



## OFFICE OF ENFORCEMENT AND COMPLIANCE ASSURANCE

WASHINGTON, D.C. 20460

August 5, 2025

Mr. Guillaume Thibodeau-Fortin, P. Eng.  
Laboratory Manager  
Stove Builder International  
250, rue De Copenhague  
Saint-Augustin-de-Desmaures  
Quebec G3A 2H3  
CANADA

Re: SR-3.2 Series: St-Louis, Helia, Elevate, Chambly, and HEA200 Wood Heater Models;  
Certificate of Compliance Number 398-25

Dear Mr. Thibodeau-Fortin:

I am pleased to inform Stove Builder International that the above-referenced models have been approved for certification pursuant to the 2015 New Source Performance Standard (NSPS) for New Residential Wood Heaters, New Residential Hydronic Heaters and Forced-Air Furnaces at 40 CFR Part 60, Subpart AAA (2015 NSPS) by the United States Environmental Protection Agency. Certification under the 2015 NSPS is valid through August 5, 2030. This letter serves as your wood heater Certificate of Compliance. Please refer to the above-referenced Certificate of Compliance number in all future correspondence.

Based on a January 17, 2025,<sup>1</sup> test report prepared by PFS-TECO demonstrating compliance with the EPA-approved Alternative Test Method<sup>2</sup> and the information provided in your February 6, 2025, application, the above-referenced models are certified as meeting the 2015 NSPS. Under the 2015 NSPS and based on the Intertek Testing Services NA, Inc., February 6,

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<sup>1</sup> Revised April 29, 2025, and July 11, 2025.

<sup>2</sup> November 13, 2024, letter from Steffan M. Johnson, Group Leader, Measurement Technology Group, Office of Air Quality Planning and Standards to Guillaume Thibodeau-Fortin, Laboratory Manager, Stove Builder International, approving the use of the New York State Energy Research and Development Authority (NYSERDA) Test Method for Certification of Cordwood-Fired Stoves under the 2015 New Source Performance Standards with the ASTM International Test Method E2515 using certain modifications as detailed in the approval letter. A copy of the letter can be found in Appendix A of the test report.

2025,<sup>3</sup> Certification of Conformity, the models' emission rate of 1.8 g/hr meets the 2020 NSPS cordwood particulate matter emissions limit of 2.5 g/hr. The heat output range and overall heating efficiency for the above-referenced models are 29,605 – 83,857 BTU/hr and 76%, respectively. This model line's carbon monoxide emission rate is 1.4 g/min.

This Certificate of Compliance is valid for the above-referenced models and cannot be transferred to another model line without applying for another Certificate of Compliance. This Certificate of Compliance allows you to advertise and sell the above-referenced models through August 5, 2030. Thereafter, you may not advertise for sale, offer for sale, or sell wood heaters under this Certificate of Compliance without applying for and obtaining another Certificate of Compliance.

All wood heaters manufactured or sold under this Certificate of Compliance must comply with the EPA labeling requirements found at § 60.536. These provisions require each wood heater to have a permanent label affixed to it, including the month and year of manufacture, model name or number, serial number, certification test emission value, test method, standard met, and compliance certification statement.

In addition, you must comply with all applicable requirements of the regulation, including:

1. Conducting a third-party certifier-approved quality assurance program which ensures that all units within a model line are similar to the wood heater submitted for certification testing in all respects that would affect emissions and are in compliance with the applicable emission limit, pursuant to § 60.533(m);
2. Applying for recertification whenever any change is made to the above-referenced models that affects or is presumed to affect the particulate matter emission rate for the model line, pursuant to § 60.533(k)(1);
3. Providing an owner's manual that includes the information listed in § 60.536(g)(1) with each affected wood heater model offered for sale;
4. Placing a copy of the full non-Confidential Business Information (non-CBI) certification test report and summary of the test report on the manufacturer's website and available to the public within 30 days after the EPA issues a Certificate of Compliance, pursuant to § 60.533(b)(12). The up-to-date non-CBI certification test report and summary (if later revised) should remain posted on the manufacturer's website for as long as the model line is manufactured and/or offered for sale in the U.S.;
5. Submitting a report to the EPA every two years following issuance of a Certificate of Compliance for each model line. This report must include the sales for each model by

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<sup>3</sup> Revised July 17, 2025.



state and certify that no changes in the design or manufacture of this model line have been made that require recertification under § 60.533(k);

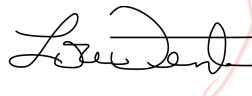
6. Retaining records and submitting reports as required at § 60.537; and
7. Submitting wood heaters for audit testing if selected by the EPA under §§ 60.533(n)(1)(i) and (2)(i).

Failure to comply with these requirements may result in revoking this Certificate of Compliance and enforcement action, including penalties as specified under the Clean Air Act. Pursuant to the EPA-approved Alternative Test Method, you must also include your approval letter in the certification test report for posting on your website. To promote transparency in implementing the Wood Heater Program, we request that manufacturers submit a copy of the Uniform Resource Locator (URL) or web address where the non-CBI certification test report is posted to [WoodHeaterReports@epa.gov](mailto:WoodHeaterReports@epa.gov) within ten (10) days of posting.

Once the EPA has verified that the full non-CBI certification test report has been posted on the manufacturer's website, the Agency will add the above-referenced models to the EPA-Certified Wood Heater Database.

If you have any questions concerning this letter, please contact the Wood Heater Program at [WoodHeaterReports@epa.gov](mailto:WoodHeaterReports@epa.gov).

Sincerely,



Digitally signed by  
LOREN DENTON  
Date: 2025.08.05  
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Loren Denton, Ph.D.  
Director  
Monitoring, Assistance, and Media Programs Division  
Office of Compliance  
Office of Enforcement and Compliance Assurance

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# Stove Builder International

Project # 24-303

Model: St-Louis

AKA: Helia, Elevate, Chambly, HEA200

Type: Non-catalytic Wood Fired Heater

Date: January 17, 2025

Revised Date: July 11, 2025

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## **NYSERDA Test Method for Certification of Cordwood-Fired Stoves Under the 2015 New Source Performance Standard (EPA Alternate Test Method)**

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2H3  
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[gthibodeaufortin@sbi-international.com](mailto:gthibodeaufortin@sbi-international.com)

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Prepared by: Aaron Kravitz,  
Laboratory Manager

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**11785 SE Highway 212 – Suite 305  
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(503) 650-0088  
[WWW.PFSTECO.COM](http://WWW.PFSTECO.COM)**

## Revision Summary

January 17, 2025 – Original Issue

April 29, 2025 – Added note describing appliance forced air kit to Appliance Description on page 14 and clarified its use during testing in Introduction on page 4.

July 11, 2025 – Revised the following items:

- Updated description of blower system in Appliance Description on page 14 and Introduction on page 4.
- New, updated manual revision added to Appendix B
- Added conditioning data to Appendix A

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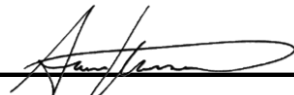
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## Affidavit

PFS-TECO was contracted by Stove Builder International (SBI) to provide testing services for the St-Louis Series Wood-Fired Room Heater per the *NYSERDA Test Method for Certification of Cordwood-Fired Stoves Under the 2015 New Source Performance Standard*, which was approved for use by EPA under an Alternate Test Method (ATM) in a letter to the manufacturer dated November 13, 2024. All testing and associated procedures were conducted at PFS-TECO's Portland Laboratory beginning on 12/9/2024 and ending on 12/12/2024. PFS' laboratory is located at 11785 SE Hwy 212 Ste 305, Clackamas, OR 97015. Testing procedures followed the NYSERDA IDC method, with variances as described in the ATM. Particulate sampling was performed per ASTM E2515, *Standard Test Method for Determination of Particulate Matter Emissions Collected by a Dilution Tunnel* and *NYSERDA Standard Operation Procedures for use of a Thermo Scientific 1405-D TEOM™ in a dilution tunnel with wood-fired stoves, hydronic heaters, and furnaces*, with variances as described in the ATM. A copy of the EPA ATM letter is included in Appendix A for reference, as required by the approval letter. Test results apply only to the specific appliance tested.

PFS-TECO is accredited by the U.S. Environmental Protection Agency for the certification and auditing of wood heaters pursuant to subpart AAA of 40 CFR Part 60, New Source Performance Standards for Residential Wood Heaters and subpart QQQQ of 40 CFR Part 60, Standards of Performance for New Hydronic Heaters and Forced Air Furnaces, Methods 28R, 28WHH, 28 WHH-PTS, and all methods listed in Sections 60.534 and 60.5476. PFS-TECO holds EPA Accreditation Certificate Numbers 4 and 4M (mobile). PFS-TECO is accredited by IAS to ISO 17020:2012 "Criteria for Bodies Performing Inspections", and ISO 17025:2017 "Requirements for Testing Laboratories." PFS-TECO is also accredited by Standards Council of Canada to ISO 17065:2012 "Requirements for Bodies Operating Product Certification Systems."

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

  
\_\_\_\_\_  
Aaron Kravitz, Laboratory Manager

## Introduction

SBI contracted with PFS-TECO to perform EPA certification testing on the St-Louis Series Wood-Fired Room Heater. All testing was performed at PFS' Portland laboratory. All testing was performed by Aaron Kravitz.

### Notes

- Prior to the start of testing, 50 hours of conditioning was performed by the manufacturer in accordance with the ATM.
- Prior to the start of testing, the dilution tunnel was cleaned with a steel brush (December 6, 2024).
- A TEOM using TX-40 filters was used to determine 1<sup>st</sup> hour emissions and integrated emissions in accordance with the ATM for all test runs.
- A total of 4 test runs were completed. Three test runs were included in average emissions results, while a 4<sup>th</sup> test run, which included a simulated power failure at the start of L4, is excluded from averages. Test runs were performed in accordance with the ATM. All runs have been found to be appropriate, see the Run Narrative section for further detail on each run.
- No fuel pieces were intentionally squared or debarked and met all requirements specified in the ATM. Fuel pieces used for testing had little to no bark due to natural drying, splitting, and impacts caused by multiple moisture measurements. As required, video recording of all runs was performed.
- For the purpose of measuring temperature of the unit, 5 thermocouples were installed on the outer surface of the firebox per the ATM.
- Both of the blowers installed on the unit were operated per the manufacturer's instructions.

## Wood Heater Identification and Testing

- Appliance Tested: ***St-Louis***
- Serial Number: ***PFS Tracking Number 214***
- Manufacturer: ***Stove Builder International***
- Catalyst: ***No***
- Heat exchange blower: ***Integral***
- Type: ***Wood Stove***
- Style: ***Built-In Fireplace***
- Unit Condition: ***Good***
- Date Received: ***Wednesday, November 27, 2024***
- Testing Period – Start: ***Monday, December 09, 2024***  
Finish: ***Thursday, December 12, 2024***
- Test Location: ***PFS TECO***  
***11785 SE Hwy 212 Ste. 305***  
***Clackamas, OR 97015***
- Elevation: ***~131 Feet above sea level***
- Test Technician(s): ***Aaron Kravitz***
- Observers: ***Guillaume Thibodeau-Fortin of SBI, Engineer***

## Test Procedures and Equipment

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

### Equipment List:

| Equipment ID#  | Equipment Description                                                    |
|----------------|--------------------------------------------------------------------------|
| 50             | Digiweigh DWP12i Platform Scale                                          |
| 129            | APEX XC-60-ED Digital Emissions Sampling Box A                           |
| 130            | APEX XC-60-ED Digital Emissions Sampling Box B                           |
| 137            | California Analytical ZRE CO <sub>2</sub> /CO/O <sub>2</sub> IR ANALYZER |
| 94             | Moisture meter calibration block                                         |
| 95             | Anemometer                                                               |
| 97             | 10 lb audit weight                                                       |
| 107            | Sartorius Analytical Balance                                             |
| 109A/B         | Troemner 100mg/200mg Audit Weights                                       |
| 217            | Microtector                                                              |
| 115            | Delmhorst Wood Moisture Meter                                            |
| 190            | Mettler 3'x3' floor scale w/digital weight indicator                     |
| 205            | DewTrak tunnel dewpoint monitor                                          |
| 209            | Tape Measure                                                             |
| 216            | Temperature Logger                                                       |
| CC505834       | Gas Analyzer Calibration Span Gas                                        |
| CC139173       | Gas Analyzer Calibration Mid Gas                                         |
| CC341544       | Gas Analyzer Calibration Mid Gas                                         |
| EPA B47459     | Dichot TEOM – Tunnel Sampling                                            |
| EPA B47461     | Dichot TEOM – Ambient Sampling                                           |
| 197            | Mass Flow Meter                                                          |
| Thermo CVK7037 | TEOM Calibration Kit                                                     |
| 202            | Digital Barometer                                                        |

The TEOM instruments were calibrated in accordance with NYSERDA Standard Operation Procedures for Thermo Scientific 1405-D TEOM™ for use in a dilution tunnel, dated September 29, 2022, and the manufacturer's instructions, using mass flow meter ID # 197 and manufacturer-supplied calibration kit serial # CVK7037.

Barometric pressure data was taken from local National Weather Service station KPDX. As PFS and KPDX are at the same altitude, the correction for altitude per ASTM E2515 6.1.2 is 1:1. NWS data was verified with on-site barometer #202, which is calibrated yearly.



## Results

The average emissions rate for the test series was measured to be **1.0 g/hr** when measured with a TEOM, or **1.8 g/hr** when measured in accordance with ASTM E2515. With average 1<sup>st</sup> hour TEOM emissions of **3.5 g/hr**. Average Higher Heating Value efficiency of **76%**. The average CO emission rate for the test series was **1.4 g/min**. The SBI St-Louis Wood-Fired Room Heater meets the 2020 cordwood PM emission standard of  $\leq 2.5$  g/hr per CFR 40 part 60, §60.532 (c).

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

## Summary Tables

### Run 1

|      |                        |        |        |        |        |                    |        |
|------|------------------------|--------|--------|--------|--------|--------------------|--------|
|      | Burn Phase:            | L1     | L2     | L3     | L4     | 1 <sup>st</sup> hr | Total  |
|      | Burn Time (min):       | 19     | 58     | 63     | 253    |                    | 396    |
|      | Burn Rate (dry kg/hr): | 6.12   | 4.69   | 3.12   | 2.01   |                    | 2.76   |
| TEOM | Eg:                    | 1.9    | 2.9    | 1.0    | 1.3    | 4.6                | 7.1    |
| TEOM | Eg/hr:                 | 5.9    | 3.0    | 1.0    | 0.3    | 4.6                | 1.1    |
| TEOM | Eg/kg:                 | 0.97   | 0.65   | 0.31   | 0.16   | 0.84               | 0.39   |
| TEOM | Eg/MJ output:          | 0.067  | 0.043  | 0.020  | 0.010  |                    | 0.026  |
| TEOM | Elb/mmbtu output:      | 0.156  | 0.100  | 0.047  | 0.023  |                    | 0.060  |
| 2515 | Eg:                    |        |        |        |        |                    | 11.8   |
| 2515 | Eg/hr:                 |        |        |        |        |                    | 1.8    |
| 2515 | Eg/kg:                 |        |        |        |        |                    | 0.65   |
| 2515 | Eg/MJ output:          |        |        |        |        |                    | 0.043  |
| 2515 | Elb/mmbtu output:      |        |        |        |        |                    | 0.099  |
|      | CO (g):                | 54.7   | 86.8   | 99.2   | 305.1  |                    | 545.7  |
|      | CO (g/min):            | 2.9    | 1.5    | 1.6    | 1.2    |                    | 1.4    |
|      | CO g/hr:               | 172.6  | 89.8   | 94.5   | 72.4   |                    | 82.7   |
|      | CO g/kg:               | 28.2   | 19.1   | 30.3   | 36.0   |                    | 30.0   |
|      | CO g/MJ output:        | 2.0    | 1.3    | 2.0    | 2.3    |                    | 2.0    |
|      | CO lb/mmBTU output:    | 4.5    | 3.0    | 4.7    | 5.4    |                    | 4.6    |
|      | Output (BTU/hr)        | 83,857 | 66,900 | 44,707 | 29,605 |                    | 39,849 |
|      | Efficiency (%)         | 72.3%  | 75.2%  | 75.6%  | 78.0%  |                    | 76.2%  |

*Run 2*

|      |                        |        |        |        |        |                    |        |
|------|------------------------|--------|--------|--------|--------|--------------------|--------|
|      | Burn Phase:            | L1     | L2     | L3     | L4     | 1 <sup>st</sup> hr | Total  |
|      | Burn Time (min):       | 17     | 56     | 57     | 191    |                    | 324    |
|      | Burn Rate (dry kg/hr): | 6.87   | 4.52   | 3.28   | 2.60   |                    | 3.25   |
| TEOM | Eg:                    | 1.9    | 1.6    | 1.66   | 1.2    | 3.0                | 6.4    |
| TEOM | Eg/hr:                 | 6.6    | 1.7    | 1.75   | 0.39   | 3.0                | 1.2    |
| TEOM | Eg/kg:                 | 1.0    | 0.38   | 0.53   | 0.15   | 0.55               | 0.36   |
| TEOM | Eg/MJ output:          | 0.067  | 0.026  | 0.035  | 0.010  |                    | 0.024  |
| TEOM | Elb/mmbtu output:      | 0.156  | 0.061  | 0.081  | 0.023  |                    | 0.056  |
| 2515 | Eg:                    |        |        |        |        |                    | 11.2   |
| 2515 | Eg/hr:                 |        |        |        |        |                    | 2.1    |
| 2515 | Eg/kg:                 |        |        |        |        |                    | 0.64   |
| 2515 | Eg/MJ output:          |        |        |        |        |                    | 0.042  |
| 2515 | Elb/mmbtu output:      |        |        |        |        |                    | 0.099  |
|      | CO (g):                | 43.4   | 40.8   | 61.5   | 342.5  |                    | 488.2  |
|      | CO (g/min):            | 2.6    | 0.7    | 1.1    | 1.8    |                    | 1.5    |
|      | CO g/hr:               | 153.3  | 43.7   | 64.7   | 107.6  |                    | 90.4   |
|      | CO g/kg:               | 22.3   | 9.7    | 19.7   | 41.4   |                    | 27.8   |
|      | CO g/MJ output:        | 1.6    | 0.7    | 1.3    | 2.7    |                    | 1.9    |
|      | CO lb/mmBTU output:    | 3.6    | 1.6    | 3.0    | 6.3    |                    | 4.3    |
|      | Output (BTU/hr)        | 93,744 | 62,039 | 47,791 | 37,563 |                    | 46,193 |
|      | Efficiency (%)         | 72.1%  | 72.5%  | 76.8%  | 76.4%  |                    | 75.0%  |

*Run 3*

|      |                        |        |        |        |        |                    |        |
|------|------------------------|--------|--------|--------|--------|--------------------|--------|
|      | Burn Phase:            | L1     | L2     | L3     | L4     | 1 <sup>st</sup> hr | Total  |
|      | Burn Time (min):       | 17     | 73     | 63     | 251    |                    | 407    |
|      | Burn Rate (dry kg/hr): | 6.60   | 3.75   | 3.08   | 2.04   |                    | 2.68   |
| TEOM | Eg:                    | 2.6    | 0.57   | 0.63   | 1.6    | 3.0                | 5.4    |
| TEOM | Eg/hr:                 | 9.1    | 0.47   | 0.60   | 0.38   | 3.0                | 0.79   |
| TEOM | Eg/kg:                 | 1.4    | 0.13   | 0.19   | 0.19   | 0.58               | 0.30   |
| TEOM | Eg/MJ output:          | 0.092  | 0.008  | 0.013  | 0.012  |                    | 0.019  |
| TEOM | Elb/mmbtu output:      | 0.215  | 0.019  | 0.030  | 0.028  |                    | 0.045  |
| 2515 | Eg:                    |        |        |        |        |                    | 9.6    |
| 2515 | Eg/hr:                 |        |        |        |        |                    | 1.4    |
| 2515 | Eg/kg:                 |        |        |        |        |                    | 0.53   |
| 2515 | Eg/MJ output:          |        |        |        |        |                    | 0.035  |
| 2515 | Elb/mmbtu output:      |        |        |        |        |                    | 0.080  |
|      | CO (g):                | 41.0   | 45.1   | 49.6   | 298.7  |                    | 434.5  |
|      | CO (g/min):            | 2.4    | 0.62   | 0.79   | 1.2    |                    | 1.1    |
|      | CO g/hr:               | 144.8  | 37.1   | 47.2   | 71.4   |                    | 64.0   |
|      | CO g/kg:               | 21.9   | 9.9    | 15.3   | 35.1   |                    | 23.9   |
|      | CO g/MJ output:        | 1.5    | 0.7    | 1.0    | 2.3    |                    | 1.6    |
|      | CO lb/mmBTU output:    | 3.4    | 1.5    | 2.3    | 5.3    |                    | 3.6    |
|      | Output (BTU/hr)        | 90,739 | 54,002 | 44,481 | 29,648 |                    | 38,645 |
|      | Efficiency (%)         | 72.5%  | 75.9%  | 76.1%  | 76.9%  |                    | 76.1%  |

*Run 4*

|      |                        |        |        |        |        |                    |        |
|------|------------------------|--------|--------|--------|--------|--------------------|--------|
|      | Burn Phase:            | L1     | L2     | L3     | L4     | 1 <sup>st</sup> hr | Total  |
|      | Burn Time (min):       | 20     | 62     | 60     | 195    |                    | 340    |
|      | Burn Rate (dry kg/hr): | 5.87   | 4.42   | 3.34   | 2.62   |                    | 3.24   |
| TEOM | Eg:                    | 2.1    | 1.3    | 0.61   | 2.4    | 3.2                | 6.3    |
| TEOM | Eg/hr:                 | 6.3    | 1.2    | 0.61   | 0.73   | 3.2                | 1.1    |
| TEOM | Eg/kg:                 | 1.1    | 0.27   | 0.18   | 0.28   | 0.57               | 0.35   |
| TEOM | Eg/MJ output:          | 0.070  | 0.018  | 0.012  | 0.019  |                    | 0.023  |
| TEOM | Elb/mmbtu output:      | 0.164  | 0.042  | 0.028  | 0.044  |                    | 0.053  |
| 2515 | Eg:                    |        |        |        |        |                    | 11.7   |
| 2515 | Eg/hr:                 |        |        |        |        |                    | 2.1    |
| 2515 | Eg/kg:                 |        |        |        |        |                    | 0.63   |
| 2515 | Eg/MJ output:          |        |        |        |        |                    | 0.042  |
| 2515 | Elb/mmbtu output:      |        |        |        |        |                    | 0.098  |
|      | CO (g):                | 38.9   | 98.1   | 35.6   | 222.3  |                    | 394.9  |
|      | CO (g/min):            | 1.9    | 1.6    | 0.59   | 1.1    |                    | 1.2    |
|      | CO g/hr:               | 116.8  | 94.9   | 35.6   | 68.4   |                    | 69.7   |
|      | CO g/kg:               | 19.9   | 21.5   | 10.7   | 26.1   |                    | 21.5   |
|      | CO g/MJ output:        | 1.3    | 1.4    | 0.7    | 1.8    |                    | 1.4    |
|      | CO lb/mmBTU output:    | 3.0    | 3.3    | 1.6    | 4.1    |                    | 3.3    |
|      | Output (BTU/hr)        | 80,377 | 63,461 | 48,508 | 36,913 |                    | 46,031 |
|      | Efficiency (%)         | 72.3%  | 75.8%  | 76.7%  | 74.5%  |                    | 75.0%  |

## Test Run Narrative

*Run 1*

Run 1 was performed on 12/9/2024 as an Integrated Duty Cycle run per the ATM. Emissions sampling began from a cold start ignition of kindling and start-up fuel. L2 test fuel was loaded at 20 minutes, L3 at 79 minutes, and L4 at 143 minutes. The total test time was 396 minutes. The particulate emissions rate from kindling ignition to test completion was 1.1 g/hr as measured by the TEOM, or 1.8 g/hr as measured in accordance with ASTM E2515. No filter change was needed for E2515 sampling. The overall burn rate from ignition to completion was 2.71 kg/hr, and overall efficiency was 76.2%. All test results were appropriate and valid. There were no anomalies, and all test criteria were met. No condensed water was detected in the tunnel at any time. Video was recorded for the entire run.

*Run 2*

Run 2 was performed on 12/10/2024 as an Integrated Duty Cycle run per the ATM. Emissions sampling began from a cold start ignition of kindling and start-up fuel. L2 test fuel was loaded at 18 minutes, L3 at 75 minutes, and L4 at 133 minutes. The total test time was 324 minutes. The particulate emissions rate from kindling ignition to test completion was 1.2 g/hr as measured by the TEOM, or 2.1 g/hr as measured in

accordance with ASTM E2515. No filter change was needed for E2515 sampling. The overall burn rate from ignition to completion was 3.25 kg/hr, and overall efficiency was 75.0%. All test results were appropriate and valid. There were no anomalies, and all test criteria were met. No condensed water was detected in the tunnel at any time. Video was recorded for the entire run.

#### *Run 3*

Run 3 was performed on 12/11/2024 as an Integrated Duty Cycle run per the ATM. Emissions sampling began from a cold start ignition of kindling and start-up fuel. L2 test fuel was loaded at 18 minutes, L3 at 92 minutes, and L4 at 156 minutes. The total test time was 407 minutes. The particulate emissions rate from kindling ignition to test completion was 0.79 g/hr as measured by the TEOM, or 1.4 g/hr as measured in accordance with ASTM E2515. No filter change was needed for E2515 sampling. The overall burn rate from ignition to completion was 2.68 kg/hr, and overall efficiency was 76.1%. All test results were appropriate and valid. There were no anomalies, and all test criteria were met. No condensed water was detected in the tunnel at any time. Video was recorded for the entire run.

#### *Run 4*

Run 4 was performed on 12/12/2024 as an Integrated Duty Cycle power failure simulation run per the ATM. Emissions sampling began from a cold start ignition of kindling and start-up fuel. L2 test fuel was loaded at 21 minutes, L3 at 84 minutes, and L4 at 145 minutes. Upon loading L4, power to the unit was cut to simulate a power failure, and power remained off for the remainder of the test. The total test time was 340 minutes. The particulate emissions rate from kindling ignition to test completion was 1.1 g/hr as measured by the TEOM, or 2.1 g/hr as measured in accordance with ASTM E2515. No filter change was needed for E2515 sampling. The overall burn rate from ignition to completion was 3.24 kg/hr, and overall efficiency was 75.0%. All test results were appropriate and valid. There were no anomalies, and all test criteria were met. No condensed water was detected in the tunnel at any time. Video was recorded for the entire run.

## Test Conditions Summary

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

| Run | Ambient (°F) |      | Relative Humidity (%) |      | Average Barometric Pressure (In. Hg.) | Test Run Time (Min) |
|-----|--------------|------|-----------------------|------|---------------------------------------|---------------------|
|     | Pre          | Post | Pre                   | Post |                                       |                     |
| 1   | 65.2         | 67.7 | 45.0                  | 28.8 | 30.27                                 | 396                 |
| 2   | 65.2         | 67.5 | 30.2                  | 22.7 | 30.17                                 | 324                 |
| 3   | 65.2         | 66.6 | 29.7                  | 21.6 | 30.00                                 | 407                 |
| 4   | 65.1         | 66.0 | 27.3                  | 31.6 | 29.65                                 | 340                 |

## Appliance Operation and Test Settings

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

### Settings & Run Notes

|              | L1 Settings                         | L2 Settings                                                                           | L3 Settings                          | L4 Settings                             |
|--------------|-------------------------------------|---------------------------------------------------------------------------------------|--------------------------------------|-----------------------------------------|
| <b>Run 1</b> | Thermostat set to on<br>Fan on auto | Thermostat set to on until<br>50% fuel consumption, then<br>set to off<br>Fan on auto | Thermostat set to off<br>Fan on auto | Thermostat set to<br>off<br>Fan on auto |
| <b>Run 2</b> | Thermostat set to on<br>Fan on auto | Thermostat set to on until<br>50% fuel consumption, then<br>set to off<br>Fan on auto | Thermostat set to off<br>Fan on auto | Thermostat set to<br>off<br>Fan on auto |
| <b>Run 3</b> | Thermostat set to on<br>Fan on auto | Thermostat set to on until<br>50% fuel consumption, then<br>set to off<br>Fan on auto | Thermostat set to off<br>Fan on auto | Thermostat set to<br>off<br>Fan on auto |
| <b>Run 4</b> | Thermostat set to on<br>Fan on auto | Thermostat set to on until<br>50% fuel consumption, then<br>set to off<br>Fan on auto | Thermostat set to off<br>Fan on auto | Power Failure                           |

## Appliance Description

**Models:** The St-Louis is part of the St-Louis Series, all of which are identical with respect to all parts that may impact emissions performance as specified by 40 CFR 60 § 60.533(k). The models are only different with respect to branding, decorative features, and support method. Drawings for all models are in Appendix D. See below for model list:

- Helia, Elevate, Chambly, HEA200

**Appliance Type:** Built-In Wood-Fired Room Heater

**Total Firebox Volume:** 3.15 ft<sup>3</sup>

**Usable Firebox Volume:** 1.90 ft<sup>3</sup>, see ATM document in Appendix A for further detail on Total versus Usable Firebox Volume.

**Air Introduction System:** Primary combustion air enters the appliance through the motorized air control openings located on the bottom front of the stove. Part of primary combustion air is routed up the sides of the firebox, then down into the combustion chamber in front of the door glass. Other primary combustion is routed below the firebox then upward in the direction of the charcoal bed. Secondary air brought in through a motorized opening on the bottom of the appliance. Secondary air is fed to air tubes channels located at both the top and rear of the firebox. All air inlets are controlled by an automatic damper system which is regulated by thermostat. Dimensions on all these features can be found in Appendix D.

**Baffles:** Combustion air is routed to the front of the stove with a ceramic fiber baffle that sits on top of the secondary air channels located above the firebox.

**Refractory Insulation:** The firebox is lined with 1 1/4" thick high-density firebrick.

**Flue Outlet:** 8-inch exhaust outlet located on the top of the appliance.

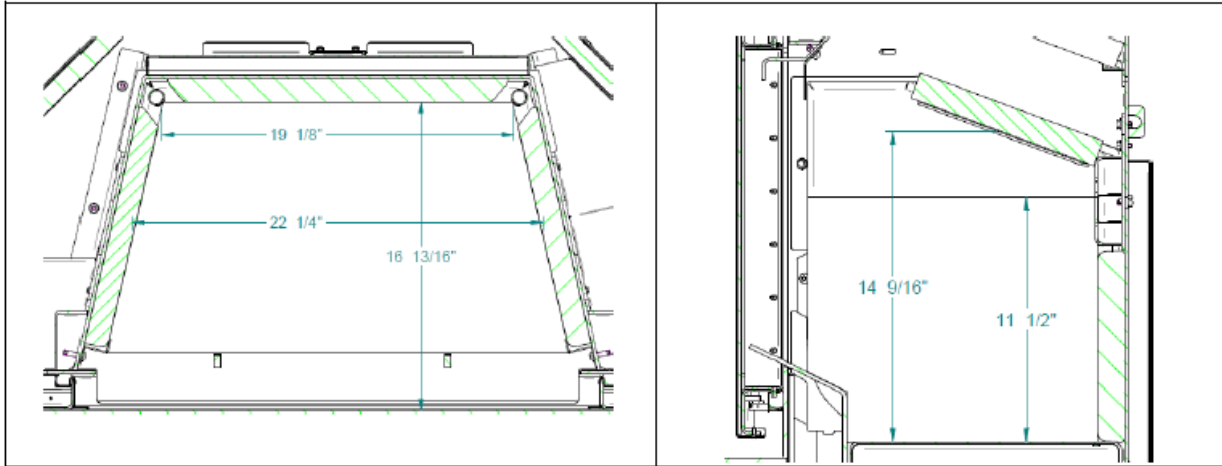
**Fan:** A variable speed convection fan is mounted to the front of the appliance, under the firebox. An additional blower is permanently affixed to the side of the unit which delivers heat to the gravity duct system.

## Appliance Dimensions

| Height   | Width   | Depth    |
|----------|---------|----------|
| 49 7/16" | 38 1/8" | 22 7/16" |

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

## Overall Firebox Volume Dimension



$$OFV = 22.25 \times 16.813 \times 14.563 = 5447.9 \text{ in}^3$$

$$OFV = \frac{5447.9}{12^3} = 3.15 \text{ ft}^3$$



19.000"

22.111" mid-depth width

13.693"

14.000"

1.90 ft³ of usable firebox volume

VUE B-B

11.500"

24.382"

25.221"

2.355"

1.848"

942"

2.355"

1.848"

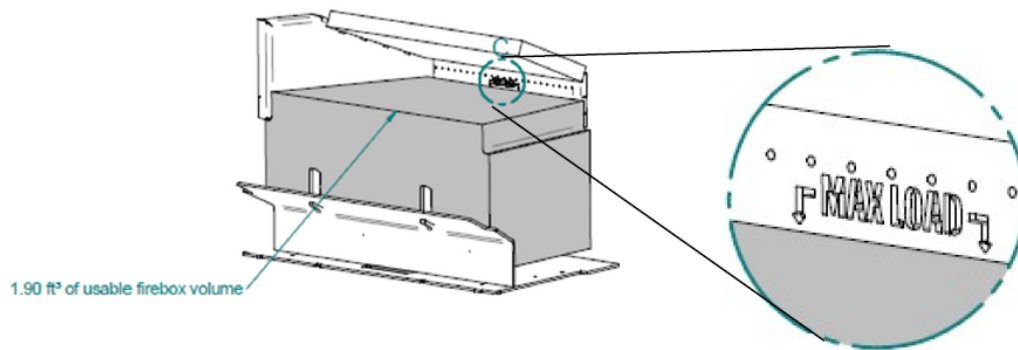
MAX LOAD

NOTE: Mid-depth width is used in the "NYSEDA 2015 NSPS Fuel Load Calculator"

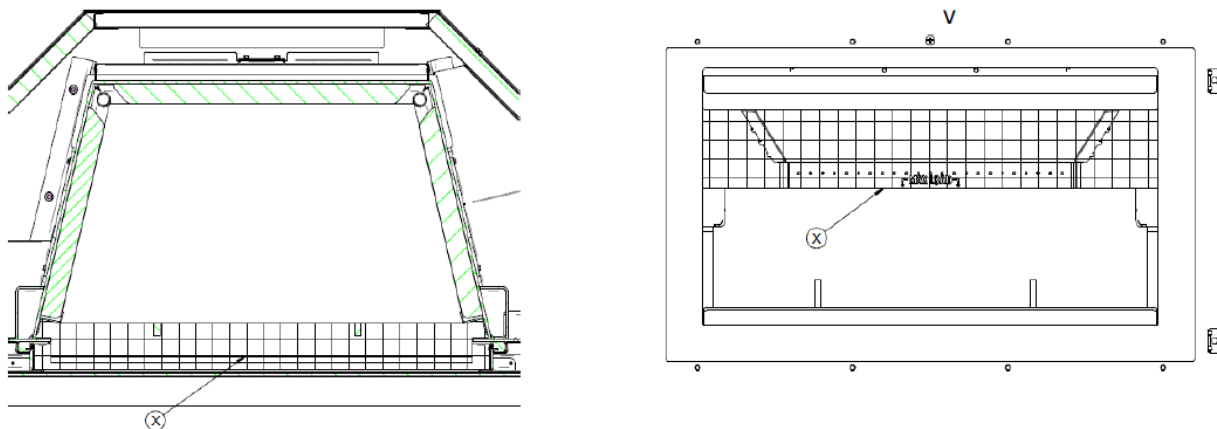
CONFIDENTIAL

$$UFV = \frac{3287.5}{12^3} = 1.903 \text{ ft}^3$$

Per user's manual, no fuel should be put on the grid section identified with an X. This explains the difference between the overall and usable firebox volume.



*Figure 1 - Usable Firebox Volume*



Fuel was loaded in East-West orientation per the Fuel Load Calculator and the ATM letter.

Appliance Front



Appliance Left



Appliance Right



Appliance Rear



## Appliance Fire Box





## Test Fuel Properties

Test fuel used was maple cordwood, split and air-dried to the specified moisture content range. No kiln-drying was used. Fuel is sourced locally in Oregon. Fuel was not debarked, though bark frequently fell off of fuel pieces in the course of splitting to final size. Fuel was free of decay, fungus or other contaminants. No moisture was added to the fuel. Test fuel moisture was measured within 24h from loading. The fuel was stored in the same ambient condition than the laboratory. As per the Fuel Load Calculator, all pieces of fuel were cut to 18.25 inches long.

While splitting test fuel, it was verified that every piece of test fuel with 4 sides were verified to meet the 70% rule in the ATM. No pieces were intentionally squared. Typical fuel loads are pictured below:

Typical Kindling Load



Typical L1 Load



Typical L2 Load



Typical L3 Load



Typical L4 Load (small)



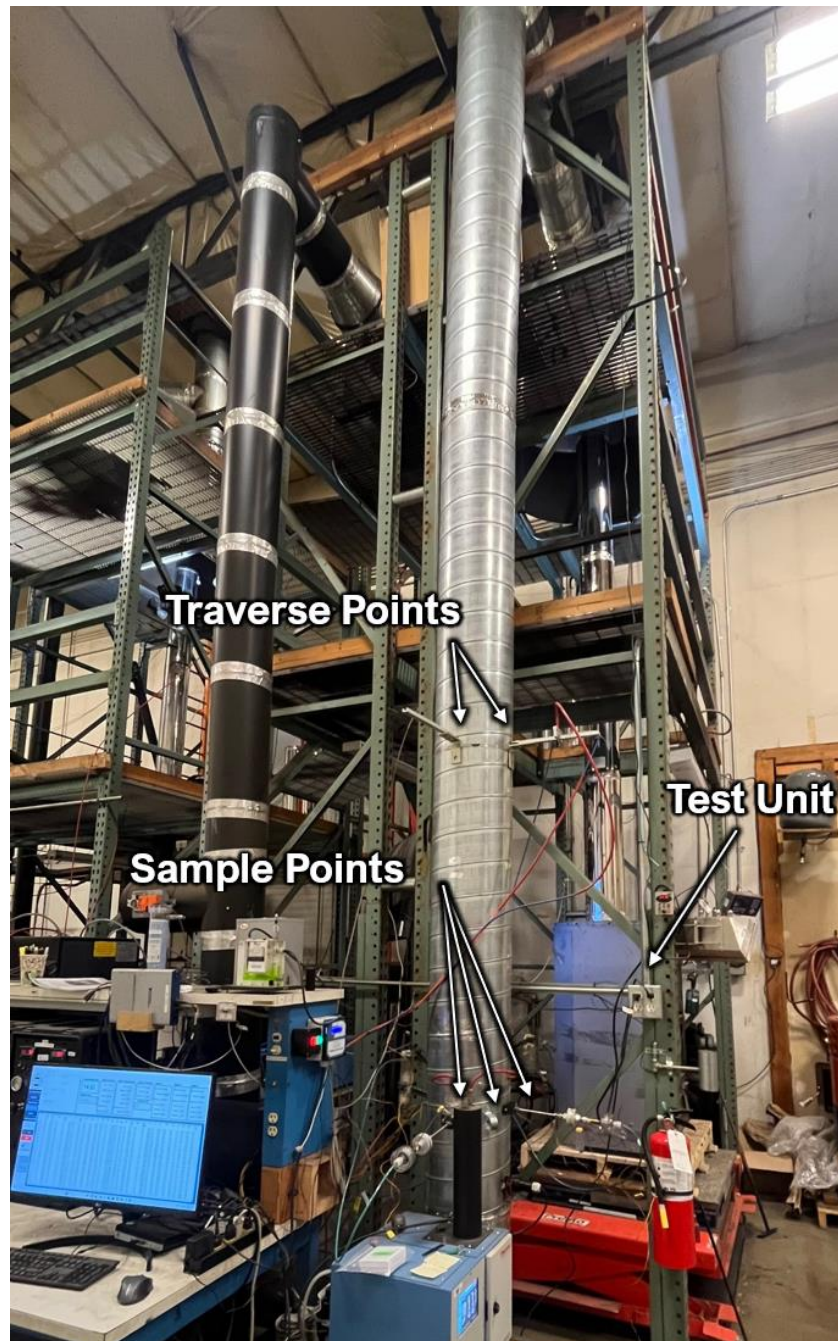
Typical L4 Load (large)



## Sampling Locations and Descriptions

PM measurement sample ports are located 16.5 feet downstream from any disturbances and 3.5 feet upstream from any disturbances. Flow rate traverse data was collected 8 feet downstream from any disturbances and 4 feet upstream from any disturbances. (See photograph below and Tunnel Schematic in Appendix A).

### Sample Points



## Sampling Methods

ASTM E2515 was used in collecting particulate samples. Samples included: the primary (front) filter, backup (rear) filter and sample probe. The primary materials of the filter holders consisted of an aluminum front filter holder and polycarbonate rear filter holder. The dilution tunnel is 12 inches in diameter. All sampling conditions per ASTM E2515 were followed. No alternate procedures were used with the exception of caveats described in the ATM: , filter temperatures were maintained between 80 and 90°F for all tests, filters were weighed in pairs where applicable, and no sampling intervals fell outside of proportional rates of +/- 10%. Ambient temperatures were recorded in accordance with ASTM E2515 using a probe located at the level of the primary air intake, 5' away from and in the 90° arc in front of the test unit. Flue gasses were sampled from a probe 2" above the flue temperature probe through a sampling system verified to have a 90% response time of under 30 seconds.

## Analytical Methods Description

All sample recovery and analysis procedures followed ASTM E2515 procedures. At the end of each test run, filters, O-Rings and probes were removed from their housings dessicated for a minimum of 24 hours, and then weighed at 6 hour intervals to a constant weight per ASTM E2515-11 Section 10. Prior to being placed in the dessicator, sample filters were intially weighed within 1 hour of the post-test leak checks in accordance with the ATM.

## Calibration, Quality Control and Assurances

Calibration procedures and results were conducted per, ASTM E2515-11 and the ATM. Test method quality control procedures (leak checks, volume meter checks, stratification checks, proportionality results) followed the procedures outlined. Sampling trains were disassembled only after post-leak check were performed and found compliant.

Raw data, calibration records, and other relevant documentation will be retained by PFS-TECO for a minimum of 7 years.

## Appliance Sealing and Storage

Upon completion of testing, the appliance and the chimney were secured with metal strapping and the seal below was applied, the appliance was then returned to the



manufacturer's location at: 250 Rue de Copenhague Saint-Augustin-de-Desmaures, QC G3A 2H3 for archival.

## Sealing Label

### ATTENTION:

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

THIS APPLIANCE HAS BEEN SEALED IN ACCORDANCE WITH REQUIREMENTS OF 40CFR  
PART 60 SUBPART AAA §60.535 (a)(2)(vii)

REPORT # \_\_\_\_\_

DATE SEALED \_\_\_\_\_

MANUFACTURER \_\_\_\_\_

MODEL # \_\_\_\_\_

## Sealed Unit



## List of Appendices

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

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

Appendix B – Labels and Manuals

Appendix C –Equipment Calibration Records

## Unit preburn period

Total preburning time (h)

53.93

Model tested:

St.Louis

| Date       | Load Type                 | Duration | Av. Flue | Fuel added | Moisture | Burn Rate (Dry) |
|------------|---------------------------|----------|----------|------------|----------|-----------------|
|            |                           | (min)    | (°F)     | (lbs)      | (DB%)    | (kg/hr)         |
| 2024-10-22 | Load 1 - Start-up         | 27       | 349      | 7.92       | 20.8     | 4.3             |
|            | Load 2 - High-fire        | 72       | 399      | 13.27      | 23.0     | 3.3             |
|            | Load 3 - Maintenance-fire | 76       | 388      | 9.57       | 20.4     | 2.2             |
|            | Load 4 - Low burn rate    | 305      | 312      | 22.99      | 21.7     | 1.5             |
| 2024-10-24 | Load 1 - Start-up         | 25       | 357      | 7.94       | 19.6     | 4.6             |
|            | Load 2 - High-fire        | 74       | 425      | 13.51      | 22.3     | 3.2             |
|            | Load 3 - Maintenance-fire | 77       | 397      | 9.28       | 20.6     | 2.2             |
|            | Load 4 - Low burn rate    | 377      | 263      | 23.48      | 20.1     | 1.3             |
| 2024-10-25 | Load 1 - Start-up         | 29       | 345      | 7.89       | 22.1     | 3.9             |
|            | Load 2 - High-fire        | 80       | 411      | 13.88      | 19.9     | 3.2             |
|            | Load 3 - Maintenance-fire | 70       | 381      | 9.07       | 19.0     | 2.4             |
|            | Load 4 - Low burn rate    | 230      | 371      | 23.03      | 21.3     | 2.0             |
| 2024-10-29 | Load 1 - Start-up         | 24       | 364      | 7.68       | 19.0     | 4.8             |
|            | Load 2 - High-fire        | 72       | 418      | 13.69      | 20.3     | 3.4             |
|            | Load 3 - Maintenance-fire | 70       | 394      | 9.36       | 19.4     | 2.4             |
|            | Load 4 - Low burn rate    | 242      | 362      | 23.90      | 21.9     | 2.0             |
| 2024-10-30 | Load 1 - Start-up         | 24       | 366      | 7.54       | 20.9     | 5.3             |
|            | Load 2 - High-fire        | 77       | 406      | 13.94      | 21.4     | 4.7             |
|            | Load 3 - Maintenance-fire | 74       | 383      | 9.67       | 20.0     | 2.4             |
|            | Load 4 - Low burn rate    | 318      | 286      | 23.74      | 21.4     | 2.0             |
| 2024-10-31 | Load 1 - Start-up         | 27       | 363      | 7.93       | 20.9     | 4.3             |
|            | Load 2 - High-fire        | 70       | 406      | 13.25      | 20.5     | 3.3             |
|            | Load 3 - Maintenance-fire | 66       | 391      | 9.29       | 20.3     | 2.5             |
|            | Load 4 - Low burn rate    | 287      | 308      | 22.97      | 21.0     | 1.6             |
| 2024-11-01 | Load 1 - Start-up         | 26       | 358      | 7.98       | 19.6     | 4.5             |
|            | Load 2 - High-fire        | 81       | 396      | 13.81      | 20.0     | 3.1             |
|            | Load 3 - Maintenance-fire | 72       | 370      | 9.19       | 20.1     | 2.2             |
|            | Load 4 - Low burn rate    | 264      | 311      | 22.89      | 20.9     | 1.8             |

|                         |                           |            |                  |                                              |                       |                  |                     |              |           |
|-------------------------|---------------------------|------------|------------------|----------------------------------------------|-----------------------|------------------|---------------------|--------------|-----------|
| St.Louis Pre-burn Data  |                           | 2024-10-22 |                  | Total time (h)                               |                       | 8.00             |                     |              |           |
| Wood Specie: Maple      |                           |            |                  |                                              |                       |                  |                     |              |           |
| Load time               | Load type                 | Fuel added | Moisture         | Piece amount                                 | Length of fuel        | Fuel Burnt (Dry) | Burn Rate (Dry)     | Time         | Flue Temp |
| (-)                     | (-)                       | (lb)       | (DB %)           | (-)                                          | (in.)                 | (lb)             | (kg/hr)             | (min)        | (°F)      |
| 2024-10-22 11:46        | Load 1 - Start-up         | 7.92       | 20.8             | 4                                            | 18.00                 | 4.26             | 4.29                | 27           | 349.2     |
| 2024-10-22 12:14        | Load 2 - High-fire        | 13.27      | 23.0             | 4                                            | 18.00                 | 9.63             | 3.28                | 72           | 398.7     |
| 2024-10-22 13:28        | Load 3 - Maintenance-fire | 9.57       | 20.4             | 2                                            | 18.00                 | 6.92             | 2.23                | 76           | 387.5     |
| 2024-10-22 14:45        | Load 4 - Low burn rate    | 22.99      | 21.7             | 6                                            | 18.00                 | 18.87            | 1.52                | 305          | 312.3     |
| Average Tflue (°F)      |                           | 349.2      |                  | 398.7                                        |                       | 387.5            |                     | 312.3        |           |
| Load 1 - Start-up (min) |                           | 27         | High-fire (min)  | 72                                           | Maintenace-fire (min) | 76               | Low burn rate (min) | 305          |           |
| Air control position    |                           | Full open  |                  | Full open then fully closed (@50% fuel load) |                       | Fully closed     |                     | Fully closed |           |
| Index                   | Date & Time               | Flue (F)   | Date & Time      | Flue (F)                                     | Date & Time           | Flue (F)         | Date & Time         | Flue (F)     |           |
| 0                       | 2024-10-22 11:46          | 76.3       | 2024-10-22 12:14 | 433.1                                        | 2024-10-22 13:28      | 363.6            | 2024-10-22 14:45    | 385.4        |           |
| 1                       | 2024-10-22 11:47          | 130.4      | 2024-10-22 12:15 | 414.5                                        | 2024-10-22 13:29      | 389.3            | 2024-10-22 14:46    | 373.7        |           |
| 2                       | 2024-10-22 11:48          | 251.1      | 2024-10-22 12:16 | 437.5                                        | 2024-10-22 13:30      | 433.3            | 2024-10-22 14:47    | 421.6        |           |
| 3                       | 2024-10-22 11:49          | 349.4      | 2024-10-22 12:17 | 447.1                                        | 2024-10-22 13:31      | 450.8            | 2024-10-22 14:48    | 456.9        |           |
| 4                       | 2024-10-22 11:50          | 336.4      | 2024-10-22 12:18 | 447.4                                        | 2024-10-22 13:32      | 425.6            | 2024-10-22 14:49    | 444.5        |           |
| 5                       | 2024-10-22 11:51          | 340.8      | 2024-10-22 12:19 | 435.0                                        | 2024-10-22 13:33      | 406.0            | 2024-10-22 14:50    | 429.4        |           |
| 6                       | 2024-10-22 11:52          | 345.7      | 2024-10-22 12:20 | 432.8                                        | 2024-10-22 13:34      | 396.7            | 2024-10-22 14:51    | 423.4        |           |
| 7                       | 2024-10-22 11:53          | 345.6      | 2024-10-22 12:21 | 437.6                                        | 2024-10-22 13:35      | 391.4            | 2024-10-22 14:52    | 421.9        |           |
| 8                       | 2024-10-22 11:54          | 346.3      | 2024-10-22 12:22 | 444.6                                        | 2024-10-22 13:36      | 389.2            | 2024-10-22 14:53    | 419.9        |           |
| 9                       | 2024-10-22 11:55          | 347.4      | 2024-10-22 12:23 | 448.0                                        | 2024-10-22 13:37      | 388.2            | 2024-10-22 14:54    | 416.5        |           |
| 10                      | 2024-10-22 11:56          | 347.5      | 2024-10-22 12:24 | 454.1                                        | 2024-10-22 13:38      | 387.4            | 2024-10-22 14:55    | 414.8        |           |
| 11                      | 2024-10-22 11:57          | 347.1      | 2024-10-22 12:25 | 457.6                                        | 2024-10-22 13:39      | 386.3            | 2024-10-22 14:56    | 412.9        |           |
| 12                      | 2024-10-22 11:58          | 354.1      | 2024-10-22 12:26 | 456.5                                        | 2024-10-22 13:40      | 386.2            | 2024-10-22 14:57    | 413.0        |           |
| 13                      | 2024-10-22 11:59          | 361.7      | 2024-10-22 12:27 | 457.2                                        | 2024-10-22 13:41      | 385.8            | 2024-10-22 14:58    | 412.8        |           |
| 14                      | 2024-10-22 12:00          | 368.6      | 2024-10-22 12:28 | 460.9                                        | 2024-10-22 13:42      | 385.9            | 2024-10-22 14:59    | 413.2        |           |
| 15                      | 2024-10-22 12:01          | 375.4      | 2024-10-22 12:29 | 457.2                                        | 2024-10-22 13:43      | 386.0            | 2024-10-22 15:00    | 413.7        |           |
| 16                      | 2024-10-22 12:02          | 379.2      | 2024-10-22 12:30 | 446.8                                        | 2024-10-22 13:44      | 385.8            | 2024-10-22 15:01    | 416.2        |           |
| 17                      | 2024-10-22 12:03          | 386.2      | 2024-10-22 12:31 | 433.7                                        | 2024-10-22 13:45      | 385.8            | 2024-10-22 15:02    | 417.0        |           |
| 18                      | 2024-10-22 12:04          | 394.2      | 2024-10-22 12:32 | 425.4                                        | 2024-10-22 13:46      | 386.4            | 2024-10-22 15:03    | 418.5        |           |
| 19                      | 2024-10-22 12:05          | 390.4      | 2024-10-22 12:33 | 424.0                                        | 2024-10-22 13:47      | 386.8            | 2024-10-22 15:04    | 418.9        |           |
| 20                      | 2024-10-22 12:06          | 387.7      | 2024-10-22 12:34 | 425.2                                        | 2024-10-22 13:48      | 387.0            | 2024-10-22 15:05    | 420.0        |           |
| 21                      | 2024-10-22 12:07          | 389.8      | 2024-10-22 12:35 | 426.4                                        | 2024-10-22 13:49      | 387.5            | 2024-10-22 15:06    | 421.0        |           |
| 22                      | 2024-10-22 12:08          | 393.4      | 2024-10-22 12:36 | 428.8                                        | 2024-10-22 13:50      | 387.5            | 2024-10-22 15:07    | 421.6        |           |
| 23                      | 2024-10-22 12:09          | 395.5      | 2024-10-22 12:37 | 428.5                                        | 2024-10-22 13:51      | 388.2            | 2024-10-22 15:08    | 423.4        |           |
| 24                      | 2024-10-22 12:10          | 398.9      | 2024-10-22 12:38 | 429.5                                        | 2024-10-22 13:52      | 388.7            | 2024-10-22 15:09    | 424.6        |           |
| 25                      | 2024-10-22 12:11          | 404.2      | 2024-10-22 12:39 | 430.5                                        | 2024-10-22 13:53      | 387.9            | 2024-10-22 15:10    | 425.2        |           |
| 26                      | 2024-10-22 12:12          | 411.1      | 2024-10-22 12:40 | 429.8                                        | 2024-10-22 13:54      | 388.5            | 2024-10-22 15:11    | 426.3        |           |
| 27                      | 2024-10-22 12:13          | 421.8      | 2024-10-22 12:41 | 422.0                                        | 2024-10-22 13:55      | 388.4            | 2024-10-22 15:12    | 426.5        |           |
| 28                      |                           |            | 2024-10-22 12:42 | 416.7                                        | 2024-10-22 13:56      | 387.5            | 2024-10-22 15:13    | 426.7        |           |
| 29                      |                           |            | 2024-10-22 12:43 | 418.9                                        | 2024-10-22 13:57      | 386.8            | 2024-10-22 15:14    | 425.6        |           |
| 30                      |                           |            | 2024-10-22 12:44 | 409.7                                        | 2024-10-22 13:58      | 386.3            | 2024-10-22 15:15    | 425.2        |           |
| 31                      |                           |            | 2024-10-22 12:45 | 402.7                                        | 2024-10-22 13:59      | 385.5            | 2024-10-22 15:16    | 426.0        |           |
| 32                      |                           |            | 2024-10-22 12:46 | 397.7                                        | 2024-10-22 14:00      | 384.3            | 2024-10-22 15:17    | 426.1        |           |
| 33                      |                           |            | 2024-10-22 12:47 | 391.9                                        | 2024-10-22 14:01      | 390.5            | 2024-10-22 15:18    | 426.2        |           |
| 34                      |                           |            | 2024-10-22 12:48 | 391.7                                        | 2024-10-22 14:02      | 398.4            | 2024-10-22 15:19    | 425.9        |           |
| 35                      |                           |            | 2024-10-22 12:49 | 387.4                                        | 2024-10-22 14:03      | 396.9            | 2024-10-22 15:20    | 426.0        |           |
| 36                      |                           |            | 2024-10-22 12:50 | 386.0                                        | 2024-10-22 14:04      | 394.7            | 2024-10-22 15:21    | 426.9        |           |
| 37                      |                           |            | 2024-10-22 12:51 | 384.0                                        | 2024-10-22 14:05      | 393.6            | 2024-10-22 15:22    | 426.9        |           |
| 38                      |                           |            | 2024-10-22 12:52 | 379.8                                        | 2024-10-22 14:06      | 394.0            | 2024-10-22 15:23    | 427.8        |           |
| 39                      |                           |            | 2024-10-22 12:53 | 376.6                                        | 2024-10-22 14:07      | 393.5            | 2024-10-22 15:24    | 428.5        |           |
| 40                      |                           |            | 2024-10-22 12:54 | 373.6                                        | 2024-10-22 14:08      | 392.2            | 2024-10-22 15:25    | 430.0        |           |
| 41                      |                           |            | 2024-10-22 12:55 | 372.3                                        | 2024-10-22 14:09      | 391.9            | 2024-10-22 15:26    | 431.0        |           |
| 42                      |                           |            | 2024-10-22 12:56 | 373.2                                        | 2024-10-22 14:10      | 392.1            | 2024-10-22 15:27    | 431.2        |           |
| 43                      |                           |            | 2024-10-22 12:57 | 373.1                                        | 2024-10-22 14:11      | 391.9            | 2024-10-22 15:28    | 431.4        |           |
| 44                      |                           |            | 2024-10-22 12:58 | 373.1                                        | 2024-10-22 14:12      | 392.4            | 2024-10-22 15:29    | 431.4        |           |
| 45                      |                           |            | 2024-10-22 13:00 | 373.6                                        | 2024-10-22 14:13      | 391.9            | 2024-10-22 15:30    | 432.2        |           |
| 46                      |                           |            | 2024-10-22 13:01 | 375.4                                        | 2024-10-22 14:14      | 391.1            | 2024-10-22 15:31    | 431.4        |           |
| 47                      |                           |            | 2024-10-22 13:02 | 377.9                                        | 2024-10-22 14:15      | 389.9            | 2024-10-22 15:32    | 430.4        |           |
| 48                      |                           |            | 2024-10-22 13:03 | 378.9                                        | 2024-10-22 14:16      | 389.3            | 2024-10-22 15:33    | 430.9        |           |
| 49                      |                           |            | 2024-10-22 13:04 | 379.0                                        | 2024-10-22 14:17      | 389.1            | 2024-10-22 15:34    | 431.7        |           |
| 50                      |                           |            | 2024-10-22 13:05 | 379.0                                        | 2024-10-22 14:18      | 388.2            | 2024-10-22 15:35    | 431.7        |           |
| 51                      |                           |            | 2024-10-22 13:06 | 378.0                                        | 2024-10-22 14:19      | 387.1            | 2024-10-22 15:36    | 431.5        |           |
| 52                      |                           |            | 2024-10-22 13:07 | 377.0                                        | 2024-10-22 14:20      | 386.2            | 2024-10-22 15:37    | 432.8        |           |
| 53                      |                           |            | 2024-10-22 13:08 | 375.7                                        | 2024-10-22 14:21      | 384.8            | 2024-10-22 15:38    | 434.1        |           |
| 54                      |                           |            | 2024-10-22 13:09 | 374.4                                        | 2024-10-22 14:22      | 384.6            | 2024-10-22 15:39    | 435.1        |           |
| 55                      |                           |            | 2024-10-22 13:10 | 371.7                                        | 2024-10-22 14:23      | 383.6            | 2024-10-22 15:40    | 436.1        |           |
| 56                      |                           |            | 2024-10-22 13:11 | 369.4                                        | 2024-10-22 14:24      | 382.6            | 2024-10-22 15:41    | 437.9        |           |
| 57                      |                           |            | 2024-10-22 13:12 | 367.0                                        | 2024-10-22 14:25      | 381.5            | 2024-10-22 15:42    | 438.9        |           |
| 58                      |                           |            | 2024-10-22 13:13 | 365.0                                        | 2024-10-22 14:26      | 380.8            | 2024-10-22 15:43    | 439.9        |           |
| 59                      |                           |            | 2024-10-22 13:14 | 362.7                                        | 2024-10-22 14:27      | 380.1            | 2024-10-22 15:44    | 438.3        |           |
| 60                      |                           |            | 2024-10-22 13:15 | 361.5                                        | 2024-10-22 14:28      | 379.5            | 2024-10-22 15:45    | 438.0        |           |
| 61                      |                           |            | 2024-10-22 13:16 | 359.4                                        | 2024-10-22 14:29      | 378.8            | 2024-10-22 15:46    | 438.4        |           |
| 62                      |                           |            | 2024-10-22 13:17 | 357.3                                        | 2024-10-22 14:30      | 378.5            | 2024-10-22 15:47    | 438.3        |           |
| 63                      |                           |            | 2024-10-22 13:18 | 357.2                                        | 2024-10-22 14:31      | 377.7            | 2024-10-22 15:48    | 437.4        |           |
| 64                      |                           |            | 2024-10-22 13:19 | 356.5                                        | 2024-10-22 14:32      | 377.0            | 2024-10-22 15:49    | 437.5        |           |
| 65                      |                           |            | 2024-10-22 13:20 | 357.2                                        | 2024-10-22 14:33      | 376.9            | 2024-10-22 15:50    | 436.9        |           |
| 66                      |                           |            | 2024-10-22 13:21 | 356.4                                        | 2024-10-22 14:34      | 375.6            | 2024-10-22 15:51    | 436.0        |           |
| 67                      |                           |            | 2024-10-22 13:22 | 354.9                                        | 2024-10-22 14:35      | 375.5            | 2024-10-22 15:52    | 434.3        |           |

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| 68  |  |  | 2024-10-22 13:23 | 354.5 | 2024-10-22 14:36 | 375.8 | 2024-10-22 15:53 | 432.2 |
| 69  |  |  | 2024-10-22 13:24 | 354.2 | 2024-10-22 14:37 | 375.4 | 2024-10-22 15:54 | 431.3 |
| 70  |  |  | 2024-10-22 13:25 | 352.6 | 2024-10-22 14:38 | 375.8 | 2024-10-22 15:55 | 428.8 |
| 71  |  |  | 2024-10-22 13:26 | 351.5 | 2024-10-22 14:39 | 375.9 | 2024-10-22 15:56 | 426.3 |
| 72  |  |  | 2024-10-22 13:27 | 350.5 | 2024-10-22 14:40 | 376.1 | 2024-10-22 15:57 | 425.3 |
| 73  |  |  |                  |       | 2024-10-22 14:41 | 376.1 | 2024-10-22 15:58 | 424.2 |
| 74  |  |  |                  |       | 2024-10-22 14:42 | 374.8 | 2024-10-22 15:59 | 422.9 |
| 75  |  |  |                  |       | 2024-10-22 14:43 | 374.0 | 2024-10-22 16:00 | 421.9 |
| 76  |  |  |                  |       | 2024-10-22 14:44 | 372.8 | 2024-10-22 16:01 | 421.0 |
| 77  |  |  |                  |       |                  |       | 2024-10-22 16:02 | 420.7 |
| 78  |  |  |                  |       |                  |       | 2024-10-22 16:03 | 418.3 |
| 79  |  |  |                  |       |                  |       | 2024-10-22 16:04 | 415.4 |
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| 81  |  |  |                  |       |                  |       | 2024-10-22 16:06 | 409.9 |
| 82  |  |  |                  |       |                  |       | 2024-10-22 16:07 | 408.3 |
| 83  |  |  |                  |       |                  |       | 2024-10-22 16:08 | 408.2 |
| 84  |  |  |                  |       |                  |       | 2024-10-22 16:09 | 408.3 |
| 85  |  |  |                  |       |                  |       | 2024-10-22 16:10 | 408.5 |
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| 87  |  |  |                  |       |                  |       | 2024-10-22 16:12 | 409.5 |
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| 89  |  |  |                  |       |                  |       | 2024-10-22 16:14 | 407.5 |
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| 91  |  |  |                  |       |                  |       | 2024-10-22 16:16 | 407.4 |
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| 94  |  |  |                  |       |                  |       | 2024-10-22 16:19 | 402.1 |
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| 138 |  |  |                  |       |                  |       | 2024-10-22 17:03 | 368.6 |
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| 148 |  |  |                  |       |                  |       | 2024-10-22 17:13 | 353.9 |

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| 153 |  |  |  |  |  |  | 2024-10-22 17:18 | 354.9 |
| 154 |  |  |  |  |  |  | 2024-10-22 17:19 | 354.5 |
| 155 |  |  |  |  |  |  | 2024-10-22 17:20 | 354.1 |
| 156 |  |  |  |  |  |  | 2024-10-22 17:21 | 353.8 |
| 157 |  |  |  |  |  |  | 2024-10-22 17:22 | 354.4 |
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| 163 |  |  |  |  |  |  | 2024-10-22 17:28 | 346.4 |
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| 169 |  |  |  |  |  |  | 2024-10-22 17:34 | 306.6 |
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| 173 |  |  |  |  |  |  | 2024-10-22 17:38 | 280.8 |
| 174 |  |  |  |  |  |  | 2024-10-22 17:39 | 274.6 |
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| 188 |  |  |  |  |  |  | 2024-10-22 17:53 | 235.1 |
| 189 |  |  |  |  |  |  | 2024-10-22 17:54 | 233.5 |
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| 191 |  |  |  |  |  |  | 2024-10-22 17:56 | 231.4 |
| 192 |  |  |  |  |  |  | 2024-10-22 17:57 | 230.2 |
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| 204 |  |  |  |  |  |  | 2024-10-22 18:09 | 216.4 |
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| 208 |  |  |  |  |  |  | 2024-10-22 18:13 | 213.5 |
| 209 |  |  |  |  |  |  | 2024-10-22 18:14 | 212.5 |
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| 211 |  |  |  |  |  |  | 2024-10-22 18:16 | 210.4 |
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| 213 |  |  |  |  |  |  | 2024-10-22 18:18 | 209.6 |
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| 219 |  |  |  |  |  |  | 2024-10-22 18:24 | 204.9 |
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| 221 |  |  |  |  |  |  | 2024-10-22 18:26 | 203.5 |
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| 223 |  |  |  |  |  |  | 2024-10-22 18:28 | 202.6 |
| 224 |  |  |  |  |  |  | 2024-10-22 18:29 | 201.8 |
| 225 |  |  |  |  |  |  | 2024-10-22 18:30 | 201.3 |
| 226 |  |  |  |  |  |  | 2024-10-22 18:31 | 201.0 |
| 227 |  |  |  |  |  |  | 2024-10-22 18:32 | 200.1 |
| 228 |  |  |  |  |  |  | 2024-10-22 18:33 | 199.3 |
| 229 |  |  |  |  |  |  | 2024-10-22 18:34 | 198.7 |



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| 230 |  |  |  |  |  |  | 2024-10-22 18:35 | 198.5 |
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| 233 |  |  |  |  |  |  | 2024-10-22 18:38 | 196.4 |
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| 235 |  |  |  |  |  |  | 2024-10-22 18:40 | 195.8 |
| 236 |  |  |  |  |  |  | 2024-10-22 18:41 | 195.0 |
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| 257 |  |  |  |  |  |  | 2024-10-22 19:02 | 187.3 |
| 258 |  |  |  |  |  |  | 2024-10-22 19:03 | 186.7 |
| 259 |  |  |  |  |  |  | 2024-10-22 19:04 | 186.7 |
| 260 |  |  |  |  |  |  | 2024-10-22 19:05 | 186.0 |
| 261 |  |  |  |  |  |  | 2024-10-22 19:06 | 186.2 |
| 262 |  |  |  |  |  |  | 2024-10-22 19:07 | 186.0 |
| 263 |  |  |  |  |  |  | 2024-10-22 19:08 | 185.4 |
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| 265 |  |  |  |  |  |  | 2024-10-22 19:10 | 184.9 |
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| 269 |  |  |  |  |  |  | 2024-10-22 19:14 | 184.0 |
| 270 |  |  |  |  |  |  | 2024-10-22 19:15 | 183.6 |
| 271 |  |  |  |  |  |  | 2024-10-22 19:16 | 183.0 |
| 272 |  |  |  |  |  |  | 2024-10-22 19:17 | 183.1 |
| 273 |  |  |  |  |  |  | 2024-10-22 19:18 | 183.0 |
| 274 |  |  |  |  |  |  | 2024-10-22 19:19 | 182.5 |
| 275 |  |  |  |  |  |  | 2024-10-22 19:20 | 181.5 |
| 276 |  |  |  |  |  |  | 2024-10-22 19:21 | 181.0 |
| 277 |  |  |  |  |  |  | 2024-10-22 19:22 | 186.8 |
| 278 |  |  |  |  |  |  | 2024-10-22 19:23 | 205.6 |
| 279 |  |  |  |  |  |  | 2024-10-22 19:24 | 208.2 |
| 280 |  |  |  |  |  |  | 2024-10-22 19:25 | 210.1 |
| 281 |  |  |  |  |  |  | 2024-10-22 19:26 | 212.7 |
| 282 |  |  |  |  |  |  | 2024-10-22 19:27 | 214.3 |
| 283 |  |  |  |  |  |  | 2024-10-22 19:28 | 213.0 |
| 284 |  |  |  |  |  |  | 2024-10-22 19:29 | 203.1 |
| 285 |  |  |  |  |  |  | 2024-10-22 19:30 | 196.8 |
| 286 |  |  |  |  |  |  | 2024-10-22 19:31 | 192.7 |
| 287 |  |  |  |  |  |  | 2024-10-22 19:32 | 189.9 |
| 288 |  |  |  |  |  |  | 2024-10-22 19:33 | 187.7 |
| 289 |  |  |  |  |  |  | 2024-10-22 19:34 | 185.6 |
| 290 |  |  |  |  |  |  | 2024-10-22 19:35 | 183.8 |
| 291 |  |  |  |  |  |  | 2024-10-22 19:36 | 182.8 |
| 292 |  |  |  |  |  |  | 2024-10-22 19:37 | 181.7 |
| 293 |  |  |  |  |  |  | 2024-10-22 19:38 | 181.2 |
| 294 |  |  |  |  |  |  | 2024-10-22 19:39 | 180.3 |
| 295 |  |  |  |  |  |  | 2024-10-22 19:40 | 179.6 |
| 296 |  |  |  |  |  |  | 2024-10-22 19:41 | 178.8 |
| 297 |  |  |  |  |  |  | 2024-10-22 19:42 | 178.3 |
| 298 |  |  |  |  |  |  | 2024-10-22 19:43 | 177.4 |
| 299 |  |  |  |  |  |  | 2024-10-22 19:44 | 177.2 |
| 300 |  |  |  |  |  |  | 2024-10-22 19:45 | 176.2 |
| 301 |  |  |  |  |  |  | 2024-10-22 19:46 | 175.5 |
| 302 |  |  |  |  |  |  | 2024-10-22 19:47 | 175.2 |
| 303 |  |  |  |  |  |  | 2024-10-22 19:48 | 174.9 |
| 304 |  |  |  |  |  |  | 2024-10-22 19:49 | 174.6 |
| 305 |  |  |  |  |  |  | 2024-10-22 19:49 | 174.5 |

|                        |                           |            |          |                |                |                  |                 |       |           |
|------------------------|---------------------------|------------|----------|----------------|----------------|------------------|-----------------|-------|-----------|
| St.Louis Pre-burn Data |                           | 2024-10-24 |          | Total time (h) |                | 9.22             |                 |       |           |
| Wood Specie: Maple     |                           |            |          |                |                |                  |                 |       |           |
| Load time              | Load type                 | Fuel added | Moisture | Piece amount   | Length of fuel | Fuel Burnt (Dry) | Burn Rate (Dry) | Time  | Flue Temp |
| (-)                    | (-)                       | (lb)       | (DB %)   | (-)            | (in.)          | (lb)             | (kg/hr)         | (min) | (°F)      |
| 2024-10-24 12:12       | Load 1 - Start-up         | 7.94       | 19.6     | 4              | 18.00          | 4.27             | 4.65            | 25    | 356.5     |
| 2024-10-24 12:38       | Load 2 - High-fire        | 13.51      | 22.3     | 4              | 18.00          | 9.56             | 3.16            | 74    | 424.9     |
| 2024-10-24 13:53       | Load 3 - Maintenance-fire | 9.28       | 20.6     | 2              | 18.00          | 7.03             | 2.24            | 77    | 397.2     |
| 2024-10-24 15:11       | Load 4 - Low burn rate    | 23.48      | 20.1     | 6              | 18.00          | 19.58            | 1.27            | 377   | 263.3     |

|                      | Average Tflue (°F)      | 356.5    |                                              | 424.9    |                        | 397.2    | 263.3               |          |
|----------------------|-------------------------|----------|----------------------------------------------|----------|------------------------|----------|---------------------|----------|
|                      | Load 1 - Start-up (min) | 25       | High-fire (min)                              | 74       | Maintenance-fire (min) | 77       | Low burn rate (min) | 377      |
| Air control position | Full open               |          | Full open then fully closed (@50% fuel load) |          | Fully closed           |          | Fully closed        |          |
| Index                | Date & Time             | Flue (F) | Date & Time                                  | Flue (F) | Date & Time            | Flue (F) | Date & Time         | Flue (F) |
| 0                    | 2024-10-24 12:12        | 76.9     | 2024-10-24 12:38                             | 407.7    | 2024-10-24 13:53       | 410.2    | 2024-10-24 15:11    | 383.8    |
| 1                    | 2024-10-24 12:13        | 116.2    | 2024-10-24 12:39                             | 450.5    | 2024-10-24 13:54       | 462.3    | 2024-10-24 15:12    | 362.3    |
| 2                    | 2024-10-24 12:14        | 199.0    | 2024-10-24 12:40                             | 442.8    | 2024-10-24 13:55       | 474.8    | 2024-10-24 15:13    | 407.2    |
| 3                    | 2024-10-24 12:15        | 287.2    | 2024-10-24 12:41                             | 425.0    | 2024-10-24 13:56       | 457.7    | 2024-10-24 15:14    | 447.0    |
| 4                    | 2024-10-24 12:16        | 326.1    | 2024-10-24 12:42                             | 424.7    | 2024-10-24 13:57       | 452.5    | 2024-10-24 15:15    | 462.1    |
| 5                    | 2024-10-24 12:17        | 344.5    | 2024-10-24 12:43                             | 440.0    | 2024-10-24 13:58       | 447.5    | 2024-10-24 15:16    | 458.9    |
| 6                    | 2024-10-24 12:18        | 352.7    | 2024-10-24 12:44                             | 450.0    | 2024-10-24 13:59       | 441.4    | 2024-10-24 15:17    | 446.2    |
| 7                    | 2024-10-24 12:19        | 357.5    | 2024-10-24 12:45                             | 458.2    | 2024-10-24 14:00       | 430.0    | 2024-10-24 15:18    | 439.1    |
| 8                    | 2024-10-24 12:20        | 365.9    | 2024-10-24 12:46                             | 464.2    | 2024-10-24 14:01       | 422.5    | 2024-10-24 15:19    | 436.2    |
| 9                    | 2024-10-24 12:21        | 369.1    | 2024-10-24 12:47                             | 464.8    | 2024-10-24 14:02       | 416.7    | 2024-10-24 15:20    | 434.0    |
| 10                   | 2024-10-24 12:22        | 371.6    | 2024-10-24 12:48                             | 457.8    | 2024-10-24 14:03       | 411.5    | 2024-10-24 15:21    | 433.3    |
| 11                   | 2024-10-24 12:23        | 381.7    | 2024-10-24 12:49                             | 456.4    | 2024-10-24 14:04       | 407.2    | 2024-10-24 15:22    | 434.7    |
| 12                   | 2024-10-24 12:24        | 389.2    | 2024-10-24 12:50                             | 459.9    | 2024-10-24 14:05       | 403.8    | 2024-10-24 15:23    | 435.0    |
| 13                   | 2024-10-24 12:25        | 395.1    | 2024-10-24 12:51                             | 460.8    | 2024-10-24 14:06       | 402.4    | 2024-10-24 15:24    | 434.7    |
| 14                   | 2024-10-24 12:26        | 399.8    | 2024-10-24 12:52                             | 460.5    | 2024-10-24 14:07       | 402.0    | 2024-10-24 15:25    | 434.5    |
| 15                   | 2024-10-24 12:27        | 402.0    | 2024-10-24 12:53                             | 459.3    | 2024-10-24 14:08       | 401.4    | 2024-10-24 15:26    | 434.2    |
| 16                   | 2024-10-24 12:28        | 405.7    | 2024-10-24 12:54                             | 459.2    | 2024-10-24 14:09       | 400.8    | 2024-10-24 15:27    | 433.8    |
| 17                   | 2024-10-24 12:29        | 414.6    | 2024-10-24 12:55                             | 460.8    | 2024-10-24 14:10       | 402.0    | 2024-10-24 15:28    | 433.3    |
| 18                   | 2024-10-24 12:30        | 416.4    | 2024-10-24 12:56                             | 460.3    | 2024-10-24 14:11       | 402.0    | 2024-10-24 15:29    | 433.2    |
| 19                   | 2024-10-24 12:31        | 412.3    | 2024-10-24 12:57                             | 458.8    | 2024-10-24 14:12       | 403.2    | 2024-10-24 15:30    | 433.2    |
| 20                   | 2024-10-24 12:32        | 411.8    | 2024-10-24 12:58                             | 458.5    | 2024-10-24 14:13       | 403.7    | 2024-10-24 15:31    | 434.7    |
| 21                   | 2024-10-24 12:33        | 411.1    | 2024-10-24 12:59                             | 458.7    | 2024-10-24 14:14       | 403.4    | 2024-10-24 15:32    | 435.3    |
| 22                   | 2024-10-24 12:34        | 411.5    | 2024-10-24 13:00                             | 459.5    | 2024-10-24 14:15       | 404.2    | 2024-10-24 15:33    | 435.2    |
| 23                   | 2024-10-24 12:35        | 414.1    | 2024-10-24 13:01                             | 459.8    | 2024-10-24 14:16       | 405.1    | 2024-10-24 15:34    | 434.7    |
| 24                   | 2024-10-24 12:36        | 416.8    | 2024-10-24 13:02                             | 459.9    | 2024-10-24 14:17       | 404.5    | 2024-10-24 15:35    | 434.6    |
| 25                   | 2024-10-24 12:37        | 420.7    | 2024-10-24 13:03                             | 461.7    | 2024-10-24 14:18       | 404.1    | 2024-10-24 15:36    | 433.8    |
| 26                   |                         |          | 2024-10-24 13:04                             | 463.8    | 2024-10-24 14:19       | 402.8    | 2024-10-24 15:37    | 433.1    |
| 27                   |                         |          | 2024-10-24 13:05                             | 466.2    | 2024-10-24 14:20       | 402.8    | 2024-10-24 15:38    | 431.6    |
| 28                   |                         |          | 2024-10-24 13:06                             | 469.0    | 2024-10-24 14:21       | 401.5    | 2024-10-24 15:39    | 429.4    |
| 29                   |                         |          | 2024-10-24 13:07                             | 471.2    | 2024-10-24 14:22       | 400.3    | 2024-10-24 15:40    | 428.9    |
| 30                   |                         |          | 2024-10-24 13:08                             | 474.5    | 2024-10-24 14:23       | 399.3    | 2024-10-24 15:41    | 428.0    |
| 31                   |                         |          | 2024-10-24 13:09                             | 477.6    | 2024-10-24 14:24       | 398.2    | 2024-10-24 15:42    | 428.2    |
| 32                   |                         |          | 2024-10-24 13:10                             | 465.2    | 2024-10-24 14:25       | 397.5    | 2024-10-24 15:43    | 428.0    |
| 33                   |                         |          | 2024-10-24 13:11                             | 444.9    | 2024-10-24 14:26       | 396.4    | 2024-10-24 15:44    | 427.6    |
| 34                   |                         |          | 2024-10-24 13:12                             | 431.8    | 2024-10-24 14:27       | 395.0    | 2024-10-24 15:45    | 428.3    |
| 35                   |                         |          | 2024-10-24 13:13                             | 422.5    | 2024-10-24 14:28       | 396.1    | 2024-10-24 15:46    | 429.5    |
| 36                   |                         |          | 2024-10-24 13:14                             | 414.9    | 2024-10-24 14:29       | 398.4    | 2024-10-24 15:47    | 431.2    |
| 37                   |                         |          | 2024-10-24 13:15                             | 409.8    | 2024-10-24 14:30       | 398.4    | 2024-10-24 15:48    | 433.0    |
| 38                   |                         |          | 2024-10-24 13:16                             | 406.4    | 2024-10-24 14:31       | 399.3    | 2024-10-24 15:49    | 435.9    |
| 39                   |                         |          | 2024-10-24 13:17                             | 410.2    | 2024-10-24 14:32       | 395.4    | 2024-10-24 15:50    | 438.3    |
| 40                   |                         |          | 2024-10-24 13:18                             | 414.5    | 2024-10-24 14:33       | 392.2    | 2024-10-24 15:51    | 439.3    |
| 41                   |                         |          | 2024-10-24 13:19                             | 409.8    | 2024-10-24 14:34       | 390.8    | 2024-10-24 15:52    | 440.6    |
| 42                   |                         |          | 2024-10-24 13:20                             | 406.2    | 2024-10-24 14:35       | 389.6    | 2024-10-24 15:53    | 440.2    |
| 43                   |                         |          | 2024-10-24 13:21                             | 403.4    | 2024-10-24 14:36       | 388.2    | 2024-10-24 15:54    | 441.8    |
| 44                   |                         |          | 2024-10-24 13:22                             | 402.4    | 2024-10-24 14:37       | 387.0    | 2024-10-24 15:55    | 441.9    |
| 45                   |                         |          | 2024-10-24 13:23                             | 400.9    | 2024-10-24 14:38       | 385.9    | 2024-10-24 15:56    | 442.1    |
| 46                   |                         |          | 2024-10-24 13:24                             | 399.8    | 2024-10-24 14:39       | 384.9    | 2024-10-24 15:57    | 442.0    |
| 47                   |                         |          | 2024-10-24 13:25                             | 399.5    | 2024-10-24 14:40       | 382.8    | 2024-10-24 15:58    | 442.9    |
| 48                   |                         |          | 2024-10-24 13:26                             | 399.7    | 2024-10-24 14:41       | 382.0    | 2024-10-24 15:59    | 443.1    |
| 49                   |                         |          | 2024-10-24 13:27                             | 399.9    | 2024-10-24 14:42       | 382.6    | 2024-10-24 16:00    | 443.2    |
| 50                   |                         |          | 2024-10-24 13:28                             | 400.3    | 2024-10-24 14:43       | 381.4    | 2024-10-24 16:01    | 444.5    |
| 51                   |                         |          | 2024-10-24 13:29                             | 399.7    | 2024-10-24 14:44       | 380.6    | 2024-10-24 16:02    | 444.5    |
| 52                   |                         |          | 2024-10-24 13:30                             | 400.5    | 2024-10-24 14:45       | 380.2    | 2024-10-24 16:03    | 444.7    |
| 53                   |                         |          | 2024-10-24 13:31                             | 401.3    | 2024-10-24 14:46       | 379.5    | 2024-10-24 16:04    | 442.8    |
| 54                   |                         |          | 2024-10-24 13:32                             | 401.0    | 2024-10-24 14:47       | 378.7    | 2024-10-24 16:05    | 441.8    |
| 55                   |                         |          | 2024-10-24 13:33                             | 401.3    | 2024-10-24 14:48       | 378.5    | 2024-10-24 16:06    | 439.9    |
| 56                   |                         |          | 2024-10-24 13:34                             | 402.1    | 2024-10-24 14:49       | 377.8    | 2024-10-24 16:07    | 437.3    |
| 57                   |                         |          | 2024-10-24 13:35                             | 402.5    | 2024-10-24 14:50       | 378.0    | 2024-10-24 16:08    | 434.1    |
| 58                   |                         |          | 2024-10-24 13:36                             | 400.8    | 2024-10-24 14:51       | 379.5    | 2024-10-24 16:09    | 431.8    |
| 59                   |                         |          | 2024-10-24 13:37                             | 398.9    | 2024-10-24 14:52       | 379.9    | 2024-10-24 16:10    | 430.0    |
| 60                   |                         |          | 2024-10-24 13:38                             | 397.2    | 2024-10-24 14:53       | 379.9    | 2024-10-24 16:11    | 428.6    |
| 61                   |                         |          | 2024-10-24 13:39                             | 394.9    | 2024-10-24 14:54       | 381.7    | 2024-10-24 16:12    | 426.2    |
| 62                   |                         |          | 2024-10-24 13:40                             | 393.5    | 2024-10-24 14:55       | 380.4    | 2024-10-24 16:13    | 425.0    |
| 63                   |                         |          | 2024-10-24 13:41                             | 392.0    | 2024-10-24 14:56       | 381.8    | 2024-10-24 16:14    | 422.0    |
| 64                   |                         |          | 2024-10-24 13:42                             | 390.6    | 2024-10-24 14:57       | 382.4    | 2024-10-24 16:15    | 420.6    |
| 65                   |                         |          | 2024-10-24 13:43                             | 390.2    | 2024-10-24 14:58       | 382.4    | 2024-10-24 16:16    | 417.2    |
| 66                   |                         |          | 2024-10-24 13:44                             | 388.0    | 2024-10-24 14:59       | 383.2    | 2024-10-24 16:17    | 415.1    |
| 67                   |                         |          | 2024-10-24 13:45                             | 386.0    | 2024-10-24 15:00       | 383.7    | 2024-10-24 16:18    | 412.8    |

