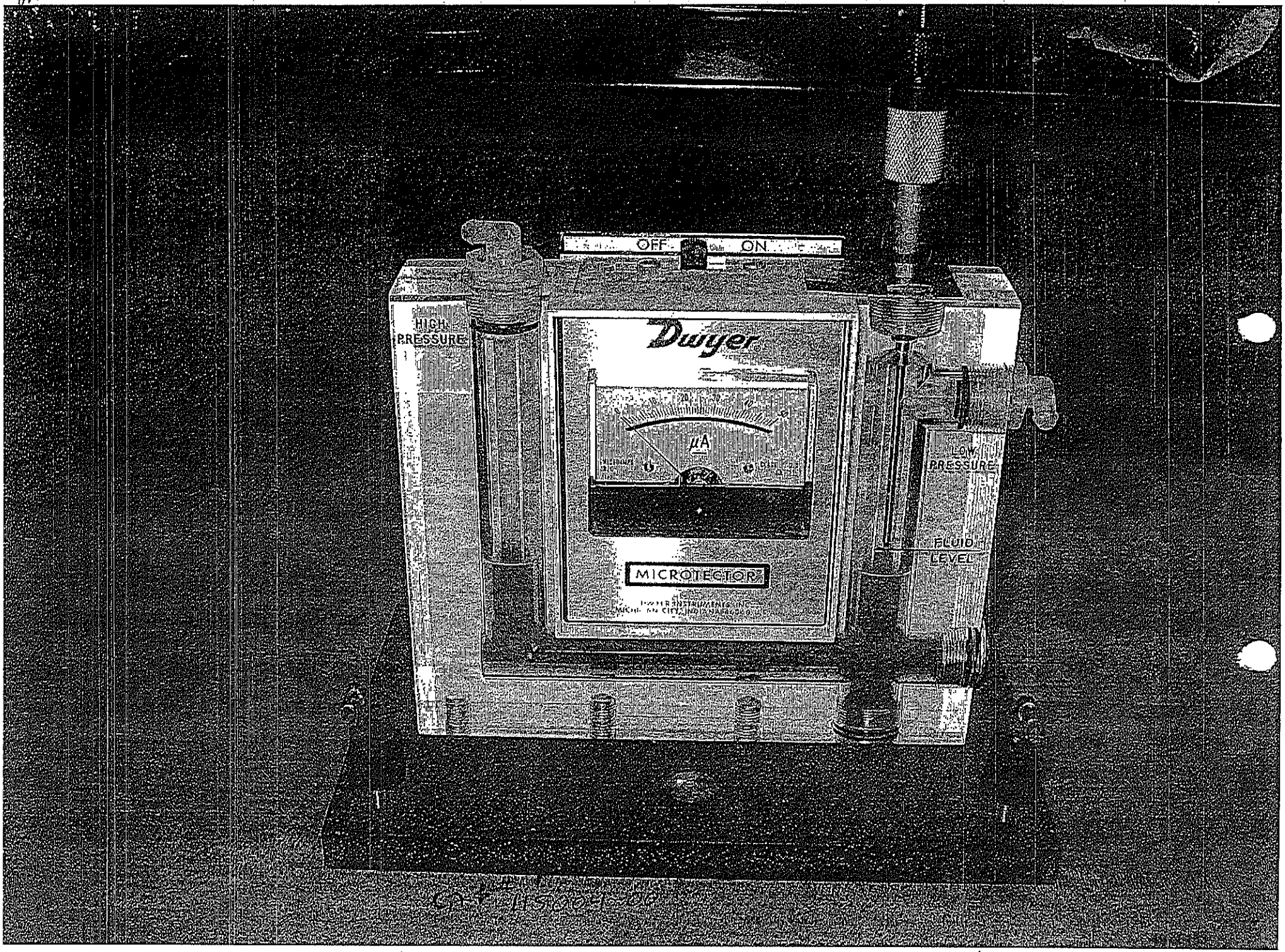

1400° F
1200° F
1000° F
800° F
600° F
400° F
300° F
200° F
100° F
70° F
40° F
3
2.0
2.2
2.4
2.6
2.8
3.0
3.2
3.4
3.6
3.8
4.0
Tube (Velocity Pressure) in Inches of Water


13000
12000
11000
10000
9000
8000
7000
6000
5000
4000
3000
2000
1000
0
Air Velocity, in Feet per Minute
0
.2
.4
.6
.8
1.0
1.2
1.4
1.6
1.8

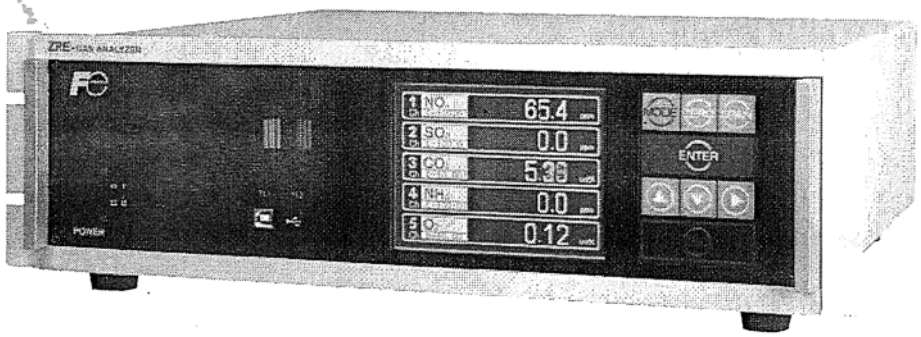

2600
2400
2200
2000
1800
1600
1400
1200
1000
800
600
400
200
0
1400° F
1200° F
1000° F
800° F
600° F
400° F
300° F
200° F
100° F
70° F
40° F
0
.02
.04
.06
.08
.10
.12
.14
.16
.18
.20
Gage Reading with Pitot Tube (Velocity Pressure) in Inches of Water

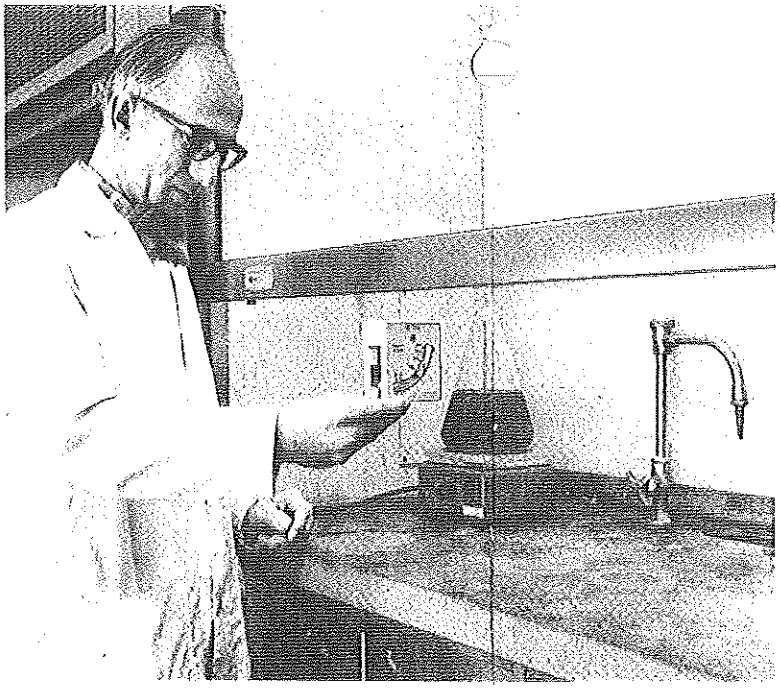

OFF
ON
HIGH PRESSURE
Dwyer
μA
LOW PRESSURE
FLUID LEVEL
MICROTECTOR

Instruction Manual

# NDIR TYPE INFRARED GAS ANALYZER

**TYPE: ZRE**



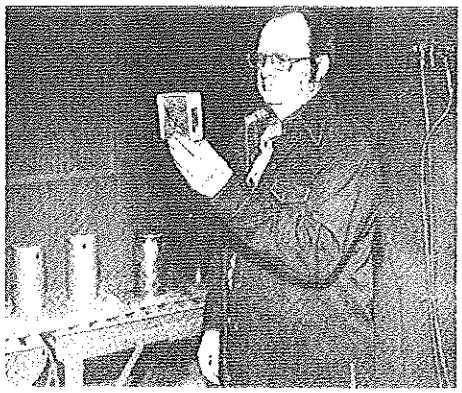


Bulletin H-14

# INSTRUCTIONS for No. 480 VANEOMETER™ AIR VELOCITY METER

Use a Vaneometer to measure velocity of air flow into laboratory fume hoods and...

...at paint spray booths to determine when to change filters. Or wherever needed to meet OSHA standards of ventilation for smoke, dust or fume removal.



## Use this sensitive new Dwyer Vaneometer™ to measure low air velocities–at low cost.

**THE PROBLEM:** How can you insure that OSHA, EPA and other safety ventilation requirements are met—at paint spray booths and at fume, smoke and dust exhaust hoods—in the plant, laboratory or restaurant? To do this, you need to measure low air velocities—from 25 to 400 feet per minute.+

Until now, instruments for this purpose have been complex and costly—from four to ten times the modest price of this unit.

**SOLUTION:** The new Dwyer Vaneometer™. It's pocket-size and light in weight—only four ounces. So it's handy to carry from one work station to another to make spot checks of air flow.* And it's easy to use—for untrained personnel. Just hold meter parallel to air flow—the pendulum vane/pointer indicates air velocity in feet per minute on a large, easy-to-read scale.

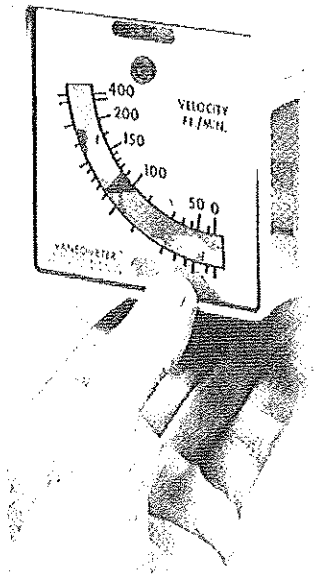
It can be hand held—or permanently mounted if continuous monitoring of face velocity is desired. A versatile steel mounting bracket and operating instructions are included. It's sensitive and accurate to ±10% of full scale. The Vaneometer has a bubble level and scale visible on both sides.

With housing of tough ABS plastic, it is durable and easy to clean with soap and water. The polyester vane can be cleaned with lacquer thinner. A spare vane is provided.

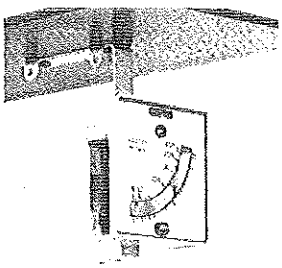
The Vaneometer is a tested, practical instrument for daily use—sensibly designed by Dwyer—"The Low Pressure People". Try one—and judge for yourself.

*For horizontal air flows only at this time.

+Metric scales are available. Range: 0 to 2.0 meters per second.

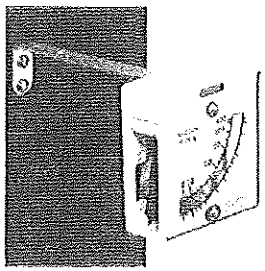



The Vaneometer's large scales are easy to read. Both sides have factory calibrated scales. Recessed bubble level at top helps insure accurate readings.



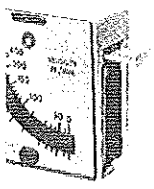
A versatile steel mounting bracket is included.

Left—Shows overhead mounting of Vaneometer for continuous monitoring.



The same bracket permits wall mounting. Bolts, nuts and screws are included.

## How to Operate Meter



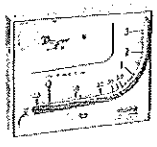
To install vane, pull vane holder from end of Vaneometer. Carefully remove vane from plastic bag and cardboard envelope. (Two vanes are enclosed, one is a spare.) Hang the vane by the wire in the two slots provided in the vane holder, then re-install the vane holder in the meter. Either side of vane may face the air flow. The meter is now ready to take readings. It is precalibrated. If vane becomes damaged, it is easily replaced with spare vane.

The Vaneometer is accurate to ±5% of full scale from bottom of scale to 100 FPM and ±10% from 100 FPM to top of scale.

For permanent mounting with bracket, Vaneometer should be located at least 6 inches from wall or side of duct. For accurate readings be sure to keep meter level at all times.

To determine face velocity, take the average of six readings. Readings should be taken at the center of six equal sections, three across top and three across the bottom.

When conditions are such that the Vaneometer cannot be permanently mounted, it may be more practical to install a Dwyer Mark II differential pressure manometer and calibrate it to indicate a dirty filter condition. To calibrate a Dwyer Mark II No. 25 Manometer with the Vaneometer, first follow Mark II installation instructions, (Bulletin D-58 included with the gage). Install new filters, start spray booth fan, note and record manometer reading and face velocity. Block-off filter media until face velocity reaches 100 feet per minute or conforms to OSHA, EPA or governing agency. Record and mark this point on the manometer, then replace filters at this point.



For replacement Vanes, order Part No. A390, package of two.

MARK II MANOMETER

DWYER INSTRUMENTS, INC., P.O. BOX 373, MICHIGAN CITY, INDIANA 46360, U.S.A., Phone 219/879-8000





FR 69-440330-01

# Example Calculations

## Equations and Sample Calculations – ASTM E2779 & E2515

| | |
|---|---|
| Manufacturer: | Harman |
| Model: | Accentra-2 |
| Run: | 1 |
| Category: | [Integrated] |

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

| | |
|---|---|
| BR | Dry burn rate, kg/hr |
| $m_n$ | Total particulate matter collected, mg |
| $V_{m(std)}$ | Volume of gas sampled corrected to standard conditions, dscf |
| $v_s$ | Average dilution tunnel gas velocity, ft/sec |
| $C_s$ | Particulate concentration, g/dscf |
| $Q_{sd}$ | Dilution tunnel gas flow rate, dscf/min |
| E | Particulate emission rate, lbs/hr |
| $E_T$ | Total particulate emissions, grams |
| $MC_{avg}$ | Average fuel load moisture content, % |
| PR | Proportional rate variation, % |
| $E_{g/hr}$ | Emission rate, g/hr |

**BR – Dry Burn Rate, kg/hr**
ASTM E2779 equation (3)

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

Where,

| | | |
|---|---|---|
| BR | = | Dry burn rate, kg/hr |
| $M_{FTAdb}$ | = | Total weight of fuel crib, dry basis, kg |
| θ | = | Total time of test run, minutes |

Sample Calculation:

$M_{FTAdb}$ = 11.04 lbs

$M_{FTAdb}$ = 11.04 x 0.4536 kg/lb

$M_{FTAdb}$ = 5.01 kg

$$BR = \frac{60 \times 5.0}{365}$$

BR = 0.82 kg/hr

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

$$m_n = m_p + m_f + m_g$$

Where:

$m_n$ = Total particulate matter collected, mg

$m_p$ = Particulate matter from probe, mg

$m_f$ = Particulate matter from filters, mg

$m_g$ = Particulate matter from filter seals, mg

Sample Calculation:

Using equation for Train 1:

$m_n = \underline{0.0} + \underline{3.1} + \underline{0.0}$

$m_n = \underline{3.1}$ mg

Using equation for Train 2:

$m_n = \underline{0.2} + \underline{2.7} + \underline{0.4}$

$m_n = \underline{3.3}$ mg

**$V_{m(std)}$ – Volume of Gas Sampled Corrected to Dry Standard Conditions, dscf**
ASTM E2515 equation (8)

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

Where:

| | | |
|---|---|---|
| $K_1$ | = | 17.64 °R/in. Hg |
| $V_{mr}$ | = | Volume of gas sample measured at the dry gas meter, dcf |
| Y | = | Dry gas meter calibration factor, dimensionless |
| $P_b$ | = | Barometric pressure at the testing site, in. Hg |
| ΔH | = | Average pressure differential across the orifice meter, in. $H_2O$ |
| $T_m$ | = | Absolute average dry gas meter temperature, R |

Sample Calculation:

Using equation for Train 1:

$$V_{m(std)} = \frac{43.835 \times 1.00 \times 17.64 \times \left(29.95 + \frac{0.72}{13.6}\right)}{(81.77 + 460)}$$

$V_{m(std)}$ = 42.99 ft3

Using equation for Train 2:

$$V_{m(std)} = \frac{44.078 \times 1.01 \times 17.64 \times \left(29.95 + \frac{0.59}{13.6}\right)}{(81.63 + 460)}$$

$V_{m(std)}$ = 43.36 ft3

Using equation for ambient train:

$$V_{m(std)} = \frac{49.18 \times 1.02 \times 17.64 \times \left(29.95 + \frac{0.00}{13.6}\right)}{(70.43 + 460)}$$

$V_{m(std)}$ = 49.92 ft3

**$v_s$ – Dilution Tunnel Gas Velocity, ft/sec**

ASTM E2515 equations (9) and (1)

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

$$F_p = \frac{V_{strav}}{V_{scent}}$$

Where:

| | | |
|---|---|---|
| $v_s$ | = | *Average dilution tunnel gas velocity, ft/sec |
| $k_p$ | = | Pitot tube constant: |
| $F_p$ | = | **Adjustment factor for center of tunnel pitot tube placement: |
| $v_{strav}$ | = | Dilution tunnel velocity calculated after the multi-point pitot traverse |
| $v_{scent}$ | = | Dilution tunnel velocity calculated after the multi-point pitot traverse at the center |
| $\Delta P_{trav}$ | = | $(sqrt(\Delta P))_{avg}$ calculated after the multi-point pitot traverse |
| $\Delta P_{cent}$ | = | sqrt(ΔP) measured at the center of the dilution tunnel during the multi-point pitot traverse |
| $C_p$ | = | Standard pitot tube coefficient: 0.99, unitless |
| ΔP | = | Velocity pressure in the dilution tunnel, mm $H_2O$ |
| $P_b$ | = | Barometric pressure at test site, in. Hg |
| $P_g$ | = | Static pressure of tunnel, in. Hg |
| $P_s$ | = | Absolute tunnel pressure, = $P_b + P_g$ |
| $M_s$ | = | ***Molecular weight of tunnel gas (wet); assume $M_d$=29 lb/lb-mole (dry) |
| $B_{ws}$ | = | Moisture content of dilution tunnel gas, ratio; assume 2% |
| $T_s$ | = | Dilution tunnel temperature, °R; (°R = °F + 460) |

Sample calculation:

$$V_s = \frac{1}{} \times 85.49 \times \frac{0.99}{} \times \frac{0.195}{} \times \left( \frac{\frac{87.09}{} + 460}{\left( \frac{29.95}{} + \frac{-0.63}{13.6} \right) \times 28.56} \right)^{1/2}$$

$V_s$ = 13.2 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.

**$F_P$ is equal to 1 if the pitot tube is place at $(sqrt(\Delta P))_{avgtrav}$ after the initial traverse data is collected.

**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.

**$C_s$ – Particulate Concentration, 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 |
| $C_s$ | = | Concentration of particulate matter in stack gas, dry basis, corrected to standard conditions, g/dscf |
| $m_n$ | = | Total mass of particulate matter collected in the sampling train, mg |
| $V_{m(std)}$ | = | Volume of gas sampled corrected to dry standard conditions, dscf |

Sample calculation:

For Train 1:

$$C_s = 0.001 \times \frac{3.1}{42.99}$$

$C_s$ = 0.000072 g/dscf

For Train 2

$$C_s = 0.001 \times \frac{3.3}{43.36}$$

$C_s$ = 0.000076 g/dscf

For Ambient Train

$$C_s = 0.001 \times \frac{0.2}{49.92}$$

$C_s$ = 0.000004 g/dscf

**$Q_{sd}$ – Average Dilution Tunnel Gas Flow Rate, dscf/hr**

ASTM E2515 equation (3)

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

Where:

| | | |
|---|---|---|
| $Q_{sd}$ | = | Gas flow rate corrected to dry, standard conditions, dscf/hr |
| 3600 | = | Conversion from seconds to hours (ASTM method uses 60 to convert in minutes) |
| $B_{ws}$ | = | Moisture content of dilution tunnel gas, ratio; assume 4% |
| $v_s$ | = | Average dilution tunnel gas velocity, ft/sec |
| A | = | Cross sectional area of dilution tunnel, $ft^2$ |
| $T_{std}$ | = | Standard absolute temperature, 528 °R |
| $T_{s(avg)}$ | = | Average absolute dilution tunnel temperature, °R, (°R = °F + 460) |
| $P_b$ | = | Barometric pressure at test site, in. Hg |
| $P_g$ | = | Dilution tunnel static pressure, in. Hg |
| $P_s$ | = | Absolute dilution tunnel gas pressure, in Hg, (Hg = $P_b + P_g$) |
| $P_{std}$ | = | Standard absolute pressure, 29.92 in Hg |

Sample calculation:

$$Q_{sd} = 3600 \times (1 - 0.04) \times \underline{13.20} \times \underline{0.196} \times \frac{528}{\underline{87.09} + 460} \times \frac{\underline{29.95} + \frac{\underline{-0.625}}{13.6}}{29.92}$$

$Q_{sd}$ = <u>8640.99989</u> dscf/hr

**E, $E_T$ – Particulate Emissions**

ASTM E2515 equation (15)

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

Where:

| | | |
|---|---|---|
| $E_T$ | = | Particulate emissions, g |
| $C_s$ | = | Concentration of particulate matter in the stack, g/dscf |
| $C_r$ | = | Concentration of ambient particulate matter, g/dscf |
| $Q_{std}$ | = | Average dilution tunnel gas flow rate, dscf/hr |
| θ | = | Total time of test run, minutes |

Sample calculation:

For Train 1

$E_T$ = ( 0.000072 - 0.000004 ) x 8640.99989 x 365 /60

$E_T$ = 3.58 g

For Train 2

$E_T$ = ( 0.000076 - 0.000004 ) x 8641.0 x 365 /60

$E_T$ = 3.79 g

Average

E = 3.68 g

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

| | |
|---|---|
| 7.5% of the average = | 0.28 |
| Train 1 difference = | 0.11 |
| Train 2 difference = | 0.11 |

**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:

$\theta$ = Time of test, min

$\theta_i$ = Time of interval, 1 min

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

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

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

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

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

$T_m$ = Average dry gas meter temperature, $^oR$

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

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

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

$$PR = \left( \frac{365 \times 0.11 \times 13.20 \times (102 + 460) \times (81.8 + 460)}{1 \times 43.8 \times 13.4 \times (87.09 + 460) \times (71.0 + 460)} \right) \times 100$$

PR = 95.5765 %

# Section 4

## Owner's Manual(s)

**MODEL / MODÈLE: "Accentra-2"**
Room Heater Pellet Fuel-Burning Type
SUITABLE FOR MOBILE-HOME INSTALLATION
This pellet burning appliance has been tested and listed for use in
Manufactured Homes In accordance with OAR 814-23-900 through 814-23-909

**Serial No.**
**N° de série:** HF BARCODE LABEL

**Report #/Rapport #**135-S-10b-2, 0135PS035E

**Test to/testé à:** ASTM E 2779-10, ASTEM E 2515-11, ASTM E 1509-04, ULC/ORD-C1482-M1990, ULC-S627-00, EPA Method 28R

Room Heater Pellet fuel Burning type (UM) 84-HUD

**"PREVENT HOUSE FIRES"** Install and Use only in accordance with manufacture's installation and operation instructions.

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.

Contact local building or fire officials about restrictions and inspection in your area.

**WARNING: FOR MANUFACTURED HOMES:** Do not install appliance in a sleeping room. An outside combustion air inlet must be provided. The structural integrity of the manufactured home floor, ceiling and walls must be maintained.

Refer to manufacturer's instructions and local codes for precautions required for passing chimney through a combustible wall or ceiling. Inspect and clean exhaust venting system frequently in accordance with manufacturer's instructions.

Use a 3" or 4" diameter type "L" or "PL" venting system.

Do not connect this unit to a chimney flue servicing another appliance.

**FOR USE WITH PELLETIZED WOOD FUEL ONLY.**

Input Rating Max: 5.7 lb. fuel/hr

EPA Certified Emissions: 0.61 g/hr

Electrical Rating: 240 VAC, 50 Hz, Start 2.6 AMPS, Run 2.0 AMPS

U.S. Electrical Rating: 115 VAC, 60 Hz, Start 4.2 AMPS, Run 3.6 AMPS

Fuel Type: Wood Pellets

**Route power cord away from unit.**

**OPERATE ONLY WITH DOORS CLOSED**

**DANGER: Risk of Electrical Shock. Disconnect Power Before Servicing Unit.**

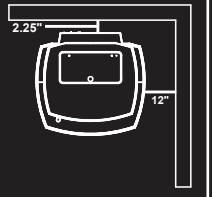
For Further Instruction refer to Installation and Owner's Manual.

Replace glass only with 5mm mirrored ceramic available from your dealer.

**DO NOT REMOVE THIS LABEL / NE PAS ENLEVER CETTE ÉTIQUETTE**

**MINIMUM CLEARANCES TO COMBUSTIBLES/ DISTANCE DE SECURITE PAR RAPPORT AUX MATERIAUX COMBUSTIBLES:**

| | | |
|---|---|---|
| Back Wall / Entre Mur Arrière | 2.25" | (25mm) |
| Side Wall / Entre Paroi Latérale | 12" | (305mm) |
| **Corner Installation / En Angle** | | |
| Walls to Appliance Entre Murs et Appareil | 6.25" | (159mm) |

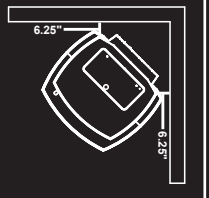



**Floor Protection/Protection du Plancher**

| | USA | CANADA |
|---|---|---|
| Sides/Côtés (A) | 6" | 152 mm |
| Back/Arrière (B) | 0" | 0 mm |
| Front/Avant (C) | 6" | 152 mm |

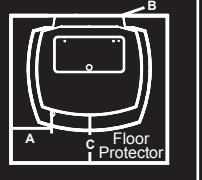
Use a non-combustible floor protector extending under and to the sides, front and back of the unit as shown in floor protection diagram. Measure from distance from the surface of the glass door.

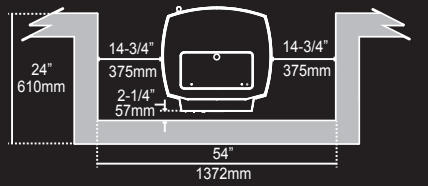
**Recommended:** Non-combustible floor protection extended beneath the fluepipe when installed with horizontal venting.




**Alcove Installation**

| | | |
|---|---|---|
| Min. Alcove Height | 60" | 1524mm |
| Min. Alcove Side Wall | 14.75" | 375mm |
| Max. Alcove Depth | 24" | 610mm |




**Test pour / tested à:** ASTM E 2779-10, ASTEM E 2515-11, ASTM E 1509 à 1504, ULC / ORD-C1482-M1990, ULC-S627-00, EPA Method 28R

L'appareil de chauffage à pellets type de combustion de carburant (UM) 84-HUD

**"Empêcher MAISON incendies"** installer et utiliser uniquement en conformité avec installation et d'utilisation les instructions du fabricant.

Ce poêle à bois doit inspection périodique et la réparation pour un fonctionnement correct. Consultez le manuel du propriétaire pour plus d'informations. Ce est contre les règlements fédéraux pour faire fonctionner ce poêle à bois d'une manière incompatible avec les instructions d'utilisation dans le manuel du propriétaire.

Contactez le service des incendies à propos des restrictions et l'inspection dans votre région.

**AVERTISSEMENT: POUR maisons préfabriquées:** Ne pas installer l'appareil dans une chambre à coucher. Une entrée d'air de combustion à l'extérieur doit être fournie. L'intégrité structurale de la maison étage, plafond et murs fabriqués doit être maintenue.

Reportez-vous aux instructions du fabricant et les codes locaux pour les précautions nécessaires pour faire passer la cheminée à travers un mur ou un plafond combustible. Inspectez et nettoyez système d'évacuation souvent en conformité avec les instructions du fabricant.

Utilisez un "ou 4" Type de diamètre «L» 3 ou le système de ventilation "PL".

Ne pas connecter cet appareil à un conduit de cheminée desservant un autre appareil.

**À UTILISER AVEC LA GRANULE DE BOIS SEULEMENT.**

Entrée Max Note: £ 5,7 carburant / h

Émissions certifiés EPA: 0,61 g / h

Note électrique: 240 VAC, 50 Hz, 2,6 AMPS Lancer, Exécuter 2,0 AMPS

US Note électrique: 115 VAC, 60 Hz, Start 4,2 AMPS, Run 3,6 AMPS

Type de carburant: granulés de bois

**Route cordon électrique de l'appareil.**

**Fonctionner uniquement avec les portes fermées**

**DANGER: Risque de choc électrique. Débranchez l'alimentation avant l'Unité des services.**

Pour de plus amples instructions reportez-vous à Installation et le manuel du propriétaire.

Remplacer le verre seulement avec 5mm miroir en céramique disponibles chez votre revendeur.

**US ENVIRONMENTAL PROTECTION AGENCY (Accentra)**
**Certified to comply with 2020 particulate emission standards.**
**Certifié conforme aux normes 2020 d'émission de particules.**

HARMAN®

**Made in U.S.A. of US and imported parts. / Fabriqué aux États-Unis-d'Amérique par des pièces d'origine américaine et pièces importées.**

**Date of Manufacture / Date de fabrication:**

| 2020 | 2021 | 2022 | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |

**Manufactured by / Fabriqué par: Hearth and Home Technologies 352 Mountain House Road, Halifax PA 17032**

3-90-247_R10

# Installation Manual

## Installation and Appliance Setup

**INSTALLER: Leave this manual with party responsible for use and operation.**
**OWNER: Retain this manual for future reference.**

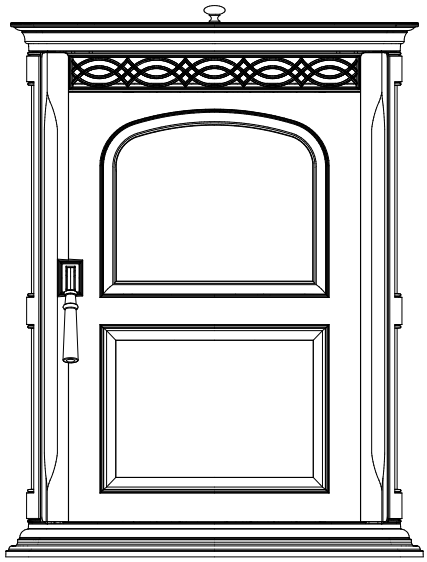
***NOTICE: SAVE THESE INSTRUCTIONS***

HARMAN®

BUILT TO A STANDARD, NOT A PRICE

### Model(s):

### *Accentra Freestanding Pellet Stove*



NATIONAL FIREPLACE INSTITUTE

Pellet Fuels Institute

### ⚠ CAUTION

Check building codes prior to installation.

- Installation MUST comply with local, regional, state and national codes and regulations.
- Contact local building or fire officials about restrictions and installation inspection requirements in your area.

### ⚠ CAUTION

Tested and approved for wood pellet fuel only. Burning of any other type of fuel voids your warranty.

### ⚠ WARNING

**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.**

- Do not store or use gasoline or other flammable vapors and liquids in the vicinity of this or any other appliance.
- Do not overfire - If any external part starts to glow, you are overfiring. Reduce feed rate. Overfiring will void your warranty.
- Comply with all minimum clearances to combustibles as specified. Failure to comply may cause house fire.

### ⚠ WARNING

**HOT SURFACES!**

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

**Hot glass will cause burns.**

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

### NOTE

To obtain a French translation of this manual, please contact your dealer or visit www.harmanstoves.com.

Pour obtenir une traduction française de ce manuel, s'il vous plaît contacter votre revendeur ou visitez www.harmanstoves.com.

## ⚠ Safety Alert Key:

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

# TABLE OF CONTENTS



**➔ = Contains updated information**

## ATTENTION INSTALLER:

***Follow this Standard Work Checklist***

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

Customer: _____
Date Installed: _____
Lot/Address: _____
Location of Appliance: _____
Installer: _____
Dealer/Distributor Phone Number: _____
Serial Number: _____
Model Name: _____

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

| **Appliance Install** | YES | IF NO, WHY? |
|---|---|---|
| Verified clearance to combustibles. | ☐ | _____ |
| Appliance is leveled and connector is secured to appliance. | ☐ | _____ |
| Hearth extension size/height decided. | ☐ | _____ |
| Outside air kit installed. | ☐ | _____ |
| Floor protection requirements have been met. | ☐ | _____ |
| If appliance is connected to a masonry chimney, it should be cleaned and inspected by a professional. If installed to a factory built metal chimney, the chimney must be installed according to the manufacturer's instructions and clearances. | ☐ | _____ |
| **Venting/Chimney** | | |
| Chimney configuration complies with diagrams. | ☐ | _____ |
| Chimney installed, locked and secured in place with proper clearance. | ☐ | _____ |
| Chimney meets recommended height requirements (5 feet minimum vertical). | ☐ | _____ |
| Roof flashing installed and sealed. | ☐ | _____ |
| Terminations installed and sealed. | ☐ | _____ |
| **Electrical** | | |
| 120 VAC unswitched power provided to the appliance. | ☐ | _____ |
| Check outlet with multi-meter for proper polarity and voltage (115-120 VAC). Record voltage reading: _____ | ☐ | _____ |
| **Clearances** | | |
| Verified all clearances meet installation manual requirements. | ☐ | _____ |
| Mantels and wall projections comply with installation manual requirements. | ☐ | _____ |
| Floor protection and heart extensions installed per manual requirements. | ☐ | _____ |
| **Appliance Setup** | | |
| All protective materials removed. | ☐ | _____ |
| All labels have been removed from the door. | ☐ | _____ |
| All packaging materials are removed from inside/under appliance. | ☐ | _____ |
| Manual bag and all of its contents are removed from inside/under the appliance and given to the party responsible for use and operation. | ☐ | _____ |
| Started appliance and verified that all motors and blowers operate as they should. | ☐ | _____ |
| Checked draft using a Manometer. Record readings: _____ | ☐ | _____ |
| Checked vacuum using a Manometer. Record readings: _____ | ☐ | _____ |

**Hearth & Home Technologies recommends the following:**
Photographing the installation and copying this checklist for your file.
That this checklist remain visible at all times on the appliance until the installation is complete.

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

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

# 1 Product Specific and Important Safety Information

## A. Appliance Certification

| | |
|---|---|
| **MODEL:** | Accentra Pellet Stove |
| **LABORATORY:** | OMNI Test Laboratories, Inc |
| **REPORT NO.** | 135-S-10b-2, 0135PS035E |
| **TYPE:** | Pellet Fueled/Supplementary For Residential Use |
| **STANDARD(s):** | ASTM E 1509-04, ULC/ORD-C1482-M1990, ULC-S627-00, ASTM E 2779-10, ASTM E 2515-11 |
| **ELECTRICAL RATING** | 115 VAC, 60 Hz, Start 4.2 AMPS, Run 3.6 AMPS |
| **GLASS SPECIFICATIONS** | 5mm Ceramic Glass |

**NOTE:** This installation must conform with local codes. In the absence of local codes you must comply with the **ASTM E1509-2004, ULC-S628-93, ULC/ORD-C-1482-M1990, (UM) 84-HUD.**

The Accentra is Certified to comply with 2020 particulate emission standards.


## B. Mobile Home Approved

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

The structural integrity of the mobile home floor, ceiling, and walls must be maintained. The appliance must be properly grounded to the frame of the mobile home and use only listed pellet vent, Class “PL” connector pipe.

A Harman® Outside Air Kit must be installed in a mobile home installation.

**WARNING**

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

**DO NOT INSTALL IN SLEEPING ROOM.**

## C. BTU & Efficiency Specifications

| | |
|---|---|
| **EPA Certified Emissions:** | 0.62 g/hr |
| ***LHV Tested Efficiency:** | 78% |
| ****HHV Tested Efficiency:** | 71.2% |
| *****EPA BTU Output:** | 6,253 - 25,200 |
| ******BTU Input** | 9,700 - 38,800 |
| **Vent Size:** | 3 Inch |
| **Hopper Capacity:** | 50 lbs |
| **Fuel** | Wood Pellet |

** Weighted average LHV efficiency using data collected during EPA emissions test.*

***Weighted average HHV efficiency using data collected during EPA emissions test.*

****A range of BTU outputs based on EPA Default Efficiency and the burn rates from the low and high EPA tests.*

*****Based on the maximum feed rate per hour multiplied by approximately 8,600 BTU’s which is the average BTU’s from a pound of pellets.*

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.

## D. Non-Combustible Materials Specification

Material which will not ignite and burn. Such materials are those consisting entirely of steel, iron, brick, tile, concrete, slate, glass or plasters, or any combination thereof.

Materials that are reported as passing **ASTM E 136, Standard Test Method for Behavior of Materials in a Vertical Tube Furnace at 750° C** and **UL763** shall be considered non-combustible materials.

## E. Combustible Materials Specification

Materials made of or surfaced with wood, compressed paper, plant fibers, plastics, or other material that can ignite and burn, whether flame proofed or not, or plastered or un-plastered shall be considered combustible materials.

## F. Electrical Codes

***NOTE: Some generator or battery back-up systems may not be compatible with the micro-processor electronics on this appliance. Please consult the power supply manufacturer for compatible systems.***

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

***DO NOT:***

- *Install or operate damaged appliance*
- *Modify appliance*
- *Install other than as instructed by Hearth & Home Technologies*
- *Operate the appliance without fully assembling all components*
- *Overfire*
- *Install any component not approved by Hearth & Home Technologies*
- *Install parts or components not Listed or approved.*
- *Disable safety switches*

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

*For assistance or additional information, consult a qualified installer, service agency or your dealer.*

**NOTE:** Hearth & Home Technologies, manufacturer of this appliance, reserves the right to alter its products, their specifications and/or price without notice.



## G. California

**WARNING**

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

# 2 Getting Started

## A. Design and Installation Considerations

### 1. Appliance Location

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

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

It is a good idea to plan your installation on paper, using exact measurements for clearances and floor protection, before actually beginning the installation

Consideration must be given to:

- Safety, convenience, traffic flow
- Placement of the chimney and chimney connector.
- If you are not using an existing chimney, place the appliance where there will be a clear passage for a factory-built listed chimney through the ceiling and roof.
- Installing an optional outside air kit would affect the location of the vent termination.

Since pellet exhaust can contain ash, soot or sparks, you must consider the location of:

- Windows
- Air Intakes
- Air Conditioner
- Overhang, soffits, porch roofs, adjacent walls
- Landscaping, vegetation

When locating vent and venting termination, vent above roof line when possible.

***NOTICE:*** *Locating the appliance in a location of considerable air movement can cause intermittent smoke spillage from appliance. Do not locate appliance near:*

- *Frequently open doors*
- *Central heat outlets or returns*

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

hearthED FACTORY TRAINING Fuel Your Fire

NFI NATIONAL FIREPLACE INSTITUTE A CERTIFICATION AGENCY

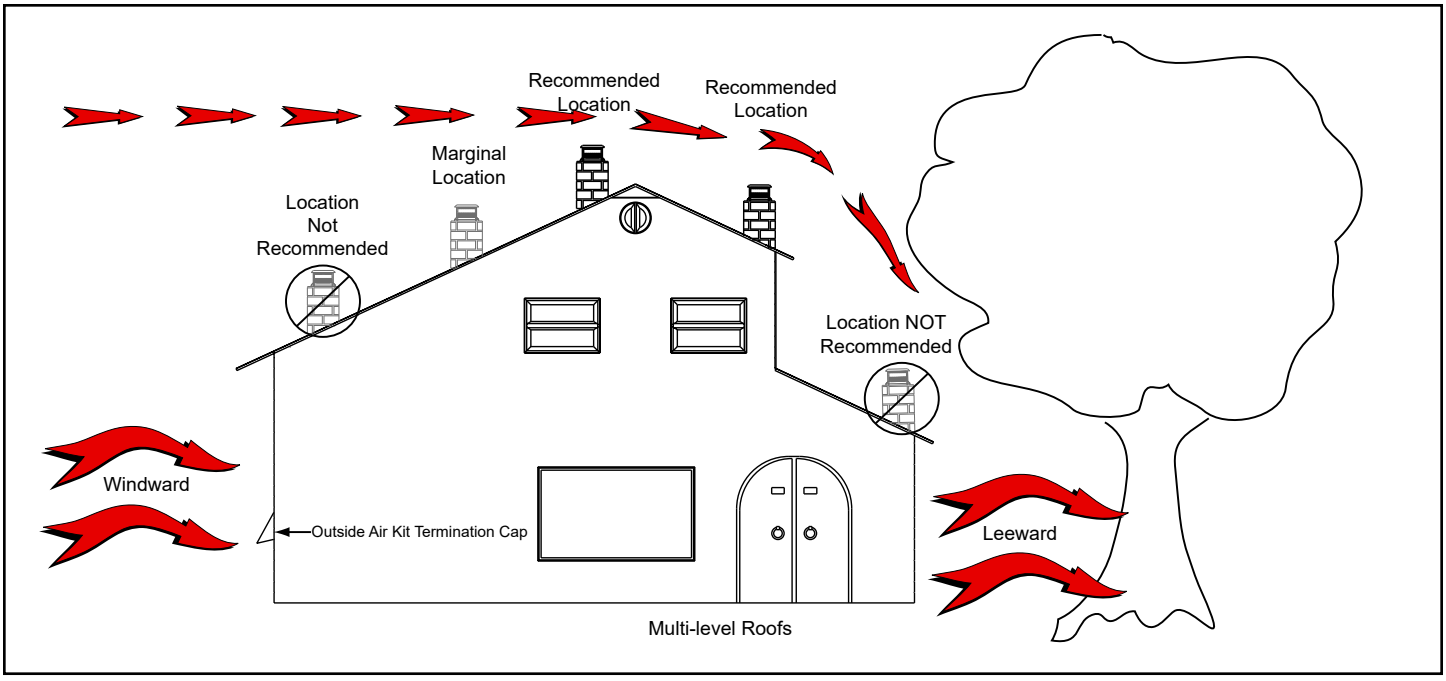



**Figure 2.1**

## B. Tools And Supplies Needed

**Tools and building supplies normally required for installation, unless installing into an existing masonry fireplace:**

- Reciprocating Saw
- Hammer
- Phillips Screwdriver
- Tape Measure
- Level
- Non-Combustible Sealant
- Material
- Gloves
- Safety Glasses
- Electric Drill & Bits

**May also need:**

- Vent Support Straps
- Venting Paint

## C. Inspect Appliance and Components

- Carefully remove the appliance and components from the packaging.
- The vent system components and decorative doors and fronts may be shipped in separate packages.
- Report to your dealer any parts damaged in shipment, particularly the condition of the glass.
- **Read all of the instructions before starting the installation. Follow these instructions carefully during the installation to ensure maximum safety and benefit.**

**WARNING**

***RISK OF FIRE OR EXPLOSION! Damaged parts could impair safe operation. DO NOT i****nstall damaged, incomplete or substitute components. Keep appliance dry.*

Hearth & Home Technologies disclaims any responsibility for, and the warranty will be voided by the following actions:

- Installation and use of any damaged appliance or vent system component.
- Modification of the appliance or vent system.
- Installation other than as instructed by Hearth & Home Technologies.
- Installation and/or use of any component part not approved by Hearth & Home Technologies.

**Any such action may cause a fire hazard.**

**WARNING**

***Risk of Fire, Explosion or Electric Shock! DO NOT use this appliance if any part has been under water. Call a qualified service technician to inspect the appliance and to replace any part of the control system which has been under water.***

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

Most pellet vent pipe requires a minimum of 1" of clearance to combustible materials although some can be installed at 1" clearance.

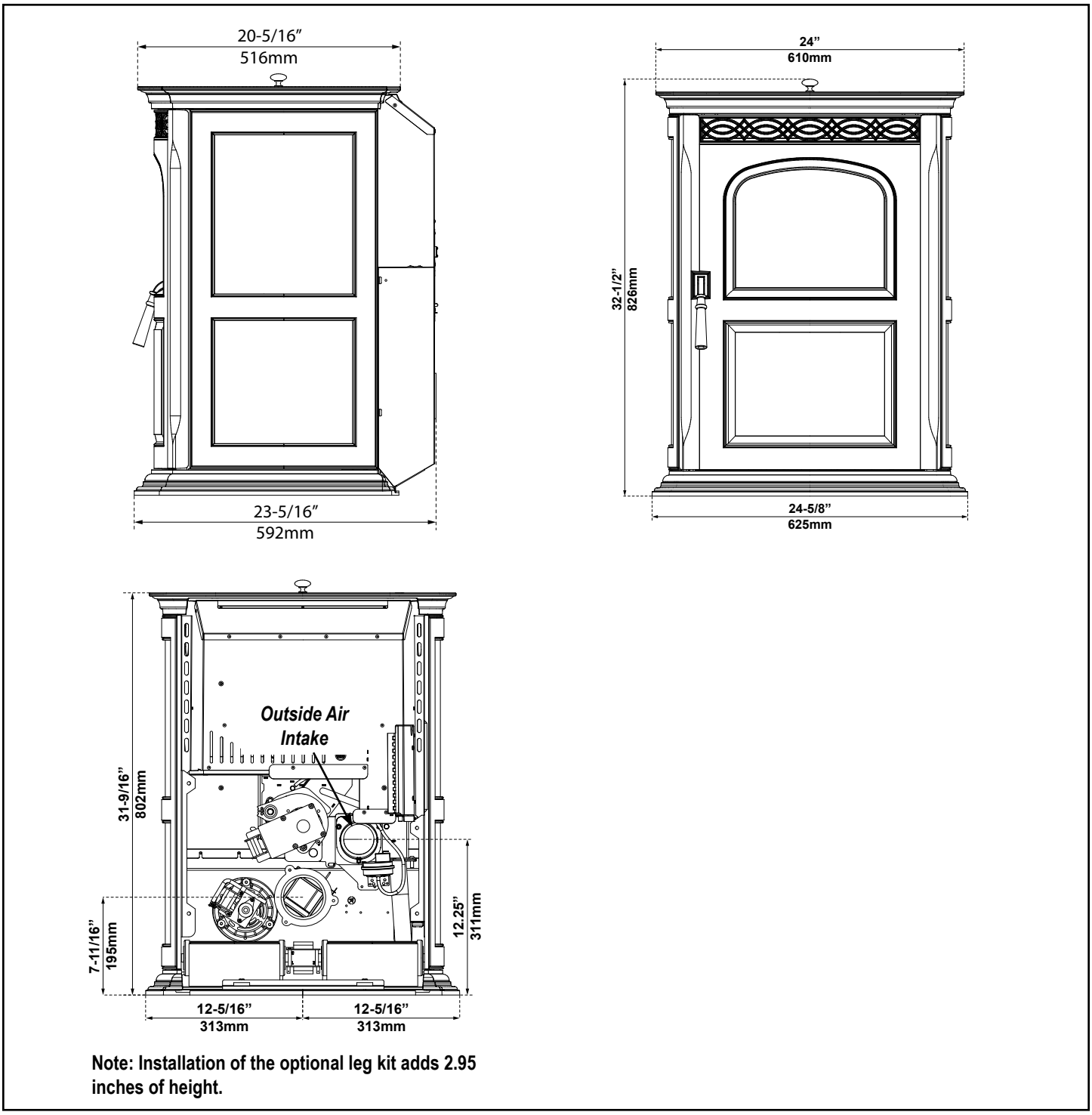
Follow these instructions along with all local codes regarding installation of this appliance.

Do **NOT** use makeshift compromises when installing this appliance, serious consequences may result.

# 3 Clearances

## A. Appliance Dimension Diagram

Dimensions are actual appliance dimensions. Use for reference only.




**Note: Installation of the optional leg kit adds 2.95 inches of height.**

**Figure 3.1**

## B. Clearances to Combustibles

When selecting a location for the appliance it is important to consider the required clearances to walls.

Notice: Illustrations reflect typical installations and are FOR DESIGN PURPOSES ONLY. Actual installation may vary due to individual design preference.

**CAUTION**

**THIS APPLIANCE MUST BE VENTED TO THE OUTSIDE.**

**WARNING**

***RISK OF FIRE OR BURNS! Provide adequate clearance around air openings and for service access.*** *Due to high temperatures, the appliance should be located out of traffic and away from furniture and draperies.*

**Alcove Installation:**
The Clearance to The Top of The Unit is 60” (152cm) Measured From The Floor.

This is the minimum size Harman® recommends for an alcove with a 60” ceiling. Figuer 3.2.

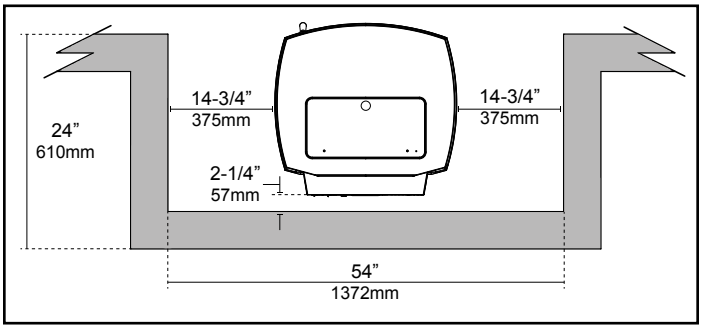



**Figure 3.2**

Place the stove away from combustible walls at least as far as shown in Figures 3.3.

Note that the clearances shown are minimum for safety but do not leave much room for access when cleaning or servicing. Please take this into account when placing the stove.

Due to high temperatures, the stove should be placed out of traffic and away from furniture and draperies.

Children and adults should be alerted to the hazards of high surface temperatures and should stay away to avoid burns to skin and/or clothing.

Young children should be carefully supervised when they are in the same room as the stove.

Clothing and other flammable materials should not be placed on or near this unit.

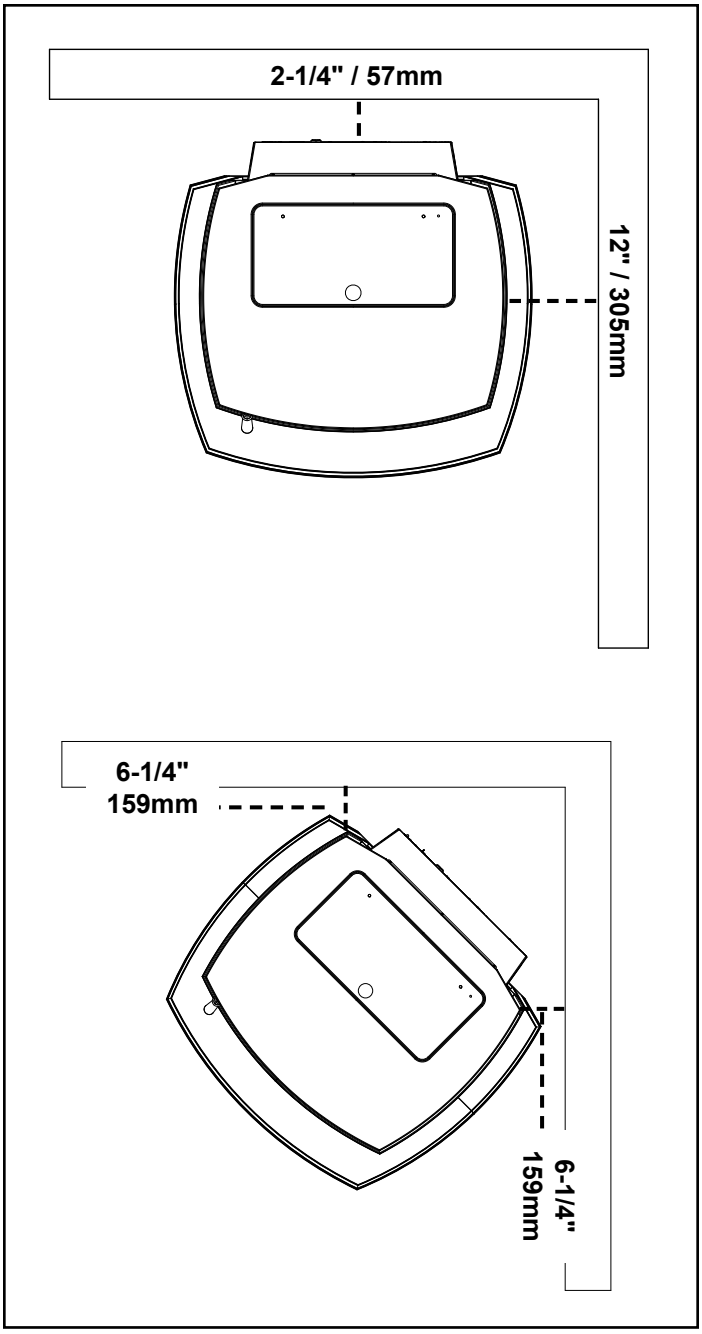



**Figure 3.3**

## C. Floor Protection

Place the stove on a noncombustible floor or floor protector that extends a minimum of 6” (152mm) to the front of the load door opening, 6” (152mm) to the sides of the door opening, and 1” to the rear, or a Harman® Cast Iron floor protector.

The minimum floor protector material is 20 gauge sheet metal. Other floor protector materials are ceramic tile, stone, brick, etc. Figure 3.4

Minimum Size floor protection is 24-1/16” deep x 28-5/8” wide.

*Floor protection dimensions for the front and sides are measured from the appliance door opening in The United States. In Canada, the side dimension is measured from the widest part of the appliance.

**Venting:**
**US** - Follow PL vent manufacturers recommendations when configuring vent pipe installation.

**Canada** - Must extend 2” (51mm) beyond each side of any horizontal flue pipe.

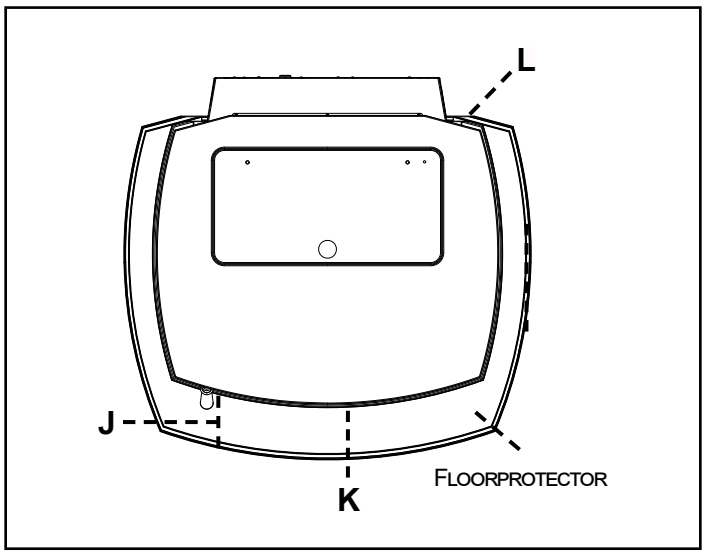



**Figure 3.4**

| Floor Protection Requirements | | US | Canada |
|---|---|---|---|
| **J** | Sides | 6" | 152mm |
| **K** | Front | 6” | 152mm |
| **L** | Rear | 0” | 0mm |

Alternate floor protector dimension may be used as long as they satisfy the measurement requirements shown below.

Minimum size floor protection for a corner installation hearth pad is 24-1/16” deep x 28-5/8” wide. NOTE: Floor protector WILL NOT touch the wall. Figure 3.5.

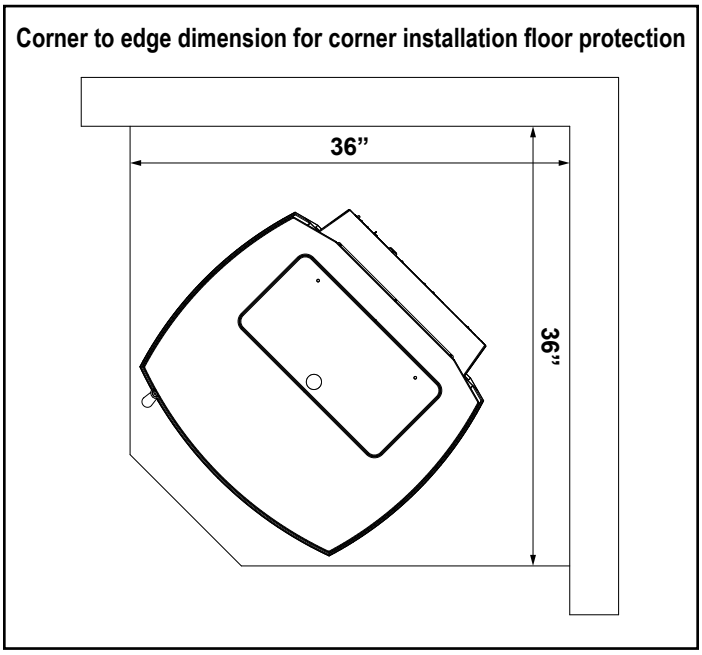



**Figure 3.5**

## D. Mobile Home Installation

When installing this unit in a mobile home several requirements must be followed (Reference HUD Regulation #24CFR3280):

- The unit must be bolted to the floor. This can be done with 1/4" lag screws through the 2 holes in the base plate. Figure 3.6
- The unit must also be connected to outside air.
- Floor protection and clearances must be followed as shown.
- The appliance must be properly grounded to the frame of the mobile home using a minimum of 8 AWG copper solid or stranded, insulated or bare wire or equivalent.
- Chimney must meet requirements of CAN/ULC-S629, Standard for 650°C Factory Built Chimneys. Follow Manufacturer's guidelines concerning height and clearances to combustibles. Use the same manufacturer's components to provide an effective vapor barrier where the chimney or other component penetrates to the exterior of the mobile home. **DO NOT MIX COMPONENTS FROM DIFFERENT MANUFACTURERS.** The top section of chimney and the chimney cap must be removable to a maximum height of 13-1/2' for transport of the mobile home.

Due to high temperatures, the Accentra should be placed out of traffic and away from furniture and draperies. Children and adults should be alerted to the hazards of high surface temperatures and should stay away to avoid burn to skin and/or clothing. Young children should be carefully supervised when they are in the same room as the stove. Clothing and other flammable materials should not be placed on or near the Accentra Pellet Stove.

Installation and repair of the Accentra Pellet Stove should be done by a qualified service person. The appliance should be inspected before use and at least annually by a qualified service person. More frequent cleaning will be required. It is imperative that control compartments, burners, and circulating air passageways of the Accentra be kept clean.

**CAUTION**

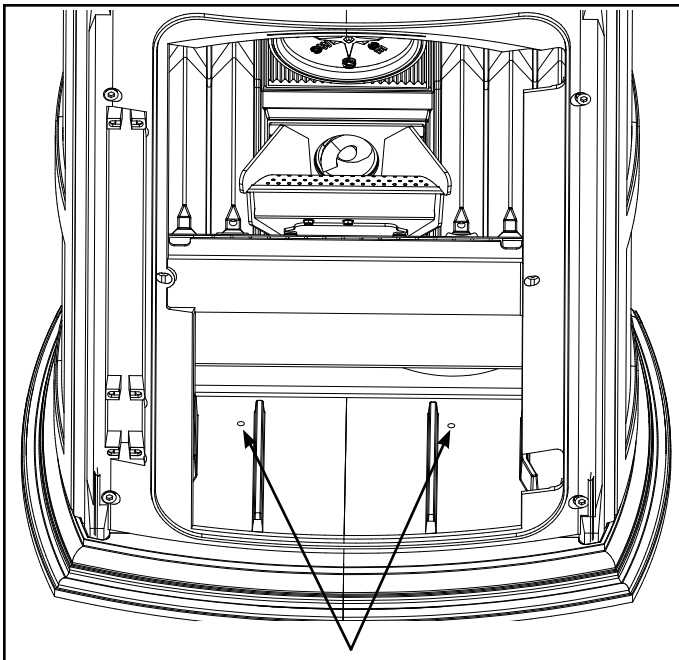
**This appliance must be vented to the outside.**

**WARNING**

**MOBILE HOME INSTALLATION SHOULD BE DONE IN ACCORDANCE WITH THE MANUFACTURED HOME AND SAFETY STANDARD (HUD), CFR 3280, PART 24.**

**WARNING**

**DO NOT INSTALL IN SLEEPING ROOM**



Unit bolt down holes for mobile home installation lag to floor with 1/4" diameter lag bolts with washer. (not supplied.) Note: If the optional leg kit is used, a longer bolt will be required.

**Figure 3.6**

**CAUTION**

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

**CAUTION**

**THE STOVE IS HOT WHILE IN OPERATION.**

**KEEP CHILDREN, CLOTHING AND FURNITURE AWAY. CONTACT MAY CAUSE SKIN BURNS.**

**WARNING**

**KEEP COMBUSTIBLE MATERIALS SUCH AS GRASS, LEAVES, ETC. AT LEAST 3 FEET AWAY FROM THE POINT DIRECTLY UNDER THE VENT TERMINATION.**

# 4 Termination Location and Vent Information

## A. Vent Termination Minimum Clearances

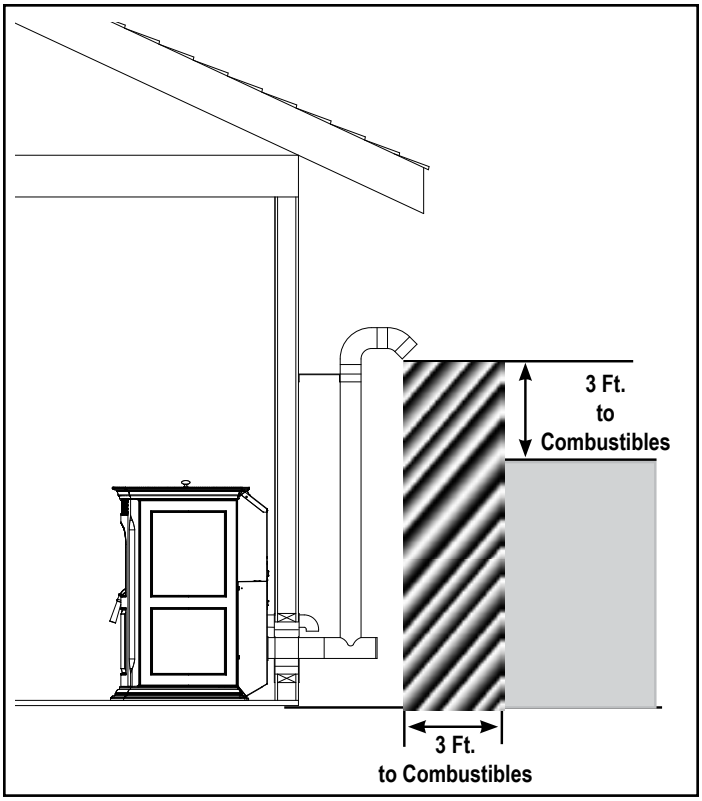



**Figure 4.1**

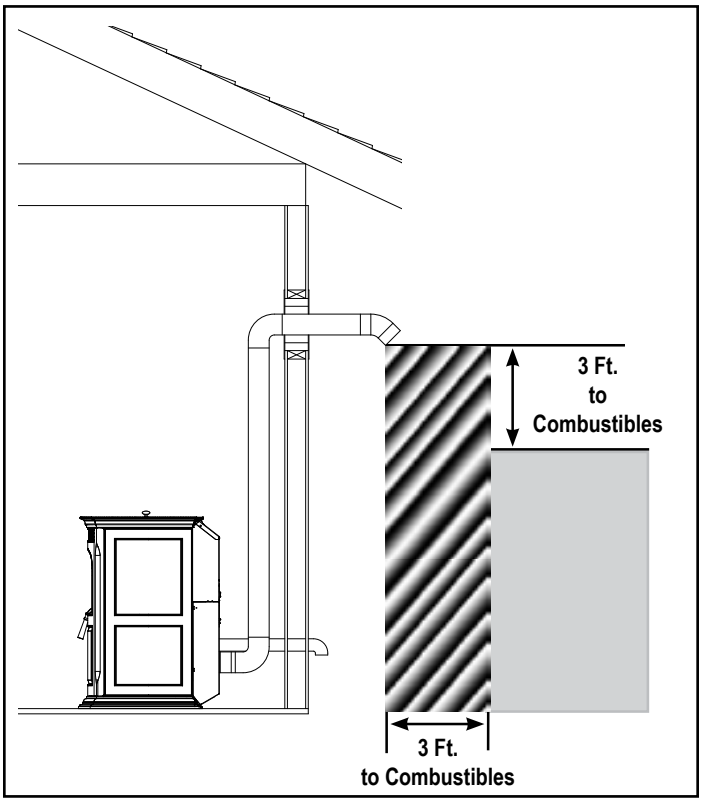



**Figure 4.2**

**Note:** Follow venting manufacturer's recommendations for sealing pipe joints.

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

**#1 Preferred method (Figure 4.1)**

This method provides excellent venting for normal operation and allows the stove to be installed closest to the wall. Two inches from the wall is safe; however, four inches allows better access to remove the rear panel. The vertical portion of the vent should be three to five feet high. This vertical section will help provide natural draft in the event of a power failure.

**Do not place joints within wall pass-through.**

**WARNING**

**THE CHIMNEY AND CONNECTOR MUST BE MAINTAINED IN GOOD CONDITION AND KEPT CLEAN.**

**CAUTION**

**DO NOT USE MAKESHIFT COMPROMISES WHEN INSTALLING THIS APPLIANCE. DAMAGE AND/OR INJURY MAY RESULT.**

**#2 Preferred method (Figure 4.2)**

This method also provides excellent venting for normal operation but requires the stove to be installed farther from the wall. The vertical portion of the vent should be three to five feet high and at least 1" from a combustible wall. This vertical section will provide natural draft in the event of a power failure.

If the stove is installed below grade be sure the vent t*ermination is at least 12" above grade. The outlet must also be 1 foot from the house/building.*

**Do not place joints within wall pass-through.**

**CAUTION**

**KEEP COMBUSTIBLE MATERIALS (SUCH AS GRASS, LEAVES, ETC.) AT LEAST 3 FEET AWAY FROM THE FLUE OUTLET ON THE OUTSIDE OF THE BUILDING.**

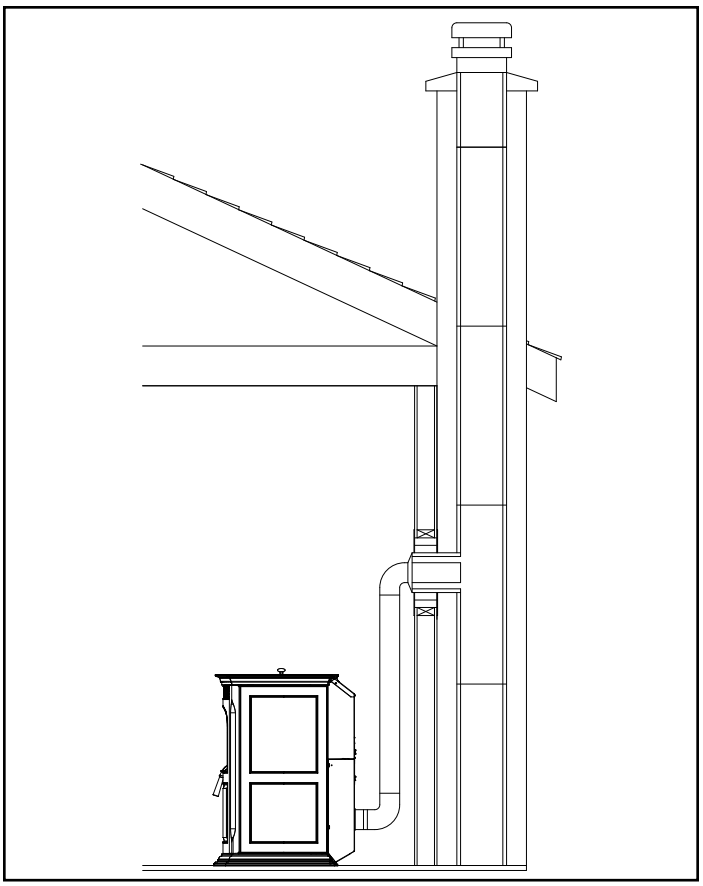


**Figure 4.3**

**#3 Installing into an existing chimney (Figure 4.3)**

This method provides excellent venting for normal operation. This method also provides natural draft in the event of a power failure. If the chimney condition is questionable* you may want to install a liner as in method #7.

In some places in the US and Canada it is required that the vent pipe extend all the way to the top of the chimney.

*The chimney should be inspected and cleaned before installing your stove. If you discover that the chimney does not have a clay tile liner or has cracks or flaking of the tile liner you will need to install a stainless steel liner within the chimney. In most cases the inside diameter of this liner should be 4". Either flexible or rigid liner may be used for this purpose. Refer to Method 6 & 7.

Be sure to design the venting so that it can be easily cleaned.

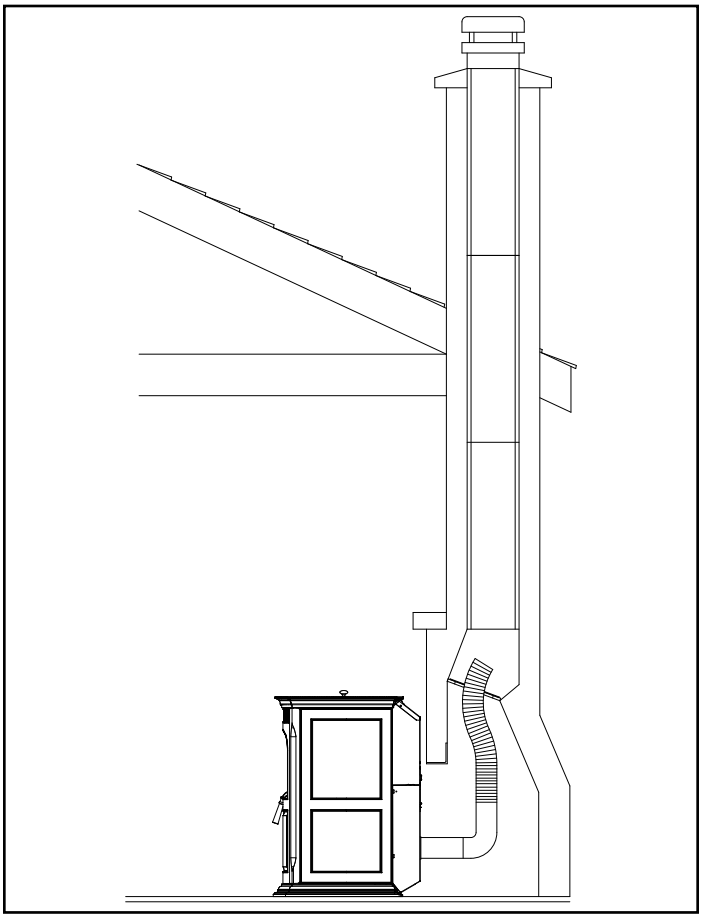


**Figure 4.4**

**#4 Installing into an existing fireplace chimney (Figure 4.4)**

This method provides excellent venting for normal operation. This method also provides natural draft in the event of a power failure. If the chimney condition is questionable* you may want to install a liner as in method #6.

In some places in the US and Canada it is required that the vent pipe extend all the way to the top of the chimney.

*The chimney should be inspected and cleaned before installing your stove. If you discover that the chimney does not have a clay tile liner or has cracks or flaking of the tile liner you will need to install a stainless steel liner within the chimney. In most cases the inside diameter of this liner should be 4". Either flexible or rigid liner may be used for this purpose. Refer to Method 5 & 6.

The chimney should be sealed at the damper using a steel plate. Kaowool, mineral wool or an equivalent non-combustible insulation is recommended to be installed on top of the sealing plate to reduce the possibility of condensation. The connector pipe should extend through the smoke chamber to the base or into the first flue tile.

Be sure to design the venting so that it can be easily cleaned.

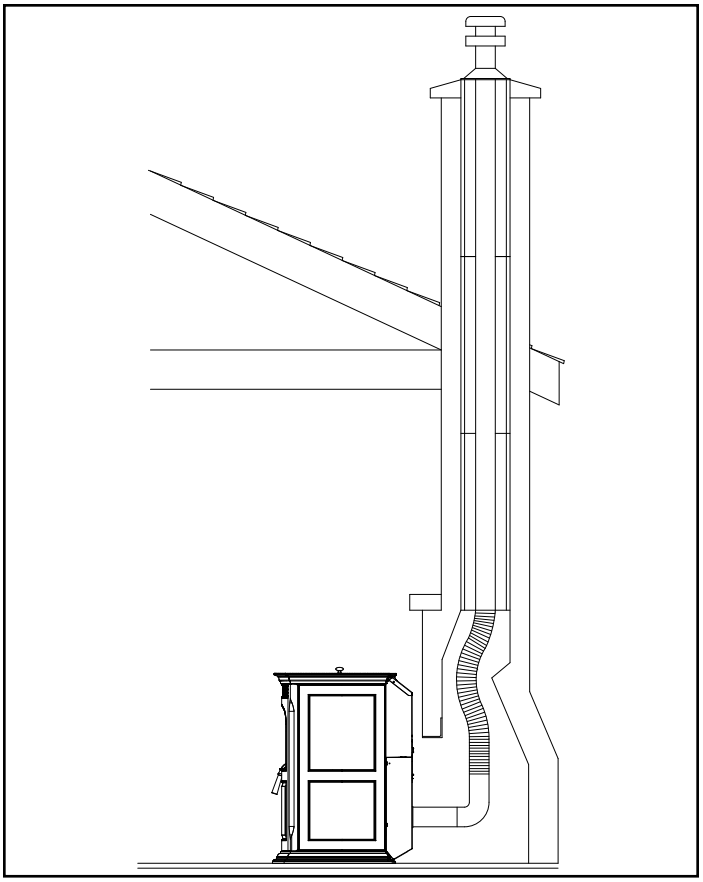


**Figure 4.5**

**#5 Installing into an existing fireplace chimney (Figure 4.5) w/Full Liner**

This method provides excellent venting for normal operation. This method also provides natural draft in the event of a power failure.

In some places in the US and Canada it is required that the vent pipe extend all the way to the top of the chimney. The pipe or liner inside the chimney should be 4” diameter.

In this method a cap should also be installed on the chimney to keep out rain. Be sure to use approved pellet vent pipe fittings. Pipe size should be increased to 4” using this method.

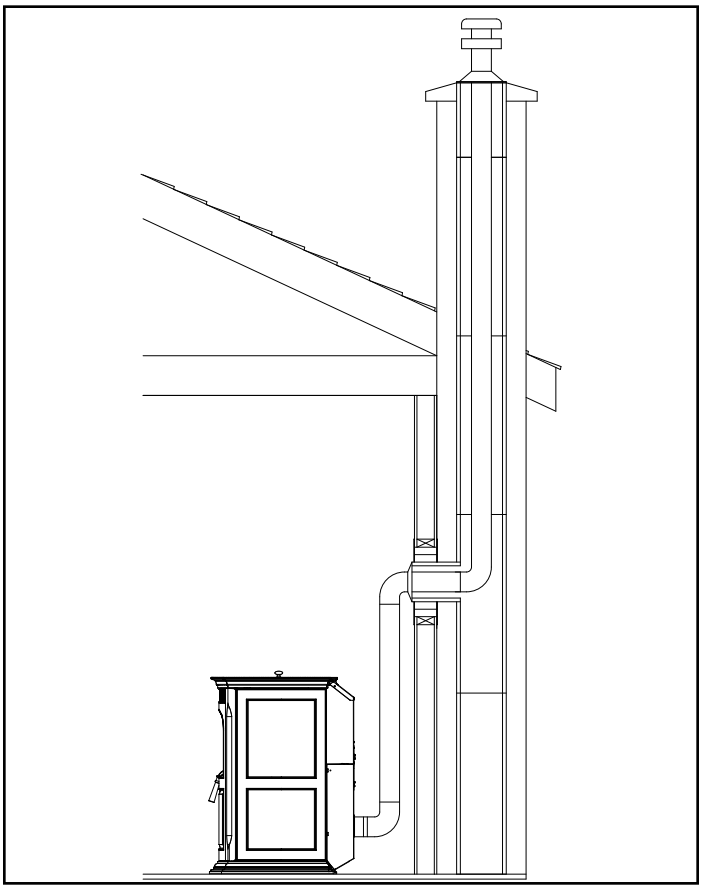


**Figure 4.6**

**#6 Installing into an existing chimney (Figure 4.6) w/Full liner**

This method provides excellent venting for normal operation. This method also provides natural draft in the event of a power failure.

In some places in the US and Canada it is required that the vent pipe extend all the way to the top of the chimney. The pipe or liner inside the chimney should be 4” diameter.

In this method a cap should also be installed on the chimney to keep out rain.

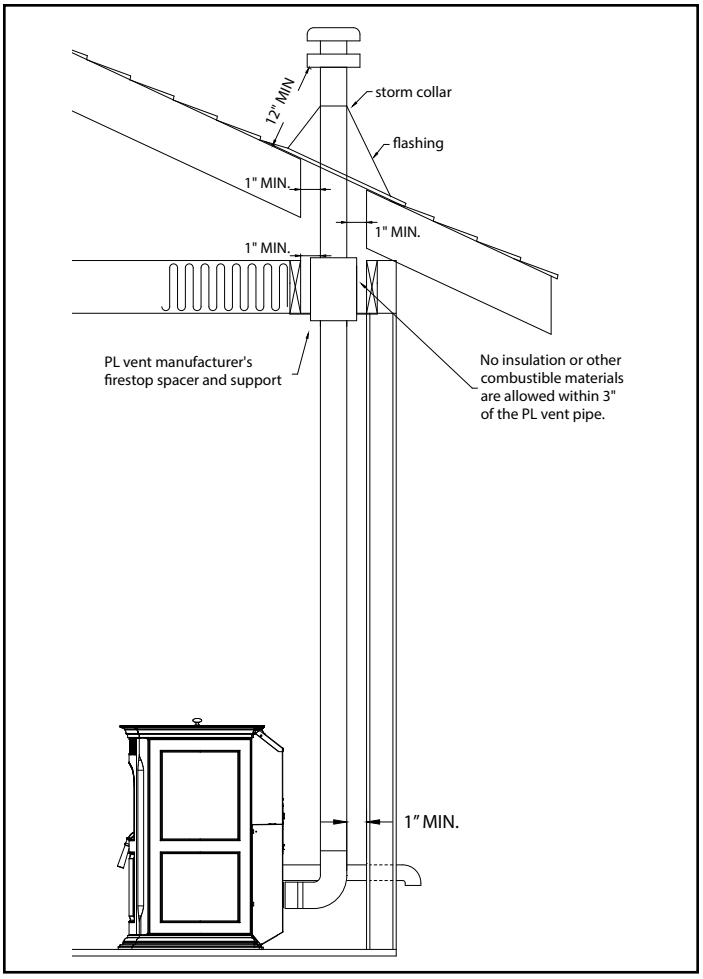



**Figure 4.7**

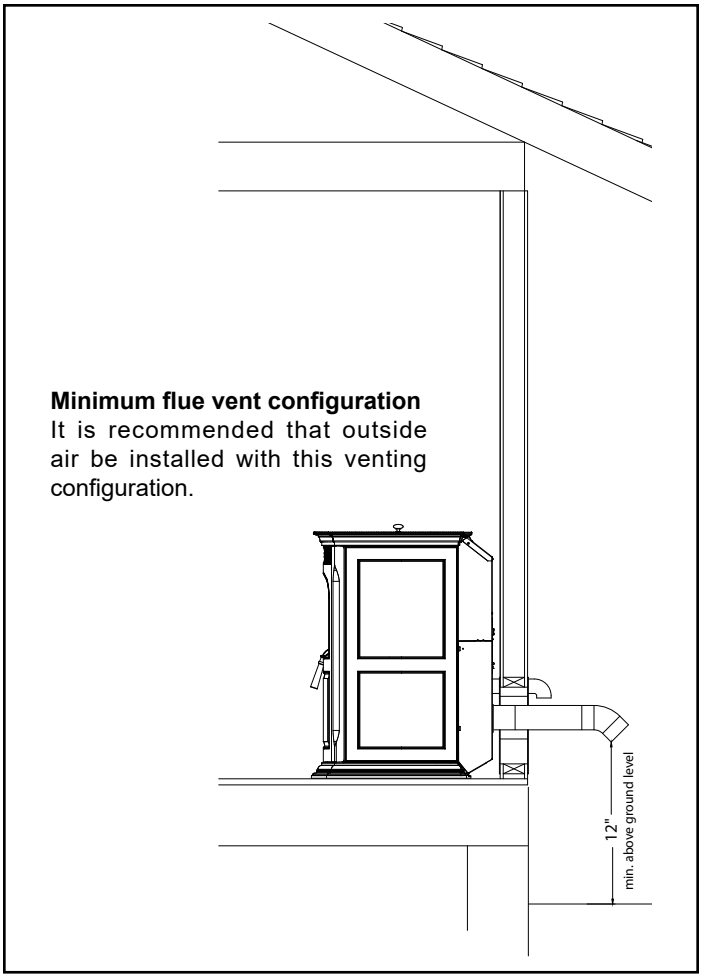



**Figure 4.8**

### #7 Installing through the ceiling

Through the ceiling vent, follow PL vent manufacturers recommendations when using wall and ceiling pass through.

**Do not place joints within wall pass-through.**

Dotted area represents the minimum clearance to combustible materials such as shrubbery, mulch or tall grasses.

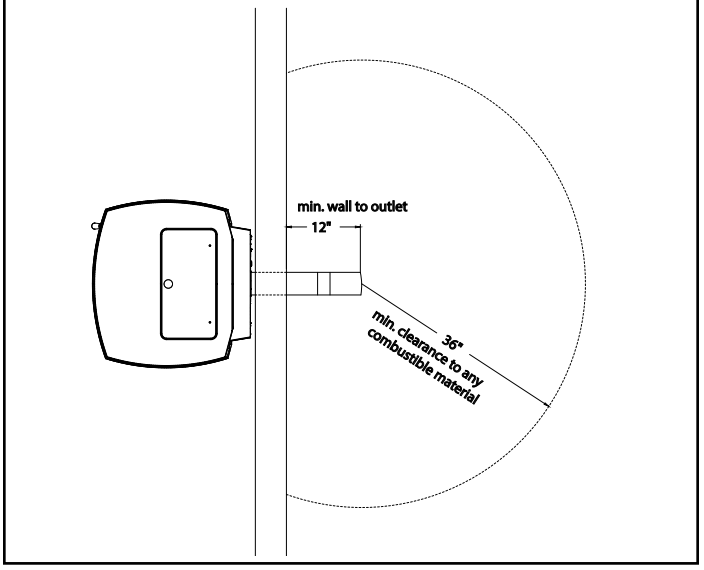



**Figure 4.9**

## B. Chimney Diagram

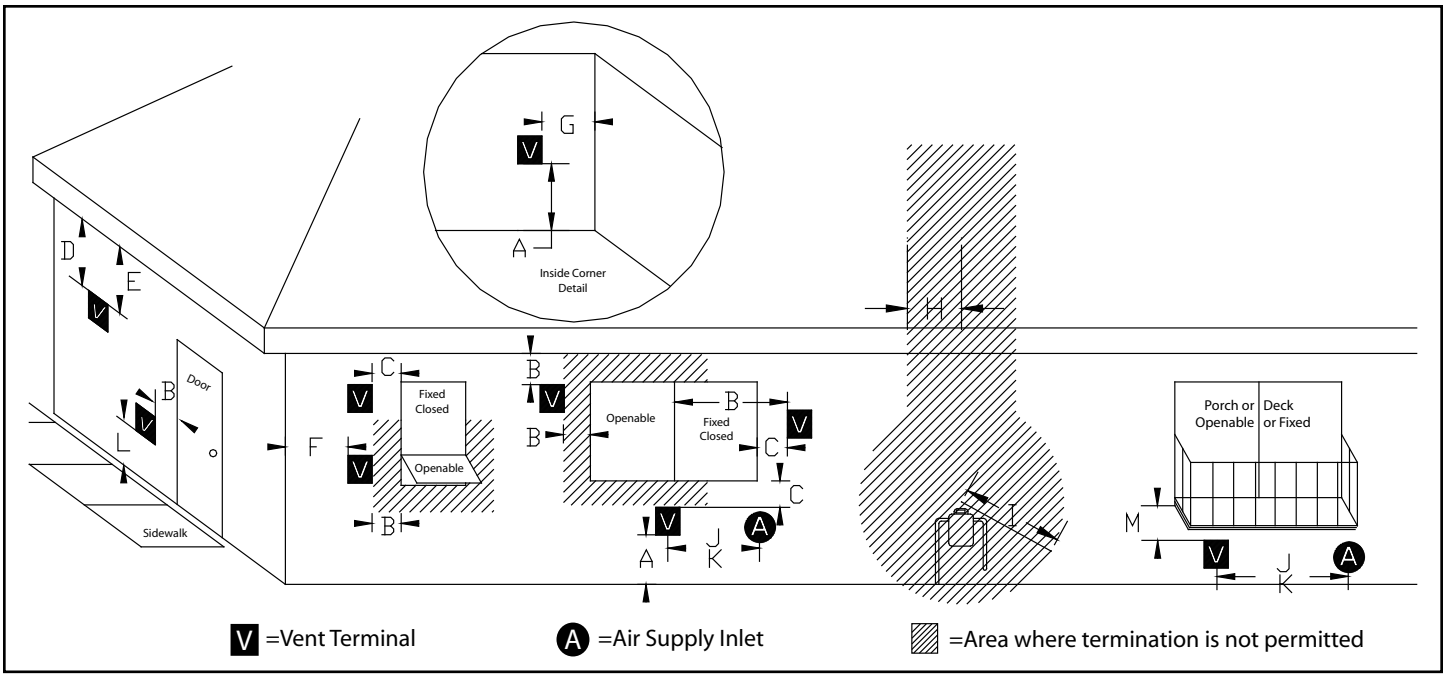



**Figure 4.10**

**Requirements for Terminating the Venting**

**WARNING**

**Venting terminals must not be recessed into a wall or siding.**

**NOTE**

**Only PL vent pipe wall pass-through and fire stops should be used when venting through combustible materials.**

**Always take into consideration the effect the prevailing wind direction or other wind currents will cause with flyash and /or smoke when placing the termination.**

**In addition, the following must be observed:**

A. The clearance above grade must be a minimum of 12".

B. The clearance to a window or door that may be opened must be a minimum of 48" to the side, 48" below the window/door, 12" above the window/door. (**with outside air installed, 9" to side and below**)

C. A 12" clearance to a permanently closed window is recommended to prevent condensation on the window.

D. The vertical clearance to a ventilated soffit located above the terminal within a horizontal distance of 2 feet (60 cm) from the center-line of the terminal must be a minimum of 18".

E. The clearance to an unventilated soffit must be a minimum of 12".

F. The clearance to an outside corner is 11" from center of pipe.

G. The clearance to an inside corner is 12".

H. A vent must not be installed within 3 feet (90 cm) above a gas meter/regulator assembly when measured from the horizontal center-line of the regulator.

I. The clearance to service regulator vent outlet must be a minimum of 6 feet.

J. The clearance to a non-mechanical air supply inlet to the building or the combustion air inlet to any other appliance must be a minimum of 48".

K. The clearance to a mechanical air supply inlet must be a minimum of 10 feet. (**with outside air installed, 6 feet**)

L. The clearance above a paved sidewalk or a paved driveway located on public property must be a minimum of 7 feet.

M. The clearance under a veranda, porch, deck or balcony must be a minimum of 12 inches. **(B. also)**

**NOTE**

**The clearance to vegetation and other exterior combustibles such as mulch is 36" as measured from the center of the outlet or cap. This 36" radius continues to grade.**

Certain Canadian and or Local codes or regulations may require different clearances.

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

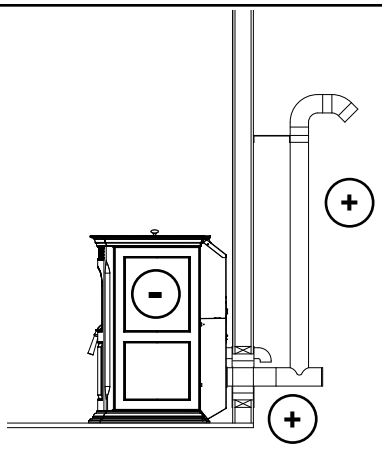
Only permitted if veranda, porch, deck, or balcony is fully open on a minimum of 2 sides beneath the floor.

**See NFPA 211 for more installation clearance reductions when using outside air.**

**NOTE**

**Where passage through a wall, or partition of combustible construction is desired, the installation shall conform to CAN/CSA-B365. (if in Canada)**

## C. Venting & Use of Elbows




⊕ = *Positive static pressure*
⊖ = *Negative static pressure*

**Figure 4.11**

Harman pellet stoves depend on a combustion fan to pull air through the unit for combustion. The venting system restricts the ability of the combustion fan to move the required amount of air through the unit. A system with too much resistance will result in incomplete combustion, more frequent required cleaning and poor unit performance. It is always best to choose a location for the appliance that will result in a venting system with the shortest equivalent vent length (EVL).

It is best to have your venting system designed by a Harman authorized dealer before you finalize your purchase of an appliance.

***Equivalent Vent Length:* The equivalent vent length for common pellet vent components are:**

- 90° Elbows or Tee: 5 EVL Units
- 45° elbow: 3 EVL Units
- Vertical Pipe or Liner: ½ EVL Unit
- Horizontal Pipe or liner: 1 EVL Unit

***The total allowable equivalent vent length is:***

- 20 EVL for 3” pellet vent pipe or liner
- 30 EVL for 4” pellet vent pipe or liner

Due to the potential for fly ash accumulation in horizontal venting sections, the maximum permissible horizontal venting length is:

- 4 ft. for 3” & 4” pellet vent pipe.

**Example: First Floor Installation**

A unit is to be installed using 3” Pellet Pipe with 3 feet of horizontal pipe, a Tee, 10 feet of vertical pipe, a 90° elbow and a termination cap.

***The equivalent vent length is:***

| | |
|---|---|
| 3 ft. of Horizontal Pipe (1 x 3 EVL) | = 3 EVL |
| 90° Elbow or Tee (1 x EVL) | = 5 EVL |
| 10 ft. of Vertical Pipe (10 x .5 EVL) | = 5 EVL |
| 90° Elbow or Tee (1 x EVL) | = 5 EVL |
| Termination Cap | = 0 EVL |
| Equivalent Vent Length | = 18 EVL |

In the example system detailed above, the EVL was 138which is less than the maximum of 20 EVL for 3” pellet vent pipe, thus this is a satisfactory venting configuration.

**Example: Connection to Masonry Chimney**

A unit is to be installed using 3” Pellet Pipe with 2 feet of horizontal pipe, a Tee, 4 feet of vertical pipe, an elbow, a Tee, 21 feet of vertical liner, and a termination cap.

***The equivalent vent length is:***

| | |
|---|---|
| 2 ft. of Horizontal Pipe (1 x 2 EVL) | = 2 EVL |
| 90° Tee (1 x 5 EVL) | = 5 EVL |
| 4 ft. of Vertical Pipe (4 x .5 EVL) | = 2 EVL |
| 90° Elbow (1 x 5 EVL) | = 5 EVL |
| 90° Tee (1 x 5 EVL) | = 5 EVL |
| 21 ft. of Vertical Liner (21 x .5 EVL) | = 10.5 EVL |
| Termination Cap | = 0 EVL |
| Equivalent Vent Length | = 29.5 EVL |

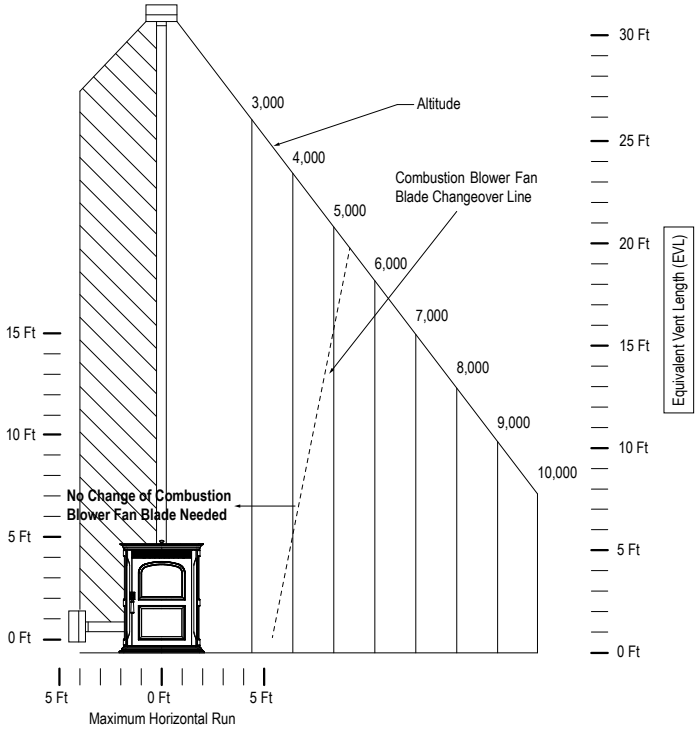
In the example system detailed above, the EVL was 29.5 which exceeds the maximum of 20 ft. for 3” pellet vent pipe, thus 3” vent pipe should not be used in this installation. However, since 4” pipe can support an EVL up to 30, the use of 4” pipe would create a satisfactory installation.

## C. Venting & Use of Elbows *continued*

**Note:** When the amount of vertical pellet vent pipe in the system exceeds 15 feet, 4” pellet vent pipe should be used.

**Note:** Equivalent Venting Length decreases as altitude increases.

**Note:** When the High Altitude Fan Blade is used, the maximum length of Outside Air Pipe decreases to 20 ft.




**Example:**

A unit with an EVL of 13, is to be installed at an altitude of 3,000 feet above sea level.

From the chart to the left, at 3,000 feet of altitude, the maximum permissible equivalent venting length is 26 feet. Therefore this would be an acceptable installation with no need to change the combustion blower fan.

However, if the same unit (EVL 13)was to be installed an altitude of 9,000 feet above sea level, the installation would no longer be acceptable and the equivalent vent length of the pipe would have to be reduced for proper unit operation.

- Long runs of flex or PL vent pipe installed directly vertical from the flue stub may require more frequent cleaning due to fly ash falling off inside and collecting directly above the combustion blower outlet.
- 4" stainless steel flex vent piping is only allowed for use in masonry fireplaces and chimneys or factory built wood-burning fireplaces with Class A metal chimneys.
- All pellet vent pipe must be secured together either by means provided by pipe manufacturer or by 3 screws at each joint.
- Use only the specified venting components. Use of any other components will void the product warranty and may pose a hazard.
- Do Not Install a Flue Damper In The Exhaust Venting System of This Appliance.
- DO NOT CONNECT THIS UNIT TO A CHIMNEY FLUE SERVING ANOTHER APPLIANCE.
- **NOTE:** Simpson DuraVent PelletVent Pro Harman®Adapter Part #3PVP-ADHB and PelletVent Pro Harman®Adapter Increaser Part #3PVPX4ADHB are highly recommended to be installed on the starter collar to insure a proper pipe connection to the unit.
- **INSTALL VENT AT CLEARANCES SPECIFIED BY THE VENT MANUFACTURER**
- Use silicone to create an effective vapor barrier at the location where the chimney or outside air ducting passes through to the exterior of the structure

## D. Outside Air

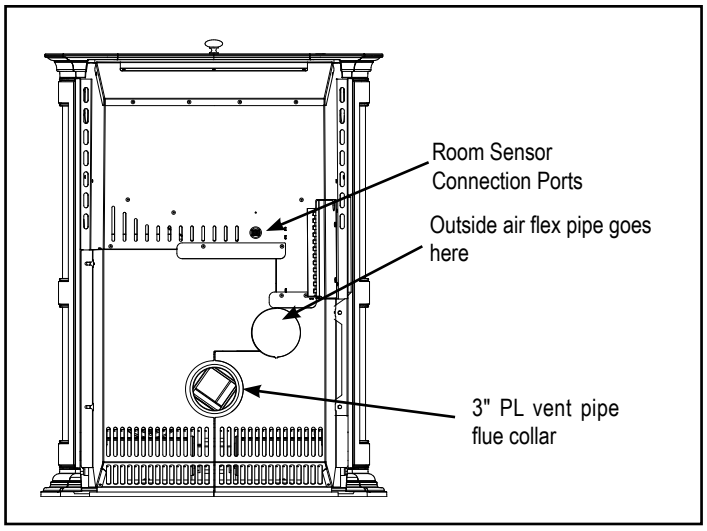



**Figure 4.12**

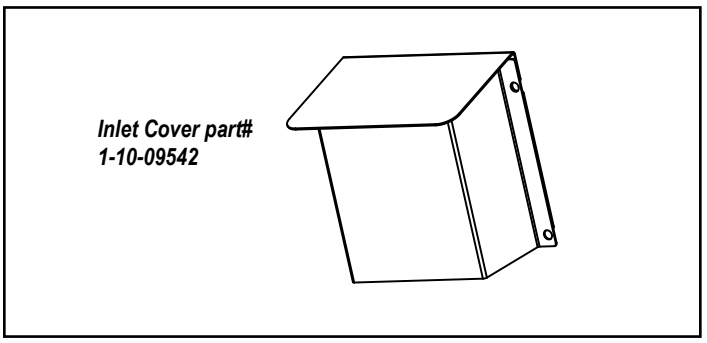



**Figure 4.13**

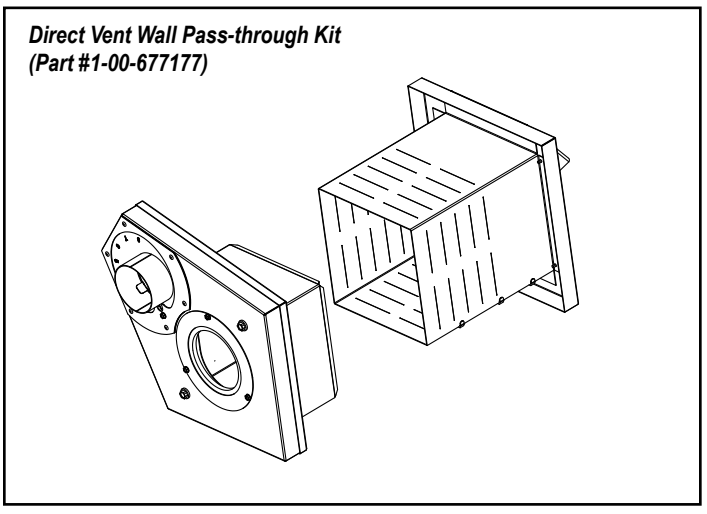



**Figure 4.14**

**Outside Air:**

**Hearth & Home Technologies recommend attaching outside air in all installations, especially lower level and main floor locations.**

Per national building codes, consideration must be given to combustion air supply to all combustion appliances. Failure to supply adequate combustion air for all appliance demands, may lead to back-drafting of those and other appliances.