|     |  |  |                  |       |                  |       |                  |       |
|-----|--|--|------------------|-------|------------------|-------|------------------|-------|
| 68  |  |  | 2024-10-24 13:46 | 383.8 | 2024-10-24 15:01 | 383.2 | 2024-10-24 16:19 | 410.4 |
| 69  |  |  | 2024-10-24 13:47 | 382.0 | 2024-10-24 15:02 | 379.1 | 2024-10-24 16:20 | 407.3 |
| 70  |  |  | 2024-10-24 13:48 | 383.5 | 2024-10-24 15:03 | 380.0 | 2024-10-24 16:21 | 406.0 |
| 71  |  |  | 2024-10-24 13:49 | 383.6 | 2024-10-24 15:04 | 381.5 | 2024-10-24 16:22 | 405.2 |
| 72  |  |  | 2024-10-24 13:50 | 384.0 | 2024-10-24 15:05 | 381.2 | 2024-10-24 16:23 | 402.7 |
| 73  |  |  | 2024-10-24 13:51 | 383.7 | 2024-10-24 15:06 | 381.4 | 2024-10-24 16:24 | 400.9 |
| 74  |  |  | 2024-10-24 13:52 | 384.1 | 2024-10-24 15:07 | 380.7 | 2024-10-24 16:25 | 399.4 |
| 75  |  |  |                  |       | 2024-10-24 15:08 | 380.4 | 2024-10-24 16:26 | 397.6 |
| 76  |  |  |                  |       | 2024-10-24 15:09 | 380.5 | 2024-10-24 16:27 | 395.5 |
| 77  |  |  |                  |       | 2024-10-24 15:10 | 380.0 | 2024-10-24 16:28 | 393.7 |
| 78  |  |  |                  |       |                  |       | 2024-10-24 16:29 | 392.0 |
| 79  |  |  |                  |       |                  |       | 2024-10-24 16:30 | 390.7 |
| 80  |  |  |                  |       |                  |       | 2024-10-24 16:31 | 388.2 |
| 81  |  |  |                  |       |                  |       | 2024-10-24 16:32 | 385.9 |
| 82  |  |  |                  |       |                  |       | 2024-10-24 16:33 | 384.8 |
| 83  |  |  |                  |       |                  |       | 2024-10-24 16:34 | 382.8 |
| 84  |  |  |                  |       |                  |       | 2024-10-24 16:35 | 381.2 |
| 85  |  |  |                  |       |                  |       | 2024-10-24 16:36 | 379.7 |
| 86  |  |  |                  |       |                  |       | 2024-10-24 16:37 | 377.7 |
| 87  |  |  |                  |       |                  |       | 2024-10-24 16:38 | 376.3 |
| 88  |  |  |                  |       |                  |       | 2024-10-24 16:39 | 374.5 |
| 89  |  |  |                  |       |                  |       | 2024-10-24 16:40 | 372.5 |
| 90  |  |  |                  |       |                  |       | 2024-10-24 16:41 | 371.2 |
| 91  |  |  |                  |       |                  |       | 2024-10-24 16:42 | 370.6 |
| 92  |  |  |                  |       |                  |       | 2024-10-24 16:43 | 369.4 |
| 93  |  |  |                  |       |                  |       | 2024-10-24 16:44 | 366.4 |
| 94  |  |  |                  |       |                  |       | 2024-10-24 16:45 | 366.1 |
| 95  |  |  |                  |       |                  |       | 2024-10-24 16:46 | 368.4 |
| 96  |  |  |                  |       |                  |       | 2024-10-24 16:47 | 370.6 |
| 97  |  |  |                  |       |                  |       | 2024-10-24 16:48 | 371.8 |
| 98  |  |  |                  |       |                  |       | 2024-10-24 16:49 | 372.8 |
| 99  |  |  |                  |       |                  |       | 2024-10-24 16:50 | 373.6 |
| 100 |  |  |                  |       |                  |       | 2024-10-24 16:51 | 373.9 |
| 101 |  |  |                  |       |                  |       | 2024-10-24 16:52 | 374.2 |
| 102 |  |  |                  |       |                  |       | 2024-10-24 16:53 | 374.8 |
| 103 |  |  |                  |       |                  |       | 2024-10-24 16:54 | 374.6 |
| 104 |  |  |                  |       |                  |       | 2024-10-24 16:55 | 374.8 |
| 105 |  |  |                  |       |                  |       | 2024-10-24 16:56 | 374.3 |
| 106 |  |  |                  |       |                  |       | 2024-10-24 16:57 | 374.7 |
| 107 |  |  |                  |       |                  |       | 2024-10-24 16:58 | 374.7 |
| 108 |  |  |                  |       |                  |       | 2024-10-24 16:59 | 375.2 |
| 109 |  |  |                  |       |                  |       | 2024-10-24 17:00 | 375.3 |
| 110 |  |  |                  |       |                  |       | 2024-10-24 17:01 | 376.3 |
| 111 |  |  |                  |       |                  |       | 2024-10-24 17:02 | 375.9 |
| 112 |  |  |                  |       |                  |       | 2024-10-24 17:03 | 376.3 |
| 113 |  |  |                  |       |                  |       | 2024-10-24 17:04 | 376.8 |
| 114 |  |  |                  |       |                  |       | 2024-10-24 17:05 | 376.4 |
| 115 |  |  |                  |       |                  |       | 2024-10-24 17:06 | 376.4 |
| 116 |  |  |                  |       |                  |       | 2024-10-24 17:07 | 374.7 |
| 117 |  |  |                  |       |                  |       | 2024-10-24 17:08 | 373.5 |
| 118 |  |  |                  |       |                  |       | 2024-10-24 17:09 | 371.5 |
| 119 |  |  |                  |       |                  |       | 2024-10-24 17:10 | 370.4 |
| 120 |  |  |                  |       |                  |       | 2024-10-24 17:11 | 368.0 |
| 121 |  |  |                  |       |                  |       | 2024-10-24 17:12 | 366.5 |
| 122 |  |  |                  |       |                  |       | 2024-10-24 17:13 | 365.5 |
| 123 |  |  |                  |       |                  |       | 2024-10-24 17:14 | 362.6 |
| 124 |  |  |                  |       |                  |       | 2024-10-24 17:15 | 360.7 |
| 125 |  |  |                  |       |                  |       | 2024-10-24 17:16 | 359.1 |
| 126 |  |  |                  |       |                  |       | 2024-10-24 17:17 | 363.4 |
| 127 |  |  |                  |       |                  |       | 2024-10-24 17:18 | 367.1 |
| 128 |  |  |                  |       |                  |       | 2024-10-24 17:19 | 369.5 |
| 129 |  |  |                  |       |                  |       | 2024-10-24 17:20 | 369.6 |
| 130 |  |  |                  |       |                  |       | 2024-10-24 17:21 | 368.9 |
| 131 |  |  |                  |       |                  |       | 2024-10-24 17:22 | 367.5 |
| 132 |  |  |                  |       |                  |       | 2024-10-24 17:23 | 366.4 |
| 133 |  |  |                  |       |                  |       | 2024-10-24 17:24 | 364.6 |
| 134 |  |  |                  |       |                  |       | 2024-10-24 17:25 | 360.4 |
| 135 |  |  |                  |       |                  |       | 2024-10-24 17:26 | 355.7 |
| 136 |  |  |                  |       |                  |       | 2024-10-24 17:27 | 351.9 |
| 137 |  |  |                  |       |                  |       | 2024-10-24 17:28 | 349.1 |
| 138 |  |  |                  |       |                  |       | 2024-10-24 17:29 | 347.1 |
| 139 |  |  |                  |       |                  |       | 2024-10-24 17:30 | 333.6 |
| 140 |  |  |                  |       |                  |       | 2024-10-24 17:31 | 316.9 |
| 141 |  |  |                  |       |                  |       | 2024-10-24 17:32 | 305.0 |
| 142 |  |  |                  |       |                  |       | 2024-10-24 17:33 | 296.9 |
| 143 |  |  |                  |       |                  |       | 2024-10-24 17:34 | 290.2 |
| 144 |  |  |                  |       |                  |       | 2024-10-24 17:35 | 280.5 |
| 145 |  |  |                  |       |                  |       | 2024-10-24 17:36 | 271.8 |
| 146 |  |  |                  |       |                  |       | 2024-10-24 17:37 | 264.1 |
| 147 |  |  |                  |       |                  |       | 2024-10-24 17:38 | 258.8 |
| 148 |  |  |                  |       |                  |       | 2024-10-24 17:39 | 254.0 |

|     |  |  |  |  |  |  |                  |       |
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| 149 |  |  |  |  |  |  | 2024-10-24 17:40 | 248.9 |
| 150 |  |  |  |  |  |  | 2024-10-24 17:41 | 244.7 |
| 151 |  |  |  |  |  |  | 2024-10-24 17:42 | 241.0 |
| 152 |  |  |  |  |  |  | 2024-10-24 17:43 | 237.6 |
| 153 |  |  |  |  |  |  | 2024-10-24 17:44 | 233.8 |
| 154 |  |  |  |  |  |  | 2024-10-24 17:45 | 230.0 |
| 155 |  |  |  |  |  |  | 2024-10-24 17:46 | 227.1 |
| 156 |  |  |  |  |  |  | 2024-10-24 17:47 | 224.4 |
| 157 |  |  |  |  |  |  | 2024-10-24 17:48 | 221.5 |
| 158 |  |  |  |  |  |  | 2024-10-24 17:49 | 219.4 |
| 159 |  |  |  |  |  |  | 2024-10-24 17:50 | 216.4 |
| 160 |  |  |  |  |  |  | 2024-10-24 17:51 | 237.9 |
| 161 |  |  |  |  |  |  | 2024-10-24 17:52 | 243.6 |
| 162 |  |  |  |  |  |  | 2024-10-24 17:53 | 244.7 |
| 163 |  |  |  |  |  |  | 2024-10-24 17:54 | 244.2 |
| 164 |  |  |  |  |  |  | 2024-10-24 17:55 | 244.8 |
| 165 |  |  |  |  |  |  | 2024-10-24 17:56 | 245.1 |
| 166 |  |  |  |  |  |  | 2024-10-24 17:57 | 235.3 |
| 167 |  |  |  |  |  |  | 2024-10-24 17:58 | 225.9 |
| 168 |  |  |  |  |  |  | 2024-10-24 17:59 | 219.0 |
| 169 |  |  |  |  |  |  | 2024-10-24 18:00 | 214.5 |
| 170 |  |  |  |  |  |  | 2024-10-24 18:01 | 211.3 |
| 171 |  |  |  |  |  |  | 2024-10-24 18:02 | 209.0 |
| 172 |  |  |  |  |  |  | 2024-10-24 18:03 | 207.3 |
| 173 |  |  |  |  |  |  | 2024-10-24 18:04 | 205.6 |
| 174 |  |  |  |  |  |  | 2024-10-24 18:05 | 204.5 |
| 175 |  |  |  |  |  |  | 2024-10-24 18:06 | 202.9 |
| 176 |  |  |  |  |  |  | 2024-10-24 18:07 | 201.6 |
| 177 |  |  |  |  |  |  | 2024-10-24 18:08 | 201.0 |
| 178 |  |  |  |  |  |  | 2024-10-24 18:09 | 200.0 |
| 179 |  |  |  |  |  |  | 2024-10-24 18:10 | 199.3 |
| 180 |  |  |  |  |  |  | 2024-10-24 18:11 | 198.7 |
| 181 |  |  |  |  |  |  | 2024-10-24 18:12 | 198.0 |
| 182 |  |  |  |  |  |  | 2024-10-24 18:13 | 197.2 |
| 183 |  |  |  |  |  |  | 2024-10-24 18:14 | 197.1 |
| 184 |  |  |  |  |  |  | 2024-10-24 18:15 | 196.5 |
| 185 |  |  |  |  |  |  | 2024-10-24 18:16 | 195.4 |
| 186 |  |  |  |  |  |  | 2024-10-24 18:17 | 195.0 |
| 187 |  |  |  |  |  |  | 2024-10-24 18:18 | 194.8 |
| 188 |  |  |  |  |  |  | 2024-10-24 18:19 | 194.3 |
| 189 |  |  |  |  |  |  | 2024-10-24 18:20 | 193.5 |
| 190 |  |  |  |  |  |  | 2024-10-24 18:21 | 193.4 |
| 191 |  |  |  |  |  |  | 2024-10-24 18:22 | 192.8 |
| 192 |  |  |  |  |  |  | 2024-10-24 18:23 | 192.2 |
| 193 |  |  |  |  |  |  | 2024-10-24 18:24 | 191.5 |
| 194 |  |  |  |  |  |  | 2024-10-24 18:25 | 191.1 |
| 195 |  |  |  |  |  |  | 2024-10-24 18:26 | 190.6 |
| 196 |  |  |  |  |  |  | 2024-10-24 18:27 | 190.2 |
| 197 |  |  |  |  |  |  | 2024-10-24 18:28 | 189.5 |
| 198 |  |  |  |  |  |  | 2024-10-24 18:29 | 189.1 |
| 199 |  |  |  |  |  |  | 2024-10-24 18:30 | 187.9 |
| 200 |  |  |  |  |  |  | 2024-10-24 18:31 | 188.1 |
| 201 |  |  |  |  |  |  | 2024-10-24 18:32 | 187.7 |
| 202 |  |  |  |  |  |  | 2024-10-24 18:33 | 187.5 |
| 203 |  |  |  |  |  |  | 2024-10-24 18:34 | 187.4 |
| 204 |  |  |  |  |  |  | 2024-10-24 18:35 | 187.2 |
| 205 |  |  |  |  |  |  | 2024-10-24 18:36 | 186.8 |
| 206 |  |  |  |  |  |  | 2024-10-24 18:37 | 185.9 |
| 207 |  |  |  |  |  |  | 2024-10-24 18:38 | 185.5 |
| 208 |  |  |  |  |  |  | 2024-10-24 18:39 | 185.2 |
| 209 |  |  |  |  |  |  | 2024-10-24 18:40 | 184.7 |
| 210 |  |  |  |  |  |  | 2024-10-24 18:41 | 184.5 |
| 211 |  |  |  |  |  |  | 2024-10-24 18:42 | 183.8 |
| 212 |  |  |  |  |  |  | 2024-10-24 18:43 | 183.5 |
| 213 |  |  |  |  |  |  | 2024-10-24 18:44 | 182.9 |
| 214 |  |  |  |  |  |  | 2024-10-24 18:45 | 182.6 |
| 215 |  |  |  |  |  |  | 2024-10-24 18:46 | 182.4 |
| 216 |  |  |  |  |  |  | 2024-10-24 18:47 | 182.4 |
| 217 |  |  |  |  |  |  | 2024-10-24 18:48 | 182.0 |
| 218 |  |  |  |  |  |  | 2024-10-24 18:49 | 181.5 |
| 219 |  |  |  |  |  |  | 2024-10-24 18:50 | 181.1 |
| 220 |  |  |  |  |  |  | 2024-10-24 18:51 | 180.5 |
| 221 |  |  |  |  |  |  | 2024-10-24 18:52 | 180.8 |
| 222 |  |  |  |  |  |  | 2024-10-24 18:53 | 180.7 |
| 223 |  |  |  |  |  |  | 2024-10-24 18:54 | 180.4 |
| 224 |  |  |  |  |  |  | 2024-10-24 18:55 | 179.6 |
| 225 |  |  |  |  |  |  | 2024-10-24 18:56 | 180.1 |
| 226 |  |  |  |  |  |  | 2024-10-24 18:57 | 179.3 |
| 227 |  |  |  |  |  |  | 2024-10-24 18:58 | 179.3 |
| 228 |  |  |  |  |  |  | 2024-10-24 18:59 | 179.0 |
| 229 |  |  |  |  |  |  | 2024-10-24 19:00 | 178.9 |

|     |  |  |  |  |  |  |                  |       |
|-----|--|--|--|--|--|--|------------------|-------|
| 230 |  |  |  |  |  |  | 2024-10-24 19:01 | 178.5 |
| 231 |  |  |  |  |  |  | 2024-10-24 19:02 | 178.3 |
| 232 |  |  |  |  |  |  | 2024-10-24 19:03 | 177.8 |
| 233 |  |  |  |  |  |  | 2024-10-24 19:04 | 177.7 |
| 234 |  |  |  |  |  |  | 2024-10-24 19:05 | 177.5 |
| 235 |  |  |  |  |  |  | 2024-10-24 19:06 | 177.2 |
| 236 |  |  |  |  |  |  | 2024-10-24 19:07 | 177.2 |
| 237 |  |  |  |  |  |  | 2024-10-24 19:08 | 177.0 |
| 238 |  |  |  |  |  |  | 2024-10-24 19:09 | 176.5 |
| 239 |  |  |  |  |  |  | 2024-10-24 19:10 | 176.0 |
| 240 |  |  |  |  |  |  | 2024-10-24 19:11 | 175.6 |
| 241 |  |  |  |  |  |  | 2024-10-24 19:12 | 175.4 |
| 242 |  |  |  |  |  |  | 2024-10-24 19:13 | 175.3 |
| 243 |  |  |  |  |  |  | 2024-10-24 19:14 | 174.9 |
| 244 |  |  |  |  |  |  | 2024-10-24 19:15 | 174.8 |
| 245 |  |  |  |  |  |  | 2024-10-24 19:16 | 174.9 |
| 246 |  |  |  |  |  |  | 2024-10-24 19:17 | 174.6 |
| 247 |  |  |  |  |  |  | 2024-10-24 19:18 | 173.9 |
| 248 |  |  |  |  |  |  | 2024-10-24 19:19 | 173.9 |
| 249 |  |  |  |  |  |  | 2024-10-24 19:20 | 173.2 |
| 250 |  |  |  |  |  |  | 2024-10-24 19:21 | 173.2 |
| 251 |  |  |  |  |  |  | 2024-10-24 19:22 | 173.2 |
| 252 |  |  |  |  |  |  | 2024-10-24 19:23 | 172.8 |
| 253 |  |  |  |  |  |  | 2024-10-24 19:24 | 172.6 |
| 254 |  |  |  |  |  |  | 2024-10-24 19:25 | 172.6 |
| 255 |  |  |  |  |  |  | 2024-10-24 19:26 | 172.4 |
| 256 |  |  |  |  |  |  | 2024-10-24 19:27 | 172.1 |
| 257 |  |  |  |  |  |  | 2024-10-24 19:28 | 172.1 |
| 258 |  |  |  |  |  |  | 2024-10-24 19:29 | 172.3 |
| 259 |  |  |  |  |  |  | 2024-10-24 19:30 | 171.5 |
| 260 |  |  |  |  |  |  | 2024-10-24 19:31 | 171.1 |
| 261 |  |  |  |  |  |  | 2024-10-24 19:32 | 170.8 |
| 262 |  |  |  |  |  |  | 2024-10-24 19:33 | 170.9 |
| 263 |  |  |  |  |  |  | 2024-10-24 19:34 | 170.2 |
| 264 |  |  |  |  |  |  | 2024-10-24 19:35 | 170.3 |
| 265 |  |  |  |  |  |  | 2024-10-24 19:36 | 170.1 |
| 266 |  |  |  |  |  |  | 2024-10-24 19:37 | 170.1 |
| 267 |  |  |  |  |  |  | 2024-10-24 19:38 | 170.2 |
| 268 |  |  |  |  |  |  | 2024-10-24 19:39 | 169.2 |
| 269 |  |  |  |  |  |  | 2024-10-24 19:40 | 169.1 |
| 270 |  |  |  |  |  |  | 2024-10-24 19:41 | 169.3 |
| 271 |  |  |  |  |  |  | 2024-10-24 19:42 | 169.2 |
| 272 |  |  |  |  |  |  | 2024-10-24 19:43 | 168.7 |
| 273 |  |  |  |  |  |  | 2024-10-24 19:44 | 168.2 |
| 274 |  |  |  |  |  |  | 2024-10-24 19:45 | 168.2 |
| 275 |  |  |  |  |  |  | 2024-10-24 19:46 | 167.7 |
| 276 |  |  |  |  |  |  | 2024-10-24 19:47 | 167.5 |
| 277 |  |  |  |  |  |  | 2024-10-24 19:48 | 167.3 |
| 278 |  |  |  |  |  |  | 2024-10-24 19:49 | 167.7 |
| 279 |  |  |  |  |  |  | 2024-10-24 19:50 | 167.6 |
| 280 |  |  |  |  |  |  | 2024-10-24 19:51 | 167.3 |
| 281 |  |  |  |  |  |  | 2024-10-24 19:52 | 166.8 |
| 282 |  |  |  |  |  |  | 2024-10-24 19:53 | 166.9 |
| 283 |  |  |  |  |  |  | 2024-10-24 19:54 | 167.0 |
| 284 |  |  |  |  |  |  | 2024-10-24 19:55 | 167.0 |
| 285 |  |  |  |  |  |  | 2024-10-24 19:56 | 166.4 |
| 286 |  |  |  |  |  |  | 2024-10-24 19:57 | 165.7 |
| 287 |  |  |  |  |  |  | 2024-10-24 19:58 | 165.8 |
| 288 |  |  |  |  |  |  | 2024-10-24 19:59 | 165.4 |
| 289 |  |  |  |  |  |  | 2024-10-24 20:00 | 165.2 |
| 290 |  |  |  |  |  |  | 2024-10-24 20:01 | 164.9 |
| 291 |  |  |  |  |  |  | 2024-10-24 20:02 | 164.1 |
| 292 |  |  |  |  |  |  | 2024-10-24 20:03 | 164.3 |
| 293 |  |  |  |  |  |  | 2024-10-24 20:04 | 164.3 |
| 294 |  |  |  |  |  |  | 2024-10-24 20:05 | 164.4 |
| 295 |  |  |  |  |  |  | 2024-10-24 20:06 | 164.0 |
| 296 |  |  |  |  |  |  | 2024-10-24 20:07 | 163.9 |
| 297 |  |  |  |  |  |  | 2024-10-24 20:08 | 163.5 |
| 298 |  |  |  |  |  |  | 2024-10-24 20:09 | 163.4 |
| 299 |  |  |  |  |  |  | 2024-10-24 20:10 | 163.0 |
| 300 |  |  |  |  |  |  | 2024-10-24 20:11 | 163.0 |
| 301 |  |  |  |  |  |  | 2024-10-24 20:12 | 163.1 |
| 302 |  |  |  |  |  |  | 2024-10-24 20:13 | 162.8 |
| 303 |  |  |  |  |  |  | 2024-10-24 20:14 | 162.4 |
| 304 |  |  |  |  |  |  | 2024-10-24 20:15 | 162.2 |
| 305 |  |  |  |  |  |  | 2024-10-24 20:16 | 162.6 |
| 306 |  |  |  |  |  |  | 2024-10-24 20:17 | 161.9 |
| 307 |  |  |  |  |  |  | 2024-10-24 20:18 | 161.8 |
| 308 |  |  |  |  |  |  | 2024-10-24 20:19 | 161.3 |
| 309 |  |  |  |  |  |  | 2024-10-24 20:20 | 161.6 |
| 310 |  |  |  |  |  |  | 2024-10-24 20:21 | 161.2 |

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| 311 |  |  |  |  |  |  | 2024-10-24 20:22 | 161.1 |
| 312 |  |  |  |  |  |  | 2024-10-24 20:23 | 160.7 |
| 313 |  |  |  |  |  |  | 2024-10-24 20:24 | 161.1 |
| 314 |  |  |  |  |  |  | 2024-10-24 20:25 | 160.6 |
| 315 |  |  |  |  |  |  | 2024-10-24 20:26 | 160.4 |
| 316 |  |  |  |  |  |  | 2024-10-24 20:27 | 160.1 |
| 317 |  |  |  |  |  |  | 2024-10-24 20:28 | 159.7 |
| 318 |  |  |  |  |  |  | 2024-10-24 20:29 | 159.6 |
| 319 |  |  |  |  |  |  | 2024-10-24 20:30 | 159.5 |
| 320 |  |  |  |  |  |  | 2024-10-24 20:31 | 159.4 |
| 321 |  |  |  |  |  |  | 2024-10-24 20:32 | 159.2 |
| 322 |  |  |  |  |  |  | 2024-10-24 20:33 | 159.3 |
| 323 |  |  |  |  |  |  | 2024-10-24 20:34 | 159.1 |
| 324 |  |  |  |  |  |  | 2024-10-24 20:35 | 158.3 |
| 325 |  |  |  |  |  |  | 2024-10-24 20:36 | 158.0 |
| 326 |  |  |  |  |  |  | 2024-10-24 20:37 | 157.9 |
| 327 |  |  |  |  |  |  | 2024-10-24 20:38 | 157.9 |
| 328 |  |  |  |  |  |  | 2024-10-24 20:39 | 157.7 |
| 329 |  |  |  |  |  |  | 2024-10-24 20:40 | 157.4 |
| 330 |  |  |  |  |  |  | 2024-10-24 20:41 | 157.3 |
| 331 |  |  |  |  |  |  | 2024-10-24 20:42 | 157.5 |
| 332 |  |  |  |  |  |  | 2024-10-24 20:43 | 157.1 |
| 333 |  |  |  |  |  |  | 2024-10-24 20:44 | 157.2 |
| 334 |  |  |  |  |  |  | 2024-10-24 20:45 | 157.2 |
| 335 |  |  |  |  |  |  | 2024-10-24 20:46 | 157.2 |
| 336 |  |  |  |  |  |  | 2024-10-24 20:47 | 156.9 |
| 337 |  |  |  |  |  |  | 2024-10-24 20:48 | 157.1 |
| 338 |  |  |  |  |  |  | 2024-10-24 20:49 | 157.0 |
| 339 |  |  |  |  |  |  | 2024-10-24 20:50 | 157.2 |
| 340 |  |  |  |  |  |  | 2024-10-24 20:51 | 156.8 |
| 341 |  |  |  |  |  |  | 2024-10-24 20:52 | 156.3 |
| 342 |  |  |  |  |  |  | 2024-10-24 20:53 | 156.6 |
| 343 |  |  |  |  |  |  | 2024-10-24 20:54 | 156.4 |
| 344 |  |  |  |  |  |  | 2024-10-24 20:55 | 156.4 |
| 345 |  |  |  |  |  |  | 2024-10-24 20:56 | 156.2 |
| 346 |  |  |  |  |  |  | 2024-10-24 20:57 | 156.4 |
| 347 |  |  |  |  |  |  | 2024-10-24 20:58 | 156.5 |
| 348 |  |  |  |  |  |  | 2024-10-24 20:59 | 157.1 |
| 349 |  |  |  |  |  |  | 2024-10-24 21:00 | 156.8 |
| 350 |  |  |  |  |  |  | 2024-10-24 21:01 | 156.9 |
| 351 |  |  |  |  |  |  | 2024-10-24 21:02 | 156.5 |
| 352 |  |  |  |  |  |  | 2024-10-24 21:03 | 156.4 |
| 353 |  |  |  |  |  |  | 2024-10-24 21:04 | 156.6 |
| 354 |  |  |  |  |  |  | 2024-10-24 21:05 | 156.8 |
| 355 |  |  |  |  |  |  | 2024-10-24 21:06 | 156.7 |
| 356 |  |  |  |  |  |  | 2024-10-24 21:07 | 156.4 |
| 357 |  |  |  |  |  |  | 2024-10-24 21:08 | 156.2 |
| 358 |  |  |  |  |  |  | 2024-10-24 21:09 | 156.3 |
| 359 |  |  |  |  |  |  | 2024-10-24 21:10 | 156.5 |
| 360 |  |  |  |  |  |  | 2024-10-24 21:11 | 156.4 |
| 361 |  |  |  |  |  |  | 2024-10-24 21:12 | 156.0 |
| 362 |  |  |  |  |  |  | 2024-10-24 21:13 | 156.2 |
| 363 |  |  |  |  |  |  | 2024-10-24 21:14 | 156.1 |
| 364 |  |  |  |  |  |  | 2024-10-24 21:15 | 156.4 |
| 365 |  |  |  |  |  |  | 2024-10-24 21:16 | 156.0 |
| 366 |  |  |  |  |  |  | 2024-10-24 21:17 | 156.2 |
| 367 |  |  |  |  |  |  | 2024-10-24 21:18 | 156.5 |
| 368 |  |  |  |  |  |  | 2024-10-24 21:19 | 156.5 |
| 369 |  |  |  |  |  |  | 2024-10-24 21:20 | 156.3 |
| 370 |  |  |  |  |  |  | 2024-10-24 21:21 | 156.2 |
| 371 |  |  |  |  |  |  | 2024-10-24 21:22 | 156.1 |
| 372 |  |  |  |  |  |  | 2024-10-24 21:23 | 155.9 |
| 373 |  |  |  |  |  |  | 2024-10-24 21:24 | 155.9 |
| 374 |  |  |  |  |  |  | 2024-10-24 21:25 | 155.6 |
| 375 |  |  |  |  |  |  | 2024-10-24 21:26 | 156.1 |
| 376 |  |  |  |  |  |  | 2024-10-24 21:27 | 156.0 |
| 377 |  |  |  |  |  |  | 2024-10-24 21:27 | 156.0 |

|                        |                           |            |                |              |                |                  |                 |       |           |
|------------------------|---------------------------|------------|----------------|--------------|----------------|------------------|-----------------|-------|-----------|
| St.Louis Pre-burn Data |                           | 2024-10-25 | Total time (h) |              | 6.82           |                  |                 |       |           |
| Wood Specie: Maple     |                           |            |                |              |                |                  |                 |       |           |
| Load time              | Load type                 | Fuel added | Moisture       | Piece amount | Length of fuel | Fuel Burnt (Dry) | Burn Rate (Dry) | Time  | Flue Temp |
| (-)                    | (-)                       | (lb)       | (DB %)         | (-)          | (in.)          | (lb)             | (kg/hr)         | (min) | (°F)      |
| 2024-10-25 10:34       | Load 1 - Start-up         | 7.89       | 22.1           | 4            | 18.00          | 4.18             | 3.92            | 29    | 345.5     |
| 2024-10-25 11:04       | Load 2 - High-fire        | 13.88      | 19.9           | 4            | 18.00          | 10.31            | 3.16            | 80    | 410.7     |
| 2024-10-25 12:25       | Load 3 - Maintenance-fire | 9.07       | 19.0           | 2            | 18.00          | 6.73             | 2.35            | 70    | 381.0     |
| 2024-10-25 13:36       | Load 4 - Low burn rate    | 23.03      | 21.3           | 6            | 18.00          | 18.95            | 2.02            | 230   | 370.5     |

|                         |                  |          |                                              |          |                       |          |                     |          |
|-------------------------|------------------|----------|----------------------------------------------|----------|-----------------------|----------|---------------------|----------|
| Average Tflue (°F)      |                  | 345.5    |                                              | 410.7    |                       | 381.0    |                     | 370.5    |
| Load 1 - Start-up (min) |                  | 29       | High-fire (min)                              | 80       | Maintenace-fire (min) | 70       | Low burn rate (min) | 230      |
| Air control position    | Full open        |          | Full open then fully closed (@50% fuel load) |          | Fully closed          |          | Fully closed        |          |
| Index                   | Date & Time      | Flue (F) | Date & Time                                  | Flue (F) | Date & Time           | Flue (F) | Date & Time         | Flue (F) |
| 0                       | 2024-10-25 10:34 | 75.8     | 2024-10-25 11:04                             | 387.0    | 2024-10-25 12:25      | 395.5    | 2024-10-25 13:36    | 351.3    |
| 1                       | 2024-10-25 10:35 | 136.3    | 2024-10-25 11:05                             | 436.3    | 2024-10-25 12:26      | 436.7    | 2024-10-25 13:37    | 370.7    |
| 2                       | 2024-10-25 10:36 | 248.1    | 2024-10-25 11:06                             | 448.3    | 2024-10-25 12:27      | 444.2    | 2024-10-25 13:38    | 417.4    |
| 3                       | 2024-10-25 10:37 | 336.5    | 2024-10-25 11:07                             | 440.6    | 2024-10-25 12:28      | 440.4    | 2024-10-25 13:39    | 444.0    |
| 4                       | 2024-10-25 10:38 | 340.5    | 2024-10-25 11:08                             | 433.4    | 2024-10-25 12:29      | 419.8    | 2024-10-25 13:40    | 443.7    |
| 5                       | 2024-10-25 10:39 | 338.5    | 2024-10-25 11:09                             | 430.7    | 2024-10-25 12:30      | 407.9    | 2024-10-25 13:41    | 429.7    |
| 6                       | 2024-10-25 10:40 | 339.4    | 2024-10-25 11:10                             | 433.5    | 2024-10-25 12:31      | 406.1    | 2024-10-25 13:42    | 419.6    |
| 7                       | 2024-10-25 10:41 | 343.3    | 2024-10-25 11:11                             | 435.6    | 2024-10-25 12:32      | 406.1    | 2024-10-25 13:43    | 416.8    |
| 8                       | 2024-10-25 10:42 | 344.9    | 2024-10-25 11:12                             | 439.4    | 2024-10-25 12:33      | 401.7    | 2024-10-25 13:44    | 415.9    |
| 9                       | 2024-10-25 10:43 | 347.9    | 2024-10-25 11:13                             | 441.1    | 2024-10-25 12:34      | 397.7    | 2024-10-25 13:45    | 417.1    |
| 10                      | 2024-10-25 10:44 | 349.4    | 2024-10-25 11:14                             | 440.5    | 2024-10-25 12:35      | 394.0    | 2024-10-25 13:46    | 417.3    |
| 11                      | 2024-10-25 10:45 | 348.5    | 2024-10-25 11:15                             | 441.0    | 2024-10-25 12:36      | 393.3    | 2024-10-25 13:47    | 417.7    |
| 12                      | 2024-10-25 10:46 | 345.1    | 2024-10-25 11:16                             | 446.5    | 2024-10-25 12:37      | 392.7    | 2024-10-25 13:48    | 418.4    |
| 13                      | 2024-10-25 10:47 | 349.3    | 2024-10-25 11:17                             | 447.1    | 2024-10-25 12:38      | 392.0    | 2024-10-25 13:49    | 419.0    |
| 14                      | 2024-10-25 10:48 | 356.9    | 2024-10-25 11:18                             | 446.7    | 2024-10-25 12:39      | 391.2    | 2024-10-25 13:50    | 419.0    |
| 15                      | 2024-10-25 10:49 | 365.4    | 2024-10-25 11:19                             | 448.8    | 2024-10-25 12:40      | 391.2    | 2024-10-25 13:51    | 420.0    |
| 16                      | 2024-10-25 10:50 | 365.0    | 2024-10-25 11:20                             | 449.8    | 2024-10-25 12:41      | 391.4    | 2024-10-25 13:52    | 421.6    |
| 17                      | 2024-10-25 10:51 | 365.3    | 2024-10-25 11:21                             | 451.7    | 2024-10-25 12:42      | 390.5    | 2024-10-25 13:53    | 422.1    |
| 18                      | 2024-10-25 10:52 | 368.5    | 2024-10-25 11:22                             | 453.7    | 2024-10-25 12:43      | 390.0    | 2024-10-25 13:54    | 421.7    |
| 19                      | 2024-10-25 10:53 | 377.4    | 2024-10-25 11:23                             | 455.6    | 2024-10-25 12:44      | 389.5    | 2024-10-25 13:55    | 422.3    |
| 20                      | 2024-10-25 10:54 | 380.3    | 2024-10-25 11:24                             | 455.3    | 2024-10-25 12:45      | 389.0    | 2024-10-25 13:56    | 422.6    |
| 21                      | 2024-10-25 10:55 | 380.0    | 2024-10-25 11:25                             | 450.7    | 2024-10-25 12:46      | 389.6    | 2024-10-25 13:57    | 422.1    |
| 22                      | 2024-10-25 10:56 | 383.9    | 2024-10-25 11:26                             | 444.5    | 2024-10-25 12:47      | 388.0    | 2024-10-25 13:58    | 421.2    |
| 23                      | 2024-10-25 10:57 | 390.3    | 2024-10-25 11:27                             | 440.1    | 2024-10-25 12:48      | 386.2    | 2024-10-25 13:59    | 421.5    |
| 24                      | 2024-10-25 10:58 | 396.3    | 2024-10-25 11:28                             | 435.2    | 2024-10-25 12:49      | 385.0    | 2024-10-25 14:00    | 421.7    |
| 25                      | 2024-10-25 10:59 | 399.4    | 2024-10-25 11:29                             | 431.4    | 2024-10-25 12:50      | 383.6    | 2024-10-25 14:01    | 421.4    |
| 26                      | 2024-10-25 11:00 | 396.8    | 2024-10-25 11:30                             | 428.5    | 2024-10-25 12:51      | 382.5    | 2024-10-25 14:02    | 420.9    |
| 27                      | 2024-10-25 11:01 | 396.3    | 2024-10-25 11:31                             | 429.0    | 2024-10-25 12:52      | 381.2    | 2024-10-25 14:03    | 420.0    |
| 28                      | 2024-10-25 11:02 | 398.5    | 2024-10-25 11:32                             | 432.9    | 2024-10-25 12:53      | 379.5    | 2024-10-25 14:04    | 419.6    |
| 29                      | 2024-10-25 11:03 | 400.6    | 2024-10-25 11:33                             | 434.7    | 2024-10-25 12:54      | 378.3    | 2024-10-25 14:05    | 419.7    |
| 30                      |                  |          | 2024-10-25 11:34                             | 437.4    | 2024-10-25 12:55      | 376.2    | 2024-10-25 14:06    | 419.2    |
| 31                      |                  |          | 2024-10-25 11:35                             | 437.1    | 2024-10-25 12:56      | 375.2    | 2024-10-25 14:07    | 417.5    |
| 32                      |                  |          | 2024-10-25 11:36                             | 438.1    | 2024-10-25 12:57      | 373.4    | 2024-10-25 14:08    | 417.3    |
| 33                      |                  |          | 2024-10-25 11:37                             | 435.8    | 2024-10-25 12:58      | 372.2    | 2024-10-25 14:09    | 416.0    |
| 34                      |                  |          | 2024-10-25 11:38                             | 429.8    | 2024-10-25 12:59      | 370.8    | 2024-10-25 14:10    | 415.5    |
| 35                      |                  |          | 2024-10-25 11:39                             | 420.6    | 2024-10-25 13:00      | 369.8    | 2024-10-25 14:11    | 413.9    |
| 36                      |                  |          | 2024-10-25 11:40                             | 412.5    | 2024-10-25 13:01      | 369.7    | 2024-10-25 14:12    | 413.9    |
| 37                      |                  |          | 2024-10-25 11:41                             | 407.5    | 2024-10-25 13:02      | 369.0    | 2024-10-25 14:13    | 412.9    |
| 38                      |                  |          | 2024-10-25 11:42                             | 409.9    | 2024-10-25 13:03      | 368.8    | 2024-10-25 14:14    | 412.0    |
| 39                      |                  |          | 2024-10-25 11:43                             | 411.1    | 2024-10-25 13:04      | 367.7    | 2024-10-25 14:15    | 411.2    |
| 40                      |                  |          | 2024-10-25 11:44                             | 406.0    | 2024-10-25 13:05      | 366.5    | 2024-10-25 14:16    | 410.9    |
| 41                      |                  |          | 2024-10-25 11:45                             | 402.6    | 2024-10-25 13:06      | 370.2    | 2024-10-25 14:17    | 410.3    |
| 42                      |                  |          | 2024-10-25 11:46                             | 404.9    | 2024-10-25 13:07      | 372.5    | 2024-10-25 14:18    | 409.4    |
| 43                      |                  |          | 2024-10-25 11:47                             | 407.6    | 2024-10-25 13:08      | 373.3    | 2024-10-25 14:19    | 409.9    |
| 44                      |                  |          | 2024-10-25 11:48                             | 411.1    | 2024-10-25 13:09      | 373.7    | 2024-10-25 14:20    | 408.8    |
| 45                      |                  |          | 2024-10-25 11:49                             | 413.7    | 2024-10-25 13:10      | 374.6    | 2024-10-25 14:21    | 408.8    |
| 46                      |                  |          | 2024-10-25 11:50                             | 410.1    | 2024-10-25 13:11      | 374.5    | 2024-10-25 14:22    | 408.0    |
| 47                      |                  |          | 2024-10-25 11:51                             | 406.9    | 2024-10-25 13:12      | 374.1    | 2024-10-25 14:23    | 409.3    |
| 48                      |                  |          | 2024-10-25 11:52                             | 404.9    | 2024-10-25 13:13      | 373.3    | 2024-10-25 14:24    | 409.0    |
| 49                      |                  |          | 2024-10-25 11:53                             | 403.0    | 2024-10-25 13:14      | 372.5    | 2024-10-25 14:25    | 409.9    |
| 50                      |                  |          | 2024-10-25 11:54                             | 400.5    | 2024-10-25 13:15      | 372.9    | 2024-10-25 14:26    | 411.0    |
| 51                      |                  |          | 2024-10-25 11:55                             | 397.0    | 2024-10-25 13:16      | 372.4    | 2024-10-25 14:27    | 411.8    |
| 52                      |                  |          | 2024-10-25 11:56                             | 394.5    | 2024-10-25 13:17      | 371.5    | 2024-10-25 14:28    | 412.5    |
| 53                      |                  |          | 2024-10-25 11:57                             | 392.5    | 2024-10-25 13:18      | 370.9    | 2024-10-25 14:29    | 413.6    |
| 54                      |                  |          | 2024-10-25 11:58                             | 391.0    | 2024-10-25 13:19      | 370.7    | 2024-10-25 14:30    | 414.4    |
| 55                      |                  |          | 2024-10-25 11:59                             | 389.0    | 2024-10-25 13:20      | 370.1    | 2024-10-25 14:31    | 415.9    |
| 56                      |                  |          | 2024-10-25 12:00                             | 388.7    | 2024-10-25 13:21      | 369.4    | 2024-10-25 14:32    | 417.0    |
| 57                      |                  |          | 2024-10-25 12:01                             | 388.0    | 2024-10-25 13:22      | 368.6    | 2024-10-25 14:33    | 418.4    |
| 58                      |                  |          | 2024-10-25 12:02                             | 385.1    | 2024-10-25 13:23      | 368.6    | 2024-10-25 14:34    | 419.3    |
| 59                      |                  |          | 2024-10-25 12:03                             | 383.9    | 2024-10-25 13:24      | 368.1    | 2024-10-25 14:35    | 420.0    |
| 60                      |                  |          | 2024-10-25 12:04                             | 382.0    | 2024-10-25 13:25      | 368.5    | 2024-10-25 14:36    | 420.8    |
| 61                      |                  |          | 2024-10-25 12:05                             | 381.9    | 2024-10-25 13:26      | 368.1    | 2024-10-25 14:37    | 422.0    |
| 62                      |                  |          | 2024-10-25 12:06                             | 380.4    | 2024-10-25 13:27      | 366.0    | 2024-10-25 14:38    | 424.0    |
| 63                      |                  |          | 2024-10-25 12:07                             | 378.6    | 2024-10-25 13:28      | 364.9    | 2024-10-25 14:39    | 425.3    |
| 64                      |                  |          | 2024-10-25 12:08                             | 376.5    | 2024-10-25 13:29      | 363.3    | 2024-10-25 14:40    | 425.5    |
| 65                      |                  |          | 2024-10-25 12:09                             | 375.8    | 2024-10-25 13:30      | 363.4    | 2024-10-25 14:41    | 426.2    |
| 66                      |                  |          | 2024-10-25 12:10                             | 374.4    | 2024-10-25 13:31      | 361.5    | 2024-10-25 14:42    | 427.8    |
| 67                      |                  |          | 2024-10-25 12:11                             | 375.9    | 2024-10-25 13:32      | 360.6    | 2024-10-25 14:43    | 428.6    |
| 68                      |                  |          | 2024-10-25 12:12                             | 376.0    | 2024-10-25 13:33      | 359.3    | 2024-10-25 14:44    | 428.5    |
| 69                      |                  |          | 2024-10-25 12:13                             | 375.6    | 2024-10-25 13:34      | 360.0    | 2024-10-25 14:45    | 428.0    |
| 70                      |                  |          | 2024-10-25 12:14                             | 374.5    | 2024-10-25 13:35      | 361.0    | 2024-10-25 14:46    | 428.1    |
| 71                      |                  |          | 2024-10-25 12:15                             | 373.7    |                       |          | 2024-10-25 14:47    | 426.4    |
| 72                      |                  |          | 2024-10-25 12:16                             | 373.3    |                       |          | 2024-10-25 14:48    | 426.6    |



|     |  |  |                  |       |  |  |                  |       |
|-----|--|--|------------------|-------|--|--|------------------|-------|
| 73  |  |  | 2024-10-25 12:17 | 373.1 |  |  | 2024-10-25 14:49 | 425.4 |
| 74  |  |  | 2024-10-25 12:18 | 372.2 |  |  | 2024-10-25 14:50 | 424.3 |
| 75  |  |  | 2024-10-25 12:19 | 372.6 |  |  | 2024-10-25 14:51 | 424.3 |
| 76  |  |  | 2024-10-25 12:20 | 372.9 |  |  | 2024-10-25 14:52 | 423.6 |
| 77  |  |  | 2024-10-25 12:21 | 369.1 |  |  | 2024-10-25 14:53 | 424.6 |
| 78  |  |  | 2024-10-25 12:22 | 365.6 |  |  | 2024-10-25 14:54 | 424.6 |
| 79  |  |  | 2024-10-25 12:23 | 363.7 |  |  | 2024-10-25 14:55 | 424.4 |
| 80  |  |  | 2024-10-25 12:24 | 364.7 |  |  | 2024-10-25 14:56 | 424.6 |
| 81  |  |  |                  |       |  |  | 2024-10-25 14:57 | 423.6 |
| 82  |  |  |                  |       |  |  | 2024-10-25 14:58 | 421.8 |
| 83  |  |  |                  |       |  |  | 2024-10-25 14:59 | 421.5 |
| 84  |  |  |                  |       |  |  | 2024-10-25 15:00 | 421.0 |
| 85  |  |  |                  |       |  |  | 2024-10-25 15:01 | 420.2 |
| 86  |  |  |                  |       |  |  | 2024-10-25 15:02 | 418.5 |
| 87  |  |  |                  |       |  |  | 2024-10-25 15:03 | 418.0 |
| 88  |  |  |                  |       |  |  | 2024-10-25 15:04 | 417.9 |
| 89  |  |  |                  |       |  |  | 2024-10-25 15:05 | 416.8 |
| 90  |  |  |                  |       |  |  | 2024-10-25 15:06 | 414.6 |
| 91  |  |  |                  |       |  |  | 2024-10-25 15:07 | 412.7 |
| 92  |  |  |                  |       |  |  | 2024-10-25 15:08 | 409.5 |
| 93  |  |  |                  |       |  |  | 2024-10-25 15:09 | 407.0 |
| 94  |  |  |                  |       |  |  | 2024-10-25 15:10 | 405.0 |
| 95  |  |  |                  |       |  |  | 2024-10-25 15:11 | 402.2 |
| 96  |  |  |                  |       |  |  | 2024-10-25 15:12 | 400.5 |
| 97  |  |  |                  |       |  |  | 2024-10-25 15:13 | 398.9 |
| 98  |  |  |                  |       |  |  | 2024-10-25 15:14 | 396.0 |
| 99  |  |  |                  |       |  |  | 2024-10-25 15:15 | 393.7 |
| 100 |  |  |                  |       |  |  | 2024-10-25 15:16 | 390.3 |
| 101 |  |  |                  |       |  |  | 2024-10-25 15:17 | 387.2 |
| 102 |  |  |                  |       |  |  | 2024-10-25 15:18 | 384.9 |
| 103 |  |  |                  |       |  |  | 2024-10-25 15:19 | 382.7 |
| 104 |  |  |                  |       |  |  | 2024-10-25 15:20 | 380.1 |
| 105 |  |  |                  |       |  |  | 2024-10-25 15:21 | 377.3 |
| 106 |  |  |                  |       |  |  | 2024-10-25 15:22 | 374.6 |
| 107 |  |  |                  |       |  |  | 2024-10-25 15:23 | 371.1 |
| 108 |  |  |                  |       |  |  | 2024-10-25 15:24 | 368.9 |
| 109 |  |  |                  |       |  |  | 2024-10-25 15:25 | 366.3 |
| 110 |  |  |                  |       |  |  | 2024-10-25 15:26 | 365.1 |
| 111 |  |  |                  |       |  |  | 2024-10-25 15:27 | 365.8 |
| 112 |  |  |                  |       |  |  | 2024-10-25 15:28 | 365.2 |
| 113 |  |  |                  |       |  |  | 2024-10-25 15:29 | 364.9 |
| 114 |  |  |                  |       |  |  | 2024-10-25 15:30 | 363.8 |
| 115 |  |  |                  |       |  |  | 2024-10-25 15:31 | 362.7 |
| 116 |  |  |                  |       |  |  | 2024-10-25 15:32 | 362.0 |
| 117 |  |  |                  |       |  |  | 2024-10-25 15:33 | 360.8 |
| 118 |  |  |                  |       |  |  | 2024-10-25 15:34 | 359.7 |
| 119 |  |  |                  |       |  |  | 2024-10-25 15:35 | 357.6 |
| 120 |  |  |                  |       |  |  | 2024-10-25 15:36 | 357.0 |
| 121 |  |  |                  |       |  |  | 2024-10-25 15:37 | 354.7 |
| 122 |  |  |                  |       |  |  | 2024-10-25 15:38 | 353.6 |
| 123 |  |  |                  |       |  |  | 2024-10-25 15:39 | 352.5 |
| 124 |  |  |                  |       |  |  | 2024-10-25 15:40 | 350.9 |
| 125 |  |  |                  |       |  |  | 2024-10-25 15:41 | 349.1 |
| 126 |  |  |                  |       |  |  | 2024-10-25 15:42 | 347.9 |
| 127 |  |  |                  |       |  |  | 2024-10-25 15:43 | 345.8 |
| 128 |  |  |                  |       |  |  | 2024-10-25 15:44 | 344.1 |
| 129 |  |  |                  |       |  |  | 2024-10-25 15:45 | 341.5 |
| 130 |  |  |                  |       |  |  | 2024-10-25 15:46 | 339.7 |
| 131 |  |  |                  |       |  |  | 2024-10-25 15:47 | 343.3 |
| 132 |  |  |                  |       |  |  | 2024-10-25 15:48 | 350.2 |
| 133 |  |  |                  |       |  |  | 2024-10-25 15:49 | 358.0 |
| 134 |  |  |                  |       |  |  | 2024-10-25 15:50 | 365.4 |
| 135 |  |  |                  |       |  |  | 2024-10-25 15:51 | 370.7 |
| 136 |  |  |                  |       |  |  | 2024-10-25 15:52 | 371.6 |
| 137 |  |  |                  |       |  |  | 2024-10-25 15:53 | 369.2 |
| 138 |  |  |                  |       |  |  | 2024-10-25 15:54 | 370.7 |
| 139 |  |  |                  |       |  |  | 2024-10-25 15:55 | 375.0 |
| 140 |  |  |                  |       |  |  | 2024-10-25 15:56 | 377.8 |
| 141 |  |  |                  |       |  |  | 2024-10-25 15:57 | 379.3 |
| 142 |  |  |                  |       |  |  | 2024-10-25 15:58 | 381.0 |
| 143 |  |  |                  |       |  |  | 2024-10-25 15:59 | 382.9 |
| 144 |  |  |                  |       |  |  | 2024-10-25 16:00 | 383.7 |
| 145 |  |  |                  |       |  |  | 2024-10-25 16:01 | 385.0 |
| 146 |  |  |                  |       |  |  | 2024-10-25 16:02 | 385.6 |
| 147 |  |  |                  |       |  |  | 2024-10-25 16:03 | 386.5 |
| 148 |  |  |                  |       |  |  | 2024-10-25 16:04 | 386.3 |
| 149 |  |  |                  |       |  |  | 2024-10-25 16:05 | 386.6 |
| 150 |  |  |                  |       |  |  | 2024-10-25 16:06 | 387.4 |
| 151 |  |  |                  |       |  |  | 2024-10-25 16:07 | 387.8 |
| 152 |  |  |                  |       |  |  | 2024-10-25 16:08 | 387.8 |
| 153 |  |  |                  |       |  |  | 2024-10-25 16:09 | 388.1 |
| 154 |  |  |                  |       |  |  | 2024-10-25 16:10 | 388.1 |
| 155 |  |  |                  |       |  |  | 2024-10-25 16:11 | 388.0 |
| 156 |  |  |                  |       |  |  | 2024-10-25 16:12 | 388.4 |
| 157 |  |  |                  |       |  |  | 2024-10-25 16:13 | 388.1 |
| 158 |  |  |                  |       |  |  | 2024-10-25 16:14 | 389.0 |

|     |  |  |  |  |  |                  |       |
|-----|--|--|--|--|--|------------------|-------|
| 159 |  |  |  |  |  | 2024-10-25 16:15 | 389.0 |
| 160 |  |  |  |  |  | 2024-10-25 16:16 | 388.3 |
| 161 |  |  |  |  |  | 2024-10-25 16:17 | 388.3 |
| 162 |  |  |  |  |  | 2024-10-25 16:18 | 388.2 |
| 163 |  |  |  |  |  | 2024-10-25 16:19 | 388.0 |
| 164 |  |  |  |  |  | 2024-10-25 16:20 | 388.2 |
| 165 |  |  |  |  |  | 2024-10-25 16:21 | 388.5 |
| 166 |  |  |  |  |  | 2024-10-25 16:22 | 388.5 |
| 167 |  |  |  |  |  | 2024-10-25 16:23 | 388.6 |
| 168 |  |  |  |  |  | 2024-10-25 16:24 | 387.9 |
| 169 |  |  |  |  |  | 2024-10-25 16:25 | 388.3 |
| 170 |  |  |  |  |  | 2024-10-25 16:26 | 388.9 |
| 171 |  |  |  |  |  | 2024-10-25 16:27 | 388.5 |
| 172 |  |  |  |  |  | 2024-10-25 16:28 | 387.6 |
| 173 |  |  |  |  |  | 2024-10-25 16:29 | 387.4 |
| 174 |  |  |  |  |  | 2024-10-25 16:30 | 387.4 |
| 175 |  |  |  |  |  | 2024-10-25 16:31 | 386.8 |
| 176 |  |  |  |  |  | 2024-10-25 16:32 | 386.4 |
| 177 |  |  |  |  |  | 2024-10-25 16:33 | 385.8 |
| 178 |  |  |  |  |  | 2024-10-25 16:34 | 385.6 |
| 179 |  |  |  |  |  | 2024-10-25 16:35 | 385.0 |
| 180 |  |  |  |  |  | 2024-10-25 16:36 | 384.5 |
| 181 |  |  |  |  |  | 2024-10-25 16:37 | 383.9 |
| 182 |  |  |  |  |  | 2024-10-25 16:38 | 383.3 |
| 183 |  |  |  |  |  | 2024-10-25 16:39 | 382.9 |
| 184 |  |  |  |  |  | 2024-10-25 16:40 | 381.8 |
| 185 |  |  |  |  |  | 2024-10-25 16:41 | 381.5 |
| 186 |  |  |  |  |  | 2024-10-25 16:42 | 380.5 |
| 187 |  |  |  |  |  | 2024-10-25 16:43 | 379.7 |
| 188 |  |  |  |  |  | 2024-10-25 16:44 | 378.3 |
| 189 |  |  |  |  |  | 2024-10-25 16:45 | 377.2 |
| 190 |  |  |  |  |  | 2024-10-25 16:46 | 365.3 |
| 191 |  |  |  |  |  | 2024-10-25 16:47 | 354.4 |
| 192 |  |  |  |  |  | 2024-10-25 16:48 | 348.1 |
| 193 |  |  |  |  |  | 2024-10-25 16:49 | 340.3 |
| 194 |  |  |  |  |  | 2024-10-25 16:50 | 333.3 |
| 195 |  |  |  |  |  | 2024-10-25 16:51 | 327.4 |
| 196 |  |  |  |  |  | 2024-10-25 16:52 | 323.3 |
| 197 |  |  |  |  |  | 2024-10-25 16:53 | 319.7 |
| 198 |  |  |  |  |  | 2024-10-25 16:54 | 303.1 |
| 199 |  |  |  |  |  | 2024-10-25 16:55 | 285.6 |
| 200 |  |  |  |  |  | 2024-10-25 16:56 | 273.2 |
| 201 |  |  |  |  |  | 2024-10-25 16:57 | 264.3 |
| 202 |  |  |  |  |  | 2024-10-25 16:58 | 256.6 |
| 203 |  |  |  |  |  | 2024-10-25 16:59 | 250.8 |
| 204 |  |  |  |  |  | 2024-10-25 17:00 | 245.4 |
| 205 |  |  |  |  |  | 2024-10-25 17:01 | 241.1 |
| 206 |  |  |  |  |  | 2024-10-25 17:02 | 237.3 |
| 207 |  |  |  |  |  | 2024-10-25 17:03 | 233.9 |
| 208 |  |  |  |  |  | 2024-10-25 17:04 | 230.8 |
| 209 |  |  |  |  |  | 2024-10-25 17:05 | 227.5 |
| 210 |  |  |  |  |  | 2024-10-25 17:06 | 224.9 |
| 211 |  |  |  |  |  | 2024-10-25 17:07 | 222.0 |
| 212 |  |  |  |  |  | 2024-10-25 17:08 | 219.8 |
| 213 |  |  |  |  |  | 2024-10-25 17:09 | 218.2 |
| 214 |  |  |  |  |  | 2024-10-25 17:10 | 216.3 |
| 215 |  |  |  |  |  | 2024-10-25 17:11 | 213.9 |
| 216 |  |  |  |  |  | 2024-10-25 17:12 | 212.2 |
| 217 |  |  |  |  |  | 2024-10-25 17:13 | 210.2 |
| 218 |  |  |  |  |  | 2024-10-25 17:14 | 208.6 |
| 219 |  |  |  |  |  | 2024-10-25 17:15 | 207.0 |
| 220 |  |  |  |  |  | 2024-10-25 17:16 | 205.5 |
| 221 |  |  |  |  |  | 2024-10-25 17:17 | 204.2 |
| 222 |  |  |  |  |  | 2024-10-25 17:18 | 202.8 |
| 223 |  |  |  |  |  | 2024-10-25 17:19 | 201.7 |
| 224 |  |  |  |  |  | 2024-10-25 17:20 | 199.9 |
| 225 |  |  |  |  |  | 2024-10-25 17:21 | 198.7 |
| 226 |  |  |  |  |  | 2024-10-25 17:22 | 197.5 |
| 227 |  |  |  |  |  | 2024-10-25 17:23 | 196.4 |
| 228 |  |  |  |  |  | 2024-10-25 17:24 | 195.6 |
| 229 |  |  |  |  |  | 2024-10-25 17:25 | 194.7 |
| 230 |  |  |  |  |  | 2024-10-25 17:26 | 193.3 |

|                        |                           |            |          |                |                |                  |                 |       |           |
|------------------------|---------------------------|------------|----------|----------------|----------------|------------------|-----------------|-------|-----------|
| St.Louis Pre-burn Data |                           | 2024-10-29 |          | Total time (h) |                | 6.80             |                 |       |           |
| Wood Specie: Maple     |                           |            |          |                |                |                  |                 |       |           |
| Load time              | Load type                 | Fuel added | Moisture | Piece amount   | Length of fuel | Fuel Burnt (Dry) | Burn Rate (Dry) | Time  | Flue Temp |
| (-)                    | (-)                       | (lb)       | (DB %)   | (-)            | (in.)          | (lb)             | (kg/hr)         | (min) | (°F)      |
| 2024-10-29 11:51       | Load 1 - Start-up         | 7.68       | 19.0     | 4              | 18.00          | 4.21             | 4.77            | 24    | 364.5     |
| 2024-10-29 12:16       | Load 2 - High-fire        | 13.69      | 20.3     | 4              | 18.00          | 10.06            | 3.42            | 72    | 417.7     |
| 2024-10-29 13:29       | Load 3 - Maintenance-fire | 9.36       | 19.4     | 2              | 18.00          | 6.96             | 2.44            | 70    | 394.0     |
| 2024-10-29 14:40       | Load 4 - Low burn rate    | 23.90      | 21.9     | 6              | 18.00          | 19.58            | 1.98            | 242   | 361.8     |

|                          |                  |           |                  |                                              |                  |              |                  |                        |  |
|--------------------------|------------------|-----------|------------------|----------------------------------------------|------------------|--------------|------------------|------------------------|--|
| Average Tflue (°F)       |                  | 364.5     |                  | 417.7                                        |                  | 394.0        |                  | 361.8                  |  |
| Load 1 - Start-up (min)  |                  | 24        |                  | High-fire (min)                              |                  | 72           |                  | Maintenance-fire (min) |  |
| Load 2 - High-fire (min) |                  | 70        |                  | Low burn rate (min)                          |                  | 242          |                  |                        |  |
| Air control position     |                  | Full open |                  | Full open then fully closed (@50% fuel load) |                  | Fully closed |                  | Fully closed           |  |
| Index                    | Date & Time      | Flue (F)  | Date & Time      | Flue (F)                                     | Date & Time      | Flue (F)     | Date & Time      | Flue (F)               |  |
| 0                        | 2024-10-29 11:51 | 70.7      | 2024-10-29 12:16 | 411.9                                        | 2024-10-29 13:29 | 390.7        | 2024-10-29 14:40 | 353.3                  |  |
| 1                        | 2024-10-29 11:52 | 117.0     | 2024-10-29 12:17 | 459.6                                        | 2024-10-29 13:30 | 454.1        | 2024-10-29 14:41 | 368.4                  |  |
| 2                        | 2024-10-29 11:53 | 220.3     | 2024-10-29 12:18 | 478.1                                        | 2024-10-29 13:31 | 489.0        | 2024-10-29 14:42 | 411.4                  |  |
| 3                        | 2024-10-29 11:54 | 326.0     | 2024-10-29 12:19 | 462.3                                        | 2024-10-29 13:32 | 489.5        | 2024-10-29 14:43 | 435.7                  |  |
| 4                        | 2024-10-29 11:55 | 366.1     | 2024-10-29 12:20 | 455.7                                        | 2024-10-29 13:33 | 475.8        | 2024-10-29 14:44 | 436.2                  |  |
| 5                        | 2024-10-29 11:56 | 371.4     | 2024-10-29 12:21 | 452.4                                        | 2024-10-29 13:34 | 450.2        | 2024-10-29 14:45 | 420.6                  |  |
| 6                        | 2024-10-29 11:57 | 354.7     | 2024-10-29 12:22 | 449.2                                        | 2024-10-29 13:35 | 435.4        | 2024-10-29 14:46 | 412.3                  |  |
| 7                        | 2024-10-29 11:58 | 381.2     | 2024-10-29 12:23 | 445.9                                        | 2024-10-29 13:36 | 427.7        | 2024-10-29 14:47 | 409.0                  |  |
| 8                        | 2024-10-29 11:59 | 393.2     | 2024-10-29 12:24 | 445.6                                        | 2024-10-29 13:37 | 423.0        | 2024-10-29 14:48 | 406.4                  |  |
| 9                        | 2024-10-29 12:00 | 375.1     | 2024-10-29 12:25 | 445.9                                        | 2024-10-29 13:38 | 419.1        | 2024-10-29 14:49 | 406.2                  |  |
| 10                       | 2024-10-29 12:01 | 378.2     | 2024-10-29 12:26 | 447.8                                        | 2024-10-29 13:39 | 414.7        | 2024-10-29 14:50 | 406.6                  |  |
| 11                       | 2024-10-29 12:02 | 380.8     | 2024-10-29 12:27 | 452.4                                        | 2024-10-29 13:40 | 411.1        | 2024-10-29 14:51 | 405.6                  |  |
| 12                       | 2024-10-29 12:03 | 387.2     | 2024-10-29 12:28 | 458.3                                        | 2024-10-29 13:41 | 407.9        | 2024-10-29 14:52 | 405.8                  |  |
| 13                       | 2024-10-29 12:04 | 392.2     | 2024-10-29 12:29 | 456.4                                        | 2024-10-29 13:42 | 405.2        | 2024-10-29 14:53 | 405.4                  |  |
| 14                       | 2024-10-29 12:05 | 405.3     | 2024-10-29 12:30 | 457.1                                        | 2024-10-29 13:43 | 404.3        | 2024-10-29 14:54 | 405.5                  |  |
| 15                       | 2024-10-29 12:06 | 417.1     | 2024-10-29 12:31 | 458.1                                        | 2024-10-29 13:44 | 402.0        | 2024-10-29 14:55 | 404.2                  |  |
| 16                       | 2024-10-29 12:07 | 425.4     | 2024-10-29 12:32 | 457.8                                        | 2024-10-29 13:45 | 400.3        | 2024-10-29 14:56 | 404.9                  |  |
| 17                       | 2024-10-29 12:08 | 423.0     | 2024-10-29 12:33 | 458.6                                        | 2024-10-29 13:46 | 398.8        | 2024-10-29 14:57 | 405.9                  |  |
| 18                       | 2024-10-29 12:09 | 416.6     | 2024-10-29 12:34 | 461.0                                        | 2024-10-29 13:47 | 397.7        | 2024-10-29 14:58 | 407.4                  |  |
| 19                       | 2024-10-29 12:10 | 417.3     | 2024-10-29 12:35 | 464.3                                        | 2024-10-29 13:48 | 395.3        | 2024-10-29 14:59 | 408.0                  |  |
| 20                       | 2024-10-29 12:11 | 422.7     | 2024-10-29 12:36 | 466.7                                        | 2024-10-29 13:49 | 394.9        | 2024-10-29 15:00 | 409.4                  |  |
| 21                       | 2024-10-29 12:12 | 419.0     | 2024-10-29 12:37 | 462.3                                        | 2024-10-29 13:50 | 396.3        | 2024-10-29 15:01 | 410.2                  |  |
| 22                       | 2024-10-29 12:13 | 413.4     | 2024-10-29 12:38 | 454.9                                        | 2024-10-29 13:51 | 400.6        | 2024-10-29 15:02 | 411.6                  |  |
| 23                       | 2024-10-29 12:14 | 415.6     | 2024-10-29 12:39 | 442.1                                        | 2024-10-29 13:52 | 398.7        | 2024-10-29 15:03 | 411.6                  |  |
| 24                       | 2024-10-29 12:15 | 422.2     | 2024-10-29 12:40 | 430.7                                        | 2024-10-29 13:53 | 396.6        | 2024-10-29 15:04 | 412.9                  |  |
| 25                       |                  |           | 2024-10-29 12:41 | 422.9                                        | 2024-10-29 13:54 | 395.1        | 2024-10-29 15:05 | 413.6                  |  |
| 26                       |                  |           | 2024-10-29 12:42 | 416.5                                        | 2024-10-29 13:55 | 393.8        | 2024-10-29 15:06 | 414.2                  |  |
| 27                       |                  |           | 2024-10-29 12:43 | 411.7                                        | 2024-10-29 13:56 | 392.8        | 2024-10-29 15:07 | 414.7                  |  |
| 28                       |                  |           | 2024-10-29 12:44 | 408.8                                        | 2024-10-29 13:57 | 391.1        | 2024-10-29 15:08 | 414.6                  |  |
| 29                       |                  |           | 2024-10-29 12:45 | 405.6                                        | 2024-10-29 13:58 | 389.6        | 2024-10-29 15:09 | 415.0                  |  |
| 30                       |                  |           | 2024-10-29 12:46 | 405.4                                        | 2024-10-29 13:59 | 391.8        | 2024-10-29 15:10 | 416.0                  |  |
| 31                       |                  |           | 2024-10-29 12:47 | 405.7                                        | 2024-10-29 14:00 | 393.2        | 2024-10-29 15:11 | 415.9                  |  |
| 32                       |                  |           | 2024-10-29 12:48 | 405.3                                        | 2024-10-29 14:01 | 393.9        | 2024-10-29 15:12 | 416.5                  |  |
| 33                       |                  |           | 2024-10-29 12:49 | 404.3                                        | 2024-10-29 14:02 | 393.5        | 2024-10-29 15:13 | 417.8                  |  |
| 34                       |                  |           | 2024-10-29 12:50 | 405.1                                        | 2024-10-29 14:03 | 392.9        | 2024-10-29 15:14 | 418.8                  |  |
| 35                       |                  |           | 2024-10-29 12:51 | 406.0                                        | 2024-10-29 14:04 | 392.7        | 2024-10-29 15:15 | 420.1                  |  |
| 36                       |                  |           | 2024-10-29 12:52 | 405.5                                        | 2024-10-29 14:05 | 391.8        | 2024-10-29 15:16 | 420.7                  |  |
| 37                       |                  |           | 2024-10-29 12:53 | 406.1                                        | 2024-10-29 14:06 | 390.3        | 2024-10-29 15:17 | 421.1                  |  |
| 38                       |                  |           | 2024-10-29 12:54 | 406.8                                        | 2024-10-29 14:07 | 389.4        | 2024-10-29 15:18 | 421.4                  |  |
| 39                       |                  |           | 2024-10-29 12:55 | 403.1                                        | 2024-10-29 14:08 | 387.8        | 2024-10-29 15:19 | 422.3                  |  |
| 40                       |                  |           | 2024-10-29 12:56 | 399.7                                        | 2024-10-29 14:09 | 386.7        | 2024-10-29 15:20 | 422.9                  |  |
| 41                       |                  |           | 2024-10-29 12:57 | 398.6                                        | 2024-10-29 14:10 | 386.7        | 2024-10-29 15:21 | 422.6                  |  |
| 42                       |                  |           | 2024-10-29 12:58 | 400.9                                        | 2024-10-29 14:11 | 385.5        | 2024-10-29 15:22 | 423.1                  |  |
| 43                       |                  |           | 2024-10-29 12:59 | 402.8                                        | 2024-10-29 14:12 | 383.8        | 2024-10-29 15:23 | 423.6                  |  |
| 44                       |                  |           | 2024-10-29 13:00 | 402.6                                        | 2024-10-29 14:13 | 382.6        | 2024-10-29 15:24 | 423.1                  |  |
| 45                       |                  |           | 2024-10-29 13:01 | 403.6                                        | 2024-10-29 14:14 | 381.3        | 2024-10-29 15:25 | 423.2                  |  |
| 46                       |                  |           | 2024-10-29 13:02 | 403.4                                        | 2024-10-29 14:15 | 380.7        | 2024-10-29 15:26 | 424.0                  |  |
| 47                       |                  |           | 2024-10-29 13:03 | 402.9                                        | 2024-10-29 14:16 | 380.4        | 2024-10-29 15:27 | 424.2                  |  |
| 48                       |                  |           | 2024-10-29 13:04 | 403.8                                        | 2024-10-29 14:17 | 378.8        | 2024-10-29 15:28 | 424.4                  |  |
| 49                       |                  |           | 2024-10-29 13:05 | 403.3                                        | 2024-10-29 14:18 | 378.6        | 2024-10-29 15:29 | 424.5                  |  |
| 50                       |                  |           | 2024-10-29 13:06 | 399.1                                        | 2024-10-29 14:19 | 379.1        | 2024-10-29 15:30 | 424.5                  |  |
| 51                       |                  |           | 2024-10-29 13:07 | 397.1                                        | 2024-10-29 14:20 | 377.6        | 2024-10-29 15:31 | 424.6                  |  |
| 52                       |                  |           | 2024-10-29 13:08 | 395.7                                        | 2024-10-29 14:21 | 377.2        | 2024-10-29 15:32 | 424.9                  |  |
| 53                       |                  |           | 2024-10-29 13:09 | 396.6                                        | 2024-10-29 14:22 | 376.5        | 2024-10-29 15:33 | 424.4                  |  |
| 54                       |                  |           | 2024-10-29 13:10 | 399.8                                        | 2024-10-29 14:23 | 376.4        | 2024-10-29 15:34 | 424.1                  |  |
| 55                       |                  |           | 2024-10-29 13:11 | 401.8                                        | 2024-10-29 14:24 | 377.1        | 2024-10-29 15:35 | 424.6                  |  |
| 56                       |                  |           | 2024-10-29 13:12 | 400.3                                        | 2024-10-29 14:25 | 377.5        | 2024-10-29 15:36 | 424.3                  |  |
| 57                       |                  |           | 2024-10-29 13:13 | 397.9                                        | 2024-10-29 14:26 | 376.3        | 2024-10-29 15:37 | 424.8                  |  |
| 58                       |                  |           | 2024-10-29 13:14 | 396.7                                        | 2024-10-29 14:27 | 377.6        | 2024-10-29 15:38 | 425.2                  |  |
| 59                       |                  |           | 2024-10-29 13:15 | 394.8                                        | 2024-10-29 14:28 | 375.4        | 2024-10-29 15:39 | 426.4                  |  |
| 60                       |                  |           | 2024-10-29 13:16 | 393.5                                        | 2024-10-29 14:29 | 373.6        | 2024-10-29 15:40 | 427.4                  |  |
| 61                       |                  |           | 2024-10-29 13:17 | 392.7                                        | 2024-10-29 14:30 | 370.6        | 2024-10-29 15:41 | 428.6                  |  |
| 62                       |                  |           | 2024-10-29 13:18 | 391.9                                        | 2024-10-29 14:31 | 367.1        | 2024-10-29 15:42 | 430.4                  |  |
| 63                       |                  |           | 2024-10-29 13:19 | 390.9                                        | 2024-10-29 14:32 | 366.8        | 2024-10-29 15:43 | 431.7                  |  |
| 64                       |                  |           | 2024-10-29 13:20 | 388.3                                        | 2024-10-29 14:33 | 365.4        | 2024-10-29 15:44 | 432.5                  |  |
| 65                       |                  |           | 2024-10-29 13:21 | 387.6                                        | 2024-10-29 14:34 | 363.4        | 2024-10-29 15:45 | 433.4                  |  |
| 66                       |                  |           | 2024-10-29 13:22 | 386.1                                        | 2024-10-29 14:35 | 361.1        | 2024-10-29 15:46 | 434.8                  |  |
| 67                       |                  |           | 2024-10-29 13:23 | 384.6                                        | 2024-10-29 14:36 | 358.4        | 2024-10-29 15:47 | 436.0                  |  |
| 68                       |                  |           | 2024-10-29 13:24 | 385.4                                        | 2024-10-29 14:37 | 362.6        | 2024-10-29 15:48 | 438.2                  |  |
| 69                       |                  |           | 2024-10-29 13:25 | 385.4                                        | 2024-10-29 14:38 | 364.3        | 2024-10-29 15:49 | 439.9                  |  |
| 70                       |                  |           | 2024-10-29 13:26 | 384.3                                        | 2024-10-29 14:39 | 365.8        | 2024-10-29 15:50 | 440.8                  |  |
| 71                       |                  |           | 2024-10-29 13:27 | 383.4                                        |                  |              | 2024-10-29 15:51 | 440.0                  |  |
| 72                       |                  |           | 2024-10-29 13:28 | 381.1                                        |                  |              | 2024-10-29 15:52 | 440.2                  |  |