When the appliance is side-wall vented: The air intake is best located on the same exterior wall as the exhaust vent outlet and located lower on the wall than the exhaust vent outlet.

When the appliance is roof vented: The air intake is best located on the exterior wall oriented towards the prevailing wind direction during the heating season.

The outside air connection will supply the demands of the pellet appliance, but consideration must be given to the total house demand. House demand may consume some air needed for the stove, especially during a power failure. It may be necessary to add additional ventilation to the space in which the pellet appliance is located. Consult with your local HVAC professional to determine the ventilation demands for your house.

To install outside air use 3". non-combustible flex pipe Figure 4.13. There is a break-away hole on the rear panel of the P-Series stove which must be removed before connecting the flex pipe. Figure 4.12. The pipe should be run outside and terminate to the side or below the vent pipe outlet so the flue outlet is more than 12" from the inlet cover. The Termination Cap should be used to keep birds, rodents, etc. out of the pipe, Figure 4.13.

You may choose to use the optional Direct Vent Wall Pass-through Kit which incorporates the venting pass-through and outside air inlet into one component. Figure 4.14.

**Use silicone to create an effective vapor barrier at the location where the chimney or outside air ducting passes through to the exterior of the structure.**

## E. Locating Your Appliance & Chimney

Location of the appliance and chimney will affect performance.

- Install through the warm airspace enclosed by the building envelope. This helps to produce more draft, especially during lighting and die-down of the fire.
- Penetrate the highest part of the roof. This minimizes the effects of wind loading.
- Locate termination cap away from trees, adjacent structures, uneven roof lines and other obstructions.
- Minimize the use of chimney offsets.
- Consider the appliance location relative to floor and ceiling and attic joists.

**CAUTION**

- DO NOT CONNECT THIS UNIT TO A CHIMNEY FLUE SERVICING ANOTHER APPLIANCE.
- DO NOT CONNECT TO ANY AIR DISTRIBUTION DUCT OR SYSTEM.

May allow flue gases to enter the house.

## F. Draft

Draft is the pressure difference needed to vent appliances successfully. When an appliance is drafting successfully, all combustion by products are exiting the home through the chimney.

Considerations for successful draft include:

- Preventing negative pressure
- Location of appliance and chimney

To measure the draft or negative pressure on your appliance use a magnahelic or a digital pressure gauge capable of reading 0 - 1 inches of water column (W.C.).

The appliance should be running on high for at least 15 minutes for the test.

With the stove running on high you should have a negative pressure equal to or greater than the number given in the chart below. If you have a lower reading than you find on the chart, your appliance does not have adequate draft to burn the fuel properly.

| **Minimum Vacuum Requirements:** | **.35 - .55** |
|---|---|

Prior to installing the flue pipe, connect a draft meter. (The draft meter must have a minimum range of 0 - .5") Record the first reading. Connect flue pipe to stove and be sure all doors and windows in the home are closed. Record the second draft reading _____. If the second reading is more than .05" lower than the first reading, check for possible restrictions or the need for outside air. For more information on the draft test procedure, refer to Page 21

## G. Negative Pressure

**WARNING**

***Risk of Asphyxiation!*** *Negative pressure can cause spillage of combustion fumes and soot.*

Negative pressure results from the imbalance of air available for the appliance to operate properly. It can be strongest in lower levels of the house.

Causes include:

- Exhaust fans (kitchen, bath, etc.)
- Range hoods
- Combustion air requirements for furnaces, water heaters and other combustion appliances
- Clothes dryers
- Location of return-air vents to furnace or air conditioning
- Imbalances of the HVAC air handling system
- Upper level air leaks such as:
  - Recessed lighting
  - Attic hatch
  - Duct leaks

To minimize the effects of negative air pressure:

- Install the outside air kit with the intake facing prevailing winds during the heating season
- Ensure adequate outdoor air for all combustion appliances and exhaust equipment
- Ensure furnace and air conditioning return vents are not located in the immediate vicinity of the appliance
- Avoid installing the appliance near doors, walkways or small isolated spaces
- Recessed lighting should be a "sealed can" design
- Attic hatches weather stripped or sealed
- Attic mounted duct work and air handler joints and seams taped or sealed

***NOTICE:*** *Hearth & Home Technologies assumes no responsibility for the improper performance of the chimney system caused by:*

- *Inadequate draft due to environmental conditions*
- *Downdrafts*
- *Tight sealing construction of the structure*
- *Mechanical exhausting devices*

## H. Avoiding Smoke and Odors

**Negative Pressure, Shut-down, and Power Failure:**

**To reduce the probability of back-drafting or burn-back in the pellet burning appliance during power failure or shut-down conditions, the stove must be able to draft naturally** without exhaust blower operation. Negative pressure in the house will resist this natural draft if not accounted for in the pellet appliance installation.

Heat rises in the house and leaks out at upper levels. This air must be replaced with cold air from outdoors, which flows into lower levels of the house. Vents and chimneys into basements and lower levels of the house can become the conduit for air supply, and reverse under these conditions.

**Outside Air**

An outside air kit is recommended in all installations. The Outside Air Kit must be ordered separately.

Per national building codes, consideration must be given to combustion air supply to all combustion appliances. Failure to supply adequate combustion air for all appliance demands may lead to back drafting of those and other appliances.

When the appliance is roof vented (strongly recommended):
The air intake is best located on the exterior wall oriented towards the prevailing wind direction during the heating season.

When the appliance is side-wall vented:
The air intake is best located on the same exterior wall as the exhaust vent outlet and located lower on the wall than the exhaust vent outlet.

The outside air supply kit can supply most of the demands of the pellet appliance, but consideration must be given to the total house demand.

House demand may consume the air needed for the appliance. It may be necessary to add additional ventilation to the space in which the pellet appliance is located.

Consult with your local HVAC professional to determine the ventilation demands for your house.

**Vent Pipe**

Be sure to use approved pellet vent pipe wall and ceiling pass- through fittings to go through combustible walls and ceilings. Be sure to use a starting collar to attach the venting system to the stove. The starting collar must be secured to the flue stub with at least three screws, and sealed with high temp silicone caulking.

4” stainless steel flex vent piping is only allowed for use in masonry fireplaces and chimneys or factory built wood burning fireplaces with class A metal chimneys.

Pellet venting pipe (also known as Type L vent) is constructed of two layers with air space between the layers. This air space acts as an insulator and reduces the outside surface temperature to allow a clearance to combustibles of only 1 inch. The sections of pipe lock together to form an air tight seal. Follow venting manufacturer’s recommendations for sealing pipe joints.

Where passing through an exterior wall or roof, be sure to use the appropriate pass-through device providing an adequate vapor barrier. Venting manufacturers generally provide these pass-through devices.

**Vent Configurations:**

To reduce probability of reverse drafting during shut-down conditions, Hearth & Home Technologies strongly recommends:

- Installing the pellet vent with a minimum vertical run of five feet, preferably terminating above the roof line.
- Installing the outside air intake at least four feet below the vent termination.

To prevent soot damage to exterior walls of the house and to prevent re-entry of soot or ash into the house:

- Maintain specified clearances to windows, doors, and air inlets, including air conditioners.
- Vents should not be placed below ventilated soffits. Run the vent above the roof.
- Avoid venting into alcove locations.
- Vents should not terminate under overhangs, decks or onto covered porches.
- Maintain minimum clearance of 12 inches from the vent termination to the exterior wall. If you see deposits developing on the wall, you may need to extend this distance to accommodate your installation conditions.

**Hearth & Home Technologies assumes no responsibility for, nor does the warranty extend to, smoke damage caused by reverse drafting of pellet appliances under shut-down or power failure conditions.**

## I. Fire Safety

To provide reasonable fire safety, the following should be given serious consideration:

- Install at least one smoke detector and CO detector on each floor of your home.
- Locate smoke detector away from the heating appliance and close to the sleeping areas.
- Follow the smoke detector manufacturer's placement and installation instructions and maintain regularly.
- Conveniently locate a Class A fire extinguisher to contend with small fires.
- In the event of a hopper fire:
    - Evacuate the house immediately.
    - Notify fire department.

**WARNING**

Fire Risk.
Hearth & Home Technologies disclaims any responsibility for, and the warranty will be voided by the following actions:

- Installation and use of any damaged appliance.
- Modification of the appliance.
- Installation other than as instructed by Hearth & Home Technologies.
- Installation and/or use of any component part not approved by Hearth & Home Technologies.
- Operating appliance without fully assembling all components.
- Do NOT Overfire.

**Or any such action that may cause a fire hazard.**

**WARNING**

**THIS WOOD HEATER HAS A MANUFACTURER-SET MINIMUM LOW BURN RATE THAT MUST NOT BE ALTERED. IT IS AGAINST FEDERAL REGULATIONS TO ALTER THIS SETTING OR OTHERWISE OPERATE THIS WOOD HEATER IN A MANNER INCONSISTENT WITH OPERATING INSTRUCTIONS IN THIS MANUAL.**

## J. Inspect Appliance & Components

- Remove appliance and components from packaging and inspect for damage.
- Report to your dealer any parts damaged in shipment.
- **Read all the instructions before starting the installation. Follow these instructions carefully during the installation to ensure maximum safety and benefit.**

**WARNING**

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

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

Report damaged parts to dealer.

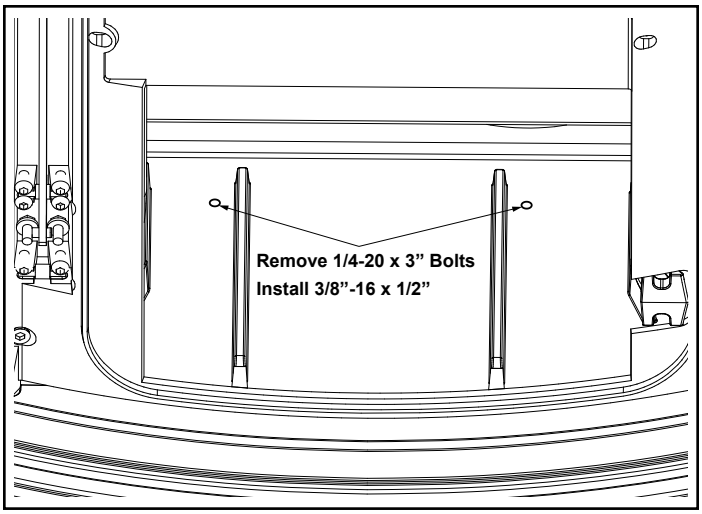



**Figure 5.1**

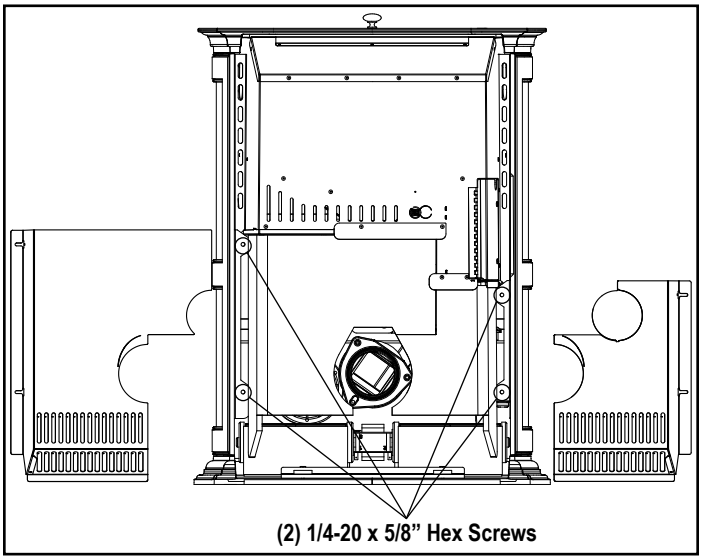



**Figure 5.2**

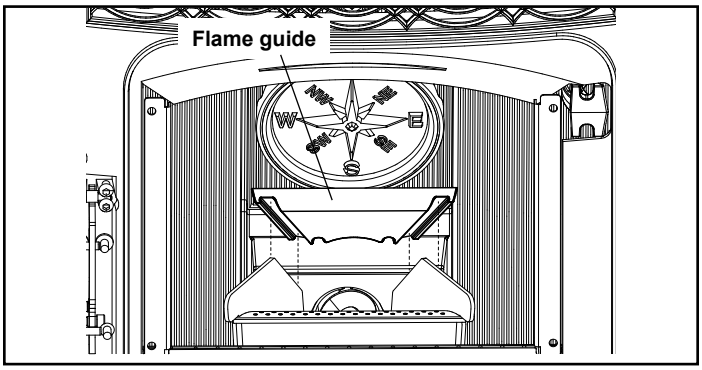



**Figure 5.3**

## A. Unpacking

To free the stove from the skid you must remove the (2) 1/4-20 x 3". Figure 5.1. (2) 1/4-20 x 3" are located just inside the door under the ash pan.

Once unit is removed from the skid install (2) 3/8"-16 x 1/2" bolts located in the manual pack in the empty holes.

## B. Removing Rear Cover Panels

The rear cover panels are secured to the stove with two screws each. These screws need only be loosened, not removed, to remove the panels. It is recommended that the rear covers are installed after the unit is in place and the vent pipe is installed, to prevent contact with hot or moving parts.

## C. Flame Guide

Install the cast iron flame guide on top of the burn pot. Make sure that the flame guide is fully seated on the vertical sides of the burn pot and that the back of the guide rests against the body of the stove. Figure 5.3.

## D. Room Sensor Installation

The room sensor is a small temperature sensor on the end of a 60" wire. This sensor is installed much like a standard wall thermostat. There is a remote room sensor port on the rear of the unit for easy external connection. Use standard 18-2 thermostat wire to extend the sensor to the desired location (50' maximum). The room sensor should be installed in the location where you want to control the temperature.

Distances of more than 25 feet from the unit or in another room are not recommended. The room sensor is essential for the Accentra's excellent efficiency.

**NOTE:** It is recommended that the room sensor be installed, even if only installed on the rear of the unit as a return air sensor.

## E. Low Draft Voltage Adjustment

These units are pre-tested at the factory with exactly 120 VAC, 60 Hz. They are checked and adjusted for firebox tightness, gasket leakage, motor operation and igniter operation. The Accentra is then factory set at a mid-point adjustment and in most cases will not need any adjustments.

**The factory low draft setting may not be correct for the unit's permanent installation conditions.**

The control board on the Accentra is equipped with a low draft adjustment port located on the control face just to the right of the igniter light. Figure 5.4. This voltage adjustment is provided to allow the unit to be adjusted for the household voltage where the unit is going to be in permanent operation. **The line voltage varies from area to area and often home to home.**

The low draft voltage should be adjusted to achieve the most efficient burn on low burn or "maintenance". This voltage adjustment allows the installer to change the low voltage set point approximately 10 volts. This adjustment should be done by the installer during set up because a draft meter reading is **required** to insure proper set up.

**Combustion Motor Speed Control**

**Low draft only set point.** The small straight screwdriver slot is plastic; therefore, the unit can be adjusted while in operation.

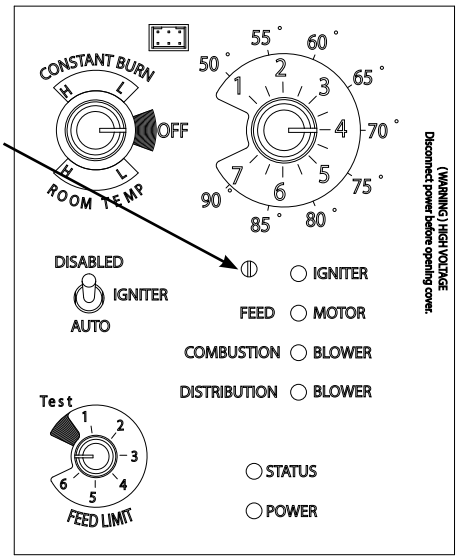
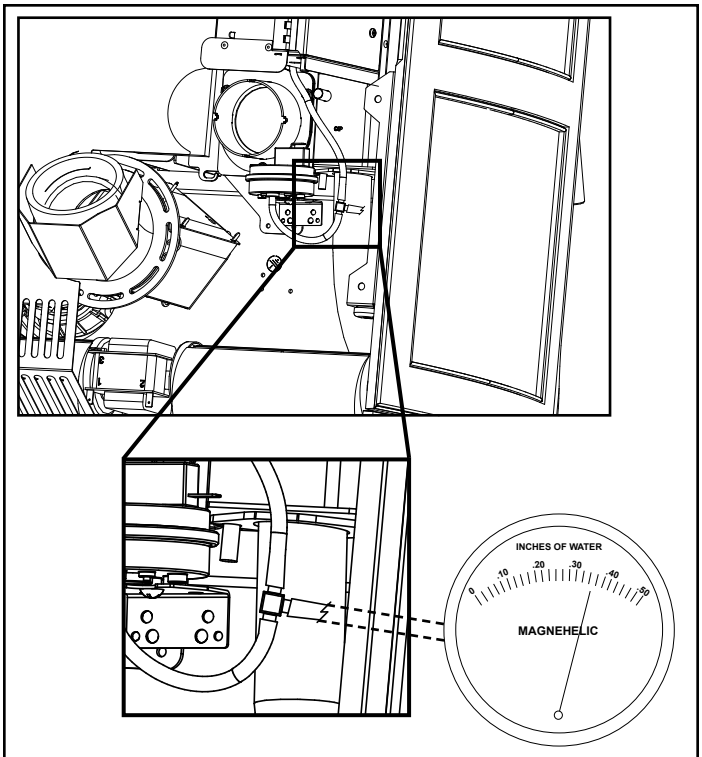



**Figure 5.4**




**The rear panel will need to be removed prior to installing the draft meter to the barbed tee. Be sure to hold the barbed tee while removing the plug cover. Replace plug cover after draft test.**

**Figure 5.5**

If the unit is not adjusted properly, it does not cause a safety concern. If the unit is adjusted too high, only efficiency is lost. If the unit is adjusted too low, the low draft pressure switch will not allow the feed motor or the igniter to operate.

A simple draft test should be performed after completing the flue pipe installation. To record the results for future reference:

1. Plug unit into a 120VAC, 60 HZ outlet.
2. Close the hopper lid, front view door, and the ash pan. Neither pellets or a fire are required for this test.
3. With the mode selector in the "OFF" position, turn the feed adjuster to "TEST".
4. Record the high draft_____in W.C. (Normal is -.50 to -.60) The control will be on the High Draft for a total of 2 minutes.
5. After 1 minute, the combustion motor will go down to low draft and the distribution blower will go on high. Allow approximately 15 seconds to pass for the combustion motor to slow before checking the low draft.
6. If the low draft is between -.35 and -.45, record the reading _____ in W.C. If the reading is higher, slowly turn the set screw counter-clockwise until the draft lowers. If the reading is lower, very slowly turn the set screw clockwise until the draft increases.

**NOTE: In some cases, the draft may not go as low as -.35 to -.45 even with the set screw completely counter-clockwise. Ideally, you should just set it as low as possible.**

# 6 Reference Material

## A. Safety Reminders

When installing and operating your Harman® Accentra, respect basic safety standards. Read these instructions carefully before you attempt to install or operate the Accentra. Failure to do so may result in damage to property or personal injury and may void the product warranty.

Consult with your local building code agency and insurance representative before you begin your installation to ensure compliance with local codes, including the need for permits and follow-up inspections.

**CAUTION**

**This appliance must be vented to the outside.**

Due to high temperatures, this stove should be placed out of traffic and away from furniture and draperies.

Children and adults should be alerted to the hazards of high surface temperatures and should stay away to avoid burn to skin and/or clothing.

Young children should be carefully supervised when they are in the same room as the stove.

Clothing and other flammable materials should not be placed on or near this stove.

Installation and repair of this stove should be done by a qualified service person. The appliance should be inspected before use and at least annually by a qualified service person. More frequent cleaning will be required. It is imperative that control compartments, burners, and circulating air passageways of this stove be kept clean.

Do **NOT** use makeshift compromises when installing this appliance, serious consequences may result.

With any hearth appliance, installation of smoke detectors is recommended on every level of the home.

**Possible causes of smoke detector activation:**

Paint curing process - Open a window near the appliance for the first few hours of burning.

Exhaust being drawn back inside the dwelling - Outside air connection to the appliance is necessary.

Vent leakage - Follow venting manufacturer's recommendations for sealing pipe joints.

**WARNING**

**KEEP COMBUSTIBLE MATERIALS SUCH AS GRASS, LEAVES, ETC. AT LEAST 3 FEET AWAY FROM THE POINT DIRECTLY UNDER THE VENT TERMINATION.**

**WARNING**

**USE OF IMPROPER FUELS, FIRE STARTERS OR ALTERING THE STOVE FOR HIGHER HEAT OUTPUT MAY CAUSE DAMAGE TO THE STOVE AND COULD RESULT IN A HOUSE FIRE. USE ONLY APPROVED FUELS AND OPERATION GUIDELINES**

**WARNING**

**MOBILE/MANUFACTURED HOME GUIDELINES DO NOT ALLOW INSTALLATION IN A SLEEPING ROOM.**

**WARNING**

**BURNING COLORED PAPER, CARDBOARD, SOLVENTS, TRASH AND GARBAGE OR ALTERING THE STOVE FOR HIGHER HEAT OUTPUT MAY CAUSE DAMAGE TO THE STOVE AND COULD RESULT IN A HOUSE FIRE. USE ONLY APPROVED FUELS AND FOLLOW ONLY THESE OPERATION GUIDELINES.**

**CAUTION**

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

**CAUTION**

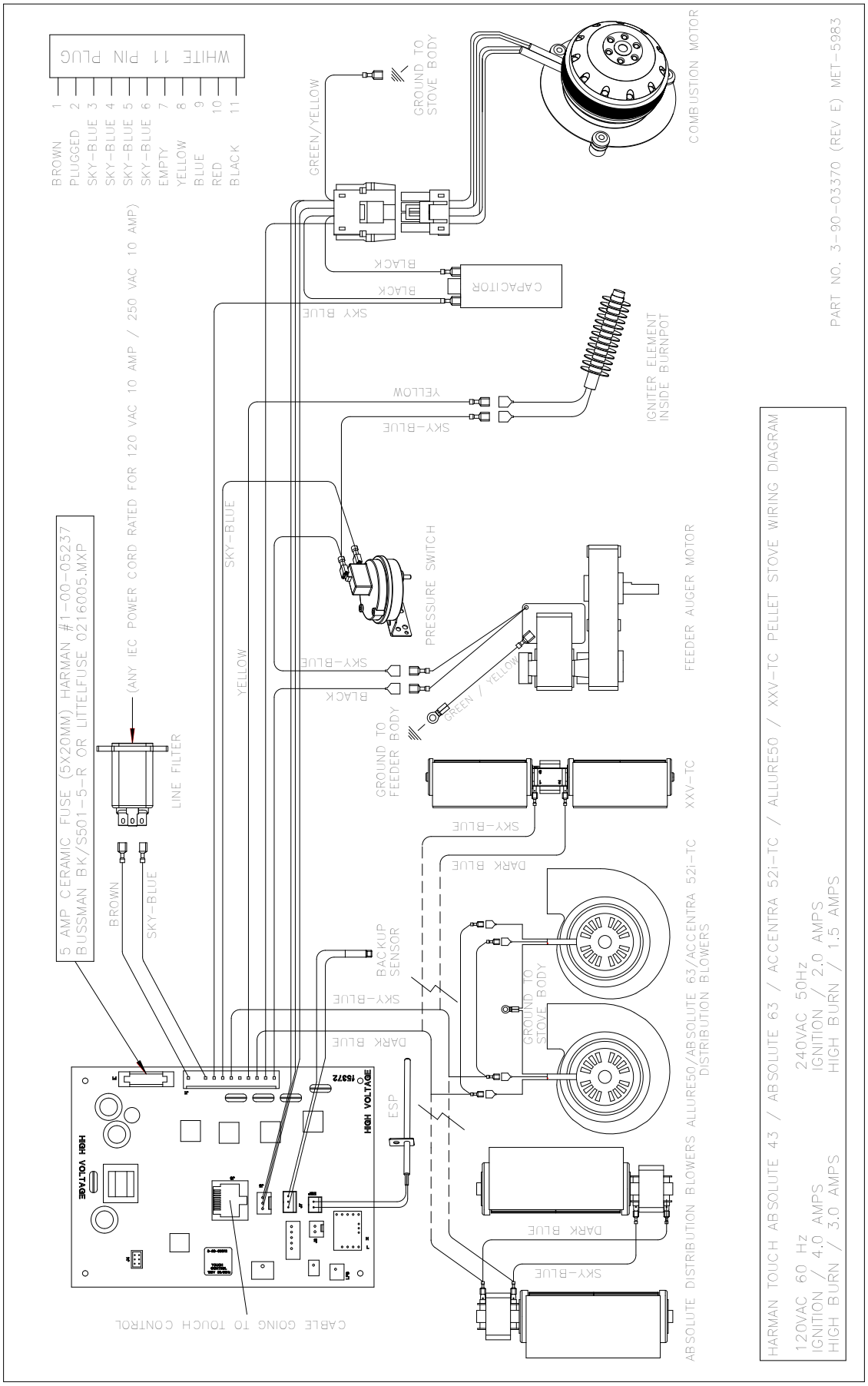
**THE STOVE IS HOT WHILE IN OPERATION.**

**KEEP CHILDREN, CLOTHING AND FURNITURE AWAY. CONTACT MAY CAUSE SKIN BURNS.**

**CAUTION**

**WHEN THIS ROOM HEATER IS NOT PROPERLY INSTALLED, A HOUSE FIRE MAY RESULT. TO REDUCE THE RISK OF FIRE, FOLLOW THE INSTALLATION INSTRUCTIONS. CONTACT LOCAL BUILDING OR FIRE OFFICIALS ABOUT RESTRICTIONS AND INSTALLATION INSPECTION REQUIREMENTS IN YOUR AREA.**

# B. Wiring Diagram



HARMAN®

BUILT TO A STANDARD, NOT A PRICE

## CONTACT INFORMATION

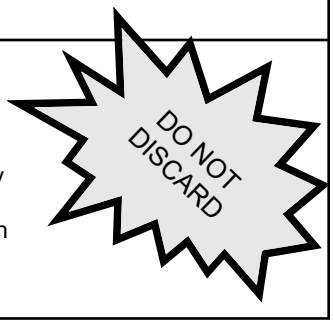
Hearth & Home Technologies
352 Mountain House Road
Halifax, PA 17032
Division of HNI INDUSTRIES

**Please contact your Vermont Castings dealer with any questions or concerns.
For the number of your nearest Vermont Castings dealer
log onto www.harmanstoves.com**

## CAUTION

### DO NOT DISCARD THIS MANUAL

- Important operating and maintenance instructions included.
- Read, understand and follow these instructions for safe installation and operation.
- Leave this manual with party responsible for use and operation of this appliance.




**We recommend that you record the following pertinent information for your heating appliance.**

Date purchased/installed:

Serial Number: Location on appliance:

Dealership purchased from: Dealer Phone: 1( ) -

Notes:



HEARTH & HOME technologies™

# Owner's Manual
## Care and Operation

**INSTALLER: Leave this manual with party responsible for use and operation.**
**OWNER: Retain this manual for future reference.**
**Contact your local dealer with questions on installation, operation or service.**

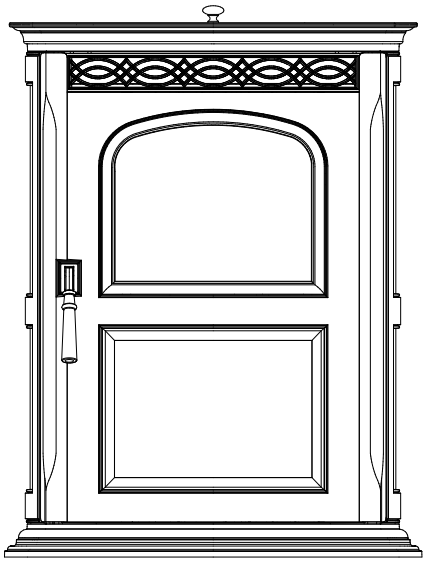
***NOTICE: SAVE THESE INSTRUCTIONS***

HARMAN®

BUILT TO A STANDARD, NOT A PRICE

**Model(s):**

***Accentra Freestanding Pellet Stove***



NATIONAL FIREPLACE INSTITUTE

Pellet Fuels Institute

### ⚠ CAUTION

Check building codes prior to installation.

- Installation MUST comply with local, regional, state and national codes and regulations.
- Contact local building or fire officials about restrictions and installation inspection requirements in your area.

### ⚠ CAUTION

Tested and approved for wood pellet fuel only. Burning of any other type of fuel voids your warranty.

### ⚠ WARNING

**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.**

- Do not store or use gasoline or other flammable vapors and liquids in the vicinity of this or any other appliance.
- Do not overfire - If any external part starts to glow, you are overfiring. Reduce feed rate. Overfiring will void your warranty.
- Comply with all minimum clearances to combustibles as specified. Failure to comply may cause house fire.

### ⚠ WARNING

**HOT SURFACES!**

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

**Hot glass will cause burns.**

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

### NOTE

To obtain a French translation of this manual, please contact your dealer or visit www.harmanstoves.com.

Pour obtenir une traduction française de ce manuel, s'il vous plaît contacter votre revendeur ou visitez www.harmanstoves.com.

# 1 Welcome

**Read this manual before operating this appliance.**
**Please retain this Owner's Manual for future reference.**
**Read the Installation Manual before making any installation or finishing changes.**

## A. Congratulations

Congratulations on selecting a Harman® Freestanding Pellet Stove. The Harman® Accentra pellet stove you have selected is designed to provide the utmost in safety, reliability, and efficiency.

As the owner of a new pellet stove, you'll want to read and carefully follow all of the instructions contained in this owner's manual. Pay special attention to all cautions and warnings.

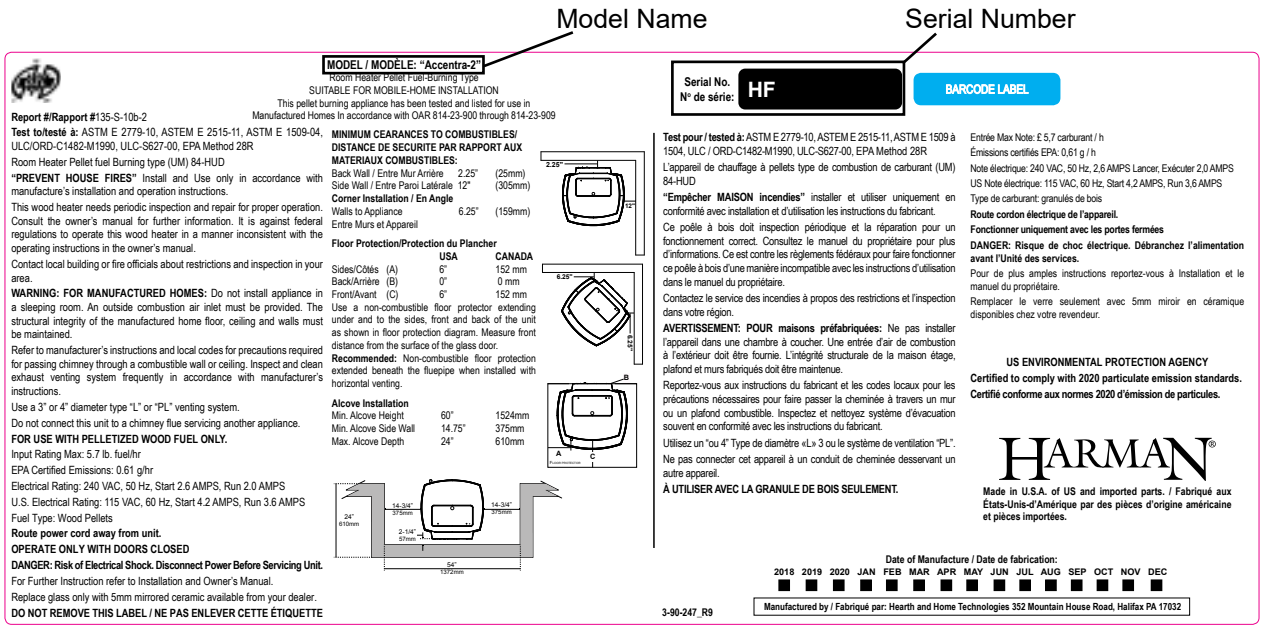
This owner's manual should be retained for future reference. We suggest that you keep it with your other important documents and product manuals.

Your new Harman® Accentra Pellet Stove will give you years of durable use and trouble-free enjoyment. Welcome to the Harman® family!

**Note: Cast iron is an artisan crafted material, which is made the same way today as nearly 2000 years ago. Due to the intrinsic primitive nature of the casting process, part to part variation is normal and adds to the character of a hand built cast iron appliance**

## Listing Label Information/Location

The model information regarding your specific stove can be found on the rating plate usually located in the control area of the stove.



## Safety Alert Key:

- ***DANGER!*** *Indicates a hazardous situation which, if not avoided will result in death or serious injury.*
- ***WARNING!*** *Indicates a hazardous situation which, if not avoided could result in death or serious injury.*
- ***CAUTION!*** *Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.*
- ***NOTICE:*** *Used to address practices not related to personal injury.*

# Table of Contents



**➔ = Contains updated information**

# 2 Product Specific and Important Safety Information

## A. Appliance Certification

| | |
|---|---|
| **MODEL:** | Accentra Pellet Stove |
| **LABORATORY:** | OMNI Test Laboratories, Inc |
| **REPORT NO.** | 135-S-10b-2, 0135PS035E |
| **TYPE:** | Pellet Fueled/Supplementary For Residential Use |
| **STANDARD(s):** | ASTM E 1509-04, ULC/ORD-C1482-M1990, ULC-S627-00, ASTM E 2779-10, ASTM E 2515-11 |
| **ELECTRICAL RATING** | 115 VAC, 60 Hz, Start 4.2 AMPS, Run 3.6 AMPS |
| **GLASS SPECIFICATIONS** | 5mm Ceramic Glass |

**NOTE:** This installation must conform with local codes. In the absence of local codes you must comply with the **ASTM E1509-2004, ULC S628-93, ULC/ORD-C-1482-M1990, (UM) 84-HUD**

The Accentra is Certified to comply with 2020 particulate emission standards.


## B. Mobile Home Approved

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

The structural integrity of the mobile home floor, ceiling, and walls must be maintained. The appliance must be properly grounded to the frame of the mobile home and use only listed pellet vent, Class “PL” connector pipe.

A Harman® Outside Air Kit must be installed in a mobile home installation.

**WARNING**

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

**DO NOT INSTALL IN SLEEPING ROOM.**

## C. BTU & Efficiency Specifications

| | |
|---|---|
| **EPA Certified Emissions:** | 0.62 g/hr |
| ***LHV Tested Efficiency:** | 78% |
| ****HHV Tested Efficiency:** | 71.2% |
| *****EPA BTU Output:** | 6,253 - 25,200 |
| ******BTU Input** | 9,700 - 38,800 |
| **Vent Size:** | 3 Inch |
| **Hopper Capacity:** | 50 lbs |
| **Fuel** | Wood Pellet |

** Weighted average LHV efficiency using data collected during EPA emissions test.*

***Weighted average HHV efficiency using data collected during EPA emissions test.*

****A range of BTU outputs based on EPA Default Efficiency and the burn rates from the low and high EPA tests.*

*****Based on the maximum feed rate per hour multiplied by approximately 8,600 BTU’s which is the average BTU’s from a pound of pellets.*

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.

## D. California

**WARNING**

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

## WARNING

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

***DO NOT:***

- *Install or operate damaged appliance*
- *Modify appliance*
- *Install other than as instructed by Hearth & Home Technologies*
- *Operate the appliance without fully assembling all components*
- *Overfire*
- *Install any component not approved by Hearth & Home Technologies*
- *Install parts or components not Listed or approved.*
- *Disable safety switches*

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

*For assistance or additional information, consult a qualified installer, service agency or your dealer.*

**NOTE:** Hearth & Home Technologies, manufacturer of this appliance, reserves the right to alter its products, their specifications and/or price without notice.

# 3 General Information

## A. Appliance Safety

**WARNING! DO NOT operate stove before reading and understanding operating instructions. Failure to operate stove according to operating instructions could cause fire or injury.**

**WARNING**

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

**Hot glass will cause burns.**
- **DO NOT** touch glass until it is cooled
- NEVER allow children to touch glass
- Keep children away

- CAREFULLY SUPERVISE children in same room as stove.
- Alert children and adults to hazards of high temperatures.

**High temperatures may ignite clothing or other flammable materials.**
- Keep clothing, furniture, draperies and other flammable materials away.

Contact your dealer or Hearth & Home Technologies if the barrier is not present or help is needed to properly install one.

**WARNING**

If you expect that small children or vulnerable adults may come into contact with this appliance, the following precautions are recommended:

- Install a physical barrier such as:
  - A decorative firescreen.
  - Adjustable safety gate.
- Install a switch lock or a wall/remote control with child protection lockout feature.
- Keep remote controls out of reach of children.
- Never leave children alone near a hot stove, whether operating or cooling down.
- Teach children to NEVER touch the stove.
- Consider not using the stove when children will be present.

Contact your dealer for more information, or visit: www.hpba.org/safety-information.

To prevent unintended operation when not using your stove for an extended period of time (summer months, vacations, trips, etc):

- Unplug stove from receptacle.

Connect the power cord to a 120 VAC, 60 Hz grounded receptacle. (A surge protector is recommended to protect the circuit board.) Be sure the polarity of the outlet the stove is plugged into is correct.

## B. Clear Space

**WARNING**

**THIS WOOD HEATER HAS A MANUFACTURER-SET MINIMUM LOW BURN RATE THAT MUST NOT BE ALTERED. IT IS AGAINST FEDERAL REGULATIONS TO ALTER THIS SETTING OR OTHERWISE OPERATE THIS WOOD HEATER IN A MANNER INCONSISTENT WITH OPERATING INSTRUCTIONS IN THIS MANUAL.**

**WARNING**

***RISK OF FIRE! Do NOT place combustible objects in front or to the sides of the appliance.*** *High temperatures may ignite clothing, furniture or draperies.*

**Mantel:** Avoid placing candles and other heat-sensitive objects on mantel or hearth. Heat may damage these objects.

**NOTICE**

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

**WARNING**

***RISK OF FIRE!*** *Keep combustible materials, gasoline and other flammable vapors and liquids clear of appliance.*

- *Do **NOT** store flammable materials in the appliance's vicinity.*
- *Do **NOT** use gasoline, lantern fuel, kerosene, charcoal lighter fluid or similar liquids to start or "freshen up" a fire in this heater.*

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

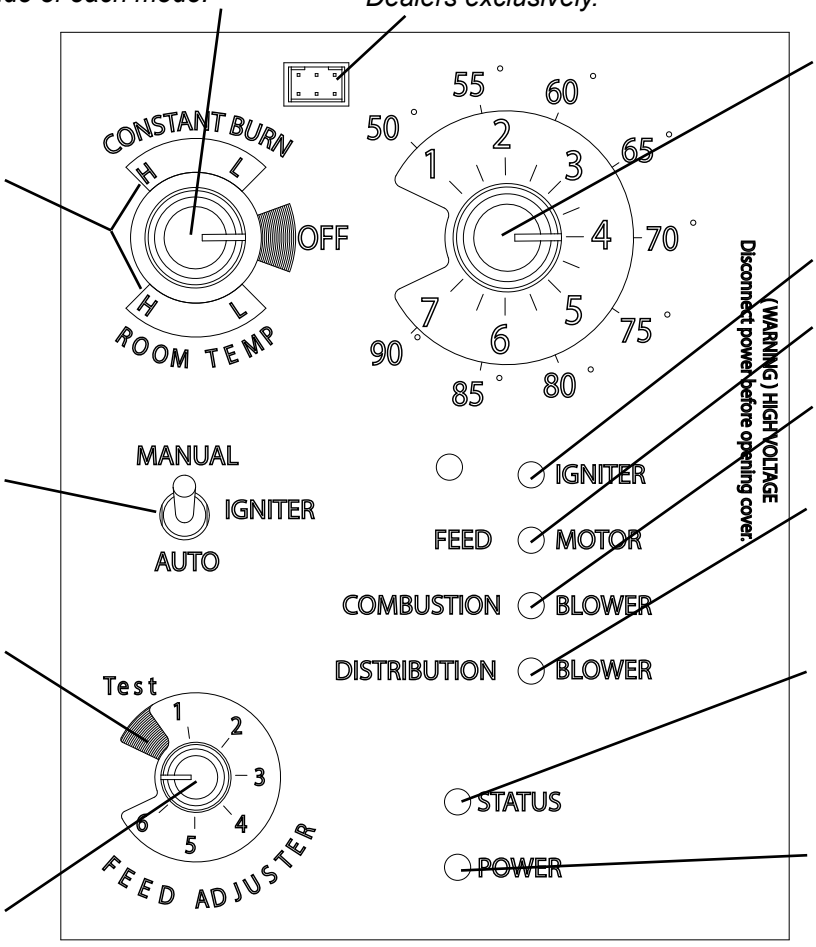
## C. Control Explanation

***Mode Selector***
*Allows you to choose between Room Temp Mode, Constant Burn Mode, or OFF. Also allows you to vary the distribution blower speed by turning the knob to the high or low side of each mode.*

***Dealer Diagnostic Port***
*For dealer maintenance only. Requires special DDM monitor supplied to Harman® Dealers exclusively.*

***Temp dial***
*Allows you to adjust the room temperature in Room Temp Mode using the outer scale marked in degrees Fahrenheit. It also allows you to adjust the stove temperature while in Constant Burn Mode using the inner scale marked from 1 to 7.*

***Distribution Blower speed adjustment range.***
*L = low*
*H = high*
*Variable speed anywhere between L and H; although as the stove temp. goes up, so does the L and H scale.*




***Igniter switch***
*Set to appropriate Start-Up mode.*

*Indicates igniter is on.*

*Indicates power to the feed motor.*

*Indicates power to combustion blower*

*Indicates power to distribution blower.*

***Test***
*Runs all motors at full speed for one minute to check operation. After a minute, the control will simulate a minimum burn and the combustion blower will remain on low.*

***Status Light***
*Will be lit in either stove or room temp mode when pointer is not within off position band except after normal shut down.*

***Feed Limit***
*Sets the maximum feed rate*

***Power Light***
*Indicates power to the control.*

## D. Fuel Specifications

**Fuel and Fuel Storage**

Pellet fuel quality can fluctuate from manufacturer to manufacturer, and even from bag to bag.

Hearth & Home Technologies recommends using only fuel that is certified by the Pellet Fuels Institute (PFI).

Fuel Material

- Made from sawdust and/or other wood by-products
- Source material typically determines ash content

Higher Ash Content Material

- Hardwoods with high mineral content
- Bark and leaves as source material
- “Standard” grade pellets and other biomass

Lower Ash Content Material

- Softwood; pine, fir, etc.
- Materials with lower mineral content
- “Premium” grade pellets

Clinkers

Minerals and other non-combustible materials, like sand, will turn into a hard glass-like substance when heated.

Trees from different areas will vary in mineral content. For this reason, some fuels will produce more clinkers than others.

Moisture

Always burn dry fuel. Burning fuel with high moisture content takes energy to dry and tends to cool the appliance thus, robbing heat from your home. Damp pellet fuel could turn back into sawdust which does not flow properly through the feed system.

Size

- Pellets are either 1/4 inch or 5/16 inch (6-8mm) in diameter
- Length should be no more than 1-1/2 inches (38mm)
- Pellet length can vary from lot to lot from the same manufacturer.

Performance

- Higher ash content requires more frequent maintenance.
- “Premium” grade pellets will produce the highest heat output.
- Burning pellets longer than 1-1/2 inches (38mm) can cause inconsistent feeding and/or ignition.

We recommend that you buy fuel in multi-ton lots whenever possible. However, we do recommend trying different brands prior to purchasing multi-ton lots, to ensure your satisfaction.

Storage

- Wood pellets should be left in their original sealed bag until ready to use, to prevent moisture.
- Do not store fuel within the specified clearance areas, or in a location that will interfere with routine cleaning and maintenance procedures.

**WARNING**

Tested and approved for use with wood pellets ONLY. Burning of any other fuel will void your warranty.

**NOTICE**

Hearth & Home Technologies is not responsible for stove performance or extra maintenance required as a result of using fuel with higher ash or mineral content.

## E. General Operating Information

### 1. Room Sensor Calls For Heat

The appliance is like most modern furnaces; when the room sensor calls for heat, your appliance will automatically light and deliver heat.

When the room is up to temperature and the room sensor is satisfied, the appliance will shut down.

### 2. Heat Output Controls

The appliance will turn on and off as the room sensor demands. When the room sensor calls for heat, the appliance will always start up on High. After burning approximately 7-10 minutes, the appliance will then burn at the rate at which it was originally set. If the appliance is set at one of the lower settings, it will run quieter but take longer to heat up an area than if it were set at a higher burn rate.

Regardless of the burn rate, when the area is warm enough to satisfy the room sensor, the appliance will shut off.

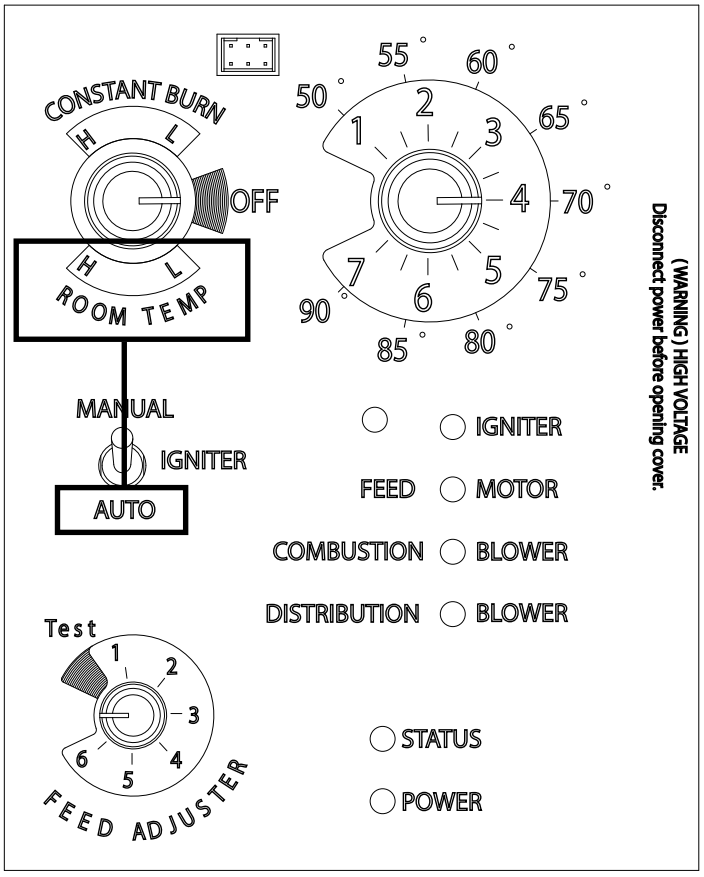



**Figure 3.1**

## F. Before Your First Fire

1. First, make sure your appliance has been properly installed and that all safety requirements have been met. Pay particular attention to the fire protection and venting instructions.
2. Double check that the ash pan and firebox are empty!
3. Close the front door.

**⚠ WARNING**

**Fire Hazard.**
Keep combustible materials, gasoline and other flammable vapors and liquids clear of appliance.

- Do NOT store flammable materials in the appliance's vicinity.
- 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.
- DO NOT BURN GARBAGE OR FLAMMABLE FLUIDS SUCH AS GASOLINE, NAPHTHA OR ENGINE OIL.
- DO NOT USE CHEMICALS OF FLUIDS TO START THE FIRE.
- Combustible materials may ignite.

# 4 Operating Instructions

## A. Starting Your First Fire

1. A room sensor is required for proper operation of this appliance in “Room Temp” mode. At this time, fill the hopper with pellets, insure the control is set to “OFF”. Figure 4.2. Plug the power cord into a properly grounded, nearby outlet.
2. Once power is present, the unit it will run through a quick diagnostics test to insure the control is operating properly. This is normal.
3. For your first fire it may be necessary to purge the auger system by putting the feed Limit knob to “Test” prior to starting the unit. Figure 4.3. This insures that plenty of fuel enters the burn pot for proper ignition.
4. Flip toggle switch to desired mode “auto or Disabled”. Figure 4.4. Set Feed Limit knob to desired setting and turn mode dial to “Room Temp” or “Constant Burn” Figure 4.5. **Note:** Feed rate of #4 is a good starting point. Adjustments made need to be made depending on fuel quality and/or heat output desired.
5. The fuel feed system and the igniter should now be on.
6. Once the appliance has ignited, let it burn for approximately 7-10 minutes. After this time the unit should begin to operate per the settings at the control.