|     |  |  |  |  |  |                  |       |
|-----|--|--|--|--|--|------------------|-------|
| 73  |  |  |  |  |  | 2024-10-29 15:53 | 438.6 |
| 74  |  |  |  |  |  | 2024-10-29 15:54 | 437.7 |
| 75  |  |  |  |  |  | 2024-10-29 15:55 | 436.0 |
| 76  |  |  |  |  |  | 2024-10-29 15:56 | 435.8 |
| 77  |  |  |  |  |  | 2024-10-29 15:57 | 436.3 |
| 78  |  |  |  |  |  | 2024-10-29 15:58 | 434.6 |
| 79  |  |  |  |  |  | 2024-10-29 15:59 | 433.2 |
| 80  |  |  |  |  |  | 2024-10-29 16:00 | 432.5 |
| 81  |  |  |  |  |  | 2024-10-29 16:01 | 430.7 |
| 82  |  |  |  |  |  | 2024-10-29 16:02 | 430.2 |
| 83  |  |  |  |  |  | 2024-10-29 16:03 | 427.8 |
| 84  |  |  |  |  |  | 2024-10-29 16:04 | 426.8 |
| 85  |  |  |  |  |  | 2024-10-29 16:05 | 425.2 |
| 86  |  |  |  |  |  | 2024-10-29 16:06 | 422.5 |
| 87  |  |  |  |  |  | 2024-10-29 16:07 | 421.0 |
| 88  |  |  |  |  |  | 2024-10-29 16:08 | 419.3 |
| 89  |  |  |  |  |  | 2024-10-29 16:09 | 417.7 |
| 90  |  |  |  |  |  | 2024-10-29 16:10 | 416.1 |
| 91  |  |  |  |  |  | 2024-10-29 16:11 | 414.8 |
| 92  |  |  |  |  |  | 2024-10-29 16:12 | 412.8 |
| 93  |  |  |  |  |  | 2024-10-29 16:13 | 412.6 |
| 94  |  |  |  |  |  | 2024-10-29 16:14 | 411.7 |
| 95  |  |  |  |  |  | 2024-10-29 16:15 | 409.7 |
| 96  |  |  |  |  |  | 2024-10-29 16:16 | 407.0 |
| 97  |  |  |  |  |  | 2024-10-29 16:17 | 403.9 |
| 98  |  |  |  |  |  | 2024-10-29 16:18 | 401.3 |
| 99  |  |  |  |  |  | 2024-10-29 16:19 | 398.8 |
| 100 |  |  |  |  |  | 2024-10-29 16:20 | 397.1 |
| 101 |  |  |  |  |  | 2024-10-29 16:21 | 394.4 |
| 102 |  |  |  |  |  | 2024-10-29 16:22 | 392.3 |
| 103 |  |  |  |  |  | 2024-10-29 16:23 | 391.1 |
| 104 |  |  |  |  |  | 2024-10-29 16:24 | 389.5 |
| 105 |  |  |  |  |  | 2024-10-29 16:25 | 387.7 |
| 106 |  |  |  |  |  | 2024-10-29 16:26 | 387.1 |
| 107 |  |  |  |  |  | 2024-10-29 16:27 | 386.1 |
| 108 |  |  |  |  |  | 2024-10-29 16:28 | 385.5 |
| 109 |  |  |  |  |  | 2024-10-29 16:29 | 382.9 |
| 110 |  |  |  |  |  | 2024-10-29 16:30 | 380.2 |
| 111 |  |  |  |  |  | 2024-10-29 16:31 | 379.0 |
| 112 |  |  |  |  |  | 2024-10-29 16:32 | 377.2 |
| 113 |  |  |  |  |  | 2024-10-29 16:33 | 375.0 |
| 114 |  |  |  |  |  | 2024-10-29 16:34 | 374.2 |
| 115 |  |  |  |  |  | 2024-10-29 16:35 | 371.3 |
| 116 |  |  |  |  |  | 2024-10-29 16:36 | 370.1 |
| 117 |  |  |  |  |  | 2024-10-29 16:37 | 368.6 |
| 118 |  |  |  |  |  | 2024-10-29 16:38 | 366.5 |
| 119 |  |  |  |  |  | 2024-10-29 16:39 | 365.0 |
| 120 |  |  |  |  |  | 2024-10-29 16:40 | 363.2 |
| 121 |  |  |  |  |  | 2024-10-29 16:41 | 361.5 |
| 122 |  |  |  |  |  | 2024-10-29 16:42 | 360.5 |
| 123 |  |  |  |  |  | 2024-10-29 16:43 | 365.6 |
| 124 |  |  |  |  |  | 2024-10-29 16:44 | 368.0 |
| 125 |  |  |  |  |  | 2024-10-29 16:45 | 369.6 |
| 126 |  |  |  |  |  | 2024-10-29 16:46 | 369.4 |
| 127 |  |  |  |  |  | 2024-10-29 16:47 | 370.1 |
| 128 |  |  |  |  |  | 2024-10-29 16:48 | 370.3 |
| 129 |  |  |  |  |  | 2024-10-29 16:49 | 366.4 |
| 130 |  |  |  |  |  | 2024-10-29 16:50 | 361.6 |
| 131 |  |  |  |  |  | 2024-10-29 16:51 | 358.4 |
| 132 |  |  |  |  |  | 2024-10-29 16:52 | 356.4 |
| 133 |  |  |  |  |  | 2024-10-29 16:53 | 354.0 |
| 134 |  |  |  |  |  | 2024-10-29 16:54 | 352.3 |
| 135 |  |  |  |  |  | 2024-10-29 16:55 | 351.4 |
| 136 |  |  |  |  |  | 2024-10-29 16:56 | 350.3 |
| 137 |  |  |  |  |  | 2024-10-29 16:57 | 348.3 |
| 138 |  |  |  |  |  | 2024-10-29 16:58 | 347.4 |
| 139 |  |  |  |  |  | 2024-10-29 16:59 | 347.4 |
| 140 |  |  |  |  |  | 2024-10-29 17:00 | 351.2 |
| 141 |  |  |  |  |  | 2024-10-29 17:01 | 353.8 |
| 142 |  |  |  |  |  | 2024-10-29 17:02 | 355.0 |
| 143 |  |  |  |  |  | 2024-10-29 17:03 | 355.9 |
| 144 |  |  |  |  |  | 2024-10-29 17:04 | 358.6 |
| 145 |  |  |  |  |  | 2024-10-29 17:05 | 359.6 |
| 146 |  |  |  |  |  | 2024-10-29 17:06 | 360.4 |
| 147 |  |  |  |  |  | 2024-10-29 17:07 | 362.2 |
| 148 |  |  |  |  |  | 2024-10-29 17:08 | 363.4 |
| 149 |  |  |  |  |  | 2024-10-29 17:09 | 365.0 |
| 150 |  |  |  |  |  | 2024-10-29 17:10 | 365.9 |
| 151 |  |  |  |  |  | 2024-10-29 17:11 | 366.5 |
| 152 |  |  |  |  |  | 2024-10-29 17:12 | 368.3 |
| 153 |  |  |  |  |  | 2024-10-29 17:13 | 369.1 |
| 154 |  |  |  |  |  | 2024-10-29 17:14 | 369.3 |
| 155 |  |  |  |  |  | 2024-10-29 17:15 | 370.2 |
| 156 |  |  |  |  |  | 2024-10-29 17:16 | 370.7 |
| 157 |  |  |  |  |  | 2024-10-29 17:17 | 371.4 |
| 158 |  |  |  |  |  | 2024-10-29 17:18 | 372.1 |

|     |  |  |  |  |  |                  |       |
|-----|--|--|--|--|--|------------------|-------|
| 159 |  |  |  |  |  | 2024-10-29 17:19 | 371.7 |
| 160 |  |  |  |  |  | 2024-10-29 17:20 | 371.5 |
| 161 |  |  |  |  |  | 2024-10-29 17:21 | 370.9 |
| 162 |  |  |  |  |  | 2024-10-29 17:22 | 371.2 |
| 163 |  |  |  |  |  | 2024-10-29 17:23 | 371.0 |
| 164 |  |  |  |  |  | 2024-10-29 17:24 | 371.5 |
| 165 |  |  |  |  |  | 2024-10-29 17:25 | 371.0 |
| 166 |  |  |  |  |  | 2024-10-29 17:26 | 370.6 |
| 167 |  |  |  |  |  | 2024-10-29 17:27 | 370.1 |
| 168 |  |  |  |  |  | 2024-10-29 17:28 | 369.8 |
| 169 |  |  |  |  |  | 2024-10-29 17:29 | 369.7 |
| 170 |  |  |  |  |  | 2024-10-29 17:30 | 369.0 |
| 171 |  |  |  |  |  | 2024-10-29 17:31 | 368.3 |
| 172 |  |  |  |  |  | 2024-10-29 17:32 | 368.3 |
| 173 |  |  |  |  |  | 2024-10-29 17:33 | 368.0 |
| 174 |  |  |  |  |  | 2024-10-29 17:34 | 367.3 |
| 175 |  |  |  |  |  | 2024-10-29 17:35 | 367.3 |
| 176 |  |  |  |  |  | 2024-10-29 17:36 | 366.5 |
| 177 |  |  |  |  |  | 2024-10-29 17:37 | 366.7 |
| 178 |  |  |  |  |  | 2024-10-29 17:38 | 366.6 |
| 179 |  |  |  |  |  | 2024-10-29 17:39 | 366.0 |
| 180 |  |  |  |  |  | 2024-10-29 17:40 | 365.9 |
| 181 |  |  |  |  |  | 2024-10-29 17:41 | 366.5 |
| 182 |  |  |  |  |  | 2024-10-29 17:42 | 365.7 |
| 183 |  |  |  |  |  | 2024-10-29 17:43 | 365.1 |
| 184 |  |  |  |  |  | 2024-10-29 17:44 | 364.7 |
| 185 |  |  |  |  |  | 2024-10-29 17:45 | 363.9 |
| 186 |  |  |  |  |  | 2024-10-29 17:46 | 363.7 |
| 187 |  |  |  |  |  | 2024-10-29 17:47 | 359.6 |
| 188 |  |  |  |  |  | 2024-10-29 17:48 | 354.9 |
| 189 |  |  |  |  |  | 2024-10-29 17:49 | 351.4 |
| 190 |  |  |  |  |  | 2024-10-29 17:50 | 350.0 |
| 191 |  |  |  |  |  | 2024-10-29 17:51 | 348.2 |
| 192 |  |  |  |  |  | 2024-10-29 17:52 | 337.0 |
| 193 |  |  |  |  |  | 2024-10-29 17:53 | 318.7 |
| 194 |  |  |  |  |  | 2024-10-29 17:54 | 306.5 |
| 195 |  |  |  |  |  | 2024-10-29 17:55 | 298.3 |
| 196 |  |  |  |  |  | 2024-10-29 17:56 | 286.6 |
| 197 |  |  |  |  |  | 2024-10-29 17:57 | 277.6 |
| 198 |  |  |  |  |  | 2024-10-29 17:58 | 271.3 |
| 199 |  |  |  |  |  | 2024-10-29 17:59 | 266.4 |
| 200 |  |  |  |  |  | 2024-10-29 18:00 | 262.1 |
| 201 |  |  |  |  |  | 2024-10-29 18:01 | 258.1 |
| 202 |  |  |  |  |  | 2024-10-29 18:02 | 254.9 |
| 203 |  |  |  |  |  | 2024-10-29 18:03 | 252.0 |
| 204 |  |  |  |  |  | 2024-10-29 18:04 | 249.6 |
| 205 |  |  |  |  |  | 2024-10-29 18:05 | 247.4 |
| 206 |  |  |  |  |  | 2024-10-29 18:06 | 245.4 |
| 207 |  |  |  |  |  | 2024-10-29 18:07 | 243.7 |
| 208 |  |  |  |  |  | 2024-10-29 18:08 | 241.0 |
| 209 |  |  |  |  |  | 2024-10-29 18:09 | 239.5 |
| 210 |  |  |  |  |  | 2024-10-29 18:10 | 237.8 |
| 211 |  |  |  |  |  | 2024-10-29 18:11 | 236.1 |
| 212 |  |  |  |  |  | 2024-10-29 18:12 | 235.2 |
| 213 |  |  |  |  |  | 2024-10-29 18:13 | 234.2 |
| 214 |  |  |  |  |  | 2024-10-29 18:14 | 232.8 |
| 215 |  |  |  |  |  | 2024-10-29 18:15 | 231.9 |
| 216 |  |  |  |  |  | 2024-10-29 18:16 | 230.3 |
| 217 |  |  |  |  |  | 2024-10-29 18:17 | 229.1 |
| 218 |  |  |  |  |  | 2024-10-29 18:18 | 227.7 |
| 219 |  |  |  |  |  | 2024-10-29 18:19 | 226.7 |
| 220 |  |  |  |  |  | 2024-10-29 18:20 | 225.3 |
| 221 |  |  |  |  |  | 2024-10-29 18:21 | 224.9 |
| 222 |  |  |  |  |  | 2024-10-29 18:22 | 224.3 |
| 223 |  |  |  |  |  | 2024-10-29 18:23 | 223.4 |
| 224 |  |  |  |  |  | 2024-10-29 18:24 | 222.7 |
| 225 |  |  |  |  |  | 2024-10-29 18:25 | 221.8 |
| 226 |  |  |  |  |  | 2024-10-29 18:26 | 220.6 |
| 227 |  |  |  |  |  | 2024-10-29 18:27 | 219.9 |
| 228 |  |  |  |  |  | 2024-10-29 18:28 | 219.0 |
| 229 |  |  |  |  |  | 2024-10-29 18:29 | 217.8 |
| 230 |  |  |  |  |  | 2024-10-29 18:30 | 217.0 |
| 231 |  |  |  |  |  | 2024-10-29 18:31 | 216.4 |
| 232 |  |  |  |  |  | 2024-10-29 18:32 | 215.6 |
| 233 |  |  |  |  |  | 2024-10-29 18:33 | 214.4 |
| 234 |  |  |  |  |  | 2024-10-29 18:34 | 214.2 |
| 235 |  |  |  |  |  | 2024-10-29 18:35 | 213.3 |
| 236 |  |  |  |  |  | 2024-10-29 18:36 | 212.1 |
| 237 |  |  |  |  |  | 2024-10-29 18:37 | 211.7 |
| 238 |  |  |  |  |  | 2024-10-29 18:38 | 211.3 |
| 239 |  |  |  |  |  | 2024-10-29 18:39 | 210.9 |
| 240 |  |  |  |  |  | 2024-10-29 18:40 | 210.1 |
| 241 |  |  |  |  |  | 2024-10-29 18:41 | 209.3 |
| 242 |  |  |  |  |  | 2024-10-29 18:42 | 209.0 |

|                        |                           |            |          |                |                |                  |                 |       |           |
|------------------------|---------------------------|------------|----------|----------------|----------------|------------------|-----------------|-------|-----------|
| St.Louis Pre-burn Data |                           | 2024-10-30 |          | Total time (h) |                | 8.22             |                 |       |           |
| Wood Specie: Maple     |                           |            |          |                |                |                  |                 |       |           |
| Load time              | Load type                 | Fuel added | Moisture | Piece amount   | Length of fuel | Fuel Burnt (Dry) | Burn Rate (Dry) | Time  | Flue Temp |
| (-)                    | (-)                       | (lb)       | (DB %)   | (-)            | (in.)          | (lb)             | (kg/hr)         | (min) | (°F)      |
| 2024-10-30 10:54       | Load 1 - Start-up         | 7.54       | 20.9     | 4              | 18.00          | 3.88             | 4.40            | 24    | 365.9     |
| 2024-10-30 11:19       | Load 2 - High-fire        | 13.94      | 21.4     | 4              | 18.00          | 10.04            | 3.19            | 77    | 406.1     |
| 2024-10-30 12:37       | Load 3 - Maintenance-fire | 9.67       | 20.0     | 2              | 18.00          | 7.09             | 2.35            | 74    | 382.9     |
| 2024-10-30 13:52       | Load 4 - Low burn rate    | 23.74      | 21.4     | 6              | 18.00          | 19.55            | 1.51            | 318   | 286.3     |

|                      |                         |           |       |                                              |          |                  |                        |                  |    |                     |       |     |
|----------------------|-------------------------|-----------|-------|----------------------------------------------|----------|------------------|------------------------|------------------|----|---------------------|-------|-----|
|                      | Average Tflue (°F)      |           | 365.9 |                                              | 406.1    |                  |                        | 382.9            |    |                     | 286.3 |     |
|                      | Load 1 - Start-up (min) |           | 24    | High-fire (min)                              |          | 77               | Maintenance-fire (min) |                  | 74 | Low burn rate (min) |       | 318 |
| Air control position |                         | Full open |       | Full open then fully closed (@50% fuel load) |          | Fully closed     |                        | Fully closed     |    |                     |       |     |
| Index                | Date & Time             | Flue (F)  |       | Date & Time                                  | Flue (F) | Date & Time      | Flue (F)               | Date & Time      |    | Flue (F)            |       |     |
| 0                    | 2024-10-30 10:54        | 73.1      |       | 2024-10-30 11:19                             | 389.6    | 2024-10-30 12:37 | 379.1                  | 2024-10-30 13:52 |    | 344.7               |       |     |
| 1                    | 2024-10-30 10:55        | 123.4     |       | 2024-10-30 11:20                             | 409.8    | 2024-10-30 12:38 | 433.8                  | 2024-10-30 13:53 |    | 379.3               |       |     |
| 2                    | 2024-10-30 10:56        | 189.9     |       | 2024-10-30 11:21                             | 421.3    | 2024-10-30 12:39 | 453.4                  | 2024-10-30 13:54 |    | 422.2               |       |     |
| 3                    | 2024-10-30 10:57        | 276.8     |       | 2024-10-30 11:22                             | 411.1    | 2024-10-30 12:40 | 456.6                  | 2024-10-30 13:55 |    | 442.6               |       |     |
| 4                    | 2024-10-30 10:58        | 329.5     |       | 2024-10-30 11:23                             | 411.8    | 2024-10-30 12:41 | 450.3                  | 2024-10-30 13:56 |    | 440.6               |       |     |
| 5                    | 2024-10-30 10:59        | 358.5     |       | 2024-10-30 11:24                             | 418.0    | 2024-10-30 12:42 | 437.9                  | 2024-10-30 13:57 |    | 432.0               |       |     |
| 6                    | 2024-10-30 11:00        | 367.4     |       | 2024-10-30 11:25                             | 423.8    | 2024-10-30 12:43 | 426.0                  | 2024-10-30 13:58 |    | 426.4               |       |     |
| 7                    | 2024-10-30 11:01        | 373.3     |       | 2024-10-30 11:26                             | 431.9    | 2024-10-30 12:44 | 418.3                  | 2024-10-30 13:59 |    | 423.4               |       |     |
| 8                    | 2024-10-30 11:02        | 382.3     |       | 2024-10-30 11:27                             | 437.5    | 2024-10-30 12:45 | 413.0                  | 2024-10-30 14:00 |    | 422.0               |       |     |
| 9                    | 2024-10-30 11:03        | 393.1     |       | 2024-10-30 11:28                             | 443.0    | 2024-10-30 12:46 | 409.4                  | 2024-10-30 14:01 |    | 413.0               |       |     |
| 10                   | 2024-10-30 11:04        | 397.9     |       | 2024-10-30 11:29                             | 450.4    | 2024-10-30 12:47 | 406.6                  | 2024-10-30 14:02 |    | 409.9               |       |     |
| 11                   | 2024-10-30 11:05        | 401.6     |       | 2024-10-30 11:30                             | 454.9    | 2024-10-30 12:48 | 405.1                  | 2024-10-30 14:03 |    | 410.3               |       |     |
| 12                   | 2024-10-30 11:06        | 408.8     |       | 2024-10-30 11:31                             | 453.9    | 2024-10-30 12:49 | 403.4                  | 2024-10-30 14:04 |    | 411.4               |       |     |
| 13                   | 2024-10-30 11:07        | 412.2     |       | 2024-10-30 11:32                             | 451.4    | 2024-10-30 12:50 | 405.9                  | 2024-10-30 14:05 |    | 412.8               |       |     |
| 14                   | 2024-10-30 11:08        | 408.5     |       | 2024-10-30 11:33                             | 451.1    | 2024-10-30 12:51 | 403.2                  | 2024-10-30 14:06 |    | 415.3               |       |     |
| 15                   | 2024-10-30 11:09        | 407.9     |       | 2024-10-30 11:34                             | 451.2    | 2024-10-30 12:52 | 401.6                  | 2024-10-30 14:07 |    | 412.7               |       |     |
| 16                   | 2024-10-30 11:10        | 417.2     |       | 2024-10-30 11:35                             | 451.4    | 2024-10-30 12:53 | 399.4                  | 2024-10-30 14:08 |    | 411.1               |       |     |
| 17                   | 2024-10-30 11:11        | 429.5     |       | 2024-10-30 11:36                             | 450.8    | 2024-10-30 12:54 | 397.3                  | 2024-10-30 14:09 |    | 410.0               |       |     |
| 18                   | 2024-10-30 11:12        | 431.7     |       | 2024-10-30 11:37                             | 450.4    | 2024-10-30 12:55 | 395.3                  | 2024-10-30 14:10 |    | 410.0               |       |     |
| 19                   | 2024-10-30 11:13        | 426.8     |       | 2024-10-30 11:38                             | 450.0    | 2024-10-30 12:56 | 393.4                  | 2024-10-30 14:11 |    | 409.3               |       |     |
| 20                   | 2024-10-30 11:14        | 422.1     |       | 2024-10-30 11:39                             | 453.1    | 2024-10-30 12:57 | 391.8                  | 2024-10-30 14:12 |    | 409.5               |       |     |
| 21                   | 2024-10-30 11:15        | 425.0     |       | 2024-10-30 11:40                             | 455.0    | 2024-10-30 12:58 | 390.1                  | 2024-10-30 14:13 |    | 409.0               |       |     |
| 22                   | 2024-10-30 11:16        | 429.6     |       | 2024-10-30 11:41                             | 456.3    | 2024-10-30 12:59 | 388.6                  | 2024-10-30 14:14 |    | 408.4               |       |     |
| 23                   | 2024-10-30 11:17        | 429.9     |       | 2024-10-30 11:42                             | 456.7    | 2024-10-30 13:00 | 386.3                  | 2024-10-30 14:15 |    | 409.3               |       |     |
| 24                   | 2024-10-30 11:18        | 430.4     |       | 2024-10-30 11:43                             | 456.1    | 2024-10-30 13:01 | 385.8                  | 2024-10-30 14:16 |    | 409.4               |       |     |
| 25                   |                         |           |       | 2024-10-30 11:44                             | 454.6    | 2024-10-30 13:02 | 388.1                  | 2024-10-30 14:17 |    | 409.5               |       |     |
| 26                   |                         |           |       | 2024-10-30 11:45                             | 451.4    | 2024-10-30 13:03 | 388.7                  | 2024-10-30 14:18 |    | 410.0               |       |     |
| 27                   |                         |           |       | 2024-10-30 11:46                             | 449.7    | 2024-10-30 13:04 | 388.4                  | 2024-10-30 14:19 |    | 409.9               |       |     |
| 28                   |                         |           |       | 2024-10-30 11:47                             | 447.6    | 2024-10-30 13:05 | 388.0                  | 2024-10-30 14:20 |    | 410.7               |       |     |
| 29                   |                         |           |       | 2024-10-30 11:48                             | 446.1    | 2024-10-30 13:06 | 387.1                  | 2024-10-30 14:21 |    | 410.8               |       |     |
| 30                   |                         |           |       | 2024-10-30 11:49                             | 445.1    | 2024-10-30 13:07 | 386.3                  | 2024-10-30 14:22 |    | 411.1               |       |     |
| 31                   |                         |           |       | 2024-10-30 11:50                             | 442.7    | 2024-10-30 13:08 | 385.8                  | 2024-10-30 14:23 |    | 411.3               |       |     |
| 32                   |                         |           |       | 2024-10-30 11:51                             | 434.6    | 2024-10-30 13:09 | 385.3                  | 2024-10-30 14:24 |    | 411.6               |       |     |
| 33                   |                         |           |       | 2024-10-30 11:52                             | 417.6    | 2024-10-30 13:10 | 384.5                  | 2024-10-30 14:25 |    | 411.2               |       |     |
| 34                   |                         |           |       | 2024-10-30 11:53                             | 408.9    | 2024-10-30 13:11 | 383.8                  | 2024-10-30 14:26 |    | 413.4               |       |     |
| 35                   |                         |           |       | 2024-10-30 11:54                             | 401.4    | 2024-10-30 13:12 | 382.4                  | 2024-10-30 14:27 |    | 415.0               |       |     |
| 36                   |                         |           |       | 2024-10-30 11:55                             | 396.4    | 2024-10-30 13:13 | 381.0                  | 2024-10-30 14:28 |    | 417.0               |       |     |
| 37                   |                         |           |       | 2024-10-30 11:56                             | 392.1    | 2024-10-30 13:14 | 379.2                  | 2024-10-30 14:29 |    | 419.3               |       |     |
| 38                   |                         |           |       | 2024-10-30 11:57                             | 390.9    | 2024-10-30 13:15 | 378.3                  | 2024-10-30 14:30 |    | 419.8               |       |     |
| 39                   |                         |           |       | 2024-10-30 11:58                             | 387.1    | 2024-10-30 13:16 | 376.9                  | 2024-10-30 14:31 |    | 420.2               |       |     |
| 40                   |                         |           |       | 2024-10-30 11:59                             | 384.8    | 2024-10-30 13:17 | 376.2                  | 2024-10-30 14:32 |    | 420.6               |       |     |
| 41                   |                         |           |       | 2024-10-30 12:00                             | 382.4    | 2024-10-30 13:18 | 376.0                  | 2024-10-30 14:33 |    | 420.7               |       |     |
| 42                   |                         |           |       | 2024-10-30 12:01                             | 380.1    | 2024-10-30 13:19 | 374.2                  | 2024-10-30 14:34 |    | 420.3               |       |     |
| 43                   |                         |           |       | 2024-10-30 12:02                             | 379.0    | 2024-10-30 13:20 | 373.7                  | 2024-10-30 14:35 |    | 421.2               |       |     |
| 44                   |                         |           |       | 2024-10-30 12:03                             | 377.9    | 2024-10-30 13:21 | 373.0                  | 2024-10-30 14:36 |    | 422.3               |       |     |
| 45                   |                         |           |       | 2024-10-30 12:04                             | 378.0    | 2024-10-30 13:22 | 372.5                  | 2024-10-30 14:37 |    | 423.8               |       |     |
| 46                   |                         |           |       | 2024-10-30 12:05                             | 378.1    | 2024-10-30 13:23 | 371.5                  | 2024-10-30 14:38 |    | 424.5               |       |     |
| 47                   |                         |           |       | 2024-10-30 12:06                             | 378.6    | 2024-10-30 13:24 | 370.5                  | 2024-10-30 14:39 |    | 426.6               |       |     |
| 48                   |                         |           |       | 2024-10-30 12:07                             | 379.6    | 2024-10-30 13:25 | 370.0                  | 2024-10-30 14:40 |    | 428.0               |       |     |
| 49                   |                         |           |       | 2024-10-30 12:08                             | 380.6    | 2024-10-30 13:26 | 369.8                  | 2024-10-30 14:41 |    | 429.4               |       |     |
| 50                   |                         |           |       | 2024-10-30 12:09                             | 380.9    | 2024-10-30 13:27 | 368.7                  | 2024-10-30 14:42 |    | 430.1               |       |     |
| 51                   |                         |           |       | 2024-10-30 12:10                             | 381.4    | 2024-10-30 13:28 | 367.8                  | 2024-10-30 14:43 |    | 431.4               |       |     |
| 52                   |                         |           |       | 2024-10-30 12:11                             | 382.0    | 2024-10-30 13:29 | 367.8                  | 2024-10-30 14:44 |    | 432.6               |       |     |
| 53                   |                         |           |       | 2024-10-30 12:12                             | 382.8    | 2024-10-30 13:30 | 368.3                  | 2024-10-30 14:45 |    | 433.2               |       |     |
| 54                   |                         |           |       | 2024-10-30 12:13                             | 383.4    | 2024-10-30 13:31 | 368.0                  | 2024-10-30 14:46 |    | 434.5               |       |     |
| 55                   |                         |           |       | 2024-10-30 12:14                             | 383.2    | 2024-10-30 13:32 | 367.7                  | 2024-10-30 14:47 |    | 435.8               |       |     |
| 56                   |                         |           |       | 2024-10-30 12:15                             | 383.7    | 2024-10-30 13:33 | 367.8                  | 2024-10-30 14:48 |    | 436.9               |       |     |
| 57                   |                         |           |       | 2024-10-30 12:16                             | 381.7    | 2024-10-30 13:34 | 367.3                  | 2024-10-30 14:49 |    | 437.0               |       |     |
| 58                   |                         |           |       | 2024-10-30 12:17                             | 379.2    | 2024-10-30 13:35 | 366.3                  | 2024-10-30 14:50 |    | 437.7               |       |     |
| 59                   |                         |           |       | 2024-10-30 12:18                             | 377.3    | 2024-10-30 13:36 | 364.9                  | 2024-10-30 14:51 |    | 438.2               |       |     |
| 60                   |                         |           |       | 2024-10-30 12:19                             | 376.7    | 2024-10-30 13:37 | 363.7                  | 2024-10-30 14:52 |    | 438.6               |       |     |
| 61                   |                         |           |       | 2024-10-30 12:20                             | 375.4    | 2024-10-30 13:38 | 362.3                  | 2024-10-30 14:53 |    | 438.7               |       |     |
| 62                   |                         |           |       | 2024-10-30 12:21                             | 373.7    | 2024-10-30 13:39 | 360.7                  | 2024-10-30 14:54 |    | 439.0               |       |     |
| 63                   |                         |           |       | 2024-10-30 12:22                             | 372.7    | 2024-10-30 13:40 | 359.4                  | 2024-10-30 14:55 |    | 439.3               |       |     |
| 64                   |                         |           |       | 2024-10-30 12:23                             | 371.0    | 2024-10-30 13:41 | 357.7                  | 2024-10-30 14:56 |    | 440.1               |       |     |
| 65                   |                         |           |       | 2024-10-30 12:24                             | 369.8    | 2024-10-30 13:42 | 356.9                  | 2024-10-30 14:57 |    | 439.8               |       |     |
| 66                   |                         |           |       | 2024-10-30 12:25                             | 371.5    | 2024-10-30 13:43 | 355.7                  | 2024-10-30 14:58 |    | 440.5               |       |     |
| 67                   |                         |           |       | 2024-10-30 12:26                             | 372.9    | 2024-10-30 13:44 | 354.3                  | 2024-10-30 14:59 |    | 440.7               |       |     |
| 68                   |                         |           |       | 2024-10-30 12:27                             | 373.1    | 2024-10-30 13:45 | 352.8                  | 2024-10-30 15:00 |    | 440.9               |       |     |
| 69                   |                         |           |       | 2024-10-30 12:28                             | 372.9    | 2024-10-30 13:46 | 351.6                  | 2024-10-30 15:01 |    | 440.8               |       |     |
| 70                   |                         |           |       | 2024-10-30 12:29                             | 373.5    | 2024-10-30 13:47 | 350.8                  | 2024-10-30 15:02 |    | 440.7               |       |     |
| 71                   |                         |           |       | 2024-10-30 12:30                             | 373.5    | 2024-10-30 13:48 | 349.3                  | 2024-10-30 15:03 |    | 440.1               |       |     |
| 72                   |                         |           |       | 2024-10-30 12:31                             | 374.6    | 2024-10-30 13:49 | 347.1                  | 2024-10-30 15:04 |    | 439.9               |       |     |
| 73                   |                         |           |       | 2024-10-30 12:32                             | 374.2    | 2024-10-30 13:50 | 346.6                  | 2024-10-30 15:05 |    | 439.7               |       |     |
| 74                   |                         |           |       | 2024-10-30 12:33                             | 373.1    | 2024-10-30 13:51 | 347.8                  | 2024-10-30 15:06 |    | 439.0               |       |     |
| 75                   |                         |           |       | 2024-10-30 12:34                             | 370.7    |                  |                        | 2024-10-30 15:07 |    | 437.8               |       |     |

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| 76  |  |  | 2024-10-30 12:35 | 367.8 |  |  | 2024-10-30 15:08 | 437.6 |
| 77  |  |  | 2024-10-30 12:36 | 365.1 |  |  | 2024-10-30 15:09 | 435.6 |
| 78  |  |  |                  |       |  |  | 2024-10-30 15:10 | 434.0 |
| 79  |  |  |                  |       |  |  | 2024-10-30 15:11 | 432.2 |
| 80  |  |  |                  |       |  |  | 2024-10-30 15:12 | 430.8 |
| 81  |  |  |                  |       |  |  | 2024-10-30 15:13 | 426.9 |
| 82  |  |  |                  |       |  |  | 2024-10-30 15:14 | 425.5 |
| 83  |  |  |                  |       |  |  | 2024-10-30 15:15 | 423.0 |
| 84  |  |  |                  |       |  |  | 2024-10-30 15:16 | 420.3 |
| 85  |  |  |                  |       |  |  | 2024-10-30 15:17 | 418.0 |
| 86  |  |  |                  |       |  |  | 2024-10-30 15:18 | 414.6 |
| 87  |  |  |                  |       |  |  | 2024-10-30 15:19 | 413.0 |
| 88  |  |  |                  |       |  |  | 2024-10-30 15:20 | 411.3 |
| 89  |  |  |                  |       |  |  | 2024-10-30 15:21 | 409.7 |
| 90  |  |  |                  |       |  |  | 2024-10-30 15:22 | 407.3 |
| 91  |  |  |                  |       |  |  | 2024-10-30 15:23 | 405.6 |
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| 93  |  |  |                  |       |  |  | 2024-10-30 15:25 | 400.9 |
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| 96  |  |  |                  |       |  |  | 2024-10-30 15:28 | 392.6 |
| 97  |  |  |                  |       |  |  | 2024-10-30 15:29 | 389.8 |
| 98  |  |  |                  |       |  |  | 2024-10-30 15:30 | 386.3 |
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| 104 |  |  |                  |       |  |  | 2024-10-30 15:36 | 378.1 |
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| 106 |  |  |                  |       |  |  | 2024-10-30 15:38 | 375.3 |
| 107 |  |  |                  |       |  |  | 2024-10-30 15:39 | 374.6 |
| 108 |  |  |                  |       |  |  | 2024-10-30 15:40 | 372.7 |
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| 110 |  |  |                  |       |  |  | 2024-10-30 15:42 | 369.1 |
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| 115 |  |  |                  |       |  |  | 2024-10-30 15:47 | 355.3 |
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| 117 |  |  |                  |       |  |  | 2024-10-30 15:49 | 352.9 |
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| 119 |  |  |                  |       |  |  | 2024-10-30 15:51 | 350.3 |
| 120 |  |  |                  |       |  |  | 2024-10-30 15:52 | 349.4 |
| 121 |  |  |                  |       |  |  | 2024-10-30 15:53 | 348.4 |
| 122 |  |  |                  |       |  |  | 2024-10-30 15:54 | 347.0 |
| 123 |  |  |                  |       |  |  | 2024-10-30 15:55 | 347.1 |
| 124 |  |  |                  |       |  |  | 2024-10-30 15:56 | 346.9 |
| 125 |  |  |                  |       |  |  | 2024-10-30 15:57 | 347.4 |
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| 127 |  |  |                  |       |  |  | 2024-10-30 15:59 | 348.7 |
| 128 |  |  |                  |       |  |  | 2024-10-30 16:00 | 349.3 |
| 129 |  |  |                  |       |  |  | 2024-10-30 16:01 | 349.1 |
| 130 |  |  |                  |       |  |  | 2024-10-30 16:02 | 348.0 |
| 131 |  |  |                  |       |  |  | 2024-10-30 16:03 | 346.6 |
| 132 |  |  |                  |       |  |  | 2024-10-30 16:04 | 346.1 |
| 133 |  |  |                  |       |  |  | 2024-10-30 16:05 | 345.6 |
| 134 |  |  |                  |       |  |  | 2024-10-30 16:06 | 342.7 |
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| 137 |  |  |                  |       |  |  | 2024-10-30 16:09 | 336.4 |
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| 145 |  |  |                  |       |  |  | 2024-10-30 16:17 | 264.6 |
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| 153 |  |  |                  |       |  |  | 2024-10-30 16:25 | 241.1 |
| 154 |  |  |                  |       |  |  | 2024-10-30 16:26 | 238.4 |
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| 156 |  |  |                  |       |  |  | 2024-10-30 16:28 | 235.4 |
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| 164 |  |  |                  |       |  |  | 2024-10-30 16:36 | 223.1 |

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| 166 |  |  |  |  |  | 2024-10-30 16:38 | 220.6 |
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| 170 |  |  |  |  |  | 2024-10-30 16:42 | 216.2 |
| 171 |  |  |  |  |  | 2024-10-30 16:43 | 214.9 |
| 172 |  |  |  |  |  | 2024-10-30 16:44 | 214.1 |
| 173 |  |  |  |  |  | 2024-10-30 16:45 | 213.0 |
| 174 |  |  |  |  |  | 2024-10-30 16:46 | 211.9 |
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| 178 |  |  |  |  |  | 2024-10-30 16:50 | 209.2 |
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| 188 |  |  |  |  |  | 2024-10-30 17:00 | 201.5 |
| 189 |  |  |  |  |  | 2024-10-30 17:01 | 200.8 |
| 190 |  |  |  |  |  | 2024-10-30 17:02 | 200.7 |
| 191 |  |  |  |  |  | 2024-10-30 17:03 | 200.2 |
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| 230 |  |  |  |  |  | 2024-10-30 17:42 | 185.1 |
| 231 |  |  |  |  |  | 2024-10-30 17:43 | 185.4 |
| 232 |  |  |  |  |  | 2024-10-30 17:44 | 184.7 |
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| 235 |  |  |  |  |  | 2024-10-30 17:47 | 183.7 |
| 236 |  |  |  |  |  | 2024-10-30 17:48 | 183.9 |
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| 244 |  |  |  |  |  | 2024-10-30 17:56 | 182.4 |
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| 248 |  |  |  |  |  | 2024-10-30 18:00 | 181.5 |
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| 252 |  |  |  |  |  | 2024-10-30 18:04 | 181.0 |
| 253 |  |  |  |  |  | 2024-10-30 18:05 | 180.7 |



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| 254 |  |  |  |  |  |  | 2024-10-30 18:06 | 180.7 |
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| 269 |  |  |  |  |  |  | 2024-10-30 18:21 | 178.7 |
| 270 |  |  |  |  |  |  | 2024-10-30 18:22 | 178.8 |
| 271 |  |  |  |  |  |  | 2024-10-30 18:23 | 178.6 |
| 272 |  |  |  |  |  |  | 2024-10-30 18:24 | 178.5 |
| 273 |  |  |  |  |  |  | 2024-10-30 18:25 | 178.0 |
| 274 |  |  |  |  |  |  | 2024-10-30 18:26 | 178.0 |
| 275 |  |  |  |  |  |  | 2024-10-30 18:27 | 178.3 |
| 276 |  |  |  |  |  |  | 2024-10-30 18:28 | 178.0 |
| 277 |  |  |  |  |  |  | 2024-10-30 18:29 | 178.1 |
| 278 |  |  |  |  |  |  | 2024-10-30 18:30 | 177.7 |
| 279 |  |  |  |  |  |  | 2024-10-30 18:31 | 177.7 |
| 280 |  |  |  |  |  |  | 2024-10-30 18:32 | 177.4 |
| 281 |  |  |  |  |  |  | 2024-10-30 18:33 | 177.6 |
| 282 |  |  |  |  |  |  | 2024-10-30 18:34 | 177.4 |
| 283 |  |  |  |  |  |  | 2024-10-30 18:35 | 176.9 |
| 284 |  |  |  |  |  |  | 2024-10-30 18:36 | 176.8 |
| 285 |  |  |  |  |  |  | 2024-10-30 18:37 | 176.8 |
| 286 |  |  |  |  |  |  | 2024-10-30 18:38 | 177.0 |
| 287 |  |  |  |  |  |  | 2024-10-30 18:39 | 177.0 |
| 288 |  |  |  |  |  |  | 2024-10-30 18:40 | 176.9 |
| 289 |  |  |  |  |  |  | 2024-10-30 18:41 | 176.5 |
| 290 |  |  |  |  |  |  | 2024-10-30 18:42 | 176.1 |
| 291 |  |  |  |  |  |  | 2024-10-30 18:43 | 176.3 |
| 292 |  |  |  |  |  |  | 2024-10-30 18:44 | 176.3 |
| 293 |  |  |  |  |  |  | 2024-10-30 18:45 | 176.1 |
| 294 |  |  |  |  |  |  | 2024-10-30 18:46 | 176.2 |
| 295 |  |  |  |  |  |  | 2024-10-30 18:47 | 176.0 |
| 296 |  |  |  |  |  |  | 2024-10-30 18:48 | 175.8 |
| 297 |  |  |  |  |  |  | 2024-10-30 18:49 | 176.1 |
| 298 |  |  |  |  |  |  | 2024-10-30 18:50 | 175.8 |
| 299 |  |  |  |  |  |  | 2024-10-30 18:51 | 176.1 |
| 300 |  |  |  |  |  |  | 2024-10-30 18:52 | 175.9 |
| 301 |  |  |  |  |  |  | 2024-10-30 18:53 | 175.7 |
| 302 |  |  |  |  |  |  | 2024-10-30 18:54 | 175.6 |
| 303 |  |  |  |  |  |  | 2024-10-30 18:55 | 175.7 |
| 304 |  |  |  |  |  |  | 2024-10-30 18:56 | 175.9 |
| 305 |  |  |  |  |  |  | 2024-10-30 18:57 | 175.8 |
| 306 |  |  |  |  |  |  | 2024-10-30 18:58 | 175.7 |
| 307 |  |  |  |  |  |  | 2024-10-30 18:59 | 175.8 |
| 308 |  |  |  |  |  |  | 2024-10-30 19:00 | 175.6 |
| 309 |  |  |  |  |  |  | 2024-10-30 19:01 | 175.7 |
| 310 |  |  |  |  |  |  | 2024-10-30 19:02 | 175.4 |
| 311 |  |  |  |  |  |  | 2024-10-30 19:03 | 175.5 |
| 312 |  |  |  |  |  |  | 2024-10-30 19:04 | 175.4 |
| 313 |  |  |  |  |  |  | 2024-10-30 19:05 | 175.8 |
| 314 |  |  |  |  |  |  | 2024-10-30 19:06 | 175.5 |
| 315 |  |  |  |  |  |  | 2024-10-30 19:07 | 175.5 |
| 316 |  |  |  |  |  |  | 2024-10-30 19:08 | 175.8 |
| 317 |  |  |  |  |  |  | 2024-10-30 19:09 | 175.5 |
| 318 |  |  |  |  |  |  | 2024-10-30 19:10 | 175.0 |

| St.Louis Pre-burn Data |                           | 2024-10-31 | Total time (h) |              | 7.50           |                  |                 |       |           |
|------------------------|---------------------------|------------|----------------|--------------|----------------|------------------|-----------------|-------|-----------|
| Wood Specie: Maple     |                           |            |                |              |                |                  |                 |       |           |
| Load time              | Load type                 | Fuel added | Moisture       | Piece amount | Length of fuel | Fuel Burnt (Dry) | Burn Rate (Dry) | Time  | Flue Temp |
| (-)                    | (-)                       | (lb)       | (DB %)         | (-)          | (in.)          | (lb)             | (kg/hr)         | (min) | (°F)      |
| 2024-10-31 10:48       | Load 1 - Start-up         | 7.93       | 20.9           | 4            | 18.00          | 4.23             | 4.26            | 27    | 363.0     |
| 2024-10-31 11:16       | Load 2 - High-fire        | 13.25      | 20.5           | 4            | 18.00          | 9.56             | 3.35            | 70    | 406.5     |
| 2024-10-31 12:27       | Load 3 - Maintenance-fire | 9.29       | 20.3           | 2            | 18.00          | 6.75             | 2.51            | 66    | 391.3     |
| 2024-10-31 13:34       | Load 4 - Low burn rate    | 22.97      | 21.0           | 6            | 18.00          | 18.92            | 1.61            | 287   | 308.1     |

|                      | Average Tflue (°F)      |          | 363.0            |                                              | 406.5            |          | 391.3                  |          | 308.1       |                     |             |          |
|----------------------|-------------------------|----------|------------------|----------------------------------------------|------------------|----------|------------------------|----------|-------------|---------------------|-------------|----------|
|                      | Load 1 - Start-up (min) |          | 27               | High-fire (min)                              |                  | 70       | Maintenance-fire (min) |          | 66          | Low burn rate (min) |             | 287      |
| Air control position | Full open               |          |                  | Full open then fully closed (@50% fuel load) |                  |          | Fully closed           |          |             | Fully closed        |             |          |
| Index                | Date & Time             | Flue (F) | Date & Time      | Flue (F)                                     | Date & Time      | Flue (F) | Date & Time            | Flue (F) | Date & Time | Flue (F)            | Date & Time | Flue (F) |
| 0                    | 2024-10-31 10:48        | 78.0     | 2024-10-31 11:16 |                                              | 2024-10-31 12:27 |          | 2024-10-31 13:34       |          |             |                     |             |          |
| 1                    | 2024-10-31 10:49        | 134.2    | 2024-10-31 11:17 |                                              | 2024-10-31 12:28 |          | 2024-10-31 13:35       |          |             |                     |             |          |
| 2                    | 2024-10-31 10:50        | 223.7    | 2024-10-31 11:18 |                                              | 2024-10-31 12:29 |          | 2024-10-31 13:36       |          |             |                     |             |          |
| 3                    | 2024-10-31 10:51        | 307.6    | 2024-10-31 11:19 |                                              | 2024-10-31 12:30 |          | 2024-10-31 13:37       |          |             |                     |             |          |
| 4                    | 2024-10-31 10:52        | 342.4    | 2024-10-31 11:20 |                                              | 2024-10-31 12:31 |          | 2024-10-31 13:38       |          |             |                     |             |          |
| 5                    | 2024-10-31 10:53        | 361.5    | 2024-10-31 11:21 |                                              | 2024-10-31 12:32 |          | 2024-10-31 13:39       |          |             |                     |             |          |
| 6                    | 2024-10-31 10:54        | 359.7    | 2024-10-31 11:22 |                                              | 2024-10-31 12:33 |          | 2024-10-31 13:40       |          |             |                     |             |          |
| 7                    | 2024-10-31 10:55        | 366.4    | 2024-10-31 11:23 |                                              | 2024-10-31 12:34 |          | 2024-10-31 13:41       |          |             |                     |             |          |
| 8                    | 2024-10-31 10:56        | 374.4    | 2024-10-31 11:24 |                                              | 2024-10-31 12:35 |          | 2024-10-31 13:42       |          |             |                     |             |          |
| 9                    | 2024-10-31 10:57        | 378.5    | 2024-10-31 11:25 |                                              | 2024-10-31 12:36 |          | 2024-10-31 13:43       |          |             |                     |             |          |
| 10                   | 2024-10-31 10:58        | 381.7    | 2024-10-31 11:26 |                                              | 2024-10-31 12:37 |          | 2024-10-31 13:44       |          |             |                     |             |          |
| 11                   | 2024-10-31 10:59        | 383.7    | 2024-10-31 11:27 |                                              | 2024-10-31 12:38 |          | 2024-10-31 13:45       |          |             |                     |             |          |
| 12                   | 2024-10-31 11:00        | 383.5    | 2024-10-31 11:28 |                                              | 2024-10-31 12:39 |          | 2024-10-31 13:46       |          |             |                     |             |          |
| 13                   | 2024-10-31 11:01        | 386.8    | 2024-10-31 11:29 |                                              | 2024-10-31 12:40 |          | 2024-10-31 13:47       |          |             |                     |             |          |
| 14                   | 2024-10-31 11:02        | 392.0    | 2024-10-31 11:30 |                                              | 2024-10-31 12:41 |          | 2024-10-31 13:48       |          |             |                     |             |          |
| 15                   | 2024-10-31 11:03        | 398.5    | 2024-10-31 11:31 |                                              | 2024-10-31 12:42 |          | 2024-10-31 13:49       |          |             |                     |             |          |
| 16                   | 2024-10-31 11:04        | 399.3    | 2024-10-31 11:32 |                                              | 2024-10-31 12:43 |          | 2024-10-31 13:50       |          |             |                     |             |          |
| 17                   | 2024-10-31 11:05        | 394.5    | 2024-10-31 11:33 |                                              | 2024-10-31 12:44 |          | 2024-10-31 13:51       |          |             |                     |             |          |
| 18                   | 2024-10-31 11:06        | 395.0    | 2024-10-31 11:34 |                                              | 2024-10-31 12:45 |          | 2024-10-31 13:52       |          |             |                     |             |          |
| 19                   | 2024-10-31 11:07        | 398.9    | 2024-10-31 11:35 |                                              | 2024-10-31 12:46 |          | 2024-10-31 13:53       |          |             |                     |             |          |
| 20                   | 2024-10-31 11:08        | 404.2    | 2024-10-31 11:36 |                                              | 2024-10-31 12:47 |          | 2024-10-31 13:54       |          |             |                     |             |          |
| 21                   | 2024-10-31 11:09        | 407.6    | 2024-10-31 11:37 |                                              | 2024-10-31 12:48 |          | 2024-10-31 13:55       |          |             |                     |             |          |
| 22                   | 2024-10-31 11:10        | 411.7    | 2024-10-31 11:38 |                                              | 2024-10-31 12:49 |          | 2024-10-31 13:56       |          |             |                     |             |          |
| 23                   | 2024-10-31 11:11        | 415.5    | 2024-10-31 11:39 |                                              | 2024-10-31 12:50 |          | 2024-10-31 13:57       |          |             |                     |             |          |
| 24                   | 2024-10-31 11:12        | 420.2    | 2024-10-31 11:40 |                                              | 2024-10-31 12:51 |          | 2024-10-31 13:58       |          |             |                     |             |          |
| 25                   | 2024-10-31 11:13        | 421.3    | 2024-10-31 11:41 |                                              | 2024-10-31 12:52 |          | 2024-10-31 13:59       |          |             |                     |             |          |
| 26                   | 2024-10-31 11:14        | 420.5    | 2024-10-31 11:42 |                                              | 2024-10-31 12:53 |          | 2024-10-31 14:00       |          |             |                     |             |          |
| 27                   | 2024-10-31 11:15        | 421.6    | 2024-10-31 11:43 |                                              | 2024-10-31 12:54 |          | 2024-10-31 14:01       |          |             |                     |             |          |
| 28                   |                         |          | 2024-10-31 11:44 |                                              | 2024-10-31 12:55 |          | 2024-10-31 14:02       |          |             |                     |             |          |
| 29                   |                         |          | 2024-10-31 11:45 |                                              | 2024-10-31 12:56 |          | 2024-10-31 14:03       |          |             |                     |             |          |
| 30                   |                         |          | 2024-10-31 11:46 |                                              | 2024-10-31 12:57 |          | 2024-10-31 14:04       |          |             |                     |             |          |
| 31                   |                         |          | 2024-10-31 11:47 |                                              | 2024-10-31 12:58 |          | 2024-10-31 14:05       |          |             |                     |             |          |
| 32                   |                         |          | 2024-10-31 11:48 |                                              | 2024-10-31 12:59 |          | 2024-10-31 14:06       |          |             |                     |             |          |
| 33                   |                         |          | 2024-10-31 11:49 |                                              | 2024-10-31 13:00 |          | 2024-10-31 14:07       |          |             |                     |             |          |
| 34                   |                         |          | 2024-10-31 11:50 |                                              | 2024-10-31 13:01 |          | 2024-10-31 14:08       |          |             |                     |             |          |
| 35                   |                         |          | 2024-10-31 11:51 |                                              | 2024-10-31 13:02 |          | 2024-10-31 14:09       |          |             |                     |             |          |
| 36                   |                         |          | 2024-10-31 11:52 |                                              | 2024-10-31 13:03 |          | 2024-10-31 14:10       |          |             |                     |             |          |
| 37                   |                         |          | 2024-10-31 11:53 |                                              | 2024-10-31 13:04 |          | 2024-10-31 14:11       |          |             |                     |             |          |
| 38                   |                         |          | 2024-10-31 11:54 |                                              | 2024-10-31 13:05 |          | 2024-10-31 14:12       |          |             |                     |             |          |
| 39                   |                         |          | 2024-10-31 11:55 |                                              | 2024-10-31 13:06 |          | 2024-10-31 14:13       |          |             |                     |             |          |
| 40                   |                         |          | 2024-10-31 11:56 |                                              | 2024-10-31 13:07 |          | 2024-10-31 14:14       |          |             |                     |             |          |
| 41                   |                         |          | 2024-10-31 11:57 |                                              | 2024-10-31 13:08 |          | 2024-10-31 14:15       |          |             |                     |             |          |
| 42                   |                         |          | 2024-10-31 11:58 |                                              | 2024-10-31 13:09 |          | 2024-10-31 14:16       |          |             |                     |             |          |
| 43                   |                         |          | 2024-10-31 11:59 |                                              | 2024-10-31 13:10 |          | 2024-10-31 14:17       |          |             |                     |             |          |
| 44                   |                         |          | 2024-10-31 12:00 |                                              | 2024-10-31 13:11 |          | 2024-10-31 14:18       |          |             |                     |             |          |
| 45                   |                         |          | 2024-10-31 12:01 |                                              | 2024-10-31 13:12 |          | 2024-10-31 14:19       |          |             |                     |             |          |
| 46                   |                         |          | 2024-10-31 12:02 |                                              | 2024-10-31 13:13 |          | 2024-10-31 14:20       |          |             |                     |             |          |
| 47                   |                         |          | 2024-10-31 12:03 |                                              | 2024-10-31 13:14 |          | 2024-10-31 14:21       |          |             |                     |             |          |
| 48                   |                         |          | 2024-10-31 12:04 |                                              | 2024-10-31 13:15 |          | 2024-10-31 14:22       |          |             |                     |             |          |
| 49                   |                         |          | 2024-10-31 12:05 |                                              | 2024-10-31 13:16 |          | 2024-10-31 14:23       |          |             |                     |             |          |
| 50                   |                         |          | 2024-10-31 12:06 |                                              | 2024-10-31 13:17 |          | 2024-10-31 14:24       |          |             |                     |             |          |
| 51                   |                         |          | 2024-10-31 12:07 |                                              | 2024-10-31 13:18 |          | 2024-10-31 14:25       |          |             |                     |             |          |
| 52                   |                         |          | 2024-10-31 12:08 |                                              | 2024-10-31 13:19 |          | 2024-10-31 14:26       |          |             |                     |             |          |
| 53                   |                         |          | 2024-10-31 12:09 |                                              | 2024-10-31 13:20 |          | 2024-10-31 14:27       |          |             |                     |             |          |
| 54                   |                         |          | 2024-10-31 12:10 |                                              | 2024-10-31 13:21 |          | 2024-10-31 14:28       |          |             |                     |             |          |
| 55                   |                         |          | 2024-10-31 12:11 |                                              | 2024-10-31 13:22 |          | 2024-10-31 14:29       |          |             |                     |             |          |
| 56                   |                         |          | 2024-10-31 12:12 |                                              | 2024-10-31 13:23 |          | 2024-10-31 14:30       |          |             |                     |             |          |
| 57                   |                         |          | 2024-10-31 12:13 |                                              | 2024-10-31 13:24 |          | 2024-10-31 14:31       |          |             |                     |             |          |
| 58                   |                         |          | 2024-10-31 12:14 |                                              | 2024-10-31 13:25 |          | 2024-10-31 14:32       |          |             |                     |             |          |
| 59                   |                         |          | 2024-10-31 12:15 |                                              | 2024-10-31 13:26 |          | 2024-10-31 14:33       |          |             |                     |             |          |
| 60                   |                         |          | 2024-10-31 12:16 |                                              | 2024-10-31 13:27 |          | 2024-10-31 14:34       |          |             |                     |             |          |
| 61                   |                         |          | 2024-10-31 12:17 |                                              | 2024-10-31 13:28 |          | 2024-10-31 14:35       |          |             |                     |             |          |
| 62                   |                         |          | 2024-10-31 12:18 |                                              | 2024-10-31 13:29 |          | 2024-10-31 14:36       |          |             |                     |             |          |
| 63                   |                         |          | 2024-10-31 12:19 |                                              | 2024-10-31 13:30 |          | 2024-10-31 14:37       |          |             |                     |             |          |
| 64                   |                         |          | 2024-10-31 12:20 |                                              | 2024-10-31 13:31 |          | 2024-10-31 14:38       |          |             |                     |             |          |
| 65                   |                         |          | 2024-10-31 12:21 |                                              | 2024-10-31 13:32 |          | 2024-10-31 14:39       |          |             |                     |             |          |
| 66                   |                         |          | 2024-10-31 12:22 |                                              | 2024-10-31 13:33 |          | 2024-10-31 14:40       |          |             |                     |             |          |
| 67                   |                         |          | 2024-10-31 12:23 |                                              |                  |          | 2024-10-31 14:41       |          |             |                     |             |          |
| 68                   |                         |          | 2024-10-31 12:24 |                                              |                  |          | 2024-10-31 14:42       |          |             |                     |             |          |
| 69                   |                         |          | 2024-10-31 12:25 |                                              |                  |          | 2024-10-31 14:43       |          |             |                     |             |          |
| 70                   |                         |          | 2024-10-31 12:26 |                                              |                  |          | 2024-10-31 14:44       |          |             |                     |             |          |
| 71                   |                         |          |                  |                                              |                  |          | 2024-10-31 14:45       |          |             |                     |             |          |
| 72                   |                         |          |                  |                                              |                  |          | 2024-10-31 14:46       |          |             |                     |             |          |
| 73                   |                         |          |                  |                                              |                  |          | 2024-10-31 14:47       |          |             |                     |             |          |
| 74                   |                         |          |                  |                                              |                  |          | 2024-10-31 14:48       |          |             |                     |             |          |
| 75                   |                         |          |                  |                                              |                  |          | 2024-10-31 14:49       |          |             |                     |             |          |
| 76                   |                         |          |                  |                                              |                  |          | 2024-10-31 14:50       |          |             |                     |             |          |
| 77                   |                         |          |                  |                                              |                  |          | 2024-10-31 14:51       |          |             |                     |             |          |
| 78                   |                         |          |                  |                                              |                  |          | 2024-10-31 14:52       |          |             |                     |             |          |
| 79                   |                         |          |                  |                                              |                  |          | 2024-10-31 14:53       |          |             |                     |             |          |
| 80                   |                         |          |                  |                                              |                  |          | 2024-10-31 14:54       |          |             |                     |             |          |
| 81                   |                         |          |                  |                                              |                  |          | 2024-10-31 14:55       |          |             |                     |             |          |
| 82                   |                         |          |                  |                                              |                  |          | 2024-10-31 14:56       |          |             |                     |             |          |

|     |  |  |  |  |  |                  |       |
|-----|--|--|--|--|--|------------------|-------|
| 83  |  |  |  |  |  | 2024-10-31 14:57 | 413.5 |
| 84  |  |  |  |  |  | 2024-10-31 14:58 | 409.7 |
| 85  |  |  |  |  |  | 2024-10-31 14:59 | 406.7 |
| 86  |  |  |  |  |  | 2024-10-31 15:00 | 403.8 |
| 87  |  |  |  |  |  | 2024-10-31 15:01 | 401.0 |
| 88  |  |  |  |  |  | 2024-10-31 15:02 | 399.1 |
| 89  |  |  |  |  |  | 2024-10-31 15:03 | 396.3 |
| 90  |  |  |  |  |  | 2024-10-31 15:04 | 394.2 |
| 91  |  |  |  |  |  | 2024-10-31 15:05 | 392.8 |
| 92  |  |  |  |  |  | 2024-10-31 15:06 | 391.3 |
| 93  |  |  |  |  |  | 2024-10-31 15:07 | 389.4 |
| 94  |  |  |  |  |  | 2024-10-31 15:08 | 387.5 |
| 95  |  |  |  |  |  | 2024-10-31 15:09 | 389.9 |
| 96  |  |  |  |  |  | 2024-10-31 15:10 | 390.3 |
| 97  |  |  |  |  |  | 2024-10-31 15:11 | 389.6 |
| 98  |  |  |  |  |  | 2024-10-31 15:12 | 388.3 |
| 99  |  |  |  |  |  | 2024-10-31 15:13 | 387.1 |
| 100 |  |  |  |  |  | 2024-10-31 15:14 | 385.7 |
| 101 |  |  |  |  |  | 2024-10-31 15:15 | 384.2 |
| 102 |  |  |  |  |  | 2024-10-31 15:16 | 382.4 |
| 103 |  |  |  |  |  | 2024-10-31 15:17 | 381.3 |
| 104 |  |  |  |  |  | 2024-10-31 15:18 | 380.4 |
| 105 |  |  |  |  |  | 2024-10-31 15:19 | 378.9 |
| 106 |  |  |  |  |  | 2024-10-31 15:20 | 377.6 |
| 107 |  |  |  |  |  | 2024-10-31 15:21 | 376.4 |
| 108 |  |  |  |  |  | 2024-10-31 15:22 | 375.5 |
| 109 |  |  |  |  |  | 2024-10-31 15:23 | 373.9 |
| 110 |  |  |  |  |  | 2024-10-31 15:24 | 373.4 |
| 111 |  |  |  |  |  | 2024-10-31 15:25 | 372.1 |
| 112 |  |  |  |  |  | 2024-10-31 15:26 | 370.9 |
| 113 |  |  |  |  |  | 2024-10-31 15:27 | 369.1 |
| 114 |  |  |  |  |  | 2024-10-31 15:28 | 367.7 |
| 115 |  |  |  |  |  | 2024-10-31 15:29 | 367.0 |
| 116 |  |  |  |  |  | 2024-10-31 15:30 | 366.0 |
| 117 |  |  |  |  |  | 2024-10-31 15:31 | 365.2 |
| 118 |  |  |  |  |  | 2024-10-31 15:32 | 364.8 |
| 119 |  |  |  |  |  | 2024-10-31 15:33 | 363.8 |
| 120 |  |  |  |  |  | 2024-10-31 15:34 | 362.6 |
| 121 |  |  |  |  |  | 2024-10-31 15:35 | 361.1 |
| 122 |  |  |  |  |  | 2024-10-31 15:36 | 358.6 |
| 123 |  |  |  |  |  | 2024-10-31 15:37 | 355.5 |
| 124 |  |  |  |  |  | 2024-10-31 15:38 | 354.0 |
| 125 |  |  |  |  |  | 2024-10-31 15:39 | 351.1 |
| 126 |  |  |  |  |  | 2024-10-31 15:40 | 350.5 |
| 127 |  |  |  |  |  | 2024-10-31 15:41 | 354.9 |
| 128 |  |  |  |  |  | 2024-10-31 15:42 | 355.8 |
| 129 |  |  |  |  |  | 2024-10-31 15:43 | 353.3 |
| 130 |  |  |  |  |  | 2024-10-31 15:44 | 353.2 |
| 131 |  |  |  |  |  | 2024-10-31 15:45 | 352.9 |
| 132 |  |  |  |  |  | 2024-10-31 15:46 | 353.7 |
| 133 |  |  |  |  |  | 2024-10-31 15:47 | 353.8 |
| 134 |  |  |  |  |  | 2024-10-31 15:48 | 354.9 |
| 135 |  |  |  |  |  | 2024-10-31 15:49 | 354.6 |
| 136 |  |  |  |  |  | 2024-10-31 15:50 | 355.2 |
| 137 |  |  |  |  |  | 2024-10-31 15:51 | 355.9 |
| 138 |  |  |  |  |  | 2024-10-31 15:52 | 356.5 |
| 139 |  |  |  |  |  | 2024-10-31 15:53 | 356.4 |
| 140 |  |  |  |  |  | 2024-10-31 15:54 | 356.4 |
| 141 |  |  |  |  |  | 2024-10-31 15:55 | 357.0 |
| 142 |  |  |  |  |  | 2024-10-31 15:56 | 356.5 |
| 143 |  |  |  |  |  | 2024-10-31 15:57 | 356.1 |
| 144 |  |  |  |  |  | 2024-10-31 15:58 | 355.8 |
| 145 |  |  |  |  |  | 2024-10-31 15:59 | 356.1 |
| 146 |  |  |  |  |  | 2024-10-31 16:00 | 356.1 |
| 147 |  |  |  |  |  | 2024-10-31 16:01 | 350.9 |
| 148 |  |  |  |  |  | 2024-10-31 16:02 | 345.3 |
| 149 |  |  |  |  |  | 2024-10-31 16:03 | 341.5 |
| 150 |  |  |  |  |  | 2024-10-31 16:04 | 340.0 |
| 151 |  |  |  |  |  | 2024-10-31 16:05 | 338.1 |
| 152 |  |  |  |  |  | 2024-10-31 16:06 | 323.5 |
| 153 |  |  |  |  |  | 2024-10-31 16:07 | 304.8 |
| 154 |  |  |  |  |  | 2024-10-31 16:08 | 292.4 |
| 155 |  |  |  |  |  | 2024-10-31 16:09 | 283.0 |
| 156 |  |  |  |  |  | 2024-10-31 16:10 | 276.5 |
| 157 |  |  |  |  |  | 2024-10-31 16:11 | 271.2 |
| 158 |  |  |  |  |  | 2024-10-31 16:12 | 266.1 |
| 159 |  |  |  |  |  | 2024-10-31 16:13 | 262.3 |
| 160 |  |  |  |  |  | 2024-10-31 16:14 | 259.2 |
| 161 |  |  |  |  |  | 2024-10-31 16:15 | 255.8 |
| 162 |  |  |  |  |  | 2024-10-31 16:16 | 252.9 |
| 163 |  |  |  |  |  | 2024-10-31 16:17 | 250.3 |
| 164 |  |  |  |  |  | 2024-10-31 16:18 | 247.6 |
| 165 |  |  |  |  |  | 2024-10-31 16:19 | 245.4 |
| 166 |  |  |  |  |  | 2024-10-31 16:20 | 243.7 |
| 167 |  |  |  |  |  | 2024-10-31 16:21 | 241.6 |
| 168 |  |  |  |  |  | 2024-10-31 16:22 | 239.9 |
| 169 |  |  |  |  |  | 2024-10-31 16:23 | 238.0 |
| 170 |  |  |  |  |  | 2024-10-31 16:24 | 236.6 |
| 171 |  |  |  |  |  | 2024-10-31 16:25 | 235.2 |
| 172 |  |  |  |  |  | 2024-10-31 16:26 | 233.7 |
| 173 |  |  |  |  |  | 2024-10-31 16:27 | 232.9 |
| 174 |  |  |  |  |  | 2024-10-31 16:28 | 231.1 |
| 175 |  |  |  |  |  | 2024-10-31 16:29 | 229.8 |
| 176 |  |  |  |  |  | 2024-10-31 16:30 | 229.0 |
| 177 |  |  |  |  |  | 2024-10-31 16:31 | 227.1 |
| 178 |  |  |  |  |  | 2024-10-31 16:32 | 225.9 |

|     |  |  |  |  |  |  |                  |       |
|-----|--|--|--|--|--|--|------------------|-------|
| 179 |  |  |  |  |  |  | 2024-10-31 16:33 | 225.1 |
| 180 |  |  |  |  |  |  | 2024-10-31 16:34 | 223.9 |
| 181 |  |  |  |  |  |  | 2024-10-31 16:35 | 222.8 |
| 182 |  |  |  |  |  |  | 2024-10-31 16:36 | 221.8 |
| 183 |  |  |  |  |  |  | 2024-10-31 16:37 | 221.4 |
| 184 |  |  |  |  |  |  | 2024-10-31 16:38 | 220.6 |
| 185 |  |  |  |  |  |  | 2024-10-31 16:39 | 219.3 |
| 186 |  |  |  |  |  |  | 2024-10-31 16:40 | 218.4 |
| 187 |  |  |  |  |  |  | 2024-10-31 16:41 | 217.5 |
| 188 |  |  |  |  |  |  | 2024-10-31 16:42 | 216.4 |
| 189 |  |  |  |  |  |  | 2024-10-31 16:43 | 215.6 |
| 190 |  |  |  |  |  |  | 2024-10-31 16:44 | 214.6 |
| 191 |  |  |  |  |  |  | 2024-10-31 16:45 | 214.0 |
| 192 |  |  |  |  |  |  | 2024-10-31 16:46 | 212.7 |
| 193 |  |  |  |  |  |  | 2024-10-31 16:47 | 211.8 |
| 194 |  |  |  |  |  |  | 2024-10-31 16:48 | 210.9 |
| 195 |  |  |  |  |  |  | 2024-10-31 16:49 | 210.3 |
| 196 |  |  |  |  |  |  | 2024-10-31 16:50 | 209.3 |
| 197 |  |  |  |  |  |  | 2024-10-31 16:51 | 208.4 |
| 198 |  |  |  |  |  |  | 2024-10-31 16:52 | 208.0 |
| 199 |  |  |  |  |  |  | 2024-10-31 16:53 | 207.6 |
| 200 |  |  |  |  |  |  | 2024-10-31 16:54 | 206.8 |
| 201 |  |  |  |  |  |  | 2024-10-31 16:55 | 206.8 |
| 202 |  |  |  |  |  |  | 2024-10-31 16:56 | 206.1 |
| 203 |  |  |  |  |  |  | 2024-10-31 16:57 | 205.6 |
| 204 |  |  |  |  |  |  | 2024-10-31 16:58 | 204.7 |
| 205 |  |  |  |  |  |  | 2024-10-31 16:59 | 203.9 |
| 206 |  |  |  |  |  |  | 2024-10-31 17:00 | 203.2 |
| 207 |  |  |  |  |  |  | 2024-10-31 17:01 | 202.8 |
| 208 |  |  |  |  |  |  | 2024-10-31 17:02 | 202.4 |
| 209 |  |  |  |  |  |  | 2024-10-31 17:03 | 202.3 |
| 210 |  |  |  |  |  |  | 2024-10-31 17:04 | 201.8 |
| 211 |  |  |  |  |  |  | 2024-10-31 17:05 | 200.9 |
| 212 |  |  |  |  |  |  | 2024-10-31 17:06 | 200.6 |
| 213 |  |  |  |  |  |  | 2024-10-31 17:07 | 200.3 |
| 214 |  |  |  |  |  |  | 2024-10-31 17:08 | 199.7 |
| 215 |  |  |  |  |  |  | 2024-10-31 17:09 | 199.1 |
| 216 |  |  |  |  |  |  | 2024-10-31 17:10 | 198.6 |
| 217 |  |  |  |  |  |  | 2024-10-31 17:11 | 197.7 |
| 218 |  |  |  |  |  |  | 2024-10-31 17:12 | 197.4 |
| 219 |  |  |  |  |  |  | 2024-10-31 17:13 | 197.3 |
| 220 |  |  |  |  |  |  | 2024-10-31 17:14 | 196.9 |
| 221 |  |  |  |  |  |  | 2024-10-31 17:15 | 195.8 |
| 222 |  |  |  |  |  |  | 2024-10-31 17:16 | 195.5 |
| 223 |  |  |  |  |  |  | 2024-10-31 17:17 | 195.1 |
| 224 |  |  |  |  |  |  | 2024-10-31 17:18 | 195.0 |
| 225 |  |  |  |  |  |  | 2024-10-31 17:19 | 194.2 |
| 226 |  |  |  |  |  |  | 2024-10-31 17:20 | 194.0 |
| 227 |  |  |  |  |  |  | 2024-10-31 17:21 | 193.9 |
| 228 |  |  |  |  |  |  | 2024-10-31 17:22 | 194.0 |
| 229 |  |  |  |  |  |  | 2024-10-31 17:23 | 193.7 |
| 230 |  |  |  |  |  |  | 2024-10-31 17:24 | 192.8 |
| 231 |  |  |  |  |  |  | 2024-10-31 17:25 | 192.2 |
| 232 |  |  |  |  |  |  | 2024-10-31 17:26 | 191.8 |
| 233 |  |  |  |  |  |  | 2024-10-31 17:27 | 192.0 |
| 234 |  |  |  |  |  |  | 2024-10-31 17:28 | 191.6 |
| 235 |  |  |  |  |  |  | 2024-10-31 17:29 | 191.8 |
| 236 |  |  |  |  |  |  | 2024-10-31 17:30 | 191.0 |
| 237 |  |  |  |  |  |  | 2024-10-31 17:31 | 190.5 |
| 238 |  |  |  |  |  |  | 2024-10-31 17:32 | 190.2 |
| 239 |  |  |  |  |  |  | 2024-10-31 17:33 | 189.9 |
| 240 |  |  |  |  |  |  | 2024-10-31 17:34 | 189.9 |
| 241 |  |  |  |  |  |  | 2024-10-31 17:35 | 189.6 |
| 242 |  |  |  |  |  |  | 2024-10-31 17:36 | 189.2 |
| 243 |  |  |  |  |  |  | 2024-10-31 17:37 | 188.8 |
| 244 |  |  |  |  |  |  | 2024-10-31 17:38 | 188.7 |
| 245 |  |  |  |  |  |  | 2024-10-31 17:39 | 188.0 |
| 246 |  |  |  |  |  |  | 2024-10-31 17:40 | 188.2 |
| 247 |  |  |  |  |  |  | 2024-10-31 17:41 | 187.5 |
| 248 |  |  |  |  |  |  | 2024-10-31 17:42 | 187.3 |
| 249 |  |  |  |  |  |  | 2024-10-31 17:43 | 187.5 |
| 250 |  |  |  |  |  |  | 2024-10-31 17:44 | 186.8 |
| 251 |  |  |  |  |  |  | 2024-10-31 17:45 | 186.9 |
| 252 |  |  |  |  |  |  | 2024-10-31 17:46 | 186.4 |
| 253 |  |  |  |  |  |  | 2024-10-31 17:47 | 185.9 |
| 254 |  |  |  |  |  |  | 2024-10-31 17:48 | 186.1 |
| 255 |  |  |  |  |  |  | 2024-10-31 17:49 | 186.2 |
| 256 |  |  |  |  |  |  | 2024-10-31 17:50 | 185.9 |
| 257 |  |  |  |  |  |  | 2024-10-31 17:51 | 185.6 |
| 258 |  |  |  |  |  |  | 2024-10-31 17:52 | 185.5 |
| 259 |  |  |  |  |  |  | 2024-10-31 17:53 | 185.0 |
| 260 |  |  |  |  |  |  | 2024-10-31 17:54 | 185.4 |
| 261 |  |  |  |  |  |  | 2024-10-31 17:55 | 185.1 |
| 262 |  |  |  |  |  |  | 2024-10-31 17:56 | 185.1 |
| 263 |  |  |  |  |  |  | 2024-10-31 17:57 | 184.9 |
| 264 |  |  |  |  |  |  | 2024-10-31 17:58 | 184.7 |
| 265 |  |  |  |  |  |  | 2024-10-31 17:59 | 184.3 |
| 266 |  |  |  |  |  |  | 2024-10-31 18:00 | 184.5 |
| 267 |  |  |  |  |  |  | 2024-10-31 18:01 | 184.1 |
| 268 |  |  |  |  |  |  | 2024-10-31 18:02 | 184.1 |
| 269 |  |  |  |  |  |  | 2024-10-31 18:03 | 183.9 |
| 270 |  |  |  |  |  |  | 2024-10-31 18:04 | 183.7 |
| 271 |  |  |  |  |  |  | 2024-10-31 18:05 | 183.7 |
| 272 |  |  |  |  |  |  | 2024-10-31 18:06 | 183.7 |
| 273 |  |  |  |  |  |  | 2024-10-31 18:07 | 183.3 |
| 274 |  |  |  |  |  |  | 2024-10-31 18:08 | 183.1 |

|     |  |  |  |  |  |  |                  |       |
|-----|--|--|--|--|--|--|------------------|-------|
| 275 |  |  |  |  |  |  | 2024-10-31 18:09 | 182.5 |
| 276 |  |  |  |  |  |  | 2024-10-31 18:10 | 182.2 |
| 277 |  |  |  |  |  |  | 2024-10-31 18:11 | 182.3 |
| 278 |  |  |  |  |  |  | 2024-10-31 18:12 | 182.5 |
| 279 |  |  |  |  |  |  | 2024-10-31 18:13 | 182.2 |
| 280 |  |  |  |  |  |  | 2024-10-31 18:14 | 181.8 |
| 281 |  |  |  |  |  |  | 2024-10-31 18:15 | 181.7 |
| 282 |  |  |  |  |  |  | 2024-10-31 18:16 | 181.6 |
| 283 |  |  |  |  |  |  | 2024-10-31 18:17 | 180.9 |
| 284 |  |  |  |  |  |  | 2024-10-31 18:18 | 180.5 |
| 285 |  |  |  |  |  |  | 2024-10-31 18:19 | 179.9 |
| 286 |  |  |  |  |  |  | 2024-10-31 18:20 | 179.6 |
| 287 |  |  |  |  |  |  | 2024-10-31 18:21 | 179.7 |

|                        |                           |            |                |              |                |                  |                 |       |           |
|------------------------|---------------------------|------------|----------------|--------------|----------------|------------------|-----------------|-------|-----------|
| St.Louis Pre-burn Data |                           | 2024-11-01 | Total time (h) |              | 7.38           |                  |                 |       |           |
| Wood Specie: Maple     |                           |            |                |              |                |                  |                 |       |           |
| Load time              | Load type                 | Fuel added | Moisture       | Piece amount | Length of fuel | Fuel Burnt (Dry) | Burn Rate (Dry) | Time  | Flue Temp |
| (-)                    | (-)                       | (lb)       | (DB %)         | (-)          | (in.)          | (lb)             | (kg/hr)         | (min) | (°F)      |
| 2024-11-01 11:53       | Load 1 - Start-up         | 7.98       | 19.6           | 4            | 18.00          | 4.27             | 4.47            | 26    | 357.8     |
| 2024-11-01 12:20       | Load 2 - High-fire        | 13.81      | 20.0           | 4            | 18.00          | 10.13            | 3.06            | 81    | 396.0     |
| 2024-11-01 13:42       | Load 3 - Maintenance-fire | 9.19       | 20.1           | 2            | 18.00          | 6.59             | 2.24            | 72    | 370.2     |
| 2024-11-01 14:55       | Load 4 - Low burn rate    | 22.89      | 20.9           | 6            | 18.00          | 18.95            | 1.76            | 264   | 311.4     |

|                      |                  |                         |                                              |                 |                  |                       |                  |                     |       |
|----------------------|------------------|-------------------------|----------------------------------------------|-----------------|------------------|-----------------------|------------------|---------------------|-------|
|                      |                  | Average Tflue (°F)      | 357.8                                        |                 | 396.0            |                       | 370.2            |                     | 311.4 |
|                      |                  | Load 1 - Start-up (min) | 26                                           | High-fire (min) | 81               | Maintenace-fire (min) | 72               | Low burn rate (min) | 264   |
| Air control position | Full open        |                         | Full open then fully closed (@50% fuel load) |                 | Fully closed     |                       | Fully closed     |                     |       |
| Index                | Date & Time      | Flue (F)                | Date & Time                                  | Flue (F)        | Date & Time      | Flue (F)              | Date & Time      | Flue (F)            |       |
| 0                    | 2024-11-01 11:53 | 75.2                    | 2024-11-01 12:20                             | 415.6           | 2024-11-01 13:42 | 374.4                 | 2024-11-01 14:55 | 343.9               |       |
| 1                    | 2024-11-01 11:54 | 117.6                   | 2024-11-01 12:21                             | 411.2           | 2024-11-01 13:43 | 403.8                 | 2024-11-01 14:56 | 360.4               |       |
| 2                    | 2024-11-01 11:55 | 231.0                   | 2024-11-01 12:22                             | 435.2           | 2024-11-01 13:44 | 440.0                 | 2024-11-01 14:57 | 400.2               |       |
| 3                    | 2024-11-01 11:56 | 333.5                   | 2024-11-01 12:23                             | 434.3           | 2024-11-01 13:45 | 446.1                 | 2024-11-01 14:58 | 419.9               |       |
| 4                    | 2024-11-01 11:57 | 358.7                   | 2024-11-01 12:24                             | 430.5           | 2024-11-01 13:46 | 427.4                 | 2024-11-01 14:59 | 424.8               |       |
| 5                    | 2024-11-01 11:58 | 359.6                   | 2024-11-01 12:25                             | 432.8           | 2024-11-01 13:47 | 412.4                 | 2024-11-01 15:00 | 420.5               |       |
| 6                    | 2024-11-01 11:59 | 358.7                   | 2024-11-01 12:26                             | 432.7           | 2024-11-01 13:48 | 407.9                 | 2024-11-01 15:01 | 414.2               |       |
| 7                    | 2024-11-01 12:00 | 368.0                   | 2024-11-01 12:27                             | 437.0           | 2024-11-01 13:49 | 407.3                 | 2024-11-01 15:02 | 407.6               |       |
| 8                    | 2024-11-01 12:01 | 375.2                   | 2024-11-01 12:28                             | 442.2           | 2024-11-01 13:50 | 408.2                 | 2024-11-01 15:03 | 401.7               |       |
| 9                    | 2024-11-01 12:02 | 371.6                   | 2024-11-01 12:29                             | 445.0           | 2024-11-01 13:51 | 407.2                 | 2024-11-01 15:04 | 396.9               |       |
| 10                   | 2024-11-01 12:03 | 370.2                   | 2024-11-01 12:30                             | 448.2           | 2024-11-01 13:52 | 406.1                 | 2024-11-01 15:05 | 393.5               |       |
| 11                   | 2024-11-01 12:04 | 371.9                   | 2024-11-01 12:31                             | 450.7           | 2024-11-01 13:53 | 405.6                 | 2024-11-01 15:06 | 391.1               |       |
| 12                   | 2024-11-01 12:05 | 378.8                   | 2024-11-01 12:32                             | 454.3           | 2024-11-01 13:54 | 403.7                 | 2024-11-01 15:07 | 387.2               |       |
| 13                   | 2024-11-01 12:06 | 385.7                   | 2024-11-01 12:33                             | 458.3           | 2024-11-01 13:55 | 400.5                 | 2024-11-01 15:08 | 385.4               |       |
| 14                   | 2024-11-01 12:07 | 387.3                   | 2024-11-01 12:34                             | 455.7           | 2024-11-01 13:56 | 397.1                 | 2024-11-01 15:09 | 384.3               |       |
| 15                   | 2024-11-01 12:08 | 387.6                   | 2024-11-01 12:35                             | 447.1           | 2024-11-01 13:57 | 393.5                 | 2024-11-01 15:10 | 389.2               |       |
| 16                   | 2024-11-01 12:09 | 388.6                   | 2024-11-01 12:36                             | 436.1           | 2024-11-01 13:58 | 390.5                 | 2024-11-01 15:11 | 390.4               |       |
| 17                   | 2024-11-01 12:10 | 392.7                   | 2024-11-01 12:37                             | 428.4           | 2024-11-01 13:59 | 388.3                 | 2024-11-01 15:12 | 389.6               |       |
| 18                   | 2024-11-01 12:11 | 398.6                   | 2024-11-01 12:38                             | 423.1           | 2024-11-01 14:00 | 386.2                 | 2024-11-01 15:13 | 389.0               |       |
| 19                   | 2024-11-01 12:12 | 406.6                   | 2024-11-01 12:39                             | 419.8           | 2024-11-01 14:01 | 382.9                 | 2024-11-01 15:14 | 388.6               |       |
| 20                   | 2024-11-01 12:13 | 410.8                   | 2024-11-01 12:40                             | 416.8           | 2024-11-01 14:02 | 380.8                 | 2024-11-01 15:15 | 389.6               |       |
| 21                   | 2024-11-01 12:14 | 406.5                   | 2024-11-01 12:41                             | 414.5           | 2024-11-01 14:03 | 378.7                 | 2024-11-01 15:16 | 389.5               |       |
| 22                   | 2024-11-01 12:15 | 402.3                   | 2024-11-01 12:42                             | 413.6           | 2024-11-01 14:04 | 376.0                 | 2024-11-01 15:17 | 388.8               |       |
| 23                   | 2024-11-01 12:16 | 403.0                   | 2024-11-01 12:43                             | 412.6           | 2024-11-01 14:05 | 377.7                 | 2024-11-01 15:18 | 389.5               |       |
| 24                   | 2024-11-01 12:17 | 405.9                   | 2024-11-01 12:44                             | 411.8           | 2024-11-01 14:06 | 379.0                 | 2024-11-01 15:19 | 389.5               |       |
| 25                   | 2024-11-01 12:18 | 407.4                   | 2024-11-01 12:45                             | 410.2           | 2024-11-01 14:07 | 380.5                 | 2024-11-01 15:20 | 389.3               |       |
| 26                   | 2024-11-01 12:19 | 408.0                   | 2024-11-01 12:46                             | 409.1           | 2024-11-01 14:08 | 379.8                 | 2024-11-01 15:21 | 389.0               |       |
| 27                   |                  |                         | 2024-11-01 12:47                             | 407.0           | 2024-11-01 14:09 | 374.3                 | 2024-11-01 15:22 | 389.2               |       |
| 28                   |                  |                         | 2024-11-01 12:48                             | 404.9           | 2024-11-01 14:10 | 370.7                 | 2024-11-01 15:23 | 388.7               |       |
| 29                   |                  |                         | 2024-11-01 12:49                             | 403.6           | 2024-11-01 14:11 | 367.6                 | 2024-11-01 15:24 | 388.8               |       |
| 30                   |                  |                         | 2024-11-01 12:50                             | 400.9           | 2024-11-01 14:12 | 364.7                 | 2024-11-01 15:25 | 389.8               |       |
| 31                   |                  |                         | 2024-11-01 12:51                             | 399.1           | 2024-11-01 14:13 | 361.7                 | 2024-11-01 15:26 | 390.0               |       |
| 32                   |                  |                         | 2024-11-01 12:52                             | 396.2           | 2024-11-01 14:14 | 360.3                 | 2024-11-01 15:27 | 390.7               |       |
| 33                   |                  |                         | 2024-11-01 12:53                             | 390.6           | 2024-11-01 14:15 | 362.7                 | 2024-11-01 15:28 | 391.3               |       |
| 34                   |                  |                         | 2024-11-01 12:54                             | 388.1           | 2024-11-01 14:16 | 363.2                 | 2024-11-01 15:29 | 391.9               |       |
| 35                   |                  |                         | 2024-11-01 12:55                             | 386.6           | 2024-11-01 14:17 | 363.1                 | 2024-11-01 15:30 | 392.8               |       |
| 36                   |                  |                         | 2024-11-01 12:56                             | 385.6           | 2024-11-01 14:18 | 363.0                 | 2024-11-01 15:31 | 394.0               |       |
| 37                   |                  |                         | 2024-11-01 12:57                             | 384.0           | 2024-11-01 14:19 | 363.6                 | 2024-11-01 15:32 | 395.6               |       |
| 38                   |                  |                         | 2024-11-01 12:58                             | 381.9           | 2024-11-01 14:20 | 361.9                 | 2024-11-01 15:33 | 397.4               |       |
| 39                   |                  |                         | 2024-11-01 12:59                             | 381.8           | 2024-11-01 14:21 | 360.2                 | 2024-11-01 15:34 | 398.9               |       |
| 40                   |                  |                         | 2024-11-01 13:00                             | 379.9           | 2024-11-01 14:22 | 359.3                 | 2024-11-01 15:35 | 400.1               |       |
| 41                   |                  |                         | 2024-11-01 13:01                             | 379.0           | 2024-11-01 14:23 | 356.9                 | 2024-11-01 15:36 | 401.3               |       |
| 42                   |                  |                         | 2024-11-01 13:02                             | 379.2           | 2024-11-01 14:24 | 355.4                 | 2024-11-01 15:37 | 402.9               |       |
| 43                   |                  |                         | 2024-11-01 13:03                             | 378.3           | 2024-11-01 14:25 | 353.3                 | 2024-11-01 15:38 | 403.8               |       |
| 44                   |                  |                         | 2024-11-01 13:04                             | 376.4           | 2024-11-01 14:26 | 350.9                 | 2024-11-01 15:39 | 405.3               |       |
| 45                   |                  |                         | 2024-11-01 13:05                             | 377.0           | 2024-11-01 14:27 | 350.8                 | 2024-11-01 15:40 | 405.7               |       |
| 46                   |                  |                         | 2024-11-01 13:06                             | 376.5           | 2024-11-01 14:28 | 354.3                 | 2024-11-01 15:41 | 408.3               |       |
| 47                   |                  |                         | 2024-11-01 13:07                             | 376.5           | 2024-11-01 14:29 | 356.1                 | 2024-11-01 15:42 | 409.4               |       |
| 48                   |                  |                         | 2024-11-01 13:08                             | 376.5           | 2024-11-01 14:30 | 357.4                 | 2024-11-01 15:43 | 410.8               |       |
| 49                   |                  |                         | 2024-11-01 13:09                             | 376.3           | 2024-11-01 14:31 | 357.6                 | 2024-11-01 15:44 | 412.4               |       |
| 50                   |                  |                         | 2024-11-01 13:10                             | 376.0           | 2024-11-01 14:32 | 357.2                 | 2024-11-01 15:45 | 414.2               |       |
| 51                   |                  |                         | 2024-11-01 13:11                             | 376.3           | 2024-11-01 14:33 | 357.2                 | 2024-11-01 15:46 | 415.3               |       |
| 52                   |                  |                         | 2024-11-01 13:12                             | 376.1           | 2024-11-01 14:34 | 353.7                 | 2024-11-01 15:47 | 416.5               |       |
| 53                   |                  |                         | 2024-11-01 13:13                             | 375.7           | 2024-11-01 14:35 | 352.0                 | 2024-11-01 15:48 | 418.0               |       |
| 54                   |                  |                         | 2024-11-01 13:14                             | 375.3           | 2024-11-01 14:36 | 350.4                 | 2024-11-01 15:49 | 419.4               |       |
| 55                   |                  |                         | 2024-11-01 13:15                             | 375.4           | 2024-11-01 14:37 | 349.4                 | 2024-11-01 15:50 | 420.8               |       |
| 56                   |                  |                         | 2024-11-01 13:16                             | 375.4           | 2024-11-01 14:38 | 348.2                 | 2024-11-01 15:51 | 421.9               |       |
| 57                   |                  |                         | 2024-11-01 13:17                             | 375.0           | 2024-11-01 14:39 | 347.8                 | 2024-11-01 15:52 | 423.6               |       |
| 58                   |                  |                         | 2024-11-01 13:18                             | 375.3           | 2024-11-01 14:40 | 347.3                 | 2024-11-01 15:53 | 424.8               |       |
| 59                   |                  |                         | 2024-11-01 13:19                             | 376.0           | 2024-11-01 14:41 | 347.2                 | 2024-11-01 15:54 | 426.5               |       |
| 60                   |                  |                         | 2024-11-01 13:20                             | 376.2           | 2024-11-01 14:42 | 346.6                 | 2024-11-01 15:55 | 428.6               |       |
| 61                   |                  |                         | 2024-11-01 13:21                             | 376.8           | 2024-11-01 14:43 | 345.7                 | 2024-11-01 15:56 | 429.0               |       |
| 62                   |                  |                         | 2024-11-01 13:22                             | 377.8           | 2024-11-01 14:44 | 346.4                 | 2024-11-01 15:57 | 430.2               |       |
| 63                   |                  |                         | 2024-11-01 13:23                             | 378.2           | 2024-11-01 14:45 | 347.4                 | 2024-11-01 15:58 | 432.5               |       |
| 64                   |                  |                         | 2024-11-01 13:24                             | 378.0           | 2024-11-01 14:46 | 346.9                 | 2024-11-01 15:59 | 433.5               |       |
| 65                   |                  |                         | 2024-11-01 13:25                             | 377.6           | 2024-11-01 14:47 | 347.1                 | 2024-11-01 16:00 | 435.0               |       |
| 66                   |                  |                         | 2024-11-01 13:26                             | 377.6           | 2024-11-01 14:48 | 346.2                 | 2024-11-01 16:01 | 437.1               |       |
| 67                   |                  |                         | 2024-11-01 13:27                             | 377.3           | 2024-11-01 14:49 | 346.1                 | 2024-11-01 16:02 | 438.6               |       |
| 68                   |                  |                         | 2024-11-01 13:28                             | 376.9           | 2024-11-01 14:50 | 344.5                 | 2024-11-01 16:03 | 440.9               |       |
| 69                   |                  |                         | 2024-11-01 13:29                             | 376.8           | 2024-11-01 14:51 | 343.6                 | 2024-11-01 16:04 | 441.1               |       |
| 70                   |                  |                         | 2024-11-01 13:30                             | 375.6           | 2024-11-01 14:52 | 342.6                 | 2024-11-01 16:05 | 440.8               |       |
| 71                   |                  |                         | 2024-11-01 13:31                             | 374.7           | 2024-11-01 14:53 | 340.9                 | 2024-11-01 16:06 | 440.8               |       |
| 72                   |                  |                         | 2024-11-01 13:32                             | 373.5           | 2024-11-01 14:54 | 342.8                 | 2024-11-01 16:07 | 439.9               |       |
| 73                   |                  |                         | 2024-11-01 13:33                             | 371.9           |                  |                       | 2024-11-01 16:08 | 438.8               |       |
| 74                   |                  |                         | 2024-11-01 13:34                             | 370.7           |                  |                       | 2024-11-01 16:09 | 437.4               |       |
| 75                   |                  |                         | 2024-11-01 13:35                             | 369.0           |                  |                       | 2024-11-01 16:10 | 433.8               |       |

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|-----|--|--|------------------|-------|--|--|------------------|-------|
| 76  |  |  | 2024-11-01 13:36 | 368.3 |  |  | 2024-11-01 16:11 | 431.7 |
| 77  |  |  | 2024-11-01 13:37 | 367.2 |  |  | 2024-11-01 16:12 | 430.4 |
| 78  |  |  | 2024-11-01 13:38 | 366.3 |  |  | 2024-11-01 16:13 | 427.8 |
| 79  |  |  | 2024-11-01 13:39 | 364.6 |  |  | 2024-11-01 16:14 | 425.5 |
| 80  |  |  | 2024-11-01 13:40 | 363.1 |  |  | 2024-11-01 16:15 | 423.2 |
| 81  |  |  | 2024-11-01 13:41 | 362.0 |  |  | 2024-11-01 16:16 | 421.6 |
| 82  |  |  |                  |       |  |  | 2024-11-01 16:17 | 419.9 |
| 83  |  |  |                  |       |  |  | 2024-11-01 16:18 | 418.0 |
| 84  |  |  |                  |       |  |  | 2024-11-01 16:19 | 415.4 |
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| 86  |  |  |                  |       |  |  | 2024-11-01 16:21 | 412.0 |
| 87  |  |  |                  |       |  |  | 2024-11-01 16:22 | 409.7 |
| 88  |  |  |                  |       |  |  | 2024-11-01 16:23 | 407.3 |
| 89  |  |  |                  |       |  |  | 2024-11-01 16:24 | 405.5 |
| 90  |  |  |                  |       |  |  | 2024-11-01 16:25 | 402.7 |
| 91  |  |  |                  |       |  |  | 2024-11-01 16:26 | 401.2 |
| 92  |  |  |                  |       |  |  | 2024-11-01 16:27 | 399.3 |
| 93  |  |  |                  |       |  |  | 2024-11-01 16:28 | 396.3 |
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| 96  |  |  |                  |       |  |  | 2024-11-01 16:31 | 394.3 |
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| 99  |  |  |                  |       |  |  | 2024-11-01 16:34 | 397.3 |
| 100 |  |  |                  |       |  |  | 2024-11-01 16:35 | 398.0 |
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| 104 |  |  |                  |       |  |  | 2024-11-01 16:39 | 394.5 |
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| 106 |  |  |                  |       |  |  | 2024-11-01 16:41 | 391.9 |
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| 110 |  |  |                  |       |  |  | 2024-11-01 16:45 | 385.2 |
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| 112 |  |  |                  |       |  |  | 2024-11-01 16:47 | 384.1 |
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| 114 |  |  |                  |       |  |  | 2024-11-01 16:49 | 382.0 |
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| 122 |  |  |                  |       |  |  | 2024-11-01 16:57 | 364.6 |
| 123 |  |  |                  |       |  |  | 2024-11-01 16:58 | 361.2 |
| 124 |  |  |                  |       |  |  | 2024-11-01 16:59 | 358.0 |
| 125 |  |  |                  |       |  |  | 2024-11-01 17:00 | 356.0 |
| 126 |  |  |                  |       |  |  | 2024-11-01 17:01 | 354.7 |
| 127 |  |  |                  |       |  |  | 2024-11-01 17:02 | 352.5 |
| 128 |  |  |                  |       |  |  | 2024-11-01 17:03 | 351.4 |
| 129 |  |  |                  |       |  |  | 2024-11-01 17:04 | 350.3 |
| 130 |  |  |                  |       |  |  | 2024-11-01 17:05 | 350.0 |
| 131 |  |  |                  |       |  |  | 2024-11-01 17:06 | 349.3 |
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| 137 |  |  |                  |       |  |  | 2024-11-01 17:12 | 350.2 |
| 138 |  |  |                  |       |  |  | 2024-11-01 17:13 | 349.7 |
| 139 |  |  |                  |       |  |  | 2024-11-01 17:14 | 344.5 |
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| 142 |  |  |                  |       |  |  | 2024-11-01 17:17 | 337.2 |
| 143 |  |  |                  |       |  |  | 2024-11-01 17:18 | 335.6 |
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| 145 |  |  |                  |       |  |  | 2024-11-01 17:20 | 297.5 |
| 146 |  |  |                  |       |  |  | 2024-11-01 17:21 | 287.4 |
| 147 |  |  |                  |       |  |  | 2024-11-01 17:22 | 279.5 |
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| 150 |  |  |                  |       |  |  | 2024-11-01 17:25 | 264.3 |
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| 158 |  |  |                  |       |  |  | 2024-11-01 17:33 | 296.7 |
| 159 |  |  |                  |       |  |  | 2024-11-01 17:34 | 284.7 |
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| 163 |  |  |                  |       |  |  | 2024-11-01 17:38 | 250.7 |
| 164 |  |  |                  |       |  |  | 2024-11-01 17:39 | 246.4 |

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| 165 |  |  |  |  |  |  | 2024-11-01 17:40 | 243.5 |
| 166 |  |  |  |  |  |  | 2024-11-01 17:41 | 240.5 |
| 167 |  |  |  |  |  |  | 2024-11-01 17:42 | 237.8 |
| 168 |  |  |  |  |  |  | 2024-11-01 17:43 | 235.5 |
| 169 |  |  |  |  |  |  | 2024-11-01 17:44 | 233.0 |
| 170 |  |  |  |  |  |  | 2024-11-01 17:45 | 231.4 |
| 171 |  |  |  |  |  |  | 2024-11-01 17:46 | 229.7 |
| 172 |  |  |  |  |  |  | 2024-11-01 17:47 | 228.4 |
| 173 |  |  |  |  |  |  | 2024-11-01 17:48 | 226.9 |
| 174 |  |  |  |  |  |  | 2024-11-01 17:49 | 226.2 |
| 175 |  |  |  |  |  |  | 2024-11-01 17:50 | 224.4 |
| 176 |  |  |  |  |  |  | 2024-11-01 17:51 | 222.9 |
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| 190 |  |  |  |  |  |  | 2024-11-01 18:05 | 208.5 |
| 191 |  |  |  |  |  |  | 2024-11-01 18:06 | 207.9 |
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| 193 |  |  |  |  |  |  | 2024-11-01 18:08 | 206.3 |
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| 195 |  |  |  |  |  |  | 2024-11-01 18:10 | 204.6 |
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| 198 |  |  |  |  |  |  | 2024-11-01 18:13 | 202.8 |
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| 227 |  |  |  |  |  |  | 2024-11-01 18:42 | 186.9 |
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| 229 |  |  |  |  |  |  | 2024-11-01 18:44 | 186.1 |
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| 239 |  |  |  |  |  |  | 2024-11-01 18:54 | 182.4 |
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| 252 |  |  |  |  |  |  | 2024-11-01 19:07 | 179.0 |
| 253 |  |  |  |  |  |  | 2024-11-01 19:08 | 178.5 |



|     |  |  |  |  |  |  |                  |       |
|-----|--|--|--|--|--|--|------------------|-------|
| 254 |  |  |  |  |  |  | 2024-11-01 19:09 | 178.3 |
| 255 |  |  |  |  |  |  | 2024-11-01 19:10 | 177.4 |
| 256 |  |  |  |  |  |  | 2024-11-01 19:11 | 177.3 |
| 257 |  |  |  |  |  |  | 2024-11-01 19:12 | 176.9 |
| 258 |  |  |  |  |  |  | 2024-11-01 19:13 | 176.8 |
| 259 |  |  |  |  |  |  | 2024-11-01 19:14 | 176.5 |
| 260 |  |  |  |  |  |  | 2024-11-01 19:15 | 176.6 |
| 261 |  |  |  |  |  |  | 2024-11-01 19:16 | 176.2 |
| 262 |  |  |  |  |  |  | 2024-11-01 19:17 | 176.3 |
| 263 |  |  |  |  |  |  | 2024-11-01 19:18 | 176.0 |
| 264 |  |  |  |  |  |  | 2024-11-01 19:19 | 175.9 |

## List of Appendices

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

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

Appendix B – Labels and Manuals

Appendix C –Equipment Calibration Records



OFFICE OF AIR QUALITY PLANNING AND STANDARDS

RESEARCH TRIANGLE PARK, NC 27711

November 13, 2024

Mr. Guillaume Thibodeau-Fortin, P. Eng.  
Laboratory Manager  
Stove Builder International, Inc.  
250, De Copenhague  
St-Augustin-de-Desmaures (Qc)  
G3A 2H3, Canada

Dear Mr. Thibodeau-Fortin,

I am writing in response to your letter dated September 24, 2024, in which you request approval of an alternative test method for demonstrating compliance with New Source Performance Standard (NSPS) Subpart AAA, Standards of Performance for New Residential Wood Heaters (Subpart AAA). The U.S. Environmental Protection Agency's (EPA) Office of Air Quality Planning and Standards is the delegated authority for approval/disapproval determinations on any major alternatives to test methods and other compliance determination procedures required under 40 CFR parts 59, 60, 61, 63, and 65.

According to the information provided in your correspondence, you seek an alternative test method and testing procedures for use when conducting testing on the Stove Builder International Inc. (SBI) SR 3.2 Series residential wood heater. Currently, as required by section 60.534(a)(2) of Subpart AAA, a manufacturer, when using the 2020 cord wood alternative compliance option, must have their appliance tested by an EPA-approved test laboratory and the testing conducted with cord wood using an alternative cord wood test method approved by the EPA Administrator or their delegated authority to establish the certification test conditions and the particulate matter (PM) emission values.

You request to use the specified modifications, detailed below, coupled with NYSERDA Test Method for Certification of Cordwood-Fired Stoves Under the 2015 New Source Performance Standard (attached) as the alternative cord wood test method to certify the SBI SR 3.2 Series model line. In your request, you state that the SBI SR 3.2 Series is an automatically controlled room heater and that you are seeking a cord wood alternative test method to use for this compliance testing. You also state, in your request letter, that your appliance has a usable firebox volume of 1.90 ft<sup>3</sup> with an overall firebox volume of 3.15 ft<sup>3</sup>. You state that this Series will include a freestanding version as well as a built-in wall version of the heater with the exact same firebox (dimensional, refractory and components). To meet the requirements of the 2015 New Source Performance Standard to test the heater at the lowest achievable burn rate, you propose to test the heater in the freestanding version. This version uses a non-insulated black pipe as chimney connector, and combustion may be slightly slower in the freestanding

version, however, self-regulated combustion will keep the firebox to a proper combustion temperature with its internal temperature sensors. You state that differences between these two models are minor. Because the nominal length of your usable firebox is 22.111 inches, you state that you will use cord wood fuel with a nominal length of 18.0in length, loaded in East-West fashion, for testing which represents 80% to 95% of the usable firebox width (the longest dimension). In your request, you state that you would like to use Big Leaf Maple cord wood for compliance testing. This fuel is among the allowable fuel species specified in the fuel load calculator that accompanies the NYSERDA Test Method for Certification of Cordwood-Fired Stoves Under the 2015 New Source Performance Standard.

We understand from your request, that you also seek to use several alternative testing procedures, detailed in the second list below, when conducting sampling as required by 40 CFR 60.534(c), which requires that PM emission concentrations be measured using ASTM E2515-11 *Standard Test Method for Determination of Particulate Matter Emissions Collected by a Dilution Tunnel* (ASTM E2515-11).

Based on the information you have provided and with the caveats set forth below, we are approving your request to use the NYSERDA Test Method for Certification of Cordwood-Fired Stoves Under the 2015 New Source Performance Standard as the alternative cord wood test method when conducting certification testing as required by Subpart AAA, section 60.534(a)(2) on the SBI SR 3.2 Series room heater with ASTM E-2515 using the modifications detailed below.

Here are the proposed revisions of the "NYSERDA Test Method for Certification of Cordwood-Fired Stoves Under the 2015 New Source Performance Standard":

1. Section 1.5.2 and 13.9 – Additional information:
  - a. 10-minute average data is to be calculated as follows:
    - i. On B415.1 spreadsheet, the weight remaining on the scale and elapsed time is real time, at every minute.
    - ii. All other parameters (CO, CO<sub>2</sub>, O<sub>2</sub>, Flue temperature and ambient temperature) are averaged using a 10-minute rolling average of the following data point. For example, at t=0, weight is weight<sub>0</sub>, CO/CO<sub>2</sub>/Flue/Ambient are the average from t=0 to t=9. At t=1, weight is weight<sub>1</sub>, CO/CO<sub>2</sub>/Flue/Ambient are the average from t=1 to t=10, etc.
2. Section 3.19 – Additional information:
  - a. The locked version of the Fuel Load Calculator to be used is dated 8/7/2023.
3. Section 5.1 – Additional information:
  - a. A complete copy of the Owner's manual must be provided to the test laboratory one day prior to the day of testing. All fuel loading details must meet the requirements of Section 11 in the

NYSERDA Test Method for Certification of Cordwood-Fired Stoves Under the 2015 New Source Performance Standard.

- b. All certification test procedures must be consistent with the Owner's manual and the manufacturer may not provide other operating instructions to the test lab.
  - c. All fuel loading procedures and air control / door closing procedures must be included in the Owner's manual. This includes necessary bypass operating instructions/ information required in Section 11.6.5.1 of The NYSERDA Test Method for Certification of Cordwood-Fired Stoves Under the 2015 New Source Performance Standard, as well as required fuel piece length information required in section 11.3.4.1.3 of that test method.
  - d. Kindling and start-up instructions in the owner's manual are limited to top-down start, or bottom-up start direction. For the purposes of this testing, a bottom-up start will be required. There must be no discussion regarding fuel spacing and piece size in the instructions to the lab. However, general guidance on kindling and start-up fuel arrangement can be supplied (e.g., Split the start-up fuel piece into 6 pieces, use between 10-15 pieces of kindling, put the biggest pieces on the bottom and the smallest on top, stack into 5 to 7 layers). For the purposes of this testing, kindling and start up fuel requirements will be determined by the fuel load calculator.
  - e. The Owner's manual information may inform the test laboratory on appliance operation however NO INSTRUCTIONS IN THE OWNER'S MANUAL MAY OVERRIDE ANY REQUIREMENT OF THIS TEST METHOD, ASTM E-2515, The NYSERDA Test Method for Certification of Cordwood-Fired Stoves Under the 2015 New Source Performance Standard OR ANY provision stipulated in 40 CFR 60, Subpart AAA.
4. Section 5.5.2 – Modification of the requirement:
- a. SR 3.2 Series are wood heaters with electronically controlled air intakes. This wood heater series is not intended to be used without electricity. If a power outage occurs when a user is burning wood in his wood heater, the air controls will go to a "Fail Safe Mode" position using mechanical springs. This way, the combustion can be terminated safely. Precisely, primary air from under the coal bed will be fully closed, primary air wash will be approximately halfway opened (medium burn rate condition) and secondary air will be fully opened.
5. Section 11.2 – Additional information:
- a. Overall firebox dimensions and usable firebox dimensions must have been provided to EPA prior to alternative method approval. In addition, the usable firebox dimensions must be illustrated in the Owner's manual with instructions to the end user for appropriate fueling/loading.
  - b. Overall firebox volume and usable firebox volume must also be reported in the test report and must agree with dimensions stated in this letter.
  - c. Fuel load density must be based on the usable firebox dimensions listed below in this alternative test method approval.
    - i. On the SR 3.2 Series, the Usable Firebox Volume (UFV) is smaller than the Overall Firebox Volume. The reason for this is because wood should not be placed between the glass and the andirons or above the Max Load indicator. As provided, the Owner's Manual for the SR 3.2 Series specifies:

*"The images below show the space in the firebox where the logs are to be placed. It*

is important to always respect this space and not to put logs in the grid area marked with an X. The marked area is defined by the space between the glass and the andirons and above the “MAX LOAD” marking which represent where most of the secondary combustion air is injected inside the firebox. Leave enough space between the logs for good air circulation. Using more than the usable firebox volume for loading wood will result in poor combustion. The Usable firebox volume of 1.90 ft<sup>3</sup> shown below is the one used during EPA emissions certification. The recommended log length for this wood heater is 16 inches. Fuel specie and length used for the EPA certification will be Big Leaf Maple and 18 inches long. ”

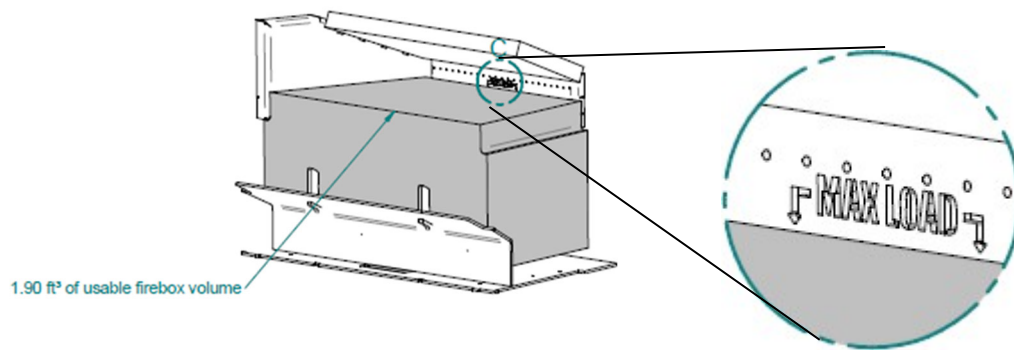


Figure 1 - Usable Firebox Volume

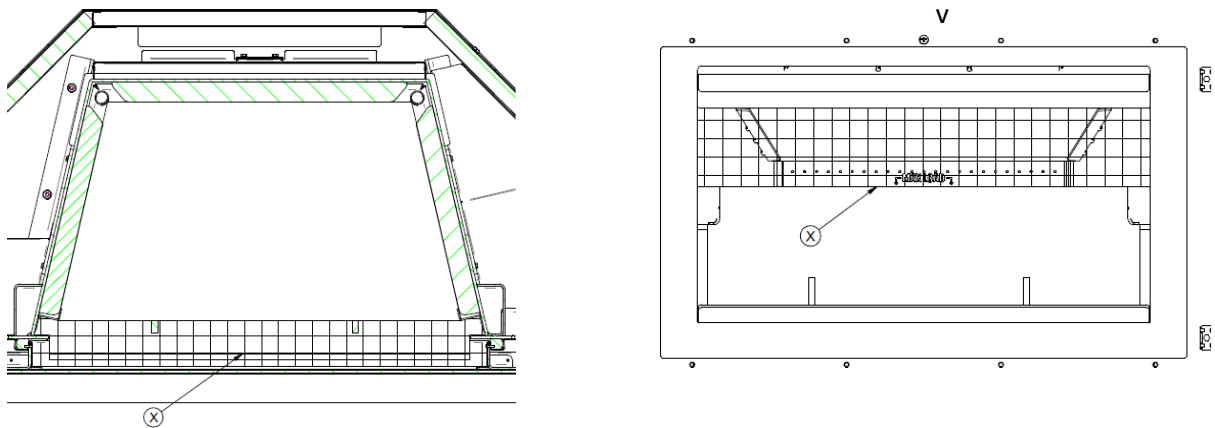


Figure 2 - Zone marked with X is not in the usable firebox volume

ii. SR 3.2 Series UFV calculation:

$$UFV = V_{trap} - 2V_{side} - V_{front}$$

$$V_{trap} = \frac{(25.221 + 19.0)}{2} \times 13.693 \times 11.5 = 3,481.7 \text{ in}^3$$

$$V_{side} = \left( (1.896 \times 0.694) + (0.338 \times 0.354) + \left( \frac{\pi \times 0.354^2}{4} \right) \right) \times 14.042 = 21.539 \text{ in}^3$$

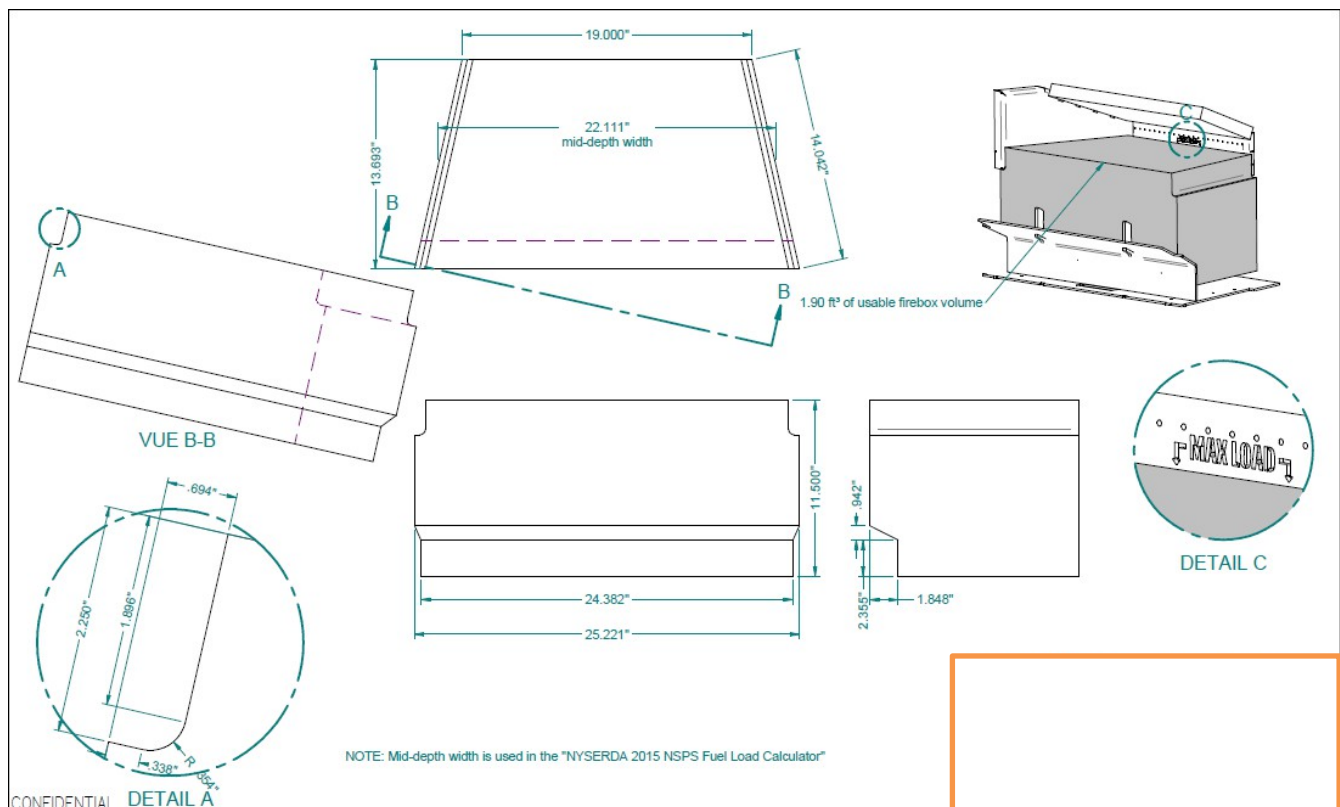
$$V_{front} = \left( (2.355 \times 1.848) + \left( \frac{1.848 \times 0.942}{2} \right) \right) \times \left( \frac{(25.221 + 24.382)}{2} \right) = 151.1 \text{ in}^3$$

$$UFV = 3481.7 - 2 \times 21.5 - 151.1 = 3287.5 \text{ in}^3$$

$$UFV = \frac{3287.5}{12^3} = 1.903 \text{ ft}^3$$

Please note that CAD models give a volume of 3309.045 in<sup>3</sup>. This calculation is 0.65% under the CAD volume which is representative.

iii. SR 3.2 Series UFV schematic:



d. UFV calculation from "The NYSERDA 2015 NSPS Fuel Calculator (8/7/2023)" need a fuel adjustment of 0.112 ft<sup>3</sup> to match the UFV calculation of 1.903 ft<sup>3</sup> above.

| 1.3 Firebox Information |                                        |                                  |
|-------------------------|----------------------------------------|----------------------------------|
| Firebox Shape:          | <input checked="" type="radio"/> Cubic | <input type="radio"/> Cylindrica |
| Firebox width:          | 22.11                                  | in.                              |
| Firebox depth:          | 13.69                                  | in.                              |
| Firebox height:         | 11.50                                  | in.                              |
| Volume adjustment:      | 0.112                                  | ft <sup>3</sup>                  |
| Firebox Net Volume:     | 1.903                                  | ft <sup>3</sup>                  |

- i. Volume adjustment represent the 2 small side volumes remove as well as the front volume removed. It can be calculated as follow:

$$V_{adj} = 2V_{side} + V_{rad}$$

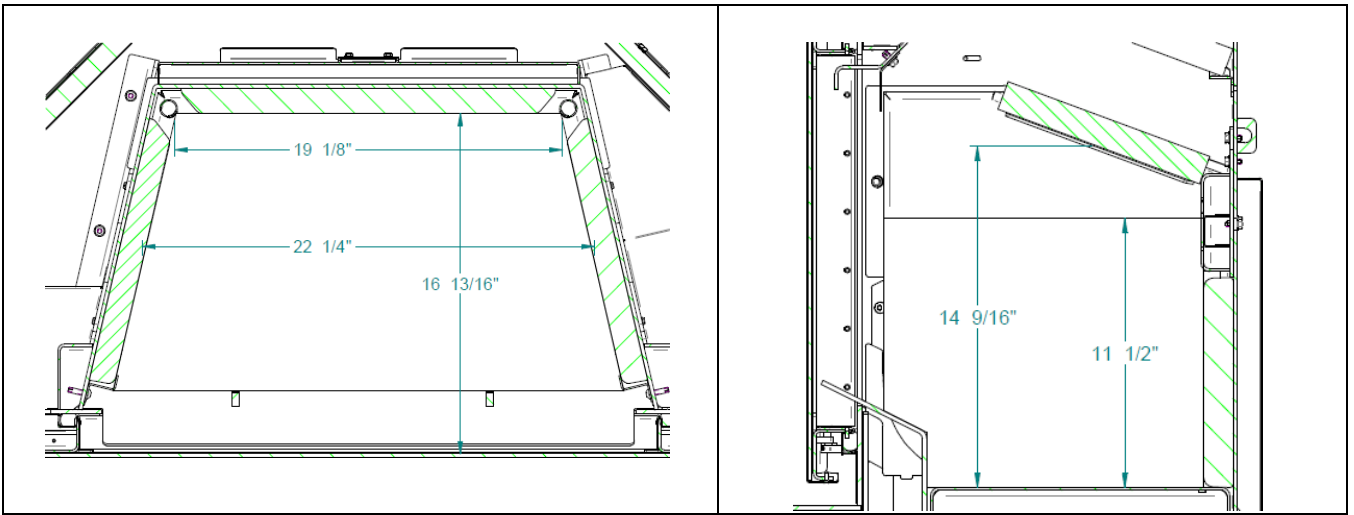
$$V_{adj} = 2 \times 21.539 + 151.1 = 194.178 \text{ in}^3 = 0.112 \text{ ft}^3$$

- ii. Firebox depth of 13.693 inches is measured from the back of the firebox up to the steel andirons at the front of the firebox. Refer to the UFV drawing above for more details.
- iii. Firebox height of 11.5 inches is the dimension measured from the bottom of the firebox up to the “MAX LOAD” marking. The volume above is for mixing and secondary combustion. Refer to the UFV drawing above for more details.
- iv. Firebox width of 21.111 inches is the width measured in the middle of the dept, from side firebrick to the other. It represents the average width of the firebox Refer to the UFV drawing above for more details.
- e. The Overall firebox volume (OFV) is for marketing purposes only. The overall firebox calculation is not intended to be used for testing, as it includes areas of the firebox that the test fuel load is not permitted to be placed into. This area is a buffer zone to allow an easier fuel insertion, to prevent ash spillage and to allow the air wash to work properly. The calculation presented below approximates the volume a consumer could easily confirm using a measuring tape. As provided, the Owner’s Manual for the SR 3.2 series specifies:

*“The overall firebox calculation is an approximation and is not intended to be used for loading wood. This volume includes a buffer zone to allow an easier fuel insertion, prevent ash spillage and allow the air wash to work properly. IMPORTANT, NO FUEL SHOULD BE ADDED ABOVE THE MAX LOAD INDICATOR OR ABOVE 11 1/2” ABOVE THE BOTTOM PLATE.”*

- i. SR3.2 Series Overall firebox volume (OFV) Calculation:





$$OFV = 22.25 \times 16.813 \times 14.563 = 5447.9 \text{ in}^3$$

$$OFV = \frac{5447.9}{12^3} = 3.15 \text{ ft}^3$$

6. Section 11.3.6 – Additional information:

- a. In the Fuel Load Calculator, it is acceptable to have a different actual # of pieces than the target # of pieces as long as the fuel load weight and the fuel pieces weight are respected.

7. Section 11.6.8.4.4 – Modification to the requirement:

- a. If the door can't remain cracked to 1 inch because of a mechanical constraint (seal along the door hinge), then it may be backstopped at the 1" mark (held in place) or it may be cracked to the closest resting position, but no less than 1 inch.

8. Section 11.6.11.3.4.2– Additional information:

- a. The heat output setting can be set to lowest burn rate before the end of the 10-minute period as it is suggested by the word "may".

9. Section 11.10.1.2– Additional information:

- a. A fourth test run must be done without external power, and these data reported within the compliance test report, however these data will not be part of the average emission rate for compliance with the rule. Power outage may happen unexpectedly at a specific moment of combustion, and EPA requires data on emissions resulting during a failure mode impacting this appliance. We recommend to de-energized the appliance at the beginning of L4 phase to conduct this test. You state that without electricity, the user's manual will recommend keeping the door open for a longer period (for example, 5 minutes), to ensure proper ignition. In normal operating conditions, the door can be

closed earlier than the 5-minute period due to the self-regulated combustion.

10. Section 14.2.1– Additional information:

- a. Since ASTM E2515 sampling of PM emission rate is done for the whole test run (L1 to L4 on the same filters), then the PM emission rate reported by phase will be done using TEOM data.

11. Additional requirements:

- a. Emissions must be measured and reported from all test runs.
- b. The NYSERDA Test Method for Certification of Cordwood-Fired Stoves Under the 2015 New Source Performance Standards is meant to be run in triplicate, with no test runs excluded (no option to replace one test run with two others) and the reported test result is the average value of these three replicate tests.
- c. The trains must not be disassembled until after a post-test leak check is performed.
- d. The blowers of the SBI SR 3.2 Series are operated automatically. They will turn ON at highest speed when temperature reaches a kick in point and will turn OFF at another kickoff point temperature measured inside the wood heater. The testing must be conducted with the blowers engaged in automatic mode.
- e. Per section 11.6.7.1 of the NYSERDA Test Method for Certification of Cordwood-Fired Stoves Under the 2015 New Source Performance Standards, section 11.6.7.2 all test runs must be video recorded in their entirety or at least at 1-minute intervals, and remote witness capability must be made available by the test lab upon request.

The laboratory will follow Technical Information Document 024 - Memo on Rounding and Significant Figures for rounding conventions: <https://www.epa.gov/emc/technical-informationdocument-024-memo- rounding-and-significant-figures>

**The following subjects are items of ASTM E2515-10 to be modified:**

1. Section 9.2.2 – Modification of requirement:

- a. Tunnel flow rate must be sufficient to maintain tunnel temperature below 125 °F (maximum) and 113 °F on a 10-minute rolling average, excluding periods when the appliance door is open. Two exceedances are allowed of the 10-minute rolling average points in each test run. The tunnel relative humidity must be below 90% humidity at 80°F (ASTM E2515-11 minimum filter temperature as required in this alternative test method) based on 1-minute data excluding periods when the appliance door is open.
  - i. Optionally, real-time tunnel dewpoint temperature measurements recorded at a minimum rate of one reading per minute can be made to override the maximum tunnel temperature requirement (125°F maximum and 113°F on a 10-minute rolling average). One-minute dewpoint temperature measurements in the dilution tunnel must be below the one-minute ASTM E2515-11 filter temperature measurement. If there is an exceedance of the tunnel dewpoint temperature above the ASTM E2515-11 filter temperature, then the test run is invalid and must be repeated.

- ii. As an alternative to 1.a.i, the tunnel relative humidity may be measured using a psychrometer to measure the wet bulb temperature in the dilution tunnel. These measurements must be taken and recorded, at a minimum of every 2 minutes. ASTM E0377-15 Standard Test Method for Measuring Humidity with a Psychrometer (the Measurement of Wet- and Dry- Bulb Temperatures) may be followed for these purposes.
- b. With respect to the last sentence in ASTM E2515-11 section 9.2.2, you are excluded from the following requirement: "The maximum tunnel flow rate shall not exceed five times the minimum flow rate determined as shown in 9.2.4."
- 2. Section 9.8.1, 10.2.1 and 11.7 – Additional requirements:
  - a. The filter temperature must be maintained between 80 and 90 °F during testing.
  - b. Filters must be weighed in pairs using EPA ALT-154.
  - c. Only one point per sampling train is allowed outside the  $\pm 10$  percent proportionality range per test run.
  - d. Non-desiccated post-test filter weights must be taken within an hour after the post-test leak check. These initial weights must be included in the test report.
  - e. Oven drying desiccation is not allowed.
  - f. Dual train comparison (precision) must be calculated in terms of percent difference between the two sample trains and in terms of calculated emissions difference on a g/kg basis. These values must both be clearly reported for each test run.
  - g. Negative filter weights must be discussed in the test report. Where negative mass (i.e., filter material left on O-rings and gaskets) is subtracted from the overall PM mass, the resultant PM mass must be reported with the mass subtracted and with the mass not subtracted for comparison purposes. Given the gravimetric procedures in ALT-154 we do not expect to encounter any negative mass issues with the filters but if any should be present there must be a full discussion in the test report on how this may have come to be the case and what impact it may have on the measured emissions.
- 3. Section 9.5.2 to 11.4.2 – Additional requirement:
  - a. Ambient background sampling and filter collection must be conducted per the NYSEDA Test Method for Certification of Cordwood-Fired Stoves Under the 2015 New Source Performance Standards, Section 11.12ASTM E2515-11, section 4.3 and all other method specific room air sampling requirements.
- 4. Sections 9.6.4 through 9.6.5.1 - Additional requirement:
  - a. Particulate matter emission concentrations must be measured with ASTM E2515-11 with the following exceptions, eliminate section 9.6.5.1 of ASTM E2515-11 and perform the post-test leak checks as specified below:
    - i. Post-Test Leak Check: A leak check of each sampling train is mandatory at the conclusion of each sampling run before sample recovery. The leak check must be performed in accordance with the procedures of ASTM E2515-11, section 9.6.4.1, except that it must be conducted at a vacuum equal to or greater than the maximum value reached during the sampling run. If the leakage rate is found to be no greater than 0.0003 m<sup>3</sup>/min (0.01 cfm) or 4% of the average

sampling rate (whichever is less), the leak check results are acceptable. If a higher leakage rate is obtained, the sampling run is invalid.

- b. Additionally, if a component change of either sampling train is needed during sampling, then perform the leak check specified below:
  - i. Leak Checks During Sample Run: If, during a sampling run, a component (e.g., filter assembly) change becomes necessary, a leak check must be conducted immediately before the change is made. Record the sample volume before and after the leak test. The sample volume collected during any leak checks must not be included in the total sample volume for the test run. The leak check must be done according to the procedure outlined in ASTM E2515-11, section 9.6.4.1, except that it must be done at a vacuum equal to or greater than the maximum value recorded up to that point in the sampling run. If the leakage rate is found to be no greater than 0.0003 m<sup>3</sup>/min (0.01 cfm) or 4% of the average sampling rate (whichever is less), the leak check results are acceptable. If a higher leakage rate is obtained, the sampling run is invalid.
- c. NOTE: Immediately after component changes, leak checks are optional but highly recommended. If such leak checks are done, the post-test leak check procedure referenced above shall be used.

When using ASTM E2515-11 to conduct first hour PM sampling as required by 60.534(d), these changes and modifications must be made:

1. To determine the first hour PM emissions as required by 60.534(d), the NYSERDA Test Method for Certification of Cordwood-Fired Stoves Under the 2015 New Source Performance Standards, section 10.2.3, requires the use of a TEOM to report the first-hour emission rate, to provide data for phased emissions, and real-time data reporting requirements. All TEOM measurements shall run through the entirety of the test to obtain full run data.
2. Note: NO ASTM E2515 SAMPLING WILL BE DONE FOR THE FIRST HOUR EMISSIONS.

Finally, "NYSERDA Test Method for Certification of Cordwood-Fired Stoves Under the 2015 New Source Performance Standard" dated November 1, 2023" will be used with the caveat above in conjunction with ASTM E2515-11 to measure particulate emission concentrations and CSA B415.1-10 to measure efficiencies and CO emission rates.

All other requirements of the NYSERDA Test Method for Certification of Cordwood-Fired Stoves Under the 2015 New Source Performance Standards and ASTM E2515-11 must be followed during the testing, and all requirements of 40 CFR part 60, Subpart AAA must be satisfied and described in your test report. This approval is based on the understanding that the lowest heat output (Btu/hr) setting on the SR 3.2 Series room heater available to the user will correspond to the lowest burn rate to be evaluated during certification testing and the test report will fully document that the certification testing was conducted as such. This is consistent with section 60.534(a)(1) of Subpart AAA, which states, "the burn rate for the

low burn category must be no greater than the rate that an operator can achieve in home use and no greater than is advertised by the manufacturer or retailer."

A copy of this letter must be included in any certification test report where this alternative test method determination is used for compliance to 40 CFR 60, Subpart AAA requirements.

If you have additional questions regarding this approval, please contact me at 919-541-4790 or [johnson.steffan@epa.gov](mailto:johnson.steffan@epa.gov).

Sincerely,

Steffan M. Johnson  
Group Leader  
Measurement Technology Group

attachment

cc: Sara Ayers – EPA/OECA/OC  
Shannon Banner – EPA/OAQPS/SPPD  
James Hemby – EPA/OAQPS/AQAD  
Eleana Little – EPA /OECA/OC  
Rafael Sanchez – EPA/OECA  
Bill Schrock - EPA/OAQPS/SPPD  
Phil Sebasco – EPA /OECA/OC  
Nick Swanson – EPA/OAQPS/SPPD  
Michael Toney – EPA/OAQPS/AQAD  
Chet Wayland – EPA/OAQPS/AQAD

## **NYSERDA Test Method for Certification of Cordwood-Fired Stoves Under the 2015 New Source Performance Standard**

Note: This method does not include all the specifications (e.g. equipment and supplies) and procedures (e.g., sample and analytical) essential to its performance. Some material is incorporated by reference from other methods. Therefore, to obtain reliable results, persons using this method shall have a thorough knowledge of at least the following EPA Tests:

- Method 1- Sample and Velocity Traverses for Stationary Sources
- Method 2- Determination of Stack Gas Velocity and Volumetric Flow Rate (Standard Type Pitot Tube)
- Method 3 – Gas Analysis for the Determination of Dry Molecular Weight
- Method 4 – Determination of Moisture Content in Stack Gases
- Method 5G – Determination of Particulate Matter from Wood Heaters (Dilution Tunnel Sampling Location)
- Method 10 - Carbon Monoxide - Instrumental Analyzer
- Method 28 – Certification and Auditing of Wood Heaters

### ***1. Scope and Application***

- 1.1. This test method specifies operation and fueling for certification and auditing of manually fed wood-fired stoves and heaters with manual or automatic controls.
- 1.2. This test method measures particulate matter (PM) emissions, heat output, and efficiency.
- 1.3. Carbon monoxide emissions are measured per CSA B415.1 *Performance Testing of Solid-Fuel-Burning Heating Appliances*.
- 1.4. Particulate emissions are measured using the dilution tunnel method.
  - 1.4.1. As specified in ASTM E2515-11, *Standard Test Method for Determination of Particulate Matter Emissions Collected in a Dilution Tunnel*, with modifications described in Section 10.1 of this test method.
  - 1.4.2. Using the Tapered Element Oscillating Microbalance (TEOM) continuous PM method as detailed in this test method.
- 1.5. Efficiency using CSA B415.1 with the following exceptions:
  - 1.5.1. No substitution of data is allowed.

***THIS PROTOCOL FOR WOOD STOVES IS THE PROPERTY OF THE NEW YORK STATE ENERGY RESEARCH AND DEVELOPMENT AUTHORITY (NYSERDA) AND CAN BE USED TO TEST TECHNOLOGIES IN A LABORATORY SETTING. ANY DEVIATIONS OR CHANGES TO THIS PROTOCOL FOR WOOD STOVES ARE NOT APPROVED OR SANCTIONED BY NYSERDA. DO NOT CITE, COPY, or DISTRIBUTE THIS PROTOCOL FOR WOOD STOVES WITHOUT THE WRITTEN PERMISSION OF NYSERDA***

- 1.5.2. 10-minute average data must be used to calculate efficiency
- 1.6. Analyte. Particulate matter (PM). No CAS number assigned.
- 1.7. Applicability. This method is applicable for the certification and auditing of wood space heaters that burn cordwood fuel. The test quantifies PM and CO emissions and provides overall efficiency ratings, maximum burn time, and heat output.
- 1.8. Data Quality Objectives. Adherence to the requirements of this method will enhance the quality of the data obtained from air pollutant sampling methods.
- 1.9. Distinguishing features of appliances covered by this standard include:
  - 1.9.1. Cordwood fuel is hand-fed into the firebox.
  - 1.9.2. A chimney or vent that exhausts combustion products from the appliance.
- 1.10. The values stated are to be regarded as the standard, whether in I-P (British) or SI units. The values given in parentheses are for information only.
- 1.11. Data Quality Objectives.
  - 1.11.1. Adherence to the requirements of this method will enhance the quality of the data obtained from air pollutant sampling methods.
  - 1.11.2. Measurement of emissions and heating efficiency provides a uniform basis for comparison of product performance that is useful to the consumer. It is also required to relate emissions produced to useful heat production.
  - 1.11.3. This is a laboratory method intended to capture operating periods that are representative of actual field use without excessive test burden.

## **2. Referenced Methods**

- 2.1. NYSERDA Standard Operation Procedures for use of a Thermo Scientific 1405-D TEOM™ in a dilution tunnel with wood-fired stoves, hydronic heaters, and furnaces
- 2.2. ASTM 2515-11: Test Method for Determination of Particulate Matter Emissions Collected by a Dilution Tunnel.
- 2.3. CSA B415.1 Performance Testing of Solid-Fuel-Burning Heating Appliances.

## **3. Definitions**

- 3.1. Aborted Test Run – The run shall be considered aborted if a force majeure event occurs, such as a power outage or equipment operation failure. Aborted test runs are treated differently than incomplete or invalid test runs.

- 3.2. Active Period – the active period of a test is defined as the following events: (1) Door opening and closing, damper adjustments, adjustments of air controls, (2) Kindling and start-up wood within the stove and prior to ignition; (3) Coal bed raking, ((4) Fuel pieces before loading; (5) Fuel in firebox immediately after loading, (6) Fuel adjustments; (7) End of the test run coal bed conditions (this requires opening the door at the end of test), or (8) any other event where the user engages with the appliance.
- 3.3. Appliance – a wood heater capable of and intended for space heating defined in the applicable regulation. The appliance includes a combustion chamber, combustion air settings, operating controls, and a thermostat if specified, and any other accessory required for standard operation, such as a barometric damper.
- 3.4. Automatically controlled appliance – an appliance whose air controls are controlled automatically controlled throughout the appliance operation and can only be disabled by a technician or when in a power-out mode. Appliances controlling air for portions of a burn cycle are not automatically controlled appliances for this test method.
- 3.5. Centroidal Area – means the central area of the stack or duct that is no greater than 1 percent of the stack or duct cross-section. This area has the same geometric shape as the stack or duct.
- 3.6. Certification or audit test – a series of at least three test runs (four runs, if use of a fan is an option) conducted for certification or audit purposes that meets the specifications detailed in this protocol.
- 3.7. Chop – using a poker or another piece of wood to strike a piece of the fuel charge to break it into smaller pieces.
- 3.8. Coal-bed Stirring – prior to adding a new fuel charge, using a poker or piece of wood to stir or level the coal bed of the appliance for the sole purpose of ensuring ease of loading of the fuel charge. No special formations can be made, such as creating coal bed formations or pushing coals to one side or creating slopes with the coals.
- 3.9. Data recorder – The equipment that permanently records the concentrations reported by the analyzers.
- 3.10. Drift – Difference between pre and post run calibration system bias (or system calibration error) checks at a specific calibration concentration level.
- 3.11. East-west stove – a stove where the firebox dimension parallel to the loading door is greater or equal to the stove depth measurement. Logs are loaded so that they are viewed on the long length of the stove.
- 3.12. Emission factor – the emission of a pollutant expressed in mass per unit of energy (typically) output from the appliance.
- 3.13. Firebox – the portion of the chamber in the wood heater in which the test fuel charge is placed and combusted.



- 3.14. Firebox depth – the horizontal length of the fire chamber dimension measured perpendicular to the loading door. The manufacturer can only subtract the volume of the actual firebox if fuel cannot be loaded in the area removed from the firebox volume. If the manufacturer believes that a portion of the firebox depth is not usable for firebox volume calculation, photo documentation and a written basis must be included in the test report.
- 3.15. Firebox Height – the vertical distance extending above the top of the firebox to the floor of the firebox. Firebox height is not necessarily uniform. The measurement must account for variations caused by internal baffles, air channels, or other permanent obstructions. The manufacturer can only subtract the volume of the actual firebox if fuel cannot be loaded in the area removed from the firebox volume. The manufacturer can only subtract the volume of the actual firebox if fuel cannot be loaded in the area removed from the firebox volume.
- 3.16. Firebox width – the horizontal fire chamber dimension that is parallel to the loading door. The manufacturer can only subtract the volume of the actual firebox if fuel cannot be loaded in the area removed from the firebox volume. If the manufacturer believes that a portion of the firebox width is not usable for firebox volume calculation, photo documentation and a written basis must be included in the test report.
- 3.17. Flue Gas Measurement System – All the equipment used to measure stack gas components of interest. This system comprises five major subsystems: sample acquisition, sample transport, sample conditioning, gas analyzer, and data recorder.
- 3.18. Fuel Adjustment – manipulations to the fuel charge to reflect typical owner practices that allow the cordwood fuel to burn appropriately during the test period. A fuel adjustment includes minor changes in fuel placement. It does not include chopping the wood, stirring the coal bed, or reorganizing fuel placement.
- 3.19. Fuel load calculator – The locked excel spreadsheet tool that determines the allowable test fuel load weights and required piece sizes for each individual load.
- 3.20. Fuel loading direction – For loads 2, 3, and 4 fuel shall be loaded based parallel to the dimension with the largest value. If the firebox length and width are within 2”, fuel shall be loaded in an east/west fashion, parallel to the loading door. A crisscross configuration is allowed for L1 but cannot be used as a load configuration for loads 2, 3, or 4.
- 3.21. Gas analyzer – Instrument that measures and transmits an output proportional to a gas concentration.
- 3.22. Incomplete Test Run – Any test run that does not successfully complete all six test phases continuously due to stopped fuel combustion or other appliance issues, as detailed in Section 12.24.11.
- 3.23. Invalid Test Run – Any complete or partial test that does not meet the specifications detailed in this test method as the fault of the system operation.

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- 3.24. Kindling pieces – small pieces of wood less than 1” in diameter. No bark or moisture requirements for these pieces, however kindling pieces shall not be dried or stored anywhere but in laboratory ambient conditions. Kindling length shall be of the same wood species as the fuel charge length. Individual kindling pieces may weigh no less than 1.5 ounces.
- 3.25. Large fuel pieces – pieces that are larger for the appliance as defined by the fuel load calculator.
- 3.26. L1 Start-up – period of the test when the unit has kindling and startup fuel under the conditions described in Section 11.6.7.
- 3.27. L2 High-fire Phase – period of the test when the unit has a small coal bed and the stoves air settings are fully open. It is intended to replicate periods when homeowners are trying to quickly heat an area, shortly after starting or restarting the appliance.
- 3.28. L3 Maintenance-fire phase– period of the test when a fire is maintained with a medium-sized coal bed, and a smaller batch of wood made up of two large pieces. This is intended to simulate a period when the operator is trying to maintain consistent heat output.
- 3.29. L4 Low-burn Rate Phase – period of the test when the stove has a large coal bed, the stove is fully loaded, and the adjustable air settings are set to produce the lowest possible burn rate and have the lowest air settings. It is intended to simulate when the operator is trying to maintain heat over a long time, such as overnight or while away for significant periods of time.
- 3.30. North-south stove – a firebox that has its longest dimension measurement perpendicular to the loading door. In this stove type, logs are loaded so that the ends of the fuel are viewed when loaded.
- 3.31. Phase – A distinct period in the test run with its own operational procedures and conditions.
- 3.32. Primary air supply – air supply that introduces air to the wood heater in the combustion chamber and is adjusted to target a desired burn rate. The wood heater manufacturer or test facility can document this through design drawings.
- 3.33. Secondary air supply – air supply that introduces air to the wood heater such that the burn rate is not altered by more than 10 percent when the secondary air supply is adjusted during the test run. The wood heater manufacturer or test facility can document this through design drawings that show the secondary air is introduced only into a mixing chamber or secondary chamber outside the firebox.
- 3.34. Significant figure – is any digit that is necessary to define the specific value or quantity. Zeros may be used either to indicate a specific value, like any other digit or to indicate the magnitude of a number.
- 3.35. Small fuel pieces – pieces that are small for the appliance as defined by the fuel load calculator.
- 3.36. Starter fuel – pieces of cordwood that can be smaller than small and large pieces but larger than kindling, as defined by the fuel load calculator.

- 3.37. System calibration mode – The introduction of calibration gases into the measurement system at the flue gas inlet probe upstream of conditioning components, filtration, and flue gas sample transport equipment.
- 3.38. Test data – means the data for all test runs conducted on the wood heater, including any data collected during failed and invalid runs and includes records of preparation of standards, identification of equipment used and personnel present, records of calibrations, raw data sheets for field sampling, raw data sheets for field and laboratory analyses, chain-of-custody documentation, and example calculations for reported results.
- 3.39. Test facility – the area in which the wood heater is installed, operated, and sampled for emissions.
- 3.40. Test fuel charge– the collection of test fuel pieces used in each of the four phases of the test run. L2, L3, and L4 recommend that at least 75% of the individual pieces with at least 80% bark on one side of the fuel piece. Bark shall not be removed for certification testing. Any fuel charge that suggests bark was purposely removed or shaped shall be deemed invalid. Examples of fuel piece manipulation are provided in Section 11. If 75% of the fuel load pieces for L2, L3, and L4 do not have bark, document in the test report, and provide a basis for the lack of bark.
- 3.41. Test fuel load – the group of test fuel pieces that are loaded, as specified by phase, throughout the test run.
- 3.42. Test fuel loading – the arrangement of the test fuel charge.
- 3.43. Total run fuel load – the amount of wood burned during the entire test run.
- 3.44. Test fuel loading density – the calculation determining the weight of the as-fired test fuel load. The calculation is based on the usable volume of the firebox.
- 3.45. Test run – an individual emission test that includes the four operational phases required by the fueling protocol.
- 3.46. Usable firebox volume – the calculated volume of the firebox determined using its height, width, and depth as defined in this section. This calculation represents the area where wood is likely to be loaded. If the manufacturer claims that portions of the firebox may not be used in the calculation, a justification must be submitted with the test report. If the justification is not approved, the test results will be deemed unrepresentative for certification purposes. It is highly recommended that manufacturers obtain regulatory approval if making claims that portions of the firebox are not appropriate for inclusion in the calculation.
- 3.47. Wood heater – an enclosed, wood-burning appliance capable of and intended for space heating or domestic water heating, as defined in the applicable regulation.

#### **4. Interferences**

None.

## **5. *Summary of Method***

- 5.1. Particulate matter emissions are measured from a wood heater burning cordwood test fuel in a test facility maintained at a set of prescribed ambient conditions. Procedures for operating the appliance, measuring PM and CO emission rates, and methods for reducing data and calculating results are provided.
- 5.2. *Dilution Tunnel.* A dilution tunnel following the specifications detailed in ASTM E2515-11 shall be used for particulate measurements.
- 5.3. *Particulate Matter:* PM emissions are measured in a dilution tunnel specified in ASTM 2515-11 *Standard Test Method for Determination of Particulate Matter Emissions Collected in a Dilution Tunnel* with exceptions as defined in Section 10.1. The flow rate in the dilution tunnel is maintained at a constant rate throughout the test cycle and accurately measured. PM emissions are measured in the dilution tunnel using both the filter method specified in ASTM 2515-11 and with a Thermo model 1405-D using NYSERDA Standard Operation Procedures for use of a Thermo Scientific 1405-D TEOM™ in a dilution tunnel with wood-fired stoves, hydronic heaters, and furnaces.
- 5.4. *Operation.* Appliance operation is conducted on a cold-to-hot test cycle, meaning that the appliance starts the first test run at room temperature and ends with the appliance in a heated state. The second and third test runs may start at a slightly warmer temperature if the appliance is designed to retain the heat from the first run. The appliance is operated at operational phases representing start-up emissions, high heat demand, low heat demand, changing air conditions, and refueling. To complete the certification test, the appliance shall complete three valid test runs for manually air-controlled appliances and four test runs for appliances with automatic air controls. Overall results average all valid test runs to determine the test results.
- 5.5. *Repeatability.*
  - 5.5.1. For manual air control stoves, a series of at least three test runs are conducted for certification or audit purposes.
  - 5.5.2. For appliances with automatic air controls, a series of at least three test runs using automatic controls and a single run completed with the heater and controls disconnected from any external power source shall be conducted for certification and audit purposes.

## **6. *Significance and Use***

- 6.1. The measurement of particulate matter emission rates is an important test method widely used in the practice of air pollution control.
  - 6.1.1. These measurements, when approved by state or federal agencies, are often required for the purpose of determining compliance with regulations and statutes.

- 6.1.2. The measurements made before and after design modifications are necessary to demonstrate the effectiveness of design changes in reducing emissions and make this standard an important tool in manufacturers' research and development programs.
- 6.2. Measurement of heating efficiency provides a uniform basis for comparison of product performance that is useful to the consumer. It is also required to relate emissions produced to the useful heat production.

## **7. Safety**

- 7.1. Disclaimer. This method may involve hazardous materials, operations, and equipment. This test method may not address all the safety problems associated with its use. It is the responsibility of the user of this test method to establish appropriate safety and health practices and to determine the applicability of regulatory limitations prior to performing this test method.
- 7.2. These tests involve combustion of wood, which releases substantial amounts of heat and combustion products. The heating system also produces large quantities of very hot water and the potential for steam production and system pressurization. Appropriate precautions must be taken to protect personnel from burn hazards and respiration of products of combustion. Exposure of personnel to unsafe levels of carbon monoxide must be avoided, and the use of continuous ambient carbon monoxide monitoring is strongly recommended.

## **8. Equipment and Supplies.** The following items are required for sample collection:

- 8.1. Anemometer. A device capable of detecting air velocities less than 0.10 m/sec (20 ft/min), for measuring air velocities near the test appliance.
- 8.2. *Appliance Flue.*
  - 8.2.1. Steel flue pipe extending to  $8.5 \pm 0.5$  ft. ( $2.6 \pm 0.15$  m) above the top of the platform scale, and above this level, insulated solid pack type chimney extending to  $15 \pm 1$  ft. ( $4.6 \pm 0.3$  m) above the platform scale, and of the size specified by the appliance manufacturer. This applies to both freestanding and inserts type appliances.
  - 8.2.2. Other chimney types (e.g., solid pack insulated pipe) may be used in place of the steel flue pipe if the appliance manufacturer's written appliance specifications require such chimney for home installation (e.g., zero clearance appliance inserts). Such alternative chimney or flue pipe must remain and be sealed with the appliance following the certification test. This applies only to appliances requiring a specialized chimney.

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- 8.2.3. Solid pack insulated chimneys shall have a minimum of 2.5 cm (1 in.) solid-pack insulating material surrounding the entire flue and possess a label demonstrating conformance to U.L. 103 (incorporated by reference—see §60.17).
- 8.3. Appliance Platform Scale and Monitor. For monitoring of fuel load weight change. The scale shall be capable of measuring weight to within 0.01 kg (0.02 lb.) and calibrated to NIST traceable standards at least annually.
- 8.4. Barometer. Aneroid or another barometer capable of measuring atmospheric pressure to within 0.1 in. Hg ( 2.5 mm Hg) with an uncertainty of +/- 0.05 in. Hg (+/- 1.27 mm Hg).
- 8.5. CO Gas Analyzer. A continuous nondispersive infrared (NDIR) analyzer, or equivalent, that measures the CO concentration in the flue gas stream. A dual-range analyzer is acceptable. These analyzers are often equipped with automated range-switching capability, so that when readings exceed the full-scale of the low measurement range, they are recorded on the high range. As an alternative to using a dual-range analyzer, you may use two segments of a single, large measurement scale to serve as the low and high ranges. In all cases, when two ranges are used, you must quality-assure both ranges using the proper sets of calibration gases.
- 8.6. CO<sub>2</sub> Gas Analyzer. A continuous NDIR analyzer, or equivalent, that measures the CO<sub>2</sub> concentration in the flue gas stream. Dual-range analyzer is acceptable. These analyzers are often equipped with automated range-switching capability, so that when readings exceed the full-scale of the low measurement range, they are recorded on the high range. As an alternative to using a dual-range analyzer, you may use two segments of a single, large measurement scale to serve as the low and high ranges. In all cases, when two ranges are used, you must quality-assure both ranges using the proper sets of calibration gases.
- 8.7. Dilution Tunnel must meet the requirements of ASTM E2515-11, clauses 6.1.6 and 9.2.
- 8.8. Dilution Tunnel temperature and relative humidity measurement. A probe with analog or digital data outputs capable of measuring tunnel temperature to within 0.5 °C (1.0 °F) and tunnel RH to within 2% between 5 and 95% RH at maximum tunnel temperatures, such as the Omega HX85A or equivalent. The probe should also report calculated dewpoint.
- 8.9. Draft Gauge. Electromanometer or other devices for the determination of flue draft or static pressure readable to within 0.005 in. H<sub>2</sub>O (1.2 Pa)
- 8.10. Flue Gas Sample Probe. Stainless steel or other approved material of sufficient length to measure the sample point in stack.
- 8.11. Flue Gas Particulate Filters. The filter(s) must be made of material that is non-reactive to the gas being sampled and placed upstream of the gas analyzer.

- 8.12. Flue Gas Sample Line. The sample line from the probe to the conditioning system/sample pump should be made of Teflon or other material that does not adsorb or otherwise alter the sample gas.
- 8.13. Flue Gas Calibration Line. The sample line from the flue gas probe to the calibration gas shall be made of Teflon or other material that does not adsorb or otherwise alter the sample gas.
- 8.14. Flue Gas Conditioning Equipment. A condenser, dryer or other suitable system which removes moisture, condensable organic material and particulate continuously from the sample flue gas.
- 8.15. Flue Gas Sampling Pump. A leak-free pump is needed to pull the sample gas through the system at a flow rate sufficient to minimize the response time of the measurement system. The pump may be constructed of any material that is non- reactive to the gas being sampled.
- 8.16. Flue Gas Temperature Measurement. A type K thermocouple or equivalent located in the centroid of the stack located 8.0 +/- 0.5 ft (2.44 m +/- 150 mm) above the platform scale, capable of measuring with an accuracy of 4.0°F (2.2°C) or 0.75% of reading, whichever is greater.
- 8.17. Flue Gas Composition Measurement. A sample probe and continuous infrared analyzer or equivalent capable of measuring span of carbon monoxide (CO) and carbon dioxide (CO<sub>2</sub>) in the flue gas produced by the appliance tested. Continuous analyzers (or equivalent) shall have maximum zero and span drift, over a 24 h period, of 1% of full scale.
- 8.18. Fuel Scale. Balance capable of weighing the test fuel charge to within 0.02 kg (0.05 lb.) and calibrated to NIST traceable standards at least annually.
- 8.19. Humidity Gauge. Psychrometer or hygrometer for measuring room humidity to within +/- 4% from 25 to 95% RH.
- 8.20. Moisture Meter. Calibrated electrical resistance meter for measuring test fuel moisture to within 2 percent moisture content.
- 8.21. Surface Temperatures. Capable of measuring temperature to within 1.5 percent of expected absolute temperatures with an accuracy of 4.0°F (2.2°C) or 0.75% of reading, whichever is greater.
- 8.22. Test Facility Temperature Monitor. A thermistor, RTD, Type T-Special thermocouple, or other equivalent device, located centrally in a vertically oriented 150 mm (6 in.) long, 50 mm (2 in.) diameter pipe shield that is open at both ends, capable of measuring temperature to within 1°F of expected temperatures.
- 8.23. TEOM – Thermo Fisher Scientific TEOM model 1405-D (Thermo part # 1405D-ANF, excluding models 1405, 1405-DF, or 1405-F) to measure and report continuous particulate matter (PM) measurements in an ASTM 2515-11 dilution tunnel or equivalent dilution method, and operated according to the NYSERDA Dichot TEOM Standard Operating Procedures. For lab air PM

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measurements, Thermo Fisher Scientific TEOM model 1405 (Thermo part # 1405-ANF, excluding model 1405-F), operated according to the NYSERDA Dichot TEOM Standard Operating Procedures.

## **9. Calibration and Standardizations**

- 9.1. ASTM E2515-11. Perform all calibrations required by ASTM E2515-11.
- 9.2. Anemometer. Calibrate the anemometer as specified by the manufacturer's instructions before the first certification test every six months thereafter.
- 9.3. Appliance Platform Scale. Perform a multipoint calibration (at least five points spanning the operational range) of the platform scale before its initial use. The scale manufacturer's calibration results are sufficient for this purpose. Before each certification test, audit the scale with the wood heater in place by weighing at least one calibration weight (Class F) that corresponds to between 20 percent and 80 percent of the expected test fuel charge weight. If the scale cannot reproduce the value of the calibration weight within 0.0045 kg (0.01 lb.) or 1 percent of the expected test fuel charge weight, whichever is greater, recalibrate the scale before use with at least five calibration weights spanning the operational range of the scale.
- 9.4. Barometer. Calibrate using a reference pressure monitor calibrator before the first certification test and semiannually after.
- 9.5. Draft Gauge. Calibrate as per the manufacturer's instructions; a liquid manometer does not require calibration (but must be properly leveled, zeroed, and the system leak checked).
- 9.6. Humidity Gauge. Calibrate as per the manufacturer's instructions before the first certification test and annually thereafter.
- 9.7. Fuel Scale. Calibrate as described in 9.2.
- 9.8. Moisture Meter. Calibrate as per the manufacturer's instructions before the first certification test and semiannually thereafter.
- 9.9. Temperature Sensors. Calibrate using at least five points with an operating range within specification and in compliance with NIST Monograph 175. To be calibrated before the first certification test and semiannually thereafter.

## **10. Sampling, Test Specimens, and Test Appliances**

- 10.1. Particulate matter sampling shall follow ASTM except for the following modifications listed here.
  - 10.1.1. Liquid water should not be present anywhere in the sampling system for a valid sample. The presence of condensed water anywhere in the sampling system invalidates the test run. All data from all invalid test runs shall be included in the report. The reviewing authority shall make a final determination on invalidated runs. Data from any invalidated test run shall



not be used to calculate results. If the testing agency believes a run has been invalidated, the test run shall be repeated.

10.1.2. Dilution tunnel temperature and relative humidity shall be measured electronically and logged at one-minute intervals near the sample probe to calculate dewpoint.

10.1.3. The following section details test conditions that shall be maintained for a valid test run. A valid test shall have no more than two individual deviations from the conditions below to remain a valid run. An example of an individual deviation is a single, ten-minute rolling average where the dilution tunnel exceeded temperature thresholds. Another ten-minute period exceeding the tunnel temperature requirement shall be considered a second deviation.

10.1.3.1. Tunnel flow rate must be sufficient to maintain tunnel temperature below 125 °F (maximum) and 113 °F on a 10-minute rolling average, excluding periods when the appliance door is open. Two exceedances are allowed of the 10-minute rolling average points in each test run. The tunnel relative humidity must be below 90% humidity at 80 °F (ASTM E2515-11 minimum filter temperature as required in this alternative test method) based on 1-minute data excluding periods when the appliance door is open.

10.1.3.1.1. Optionally, real-time tunnel dewpoint temperature measurements recorded at a minimum rate of one reading per minute can be made to override the maximum tunnel temperature requirement (125 °F maximum and 113 °F on a 10-minute rolling average). One-minute dewpoint temperature measurements in the dilution tunnel must be below the one-minute ASTM E2515-11 filter temperature measurement. If there is an exceedance of the tunnel dewpoint temperature above the ASTM E2515-11 filter temperature, then the test run is invalid and must be repeated.

10.1.3.1.2. As an alternative, the tunnel relative humidity may be measured using a psychrometer to measure the wet bulb temperature in the dilution tunnel. These measurements must be taken and recorded, at a minimum of every 2 minutes. ASTM E0377-15 Standard Test Method for Measuring Humidity with a Psychrometer (the Measurement of Wet- and Dry Bulb Temperatures) may be followed for these purposes.

10.1.3.2. A minimum average tunnel flow of 600 DSCFM is required. Higher tunnel flows may be required to meet the parameters of Section 10.1.3. With respect to the last sentence in ASTM 2515-11 Section 9.2.2, tests are excluded from the following requirement, *“The maximum tunnel flow rate shall not exceed five times the minimum flow rate determined as shown in 9.2.4.”*

10.1.3.3. All exceedances must be reported in the test anomalies section, even if deviations are within the test method tolerances.

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10.1.3.4. ASTM 2515-11 filter trains 1 and 2 must meet a precision requirement of 7.5% or lower, regardless of g/kg comparison.

10.1.3.5. Use rounding requirements specified in Section 13.2 of this test method.

10.1.3.6. Use processes specified in Section 10.2.

10.2. Sample Collection. The following are required for sample collection:

10.2.1. Teflon coated glass fiber filters as supplied by the TEOM manufacturer for use with the TEOM model 1405-D. These are Pallflex Emfab (TX40) with an exposed diameter of 13 mm, without organic binder, exhibiting at least 99.95 percent efficiency.

10.2.2. *Test Specimens.* Appliances shall be supplied as complete systems, including all controls and accessories necessary for installation at the test facility. A full set of specifications, designs, and assembly drawings shall be provided when the product is placed under certification of a third-party agency.

10.2.3. Particulate Matter Sampling uses two ASTM 2515-11 sampling trains and a TEOM to obtain real-time data. TEOM data shall be used to report the first-hour emission rate, to provide data for phased emissions, and real-time data reporting requirements. All measurements shall run through the entirety of the test to obtain full run data.

10.2.3.1. Train 1 and 2 shall provide dual sampling trains that shall measure PM emissions from run start to run completion. Trains 1 and 2 must meet a precision requirement of 7.5% or lower per ASTM 2515-11, regardless of g/kg comparison.

10.2.3.1.1. Proportional rate variation shall meet ASTM 2515-11 requirements for all phases.

10.2.3.1.2. Filter conditions must be monitored, and filter changes are required to avoid filter clogging.

10.2.3.2. TEOM data shall be collected at 1-minute intervals for reporting. TEOM operation shall follow the procedures listed on the most recent NYSERDA Standard Operation Procedures for Thermo Scientific 1405-D TEOM for use in a dilution tunnel, found in the EPA docket.

10.3. *Flue Gas Measurement System Setup and Calibration*

10.3.1. Install Flue Gas Sample probe 2 in. (50 mm) above the flue gas temperature measurement in the stack.

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10.3.2. Setup Flue Gas Measurement System with an appropriate sample flow rate to reach 90% of their final reading within 30 seconds when beginning at ambient levels and responding to a high-level calibration gas.