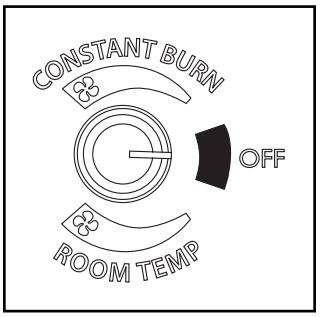



**Figure 4.2**

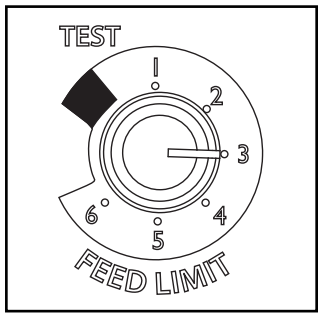



**Figure 4.3**

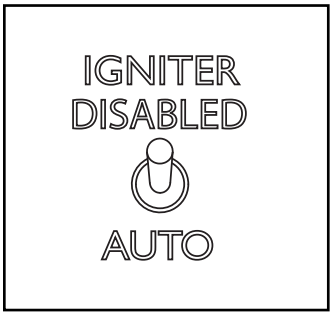



**Figure 4.4**

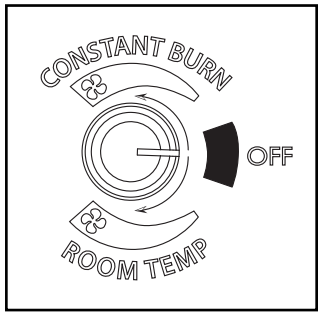



**Figure 4.5**

## B. Fire Characteristics

A properly adjusted fire has a medium active flame pattern that extends out of the burn pot approximately 6 inches (152mm).

## C. Feed Limit Adjustment Instructions

The Feed Limit control is factory set at #4, and should be adequate for most fuels.

However, if the flame height is too high or too low, you will need to adjust the feed rate. Wait until the appliance has been burning for 15 minutes before making your adjustments and allow 15 minutes for the Feed Limit to take effect.

**CAUTION**

Odors and vapors released during initial operation.

- Curing of high temperature paint.
- Open windows for air circulation.

Odors may be irritating to sensitive individuals.

## D. Ignition Cycles

1. At the beginning of each ignition cycle, it is normal to see some smoke in the firebox. The smoke will stop once the fire starts.
2. The distribution blower will automatically turn on after your appliance has reached the set temperature.

   This blower transfers heat from your appliance into the room, and will continue to run in “Constant Burn” mode at the set speed you have the control knob at. In “room temp” mode however, the blower will turn on and off in accordance to what temperature the room sensor is reading. When the room sensor is satisfied the blower will shut down until the room sensor sees a demand for heat.
3. Occasionally the appliance may run out of fuel and shut itself down. When this happens, the unit will need to be turned to the off position and restarted.

   If needed, follow Section A , “Starting Your First Fire”.

**WARNING**

Fire Risk

Do NOT operate appliance:

- With appliance door open.
- Burnpot floor open.
- Cleaning slide plates open.

Do NOT store fuel:

- Closer than required clearances to combustibles to appliance
- Within space required for loading or ash removal.

## E. Automatic Ignition

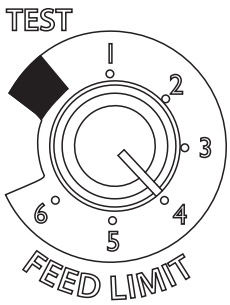



**Figure 4.6**

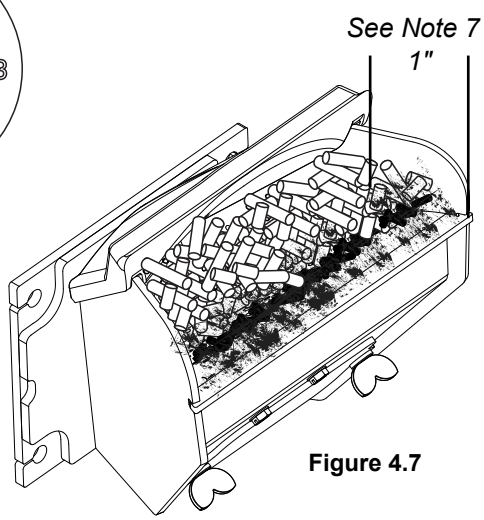



**Figure 4.7**

1. *Fines are small pieces of broken pellets (sawdust). Fines do not flow easily and often build up on the hopper funnel bottom angles. These fines can be pushed into the feeder opening and then fill the hopper with pellets. As the system works, they will be burned.*
2. *The "TEST" cycle will operate the feed motor for exactly one minute. Turning to "TEST" again and again may load too much fuel into the burn pot causing excessive smoke on start-up.*
3. *The firebox low pressure switch will not allow the auger motor or the igniter element to operate if the view door is open.*
4. *Adjust Feed Rate. If this is your first fire or you are trying different pellets, set the Feed Limit to #4, Figure 4.6 This is a conservative number and will probably need to be increased. After you know a feed rate setting that works well, use that setting. Remember, if your feed rate is too high you may waste fuel.*
5. *This is usually a weekly maintenance procedure. Cleaning the burn pot with the scraper with a small amount of new fuel in the bottom is not a problem. First, scrape the ashes off the front of the burn pot into the ash pan. Then scrape the holed surface downward into the burn pot. When the stove feeds, these scrapings will be pushed out by the feeder.*
6. *The ash pan can hold the ashes from approximately 1 ton of premium fuel. This means the ashes will only need to be emptied a few times a year.*
7. *Setting the Feed Limit # for maximum burn: With the unit burning in "AUTO", turn to "Stove Mode" and put the fan on "H". Set the Temperature Dial to #7. Allow the unit to burn for about 30 minutes and check ash on front of burn pot. Figure 4.7. If the ash line is larger than 1", turn the Feed Limit from #4 to #5. Allow another 30 minutes of burn time and check again. If, at #6 setting, a 1" or less ash bed is not obtainable, it is not a problem. The 1" ash bed is only at maximum burn rate and during normal operation, the ash bed will be larger.*

**Igniter Switch to "AUTO" (up position)**

Make sure the unit is plugged into a properly grounded, 120 VAC, 60 Hz electrical source. The power light should be the only light lit.

**Note: Be sure there is no fuel or other combustibles in the ash pan prior to lighting.**

1. Turn Mode Selector to "OFF".
2. Fill hopper with pellets.
3. Clean burn pot with scraper, if necessary.
4. If starting after an empty hopper, turn Feed Limit to "TEST" (for one 60 second cycle).[2] This will flow pellets into the auger tube and also allow you to check the motors for operation.

**NOTE: The auger motor will not operate with the view door open.**

5. Turn Feed Limit to #4.[4]
6. Flip the Igniter Switch up into the "AUTO" position.
7. Turn the Temperature Dial to the desired room temperature.
8. Turn Mode Selector to Room Temperature or Constant Burn.
9. Fill hopper with pellets and remove ashes as required. Keep the hopper lid and firebox doors closed while in operation. Maintain door seals in good condition. Failure to do so will affect operation of the appliance and may permit escape of smoke or gases into the living space.

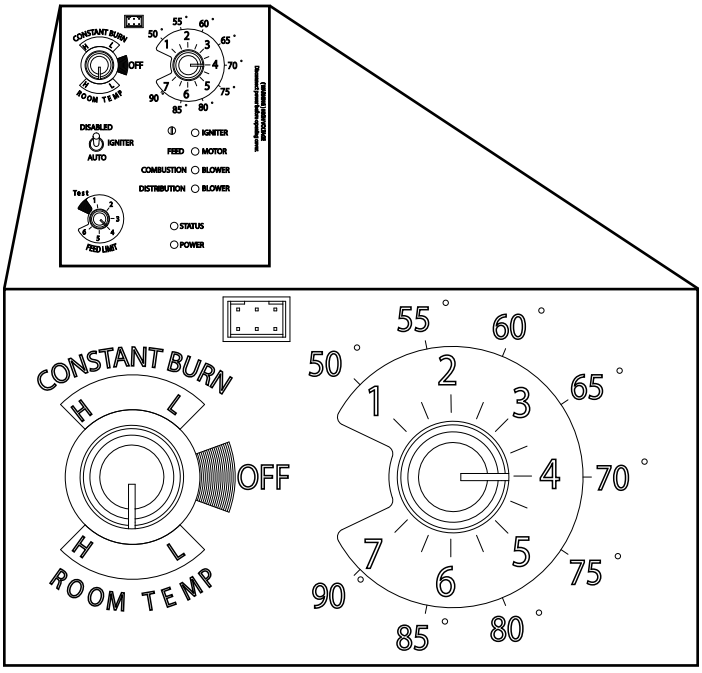
**WARNING**

**BURNING GARBAGE, USE OF IMPROPER FUELS, FIRE STARTERS OR ALTERING THE STOVE FOR HIGHER HEAT OUTPUT MAY CAUSE DAMAGE TO THE STOVE AND COULD RESULT IN A HOUSE FIRE. USE ONLY APPROVED FUELS AND FOLLOW ONLY THESE OPERATION GUIDELINES.**

**WARNING**

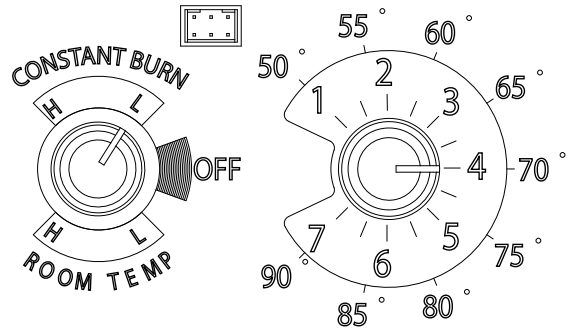
**NEVER USE GASOLINE, GASOLINE-TYPE LANTERN FUEL, KEROSENE, CHARCOAL LIGHTER FLUID, OR SIMILAR LIQUIDS TO START OR 'FRESHEN UP' A FIRE IN THIS HEATER. KEEP ALL SUCH LIQUIDS WELL AWAY FROM THE HEATER, WHILE IN USE.**

## E. Automatic Ignition (Continued)

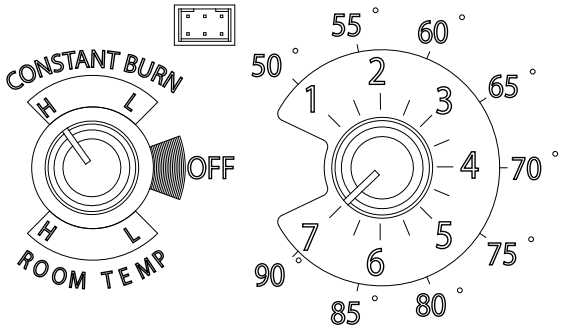



***Room Temperature Mode:*** *This setting will produce a room temperature of 70 degrees with the distribution blower at medium speed.*

## Constant Burn Mode




*This setting will produce medium heat with the distribution blower on "low".*




*This setting will produce continuous maximum heat output with the distribution blower at full speed.*

The Accentra Pellet Stove is more than just automatic ignition, it is also automatic temperature control. The automatic system will allow the fire size to be adjusted to match the heating needs and even put the fire out if necessary. If heat is needed after the fire is out, the Accentra Pellet Stove will automatically re-ignite and adjust the fire size to match the heating need. The totally automatic room sensor mode is recommended because of its efficiency. The unit can be switched between "AUTO" and "DISABLED" at any time during operation.

**<u>Igniter switch to “AUTO”</u>**

**Room Temperature Mode**

In “Room Temp Mode” heat output is controlled automatically by the Room Sensing Probe. When the Room Sensing Probe calls for heat, the stove will increase output. When the Room Sensing Probe is getting close to the set temperature, the stove will begin to level off output and keep the fire burning at just the right temperature to maintain that setting.

High output is determined by the feed rate setting. This setting, generally on #4, can be increased if higher burn rates are necessary (Figure 4.6). The unit’s maximum burn rate should not create less than 1” of ash on the burn pot front edge (Figure 4.7). Overfeeding is not a safety concern, but fuel may be wasted if unburned pellets fall into the ash pan.

In “Room Temp Mode” a constant fuel consumption rate is sacrificed for exact room temperature. Therefore, as it gets colder  more pellets will be burned automatically.

The distribution blower speed will vary according to the position of the mode selector pointer, and fire size.

**<u>Igniter switch to “AUTO”</u>**

**Constant Burn Mode**

This allows for automatic ignition upon start-up only. The unit can then be set at any desired setting. The heat output and fuel consumption will remain constant regardless of room temperature. The unit’s maximum feed rate should not create less than 1” of ash on the burn pot front edge. Figure 4.7.

The unit’s low burn or maintenance setting is as low as it will go. It will not go out unless it runs out of fuel or is turned off.

**<u>Shut-Down Procedure</u>**

To kill the fire or stop burning the stove, turn the Mode Selector to “OFF”. This will cause the fire to diminish and burn out. When the fire burns out and the stove cools down everything will stop.

If you pull the plug to shut down the stove, all motors will stop. This may cause incomplete combustion and smoke in the firebox. If the load door is opened, the smoke may escape.

<u>The best way to shut down the stove is simply let it run out of pellets, then the stove will shut down automatically.</u>

# 5 Maintenance & Service

When properly maintained, your stove will give you many years of trouble-free service. **Contact your dealer** to answer questions regarding proper operation, trouble-shooting and service for your appliance. Visit www.harmanstoves.com to find a dealer. We recommend annual service by a qualified service technician.

**Note:** Do not use a household vacuum to clean the stove. We recommend that you use a shop vacuum that is equipped with a fine dust filter called a HEPA filter or a vacuum specially made for fly ash and soot. USING A VACUUM WHICH IS NOT EQUIPPED WITH A FINE DUST FILTER WILL BLOW FLY ASH AND SOOT OUT INTO THE ROOM.

**NOTE:** THE STOVE MUST BE COMPLETELY OUT BEFORE YOU VACUUM THE STOVE. LIVE PELLET EMBERS, IF SUCKED INTO THE VACUUM, WILL LIGHT THE VACUUM ON FIRE AND MAY ULTIMATELY CAUSE A HOUSE FIRE.

## A. Proper Shutdown Procedure

**CAUTION**

**Shock and Smoke Hazard**

- Turn unit to the off position, let appliance completely cool and combustion blower must be off. Now you can unplug appliance before servicing.
- Smoke spillage into room can occur if appliance is not cool before unplugging.
- Risk of shock if appliance not unplugged before servicing appliance.

***Follow the detailed instructions found in this section for each step listed in the chart below***.

## B. General Maintenance

**Types of Fuel**

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

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

Dirty fuel will cause clinkers to form in the burnpot. A clinker is formed when dirt, ash or a non-burnable substance is heated to 2000°F (1093°C) and becomes glass-like.

**Enamel Touch-Up**

Enamel touch up paint is provided for fixing minor enamel chips or blemishes that may occur after stove installation. Unfortunately, because the enamel finish of your stove is a baked on glass finish, this enamel touch up paint may not be a perfect match to the color and gloss of the original factory finish. To use this touch up paint: Ensure the stove is cool and that the surface to be painted is clean. Apply in several light coats and take care to only coat the chipped area. Allow the paint to dry for 24 hours before touching or firing the stove.

## C. Quick Reference Maintenance Chart

| Frequency | Cleaning Procedure | Safety Measures | Tips |
|---|---|---|---|
| **Daily** | Scrape Burn pot | Wear flame resistant gloves[3] | Vigorous, strong scraping specifically near neck of burn pot. Scrape every time you add pellets or at least every 3 bags of fuel.[2] |
| **Weekly** | Empty Ash Pan | Wear protective gloves.[1]<br>Put ashes into a steel non-combustible container with tight fitting lid outside. | Unit does not need to be turned off. Reduce to low burn during removal. |
| | Clean the Glass | Stove must be turned off and cold. | |
| **Monthly** | Scrape & Vacuum Heat Exchanger | Stove must be turned off and cold. | Use provided scraper. Scrape back and sides of firebox. |
| | Brush & vacuum the distribution fan | Stove must be turned off, cold and unplugged from power supply. | Use provided paint brush. This should be done approximately every 25 bags.[2] |
| | Inspect Hopper lid gasket for damage | | Replace gasketing if frays, tears or other visible damage to gasket. This should be done approximately every 50 bags.[2] |
| | Clean Igniter | Stove must be turned off, cold and unplugged from power supply.<br>Wear protective gloves.[1]<br>Put ashes into a steel non-combustible container with tight fitting lid outside. | Use provided paint brush. Vacuum loose ash from around igniter and inside burn pot. |
| **Stove MUST be turned off, cold and unplugged from power supply for Yearly Cleaning.** | | | |
| **Yearly[4]** | Brush & vacuum the combustion fan and venting/exhaust path | Wear protective gloves.[1]<br>Put ashes into a steel non-combustible container with tight fitting lid outside. | Use provided paint brush to brush fan blades. *Use flue brush to clean venting being careful not to damage the ESP.[2] |
| | Inspect door gasket | | Replace gasketing if frays, tears or other visible damage to gasket. |
| | Brush & vacuum venting system | Wear protective gloves.[1]<br>Put ashes into a steel non-combustible container with tight fitting lid outside. | |

* A flue brush of appropriate size and length may need to be purchased for proper maintenance.

1. Protective gloves will help prevent skin abrasion while working on steel surfaces.
2. Frequency of cleaning depends largely on fuel type. Lower quality pellets require most frequent cleaning.
3. Flame resistant gloves will help protect your skin from potential contact with heat or flames.
4. Yearly cleaning is also known as a Total Clean. This requires completing all the Daily, Weekly, Monthly and Yearly maintenance mentioned. This should be done before you begin burning the unit each heating season.

## D. Glass Maintenance

*The glass used in your stove is manufactured to exact standards to withstand the high heat of the fire, but like all glass, it must be treated with common sense and care. Never abuse the glass by slamming the door shut or striking the glass with a heavy object. If the glass is broken or damaged, do not operate the stove until it has been replaced.*

### Glass - Cleaning

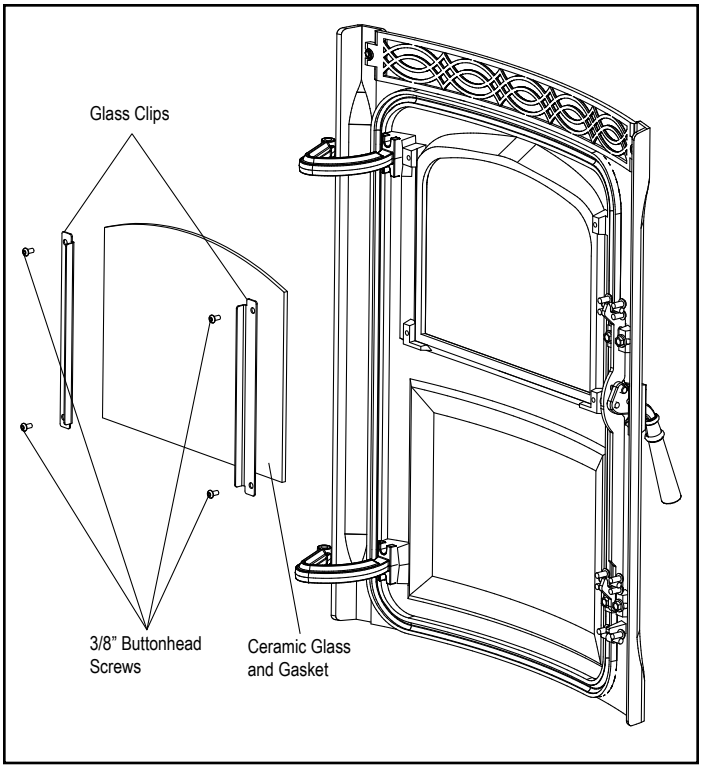
Sometimes it will be necessary to clean accumulated ash from the glass surface; allowing this ash to remain on the glass for long periods can result in “etching” due to the acidity of the ash. Never clean the glass while it is hot, and **do not** use abrasive substances. Wash the surface with cool water, and rinse thoroughly. You may wish to use a non-abrasive cleaner specifically designed for use on stove glass. In any case, dry thoroughly before relighting your stove.

### Glass - Replacement

If the stove’s glass is cracked or broken, you must replace it before operating your stove. Remove pieces carefully. Replace glass only with Harman® replacement glass; **do not use substitutes.**

Carefully remove damaged glass, gasket material, and hold down clips (set aside).

Install the self adhesive 1/4”” gasket material around the front face of the glass. Set the glass panel and gasket gently onto the door. Install the hold down clips and tighten with bolts.



## E. Burnpot Maintenance

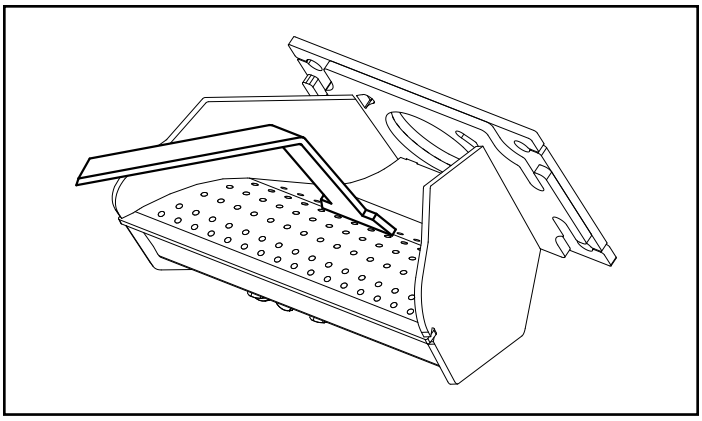


**Figure 5.1**

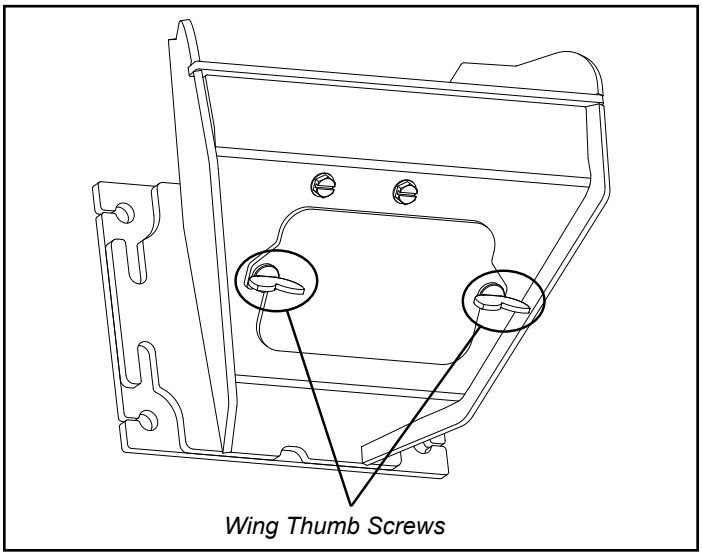



**Figure 5.2**

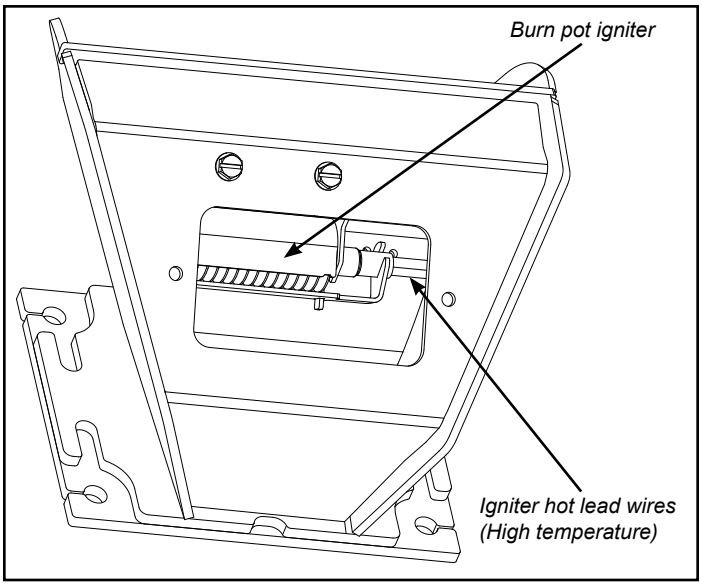



**Figure 5.3 -** Viewed from below through the ash pan opening.

When adding fuel, take the opportunity to clean the burn pot. **(Weekly at minimum)**

- Scrape the top holed surface and sides of the burn pot down to auger tube Figure 5.1. It is not necessary to completely remove all material from the burn pot. The excess will be pushed out during the next use.
- With the fire out and burn pot cold, use the supplied allen wrench to remove any build-up that may have accumulated in the holes of the burn pot grate. Simply push the allen wrench down through each hole ensuring it is clear of any build-up paying attention not to damage the igniter element in the process.

**Monthly, or after each ton of fuel burned:**

- Loosen the (2) wing thumb screws on the lower front angle of the burn pot. Figure 5.2
- Lift off the clean-out cover to open the bottom clean-out chamber. Figure 5.3

**⚠ DANGER**

**Disconnect the power to the unit before removing cover.**

- Clean ash buildup from inside the chamber while cover is off. Use the scraper to tap on the top front edge of the burn pot. This will help knock pieces of ash, loosened by the scraping process, down through the holes. It also helps knock scale off of the igniter element.

**Figure 5.3**

The igniter is made to be removable for service by insulated male/female wire connectors. These connections between the hot leads (the wires inside the burn pot) and the cold leads (the wires from the control board) are always pulled to the inside rear of the feeder body. **(Not coiled inside the burn pot.)**

It is very important that these connections are to the inside rear of the feeder body. Also, the extra wire of the igniter wire service loop must be pulled out through the rear of the feeder and tied up so that it will not be damaged by any moving parts.

**⚠ CAUTION**

**Use caution when cleaning burn pot clean-out chamber. Do not damage the high temperature igniter wires.**

**Note: The hot lead/cold lead connection must always be pulled to the rear of the feeder body before operation.**

## F. Heat Exchanger & Combustion Blower Maintenance

**Recommended once per month or after each ton of pellets burned:**

- Remove the two heat exchanger covers. Figure 5.4 These covers are made of cast iron and are held into place with a swing latch in the upper right and left corners. Figure 5.5. Swing the latch upward far enough to release the top edge of the heat exchanger cover. Tilt the cover forward approximately 2" and lift it upward about 1" to release the bottom edge. The cover can now be taken completely out through the upper door opening. Repeat the process with the second heat exchanger cover.

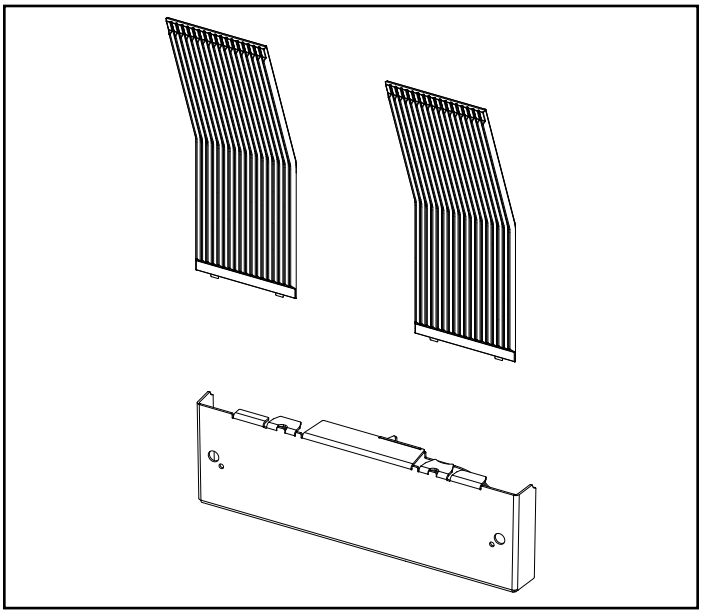


**Figure 5.4**

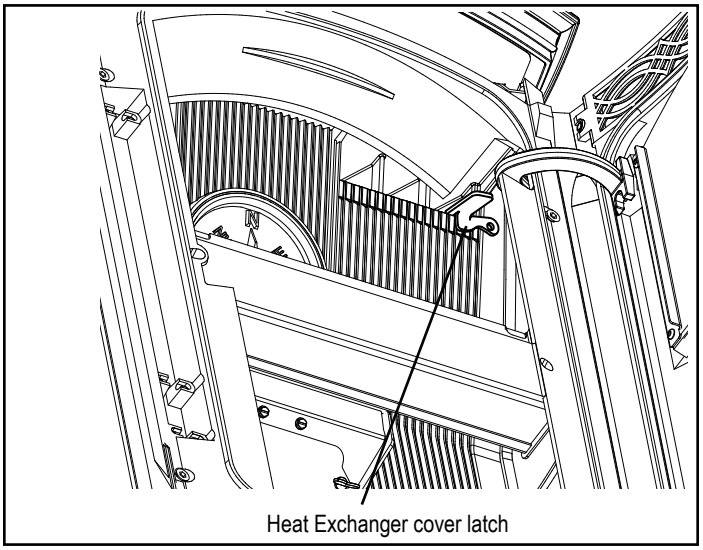



**Figure 5.5**

- Remove the combustion intake assembly. Figure 5.4. The combustion intake assembly is held into place with two swing latches Figure 5.6. Swing each latch until it hangs down away from the retainer stud. Now the assembly can be taken out by tilting the right side outward first through the lower door opening.
- The units interior is now ready to clean. Use the scraper provided to clean the heat exchanger surfaces. A wire brush or short bristled brush is an excellent cleaning tool. Clean the fan blade and combustion blower fan housing. NOTE: Be careful not to bend the fan blade while cleaning. A bent blade will throw the fan blade out of balance. Figure 5.7.

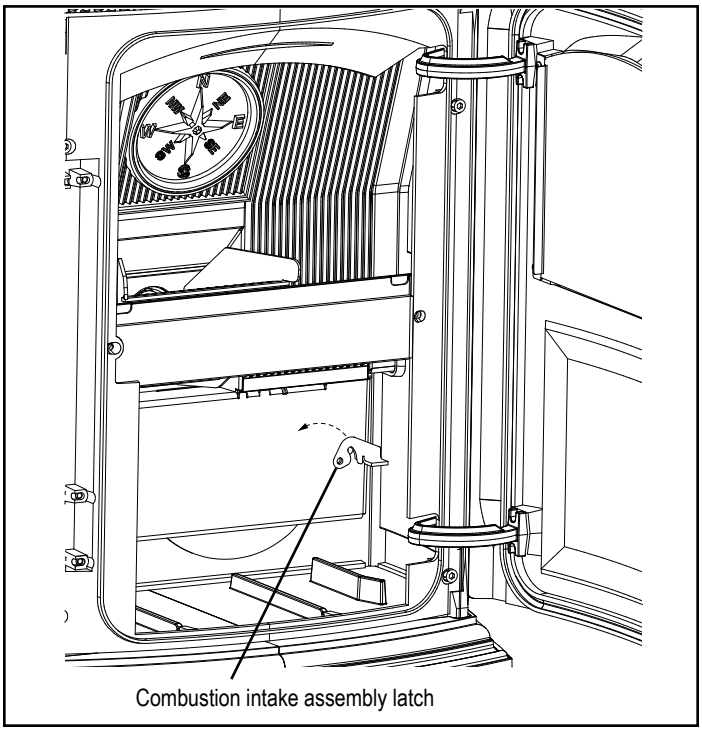



**Figure 5.6**

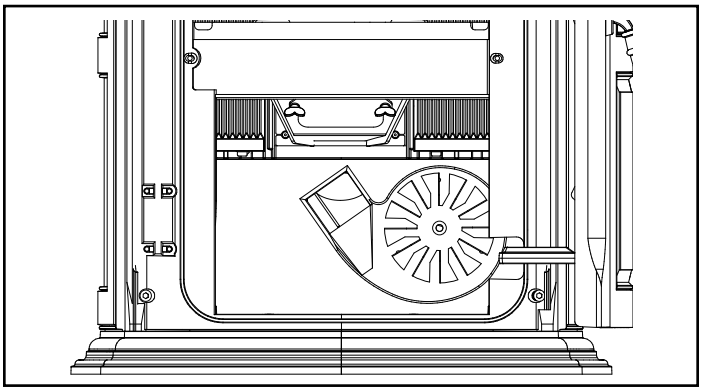
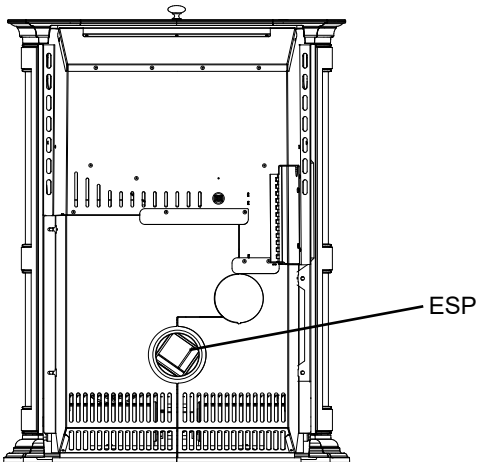


**Figure 5.7**

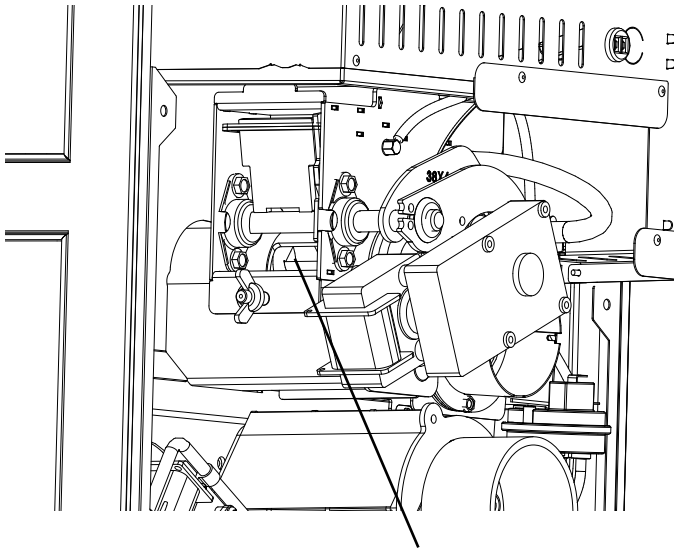
- With the blower housing open, there is easy access to the flue pipe exiting the rear of the unit. Figure 5.7. Vacuum the flue pipe as far into the pipe as possible. NOTE: Be careful while cleaning the flue pipe not to bend the exhaust probe. The ESP is approximately 8" into the tube and is visible when looking into the exhaust.




Be careful not to damage probe when cleaning with brush.

**Figure 5.7**

## G. Pellet Feeder Chamber



Possible pellet fines buildup area.

**Figure 5.8**

**Feeder Chamber**

This chamber may get a buildup of fines from the feeder mechanism movement. This area should be checked and cleaned at least **once a year.**

**To remove the feeder cover:**

- Remove the (2) 5/16” wing nuts.
- Slide the cover off of the threaded studs.
- Inspect and clean the inner chamber if necessary. See above picture.
- Reinstall the cover making certain it is centered on the feeder body and tighten the wing nuts as tightly as you can by hand.

**NOTE: Views are shown with the rear motor covers removed.**

# 6 Troubleshooting and Frequently Asked Questions

## A. Error Code Description

### Status light error messages:

**2 Blinks:** Indicates an open feed circuit, typically from pressure switch or hopper switch. Blink status automatically clears when feed circuit is complete. Does not blink if door/ hopper is opened when stove is off.

**3 Blinks:** Indicates that the ESP (Exhaust Sensing Probe) has failed, has a broken connection, or has gone out of range too many times. This requires a manual reset*.

**4 Blinks:** Can occur only in Room Temp Mode and indicates Room Sensing Probe failed or not installed. If a Room Sensing Probe is then installed, the status light will automatically reset.

NOTE: Unit will not start in "AUTO" with this status error.

**5 Blinks (In Igniter Auto. Mode Only):** Indicates that the unit has failed to light within the 36 minute start cycle. To reset - Turn Mode Selector to "OFF", then turn to either mode again.)

**6 Blinks** : Indicates that the control has calculated poor or incomplete combustion occurring for more than 25 minutes.

A six blink status may be set if the stove is allowed to run out of pellets. To reset, turn mode selector to "OFF" then back on to the desired mode. If the unit was not out of pellets, see Troubleshooting section for more details.

* **Manual reset**- disconnect power cord for a few seconds and reconnect. If error still occurs call your Dealer.

## B. Frequently Asked Questions

| ISSUES | SOLUTIONS |
|---|---|
| 1. Metallic noise. | 1. Noise is caused by metal expanding and contracting as it heats up and cools down, similar to the sound produced by a furnace or heating duct. This noise does not affect the operation or longevity of your appliance. |
| 2. White ash buildup on glass. | 2. This is normal. Clean the glass using any non-abrasive glass cleaner. |
| 3. Glass has buildup of black soot | 3. Excessive build-up of ash. See solution #4. The lower burn settings will produce more ash, the higher burn settings produce less. The more it burns on low the more frequent cleaning of the glass is required. |
| 4. Glass has turned dirty. | 4. Excessive build up of ash. The lower burn settings will produce more ash, the higher burn settings produce less. The more it burns on low the more frequent cleaning of the glass is required. |
| 5. Fire has tall flames with black tails and is lazy. | 5. The feed rate needs to be reduced or the burnpot needs cleaning. Heat exchanger or exhaust blower needs cleaning. |
| 6. Smoky start-up or puffs of smoke from the airwash. | 6. Either the burnpot is dirty or there is too much fuel at start-up and not enough air. |
| 7. Large flame at start-up. | 7. This is normal. Flame will settle down once the fire is established. |

**Contact your dealer for additional information regarding operation and troubleshooting. Visit www.harmanstoves.com to find dealer.**

## Touch Up Paint

The touch up paint provided with your unit is for fixing minor chips or blemishes that may occur after stove installation.

Unfortunately, because the finish of your stove is baked on, this touch up paint may not be a perfect match to the color of the original finish.

**To use this touch up paint:** Ensure the stove is cool and that the surface to be painted is clean. Apply in several light coats and take care to only coat the chipped area. Allow the paint to dry for 24 hours before touching or firing the stove.

## C. Troubleshooting

With proper installation, operation, and maintenance your appliance will provide years of trouble-free service. If you do experience a problem, this troubleshooting guide will assist a qualified service person in the diagnosis of a problem and the corrective action to be taken. This troubleshooting guide can only be used by a qualified service technician.

**STOVE DOES NOT FEED**

1. No fuel in hopper.
2. Firebox draft may be too low for sensing switch in feeder circuit to operate. **Check for closed doors**, loose or missing gasket on doors or hopper lid.
3. Feed motor will not run until the ESP control senses a certain temperature. Maybe you did not put enough fuel or starting gel in the burn pot before manually lighting the fire.
4. Restriction in the hopper or feeder. Remove all fuel and examine. Clear the obstruction.
5. Feed motor has failed.

**PARTIALLY BURNED PELLETS**

1. Feed rate too high.
2. Poor air to fuel mixture. (Check burn pot clean-out cover and air intake).
3. Burn pot or heat exchanger tubes may need to be cleaned.
4. Combination of all the above.
5. #6 status blink: A 6 blink control board status indication is caused by poor or incomplete combustion. The circuit board has the ability to track the combustion through feed settings and ESP temperatures. When the control board has calculated poor or incomplete combustion, it will shut down the unit as a safety feature. (Poor or incomplete combustion is a contributor of creosote which may cause a chimney fire)

**A 6 blink status may be caused by several things:**

1. Blocked or partially blocked flue.
2. Blocked or partially blocked inlet air.
   a. Backdraft damper on the inlet pipe may be stuck closed.
   b. If outside air is installed, the inlet cover may be blocked.
3. The air chamber under the burnpot may be filled with fines and small bits of ash.
4. The holes in the burnpot may be getting filled with ash or carbon buildup.
5. Combustion blower fan blades may need cleaned.
6. Fuel restrictions as noted above.

**SMOKE SMELL**

Seal the vent pipe joints and connection to stove with silicone. The exhaust vent is the only part of the system that is under positive pressure.

**FIRE HAS GONE OUT- Check for status light.**

1. No fuel in hopper.
2. Draft is too low, blocked flue.
3. Something is restricting fuel flow.
4. Hopper lid not closed properly.
5. Feed motor or combustion blower has failed.

**SMOKE IS VISIBLE COMING OUT OF VENT**

1. Air-fuel ratio is too rich.
   a. Feed rate too high.
   b. Draft too low caused by a gasket leak.

**LOW HEAT OUTPUT**

1. Feed rate too low
2. Draft too low because of gasket leak.
3. Poor quality or damp pellets
4. Combination of 1 and 2.

**HELPFUL HINTS**

**1. Cleaning Burn Pot**

Whenever your stove is not burning, take the opportunity to scrape the burn pot to remove carbon buildup. A vacuum cleaner is handy to remove the residue. Be sure the stove is cold if you use a vacuum.

Carbon buildup can be scraped loose with the fire burning using the special tool provided with your stove. Scrape the floor and sides of the burn pot. The carbon will be pushed out by the incoming fuel. Always wear gloves to do this.

**2. Removing Ashes**

Turn the Temp Dial to number 1 approximately 30 minutes before removing ashes. This will result in a cooler stove and ash pan.

Maximum Feed Limit settings are not needed in most cases. Operating in the normal range (#4) is recommended when maximum heat output is not required. The ESP probe prevents the stove from being over-fired.

Keep the stove free of dust and dirt.

**Fuel**

The Accentra Pellet Stove is approved for burning any grade of pelletized bio-mass fuel.

It should be noted, however, that higher ash content will require more frequent ash removal, scraping of the burn pot, and may provide less BTU's per pound.

Fuel should **not** be stored within the stove installation clearances or within the space required for charging and ash removal.

# 7 Reference Material

## A. Safety Reminders

When operating your Harman® Accentra Pellet Stove, respect basic safety standards. Read these instructions carefully before you attempt to operate the Accentra Pellet Stove. Failure to do so may result in damage to property or personal injury and may void the product warranty.

**CAUTION: This appliance must be vented to the outside.**

Due to high temperatures, this stove should be placed out of traffic and away from furniture and draperies.

Children and adults should be alerted to the hazards of high surface temperatures and should stay away to avoid burn to skin and/or clothing.

Young children should be carefully supervised when they are in the same room as the stove.

Clothing and other flammable materials should not be placed on or near this stove.

Installation and repair of this stove should be done by a qualified service person. The appliance should be inspected before use and at least annually by a qualified service person. More frequent cleaning will be required. It is imperative that control compartments, burners, and circulating air passageways of this stove be kept clean.

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

**Soot and fly ash:** Formation and need for removal. The products of combustion contain small particles of fly ash. The fly ash will collect in the exhaust venting system and will restrict the flow of the flue gases. Pellet fuels have different ash contents depending on what type of wood has been used to make the pellets. **We recommend to clean the system after approximately 1 ton of pellets have been burned and judge from that how often the stove should be cleaned, remember if you change pellets it may change how often you have to clean your stove.**

When burning wood slowly, the potential exists for creosote to form. The venting system should be inspected periodically throughout the heating season to determine if a creosote buildup has occurred. If a significant layer of creosote has accumulated (3mm or more), it should be removed to reduce the risk of a chimney fire. If a fire occurs, call the fire department, shut down the stove, and evacuate the residence. Before using the appliance, have the venting system thoroughly inspected and replace any damaged components.

With any hearth appliance, installation of smoke detectors is recommended on every level of the home.

**Possible causes of smoke detector activation:**

Paint curing process - Open a window near the appliance for the first few hours of burning.

Exhaust being drawn back inside the dwelling - Outside air connection to the appliance is necessary.

Vent leakage - Follow venting manufacturer's recommendations for sealing pipe joints.

**CAUTION**

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

**CAUTION**

**THE STOVE IS HOT WHILE IN OPERATION.**

**KEEP CHILDREN, CLOTHING AND FURNITURE AWAY. CONTACT MAY CAUSE SKIN BURNS.**

**WARNING**

**KEEP COMBUSTIBLE MATERIALS SUCH AS GRASS, LEAVES, ETC. AT LEAST 3 FEET AWAY FROM THE POINT DIRECTLY UNDER THE VENT TERMINATION.**

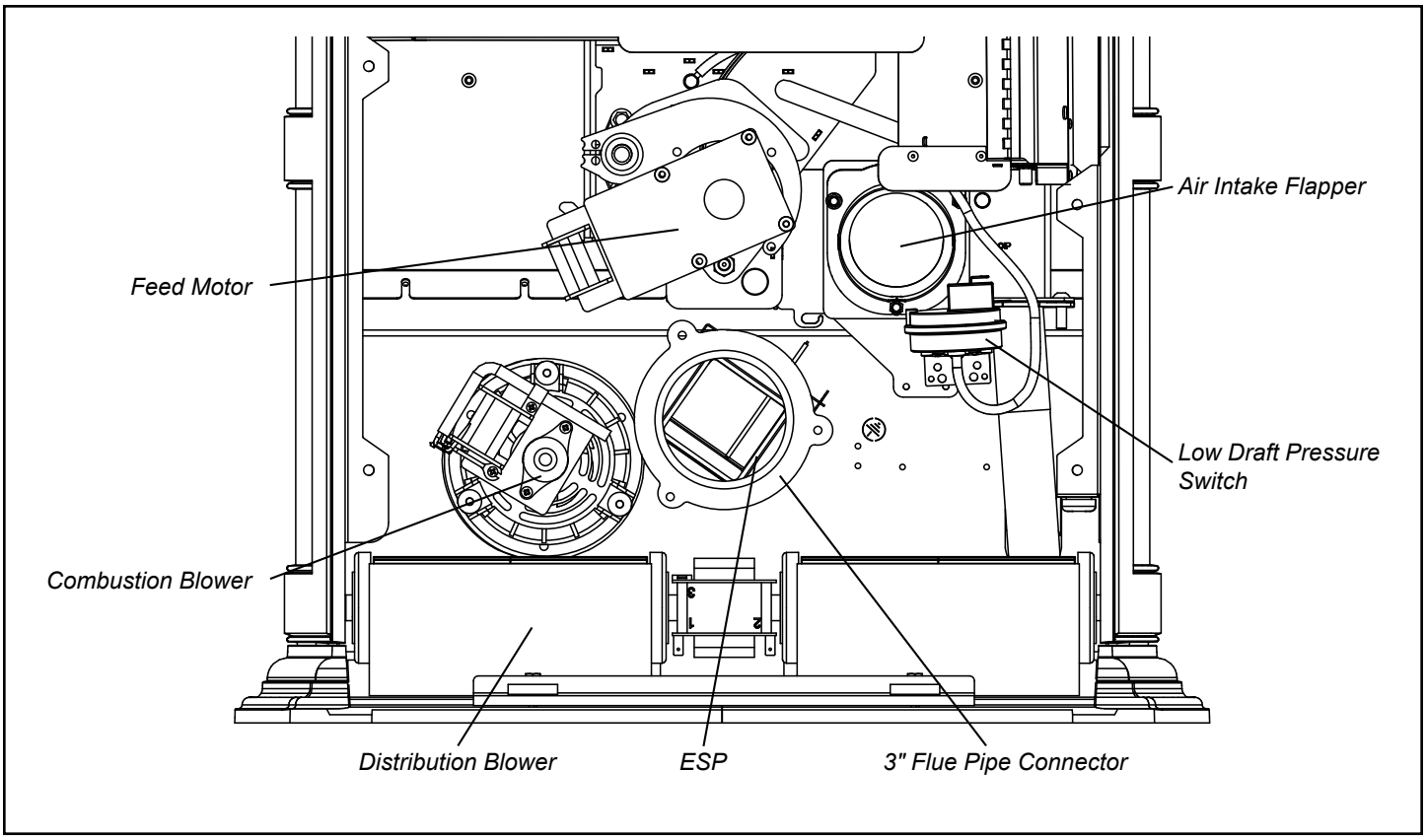
**WARNING**

**USE OF IMPROPER FUELS, FIRE STARTERS OR ALTERING THE STOVE FOR HIGHER HEAT OUTPUT MAY CAUSE DAMAGE TO THE STOVE AND COULD RESULT IN A HOUSE FIRE. USE ONLY APPROVED FUELS AND OPERATION GUIDELINES**

**WARNING**

**MOBILE/MANUFACTURED HOME GUIDELINES DO NOT ALLOW INSTALLATION IN A SLEEPING ROOM.**

## B. Motor and Component Location




# Accentra Pellet Stove Safety Devices

The **Control Board/ESP** combination is responsible for all high limit safety control. There are 2 high limits, one normal operation high limit and one backup high limit. The control has an automatic diagnostic circuit that continuously monitors the ESP and Room Sensor for faults. If a fault should occur, the control sends a status alert and at the same time the unit goes down to minimum feed/ minimum burn as a safety condition.

The **Low Draft Pressure Switch** is a differential pressure switch that monitors the negative pressure (Draft) in the firebox. If the draft becomes too low for proper combustion, the switch opens, cutting power to the feed motor and the igniter circuits. This switch is connected into the AC (high voltage) wiring.

## C. Loss of Power

Harman pellet burning appliances rely on a combustion blower to remove exhaust from the firebox. A power failure will cause the combustion blower to stop running, which may lead to exhaust see page into the room. Vertical rise in the venting system can help create natural draft, which may reduce the likelihood of exhaust leakage into the home.

Installation of a low-cost uninterruptible power supply (UPS) or battery backup system can help ensure the units shuts down without any minor smoke leakage into the home. Harman recommends the installation of one of these two systems for areas prone to power outages.