10.3.3. Flue Gas Measurement System shall record CO and CO<sub>2</sub> concentrations at one-minute intervals.

#### 10.4. Preparation of Apparatus

10.4.1. Wood Heater Installation for Certification Testing. Assemble the wood heater appliance and parts in conformance with the manufacturer's provided User Guide. These instructions must match all instructions materials developed by the manufacturer and/or their distributors. Place the wood heater on the platform scale and connect the chimney to the appliance. Clean the flue with an appropriately sized, wire chimney brush before initiating Run 1 of the certification test. Test documentation should include the date and time of flue cleaning.

#### 10.4.2. Wood Heater Temperature Monitors.

10.4.2.1. For catalyst-equipped wood heaters, locate a temperature monitor (optional) about 25 mm (1 in.) upstream of the catalyst at the centroid of the catalyst face area, and locate a temperature monitor (mandatory) that will indicate the catalyst exhaust temperature. This temperature monitor is centrally located within 25 mm (1 in.) downstream at the centroid of the catalyst face area. Record these locations.

10.4.2.2. Locate wood heater surface temperature monitors at five locations on the wood heater firebox exterior surface. Position the temperature monitors centrally on the top surface, centrally on two sidewall surfaces, and centrally on the bottom and back surfaces. Position the monitor sensing tip on the exterior of the firebox surface inside of any heat shield, room air circulation walls, or other wall or shield separated from the firebox exterior surface. Surface temperature locations for unusual design shapes (e.g., spherical, etc.) shall be positioned so that there are four surface temperature monitors positioned to average stove temperature across various points on the appliance.

#### 10.5. Conditioning

10.5.1. Wood Heater Aging Prior to Certification Testing. A wood heater of any type shall be aged at least 50 hours before initiating a certification test. The aging procedure shall be conducted by the manufacturer or a manufacturer's agent prior to sending the appliance to the testing laboratory.

During aging, the appliance shall be operated at a variety of burn rates. Documentation for wood heating aging must be included in the test report to include data on individual hourly burn rates.

10.5.1.1. The manufacturer shall supply wood heater aging information for the final test reports. Aging data that shall be reported include all fuel parameters (species, moisture content, load weights, piece amounts, and size), air settings used, time spent in each air setting phase, amount of fuel burned, and appliance burn rates.

10.5.1.2. If an appliance uses a catalytic combustor, it must be engaged according to the manufacturer's instructions and operate with the catalyst engaged for at least 50 hours during the break-in period. In addition to the reporting requirements listed in 8.1.1, catalytic appliances shall also report hourly catalyst exit temperature data to include the dates and hours of operation.

## **11. Procedure**

11.1. Test Facility Conditions. The test facility shall meet the following requirements during testing.

11.1.1. The test facility temperature shall be maintained between 65 and 87 °F (13 and 31 °C) during each test run.

11.1.2. The flue shall discharge into the same space or into a space freely communicating with the test facility. Any hood or similar device used to vent combustion products shall not induce a draft greater than 0.005 in. H<sub>2</sub>O (1.25 Pa ) on the wood heater measured when the wood heater is not operating.

11.1.3. For test facilities with artificially induced barometric pressures (e.g., pressurized chambers), the barometric pressure in the test facility shall not exceed 30.5 in. Hg (775 mm Hg ) during any test run.

11.1.4. Locate the test facility temperature monitor on the horizontal plane that includes the primary air intake opening for the wood heater. Locate the temperature monitor 3 to 6 ft. (0.9 to 1.8 m) from the front of the wood heater in the 90° sector in front of the wood heater.

11.1.5. Use an anemometer, or equivalent device, to measure the air velocity. Measure and record the room air velocity before the ignition period in L1 Startup and once immediately following the test run completion. Air velocities within 0.6 m (2 ft.) of the test appliance and exhaust system shall be less than 0.25 m/sec (50 ft./min) without fire in the unit.

11.1.6. Measure and record the test facility's ambient relative humidity, barometric pressure, and temperature before and after each test run using equipment as specified in Section 6.

11.2. Wood Heater Firebox Volume.

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- 11.2.1. Determine the firebox volume using the definitions for height, width, and length. Volume adjustments due to the presence of firebrick and other permanent fixtures may be necessary. All adjustments shall be detailed in the test report and shall conform to the definition of usable firebox volume contained in this test method. Measurements shall include areas adjacent to and above a baffle.
- 11.2.2. If a manufacturer deems certain areas of the firebox as unusable for fuel load calculations, written documentation stating the basis for that claim and supporting photographic image(s) must be provided and approved by the regulatory authority prior to conducting the certification test. If approval is not granted prior to the test, then the test may be invalidated if the reviewing agency determines the firebox volume is inaccurate.
- 11.3. Test Fuel. The test fuel shall conform to the following requirements and meet specifications as required by the fuel loading calculator:
  - 11.3.1. Fuel Species. Untreated, air-dried, cordwood fuel.
    - 11.3.1.1. Allowable species: maple (big leaf, red, silver), Douglas fir, or birch (black, white, yellow, paper).
    - 11.3.1.2. Kiln-dried fuel is not permitted. Kiln-dried fuel includes drying at elevated air temperature settings above 90 °F.
    - 11.3.1.3. Fuel shall be free of decay, fungus, or other contaminants.
  - 11.3.2. Fuel Moisture.
    - 11.3.2.1. Determine fuel moisture for each fuel piece by averaging five moisture meter readings, one from each of three sides, and each of the ends in the middle, measured parallel to the wood grain.
    - 11.3.2.2. The test fuel load shall have an average moisture content from 19% to 25%, dry basis.
    - 11.3.2.3. Individual fuel pieces shall have an average moisture content of 19% to 25% dry basis.
    - 11.3.2.4. The addition of moisture to previously dried wood is not allowed.
    - 11.3.2.5. It is recommended that the test fuel be stored in a temperature and humidity-controlled room.

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11.3.2.6. Fuel moisture shall be measured within 24 hours of using the fuel for the test and shall be bagged or stored in a humidity-controlled environment until 2 hours prior to testing. A humidity-controlled environment is one where fuel is not subject to conditions that would remove moisture from the fuel, such as fans or a heating source, and maintain relative humidity levels greater than 75%.

11.3.3. Fuel Temperature. The test fuel shall be at the test facility temperature of 55 to 87 °F (13 to 30.6 °C)  $\pm$  2 °F.

11.3.4. Fuel Dimensions. The dimensions of each test fuel piece shall conform to definitions specified by the protocols using the fuel load calculator.

11.3.4.1. Fuel length:

11.3.4.1.1. The length of the fuel pieces will be determined by the fuel load calculator.

11.3.4.1.2. Measurements shall be taken, and the length of the test fuel will be determined by entering the firebox dimensions.

11.3.4.1.3. Piece length specified by the fuel calculator shall be communicated and specified for use in the owner's manual and website. Piece size shall be within 0.5" of the log length determined by the calculator, as measured on the shortest length measurement.

11.3.5. Fuel Loading Direction

11.3.5.1. Fuel loading direction shall be determined by the firebox measurement.

11.3.5.1.1. Stoves with a depth measurement greater than two inches from the width measurement shall be tested with the fuel in a north-south configuration and may not test with fuel in an east-west or crisscross configuration in any load other than Load 1 and Load 2.

11.3.5.1.2. Stoves with a width measurement greater than the depth measurement or a width measurement within two inches of the depth measurement shall be tested with the fuel loaded in an east-west configuration and may not test with fuel in a north/south configuration or crisscross configuration in any load other than Load 1.

11.3.6. Fuel piece weight for each phase of the protocol shall be determined by the fuel load calculator.

11.3.6.1. Kindling – shall be:

11.3.6.1.1. Pieces of wood less than or equal to 1” in diameter.

11.3.6.1.2. No bark requirements for kindling fuel.

11.3.6.1.3. Fuel species may be any species allowed in 7.2.1.1.

11.3.6.1.4. No moisture requirements.

11.3.6.1.5. Length of kindling shall be the fuel length specified by the fuel load calculator.

11.3.6.1.6. Kindling fuel shall conform to the rule that 7 to 10 pieces of kindling equal 1 pound of kindling fuel (+/- 5%).

11.3.6.2. Trapezoidal pieces. The top of any trapezoidal-shaped piece may not be greater in dimension than 70% of the base dimension of the trapezoid and must conform to the piece limits specifications.

11.3.6.3. Starter fuel: pieces of cordwood shall be used during the startup phase. Individual piece weight for starter fuel shall be determined by the fuel load calculator. Each piece shall be triangular, irregular, or circular in cross-section. Square-like or rectangle-like pieces shall not be used (see Figure 1). Pieces that have squared cross sections shall be split to represent the typical triangle nature of wood (see Figure 3). Trapezoidal pieces must be minimized to the extent possible, and fuel load pieces shall be composed to include different shapes of wood if using any trapezoidal pieces. .

11.3.6.4. Small fuel pieces: smaller pieces of cordwood by weight and pre-defined length, as defined by the fuel load calculator. Square-like or rectangle-like cross sections pieces shall not be used (see Figure 1). Pieces that have square cross-sections shall be split to represent the typical triangle nature of wood (see Figure 3). Trapezoidal pieces must be minimized to the extent possible. No more than two (2) small fuel pieces can be trapezoidal in shape (Figure 2) per fuel load.

11.3.6.5. Large fuel pieces: larger pieces of cordwood, by weight and pre-defined length, as defined by the fuel load calculator. Each piece shall be triangular, irregular, or circular in cross-section. Square-like or rectangle-like cross section pieces shall not be used (see Figure 1). Pieces that have square cross-sections shall be split to represent the typical triangle nature of wood (see Figure 3). Trapezoidal pieces must be minimized

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to the extent possible. No more than one (1) large fuel piece can be trapezoidal in shape (Figure 2) per fuel load.

Figure 1. Schematic of unacceptable cross-sectional profiles



Figure 2. Schematic of undesirable and limited use shapes



Figure 3. Schematics of acceptable cross-sectional profiles



#### 11.4. Sampling Equipment.

11.4.1. Prepare the tunnel and lab air PM sampling equipment as defined by the NYSERDA Standard Operation Procedures for use of a Thermo Scientific 1405-D TEOM™ in a dilution tunnel with wood-fired stoves, hydronic heaters, and furnaces.

11.4.2. Prepare all other equipment as defined by method EPA Method 1, 2, 3, 4, and ASTM 2515-11, other than deviations from ASTM 2515-11 that are specified in this test method.

#### 11.5. Manufacturer participation in certification testing.

11.5.1. A representative of the manufacturer may observe testing but may not provide instructions to the certification lab, in any form, with testing staff or equipment once the certification tests begin. The names of testing witnesses cannot be withheld as confidential business information (CBI). All correspondence between the manufacturer and lab, written or verbal, must be included in the test report.

#### 11.6. Test Run Procedure.



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- 11.6.1. Before each test series, the firebox shall be vacuumed. Testing shall begin without any ash or other materials in the appliance.
- 11.6.2. Before initiating the compliance test series, clean the flue and dilution tunnel with an appropriately sized wire chimney brush before each certification test. Test documentation should include the date and time of flue cleaning.
- 11.6.3. Record fuel weight data, temperature measurements, and gas concentrations at 1-minute intervals.
- 11.6.4. Wood Heater Operation and Adjustments. Record all adjustments made to the air supply controls, adjustments to and additions or subtractions of fuel, and any other changes to wood heater operations that occur during the test period.
- 11.6.5. Appliance operation –
  - 11.6.5.1. Bypass operation for all appliances shall follow operational instructions contained in the appliance owner's manual.
  - 11.6.5.2. For appliances that can be sold with blowers, test runs must be conducted with automatic blowers turned on at the highest setting for all test runs.
- 11.6.6. The weight of fuel remaining at the end of the test run is determined as the difference between the weight of the wood heater with the remaining coals and fuel and the weight after loading the fuel charge. The starting weight is the tare weight of the cleaned, dry wood heater.
- 11.6.7. Run Documentations. Tests shall conform to one of the options listed below. Failure to comply with one of the options will result in an invalid test run.
  - 11.6.7.1. All runs shall be video recorded in their entirety. The video shall be of sufficient quality to determine fuel characteristics, fuel loading procedures, and firebox conditions during any testing or aging conducted by the test lab. The testing lab shall have the capacity to allow appropriate agencies the opportunity to remotely witness the test.
  - 11.6.7.2. All active periods, as defined by this test method, shall be video recorded and inactive periods, if not video recorded in real time, shall be video recorded at no more than 1-minute intervals.
- 11.6.8. *L1: Start-up Phase*

11.6.8.1. L1 Appliance requirements.

11.6.8.1.1. Stove temperature: internal and external stove temperature must not be greater than the ambient temperature  $\pm 2^{\circ}\text{F}$  ( $1.1^{\circ}\text{C}$ ) for Run 1. There is no stove starting temperature requirement for Runs 2 and 3 except in the case of a failed first run. In this case, if Run 1 is invalid or incomplete, the stove must meet Run 1 condition for at least one valid run. Temperature measurements for the external and internal temperatures shall be taken within 15 minutes before starting the test and shall be reported in the test report.

11.6.8.1.2. Tare the appliance scale before starting the test. Record appliance scale weights at the start and end of L1 phase.

11.6.8.2. L1 Fuel requirements.

11.6.8.2.1. L1 Fuel type – during the startup phase, newspaper (optional up to six full sheets of traditional newspaper size), kindling, and starter fuel pieces are used. No other additions are allowed.

11.6.8.2.2. L1 Loading density

11.6.8.2.2.1. Kindling loading density: 1 lb. per cubic foot for dry kindling,  $\pm 5\%$ . The fuel load calculator determines the amount of kindling that can be used.

11.6.8.2.2.2. Starter Fuel loading density: 3 lb. per cubic foot,  $\pm 5\%$ . The fuel load calculator will determine the minimum piece weight that can be used as starter fuel.

11.6.8.3. L1 Fuel loading structure: The loading structure of the fire shall be a bottom-up configuration with newspaper on the bottom, kindling on top of the paper, and starter fuel on top of the kindling. Kindling and starter fuel shall be loaded in a crisscross configuration.

11.6.8.4. L1 Operational parameters.

11.6.8.4.1. All kindling, starter fuel, and newspaper must be in the firebox for light off.

11.6.8.4.2. Settings

11.6.8.4.2.1. Manual appliances: All air settings are fully open.

11.6.8.4.2.2. Automatically controlled appliances: settings used to achieve maximum heat output. Air control settings shall not be modified setting, and the appliance shall operate as dictated by the automatic controls.

11.6.8.4.3. Light the fire with a torch for a period of no more than 30 seconds.

11.6.8.4.4. Immediately after lighting the fire, the appliance door shall be moved to a cracked open position. Cracked open position is defined as opening no more than one inch. The appliance door shall be closed within 5 minutes after ignition.

11.6.8.5. L1 Fuel Adjustments: up to three fuel adjustments are allowed in the startup phase. The door may be open for 30 seconds during each fuel adjustment.

11.6.8.6. L1 End of Phase – the end of the startup phase is defined by the weight specified by the fuel load calculator.

11.6.8.7. L1 Documentation – Video of the test to clearly show appliance settings, fuel charge placement while loading, changes in appliance settings, coalbed, and fire when the door is closed sufficient to determine fueling positioning, coal bed conditions, appliance operation, and fuel charge combustion conditions. Photo of the fuel charge.

11.6.9. L2: *High-fire Phase* – the high-fire phase commences immediately after the startup phase ends.

11.6.9.1. L2 Appliance Requirements.

11.6.9.1.1. Record the weight of the stove prior to loading the L2 fuel charge, the weight of the fuel charge prior to loading, and the scale weight after loading the L2 fuel charge.

11.6.9.2. L2 Fuel requirements.

11.6.9.2.1. L2 piece size – during the high-fire phase, small cordwood pieces by weight, as defined by the fuel load calculator, are used.

11.6.9.2.2. L2 loading density: 7 lb. per cubic foot, +/- 5%. The fuel load calculator will define the total load weight and the range of allowable piece sizes by weight.

11.6.9.3. L2 Operational parameters:

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11.6.9.3.1. Door opening: Open the door upon completion of the startup phase and load the L2 fuel load within 60 seconds. Once the fuel has been loaded, the appliance doors shall be closed immediately.

11.6.9.3.2. Air settings

11.6.9.3.2.1. Manually controlled appliances. During the start of the phase air settings shall be fully open to achieve maximum heat output. When 50% of the L2 fuel load mass has been consumed, the air settings shall be moved to the lowest settings.

11.6.9.3.2.2. Automatically controlled appliances: At the start of the phase settings shall be set at those used to achieve maximum heat output. When 50% of the L2 fuel load mass has been consumed, the control systems shall be moved to the control settings to achieve the lowest burn rate. Air control settings shall not be modified after moving to lowest heat output setting, and the appliance shall operate as dictated by the automatic controls.

11.6.9.4. L2 Fuel Adjustments.

11.6.9.4.1. One fuel adjustment may be made during the high-fire phase prior to moving the primary air control(s) to their lowest setting. The fuel adjustment shall optimize fuel placement for burn conditions. The door shall remain open for 30 seconds for fuel adjustments.

11.6.9.4.2. Additional fuel adjustments shall be made if there is a five-minute period without a weight change of 0.10 pounds at any point during the high-fire phase.

11.6.9.4.3. If there is a five-minute period without a weight change (0.10 lb) at any point during the high-fire phase, the appliance door may be opened for 30 seconds for fuel adjustments.

11.6.9.4.4. All fuel adjustments must be documented in the test report notes and summary.

11.6.9.5. End of L2 Phase –The high-fire phase ends when the scale indicates that 90% of the high-fire fuel mass has been consumed.

11.6.9.6. L2 Documentation – Video of the test during active periods to clearly show appliance settings, fuel charge placement while loading, changes in appliance settings,

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coal-bed, and fire when the door is closed sufficient to determine fuel positioning, coal bed conditions, appliance operation, and fuel charge combustion conditions.  
Photo of the fuel charge prior to loading.

11.6.10. *L3: Maintenance-fire Phase* – the L3 maintenance-fire phase commences immediately after the L2 high-fire phase ends.

11.6.10.1. L3 Appliance Requirements.

11.6.10.1.1. Record the weight of the stove prior to loading the maintenance-fire fuel charge, the weight of the fuel charge prior to loading, and the scale weight after loading the maintenance-fire fuel charge.

11.6.10.2. L3 Fuel Requirements.

11.6.10.2.1. Fuel type – during the L3 phase, large cordwood pieces are used. The fuel load calculator will define the total load weight and the range of allowable piece sizes by weight.

11.6.10.2.2. L3 Fuel loading structure: fuel shall be loaded in the direction specified by the fueling calculator.

11.6.10.2.3. L3 loading density: 5 lb. per cubic foot, +/- 5%. The fuel load calculator will define the total load weight and the range of allowable piece sizes by weight.

11.6.10.3. L3 Operational Parameters:

11.6.10.3.1. Open door upon completion of the L2 phase and load the maintenance-fire fuel charge.

11.6.10.3.2. Air controls

11.6.10.3.2.1. Manually controlled air settings: shall be placed in the fully open position for the first five minutes of the phase, and then returned to the low air setting.

11.6.10.3.2.2. Automatically controlled air settings: shall be placed in the maximum heat output setting for the first five minutes and then shifted to the lowest heat output setting. Air control settings shall not be modified after moving to the lowest heat output setting, and the appliance shall operate as dictated by the automatic controls.

11.6.10.3.3. L3 Load - L3 fuel loaded within 30 seconds of the door opening. Close the loading door immediately.

11.6.10.4. L3 Fuel Adjustments: Fuel Adjustments: If there is a ten-minute period without weight change (0.10 lb.) at any point during the L3-fire phase, a fuel adjustment shall be made to increase the burn rate. The door may be open for up to 30 seconds for fuel adjustments. Only two fuel adjustments may be made during this phase. If after the second fuel adjustment, another ten-minute period of no weight change (0.10 lb.) occurs, the run ends, and it is a failed test run.

11.6.10.5. L3 End of Phase – The L3-fire phase ends when the scale indicates that 90% of the maintenance-fire fuel mass has been consumed.

11.6.10.6. L3 Documentation – Video of the test to clearly show appliance settings, fuel charge placement while loading, changes in appliance settings, coal-bed, and fire when the door is closed sufficient to determine fueling positioning, coal bed conditions, appliance operation, and fuel charge combustion conditions. Photo of the fuel charge prior to loading.

11.6.11. *L4: Low burn rate phase* – L4 phase commences immediately after the L3-fire ends.

11.6.11.1. L4 Appliance Requirements.

11.6.11.1.1. Record the weight of the stove prior to loading the L4-fire fuel charge, the load of the fuel charge prior to loading, and the scale weight after loading the overnight-fire fuel charge. Alternatively, if the scale was zeroed prior to starting the test, record the scale weight before and after loading the overnight-fire fuel charge.

11.6.11.2. L4 Fuel requirements

11.6.11.2.1. L4 fuel type –a mix of small and large cordwood pieces are used. At least 50% of the fuel charge load, by the number of pieces, must be large pieces.

11.6.11.2.2. L4 Loading structure: fuel will be loaded in one direction.

11.6.11.2.3. L4 loading density: The fuel load calculator specifies a load volume of 12 lb./ft.<sup>3</sup> +/-5%. Fuel shall be loaded in a manner to maximize the number of pieces that will fit in the stove without using force. If all pieces cannot be loaded, the stove shall be loaded to the maximum extent possible.

11.6.11.3. L4 Operational Parameters:

11.6.11.3.1. Open the loading door upon completion of the L3 maintenance-fire phase.

11.6.11.3.2. Load the L4 fuel charge within two minutes (120 seconds).

11.6.11.3.3. Keep the door in cracked position (*open up to 1 inch as measured from the opposite of the hinge - largest opening one inch*) for up to five minutes from the beginning of the L4 phase.

11.6.11.3.4. Air controls

11.6.11.3.4.1. Manual air settings: may be placed in the fully open position for the first ten minutes of the phase, and then returned to the low air setting.

11.6.11.3.4.2. Automatically controlled air settings: may be placed in the maximum heat output setting for the first ten minutes and then shifted to the lowest heat output setting. Air control settings shall not be modified after moving to the lowest heat output setting, and the appliance shall operate as dictated by the automatic controls.

11.6.11.4. L4 Fuel Adjustments.

11.6.11.4.1. Unlimited fuel adjustments are allowed within the first ten minutes of the phase. The door may be open for up to 30 seconds for fuel adjustments.

11.6.11.4.2. If there is a ten-minute period without weight change (0.10 lb.) during the first hour of the L4- phase, a fuel adjustment shall be made. The door may be open for up to 30 seconds for fuel adjustments.

11.6.11.4.3. Only two fuel adjustments may be made during the first hour. If after the second fuel adjustment, another period of no weight change (0.10 lb.) is observed, the run ends, and it is a failed test run.

11.6.11.4.4. No fuel adjustments are allowed after the first hour of the phase.

11.6.11.4.5. If there is no weight change (0.10 lb) for a consecutive period of 20 minutes at any point after the first hour of the phase, the test run ends and is an incomplete test run.

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- 11.6.11.5. L4 End of Phase – The L4 phase shall end when the scale indicates that 100% of the total L4 fuel mass has been consumed. If the fuel load does not burn to 90%, it is a failed test run.
- 11.6.11.6. L4 Documentation - Video of the test during active periods to clearly show appliance settings, fuel charge placement while loading, changes in appliance settings, coalbed, and fire when the door is closed sufficient to determine fuel positioning, coal bed conditions, appliance operation, and fuel charge combustion conditions. Photo of the fuel charge prior to loading.
- 11.7. Test Run. A complete test run requires the completion of all four burn phases and loads. For any appliance that will not accommodate the loading arrangement specified in this test method, the test facility personnel shall contact the Agency Administrator to obtain written approval for an alternative loading arrangement.
- 11.8. Test Run Requirements. The following describes the required parameters for each test run. Each emission test run shall include all operational and fueling protocol phases in order as described.
  - 11.8.1. Consecutive Test Runs. Consecutive test runs may be conducted, provided that the following requirements are met:
    - 11.8.1.1. Run 1 – The appliance shall have an internal and external starting temperature within +/- 2 °F (1.1°C) of ambient laboratory temperature at the beginning of Run 1.
    - 11.8.1.2. Run 2 – The second test run may commence 24 hours after the start of Run 1. Stove coals and ash can remain in the stove until 1 hour before conducting Run 2. All coals and ash shall be removed at least one hour prior to commencing Run 2.
    - 11.8.1.3. Run 3 – The third test run may commence 24 hours after the start of Run 2. Stove coals and ash may remain in the stove until 1 hour before conducting Run 3. All coals and ash shall be removed at least one hour prior to commencing Run 2.
- 11.9. *Failure to Operate at All Test Conditions*
  - 11.9.1. If the appliance fails two runs due to incomplete or invalid test runs, it shall be determined that the appliance has failed the certification test and requires a modification to appliance design. All data for incomplete runs shall be reported. Incomplete failed test runs are defined as the following:
    - 11.9.1.1. If a wood heater fails to complete all four phases of the test run, the run shall be considered a failed test run.



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- 11.9.1.2. If there is no weight change, defined as 0.10 lb., for a consecutive period of 20 minutes at any point during the test, the unit has failed the test run.
- 11.9.2. If a test run violates any of the test method parameters, the run is invalid.
- 11.9.3. If during certification testing a critical component of the stove is damaged or breaks, the certification test will be stopped and considered invalid.
  - 11.9.3.1. If damage is noted during a test, repairs shall be made by the manufacturer (or by laboratory personnel with written direction from the manufacturer). If the repair involves components that would need aging, the appliance shall then undergo another round of wood heater aging as specified in section 10.6. These components may include but are not limited to catalyst elements, gaskets, and refractory components. The aging process is intended not only to 'cure' the stove but also to cycle parts that may fail with extended use. Alternate aging techniques may be approved by the administrator, depending on the nature of the failure, material, and critical nature.
- 11.10. Test Run Completion. Once three (four for appliances with automatic controls) valid runs have been completed, the testing is complete. No additional runs may be completed.
  - 11.10.1. *Additional Test Runs.*
    - 11.10.1.1. *Invalid/Incomplete Runs.* If there is an invalid run, another additional run may be attempted to complete the test series. If more than three test runs are conducted, the results from all valid test runs shall be used in calculating the average emission rate. The measurement data and results of all test runs shall be reported regardless of which values are used in calculating the emission rate.
    - 11.10.1.2. *No Power Mode for Automatically Controlled Appliances.* For appliances that can only be operated in an automatically controlled mode when power is supplied to the unit, the "no power mode" test run shall not be averaged into the overall test result, but the result from the "no power mode" test run shall be reported separately in the test report. For units where the operator has a choice to operate the appliance in automatic or manual mode, the "no power test" shall be included in the determining the reported results.
    - 11.10.1.3. *Data Elimination.* No test run data can be eliminated from the reporting requirements of this method.
    - 11.10.1.4. A maximum of five runs (six for appliances with automatic controls) attempts can be completed. If a wood heater cannot complete three valid runs after five (six for appliances with automatic controls) attempts, the appliance has failed the certification test.
  - 11.10.2. *Invalid Runs.* When a test run fails to meet one of the QA/QC criteria stipulated in the test method, the data are invalid, and the run must be repeated. Data for the invalidated test run

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must be included in the test report, but the data must not be used in the calculation of average emission values.

- 11.10.3. *Incomplete Runs*: When an appliance cannot successfully complete all operational elements of the protocol specified in Section 11.6.7 through 11.6.10, it is an incomplete run

#### 11.11. Auxiliary Wood Heater Equipment Operation.

- 11.11.1. All test runs should have the fan “ON” at the highest setting except for:

11.11.1.1. The duration of L1;

11.11.1.2. When the door is open in all loads (L1, L2, L3 and L4);

11.11.1.3. From the end of L3 to when the air control is set to the lowest position for L4.

- 11.11.2. An automatic blower can be left energized.

#### 11.12. PM Data Recording.

- 11.12.1. All TEOM data shall be collected and recorded at intervals of 1 minute. TEOM operation shall follow the procedures listed in NYSERDA Standard Operation Procedures for use of a Thermo Scientific 1405-D TEOM™ in a dilution tunnel with wood-fired stoves, hydronic heaters, and furnaces.

- 11.12.2. Tunnel and lab air PM TEOM Data shall be reported using the Excel data analysis spreadsheet templates that are part of the NYSERDA Standard Operation Procedures for Thermo 1405-D TEOM for use in a dilution tunnel. These data analysis spreadsheets shall be submitted as part of the test report.

- 11.12.3. Lab PM measurement – TEOM. A single channel TEOM is used to measure ambient lab air PM during the test, as configured in NYSERDA Standard Operation Procedures for use of a Thermo Scientific 1405-D TEOM™ in a dilution tunnel with wood-fired stoves, hydronic heaters, and furnaces. The sample flow shall be 3 LPM.

### 12. ***Quality Control Measures***

- 12.1. Dilution tunnel - Conduct sampling equipment leak check and calibration pre-and post-test.
- 12.2. TEOM – Flow and Leak checks are done before and after every test run per NYSERDA Standard Operation Procedures for use of a Thermo Scientific 1405-D TEOM™ in a dilution tunnel with wood-fired stoves, hydronic heaters, and furnaces. Additional quality control measures are included in the TEOM Operating Procedure.
- 12.3. Conduct all checks and calibrations per ASTM 2515-11.

### 13. ***Data Analysis and Calculations.***

Proportioning of emission factors and rates per phase according to Appendix A, variables shall have

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subscript added to determine the relevancy of phase, i.e.  $E_{T(P1)}$  indicates Total particulate emissions for Phase 1 and  $E_{g/hr(P2)}$  indicates emissions factor in grams per hour for Phase 2.

13.1. Emission Calculations. Particulate matter, carbon dioxide, and carbon monoxide shall be calculated using the following methodology and reported in grams per hour, grams per kilogram and pounds per million British Thermal Unit (BTU) heat output.

13.2. Rounding

13.2.1. All calculations shall be conducted using all decimal values provided by the instrumentation or recorded by the operator.

13.2.2. No truncation of data is acceptable until the final result has been calculated.

13.2.3. Only the final calculation of the PM emissions rate shall be rounded to three significant figures.

13.2.4. When rounding off a figure, the following procedure should be used. If the first digit to be discarded is less than five, the last digit retained should not be changed. When the first digit discarded is greater than five, or if it is a five followed by at least one digit other than zero, the last figure retained should be increased by one unit. When the first digit discarded is exactly five, followed only by zeros, the last digit retained should be rounded upward if it is an odd number, but no adjustment made if it is an even number.

13.3. TEOM data shall be reported as follows.

13.3.1. Emissions from each of the 4 phases of the test shall be reported as individual results in grams per hour, grams per kilogram, and lb/MMBtu (heat output). Calculations shall use Section 7 of the NYSERDA Standard Operation Procedures for use of a Thermo Scientific 1405-D TEOM™ in a dilution tunnel with wood-fired stoves, hydronic heaters, and furnaces.

13.3.2. Emissions from the entire test run in grams per hour, grams per kilogram, and lb/MMBtu (heat output) using the TEOM data.

13.4. PM Filter data: Emissions from the entire test run in grams per hour, grams per kilogram, and lb/MMBtu (heat output) using the ASTM 2515-11 filter data.

Nomenclature

BR – average dry fuel burn rate, lb/hour

$BR_{(x)}$  – Burn rate for specific phase,  $BR_{L1}$ ,  $BR_{L2}$ ,  $BR_{L3}$ ,  $BR_{L4}$

CO – Carbon Monoxide

CO<sub>2</sub> – Carbon Dioxide

BT = time of 90% of overnight load consumed – time of overnight loading

$C_{steel}$  – Specific heat of steel (0.1 Btu/ lb)

$E_T$  – Total particulate emissions for the full test run in grams  
 $E_{g/MJ}$  – PM emissions rate in grams per megajoule of heat output  
 $E_{g/kg}$  – PM emissions factor in grams per kilogram of dry fuel burned  
 $E_{g/hr}$  – PM emissions rate in grams per hour  
 HHV – Higher heating value of dry fuel (Btu/lb), measured with ASTM E711  
 $kJ/kgmol\ K$  - kilojoules per kilogram-mol Kelvin  
 $\%M_d$  - Fuel moisture content, dry basis, percent  
 $\%M_w$  - Average moisture in test fuel charge, wet basis, percent  
 PCTCO<sub>2</sub> – average CO<sub>2</sub> in the dry flue gas (%)  
 PPMco – average CO in the dry flue gas (ppm)  
 $Q_{out}$  – Total heat output in BTU's (megajoules)  
 $SC_i$  – Scale weight at specific time interval, lb.  
 $T_1$  – Surface Temperature 1 °F (°C)  
 $T_2$  – Surface Temperature 2 °F (°C)  
 $T_3$  – Surface Temperature 3 °F (°C)  
 $T_4$  – Surface Temperature 4 °F (°C)  
 $T_5$  – Surface Temperature 5 °F (°C)  
 $T_6$  - Flue Gas Temperature °F (°C)  
 $T_7$  – Room Temperature °F (°C)  
 $TS_{avg(i)}$  – Initial Average Surface Temperature °F (°C)  
 $TS_{avg(f)}$  – Final Average Surface Temperature °F (°C)  
 $W_{fuel}$  – Fuel charge weight in pounds (kg)  
 $\Theta$  – Total length of test run, hours  
 $\Theta_{(x)}$  – Total length of test run in hours per phase, X  
 $\%M_w = 100(\%M_d)/100 + \%M_d$

13.5. Average Wood Heater Surface Temperatures. Calculate the average of the wood heater surface temperatures at the start of the phase (L4) and end at the end of the test (L4) of the test run.

$$L4\ TS_{avg(i)} = (T_1 + T_2 + T_3 + T_4 + T_5) / 5$$

$$L4\ TS_{avg(f)} = (T_1 + T_2 + T_3 + T_4 + T_5) / 5$$

Average surface temperatures at the start and end of any phase can be determined by averaging all five sensors at the beginning and end of each phase.

$$L_x\ TS_{avg(i)} = (T_1 + T_2 + T_3 + T_4 + T_5) / 5$$

$$L_x\ TS_{avg(f)} = (T_1 + T_2 + T_3 + T_4 + T_5) / 5$$

13.6. Determine Burn Rates

$BR_{L1}$  = not applicable

$$BR_{L2} = (L2\ Initial\ SC_i - L2\ Final\ SC_i) / \Theta_{(L2)},\ lbs./hr$$

$$BR_{L3} = (L3\ Initial\ SC_i - L3\ Final\ SC_i) / \Theta_{(L3)},\ lbs./hr$$

$$BR_{L4} = (L4\ Initial\ SC_i - L4\ Final\ SC_i) / \Theta_{(L4)},\ lbs./hr$$

### 13.7. Emissions

13.7.1. Determine emission rates and emission factors, reporting results from both TEOM and filter data, as:

$$E_{g/MJ} = E_T / (Q_{out} \times 0.001055), \text{ g/MJ}$$

$$E_{g/kg} = E_T / (W_{fuel} / (1 + M\%M_d / 100)), \text{ g/dry kg}$$

$$E_{g/hr} = E_T / \Theta, \text{ g/hr}$$

### 13.8. CO Calculations

$$CO_{PPM} \text{ to } CO_{\%} = CO_{ppm} / 10000 \text{ ppm}/\% = CO_{\%}$$

$$CO_{2(ppm)} \text{ to } CO_{2(\%)} = CO_{2(ppm)} / 10000 \text{ ppm}/\% = CO_{2(\%)}$$

$$CO \text{ factor (g/kg dry wood)} = (CO_{\%} \times 1000 \text{ g/kg} \times 0.508 \times (28 \text{ g/mol} / 12 \text{ g/mol})) / CO_{2(\%)}$$

Where: 0.508 is the assumed carbon fraction of wood

28 is the molecular weight of CO

12 is the molecular weight of Carbon

1000 is a conversion of grams/kg

13.9. Efficiency calculation: As defined in 40 CFR part 60 per subpart AAA, efficiency shall be calculated per CSA B415.10 to be comparable with EPA Method 28R. Efficiency (%HHV), CO emission rate (g/h and g/min) emissions factor (lb/MMBtu, and power output (BTU/h) shall be calculated for all individual loads (L1, L2, L3, and L4) with the following exceptions:

13.9.1. No substitution of data is allowed.

13.9.2. 10-minute average data must be used to calculate efficiency

**14. Reporting Requirements.** The report shall include the following:

#### 14.1. Introduction

14.1.1. Purpose of test: certification, audit, efficiency,

14.1.2. Name and location of the laboratory conducting the test.

14.1.3. Wood appliance identification – manufacturer, model number/name, design type, description of the appliance tested, stove condition, and date of receipt.

14.1.4. Test information – location of testing, date of tests, sampling methods used, number of test runs, a statement detailing any previous certification testing completed on the wood appliance.

14.1.5. A list of people who conducted research on the appliance, participated in testing preparation, or witnessed the certification testing. This list shall clearly specify their roles in

the testing program for the appliance. The list shall include the participant's name, title, company, contact information and the purpose of their participation.

14.1.6. A statement that the test results apply only to the specific appliance tested.

#### 14.2. Summary and Discussion of Results

14.2.1. Table of results to include test run number, average burn rate for entire run and each phase, carbon monoxide and particulate emission rate for full run, particulate and carbon monoxide emission rate for each load phase (L1, L2, L3, L4), efficiency for the full run and each phase, burn time for total run and each phase.

14.2.2. For each test run and pollutant with real-time data to include:  $\Theta_1, \Theta_2, \Theta_3$ , CO, CO<sub>2</sub>, PM, and efficiency for (1) L1 - the startup phase and (2) L2 - high-, (3) L3-maintenance-, and (4) L4 low burn rate fire phases. Calculated results for PM emissions shall be reported as total emissions in grams, pounds per million Btu output, grams per MJ, grams per kilogram of dry fuel and grams per hour, and pounds per hour. Calculated results for  $\Theta_1, \Theta_2, \Theta_3$ , CO, and CO<sub>2</sub> emissions shall be reported as grams per kilogram of dry fuel and parts per million for CO and percent for CO and CO<sub>2</sub>. Efficiency shall be reported for each load. CO measurements shall be obtained from the dilution tunnel.

14.2.3. A narrative discussion detailing any issues or anomalies that arose during each test run and how those were handled, including comments about the fuel, and loading of the appliance.

##### 14.2.4. TEOM PM Plots

14.2.4.1. A plot of PM emission rate in grams/hour vs. time at 1-minute intervals, for the entire test period, for each run. The report shall include a table reporting the maximum 1-minute, 5-minute, and 60-minute grams per hour on a rolling basis for the test run.

14.2.5. Summary of other data – test facility conditions, surface temperature averages, catalyst temperature averages, pretest fuel weights, test fuel charge weights – total and by phase.

14.3. Discussion. Test run result, specific test run problems, and solutions. Comments on fuel, loading, analysis, and anything that may impact the reported result(s).

14.3.1. Details of deviations from, additions to or exclusions from the test method, and their data quality implications on the test results (if any), as well as information on specific test conditions, such as environmental conditions. An explanation of the deviations, additions, or exclusions shall be provided along with an analysis as to why these elements had no impact.

#### 14.4. Process description:

14.4.1. Data and drawings indicating the firebox size and location of the fuel charge.

14.4.2. Drawings and calculations used to determine firebox volume to include volume, height, width, and lengths, weight, and volume adjustments.

14.4.3. Firebox configuration – At a minimum to include air supply locations and operation, air supply introduction location, refractory location and dimensions, catalyst location, baffle and by-pass location and operation (include line drawings or photographs)

14.4.4. Appliance operation during the test – shall supply details on air supply settings and

adjustments.

14.5. Test fuel properties – the report shall provide information on the species, density, fuel moisture, fuel temperature, and load details from the fuel load calculator to include all measurements including the number of pieces, individual piece weights, piece length, moisture content and weight.

#### 14.6. Sampling

14.6.1. A description of the test procedures and test equipment, including a schematic or other drawing showing the location of all required test equipment. Also, a description of test fuel sourcing, handling and storage practices shall be included.

14.6.2. Describe the sampling location relative to the wood heater, include drawing or photographs.

14.6.3. Provide data on sampling blanks.

#### 14.7. Quality Control and Assurance Procedures

14.7.1. Calibration procedures and results certification procedures, sample and analysis procedures.

14.7.2. Test method quality control procedures to include TEOM leak and flow checks, stratification (velocity) checks, tunnel flow range results, filter temperature range verification and dilution tunnel RH verification.

#### 14.8. Appendices

14.8.1. Results and Example Calculations. Raw data and complete calculations for data included in summary tables.

14.8.2. Raw data. Copies of all files or sheets for sampling measurement, temperature records, and other materials used by lab related to testing.

14.8.3. Calibration Results. Summary of all calibrations, checks, and audits pertinent to the certification.

14.8.4. Sampling and Operation Records. Copies of all uncorrected records of activities not included in raw data sheets (e.g., wood heater door open, times and durations) as well as photographs of fuel loading and airflow settings.

14.8.5. Correspondence. Any correspondence to include written, electronic or verbal communications regarding appliance testing. Items shall include:

14.8.5.1. Request to conduct testing

14.8.5.2. Scheduling of testing

14.8.5.3. Notice to EPA to conduct test and any modifications to that request.

14.8.6. Test Facility Information. Report test facility temperature, air velocity, and humidity information.

14.8.7. Test Equipment Calibration and Audit Information. Report calibration and audit results for the platform scale, test fuel balance, test fuel moisture meter, and sampling equipment, including volume metering systems and gaseous analyzers.

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- 14.8.8. Pretest procedures. Report all pretest procedures conducted at the lab on the appliance to burns, rates, and amounts.
- 14.8.9. All required data for each test run shall be provided in spreadsheet format both in the printed report and in a computer file such that the data can be easily analyzed and calculations easily verified. Formulas used for all calculations shall be accessible for review.
- 14.8.10. For each test run: report TEOM flow and temperature and verification of all TEOM data validation parameters as required in NYSERDA Standard Operation Procedures for use of a Thermo Scientific 1405-D TEOM™ in a dilution tunnel with wood-fired stoves, hydronic heaters, and furnaces.
- 14.8.11. Raw data, calibration records, and other relevant documentation shall be retained by the laboratory for a minimum of 7 years.

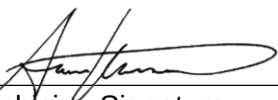


**WOOD STOVE TEST DATA PACKET**  
**IDC / ASTM E2515**



**Run 1 Data Summary**

|             |           |
|-------------|-----------|
| Client:     | SBI       |
| Model:      | St Louis  |
| Job #:      | 24-303    |
| Tracking #: | 216       |
| Test Date:  | 12/9/2024 |

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

1/2/2025  
Date

# DILUTION TUNNEL & MISC. DATA - ASTM E2780 / E2515

Client: SBI  
 Model: St Louis  
 Run #: 1  
 Test Start Time: 11:09

Job #: 24-303  
 Tracking #: 216  
 Technician: AK  
 Date: 12/9/2024

Total Sampling Time (min): 396  
 Recording Interval (min): 1

Meter Box  $\gamma$  Factor: 1.000 (A)  
 Meter Box  $\gamma$  Factor: 1.008 (B)  
 Meter Box  $\gamma$  Factor: - (C)  
 Meter Box  $\gamma$  Factor: 1.004 (Ambient)

Induced Draft Check (in. H<sub>2</sub>O): 0  
 Smoke Capture Check (%): 100%  
 Date Flue Pipe Last Cleaned: 12/6/2024  
 Test Fuel Scale Audit (lbs): 10.00  
 Platform Scale Audit (lbs): 10.0

|                              | Pre-Test | Post Test | Avg.            |
|------------------------------|----------|-----------|-----------------|
| Barometric Pressure (in. Hg) | 30.24    | 30.30     | 30.27           |
| Relative Humidity (%)        | 45.0     | 28.8      |                 |
| Room Air Velocity (ft/min)   | <50      | <50       |                 |
| Pitot Tube Leak Check        | 0        | 0         |                 |
| Ambient Sample Volume:       |          | 99.214    | ft <sup>3</sup> |

## Sample Train Leak Checks

|           | Pre-test | Post-test |       |            |
|-----------|----------|-----------|-------|------------|
| (A)       | 0.000    | 0.000     | cfm @ | -7 in. Hg  |
| (B)       | 0.000    | 0.000     | cfm @ | -8 in. Hg  |
| (C)       | -        | -         | cfm @ | - in. Hg   |
| (Ambient) | 0.000    | 0.000     | cfm @ | -13 in. Hg |

## DILUTION TUNNEL FLOW

### Traverse Data

| Point  | dP (in H <sub>2</sub> O) | Temp (°F) |
|--------|--------------------------|-----------|
| 1      | 0.068                    | 68        |
| 2      | 0.076                    | 68        |
| 3      | 0.078                    | 68        |
| 4      | 0.078                    | 68        |
| 5      | 0.070                    | 68        |
| 6      | 0.062                    | 68        |
| 7      | 0.060                    | 68        |
| 8      | 0.072                    | 68        |
| 9      | 0.082                    | 68        |
| 10     | 0.086                    | 68        |
| 11     | 0.078                    | 68        |
| 12     | 0.060                    | 68        |
| Center | 0.075                    | 68        |

Dilution Tunnel H<sub>2</sub>O: 2.00 percent  
 Tunnel Diameter: 12 inches  
 Pitot Tube Cp: 0.99 [unitless]  
 Dilution Tunnel MW(dry): 29.00 lb/lb-mole  
 Dilution Tunnel MW(wet): 28.78 lb/lb-mole  
 Tunnel Area: 0.7854 ft<sup>2</sup>

V<sub>strav</sub>: 17.72 ft/sec

V<sub>scnt</sub>: 18.06 ft/sec

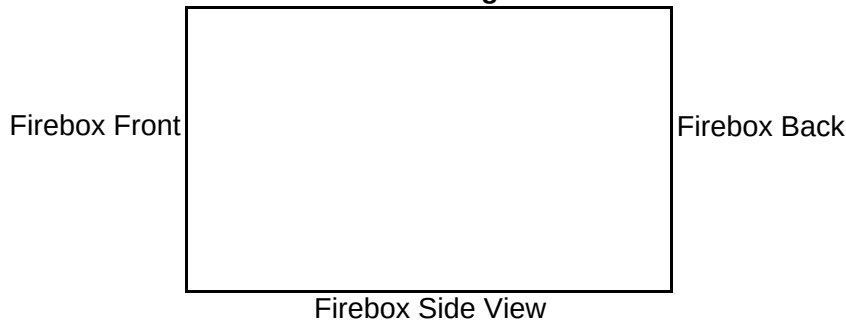
F<sub>p</sub>: 0.982 [ratio]

Initial Tunnel Flow: 827.3 scf/min

Static Pressure: -0.202 in. H<sub>2</sub>O

## TEST FUEL PROPERTIES

### Fuel Load Configuration



### Actual Fuel Used Properties

Fuel Type: D. Fir  
 HHV (kJ/kg): 19,810  
 %C: 48.73  
 %H: 6.87  
 %O: 43.9  
 %Ash: 0.5  
 MC (%DB): #DIV/0!

# BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: SBI  
 Model: St Louis  
 Run #: 1

Job #: 24-303  
 Tracking #: 216  
 Technician: AK  
 Date: 12/9/2024

| Elapsed Time (min) | Particulate Sampling Data |                   |                                          |                                  |                 |                      |               | Fuel Weight (lb) |               | Temperature Data (°F) |      |        |         |
|--------------------|---------------------------|-------------------|------------------------------------------|----------------------------------|-----------------|----------------------|---------------|------------------|---------------|-----------------------|------|--------|---------|
|                    | Gas Meter (ft³)           | Sample Rate (cfm) | Dilution Tunnel dP (in H <sub>2</sub> O) | Orifice dH (in H <sub>2</sub> O) | Meter Temp (°F) | Meter Vacuum (in Hg) | Pro. Rate (%) | Scale Reading    | Weight Change | Dilution Tunnel       | Flue | Filter | Ambient |
| 0                  | -0.001                    |                   | 0.074                                    | 0.01                             | 67              | -0.3                 |               | 7.87             |               | 68                    | 66   | 85     | 66      |
| 1                  | 0.155                     | 0.156             | 0.075                                    | 1.37                             | 67              | -1.4                 | -             | 7.51             | -0.36         | 75                    | 173  | 84     | 66      |
| 2                  | 0.333                     | 0.178             | 0.073                                    | 1.35                             | 67              | -1.3                 | -             | 7.18             | -0.33         | 85                    | 261  | 83     | 66      |
| 3                  | 0.513                     | 0.180             | 0.074                                    | 1.36                             | 67              | -1.3                 | -             | 6.81             | -0.37         | 80                    | 317  | 82     | 66      |
| 4                  | 0.691                     | 0.178             | 0.075                                    | 1.35                             | 67              | -1.2                 | -             | 6.50             | -0.31         | 78                    | 379  | 81     | 66      |
| 5                  | 0.868                     | 0.177             | 0.074                                    | 1.35                             | 67              | -1.3                 | -             | 6.11             | -0.39         | 80                    | 442  | 83     | 66      |
| 6                  | 1.045                     | 0.177             | 0.075                                    | 1.34                             | 67              | -1.3                 | -             | 5.73             | -0.38         | 82                    | 489  | 84     | 66      |
| 7                  | 1.223                     | 0.178             | 0.073                                    | 1.34                             | 67              | -1.3                 | -             | 5.39             | -0.34         | 83                    | 506  | 84     | 66      |
| 8                  | 1.400                     | 0.177             | 0.074                                    | 1.34                             | 67              | -1.3                 | -             | 5.04             | -0.35         | 84                    | 506  | 83     | 66      |
| 9                  | 1.577                     | 0.177             | 0.074                                    | 1.32                             | 67              | -1.3                 | -             | 4.76             | -0.28         | 84                    | 502  | 82     | 66      |
| 10                 | 1.753                     | 0.176             | 0.074                                    | 1.32                             | 68              | -1.3                 | 103           | 4.46             | -0.30         | 85                    | 508  | 82     | 66      |
| 11                 | 1.929                     | 0.176             | 0.075                                    | 1.32                             | 68              | -1.3                 | -             | 4.19             | -0.27         | 86                    | 509  | 83     | 66      |
| 12                 | 2.105                     | 0.176             | 0.076                                    | 1.33                             | 68              | -1.3                 | -             | 3.93             | -0.26         | 86                    | 508  | 84     | 66      |
| 13                 | 2.282                     | 0.177             | 0.074                                    | 1.32                             | 68              | -1.3                 | -             | 3.71             | -0.22         | 87                    | 502  | 84     | 66      |
| 14                 | 2.459                     | 0.177             | 0.076                                    | 1.32                             | 68              | -1.3                 | -             | 3.48             | -0.23         | 87                    | 500  | 83     | 66      |
| 15                 | 2.635                     | 0.176             | 0.073                                    | 1.31                             | 69              | -1.2                 | -             | 3.26             | -0.22         | 87                    | 499  | 82     | 67      |
| 16                 | 2.810                     | 0.175             | 0.075                                    | 1.32                             | 69              | -1.2                 | -             | 3.03             | -0.23         | 88                    | 507  | 82     | 67      |
| 17                 | 2.985                     | 0.175             | 0.073                                    | 1.31                             | 69              | -1.3                 | -             | 2.82             | -0.21         | 88                    | 510  | 83     | 67      |
| 18                 | 3.161                     | 0.176             | 0.074                                    | 1.31                             | 69              | -1.4                 | -             | 2.62             | -0.20         | 88                    | 509  | 84     | 67      |
| 19                 | 3.337                     | 0.176             | 0.075                                    | 1.32                             | 69              | -1.4                 | -             | 2.42             | -0.20         | 89                    | 509  | 83     | 67      |
| 20                 | 3.512                     | 0.175             | 0.072                                    | 1.30                             | 70              | -1.2                 | 106           | 14.86            | 12.44         | 109                   | 390  | 82     | 67      |
| 21                 | 3.688                     | 0.176             | 0.072                                    | 1.29                             | 70              | -1.3                 | -             | 15.48            | 0.62          | 98                    | 454  | 82     | 67      |
| 22                 | 3.864                     | 0.176             | 0.073                                    | 1.31                             | 70              | -1.3                 | -             | 15.17            | -0.31         | 95                    | 496  | 83     | 67      |
| 23                 | 4.039                     | 0.175             | 0.074                                    | 1.31                             | 71              | -1.3                 | -             | 14.90            | -0.27         | 93                    | 503  | 84     | 67      |
| 24                 | 4.213                     | 0.174             | 0.073                                    | 1.30                             | 71              | -1.3                 | -             | 14.70            | -0.20         | 91                    | 490  | 84     | 67      |
| 25                 | 4.388                     | 0.175             | 0.073                                    | 1.30                             | 71              | -1.4                 | -             | 14.50            | -0.20         | 91                    | 487  | 83     | 67      |
| 26                 | 4.563                     | 0.175             | 0.073                                    | 1.30                             | 71              | -1.3                 | -             | 14.28            | -0.22         | 91                    | 495  | 82     | 67      |
| 27                 | 4.739                     | 0.176             | 0.073                                    | 1.30                             | 72              | -1.3                 | -             | 14.09            | -0.19         | 91                    | 498  | 82     | 67      |
| 28                 | 4.914                     | 0.175             | 0.074                                    | 1.30                             | 72              | -1.4                 | -             | 13.91            | -0.18         | 90                    | 487  | 83     | 67      |
| 29                 | 5.090                     | 0.176             | 0.074                                    | 1.30                             | 72              | -1.4                 | -             | 13.72            | -0.19         | 90                    | 488  | 84     | 67      |
| 30                 | 5.265                     | 0.175             | 0.074                                    | 1.31                             | 72              | -1.3                 | 106           | 13.43            | -0.29         | 91                    | 518  | 84     | 67      |
| 31                 | 5.441                     | 0.176             | 0.075                                    | 1.30                             | 73              | -1.4                 | -             | 13.11            | -0.32         | 93                    | 546  | 83     | 67      |

# BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: SBI  
 Model: St Louis  
 Run #: 1

Job #: 24-303  
 Tracking #: 216  
 Technician: AK  
 Date: 12/9/2024

| Elapsed Time (min) | Particulate Sampling Data |                   |                                          |                                  |                 |                      |               | Fuel Weight (lb) |               | Temperature Data (°F) |      |        |         |
|--------------------|---------------------------|-------------------|------------------------------------------|----------------------------------|-----------------|----------------------|---------------|------------------|---------------|-----------------------|------|--------|---------|
|                    | Gas Meter (ft³)           | Sample Rate (cfm) | Dilution Tunnel dP (in H <sub>2</sub> O) | Orifice dH (in H <sub>2</sub> O) | Meter Temp (°F) | Meter Vacuum (in Hg) | Pro. Rate (%) | Scale Reading    | Weight Change | Dilution Tunnel       | Flue | Filter | Ambient |
| 32                 | 5.615                     | 0.174             | 0.073                                    | 1.32                             | 73              | -1.4                 | -             | 12.59            | -0.52         | 93                    | 563  | 82     | 68      |
| 33                 | 5.789                     | 0.174             | 0.074                                    | 1.31                             | 73              | -1.3                 | -             | 12.31            | -0.28         | 91                    | 539  | 82     | 68      |
| 34                 | 5.965                     | 0.176             | 0.075                                    | 1.30                             | 74              | -1.4                 | -             | 12.06            | -0.25         | 89                    | 519  | 84     | 68      |
| 35                 | 6.140                     | 0.175             | 0.073                                    | 1.31                             | 74              | -1.3                 | -             | 11.82            | -0.24         | 89                    | 517  | 84     | 68      |
| 36                 | 6.315                     | 0.175             | 0.075                                    | 1.30                             | 74              | -1.3                 | -             | 11.59            | -0.23         | 88                    | 518  | 83     | 68      |
| 37                 | 6.491                     | 0.176             | 0.075                                    | 1.30                             | 74              | -1.4                 | -             | 11.34            | -0.25         | 89                    | 521  | 82     | 68      |
| 38                 | 6.667                     | 0.176             | 0.075                                    | 1.31                             | 75              | -1.4                 | -             | 11.08            | -0.26         | 89                    | 523  | 82     | 68      |
| 39                 | 6.842                     | 0.175             | 0.073                                    | 1.30                             | 75              | -1.5                 | -             | 10.82            | -0.26         | 89                    | 525  | 84     | 69      |
| 40                 | 7.017                     | 0.175             | 0.075                                    | 1.30                             | 75              | -1.5                 | 103           | 10.57            | -0.25         | 89                    | 527  | 84     | 69      |
| 41                 | 7.191                     | 0.174             | 0.075                                    | 1.31                             | 76              | -1.4                 | -             | 10.33            | -0.24         | 89                    | 522  | 84     | 69      |
| 42                 | 7.366                     | 0.175             | 0.074                                    | 1.31                             | 76              | -1.5                 | -             | 10.09            | -0.24         | 89                    | 517  | 83     | 69      |
| 43                 | 7.542                     | 0.176             | 0.074                                    | 1.30                             | 76              | -1.5                 | -             | 9.86             | -0.23         | 89                    | 519  | 82     | 69      |
| 44                 | 7.718                     | 0.176             | 0.073                                    | 1.31                             | 76              | -1.4                 | -             | 9.62             | -0.24         | 89                    | 518  | 82     | 69      |
| 45                 | 7.893                     | 0.175             | 0.073                                    | 1.30                             | 77              | -1.5                 | -             | 9.41             | -0.21         | 89                    | 519  | 83     | 69      |
| 46                 | 8.069                     | 0.176             | 0.076                                    | 1.30                             | 77              | -1.4                 | -             | 9.15             | -0.26         | 88                    | 504  | 84     | 69      |
| 47                 | 8.245                     | 0.176             | 0.073                                    | 1.28                             | 77              | -1.4                 | -             | 8.93             | -0.22         | 87                    | 486  | 84     | 70      |
| 48                 | 8.420                     | 0.175             | 0.076                                    | 1.30                             | 77              | -1.4                 | -             | 8.73             | -0.20         | 86                    | 468  | 83     | 70      |
| 49                 | 8.594                     | 0.174             | 0.075                                    | 1.31                             | 78              | -1.4                 | -             | 8.54             | -0.19         | 85                    | 456  | 82     | 71      |
| 50                 | 8.770                     | 0.176             | 0.074                                    | 1.31                             | 78              | -1.4                 | 102           | 8.36             | -0.18         | 85                    | 448  | 82     | 70      |
| 51                 | 8.946                     | 0.176             | 0.074                                    | 1.30                             | 78              | -1.4                 | -             | 8.19             | -0.17         | 85                    | 443  | 83     | 70      |
| 52                 | 9.122                     | 0.176             | 0.075                                    | 1.30                             | 78              | -1.5                 | -             | 8.03             | -0.16         | 85                    | 441  | 84     | 70      |
| 53                 | 9.299                     | 0.177             | 0.076                                    | 1.30                             | 79              | -1.5                 | -             | 7.85             | -0.18         | 85                    | 439  | 84     | 70      |
| 54                 | 9.475                     | 0.176             | 0.075                                    | 1.30                             | 79              | -1.5                 | -             | 7.67             | -0.18         | 84                    | 438  | 83     | 70      |
| 55                 | 9.650                     | 0.175             | 0.076                                    | 1.32                             | 79              | -1.5                 | -             | 7.48             | -0.19         | 84                    | 437  | 82     | 70      |
| 56                 | 9.825                     | 0.175             | 0.077                                    | 1.30                             | 80              | -1.5                 | -             | 7.29             | -0.19         | 85                    | 437  | 82     | 70      |
| 57                 | 10.001                    | 0.176             | 0.075                                    | 1.31                             | 80              | -1.4                 | -             | 7.11             | -0.18         | 85                    | 437  | 84     | 70      |
| 58                 | 10.177                    | 0.176             | 0.076                                    | 1.30                             | 80              | -1.5                 | -             | 6.92             | -0.19         | 85                    | 438  | 84     | 70      |
| 59                 | 10.354                    | 0.177             | 0.074                                    | 1.30                             | 80              | -1.5                 | -             | 6.73             | -0.19         | 85                    | 438  | 84     | 70      |
| 60                 | 10.530                    | 0.176             | 0.075                                    | 1.31                             | 81              | -1.5                 | 102           | 6.53             | -0.20         | 85                    | 439  | 83     | 70      |
| 61                 | 10.706                    | 0.176             | 0.074                                    | 1.29                             | 81              | -1.5                 | -             | 6.34             | -0.19         | 85                    | 444  | 82     | 71      |
| 62                 | 10.881                    | 0.175             | 0.077                                    | 1.31                             | 81              | -1.6                 | -             | 6.14             | -0.20         | 85                    | 446  | 82     | 71      |
| 63                 | 11.057                    | 0.176             | 0.074                                    | 1.31                             | 81              | -1.5                 | -             | 5.95             | -0.19         | 85                    | 448  | 83     | 71      |

# BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: SBI  
 Model: St Louis  
 Run #: 1

Job #: 24-303  
 Tracking #: 216  
 Technician: AK  
 Date: 12/9/2024

| Elapsed Time (min) | Particulate Sampling Data |                   |                                          |                                  |                 |                      |               | Fuel Weight (lb) |               | Temperature Data (°F) |      |        |         |
|--------------------|---------------------------|-------------------|------------------------------------------|----------------------------------|-----------------|----------------------|---------------|------------------|---------------|-----------------------|------|--------|---------|
|                    | Gas Meter (ft³)           | Sample Rate (cfm) | Dilution Tunnel dP (in H <sub>2</sub> O) | Orifice dH (in H <sub>2</sub> O) | Meter Temp (°F) | Meter Vacuum (in Hg) | Pro. Rate (%) | Scale Reading    | Weight Change | Dilution Tunnel       | Flue | Filter | Ambient |
| 64                 | 11.234                    | 0.177             | 0.076                                    | 1.30                             | 81              | -1.5                 | -             | 5.76             | -0.19         | 85                    | 442  | 84     | 71      |
| 65                 | 11.410                    | 0.176             | 0.076                                    | 1.29                             | 82              | -1.5                 | -             | 5.59             | -0.17         | 85                    | 442  | 84     | 71      |
| 66                 | 11.587                    | 0.177             | 0.078                                    | 1.30                             | 82              | -1.5                 | -             | 5.43             | -0.16         | 84                    | 439  | 83     | 71      |
| 67                 | 11.763                    | 0.176             | 0.077                                    | 1.30                             | 82              | -1.5                 | -             | 5.28             | -0.15         | 84                    | 435  | 82     | 71      |
| 68                 | 11.938                    | 0.175             | 0.074                                    | 1.32                             | 82              | -1.5                 | -             | 5.11             | -0.17         | 84                    | 432  | 82     | 71      |
| 69                 | 12.115                    | 0.177             | 0.075                                    | 1.32                             | 82              | -1.6                 | -             | 4.96             | -0.15         | 84                    | 428  | 83     | 71      |
| 70                 | 12.291                    | 0.176             | 0.076                                    | 1.31                             | 83              | -1.6                 | 101           | 4.80             | -0.16         | 84                    | 428  | 84     | 71      |
| 71                 | 12.468                    | 0.177             | 0.076                                    | 1.31                             | 83              | -1.6                 | -             | 4.66             | -0.14         | 84                    | 427  | 83     | 71      |
| 72                 | 12.645                    | 0.177             | 0.076                                    | 1.31                             | 83              | -1.6                 | -             | 4.49             | -0.17         | 84                    | 428  | 82     | 71      |
| 73                 | 12.821                    | 0.176             | 0.075                                    | 1.30                             | 83              | -1.5                 | -             | 4.33             | -0.16         | 84                    | 425  | 83     | 71      |
| 74                 | 12.996                    | 0.175             | 0.075                                    | 1.31                             | 83              | -1.6                 | -             | 4.19             | -0.14         | 84                    | 425  | 84     | 71      |
| 75                 | 13.173                    | 0.177             | 0.077                                    | 1.30                             | 84              | -1.5                 | -             | 4.07             | -0.12         | 84                    | 423  | 84     | 71      |
| 76                 | 13.350                    | 0.177             | 0.076                                    | 1.31                             | 84              | -1.6                 | -             | 3.93             | -0.14         | 84                    | 424  | 84     | 71      |
| 77                 | 13.527                    | 0.177             | 0.076                                    | 1.29                             | 84              | -1.7                 | -             | 3.78             | -0.15         | 84                    | 423  | 83     | 71      |
| 78                 | 13.703                    | 0.176             | 0.078                                    | 1.31                             | 84              | -1.6                 | -             | 3.66             | -0.12         | 84                    | 418  | 82     | 71      |
| 79                 | 13.879                    | 0.176             | 0.075                                    | 1.29                             | 84              | -1.7                 | -             | 13.64            | 9.98          | 114                   | 433  | 83     | 71      |
| 80                 | 14.054                    | 0.175             | 0.073                                    | 1.29                             | 84              | -1.7                 | 103           | 13.11            | -0.53         | 109                   | 549  | 84     | 71      |
| 81                 | 14.230                    | 0.176             | 0.074                                    | 1.29                             | 85              | -1.7                 | -             | 12.59            | -0.52         | 101                   | 578  | 84     | 71      |
| 82                 | 14.406                    | 0.176             | 0.075                                    | 1.30                             | 85              | -1.7                 | -             | 12.25            | -0.34         | 96                    | 544  | 83     | 72      |
| 83                 | 14.582                    | 0.176             | 0.075                                    | 1.30                             | 85              | -1.6                 | -             | 12.02            | -0.23         | 91                    | 484  | 82     | 72      |
| 84                 | 14.759                    | 0.177             | 0.074                                    | 1.32                             | 85              | -1.7                 | -             | 11.79            | -0.23         | 89                    | 464  | 82     | 72      |
| 85                 | 14.936                    | 0.177             | 0.074                                    | 1.31                             | 85              | -1.6                 | -             | 11.58            | -0.21         | 88                    | 469  | 83     | 71      |
| 86                 | 15.111                    | 0.175             | 0.074                                    | 1.30                             | 85              | -1.6                 | -             | 11.36            | -0.22         | 88                    | 469  | 84     | 72      |
| 87                 | 15.287                    | 0.176             | 0.074                                    | 1.29                             | 86              | -1.7                 | -             | 11.13            | -0.23         | 88                    | 468  | 85     | 72      |
| 88                 | 15.463                    | 0.176             | 0.073                                    | 1.31                             | 86              | -1.6                 | -             | 10.91            | -0.22         | 87                    | 467  | 85     | 72      |
| 89                 | 15.640                    | 0.177             | 0.075                                    | 1.30                             | 86              | -1.7                 | -             | 10.70            | -0.21         | 87                    | 451  | 84     | 72      |
| 90                 | 15.817                    | 0.177             | 0.074                                    | 1.30                             | 86              | -1.6                 | 103           | 10.50            | -0.20         | 86                    | 443  | 83     | 72      |
| 91                 | 15.993                    | 0.176             | 0.076                                    | 1.31                             | 86              | -1.6                 | -             | 10.28            | -0.22         | 87                    | 447  | 82     | 72      |
| 92                 | 16.169                    | 0.176             | 0.075                                    | 1.31                             | 86              | -1.6                 | -             | 10.09            | -0.19         | 87                    | 450  | 83     | 72      |
| 93                 | 16.345                    | 0.176             | 0.076                                    | 1.31                             | 86              | -1.6                 | -             | 9.89             | -0.20         | 87                    | 452  | 84     | 72      |
| 94                 | 16.521                    | 0.176             | 0.076                                    | 1.30                             | 87              | -1.6                 | -             | 9.70             | -0.19         | 87                    | 448  | 85     | 72      |
| 95                 | 16.697                    | 0.176             | 0.076                                    | 1.29                             | 87              | -1.6                 | -             | 9.51             | -0.19         | 86                    | 447  | 85     | 72      |

# BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: SBI  
 Model: St Louis  
 Run #: 1

Job #: 24-303  
 Tracking #: 216  
 Technician: AK  
 Date: 12/9/2024

| Elapsed Time (min) | Particulate Sampling Data |                   |                                          |                                  |                 |                      |               | Fuel Weight (lb) |               | Temperature Data (°F) |      |        |         |
|--------------------|---------------------------|-------------------|------------------------------------------|----------------------------------|-----------------|----------------------|---------------|------------------|---------------|-----------------------|------|--------|---------|
|                    | Gas Meter (ft³)           | Sample Rate (cfm) | Dilution Tunnel dP (in H <sub>2</sub> O) | Orifice dH (in H <sub>2</sub> O) | Meter Temp (°F) | Meter Vacuum (in Hg) | Pro. Rate (%) | Scale Reading    | Weight Change | Dilution Tunnel       | Flue | Filter | Ambient |
| 96                 | 16.874                    | 0.177             | 0.075                                    | 1.30                             | 87              | -1.7                 | -             | 9.33             | -0.18         | 86                    | 443  | 84     | 72      |
| 97                 | 17.051                    | 0.177             | 0.075                                    | 1.29                             | 87              | -1.6                 | -             | 9.16             | -0.17         | 86                    | 439  | 83     | 72      |
| 98                 | 17.227                    | 0.176             | 0.075                                    | 1.30                             | 87              | -1.6                 | -             | 9.00             | -0.16         | 86                    | 437  | 82     | 72      |
| 99                 | 17.403                    | 0.176             | 0.075                                    | 1.29                             | 87              | -1.6                 | -             | 8.83             | -0.17         | 86                    | 433  | 83     | 72      |
| 100                | 17.579                    | 0.176             | 0.076                                    | 1.30                             | 87              | -1.6                 | 101           | 8.67             | -0.16         | 86                    | 430  | 84     | 72      |
| 101                | 17.756                    | 0.177             | 0.077                                    | 1.31                             | 87              | -1.6                 | -             | 8.50             | -0.17         | 86                    | 426  | 84     | 72      |
| 102                | 17.933                    | 0.177             | 0.076                                    | 1.30                             | 87              | -1.6                 | -             | 8.35             | -0.15         | 86                    | 423  | 83     | 72      |
| 103                | 18.110                    | 0.177             | 0.075                                    | 1.28                             | 88              | -1.6                 | -             | 8.22             | -0.13         | 86                    | 420  | 82     | 72      |
| 104                | 18.285                    | 0.175             | 0.077                                    | 1.31                             | 88              | -1.7                 | -             | 8.08             | -0.14         | 86                    | 418  | 83     | 72      |
| 105                | 18.461                    | 0.176             | 0.077                                    | 1.30                             | 88              | -1.7                 | -             | 7.95             | -0.13         | 86                    | 417  | 84     | 72      |
| 106                | 18.638                    | 0.177             | 0.075                                    | 1.30                             | 88              | -1.7                 | -             | 7.81             | -0.14         | 86                    | 413  | 84     | 72      |
| 107                | 18.815                    | 0.177             | 0.075                                    | 1.30                             | 88              | -1.6                 | -             | 7.68             | -0.13         | 85                    | 408  | 84     | 72      |
| 108                | 18.992                    | 0.177             | 0.077                                    | 1.30                             | 88              | -1.7                 | -             | 7.55             | -0.13         | 85                    | 406  | 83     | 72      |
| 109                | 19.168                    | 0.176             | 0.075                                    | 1.31                             | 88              | -1.7                 | -             | 7.40             | -0.15         | 85                    | 405  | 82     | 72      |
| 110                | 19.344                    | 0.176             | 0.075                                    | 1.30                             | 88              | -1.6                 | 100           | 7.29             | -0.11         | 85                    | 401  | 82     | 72      |
| 111                | 19.520                    | 0.176             | 0.076                                    | 1.31                             | 88              | -1.6                 | -             | 7.17             | -0.12         | 85                    | 400  | 84     | 72      |
| 112                | 19.698                    | 0.178             | 0.075                                    | 1.30                             | 89              | -1.7                 | -             | 7.05             | -0.12         | 85                    | 396  | 84     | 73      |
| 113                | 19.875                    | 0.177             | 0.076                                    | 1.29                             | 89              | -1.6                 | -             | 6.94             | -0.11         | 85                    | 402  | 84     | 72      |
| 114                | 20.052                    | 0.177             | 0.075                                    | 1.30                             | 89              | -1.7                 | -             | 6.81             | -0.13         | 85                    | 406  | 84     | 72      |
| 115                | 20.228                    | 0.176             | 0.077                                    | 1.30                             | 89              | -1.7                 | -             | 6.68             | -0.13         | 85                    | 406  | 82     | 72      |
| 116                | 20.404                    | 0.176             | 0.075                                    | 1.31                             | 89              | -1.7                 | -             | 6.56             | -0.12         | 85                    | 405  | 82     | 72      |
| 117                | 20.581                    | 0.177             | 0.076                                    | 1.30                             | 89              | -1.7                 | -             | 6.45             | -0.11         | 85                    | 406  | 83     | 72      |
| 118                | 20.758                    | 0.177             | 0.077                                    | 1.31                             | 89              | -1.7                 | -             | 6.33             | -0.12         | 85                    | 403  | 84     | 72      |
| 119                | 20.935                    | 0.177             | 0.075                                    | 1.30                             | 89              | -1.8                 | -             | 6.22             | -0.11         | 85                    | 401  | 84     | 72      |
| 120                | 21.112                    | 0.177             | 0.076                                    | 1.31                             | 89              | -1.7                 | 100           | 6.11             | -0.11         | 85                    | 399  | 84     | 72      |
| 121                | 21.287                    | 0.175             | 0.077                                    | 1.30                             | 89              | -1.7                 | -             | 5.97             | -0.14         | 84                    | 398  | 82     | 73      |
| 122                | 21.464                    | 0.177             | 0.076                                    | 1.30                             | 89              | -1.7                 | -             | 5.99             | 0.02          | 88                    | 397  | 82     | 72      |
| 123                | 21.641                    | 0.177             | 0.076                                    | 1.29                             | 90              | -1.7                 | -             | 5.95             | -0.04         | 89                    | 397  | 83     | 71      |
| 124                | 21.819                    | 0.178             | 0.077                                    | 1.30                             | 90              | -1.8                 | -             | 5.89             | -0.06         | 90                    | 397  | 84     | 71      |
| 125                | 21.996                    | 0.177             | 0.074                                    | 1.30                             | 90              | -1.8                 | -             | 5.83             | -0.06         | 90                    | 397  | 84     | 71      |
| 126                | 22.171                    | 0.175             | 0.074                                    | 1.30                             | 90              | -1.8                 | -             | 5.75             | -0.08         | 91                    | 397  | 83     | 71      |
| 127                | 22.348                    | 0.177             | 0.076                                    | 1.31                             | 90              | -1.8                 | -             | 5.68             | -0.07         | 91                    | 396  | 82     | 71      |

# BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: SBI  
 Model: St Louis  
 Run #: 1

Job #: 24-303  
 Tracking #: 216  
 Technician: AK  
 Date: 12/9/2024

| Elapsed Time (min) | Particulate Sampling Data |                   |                                          |                                  |                 |                      |               | Fuel Weight (lb) |               | Temperature Data (°F) |      |        |         |
|--------------------|---------------------------|-------------------|------------------------------------------|----------------------------------|-----------------|----------------------|---------------|------------------|---------------|-----------------------|------|--------|---------|
|                    | Gas Meter (ft³)           | Sample Rate (cfm) | Dilution Tunnel dP (in H <sub>2</sub> O) | Orifice dH (in H <sub>2</sub> O) | Meter Temp (°F) | Meter Vacuum (in Hg) | Pro. Rate (%) | Scale Reading    | Weight Change | Dilution Tunnel       | Flue | Filter | Ambient |
| 128                | 22.525                    | 0.177             | 0.076                                    | 1.30                             | 90              | -1.9                 | -             | 5.60             | -0.08         | 91                    | 397  | 83     | 71      |
| 129                | 22.702                    | 0.177             | 0.077                                    | 1.30                             | 90              | -1.8                 | -             | 5.51             | -0.09         | 91                    | 398  | 84     | 71      |
| 130                | 22.879                    | 0.177             | 0.077                                    | 1.31                             | 90              | -1.8                 | 99            | 5.43             | -0.08         | 91                    | 397  | 84     | 71      |
| 131                | 23.055                    | 0.176             | 0.075                                    | 1.30                             | 90              | -1.9                 | -             | 5.35             | -0.08         | 90                    | 395  | 84     | 71      |
| 132                | 23.231                    | 0.176             | 0.075                                    | 1.30                             | 90              | -1.8                 | -             | 5.27             | -0.08         | 91                    | 395  | 82     | 71      |
| 133                | 23.408                    | 0.177             | 0.075                                    | 1.30                             | 90              | -1.9                 | -             | 5.19             | -0.08         | 91                    | 395  | 82     | 71      |
| 134                | 23.585                    | 0.177             | 0.076                                    | 1.30                             | 90              | -1.8                 | -             | 5.11             | -0.08         | 90                    | 395  | 84     | 71      |
| 135                | 23.763                    | 0.178             | 0.077                                    | 1.28                             | 91              | -1.8                 | -             | 5.02             | -0.09         | 90                    | 395  | 84     | 71      |
| 136                | 23.940                    | 0.177             | 0.078                                    | 1.29                             | 91              | -1.9                 | -             | 4.94             | -0.08         | 90                    | 394  | 85     | 70      |
| 137                | 24.115                    | 0.175             | 0.075                                    | 1.30                             | 91              | -1.9                 | -             | 4.87             | -0.07         | 90                    | 395  | 84     | 71      |
| 138                | 24.292                    | 0.177             | 0.077                                    | 1.30                             | 91              | -1.9                 | -             | 4.78             | -0.09         | 90                    | 396  | 83     | 71      |
| 139                | 24.469                    | 0.177             | 0.075                                    | 1.31                             | 91              | -1.9                 | -             | 4.69             | -0.09         | 90                    | 396  | 82     | 70      |
| 140                | 24.647                    | 0.178             | 0.075                                    | 1.30                             | 91              | -1.9                 | 100           | 4.61             | -0.08         | 90                    | 392  | 83     | 70      |
| 141                | 24.824                    | 0.177             | 0.075                                    | 1.31                             | 91              | -2.0                 | -             | 4.54             | -0.07         | 90                    | 386  | 84     | 70      |
| 142                | 25.000                    | 0.176             | 0.076                                    | 1.30                             | 91              | -1.9                 | -             | 4.48             | -0.06         | 90                    | 383  | 85     | 70      |
| 143                | 25.177                    | 0.177             | 0.072                                    | 1.31                             | 91              | -2.0                 | -             | 30.19            | 25.71         | 111                   | 361  | 85     | 71      |
| 144                | 25.354                    | 0.177             | 0.075                                    | 1.29                             | 91              | -2.0                 | -             | 26.75            | -3.44         | 105                   | 439  | 85     | 71      |
| 145                | 25.531                    | 0.177             | 0.074                                    | 1.30                             | 91              | -2.0                 | -             | 26.46            | -0.29         | 100                   | 497  | 84     | 71      |
| 146                | 25.708                    | 0.177             | 0.075                                    | 1.31                             | 91              | -2.0                 | -             | 25.97            | -0.49         | 98                    | 520  | 83     | 71      |
| 147                | 25.885                    | 0.177             | 0.074                                    | 1.30                             | 91              | -1.9                 | -             | 25.66            | -0.31         | 93                    | 487  | 82     | 71      |
| 148                | 26.061                    | 0.176             | 0.075                                    | 1.30                             | 91              | -1.9                 | -             | 25.41            | -0.25         | 90                    | 456  | 83     | 72      |
| 149                | 26.238                    | 0.177             | 0.074                                    | 1.30                             | 91              | -2.0                 | -             | 25.17            | -0.24         | 89                    | 456  | 84     | 72      |
| 150                | 26.416                    | 0.178             | 0.076                                    | 1.32                             | 91              | -2.0                 | 100           | 24.94            | -0.23         | 88                    | 452  | 85     | 72      |
| 151                | 26.593                    | 0.177             | 0.075                                    | 1.30                             | 92              | -1.9                 | -             | 24.71            | -0.23         | 88                    | 455  | 85     | 72      |
| 152                | 26.770                    | 0.177             | 0.077                                    | 1.30                             | 92              | -1.9                 | -             | 24.47            | -0.24         | 87                    | 452  | 86     | 73      |
| 153                | 26.946                    | 0.176             | 0.074                                    | 1.30                             | 92              | -2.0                 | -             | 24.23            | -0.24         | 87                    | 448  | 85     | 73      |
| 154                | 27.123                    | 0.177             | 0.075                                    | 1.31                             | 92              | -2.0                 | -             | 24.00            | -0.23         | 87                    | 447  | 84     | 72      |
| 155                | 27.301                    | 0.178             | 0.075                                    | 1.29                             | 92              | -1.9                 | -             | 23.76            | -0.24         | 87                    | 456  | 82     | 72      |
| 156                | 27.478                    | 0.177             | 0.074                                    | 1.30                             | 92              | -1.9                 | -             | 23.54            | -0.22         | 87                    | 456  | 82     | 72      |
| 157                | 27.655                    | 0.177             | 0.075                                    | 1.32                             | 92              | -1.8                 | -             | 23.29            | -0.25         | 87                    | 463  | 83     | 72      |
| 158                | 27.832                    | 0.177             | 0.075                                    | 1.30                             | 92              | -1.8                 | -             | 23.04            | -0.25         | 88                    | 467  | 84     | 73      |
| 159                | 28.009                    | 0.177             | 0.076                                    | 1.30                             | 92              | -1.8                 | -             | 22.80            | -0.24         | 88                    | 468  | 84     | 73      |

# BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: SBI  
 Model: St Louis  
 Run #: 1

Job #: 24-303  
 Tracking #: 216  
 Technician: AK  
 Date: 12/9/2024

| Elapsed Time (min) | Particulate Sampling Data |                   |                                          |                                  |                 |                      |               | Fuel Weight (lb) |               | Temperature Data (°F) |      |        |         |
|--------------------|---------------------------|-------------------|------------------------------------------|----------------------------------|-----------------|----------------------|---------------|------------------|---------------|-----------------------|------|--------|---------|
|                    | Gas Meter (ft³)           | Sample Rate (cfm) | Dilution Tunnel dP (in H <sub>2</sub> O) | Orifice dH (in H <sub>2</sub> O) | Meter Temp (°F) | Meter Vacuum (in Hg) | Pro. Rate (%) | Scale Reading    | Weight Change | Dilution Tunnel       | Flue | Filter | Ambient |
| 160                | 28.186                    | 0.177             | 0.076                                    | 1.31                             | 92              | -1.9                 | 100           | 22.58            | -0.22         | 88                    | 470  | 83     | 73      |
| 161                | 28.364                    | 0.178             | 0.075                                    | 1.31                             | 92              | -1.9                 | -             | 22.34            | -0.24         | 88                    | 467  | 82     | 73      |
| 162                | 28.541                    | 0.177             | 0.075                                    | 1.31                             | 92              | -1.8                 | -             | 22.11            | -0.23         | 88                    | 469  | 83     | 72      |
| 163                | 28.717                    | 0.176             | 0.075                                    | 1.30                             | 92              | -1.8                 | -             | 21.94            | -0.17         | 88                    | 470  | 84     | 73      |
| 164                | 28.894                    | 0.177             | 0.075                                    | 1.31                             | 92              | -1.8                 | -             | 21.70            | -0.24         | 88                    | 469  | 85     | 73      |
| 165                | 29.072                    | 0.178             | 0.074                                    | 1.30                             | 92              | -1.7                 | -             | 21.47            | -0.23         | 88                    | 469  | 85     | 73      |
| 166                | 29.249                    | 0.177             | 0.075                                    | 1.29                             | 92              | -1.7                 | -             | 21.23            | -0.24         | 88                    | 470  | 83     | 73      |
| 167                | 29.426                    | 0.177             | 0.076                                    | 1.30                             | 92              | -1.8                 | -             | 21.00            | -0.23         | 88                    | 470  | 82     | 73      |
| 168                | 29.602                    | 0.176             | 0.074                                    | 1.31                             | 92              | -1.8                 | -             | 20.76            | -0.24         | 88                    | 472  | 82     | 73      |
| 169                | 29.779                    | 0.177             | 0.075                                    | 1.29                             | 92              | -1.7                 | -             | 20.52            | -0.24         | 88                    | 472  | 84     | 73      |
| 170                | 29.957                    | 0.178             | 0.074                                    | 1.29                             | 92              | -1.7                 | 100           | 20.29            | -0.23         | 88                    | 474  | 85     | 73      |
| 171                | 30.135                    | 0.178             | 0.075                                    | 1.30                             | 92              | -1.8                 | -             | 20.04            | -0.25         | 89                    | 475  | 85     | 73      |
| 172                | 30.312                    | 0.177             | 0.075                                    | 1.31                             | 93              | -1.7                 | -             | 19.81            | -0.23         | 88                    | 474  | 86     | 73      |
| 173                | 30.488                    | 0.176             | 0.075                                    | 1.30                             | 93              | -1.7                 | -             | 19.58            | -0.23         | 89                    | 476  | 85     | 73      |
| 174                | 30.665                    | 0.177             | 0.074                                    | 1.31                             | 93              | -1.7                 | -             | 19.33            | -0.25         | 89                    | 475  | 84     | 73      |
| 175                | 30.843                    | 0.178             | 0.075                                    | 1.30                             | 93              | -1.7                 | -             | 19.10            | -0.23         | 89                    | 477  | 83     | 73      |
| 176                | 31.021                    | 0.178             | 0.074                                    | 1.31                             | 93              | -1.7                 | -             | 18.86            | -0.24         | 89                    | 476  | 83     | 73      |
| 177                | 31.197                    | 0.176             | 0.075                                    | 1.30                             | 93              | -1.7                 | -             | 18.62            | -0.24         | 89                    | 476  | 84     | 74      |
| 178                | 31.374                    | 0.177             | 0.074                                    | 1.30                             | 93              | -1.7                 | -             | 18.40            | -0.22         | 89                    | 476  | 84     | 74      |
| 179                | 31.551                    | 0.177             | 0.073                                    | 1.30                             | 93              | -1.7                 | -             | 18.16            | -0.24         | 89                    | 477  | 84     | 73      |
| 180                | 31.728                    | 0.177             | 0.073                                    | 1.29                             | 93              | -1.7                 | 101           | 17.93            | -0.23         | 89                    | 477  | 84     | 73      |
| 181                | 31.906                    | 0.178             | 0.076                                    | 1.30                             | 93              | -1.7                 | -             | 17.69            | -0.24         | 89                    | 478  | 83     | 73      |
| 182                | 32.083                    | 0.177             | 0.073                                    | 1.30                             | 93              | -1.7                 | -             | 17.46            | -0.23         | 89                    | 478  | 83     | 73      |
| 183                | 32.259                    | 0.176             | 0.075                                    | 1.31                             | 93              | -1.7                 | -             | 17.24            | -0.22         | 89                    | 477  | 83     | 73      |
| 184                | 32.436                    | 0.177             | 0.075                                    | 1.30                             | 93              | -1.7                 | -             | 17.00            | -0.24         | 89                    | 475  | 84     | 73      |
| 185                | 32.614                    | 0.178             | 0.075                                    | 1.31                             | 93              | -1.7                 | -             | 16.79            | -0.21         | 90                    | 474  | 84     | 73      |
| 186                | 32.792                    | 0.178             | 0.073                                    | 1.30                             | 93              | -1.7                 | -             | 16.57            | -0.22         | 89                    | 472  | 84     | 73      |
| 187                | 32.969                    | 0.177             | 0.075                                    | 1.30                             | 93              | -1.7                 | -             | 16.33            | -0.24         | 89                    | 461  | 84     | 74      |
| 188                | 33.145                    | 0.176             | 0.076                                    | 1.31                             | 93              | -1.6                 | -             | 16.12            | -0.21         | 89                    | 455  | 83     | 73      |
| 189                | 33.322                    | 0.177             | 0.074                                    | 1.31                             | 93              | -1.7                 | -             | 15.90            | -0.22         | 89                    | 451  | 83     | 73      |
| 190                | 33.500                    | 0.178             | 0.076                                    | 1.30                             | 93              | -1.7                 | 101           | 15.71            | -0.19         | 89                    | 450  | 84     | 74      |
| 191                | 33.678                    | 0.178             | 0.073                                    | 1.31                             | 93              | -1.6                 | -             | 15.49            | -0.22         | 88                    | 448  | 84     | 74      |



# BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: SBI  
 Model: St Louis  
 Run #: 1

Job #: 24-303  
 Tracking #: 216  
 Technician: AK  
 Date: 12/9/2024

| Elapsed Time (min) | Particulate Sampling Data |                   |                                          |                                  |                 |                      |               | Fuel Weight (lb) |               | Temperature Data (°F) |      |        |         |
|--------------------|---------------------------|-------------------|------------------------------------------|----------------------------------|-----------------|----------------------|---------------|------------------|---------------|-----------------------|------|--------|---------|
|                    | Gas Meter (ft³)           | Sample Rate (cfm) | Dilution Tunnel dP (in H <sub>2</sub> O) | Orifice dH (in H <sub>2</sub> O) | Meter Temp (°F) | Meter Vacuum (in Hg) | Pro. Rate (%) | Scale Reading    | Weight Change | Dilution Tunnel       | Flue | Filter | Ambient |
| 192                | 33.854                    | 0.176             | 0.075                                    | 1.30                             | 93              | -1.8                 | -             | 15.29            | -0.20         | 88                    | 448  | 85     | 74      |
| 193                | 34.031                    | 0.177             | 0.075                                    | 1.29                             | 93              | -1.7                 | -             | 15.08            | -0.21         | 89                    | 447  | 85     | 74      |
| 194                | 34.208                    | 0.177             | 0.075                                    | 1.29                             | 93              | -1.6                 | -             | 14.88            | -0.20         | 88                    | 444  | 84     | 74      |
| 195                | 34.385                    | 0.177             | 0.075                                    | 1.30                             | 93              | -1.7                 | -             | 14.67            | -0.21         | 88                    | 444  | 83     | 74      |
| 196                | 34.563                    | 0.178             | 0.075                                    | 1.31                             | 93              | -1.7                 | -             | 14.45            | -0.22         | 89                    | 443  | 82     | 74      |
| 197                | 34.740                    | 0.177             | 0.074                                    | 1.32                             | 93              | -1.7                 | -             | 14.24            | -0.21         | 88                    | 443  | 83     | 74      |
| 198                | 34.916                    | 0.176             | 0.073                                    | 1.30                             | 93              | -1.7                 | -             | 14.04            | -0.20         | 88                    | 441  | 84     | 74      |
| 199                | 35.093                    | 0.177             | 0.075                                    | 1.31                             | 93              | -1.6                 | -             | 13.83            | -0.21         | 88                    | 443  | 85     | 74      |
| 200                | 35.271                    | 0.178             | 0.074                                    | 1.30                             | 93              | -1.7                 | 100           | 13.60            | -0.23         | 88                    | 444  | 85     | 74      |
| 201                | 35.449                    | 0.178             | 0.076                                    | 1.31                             | 93              | -1.8                 | -             | 13.39            | -0.21         | 88                    | 443  | 85     | 74      |
| 202                | 35.625                    | 0.176             | 0.078                                    | 1.31                             | 93              | -1.7                 | -             | 13.19            | -0.20         | 88                    | 442  | 84     | 74      |
| 203                | 35.802                    | 0.177             | 0.075                                    | 1.31                             | 93              | -1.8                 | -             | 13.00            | -0.19         | 88                    | 440  | 83     | 74      |
| 204                | 35.979                    | 0.177             | 0.076                                    | 1.28                             | 93              | -1.7                 | -             | 12.79            | -0.21         | 88                    | 440  | 82     | 74      |
| 205                | 36.157                    | 0.178             | 0.075                                    | 1.30                             | 94              | -1.7                 | -             | 12.61            | -0.18         | 88                    | 438  | 83     | 73      |
| 206                | 36.334                    | 0.177             | 0.076                                    | 1.31                             | 94              | -1.7                 | -             | 12.43            | -0.18         | 88                    | 435  | 84     | 74      |
| 207                | 36.511                    | 0.177             | 0.073                                    | 1.30                             | 94              | -1.8                 | -             | 12.26            | -0.17         | 88                    | 433  | 85     | 74      |
| 208                | 36.687                    | 0.176             | 0.076                                    | 1.30                             | 94              | -1.8                 | -             | 12.06            | -0.20         | 88                    | 430  | 85     | 74      |
| 209                | 36.864                    | 0.177             | 0.076                                    | 1.31                             | 94              | -1.7                 | -             | 11.90            | -0.16         | 88                    | 430  | 85     | 74      |
| 210                | 37.042                    | 0.178             | 0.075                                    | 1.30                             | 94              | -1.7                 | 100           | 11.72            | -0.18         | 88                    | 428  | 84     | 74      |
| 211                | 37.220                    | 0.178             | 0.076                                    | 1.31                             | 94              | -1.8                 | -             | 11.58            | -0.14         | 88                    | 424  | 83     | 74      |
| 212                | 37.396                    | 0.176             | 0.075                                    | 1.31                             | 94              | -1.7                 | -             | 11.43            | -0.15         | 88                    | 420  | 83     | 74      |
| 213                | 37.573                    | 0.177             | 0.075                                    | 1.31                             | 94              | -1.7                 | -             | 11.28            | -0.15         | 88                    | 417  | 84     | 74      |
| 214                | 37.750                    | 0.177             | 0.075                                    | 1.29                             | 94              | -1.7                 | -             | 11.12            | -0.16         | 88                    | 427  | 85     | 73      |
| 215                | 37.927                    | 0.177             | 0.074                                    | 1.30                             | 94              | -1.7                 | -             | 10.98            | -0.14         | 88                    | 430  | 85     | 74      |
| 216                | 38.105                    | 0.178             | 0.075                                    | 1.30                             | 94              | -1.8                 | -             | 10.82            | -0.16         | 88                    | 430  | 85     | 73      |
| 217                | 38.282                    | 0.177             | 0.076                                    | 1.29                             | 94              | -1.9                 | -             | 10.68            | -0.14         | 88                    | 427  | 85     | 74      |
| 218                | 38.458                    | 0.176             | 0.075                                    | 1.31                             | 94              | -1.8                 | -             | 10.55            | -0.13         | 88                    | 426  | 84     | 74      |
| 219                | 38.635                    | 0.177             | 0.076                                    | 1.31                             | 94              | -1.9                 | -             | 10.40            | -0.15         | 88                    | 424  | 83     | 74      |
| 220                | 38.813                    | 0.178             | 0.076                                    | 1.30                             | 94              | -1.8                 | 100           | 10.25            | -0.15         | 88                    | 422  | 83     | 73      |
| 221                | 38.991                    | 0.178             | 0.076                                    | 1.31                             | 94              | -1.8                 | -             | 10.11            | -0.14         | 88                    | 422  | 83     | 74      |
| 222                | 39.167                    | 0.176             | 0.076                                    | 1.31                             | 94              | -1.7                 | -             | 9.98             | -0.13         | 88                    | 420  | 84     | 74      |
| 223                | 39.344                    | 0.177             | 0.076                                    | 1.29                             | 94              | -1.8                 | -             | 9.84             | -0.14         | 88                    | 418  | 85     | 74      |

# BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: SBI  
 Model: St Louis  
 Run #: 1

Job #: 24-303  
 Tracking #: 216  
 Technician: AK  
 Date: 12/9/2024

| Elapsed Time (min) | Particulate Sampling Data |                   |                                          |                                  |                 |                      |               | Fuel Weight (lb) |               | Temperature Data (°F) |      |        |         |
|--------------------|---------------------------|-------------------|------------------------------------------|----------------------------------|-----------------|----------------------|---------------|------------------|---------------|-----------------------|------|--------|---------|
|                    | Gas Meter (ft³)           | Sample Rate (cfm) | Dilution Tunnel dP (in H <sub>2</sub> O) | Orifice dH (in H <sub>2</sub> O) | Meter Temp (°F) | Meter Vacuum (in Hg) | Pro. Rate (%) | Scale Reading    | Weight Change | Dilution Tunnel       | Flue | Filter | Ambient |
| 224                | 39.521                    | 0.177             | 0.076                                    | 1.30                             | 94              | -1.9                 | -             | 9.71             | -0.13         | 88                    | 417  | 85     | 74      |
| 225                | 39.699                    | 0.178             | 0.076                                    | 1.30                             | 94              | -1.9                 | -             | 9.57             | -0.14         | 88                    | 416  | 85     | 74      |
| 226                | 39.876                    | 0.177             | 0.076                                    | 1.32                             | 94              | -1.9                 | -             | 9.43             | -0.14         | 88                    | 416  | 84     | 74      |
| 227                | 40.053                    | 0.177             | 0.075                                    | 1.30                             | 94              | -1.9                 | -             | 9.31             | -0.12         | 87                    | 414  | 83     | 74      |
| 228                | 40.230                    | 0.177             | 0.075                                    | 1.31                             | 94              | -1.9                 | -             | 9.20             | -0.11         | 87                    | 412  | 82     | 74      |
| 229                | 40.407                    | 0.177             | 0.076                                    | 1.31                             | 94              | -1.9                 | -             | 9.09             | -0.11         | 87                    | 409  | 83     | 74      |
| 230                | 40.585                    | 0.178             | 0.077                                    | 1.30                             | 94              | -1.8                 | 99            | 9.00             | -0.09         | 87                    | 408  | 85     | 74      |
| 231                | 40.763                    | 0.178             | 0.076                                    | 1.31                             | 94              | -1.9                 | -             | 8.90             | -0.10         | 87                    | 406  | 85     | 74      |
| 232                | 40.939                    | 0.176             | 0.076                                    | 1.30                             | 94              | -1.9                 | -             | 8.80             | -0.10         | 87                    | 402  | 85     | 74      |
| 233                | 41.116                    | 0.177             | 0.074                                    | 1.31                             | 94              | -2.0                 | -             | 8.72             | -0.08         | 87                    | 399  | 85     | 74      |
| 234                | 41.293                    | 0.177             | 0.076                                    | 1.31                             | 94              | -2.0                 | -             | 8.62             | -0.10         | 87                    | 396  | 85     | 74      |
| 235                | 41.471                    | 0.178             | 0.077                                    | 1.30                             | 94              | -1.9                 | -             | 8.53             | -0.09         | 87                    | 393  | 84     | 74      |
| 236                | 41.649                    | 0.178             | 0.075                                    | 1.30                             | 94              | -1.9                 | -             | 8.44             | -0.09         | 87                    | 390  | 83     | 74      |
| 237                | 41.825                    | 0.176             | 0.076                                    | 1.31                             | 94              | -2.0                 | -             | 8.35             | -0.09         | 86                    | 388  | 82     | 74      |
| 238                | 42.002                    | 0.177             | 0.076                                    | 1.31                             | 94              | -2.0                 | -             | 8.27             | -0.08         | 86                    | 386  | 83     | 74      |
| 239                | 42.180                    | 0.178             | 0.075                                    | 1.30                             | 94              | -2.0                 | -             | 8.17             | -0.10         | 86                    | 385  | 84     | 74      |
| 240                | 42.357                    | 0.177             | 0.076                                    | 1.30                             | 94              | -2.0                 | 99            | 8.10             | -0.07         | 86                    | 384  | 85     | 74      |
| 241                | 42.535                    | 0.178             | 0.076                                    | 1.30                             | 94              | -1.9                 | -             | 8.02             | -0.08         | 86                    | 381  | 85     | 74      |
| 242                | 42.711                    | 0.176             | 0.075                                    | 1.30                             | 94              | -2.0                 | -             | 7.96             | -0.06         | 86                    | 378  | 85     | 74      |
| 243                | 42.888                    | 0.177             | 0.074                                    | 1.29                             | 95              | -2.0                 | -             | 7.89             | -0.07         | 86                    | 383  | 84     | 74      |
| 244                | 43.066                    | 0.178             | 0.076                                    | 1.29                             | 94              | -2.0                 | -             | 7.81             | -0.08         | 86                    | 392  | 83     | 74      |
| 245                | 43.243                    | 0.177             | 0.074                                    | 1.30                             | 94              | -1.9                 | -             | 7.74             | -0.07         | 86                    | 394  | 82     | 74      |
| 246                | 43.421                    | 0.178             | 0.077                                    | 1.31                             | 95              | -2.0                 | -             | 7.68             | -0.06         | 86                    | 393  | 83     | 74      |
| 247                | 43.597                    | 0.176             | 0.076                                    | 1.30                             | 95              | -2.0                 | -             | 7.58             | -0.10         | 86                    | 392  | 84     | 75      |
| 248                | 43.774                    | 0.177             | 0.076                                    | 1.30                             | 95              | -2.0                 | -             | 7.62             | 0.04          | 90                    | 394  | 85     | 74      |
| 249                | 43.951                    | 0.177             | 0.074                                    | 1.31                             | 95              | -2.0                 | -             | 7.61             | -0.01         | 91                    | 394  | 84     | 73      |
| 250                | 44.129                    | 0.178             | 0.076                                    | 1.31                             | 95              | -2.0                 | 99            | 7.57             | -0.04         | 92                    | 395  | 83     | 73      |
| 251                | 44.307                    | 0.178             | 0.075                                    | 1.29                             | 95              | -2.0                 | -             | 7.55             | -0.02         | 92                    | 396  | 82     | 73      |
| 252                | 44.482                    | 0.175             | 0.075                                    | 1.31                             | 95              | -2.0                 | -             | 7.52             | -0.03         | 92                    | 395  | 83     | 73      |
| 253                | 44.660                    | 0.178             | 0.075                                    | 1.31                             | 95              | -2.1                 | -             | 7.48             | -0.04         | 92                    | 398  | 84     | 73      |
| 254                | 44.837                    | 0.177             | 0.075                                    | 1.30                             | 95              | -2.0                 | -             | 7.43             | -0.05         | 93                    | 399  | 85     | 73      |
| 255                | 45.015                    | 0.178             | 0.076                                    | 1.30                             | 95              | -2.0                 | -             | 7.39             | -0.04         | 92                    | 395  | 85     | 73      |

# BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: SBI  
 Model: St Louis  
 Run #: 1

Job #: 24-303  
 Tracking #: 216  
 Technician: AK  
 Date: 12/9/2024

| Elapsed Time (min) | Particulate Sampling Data |                   |                                          |                                  |                 |                      |               | Fuel Weight (lb) |               | Temperature Data (°F) |      |        |         |
|--------------------|---------------------------|-------------------|------------------------------------------|----------------------------------|-----------------|----------------------|---------------|------------------|---------------|-----------------------|------|--------|---------|
|                    | Gas Meter (ft³)           | Sample Rate (cfm) | Dilution Tunnel dP (in H <sub>2</sub> O) | Orifice dH (in H <sub>2</sub> O) | Meter Temp (°F) | Meter Vacuum (in Hg) | Pro. Rate (%) | Scale Reading    | Weight Change | Dilution Tunnel       | Flue | Filter | Ambient |
| 256                | 45.193                    | 0.178             | 0.076                                    | 1.30                             | 95              | -2.1                 | -             | 7.33             | -0.06         | 92                    | 387  | 85     | 73      |
| 257                | 45.368                    | 0.175             | 0.076                                    | 1.30                             | 95              | -2.0                 | -             | 7.28             | -0.05         | 92                    | 383  | 84     | 72      |
| 258                | 45.545                    | 0.177             | 0.077                                    | 1.30                             | 95              | -2.1                 | -             | 7.22             | -0.06         | 92                    | 379  | 83     | 72      |
| 259                | 45.723                    | 0.178             | 0.075                                    | 1.30                             | 95              | -2.1                 | -             | 7.17             | -0.05         | 92                    | 379  | 82     | 72      |
| 260                | 45.901                    | 0.178             | 0.076                                    | 1.30                             | 95              | -2.1                 | 100           | 7.12             | -0.05         | 92                    | 377  | 83     | 72      |
| 261                | 46.079                    | 0.178             | 0.076                                    | 1.31                             | 95              | -2.2                 | -             | 7.07             | -0.05         | 92                    | 378  | 84     | 72      |
| 262                | 46.254                    | 0.175             | 0.077                                    | 1.31                             | 95              | -2.2                 | -             | 7.02             | -0.05         | 91                    | 378  | 85     | 72      |
| 263                | 46.431                    | 0.177             | 0.077                                    | 1.32                             | 95              | -2.2                 | -             | 6.96             | -0.06         | 91                    | 377  | 85     | 72      |
| 264                | 46.609                    | 0.178             | 0.077                                    | 1.30                             | 95              | -2.2                 | -             | 6.91             | -0.05         | 91                    | 377  | 85     | 72      |
| 265                | 46.787                    | 0.178             | 0.076                                    | 1.31                             | 95              | -2.2                 | -             | 6.85             | -0.06         | 91                    | 375  | 84     | 72      |
| 266                | 46.964                    | 0.177             | 0.075                                    | 1.31                             | 95              | -2.3                 | -             | 6.81             | -0.04         | 91                    | 373  | 83     | 72      |
| 267                | 47.140                    | 0.176             | 0.076                                    | 1.31                             | 95              | -2.2                 | -             | 6.77             | -0.04         | 91                    | 372  | 82     | 72      |
| 268                | 47.318                    | 0.178             | 0.076                                    | 1.30                             | 95              | -2.2                 | -             | 6.73             | -0.04         | 91                    | 370  | 83     | 72      |
| 269                | 47.495                    | 0.177             | 0.077                                    | 1.31                             | 95              | -2.2                 | -             | 6.68             | -0.05         | 91                    | 370  | 84     | 72      |
| 270                | 47.673                    | 0.178             | 0.075                                    | 1.29                             | 95              | -2.2                 | 100           | 6.64             | -0.04         | 91                    | 369  | 84     | 72      |
| 271                | 47.850                    | 0.177             | 0.075                                    | 1.30                             | 95              | -2.3                 | -             | 6.60             | -0.04         | 91                    | 366  | 85     | 72      |
| 272                | 48.026                    | 0.176             | 0.073                                    | 1.32                             | 95              | -2.2                 | -             | 6.58             | -0.02         | 91                    | 368  | 84     | 72      |
| 273                | 48.204                    | 0.178             | 0.075                                    | 1.30                             | 95              | -2.3                 | -             | 6.55             | -0.03         | 91                    | 375  | 83     | 72      |
| 274                | 48.381                    | 0.177             | 0.076                                    | 1.30                             | 95              | -2.3                 | -             | 6.51             | -0.04         | 91                    | 376  | 83     | 72      |
| 275                | 48.559                    | 0.178             | 0.075                                    | 1.30                             | 95              | -2.3                 | -             | 6.48             | -0.03         | 90                    | 357  | 83     | 72      |
| 276                | 48.736                    | 0.177             | 0.076                                    | 1.30                             | 95              | -2.3                 | -             | 6.45             | -0.03         | 90                    | 344  | 84     | 72      |
| 277                | 48.912                    | 0.176             | 0.075                                    | 1.30                             | 95              | -2.3                 | -             | 6.41             | -0.04         | 90                    | 338  | 85     | 72      |
| 278                | 49.089                    | 0.177             | 0.075                                    | 1.30                             | 95              | -2.4                 | -             | 6.38             | -0.03         | 90                    | 335  | 85     | 72      |
| 279                | 49.267                    | 0.178             | 0.076                                    | 1.30                             | 95              | -2.4                 | -             | 6.36             | -0.02         | 89                    | 332  | 85     | 72      |
| 280                | 49.445                    | 0.178             | 0.076                                    | 1.30                             | 95              | -2.3                 | 100           | 6.35             | -0.01         | 89                    | 305  | 84     | 72      |
| 281                | 49.622                    | 0.177             | 0.076                                    | 1.30                             | 95              | -2.3                 | -             | 6.34             | -0.01         | 88                    | 283  | 83     | 72      |
| 282                | 49.798                    | 0.176             | 0.077                                    | 1.33                             | 95              | -2.4                 | -             | 6.33             | -0.01         | 88                    | 271  | 83     | 71      |
| 283                | 49.976                    | 0.178             | 0.077                                    | 1.30                             | 95              | -2.4                 | -             | 6.30             | -0.03         | 87                    | 263  | 84     | 71      |
| 284                | 50.154                    | 0.178             | 0.075                                    | 1.31                             | 95              | -2.4                 | -             | 6.29             | -0.01         | 87                    | 257  | 85     | 72      |
| 285                | 50.331                    | 0.177             | 0.077                                    | 1.30                             | 95              | -2.3                 | -             | 6.27             | -0.02         | 87                    | 252  | 84     | 71      |
| 286                | 50.508                    | 0.177             | 0.077                                    | 1.31                             | 95              | -2.5                 | -             | 6.25             | -0.02         | 87                    | 248  | 83     | 71      |
| 287                | 50.685                    | 0.177             | 0.077                                    | 1.31                             | 95              | -2.4                 | -             | 6.24             | -0.01         | 86                    | 245  | 82     | 71      |

# BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: SBI  
 Model: St Louis  
 Run #: 1

Job #: 24-303  
 Tracking #: 216  
 Technician: AK  
 Date: 12/9/2024

| Elapsed Time (min) | Particulate Sampling Data |                   |                                          |                                  |                 |                      |               | Fuel Weight (lb) |               | Temperature Data (°F) |      |        |         |
|--------------------|---------------------------|-------------------|------------------------------------------|----------------------------------|-----------------|----------------------|---------------|------------------|---------------|-----------------------|------|--------|---------|
|                    | Gas Meter (ft³)           | Sample Rate (cfm) | Dilution Tunnel dP (in H <sub>2</sub> O) | Orifice dH (in H <sub>2</sub> O) | Meter Temp (°F) | Meter Vacuum (in Hg) | Pro. Rate (%) | Scale Reading    | Weight Change | Dilution Tunnel       | Flue | Filter | Ambient |
| 288                | 50.862                    | 0.177             | 0.075                                    | 1.30                             | 95              | -2.5                 | -             | 6.22             | -0.02         | 86                    | 241  | 83     | 71      |
| 289                | 51.040                    | 0.178             | 0.077                                    | 1.32                             | 95              | -2.4                 | -             | 6.19             | -0.03         | 86                    | 240  | 84     | 71      |
| 290                | 51.218                    | 0.178             | 0.076                                    | 1.30                             | 95              | -2.4                 | 99            | 6.18             | -0.01         | 86                    | 237  | 85     | 71      |
| 291                | 51.394                    | 0.176             | 0.076                                    | 1.31                             | 95              | -2.5                 | -             | 6.16             | -0.02         | 86                    | 234  | 85     | 71      |
| 292                | 51.571                    | 0.177             | 0.077                                    | 1.32                             | 95              | -2.4                 | -             | 6.15             | -0.01         | 86                    | 232  | 85     | 71      |
| 293                | 51.749                    | 0.178             | 0.077                                    | 1.30                             | 95              | -2.4                 | -             | 6.13             | -0.02         | 86                    | 231  | 85     | 71      |
| 294                | 51.927                    | 0.178             | 0.077                                    | 1.29                             | 95              | -2.5                 | -             | 6.10             | -0.03         | 85                    | 228  | 83     | 71      |
| 295                | 52.105                    | 0.178             | 0.075                                    | 1.30                             | 95              | -2.6                 | -             | 6.09             | -0.01         | 85                    | 226  | 82     | 71      |
| 296                | 52.281                    | 0.176             | 0.076                                    | 1.31                             | 95              | -2.5                 | -             | 6.07             | -0.02         | 85                    | 223  | 83     | 71      |
| 297                | 52.459                    | 0.178             | 0.077                                    | 1.31                             | 95              | -2.5                 | -             | 6.06             | -0.01         | 85                    | 223  | 84     | 71      |
| 298                | 52.636                    | 0.177             | 0.078                                    | 1.31                             | 95              | -2.5                 | -             | 6.05             | -0.01         | 85                    | 222  | 85     | 71      |
| 299                | 52.814                    | 0.178             | 0.075                                    | 1.30                             | 95              | -2.6                 | -             | 6.03             | -0.02         | 85                    | 220  | 85     | 71      |
| 300                | 52.992                    | 0.178             | 0.076                                    | 1.30                             | 95              | -2.6                 | 99            | 6.01             | -0.02         | 84                    | 219  | 85     | 71      |
| 301                | 53.168                    | 0.176             | 0.077                                    | 1.31                             | 95              | -2.5                 | -             | 5.99             | -0.02         | 84                    | 217  | 84     | 71      |
| 302                | 53.346                    | 0.178             | 0.077                                    | 1.31                             | 95              | -2.6                 | -             | 5.98             | -0.01         | 84                    | 215  | 82     | 71      |
| 303                | 53.524                    | 0.178             | 0.076                                    | 1.31                             | 95              | -2.6                 | -             | 5.96             | -0.02         | 84                    | 214  | 82     | 71      |
| 304                | 53.702                    | 0.178             | 0.077                                    | 1.30                             | 95              | -2.6                 | -             | 5.93             | -0.03         | 84                    | 214  | 83     | 71      |
| 305                | 53.878                    | 0.176             | 0.077                                    | 1.30                             | 95              | -2.6                 | -             | 5.92             | -0.01         | 84                    | 213  | 84     | 71      |
| 306                | 54.055                    | 0.177             | 0.077                                    | 1.30                             | 95              | -2.6                 | -             | 5.90             | -0.02         | 84                    | 211  | 85     | 71      |
| 307                | 54.233                    | 0.178             | 0.077                                    | 1.32                             | 95              | -2.6                 | -             | 5.89             | -0.01         | 84                    | 209  | 85     | 71      |
| 308                | 54.411                    | 0.178             | 0.077                                    | 1.30                             | 95              | -2.6                 | -             | 5.88             | -0.01         | 83                    | 208  | 83     | 71      |
| 309                | 54.589                    | 0.178             | 0.076                                    | 1.30                             | 96              | -2.7                 | -             | 5.86             | -0.02         | 83                    | 208  | 82     | 71      |
| 310                | 54.765                    | 0.176             | 0.076                                    | 1.30                             | 96              | -2.7                 | 99            | 5.84             | -0.02         | 83                    | 206  | 83     | 71      |
| 311                | 54.942                    | 0.177             | 0.075                                    | 1.31                             | 95              | -2.6                 | -             | 5.83             | -0.01         | 83                    | 206  | 84     | 71      |
| 312                | 55.120                    | 0.178             | 0.076                                    | 1.31                             | 95              | -2.7                 | -             | 5.81             | -0.02         | 83                    | 204  | 85     | 70      |
| 313                | 55.298                    | 0.178             | 0.077                                    | 1.31                             | 95              | -2.6                 | -             | 5.79             | -0.02         | 83                    | 205  | 84     | 71      |
| 314                | 55.476                    | 0.178             | 0.077                                    | 1.31                             | 95              | -2.7                 | -             | 5.76             | -0.03         | 83                    | 203  | 83     | 70      |
| 315                | 55.652                    | 0.176             | 0.077                                    | 1.30                             | 96              | -2.7                 | -             | 5.75             | -0.01         | 82                    | 203  | 82     | 70      |
| 316                | 55.829                    | 0.177             | 0.078                                    | 1.31                             | 95              | -2.7                 | -             | 5.74             | -0.01         | 82                    | 202  | 82     | 70      |
| 317                | 56.007                    | 0.178             | 0.077                                    | 1.31                             | 95              | -2.8                 | -             | 5.72             | -0.02         | 82                    | 201  | 84     | 70      |
| 318                | 56.185                    | 0.178             | 0.077                                    | 1.31                             | 95              | -2.7                 | -             | 5.70             | -0.02         | 82                    | 201  | 84     | 70      |
| 319                | 56.362                    | 0.177             | 0.077                                    | 1.31                             | 95              | -2.7                 | -             | 5.69             | -0.01         | 82                    | 201  | 84     | 70      |

# BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: SBI  
 Model: St Louis  
 Run #: 1

Job #: 24-303  
 Tracking #: 216  
 Technician: AK  
 Date: 12/9/2024

| Elapsed Time (min) | Particulate Sampling Data |                   |                                          |                                  |                 |                      |               | Fuel Weight (lb) |               | Temperature Data (°F) |      |        |         |
|--------------------|---------------------------|-------------------|------------------------------------------|----------------------------------|-----------------|----------------------|---------------|------------------|---------------|-----------------------|------|--------|---------|
|                    | Gas Meter (ft³)           | Sample Rate (cfm) | Dilution Tunnel dP (in H <sub>2</sub> O) | Orifice dH (in H <sub>2</sub> O) | Meter Temp (°F) | Meter Vacuum (in Hg) | Pro. Rate (%) | Scale Reading    | Weight Change | Dilution Tunnel       | Flue | Filter | Ambient |
| 320                | 56.539                    | 0.177             | 0.076                                    | 1.31                             | 95              | -2.7                 | 99            | 5.67             | -0.02         | 82                    | 200  | 83     | 70      |
| 321                | 56.717                    | 0.178             | 0.075                                    | 1.30                             | 95              | -2.8                 | -             | 5.66             | -0.01         | 82                    | 198  | 82     | 70      |
| 322                | 56.895                    | 0.178             | 0.076                                    | 1.30                             | 95              | -2.8                 | -             | 5.64             | -0.02         | 82                    | 197  | 83     | 70      |
| 323                | 57.073                    | 0.178             | 0.078                                    | 1.31                             | 95              | -2.7                 | -             | 5.62             | -0.02         | 82                    | 197  | 84     | 70      |
| 324                | 57.249                    | 0.176             | 0.077                                    | 1.31                             | 95              | -2.8                 | -             | 5.61             | -0.01         | 82                    | 196  | 85     | 70      |
| 325                | 57.426                    | 0.177             | 0.078                                    | 1.31                             | 95              | -2.7                 | -             | 5.58             | -0.03         | 82                    | 196  | 84     | 70      |
| 326                | 57.605                    | 0.179             | 0.076                                    | 1.31                             | 95              | -2.7                 | -             | 5.56             | -0.02         | 81                    | 194  | 83     | 70      |
| 327                | 57.783                    | 0.178             | 0.077                                    | 1.31                             | 95              | -2.8                 | -             | 5.55             | -0.01         | 81                    | 194  | 82     | 70      |
| 328                | 57.960                    | 0.177             | 0.077                                    | 1.31                             | 95              | -2.8                 | -             | 5.53             | -0.02         | 81                    | 194  | 83     | 70      |
| 329                | 58.136                    | 0.176             | 0.077                                    | 1.32                             | 95              | -2.8                 | -             | 5.52             | -0.01         | 81                    | 194  | 84     | 70      |
| 330                | 58.314                    | 0.178             | 0.078                                    | 1.30                             | 95              | -2.8                 | 98            | 5.50             | -0.02         | 81                    | 194  | 84     | 70      |
| 331                | 58.492                    | 0.178             | 0.077                                    | 1.30                             | 95              | -2.8                 | -             | 5.49             | -0.01         | 81                    | 192  | 85     | 70      |
| 332                | 58.670                    | 0.178             | 0.077                                    | 1.31                             | 95              | -2.8                 | -             | 5.46             | -0.03         | 81                    | 192  | 84     | 70      |
| 333                | 58.847                    | 0.177             | 0.078                                    | 1.29                             | 95              | -2.8                 | -             | 5.46             | 0.00          | 81                    | 191  | 82     | 70      |
| 334                | 59.024                    | 0.177             | 0.077                                    | 1.30                             | 95              | -2.9                 | -             | 5.44             | -0.02         | 81                    | 191  | 82     | 70      |
| 335                | 59.202                    | 0.178             | 0.077                                    | 1.31                             | 95              | -2.8                 | -             | 5.42             | -0.02         | 81                    | 191  | 83     | 70      |
| 336                | 59.380                    | 0.178             | 0.076                                    | 1.31                             | 95              | -2.8                 | -             | 5.40             | -0.02         | 80                    | 189  | 84     | 70      |
| 337                | 59.558                    | 0.178             | 0.076                                    | 1.31                             | 95              | -2.8                 | -             | 5.39             | -0.01         | 81                    | 188  | 84     | 70      |
| 338                | 59.734                    | 0.176             | 0.076                                    | 1.31                             | 95              | -2.9                 | -             | 5.37             | -0.02         | 81                    | 189  | 83     | 70      |
| 339                | 59.911                    | 0.177             | 0.075                                    | 1.32                             | 95              | -2.9                 | -             | 5.36             | -0.01         | 80                    | 189  | 82     | 70      |
| 340                | 60.089                    | 0.178             | 0.078                                    | 1.31                             | 95              | -2.8                 | 97            | 5.34             | -0.02         | 80                    | 188  | 82     | 70      |
| 341                | 60.268                    | 0.179             | 0.077                                    | 1.30                             | 95              | -2.8                 | -             | 5.32             | -0.02         | 80                    | 188  | 84     | 70      |
| 342                | 60.445                    | 0.177             | 0.077                                    | 1.31                             | 95              | -2.9                 | -             | 5.31             | -0.01         | 80                    | 187  | 85     | 70      |
| 343                | 60.621                    | 0.176             | 0.078                                    | 1.31                             | 95              | -2.8                 | -             | 5.29             | -0.02         | 80                    | 188  | 84     | 70      |
| 344                | 60.799                    | 0.178             | 0.077                                    | 1.30                             | 95              | -2.9                 | -             | 5.27             | -0.02         | 80                    | 187  | 83     | 70      |
| 345                | 60.977                    | 0.178             | 0.078                                    | 1.30                             | 95              | -3.0                 | -             | 5.26             | -0.01         | 80                    | 187  | 82     | 70      |
| 346                | 61.155                    | 0.178             | 0.076                                    | 1.31                             | 95              | -2.9                 | -             | 5.24             | -0.02         | 80                    | 186  | 82     | 70      |
| 347                | 61.332                    | 0.177             | 0.077                                    | 1.30                             | 95              | -3.0                 | -             | 5.23             | -0.01         | 80                    | 185  | 84     | 70      |
| 348                | 61.509                    | 0.177             | 0.077                                    | 1.32                             | 95              | -3.0                 | -             | 5.21             | -0.02         | 80                    | 185  | 84     | 70      |
| 349                | 61.687                    | 0.178             | 0.077                                    | 1.30                             | 95              | -3.0                 | -             | 5.20             | -0.01         | 80                    | 185  | 84     | 70      |
| 350                | 61.865                    | 0.178             | 0.078                                    | 1.31                             | 95              | -2.9                 | 97            | 5.18             | -0.02         | 80                    | 185  | 85     | 70      |
| 351                | 62.043                    | 0.178             | 0.078                                    | 1.32                             | 95              | -2.9                 | -             | 5.17             | -0.01         | 79                    | 184  | 85     | 70      |

# BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: SBI  
 Model: St Louis  
 Run #: 1

Job #: 24-303  
 Tracking #: 216  
 Technician: AK  
 Date: 12/9/2024

| Elapsed Time (min) | Particulate Sampling Data |                   |                                          |                                  |                 |                      |               | Fuel Weight (lb) |               | Temperature Data (°F) |      |        |         |
|--------------------|---------------------------|-------------------|------------------------------------------|----------------------------------|-----------------|----------------------|---------------|------------------|---------------|-----------------------|------|--------|---------|
|                    | Gas Meter (ft³)           | Sample Rate (cfm) | Dilution Tunnel dP (in H <sub>2</sub> O) | Orifice dH (in H <sub>2</sub> O) | Meter Temp (°F) | Meter Vacuum (in Hg) | Pro. Rate (%) | Scale Reading    | Weight Change | Dilution Tunnel       | Flue | Filter | Ambient |
| 352                | 62.220                    | 0.177             | 0.077                                    | 1.31                             | 95              | -2.9                 | -             | 5.15             | -0.02         | 79                    | 184  | 85     | 70      |
| 353                | 62.397                    | 0.177             | 0.077                                    | 1.31                             | 95              | -3.0                 | -             | 5.13             | -0.02         | 79                    | 184  | 84     | 70      |
| 354                | 62.576                    | 0.179             | 0.076                                    | 1.30                             | 95              | -2.9                 | -             | 5.12             | -0.01         | 80                    | 182  | 82     | 70      |
| 355                | 62.754                    | 0.178             | 0.076                                    | 1.31                             | 95              | -2.9                 | -             | 5.10             | -0.02         | 79                    | 182  | 82     | 70      |
| 356                | 62.931                    | 0.177             | 0.076                                    | 1.30                             | 95              | -3.0                 | -             | 5.08             | -0.02         | 79                    | 182  | 83     | 70      |
| 357                | 63.108                    | 0.177             | 0.076                                    | 1.30                             | 95              | -2.9                 | -             | 5.06             | -0.02         | 79                    | 182  | 84     | 70      |
| 358                | 63.286                    | 0.178             | 0.078                                    | 1.31                             | 95              | -2.9                 | -             | 5.05             | -0.01         | 79                    | 182  | 84     | 70      |
| 359                | 63.464                    | 0.178             | 0.078                                    | 1.31                             | 95              | -3.0                 | -             | 5.03             | -0.02         | 79                    | 182  | 83     | 70      |
| 360                | 63.642                    | 0.178             | 0.078                                    | 1.31                             | 95              | -2.9                 | 97            | 5.02             | -0.01         | 79                    | 183  | 82     | 70      |
| 361                | 63.818                    | 0.176             | 0.078                                    | 1.31                             | 95              | -3.0                 | -             | 5.00             | -0.02         | 79                    | 182  | 82     | 69      |
| 362                | 63.996                    | 0.178             | 0.078                                    | 1.31                             | 95              | -2.9                 | -             | 4.99             | -0.01         | 79                    | 181  | 83     | 69      |
| 363                | 64.174                    | 0.178             | 0.077                                    | 1.31                             | 95              | -3.0                 | -             | 4.97             | -0.02         | 79                    | 181  | 84     | 69      |
| 364                | 64.352                    | 0.178             | 0.076                                    | 1.32                             | 95              | -3.0                 | -             | 4.96             | -0.01         | 79                    | 181  | 85     | 69      |
| 365                | 64.529                    | 0.177             | 0.077                                    | 1.31                             | 95              | -3.0                 | -             | 4.94             | -0.02         | 79                    | 181  | 84     | 69      |
| 366                | 64.706                    | 0.177             | 0.077                                    | 1.30                             | 95              | -3.0                 | -             | 4.93             | -0.01         | 79                    | 180  | 82     | 69      |
| 367                | 64.884                    | 0.178             | 0.077                                    | 1.31                             | 95              | -3.1                 | -             | 4.91             | -0.02         | 79                    | 180  | 82     | 69      |
| 368                | 65.062                    | 0.178             | 0.078                                    | 1.30                             | 95              | -3.0                 | -             | 4.89             | -0.02         | 79                    | 179  | 83     | 69      |
| 369                | 65.241                    | 0.179             | 0.076                                    | 1.30                             | 95              | -3.0                 | -             | 4.88             | -0.01         | 79                    | 179  | 84     | 69      |
| 370                | 65.416                    | 0.175             | 0.078                                    | 1.30                             | 95              | -3.0                 | 97            | 4.86             | -0.02         | 79                    | 179  | 84     | 69      |
| 371                | 65.594                    | 0.178             | 0.077                                    | 1.31                             | 95              | -3.1                 | -             | 4.85             | -0.01         | 79                    | 179  | 83     | 69      |
| 372                | 65.772                    | 0.178             | 0.077                                    | 1.31                             | 95              | -3.1                 | -             | 4.83             | -0.02         | 79                    | 177  | 82     | 69      |
| 373                | 65.951                    | 0.179             | 0.076                                    | 1.31                             | 95              | -3.0                 | -             | 4.81             | -0.02         | 79                    | 177  | 83     | 69      |
| 374                | 66.128                    | 0.177             | 0.077                                    | 1.30                             | 95              | -3.1                 | -             | 4.80             | -0.01         | 79                    | 177  | 84     | 69      |
| 375                | 66.305                    | 0.177             | 0.078                                    | 1.32                             | 95              | -3.1                 | -             | 4.78             | -0.02         | 78                    | 177  | 84     | 69      |
| 376                | 66.483                    | 0.178             | 0.077                                    | 1.31                             | 95              | -3.1                 | -             | 4.77             | -0.01         | 78                    | 177  | 84     | 69      |
| 377                | 66.661                    | 0.178             | 0.079                                    | 1.30                             | 95              | -3.0                 | -             | 4.76             | -0.01         | 78                    | 176  | 84     | 69      |
| 378                | 66.839                    | 0.178             | 0.078                                    | 1.31                             | 95              | -3.0                 | -             | 4.74             | -0.02         | 78                    | 176  | 84     | 69      |
| 379                | 67.015                    | 0.176             | 0.077                                    | 1.30                             | 95              | -3.1                 | -             | 4.72             | -0.02         | 78                    | 177  | 82     | 69      |
| 380                | 67.193                    | 0.178             | 0.078                                    | 1.31                             | 95              | -3.1                 | 97            | 4.71             | -0.01         | 78                    | 176  | 82     | 69      |
| 381                | 67.371                    | 0.178             | 0.077                                    | 1.31                             | 95              | -3.1                 | -             | 4.69             | -0.02         | 78                    | 175  | 83     | 69      |
| 382                | 67.549                    | 0.178             | 0.077                                    | 1.30                             | 95              | -3.1                 | -             | 4.68             | -0.01         | 78                    | 175  | 84     | 69      |
| 383                | 67.727                    | 0.178             | 0.079                                    | 1.31                             | 95              | -3.1                 | -             | 4.66             | -0.02         | 78                    | 175  | 84     | 69      |

# BOX A TEST DATA - ASTM E2780 / ASTM E2515

|                        |                        |  |
|------------------------|------------------------|--|
| Client: <u>SBI</u>     | Job #: <u>24-303</u>   |  |
| Model: <u>St Louis</u> | Tracking #: <u>216</u> |  |
| Run #: <u>1</u>        | Technician: <u>AK</u>  |  |
|                        | Date: <u>12/9/2024</u> |  |

| Elapsed Time (min) | Particulate Sampling Data |                   |                                          |                                  |                 |                      |               | Fuel Weight (lb) |               | Temperature Data (°F) |       |        |         |
|--------------------|---------------------------|-------------------|------------------------------------------|----------------------------------|-----------------|----------------------|---------------|------------------|---------------|-----------------------|-------|--------|---------|
|                    | Gas Meter (ft³)           | Sample Rate (cfm) | Dilution Tunnel dP (in H <sub>2</sub> O) | Orifice dH (in H <sub>2</sub> O) | Meter Temp (°F) | Meter Vacuum (in Hg) | Pro. Rate (%) | Scale Reading    | Weight Change | Dilution Tunnel       | Flue  | Filter | Ambient |
| 384                | 67.904                    | 0.177             | 0.077                                    | 1.31                             | 95              | -3.1                 | -             | 4.64             | -0.02         | 78                    | 174   | 83     | 69      |
| 385                | 68.082                    | 0.178             | 0.078                                    | 1.31                             | 95              | -3.1                 | -             | 4.62             | -0.02         | 78                    | 174   | 82     | 69      |
| 386                | 68.260                    | 0.178             | 0.077                                    | 1.31                             | 95              | -3.1                 | -             | 4.62             | 0.00          | 78                    | 174   | 83     | 69      |
| 387                | 68.438                    | 0.178             | 0.077                                    | 1.32                             | 95              | -3.1                 | -             | 4.61             | -0.01         | 78                    | 174   | 84     | 69      |
| 388                | 68.614                    | 0.176             | 0.077                                    | 1.31                             | 95              | -3.1                 | -             | 4.59             | -0.02         | 78                    | 173   | 84     | 69      |
| 389                | 68.792                    | 0.178             | 0.078                                    | 1.31                             | 95              | -3.1                 | -             | 4.57             | -0.02         | 78                    | 173   | 83     | 69      |
| 390                | 68.970                    | 0.178             | 0.077                                    | 1.31                             | 95              | -3.2                 | 98            | 4.56             | -0.01         | 78                    | 173   | 82     | 68      |
| 391                | 69.148                    | 0.178             | 0.077                                    | 1.31                             | 95              | -3.1                 | -             | 4.55             | -0.01         | 77                    | 173   | 82     | 68      |
| 392                | 69.326                    | 0.178             | 0.077                                    | 1.32                             | 95              | -3.2                 | -             | 4.53             | -0.02         | 77                    | 172   | 83     | 68      |
| 393                | 69.503                    | 0.177             | 0.078                                    | 1.31                             | 95              | -3.1                 | -             | 4.52             | -0.01         | 77                    | 172   | 84     | 68      |
| 394                | 69.681                    | 0.178             | 0.079                                    | 1.31                             | 95              | -3.2                 | -             | 4.50             | -0.02         | 77                    | 172   | 84     | 68      |
| 395                | 69.859                    | 0.178             | 0.076                                    | 1.31                             | 95              | -3.1                 | -             | 4.49             | -0.01         | 77                    | 172   | 83     | 68      |
| 396                | 70.037                    | 0.178             | 0.077                                    | 1.31                             | 95              | -3.1                 | 98            | 4.48             | -0.01         | 77                    | 172   | 82     | 68      |
| Avg/Tot            | 70.038                    | 0.177             | 0.076                                    | 1.30                             | 89.4            | -2.0                 | 100           |                  |               | 86.1                  | 364.9 | 83.5   | 71.0    |

# BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: SBI  
 Model: St Louis  
 Run #: 1

Job #: 24-303  
 Tracking #: 216  
 Technician: AK  
 Date: 12/9/2024

| Elapsed Time (min) | Particulate Sampling Data    |                   |                                  |                 |                      |               |             | Flue Gas Data                    |                     |        |
|--------------------|------------------------------|-------------------|----------------------------------|-----------------|----------------------|---------------|-------------|----------------------------------|---------------------|--------|
|                    | Gas Meter (ft <sup>3</sup> ) | Sample Rate (cfm) | Orifice dH (in H <sub>2</sub> O) | Meter Temp (°F) | Meter Vacuum (in Hg) | Pro. Rate (%) | Filter (°F) | Flue Draft (in H <sub>2</sub> O) | CO <sub>2</sub> (%) | CO (%) |
| 0                  | -0.001                       |                   | 0.00                             | 67              | -0.5                 |               | 85          | 0.003                            | 0.10                | 0.006  |
| 1                  | 0.148                        | 0.149             | 1.36                             | 67              | -1.5                 | -             | 84          | 0.004                            | 1.10                | 0.090  |
| 2                  | 0.320                        | 0.172             | 1.34                             | 67              | -1.5                 | -             | 83          | 0.001                            | 2.34                | 0.107  |
| 3                  | 0.490                        | 0.170             | 1.32                             | 67              | -1.6                 | -             | 83          | 0.002                            | 8.76                | 0.201  |
| 4                  | 0.659                        | 0.169             | 1.31                             | 67              | -1.4                 | -             | 82          | 0.005                            | 10.64               | 0.228  |
| 5                  | 0.829                        | 0.170             | 1.31                             | 67              | -1.4                 | -             | 82          | 0.005                            | 12.95               | 0.350  |
| 6                  | 0.998                        | 0.169             | 1.32                             | 67              | -1.4                 | -             | 81          | 0.004                            | 14.43               | 0.731  |
| 7                  | 1.168                        | 0.170             | 1.30                             | 67              | -1.5                 | -             | 81          | 0.007                            | 13.62               | 0.392  |
| 8                  | 1.338                        | 0.170             | 1.30                             | 67              | -1.6                 | -             | 81          | 0.006                            | 13.42               | 0.241  |
| 9                  | 1.507                        | 0.169             | 1.29                             | 67              | -1.4                 | -             | 81          | 0.006                            | 11.88               | 0.185  |
| 10                 | 1.675                        | 0.168             | 1.30                             | 67              | -1.6                 | 103           | 82          | 0.006                            | 11.83               | 0.176  |
| 11                 | 1.843                        | 0.168             | 1.29                             | 68              | -1.4                 | -             | 82          | 0.004                            | 11.80               | 0.176  |
| 12                 | 2.011                        | 0.168             | 1.31                             | 68              | -1.4                 | -             | 83          | 0.006                            | 10.98               | 0.201  |
| 13                 | 2.179                        | 0.168             | 1.30                             | 68              | -1.4                 | -             | 83          | 0.004                            | 11.07               | 0.201  |
| 14                 | 2.347                        | 0.168             | 1.29                             | 68              | -1.5                 | -             | 84          | 0.007                            | 10.23               | 0.244  |
| 15                 | 2.516                        | 0.169             | 1.29                             | 68              | -1.5                 | -             | 85          | 0.008                            | 10.12               | 0.233  |
| 16                 | 2.684                        | 0.168             | 1.29                             | 69              | -1.4                 | -             | 86          | 0.006                            | 10.91               | 0.189  |
| 17                 | 2.850                        | 0.166             | 1.28                             | 69              | -1.5                 | -             | 87          | 0.006                            | 11.05               | 0.164  |
| 18                 | 3.017                        | 0.167             | 1.30                             | 69              | -1.4                 | -             | 86          | 0.005                            | 10.62               | 0.142  |
| 19                 | 3.184                        | 0.167             | 1.27                             | 69              | -1.5                 | -             | 86          | 0.004                            | 10.49               | 0.149  |
| 20                 | 3.352                        | 0.168             | 1.30                             | 70              | -1.4                 | 106           | 85          | 0.007                            | 4.10                | 0.083  |
| 21                 | 3.520                        | 0.168             | 1.28                             | 70              | -1.6                 | -             | 85          | 0.003                            | 5.21                | 0.622  |
| 22                 | 3.686                        | 0.166             | 1.28                             | 70              | -1.4                 | -             | 84          | 0.003                            | 10.58               | 0.491  |
| 23                 | 3.852                        | 0.166             | 1.30                             | 71              | -1.5                 | -             | 84          | 0.010                            | 11.97               | 0.289  |
| 24                 | 4.019                        | 0.167             | 1.29                             | 71              | -1.6                 | -             | 84          | 0.006                            | 9.73                | 0.214  |
| 25                 | 4.187                        | 0.168             | 1.28                             | 71              | -1.4                 | -             | 84          | 0.004                            | 9.12                | 0.243  |
| 26                 | 4.355                        | 0.168             | 1.27                             | 71              | -1.5                 | -             | 84          | 0.007                            | 9.61                | 0.295  |
| 27                 | 4.522                        | 0.167             | 1.29                             | 72              | -1.4                 | -             | 84          | 0.002                            | 9.69                | 0.201  |
| 28                 | 4.688                        | 0.166             | 1.29                             | 72              | -1.5                 | -             | 85          | 0.008                            | 7.92                | 0.446  |
| 29                 | 4.855                        | 0.167             | 1.28                             | 72              | -1.4                 | -             | 85          | 0.005                            | 7.32                | 0.496  |
| 30                 | 5.022                        | 0.167             | 1.29                             | 73              | -1.4                 | 105           | 86          | 0.009                            | 10.21               | 0.219  |
| 31                 | 5.190                        | 0.168             | 1.29                             | 73              | -1.4                 | -             | 86          | 0.007                            | 12.76               | 0.257  |



# BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: SBI  
 Model: St Louis  
 Run #: 1

Job #: 24-303  
 Tracking #: 216  
 Technician: AK  
 Date: 12/9/2024

| Elapsed Time (min) | Particulate Sampling Data    |                   |                                  |                 |                      |               |             | Flue Gas Data                    |                     |        |
|--------------------|------------------------------|-------------------|----------------------------------|-----------------|----------------------|---------------|-------------|----------------------------------|---------------------|--------|
|                    | Gas Meter (ft <sup>3</sup> ) | Sample Rate (cfm) | Orifice dH (in H <sub>2</sub> O) | Meter Temp (°F) | Meter Vacuum (in Hg) | Pro. Rate (%) | Filter (°F) | Flue Draft (in H <sub>2</sub> O) | CO <sub>2</sub> (%) | CO (%) |
| 32                 | 5.356                        | 0.166             | 1.28                             | 73              | -1.5                 | -             | 86          | 0.006                            | 13.98               | 0.245  |
| 33                 | 5.523                        | 0.167             | 1.29                             | 74              | -1.4                 | -             | 85          | 0.013                            | 13.92               | 0.150  |
| 34                 | 5.689                        | 0.166             | 1.30                             | 74              | -1.4                 | -             | 85          | 0.009                            | 12.47               | 0.121  |
| 35                 | 5.857                        | 0.168             | 1.30                             | 74              | -1.4                 | -             | 85          | 0.002                            | 11.58               | 0.191  |
| 36                 | 6.025                        | 0.168             | 1.29                             | 74              | -1.4                 | -             | 84          | 0.003                            | 11.55               | 0.208  |
| 37                 | 6.192                        | 0.167             | 1.27                             | 75              | -1.5                 | -             | 84          | 0.008                            | 11.85               | 0.144  |
| 38                 | 6.358                        | 0.166             | 1.28                             | 75              | -1.4                 | -             | 84          | -0.001                           | 12.03               | 0.097  |
| 39                 | 6.525                        | 0.167             | 1.29                             | 75              | -1.5                 | -             | 84          | 0.004                            | 12.49               | 0.073  |
| 40                 | 6.693                        | 0.168             | 1.29                             | 76              | -1.5                 | 103           | 84          | 0.009                            | 13.09               | 0.062  |
| 41                 | 6.861                        | 0.168             | 1.28                             | 76              | -1.4                 | -             | 85          | 0.013                            | 12.58               | 0.058  |
| 42                 | 7.028                        | 0.167             | 1.27                             | 76              | -1.4                 | -             | 86          | 0.006                            | 12.03               | 0.051  |
| 43                 | 7.194                        | 0.166             | 1.27                             | 77              | -1.4                 | -             | 86          | 0.004                            | 11.97               | 0.052  |
| 44                 | 7.361                        | 0.167             | 1.29                             | 77              | -1.4                 | -             | 86          | 0.003                            | 12.46               | 0.063  |
| 45                 | 7.528                        | 0.167             | 1.26                             | 77              | -1.4                 | -             | 87          | 0.012                            | 12.34               | 0.070  |
| 46                 | 7.697                        | 0.169             | 1.28                             | 77              | -1.4                 | -             | 87          | 0.004                            | 12.32               | 0.071  |
| 47                 | 7.864                        | 0.167             | 1.31                             | 78              | -1.5                 | -             | 87          | 0.003                            | 13.08               | 0.093  |
| 48                 | 8.031                        | 0.167             | 1.27                             | 78              | -1.5                 | -             | 86          | 0.004                            | 13.16               | 0.109  |
| 49                 | 8.198                        | 0.167             | 1.28                             | 78              | -1.5                 | -             | 86          | 0.004                            | 13.38               | 0.183  |
| 50                 | 8.365                        | 0.167             | 1.29                             | 79              | -1.5                 | 102           | 85          | 0.006                            | 12.57               | 0.134  |
| 51                 | 8.534                        | 0.169             | 1.28                             | 79              | -1.5                 | -             | 85          | 0.006                            | 12.21               | 0.142  |
| 52                 | 8.702                        | 0.168             | 1.29                             | 79              | -1.4                 | -             | 84          | 0.003                            | 12.37               | 0.131  |
| 53                 | 8.870                        | 0.168             | 1.29                             | 79              | -1.5                 | -             | 84          | 0.006                            | 12.52               | 0.118  |
| 54                 | 9.037                        | 0.167             | 1.28                             | 80              | -1.4                 | -             | 84          | 0.004                            | 12.72               | 0.112  |
| 55                 | 9.205                        | 0.168             | 1.29                             | 80              | -1.4                 | -             | 84          | 0.005                            | 13.03               | 0.099  |
| 56                 | 9.372                        | 0.167             | 1.29                             | 80              | -1.4                 | -             | 84          | 0.009                            | 13.25               | 0.097  |
| 57                 | 9.541                        | 0.169             | 1.29                             | 80              | -1.4                 | -             | 85          | 0.010                            | 13.58               | 0.093  |
| 58                 | 9.710                        | 0.169             | 1.28                             | 80              | -1.4                 | -             | 85          | 0.007                            | 13.71               | 0.105  |
| 59                 | 9.878                        | 0.168             | 1.28                             | 81              | -1.5                 | -             | 85          | 0.001                            | 13.97               | 0.102  |
| 60                 | 10.045                       | 0.167             | 1.28                             | 81              | -1.4                 | 102           | 85          | 0.007                            | 14.16               | 0.107  |
| 61                 | 10.213                       | 0.168             | 1.31                             | 81              | -1.4                 | -             | 85          | 0.002                            | 14.48               | 0.199  |
| 62                 | 10.381                       | 0.168             | 1.31                             | 81              | -1.4                 | -             | 85          | 0.005                            | 14.85               | 0.299  |
| 63                 | 10.549                       | 0.168             | 1.29                             | 82              | -1.4                 | -             | 85          | 0.010                            | 14.99               | 0.340  |

# BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: SBI  
 Model: St Louis  
 Run #: 1

Job #: 24-303  
 Tracking #: 216  
 Technician: AK  
 Date: 12/9/2024

| Elapsed Time (min) | Particulate Sampling Data    |                   |                                  |                 |                      |               |             | Flue Gas Data                    |                     |        |
|--------------------|------------------------------|-------------------|----------------------------------|-----------------|----------------------|---------------|-------------|----------------------------------|---------------------|--------|
|                    | Gas Meter (ft <sup>3</sup> ) | Sample Rate (cfm) | Orifice dH (in H <sub>2</sub> O) | Meter Temp (°F) | Meter Vacuum (in Hg) | Pro. Rate (%) | Filter (°F) | Flue Draft (in H <sub>2</sub> O) | CO <sub>2</sub> (%) | CO (%) |
| 64                 | 10.718                       | 0.169             | 1.28                             | 82              | -1.4                 | -             | 85          | 0.010                            | 14.84               | 0.293  |
| 65                 | 10.887                       | 0.169             | 1.29                             | 82              | -1.5                 | -             | 85          | 0.005                            | 15.06               | 0.279  |
| 66                 | 11.055                       | 0.168             | 1.29                             | 82              | -1.4                 | -             | 84          | 0.005                            | 14.42               | 0.190  |
| 67                 | 11.222                       | 0.167             | 1.29                             | 82              | -1.5                 | -             | 84          | 0.002                            | 13.82               | 0.132  |
| 68                 | 11.390                       | 0.168             | 1.28                             | 83              | -1.5                 | -             | 84          | 0.014                            | 13.64               | 0.105  |
| 69                 | 11.558                       | 0.168             | 1.29                             | 83              | -1.4                 | -             | 84          | 0.006                            | 13.45               | 0.099  |
| 70                 | 11.727                       | 0.169             | 1.27                             | 83              | -1.4                 | 101           | 84          | 0.004                            | 13.46               | 0.089  |
| 71                 | 11.897                       | 0.170             | 1.30                             | 83              | -1.4                 | -             | 84          | 0.005                            | 13.64               | 0.100  |
| 72                 | 12.065                       | 0.168             | 1.27                             | 83              | -1.5                 | -             | 84          | 0.006                            | 13.80               | 0.130  |
| 73                 | 12.233                       | 0.168             | 1.29                             | 84              | -1.4                 | -             | 84          | 0.009                            | 14.36               | 0.217  |
| 74                 | 12.401                       | 0.168             | 1.27                             | 84              | -1.4                 | -             | 84          | 0.004                            | 13.77               | 0.143  |
| 75                 | 12.569                       | 0.168             | 1.28                             | 84              | -1.5                 | -             | 84          | 0.001                            | 12.93               | 0.078  |
| 76                 | 12.737                       | 0.168             | 1.28                             | 84              | -1.5                 | -             | 84          | -0.001                           | 12.94               | 0.076  |
| 77                 | 12.906                       | 0.169             | 1.29                             | 84              | -1.4                 | -             | 84          | 0.007                            | 13.56               | 0.113  |
| 78                 | 13.075                       | 0.169             | 1.28                             | 85              | -1.4                 | -             | 84          | 0.011                            | 13.38               | 0.076  |
| 79                 | 13.243                       | 0.168             | 1.29                             | 85              | -1.4                 | -             | 86          | 0.012                            | 4.14                | 0.077  |
| 80                 | 13.410                       | 0.167             | 1.30                             | 85              | -1.5                 | 102           | 86          | 0.001                            | 6.93                | 0.133  |
| 81                 | 13.578                       | 0.168             | 1.29                             | 85              | -1.4                 | -             | 86          | 0.012                            | 16.10               | 0.878  |
| 82                 | 13.745                       | 0.167             | 1.28                             | 85              | -1.5                 | -             | 86          | 0.009                            | 17.56               | 1.087  |
| 83                 | 13.913                       | 0.168             | 1.27                             | 86              | -1.5                 | -             | 85          | 0.011                            | 16.84               | 2.252  |
| 84                 | 14.083                       | 0.170             | 1.27                             | 86              | -1.6                 | -             | 85          | 0.006                            | 17.08               | 1.561  |
| 85                 | 14.251                       | 0.168             | 1.28                             | 86              | -1.4                 | -             | 85          | 0.007                            | 17.01               | 0.596  |
| 86                 | 14.420                       | 0.169             | 1.28                             | 86              | -1.5                 | -             | 85          | 0.014                            | 16.92               | 0.477  |
| 87                 | 14.587                       | 0.167             | 1.28                             | 86              | -1.4                 | -             | 84          | 0.014                            | 16.95               | 0.502  |
| 88                 | 14.755                       | 0.168             | 1.31                             | 86              | -1.5                 | -             | 84          | 0.005                            | 17.12               | 0.475  |
| 89                 | 14.924                       | 0.169             | 1.30                             | 86              | -1.4                 | -             | 84          | 0.005                            | 16.82               | 0.828  |
| 90                 | 15.092                       | 0.168             | 1.28                             | 87              | -1.5                 | 103           | 85          | 0.009                            | 16.66               | 0.468  |
| 91                 | 15.262                       | 0.170             | 1.27                             | 87              | -1.4                 | -             | 84          | 0.008                            | 15.92               | 0.297  |
| 92                 | 15.431                       | 0.169             | 1.27                             | 87              | -1.5                 | -             | 85          | 0.006                            | 15.81               | 0.454  |
| 93                 | 15.599                       | 0.168             | 1.29                             | 87              | -1.4                 | -             | 85          | 0.011                            | 15.52               | 0.610  |
| 94                 | 15.767                       | 0.168             | 1.32                             | 87              | -1.5                 | -             | 85          | 0.010                            | 15.36               | 0.497  |
| 95                 | 15.936                       | 0.169             | 1.30                             | 87              | -1.4                 | -             | 85          | 0.002                            | 15.16               | 0.313  |

# BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: SBI  
 Model: St Louis  
 Run #: 1

Job #: 24-303  
 Tracking #: 216  
 Technician: AK  
 Date: 12/9/2024

| Elapsed Time (min) | Particulate Sampling Data    |                   |                                  |                 |                      |               |             | Flue Gas Data                    |                     |        |
|--------------------|------------------------------|-------------------|----------------------------------|-----------------|----------------------|---------------|-------------|----------------------------------|---------------------|--------|
|                    | Gas Meter (ft <sup>3</sup> ) | Sample Rate (cfm) | Orifice dH (in H <sub>2</sub> O) | Meter Temp (°F) | Meter Vacuum (in Hg) | Pro. Rate (%) | Filter (°F) | Flue Draft (in H <sub>2</sub> O) | CO <sub>2</sub> (%) | CO (%) |
| 96                 | 16.104                       | 0.168             | 1.29                             | 87              | -1.4                 | -             | 85          | 0.009                            | 14.85               | 0.285  |
| 97                 | 16.272                       | 0.168             | 1.29                             | 88              | -1.5                 | -             | 85          | 0.006                            | 14.56               | 0.237  |
| 98                 | 16.442                       | 0.170             | 1.27                             | 88              | -1.5                 | -             | 85          | 0.008                            | 14.26               | 0.216  |
| 99                 | 16.611                       | 0.169             | 1.30                             | 88              | -1.4                 | -             | 85          | 0.004                            | 14.06               | 0.180  |
| 100                | 16.780                       | 0.169             | 1.30                             | 88              | -1.4                 | 101           | 85          | 0.007                            | 13.73               | 0.162  |
| 101                | 16.949                       | 0.169             | 1.29                             | 88              | -1.4                 | -             | 85          | 0.006                            | 13.55               | 0.147  |
| 102                | 17.117                       | 0.168             | 1.27                             | 88              | -1.5                 | -             | 85          | 0.003                            | 13.35               | 0.118  |
| 103                | 17.285                       | 0.168             | 1.30                             | 88              | -1.4                 | -             | 85          | 0.007                            | 12.98               | 0.127  |
| 104                | 17.454                       | 0.169             | 1.28                             | 88              | -1.4                 | -             | 85          | 0.000                            | 12.74               | 0.125  |
| 105                | 17.623                       | 0.169             | 1.27                             | 88              | -1.5                 | -             | 85          | 0.008                            | 12.53               | 0.133  |
| 106                | 17.792                       | 0.169             | 1.30                             | 89              | -1.4                 | -             | 85          | 0.003                            | 12.25               | 0.130  |
| 107                | 17.962                       | 0.170             | 1.28                             | 89              | -1.5                 | -             | 86          | 0.008                            | 12.03               | 0.130  |
| 108                | 18.131                       | 0.169             | 1.30                             | 89              | -1.5                 | -             | 86          | 0.005                            | 11.82               | 0.146  |
| 109                | 18.300                       | 0.169             | 1.28                             | 89              | -1.4                 | -             | 86          | 0.009                            | 11.69               | 0.155  |
| 110                | 18.468                       | 0.168             | 1.30                             | 89              | -1.5                 | 100           | 85          | 0.005                            | 11.48               | 0.177  |
| 111                | 18.637                       | 0.169             | 1.27                             | 89              | -1.5                 | -             | 85          | 0.008                            | 11.36               | 0.191  |
| 112                | 18.806                       | 0.169             | 1.30                             | 89              | -1.6                 | -             | 85          | 0.007                            | 11.29               | 0.192  |
| 113                | 18.974                       | 0.168             | 1.30                             | 89              | -1.4                 | -             | 85          | 0.010                            | 11.23               | 0.179  |
| 114                | 19.143                       | 0.169             | 1.28                             | 89              | -1.5                 | -             | 85          | 0.004                            | 10.76               | 0.160  |
| 115                | 19.314                       | 0.171             | 1.30                             | 89              | -1.4                 | -             | 85          | 0.007                            | 10.82               | 0.146  |
| 116                | 19.483                       | 0.169             | 1.30                             | 90              | -1.5                 | -             | 85          | 0.008                            | 10.76               | 0.147  |
| 117                | 19.652                       | 0.169             | 1.34                             | 90              | -1.5                 | -             | 85          | 0.002                            | 10.69               | 0.147  |
| 118                | 19.822                       | 0.170             | 1.27                             | 90              | -1.4                 | -             | 85          | 0.010                            | 10.68               | 0.145  |
| 119                | 19.990                       | 0.168             | 1.30                             | 90              | -1.4                 | -             | 84          | 0.005                            | 10.55               | 0.157  |
| 120                | 20.159                       | 0.169             | 1.27                             | 90              | -1.4                 | 100           | 84          | 0.001                            | 10.51               | 0.145  |
| 121                | 20.328                       | 0.169             | 1.28                             | 90              | -1.5                 | -             | 85          | 0.011                            | 10.49               | 0.160  |
| 122                | 20.497                       | 0.169             | 1.28                             | 90              | -1.5                 | -             | 85          | 0.008                            | 10.25               | 0.161  |
| 123                | 20.666                       | 0.169             | 1.28                             | 90              | -1.4                 | -             | 85          | 0.004                            | 10.12               | 0.209  |
| 124                | 20.836                       | 0.170             | 1.28                             | 90              | -1.6                 | -             | 85          | 0.010                            | 9.91                | 0.213  |
| 125                | 21.006                       | 0.170             | 1.28                             | 90              | -1.4                 | -             | 85          | 0.009                            | 9.76                | 0.210  |
| 126                | 21.175                       | 0.169             | 1.29                             | 90              | -1.6                 | -             | 85          | 0.009                            | 9.69                | 0.207  |
| 127                | 21.344                       | 0.169             | 1.28                             | 91              | -1.4                 | -             | 85          | 0.004                            | 9.65                | 0.199  |

# BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: SBI  
 Model: St Louis  
 Run #: 1

Job #: 24-303  
 Tracking #: 216  
 Technician: AK  
 Date: 12/9/2024

| Elapsed Time (min) | Particulate Sampling Data    |                   |                                  |                 |                      |               |             | Flue Gas Data                    |                     |        |
|--------------------|------------------------------|-------------------|----------------------------------|-----------------|----------------------|---------------|-------------|----------------------------------|---------------------|--------|
|                    | Gas Meter (ft <sup>3</sup> ) | Sample Rate (cfm) | Orifice dH (in H <sub>2</sub> O) | Meter Temp (°F) | Meter Vacuum (in Hg) | Pro. Rate (%) | Filter (°F) | Flue Draft (in H <sub>2</sub> O) | CO <sub>2</sub> (%) | CO (%) |
| 128                | 21.512                       | 0.168             | 1.29                             | 91              | -1.4                 | -             | 85          | 0.010                            | 9.59                | 0.198  |
| 129                | 21.681                       | 0.169             | 1.27                             | 91              | -1.4                 | -             | 85          | 0.009                            | 9.53                | 0.189  |
| 130                | 21.850                       | 0.169             | 1.29                             | 91              | -1.5                 | 99            | 85          | 0.008                            | 9.50                | 0.183  |
| 131                | 22.019                       | 0.169             | 1.30                             | 91              | -1.5                 | -             | 86          | 0.009                            | 9.36                | 0.184  |
| 132                | 22.188                       | 0.169             | 1.29                             | 91              | -1.5                 | -             | 86          | 0.010                            | 9.28                | 0.177  |
| 133                | 22.358                       | 0.170             | 1.30                             | 91              | -1.4                 | -             | 86          | 0.011                            | 9.20                | 0.183  |
| 134                | 22.528                       | 0.170             | 1.30                             | 91              | -1.4                 | -             | 86          | 0.009                            | 9.11                | 0.184  |
| 135                | 22.697                       | 0.169             | 1.29                             | 91              | -1.4                 | -             | 85          | 0.009                            | 9.17                | 0.182  |
| 136                | 22.866                       | 0.169             | 1.28                             | 91              | -1.4                 | -             | 85          | 0.001                            | 9.22                | 0.148  |
| 137                | 23.035                       | 0.169             | 1.29                             | 91              | -1.5                 | -             | 85          | 0.007                            | 9.21                | 0.149  |
| 138                | 23.204                       | 0.169             | 1.28                             | 91              | -1.4                 | -             | 85          | 0.008                            | 9.26                | 0.137  |
| 139                | 23.373                       | 0.169             | 1.29                             | 91              | -1.4                 | -             | 86          | 0.006                            | 9.51                | 0.095  |
| 140                | 23.542                       | 0.169             | 1.26                             | 91              | -1.5                 | 100           | 86          | 0.005                            | 9.58                | 0.095  |
| 141                | 23.711                       | 0.169             | 1.29                             | 91              | -1.6                 | -             | 86          | 0.009                            | 9.16                | 0.140  |
| 142                | 23.881                       | 0.170             | 1.30                             | 92              | -1.4                 | -             | 85          | -0.001                           | 9.04                | 0.144  |
| 143                | 24.051                       | 0.170             | 1.27                             | 92              | -1.5                 | -             | 86          | 0.005                            | 3.05                | 0.123  |
| 144                | 24.220                       | 0.169             | 1.31                             | 92              | -1.5                 | -             | 85          | 0.006                            | 2.85                | 0.236  |
| 145                | 24.388                       | 0.168             | 1.29                             | 92              | -1.4                 | -             | 85          | 0.002                            | 12.26               | 0.438  |
| 146                | 24.557                       | 0.169             | 1.28                             | 92              | -1.4                 | -             | 85          | 0.009                            | 14.15               | 0.331  |
| 147                | 24.725                       | 0.168             | 1.28                             | 92              | -1.4                 | -             | 85          | 0.008                            | 14.77               | 0.513  |
| 148                | 24.894                       | 0.169             | 1.29                             | 92              | -1.4                 | -             | 85          | 0.006                            | 16.16               | 1.174  |
| 149                | 25.063                       | 0.169             | 1.29                             | 92              | -1.5                 | -             | 86          | 0.006                            | 15.47               | 0.588  |
| 150                | 25.233                       | 0.170             | 1.30                             | 92              | -1.5                 | 100           | 86          | 0.008                            | 15.93               | 0.773  |
| 151                | 25.403                       | 0.170             | 1.29                             | 92              | -1.6                 | -             | 86          | 0.009                            | 16.03               | 0.752  |
| 152                | 25.572                       | 0.169             | 1.29                             | 92              | -1.5                 | -             | 86          | 0.005                            | 16.17               | 0.833  |
| 153                | 25.742                       | 0.170             | 1.29                             | 92              | -1.5                 | -             | 85          | 0.002                            | 15.87               | 0.520  |
| 154                | 25.911                       | 0.169             | 1.28                             | 92              | -1.5                 | -             | 85          | 0.003                            | 15.83               | 0.410  |
| 155                | 26.079                       | 0.168             | 1.31                             | 92              | -1.5                 | -             | 85          | 0.008                            | 15.80               | 0.335  |
| 156                | 26.248                       | 0.169             | 1.29                             | 92              | -1.5                 | -             | 85          | 0.008                            | 16.50               | 0.620  |
| 157                | 26.417                       | 0.169             | 1.29                             | 92              | -1.5                 | -             | 84          | 0.009                            | 15.98               | 0.435  |
| 158                | 26.586                       | 0.169             | 1.27                             | 92              | -1.4                 | -             | 85          | 0.002                            | 16.23               | 0.503  |
| 159                | 26.755                       | 0.169             | 1.29                             | 92              | -1.5                 | -             | 85          | 0.007                            | 16.28               | 0.552  |

# BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: SBI  
 Model: St Louis  
 Run #: 1

Job #: 24-303  
 Tracking #: 216  
 Technician: AK  
 Date: 12/9/2024

| Elapsed Time (min) | Particulate Sampling Data    |                   |                                  |                 |                      |               |             | Flue Gas Data                    |                     |        |
|--------------------|------------------------------|-------------------|----------------------------------|-----------------|----------------------|---------------|-------------|----------------------------------|---------------------|--------|
|                    | Gas Meter (ft <sup>3</sup> ) | Sample Rate (cfm) | Orifice dH (in H <sub>2</sub> O) | Meter Temp (°F) | Meter Vacuum (in Hg) | Pro. Rate (%) | Filter (°F) | Flue Draft (in H <sub>2</sub> O) | CO <sub>2</sub> (%) | CO (%) |
| 160                | 26.925                       | 0.170             | 1.25                             | 92              | -1.4                 | 100           | 86          | 0.007                            | 16.29               | 0.540  |
| 161                | 27.095                       | 0.170             | 1.28                             | 92              | -1.5                 | -             | 87          | 0.004                            | 16.12               | 0.520  |
| 162                | 27.264                       | 0.169             | 1.30                             | 92              | -1.5                 | -             | 87          | 0.010                            | 16.25               | 0.517  |
| 163                | 27.433                       | 0.169             | 1.29                             | 92              | -1.5                 | -             | 87          | 0.004                            | 16.12               | 0.444  |
| 164                | 27.602                       | 0.169             | 1.28                             | 93              | -1.5                 | -             | 86          | 0.009                            | 16.16               | 0.406  |
| 165                | 27.771                       | 0.169             | 1.29                             | 93              | -1.4                 | -             | 86          | 0.008                            | 16.21               | 0.408  |
| 166                | 27.940                       | 0.169             | 1.27                             | 93              | -1.5                 | -             | 85          | 0.010                            | 16.39               | 0.328  |
| 167                | 28.109                       | 0.169             | 1.29                             | 93              | -1.5                 | -             | 85          | 0.005                            | 16.34               | 0.307  |
| 168                | 28.278                       | 0.169             | 1.28                             | 93              | -1.4                 | -             | 85          | 0.005                            | 16.43               | 0.312  |
| 169                | 28.448                       | 0.170             | 1.28                             | 93              | -1.5                 | -             | 85          | 0.011                            | 16.52               | 0.431  |
| 170                | 28.618                       | 0.170             | 1.30                             | 93              | -1.5                 | 100           | 85          | 0.003                            | 16.79               | 0.502  |
| 171                | 28.787                       | 0.169             | 1.27                             | 93              | -1.5                 | -             | 85          | 0.012                            | 16.67               | 0.451  |
| 172                | 28.956                       | 0.169             | 1.29                             | 93              | -1.5                 | -             | 85          | 0.000                            | 16.76               | 0.421  |
| 173                | 29.125                       | 0.169             | 1.28                             | 93              | -1.3                 | -             | 85          | 0.009                            | 16.66               | 0.402  |
| 174                | 29.294                       | 0.169             | 1.28                             | 93              | -1.5                 | -             | 85          | 0.005                            | 16.74               | 0.380  |
| 175                | 29.463                       | 0.169             | 1.28                             | 93              | -1.5                 | -             | 85          | 0.005                            | 16.81               | 0.340  |
| 176                | 29.632                       | 0.169             | 1.25                             | 93              | -1.5                 | -             | 85          | 0.004                            | 16.90               | 0.325  |
| 177                | 29.801                       | 0.169             | 1.27                             | 93              | -1.4                 | -             | 85          | 0.010                            | 16.96               | 0.304  |
| 178                | 29.971                       | 0.170             | 1.28                             | 93              | -1.4                 | -             | 86          | 0.009                            | 16.82               | 0.298  |
| 179                | 30.141                       | 0.170             | 1.28                             | 93              | -1.5                 | -             | 86          | 0.007                            | 16.94               | 0.280  |
| 180                | 30.310                       | 0.169             | 1.31                             | 93              | -1.5                 | 101           | 86          | 0.002                            | 16.93               | 0.275  |
| 181                | 30.479                       | 0.169             | 1.28                             | 93              | -1.4                 | -             | 86          | 0.005                            | 16.96               | 0.289  |
| 182                | 30.648                       | 0.169             | 1.28                             | 93              | -1.4                 | -             | 85          | 0.004                            | 16.88               | 0.261  |
| 183                | 30.817                       | 0.169             | 1.28                             | 93              | -1.5                 | -             | 85          | 0.005                            | 16.92               | 0.239  |
| 184                | 30.986                       | 0.169             | 1.30                             | 93              | -1.5                 | -             | 85          | 0.003                            | 16.70               | 0.230  |
| 185                | 31.155                       | 0.169             | 1.29                             | 94              | -1.5                 | -             | 85          | 0.011                            | 16.79               | 0.202  |
| 186                | 31.324                       | 0.169             | 1.28                             | 93              | -1.5                 | -             | 85          | 0.009                            | 16.78               | 0.203  |
| 187                | 31.494                       | 0.170             | 1.28                             | 94              | -1.5                 | -             | 85          | 0.008                            | 17.04               | 0.328  |
| 188                | 31.664                       | 0.170             | 1.28                             | 93              | -1.5                 | -             | 85          | 0.015                            | 17.47               | 0.532  |
| 189                | 31.833                       | 0.169             | 1.29                             | 94              | -1.5                 | -             | 85          | 0.009                            | 17.32               | 0.427  |
| 190                | 32.003                       | 0.170             | 1.26                             | 94              | -1.3                 | 101           | 85          | 0.002                            | 17.46               | 0.384  |
| 191                | 32.172                       | 0.169             | 1.28                             | 94              | -1.4                 | -             | 86          | 0.007                            | 17.29               | 0.384  |

# BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: SBI  
 Model: St Louis  
 Run #: 1

Job #: 24-303  
 Tracking #: 216  
 Technician: AK  
 Date: 12/9/2024

| Elapsed Time (min) | Particulate Sampling Data    |                   |                                  |                 |                      |               |             | Flue Gas Data                    |                     |        |
|--------------------|------------------------------|-------------------|----------------------------------|-----------------|----------------------|---------------|-------------|----------------------------------|---------------------|--------|
|                    | Gas Meter (ft <sup>3</sup> ) | Sample Rate (cfm) | Orifice dH (in H <sub>2</sub> O) | Meter Temp (°F) | Meter Vacuum (in Hg) | Pro. Rate (%) | Filter (°F) | Flue Draft (in H <sub>2</sub> O) | CO <sub>2</sub> (%) | CO (%) |
| 192                | 32.341                       | 0.169             | 1.30                             | 94              | -1.4                 | -             | 86          | 0.005                            | 17.42               | 0.387  |
| 193                | 32.510                       | 0.169             | 1.29                             | 94              | -1.4                 | -             | 86          | 0.015                            | 17.33               | 0.376  |
| 194                | 32.678                       | 0.168             | 1.29                             | 94              | -1.5                 | -             | 86          | 0.008                            | 17.21               | 0.331  |
| 195                | 32.848                       | 0.170             | 1.28                             | 94              | -1.5                 | -             | 86          | 0.010                            | 17.26               | 0.398  |
| 196                | 33.017                       | 0.169             | 1.29                             | 94              | -1.4                 | -             | 86          | 0.011                            | 17.40               | 0.443  |
| 197                | 33.187                       | 0.170             | 1.29                             | 94              | -1.4                 | -             | 85          | 0.010                            | 17.40               | 0.457  |
| 198                | 33.357                       | 0.170             | 1.28                             | 94              | -1.4                 | -             | 85          | 0.004                            | 17.56               | 0.655  |
| 199                | 33.526                       | 0.169             | 1.28                             | 94              | -1.5                 | -             | 86          | 0.003                            | 17.38               | 0.946  |
| 200                | 33.695                       | 0.169             | 1.28                             | 94              | -1.5                 | 100           | 86          | 0.004                            | 17.52               | 1.301  |
| 201                | 33.864                       | 0.169             | 1.29                             | 94              | -1.4                 | -             | 86          | 0.007                            | 17.15               | 1.879  |
| 202                | 34.033                       | 0.169             | 1.28                             | 94              | -1.5                 | -             | 86          | 0.010                            | 16.99               | 1.843  |
| 203                | 34.202                       | 0.169             | 1.26                             | 94              | -1.4                 | -             | 86          | 0.006                            | 17.17               | 1.186  |
| 204                | 34.371                       | 0.169             | 1.30                             | 94              | -1.4                 | -             | 86          | 0.005                            | 17.18               | 0.707  |
| 205                | 34.541                       | 0.170             | 1.29                             | 94              | -1.5                 | -             | 86          | 0.002                            | 17.10               | 0.536  |
| 206                | 34.710                       | 0.169             | 1.26                             | 94              | -1.4                 | -             | 86          | 0.000                            | 16.86               | 0.453  |
| 207                | 34.881                       | 0.171             | 1.27                             | 94              | -1.5                 | -             | 85          | 0.008                            | 16.73               | 0.473  |
| 208                | 35.050                       | 0.169             | 1.29                             | 94              | -1.4                 | -             | 85          | 0.007                            | 16.43               | 0.378  |
| 209                | 35.219                       | 0.169             | 1.28                             | 94              | -1.4                 | -             | 85          | 0.004                            | 16.17               | 0.330  |
| 210                | 35.389                       | 0.170             | 1.29                             | 94              | -1.4                 | 100           | 85          | 0.005                            | 16.06               | 0.315  |
| 211                | 35.557                       | 0.168             | 1.29                             | 94              | -1.5                 | -             | 85          | 0.004                            | 15.65               | 0.213  |
| 212                | 35.727                       | 0.170             | 1.27                             | 94              | -1.5                 | -             | 85          | 0.006                            | 15.05               | 0.113  |
| 213                | 35.896                       | 0.169             | 1.28                             | 94              | -1.5                 | -             | 85          | 0.003                            | 15.11               | 0.091  |
| 214                | 36.065                       | 0.169             | 1.28                             | 94              | -1.6                 | -             | 86          | 0.010                            | 14.57               | 0.074  |
| 215                | 36.234                       | 0.169             | 1.28                             | 94              | -1.5                 | -             | 86          | 0.008                            | 14.06               | 0.074  |
| 216                | 36.404                       | 0.170             | 1.30                             | 94              | -1.4                 | -             | 86          | 0.010                            | 13.93               | 0.065  |
| 217                | 36.574                       | 0.170             | 1.28                             | 94              | -1.4                 | -             | 86          | 0.010                            | 13.85               | 0.068  |
| 218                | 36.744                       | 0.170             | 1.29                             | 95              | -1.5                 | -             | 86          | 0.008                            | 13.75               | 0.065  |
| 219                | 36.913                       | 0.169             | 1.31                             | 94              | -1.4                 | -             | 85          | 0.007                            | 13.67               | 0.064  |
| 220                | 37.082                       | 0.169             | 1.29                             | 95              | -1.5                 | 100           | 86          | 0.006                            | 13.75               | 0.058  |
| 221                | 37.251                       | 0.169             | 1.29                             | 95              | -1.5                 | -             | 86          | 0.009                            | 13.81               | 0.055  |
| 222                | 37.420                       | 0.169             | 1.27                             | 95              | -1.4                 | -             | 86          | 0.006                            | 13.94               | 0.055  |
| 223                | 37.589                       | 0.169             | 1.30                             | 95              | -1.4                 | -             | 86          | 0.006                            | 14.02               | 0.060  |

# BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: SBI  
 Model: St Louis  
 Run #: 1

Job #: 24-303  
 Tracking #: 216  
 Technician: AK  
 Date: 12/9/2024

| Elapsed Time (min) | Particulate Sampling Data    |                   |                                  |                 |                      |               |             | Flue Gas Data                    |                     |        |
|--------------------|------------------------------|-------------------|----------------------------------|-----------------|----------------------|---------------|-------------|----------------------------------|---------------------|--------|
|                    | Gas Meter (ft <sup>3</sup> ) | Sample Rate (cfm) | Orifice dH (in H <sub>2</sub> O) | Meter Temp (°F) | Meter Vacuum (in Hg) | Pro. Rate (%) | Filter (°F) | Flue Draft (in H <sub>2</sub> O) | CO <sub>2</sub> (%) | CO (%) |
| 224                | 37.758                       | 0.169             | 1.28                             | 95              | -1.4                 | -             | 85          | 0.010                            | 13.94               | 0.042  |
| 225                | 37.928                       | 0.170             | 1.29                             | 95              | -1.4                 | -             | 85          | 0.010                            | 13.84               | 0.044  |
| 226                | 38.098                       | 0.170             | 1.27                             | 95              | -1.5                 | -             | 85          | 0.010                            | 14.11               | 0.047  |
| 227                | 38.268                       | 0.170             | 1.30                             | 95              | -1.5                 | -             | 85          | 0.007                            | 14.10               | 0.053  |
| 228                | 38.437                       | 0.169             | 1.29                             | 95              | -1.6                 | -             | 86          | 0.008                            | 13.52               | 0.038  |
| 229                | 38.607                       | 0.170             | 1.28                             | 95              | -1.4                 | -             | 87          | 0.003                            | 13.10               | 0.035  |
| 230                | 38.776                       | 0.169             | 1.28                             | 95              | -1.5                 | 99            | 87          | 0.005                            | 12.90               | 0.032  |
| 231                | 38.945                       | 0.169             | 1.27                             | 95              | -1.5                 | -             | 86          | 0.008                            | 12.95               | 0.034  |
| 232                | 39.114                       | 0.169             | 1.29                             | 95              | -1.6                 | -             | 86          | 0.005                            | 12.14               | 0.035  |
| 233                | 39.283                       | 0.169             | 1.29                             | 95              | -1.4                 | -             | 86          | 0.007                            | 11.51               | 0.044  |
| 234                | 39.453                       | 0.170             | 1.29                             | 95              | -1.4                 | -             | 85          | 0.003                            | 11.31               | 0.043  |
| 235                | 39.622                       | 0.169             | 1.29                             | 95              | -1.5                 | -             | 85          | 0.005                            | 11.26               | 0.047  |
| 236                | 39.792                       | 0.170             | 1.28                             | 95              | -1.5                 | -             | 86          | 0.013                            | 11.14               | 0.046  |
| 237                | 39.963                       | 0.171             | 1.28                             | 95              | -1.4                 | -             | 86          | 0.007                            | 11.08               | 0.047  |
| 238                | 40.132                       | 0.169             | 1.28                             | 95              | -1.5                 | -             | 87          | 0.011                            | 11.06               | 0.047  |
| 239                | 40.301                       | 0.169             | 1.29                             | 95              | -1.5                 | -             | 87          | 0.004                            | 11.08               | 0.046  |
| 240                | 40.470                       | 0.169             | 1.28                             | 95              | -1.5                 | 99            | 87          | 0.005                            | 11.16               | 0.043  |
| 241                | 40.640                       | 0.170             | 1.29                             | 95              | -1.4                 | -             | 86          | 0.014                            | 11.24               | 0.045  |
| 242                | 40.809                       | 0.169             | 1.28                             | 95              | -1.5                 | -             | 86          | 0.005                            | 10.24               | 0.063  |
| 243                | 40.978                       | 0.169             | 1.26                             | 95              | -1.4                 | -             | 86          | 0.006                            | 9.58                | 0.067  |
| 244                | 41.147                       | 0.169             | 1.29                             | 95              | -1.5                 | -             | 85          | 0.005                            | 8.84                | 0.076  |
| 245                | 41.317                       | 0.170             | 1.31                             | 95              | -1.4                 | -             | 85          | 0.012                            | 8.72                | 0.079  |
| 246                | 41.487                       | 0.170             | 1.29                             | 95              | -1.4                 | -             | 85          | 0.005                            | 8.71                | 0.084  |
| 247                | 41.657                       | 0.170             | 1.30                             | 95              | -1.4                 | -             | 86          | 0.012                            | 8.71                | 0.090  |
| 248                | 41.827                       | 0.170             | 1.30                             | 95              | -1.5                 | -             | 86          | 0.003                            | 8.75                | 0.094  |
| 249                | 41.996                       | 0.169             | 1.27                             | 95              | -1.5                 | -             | 86          | 0.002                            | 8.70                | 0.099  |
| 250                | 42.165                       | 0.169             | 1.26                             | 95              | -1.4                 | 99            | 86          | 0.006                            | 8.68                | 0.085  |
| 251                | 42.334                       | 0.169             | 1.30                             | 95              | -1.5                 | -             | 86          | 0.008                            | 8.63                | 0.081  |
| 252                | 42.503                       | 0.169             | 1.28                             | 95              | -1.5                 | -             | 86          | 0.008                            | 8.58                | 0.080  |
| 253                | 42.672                       | 0.169             | 1.28                             | 95              | -1.5                 | -             | 85          | 0.003                            | 8.72                | 0.081  |
| 254                | 42.841                       | 0.169             | 1.29                             | 95              | -1.4                 | -             | 86          | 0.008                            | 8.71                | 0.086  |
| 255                | 43.011                       | 0.170             | 1.28                             | 95              | -1.5                 | -             | 86          | 0.010                            | 8.72                | 0.087  |

# BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: SBI  
 Model: St Louis  
 Run #: 1

Job #: 24-303  
 Tracking #: 216  
 Technician: AK  
 Date: 12/9/2024

| Elapsed Time (min) | Particulate Sampling Data    |                   |                                  |                 |                      |               |             | Flue Gas Data                    |                     |        |
|--------------------|------------------------------|-------------------|----------------------------------|-----------------|----------------------|---------------|-------------|----------------------------------|---------------------|--------|
|                    | Gas Meter (ft <sup>3</sup> ) | Sample Rate (cfm) | Orifice dH (in H <sub>2</sub> O) | Meter Temp (°F) | Meter Vacuum (in Hg) | Pro. Rate (%) | Filter (°F) | Flue Draft (in H <sub>2</sub> O) | CO <sub>2</sub> (%) | CO (%) |
| 256                | 43.181                       | 0.170             | 1.27                             | 95              | -1.4                 | -             | 86          | 0.007                            | 8.93                | 0.088  |
| 257                | 43.351                       | 0.170             | 1.28                             | 95              | -1.4                 | -             | 86          | 0.012                            | 9.09                | 0.096  |
| 258                | 43.520                       | 0.169             | 1.29                             | 95              | -1.4                 | -             | 85          | 0.006                            | 9.02                | 0.105  |
| 259                | 43.689                       | 0.169             | 1.30                             | 95              | -1.4                 | -             | 85          | 0.010                            | 8.97                | 0.112  |
| 260                | 43.859                       | 0.170             | 1.29                             | 96              | -1.5                 | 99            | 86          | 0.012                            | 8.98                | 0.112  |
| 261                | 44.028                       | 0.169             | 1.28                             | 95              | -1.5                 | -             | 86          | 0.004                            | 8.98                | 0.118  |
| 262                | 44.197                       | 0.169             | 1.25                             | 95              | -1.5                 | -             | 86          | 0.003                            | 8.99                | 0.106  |
| 263                | 44.366                       | 0.169             | 1.27                             | 96              | -1.5                 | -             | 86          | 0.009                            | 9.02                | 0.107  |
| 264                | 44.535                       | 0.169             | 1.27                             | 96              | -1.4                 | -             | 86          | 0.010                            | 9.09                | 0.105  |
| 265                | 44.705                       | 0.170             | 1.28                             | 96              | -1.5                 | -             | 86          | 0.005                            | 8.81                | 0.122  |
| 266                | 44.875                       | 0.170             | 1.29                             | 96              | -1.4                 | -             | 85          | 0.006                            | 8.68                | 0.150  |
| 267                | 45.045                       | 0.170             | 1.29                             | 96              | -1.5                 | -             | 86          | 0.007                            | 8.53                | 0.152  |
| 268                | 45.215                       | 0.170             | 1.27                             | 96              | -1.4                 | -             | 86          | 0.007                            | 8.47                | 0.154  |
| 269                | 45.384                       | 0.169             | 1.28                             | 96              | -1.4                 | -             | 86          | 0.015                            | 8.54                | 0.156  |
| 270                | 45.553                       | 0.169             | 1.29                             | 96              | -1.5                 | 100           | 86          | 0.005                            | 8.34                | 0.165  |
| 271                | 45.722                       | 0.169             | 1.28                             | 96              | -1.4                 | -             | 86          | 0.008                            | 7.90                | 0.197  |
| 272                | 45.891                       | 0.169             | 1.27                             | 96              | -1.4                 | -             | 86          | 0.004                            | 7.66                | 0.223  |
| 273                | 46.060                       | 0.169             | 1.29                             | 96              | -1.5                 | -             | 86          | 0.014                            | 7.36                | 0.225  |
| 274                | 46.230                       | 0.170             | 1.28                             | 96              | -1.5                 | -             | 86          | 0.009                            | 7.26                | 0.221  |
| 275                | 46.399                       | 0.169             | 1.28                             | 96              | -1.5                 | -             | 86          | 0.018                            | 7.19                | 0.214  |
| 276                | 46.569                       | 0.170             | 1.28                             | 96              | -1.4                 | -             | 86          | 0.011                            | 8.04                | 0.241  |
| 277                | 46.739                       | 0.170             | 1.29                             | 96              | -1.4                 | -             | 86          | 0.006                            | 7.92                | 0.277  |
| 278                | 46.909                       | 0.170             | 1.29                             | 96              | -1.5                 | -             | 86          | 0.002                            | 8.11                | 0.280  |
| 279                | 47.078                       | 0.169             | 1.27                             | 96              | -1.5                 | -             | 86          | 0.012                            | 8.03                | 0.284  |
| 280                | 47.247                       | 0.169             | 1.28                             | 96              | -1.4                 | 100           | 86          | 0.005                            | 8.03                | 0.291  |
| 281                | 47.416                       | 0.169             | 1.30                             | 96              | -1.5                 | -             | 86          | 0.007                            | 8.85                | 0.327  |
| 282                | 47.585                       | 0.169             | 1.27                             | 96              | -1.5                 | -             | 87          | 0.009                            | 8.64                | 0.444  |
| 283                | 47.754                       | 0.169             | 1.26                             | 96              | -1.5                 | -             | 87          | 0.009                            | 8.39                | 0.567  |
| 284                | 47.924                       | 0.170             | 1.31                             | 96              | -1.5                 | -             | 86          | 0.007                            | 8.21                | 0.778  |
| 285                | 48.094                       | 0.170             | 1.27                             | 96              | -1.5                 | -             | 86          | 0.003                            | 8.12                | 0.892  |
| 286                | 48.264                       | 0.170             | 1.30                             | 96              | -1.4                 | -             | 85          | 0.020                            | 8.00                | 0.948  |
| 287                | 48.434                       | 0.170             | 1.28                             | 96              | -1.4                 | -             | 85          | 0.014                            | 8.01                | 1.036  |



# BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: SBI  
 Model: St Louis  
 Run #: 1

Job #: 24-303  
 Tracking #: 216  
 Technician: AK  
 Date: 12/9/2024

| Elapsed Time (min) | Particulate Sampling Data    |                   |                                  |                 |                      |               |             | Flue Gas Data                    |                     |        |
|--------------------|------------------------------|-------------------|----------------------------------|-----------------|----------------------|---------------|-------------|----------------------------------|---------------------|--------|
|                    | Gas Meter (ft <sup>3</sup> ) | Sample Rate (cfm) | Orifice dH (in H <sub>2</sub> O) | Meter Temp (°F) | Meter Vacuum (in Hg) | Pro. Rate (%) | Filter (°F) | Flue Draft (in H <sub>2</sub> O) | CO <sub>2</sub> (%) | CO (%) |
| 288                | 48.604                       | 0.170             | 1.31                             | 96              | -1.5                 | -             | 85          | 0.006                            | 8.09                | 1.054  |
| 289                | 48.773                       | 0.169             | 1.28                             | 96              | -1.5                 | -             | 85          | 0.008                            | 8.11                | 1.022  |
| 290                | 48.942                       | 0.169             | 1.28                             | 96              | -1.5                 | 99            | 86          | 0.006                            | 8.16                | 0.989  |
| 291                | 49.112                       | 0.170             | 1.30                             | 96              | -1.5                 | -             | 86          | 0.002                            | 8.25                | 0.965  |
| 292                | 49.281                       | 0.169             | 1.29                             | 96              | -1.5                 | -             | 85          | 0.009                            | 8.24                | 0.936  |
| 293                | 49.450                       | 0.169             | 1.28                             | 96              | -1.4                 | -             | 85          | 0.006                            | 8.45                | 0.926  |
| 294                | 49.620                       | 0.170             | 1.30                             | 96              | -1.5                 | -             | 85          | 0.007                            | 8.43                | 0.905  |
| 295                | 49.789                       | 0.169             | 1.25                             | 96              | -1.5                 | -             | 85          | 0.008                            | 8.45                | 0.890  |
| 296                | 49.959                       | 0.170             | 1.28                             | 96              | -1.4                 | -             | 85          | 0.002                            | 8.46                | 0.871  |
| 297                | 50.130                       | 0.171             | 1.29                             | 96              | -1.5                 | -             | 86          | 0.013                            | 8.51                | 0.865  |
| 298                | 50.300                       | 0.170             | 1.29                             | 96              | -1.5                 | -             | 85          | 0.011                            | 8.55                | 0.861  |
| 299                | 50.469                       | 0.169             | 1.28                             | 96              | -1.5                 | -             | 85          | 0.012                            | 8.63                | 0.868  |
| 300                | 50.639                       | 0.170             | 1.27                             | 96              | -1.5                 | 99            | 85          | 0.001                            | 8.62                | 0.855  |
| 301                | 50.808                       | 0.169             | 1.29                             | 96              | -1.5                 | -             | 85          | 0.009                            | 8.59                | 0.855  |
| 302                | 50.978                       | 0.170             | 1.27                             | 96              | -1.5                 | -             | 85          | 0.013                            | 8.65                | 0.865  |
| 303                | 51.147                       | 0.169             | 1.28                             | 96              | -1.5                 | -             | 85          | 0.006                            | 8.70                | 0.868  |
| 304                | 51.316                       | 0.169             | 1.28                             | 96              | -1.4                 | -             | 85          | 0.000                            | 8.73                | 0.867  |
| 305                | 51.486                       | 0.170             | 1.29                             | 96              | -1.5                 | -             | 85          | 0.005                            | 8.80                | 0.874  |
| 306                | 51.655                       | 0.169             | 1.29                             | 96              | -1.4                 | -             | 85          | 0.006                            | 8.78                | 0.879  |
| 307                | 51.825                       | 0.170             | 1.28                             | 96              | -1.4                 | -             | 86          | 0.012                            | 8.81                | 0.836  |
| 308                | 51.996                       | 0.171             | 1.29                             | 96              | -1.5                 | -             | 86          | 0.008                            | 8.92                | 0.848  |
| 309                | 52.166                       | 0.170             | 1.28                             | 96              | -1.5                 | -             | 87          | 0.004                            | 8.93                | 0.846  |
| 310                | 52.335                       | 0.169             | 1.31                             | 96              | -1.5                 | 99            | 87          | 0.008                            | 8.87                | 0.838  |
| 311                | 52.505                       | 0.170             | 1.30                             | 96              | -1.4                 | -             | 87          | 0.017                            | 8.98                | 0.849  |
| 312                | 52.674                       | 0.169             | 1.28                             | 96              | -1.4                 | -             | 86          | 0.006                            | 8.95                | 0.842  |
| 313                | 52.844                       | 0.170             | 1.28                             | 96              | -1.5                 | -             | 86          | 0.012                            | 9.13                | 0.862  |
| 314                | 53.013                       | 0.169             | 1.30                             | 96              | -1.5                 | -             | 85          | 0.005                            | 9.12                | 0.862  |
| 315                | 53.183                       | 0.170             | 1.28                             | 96              | -1.5                 | -             | 85          | 0.008                            | 9.11                | 0.853  |
| 316                | 53.352                       | 0.169             | 1.29                             | 96              | -1.5                 | -             | 85          | 0.003                            | 9.17                | 0.861  |
| 317                | 53.522                       | 0.170             | 1.28                             | 96              | -1.5                 | -             | 85          | 0.009                            | 9.13                | 0.855  |
| 318                | 53.692                       | 0.170             | 1.28                             | 96              | -1.5                 | -             | 85          | 0.005                            | 9.23                | 0.864  |
| 319                | 53.862                       | 0.170             | 1.29                             | 96              | -1.5                 | -             | 85          | 0.004                            | 9.21                | 0.876  |

# BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: SBI  
 Model: St Louis  
 Run #: 1

Job #: 24-303  
 Tracking #: 216  
 Technician: AK  
 Date: 12/9/2024

| Elapsed Time (min) | Particulate Sampling Data    |                   |                                  |                 |                      |               |             | Flue Gas Data                    |                     |        |
|--------------------|------------------------------|-------------------|----------------------------------|-----------------|----------------------|---------------|-------------|----------------------------------|---------------------|--------|
|                    | Gas Meter (ft <sup>3</sup> ) | Sample Rate (cfm) | Orifice dH (in H <sub>2</sub> O) | Meter Temp (°F) | Meter Vacuum (in Hg) | Pro. Rate (%) | Filter (°F) | Flue Draft (in H <sub>2</sub> O) | CO <sub>2</sub> (%) | CO (%) |
| 320                | 54.033                       | 0.171             | 1.27                             | 96              | -1.5                 | 99            | 85          | 0.009                            | 9.20                | 0.872  |
| 321                | 54.202                       | 0.169             | 1.28                             | 96              | -1.4                 | -             | 85          | 0.009                            | 9.15                | 0.849  |
| 322                | 54.372                       | 0.170             | 1.31                             | 96              | -1.5                 | -             | 86          | 0.009                            | 9.33                | 0.869  |
| 323                | 54.542                       | 0.170             | 1.26                             | 96              | -1.5                 | -             | 86          | 0.008                            | 9.38                | 0.875  |
| 324                | 54.711                       | 0.169             | 1.30                             | 95              | -1.5                 | -             | 86          | 0.011                            | 9.30                | 0.871  |
| 325                | 54.881                       | 0.170             | 1.29                             | 96              | -1.5                 | -             | 86          | 0.012                            | 9.16                | 0.885  |
| 326                | 55.050                       | 0.169             | 1.30                             | 96              | -1.5                 | -             | 85          | 0.012                            | 9.19                | 0.909  |
| 327                | 55.219                       | 0.169             | 1.29                             | 96              | -1.5                 | -             | 85          | 0.011                            | 9.06                | 0.893  |
| 328                | 55.389                       | 0.170             | 1.28                             | 96              | -1.4                 | -             | 85          | 0.011                            | 9.18                | 0.904  |
| 329                | 55.559                       | 0.170             | 1.28                             | 96              | -1.5                 | -             | 85          | 0.008                            | 9.13                | 0.898  |
| 330                | 55.729                       | 0.170             | 1.28                             | 95              | -1.4                 | 98            | 86          | 0.001                            | 9.13                | 0.902  |
| 331                | 55.900                       | 0.171             | 1.29                             | 96              | -1.4                 | -             | 86          | 0.014                            | 9.13                | 0.903  |
| 332                | 56.070                       | 0.170             | 1.29                             | 96              | -1.5                 | -             | 86          | 0.016                            | 9.25                | 0.919  |
| 333                | 56.239                       | 0.169             | 1.31                             | 96              | -1.4                 | -             | 85          | 0.014                            | 9.11                | 0.909  |
| 334                | 56.409                       | 0.170             | 1.28                             | 95              | -1.5                 | -             | 85          | 0.007                            | 9.21                | 0.927  |
| 335                | 56.579                       | 0.170             | 1.28                             | 95              | -1.4                 | -             | 84          | 0.008                            | 9.12                | 0.926  |
| 336                | 56.748                       | 0.169             | 1.29                             | 95              | -1.5                 | -             | 84          | 0.005                            | 9.18                | 0.924  |
| 337                | 56.918                       | 0.170             | 1.27                             | 96              | -1.4                 | -             | 84          | 0.007                            | 9.10                | 0.920  |
| 338                | 57.087                       | 0.169             | 1.28                             | 96              | -1.5                 | -             | 85          | 0.009                            | 9.19                | 0.928  |
| 339                | 57.257                       | 0.170             | 1.28                             | 96              | -1.4                 | -             | 85          | 0.007                            | 9.25                | 0.917  |
| 340                | 57.426                       | 0.169             | 1.28                             | 95              | -1.5                 | 97            | 85          | 0.009                            | 9.28                | 0.900  |
| 341                | 57.596                       | 0.170             | 1.29                             | 96              | -1.4                 | -             | 85          | 0.005                            | 9.28                | 0.900  |
| 342                | 57.767                       | 0.171             | 1.27                             | 95              | -1.5                 | -             | 85          | 0.010                            | 9.09                | 0.919  |
| 343                | 57.937                       | 0.170             | 1.28                             | 95              | -1.4                 | -             | 85          | 0.009                            | 8.99                | 0.928  |
| 344                | 58.107                       | 0.170             | 1.30                             | 95              | -1.5                 | -             | 85          | 0.010                            | 8.96                | 0.930  |
| 345                | 58.277                       | 0.170             | 1.28                             | 95              | -1.5                 | -             | 85          | 0.009                            | 9.06                | 0.943  |
| 346                | 58.447                       | 0.170             | 1.27                             | 95              | -1.4                 | -             | 85          | 0.010                            | 9.09                | 0.950  |
| 347                | 58.616                       | 0.169             | 1.29                             | 95              | -1.4                 | -             | 85          | 0.010                            | 9.09                | 0.952  |
| 348                | 58.786                       | 0.170             | 1.27                             | 95              | -1.5                 | -             | 85          | 0.009                            | 9.05                | 0.950  |
| 349                | 58.956                       | 0.170             | 1.31                             | 95              | -1.5                 | -             | 85          | 0.010                            | 9.02                | 0.922  |
| 350                | 59.125                       | 0.169             | 1.30                             | 95              | -1.4                 | 97            | 85          | 0.007                            | 8.93                | 0.879  |
| 351                | 59.295                       | 0.170             | 1.29                             | 95              | -1.5                 | -             | 85          | 0.007                            | 8.98                | 0.885  |

# BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: SBI  
 Model: St Louis  
 Run #: 1

Job #: 24-303  
 Tracking #: 216  
 Technician: AK  
 Date: 12/9/2024

| Elapsed Time (min) | Particulate Sampling Data    |                   |                                  |                 |                      |               |             | Flue Gas Data                    |                     |        |
|--------------------|------------------------------|-------------------|----------------------------------|-----------------|----------------------|---------------|-------------|----------------------------------|---------------------|--------|
|                    | Gas Meter (ft <sup>3</sup> ) | Sample Rate (cfm) | Orifice dH (in H <sub>2</sub> O) | Meter Temp (°F) | Meter Vacuum (in Hg) | Pro. Rate (%) | Filter (°F) | Flue Draft (in H <sub>2</sub> O) | CO <sub>2</sub> (%) | CO (%) |
| 352                | 59.465                       | 0.170             | 1.29                             | 95              | -1.4                 | -             | 86          | 0.003                            | 8.90                | 0.872  |
| 353                | 59.635                       | 0.170             | 1.30                             | 95              | -1.4                 | -             | 85          | 0.008                            | 8.93                | 0.878  |
| 354                | 59.805                       | 0.170             | 1.30                             | 95              | -1.5                 | -             | 85          | 0.003                            | 8.82                | 0.869  |
| 355                | 59.976                       | 0.171             | 1.28                             | 95              | -1.5                 | -             | 85          | 0.013                            | 8.94                | 0.880  |
| 356                | 60.146                       | 0.170             | 1.27                             | 95              | -1.5                 | -             | 85          | 0.012                            | 8.97                | 0.886  |
| 357                | 60.316                       | 0.170             | 1.28                             | 95              | -1.5                 | -             | 84          | 0.012                            | 9.11                | 0.911  |
| 358                | 60.486                       | 0.170             | 1.29                             | 95              | -1.4                 | -             | 84          | 0.005                            | 9.02                | 0.910  |
| 359                | 60.656                       | 0.170             | 1.27                             | 95              | -1.4                 | -             | 84          | 0.006                            | 9.07                | 0.919  |
| 360                | 60.825                       | 0.169             | 1.30                             | 95              | -1.4                 | 97            | 84          | 0.002                            | 9.13                | 0.928  |
| 361                | 60.995                       | 0.170             | 1.29                             | 95              | -1.6                 | -             | 84          | 0.007                            | 9.11                | 0.935  |
| 362                | 61.165                       | 0.170             | 1.27                             | 95              | -1.4                 | -             | 85          | 0.004                            | 8.95                | 0.942  |
| 363                | 61.334                       | 0.169             | 1.28                             | 95              | -1.5                 | -             | 85          | 0.007                            | 8.84                | 0.963  |
| 364                | 61.504                       | 0.170             | 1.28                             | 95              | -1.5                 | -             | 86          | 0.009                            | 8.83                | 0.960  |
| 365                | 61.674                       | 0.170             | 1.30                             | 95              | -1.4                 | -             | 86          | 0.009                            | 8.80                | 0.948  |
| 366                | 61.844                       | 0.170             | 1.31                             | 95              | -1.5                 | -             | 85          | 0.011                            | 8.74                | 0.932  |
| 367                | 62.015                       | 0.171             | 1.30                             | 95              | -1.5                 | -             | 85          | 0.005                            | 8.79                | 0.927  |
| 368                | 62.185                       | 0.170             | 1.28                             | 95              | -1.5                 | -             | 84          | 0.013                            | 8.78                | 0.928  |
| 369                | 62.355                       | 0.170             | 1.31                             | 95              | -1.6                 | -             | 84          | 0.006                            | 8.79                | 0.934  |
| 370                | 62.525                       | 0.170             | 1.32                             | 95              | -1.4                 | 97            | 84          | 0.008                            | 8.69                | 0.936  |
| 371                | 62.695                       | 0.170             | 1.27                             | 95              | -1.4                 | -             | 83          | 0.010                            | 8.62                | 0.923  |
| 372                | 62.864                       | 0.169             | 1.29                             | 95              | -1.4                 | -             | 84          | 0.012                            | 8.61                | 0.919  |
| 373                | 63.034                       | 0.170             | 1.29                             | 95              | -1.4                 | -             | 84          | 0.008                            | 8.69                | 0.918  |
| 374                | 63.204                       | 0.170             | 1.30                             | 95              | -1.5                 | -             | 84          | 0.008                            | 8.69                | 0.914  |
| 375                | 63.374                       | 0.170             | 1.28                             | 95              | -1.4                 | -             | 84          | 0.013                            | 8.68                | 0.911  |
| 376                | 63.543                       | 0.169             | 1.29                             | 95              | -1.4                 | -             | 85          | 0.011                            | 8.61                | 0.903  |
| 377                | 63.713                       | 0.170             | 1.30                             | 95              | -1.4                 | -             | 85          | 0.008                            | 8.73                | 0.916  |
| 378                | 63.883                       | 0.170             | 1.29                             | 95              | -1.5                 | -             | 85          | 0.015                            | 8.65                | 0.968  |
| 379                | 64.054                       | 0.171             | 1.29                             | 95              | -1.4                 | -             | 85          | 0.008                            | 8.65                | 0.980  |
| 380                | 64.224                       | 0.170             | 1.29                             | 95              | -1.5                 | 97            | 85          | 0.012                            | 8.60                | 0.979  |
| 381                | 64.395                       | 0.171             | 1.32                             | 95              | -1.5                 | -             | 85          | 0.012                            | 8.60                | 0.984  |
| 382                | 64.565                       | 0.170             | 1.30                             | 95              | -1.5                 | -             | 86          | 0.005                            | 8.60                | 0.978  |
| 383                | 64.735                       | 0.170             | 1.30                             | 95              | -1.5                 | -             | 86          | 0.008                            | 8.40                | 0.964  |

# BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: SBIJob #: 24-303Model: St LouisTracking #: 216Run #: 1Technician: AKDate: 12/9/2024

| Elapsed Time (min) | Particulate Sampling Data    |                   |                                  |                 |                      |               |             | Flue Gas Data                    |                     |        |
|--------------------|------------------------------|-------------------|----------------------------------|-----------------|----------------------|---------------|-------------|----------------------------------|---------------------|--------|
|                    | Gas Meter (ft <sup>3</sup> ) | Sample Rate (cfm) | Orifice dH (in H <sub>2</sub> O) | Meter Temp (°F) | Meter Vacuum (in Hg) | Pro. Rate (%) | Filter (°F) | Flue Draft (in H <sub>2</sub> O) | CO <sub>2</sub> (%) | CO (%) |
| 384                | 64.904                       | 0.169             | 1.28                             | 95              | -1.4                 | -             | 86          | 0.013                            | 8.26                | 0.967  |
| 385                | 65.074                       | 0.170             | 1.31                             | 95              | -1.4                 | -             | 85          | 0.006                            | 8.19                | 0.945  |
| 386                | 65.244                       | 0.170             | 1.28                             | 95              | -1.5                 | -             | 85          | 0.002                            | 8.22                | 0.946  |
| 387                | 65.413                       | 0.169             | 1.28                             | 95              | -1.5                 | -             | 84          | 0.006                            | 8.12                | 0.928  |
| 388                | 65.583                       | 0.170             | 1.28                             | 95              | -1.4                 | -             | 84          | 0.008                            | 8.18                | 0.928  |
| 389                | 65.753                       | 0.170             | 1.29                             | 95              | -1.5                 | -             | 83          | 0.009                            | 8.15                | 0.923  |
| 390                | 65.923                       | 0.170             | 1.30                             | 95              | -1.5                 | 98            | 84          | 0.011                            | 8.07                | 0.907  |
| 391                | 66.093                       | 0.170             | 1.28                             | 95              | -1.5                 | -             | 85          | 0.015                            | 8.11                | 0.908  |
| 392                | 66.263                       | 0.170             | 1.28                             | 95              | -1.4                 | -             | 86          | 0.012                            | 8.13                | 0.906  |
| 393                | 66.434                       | 0.171             | 1.29                             | 95              | -1.6                 | -             | 86          | 0.012                            | 8.17                | 0.914  |
| 394                | 66.604                       | 0.170             | 1.27                             | 95              | -1.4                 | -             | 85          | 0.010                            | 8.18                | 0.914  |
| 395                | 66.774                       | 0.170             | 1.29                             | 95              | -1.4                 | -             | 85          | 0.005                            | 8.17                | 0.907  |
| 396                | 66.944                       | 0.170             | 1.29                             | 95              | -1.6                 | 98            | 84          | 0.007                            | 8.17                | 0.906  |
| Avg/Tot            | 66.945                       | 0.169             | 1.28                             | 89.8            | -1.5                 | 100           | 85.1        | 0.007                            | 11.48               | 0.452  |

# WOODSTOVE SURFACE TEMPERATURE DATA

Client: SBI  
 Model: St Louis  
 Run #: 1

Job #: 24-303  
 Tracking #: 216  
 Technician: AK  
 Date: 12/9/2024

Stove ΔT: 298

| Elapsed Time (min) | Temperature Data (°F) |          |         |        |           |                       |               |
|--------------------|-----------------------|----------|---------|--------|-----------|-----------------------|---------------|
|                    | FB Left               | FB Right | FB Back | FB Top | FB Bottom | Stove Surface Average | Catalyst Exit |
| 0                  | 68                    | 67       | 67      | 65     | 67        | 66.6                  | N/A           |
| 1                  | 68                    | 67       | 68      | 85     | 67        | 70.9                  | N/A           |
| 2                  | 69                    | 67       | 71      | 105    | 68        | 76.0                  | N/A           |
| 3                  | 70                    | 70       | 81      | 135    | 68        | 84.9                  | N/A           |
| 4                  | 76                    | 76       | 96      | 173    | 69        | 97.7                  | N/A           |
| 5                  | 84                    | 85       | 115     | 224    | 69        | 115.3                 | N/A           |
| 6                  | 95                    | 99       | 137     | 284    | 69        | 136.9                 | N/A           |
| 7                  | 110                   | 117      | 163     | 343    | 69        | 160.4                 | N/A           |
| 8                  | 126                   | 133      | 188     | 391    | 70        | 181.5                 | N/A           |
| 9                  | 139                   | 148      | 212     | 424    | 70        | 198.8                 | N/A           |
| 10                 | 154                   | 164      | 234     | 454    | 71        | 215.4                 | N/A           |
| 11                 | 170                   | 182      | 254     | 480    | 72        | 231.3                 | N/A           |
| 12                 | 185                   | 200      | 272     | 499    | 72        | 245.6                 | N/A           |
| 13                 | 200                   | 218      | 290     | 515    | 74        | 259.4                 | N/A           |
| 14                 | 216                   | 235      | 307     | 529    | 75        | 272.3                 | N/A           |
| 15                 | 232                   | 252      | 321     | 540    | 76        | 284.0                 | N/A           |
| 16                 | 248                   | 267      | 334     | 552    | 78        | 295.7                 | N/A           |
| 17                 | 264                   | 282      | 348     | 563    | 80        | 307.1                 | N/A           |
| 18                 | 279                   | 295      | 361     | 572    | 81        | 317.7                 | N/A           |
| 19                 | 294                   | 308      | 373     | 581    | 83        | 327.8                 | N/A           |
| 20                 | 306                   | 320      | 383     | 562    | 86        | 331.7                 | N/A           |
| 21                 | 319                   | 331      | 389     | 556    | 89        | 336.5                 | N/A           |
| 22                 | 328                   | 338      | 394     | 564    | 91        | 343.2                 | N/A           |
| 23                 | 337                   | 345      | 404     | 576    | 93        | 350.9                 | N/A           |
| 24                 | 344                   | 352      | 412     | 583    | 96        | 357.4                 | N/A           |
| 25                 | 351                   | 358      | 421     | 588    | 98        | 363.1                 | N/A           |
| 26                 | 356                   | 364      | 428     | 593    | 100       | 368.2                 | N/A           |
| 27                 | 362                   | 370      | 435     | 598    | 103       | 373.5                 | N/A           |
| 28                 | 366                   | 376      | 443     | 600    | 105       | 377.8                 | N/A           |
| 29                 | 369                   | 381      | 448     | 600    | 107       | 381.2                 | N/A           |
| 30                 | 371                   | 387      | 454     | 607    | 110       | 385.8                 | N/A           |
| 31                 | 373                   | 393      | 462     | 622    | 112       | 392.3                 | N/A           |
| 32                 | 373                   | 397      | 479     | 625    | 115       | 397.7                 | N/A           |
| 33                 | 374                   | 405      | 496     | 628    | 119       | 404.0                 | N/A           |
| 34                 | 376                   | 414      | 509     | 628    | 122       | 409.8                 | N/A           |
| 35                 | 381                   | 424      | 520     | 626    | 126       | 415.4                 | N/A           |
| 36                 | 385                   | 434      | 529     | 622    | 130       | 420.0                 | N/A           |
| 37                 | 391                   | 443      | 539     | 619    | 133       | 425.1                 | N/A           |
| 38                 | 396                   | 452      | 548     | 617    | 137       | 429.8                 | N/A           |
| 39                 | 400                   | 460      | 555     | 615    | 140       | 434.0                 | N/A           |
| 40                 | 403                   | 462      | 560     | 608    | 144       | 435.2                 | N/A           |
| 41                 | 406                   | 466      | 565     | 607    | 146       | 438.1                 | N/A           |
| 42                 | 411                   | 469      | 572     | 603    | 149       | 440.8                 | N/A           |
| 43                 | 418                   | 471      | 579     | 600    | 152       | 444.0                 | N/A           |
| 44                 | 423                   | 474      | 586     | 599    | 154       | 447.3                 | N/A           |
| 45                 | 430                   | 478      | 594     | 600    | 157       | 451.9                 | N/A           |
| 46                 | 437                   | 479      | 602     | 597    | 159       | 454.8                 | N/A           |
| 47                 | 444                   | 481      | 607     | 596    | 162       | 457.9                 | N/A           |

# WOODSTOVE SURFACE TEMPERATURE DATA

Client: SBI  
 Model: St Louis  
 Run #: 1

Job #: 24-303  
 Tracking #: 216  
 Technician: AK  
 Date: 12/9/2024

Stove ΔT: **298**

| Elapsed Time (min) | Temperature Data (°F) |          |         |        |           |                       |               |
|--------------------|-----------------------|----------|---------|--------|-----------|-----------------------|---------------|
|                    | FB Left               | FB Right | FB Back | FB Top | FB Bottom | Stove Surface Average | Catalyst Exit |
| 48                 | 452                   | 483      | 612     | 595    | 164       | 461.2                 | N/A           |
| 49                 | 461                   | 487      | 623     | 597    | 167       | 467.0                 | N/A           |
| 50                 | 471                   | 491      | 631     | 598    | 170       | 472.0                 | N/A           |
| 51                 | 476                   | 496      | 629     | 599    | 172       | 474.7                 | N/A           |
| 52                 | 481                   | 497      | 634     | 595    | 175       | 476.5                 | N/A           |
| 53                 | 486                   | 499      | 636     | 594    | 177       | 478.3                 | N/A           |
| 54                 | 489                   | 499      | 641     | 593    | 180       | 480.5                 | N/A           |
| 55                 | 494                   | 499      | 644     | 593    | 182       | 482.4                 | N/A           |
| 56                 | 497                   | 499      | 647     | 592    | 184       | 483.7                 | N/A           |
| 57                 | 501                   | 500      | 647     | 593    | 187       | 485.6                 | N/A           |
| 58                 | 504                   | 500      | 650     | 594    | 189       | 487.6                 | N/A           |
| 59                 | 509                   | 500      | 655     | 595    | 192       | 490.3                 | N/A           |
| 60                 | 515                   | 502      | 658     | 597    | 194       | 493.0                 | N/A           |
| 61                 | 520                   | 503      | 664     | 600    | 196       | 496.8                 | N/A           |
| 62                 | 524                   | 504      | 670     | 604    | 199       | 500.3                 | N/A           |
| 63                 | 529                   | 507      | 676     | 608    | 201       | 504.3                 | N/A           |
| 64                 | 531                   | 510      | 677     | 608    | 203       | 505.7                 | N/A           |
| 65                 | 536                   | 516      | 683     | 611    | 206       | 510.3                 | N/A           |
| 66                 | 539                   | 521      | 688     | 612    | 208       | 513.5                 | N/A           |
| 67                 | 540                   | 525      | 692     | 613    | 211       | 516.1                 | N/A           |
| 68                 | 542                   | 531      | 693     | 613    | 213       | 518.4                 | N/A           |
| 69                 | 543                   | 536      | 695     | 611    | 215       | 519.9                 | N/A           |
| 70                 | 543                   | 539      | 697     | 610    | 217       | 521.0                 | N/A           |
| 71                 | 543                   | 544      | 699     | 609    | 219       | 522.8                 | N/A           |
| 72                 | 542                   | 549      | 700     | 608    | 221       | 524.1                 | N/A           |
| 73                 | 541                   | 554      | 702     | 609    | 223       | 525.7                 | N/A           |
| 74                 | 542                   | 556      | 704     | 611    | 225       | 527.5                 | N/A           |
| 75                 | 540                   | 559      | 703     | 608    | 227       | 527.1                 | N/A           |
| 76                 | 541                   | 563      | 704     | 606    | 228       | 528.4                 | N/A           |
| 77                 | 541                   | 565      | 704     | 606    | 230       | 529.2                 | N/A           |
| 78                 | 538                   | 571      | 699     | 605    | 232       | 529.1                 | N/A           |
| 79                 | 547                   | 582      | 698     | 603    | 234       | 532.8                 | N/A           |
| 80                 | 550                   | 589      | 692     | 617    | 234       | 536.4                 | N/A           |
| 81                 | 540                   | 580      | 695     | 623    | 238       | 535.1                 | N/A           |
| 82                 | 534                   | 574      | 701     | 632    | 239       | 536.0                 | N/A           |
| 83                 | 533                   | 573      | 705     | 634    | 240       | 537.2                 | N/A           |
| 84                 | 534                   | 576      | 707     | 635    | 241       | 538.7                 | N/A           |
| 85                 | 535                   | 577      | 710     | 635    | 242       | 539.8                 | N/A           |
| 86                 | 538                   | 580      | 710     | 636    | 243       | 541.5                 | N/A           |
| 87                 | 542                   | 581      | 713     | 637    | 244       | 543.4                 | N/A           |
| 88                 | 545                   | 585      | 716     | 639    | 245       | 545.8                 | N/A           |
| 89                 | 548                   | 588      | 717     | 638    | 246       | 547.4                 | N/A           |
| 90                 | 551                   | 588      | 719     | 637    | 247       | 548.2                 | N/A           |
| 91                 | 555                   | 589      | 720     | 635    | 247       | 549.4                 | N/A           |
| 92                 | 557                   | 589      | 721     | 634    | 248       | 550.0                 | N/A           |
| 93                 | 560                   | 589      | 724     | 633    | 249       | 550.9                 | N/A           |
| 94                 | 563                   | 589      | 727     | 632    | 249       | 551.8                 | N/A           |
| 95                 | 565                   | 589      | 728     | 630    | 250       | 552.3                 | N/A           |

# WOODSTOVE SURFACE TEMPERATURE DATA

Client: SBI  
 Model: St Louis  
 Run #: 1

Job #: 24-303  
 Tracking #: 216  
 Technician: AK  
 Date: 12/9/2024

Stove ΔT: 298

| Elapsed Time (min) | Temperature Data (°F) |          |         |        |           |                       |               |
|--------------------|-----------------------|----------|---------|--------|-----------|-----------------------|---------------|
|                    | FB Left               | FB Right | FB Back | FB Top | FB Bottom | Stove Surface Average | Catalyst Exit |
| 96                 | 569                   | 589      | 729     | 628    | 250       | 553.1                 | N/A           |
| 97                 | 571                   | 588      | 730     | 626    | 251       | 553.2                 | N/A           |
| 98                 | 572                   | 589      | 732     | 623    | 251       | 553.5                 | N/A           |
| 99                 | 572                   | 589      | 732     | 620    | 251       | 552.8                 | N/A           |
| 100                | 573                   | 589      | 731     | 617    | 251       | 552.2                 | N/A           |
| 101                | 573                   | 589      | 730     | 614    | 251       | 551.6                 | N/A           |
| 102                | 575                   | 590      | 733     | 614    | 252       | 552.6                 | N/A           |
| 103                | 577                   | 590      | 736     | 614    | 254       | 554.2                 | N/A           |
| 104                | 578                   | 588      | 736     | 615    | 255       | 554.4                 | N/A           |
| 105                | 579                   | 588      | 737     | 610    | 255       | 553.8                 | N/A           |
| 106                | 579                   | 588      | 736     | 608    | 256       | 553.4                 | N/A           |
| 107                | 577                   | 585      | 735     | 605    | 256       | 551.8                 | N/A           |
| 108                | 575                   | 584      | 733     | 600    | 257       | 549.7                 | N/A           |
| 109                | 574                   | 581      | 731     | 597    | 257       | 548.0                 | N/A           |
| 110                | 572                   | 580      | 729     | 592    | 257       | 546.1                 | N/A           |
| 111                | 569                   | 577      | 726     | 589    | 257       | 543.4                 | N/A           |
| 112                | 567                   | 575      | 724     | 585    | 257       | 541.6                 | N/A           |
| 113                | 565                   | 572      | 721     | 580    | 257       | 539.0                 | N/A           |
| 114                | 564                   | 570      | 718     | 576    | 257       | 536.9                 | N/A           |
| 115                | 562                   | 567      | 716     | 573    | 257       | 534.7                 | N/A           |
| 116                | 561                   | 564      | 713     | 570    | 257       | 532.7                 | N/A           |
| 117                | 558                   | 562      | 711     | 566    | 257       | 530.7                 | N/A           |
| 118                | 557                   | 559      | 707     | 563    | 257       | 528.5                 | N/A           |
| 119                | 554                   | 558      | 704     | 559    | 257       | 526.4                 | N/A           |
| 120                | 553                   | 556      | 699     | 556    | 257       | 524.2                 | N/A           |
| 121                | 555                   | 558      | 700     | 562    | 257       | 526.2                 | N/A           |
| 122                | 562                   | 566      | 701     | 576    | 259       | 533.0                 | N/A           |
| 123                | 565                   | 571      | 698     | 585    | 260       | 535.8                 | N/A           |
| 124                | 567                   | 575      | 693     | 591    | 261       | 537.4                 | N/A           |
| 125                | 568                   | 578      | 691     | 597    | 261       | 539.0                 | N/A           |
| 126                | 567                   | 580      | 687     | 601    | 261       | 539.2                 | N/A           |
| 127                | 568                   | 582      | 683     | 604    | 261       | 539.5                 | N/A           |
| 128                | 567                   | 583      | 681     | 606    | 260       | 539.3                 | N/A           |
| 129                | 567                   | 583      | 677     | 608    | 260       | 539.0                 | N/A           |
| 130                | 567                   | 583      | 675     | 609    | 259       | 538.6                 | N/A           |
| 131                | 566                   | 583      | 673     | 610    | 259       | 538.3                 | N/A           |
| 132                | 566                   | 583      | 670     | 611    | 258       | 537.6                 | N/A           |
| 133                | 565                   | 583      | 668     | 611    | 258       | 536.8                 | N/A           |
| 134                | 564                   | 582      | 664     | 611    | 258       | 535.7                 | N/A           |
| 135                | 564                   | 581      | 664     | 611    | 257       | 535.4                 | N/A           |
| 136                | 563                   | 581      | 661     | 611    | 257       | 534.7                 | N/A           |
| 137                | 563                   | 580      | 660     | 611    | 257       | 534.0                 | N/A           |
| 138                | 562                   | 579      | 657     | 611    | 256       | 533.1                 | N/A           |
| 139                | 562                   | 578      | 655     | 612    | 257       | 532.6                 | N/A           |
| 140                | 562                   | 577      | 654     | 612    | 257       | 532.2                 | N/A           |
| 141                | 562                   | 576      | 653     | 611    | 257       | 531.9                 | N/A           |
| 142                | 563                   | 575      | 651     | 611    | 257       | 531.3                 | N/A           |
| 143                | 562                   | 575      | 647     | 585    | 260       | 525.9                 | N/A           |

# WOODSTOVE SURFACE TEMPERATURE DATA

Client: SBI  
 Model: St Louis  
 Run #: 1

Job #: 24-303  
 Tracking #: 216  
 Technician: AK  
 Date: 12/9/2024

Stove ΔT: 298

| Elapsed Time (min) | Temperature Data (°F) |          |         |        |           |                       |               |
|--------------------|-----------------------|----------|---------|--------|-----------|-----------------------|---------------|
|                    | FB Left               | FB Right | FB Back | FB Top | FB Bottom | Stove Surface Average | Catalyst Exit |
| 144                | 562                   | 574      | 642     | 575    | 259       | 522.5                 | N/A           |
| 145                | 558                   | 570      | 644     | 591    | 260       | 524.7                 | N/A           |
| 146                | 554                   | 566      | 655     | 608    | 261       | 528.7                 | N/A           |
| 147                | 538                   | 556      | 667     | 610    | 261       | 526.3                 | N/A           |
| 148                | 535                   | 551      | 676     | 614    | 261       | 527.3                 | N/A           |
| 149                | 532                   | 549      | 685     | 618    | 260       | 528.7                 | N/A           |
| 150                | 529                   | 548      | 695     | 621    | 260       | 530.8                 | N/A           |
| 151                | 530                   | 549      | 704     | 626    | 261       | 533.8                 | N/A           |
| 152                | 530                   | 551      | 711     | 628    | 261       | 536.1                 | N/A           |
| 153                | 532                   | 554      | 719     | 631    | 261       | 539.4                 | N/A           |
| 154                | 535                   | 556      | 726     | 634    | 261       | 542.3                 | N/A           |
| 155                | 536                   | 558      | 732     | 637    | 262       | 544.8                 | N/A           |
| 156                | 539                   | 560      | 738     | 639    | 262       | 547.7                 | N/A           |
| 157                | 543                   | 563      | 744     | 642    | 262       | 550.8                 | N/A           |
| 158                | 545                   | 568      | 752     | 645    | 262       | 554.3                 | N/A           |
| 159                | 547                   | 573      | 758     | 648    | 263       | 557.6                 | N/A           |
| 160                | 547                   | 574      | 759     | 648    | 262       | 557.8                 | N/A           |
| 161                | 546                   | 575      | 761     | 646    | 261       | 557.7                 | N/A           |
| 162                | 546                   | 577      | 762     | 644    | 261       | 557.9                 | N/A           |
| 163                | 546                   | 579      | 764     | 645    | 260       | 558.8                 | N/A           |
| 164                | 548                   | 580      | 768     | 645    | 260       | 560.3                 | N/A           |
| 165                | 551                   | 583      | 769     | 647    | 260       | 562.1                 | N/A           |
| 166                | 552                   | 586      | 771     | 647    | 260       | 563.2                 | N/A           |
| 167                | 553                   | 587      | 775     | 649    | 260       | 564.9                 | N/A           |
| 168                | 555                   | 588      | 778     | 651    | 260       | 566.2                 | N/A           |
| 169                | 556                   | 591      | 780     | 652    | 259       | 567.7                 | N/A           |
| 170                | 559                   | 594      | 783     | 654    | 260       | 569.8                 | N/A           |
| 171                | 562                   | 597      | 783     | 656    | 260       | 571.4                 | N/A           |
| 172                | 564                   | 599      | 786     | 658    | 260       | 573.4                 | N/A           |
| 173                | 565                   | 603      | 790     | 658    | 260       | 575.1                 | N/A           |
| 174                | 568                   | 605      | 791     | 660    | 260       | 576.7                 | N/A           |
| 175                | 569                   | 608      | 793     | 662    | 259       | 578.2                 | N/A           |
| 176                | 571                   | 613      | 794     | 662    | 259       | 580.0                 | N/A           |
| 177                | 573                   | 615      | 798     | 664    | 259       | 581.9                 | N/A           |
| 178                | 575                   | 617      | 800     | 667    | 259       | 583.6                 | N/A           |
| 179                | 576                   | 619      | 802     | 667    | 259       | 584.5                 | N/A           |
| 180                | 579                   | 621      | 804     | 667    | 260       | 586.2                 | N/A           |
| 181                | 581                   | 623      | 806     | 669    | 259       | 587.8                 | N/A           |
| 182                | 583                   | 625      | 807     | 670    | 259       | 588.7                 | N/A           |
| 183                | 585                   | 627      | 811     | 671    | 260       | 590.6                 | N/A           |
| 184                | 587                   | 629      | 813     | 671    | 259       | 591.8                 | N/A           |
| 185                | 589                   | 631      | 814     | 670    | 259       | 592.6                 | N/A           |
| 186                | 590                   | 633      | 815     | 672    | 259       | 593.7                 | N/A           |
| 187                | 592                   | 635      | 814     | 671    | 259       | 594.3                 | N/A           |
| 188                | 593                   | 636      | 815     | 671    | 259       | 594.6                 | N/A           |
| 189                | 595                   | 637      | 814     | 668    | 259       | 594.6                 | N/A           |
| 190                | 597                   | 636      | 814     | 667    | 259       | 594.6                 | N/A           |
| 191                | 596                   | 637      | 812     | 666    | 260       | 594.0                 | N/A           |



# WOODSTOVE SURFACE TEMPERATURE DATA

Client: SBI  
 Model: St Louis  
 Run #: 1

Job #: 24-303  
 Tracking #: 216  
 Technician: AK  
 Date: 12/9/2024

Stove ΔT: 298

| Elapsed Time (min) | Temperature Data (°F) |          |         |        |           |                       |               |
|--------------------|-----------------------|----------|---------|--------|-----------|-----------------------|---------------|
|                    | FB Left               | FB Right | FB Back | FB Top | FB Bottom | Stove Surface Average | Catalyst Exit |
| 192                | 597                   | 637      | 812     | 666    | 260       | 594.1                 | N/A           |
| 193                | 599                   | 637      | 812     | 664    | 260       | 594.4                 | N/A           |
| 194                | 600                   | 637      | 810     | 664    | 260       | 594.2                 | N/A           |
| 195                | 602                   | 635      | 811     | 663    | 260       | 594.3                 | N/A           |
| 196                | 604                   | 636      | 810     | 663    | 260       | 594.4                 | N/A           |
| 197                | 604                   | 636      | 808     | 664    | 260       | 594.2                 | N/A           |
| 198                | 605                   | 634      | 807     | 663    | 260       | 593.8                 | N/A           |
| 199                | 606                   | 635      | 805     | 662    | 261       | 593.6                 | N/A           |
| 200                | 607                   | 635      | 804     | 663    | 261       | 593.8                 | N/A           |
| 201                | 610                   | 633      | 804     | 663    | 261       | 594.3                 | N/A           |
| 202                | 611                   | 632      | 805     | 664    | 261       | 594.8                 | N/A           |
| 203                | 614                   | 631      | 804     | 663    | 261       | 594.4                 | N/A           |
| 204                | 616                   | 630      | 803     | 663    | 261       | 594.5                 | N/A           |
| 205                | 617                   | 629      | 803     | 662    | 261       | 594.4                 | N/A           |
| 206                | 618                   | 627      | 804     | 663    | 261       | 594.6                 | N/A           |
| 207                | 619                   | 627      | 801     | 663    | 261       | 594.1                 | N/A           |
| 208                | 620                   | 626      | 800     | 662    | 261       | 593.5                 | N/A           |
| 209                | 621                   | 625      | 798     | 660    | 261       | 592.9                 | N/A           |
| 210                | 619                   | 625      | 798     | 660    | 261       | 592.4                 | N/A           |
| 211                | 619                   | 625      | 797     | 657    | 261       | 591.6                 | N/A           |
| 212                | 617                   | 624      | 795     | 654    | 261       | 590.2                 | N/A           |
| 213                | 616                   | 624      | 792     | 652    | 260       | 588.7                 | N/A           |
| 214                | 614                   | 622      | 791     | 649    | 260       | 587.0                 | N/A           |
| 215                | 613                   | 622      | 788     | 645    | 260       | 585.7                 | N/A           |
| 216                | 610                   | 620      | 784     | 643    | 260       | 583.3                 | N/A           |
| 217                | 608                   | 619      | 782     | 640    | 260       | 581.7                 | N/A           |
| 218                | 607                   | 619      | 782     | 636    | 260       | 580.7                 | N/A           |
| 219                | 605                   | 618      | 779     | 634    | 259       | 578.8                 | N/A           |
| 220                | 603                   | 617      | 777     | 630    | 259       | 577.3                 | N/A           |
| 221                | 601                   | 617      | 774     | 627    | 259       | 575.6                 | N/A           |
| 222                | 600                   | 620      | 772     | 625    | 259       | 575.2                 | N/A           |
| 223                | 598                   | 617      | 770     | 622    | 259       | 573.3                 | N/A           |
| 224                | 597                   | 617      | 768     | 619    | 259       | 572.2                 | N/A           |
| 225                | 596                   | 616      | 768     | 617    | 259       | 571.0                 | N/A           |
| 226                | 597                   | 615      | 767     | 616    | 259       | 570.6                 | N/A           |
| 227                | 596                   | 615      | 765     | 615    | 259       | 570.1                 | N/A           |
| 228                | 596                   | 614      | 764     | 613    | 259       | 569.0                 | N/A           |
| 229                | 601                   | 615      | 771     | 617    | 261       | 572.8                 | N/A           |
| 230                | 604                   | 615      | 771     | 618    | 262       | 574.0                 | N/A           |
| 231                | 604                   | 614      | 772     | 617    | 263       | 574.3                 | N/A           |
| 232                | 606                   | 614      | 772     | 616    | 264       | 574.3                 | N/A           |
| 233                | 605                   | 613      | 770     | 611    | 265       | 572.8                 | N/A           |
| 234                | 605                   | 611      | 768     | 607    | 265       | 571.1                 | N/A           |
| 235                | 604                   | 609      | 766     | 602    | 266       | 569.4                 | N/A           |
| 236                | 603                   | 606      | 762     | 598    | 266       | 567.2                 | N/A           |
| 237                | 601                   | 604      | 760     | 594    | 267       | 565.1                 | N/A           |
| 238                | 599                   | 602      | 757     | 590    | 267       | 563.2                 | N/A           |
| 239                | 598                   | 600      | 753     | 586    | 267       | 560.6                 | N/A           |

# WOODSTOVE SURFACE TEMPERATURE DATA

Client: SBI  
 Model: St Louis  
 Run #: 1

Job #: 24-303  
 Tracking #: 216  
 Technician: AK  
 Date: 12/9/2024

Stove ΔT: 298

| Elapsed Time (min) | Temperature Data (°F) |          |         |        |           |                       |               |
|--------------------|-----------------------|----------|---------|--------|-----------|-----------------------|---------------|
|                    | FB Left               | FB Right | FB Back | FB Top | FB Bottom | Stove Surface Average | Catalyst Exit |
| 240                | 596                   | 598      | 751     | 583    | 267       | 558.9                 | N/A           |
| 241                | 594                   | 596      | 747     | 579    | 268       | 556.8                 | N/A           |
| 242                | 592                   | 594      | 745     | 575    | 268       | 554.8                 | N/A           |
| 243                | 591                   | 591      | 740     | 571    | 268       | 552.2                 | N/A           |
| 244                | 590                   | 589      | 736     | 567    | 269       | 550.0                 | N/A           |
| 245                | 586                   | 586      | 731     | 562    | 269       | 546.8                 | N/A           |
| 246                | 583                   | 583      | 727     | 557    | 269       | 543.8                 | N/A           |
| 247                | 582                   | 583      | 724     | 560    | 270       | 543.8                 | N/A           |
| 248                | 589                   | 591      | 725     | 575    | 273       | 550.3                 | N/A           |
| 249                | 591                   | 595      | 719     | 582    | 274       | 552.3                 | N/A           |
| 250                | 592                   | 598      | 714     | 588    | 275       | 553.4                 | N/A           |
| 251                | 592                   | 599      | 709     | 592    | 276       | 553.5                 | N/A           |
| 252                | 592                   | 600      | 704     | 595    | 276       | 553.4                 | N/A           |
| 253                | 591                   | 601      | 702     | 597    | 276       | 553.4                 | N/A           |
| 254                | 590                   | 601      | 697     | 600    | 276       | 552.7                 | N/A           |
| 255                | 590                   | 601      | 693     | 601    | 276       | 552.1                 | N/A           |
| 256                | 588                   | 601      | 690     | 602    | 276       | 551.3                 | N/A           |
| 257                | 587                   | 601      | 687     | 602    | 276       | 550.5                 | N/A           |
| 258                | 587                   | 600      | 686     | 602    | 275       | 549.9                 | N/A           |
| 259                | 586                   | 599      | 682     | 603    | 276       | 549.0                 | N/A           |
| 260                | 585                   | 599      | 678     | 602    | 276       | 547.7                 | N/A           |
| 261                | 583                   | 598      | 676     | 602    | 276       | 546.9                 | N/A           |
| 262                | 583                   | 597      | 673     | 602    | 276       | 545.9                 | N/A           |
| 263                | 582                   | 595      | 671     | 602    | 276       | 544.9                 | N/A           |
| 264                | 580                   | 594      | 669     | 601    | 276       | 543.9                 | N/A           |
| 265                | 579                   | 593      | 665     | 601    | 276       | 542.7                 | N/A           |
| 266                | 578                   | 591      | 663     | 600    | 276       | 541.6                 | N/A           |
| 267                | 577                   | 589      | 662     | 599    | 276       | 540.4                 | N/A           |
| 268                | 576                   | 587      | 660     | 597    | 276       | 539.1                 | N/A           |
| 269                | 576                   | 585      | 658     | 596    | 277       | 538.2                 | N/A           |
| 270                | 575                   | 582      | 654     | 595    | 277       | 536.5                 | N/A           |
| 271                | 573                   | 580      | 652     | 593    | 277       | 534.9                 | N/A           |
| 272                | 572                   | 577      | 651     | 591    | 277       | 533.5                 | N/A           |
| 273                | 571                   | 575      | 646     | 589    | 277       | 531.4                 | N/A           |
| 274                | 568                   | 572      | 644     | 587    | 277       | 529.4                 | N/A           |
| 275                | 566                   | 569      | 642     | 584    | 277       | 527.4                 | N/A           |
| 276                | 563                   | 567      | 638     | 581    | 277       | 525.0                 | N/A           |
| 277                | 561                   | 564      | 636     | 578    | 276       | 522.7                 | N/A           |
| 278                | 558                   | 561      | 632     | 574    | 276       | 520.4                 | N/A           |
| 279                | 556                   | 559      | 630     | 572    | 275       | 518.1                 | N/A           |
| 280                | 554                   | 556      | 626     | 568    | 278       | 516.3                 | N/A           |
| 281                | 551                   | 554      | 623     | 562    | 282       | 514.6                 | N/A           |
| 282                | 549                   | 552      | 622     | 557    | 286       | 513.2                 | N/A           |
| 283                | 547                   | 550      | 619     | 551    | 290       | 511.4                 | N/A           |
| 284                | 544                   | 548      | 616     | 546    | 293       | 509.6                 | N/A           |
| 285                | 542                   | 546      | 613     | 540    | 296       | 507.4                 | N/A           |
| 286                | 539                   | 544      | 609     | 535    | 300       | 505.3                 | N/A           |
| 287                | 536                   | 541      | 606     | 529    | 302       | 502.8                 | N/A           |

# WOODSTOVE SURFACE TEMPERATURE DATA

Client: SBI  
 Model: St Louis  
 Run #: 1

Job #: 24-303  
 Tracking #: 216  
 Technician: AK  
 Date: 12/9/2024

Stove ΔT: 298

| Elapsed Time (min) | Temperature Data (°F) |          |         |        |           |                       |               |
|--------------------|-----------------------|----------|---------|--------|-----------|-----------------------|---------------|
|                    | FB Left               | FB Right | FB Back | FB Top | FB Bottom | Stove Surface Average | Catalyst Exit |
| 288                | 534                   | 539      | 603     | 524    | 304       | 500.4                 | N/A           |
| 289                | 531                   | 536      | 600     | 518    | 306       | 498.1                 | N/A           |
| 290                | 528                   | 533      | 596     | 513    | 307       | 495.4                 | N/A           |
| 291                | 525                   | 530      | 593     | 508    | 308       | 492.9                 | N/A           |
| 292                | 522                   | 527      | 589     | 504    | 310       | 490.1                 | N/A           |
| 293                | 518                   | 524      | 588     | 499    | 311       | 487.7                 | N/A           |
| 294                | 515                   | 521      | 585     | 494    | 312       | 485.2                 | N/A           |
| 295                | 512                   | 518      | 581     | 490    | 312       | 482.5                 | N/A           |
| 296                | 510                   | 515      | 577     | 485    | 312       | 479.9                 | N/A           |
| 297                | 507                   | 513      | 573     | 481    | 313       | 477.3                 | N/A           |
| 298                | 504                   | 510      | 571     | 477    | 313       | 474.9                 | N/A           |
| 299                | 501                   | 507      | 568     | 473    | 313       | 472.4                 | N/A           |
| 300                | 498                   | 504      | 565     | 469    | 313       | 470.0                 | N/A           |
| 301                | 496                   | 502      | 564     | 466    | 314       | 468.3                 | N/A           |
| 302                | 494                   | 499      | 560     | 462    | 313       | 465.6                 | N/A           |
| 303                | 490                   | 497      | 559     | 459    | 313       | 463.6                 | N/A           |
| 304                | 488                   | 494      | 557     | 456    | 314       | 461.8                 | N/A           |
| 305                | 486                   | 492      | 555     | 452    | 313       | 459.6                 | N/A           |
| 306                | 484                   | 490      | 551     | 449    | 313       | 457.4                 | N/A           |
| 307                | 482                   | 487      | 550     | 447    | 313       | 455.7                 | N/A           |
| 308                | 479                   | 485      | 547     | 444    | 313       | 453.4                 | N/A           |
| 309                | 477                   | 483      | 545     | 441    | 313       | 451.8                 | N/A           |
| 310                | 476                   | 481      | 543     | 438    | 312       | 449.8                 | N/A           |
| 311                | 473                   | 479      | 542     | 436    | 311       | 448.1                 | N/A           |
| 312                | 472                   | 477      | 538     | 433    | 311       | 446.1                 | N/A           |
| 313                | 469                   | 475      | 537     | 431    | 311       | 444.5                 | N/A           |
| 314                | 468                   | 473      | 535     | 428    | 311       | 443.0                 | N/A           |
| 315                | 467                   | 471      | 533     | 426    | 310       | 441.2                 | N/A           |
| 316                | 464                   | 469      | 531     | 424    | 310       | 439.4                 | N/A           |
| 317                | 463                   | 467      | 529     | 422    | 309       | 437.9                 | N/A           |
| 318                | 461                   | 465      | 527     | 420    | 309       | 436.3                 | N/A           |
| 319                | 460                   | 464      | 527     | 418    | 308       | 435.0                 | N/A           |
| 320                | 459                   | 462      | 526     | 416    | 308       | 433.8                 | N/A           |
| 321                | 457                   | 460      | 524     | 414    | 307       | 432.4                 | N/A           |
| 322                | 456                   | 459      | 520     | 412    | 307       | 430.5                 | N/A           |
| 323                | 454                   | 457      | 520     | 410    | 306       | 429.6                 | N/A           |
| 324                | 453                   | 456      | 518     | 409    | 306       | 428.2                 | N/A           |
| 325                | 452                   | 454      | 517     | 407    | 306       | 427.1                 | N/A           |
| 326                | 450                   | 453      | 515     | 405    | 305       | 425.7                 | N/A           |
| 327                | 449                   | 452      | 513     | 404    | 304       | 424.4                 | N/A           |
| 328                | 449                   | 451      | 512     | 403    | 304       | 423.5                 | N/A           |
| 329                | 448                   | 449      | 510     | 401    | 303       | 422.2                 | N/A           |
| 330                | 446                   | 448      | 510     | 400    | 303       | 421.2                 | N/A           |
| 331                | 445                   | 447      | 507     | 398    | 302       | 419.8                 | N/A           |
| 332                | 444                   | 446      | 507     | 397    | 302       | 419.0                 | N/A           |
| 333                | 443                   | 444      | 505     | 395    | 302       | 417.9                 | N/A           |
| 334                | 441                   | 443      | 503     | 394    | 301       | 416.4                 | N/A           |
| 335                | 440                   | 442      | 503     | 393    | 300       | 415.5                 | N/A           |