**There is one Harman® approved UPS option for your appliance:**

**Uninterruptible Power Supply UPS** battery back-ups are available online or at computer and office equipment stores. Your Harman® appliance with Rev E or later software available beginning in November 2010 may be plugged directly into a Harman® approved UPS:

- **TrippLite model INTERNET750U** is tested and approved. Other brands or models may not be compatible.

When power is lost, a fully charged UPS will power a safe, combustion blower only shut-down. Your appliance will pulse the blower every few seconds to clear exhaust until the fire is out. **NOTE: The UPS provides safe shut-down only. It is not intended for continued operation.**

- A Inverter/Charger connects to a 12 volt deep cycle battery that will run your appliance for up to eight (8) hours. It includes a trickle charge feature that keeps your battery charged when power is available. **NOTE:** If the power is out for longer than battery life, smoke leakage may still occur unless your stove has been safely shut down.

**For an approved Inverter/Charger refer to www.harmanstoves.com.**

Your appliance will recognize when power is restored. What happens depends on ESP temperature and whether it is equipped with automatic ignition:

- **In "Automatic" Mode**, units equipped with automatic ignition will respond to the set point and ESP temperature and resume normal operation.
- **In "Idle" Mode**, or for units without automatic ignition:
  - If the ESP is cool, the appliance will remain shut down.
  - If the fire is out and the ESP is still warm, the feeder may restart. Since the fire is out, the ESP temperature will not rise. The unit will then shut-down, and may flash a six-blink status error. (See ESP error codes)
  - If the fire is still burning, it will resume normal operation.

Contact your dealer if you have questions about UPS compatibility with your appliance.

**IMPORTANT! :** UPS or Battery Backup cannot prevent smoke leakage from an improperly maintained unit. Keep the venting system clean and free from obstructions and maintain all gaskets to keep an airtight seal.

**WARNING**

**Use only Harman® approved battery back-up devices. Other products may not operate properly, can create unsafe conditions or damage your appliance.**

**CAUTION**

**Always keep appliance doors and hopper lid closed and latched during operation and during power failures to minimize risk of smoke or burn-back.**

## D. Emergency Manual Ignition

Harman® pellet stoves and inserts should be lit using the automatic ignition system. This is the safest and most reliable way for igniting the unit. In the event the automatic igniter is not functioning, the steps below may be followed to manually light the stove or insert in the "Constant Burn" mode. Manual lighting is for emergency purposes only, and the igniter should be repaired or replaced as soon as practical.

**WARNING**

Only use firestarter commercially marketed for pellet stoves and inserts, including wax coated wood chips, pellet starter gel and pellet igniter blocks. Use of any other type of firestarter is prohibited.

To avoid serious injury or death read and follow manufacturer's warning and instructions for use of firestarter. Use of firestarter is only permitted when performing a cold start.

Never attempt to manually light a stove or insert that has been operated recently and is not at room temperature. If automatic ignition was attempted, be sure to give the stove or insert at least 30 minutes or longer to cool to room temperature.

Be sure that the stove or insert is in the "Igniter - Disabled" mode of operation.

Once all the precautions have been taken, follow these steps:

1. Turn the Mode Selector to "OFF".
2. Fill burn pot with pellets, only half way. (Do Not Over Fill).
3. Add firestarter to pellets following manufacturer's instructions.
4. Light pellet gel with a match, and close the door, turn Mode Selector to Constant Burn. Operation will begin when the fire reaches the proper temperature.

## E. Service Parts List

HARMAN®
BUILT TO A STANDARD, NOT A PRICE

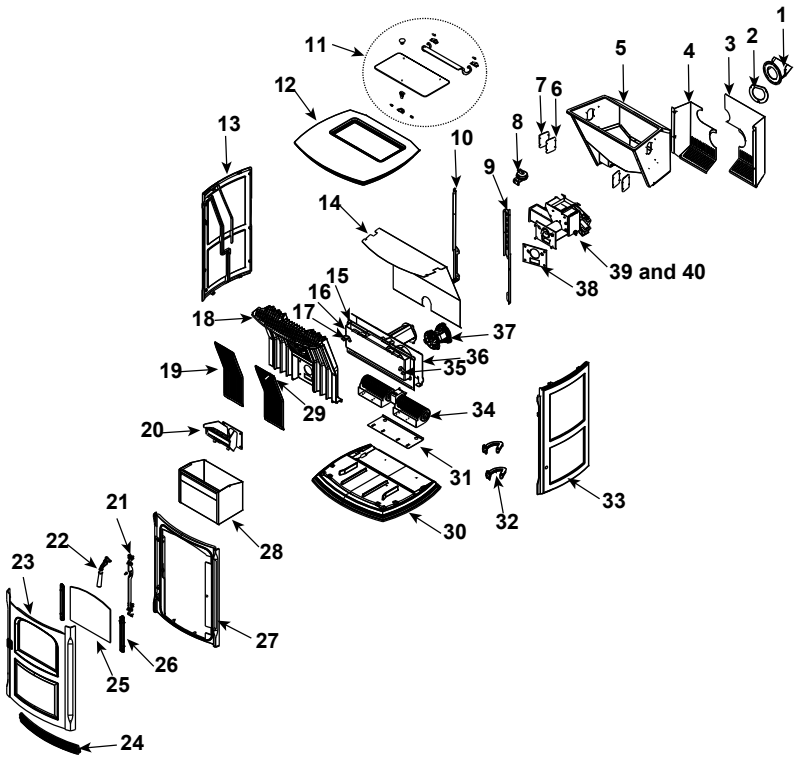
**Service Parts** — **Accentra-Cast**

**1-90-02470-1 (Black) (Active)**
**1-90-02470-14 (Majolica Brown) (10/12 - Active)**

**Beginning Manufacturing Date: N/A**
**Ending Manufacturing Date: Active**

**Retired Units**

**1-90-02470-2 (Charcoal) (Ending Manufacturing Date June 2011)**
**1-90-02470-3 (Goldenfire) (Ending Manufacturing Date June 2011)**
**1-90-02470-4 (Metallic Blue) (Ending Manufacturing Date Jan 2010)**
**1-90-02470-5 (Honey Glo) (Ending Manufacturing Date June 2009)**
**1-90-02470-10 (Mojave Red) (Ending Manufacturing Date Jan 2010)**
**1-90-02470-12 (Forest Green) (Ending Manufacturing Date Jan 2010)**
**1-90-02470-13 (Black Enamel) (Ending Manufacturing Date Mar 2010)**
**1-90-02470-15 (Sand Enamel) (Ending Manufacturing Date July 2009**




IMPORTANT: THIS IS DATED INFORMATION. Parts must be ordered from a dealer or distributor. **Hearth and Home Technologies does not sell directly to consumers**. Provide model number and serial number when requesting service parts from your dealer or distributor.

| ITEM | Description | COMMENTS | PART NUMBER | Stocked at Depot |
|---|---|---|---|---|
| 1 | Flue Tail Pipe | | 3-00-247237 | Y |
| 2 | Gasket Set, Burn Pot & Tailpipe | Pkg of 5 Sets | 1-00-07381 | Y |
| 3 | Feeder Shield Right | **No longer available** | 1-10-247142P | Y |
| | | 008402885-008408015 | 1-10-247554 | Y |
| | | Post 008408015 | 1-10-247854 | Y |
| 4 | Feeder Shield Left | **No longer available** | 1-10-247141P | Y |
| | | Post 008402885 | 1-10-247553 | Y |
| 5 | Hopper Assembly | **No longer available** | 1-10-247213A | |
| | | 008400001- 008408015 | 1-10-247778A | |
| | | Post 008408015 | 1-10-247260A | Y |
| | Gasket, Hopper Throat | | 3-44-677185 | Y |
| | Gasket, Hopper Top | | 1-00-375501 | Y |
| | Grommet, 3/4" | | 3-31-960021 | |
| | Hopper Switch 48" | Post 008403501 | 3-20-232108 | Y |

Additional service parts on following page.

3/20

IMPORTANT: THIS IS DATED INFORMATION. Parts must be ordered from a dealer or distributor. **Hearth and Home Technologies does not sell directly to consumers**. Provide model number and serial number when requesting service parts from your dealer or distributor.

| ITEM | Description | COMMENTS | PART NUMBER | Stocked at Depot |
|---|---|---|---|---|
| 6 | Top Bolt Down Cover | Qty 2 req | 2-00-247185L | |
| 7 | Top Bolt Down Cover Gasket | Pkg of 2 | 1-00-07383 | |
| 8 | Differential Switch | | 3-20-6866 | **Y** |
| 9 | Z Bracket, Right | | 2-00-247119B | |
| 10 | Z Bracket, Left | | 2-00-247139B | |
| 11 | Glass Hopper Lid | | 3-40-247100 | **Y** |
| | Gasket,Glass Hopper Lid | Pre 11340 | 3-44-247300 | **Y** |
| | | Post 11340 | 1-00-375501 | **Y** |
| | Gold Plated Knob (Hopper) | | 1-00-02000 | |
| | Black Plated Knob w/screw | | 1-00-02000-1 | |
| | Hinge Plate | Qty 2 req | 2-00-06695L | |
| | Hopper Ball Spring Plunger (Threaded) | Pkg of 3 | 3-31-5500-3 | |
| | Hopper Lid Ball Spring Mount Bracket | Pre 11340 | 2-00-247116 | |
| | Hopper Lid Glass Assembly w/Gasket | Pre 11340 | 1-10-247100 | **Y** |
| | Hopper Hinge Assembly (Qty 2 req) | Pre 11340 | 1-10-247151 | **Y** |
| | Hopper Lid Hinge | Post 11340 | 2-00-06694 | |
| | Hopper Lid Spring Latch | Pre 11340 | 1-00-247167 | |
| | Hopper Lid Latch (Set OF 2) | Post 11340 | 1-00-0669697 | **Y** |
| | Push Retainer, 5/16" | Pkg of 100 | 3-31-94807-100 | |
| | Screw Post 1/4"/ Washers (Hopper Lid) | 20 Sets | 1-00-129004 | **Y** |
| 12 | Cast Top | Painted | 4-00-247236S | |
| 13 | Cast Side Plate Left | Painted | 4-00-247106D | |
| 14 | Air Jacket Top | | 2-00-247219B | |
| 15 | Cast Combustion Housing | | 4-00-247104 | |
| 16 | Comb Intake Assembly | | 1-10-247124W | **Y** |
| 17 | Comb Manifold Latch Left | | 2-00-247126-1S | |
| 18 | Cast Heat Exchanger | | 4-00-247103 | |
| 19 | Cast Accordion Cover | Qty 2 req | 3-00-247105 | **Y** |
| 20 | Burn Pot Assembly | | 1-10-08736 | **Y** |
| | Clean out Cover | 2 Sets | 1-00-06623 | **Y** |
| | Flame Guide | | 3-00-08534 | **Y** |
| | Igniter | | 3-20-677200 | **Y** |
| | | Pkg of 10 | 1-00-677200 | **Y** |
| | Igniter Cradle, Holder & Flat Bottom | | 1-00-777907 | |
| | Thumb Screw | Pkg of 10 | 3-31-782108-10 | **Y** |
| | | | | |
| | | | | |

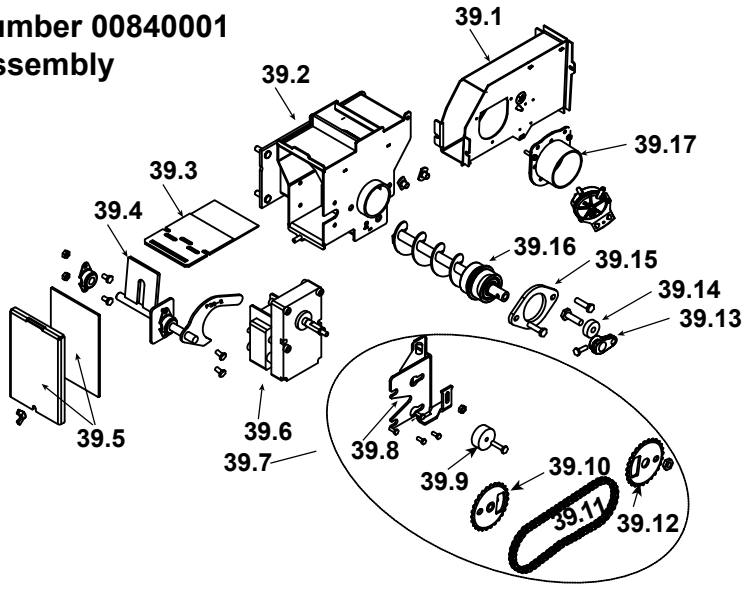
Additional service parts on following page.

IMPORTANT: THIS IS DATED INFORMATION. Parts must be ordered from a dealer or distributor. **Hearth and Home Technologies does not sell directly to consumers**. Provide model number and serial number when requesting service parts from your dealer or distributor.

| ITEM | Description | COMMENTS | PART NUMBER | Stocked at Depot |
|---|---|---|---|---|
| 21 | Door Latch Assembly | | | |
| | Latch Bar | | 2-00-247175L | |
| | Dowel Pin Retainer | | 2-00-247187L | |
| | Shoulder Screw, 5/16" shldr x 1/4" x 1/4"-20 Thread Alloy Steel | Pkg of 5 | 3-30-1105-5 | **Y** |
| | Dowel Pin 1/4" x 1-1/4" | Pkg of 15 | 3-30-2017-15 | |
| 22 | Door Handle Assembly | | | |
| | Door Handle - Painted | | 3-00-247112P | **Y** |
| | Door Only | Painted | 4-00-247109P | **Y** |
| | | Majolica Brown | 4-00-247109-14S | **Y** |
| | Wooden Handle w/ Hardware | 2 Sets | 1-00-00247 | **Y** |
| 23 | Cast Door w/Rope and Grill | | 1-10-247109A | |
| | Door Rope | | 1-00-00888 | **Y** |
| 24 | Cast Air Grill | Painted | 3-00-247114-1 | |
| 25 | Door Glass with Gasket | | 1-00-777000 | **Y** |
| | Glass Rope | | 1-00-2312 | **Y** |
| 26 | Glass Retainer | 1 Set | 1-00-777619 | **Y** |
| 27 | Cast Front Frame | Painted | 4-00-247108C | |
| 28 | Ash Pan | | 1-10-247160 | **Y** |
| 29 | Accordion Cover Latch w/Hardware | | 1-00-247131 | |
| 30 | Cast Base Plate | Painted | 4-00-247110D | |
| 31 | Distribution Blower Plate | | 2-00-247117S | |
| 32 | Cast Hinge | Qty 2 req | 4-00-247113 | |
| 33 | Cast Side Plate Right | Painted | 4-00-247107D | |
| 34 | Distribution Blower | | 1-00-29145 | **Y** |
| | Wire Kit (Needed for Bay Motor to EBM) | **No longer available** | 1-00-29045 | |
| 35 | Combustion Manifold Latch, Right | | 2-00-247126-2S | |
| 36 | Air Jacket BTM Weldment | | 1-10-247121S | |
| 37 | Combustion Blower | | 3-21-08639 | **Y** |
| | Blower Mounting Screws (Pkg of 100) | Commonly required for Combustion Blower replacement | 1-00-53483212 | |
| | Combustion Blower Gasket | | 1-00-07383 | |
| | Fan Blade, Single Paddle 5" (Comb Blower) | | 3-20-40985 | **Y** |
| 38 | Gasket Set, Burn Pot & Tailpipe | Pkg of 5 Sets | 1-00-07381 | **Y** |
| 39 | Feeder Assemblies | Pre 008400001 | Parts diagram on following pages | |
| 40 | | Post 008400001 | | |
| | Manual Pack | Majolica Brown | SRV8000-029-14 | |
| | | Black | SRV8000-029-1 | |
| | | | | |

Additional service parts on following page.

## # 39 Pre Serial Number 00840001
## Feeder Assembly

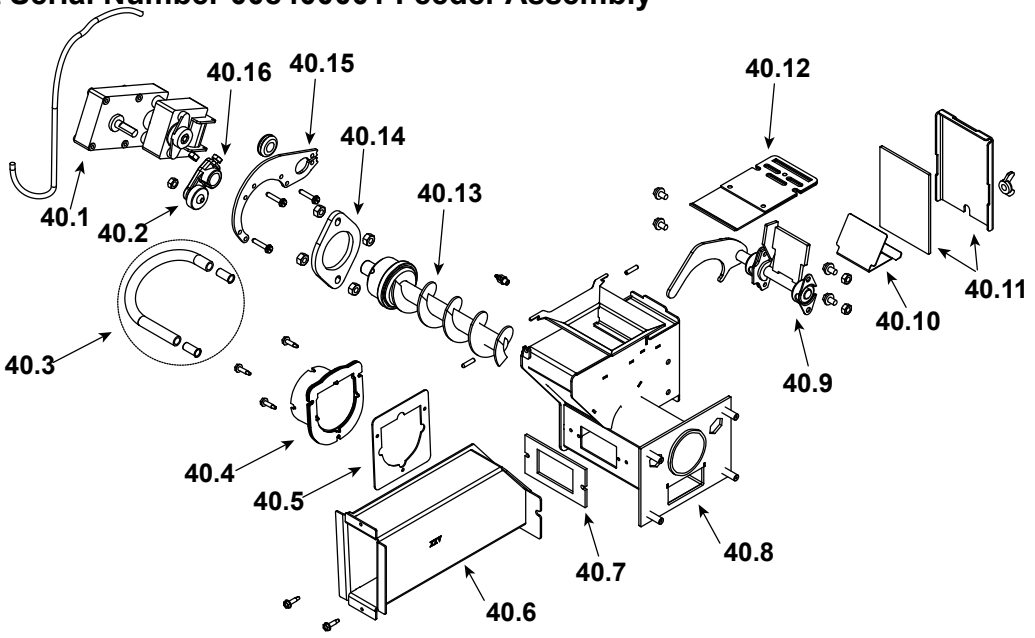



IMPORTANT: THIS IS DATED INFORMATION. Parts must be ordered from a dealer or distributor. **Hearth and Home Technologies does not sell directly to consumers**. Provide model number and serial number when requesting service parts from your dealer or distributor.

| ITEM | Description | COMMENTS | PART NUMBER | Stocked at Depot |
|---|---|---|---|---|
| 39 | Feeder Assembly | **No longer available** | 1-10-247677A | |
| 39.1 | Air Intake Weldment | **No longer available** | 1-10-247221W | |
| 39.2 | Feeder Weldment | | 1-10-677150 | **Y** |
| 39.3 | Slide Plate Assembly | | 1-10-08037 | **Y** |
| 39.4 | Pusher Arm Assembly | **No longer available** | 1-10-247220 | **Y** |
| 39.5 | Feed Cover and Gasket | 2 Sets | 1-00-677152 | **Y** |
| 39.6 | Gear Motor, 4 RPM | | 3-20-08752 | **Y** |
| 39.7 | Sprocket Kit | | 1-00-06626 | **Y** |
| 39.8 | Bracket, Gear Motor | | 1-10-677005 | **Y** |
| | Grommets & Spacers | Pkg fo 25 | 1-00-960026 | |
| 39.9 | 3/4 Feeder Tensioner | | 3-31-00075 | **Y** |
| 39.10 | 3 1/2" Sprocket w/Hub | | 1-10-08550W | **Y** |
| 39.11 | Chain - 60 Pin | | 3-50-06667 | **Y** |
| 39.12 | 3 1/2" Sprocket | | 2-00-06626M | **Y** |
| 39.13 | Cast Cam Block | | 3-00-00153 | **Y** |
| 39.14 | Cam Bearing | | 3-31-3014 | **Y** |
| 39.15 | Bearing Flange w/Hardware | | 1-00-04035 | **Y** |
| 39.16 | Auger Assembly | | 3-50-00465 | **Y** |
| 39.17 | Air Intake Damper Assembly | | 1-10-06466W | |
| | Feeder Air Crossover Kit | | 1-00-67900 | **Y** |
| | Feeder Repair kit | | 1-00-677150 | **Y** |
| | Gasket, Feeder, Air Intake | Pkg of 6 | 3-44-72224-6 | **Y** |
| | Pillow Block | Pkg of 4 | 3-31-3614087-4 | **Y** |
| | Pusher Arm, Cast Feeder | | 1-10-06684 | |

Additional service parts on following page.

## #40 Post Serial Number 008400001 Feeder Assembly




IMPORTANT: THIS IS DATED INFORMATION. Parts must be ordered from a dealer or distributor. **Hearth and Home Technologies does not sell directly to consumers**. Provide model number and serial number when requesting service parts from your dealer or distributor.

| ITEM | Description | COMMENTS | PART NUMBER | Stocked at Depot |
|---|---|---|---|---|
| 40 | Feeder Assembly | Post 008400001 | 1-10-247777A | |
| 40.1 | Pellet Feeder Gear Motor, 4 RPM | | 3-20-00677 | Y |
| 40.2 | UL Feeder Cam Bearing | | 3-31-3014 | Y |
| 40.3 | Feeder Air Crossover Kit | | 1-00-67900 | Y |
| | 9MM Silicone Tube | 5 Ft | 1-00-511427 | Y |
| 40.4 | Pellet Air Intake Assembly | | 1-10-06810A | |
| 40.5 | Gasket Feeder Air Intake | Pkg of 6 | 3-44-72224-6 | Y |
| 40.6 | UL Feeder Air Intake | | 1-10-247239 | |
| 40.7 | Gasket Ultra Air Intake | Pkg of 10 | 3-44-677160-10 | Y |
| 40.8 | Ultra Feeder Weldment | | 1-10-724132 | Y |
| 40.9 | UL Feeder Pusher Arm | | 1-10-677187W | Y |
| 40.10 | Fines Deflector | No longer available | 2-00-677138-10 | |
| 40.11 | Gasket, UL Feeder Cover | | 1-00-677122 | Y |
| 40.12 | Slide Plate Assembly | | 1-10-677121A | Y |
| 40.13 | UL Feeder Auger Assembly | | 3-50-00565 | Y |
| 40.14 | Bearing Flange w/Hardware | | 1-00-04035 | Y |
| 40.15 | UL Feeder Gear Motor Bracket w/Grommet | | 1-00-247406 | Y |
| 40.16 | UL Feeder Cam Block | | 3-00-677154 | Y |
| | Gasket, Hopper Throat | | 3-44-677185 | Y |
| | Hopper Switch FeederFitting | Pkg of 2 | 1-00-142818 | Y |
| | Pillow Block | Pkg of 4 | 3-31-3614087-4 | Y |

Additional service parts on following page.

**Beginning Manufacturing Date: N/A**
**Ending Manufacturing Date: Active**

IMPORTANT: THIS IS DATED INFORMATION. Parts must be ordered from a dealer or distributor. **Hearth and Home Technologies does not sell directly to consumers**. Provide model number and serial number when requesting service parts from your dealer or distributor.

| ITEM | Description | COMMENTS | PART NUMBER | Stocked at Depot |
|---|---|---|---|---|
| | Airwash O-rings | Pkg of 10 | 1-00-939639 | Y |
| | Arrow Burn Pot Scraper | Pkg of 10 | 2-00-773850-10 | |
| | Circuit Board w/Knobs & Shafts | | 1-00-05886 | Y |
| | Control Board Plate Assembly | | 1-10-247157S | |
| | Label, Control Board | | 3-90-247266 | |
| | D-Shaped Knob/ Shaft | 25 Sets | 1-00-015605 | Y |
| | Diagnostic Display Module | | 3-20-05401 | Y |
| | DDM Replacement Cable | | 1-00-05402 | |
| | Disonnect, Female, 1/4” | Pkg of 25 | 1-00-00959 | Y |
| | Distribution Blower Gasket | | 3-44-247118 | Y |
| | Distribution Blower Screen Frame | Pre 008402885 | 2-00-247173B | Y |
| | Draft Meter Assembly | | 1-00-00637 | |
| | Draft Meter Bolt & Tube | | 1-00-04004 | |
| | Flame Guide Bracket | | 2-00-247435 | Y |
| | Fuse 5 AMP, Pkg of 5 | Pre HF412290 | 3-20-23705-5 | Y |
| | | Post HF412290 | 1-00-05237 | Y |
| | Gasket, Base and Sides | 30 Ft | 1-00-00888 | Y |
| | Gasket Set, Burn Pot & Tailpipe | Pkg of 5 Sets | 1-00-07381 | Y |
| | Hopper Muffler & Fittings | | 1-00-18186618 | Y |
| | Hopper Switch Retrofit Kit | | 1-00-232108 | Y |
| | Inlet Reduction Ring (Combustion Blower) | | 1-00-247234 | |
| | Labels, Caution & Danger | 10 Ea | 1-00-200408541 | |
| | Label, Large Caution | | 3-90-00247 | |
| | Leg Levelers | Pkg of 4 | 1-00-12302 | |
| | Power Cord - 8’ | | 3-20-39685 | Y |
| | Rocker Switch | Pre 008403501 | 3-20-07625 | |
| | Room Sensor | | 3-20-00906 | Y |
| | Silicone Tubing, 1/8” | 5 Ft | 1-00-5113574 | Y |
| | Thermister Probe (ESP Probe) | Pre 008401067 | 3-20-11744 | Y |
| | | Post 008401067 | 3-20-00844 | Y |
| | Thermostat Extension | | 3-20-00607 | Y |
| | Touch-up paint, Black | Pre 008408085 | 3-42-1990 | |
| | | Post 008408085 | 3-42-19905 | |
| | Touch-up Paint, Enamel | Majolica Brown | 1-00-0014 | |
| | Wiring Harness | | 3-20-08727 | Y |
| **Hardware Packages** | | | | |
| | Screw,1/4”-20 x 2 1/2” Phillips Round Head Zinc Pltd Machine | Pkg of 25 | 3-30-6007-25 | Y |
| | Screw, 1/4”-20 x 1/4” Alloy Steel Black Oxide Button Head Cap | Pkg of 50 | 3-30-3013-50 | Y |
| | Screw, 1/4”-20 x 3/8” Alloy Steel Black Oxide Button Head Cap | Pkg of 100 | 3-30-3014-100 | Y |
| | Screw, 5/16” Shldr x 1/4” x 1/4”-20 Thrd Alloy Steel Shoulder | Pkg of 5 | 3-30-1105-5 | Y |
| | Washer,5/16” x 3/4” 18-8 Stainless Steel Flat | Pkg of 100 | 3-30-9003-100 | Y |

# F. Warranty Policy

**Hearth & Home Technologies LLC**

**LIMITED LIFETIME WARRANTY**

Hearth & Home Technologies LLC ("HHT") extends the following warranty for HHT gas, wood, pellet and electric hearth appliances (each a "Product" and collectively, the "Product(s)") and certain component parts set forth in the table below ("Component Part(s)") that are purchased from a HHT authorized dealer or distributor.

**WARRANTY COVERAGE:**

HHT warrants that the Products and their Component Parts will be free from defects in materials and workmanship for the applicable period of Warranty coverage set forth in the table below ("Warranty Period"). If a Product or Component Parts are found to be defective in materials or workmanship during the applicable Warranty Period, HHT will, at its option, repair the applicable Component Part(s), replace the applicable Component Part(s), or refund the purchase price of the applicable Product(s). The maximum amount recoverable under this Warranty is limited to the purchase price of the Product. This Warranty is transferable from the original purchaser to subsequent owners, but the Warranty Period will not be extended in duration or expanded in coverage for any such transfer. This Warranty is subject to conditions, exclusions, and limitations as described below.

**WARRANTY PERIOD:**

Warranty coverage begins at the date of installation. In the case of new home constructions, Warranty coverage begins on the date of first occupancy of the dwelling or six months after the sale of the Product(s) by an independent, authorized HHT dealer or distributor, whichever occurs earlier. However, the Warranty coverage shall commence no later than 24 months following the date of Product shipment from HHT, regardless of the installation or occupancy date.

The term "Lifetime" in the table below is defined as: 20 years from the beginning date of warranty coverage for gas appliances, and 10 years from the beginning date of warranty coverage for wood and pellet appliances. These time periods reflect the minimum expected useful lives of the designated Component Parts under normal operating conditions.

| **Warranty Period** | | **HHT Manufactured Appliances and Venting** | | | | | |
|---|---|---|---|---|---|---|---|
| Component Parts | Labor | Gas | Pellet | Wood | Electric | Venting | Component Parts Covered by this Warranty |
| 1 Year | | X | X | X | | X | All parts including handles, external enameled components and other material except as covered by Warranty Conditions, Warranty Exclusions, and Warranty Limitations listed |
| 2 Years | | | | | X | | All parts except as covered by Warranty Conditions, Warranty Exclusions, and Warranty Limitations listed |
| 2 years | | | X | X | | | Igniters, Auger Motors, Electronic Components, and Glass |
| | | X | | | | | Electrical components limited to modules, remotes/wall switches, valves, pilots, blowers, junction boxes, wire harnesses, transformers and lights (excluding light bulbs) |
| | | X | | X | | | Molded Refractory Panels, Glass Liners |
| 3 years | | | X | | | | Firepots, burnpots, mechanical feeders/auger assemblies |
| 5 years | 1 year | X | | | | | Vent Free Burners, Vent Free Logs |
| | | | X | X | | | Castings, Medallions and Baffles |
| 6 years | 3 years | | | X | | | Catalysts |
| 7 years | 3 years | | X | X | | | Manifold tubes, HHT Chimney and Terminations |
| 10 years | 1 year | X | | | | | Burners, logs and refractory |
| Limited Lifetime | 3 years | X | X | X | | | Firebox and heat exchanger, FlexBurn® System (engine, inner cover, access cover and fireback) |
| 1 Year | None | X | X | X | X | X | All purchased replacement parts |

**WARRANTY CONDITIONS:**

- Because HHT cannot control the quality of any Products sold by unauthorized sellers, this Warranty only covers Products that are purchased through an HHT authorized dealer or distributor unless otherwise prohibited by law; a list of HHT authorized dealers is available on the HHT branded websites.
- This Warranty is only valid while the applicable Product remains at the site of original installation.
- This Warranty is only valid in the country in which the HHT authorized dealer or distributor that sold the applicable Product is authorized to sell applicable Product.
- Contact your installing distributor or dealer for Warranty service. If the installing dealer or distributor is unable to provide necessary parts, contact the nearest HHT authorized dealer or supplier. Additional service fees may apply if you are seeking Warranty service from a dealer other than the dealer from whom you originally purchased the applicable Product.
- No HHT consumer should bear cost of warranty service or costs incurred while servicing warranty claims (i.e., travel, gas, or mileage) when the service is performed within the terms of this Warranty. Check with your dealer or distributor in advance for any costs to you when arranging a warranty call. Travel and shipping charges for parts are not covered by this Warranty.

**WARRANTY EXCLUSIONS:**

This Warranty does not cover the following:

- Changes in surface finishes as a result of normal use. As a heating appliance, some changes in color of interior and exterior surface finishes may occur. This is not a flaw and is not covered under the Warranty.
- Damage to printed, plated, or enameled surfaces caused by fingerprints, accidents, misuse, scratches, melted items or other external sources and residues left on the plated surfaces from the use of abrasive cleaners or polishes.
- Repair or replacement of parts that are subject to normal wear and tear during the Warranty Period are not covered. These parts include: paint, wood and pellet gaskets, firebricks, grates, flame guides, batteries and the discoloration of glass.
- Minor expansion, contraction, or movement of certain parts causing noise. These conditions are normal and complaints related to this noise are not covered by this Warranty.
- Damages resulting from: (1) failure to install, operate, or maintain the applicable Product in accordance with the installation instructions, operating instructions, and listing agent identification label furnished with the applicable Product; (2) failure to install the applicable Product in accordance with local building codes; (3) shipping or improper handling; (4) improper operation, abuse, misuse, continued operation with damaged, corroded or failed components, accident, or improperly/incorrectly performed repairs; (5) environmental conditions, inadequate ventilation, negative pressure, or drafting caused by tightly sealed constructions, insufficient make-up air supply, or handling devices such as exhaust fans or forced air furnaces or other such causes; (6) use of fuels other than those specified in the operation instructions; (7) installation or use of components not supplied with the applicable Product or any other components not expressly authorized and approved by HHT; (8) modification of the appliance not expressly authorized and approved by HHT in writing; and/or (9) interruptions or fluctuations of electrical power supply to the applicable Product.
- Non-HHT venting components, hearth connections or other accessories used in conjunction with the applicable Product.
- Any part of a pre-existing fireplace system in which an insert or a decorative gas applicable Product is installed.
- HHT's obligation under this Warranty does not extend to the Product's capability to heat the desired space. Information is provided to assist the consumer and the dealer in selecting the proper Product for the application. Consideration must be given to the Product location and configuration, environmental conditions, insulation and air tightness of the structure.

**This warranty is void if:**

- The applicable Product has been over-fired, operated in atmospheres contaminated by chlorine, fluorine, or other damaging chemicals. Over-firing can be identified by, but not limited to, warped plates or tubes, deformation/warping of interior cast iron structure or components, rust colored cast iron, bubbling, cracking and discoloration of steel or enamel finishes.
- The applicable Product is subjected to prolonged periods of dampness or condensation.
- There is any damage to the applicable Product due to water or weather damage which is the result of, but not limited to, improper chimney or venting installation.

**LIMITATIONS OF REMEDIES AND LIABILITY:**

- **EXCEPT TO THE EXTENT PROVIDED BY LAW, HHT MAKES NO EXPRESS WARRANTIES OTHER THAN THE WARRANTY SPECIFIED HEREIN. The owner's exclusive remedy and HHT's sole obligation under this Warranty or in contract, tort or otherwise, shall be limited to replacement of the Component Part(s), repair of the Component Part(s), or refund of the original purchase price of the applicable Product(s), as specified above; provided, however, that (i) if HHT is unable to provide replacement of the Component Part(s) and repair of the Component Part(s) is not commercially practicable or cannot be timely made, or (ii) the customer is willing to accept a refund of the purchase price of the applicable Product(s), HHT may discharge all such obligations by refunding the purchase price of the applicable Product. In no event will HHT be liable for any incidental or consequential damages caused by defects in the applicable Product. Some States do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you. This Warranty gives you specific legal rights and you may also have other rights which vary from State to State. THE DURATION OF ANY IMPLIED WARRANTY IS LIMITED TO DURATION OF THE EXPRESSED WARRANTY SPECIFIED ABOVE FOR THE APPLICABLE PRODUCT. Some States do not allow limitations on how long an implied warranty lasts, so the above limitation may not apply to you.**

HARMAN®

BUILT TO A STANDARD, NOT A PRICE

## CONTACT INFORMATION

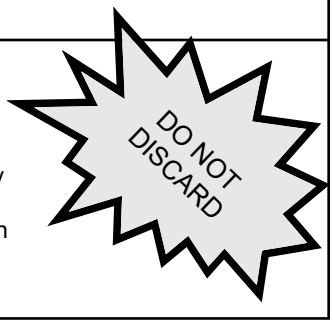
Hearth & Home Technologies
352 Mountain House Road
Halifax, PA 17032
Division of HNI INDUSTRIES

**Please contact your Vermont Castings dealer with any questions or concerns.
For the number of your nearest Vermont Castings dealer
log onto www.harmanstoves.com**

## CAUTION

### DO NOT DISCARD THIS MANUAL

- Important operating and maintenance instructions included.
- Read, understand and follow these instructions for safe installation and operation.
- Leave this manual with party responsible for use and operation of this appliance.




**We recommend that you record the following pertinent information for your heating appliance.**

Date purchased/installed:

Serial Number: Location on appliance:

Dealership purchased from: Dealer Phone: 1( ) -

Notes:

This product may be covered by one or more of the following patents: (United States) 5341794, 5263471, 6688302, 7216645, 7047962 or other U.S. and foreign patents pending.

HEARTH & HOME technologies™

# Section 5

## Test Data by Run

Take the cord from the DDM and orient the plug as shown in **Image 1**, then insert into control board DDM Port shown in **Image 2 & 3.**

Plug stove in. Once the Stove is plugged in you will see screen 1 **(Image 4)** on the DDM. This screen tells you the control board that the DDM is plugged into and the Dip switch settings for that stove. You will not need to use this screen. Push the Black button once and you get to Screen 2 **(Image 5)** that tells you the ESP temperature, Feed Rate, Maximum allowable feed rate and the maximum allowable ESP temperature. Push the Black button again and you see Screen 3 **(Image 6)** which shows you the approximate voltage to the Combustion Motor and Distribution motor, this screen also tells you when the feeder is on or off and the low draft adjustment. Push the black button again and you see Screen 4 **(Image 7)** which is what you will use to set up the stove for running. It tells you where the feed rate knob is set at and the temperature knob is set to. For the Accentra, you'll need to set the dials and low draft potentiometer so that the following values are shown in the DDM display, depending on the test burn category.

| Test Segment | Temp Dial | Feed Knob | Low Draft Pot | Stove Control |
|---|---|---|---|---|
| Pretest | 7.00 | 3.56 | -00V | Constant Burn - HIGH |
| High Burn | 7.00 | 3.56 | -00V | Constant Burn - HIGH |
| Medium Burn | 2.99 | 1.07 | -20V | Constant Burn - HIGH |
| Low Burn | 1.00 | 0.18 | -41V | Constant Burn - HIGH |

**Image 1 – DDM Connector Plug**

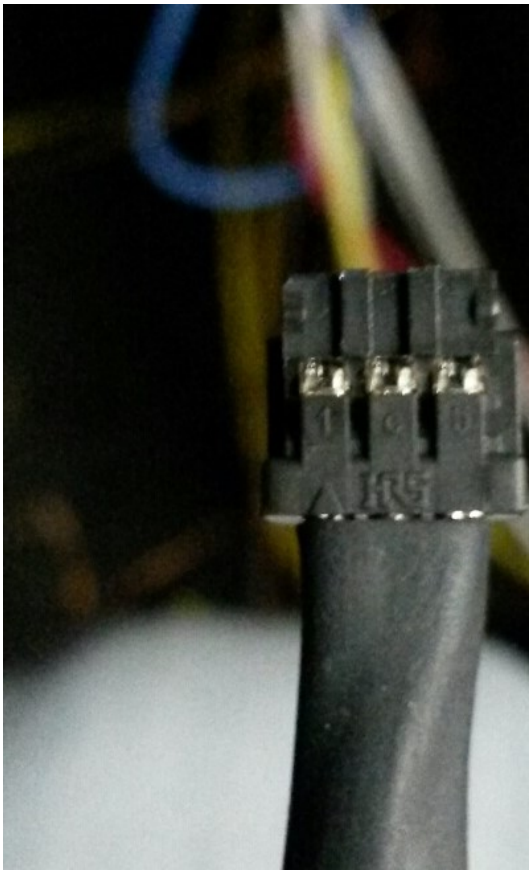


**Image 2 – DDM Port on Control Board**

## Image 3 – Plugging in DDM to Control Board


## Image 4 – Screen 1 on DDM

## Image 5 – Screen 2 on DDM


## Image 6 – Screen 3 on DDM

## Image 7 – Screen 4 on DDM

# Run 1

OMNI-Test Laboratories, Inc.

# Pellet Heater Test Results - ASTM E2779 / ASTM E2515

Manufacturer: Harman
Model: Accentra-2
Project No.: 1035PS035E
Tracking No.: 2067
Run: 1
Test Date: 05/12/15

| | |
|---|---|
| Burn Rate (Composite) | **0.82 kg/hr dry** |
| Average Tunnel Temperature | 87 degrees Fahrenheit |
| Average Gas Velocity in Dilution Tunnel - vs | 13.2 feet/second |
| Average Gas Flow Rate in Dilution Tunnel - Qsd | 8787.2 dscf/hour |
| Average Delta p | 0.038 inches H20 |
| Average Delta H | 0.72 inches H20 |
| Total Time of Test | 365 minutes |

| | |
|---|---|
| **Burn Rate (High)** | **1.95** kg/hr dry |
| **Burn Rate (Med)** | **0.80** kg/hr dry<br>**40.9%** of High |
| **Burn Rate (Low)** | **0.46** kg/hr dry<br>**23.8%** of High |

| | AMBIENT | SAMPLE TRAIN 1 | SAMPLE TRAIN 2 |
|---|---|---|---|
| Total Sample Volume - Vm | 49.18 cubic feet | 43.84 cubic feet | 44.08 cubic feet |
| Average Gas Meter Temperature | 70 degrees Fahrenheit | 82 degrees Fahrenheit | 82 degrees Fahrenheit |
| Total Sample Volume (Standard Conditions) - Vmstd | 49.9 dscf | 43.0 dscf | 43.4 dscf |
| Total Particulates - mn | 0.2 mg | 3.1 mg | 3.3 mg |
| Particulate Concentration (dry-standard) | 0.00000 grams/dscf | 0.00007 grams/dscf | 0.00008 grams/dscf |
| Particulate Emission Rate | 0.04 grams/hour | 0.63 grams/hour | 0.67 grams/hour |
| Difference from Average | | 0.02 grams/hour | 0.02 grams/hour |
| | | **Results Are Acceptable** | |

AVERAGE

| | |
|---|---|
| Total Sample Volume - Vm | 43.96 cubic feet |
| Average Gas Meter Temperature | 82 degrees Fahrenheit |
| Total Sample Volume (Standard Conditions) - Vmstd | 43.2 dscf |
| Total Particulates - mn | 3.2 |
| Particulate Concentration (dry-standard) | 0.00007 grams/dscf |
| Particulate Emission Rate | **0.62 grams/hour** |
| 7.5% of the average emission rate | 0.05 |

**Particulate Emissions:**
**1.73** g/hr First Hour
**0.62** g/hr Integrated Run
**0.89** g/kg First Hour
**0.75** g/kg Integrated Run

TRAIN 1 - FIRST HOUR

| | |
|---|---|
| Total Sample Volume - Vm | 7.16 cubic feet |
| Average Gas Meter Temperature | 75 degrees Fahrenheit |
| Total Sample Volume (Standard Conditions) - Vmstd | 7.1 dscf |
| Total Particulates - mn | 1.4 mg |
| Particulate Concentration (dry-standard) | 0.00020 grams/dscf |
| Particulate Emission Rate | **1.73 grams/hour** |

OMNI-Test Laboratories, Inc.

# Pellet Heater Test Data - ASTM E2779 / ASTM E2515

**Run:** 1

Manufacturer: Harman
Model: Accentra-2
Tracking No.: 2067
Project No.: 1035PS035E
Test Date: 12-May-15
Beginning Clock Time: 09:53
Meter Box Y Factor: 1.004 (1) 1.007 (2) 1.019 (Amb)
Barometric Pressure: Begin 29.95, Middle 29.95, End 29.95, Average 29.95 "Hg

High Burn End Time: 61
Medium Burn End Time: 181
Total Sampling Time: 365 min
Recording Interval: 1 min
Background Sample Volume: 49.182 cubic feet

PM Control Module: 335/336
Dilution Tunnel MW(dry): 29.00 lb/lb-mole
Dilution Tunnel MW(wet): 28.78 lb/lb-mole
Dilution Tunnel H2O: 2.00 percent
Dilution Tunnel Static: -0.625 "H2O
Tunnel Area: 0.1963 ft2
Pitot Tube Cp: 0.99

Tunnel Velocity: 13.15 ft/sec.
Intial Tunnel Flow: 142.4 scfm
Average Tunnel Flow: 146.5 scfm
Post-Test Leak Check (1): ).000@2.8 cfm@"Hg
Post-Test Leak Check (2): ).000@7.3 cfm@"Hg
Fuel Moisture (dry basis %): 5.05

OMNI Equipment Numbers: 335, 336, 185, 209, 23, 131, 343, 128, 132, 417, 419

Velocity Traverse Data

| | Pt.1 | Pt.2 | Pt.3 | Pt.4 | Pt.5 | Pt.6 | Pt.7 | Pt.8 | |
|---|---|---|---|---|---|---|---|---|---|
| Initial dP | 0.020 | 0.048 | 0.048 | 0.030 | 0.028 | 0.052 | 0.050 | 0.028 | "H2O |
| Temp: | 104 | 104 | 104 | 104 | 104 | 104 | 104 | 104 | oF |

| | Particulate Sampling Data | | | | | | | | | | | | | Fuel Weight, lb | | Temperature Data | | | Stack Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Elapsed Time | Gas Meter Cubic Feet (1) | Gas Meter Cubic Feet (2) | Sample Rate, cfm (1) | Sample Rate, cfm (2) | Orifice dH (1) | Meter oF (1) | Meter Vac. In. Hg. (1) | Orifice dH (2) | Meter oF (2) | Meter Vac. In. Hg. (2) | Dilution Tunnel Temp. | Pro. Rate (10%) (1) | Pro. Rate (10%) (2) | Scale Reading | Weight Change | Stack | Filter (1) | Filter (2) | Ambient | Draft In. H2O | $CO_2$ (%) | CO (%) |
| 0 | 0.000 | 0.000 | | | 0.22 | 71 | 0.7 | 0.14 | 72 | 0.2 | 104 | | | 36.7 | | 369 | 67 | 69 | 69 | -0.055 | 5.6 | 0 |
| 1 | 0.111 | 0.104 | 0.11 | 0.10 | 0.74 | 71 | 0.95 | 0.59 | 72 | 0.6 | 102 | 96 | 89 | 36.6 | -0.1 | 365 | 68 | 70 | 69 | -0.055 | 5.6 | 0 |
| 2 | 0.230 | 0.224 | 0.12 | 0.12 | 0.73 | 71 | 0.95 | 0.59 | 72 | 0.6 | 102 | 103 | 103 | 36.6 | 0 | 364 | 68 | 70 | 69 | -0.055 | 5.9 | 0 |
| 3 | 0.350 | 0.343 | 0.12 | 0.12 | 0.74 | 71 | 0.95 | 0.59 | 72 | 0.6 | 102 | 104 | 102 | 36.5 | -0.1 | 365 | 68 | 70 | 69 | -0.055 | 6.6 | 0 |
| 4 | 0.470 | 0.463 | 0.12 | 0.12 | 0.73 | 71 | 0.95 | 0.59 | 72 | 0.6 | 102 | 104 | 103 | 36.4 | -0.1 | 362 | 68 | 71 | 69 | -0.055 | 5.8 | 0 |
| 5 | 0.590 | 0.583 | 0.12 | 0.12 | 0.73 | 71 | 0.95 | 0.59 | 72 | 0.6 | 102 | 104 | 103 | 36.3 | -0.1 | 360 | 69 | 71 | 69 | -0.055 | 5.8 | 0 |
| 6 | 0.709 | 0.703 | 0.12 | 0.12 | 0.73 | 71 | 0.95 | 0.59 | 72 | 0.6 | 102 | 103 | 103 | 36.3 | 0 | 362 | 69 | 71 | 69 | -0.055 | 7 | 0.1 |
| 7 | 0.829 | 0.822 | 0.12 | 0.12 | 0.73 | 72 | 0.95 | 0.59 | 72 | 0.6 | 101 | 103 | 102 | 36.2 | -0.1 | 362 | 69 | 71 | 69 | -0.055 | 6.6 | 0.1 |
| 8 | 0.948 | 0.942 | 0.12 | 0.12 | 0.73 | 72 | 0.95 | 0.59 | 72 | 0.6 | 102 | 103 | 103 | 36.1 | -0.1 | 363 | 69 | 71 | 69 | -0.055 | 6.8 | 0.1 |
| 9 | 1.068 | 1.062 | 0.12 | 0.12 | 0.73 | 72 | 0.95 | 0.59 | 73 | 0.6 | 101 | 103 | 103 | 36.1 | 0 | 364 | 69 | 72 | 69 | -0.056 | 7 | 0.2 |
| 10 | 1.187 | 1.182 | 0.12 | 0.12 | 0.73 | 72 | 0.95 | 0.59 | 73 | 0.6 | 102 | 103 | 103 | 36.0 | -0.1 | 365 | 69 | 72 | 69 | -0.055 | 7.1 | 0.1 |
| 11 | 1.307 | 1.301 | 0.12 | 0.12 | 0.73 | 72 | 0.95 | 0.59 | 73 | 0.6 | 102 | 104 | 102 | 35.9 | -0.1 | 364 | 69 | 72 | 69 | -0.055 | 6.7 | 0.1 |
| 12 | 1.426 | 1.421 | 0.12 | 0.12 | 0.73 | 72 | 0.94 | 0.59 | 73 | 0.6 | 101 | 103 | 103 | 35.8 | -0.1 | 365 | 70 | 72 | 69 | -0.055 | 6.7 | 0.1 |
| 13 | 1.546 | 1.541 | 0.12 | 0.12 | 0.72 | 72 | 0.94 | 0.59 | 73 | 0.7 | 102 | 104 | 103 | 35.7 | -0.1 | 364 | 70 | 72 | 69 | -0.055 | 6.6 | 0.1 |
| 14 | 1.665 | 1.661 | 0.12 | 0.12 | 0.73 | 73 | 0.95 | 0.59 | 73 | 0.7 | 102 | 102 | 103 | 35.6 | -0.1 | 366 | 70 | 72 | 69 | -0.055 | 7.2 | 0.1 |
| 15 | 1.784 | 1.780 | 0.12 | 0.12 | 0.73 | 73 | 0.95 | 0.59 | 73 | 0.7 | 102 | 102 | 102 | 35.6 | 0 | 367 | 70 | 72 | 69 | -0.055 | 7.2 | 0.1 |
| 16 | 1.903 | 1.900 | 0.12 | 0.12 | 0.73 | 73 | 0.94 | 0.59 | 74 | 0.7 | 102 | 102 | 103 | 35.5 | -0.1 | 366 | 70 | 72 | 69 | -0.055 | 6.9 | 0.1 |
| 17 | 2.023 | 2.020 | 0.12 | 0.12 | 0.73 | 73 | 0.95 | 0.59 | 74 | 0.7 | 102 | 103 | 103 | 35.4 | -0.1 | 366 | 70 | 72 | 69 | -0.055 | 7 | 0.1 |
| 18 | 2.142 | 2.140 | 0.12 | 0.12 | 0.73 | 73 | 0.94 | 0.58 | 74 | 0.7 | 102 | 102 | 103 | 35.3 | -0.1 | 366 | 70 | 72 | 69 | -0.055 | 6.7 | 0.1 |
| 19 | 2.261 | 2.259 | 0.12 | 0.12 | 0.73 | 73 | 0.94 | 0.58 | 74 | 0.7 | 102 | 102 | 102 | 35.3 | 0 | 368 | 70 | 73 | 70 | -0.055 | 7.1 | 0.1 |
| 20 | 2.380 | 2.379 | 0.12 | 0.12 | 0.73 | 74 | 0.94 | 0.59 | 74 | 0.7 | 103 | 102 | 103 | 35.2 | -0.1 | 371 | 70 | 73 | 69 | -0.055 | 7.7 | 0.2 |
| 21 | 2.499 | 2.499 | 0.12 | 0.12 | 0.73 | 74 | 0.95 | 0.59 | 74 | 0.7 | 103 | 102 | 103 | 35.1 | -0.1 | 372 | 70 | 73 | 69 | -0.055 | 7.5 | 0.2 |
| 22 | 2.618 | 2.618 | 0.12 | 0.12 | 0.73 | 74 | 0.94 | 0.59 | 75 | 0.7 | 103 | 102 | 102 | 35.0 | -0.1 | 372 | 70 | 73 | 69 | -0.055 | 7.4 | 0.1 |
| 23 | 2.738 | 2.738 | 0.12 | 0.12 | 0.73 | 74 | 0.95 | 0.59 | 75 | 0.7 | 103 | 103 | 102 | 34.9 | -0.1 | 372 | 70 | 73 | 70 | -0.055 | 7 | 0.1 |
| 24 | 2.857 | 2.858 | 0.12 | 0.12 | 0.73 | 74 | 0.94 | 0.59 | 75 | 0.7 | 103 | 102 | 102 | 34.8 | -0.1 | 371 | 70 | 73 | 69 | -0.056 | 7.1 | 0.1 |
| 25 | 2.977 | 2.978 | 0.12 | 0.12 | 0.73 | 74 | 0.95 | 0.59 | 75 | 0.7 | 103 | 103 | 102 | 34.8 | 0 | 370 | 70 | 73 | 69 | -0.055 | 6.6 | 0 |
| 26 | 3.096 | 3.097 | 0.12 | 0.12 | 0.73 | 75 | 0.95 | 0.59 | 75 | 0.7 | 103 | 102 | 102 | 34.7 | -0.1 | 367 | 70 | 73 | 70 | -0.055 | 6 | 0 |
| 27 | 3.216 | 3.217 | 0.12 | 0.12 | 0.73 | 75 | 0.95 | 0.59 | 76 | 0.7 | 102 | 103 | 102 | 34.6 | -0.1 | 369 | 70 | 73 | 70 | -0.055 | 7.5 | 0.2 |
| 28 | 3.335 | 3.337 | 0.12 | 0.12 | 0.73 | 75 | 0.95 | 0.59 | 76 | 0.7 | 102 | 102 | 102 | 34.6 | 0 | 367 | 70 | 73 | 69 | -0.055 | 6.5 | 0.1 |
| 29 | 3.455 | 3.457 | 0.12 | 0.12 | 0.73 | 75 | 0.94 | 0.59 | 76 | 0.7 | 102 | 103 | 102 | 34.5 | -0.1 | 367 | 70 | 73 | 70 | -0.055 | 6.7 | 0 |
| 30 | 3.574 | 3.577 | 0.12 | 0.12 | 0.72 | 75 | 0.95 | 0.59 | 76 | 0.7 | 103 | 102 | 102 | 34.4 | -0.1 | 367 | 70 | 73 | 69 | -0.055 | 6.7 | 0 |
| 31 | 3.694 | 3.697 | 0.12 | 0.12 | 0.73 | 75 | 0.95 | 0.59 | 76 | 0.7 | 103 | 103 | 102 | 34.3 | -0.1 | 367 | 70 | 73 | 70 | -0.055 | 6.7 | 0 |
| 32 | 3.813 | 3.817 | 0.12 | 0.12 | 0.73 | 76 | 0.95 | 0.59 | 76 | 0.7 | 103 | 102 | 102 | 34.2 | -0.1 | 365 | 71 | 73 | 70 | -0.055 | 6.6 | 0 |
| 33 | 3.933 | 3.936 | 0.12 | 0.12 | 0.73 | 76 | 0.95 | 0.59 | 77 | 0.7 | 103 | 103 | 101 | 34.2 | 0 | 367 | 71 | 73 | 70 | -0.055 | 6.9 | 0 |
| 34 | 4.053 | 4.056 | 0.12 | 0.12 | 0.73 | 76 | 0.95 | 0.59 | 77 | 0.7 | 103 | 103 | 102 | 34.1 | -0.1 | 366 | 71 | 73 | 70 | -0.055 | 6.6 | 0.1 |
| 35 | 4.172 | 4.176 | 0.12 | 0.12 | 0.72 | 76 | 0.95 | 0.59 | 77 | 0.7 | 103 | 102 | 102 | 34.0 | -0.1 | 367 | 71 | 73 | 70 | -0.055 | 7.2 | 0.1 |
| 36 | 4.292 | 4.296 | 0.12 | 0.12 | 0.72 | 76 | 0.95 | 0.59 | 77 | 0.7 | 103 | 103 | 102 | 34.0 | 0 | 367 | 71 | 73 | 70 | -0.055 | 6.7 | 0.1 |

OMNI-Test Laboratories, Inc.

# Pellet Heater Test Data - ASTM E2779 / ASTM E2515

**Run:** 1

Manufacturer: Harman
Model: Accentra-2
Tracking No.: 2067
Project No.: 1035PS035E
Test Date: 12-May-15
Beginning Clock Time: 09:53
Meter Box Y Factor: 1.004 (1) 1.007 (2) 1.019 (Amb)

Barometric Pressure:

| Begin | Middle | End | Average |
|---|---|---|---|
| 29.95 | 29.95 | 29.95 | 29.95 "Hg |

High Burn End Time: 61
Medium Burn End Time: 181
Total Sampling Time: 365 min
Recording Interval: 1 min
Background Sample Volume: 49.182 cubic feet

OMNI Equipment Numbers: 335, 336, 185, 209, 23, 131, 343, 128, 132, 417, 419

PM Control Module: 335/336
Dilution Tunnel MW(dry): 29.00 lb/lb-mole
Dilution Tunnel MW(wet): 28.78 lb/lb-mole
Dilution Tunnel H2O: 2.00 percent
Dilution Tunnel Static: -0.625 "H2O
Tunnel Area: 0.1963 ft2
Pitot Tube Cp: 0.99

Tunnel Velocity: 13.15 ft/sec.
Intial Tunnel Flow: 142.4 scfm
Average Tunnel Flow: 146.5 scfm
Post-Test Leak Check (1): ).000@2.8 cfm@"Hg
Post-Test Leak Check (2): ).000@7.3 cfm@"Hg
Fuel Moisture (dry basis %): 5.05

Velocity Traverse Data

| | Pt.1 | Pt.2 | Pt.3 | Pt.4 | Pt.5 | Pt.6 | Pt.7 | Pt.8 | |
|---|---|---|---|---|---|---|---|---|---|
| Initial dP | 0.020 | 0.048 | 0.048 | 0.030 | 0.028 | 0.052 | 0.050 | 0.028 | "H2O |
| Temp: | 104 | 104 | 104 | 104 | 104 | 104 | 104 | 104 | oF |

| | Particulate Sampling Data | | | | | | | | | | | | | Fuel Weight, lb | | Temperature Data | | | Stack Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Elapsed Time | Gas Meter Cubic Feet (1) | Gas Meter Cubic Feet (2) | Sample Rate, cfm (1) | Sample Rate, cfm (2) | Orifice dH (1) | Meter oF (1) | Meter Vac. In. Hg. (1) | Orifice dH (2) | Meter oF (2) | Meter Vac. In. Hg. (2) | Dilution Tunnel Temp. | Pro. Rate (10%) (1) | Pro. Rate (10%) (2) | Scale Reading | Weight Change | Stack | Filter (1) | Filter (2) | Ambient | Draft In. H2O | $CO_2$ (%) | CO (%) |
| 37 | 4.412 | 4.416 | 0.12 | 0.12 | 0.72 | 76 | 0.95 | 0.59 | 77 | 0.7 | 103 | 103 | 102 | 33.9 | -0.1 | 368 | 71 | 73 | 70 | -0.055 | 6.9 | 0.1 |
| 38 | 4.531 | 4.536 | 0.12 | 0.12 | 0.72 | 77 | 0.95 | 0.59 | 77 | 0.7 | 103 | 102 | 102 | 33.8 | -0.1 | 366 | 71 | 73 | 70 | -0.055 | 6.3 | 0 |
| 39 | 4.651 | 4.656 | 0.12 | 0.12 | 0.72 | 77 | 0.96 | 0.59 | 78 | 0.7 | 103 | 103 | 102 | 33.7 | -0.1 | 367 | 71 | 74 | 70 | -0.055 | 6.8 | 0.1 |
| 40 | 4.770 | 4.776 | 0.12 | 0.12 | 0.72 | 77 | 0.95 | 0.59 | 78 | 0.7 | 103 | 102 | 102 | 33.7 | 0 | 367 | 71 | 74 | 70 | -0.055 | 6.8 | 0.2 |
| 41 | 4.890 | 4.896 | 0.12 | 0.12 | 0.72 | 77 | 0.95 | 0.59 | 78 | 0.7 | 103 | 103 | 102 | 33.6 | -0.1 | 368 | 71 | 74 | 70 | -0.055 | 7.1 | 0.1 |
| 42 | 5.009 | 5.016 | 0.12 | 0.12 | 0.73 | 77 | 0.96 | 0.59 | 78 | 0.7 | 103 | 102 | 102 | 33.5 | -0.1 | 367 | 71 | 74 | 70 | -0.055 | 6.4 | 0 |
| 43 | 5.129 | 5.136 | 0.12 | 0.12 | 0.72 | 77 | 0.96 | 0.59 | 78 | 0.7 | 103 | 103 | 102 | 33.4 | -0.1 | 367 | 72 | 74 | 70 | -0.055 | 6.6 | 0.1 |
| 44 | 5.249 | 5.256 | 0.12 | 0.12 | 0.72 | 78 | 0.95 | 0.59 | 78 | 0.7 | 103 | 102 | 102 | 33.4 | 0 | 368 | 72 | 74 | 70 | -0.055 | 6.8 | 0.1 |
| 45 | 5.368 | 5.377 | 0.12 | 0.12 | 0.72 | 78 | 0.96 | 0.59 | 78 | 0.7 | 103 | 102 | 103 | 33.3 | -0.1 | 369 | 72 | 74 | 70 | -0.055 | 7.2 | 0.1 |
| 46 | 5.488 | 5.497 | 0.12 | 0.12 | 0.72 | 78 | 0.96 | 0.59 | 79 | 0.7 | 103 | 102 | 102 | 33.2 | -0.1 | 367 | 72 | 74 | 70 | -0.055 | 6.3 | 0 |
| 47 | 5.607 | 5.617 | 0.12 | 0.12 | 0.72 | 78 | 0.96 | 0.59 | 79 | 0.7 | 103 | 102 | 102 | 33.1 | -0.1 | 365 | 72 | 74 | 70 | -0.055 | 6.7 | 0.1 |
| 48 | 5.726 | 5.737 | 0.12 | 0.12 | 0.72 | 78 | 0.96 | 0.59 | 79 | 0.7 | 103 | 102 | 102 | 33.1 | 0 | 365 | 72 | 74 | 70 | -0.055 | 6.7 | 0.1 |
| 49 | 5.846 | 5.857 | 0.12 | 0.12 | 0.72 | 78 | 0.96 | 0.59 | 79 | 0.7 | 103 | 102 | 102 | 33.0 | -0.1 | 366 | 72 | 74 | 70 | -0.055 | 7 | 0.1 |
| 50 | 5.965 | 5.977 | 0.12 | 0.12 | 0.72 | 78 | 0.95 | 0.59 | 79 | 0.7 | 103 | 102 | 102 | 32.9 | -0.1 | 366 | 72 | 74 | 70 | -0.055 | 6.7 | 0.1 |
| 51 | 6.085 | 6.098 | 0.12 | 0.12 | 0.73 | 78 | 0.95 | 0.59 | 79 | 0.7 | 103 | 102 | 103 | 32.8 | -0.1 | 366 | 72 | 74 | 70 | -0.055 | 6.8 | 0.1 |
| 52 | 6.205 | 6.218 | 0.12 | 0.12 | 0.72 | 79 | 0.96 | 0.59 | 79 | 0.7 | 103 | 102 | 102 | 32.7 | -0.1 | 366 | 72 | 74 | 70 | -0.055 | 6.8 | 0.1 |
| 53 | 6.324 | 6.338 | 0.12 | 0.12 | 0.73 | 79 | 0.95 | 0.59 | 79 | 0.7 | 103 | 101 | 102 | 32.7 | 0 | 366 | 72 | 74 | 70 | -0.055 | 7 | 0.1 |
| 54 | 6.444 | 6.459 | 0.12 | 0.12 | 0.72 | 79 | 0.96 | 0.59 | 80 | 0.7 | 103 | 102 | 102 | 32.6 | -0.1 | 364 | 72 | 74 | 70 | -0.055 | 6.4 | 0 |
| 55 | 6.564 | 6.579 | 0.12 | 0.12 | 0.72 | 79 | 0.96 | 0.59 | 80 | 0.7 | 103 | 102 | 101 | 32.5 | -0.1 | 364 | 72 | 74 | 71 | -0.056 | 6.6 | 0.1 |
| 56 | 6.684 | 6.699 | 0.12 | 0.12 | 0.72 | 79 | 0.96 | 0.59 | 80 | 0.7 | 103 | 102 | 101 | 32.5 | 0 | 363 | 72 | 74 | 71 | -0.055 | 6.2 | 0.1 |
| 57 | 6.804 | 6.820 | 0.12 | 0.12 | 0.73 | 79 | 0.95 | 0.59 | 80 | 0.7 | 103 | 102 | 102 | 32.4 | -0.1 | 362 | 72 | 74 | 70 | -0.055 | 6.5 | 0.1 |
| 58 | 6.923 | 6.940 | 0.12 | 0.12 | 0.72 | 79 | 0.96 | 0.59 | 80 | 0.7 | 103 | 101 | 101 | 32.3 | -0.1 | 363 | 72 | 74 | 70 | -0.055 | 6.4 | 0.1 |
| 59 | 7.043 | 7.060 | 0.12 | 0.12 | 0.72 | 79 | 0.96 | 0.59 | 80 | 0.7 | 103 | 102 | 101 | 32.3 | 0 | 363 | 72 | 74 | 71 | -0.055 | 6.5 | 0 |
| 60 | 7.163 | 7.181 | 0.12 | 0.12 | 0.72 | 79 | 0.96 | 0.59 | 80 | 0.7 | 103 | 102 | 102 | 32.2 | -0.1 | 361 | 72 | 74 | 71 | -0.055 | 6.5 | 0.1 |
| 61 | 7.283 | 7.301 | 0.12 | 0.12 | 0.72 | 79 | 0.96 | 0.59 | 80 | 0.7 | 102 | 102 | 101 | 32.1 | -0.1 | 356 | 72 | 74 | 70 | -0.055 | 4.7 | 0 |
| 62 | 7.399 | 7.422 | 0.12 | 0.12 | 0.09 | 80 | 2.78 | 0.59 | 80 | 0.7 | 102 | 99 | 102 | 32.1 | 0 | 348 | 72 | 74 | 71 | -0.055 | 3.9 | 0 |
| 63 | 7.515 | 7.542 | 0.12 | 0.12 | 0.73 | 80 | 0.95 | 0.59 | 81 | 0.7 | 101 | 99 | 101 | 32.1 | 0 | 338 | 74 | 74 | 71 | -0.055 | 3 | 0 |
| 64 | 7.635 | 7.663 | 0.12 | 0.12 | 0.72 | 80 | 0.95 | 0.59 | 81 | 0.7 | 100 | 102 | 102 | 32.0 | -0.1 | 329 | 74 | 74 | 71 | -0.055 | 3.1 | 0 |
| 65 | 7.755 | 7.784 | 0.12 | 0.12 | 0.73 | 80 | 0.95 | 0.59 | 81 | 0.7 | 99 | 102 | 102 | 32.0 | 0 | 321 | 74 | 74 | 70 | -0.055 | 2.5 | 0 |
| 66 | 7.875 | 7.904 | 0.12 | 0.12 | 0.72 | 80 | 0.96 | 0.58 | 81 | 0.7 | 98 | 102 | 101 | 32.0 | 0 | 313 | 74 | 74 | 70 | -0.055 | 2.4 | 0 |
| 67 | 7.996 | 8.025 | 0.12 | 0.12 | 0.72 | 80 | 0.96 | 0.59 | 81 | 0.7 | 98 | 102 | 102 | 32.0 | 0 | 307 | 73 | 74 | 71 | -0.056 | 2.3 | 0 |
| 68 | 8.116 | 8.145 | 0.12 | 0.12 | 0.72 | 80 | 0.95 | 0.59 | 81 | 0.7 | 97 | 102 | 101 | 32.0 | 0 | 300 | 73 | 74 | 70 | -0.055 | 2.4 | 0 |
| 69 | 8.236 | 8.266 | 0.12 | 0.12 | 0.73 | 80 | 0.96 | 0.59 | 81 | 0.7 | 97 | 102 | 102 | 31.9 | -0.1 | 293 | 73 | 74 | 71 | -0.055 | 1.9 | 0.1 |
| 70 | 8.356 | 8.387 | 0.12 | 0.12 | 0.72 | 80 | 0.95 | 0.59 | 81 | 0.7 | 96 | 101 | 102 | 31.9 | 0 | 287 | 73 | 74 | 71 | -0.055 | 1.8 | 0.1 |
| 71 | 8.476 | 8.507 | 0.12 | 0.12 | 0.72 | 80 | 0.96 | 0.59 | 81 | 0.7 | 95 | 101 | 101 | 31.9 | 0 | 283 | 73 | 74 | 71 | -0.056 | 2.1 | 0.1 |
| 72 | 8.596 | 8.628 | 0.12 | 0.12 | 0.72 | 80 | 0.95 | 0.59 | 81 | 0.7 | 95 | 101 | 101 | 31.9 | 0 | 282 | 73 | 74 | 71 | -0.055 | 2.6 | 0 |
| 73 | 8.716 | 8.749 | 0.12 | 0.12 | 0.73 | 80 | 0.96 | 0.59 | 81 | 0.7 | 95 | 101 | 101 | 31.8 | -0.1 | 281 | 73 | 74 | 71 | -0.055 | 2.6 | 0 |

OMNI-Test Laboratories, Inc.

# Pellet Heater Test Data - ASTM E2779 / ASTM E2515

**Run:** 1

Manufacturer: Harman
Model: Accentra-2
Tracking No.: 2067
Project No.: 1035PS035E
Test Date: 12-May-15
Beginning Clock Time: 09:53
Meter Box Y Factor: 1.004 (1) 1.007 (2) 1.019 (Amb)

Barometric Pressure:

| Begin | Middle | End | Average |
|---|---|---|---|
| 29.95 | 29.95 | 29.95 | 29.95 "Hg |

High Burn End Time: 61
Medium Burn End Time: 181
Total Sampling Time: 365 min
Recording Interval: 1 min
Background Sample Volume: 49.182 cubic feet

OMNI Equipment Numbers: 335, 336, 185, 209, 23, 131, 343, 128, 132, 417, 419

PM Control Module: 335/336
Dilution Tunnel MW(dry): 29.00 lb/lb-mole
Dilution Tunnel MW(wet): 28.78 lb/lb-mole
Dilution Tunnel H2O: 2.00 percent
Dilution Tunnel Static: -0.625 "H2O
Tunnel Area: 0.1963 ft2
Pitot Tube Cp: 0.99

Tunnel Velocity: 13.15 ft/sec.
Intial Tunnel Flow: 142.4 scfm
Average Tunnel Flow: 146.5 scfm
Post-Test Leak Check (1): 0.000@2.8 cfm@"Hg
Post-Test Leak Check (2): 0.000@7.3 cfm@"Hg
Fuel Moisture (dry basis %): 5.05

Velocity Traverse Data

| | Pt.1 | Pt.2 | Pt.3 | Pt.4 | Pt.5 | Pt.6 | Pt.7 | Pt.8 | |
|---|---|---|---|---|---|---|---|---|---|
| Initial dP | 0.020 | 0.048 | 0.048 | 0.030 | 0.028 | 0.052 | 0.050 | 0.028 | "H2O |
| Temp: | 104 | 104 | 104 | 104 | 104 | 104 | 104 | 104 | oF |

| | Particulate Sampling Data | | | | | | | | | | | | | Fuel Weight, lb | | Temperature Data | | | Stack Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Elapsed Time | Gas Meter Cubic Feet (1) | Gas Meter Cubic Feet (2) | Sample Rate, cfm (1) | Sample Rate, cfm (2) | Orifice dH (1) | Meter oF (1) | Meter Vac. In. Hg. (1) | Orifice dH (2) | Meter oF (2) | Meter Vac. In. Hg. (2) | Dilution Tunnel Temp. | Pro. Rate (10%) (1) | Pro. Rate (10%) (2) | Scale Reading | Weight Change | Stack | Filter (1) | Filter (2) | Ambient | Draft In. H2O | $CO_2$ (%) | CO (%) |
| 74 | 8.836 | 8.870 | 0.12 | 0.12 | 0.72 | 80 | 0.96 | 0.58 | 81 | 0.7 | 95 | 101 | 101 | 31.8 | 0 | 280 | 73 | 74 | 70 | -0.055 | 3.1 | 0 |
| 75 | 8.956 | 8.990 | 0.12 | 0.12 | 0.72 | 81 | 0.95 | 0.59 | 81 | 0.7 | 94 | 101 | 100 | 31.7 | -0.1 | 277 | 73 | 74 | 71 | -0.055 | 2.6 | 0 |
| 76 | 9.076 | 9.111 | 0.12 | 0.12 | 0.72 | 81 | 0.95 | 0.59 | 81 | 0.7 | 94 | 101 | 101 | 31.7 | 0 | 275 | 73 | 74 | 71 | -0.055 | 2.5 | 0 |
| 77 | 9.196 | 9.231 | 0.12 | 0.12 | 0.73 | 81 | 0.96 | 0.59 | 81 | 0.7 | 94 | 101 | 100 | 31.7 | 0 | 273 | 73 | 74 | 70 | -0.056 | 2.8 | 0 |
| 78 | 9.317 | 9.352 | 0.12 | 0.12 | 0.73 | 81 | 0.95 | 0.59 | 81 | 0.7 | 94 | 102 | 101 | 31.7 | 0 | 271 | 72 | 74 | 70 | -0.056 | 2.7 | 0 |
| 79 | 9.437 | 9.472 | 0.12 | 0.12 | 0.72 | 81 | 0.95 | 0.59 | 81 | 0.7 | 94 | 101 | 100 | 31.6 | -0.1 | 270 | 72 | 74 | 70 | -0.055 | 2.8 | 0 |
| 80 | 9.558 | 9.593 | 0.12 | 0.12 | 0.73 | 81 | 0.96 | 0.59 | 82 | 0.7 | 93 | 102 | 101 | 31.6 | 0 | 269 | 72 | 74 | 70 | -0.055 | 2.8 | 0 |
| 81 | 9.678 | 9.714 | 0.12 | 0.12 | 0.72 | 81 | 0.95 | 0.59 | 82 | 0.7 | 93 | 101 | 101 | 31.6 | 0 | 265 | 72 | 74 | 70 | -0.056 | 2.4 | 0 |
| 82 | 9.799 | 9.835 | 0.12 | 0.12 | 0.72 | 81 | 0.96 | 0.59 | 82 | 0.7 | 93 | 102 | 101 | 31.5 | -0.1 | 264 | 72 | 74 | 70 | -0.056 | 2.5 | 0 |
| 83 | 9.919 | 9.956 | 0.12 | 0.12 | 0.72 | 81 | 0.96 | 0.59 | 82 | 0.7 | 93 | 101 | 101 | 31.5 | 0 | 264 | 72 | 74 | 70 | -0.056 | 2.9 | 0 |
| 84 | 10.040 | 10.076 | 0.12 | 0.12 | 0.73 | 81 | 0.95 | 0.59 | 82 | 0.7 | 93 | 102 | 100 | 31.5 | 0 | 264 | 72 | 74 | 70 | -0.056 | 3 | 0 |
| 85 | 10.160 | 10.197 | 0.12 | 0.12 | 0.73 | 81 | 0.95 | 0.59 | 82 | 0.7 | 93 | 101 | 101 | 31.4 | -0.1 | 262 | 72 | 74 | 70 | -0.056 | 2.9 | 0 |
| 86 | 10.281 | 10.318 | 0.12 | 0.12 | 0.72 | 81 | 0.96 | 0.59 | 82 | 0.7 | 93 | 102 | 101 | 31.4 | 0 | 261 | 72 | 73 | 70 | -0.056 | 2.8 | 0 |
| 87 | 10.401 | 10.439 | 0.12 | 0.12 | 0.73 | 81 | 0.96 | 0.59 | 82 | 0.7 | 92 | 101 | 101 | 31.4 | 0 | 258 | 72 | 73 | 70 | -0.056 | 2.5 | 0 |
| 88 | 10.521 | 10.560 | 0.12 | 0.12 | 0.73 | 81 | 0.96 | 0.59 | 82 | 0.7 | 92 | 101 | 101 | 31.3 | -0.1 | 259 | 72 | 73 | 70 | -0.056 | 2.9 | 0 |
| 89 | 10.641 | 10.681 | 0.12 | 0.12 | 0.72 | 81 | 0.96 | 0.59 | 82 | 0.7 | 93 | 101 | 101 | 31.3 | 0 | 260 | 72 | 74 | 70 | -0.056 | 3.2 | 0 |
| 90 | 10.762 | 10.802 | 0.12 | 0.12 | 0.72 | 81 | 0.96 | 0.59 | 82 | 0.7 | 92 | 102 | 101 | 31.3 | 0 | 258 | 72 | 73 | 71 | -0.056 | 2.8 | 0 |
| 91 | 10.882 | 10.922 | 0.12 | 0.12 | 0.73 | 81 | 0.96 | 0.59 | 82 | 0.7 | 92 | 101 | 100 | 31.3 | 0 | 254 | 72 | 73 | 70 | -0.056 | 2.4 | 0 |
| 92 | 11.002 | 11.043 | 0.12 | 0.12 | 0.72 | 81 | 0.96 | 0.59 | 82 | 0.7 | 92 | 101 | 101 | 31.2 | -0.1 | 254 | 72 | 73 | 71 | -0.055 | 2.7 | 0 |
| 93 | 11.123 | 11.165 | 0.12 | 0.12 | 0.73 | 81 | 0.96 | 0.59 | 82 | 0.7 | 92 | 102 | 102 | 31.2 | 0 | 252 | 72 | 73 | 70 | -0.056 | 2.5 | 0 |
| 94 | 11.244 | 11.285 | 0.12 | 0.12 | 0.73 | 81 | 0.95 | 0.59 | 82 | 0.7 | 92 | 102 | 100 | 31.1 | -0.1 | 251 | 72 | 73 | 70 | -0.056 | 2.6 | 0 |
| 95 | 11.364 | 11.406 | 0.12 | 0.12 | 0.72 | 81 | 0.95 | 0.59 | 82 | 0.7 | 92 | 101 | 101 | 31.1 | 0 | 249 | 72 | 73 | 71 | -0.055 | 2.5 | 0 |
| 96 | 11.485 | 11.527 | 0.12 | 0.12 | 0.72 | 81 | 0.96 | 0.59 | 82 | 0.7 | 92 | 102 | 101 | 31.1 | 0 | 247 | 72 | 73 | 70 | -0.056 | 2.3 | 0 |
| 97 | 11.606 | 11.648 | 0.12 | 0.12 | 0.73 | 81 | 0.96 | 0.59 | 82 | 0.7 | 91 | 102 | 101 | 31.1 | 0 | 246 | 72 | 73 | 70 | -0.056 | 2.3 | 0 |
| 98 | 11.726 | 11.769 | 0.12 | 0.12 | 0.73 | 81 | 0.96 | 0.59 | 82 | 0.7 | 91 | 101 | 101 | 31.0 | -0.1 | 244 | 72 | 73 | 70 | -0.055 | 2.4 | 0 |
| 99 | 11.847 | 11.890 | 0.12 | 0.12 | 0.72 | 81 | 0.95 | 0.59 | 82 | 0.7 | 91 | 102 | 101 | 31.0 | 0 | 244 | 72 | 73 | 71 | -0.056 | 2.4 | 0 |
| 100 | 11.967 | 12.011 | 0.12 | 0.12 | 0.73 | 81 | 0.95 | 0.59 | 82 | 0.7 | 91 | 101 | 101 | 31.0 | 0 | 244 | 72 | 73 | 70 | -0.056 | 2.5 | 0 |
| 101 | 12.087 | 12.132 | 0.12 | 0.12 | 0.73 | 81 | 0.96 | 0.59 | 82 | 0.7 | 91 | 101 | 101 | 31.0 | 0 | 246 | 72 | 73 | 70 | -0.056 | 2.6 | 0 |
| 102 | 12.207 | 12.253 | 0.12 | 0.12 | 0.72 | 81 | 0.95 | 0.59 | 82 | 0.7 | 91 | 101 | 101 | 30.9 | -0.1 | 248 | 72 | 73 | 70 | -0.056 | 3.2 | 0 |
| 103 | 12.328 | 12.373 | 0.12 | 0.12 | 0.72 | 81 | 0.96 | 0.59 | 82 | 0.7 | 91 | 102 | 100 | 30.9 | 0 | 246 | 72 | 73 | 70 | -0.056 | 2.5 | 0 |
| 104 | 12.448 | 12.494 | 0.12 | 0.12 | 0.72 | 81 | 0.95 | 0.59 | 82 | 0.7 | 91 | 101 | 101 | 30.8 | -0.1 | 246 | 72 | 73 | 70 | -0.056 | 2.6 | 0 |
| 105 | 12.569 | 12.615 | 0.12 | 0.12 | 0.72 | 81 | 0.96 | 0.59 | 82 | 0.7 | 91 | 102 | 101 | 30.8 | 0 | 246 | 72 | 73 | 70 | -0.056 | 2.8 | 0 |
| 106 | 12.689 | 12.736 | 0.12 | 0.12 | 0.73 | 81 | 0.95 | 0.59 | 82 | 0.7 | 91 | 101 | 101 | 30.8 | 0 | 246 | 72 | 73 | 70 | -0.056 | 2.7 | 0 |
| 107 | 12.810 | 12.857 | 0.12 | 0.12 | 0.73 | 81 | 0.95 | 0.59 | 82 | 0.7 | 91 | 102 | 101 | 30.8 | 0 | 245 | 72 | 73 | 70 | -0.056 | 2.5 | 0 |
| 108 | 12.930 | 12.978 | 0.12 | 0.12 | 0.72 | 81 | 0.96 | 0.59 | 82 | 0.7 | 91 | 101 | 101 | 30.7 | -0.1 | 245 | 72 | 73 | 70 | -0.056 | 2.7 | 0 |
| 109 | 13.051 | 13.099 | 0.12 | 0.12 | 0.72 | 82 | 0.95 | 0.59 | 82 | 0.7 | 91 | 101 | 101 | 30.7 | 0 | 246 | 72 | 73 | 70 | -0.056 | 2.8 | 0 |
| 110 | 13.172 | 13.220 | 0.12 | 0.12 | 0.72 | 82 | 0.96 | 0.59 | 82 | 0.7 | 91 | 101 | 101 | 30.6 | -0.1 | 246 | 72 | 73 | 71 | -0.056 | 2.9 | 0 |

OMNI-Test Laboratories, Inc.

# Pellet Heater Test Data - ASTM E2779 / ASTM E2515

**Run:** 1

Manufacturer: Harman
Model: Accentra-2
Tracking No.: 2067
Project No.: 1035PS035E
Test Date: 12-May-15
Beginning Clock Time: 09:53
Meter Box Y Factor: 1.004 (1) 1.007 (2) 1.019 (Amb)

Barometric Pressure:

| Begin | Middle | End | Average |
|---|---|---|---|
| 29.95 | 29.95 | 29.95 | 29.95 "Hg |

High Burn End Time: 61
Medium Burn End Time: 181
Total Sampling Time: 365 min
Recording Interval: 1 min
Background Sample Volume: 49.182 cubic feet

OMNI Equipment Numbers: 335, 336, 185, 209, 23, 131, 343, 128, 132, 417, 419

PM Control Module: 335/336
Dilution Tunnel MW(dry): 29.00 lb/lb-mole
Dilution Tunnel MW(wet): 28.78 lb/lb-mole
Dilution Tunnel H2O: 2.00 percent
Dilution Tunnel Static: -0.625 "H2O
Tunnel Area: 0.1963 ft2
Pitot Tube Cp: 0.99

Tunnel Velocity: 13.15 ft/sec.
Intial Tunnel Flow: 142.4 scfm
Average Tunnel Flow: 146.5 scfm
Post-Test Leak Check (1): ).000@2.8 cfm@"Hg
Post-Test Leak Check (2): ).000@7.3 cfm@"Hg
Fuel Moisture (dry basis %): 5.05

Velocity Traverse Data

| | Pt.1 | Pt.2 | Pt.3 | Pt.4 | Pt.5 | Pt.6 | Pt.7 | Pt.8 | |
|---|---|---|---|---|---|---|---|---|---|
| Initial dP | 0.020 | 0.048 | 0.048 | 0.030 | 0.028 | 0.052 | 0.050 | 0.028 | "H2O |
| Temp: | 104 | 104 | 104 | 104 | 104 | 104 | 104 | 104 | oF |

| | Particulate Sampling Data | | | | | | | | | | | | | Fuel Weight, lb | | Temperature Data | | | Stack Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Elapsed Time | Gas Meter Cubic Feet (1) | Gas Meter Cubic Feet (2) | Sample Rate, cfm (1) | Sample Rate, cfm (2) | Orifice dH (1) | Meter oF (1) | Meter Vac. In. Hg. (1) | Orifice dH (2) | Meter oF (2) | Meter Vac. In. Hg. (2) | Dilution Tunnel Temp. | Pro. Rate (10%) (1) | Pro. Rate (10%) (2) | Scale Reading | Weight Change | Stack | Filter (1) | Filter (2) | Ambient | Draft In. H2O | $CO_2$ (%) | CO (%) |
| 111 | 13.292 | 13.341 | 0.12 | 0.12 | 0.73 | 82 | 0.96 | 0.59 | 82 | 0.7 | 91 | 101 | 101 | 30.6 | 0 | 245 | 72 | 73 | 70 | -0.056 | 2.6 | 0 |
| 112 | 13.413 | 13.462 | 0.12 | 0.12 | 0.72 | 82 | 0.96 | 0.59 | 82 | 0.7 | 91 | 101 | 101 | 30.6 | 0 | 245 | 72 | 73 | 70 | -0.056 | 2.6 | 0 |
| 113 | 13.533 | 13.583 | 0.12 | 0.12 | 0.72 | 82 | 0.96 | 0.59 | 82 | 0.7 | 91 | 101 | 101 | 30.6 | 0 | 246 | 72 | 73 | 70 | -0.056 | 2.8 | 0 |
| 114 | 13.653 | 13.704 | 0.12 | 0.12 | 0.73 | 82 | 0.96 | 0.59 | 82 | 0.7 | 91 | 101 | 101 | 30.5 | -0.1 | 245 | 72 | 73 | 70 | -0.056 | 2.9 | 0 |
| 115 | 13.773 | 13.825 | 0.12 | 0.12 | 0.72 | 82 | 0.96 | 0.59 | 82 | 0.7 | 91 | 101 | 101 | 30.5 | 0 | 244 | 72 | 73 | 70 | -0.056 | 2.6 | 0 |
| 116 | 13.894 | 13.946 | 0.12 | 0.12 | 0.72 | 82 | 0.95 | 0.59 | 82 | 0.7 | 91 | 101 | 101 | 30.5 | 0 | 244 | 72 | 73 | 70 | -0.056 | 2.7 | 0 |
| 117 | 14.014 | 14.067 | 0.12 | 0.12 | 0.73 | 82 | 0.95 | 0.59 | 82 | 0.7 | 91 | 101 | 101 | 30.5 | 0 | 244 | 72 | 73 | 70 | -0.056 | 2.7 | 0 |
| 118 | 14.134 | 14.188 | 0.12 | 0.12 | 0.72 | 82 | 0.96 | 0.59 | 82 | 0.7 | 91 | 101 | 101 | 30.4 | -0.1 | 244 | 72 | 73 | 70 | -0.056 | 2.7 | 0 |
| 119 | 14.255 | 14.309 | 0.12 | 0.12 | 0.72 | 82 | 0.95 | 0.59 | 82 | 0.7 | 91 | 101 | 101 | 30.4 | 0 | 245 | 72 | 73 | 70 | -0.056 | 3 | 0 |
| 120 | 14.376 | 14.430 | 0.12 | 0.12 | 0.72 | 82 | 0.96 | 0.59 | 82 | 0.7 | 91 | 101 | 101 | 30.3 | -0.1 | 246 | 72 | 73 | 71 | -0.056 | 2.9 | 0 |
| 121 | 14.496 | 14.551 | 0.12 | 0.12 | 0.73 | 82 | 0.95 | 0.59 | 82 | 0.7 | 91 | 101 | 101 | 30.3 | 0 | 248 | 72 | 73 | 70 | -0.056 | 3.1 | 0 |
| 122 | 14.617 | 14.672 | 0.12 | 0.12 | 0.72 | 82 | 0.96 | 0.59 | 82 | 0.7 | 91 | 101 | 101 | 30.2 | -0.1 | 249 | 72 | 73 | 70 | -0.056 | 3.1 | 0 |
| 123 | 14.737 | 14.793 | 0.12 | 0.12 | 0.72 | 82 | 0.96 | 0.59 | 82 | 0.7 | 91 | 101 | 101 | 30.2 | 0 | 248 | 72 | 73 | 70 | -0.056 | 3 | 0 |
| 124 | 14.858 | 14.914 | 0.12 | 0.12 | 0.72 | 82 | 0.96 | 0.59 | 83 | 0.7 | 91 | 101 | 101 | 30.2 | 0 | 246 | 72 | 73 | 70 | -0.056 | 2.6 | 0 |
| 125 | 14.978 | 15.035 | 0.12 | 0.12 | 0.72 | 82 | 0.96 | 0.59 | 83 | 0.7 | 91 | 101 | 101 | 30.2 | 0 | 245 | 72 | 73 | 70 | -0.056 | 2.6 | 0 |
| 126 | 15.099 | 15.155 | 0.12 | 0.12 | 0.72 | 82 | 0.96 | 0.59 | 83 | 0.7 | 91 | 101 | 100 | 30.1 | -0.1 | 244 | 73 | 73 | 70 | -0.056 | 2.6 | 0 |
| 127 | 15.219 | 15.276 | 0.12 | 0.12 | 0.72 | 82 | 0.96 | 0.59 | 83 | 0.7 | 91 | 101 | 101 | 30.1 | 0 | 243 | 72 | 73 | 70 | -0.056 | 2.7 | 0 |
| 128 | 15.339 | 15.397 | 0.12 | 0.12 | 0.72 | 82 | 0.96 | 0.59 | 83 | 0.7 | 91 | 101 | 101 | 30.1 | 0 | 241 | 73 | 73 | 70 | -0.056 | 2.2 | 0 |
| 129 | 15.459 | 15.518 | 0.12 | 0.12 | 0.72 | 82 | 0.96 | 0.59 | 82 | 0.7 | 91 | 101 | 101 | 30.0 | -0.1 | 241 | 73 | 73 | 70 | -0.056 | 2.4 | 0 |
| 130 | 15.580 | 15.639 | 0.12 | 0.12 | 0.73 | 82 | 0.95 | 0.59 | 83 | 0.7 | 91 | 101 | 101 | 30.0 | 0 | 242 | 73 | 73 | 70 | -0.056 | 2.6 | 0 |
| 131 | 15.700 | 15.760 | 0.12 | 0.12 | 0.73 | 82 | 0.96 | 0.59 | 83 | 0.7 | 91 | 101 | 101 | 30.0 | 0 | 243 | 73 | 73 | 70 | -0.056 | 2.7 | 0 |
| 132 | 15.820 | 15.881 | 0.12 | 0.12 | 0.72 | 82 | 0.95 | 0.59 | 82 | 0.7 | 91 | 101 | 101 | 29.9 | -0.1 | 241 | 73 | 73 | 70 | -0.056 | 2.6 | 0 |
| 133 | 15.941 | 16.002 | 0.12 | 0.12 | 0.72 | 82 | 0.96 | 0.59 | 83 | 0.7 | 91 | 101 | 101 | 29.9 | 0 | 241 | 73 | 73 | 70 | -0.056 | 2.4 | 0 |
| 134 | 16.062 | 16.123 | 0.12 | 0.12 | 0.72 | 82 | 0.96 | 0.59 | 83 | 0.7 | 91 | 101 | 101 | 29.9 | 0 | 240 | 73 | 73 | 70 | -0.056 | 2.4 | 0 |
| 135 | 16.182 | 16.244 | 0.12 | 0.12 | 0.72 | 82 | 0.95 | 0.59 | 83 | 0.7 | 91 | 101 | 101 | 29.9 | 0 | 239 | 73 | 73 | 70 | -0.056 | 2.4 | 0 |
| 136 | 16.303 | 16.365 | 0.12 | 0.12 | 0.72 | 82 | 0.96 | 0.59 | 83 | 0.7 | 91 | 101 | 101 | 29.8 | -0.1 | 240 | 73 | 73 | 70 | -0.056 | 2.7 | 0 |
| 137 | 16.423 | 16.486 | 0.12 | 0.12 | 0.72 | 82 | 0.96 | 0.58 | 83 | 0.7 | 91 | 101 | 101 | 29.8 | 0 | 240 | 73 | 73 | 71 | -0.056 | 2.5 | 0 |
| 138 | 16.544 | 16.607 | 0.12 | 0.12 | 0.72 | 82 | 0.95 | 0.59 | 83 | 0.7 | 91 | 101 | 101 | 29.8 | 0 | 240 | 73 | 73 | 71 | -0.056 | 2.5 | 0 |
| 139 | 16.664 | 16.728 | 0.12 | 0.12 | 0.72 | 82 | 0.96 | 0.59 | 83 | 0.7 | 91 | 101 | 101 | 29.7 | -0.1 | 241 | 73 | 73 | 71 | -0.056 | 2.5 | 0 |
| 140 | 16.785 | 16.850 | 0.12 | 0.12 | 0.72 | 82 | 0.96 | 0.58 | 83 | 0.7 | 91 | 101 | 102 | 29.7 | 0 | 240 | 73 | 73 | 70 | -0.056 | 2.7 | 0 |
| 141 | 16.905 | 16.971 | 0.12 | 0.12 | 0.72 | 82 | 0.96 | 0.59 | 83 | 0.7 | 91 | 101 | 101 | 29.7 | 0 | 238 | 73 | 73 | 70 | -0.056 | 2.3 | 0 |
| 142 | 17.024 | 17.092 | 0.12 | 0.12 | 0.72 | 83 | 0.96 | 0.59 | 83 | 0.7 | 91 | 100 | 101 | 29.6 | -0.1 | 237 | 73 | 73 | 70 | -0.056 | 2.2 | 0 |
| 143 | 17.144 | 17.213 | 0.12 | 0.12 | 0.72 | 83 | 0.96 | 0.59 | 83 | 0.7 | 91 | 100 | 101 | 29.6 | 0 | 237 | 73 | 73 | 70 | -0.056 | 2.5 | 0 |
| 144 | 17.265 | 17.334 | 0.12 | 0.12 | 0.72 | 83 | 0.96 | 0.59 | 83 | 0.7 | 91 | 101 | 101 | 29.6 | 0 | 236 | 73 | 73 | 70 | -0.056 | 2.4 | 0 |
| 145 | 17.385 | 17.455 | 0.12 | 0.12 | 0.72 | 83 | 0.95 | 0.59 | 83 | 0.7 | 91 | 100 | 101 | 29.6 | 0 | 237 | 73 | 73 | 70 | -0.056 | 2.4 | 0 |
| 146 | 17.505 | 17.576 | 0.12 | 0.12 | 0.72 | 83 | 0.96 | 0.59 | 83 | 0.7 | 91 | 100 | 101 | 29.5 | -0.1 | 238 | 73 | 73 | 70 | -0.056 | 2.5 | 0 |
| 147 | 17.626 | 17.696 | 0.12 | 0.12 | 0.72 | 83 | 0.96 | 0.59 | 83 | 0.7 | 91 | 101 | 100 | 29.5 | 0 | 237 | 73 | 73 | 70 | -0.056 | 2.5 | 0 |

OMNI-Test Laboratories, Inc.

# Pellet Heater Test Data - ASTM E2779 / ASTM E2515

**Run:** 1

Manufacturer: Harman
Model: Accentra-2
Tracking No.: 2067
Project No.: 1035PS035E
Test Date: 12-May-15
Beginning Clock Time: 09:53
Meter Box Y Factor: 1.004 (1) 1.007 (2) 1.019 (Amb)

Barometric Pressure:

| Begin | Middle | End | Average |
|---|---|---|---|
| 29.95 | 29.95 | 29.95 | 29.95 "Hg |

High Burn End Time: 61
Medium Burn End Time: 181
Total Sampling Time: 365 min
Recording Interval: 1 min
Background Sample Volume: 49.182 cubic feet

PM Control Module: 335/336
Dilution Tunnel MW(dry): 29.00 lb/lb-mole
Dilution Tunnel MW(wet): 28.78 lb/lb-mole
Dilution Tunnel H2O: 2.00 percent
Dilution Tunnel Static: -0.625 "H2O
Tunnel Area: 0.1963 ft2
Pitot Tube Cp: 0.99

Tunnel Velocity: 13.15 ft/sec.
Intial Tunnel Flow: 142.4 scfm
Average Tunnel Flow: 146.5 scfm
Post-Test Leak Check (1): ).000@2.8 cfm@"Hg
Post-Test Leak Check (2): ).000@7.3 cfm@"Hg
Fuel Moisture (dry basis %): 5.05

OMNI Equipment Numbers: 335, 336, 185, 209, 23, 131, 343, 128, 132, 417, 419

Velocity Traverse Data

| | Pt.1 | Pt.2 | Pt.3 | Pt.4 | Pt.5 | Pt.6 | Pt.7 | Pt.8 | |
|---|---|---|---|---|---|---|---|---|---|
| Initial dP | 0.020 | 0.048 | 0.048 | 0.030 | 0.028 | 0.052 | 0.050 | 0.028 | "H2O |
| Temp: | 104 | 104 | 104 | 104 | 104 | 104 | 104 | 104 | oF |

| | Particulate Sampling Data | | | | | | | | | | | | | Fuel Weight, lb | | Temperature Data | | | Stack Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Elapsed Time | Gas Meter Cubic Feet (1) | Gas Meter Cubic Feet (2) | Sample Rate, cfm (1) | Sample Rate, cfm (2) | Orifice dH (1) | Meter oF (1) | Meter Vac. In. Hg. (1) | Orifice dH (2) | Meter oF (2) | Meter Vac. In. Hg. (2) | Dilution Tunnel Temp. | Pro. Rate (10%) (1) | Pro. Rate (10%) (2) | Scale Reading | Weight Change | Stack | Filter (1) | Filter (2) | Ambient | Draft In. H2O | $CO_2$ (%) | CO (%) |
| 148 | 17.747 | 17.817 | 0.12 | 0.12 | 0.72 | 83 | 0.96 | 0.59 | 83 | 0.7 | 91 | 101 | 101 | 29.5 | 0 | 238 | 73 | 73 | 70 | -0.056 | 2.6 | 0 |
| 149 | 17.867 | 17.938 | 0.12 | 0.12 | 0.72 | 83 | 0.96 | 0.59 | 83 | 0.7 | 91 | 100 | 101 | 29.4 | -0.1 | 240 | 73 | 73 | 70 | -0.056 | 2.8 | 0 |
| 150 | 17.987 | 18.059 | 0.12 | 0.12 | 0.71 | 83 | 0.96 | 0.59 | 83 | 0.7 | 91 | 100 | 101 | 29.4 | 0 | 239 | 73 | 73 | 70 | -0.056 | 2.5 | 0 |
| 151 | 18.108 | 18.180 | 0.12 | 0.12 | 0.72 | 83 | 0.96 | 0.59 | 83 | 0.7 | 91 | 101 | 101 | 29.3 | -0.1 | 238 | 73 | 73 | 70 | -0.056 | 2.4 | 0 |
| 152 | 18.228 | 18.301 | 0.12 | 0.12 | 0.72 | 83 | 0.96 | 0.59 | 83 | 0.7 | 91 | 100 | 101 | 29.4 | 0.1 | 237 | 73 | 73 | 70 | -0.056 | 2.4 | 0 |
| 153 | 18.348 | 18.422 | 0.12 | 0.12 | 0.72 | 83 | 0.96 | 0.59 | 83 | 0.7 | 91 | 100 | 101 | 29.3 | -0.1 | 237 | 73 | 73 | 70 | -0.056 | 2.4 | 0 |
| 154 | 18.469 | 18.543 | 0.12 | 0.12 | 0.72 | 83 | 0.96 | 0.59 | 83 | 0.7 | 91 | 101 | 101 | 29.3 | 0 | 238 | 73 | 73 | 70 | -0.056 | 2.5 | 0 |
| 155 | 18.589 | 18.664 | 0.12 | 0.12 | 0.72 | 83 | 0.96 | 0.59 | 83 | 0.7 | 91 | 100 | 101 | 29.3 | 0 | 240 | 73 | 73 | 70 | -0.056 | 3 | 0 |
| 156 | 18.709 | 18.785 | 0.12 | 0.12 | 0.72 | 83 | 0.96 | 0.59 | 83 | 0.7 | 91 | 100 | 101 | 29.2 | -0.1 | 241 | 73 | 73 | 70 | -0.056 | 2.9 | 0 |
| 157 | 18.829 | 18.906 | 0.12 | 0.12 | 0.72 | 83 | 0.96 | 0.59 | 83 | 0.7 | 91 | 100 | 101 | 29.2 | 0 | 240 | 73 | 73 | 71 | -0.056 | 2.5 | 0 |
| 158 | 18.949 | 19.027 | 0.12 | 0.12 | 0.72 | 83 | 0.96 | 0.59 | 83 | 0.7 | 91 | 100 | 101 | 29.2 | 0 | 238 | 73 | 73 | 70 | -0.056 | 2.3 | 0 |
| 159 | 19.070 | 19.148 | 0.12 | 0.12 | 0.72 | 83 | 0.96 | 0.59 | 83 | 0.7 | 91 | 101 | 101 | 29.1 | -0.1 | 237 | 73 | 73 | 70 | -0.056 | 2.5 | 0 |
| 160 | 19.190 | 19.270 | 0.12 | 0.12 | 0.72 | 83 | 0.96 | 0.59 | 83 | 0.7 | 91 | 100 | 102 | 29.1 | 0 | 236 | 73 | 73 | 70 | -0.056 | 2.3 | 0 |
| 161 | 19.310 | 19.391 | 0.12 | 0.12 | 0.72 | 83 | 0.96 | 0.58 | 83 | 0.7 | 91 | 100 | 101 | 29.1 | 0 | 237 | 73 | 73 | 70 | -0.056 | 2.3 | 0 |
| 162 | 19.431 | 19.512 | 0.12 | 0.12 | 0.72 | 83 | 0.96 | 0.59 | 83 | 0.7 | 91 | 101 | 101 | 29.0 | -0.1 | 241 | 73 | 73 | 70 | -0.056 | 3.1 | 0 |
| 163 | 19.551 | 19.633 | 0.12 | 0.12 | 0.72 | 83 | 0.95 | 0.59 | 83 | 0.7 | 91 | 100 | 101 | 29.0 | 0 | 238 | 73 | 73 | 71 | -0.056 | 2.3 | 0 |
| 164 | 19.671 | 19.754 | 0.12 | 0.12 | 0.72 | 83 | 0.96 | 0.59 | 83 | 0.7 | 91 | 100 | 101 | 29.0 | 0 | 237 | 73 | 73 | 70 | -0.056 | 2.3 | 0 |
| 165 | 19.792 | 19.875 | 0.12 | 0.12 | 0.71 | 83 | 0.96 | 0.59 | 83 | 0.7 | 91 | 101 | 101 | 28.9 | -0.1 | 237 | 73 | 73 | 70 | -0.056 | 2.4 | 0 |
| 166 | 19.912 | 19.996 | 0.12 | 0.12 | 0.72 | 83 | 0.96 | 0.59 | 83 | 0.7 | 91 | 100 | 101 | 28.9 | 0 | 238 | 73 | 73 | 71 | -0.056 | 2.4 | 0 |
| 167 | 20.033 | 20.117 | 0.12 | 0.12 | 0.72 | 83 | 0.96 | 0.59 | 83 | 0.7 | 91 | 101 | 101 | 28.9 | 0 | 238 | 73 | 73 | 70 | -0.056 | 2.6 | 0 |
| 168 | 20.153 | 20.238 | 0.12 | 0.12 | 0.72 | 83 | 0.96 | 0.59 | 83 | 0.7 | 91 | 100 | 101 | 28.8 | -0.1 | 240 | 73 | 73 | 71 | -0.056 | 2.6 | 0 |
| 169 | 20.273 | 20.359 | 0.12 | 0.12 | 0.71 | 83 | 0.96 | 0.59 | 83 | 0.7 | 91 | 100 | 101 | 28.8 | 0 | 242 | 73 | 73 | 71 | -0.056 | 3 | 0 |
| 170 | 20.393 | 20.479 | 0.12 | 0.12 | 0.72 | 83 | 0.97 | 0.59 | 83 | 0.7 | 92 | 101 | 100 | 28.7 | -0.1 | 242 | 73 | 73 | 71 | -0.056 | 2.6 | 0 |
| 171 | 20.513 | 20.600 | 0.12 | 0.12 | 0.72 | 83 | 0.96 | 0.59 | 83 | 0.7 | 91 | 100 | 101 | 28.7 | 0 | 239 | 73 | 73 | 71 | -0.056 | 2.2 | 0 |
| 172 | 20.633 | 20.721 | 0.12 | 0.12 | 0.72 | 83 | 0.96 | 0.59 | 83 | 0.7 | 91 | 100 | 101 | 28.7 | 0 | 238 | 73 | 73 | 70 | -0.056 | 2.1 | 0 |
| 173 | 20.753 | 20.842 | 0.12 | 0.12 | 0.72 | 83 | 0.96 | 0.59 | 83 | 0.7 | 92 | 101 | 101 | 28.7 | 0 | 241 | 73 | 73 | 71 | -0.056 | 2.9 | 0 |
| 174 | 20.874 | 20.963 | 0.12 | 0.12 | 0.72 | 83 | 0.96 | 0.59 | 83 | 0.7 | 91 | 101 | 101 | 28.6 | -0.1 | 240 | 73 | 73 | 70 | -0.056 | 2.7 | 0 |
| 175 | 20.994 | 21.084 | 0.12 | 0.12 | 0.72 | 83 | 0.96 | 0.59 | 83 | 0.7 | 91 | 100 | 101 | 28.6 | 0 | 240 | 73 | 73 | 71 | -0.056 | 2.4 | 0 |
| 176 | 21.114 | 21.205 | 0.12 | 0.12 | 0.72 | 83 | 0.97 | 0.59 | 83 | 0.7 | 92 | 101 | 101 | 28.6 | 0 | 240 | 73 | 73 | 71 | -0.056 | 2.6 | 0 |
| 177 | 21.235 | 21.326 | 0.12 | 0.12 | 0.72 | 83 | 0.97 | 0.59 | 83 | 0.7 | 91 | 101 | 101 | 28.6 | 0 | 238 | 73 | 73 | 71 | -0.056 | 2.4 | 0 |
| 178 | 21.355 | 21.447 | 0.12 | 0.12 | 0.72 | 83 | 0.97 | 0.59 | 83 | 0.7 | 91 | 100 | 101 | 28.6 | 0 | 237 | 73 | 73 | 71 | -0.056 | 2.2 | 0 |
| 179 | 21.475 | 21.568 | 0.12 | 0.12 | 0.71 | 83 | 0.96 | 0.59 | 83 | 0.7 | 91 | 100 | 101 | 28.5 | -0.1 | 237 | 73 | 73 | 70 | -0.056 | 2.4 | 0 |
| 180 | 21.596 | 21.689 | 0.12 | 0.12 | 0.71 | 83 | 0.96 | 0.59 | 83 | 0.7 | 91 | 101 | 101 | 28.5 | 0 | 236 | 73 | 73 | 71 | -0.056 | 2.6 | 0 |
| 181 | 21.716 | 21.810 | 0.12 | 0.12 | 0.72 | 83 | 0.96 | 0.59 | 83 | 0.7 | 87 | 100 | 100 | 28.4 | -0.1 | 221 | 73 | 73 | 71 | -0.056 | 2.8 | 0 |
| 182 | 21.836 | 21.932 | 0.12 | 0.12 | 0.72 | 83 | 0.96 | 0.59 | 83 | 0.7 | 84 | 100 | 101 | 28.4 | 0 | 209 | 73 | 73 | 71 | -0.056 | 2.7 | 0 |
| 183 | 21.957 | 22.053 | 0.12 | 0.12 | 0.72 | 83 | 0.97 | 0.59 | 83 | 0.7 | 83 | 101 | 100 | 28.4 | 0 | 202 | 73 | 73 | 71 | -0.056 | 2.9 | 0 |
| 184 | 22.077 | 22.174 | 0.12 | 0.12 | 0.72 | 83 | 0.96 | 0.59 | 83 | 0.7 | 82 | 100 | 100 | 28.4 | 0 | 196 | 73 | 73 | 70 | -0.056 | 2.8 | 0 |

OMNI-Test Laboratories, Inc.

# Pellet Heater Test Data - ASTM E2779 / ASTM E2515

**Run:** 1

Manufacturer: Harman
Model: Accentra-2
Tracking No.: 2067
Project No.: 1035PS035E
Test Date: 12-May-15
Beginning Clock Time: 09:53
Meter Box Y Factor: 1.004 (1) 1.007 (2) 1.019 (Amb)

Barometric Pressure:

| Begin | Middle | End | Average |
|---|---|---|---|
| 29.95 | 29.95 | 29.95 | 29.95 "Hg |

High Burn End Time: 61
Medium Burn End Time: 181
Total Sampling Time: 365 min
Recording Interval: 1 min
Background Sample Volume: 49.182 cubic feet

OMNI Equipment Numbers: 335, 336, 185, 209, 23, 131, 343, 128, 132, 417, 419

PM Control Module: 335/336
Dilution Tunnel MW(dry): 29.00 lb/lb-mole
Dilution Tunnel MW(wet): 28.78 lb/lb-mole
Dilution Tunnel H2O: 2.00 percent
Dilution Tunnel Static: -0.625 "H2O
Tunnel Area: 0.1963 ft2
Pitot Tube Cp: 0.99

Tunnel Velocity: 13.15 ft/sec.
Intial Tunnel Flow: 142.4 scfm
Average Tunnel Flow: 146.5 scfm
Post-Test Leak Check (1): ).000@2.8 cfm@"Hg
Post-Test Leak Check (2): ).000@7.3 cfm@"Hg
Fuel Moisture (dry basis %): 5.05

Velocity Traverse Data

| | Pt.1 | Pt.2 | Pt.3 | Pt.4 | Pt.5 | Pt.6 | Pt.7 | Pt.8 | |
|---|---|---|---|---|---|---|---|---|---|
| Initial dP | 0.020 | 0.048 | 0.048 | 0.030 | 0.028 | 0.052 | 0.050 | 0.028 | "H2O |
| Temp: | 104 | 104 | 104 | 104 | 104 | 104 | 104 | 104 | oF |

| | Particulate Sampling Data | | | | | | | | | | | | | Fuel Weight, lb | | Temperature Data | | | Stack Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Elapsed Time | Gas Meter Cubic Feet (1) | Gas Meter Cubic Feet (2) | Sample Rate, cfm (1) | Sample Rate, cfm (2) | Orifice dH (1) | Meter oF (1) | Meter Vac. In. Hg. (1) | Orifice dH (2) | Meter oF (2) | Meter Vac. In. Hg. (2) | Dilution Tunnel Temp. | Pro. Rate (10%) (1) | Pro. Rate (10%) (2) | Scale Reading | Weight Change | Stack | Filter (1) | Filter (2) | Ambient | Draft In. H2O | $CO_2$ (%) | CO (%) |
| 185 | 22.197 | 22.295 | 0.12 | 0.12 | 0.72 | 83 | 0.96 | 0.59 | 83 | 0.7 | 82 | 100 | 100 | 28.3 | -0.1 | 192 | 73 | 73 | 71 | -0.056 | 2.8 | 0 |
| 186 | 22.317 | 22.416 | 0.12 | 0.12 | 0.72 | 83 | 0.96 | 0.59 | 83 | 0.7 | 81 | 100 | 100 | 28.3 | 0 | 188 | 73 | 73 | 71 | -0.056 | 2.8 | 0 |
| 187 | 22.437 | 22.537 | 0.12 | 0.12 | 0.72 | 83 | 0.97 | 0.59 | 83 | 0.7 | 80 | 99 | 100 | 28.3 | 0 | 184 | 73 | 73 | 71 | -0.056 | 2.7 | 0 |
| 188 | 22.557 | 22.659 | 0.12 | 0.12 | 0.72 | 83 | 0.96 | 0.59 | 83 | 0.7 | 80 | 99 | 100 | 28.3 | 0 | 182 | 73 | 73 | 71 | -0.056 | 3.2 | 0 |
| 189 | 22.678 | 22.779 | 0.12 | 0.12 | 0.72 | 83 | 0.96 | 0.59 | 83 | 0.7 | 80 | 100 | 99 | 28.3 | 0 | 181 | 73 | 73 | 71 | -0.056 | 3.2 | 0 |
| 190 | 22.798 | 22.900 | 0.12 | 0.12 | 0.72 | 83 | 0.96 | 0.59 | 83 | 0.7 | 80 | 99 | 100 | 28.2 | -0.1 | 180 | 73 | 73 | 71 | -0.056 | 3 | 0 |
| 191 | 22.918 | 23.021 | 0.12 | 0.12 | 0.72 | 83 | 0.97 | 0.59 | 83 | 0.7 | 80 | 99 | 100 | 28.2 | 0 | 178 | 73 | 73 | 71 | -0.056 | 2.9 | 0 |
| 192 | 23.039 | 23.142 | 0.12 | 0.12 | 0.72 | 83 | 0.96 | 0.59 | 83 | 0.7 | 79 | 100 | 100 | 28.2 | 0 | 177 | 73 | 73 | 71 | -0.056 | 2.9 | 0 |
| 193 | 23.159 | 23.263 | 0.12 | 0.12 | 0.72 | 84 | 0.97 | 0.59 | 83 | 0.7 | 79 | 99 | 100 | 28.2 | 0 | 176 | 72 | 73 | 71 | -0.056 | 3.1 | 0 |
| 194 | 23.279 | 23.384 | 0.12 | 0.12 | 0.72 | 83 | 0.96 | 0.59 | 83 | 0.7 | 79 | 99 | 100 | 28.1 | -0.1 | 175 | 72 | 73 | 71 | -0.056 | 3.2 | 0 |
| 195 | 23.400 | 23.505 | 0.12 | 0.12 | 0.71 | 83 | 0.97 | 0.59 | 83 | 0.7 | 79 | 100 | 100 | 28.1 | 0 | 176 | 72 | 73 | 71 | -0.056 | 3.8 | 0 |
| 196 | 23.520 | 23.626 | 0.12 | 0.12 | 0.72 | 83 | 0.97 | 0.59 | 83 | 0.7 | 79 | 99 | 100 | 28.1 | 0 | 175 | 72 | 72 | 71 | -0.056 | 3.1 | 0 |
| 197 | 23.641 | 23.747 | 0.12 | 0.12 | 0.72 | 84 | 0.96 | 0.59 | 83 | 0.7 | 79 | 100 | 100 | 28.1 | 0 | 174 | 72 | 72 | 71 | -0.056 | 3 | 0 |
| 198 | 23.761 | 23.868 | 0.12 | 0.12 | 0.72 | 84 | 0.96 | 0.59 | 83 | 0.7 | 79 | 99 | 100 | 28.1 | 0 | 174 | 72 | 72 | 71 | -0.056 | 3 | 0 |
| 199 | 23.881 | 23.989 | 0.12 | 0.12 | 0.71 | 84 | 0.97 | 0.59 | 83 | 0.7 | 79 | 99 | 100 | 28.0 | -0.1 | 173 | 72 | 72 | 71 | -0.056 | 2.8 | 0 |
| 200 | 24.001 | 24.110 | 0.12 | 0.12 | 0.72 | 84 | 0.96 | 0.59 | 83 | 0.7 | 79 | 99 | 100 | 28.0 | 0 | 172 | 72 | 72 | 70 | -0.056 | 3 | 0 |
| 201 | 24.121 | 24.231 | 0.12 | 0.12 | 0.72 | 84 | 0.97 | 0.59 | 83 | 0.7 | 79 | 99 | 100 | 28.0 | 0 | 172 | 72 | 72 | 70 | -0.056 | 3 | 0 |
| 202 | 24.241 | 24.352 | 0.12 | 0.12 | 0.72 | 84 | 0.96 | 0.59 | 83 | 0.7 | 79 | 99 | 100 | 28.0 | 0 | 171 | 72 | 72 | 71 | -0.056 | 2.8 | 0 |
| 203 | 24.362 | 24.474 | 0.12 | 0.12 | 0.72 | 84 | 0.96 | 0.59 | 83 | 0.7 | 79 | 100 | 100 | 28.0 | 0 | 171 | 72 | 72 | 71 | -0.056 | 3 | 0 |
| 204 | 24.482 | 24.595 | 0.12 | 0.12 | 0.72 | 84 | 0.96 | 0.59 | 83 | 0.7 | 79 | 99 | 100 | 28.0 | 0 | 170 | 72 | 72 | 71 | -0.056 | 3 | 0 |
| 205 | 24.602 | 24.716 | 0.12 | 0.12 | 0.72 | 84 | 0.97 | 0.59 | 83 | 0.7 | 78 | 99 | 99 | 27.9 | -0.1 | 170 | 72 | 72 | 71 | -0.056 | 3.1 | 0 |
| 206 | 24.723 | 24.837 | 0.12 | 0.12 | 0.72 | 84 | 0.96 | 0.59 | 83 | 0.7 | 79 | 100 | 100 | 27.9 | 0 | 170 | 72 | 72 | 71 | -0.056 | 2.9 | 0 |
| 207 | 24.843 | 24.959 | 0.12 | 0.12 | 0.72 | 84 | 0.96 | 0.59 | 83 | 0.7 | 78 | 99 | 100 | 27.9 | 0 | 170 | 72 | 72 | 71 | -0.056 | 2.6 | 0 |
| 208 | 24.964 | 25.080 | 0.12 | 0.12 | 0.71 | 84 | 0.97 | 0.59 | 83 | 0.7 | 78 | 100 | 99 | 27.9 | 0 | 169 | 72 | 72 | 70 | -0.057 | 3 | 0 |
| 209 | 25.084 | 25.201 | 0.12 | 0.12 | 0.71 | 84 | 0.96 | 0.59 | 83 | 0.7 | 78 | 99 | 99 | 27.8 | -0.1 | 169 | 72 | 72 | 70 | -0.056 | 2.9 | 0 |
| 210 | 25.205 | 25.322 | 0.12 | 0.12 | 0.71 | 84 | 0.96 | 0.59 | 83 | 0.7 | 78 | 100 | 99 | 27.8 | 0 | 169 | 72 | 72 | 71 | -0.056 | 2.7 | 0 |
| 211 | 25.325 | 25.442 | 0.12 | 0.12 | 0.72 | 84 | 0.96 | 0.59 | 83 | 0.7 | 78 | 99 | 99 | 27.8 | 0 | 168 | 72 | 72 | 71 | -0.056 | 2.8 | 0 |
| 212 | 25.446 | 25.563 | 0.12 | 0.12 | 0.72 | 84 | 0.96 | 0.59 | 83 | 0.7 | 78 | 100 | 99 | 27.8 | 0 | 169 | 72 | 72 | 71 | -0.056 | 2.8 | 0 |
| 213 | 25.566 | 25.684 | 0.12 | 0.12 | 0.71 | 84 | 0.96 | 0.59 | 83 | 0.7 | 79 | 99 | 100 | 27.8 | 0 | 169 | 72 | 72 | 70 | -0.056 | 2.9 | 0 |
| 214 | 25.686 | 25.806 | 0.12 | 0.12 | 0.72 | 84 | 0.96 | 0.59 | 83 | 0.7 | 79 | 99 | 100 | 27.7 | -0.1 | 169 | 72 | 72 | 71 | -0.056 | 3.4 | 0 |
| 215 | 25.806 | 25.927 | 0.12 | 0.12 | 0.72 | 84 | 0.96 | 0.59 | 83 | 0.7 | 79 | 99 | 100 | 27.7 | 0 | 170 | 72 | 72 | 70 | -0.056 | 3.2 | 0 |
| 216 | 25.926 | 26.048 | 0.12 | 0.12 | 0.72 | 84 | 0.96 | 0.59 | 83 | 0.7 | 79 | 99 | 100 | 27.7 | 0 | 170 | 72 | 72 | 71 | -0.056 | 3.1 | 0 |
| 217 | 26.046 | 26.168 | 0.12 | 0.12 | 0.72 | 84 | 0.97 | 0.59 | 83 | 0.7 | 79 | 99 | 99 | 27.7 | 0 | 170 | 72 | 72 | 71 | -0.056 | 2.7 | 0 |
| 218 | 26.167 | 26.290 | 0.12 | 0.12 | 0.72 | 84 | 0.97 | 0.59 | 83 | 0.7 | 79 | 100 | 100 | 27.7 | 0 | 169 | 72 | 72 | 71 | -0.056 | 2.9 | 0 |
| 219 | 26.287 | 26.411 | 0.12 | 0.12 | 0.72 | 84 | 0.97 | 0.59 | 83 | 0.7 | 79 | 99 | 100 | 27.6 | -0.1 | 170 | 72 | 72 | 71 | -0.056 | 2.8 | 0 |
| 220 | 26.408 | 26.532 | 0.12 | 0.12 | 0.71 | 84 | 0.96 | 0.59 | 83 | 0.7 | 79 | 100 | 100 | 27.6 | 0 | 169 | 72 | 72 | 71 | -0.056 | 2.5 | 0 |
| 221 | 26.528 | 26.653 | 0.12 | 0.12 | 0.72 | 84 | 0.96 | 0.59 | 83 | 0.7 | 79 | 99 | 100 | 27.6 | 0 | 168 | 72 | 72 | 71 | -0.056 | 2.5 | 0 |

OMNI-Test Laboratories, Inc.

# Pellet Heater Test Data - ASTM E2779 / ASTM E2515

**Run:** 1

Manufacturer: Harman
Model: Accentra-2
Tracking No.: 2067
Project No.: 1035PS035E
Test Date: 12-May-15
Beginning Clock Time: 09:53
Meter Box Y Factor: 1.004 (1) 1.007 (2) 1.019 (Amb)

Barometric Pressure:

| Begin | Middle | End | Average |
|---|---|---|---|
| 29.95 | 29.95 | 29.95 | 29.95 "Hg |

High Burn End Time: 61
Medium Burn End Time: 181
Total Sampling Time: 365 min
Recording Interval: 1 min
Background Sample Volume: 49.182 cubic feet

OMNI Equipment Numbers: 335, 336, 185, 209, 23, 131, 343, 128, 132, 417, 419

PM Control Module: 335/336
Dilution Tunnel MW(dry): 29.00 lb/lb-mole
Dilution Tunnel MW(wet): 28.78 lb/lb-mole
Dilution Tunnel H2O: 2.00 percent
Dilution Tunnel Static: -0.625 "H2O
Tunnel Area: 0.1963 ft2
Pitot Tube Cp: 0.99

Tunnel Velocity: 13.15 ft/sec.
Intial Tunnel Flow: 142.4 scfm
Average Tunnel Flow: 146.5 scfm
Post-Test Leak Check (1): ).000@2.8 cfm@"Hg
Post-Test Leak Check (2): ).000@7.3 cfm@"Hg
Fuel Moisture (dry basis %): 5.05

Velocity Traverse Data

| | Pt.1 | Pt.2 | Pt.3 | Pt.4 | Pt.5 | Pt.6 | Pt.7 | Pt.8 | |
|---|---|---|---|---|---|---|---|---|---|
| Initial dP | 0.020 | 0.048 | 0.048 | 0.030 | 0.028 | 0.052 | 0.050 | 0.028 | "H2O |
| Temp: | 104 | 104 | 104 | 104 | 104 | 104 | 104 | 104 | oF |

| | Particulate Sampling Data | | | | | | | | | | | | | Fuel Weight, lb | | Temperature Data | | | Stack Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Elapsed Time | Gas Meter Cubic Feet (1) | Gas Meter Cubic Feet (2) | Sample Rate, cfm (1) | Sample Rate, cfm (2) | Orifice dH (1) | Meter oF (1) | Meter Vac. In. Hg. (1) | Orifice dH (2) | Meter oF (2) | Meter Vac. In. Hg. (2) | Dilution Tunnel Temp. | Pro. Rate (10%) (1) | Pro. Rate (10%) (2) | Scale Reading | Weight Change | Stack | Filter (1) | Filter (2) | Ambient | Draft In. H2O | $CO_2$ (%) | CO (%) |
| 222 | 26.648 | 26.774 | 0.12 | 0.12 | 0.72 | 84 | 0.97 | 0.58 | 83 | 0.7 | 79 | 99 | 100 | 27.6 | 0 | 168 | 72 | 72 | 71 | -0.056 | 2.9 | 0 |
| 223 | 26.769 | 26.896 | 0.12 | 0.12 | 0.71 | 84 | 0.96 | 0.58 | 83 | 0.7 | 79 | 100 | 100 | 27.6 | 0 | 168 | 72 | 72 | 71 | -0.056 | 2.6 | 0 |
| 224 | 26.889 | 27.017 | 0.12 | 0.12 | 0.71 | 84 | 0.96 | 0.59 | 83 | 0.7 | 79 | 99 | 100 | 27.6 | 0 | 168 | 72 | 72 | 71 | -0.056 | 2.7 | 0 |
| 225 | 27.010 | 27.138 | 0.12 | 0.12 | 0.72 | 84 | 0.97 | 0.59 | 83 | 0.7 | 79 | 100 | 100 | 27.5 | -0.1 | 168 | 72 | 72 | 71 | -0.056 | 2.9 | 0 |
| 226 | 27.130 | 27.259 | 0.12 | 0.12 | 0.72 | 84 | 0.96 | 0.59 | 83 | 0.7 | 79 | 99 | 100 | 27.5 | 0 | 167 | 72 | 72 | 71 | -0.056 | 2.7 | 0 |
| 227 | 27.251 | 27.380 | 0.12 | 0.12 | 0.71 | 84 | 0.96 | 0.59 | 83 | 0.7 | 78 | 100 | 99 | 27.5 | 0 | 167 | 72 | 72 | 71 | -0.056 | 2.5 | 0 |
| 228 | 27.371 | 27.501 | 0.12 | 0.12 | 0.71 | 84 | 0.97 | 0.59 | 83 | 0.7 | 79 | 99 | 100 | 27.5 | 0 | 167 | 72 | 72 | 71 | -0.056 | 2.9 | 0 |
| 229 | 27.491 | 27.623 | 0.12 | 0.12 | 0.72 | 84 | 0.97 | 0.59 | 83 | 0.7 | 78 | 99 | 100 | 27.5 | 0 | 166 | 72 | 72 | 71 | -0.056 | 2.8 | 0 |
| 230 | 27.611 | 27.743 | 0.12 | 0.12 | 0.72 | 84 | 0.97 | 0.59 | 83 | 0.7 | 79 | 99 | 99 | 27.5 | 0 | 166 | 72 | 72 | 71 | -0.056 | 2.5 | 0 |
| 231 | 27.731 | 27.864 | 0.12 | 0.12 | 0.72 | 84 | 0.97 | 0.59 | 83 | 0.7 | 78 | 99 | 99 | 27.4 | -0.1 | 166 | 72 | 72 | 71 | -0.056 | 2.5 | 0 |
| 232 | 27.851 | 27.985 | 0.12 | 0.12 | 0.72 | 84 | 0.96 | 0.59 | 83 | 0.7 | 78 | 99 | 99 | 27.4 | 0 | 166 | 72 | 72 | 71 | -0.056 | 3.2 | 0 |
| 233 | 27.972 | 28.106 | 0.12 | 0.12 | 0.72 | 84 | 0.97 | 0.59 | 83 | 0.7 | 78 | 100 | 99 | 27.4 | 0 | 166 | 72 | 72 | 71 | -0.056 | 2.7 | 0 |
| 234 | 28.092 | 28.227 | 0.12 | 0.12 | 0.72 | 84 | 0.96 | 0.59 | 83 | 0.7 | 78 | 99 | 99 | 27.4 | 0 | 166 | 72 | 72 | 71 | -0.056 | 2.6 | 0 |
| 235 | 28.213 | 28.348 | 0.12 | 0.12 | 0.72 | 84 | 0.96 | 0.59 | 83 | 0.7 | 79 | 100 | 100 | 27.3 | -0.1 | 169 | 72 | 72 | 71 | -0.056 | 2.9 | 0 |
| 236 | 28.333 | 28.469 | 0.12 | 0.12 | 0.72 | 84 | 0.97 | 0.59 | 83 | 0.7 | 79 | 99 | 100 | 27.3 | 0 | 170 | 72 | 72 | 71 | -0.056 | 2.7 | 0 |
| 237 | 28.453 | 28.590 | 0.12 | 0.12 | 0.71 | 84 | 0.97 | 0.59 | 83 | 0.7 | 79 | 99 | 100 | 27.3 | 0 | 167 | 72 | 72 | 71 | -0.056 | 2.3 | 0 |
| 238 | 28.574 | 28.711 | 0.12 | 0.12 | 0.71 | 84 | 0.97 | 0.59 | 83 | 0.7 | 79 | 100 | 100 | 27.3 | 0 | 167 | 72 | 72 | 71 | -0.056 | 2.7 | 0 |
| 239 | 28.695 | 28.833 | 0.12 | 0.12 | 0.72 | 84 | 0.96 | 0.59 | 83 | 0.7 | 79 | 100 | 100 | 27.3 | 0 | 166 | 72 | 72 | 71 | -0.056 | 2.9 | 0 |
| 240 | 28.815 | 28.954 | 0.12 | 0.12 | 0.72 | 84 | 0.96 | 0.59 | 83 | 0.7 | 78 | 99 | 99 | 27.3 | 0 | 166 | 72 | 72 | 71 | -0.056 | 3 | 0 |
| 241 | 28.935 | 29.075 | 0.12 | 0.12 | 0.72 | 84 | 0.96 | 0.59 | 83 | 0.7 | 78 | 99 | 99 | 27.2 | -0.1 | 165 | 72 | 72 | 71 | -0.056 | 2.8 | 0 |
| 242 | 29.056 | 29.196 | 0.12 | 0.12 | 0.71 | 84 | 0.97 | 0.59 | 83 | 0.7 | 78 | 100 | 99 | 27.2 | 0 | 165 | 72 | 72 | 71 | -0.056 | 2.7 | 0 |
| 243 | 29.176 | 29.317 | 0.12 | 0.12 | 0.72 | 84 | 0.97 | 0.58 | 83 | 0.7 | 79 | 99 | 100 | 27.2 | 0 | 167 | 72 | 72 | 71 | -0.056 | 2.7 | 0 |
| 244 | 29.295 | 29.438 | 0.12 | 0.12 | 0.72 | 84 | 0.96 | 0.59 | 83 | 0.7 | 79 | 98 | 100 | 27.2 | 0 | 171 | 72 | 72 | 71 | -0.056 | 2.5 | 0 |
| 245 | 29.415 | 29.559 | 0.12 | 0.12 | 0.72 | 84 | 0.97 | 0.58 | 83 | 0.7 | 80 | 99 | 100 | 27.2 | 0 | 174 | 72 | 72 | 71 | -0.056 | 2.6 | 0 |
| 246 | 29.536 | 29.680 | 0.12 | 0.12 | 0.72 | 84 | 0.96 | 0.59 | 83 | 0.7 | 80 | 100 | 100 | 27.1 | -0.1 | 173 | 72 | 72 | 71 | -0.056 | 2.6 | 0 |
| 247 | 29.656 | 29.801 | 0.12 | 0.12 | 0.72 | 84 | 0.97 | 0.59 | 83 | 0.7 | 79 | 99 | 100 | 27.1 | 0 | 169 | 72 | 72 | 71 | -0.056 | 2.5 | 0 |
| 248 | 29.776 | 29.923 | 0.12 | 0.12 | 0.72 | 84 | 0.96 | 0.59 | 84 | 0.7 | 79 | 99 | 100 | 27.1 | 0 | 168 | 72 | 72 | 71 | -0.056 | 2.7 | 0 |
| 249 | 29.897 | 30.044 | 0.12 | 0.12 | 0.71 | 84 | 0.97 | 0.59 | 83 | 0.7 | 79 | 100 | 100 | 27.1 | 0 | 166 | 72 | 72 | 71 | -0.056 | 2.4 | 0 |
| 250 | 30.017 | 30.165 | 0.12 | 0.12 | 0.72 | 84 | 0.96 | 0.59 | 83 | 0.7 | 79 | 99 | 100 | 27.0 | -0.1 | 166 | 72 | 72 | 71 | -0.056 | 2.3 | 0 |
| 251 | 30.137 | 30.286 | 0.12 | 0.12 | 0.71 | 84 | 0.96 | 0.59 | 84 | 0.7 | 78 | 99 | 99 | 27.1 | 0.1 | 165 | 72 | 72 | 71 | -0.056 | 2.8 | 0 |
| 252 | 30.258 | 30.406 | 0.12 | 0.12 | 0.71 | 84 | 0.96 | 0.59 | 83 | 0.7 | 78 | 100 | 99 | 27.0 | -0.1 | 165 | 72 | 72 | 71 | -0.056 | 2.9 | 0 |
| 253 | 30.378 | 30.527 | 0.12 | 0.12 | 0.71 | 84 | 0.96 | 0.59 | 83 | 0.7 | 78 | 99 | 99 | 27.0 | 0 | 163 | 72 | 72 | 71 | -0.056 | 2.6 | 0 |
| 254 | 30.498 | 30.648 | 0.12 | 0.12 | 0.72 | 84 | 0.96 | 0.59 | 83 | 0.7 | 78 | 99 | 99 | 27.0 | 0 | 163 | 72 | 72 | 71 | -0.056 | 2.8 | 0 |
| 255 | 30.618 | 30.769 | 0.12 | 0.12 | 0.72 | 84 | 0.97 | 0.59 | 83 | 0.7 | 78 | 99 | 99 | 27.0 | 0 | 163 | 72 | 72 | 71 | -0.056 | 3 | 0 |
| 256 | 30.739 | 30.890 | 0.12 | 0.12 | 0.72 | 84 | 0.96 | 0.59 | 83 | 0.7 | 78 | 100 | 99 | 27.0 | 0 | 162 | 72 | 72 | 71 | -0.056 | 2.7 | 0 |
| 257 | 30.859 | 31.011 | 0.12 | 0.12 | 0.72 | 84 | 0.96 | 0.59 | 83 | 0.7 | 79 | 99 | 100 | 27.0 | 0 | 165 | 72 | 72 | 71 | -0.056 | 2.7 | 0 |
| 258 | 30.979 | 31.132 | 0.12 | 0.12 | 0.72 | 84 | 0.96 | 0.59 | 83 | 0.7 | 79 | 99 | 100 | 26.9 | -0.1 | 166 | 72 | 72 | 71 | -0.056 | 2.7 | 0 |

OMNI-Test Laboratories, Inc.

# Pellet Heater Test Data - ASTM E2779 / ASTM E2515

**Run:** 1

Manufacturer: Harman
Model: Accentra-2
Tracking No.: 2067
Project No.: 1035PS035E
Test Date: 12-May-15
Beginning Clock Time: 09:53
Meter Box Y Factor: 1.004 (1) 1.007 (2) 1.019 (Amb)

Barometric Pressure:

| Begin | Middle | End | Average |
|---|---|---|---|
| 29.95 | 29.95 | 29.95 | 29.95 "Hg |

High Burn End Time: 61
Medium Burn End Time: 181
Total Sampling Time: 365 min
Recording Interval: 1 min
Background Sample Volume: 49.182 cubic feet

OMNI Equipment Numbers: 335, 336, 185, 209, 23, 131, 343, 128, 132, 417, 419

PM Control Module: 335/336
Dilution Tunnel MW(dry): 29.00 lb/lb-mole
Dilution Tunnel MW(wet): 28.78 lb/lb-mole
Dilution Tunnel H2O: 2.00 percent
Dilution Tunnel Static: -0.625 "H2O
Tunnel Area: 0.1963 ft2
Pitot Tube Cp: 0.99

Tunnel Velocity: 13.15 ft/sec.
Intial Tunnel Flow: 142.4 scfm
Average Tunnel Flow: 146.5 scfm
Post-Test Leak Check (1): ).000@2.8 cfm@"Hg
Post-Test Leak Check (2): ).000@7.3 cfm@"Hg
Fuel Moisture (dry basis %): 5.05

Velocity Traverse Data

| | Pt.1 | Pt.2 | Pt.3 | Pt.4 | Pt.5 | Pt.6 | Pt.7 | Pt.8 | |
|---|---|---|---|---|---|---|---|---|---|
| Initial dP | 0.020 | 0.048 | 0.048 | 0.030 | 0.028 | 0.052 | 0.050 | 0.028 | "H2O |
| Temp: | 104 | 104 | 104 | 104 | 104 | 104 | 104 | 104 | oF |

| | Particulate Sampling Data | | | | | | | | | | | | | Fuel Weight, lb | | Temperature Data | | | Stack Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Elapsed Time | Gas Meter Cubic Feet (1) | Gas Meter Cubic Feet (2) | Sample Rate, cfm (1) | Sample Rate, cfm (2) | Orifice dH (1) | Meter oF (1) | Meter Vac. In. Hg. (1) | Orifice dH (2) | Meter oF (2) | Meter Vac. In. Hg. (2) | Dilution Tunnel Temp. | Pro. Rate (10%) (1) | Pro. Rate (10%) (2) | Scale Reading | Weight Change | Stack | Filter (1) | Filter (2) | Ambient | Draft In. H2O | $CO_2$ (%) | CO (%) |
| 259 | 31.099 | 31.253 | 0.12 | 0.12 | 0.72 | 84 | 0.97 | 0.59 | 83 | 0.7 | 78 | 99 | 99 | 26.9 | 0 | 164 | 72 | 72 | 71 | -0.056 | 2.4 | 0 |
| 260 | 31.219 | 31.374 | 0.12 | 0.12 | 0.72 | 84 | 0.96 | 0.59 | 83 | 0.7 | 79 | 99 | 100 | 26.9 | 0 | 165 | 72 | 72 | 71 | -0.056 | 2.6 | 0 |
| 261 | 31.339 | 31.495 | 0.12 | 0.12 | 0.72 | 84 | 0.96 | 0.59 | 83 | 0.7 | 79 | 99 | 100 | 26.9 | 0 | 170 | 72 | 72 | 71 | -0.056 | 2.8 | 0 |
| 262 | 31.459 | 31.616 | 0.12 | 0.12 | 0.72 | 84 | 0.96 | 0.59 | 83 | 0.7 | 79 | 99 | 100 | 26.8 | -0.1 | 169 | 72 | 72 | 71 | -0.056 | 2.4 | 0 |
| 263 | 31.579 | 31.737 | 0.12 | 0.12 | 0.72 | 84 | 0.97 | 0.59 | 84 | 0.7 | 79 | 99 | 99 | 26.8 | 0 | 166 | 72 | 72 | 71 | -0.056 | 2.7 | 0 |
| 264 | 31.700 | 31.859 | 0.12 | 0.12 | 0.72 | 84 | 0.96 | 0.59 | 84 | 0.7 | 78 | 100 | 100 | 26.8 | 0 | 164 | 72 | 72 | 71 | -0.056 | 2.3 | 0 |
| 265 | 31.820 | 31.980 | 0.12 | 0.12 | 0.71 | 84 | 0.97 | 0.58 | 84 | 0.7 | 78 | 99 | 99 | 26.8 | 0 | 162 | 72 | 72 | 71 | -0.056 | 2.3 | 0 |
| 266 | 31.941 | 32.101 | 0.12 | 0.12 | 0.72 | 84 | 0.97 | 0.59 | 83 | 0.7 | 78 | 100 | 99 | 26.8 | 0 | 162 | 72 | 72 | 71 | -0.056 | 2.7 | 0 |
| 267 | 32.061 | 32.222 | 0.12 | 0.12 | 0.71 | 84 | 0.97 | 0.59 | 84 | 0.7 | 78 | 99 | 99 | 26.8 | 0 | 161 | 72 | 72 | 71 | -0.056 | 2.6 | 0 |
| 268 | 32.182 | 32.343 | 0.12 | 0.12 | 0.71 | 84 | 0.96 | 0.59 | 84 | 0.7 | 78 | 100 | 99 | 26.8 | 0 | 160 | 72 | 72 | 71 | -0.056 | 2.2 | 0 |
| 269 | 32.302 | 32.464 | 0.12 | 0.12 | 0.72 | 84 | 0.97 | 0.59 | 84 | 0.7 | 78 | 99 | 99 | 26.8 | 0 | 160 | 72 | 72 | 71 | -0.056 | 2.7 | 0 |
| 270 | 32.422 | 32.586 | 0.12 | 0.12 | 0.72 | 84 | 0.97 | 0.59 | 83 | 0.7 | 78 | 99 | 100 | 26.7 | -0.1 | 162 | 72 | 72 | 71 | -0.056 | 2.6 | 0 |
| 271 | 32.543 | 32.707 | 0.12 | 0.12 | 0.72 | 84 | 0.96 | 0.59 | 83 | 0.7 | 78 | 100 | 99 | 26.7 | 0 | 164 | 72 | 72 | 71 | -0.056 | 2.6 | 0 |
| 272 | 32.663 | 32.828 | 0.12 | 0.12 | 0.71 | 84 | 0.97 | 0.59 | 83 | 0.7 | 78 | 99 | 99 | 26.7 | 0 | 161 | 72 | 72 | 71 | -0.056 | 2.3 | 0 |
| 273 | 32.783 | 32.948 | 0.12 | 0.12 | 0.72 | 84 | 0.96 | 0.59 | 83 | 0.7 | 78 | 99 | 99 | 26.7 | 0 | 160 | 72 | 72 | 70 | -0.056 | 2.3 | 0 |
| 274 | 32.903 | 33.069 | 0.12 | 0.12 | 0.72 | 84 | 0.97 | 0.59 | 83 | 0.7 | 78 | 99 | 99 | 26.7 | 0 | 160 | 72 | 72 | 70 | -0.056 | 2.6 | 0 |
| 275 | 33.023 | 33.190 | 0.12 | 0.12 | 0.72 | 84 | 0.96 | 0.59 | 83 | 0.7 | 78 | 99 | 99 | 26.7 | 0 | 160 | 72 | 72 | 71 | -0.057 | 2.7 | 0 |
| 276 | 33.143 | 33.311 | 0.12 | 0.12 | 0.72 | 84 | 0.96 | 0.59 | 83 | 0.7 | 78 | 99 | 99 | 26.6 | -0.1 | 160 | 72 | 72 | 71 | -0.056 | 2.8 | 0 |
| 277 | 33.263 | 33.432 | 0.12 | 0.12 | 0.72 | 84 | 0.96 | 0.59 | 84 | 0.7 | 78 | 99 | 99 | 26.6 | 0 | 160 | 72 | 72 | 71 | -0.056 | 2.3 | 0 |
| 278 | 33.383 | 33.553 | 0.12 | 0.12 | 0.72 | 84 | 0.97 | 0.59 | 83 | 0.7 | 79 | 99 | 100 | 26.6 | 0 | 167 | 72 | 72 | 71 | -0.056 | 2.7 | 0 |
| 279 | 33.504 | 33.674 | 0.12 | 0.12 | 0.72 | 84 | 0.97 | 0.59 | 83 | 0.7 | 79 | 100 | 100 | 26.6 | 0 | 166 | 72 | 72 | 71 | -0.057 | 2.7 | 0 |
| 280 | 33.624 | 33.795 | 0.12 | 0.12 | 0.72 | 84 | 0.96 | 0.58 | 83 | 0.7 | 79 | 99 | 100 | 26.5 | -0.1 | 166 | 72 | 72 | 71 | -0.056 | 2.2 | 0 |
| 281 | 33.745 | 33.917 | 0.12 | 0.12 | 0.72 | 84 | 0.96 | 0.59 | 83 | 0.7 | 79 | 100 | 100 | 26.5 | 0 | 167 | 72 | 72 | 71 | -0.056 | 2.9 | 0 |
| 282 | 33.865 | 34.038 | 0.12 | 0.12 | 0.71 | 84 | 0.97 | 0.59 | 83 | 0.7 | 78 | 99 | 99 | 26.5 | 0 | 164 | 72 | 72 | 70 | -0.056 | 2.3 | 0 |
| 283 | 33.985 | 34.159 | 0.12 | 0.12 | 0.71 | 84 | 0.96 | 0.59 | 83 | 0.7 | 79 | 99 | 100 | 26.5 | 0 | 165 | 72 | 72 | 71 | -0.056 | 2.2 | 0 |
| 284 | 34.106 | 34.280 | 0.12 | 0.12 | 0.72 | 84 | 0.96 | 0.59 | 83 | 0.7 | 79 | 100 | 100 | 26.5 | 0 | 165 | 72 | 72 | 71 | -0.056 | 2.6 | 0 |
| 285 | 34.226 | 34.401 | 0.12 | 0.12 | 0.72 | 84 | 0.97 | 0.58 | 84 | 0.7 | 79 | 99 | 99 | 26.5 | 0 | 166 | 72 | 72 | 71 | -0.056 | 2.4 | 0 |
| 286 | 34.346 | 34.522 | 0.12 | 0.12 | 0.72 | 84 | 0.96 | 0.58 | 84 | 0.7 | 79 | 99 | 99 | 26.5 | 0 | 166 | 72 | 72 | 70 | -0.056 | 2.4 | 0 |
| 287 | 34.466 | 34.643 | 0.12 | 0.12 | 0.71 | 84 | 0.97 | 0.59 | 83 | 0.7 | 78 | 99 | 99 | 26.4 | -0.1 | 165 | 72 | 72 | 71 | -0.056 | 2.5 | 0 |
| 288 | 34.586 | 34.764 | 0.12 | 0.12 | 0.72 | 84 | 0.97 | 0.59 | 83 | 0.7 | 79 | 99 | 100 | 26.4 | 0 | 167 | 72 | 72 | 71 | -0.056 | 2.2 | 0 |
| 289 | 34.706 | 34.885 | 0.12 | 0.12 | 0.72 | 84 | 0.97 | 0.59 | 84 | 0.7 | 79 | 99 | 99 | 26.4 | 0 | 170 | 72 | 72 | 70 | -0.056 | 2.3 | 0 |
| 290 | 34.826 | 35.007 | 0.12 | 0.12 | 0.72 | 84 | 0.96 | 0.59 | 84 | 0.7 | 79 | 99 | 100 | 26.4 | 0 | 171 | 72 | 72 | 70 | -0.056 | 2.4 | 0 |
| 291 | 34.946 | 35.128 | 0.12 | 0.12 | 0.72 | 84 | 0.96 | 0.59 | 83 | 0.7 | 79 | 99 | 100 | 26.4 | 0 | 169 | 72 | 72 | 70 | -0.056 | 2.3 | 0 |
| 292 | 35.067 | 35.249 | 0.12 | 0.12 | 0.72 | 84 | 0.97 | 0.59 | 83 | 0.7 | 79 | 100 | 100 | 26.4 | 0 | 167 | 72 | 72 | 70 | -0.056 | 2.1 | 0 |
| 293 | 35.187 | 35.370 | 0.12 | 0.12 | 0.72 | 84 | 0.96 | 0.59 | 83 | 0.7 | 79 | 99 | 100 | 26.3 | -0.1 | 166 | 72 | 72 | 70 | -0.056 | 2.4 | 0 |
| 294 | 35.307 | 35.490 | 0.12 | 0.12 | 0.71 | 84 | 0.97 | 0.59 | 83 | 0.7 | 79 | 99 | 99 | 26.3 | 0 | 166 | 71 | 72 | 70 | -0.057 | 2.3 | 0 |
| 295 | 35.428 | 35.611 | 0.12 | 0.12 | 0.71 | 84 | 0.97 | 0.59 | 83 | 0.7 | 79 | 100 | 100 | 26.3 | 0 | 168 | 71 | 72 | 70 | -0.056 | 2.3 | 0 |

OMNI-Test Laboratories, Inc.

# Pellet Heater Test Data - ASTM E2779 / ASTM E2515

**Run:** 1

Manufacturer: Harman
Model: Accentra-2
Tracking No.: 2067
Project No.: 1035PS035E
Test Date: 12-May-15
Beginning Clock Time: 09:53
Meter Box Y Factor: 1.004 (1) 1.007 (2) 1.019 (Amb)

Barometric Pressure:

| Begin | Middle | End | Average |
|---|---|---|---|
| 29.95 | 29.95 | 29.95 | 29.95 "Hg |

High Burn End Time: 61
Medium Burn End Time: 181
Total Sampling Time: 365 min
Recording Interval: 1 min
Background Sample Volume: 49.182 cubic feet

OMNI Equipment Numbers: 335, 336, 185, 209, 23, 131, 343, 128, 132, 417, 419

PM Control Module: 335/336
Dilution Tunnel MW(dry): 29.00 lb/lb-mole
Dilution Tunnel MW(wet): 28.78 lb/lb-mole
Dilution Tunnel H2O: 2.00 percent
Dilution Tunnel Static: -0.625 "H2O
Tunnel Area: 0.1963 ft2
Pitot Tube Cp: 0.99

Tunnel Velocity: 13.15 ft/sec.
Intial Tunnel Flow: 142.4 scfm
Average Tunnel Flow: 146.5 scfm
Post-Test Leak Check (1): ).000@2.8 cfm@"Hg
Post-Test Leak Check (2): ).000@7.3 cfm@"Hg
Fuel Moisture (dry basis %): 5.05

Velocity Traverse Data

| | Pt.1 | Pt.2 | Pt.3 | Pt.4 | Pt.5 | Pt.6 | Pt.7 | Pt.8 | |
|---|---|---|---|---|---|---|---|---|---|
| Initial dP | 0.020 | 0.048 | 0.048 | 0.030 | 0.028 | 0.052 | 0.050 | 0.028 | "H2O |
| Temp: | 104 | 104 | 104 | 104 | 104 | 104 | 104 | 104 | oF |

| | Particulate Sampling Data | | | | | | | | | | | | | Fuel Weight, lb | | Temperature Data | | | Stack Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Elapsed Time | Gas Meter Cubic Feet (1) | Gas Meter Cubic Feet (2) | Sample Rate, cfm (1) | Sample Rate, cfm (2) | Orifice dH (1) | Meter oF (1) | Meter Vac. In. Hg. (1) | Orifice dH (2) | Meter oF (2) | Meter Vac. In. Hg. (2) | Dilution Tunnel Temp. | Pro. Rate (10%) (1) | Pro. Rate (10%) (2) | Scale Reading | Weight Change | Stack | Filter (1) | Filter (2) | Ambient | Draft In. H2O | $CO_2$ (%) | CO (%) |
| 296 | 35.548 | 35.732 | 0.12 | 0.12 | 0.72 | 84 | 0.96 | 0.59 | 83 | 0.7 | 79 | 99 | 100 | 26.3 | 0 | 169 | 71 | 72 | 71 | -0.056 | 2.4 | 0 |
| 297 | 35.668 | 35.853 | 0.12 | 0.12 | 0.71 | 84 | 0.97 | 0.59 | 83 | 0.7 | 79 | 99 | 100 | 26.2 | -0.1 | 170 | 71 | 72 | 71 | -0.056 | 2.1 | 0 |
| 298 | 35.788 | 35.974 | 0.12 | 0.12 | 0.71 | 84 | 0.97 | 0.59 | 83 | 0.7 | 79 | 99 | 100 | 26.2 | 0 | 170 | 71 | 72 | 71 | -0.056 | 2.7 | 0 |
| 299 | 35.909 | 36.095 | 0.12 | 0.12 | 0.72 | 84 | 0.96 | 0.59 | 83 | 0.7 | 79 | 100 | 100 | 26.2 | 0 | 170 | 71 | 72 | 71 | -0.057 | 2.3 | 0 |
| 300 | 36.029 | 36.216 | 0.12 | 0.12 | 0.72 | 84 | 0.96 | 0.59 | 83 | 0.7 | 79 | 99 | 100 | 26.2 | 0 | 168 | 71 | 72 | 70 | -0.056 | 2.3 | 0 |
| 301 | 36.149 | 36.337 | 0.12 | 0.12 | 0.72 | 84 | 0.96 | 0.59 | 83 | 0.7 | 79 | 99 | 100 | 26.2 | 0 | 167 | 71 | 72 | 70 | -0.057 | 2.2 | 0 |
| 302 | 36.270 | 36.458 | 0.12 | 0.12 | 0.72 | 84 | 0.97 | 0.59 | 83 | 0.7 | 79 | 100 | 100 | 26.2 | 0 | 168 | 71 | 72 | 70 | -0.057 | 2.4 | 0 |
| 303 | 36.390 | 36.579 | 0.12 | 0.12 | 0.71 | 84 | 0.96 | 0.59 | 83 | 0.7 | 79 | 99 | 100 | 26.1 | -0.1 | 168 | 71 | 72 | 70 | -0.057 | 2.5 | 0 |
| 304 | 36.509 | 36.700 | 0.12 | 0.12 | 0.72 | 84 | 0.97 | 0.59 | 83 | 0.7 | 79 | 98 | 100 | 26.1 | 0 | 167 | 71 | 72 | 70 | -0.056 | 2.1 | 0 |
| 305 | 36.629 | 36.821 | 0.12 | 0.12 | 0.72 | 84 | 0.97 | 0.58 | 83 | 0.7 | 79 | 99 | 100 | 26.1 | 0 | 166 | 71 | 72 | 70 | -0.056 | 2.3 | 0 |
| 306 | 36.749 | 36.942 | 0.12 | 0.12 | 0.72 | 84 | 0.96 | 0.58 | 83 | 0.7 | 79 | 99 | 100 | 26.1 | 0 | 169 | 71 | 72 | 70 | -0.056 | 2.6 | 0 |
| 307 | 36.869 | 37.064 | 0.12 | 0.12 | 0.72 | 84 | 0.97 | 0.58 | 83 | 0.7 | 79 | 99 | 100 | 26.1 | 0 | 166 | 71 | 72 | 71 | -0.057 | 1.9 | 0 |
| 308 | 36.990 | 37.185 | 0.12 | 0.12 | 0.72 | 84 | 0.97 | 0.58 | 83 | 0.7 | 79 | 100 | 100 | 26.1 | 0 | 166 | 71 | 72 | 71 | -0.057 | 2.5 | 0 |
| 309 | 37.110 | 37.306 | 0.12 | 0.12 | 0.72 | 84 | 0.97 | 0.59 | 83 | 0.7 | 79 | 99 | 100 | 26.1 | 0 | 167 | 72 | 72 | 70 | -0.057 | 2.3 | 0 |
| 310 | 37.230 | 37.427 | 0.12 | 0.12 | 0.71 | 84 | 0.96 | 0.59 | 83 | 0.7 | 79 | 99 | 100 | 26.0 | -0.1 | 165 | 71 | 72 | 70 | -0.057 | 1.9 | 0 |
| 311 | 37.350 | 37.548 | 0.12 | 0.12 | 0.72 | 84 | 0.97 | 0.59 | 83 | 0.7 | 79 | 99 | 100 | 26.0 | 0 | 166 | 71 | 72 | 70 | -0.057 | 2.5 | 0 |
| 312 | 37.470 | 37.669 | 0.12 | 0.12 | 0.72 | 84 | 0.97 | 0.59 | 83 | 0.7 | 79 | 99 | 100 | 26.0 | 0 | 168 | 72 | 72 | 71 | -0.057 | 2.2 | 0 |
| 313 | 37.591 | 37.790 | 0.12 | 0.12 | 0.72 | 84 | 0.97 | 0.59 | 83 | 0.7 | 79 | 100 | 100 | 26.0 | 0 | 169 | 72 | 72 | 70 | -0.057 | 2.3 | 0 |
| 314 | 37.711 | 37.911 | 0.12 | 0.12 | 0.71 | 84 | 0.97 | 0.59 | 83 | 0.7 | 79 | 99 | 100 | 26.0 | 0 | 166 | 72 | 72 | 71 | -0.057 | 2.3 | 0 |
| 315 | 37.831 | 38.032 | 0.12 | 0.12 | 0.71 | 84 | 0.96 | 0.59 | 83 | 0.7 | 78 | 99 | 99 | 25.9 | -0.1 | 163 | 72 | 72 | 71 | -0.057 | 1.8 | 0 |
| 316 | 37.951 | 38.152 | 0.12 | 0.12 | 0.72 | 84 | 0.97 | 0.59 | 83 | 0.7 | 78 | 99 | 99 | 25.9 | 0 | 161 | 72 | 72 | 71 | -0.057 | 2.3 | 0 |
| 317 | 38.072 | 38.273 | 0.12 | 0.12 | 0.72 | 84 | 0.97 | 0.59 | 83 | 0.7 | 78 | 100 | 99 | 25.9 | 0 | 163 | 71 | 72 | 71 | -0.057 | 2.4 | 0 |
| 318 | 38.192 | 38.394 | 0.12 | 0.12 | 0.71 | 84 | 0.96 | 0.59 | 83 | 0.7 | 78 | 99 | 99 | 25.9 | 0 | 162 | 72 | 72 | 71 | -0.056 | 1.9 | 0 |
| 319 | 38.312 | 38.515 | 0.12 | 0.12 | 0.71 | 84 | 0.97 | 0.59 | 83 | 0.7 | 78 | 99 | 99 | 25.9 | 0 | 160 | 71 | 72 | 71 | -0.057 | 2.3 | 0 |
| 320 | 38.432 | 38.636 | 0.12 | 0.12 | 0.72 | 84 | 0.97 | 0.59 | 83 | 0.7 | 78 | 99 | 99 | 25.8 | -0.1 | 162 | 71 | 72 | 71 | -0.057 | 1.9 | 0 |
| 321 | 38.552 | 38.757 | 0.12 | 0.12 | 0.72 | 84 | 0.96 | 0.59 | 83 | 0.7 | 78 | 99 | 99 | 25.8 | 0 | 162 | 72 | 72 | 70 | -0.057 | 2.2 | 0 |
| 322 | 38.671 | 38.878 | 0.12 | 0.12 | 0.71 | 84 | 0.97 | 0.59 | 83 | 0.7 | 78 | 98 | 99 | 25.8 | 0 | 162 | 72 | 72 | 71 | -0.057 | 2.1 | 0 |
| 323 | 38.791 | 38.999 | 0.12 | 0.12 | 0.71 | 84 | 0.97 | 0.59 | 83 | 0.7 | 79 | 99 | 100 | 25.8 | 0 | 164 | 72 | 72 | 71 | -0.057 | 1.9 | 0 |
| 324 | 38.912 | 39.120 | 0.12 | 0.12 | 0.72 | 84 | 0.96 | 0.59 | 83 | 0.7 | 78 | 100 | 99 | 25.8 | 0 | 164 | 72 | 72 | 71 | -0.057 | 2.6 | 0 |
| 325 | 39.032 | 39.241 | 0.12 | 0.12 | 0.72 | 84 | 0.97 | 0.58 | 83 | 0.7 | 78 | 99 | 99 | 25.8 | 0 | 163 | 72 | 72 | 70 | -0.057 | 1.9 | 0 |
| 326 | 39.152 | 39.362 | 0.12 | 0.12 | 0.71 | 84 | 0.97 | 0.59 | 83 | 0.7 | 79 | 99 | 100 | 25.7 | -0.1 | 165 | 72 | 72 | 71 | -0.057 | 2 | 0 |
| 327 | 39.272 | 39.483 | 0.12 | 0.12 | 0.71 | 84 | 0.96 | 0.59 | 83 | 0.7 | 78 | 99 | 99 | 25.7 | 0 | 164 | 72 | 72 | 70 | -0.057 | 2.5 | 0 |
| 328 | 39.392 | 39.604 | 0.12 | 0.12 | 0.72 | 84 | 0.97 | 0.58 | 83 | 0.7 | 78 | 99 | 99 | 25.7 | 0 | 163 | 72 | 72 | 70 | -0.057 | 2 | 0 |
| 329 | 39.512 | 39.725 | 0.12 | 0.12 | 0.71 | 84 | 0.97 | 0.58 | 83 | 0.7 | 78 | 99 | 99 | 25.7 | 0 | 163 | 72 | 72 | 70 | -0.057 | 2.1 | 0 |
| 330 | 39.632 | 39.846 | 0.12 | 0.12 | 0.71 | 84 | 0.97 | 0.59 | 83 | 0.7 | 78 | 99 | 99 | 25.7 | 0 | 162 | 72 | 72 | 71 | -0.056 | 1.9 | 0 |
| 331 | 39.753 | 39.967 | 0.12 | 0.12 | 0.71 | 84 | 0.97 | 0.59 | 83 | 0.7 | 78 | 100 | 99 | 25.7 | 0 | 161 | 72 | 72 | 71 | -0.057 | 1.8 | 0 |
| 332 | 39.873 | 40.088 | 0.12 | 0.12 | 0.71 | 84 | 0.96 | 0.59 | 83 | 0.7 | 78 | 99 | 99 | 25.7 | 0 | 161 | 72 | 72 | 70 | -0.057 | 2.1 | 0 |

OMNI-Test Laboratories, Inc.

# Pellet Heater Test Data - ASTM E2779 / ASTM E2515

**Run:** 1

Manufacturer: Harman
Model: Accentra-2
Tracking No.: 2067
Project No.: 1035PS035E
Test Date: 12-May-15
Beginning Clock Time: 09:53
Meter Box Y Factor: 1.004 (1) 1.007 (2) 1.019 (Amb)

Barometric Pressure:

| Begin | Middle | End | Average |
|---|---|---|---|
| 29.95 | 29.95 | 29.95 | 29.95 "Hg |

High Burn End Time: 61
Medium Burn End Time: 181
Total Sampling Time: 365 min
Recording Interval: 1 min
Background Sample Volume: 49.182 cubic feet

OMNI Equipment Numbers: 335, 336, 185, 209, 23, 131, 343, 128, 132, 417, 419

PM Control Module: 335/336
Dilution Tunnel MW(dry): 29.00 lb/lb-mole
Dilution Tunnel MW(wet): 28.78 lb/lb-mole
Dilution Tunnel H2O: 2.00 percent
Dilution Tunnel Static: -0.625 "H2O
Tunnel Area: 0.1963 ft2
Pitot Tube Cp: 0.99

Tunnel Velocity: 13.15 ft/sec.
Intial Tunnel Flow: 142.4 scfm
Average Tunnel Flow: 146.5 scfm
Post-Test Leak Check (1): .000@2.8 cfm@"Hg
Post-Test Leak Check (2): .000@7.3 cfm@"Hg
Fuel Moisture (dry basis %): 5.05

Velocity Traverse Data

| | Pt.1 | Pt.2 | Pt.3 | Pt.4 | Pt.5 | Pt.6 | Pt.7 | Pt.8 | |
|---|---|---|---|---|---|---|---|---|---|
| Initial dP | 0.020 | 0.048 | 0.048 | 0.030 | 0.028 | 0.052 | 0.050 | 0.028 | "H2O |
| Temp: | 104 | 104 | 104 | 104 | 104 | 104 | 104 | 104 | oF |

| | Particulate Sampling Data | | | | | | | | | | | | | Fuel Weight, lb | | Temperature Data | | | Stack Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Elapsed Time | Gas Meter Cubic Feet (1) | Gas Meter Cubic Feet (2) | Sample Rate, cfm (1) | Sample Rate, cfm (2) | Orifice dH (1) | Meter oF (1) | Meter Vac. In. Hg. (1) | Orifice dH (2) | Meter oF (2) | Meter Vac. In. Hg. (2) | Dilution Tunnel Temp. | Pro. Rate (10%) (1) | Pro. Rate (10%) (2) | Scale Reading | Weight Change | Stack | Filter (1) | Filter (2) | Ambient | Draft In. H2O | $CO_2$ (%) | CO (%) |
| 333 | 39.993 | 40.210 | 0.12 | 0.12 | 0.72 | 84 | 0.97 | 0.58 | 83 | 0.7 | 78 | 99 | 100 | 25.7 | 0 | 160 | 72 | 72 | 70 | -0.057 | 1.9 | 0 |
| 334 | 40.113 | 40.331 | 0.12 | 0.12 | 0.72 | 84 | 0.97 | 0.59 | 83 | 0.7 | 78 | 99 | 99 | 25.6 | -0.1 | 160 | 72 | 72 | 71 | -0.057 | 2 | 0 |
| 335 | 40.233 | 40.452 | 0.12 | 0.12 | 0.71 | 84 | 0.97 | 0.59 | 83 | 0.7 | 78 | 99 | 99 | 25.6 | 0 | 160 | 72 | 72 | 70 | -0.057 | 2 | 0 |
| 336 | 40.353 | 40.573 | 0.12 | 0.12 | 0.72 | 84 | 0.96 | 0.59 | 83 | 0.7 | 78 | 99 | 99 | 25.6 | 0 | 160 | 72 | 72 | 71 | -0.057 | 1.7 | 0 |
| 337 | 40.473 | 40.693 | 0.12 | 0.12 | 0.72 | 84 | 0.96 | 0.59 | 83 | 0.7 | 79 | 99 | 99 | 25.6 | 0 | 163 | 72 | 72 | 71 | -0.057 | 2.3 | 0 |
| 338 | 40.593 | 40.814 | 0.12 | 0.12 | 0.72 | 84 | 0.97 | 0.59 | 83 | 0.7 | 79 | 99 | 100 | 25.6 | 0 | 164 | 72 | 72 | 71 | -0.057 | 1.8 | 0 |
| 339 | 40.713 | 40.935 | 0.12 | 0.12 | 0.71 | 84 | 0.97 | 0.59 | 83 | 0.7 | 79 | 99 | 100 | 25.6 | 0 | 165 | 72 | 72 | 71 | -0.057 | 2.2 | 0 |
| 340 | 40.833 | 41.056 | 0.12 | 0.12 | 0.72 | 84 | 0.97 | 0.59 | 83 | 0.7 | 79 | 99 | 100 | 25.5 | -0.1 | 165 | 72 | 72 | 71 | -0.057 | 1.6 | 0 |
| 341 | 40.953 | 41.177 | 0.12 | 0.12 | 0.72 | 84 | 0.96 | 0.59 | 83 | 0.7 | 79 | 99 | 100 | 25.5 | 0 | 165 | 72 | 72 | 71 | -0.057 | 2.1 | 0 |
| 342 | 41.073 | 41.298 | 0.12 | 0.12 | 0.72 | 84 | 0.97 | 0.59 | 83 | 0.7 | 78 | 99 | 99 | 25.5 | 0 | 162 | 72 | 72 | 71 | -0.057 | 1.7 | 0 |
| 343 | 41.193 | 41.419 | 0.12 | 0.12 | 0.72 | 84 | 0.97 | 0.59 | 83 | 0.7 | 78 | 99 | 99 | 25.5 | 0 | 161 | 72 | 72 | 71 | -0.057 | 1.9 | 0 |
| 344 | 41.313 | 41.539 | 0.12 | 0.12 | 0.71 | 84 | 0.97 | 0.59 | 83 | 0.7 | 79 | 99 | 99 | 25.5 | 0 | 163 | 72 | 72 | 71 | -0.057 | 2.5 | 0 |
| 345 | 41.433 | 41.660 | 0.12 | 0.12 | 0.72 | 84 | 0.97 | 0.59 | 83 | 0.7 | 79 | 99 | 100 | 25.5 | 0 | 163 | 72 | 72 | 71 | -0.057 | 1.9 | 0 |
| 346 | 41.553 | 41.781 | 0.12 | 0.12 | 0.72 | 84 | 0.97 | 0.59 | 83 | 0.7 | 78 | 99 | 99 | 25.5 | 0 | 162 | 72 | 72 | 71 | -0.057 | 1.9 | 0 |
| 347 | 41.673 | 41.902 | 0.12 | 0.12 | 0.71 | 84 | 0.97 | 0.58 | 84 | 0.7 | 78 | 99 | 99 | 25.4 | -0.1 | 161 | 72 | 72 | 71 | -0.057 | 2 | 0 |
| 348 | 41.794 | 42.023 | 0.12 | 0.12 | 0.71 | 84 | 0.97 | 0.59 | 83 | 0.7 | 78 | 100 | 99 | 25.4 | 0 | 161 | 72 | 72 | 71 | -0.057 | 2 | 0 |
| 349 | 41.914 | 42.144 | 0.12 | 0.12 | 0.71 | 84 | 0.96 | 0.59 | 83 | 0.7 | 78 | 99 | 99 | 25.4 | 0 | 161 | 72 | 72 | 71 | -0.056 | 2 | 0 |
| 350 | 42.034 | 42.265 | 0.12 | 0.12 | 0.71 | 84 | 0.96 | 0.58 | 83 | 0.7 | 78 | 99 | 99 | 25.3 | -0.1 | 161 | 72 | 72 | 71 | -0.057 | 2.4 | 0 |
| 351 | 42.154 | 42.386 | 0.12 | 0.12 | 0.72 | 84 | 0.97 | 0.58 | 83 | 0.7 | 78 | 99 | 99 | 25.4 | 0.1 | 160 | 71 | 72 | 71 | -0.057 | 1.9 | 0 |
| 352 | 42.275 | 42.507 | 0.12 | 0.12 | 0.71 | 84 | 0.98 | 0.58 | 84 | 0.7 | 77 | 100 | 99 | 25.4 | 0 | 157 | 71 | 72 | 71 | -0.057 | 2 | 0 |
| 353 | 42.395 | 42.628 | 0.12 | 0.12 | 0.72 | 84 | 0.96 | 0.58 | 83 | 0.7 | 77 | 99 | 99 | 25.4 | 0 | 156 | 71 | 72 | 71 | -0.057 | 2.4 | 0 |
| 354 | 42.514 | 42.749 | 0.12 | 0.12 | 0.72 | 84 | 0.98 | 0.59 | 83 | 0.7 | 77 | 98 | 99 | 25.3 | -0.1 | 157 | 71 | 72 | 71 | -0.057 | 2.1 | 0 |
| 355 | 42.634 | 42.870 | 0.12 | 0.12 | 0.72 | 84 | 0.97 | 0.59 | 83 | 0.7 | 78 | 99 | 99 | 25.3 | 0 | 159 | 71 | 72 | 71 | -0.057 | 1.9 | 0 |
| 356 | 42.754 | 42.991 | 0.12 | 0.12 | 0.72 | 84 | 0.97 | 0.59 | 83 | 0.7 | 78 | 99 | 99 | 25.3 | 0 | 162 | 71 | 72 | 71 | -0.057 | 2.2 | 0 |
| 357 | 42.874 | 43.112 | 0.12 | 0.12 | 0.72 | 84 | 0.97 | 0.59 | 83 | 0.7 | 78 | 99 | 99 | 25.3 | 0 | 161 | 71 | 72 | 71 | -0.057 | 2.2 | 0 |
| 358 | 42.994 | 43.233 | 0.12 | 0.12 | 0.72 | 84 | 0.97 | 0.58 | 83 | 0.7 | 77 | 99 | 99 | 25.3 | 0 | 158 | 71 | 72 | 71 | -0.057 | 2 | 0 |
| 359 | 43.114 | 43.354 | 0.12 | 0.12 | 0.72 | 84 | 0.97 | 0.59 | 83 | 0.7 | 78 | 99 | 99 | 25.2 | -0.1 | 159 | 71 | 72 | 71 | -0.057 | 1.9 | 0 |
| 360 | 43.234 | 43.475 | 0.12 | 0.12 | 0.71 | 84 | 0.97 | 0.59 | 83 | 0.7 | 77 | 99 | 99 | 25.2 | 0 | 159 | 71 | 72 | 71 | -0.057 | 2.3 | 0 |
| 361 | 43.355 | 43.595 | 0.12 | 0.12 | 0.72 | 84 | 0.97 | 0.59 | 83 | 0.7 | 78 | 100 | 99 | 25.2 | 0 | 159 | 71 | 72 | 71 | -0.057 | 1.8 | 0 |
| 362 | 43.475 | 43.716 | 0.12 | 0.12 | 0.72 | 84 | 0.98 | 0.59 | 83 | 0.7 | 78 | 99 | 99 | 25.2 | 0 | 160 | 71 | 72 | 71 | -0.057 | 1.7 | 0 |
| 363 | 43.595 | 43.836 | 0.12 | 0.12 | 0.72 | 84 | 0.97 | 0.59 | 83 | 0.7 | 77 | 99 | 99 | 25.2 | 0 | 159 | 71 | 72 | 71 | -0.057 | 2 | 0 |
| 364 | 43.715 | 43.957 | 0.12 | 0.12 | 0.71 | 84 | 0.97 | 0.59 | 83 | 0.7 | 77 | 99 | 99 | 25.2 | 0 | 158 | 71 | 72 | 71 | -0.056 | 1.6 | 0 |
| 365 | 43.835 | 44.078 | 0.12 | 0.12 | 0.71 | 84 | 0.97 | 0.59 | 83 | 0.7 | 77 | 99 | 99 | 25.1 | -0.1 | 158 | 71 | 72 | 70 | -0.057 | 1.8 | 0 |
| Avg/Tot | 43.835 | 44.078 | 0.12 | 0.12 | 0.72 | 82 | | 0.59 | 82 | | 87 | 100 | 100 | | | | 72 | 73 | | -0.056 | | |

OMNI-Test Laboratories, Inc.

# Pellet Heater Test Data - ASTM E2779 / ASTM E2515

**Run: 1**

Manufacturer: Harman
Model: Accentra-2
Tracking No.: 2067
Project No.: 1035PS035E
Test Date: 12-May-15
Beginning Clock Time: 09:53
Meter Box Y Factor: 1.004 (1) 1.007 (2) 1.019 (Amb)

Barometric Pressure:

| Begin | Middle | End | Average |
|---|---|---|---|
| 29.95 | 29.95 | 29.95 | 29.95 "Hg |

High Burn End Time: 61
Medium Burn End Time: 181
Total Sampling Time: 365 min
Recording Interval: 1 min
Background Sample Volume: 49.182 cubic feet

PM Control Module: 335/336
Dilution Tunnel MW(dry): 29.00 lb/lb-mole
Dilution Tunnel MW(wet): 28.56 lb/lb-mole
Dilution Tunnel H2O: 4.00 percent
Dilution Tunnel Static: -0.625 "H2O
Tunnel Area: 0.1963 ft2
Pitot Tube Cp: 0.99

Tunnel Velocity: 13.20 ft/sec.
Intial Tunnel Flow: 140.0 scfm
Average Tunnel Flow: 144.0 scfm
Post-Test Leak Check (1): 0.000@2.8 cfm@"Hg
Post-Test Leak Check (2): 0.000@7.3 cfm@"Hg
Fuel Moisture (dry basis %): 5.05

OMNI Equipment Numbers: 335, 336, 185, 209, 23, 131, 343, 128, 132, 417, 419

Velocity Traverse Data

| | Pt.1 | Pt.2 | Pt.3 | Pt.4 | Pt.5 | Pt.6 | Pt.7 | Pt.8 | |
|---|---|---|---|---|---|---|---|---|---|
| Initial dP | 0.020 | 0.048 | 0.048 | 0.030 | 0.028 | 0.052 | 0.050 | 0.028 | "H2O |
| Temp: | 104 | 104 | 104 | 104 | 104 | 104 | 104 | 104 | oF |

| | Particulate Sampling Data | | | | | | | | | | | | | Fuel Weight, lb | | Temperature Data | | | Stack Data | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Elapsed Time | Gas Meter Cubic Feet (1) | Gas Meter Cubic Feet (2) | Sample Rate, cfm (1) | Sample Rate, cfm (2) | Orifice dH (1) | Meter oF (1) | Meter Vac. In. Hg. (1) | Orifice dH (2) | Meter oF (2) | Meter Vac. In. Hg. (2) | Dilution Tunnel Temp. | Pro. Rate (10%) (1) | Pro. Rate (10%) (2) | Scale Reading | Weight Change | Stack | Filter (1) | Filter (2) | Ambient | Draft In. H2O | $CO_2$ (%) | CO (%) |
| 360 | 43.234 | 43.475 | 0.12 | 0.12 | 0.71 | 84 | 0.97 | 0.59 | 83 | 0.7 | 77 | 99 | 100 | 25.2 | 0 | 159 | 71 | 72 | 71 | -0.057 | 2.3 | 0 |
| 361 | 43.355 | 43.595 | 0.12 | 0.12 | 0.72 | 84 | 0.97 | 0.59 | 83 | 0.7 | 78 | 100 | 99 | 25.2 | 0 | 159 | 71 | 72 | 71 | -0.057 | 1.8 | 0 |
| 362 | 43.475 | 43.716 | 0.12 | 0.12 | 0.72 | 84 | 0.98 | 0.59 | 83 | 0.7 | 78 | 99 | 100 | 25.2 | 0 | 160 | 71 | 72 | 71 | -0.057 | 1.7 | 0 |
| 363 | 43.595 | 43.836 | 0.12 | 0.12 | 0.72 | 84 | 0.97 | 0.59 | 83 | 0.7 | 77 | 99 | 99 | 25.2 | 0 | 159 | 71 | 72 | 71 | -0.057 | 2 | 0 |
| 364 | 43.715 | 43.957 | 0.12 | 0.12 | 0.71 | 84 | 0.97 | 0.59 | 83 | 0.7 | 77 | 99 | 100 | 25.2 | 0 | 158 | 71 | 72 | 71 | -0.056 | 1.6 | 0 |
| 365 | 43.835 | 44.078 | 0.12 | 0.12 | 0.71 | 84 | 0.97 | 0.59 | 83 | 0.7 | 77 | 99 | 100 | 25.1 | -0.1 | 158 | 71 | 72 | 70 | -0.057 | 1.8 | 0 |
| Avg/Tot | 43.835 | 44.078 | 0.12 | 0.12 | 0.72 | 82 | | 0.59 | 82 | | 87 | 101 | 101 | | | | 72 | 73 | | -0.056 | | |

Accentra-2 Pellet Stove

| Hours of Conditioning | Date | Times | Exhaust Temperature | Fuel Added | Overall Fuel Consumed (lbs) |
|---|---|---|---|---|---|
| 0 | | 1:30:00 PM | 293.8 | 50 lbs - Energex | 0.0 |
| 0.5 | | 2:00:00 PM | 292.6 | | 2.1 |
| 1 | | 2:30:00 PM | 291.7 | | 4.3 |
| 1.5 | | 3:00:00 PM | 291.2 | | 6.4 |
| 2 | 2/2/2015 | 3:30:00 PM | 289.9 | | 8.6 |
| 2.5 | | 4:00:00 PM | 292.8 | | 10.7 |
| 3 | | 4:30:00 PM | 292.6 | | 12.9 |
| 3.5 | | 5:00:00 PM | 292.6 | | 15.0 |
| 4 | | 5:30:00 PM | 293.2 | | 17.2 |
| | | 2:30:00 PM | 294.2 | | 19.3 |
| 4.5 | | 3:00:00 PM | 297.2 | | 21.5 |
| 5 | | 3:30:00 PM | 298.4 | | 23.6 |
| 5.5 | | 4:00:00 PM | 300.4 | | 25.8 |
| 6 | | 4:30:00 PM | 297.3 | 20 lbs - Energex | 27.9 |
| 6.5 | | 5:00:00 PM | 297.5 | | 30.1 |
| 7 | | 5:30:00 PM | 297.1 | | 32.2 |
| 7.5 | | 6:00:00 PM | 301.2 | | 34.4 |
| 8 | | 6:30:00 PM | 301.2 | | 36.5 |
| 8.5 | | 7:00:00 PM | 302.1 | | 38.7 |
| 9 | 2/3/2015 | 7:30:00 PM | 302 | | 40.8 |
| 9.5 | | 8:00:00 PM | 301.6 | | 43.0 |
| 10 | | 8:30:00 PM | 300.5 | | 45.1 |
| 10.5 | | 9:00:00 PM | 299.2 | | 47.3 |
| 11 | | 9:30:00 PM | 299.9 | | 49.4 |
| 11.5 | | 10:00:00 PM | 301.1 | | 51.6 |
| 12 | | 10:30:00 PM | 300.9 | | 53.7 |
| 12.5 | | 11:00:00 PM | 301.9 | | 55.9 |
| 13 | | 11:30:00 PM | 302 | | 58.0 |
| 13.5 | | 12:00:00 AM | 300.3 | | 60.2 |
| 14 | | 12:30:00 AM | 299.8 | | 62.3 |
| 14.5 | | 1:00:00 AM | 300.2 | | 64.5 |
| | | 6:00:00 PM | 299 | 40 lbs - Energex | 66.6 |
| 15 | | 6:30:00 PM | 299.5 | | 68.8 |
| 15.5 | | 7:00:00 PM | 300.1 | | 70.9 |
| 16 | | 7:30:00 PM | 298.4 | | 73.1 |
| 16.5 | | 8:00:00 PM | 297.7 | | 75.2 |
| 17 | | 8:30:00 PM | 298.9 | | 77.4 |
| 17.5 | 2/4/2015 | 9:00:00 PM | 299 | | 79.5 |
| 18 | | 9:30:00 PM | 300.5 | | 81.7 |
| 18.5 | | 10:00:00 PM | 298.6 | | 83.8 |
| 19 | | 10:30:00 PM | 299.9 | | 86.0 |
| 19.5 | | 11:00:00 PM | 299.1 | | 88.1 |
| 20 | | 11:30:00 PM | 298.2 | | 90.3 |
| 20.5 | | 12:00:00 AM | 297.2 | | 92.4 |

| | | | | | |
|---|---|---|---|---|---|
| | | 4:00:00 PM | 297.8 | 30 lbs - Energex | 94.6 |
| 21 | | 4:30:00 PM | 297.5 | | 96.7 |
| 21.5 | | 5:00:00 PM | 297.9 | | 98.9 |
| 22 | | 5:30:00 PM | 296.8 | | 101.0 |
| 22.5 | | 6:00:00 PM | 296.5 | | 103.2 |
| 23 | | 6:30:00 PM | 297.2 | | 105.3 |
| 23.5 | | 7:00:00 PM | 298.2 | | 107.5 |
| 24 | | 7:30:00 PM | 301 | | 109.6 |
| 24.5 | 2/5/2015 | 8:00:00 PM | 299.6 | | 111.8 |
| 25 | | 8:30:00 PM | 298.7 | | 113.9 |
| 25.5 | | 9:00:00 PM | 300.6 | | 116.1 |
| 26 | | 9:30:00 PM | 299.5 | | 118.2 |
| 26.5 | | 10:00:00 PM | 298.2 | | 120.4 |
| 27 | | 10:30:00 PM | 297 | | 122.5 |
| 27.5 | | 11:00:00 PM | 299.9 | | 124.7 |
| 28 | | 11:30:00 PM | 298.5 | | 126.8 |
| 28.5 | | 12:00:00 AM | 295.2 | | 129.0 |
| | | 2:30:00 PM | 300.6 | 40 lbs - Energex | 131.1 |
| 29 | | 3:00:00 PM | 301.7 | | 133.3 |
| 29.5 | | 3:30:00 PM | 300.3 | | 135.4 |
| 30 | | 4:00:00 PM | 300.3 | | 137.6 |
| 30.5 | 2/6/2015 | 4:30:00 PM | 300.4 | | 139.7 |
| 31 | | 5:00:00 PM | 302.7 | | 141.9 |
| 31.5 | | 5:30:00 PM | 301.9 | | 144.0 |
| 32 | | 6:00:00 PM | 299.4 | | 146.2 |
| 32.5 | | 6:30:00 PM | 300.7 | | 148.3 |
| 33 | | 7:00:00 PM | 301.5 | | 150.5 |
| | | 12:30:00 PM | 295.9 | | 152.6 |
| 33.5 | | 1:00:00 PM | 296.9 | | 154.8 |
| 34 | | 1:30:00 PM | 296.2 | | 156.9 |
| 34.5 | | 2:00:00 PM | 293.7 | | 159.1 |
| 35 | | 2:30:00 PM | 294 | | 161.2 |
| 35.5 | | 3:00:00 PM | 293.6 | | 163.4 |
| 36 | 2/10/2015 | 3:30:00 PM | 293.3 | | 165.5 |
| 36.5 | | 4:00:00 PM | 295.6 | | 167.7 |
| 37 | | 4:30:00 PM | 295 | 40 lbs - Energex | 169.8 |
| 37.5 | | 5:00:00 PM | 294.6 | | 172.0 |
| 38 | | 5:30:00 PM | 293.8 | | 174.1 |
| 38.5 | | 6:00:00 PM | 293.7 | | 176.3 |
| 39 | | 6:30:00 PM | 296 | | 178.4 |
| 39.5 | | 7:00:00 PM | 296.8 | | 180.6 |
| | | 5:00:00 PM | 300.2 | | 182.7 |
| 40 | | 5:30:00 PM | 300.5 | | 184.9 |
| 40.5 | | 6:00:00 PM | 300.6 | | 187.0 |
| 41 | | 6:30:00 PM | 302.2 | | 189.2 |
| 41.5 | | 7:00:00 PM | 303.9 | | 191.3 |
| 42 | | 7:30:00 PM | 303.9 | | 193.5 |

| | | | | | |
|---|---|---|---|---|---|
| 42.5 | | 8:00:00 PM | 304.2 | | 195.6 |
| 43 | 2/13/2015 | 8:30:00 PM | 304.6 | | 197.8 |
| 43.5 | | 9:00:00 PM | 302.5 | | 199.9 |
| 44 | | 9:30:00 PM | 303.2 | | 202.1 |
| 44.5 | | 10:00:00 PM | 302.2 | | 204.2 |
| 45 | | 10:30:00 PM | 302.4 | | 206.4 |
| 45.5 | | 11:00:00 PM | 302.9 | | 208.5 |
| 46 | | 11:30:00 PM | 303.7 | | 210.7 |
| 46.5 | | 12:00:00 AM | 303.5 | | 212.8 |
| | | 2:00:00 PM | 297.3 | 40 lbs - Energex | 215.0 |
| 47 | | 2:30:00 PM | 297.5 | | 217.1 |
| 47.5 | | 3:00:00 PM | 297.7 | | 219.3 |
| 48 | | 3:30:00 PM | 296.7 | | 221.4 |
| 48.5 | | 4:00:00 PM | 296.1 | | 223.6 |
| 49 | 2/16/2015 | 4:30:00 PM | 294.9 | | 225.7 |
| 49.5 | | 5:00:00 PM | 294.9 | | 227.9 |
| 50 | | 5:30:00 PM | 296 | | 230.0 |
| 50.5 | | 6:00:00 PM | 299.2 | | 232.2 |
| 51 | | 6:30:00 PM | 297.4 | | 234.3 |
| 51.5 | | 7:00:00 PM | 294.9 | | 236.5 |
| 52 | | 7:30:00 PM | 296.3 | | 238.6 |

# OMNI-Test Laboratories, Inc.

| | |
|---|---|
| **Manufacturer:** | Harman |
| **Model:** | Accentra-2 |
| **Date:** | 05/12/15 |
| **Run:** | 1 |
| **Control #:** | 2067 |
| **Test Duration:** | 365 |
| **Output Category:** | Integrated |

**Technicians:** J. Clark

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

| | HHV Basis | LHV Basis |
|---|---|---|
| **Overall Efficiency** | 71.2% | 77.1% |
| **Combustion Efficiency** | 99.5% | 99.5% |
| **Heat Transfer Efficiency** | 72% | 77.4% |

| | | | |
|---|---|---|---|
| **Output Rate (kJ/h)** | 10,906 | 10,346 | **(Btu/h)** |
| **Burn Rate (kg/h)** | 0.82 | 1.82 | **(lb/h)** |
| **Input (kJ/h)** | 15,325 | 14,538 | **(Btu/h)** |

| | | | |
|---|---|---|---|
| **Test Load Weight (dry kg)** | 5.01 | 11.04 | **dry lb** |
| **MC wet (%)** | 4.81 | | |
| **MC dry (%)** | 5.05 | | |
| **Particulate (g )** | 0 | | |
| **CO (g)** | 25 | | |
| **Test Duration (h)** | 6.08 | | |

| **Emissions** | **Particulate** | **CO** |
|---|---|---|
| **g/MJ Output** | 0.00 | 0.38 |
| **g/kg Dry Fuel** | 0.00 | 5.07 |
| **g/h** | 0.00 | 4.18 |
| **lb/MM Btu Output** | 0.00 | 0.89 |

| | |
|---|---|
| **Air/Fuel Ratio (A/F)** | 30.20 |

**VERSION:** **2.3** **3/23/2010**

# OMNI-Test Laboratories, Inc.

| | | | |
|---|---|---|---|
| **Manufacturer:** | Harman | **Technicians:** | J. Clark |
| **Model:** | Accentra-2 | | |
| **Date:** | 05/12/15 | | |
| **Run:** | 1 | | |
| **Control #:** | 2067 | | |
| **Test Duration:** | 61 | | |
| **Output Category:** | Maximum | | |

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

| | HHV Basis | LHV Basis |
|---|---|---|
| **Overall Efficiency** | 73.1% | 79.1% |
| **Combustion Efficiency** | 99.5% | 99.5% |
| **Heat Transfer Efficiency** | 73% | 79.5% |

| | | | |
|---|---|---|---|
| **Output Rate (kJ/h)** | 26,576 | 25,210 | **(Btu/h)** |
| **Burn Rate (kg/h)** | 1.95 | 4.31 | **(lb/h)** |
| **Input (kJ/h)** | 36,364 | 34,495 | **(Btu/h)** |

| | | | |
|---|---|---|---|
| **Test Load Weight (dry kg)** | 1.99 | 4.38 | **dry lb** |
| **MC wet (%)** | 4.81 | | |
| **MC dry (%)** | 5.05 | | |
| **Particulate (g )** | 0 | | |
| **CO (g)** | 26 | | |
| **Test Duration (h)** | 1.02 | | |

| Emissions | Particulate | CO |
|---|---|---|
| **g/MJ Output** | 0.00 | 0.94 |
| **g/kg Dry Fuel** | 0.00 | 12.84 |
| **g/h** | 0.00 | 25.09 |
| **lb/MM Btu Output** | 0.00 | 2.19 |

| | |
|---|---|
| **Air/Fuel Ratio (A/F)** | 16.15 |

**VERSION:** **2.3** **3/23/2010**

# OMNI-Test Laboratories, Inc.

| | | | |
|---|---|---|---|
| **Manufacturer:** | Harman | **Technicians:** | J. Clark |
| **Model:** | Accentra-2 | | |
| **Date:** | 05/12/15 | | |
| **Run:** | 1 | | |
| **Control #:** | 2067 | | |
| **Test Duration:** | 120 | | |
| **Output Category:** | Medium | | |

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

| | HHV Basis | LHV Basis |
|---|---|---|
| **Overall Efficiency** | 64.2% | 69.5% |
| **Combustion Efficiency** | 99.5% | 99.5% |
| **Heat Transfer Efficiency** | 64% | 69.8% |

| | | | |
|---|---|---|---|
| **Output Rate (kJ/h)** | 9,540 | 9,050 | **(Btu/h)** |
| **Burn Rate (kg/h)** | 0.80 | 1.76 | **(lb/h)** |
| **Input (kJ/h)** | 14,868 | 14,104 | **(Btu/h)** |

| | | | |
|---|---|---|---|
| **Test Load Weight (dry kg)** | 1.60 | 3.52 | **dry lb** |
| **MC wet (%)** | 4.81 | | |
| **MC dry (%)** | 5.05 | | |
| **Particulate (g )** | 0 | | |
| **CO (g)** | 1 | | |
| **Test Duration (h)** | 2.00 | | |

| **Emissions** | **Particulate** | **CO** |
|---|---|---|
| **g/MJ Output** | 0.00 | 0.07 |
| **g/kg Dry Fuel** | 0.00 | 0.80 |
| **g/h** | 0.00 | 0.64 |
| **lb/MM Btu Output** | 0.00 | 0.16 |

| | |
|---|---|
| **Air/Fuel Ratio (A/F)** | 35.86 |

**VERSION:** **2.3** **3/23/2010**

# OMNI-Test Laboratories, Inc.

| | | | |
|---|---|---|---|
| **Manufacturer:** | Harman | **Technicians:** | J. Clark |
| **Model:** | Accentra-2 | | |
| **Date:** | 05/12/15 | | |
| **Run:** | 1 | | |
| **Control #:** | 2067 | | |
| **Test Duration:** | 182 | | |
| **Output Category:** | Minimum | | |

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

| | HHV Basis | LHV Basis |
|---|---|---|
| **Overall Efficiency** | 75.4% | 81.6% |
| **Combustion Efficiency** | 99.5% | 99.5% |
| **Heat Transfer Efficiency** | 76% | 82.0% |

| | | | |
|---|---|---|---|
| **Output Rate (kJ/h)** | 6,592 | 6,253 | **(Btu/h)** |
| **Burn Rate (kg/h)** | 0.47 | 1.04 | **(lb/h)** |
| **Input (kJ/h)** | 8,744 | 8,294 | **(Btu/h)** |

| | | | |
|---|---|---|---|
| **Test Load Weight (dry kg)** | 1.43 | 3.14 | **dry lb** |
| **MC wet (%)** | 4.81 | | |
| **MC dry (%)** | 5.05 | | |
| **Particulate (g )** | 0 | | |
| **CO (g)** | 0 | | |
| **Test Duration (h)** | 3.03 | | |

| **Emissions** | **Particulate** | **CO** |
|---|---|---|
| **g/MJ Output** | 0.00 | 0.00 |
| **g/kg Dry Fuel** | 0.00 | 0.00 |
| **g/h** | 0.00 | 0.00 |
| **lb/MM Btu Output** | 0.00 | 0.00 |

| | |
|---|---|
| **Air/Fuel Ratio (A/F)** | 37.28 |

**VERSION:** **2.3** **3/23/2010**

*OMNI-Test Laboratories, Inc.* **ASTM E2779 Pellet Heater Run Sheets**

Client: Harman Home Heating Project Number: 0135PS035E Run Number: 1

Model: Accentra-2 Tracking Number: 2067 Date: 5/12/15

Test Crew: J. Clark

OMNI Equipment ID numbers: 185, 335, 336, 420, 132, 410

## Pellet Heater Run Notes

### Air Control Settings

High Burn Rate Target: 100%

Settings: Temperature = 7.00 ; Feed = 3.56 ;
Low draft = -.00V ; Constant burn H

Medium Burn Rate Target: 60%

Settings: Temperature = 2.99 ; Feed = 1.07 ;
Low draft = -20 V ; Constant burn H

Low Burn Rate Target: Minimum

Settings: Temperature = 1.00 ; Feed = 0.18 ;
Low draft = -41 V ; constant burn H

Additional Settings Notes:

N/A

### Preburn Notes

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

### Test Notes

| Time | Notes |
|---|---|
| 60:00 | Test settings changed to medium burn rate target |
| 60:00 | 1-hour filter change ; B766 swapped in to Train A front |
| 180:00 | Test settings changed to minimum burn rate target |

**Pellet Moisture Content:** 5.05 % dry basis

**Background Filter Volume:** 49.182 $ft^3$

Technician Signature: _____ Date: 5/12/15

*OMNI-Test Laboratories, Inc.* **ASTM E2779 Pellet Heater Run Sheets**

Client: Harman Home Heating Project Number: 0135PS035E Run Number: 1
Model: Accentra-2 Tracking Number: 2067 Date: 5/12/15
Test Crew: J. Clark
OMNI Equipment ID numbers: See run notes

**Pellet Heater Supplemental Data**

Start Time: 9:53 Booth #: E1
Stop Time: 15:58

**Stack Gas Leak Check:**
Initial: Ø Final: Ø

**Sample Train Leak Check:**
A: 0.000 @ 2.8 "Hg
B: 0.000 @ 7.3 "Hg

**Calibrations:** Span Gas $CO_2$: 16.78 CO: 4.244

| | Pre Test | | Post Test | |
|---|---|---|---|---|
| | Zero | Span | Zero | Span |
| Time | 9:19 | 9:22 | 16:09 | 16:10 |
| $CO_2$ | 0.00 | 16.78 | 0.16 | 16.85 |
| CO | 0.000 | 4.244 | 0.015 | 4.244 |

Air Velocity (ft/min): Initial: <50 Final: <50
Scale Audit (lbs): Initial: 10.0 Final: 10.0
Pitot Tube Leak Test: Initial: Ø Final: Ø
Stack Diameter (in): 3
Induced Draft: Ø
% Smoke Capture: 100
Flue Pipe Cleaned Prior to First Test in Series:
Date: 5/8/15 Initials: JC

| | Initial | Middle | Ending |
|---|---|---|---|
| $P_b$ (in/Hg) | 29.95 | 29.95 | 29.95 |
| Ambient (°F) | 69 | 71 | 70 |

| Tunnel Traverse | |
|---|---|
| dP (in $H_2O$) | T(°F) |
| 0.020 | 104 |
| 0.048 | ↓ |
| 0.048 | |
| 0.030 | |
| 0.028 | |
| 0.052 | |
| 0.050 | |
| 0.028 | |
| N/A | N/A |
| ↓ | ↓ |
| | |
| | |
| Static P: | -0.582 JC |

-0.625

Technician Signature: Date: 5/12/15

# Accentra-2

## Explanation of Low and High burn rate settings

**Low Burn Setting:**

1. *The Harman system has a required minimum low burn temperature. If the feed limit is configured to 10%, the control system will override that minimum setting to ensure the exhaust temperature hits the minimum requirement, depending on model. When it makes this override, it makes a gross adjustment upward in feed to ensure there is not a low, smoky fire burning which could cause creosote or other issues. These gross swings up and down end up actually creating a higher low burn rate than setting the stove to 25%. At 25% the stove will operate right at the minimum exhaust temperature, never overriding upwards and thus give the lowest possible burn rate.*

**High Burn Setting:**

1. *Harman stoves also use a maximum allowable exhaust temperature to maintain safe temperatures for the unit and the venting system. The temperature knob can be set to a higher output than 3.56. However the unit will quickly hit the maximum exhaust temperature limit measured by the exhaust thermistor and will make a gross adjustment downward in feed-rate to avoid damage to the unit and venting system. This hysteresis of the feed rate actually results in a much lower overall burn rate than configuring the unit to 3.56 in this case, and allowing it to feed continuously as that prescribed rate*