# WOODSTOVE SURFACE TEMPERATURE DATA

Client: SBI  
 Model: St Louis  
 Run #: 1

Job #: 24-303  
 Tracking #: 216  
 Technician: AK  
 Date: 12/9/2024

Stove ΔT: 298

| Elapsed Time (min) | Temperature Data (°F) |          |         |        |           |                       |               |
|--------------------|-----------------------|----------|---------|--------|-----------|-----------------------|---------------|
|                    | FB Left               | FB Right | FB Back | FB Top | FB Bottom | Stove Surface Average | Catalyst Exit |
| 336                | 439                   | 441      | 501     | 392    | 300       | 414.4                 | N/A           |
| 337                | 438                   | 440      | 499     | 390    | 300       | 413.4                 | N/A           |
| 338                | 438                   | 439      | 498     | 389    | 299       | 412.4                 | N/A           |
| 339                | 436                   | 437      | 496     | 388    | 298       | 411.1                 | N/A           |
| 340                | 435                   | 436      | 495     | 387    | 298       | 410.2                 | N/A           |
| 341                | 434                   | 435      | 493     | 386    | 297       | 409.1                 | N/A           |
| 342                | 432                   | 434      | 492     | 385    | 296       | 408.0                 | N/A           |
| 343                | 432                   | 433      | 490     | 384    | 296       | 407.0                 | N/A           |
| 344                | 431                   | 432      | 489     | 383    | 295       | 406.0                 | N/A           |
| 345                | 431                   | 431      | 489     | 382    | 295       | 405.4                 | N/A           |
| 346                | 429                   | 430      | 488     | 381    | 294       | 404.3                 | N/A           |
| 347                | 429                   | 429      | 486     | 380    | 294       | 403.5                 | N/A           |
| 348                | 427                   | 428      | 485     | 379    | 293       | 402.6                 | N/A           |
| 349                | 427                   | 427      | 485     | 378    | 293       | 402.0                 | N/A           |
| 350                | 425                   | 427      | 485     | 377    | 292       | 401.2                 | N/A           |
| 351                | 424                   | 426      | 483     | 377    | 292       | 400.3                 | N/A           |
| 352                | 425                   | 425      | 482     | 376    | 291       | 399.4                 | N/A           |
| 353                | 424                   | 424      | 480     | 375    | 290       | 398.4                 | N/A           |
| 354                | 423                   | 423      | 480     | 374    | 289       | 397.7                 | N/A           |
| 355                | 422                   | 422      | 478     | 373    | 289       | 396.5                 | N/A           |
| 356                | 420                   | 421      | 476     | 372    | 288       | 395.5                 | N/A           |
| 357                | 419                   | 420      | 476     | 372    | 287       | 394.7                 | N/A           |
| 358                | 419                   | 419      | 475     | 371    | 286       | 394.1                 | N/A           |
| 359                | 419                   | 418      | 474     | 370    | 285       | 393.3                 | N/A           |
| 360                | 417                   | 417      | 474     | 369    | 285       | 392.4                 | N/A           |
| 361                | 416                   | 416      | 473     | 369    | 284       | 391.5                 | N/A           |
| 362                | 416                   | 415      | 471     | 368    | 284       | 390.7                 | N/A           |
| 363                | 416                   | 414      | 471     | 367    | 283       | 390.2                 | N/A           |
| 364                | 415                   | 413      | 469     | 367    | 282       | 389.2                 | N/A           |
| 365                | 414                   | 412      | 469     | 366    | 281       | 388.6                 | N/A           |
| 366                | 414                   | 412      | 468     | 365    | 281       | 387.8                 | N/A           |
| 367                | 413                   | 411      | 467     | 364    | 280       | 386.8                 | N/A           |
| 368                | 411                   | 410      | 465     | 364    | 279       | 385.7                 | N/A           |
| 369                | 411                   | 409      | 464     | 363    | 278       | 385.0                 | N/A           |
| 370                | 411                   | 408      | 464     | 362    | 277       | 384.4                 | N/A           |
| 371                | 409                   | 408      | 463     | 362    | 277       | 383.7                 | N/A           |
| 372                | 409                   | 407      | 462     | 361    | 276       | 382.8                 | N/A           |
| 373                | 408                   | 406      | 461     | 360    | 275       | 381.9                 | N/A           |
| 374                | 407                   | 405      | 461     | 359    | 274       | 381.3                 | N/A           |
| 375                | 407                   | 404      | 459     | 359    | 274       | 380.5                 | N/A           |
| 376                | 405                   | 404      | 459     | 358    | 273       | 379.7                 | N/A           |
| 377                | 405                   | 403      | 458     | 357    | 272       | 378.9                 | N/A           |
| 378                | 404                   | 402      | 456     | 357    | 271       | 378.0                 | N/A           |
| 379                | 404                   | 401      | 455     | 356    | 270       | 377.3                 | N/A           |
| 380                | 403                   | 400      | 453     | 356    | 269       | 376.3                 | N/A           |
| 381                | 402                   | 399      | 454     | 355    | 269       | 375.6                 | N/A           |
| 382                | 403                   | 399      | 452     | 354    | 268       | 375.0                 | N/A           |
| 383                | 401                   | 398      | 452     | 354    | 266       | 374.3                 | N/A           |

# WOODSTOVE SURFACE TEMPERATURE DATA

Client: SBI  
 Model: St Louis  
 Run #: 1

Job #: 24-303  
 Tracking #: 216  
 Technician: AK  
 Date: 12/9/2024

Stove ΔT: **298**

| Temperature Data (°F) |         |          |         |        |           |                       |               |
|-----------------------|---------|----------|---------|--------|-----------|-----------------------|---------------|
| Elapsed Time (min)    | FB Left | FB Right | FB Back | FB Top | FB Bottom | Stove Surface Average | Catalyst Exit |
| 384                   | 401     | 397      | 451     | 354    | 266       | 373.9                 | N/A           |
| 385                   | 400     | 396      | 450     | 353    | 265       | 373.0                 | N/A           |
| 386                   | 400     | 396      | 451     | 353    | 265       | 372.8                 | N/A           |
| 387                   | 399     | 395      | 449     | 352    | 264       | 371.8                 | N/A           |
| 388                   | 398     | 394      | 449     | 352    | 263       | 371.1                 | N/A           |
| 389                   | 397     | 394      | 448     | 351    | 262       | 370.3                 | N/A           |
| 390                   | 398     | 393      | 447     | 350    | 261       | 369.7                 | N/A           |
| 391                   | 396     | 392      | 445     | 350    | 260       | 368.8                 | N/A           |
| 392                   | 395     | 391      | 444     | 349    | 260       | 367.9                 | N/A           |
| 393                   | 396     | 391      | 443     | 349    | 259       | 367.4                 | N/A           |
| 394                   | 395     | 390      | 442     | 348    | 258       | 366.6                 | N/A           |
| 395                   | 394     | 389      | 442     | 348    | 257       | 366.0                 | N/A           |
| 396                   | 392     | 389      | 440     | 347    | 256       | 364.8                 | N/A           |
| Average               | 498.9   | 511.7    | 619.7   | 543.5  | 246.2     | 484.0                 | N/A           |

# LAB SAMPLE DATA - ASTM E2515

Client: SBI  
 Model: St Louis  
 Run #: 1

Job #: 24-303  
 Tracking #: 216  
 Technician: AK  
 Date: 12/9/2024

|         |     | Sample ID | Tare, mg | Final, mg | Catch, mg |
|---------|-----|-----------|----------|-----------|-----------|
| Filters | A   | G01165    | 228.1    | 230.4     | 2.3       |
|         | B   | G01166    | 227.7    | 230.0     | 2.3       |
|         | Amb | G01167    | 228.4    | 228.4     | 0.0       |
|         |     |           |          |           |           |
|         |     |           |          |           |           |
| Probes  | A   | 8A        | 116634.4 | 116634.5  | 0.1       |
|         | B   | 8B        | 116666.7 | 116666.7  | 0.0       |
|         |     |           |          |           |           |
|         |     |           |          |           |           |
| O-rings | A   | 8A        | 3522.1   | 3522.3    | 0.2       |
|         | B   | 8B        | 3358.3   | 3358.3    | 0.0       |
|         |     |           |          |           |           |
|         |     |           |          |           |           |

Placed in Dessicator on: 12/9/2024

| Balance Audit (mg): |   | 200.0       |            | 200.0       |             | 200.0       |             |             |           |
|---------------------|---|-------------|------------|-------------|-------------|-------------|-------------|-------------|-----------|
|                     |   | Weight (mg) | Date/Time  | Weight (mg) | Date/Time   | Weight (mg) | Date/Time   | Weight (mg) | Date/Time |
| Filters             | A | 230.3       | 12/9 18:15 | 230.3       | 12/13 15:00 | 230.4       | 12/18 12:00 |             |           |
|                     | B | 230.4       | 12/9 18:15 | 230.0       | 12/13 15:00 | 230.0       | 12/18 12:00 |             |           |
|                     |   | 228.4       | 12/9 18:15 | 228.4       | 12/13 15:00 | 228.4       | 12/18 12:00 |             |           |
|                     |   |             |            |             |             |             |             |             |           |
|                     |   |             |            |             |             |             |             |             |           |
| Probes              | A | 116634.8    | 12/9 18:15 | 116634.6    | 12/13 15:00 | 116634.5    | 12/18 12:00 |             |           |
|                     | B | 116667.0    | 12/9 18:15 | 116666.7    | 12/13 15:00 | 116666.7    | 12/18 12:00 |             |           |
|                     |   |             |            |             |             |             |             |             |           |
|                     |   |             |            |             |             |             |             |             |           |
| O-Rings             | A | 3522.3      | 12/9 18:15 | 3522.3      | 12/13 15:00 | 3522.3      | 12/18 12:00 |             |           |
|                     | B | 3357.9      | 12/9 18:15 | 3358.1      | 12/13 15:00 | 3358.3      | 12/18 12:00 |             |           |
|                     |   |             |            |             |             |             |             |             |           |
|                     |   |             |            |             |             |             |             |             |           |

|                        |     |
|------------------------|-----|
| Train A Aggregate, mg: | 2.6 |
| Train B Aggregate, mg: | 2.3 |
| Ambient, mg:           | 0.0 |
|                        |     |

# TEST RESULTS - ASTM E2780 / ASTM E2515

Client: SBI

Model: St Louis

Run #: 1

Job #: 24-303

Tracking #: 216

Technician: AK

Date: 12/9/2024

Total Fuel Burned (kg-dry) 18.21

|                                                         | Ambient Sample | Sample Train A | Sample Train B | 1st Hour Filter |
|---------------------------------------------------------|----------------|----------------|----------------|-----------------|
| Total Sample Volume (ft <sup>3</sup> )                  | 99.214         | 70.038         | 66.945         | -               |
| Average Gas Velocity in Dilution Tunnel (ft/sec)        | 18.1           |                |                |                 |
| Average Gas Flow Rate in Dilution Tunnel (dscf/hr)      | 49014.1        |                |                |                 |
| Average Gas Meter Temperature (°F)                      | 71.0           | 89.4           | 89.8           | -               |
| Total Sample Volume (dscf)                              | 100.173        | 68.281         | 65.742         | -               |
| Average Tunnel Temperature (°F)                         | 86.1           |                |                |                 |
| Total Time of Test (min)                                | 396            |                |                |                 |
| Total Particulate Catch (mg)                            | 0.0            | 2.6            | 2.3            | -               |
| Particulate Concentration, dry-standard (g/dscf)        | 0.0000000      | 0.0000381      | 0.0000350      | -               |
| Total PM Emissions (g)                                  | 0.00           | 12.32          | 11.32          | -               |
| Particulate Emission Rate (g/hr)                        | 0.00           | 1.87           | 1.71           | -               |
| Emissions Factor (g/kg)                                 | -              | 0.68           | 0.62           | -               |
| Difference from Average Total Particulate Emissions (g) | -              | 0.50           | 0.50           | -               |
| Difference from Average Total Particulate Emissions (%) | -              | 4.2%           | 4.2%           | -               |
| Difference from Average Emissions Factor (g/kg)         | -              | 0.03           | 0.03           | -               |

| Final Average Results            |       |
|----------------------------------|-------|
| Total Particulate Emissions (g)  | 11.82 |
| Particulate Emission Rate (g/hr) | 1.79  |
| Emissions Factor (g/kg)          | 0.65  |

| Quality Checks                   | Requirement                                                                                 | Observed                 | Result |
|----------------------------------|---------------------------------------------------------------------------------------------|--------------------------|--------|
| Dual Train Precision             | Each train within 7.5% of average emissions (in grams), or emission factors within 0.5 g/kg | See Above                | OK     |
| Filter Temps                     | <90 °F                                                                                      | 87.1                     | OK     |
| Face Velocity                    | < 30 ft/min                                                                                 | 9.6                      | OK     |
| Leakage Rate                     | Less than 4% of average sample rate                                                         | 0 cfm                    | OK     |
| Ambient Temp                     | 55-90 °F                                                                                    | Min:65.8/Max:74.5        | OK     |
| Negative Probe Weight Evaluation | <5% of Total Catch                                                                          | Probe Catch Not Negative | OK     |
| Pro-Rate Variation               | 90% of readings between 90-110%; none greater than 120% or less than 80%                    | See Data Tabs            | OK     |

## Test Input Data

Client: SBI  
 Model: St-Louis  
 Run #: 1

Job #: 24-303  
 Tracking #: 216  
 Technician: AK  
 Date: 12/9/2024

### Traverse Data

| pt     | dP (in WC) |
|--------|------------|
| 1      | 0.068      |
| 2      | 0.076      |
| 3      | 0.078      |
| 4      | 0.078      |
| 5      | 0.070      |
| 6      | 0.062      |
| 7      | 0.060      |
| 8      | 0.072      |
| 9      | 0.082      |
| 10     | 0.086      |
| 11     | 0.078      |
| 12     | 0.060      |
| Center | 0.075      |

### Tunnel Data

|                   |       |
|-------------------|-------|
| Tunnel dia. (in): | 12    |
| Pitot Cp          | 0.99  |
| Vs,cent (ft/s):   | 18.06 |
| Vs, trav (ft/s):  | 17.72 |
| Fp                | 0.982 |

|                              | Pre-Test | Post Test |
|------------------------------|----------|-----------|
| Barometric Pressure (in. Hg) | 30.24    | 30.30     |
| Lab Relative Humidity (%)    | 45.0     | 28.8      |

|                  |        |
|------------------|--------|
| Traverse Temp:   | 68     |
| Static Pressure: | -0.202 |

## Fuel Data

### Fuel Properties

|              |        |
|--------------|--------|
| Species      | Maple  |
| HHV (Btu/lb) | 8587   |
| %C           | 50.64% |
| %H           | 6.02%  |
| %O           | 41.74% |

|                     | Wet Weight | MC (%db) | Dry Weight (lbs) |
|---------------------|------------|----------|------------------|
| Kindling            | 1.99       |          |                  |
| Starter             | 5.72       | 21.69    | 4.70             |
| L2                  | 13.62      | 21.15    | 11.24            |
| L3                  | 9.82       | 22.07    | 8.04             |
| L4 <sub>s</sub>     | 7.48       | 21.85    | 6.14             |
| L4 <sub>b</sub>     | 15.38      | 23.01    | 12.50            |
| Avg. Moisture (%db) |            | 21.95    |                  |



## Run 1 Results Summary

### Test Segments

|                         | Clock    | ET(min) |
|-------------------------|----------|---------|
| L1 Ignition             | 11:09 AM | 0       |
| L1 End                  | 11:29 AM | 19      |
| L1 Duration             |          | 19      |
| Fuel Consumed (lbs-wet) |          | 5.29    |
| Fuel Consumed (lbs-dry) |          | 4.27    |

|                         |          |       |
|-------------------------|----------|-------|
| L2 Loaded               | 11:30 AM | 20    |
| L2 End                  | 12:27 PM | 78    |
| L2 Duration             |          | 58    |
| Fuel Consumed (lbs-wet) |          | 12.38 |
| Fuel Consumed (lbs-dry) |          | 10.00 |

|                         |          |      |
|-------------------------|----------|------|
| L3 Loaded               | 12:28 PM | 79   |
| L3 End                  | 1:31 AM  | 142  |
| L3 Duration             |          | 63   |
| Fuel Consumed (lbs-wet) |          | 9.00 |
| Fuel Consumed (lbs-dry) |          | 7.22 |

|                         |         |       |
|-------------------------|---------|-------|
| L4 Loaded               | 1:32 AM | 143   |
| L4 End                  | 5:45 AM | 396   |
| L4 Duration             |         | 253   |
| Fuel Consumed (lbs-wet) |         | 22.86 |
| Fuel Consumed (lbs-dry) |         | 18.64 |

|                             |       |                |                |
|-----------------------------|-------|----------------|----------------|
| Total Fuel Burned (lbs-wet) | 49.53 |                |                |
| Total Fuel Burned (lbs-dry) | 40.14 | 18.21 (kg-dry) | 2.76 kg/hr dry |

### Firebox Avg Temps (F)

|                         |     |
|-------------------------|-----|
| L1TS <sub>avg(i)</sub>  | 67  |
| L1TS <sub>avg(f)</sub>  | 381 |
| L2TS <sub>avg(i)</sub>  | 381 |
| L2TS <sub>avg(f)</sub>  | 529 |
| L3TS <sub>avg(i)</sub>  | 533 |
| L3TS <sub>avg(f)</sub>  | 531 |
| L4TS <sub>avg(i)</sub>  | 526 |
| L14TS <sub>avg(f)</sub> | 365 |

### Burn Time Rating (hrs)

|     |   |
|-----|---|
| BTR | 5 |
|-----|---|

### Burn Rate (lbs-wet/hr) (dry kg/hr)

|                  |       |      |
|------------------|-------|------|
| BR <sub>L2</sub> | 16.71 | 6.12 |
| BR <sub>L2</sub> | 12.81 | 4.69 |
| BR <sub>L3</sub> | 8.57  | 3.12 |
| BR <sub>L4</sub> | 5.42  | 2.01 |
| OVERALL          | 7.50  | 2.76 |

|                         |          |       |
|-------------------------|----------|-------|
| 1st hr Loader           | 11:09 AM | 0     |
| 1st hr End              | 12:09 PM | 60    |
| L4 Duration             |          | 60    |
| Fuel Consumed (lbs-wet) |          | 14.60 |
| Fuel Consumed (lbs-dry) |          | 12.05 |

### PM Results

| Burn Phase:                    | L1     | L2     | L3     | L4     | 1st Hr | Total  |
|--------------------------------|--------|--------|--------|--------|--------|--------|
| E <sub>T</sub> :               | 1.9    | 2.9    | 1.0    | 1.3    | 4.6    | 7.1    |
| E <sub>g/hr</sub> :            | 5.9    | 3.0    | 1.0    | 0.31   | 4.57   | 1.08   |
| E <sub>g/kg</sub> :            | 0.97   | 0.65   | 0.31   | 0.16   | 0.84   | 0.39   |
| E <sub>g/MJ output</sub> :     | 0.07   | 0.04   | 0.02   | 0.01   |        | 0.03   |
| E <sub>lb/mmbtu output</sub> : | 0.16   | 0.10   | 0.05   | 0.02   | -      | 0.06   |
| CO (g):                        | 54.7   | 86.8   | 99.2   | 305.1  |        | 545.7  |
| CO (g/min):                    | 2.88   | 1.50   | 1.57   | 1.21   |        | 1.38   |
| Output (BTU/hr)                | 83,857 | 66,900 | 44,707 | 29,605 |        | 39,849 |
| Efficiency (%)                 | 72.3%  | 75.2%  | 75.6%  | 78.0%  |        | 76.3%  |

### Rolling Average Max Values

|           | 1-min Avg. | 5-min Avg. | 60-min Avg |
|-----------|------------|------------|------------|
| PM (g/hr) | 53.4       | 23.8       | 4.7        |

### Quality Checks

### Requirement

### Observer Pass/Fail

|                     |                                         |              |      |
|---------------------|-----------------------------------------|--------------|------|
| Filter/Dewpt. Temp  | Dewpoint must never exceed filter temp  | Max Δ -32.5  | PASS |
| Filter Temp         | Must be between 80 and 90F at all times | 80.9 / 87.1  | PASS |
| Ambient Temp        | Must be between 65 and 90F at all times | 65.2 / 73.9  | PASS |
| Minimum Tunnel Flow | >600 CFM                                | 794.7        | PASS |
| Weight Loss         | Must be >0.1 lb per 20 min              | Min -0.3 lb. | PASS |

# L1 Efficiency Results

**Manufacturer:** SBI  
**Model:** St-Louis  
**Date:** 12/09/24  
**Run:** 1  
**Control #:** 216  
**Test Duration:** 19  
**Output Category:** L1

## Test Results in Accordance with CSA B415.1-10

|                                 | HHV Basis | LHV Basis |
|---------------------------------|-----------|-----------|
| <b>Overall Efficiency</b>       | 72.3%     | 77.4%     |
| <b>Combustion Efficiency</b>    | 98.2%     | 98.2%     |
| <b>Heat Transfer Efficiency</b> | 73.6%     | 78.8%     |

|                           |         |         |                |
|---------------------------|---------|---------|----------------|
| <b>Output Rate (kJ/h)</b> | 88,400  | 83,857  | <b>(Btu/h)</b> |
| <b>Burn Rate (kg/h)</b>   | 6.12    | 13.49   | <b>(lb/h)</b>  |
| <b>Input (kJ/h)</b>       | 122,212 | 115,931 | <b>(Btu/h)</b> |

|                                  |       |      |               |
|----------------------------------|-------|------|---------------|
| <b>Test Load Weight (dry kg)</b> | 1.94  | 4.27 | <b>dry lb</b> |
| <b>MC wet (%)</b>                | 19.27 |      |               |
| <b>MC dry (%)</b>                | 23.87 |      |               |
| <b>Particulate (g )</b>          | N/A   |      |               |
| <b>CO (g)</b>                    | 55    |      |               |
| <b>Test Duration (h)</b>         | 0.32  |      |               |

| <b>Emissions</b>        | <b>Particulate</b> | <b>CO</b> |
|-------------------------|--------------------|-----------|
| <b>g/MJ Output</b>      | N/A                | 1.95      |
| <b>g/kg Dry Fuel</b>    | N/A                | 28.21     |
| <b>g/h</b>              | N/A                | 172.64    |
| <b>g/min</b>            | N/A                | 2.88      |
| <b>lb/MM Btu Output</b> | N/A                | 0.51      |

|                             |       |
|-----------------------------|-------|
| <b>Air/Fuel Ratio (A/F)</b> | 11.48 |
|-----------------------------|-------|

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2.4

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## L2 Efficiency Results

**Manufacturer:** SBI  
**Model:** St-Louis  
**Date:** 12/09/24  
**Run:** 1  
**Control #:** 216  
**Test Duration:** 58  
**Output Category:** L2

### Test Results in Accordance with CSA B415.1-10

|                                 | HHV Basis | LHV Basis |
|---------------------------------|-----------|-----------|
| <b>Overall Efficiency</b>       | 75.2%     | 80.4%     |
| <b>Combustion Efficiency</b>    | 98.8%     | 98.8%     |
| <b>Heat Transfer Efficiency</b> | 76.1%     | 81.4%     |

|                           |        |        |                |
|---------------------------|--------|--------|----------------|
| <b>Output Rate (kJ/h)</b> | 70,525 | 66,900 | <b>(Btu/h)</b> |
| <b>Burn Rate (kg/h)</b>   | 4.69   | 10.35  | <b>(lb/h)</b>  |
| <b>Input (kJ/h)</b>       | 93,769 | 88,950 | <b>(Btu/h)</b> |

|                                  |       |       |               |
|----------------------------------|-------|-------|---------------|
| <b>Test Load Weight (dry kg)</b> | 4.54  | 10.00 | <b>dry lb</b> |
| <b>MC wet (%)</b>                | 19.21 |       |               |
| <b>MC dry (%)</b>                | 23.77 |       |               |
| <b>Particulate (g )</b>          | N/A   |       |               |
| <b>CO (g)</b>                    | 87    |       |               |
| <b>Test Duration (h)</b>         | 0.97  |       |               |

| <b>Emissions</b>        | <b>Particulate</b> | <b>CO</b> |
|-------------------------|--------------------|-----------|
| <b>g/MJ Output</b>      | N/A                | 1.27      |
| <b>g/kg Dry Fuel</b>    | N/A                | 19.13     |
| <b>g/h</b>              | N/A                | 89.79     |
| <b>g/min</b>            | N/A                | 1.50      |
| <b>lb/MM Btu Output</b> | N/A                | 0.51      |

|                             |      |
|-----------------------------|------|
| <b>Air/Fuel Ratio (A/F)</b> | 9.47 |
|-----------------------------|------|

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## L3 Efficiency Results

**Manufacturer:** SBI  
**Model:** St-Louis  
**Date:** 12/09/24  
**Run:** 1  
**Control #:** 216  
**Test Duration:** 63  
**Output Category:** L3

### Test Results in Accordance with CSA B415.1-10

|                                 | HHV Basis | LHV Basis |
|---------------------------------|-----------|-----------|
| <b>Overall Efficiency</b>       | 75.6%     | 80.8%     |
| <b>Combustion Efficiency</b>    | 98.0%     | 98.0%     |
| <b>Heat Transfer Efficiency</b> | 77.1%     | 82.5%     |

|                           |        |        |                |
|---------------------------|--------|--------|----------------|
| <b>Output Rate (kJ/h)</b> | 47,129 | 44,707 | <b>(Btu/h)</b> |
| <b>Burn Rate (kg/h)</b>   | 3.12   | 6.88   | <b>(lb/h)</b>  |
| <b>Input (kJ/h)</b>       | 62,354 | 59,149 | <b>(Btu/h)</b> |

|                                  |       |      |               |
|----------------------------------|-------|------|---------------|
| <b>Test Load Weight (dry kg)</b> | 3.28  | 7.22 | <b>dry lb</b> |
| <b>MC wet (%)</b>                | 19.73 |      |               |
| <b>MC dry (%)</b>                | 24.57 |      |               |
| <b>Particulate (g )</b>          | N/A   |      |               |
| <b>CO (g)</b>                    | 99    |      |               |
| <b>Test Duration (h)</b>         | 1.05  |      |               |

| <b>Emissions</b>        | <b>Particulate</b> | <b>CO</b> |
|-------------------------|--------------------|-----------|
| <b>g/MJ Output</b>      | N/A                | 2.00      |
| <b>g/kg Dry Fuel</b>    | N/A                | 30.26     |
| <b>g/h</b>              | N/A                | 94.47     |
| <b>g/min</b>            | N/A                | 1.57      |
| <b>lb/MM Btu Output</b> | N/A                | 0.51      |

|                             |       |
|-----------------------------|-------|
| <b>Air/Fuel Ratio (A/F)</b> | 10.05 |
|-----------------------------|-------|

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2.4

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## L4 Efficiency Results

**Manufacturer:** SBI  
**Model:** St-Louis  
**Date:** 12/09/24  
**Run:** 1  
**Control #:** 216  
**Test Duration:** 253  
**Output Category:** L4

### Test Results in Accordance with CSA B415.1-10

|                                 | HHV Basis | LHV Basis |
|---------------------------------|-----------|-----------|
| <b>Overall Efficiency</b>       | 78.0%     | 83.4%     |
| <b>Combustion Efficiency</b>    | 97.5%     | 97.5%     |
| <b>Heat Transfer Efficiency</b> | 80.0%     | 85.5%     |

|                           |        |        |                |
|---------------------------|--------|--------|----------------|
| <b>Output Rate (kJ/h)</b> | 31,209 | 29,605 | <b>(Btu/h)</b> |
| <b>Burn Rate (kg/h)</b>   | 2.00   | 4.42   | <b>(lb/h)</b>  |
| <b>Input (kJ/h)</b>       | 40,029 | 37,972 | <b>(Btu/h)</b> |

|                                  |       |       |               |
|----------------------------------|-------|-------|---------------|
| <b>Test Load Weight (dry kg)</b> | 8.45  | 18.63 | <b>dry lb</b> |
| <b>MC wet (%)</b>                | 18.45 |       |               |
| <b>MC dry (%)</b>                | 22.63 |       |               |
| <b>Particulate (g )</b>          | N/A   |       |               |
| <b>CO (g)</b>                    | 305   |       |               |
| <b>Test Duration (h)</b>         | 4.22  |       |               |

| <b>Emissions</b>        | <b>Particulate</b> | <b>CO</b> |
|-------------------------|--------------------|-----------|
| <b>g/MJ Output</b>      | N/A                | 2.32      |
| <b>g/kg Dry Fuel</b>    | N/A                | 36.10     |
| <b>g/h</b>              | N/A                | 72.35     |
| <b>g/min</b>            | N/A                | 1.21      |
| <b>lb/MM Btu Output</b> | N/A                | 0.51      |

|                             |       |
|-----------------------------|-------|
| <b>Air/Fuel Ratio (A/F)</b> | 10.36 |
|-----------------------------|-------|

VERSION:

2.4

4/15/2010

# Run 1 TEOM Data

| ET (min) | Ci - 1-min avg PM (ug/m <sup>3</sup> ) | Tunnel dP (in WC) | sqrtdP | Tunnel Temp (F) | Tunnel Temp - 10 minute Avg. (F) | Tunnel RH - 10 minute avg. (%) | Tunnel Velocity - Vsi (ft/s) | Tunnel Flow - Q <sub>sdi</sub> (m <sup>3</sup> /min) | E <sub>i</sub> (mg) | E <sub>g/hr, i</sub> (g/hr) | PM 5-min Rolling Avg (g/hr) | PM 60-min Rolling Avg (g/hr) | PM (cumulative g) |
|----------|----------------------------------------|-------------------|--------|-----------------|----------------------------------|--------------------------------|------------------------------|------------------------------------------------------|---------------------|-----------------------------|-----------------------------|------------------------------|-------------------|
| 0        | -27                                    | 0.074             | 0.2720 | 68              | -                                | -                              | 17.598                       | 23.733                                               | -0.633              | -0.04                       | -                           | -                            | 0.00              |
| 1        | 10413                                  | 0.075             | 0.2739 | 75.3            | -                                | -                              | 17.838                       | 23.729                                               | 247.100             | 14.83                       | -                           | -                            | 0.25              |
| 2        | 28315                                  | 0.073             | 0.2702 | 84.6            | -                                | -                              | 17.751                       | 23.210                                               | 657.175             | 39.43                       | -                           | -                            | 0.90              |
| 3        | 6501                                   | 0.074             | 0.2720 | 79.5            | -                                | -                              | 17.788                       | 23.478                                               | 152.632             | 9.16                        | -                           | -                            | 1.06              |
| 4        | 3248                                   | 0.075             | 0.2739 | 78.2            | -                                | -                              | 17.886                       | 23.665                                               | 76.859              | 4.61                        | 13.60                       | -                            | 1.13              |
| 5        | 5893                                   | 0.074             | 0.2720 | 79.6            | -                                | -                              | 17.790                       | 23.476                                               | 138.343             | 8.30                        | 15.27                       | -                            | 1.27              |
| 6        | 7983                                   | 0.075             | 0.2739 | 81.7            | -                                | -                              | 17.944                       | 23.588                                               | 188.308             | 11.30                       | 14.56                       | -                            | 1.46              |
| 7        | 4706                                   | 0.073             | 0.2702 | 83.1            | -                                | -                              | 17.726                       | 23.242                                               | 109.383             | 6.56                        | 7.99                        | -                            | 1.57              |
| 8        | 2462                                   | 0.074             | 0.2720 | 84.1            | -                                | -                              | 17.864                       | 23.379                                               | 57.565              | 3.45                        | 6.85                        | -                            | 1.63              |
| 9        | 1153                                   | 0.074             | 0.2720 | 84.4            | 79.85                            | 118.89                         | 17.869                       | 23.372                                               | 26.960              | 1.62                        | 6.25                        | -                            | 1.65              |
| 10       | 1371                                   | 0.074             | 0.2720 | 85.4            | 81.59                            | 133.77                         | 17.885                       | 23.351                                               | 32.024              | 1.92                        | 4.97                        | -                            | 1.69              |
| 11       | 885                                    | 0.075             | 0.2739 | 85.8            | 82.64                            | 149.81                         | 18.012                       | 23.500                                               | 20.804              | 1.25                        | 2.96                        | -                            | 1.71              |
| 12       | 1113                                   | 0.076             | 0.2757 | 86.2            | 82.8                             | 166.77                         | 18.139                       | 23.647                                               | 26.307              | 1.58                        | 1.96                        | -                            | 1.73              |
| 13       | 1058                                   | 0.074             | 0.2720 | 86.6            | 83.51                            | 184.23                         | 17.905                       | 23.325                                               | 24.681              | 1.48                        | 1.57                        | -                            | 1.76              |
| 14       | 1145                                   | 0.076             | 0.2757 | 86.9            | 84.38                            | 201.69                         | 18.150                       | 23.632                                               | 27.059              | 1.62                        | 1.57                        | -                            | 1.78              |
| 15       | 876                                    | 0.073             | 0.2702 | 87.2            | 85.14                            | 218.56                         | 17.793                       | 23.154                                               | 20.293              | 1.22                        | 1.43                        | -                            | 1.80              |
| 16       | 1312                                   | 0.075             | 0.2739 | 87.9            | 85.76                            | 234.44                         | 18.047                       | 23.454                                               | 30.762              | 1.85                        | 1.55                        | -                            | 1.84              |
| 17       | 785                                    | 0.073             | 0.2702 | 88.1            | 86.26                            | 249.11                         | 17.808                       | 23.135                                               | 18.162              | 1.09                        | 1.45                        | -                            | 1.85              |
| 18       | 376                                    | 0.074             | 0.2720 | 88              | 86.65                            | 262.73                         | 17.928                       | 23.295                                               | 8.756               | 0.53                        | 1.26                        | -                            | 1.86              |
| 19       | 825                                    | 0.075             | 0.2739 | 88.7            | 87.08                            | 275.63                         | 18.060                       | 23.437                                               | 19.343              | 1.16                        | 1.17                        | -                            | 1.88              |
| 20       | 37459                                  | 0.072             | 0.2683 | 108.7           | 89.41                            | 287.26                         | 18.015                       | 22.556                                               | 844.916             | 50.69                       | 11.06                       | -                            | 2.73              |
| 21       | 39064                                  | 0.072             | 0.2683 | 97.7            | 90.6                             | 297.79                         | 17.840                       | 22.777                                               | 889.791             | 53.39                       | 21.37                       | -                            | 3.62              |
| 22       | 9043                                   | 0.073             | 0.2702 | 94.6            | 91.44                            | 307.55                         | 17.913                       | 22.999                                               | 207.987             | 12.48                       | 23.65                       | -                            | 3.82              |
| 23       | 945                                    | 0.074             | 0.2720 | 92.6            | 92.04                            | 316.7                          | 18.003                       | 23.198                                               | 21.927              | 1.32                        | 23.81                       | -                            | 3.85              |
| 24       | 134                                    | 0.073             | 0.2702 | 91.3            | 92.48                            | 325.21                         | 17.860                       | 23.068                                               | 3.082               | 0.18                        | 23.61                       | -                            | 3.85              |
| 25       | 1174                                   | 0.073             | 0.2702 | 90.7            | 92.83                            | 333.12                         | 17.850                       | 23.081                                               | 27.088              | 1.63                        | 13.80                       | -                            | 3.88              |
| 26       | 764                                    | 0.073             | 0.2702 | 90.7            | 93.11                            | 340.37                         | 17.850                       | 23.081                                               | 17.635              | 1.06                        | 3.33                        | -                            | 3.89              |
| 27       | 1977                                   | 0.073             | 0.2702 | 90.5            | 93.35                            | 347.01                         | 17.847                       | 23.085                                               | 45.628              | 2.74                        | 1.38                        | -                            | 3.94              |
| 28       | 7185                                   | 0.074             | 0.2720 | 90.3            | 93.58                            | 353.02                         | 17.965                       | 23.247                                               | 167.021             | 10.02                       | 3.13                        | -                            | 4.11              |
| 29       | 6583                                   | 0.074             | 0.2720 | 90.2            | 93.73                            | 358.36                         | 17.964                       | 23.249                                               | 153.043             | 9.18                        | 4.92                        | -                            | 4.26              |
| 30       | 2688                                   | 0.074             | 0.2720 | 91.3            | 91.99                            | 363.77                         | 17.982                       | 23.225                                               | 62.439              | 3.75                        | 5.35                        | -                            | 4.32              |
| 31       | 2882                                   | 0.075             | 0.2739 | 92.7            | 91.49                            | 369.33                         | 18.126                       | 23.352                                               | 67.295              | 4.04                        | 5.95                        | -                            | 4.39              |
| 32       | 3545                                   | 0.073             | 0.5064 | 92.6            | 91.29                            | 374.78                         | 33.513                       | 43.185                                               | 153.075             | 9.18                        | 7.23                        | -                            | 4.54              |
| 33       | 1568                                   | 0.074             | 0.2720 | 90.8            | 91.11                            | 380.09                         | 17.973                       | 23.236                                               | 36.437              | 2.19                        | 5.67                        | -                            | 4.58              |
| 34       | 88                                     | 0.075             | 0.2739 | 89.3            | 90.91                            | 385.33                         | 18.070                       | 23.424                                               | 2.073               | 0.12                        | 3.86                        | -                            | 4.58              |
| 35       | 201                                    | 0.073             | 0.2702 | 88.6            | 90.7                             | 390.56                         | 17.816                       | 23.125                                               | 4.637               | 0.28                        | 3.16                        | -                            | 4.59              |
| 36       | -3                                     | 0.075             | 0.2739 | 88.4            | 90.47                            | 395.74                         | 18.055                       | 23.444                                               | -0.070              | 0.00                        | 2.35                        | -                            | 4.59              |
| 37       | 40                                     | 0.075             | 0.2739 | 88.5            | 90.27                            | 400.9                          | 18.057                       | 23.442                                               | 0.927               | 0.06                        | 0.53                        | -                            | 4.59              |
| 38       | -44                                    | 0.075             | 0.2739 | 88.6            | 90.1                             | 406.1                          | 18.058                       | 23.439                                               | -1.021              | -0.06                       | 0.08                        | -                            | 4.59              |
| 39       | 198                                    | 0.073             | 0.2702 | 88.9            | 89.97                            | 411.38                         | 17.821                       | 23.118                                               | 4.569               | 0.27                        | 0.11                        | -                            | 4.59              |
| 40       | 11                                     | 0.075             | 0.2739 | 89              | 89.74                            | 416.32                         | 18.065                       | 23.431                                               | 0.255               | 0.02                        | 0.06                        | -                            | 4.59              |
| 41       | -179                                   | 0.075             | 0.2739 | 88.7            | 89.34                            | 420.91                         | 18.060                       | 23.437                                               | -4.185              | -0.25                       | 0.01                        | -                            | 4.59              |
| 42       | -178                                   | 0.074             | 0.2720 | 88.6            | 88.94                            | 425.22                         | 17.938                       | 23.283                                               | -4.147              | -0.25                       | -0.05                       | -                            | 4.58              |
| 43       | 25                                     | 0.074             | 0.2720 | 88.6            | 88.72                            | 429.22                         | 17.938                       | 23.283                                               | 0.588               | 0.04                        | -0.04                       | -                            | 4.58              |
| 44       | 394                                    | 0.073             | 0.2702 | 88.7            | 88.66                            | 432.97                         | 17.818                       | 23.123                                               | 9.114               | 0.55                        | 0.02                        | -                            | 4.59              |
| 45       | 441                                    | 0.073             | 0.2702 | 88.5            | 88.65                            | 436.62                         | 17.814                       | 23.127                                               | 10.204              | 0.61                        | 0.14                        | -                            | 4.60              |
| 46       | 352                                    | 0.076             | 0.2757 | 88              | 88.61                            | 440.1                          | 18.168                       | 23.608                                               | 8.304               | 0.50                        | 0.29                        | -                            | 4.61              |
| 47       | 23                                     | 0.073             | 0.2702 | 87.2            | 88.48                            | 443.38                         | 17.793                       | 23.154                                               | 0.534               | 0.03                        | 0.34                        | -                            | 4.61              |
| 48       | -175                                   | 0.076             | 0.2757 | 86.2            | 88.24                            | 446.52                         | 18.139                       | 23.647                                               | -4.128              | -0.25                       | 0.29                        | -                            | 4.61              |
| 49       | -194                                   | 0.075             | 0.2739 | 85.3            | 87.88                            | 449.83                         | 18.004                       | 23.510                                               | -4.567              | -0.27                       | 0.12                        | -                            | 4.60              |
| 50       | -222                                   | 0.074             | 0.2720 | 85.2            | 87.5                             | 453.51                         | 17.882                       | 23.355                                               | -5.185              | -0.31                       | -0.06                       | -                            | 4.60              |
| 51       | -202                                   | 0.074             | 0.2720 | 84.8            | 87.11                            | 457.17                         | 17.875                       | 23.364                                               | -4.713              | -0.28                       | -0.22                       | -                            | 4.59              |
| 52       | -149                                   | 0.075             | 0.2739 | 84.5            | 86.7                             | 460.74                         | 17.991                       | 23.528                                               | -3.511              | -0.21                       | -0.27                       | -                            | 4.59              |
| 53       | -92                                    | 0.076             | 0.2757 | 84.5            | 86.29                            | 464.17                         | 18.110                       | 23.684                                               | -2.182              | -0.13                       | -0.24                       | -                            | 4.59              |
| 54       | -104                                   | 0.075             | 0.2739 | 84.4            | 85.86                            | 467.49                         | 17.989                       | 23.530                                               | -2.456              | -0.15                       | -0.22                       | -                            | 4.58              |
| 55       | -112                                   | 0.076             | 0.2757 | 84.4            | 85.45                            | 470.54                         | 18.109                       | 23.686                                               | -2.655              | -0.16                       | -0.19                       | -                            | 4.58              |
| 56       | -93                                    | 0.077             | 0.2775 | 84.6            | 85.11                            | 473.43                         | 18.231                       | 23.837                                               | -2.228              | -0.13                       | -0.16                       | -                            | 4.58              |
| 57       | -65                                    | 0.075             | 0.2739 | 84.5            | 84.84                            | 476.2                          | 17.991                       | 23.528                                               | -1.531              | -0.09                       | -0.13                       | -                            | 4.58              |
| 58       | -84                                    | 0.076             | 0.2757 | 84.5            | 84.67                            | 478.84                         | 18.110                       | 23.684                                               | -1.994              | -0.12                       | -0.13                       | -                            | 4.58              |
| 59       | -66                                    | 0.074             | 0.2720 | 84.6            | 84.6                             | 481.16                         | 17.872                       | 23.368                                               | -1.537              | -0.09                       | -0.12                       | 4.74                         | 4.57              |
| 60       | 0                                      | 0.075             | 0.2739 | 84.6            | 84.54                            | 483.26                         | 17.992                       | 23.525                                               | -0.003              | 0.00                        | -0.09                       | 4.73                         | 4.57              |
| 61       | 564                                    | 0.074             | 0.2720 | 84.7            | 84.53                            | 485.47                         | 17.874                       | 23.366                                               | 13.173              | 0.79                        | 0.10                        | 4.48                         | 4.59              |
| 62       | 797                                    | 0.077             | 0.2775 | 84.6            | 84.54                            | 487.85                         | 18.231                       | 23.837                                               | 18.992              | 1.14                        | 0.34                        | 3.80                         | 4.61              |
| 63       | 1052                                   | 0.074             | 0.2720 | 84.7            | 84.56                            | 490.44                         | 17.874                       | 23.366                                               | 24.591              | 1.48                        | 0.66                        | 3.65                         | 4.63              |
| 64       | 1207                                   | 0.076             | 0.2757 | 84.7            | 84.59                            | 492.96                         | 18.114                       | 23.680                                               | 28.572              | 1.71                        | 1.02                        | 3.59                         | 4.66              |
| 65       | 1071                                   | 0.076             | 0.2757 | 84.6            | 84.61                            | 495.75                         | 18.112                       | 23.682                                               | 25.354              | 1.52                        | 1.33                        | 3.48                         | 4.69              |
| 66       | 789                                    | 0.078             | 0.2793 | 84.4            | 84.59                            | 498.73                         | 18.345                       | 23.996                                               | 18.934              | 1.14                        | 1.40                        | 3.31                         | 4.70              |
| 67       | 494                                    | 0.077             | 0.2775 | 84.3            | 84.57                            | 501.78                         | 18.226                       | 23.844                                               | 11.781              | 0.71                        | 1.31                        | 3.22                         | 4.72              |
| 68       | 415                                    | 0.074             | 0.2720 | 84.4            | 84.56                            | 504.86                         | 17.869                       | 23.372                                               | 9.696               | 0.58                        | 1.13                        | 3.18                         | 4.73              |
| 69       | 711                                    | 0.075             | 0.2739 | 84.2            | 84.52                            | 507.82                         | 17.986                       | 23.534                                               | 16.723              | 1.00                        | 0.99                        | 3.17                         | 4.74              |
| 70       | 710                                    | 0.076             | 0.2757 | 84.4            | 84.5                             | 510.62                         | 18.109                       | 23.686                                               | 16.812              | 1.01                        | 0.89                        | 3.14                         | 4.76              |
| 71       |                                        | 0.076             | 0.2757 | 84.2            | 84.45                            | 513.22                         |                              |                                                      |                     |                             | 0.83                        | 3.14                         |                   |
| 72       |                                        | 0.076             | 0.2757 | 84.2            | 84.41                            | 515.6                          |                              |                                                      |                     |                             | 0.86                        | 3.13                         |                   |
| 73       |                                        | 0.075             | 0.2739 | 84              | 84.34                            | 517.75                         |                              |                                                      |                     |                             | 1.01                        | 3.16                         |                   |
| 74       | 646                                    | 0.075             | 0.2739 | 84              | 84.27                            | 519.92                         | 17.982                       | 23.538                                               | 15.207              | 0.91                        | 0.96                        | 3.19                         | 4.77              |
| 75       | 269                                    | 0.077             | 0.2775 | 84.1            | 84.22                            | 521.6                          | 18.222                       | 23.848                                               | 6.415               | 0.38                        | 0.65                        | 3.22                         | 4.78              |
| 76       | 148                                    | 0.076             | 0.2757 | 83.9            | 84.17                            | 523.09                         | 18.100                       | 23.697                                               | 3.510               | 0.21                        | 0.50                        | 3.21                         | 4.78              |
| 77       | 1101                                   | 0.076             | 0.2757 | 83.9            | 84.13                            | 524.4                          | 18.100                       | 23.697                                               | 26.102              | 1.57                        | 0.77                        | 3.19                         | 4.81              |
| 78       | 702                                    | 0.078             | 0.2793 | 83.7            | 84.06                            | 525.47                         | 18.334                       | 24.011                                               | 16.847              | 1.01                        | 0.82                        | 3.19                         | 4.83              |
| 79       | 3321                                   | 0.075             | 0.2739 | 114             | 87.04                            | 526.76                         | 18.472                       | 22.914                                               | 76.102              | 4.57                        | 1.55                        | 3.19                         | 4.90              |
| 80       | 2100                                   | 0.073             | 0.2702 | 108.6           | 89.46                            | 528.3                          | 18.138                       | 22.714                                               | 47.710              | 2.86                        | 2.04                        | 2.29                         | 4.95              |
| 81       | 5915                                   | 0.074             | 0.2720 | 101.2           | 91.16                            | 529.53                         | 18.142                       | 23.019                                               | 136.162             | 8.17                        | 3.64                        | 1.40                         | 5.09              |
| 82       | 5745                                   | 0.075             | 0.2739 | 95.5            | 92.29                            | 530.72                         | 18.172                       | 23.293                                               | 133.813             | 8.03                        | 4.93                        | 1.23                         | 5.22              |
| 83       | 2876                                   | 0.075             | 0.2739 | 91              | 92.99                            | 531.87                         | 18.098                       | 23.388                                               | 67.275              | 4.04                        | 5.53                        | 1.35                         | 5.29              |
| 84       | 1337                                   | 0.074             | 0.2720 | 88.8            | 93.47                            | 533                            | 17.941                       | 23.278                                               | 31.113              | 1.87                        | 4.99                        | 1.50                         | 5.32              |

# Run 1 TEOM Data

|     |       |       |        |       |       |        |        |        |         |       |       |      |      |
|-----|-------|-------|--------|-------|-------|--------|--------|--------|---------|-------|-------|------|------|
| 85  | 652   | 0.074 | 0.2720 | 88.2  | 93.88 | 534.27 | 17.931 | 23.291 | 15.194  | 0.91  | 4.60  | 1.54 | 5.33 |
| 86  | 537   | 0.074 | 0.2720 | 87.8  | 94.27 | 535.58 | 17.924 | 23.300 | 12.503  | 0.75  | 3.12  | 1.55 | 5.35 |
| 87  | 445   | 0.074 | 0.2720 | 87.7  | 94.65 | 537    | 17.923 | 23.302 | 10.375  | 0.62  | 1.64  | 1.52 | 5.36 |
| 88  | 498   | 0.073 | 0.2702 | 87.2  | 95    | 538.67 | 17.793 | 23.154 | 11.538  | 0.69  | 0.97  | 1.35 | 5.37 |
| 89  | 340   | 0.075 | 0.2739 | 86.6  | 92.26 | 540.13 | 18.025 | 23.482 | 7.985   | 0.48  | 0.69  | 1.20 | 5.38 |
| 90  | 114   | 0.074 | 0.2720 | 86.4  | 90.04 | 541.31 | 17.902 | 23.330 | 2.650   | 0.16  | 0.54  | 1.14 | 5.38 |
| 91  | 70    | 0.076 | 0.2757 | 86.7  | 88.59 | 542.74 | 18.147 | 23.636 | 1.648   | 0.10  | 0.41  | 1.08 | 5.38 |
| 92  | 324   | 0.075 | 0.2739 | 86.5  | 87.69 | 544.14 | 18.024 | 23.484 | 7.614   | 0.46  | 0.38  | 0.91 | 5.39 |
| 93  | 468   | 0.076 | 0.2757 | 86.6  | 87.25 | 545.51 | 18.145 | 23.638 | 11.055  | 0.66  | 0.37  | 0.87 | 5.40 |
| 94  | 393   | 0.076 | 0.2757 | 86.6  | 87.03 | 546.82 | 18.145 | 23.638 | 9.284   | 0.56  | 0.39  | 0.88 | 5.41 |
| 95  | 150   | 0.076 | 0.2757 | 86.3  | 86.84 | 548.07 | 18.140 | 23.645 | 3.552   | 0.21  | 0.40  | 0.89 | 5.41 |
| 96  | 242   | 0.075 | 0.2739 | 86.3  | 86.69 | 549.23 | 18.020 | 23.489 | 5.681   | 0.34  | 0.45  | 0.90 | 5.42 |
| 97  | 221   | 0.075 | 0.2739 | 86.2  | 86.54 | 550.21 | 18.019 | 23.491 | 5.180   | 0.31  | 0.42  | 0.90 | 5.42 |
| 98  | 156   | 0.075 | 0.2739 | 86.1  | 86.43 | 550.98 | 18.017 | 23.493 | 3.669   | 0.22  | 0.33  | 0.91 | 5.43 |
| 99  | 172   | 0.075 | 0.2739 | 85.8  | 86.35 | 551.52 | 18.012 | 23.500 | 4.030   | 0.24  | 0.27  | 0.91 | 5.43 |
| 100 | 94    | 0.076 | 0.2757 | 85.7  | 86.28 | 551.92 | 18.130 | 23.658 | 2.226   | 0.13  | 0.25  | 0.91 | 5.43 |
| 101 | 158   | 0.077 | 0.2775 | 85.8  | 86.19 | 552.14 | 18.251 | 23.811 | 3.756   | 0.23  | 0.23  | 0.92 | 5.44 |
| 102 | 185   | 0.076 | 0.2757 | 85.7  | 86.11 | 552.4  | 18.130 | 23.658 | 4.373   | 0.26  | 0.22  | 0.93 | 5.44 |
| 103 | 62    | 0.075 | 0.2739 | 85.5  | 86    | 552.73 | 18.007 | 23.506 | 1.467   | 0.09  | 0.19  | 0.93 | 5.44 |
| 104 | 97    | 0.077 | 0.2775 | 85.5  | 85.89 | 552.99 | 18.246 | 23.817 | 2.315   | 0.14  | 0.17  | 0.93 | 5.45 |
| 105 | 97    | 0.077 | 0.2775 | 85.6  | 85.82 | 553.14 | 18.247 | 23.815 | 2.298   | 0.14  | 0.17  | 0.92 | 5.45 |
| 106 | 72    | 0.075 | 0.2739 | 85.5  | 85.74 | 553.17 | 18.007 | 23.506 | 1.684   | 0.10  | 0.15  | 0.91 | 5.45 |
| 107 | 90    | 0.075 | 0.2739 | 85.2  | 85.64 | 553.02 | 18.002 | 23.512 | 2.121   | 0.13  | 0.12  | 0.91 | 5.45 |
| 108 | 18    | 0.077 | 0.2775 | 85.2  | 85.55 | 552.64 | 18.241 | 23.824 | 0.434   | 0.03  | 0.11  | 0.92 | 5.45 |
| 109 | 61    | 0.075 | 0.2739 | 85.1  | 85.48 | 552.16 | 18.001 | 23.515 | 1.441   | 0.09  | 0.10  | 0.93 | 5.45 |
| 110 | 69    | 0.075 | 0.2739 | 84.9  | 85.4  | 551.54 | 17.997 | 23.519 | 1.625   | 0.10  | 0.09  | 0.93 | 5.45 |
| 111 | 69    | 0.076 | 0.2757 | 84.8  | 85.3  | 550.72 | 18.115 | 23.677 | 1.637   | 0.10  | 0.09  | 0.94 | 5.46 |
| 112 | 134   | 0.075 | 0.2739 | 84.5  | 85.18 | 549.62 | 17.991 | 23.528 | 3.149   | 0.19  | 0.10  | 0.94 | 5.46 |
| 113 | 77    | 0.076 | 0.2757 | 84.5  | 85.08 | 548.1  | 18.110 | 23.684 | 1.835   | 0.11  | 0.12  | 0.95 | 5.46 |
| 114 | 44    | 0.075 | 0.2739 | 84.8  | 85.01 | 546.35 | 17.996 | 23.521 | 1.030   | 0.06  | 0.11  | 0.96 | 5.46 |
| 115 | 65    | 0.077 | 0.2775 | 84.7  | 84.92 | 544.44 | 18.232 | 23.835 | 1.545   | 0.09  | 0.11  | 0.96 | 5.46 |
| 116 | 104   | 0.075 | 0.2739 | 84.8  | 84.85 | 542.37 | 17.996 | 23.521 | 2.450   | 0.15  | 0.12  | 0.96 | 5.47 |
| 117 | 110   | 0.076 | 0.2757 | 84.8  | 84.81 | 540.27 | 18.115 | 23.677 | 2.614   | 0.16  | 0.11  | 0.97 | 5.47 |
| 118 | 116   | 0.077 | 0.2775 | 84.7  | 84.76 | 538.15 | 18.232 | 23.835 | 2.767   | 0.17  | 0.12  | 0.97 | 5.47 |
| 119 | 96    | 0.075 | 0.2739 | 84.8  | 84.73 | 535.99 | 17.996 | 23.521 | 2.262   | 0.14  | 0.14  | 0.98 | 5.47 |
| 120 | 50    | 0.076 | 0.2757 | 84.6  | 84.7  | 533.81 | 18.112 | 23.682 | 1.186   | 0.07  | 0.14  | 0.98 | 5.48 |
| 121 | 87    | 0.077 | 0.2775 | 84.4  | 84.66 | 532.09 | 18.227 | 23.841 | 2.069   | 0.12  | 0.13  | 0.97 | 5.48 |
| 122 | 69    | 0.076 | 0.2757 | 87.9  | 85    | 531.23 | 18.167 | 23.610 | 1.636   | 0.10  | 0.12  | 0.95 | 5.48 |
| 123 | 150   | 0.076 | 0.2757 | 89.3  | 85.48 | 530.91 | 18.190 | 23.580 | 3.535   | 0.21  | 0.13  | 0.92 | 5.48 |
| 124 | 32    | 0.077 | 0.2775 | 90    | 86    | 530.97 | 18.321 | 23.720 | 0.767   | 0.05  | 0.11  | 0.89 | 5.48 |
| 125 | 23    | 0.074 | 0.2720 | 90.3  | 86.56 | 531.39 | 17.965 | 23.247 | 0.524   | 0.03  | 0.10  | 0.87 | 5.48 |
| 126 | 31    | 0.074 | 0.2720 | 90.6  | 87.14 | 532.04 | 17.970 | 23.240 | 0.712   | 0.04  | 0.09  | 0.85 | 5.48 |
| 127 |       | 0.076 | 0.2757 | 90.7  | 87.73 | 532.92 |        |        |         |       | 0.08  | 0.84 |      |
| 128 |       | 0.076 | 0.2757 | 90.5  | 88.31 | 534    |        |        |         |       | 0.04  | 0.83 |      |
| 129 |       | 0.077 | 0.2775 | 90.5  | 88.88 | 535.26 |        |        |         |       | 0.04  | 0.82 |      |
| 130 | -646  | 0.077 | 0.2775 | 90.5  | 89.47 | 536.7  | 18.329 | 23.709 | -15.313 | -0.92 | -0.44 | 0.82 | 5.47 |
| 131 | -337  | 0.075 | 0.2739 | 90.4  | 90.07 | 537.91 | 18.088 | 23.401 | -7.881  | -0.47 | -0.70 | 0.82 | 5.46 |
| 132 | -167  | 0.075 | 0.2739 | 90.5  | 90.33 | 538.37 | 18.090 | 23.399 | -3.915  | -0.23 | -0.54 | 0.79 | 5.46 |
| 133 | -17   | 0.075 | 0.2739 | 90.5  | 90.45 | 538.47 | 18.090 | 23.399 | -0.401  | -0.02 | -0.41 | 0.77 | 5.46 |
| 134 | 33    | 0.076 | 0.2757 | 90.2  | 90.47 | 538.3  | 18.205 | 23.561 | 0.781   | 0.05  | -0.32 | 0.75 | 5.46 |
| 135 | 109   | 0.077 | 0.2775 | 90.2  | 90.46 | 537.95 | 18.324 | 23.715 | 2.579   | 0.15  | -0.11 | 0.74 | 5.46 |
| 136 | 250   | 0.078 | 0.2793 | 90.3  | 90.43 | 537.5  | 18.444 | 23.867 | 5.972   | 0.36  | 0.06  | 0.74 | 5.47 |
| 137 | 243   | 0.075 | 0.2739 | 90.3  | 90.39 | 536.95 | 18.086 | 23.403 | 5.678   | 0.34  | 0.18  | 0.71 | 5.47 |
| 138 | 416   | 0.077 | 0.2775 | 90.4  | 90.38 | 536.33 | 18.328 | 23.711 | 9.857   | 0.59  | 0.30  | 0.70 | 5.48 |
| 139 | 446   | 0.075 | 0.2739 | 90.4  | 90.37 | 535.69 | 18.088 | 23.401 | 10.427  | 0.63  | 0.41  | 0.62 | 5.49 |
| 140 | 694   | 0.075 | 0.2739 | 90.1  | 90.33 | 535.05 | 18.083 | 23.407 | 16.234  | 0.97  | 0.58  | 0.58 | 5.51 |
| 141 | 700   | 0.075 | 0.2739 | 89.8  | 90.27 | 534.41 | 18.078 | 23.414 | 16.378  | 0.98  | 0.70  | 0.44 | 5.53 |
| 142 | 12905 | 0.076 | 0.2757 | 89.8  | 90.2  | 533.79 | 18.198 | 23.569 | 304.156 | 18.25 | 4.28  | 0.31 | 5.83 |
| 143 | 7552  | 0.072 | 0.2683 | 111.4 | 92.29 | 532.7  | 18.057 | 22.502 | 169.944 | 10.20 | 6.21  | 0.26 | 6.00 |
| 144 | 2535  | 0.075 | 0.2739 | 105   | 93.77 | 531.37 | 18.326 | 23.096 | 58.546  | 3.51  | 6.78  | 0.56 | 6.06 |
| 145 | 1967  | 0.074 | 0.2720 | 100.4 | 94.79 | 530.3  | 18.129 | 23.036 | 45.312  | 2.72  | 7.13  | 0.73 | 6.10 |
| 146 | 3469  | 0.075 | 0.2739 | 98.1  | 95.57 | 529.7  | 18.214 | 23.239 | 80.624  | 4.84  | 7.90  | 0.78 | 6.18 |
| 147 | 1302  | 0.074 | 0.2720 | 93.3  | 95.87 | 528.93 | 18.014 | 23.183 | 30.196  | 1.81  | 4.62  | 0.81 | 6.21 |
| 148 | 2008  | 0.075 | 0.2739 | 89.9  | 95.82 | 528.35 | 18.080 | 23.412 | 47.014  | 2.82  | 3.14  | 0.89 | 6.26 |
| 149 | 2034  | 0.074 | 0.2720 | 88.5  | 95.63 | 527.96 | 17.936 | 23.285 | 47.372  | 2.84  | 3.01  | 0.91 | 6.31 |
| 150 | 1699  | 0.076 | 0.2757 | 87.9  | 95.41 | 527.81 | 18.167 | 23.610 | 40.105  | 2.41  | 2.94  | 0.96 | 6.35 |
| 151 | 1191  | 0.075 | 0.2739 | 87.6  | 95.19 | 528    | 18.042 | 23.461 | 27.935  | 1.68  | 2.31  | 1.01 | 6.38 |
| 152 | 1015  | 0.077 | 0.2775 | 87.3  | 94.94 | 528.47 | 18.276 | 23.778 | 24.141  | 1.45  | 2.24  | 1.05 | 6.40 |
| 153 | 764   | 0.074 | 0.2720 | 86.9  | 92.49 | 529.82 | 17.910 | 23.319 | 17.822  | 1.07  | 1.89  | 1.07 | 6.42 |
| 154 | 771   | 0.075 | 0.2739 | 86.9  | 90.68 | 531.81 | 18.030 | 23.476 | 18.092  | 1.09  | 1.54  | 1.08 | 6.44 |
| 155 | 827   | 0.075 | 0.2739 | 87    | 89.34 | 533.82 | 18.032 | 23.474 | 19.411  | 1.16  | 1.29  | 1.10 | 6.46 |
| 156 | 709   | 0.074 | 0.2720 | 87.1  | 88.24 | 535.71 | 17.913 | 23.315 | 16.520  | 0.99  | 1.15  | 1.11 | 6.47 |
| 157 | 867   | 0.075 | 0.2739 | 87.3  | 87.64 | 538.16 | 18.037 | 23.467 | 20.341  | 1.22  | 1.11  | 1.13 | 6.49 |
| 158 | 808   | 0.075 | 0.2739 | 87.6  | 87.41 | 540.86 | 18.042 | 23.461 | 18.959  | 1.14  | 1.12  | 1.14 | 6.51 |
| 159 | 716   | 0.076 | 0.2757 | 87.8  | 87.34 | 543.75 | 18.165 | 23.612 | 16.910  | 1.01  | 1.11  | 1.16 | 6.53 |
| 160 | 743   | 0.076 | 0.2757 | 87.8  | 87.33 | 546.46 | 18.165 | 23.612 | 17.538  | 1.05  | 1.08  | 1.18 | 6.55 |
| 161 | 562   | 0.075 | 0.2739 | 87.7  | 87.34 | 548.85 | 18.044 | 23.459 | 13.185  | 0.79  | 1.04  | 1.19 | 6.56 |
| 162 | 651   | 0.075 | 0.2739 | 87.6  | 87.37 | 551.03 | 18.042 | 23.461 | 15.265  | 0.92  | 0.98  | 1.20 | 6.57 |
| 163 | 528   | 0.075 | 0.2739 | 87.8  | 87.46 | 552.97 | 18.045 | 23.457 | 12.395  | 0.74  | 0.90  | 1.22 | 6.59 |
| 164 | 738   | 0.075 | 0.2739 | 88    | 87.57 | 554.76 | 18.048 | 23.452 | 17.311  | 1.04  | 0.91  | 1.23 | 6.60 |
| 165 | 646   | 0.074 | 0.2720 | 88    | 87.67 | 556.49 | 17.928 | 23.295 | 15.057  | 0.90  | 0.88  | 1.24 | 6.62 |
| 166 | 538   | 0.075 | 0.2739 | 88    | 87.76 | 558.05 | 18.048 | 23.452 | 12.622  | 0.76  | 0.87  | 1.26 | 6.63 |
| 167 | 588   | 0.076 | 0.2757 | 88    | 87.83 | 559.46 | 18.168 | 23.608 | 13.892  | 0.83  | 0.86  | 1.27 | 6.65 |
| 168 | 634   | 0.074 | 0.2720 | 88.2  | 87.89 | 560.65 | 17.931 | 23.291 | 14.763  | 0.89  | 0.88  | 1.29 | 6.66 |
| 169 | 667   | 0.075 | 0.2739 | 88.3  | 87.94 | 561.66 | 18.053 | 23.446 | 15.635  | 0.94  | 0.86  | 1.30 | 6.68 |
| 170 | 523   | 0.074 | 0.2720 | 88.2  | 87.98 | 562.86 | 17.931 | 23.291 | 12.172  | 0.73  | 0.83  | 1.32 | 6.69 |
| 171 | 657   | 0.075 | 0.2739 | 88.5  | 88.06 | 564.23 | 18.057 | 23.442 | 15.406  | 0.92  | 0.86  | 1.33 | 6.70 |
| 172 | 567   | 0.075 | 0.2739 | 88.3  | 88.13 | 565.78 | 18.053 | 23.446 | 13.296  | 0.80  | 0.86  | 1.34 | 6.72 |

# Run 1 TEOM Data

|     |     |       |        |      |       |        |        |        |        |       |      |      |      |
|-----|-----|-------|--------|------|-------|--------|--------|--------|--------|-------|------|------|------|
| 173 | 490 | 0.075 | 0.2739 | 88.7 | 88.22 | 567.41 | 18.060 | 23.437 | 11.483 | 0.69  | 0.82 | 1.36 | 6.73 |
| 174 | 593 | 0.074 | 0.2720 | 88.9 | 88.31 | 569.05 | 17.942 | 23.276 | 13.793 | 0.83  | 0.79 | 1.37 | 6.74 |
| 175 | 491 | 0.075 | 0.2739 | 88.8 | 88.39 | 570.66 | 18.062 | 23.435 | 11.499 | 0.69  | 0.79 | 1.38 | 6.75 |
| 176 | 455 | 0.074 | 0.2720 | 88.8 | 88.47 | 572.34 | 17.941 | 23.278 | 10.588 | 0.64  | 0.73 | 1.39 | 6.76 |
| 177 | 480 | 0.075 | 0.2739 | 88.8 | 88.55 | 574.04 | 18.062 | 23.435 | 11.258 | 0.68  | 0.70 | 1.40 | 6.78 |
| 178 | 439 | 0.074 | 0.2720 | 89   | 88.63 | 575.78 | 17.944 | 23.274 | 10.228 | 0.61  | 0.69 | 1.41 | 6.79 |
| 179 | 485 | 0.073 | 0.2702 | 89.2 | 88.72 | 577.46 | 17.826 | 23.112 | 11.213 | 0.67  | 0.66 | 1.42 | 6.80 |
| 180 | 402 | 0.073 | 0.2702 | 89   | 88.8  | 579.1  | 17.822 | 23.116 | 9.284  | 0.56  | 0.63 | 1.43 | 6.81 |
| 181 | 392 | 0.076 | 0.2757 | 89.1 | 88.86 | 580.74 | 18.187 | 23.584 | 9.254  | 0.56  | 0.61 | 1.44 | 6.82 |
| 182 | 356 | 0.073 | 0.2702 | 89.3 | 88.96 | 582.27 | 17.827 | 23.110 | 8.222  | 0.49  | 0.58 | 1.45 | 6.82 |
| 183 | 387 | 0.075 | 0.2739 | 89.3 | 89.02 | 583.81 | 18.070 | 23.424 | 9.074  | 0.54  | 0.56 | 1.45 | 6.83 |
| 184 | 294 | 0.075 | 0.2739 | 89.4 | 89.07 | 585.32 | 18.072 | 23.422 | 6.881  | 0.41  | 0.51 | 1.46 | 6.84 |
| 185 | 351 | 0.075 | 0.2739 | 89.6 | 89.15 | 586.76 | 18.075 | 23.418 | 8.210  | 0.49  | 0.50 | 1.47 | 6.85 |
| 186 | 370 | 0.073 | 0.2702 | 89.4 | 89.21 | 588.13 | 17.829 | 23.108 | 8.544  | 0.51  | 0.49 | 1.48 | 6.86 |
| 187 | 282 | 0.075 | 0.2739 | 89.2 | 89.25 | 589.37 | 18.068 | 23.427 | 6.615  | 0.40  | 0.47 | 1.46 | 6.86 |
| 188 | 272 | 0.076 | 0.2757 | 89   | 89.25 | 590.47 | 18.185 | 23.587 | 6.410  | 0.38  | 0.44 | 1.44 | 6.87 |
| 189 | 246 | 0.074 | 0.2720 | 89   | 89.23 | 591.48 | 17.944 | 23.274 | 5.723  | 0.34  | 0.43 | 1.43 | 6.88 |
| 190 | 223 | 0.076 | 0.2757 | 88.7 | 89.2  | 592.32 | 18.180 | 23.593 | 5.258  | 0.32  | 0.39 | 1.45 | 6.88 |
| 191 | 152 | 0.073 | 0.2702 | 88.4 | 89.13 | 592.94 | 17.813 | 23.129 | 3.505  | 0.21  | 0.33 | 1.46 | 6.88 |
| 192 | 205 | 0.075 | 0.2739 | 88.4 | 89.04 | 593.48 | 18.055 | 23.444 | 4.802  | 0.29  | 0.31 | 1.47 | 6.89 |
| 193 | 115 | 0.075 | 0.2739 | 88.6 | 88.97 | 593.87 | 18.058 | 23.439 | 2.696  | 0.16  | 0.26 | 1.48 | 6.89 |
| 194 | 205 | 0.075 | 0.2739 | 88.3 | 88.86 | 594.11 | 18.053 | 23.446 | 4.804  | 0.29  | 0.25 | 1.48 | 6.90 |
| 195 | 79  | 0.075 | 0.2739 | 88.4 | 88.74 | 594.28 | 18.055 | 23.444 | 1.840  | 0.11  | 0.21 | 1.48 | 6.90 |
| 196 | 133 | 0.075 | 0.2739 | 88.5 | 88.65 | 594.35 | 18.057 | 23.442 | 3.111  | 0.19  | 0.21 | 1.48 | 6.90 |
| 197 | 304 | 0.074 | 0.2720 | 88.3 | 88.56 | 594.34 | 17.933 | 23.289 | 7.074  | 0.42  | 0.23 | 1.48 | 6.91 |
| 198 | 346 | 0.073 | 0.2702 | 88.3 | 88.49 | 594.26 | 17.811 | 23.131 | 8.015  | 0.48  | 0.30 | 1.47 | 6.92 |
| 199 | 254 | 0.075 | 0.2739 | 88.1 | 88.4  | 594.17 | 18.050 | 23.450 | 5.949  | 0.36  | 0.31 | 1.46 | 6.92 |
| 200 | 451 | 0.074 | 0.2720 | 88.2 | 88.35 | 594.1  | 17.931 | 23.291 | 10.500 | 0.63  | 0.42 | 1.46 | 6.93 |
| 201 | 510 | 0.076 | 0.2757 | 88.4 | 88.35 | 594.13 | 18.175 | 23.599 | 12.042 | 0.72  | 0.52 | 1.45 | 6.94 |
| 202 | 220 | 0.078 | 0.2793 | 88.4 | 88.35 | 594.2  | 18.413 | 23.908 | 5.263  | 0.32  | 0.50 | 1.14 | 6.95 |
| 203 | 372 | 0.075 | 0.2739 | 88.1 | 88.3  | 594.2  | 18.050 | 23.450 | 8.714  | 0.52  | 0.51 | 0.98 | 6.96 |
| 204 | 362 | 0.076 | 0.2757 | 88.2 | 88.29 | 594.23 | 18.172 | 23.604 | 8.536  | 0.51  | 0.54 | 0.92 | 6.97 |
| 205 | 441 | 0.075 | 0.2739 | 88.3 | 88.28 | 594.25 | 18.053 | 23.446 | 10.333 | 0.62  | 0.54 | 0.89 | 6.98 |
| 206 | 618 | 0.076 | 0.2757 | 88.2 | 88.25 | 594.28 | 18.172 | 23.604 | 14.593 | 0.88  | 0.57 | 0.81 | 6.99 |
| 207 | 491 | 0.073 | 0.2702 | 87.9 | 88.21 | 594.27 | 17.805 | 23.140 | 11.363 | 0.68  | 0.64 | 0.79 | 7.00 |
| 208 | 520 | 0.076 | 0.2757 | 87.9 | 88.17 | 594.24 | 18.167 | 23.610 | 12.289 | 0.74  | 0.69 | 0.76 | 7.02 |
| 209 | 634 | 0.076 | 0.2757 | 87.8 | 88.14 | 594.16 | 18.165 | 23.612 | 14.972 | 0.90  | 0.76 | 0.72 | 7.03 |
| 210 | 305 | 0.075 | 0.2739 | 87.8 | 88.1  | 594.01 | 18.045 | 23.457 | 7.159  | 0.43  | 0.72 | 0.69 | 7.04 |
| 211 | 111 | 0.076 | 0.2757 | 87.6 | 88.02 | 593.74 | 18.162 | 23.617 | 2.628  | 0.16  | 0.58 | 0.68 | 7.04 |
| 212 | 109 | 0.075 | 0.2739 | 87.6 | 87.94 | 593.28 | 18.042 | 23.461 | 2.560  | 0.15  | 0.48 | 0.66 | 7.04 |
| 213 | 95  | 0.075 | 0.2739 | 87.6 | 87.89 | 592.7  | 18.042 | 23.461 | 2.239  | 0.13  | 0.35 | 0.64 | 7.05 |
| 214 | 72  | 0.075 | 0.2739 | 87.7 | 87.84 | 591.95 | 18.044 | 23.459 | 1.680  | 0.10  | 0.20 | 0.63 | 7.05 |
| 215 | 102 | 0.074 | 0.2720 | 87.8 | 87.79 | 591.07 | 17.924 | 23.300 | 2.374  | 0.14  | 0.14 | 0.61 | 7.05 |
| 216 | 82  | 0.075 | 0.2739 | 87.7 | 87.74 | 589.93 | 18.044 | 23.459 | 1.914  | 0.11  | 0.13 | 0.59 | 7.05 |
| 217 | 159 | 0.076 | 0.2757 | 88.1 | 87.76 | 588.69 | 18.170 | 23.606 | 3.743  | 0.22  | 0.14 | 0.58 | 7.06 |
| 218 | 45  | 0.075 | 0.2739 | 87.9 | 87.76 | 587.41 | 18.047 | 23.454 | 1.065  | 0.06  | 0.13 | 0.56 | 7.06 |
| 219 | 50  | 0.076 | 0.2757 | 88   | 87.78 | 586    | 18.168 | 23.608 | 1.182  | 0.07  | 0.12 | 0.54 | 7.06 |
| 220 | 65  | 0.076 | 0.2757 | 88.1 | 87.81 | 584.49 | 18.170 | 23.606 | 1.544  | 0.09  | 0.11 | 0.53 | 7.06 |
| 221 | 99  | 0.076 | 0.2757 | 87.8 | 87.83 | 582.89 | 18.165 | 23.612 | 2.328  | 0.14  | 0.12 | 0.52 | 7.06 |
| 222 | 63  | 0.076 | 0.2757 | 87.6 | 87.83 | 581.39 | 18.162 | 23.617 | 1.491  | 0.09  | 0.09 | 0.50 | 7.06 |
| 223 | 147 | 0.076 | 0.2757 | 87.7 | 87.84 | 579.86 | 18.163 | 23.615 | 3.480  | 0.21  | 0.12 | 0.49 | 7.07 |
| 224 | 112 | 0.076 | 0.2757 | 87.6 | 87.83 | 578.38 | 18.162 | 23.617 | 2.645  | 0.16  | 0.14 | 0.47 | 7.07 |
| 225 | 144 | 0.076 | 0.2757 | 87.5 | 87.8  | 576.91 | 18.160 | 23.619 | 3.390  | 0.20  | 0.16 | 0.46 | 7.07 |
| 226 | 222 | 0.076 | 0.2757 | 87.6 | 87.79 | 575.65 | 18.162 | 23.617 | 5.251  | 0.32  | 0.20 | 0.45 | 7.08 |
| 227 | 27  | 0.075 | 0.2739 | 87.4 | 87.72 | 574.49 | 18.039 | 23.465 | 0.629  | 0.04  | 0.18 | 0.44 | 7.08 |
| 228 | 84  | 0.075 | 0.2739 | 87.2 | 87.65 | 573.32 | 18.035 | 23.469 | 1.969  | 0.12  | 0.17 | 0.43 | 7.08 |
| 229 | 77  | 0.076 | 0.2757 | 87.2 | 87.57 | 572.72 | 18.155 | 23.625 | 1.815  | 0.11  | 0.16 | 0.42 | 7.08 |
| 230 | 61  | 0.077 | 0.2775 | 87.3 | 87.49 | 572.39 | 18.276 | 23.778 | 1.459  | 0.09  | 0.13 | 0.41 | 7.08 |
| 231 | 45  | 0.076 | 0.2757 | 87   | 87.41 | 572.26 | 18.152 | 23.630 | 1.066  | 0.06  | 0.08 | 0.39 | 7.08 |
| 232 | 27  | 0.076 | 0.2757 | 87   | 87.35 | 572.17 | 18.152 | 23.630 | 0.627  | 0.04  | 0.08 | 0.38 | 7.09 |
| 233 | 50  | 0.074 | 0.2720 | 86.8 | 87.26 | 572.12 | 17.908 | 23.321 | 1.168  | 0.07  | 0.07 | 0.37 | 7.09 |
| 234 | 11  | 0.076 | 0.2757 | 86.8 | 87.18 | 572.01 | 18.149 | 23.634 | 0.260  | 0.02  | 0.05 | 0.35 | 7.09 |
| 235 | 10  | 0.077 | 0.2775 | 86.5 | 87.08 | 571.85 | 18.263 | 23.796 | 0.234  | 0.01  | 0.04 | 0.34 | 7.09 |
| 236 | 64  | 0.075 | 0.2739 | 86.5 | 86.97 | 571.5  | 18.024 | 23.484 | 1.498  | 0.09  | 0.05 | 0.33 | 7.09 |
| 237 | 96  | 0.076 | 0.2757 | 86.3 | 86.86 | 571    | 18.140 | 23.645 | 2.274  | 0.14  | 0.07 | 0.32 | 7.09 |
| 238 | 36  | 0.076 | 0.2757 | 86.2 | 86.76 | 570.41 | 18.139 | 23.647 | 0.841  | 0.05  | 0.06 | 0.31 | 7.09 |
| 239 | 79  | 0.075 | 0.2739 | 86.2 | 86.66 | 569.19 | 18.019 | 23.491 | 1.857  | 0.11  | 0.08 | 0.30 | 7.09 |
| 240 | 32  | 0.076 | 0.2757 | 86   | 86.53 | 567.68 | 18.135 | 23.651 | 0.768  | 0.05  | 0.09 | 0.29 | 7.09 |
| 241 | 27  | 0.076 | 0.2757 | 85.8 | 86.41 | 565.93 | 18.132 | 23.656 | 0.642  | 0.04  | 0.08 | 0.29 | 7.09 |
| 242 | 89  | 0.075 | 0.2739 | 85.9 | 86.3  | 563.98 | 18.014 | 23.497 | 2.100  | 0.13  | 0.07 | 0.28 | 7.10 |
| 243 | 10  | 0.074 | 0.2720 | 86   | 86.22 | 561.92 | 17.895 | 23.338 | 0.244  | 0.01  | 0.07 | 0.27 | 7.10 |
| 244 | 17  | 0.076 | 0.2757 | 86.3 | 86.17 | 559.81 | 18.140 | 23.645 | 0.404  | 0.02  | 0.05 | 0.27 | 7.10 |
| 245 | -8  | 0.074 | 0.2720 | 86.3 | 86.15 | 557.55 | 17.900 | 23.332 | -0.176 | -0.01 | 0.04 | 0.26 | 7.10 |
| 246 | 55  | 0.077 | 0.2775 | 86.3 | 86.13 | 555.21 | 18.259 | 23.800 | 1.306  | 0.08  | 0.05 | 0.25 | 7.10 |
| 247 | 33  | 0.076 | 0.2757 | 86.2 | 86.12 | 553.07 | 18.139 | 23.647 | 0.781  | 0.05  | 0.03 | 0.24 | 7.10 |
| 248 | 52  | 0.076 | 0.2757 | 89.6 | 86.46 | 551.79 | 18.195 | 23.574 | 1.230  | 0.07  | 0.04 | 0.24 | 7.10 |
| 249 | 95  | 0.074 | 0.2720 | 91.3 | 86.97 | 550.96 | 17.982 | 23.225 | 2.204  | 0.13  | 0.06 | 0.23 | 7.10 |
| 250 | 46  | 0.076 | 0.2757 | 92.1 | 87.58 | 550.41 | 18.236 | 23.520 | 1.090  | 0.07  | 0.08 | 0.23 | 7.10 |
| 251 | 24  | 0.075 | 0.2739 | 92.3 | 88.23 | 550.08 | 18.119 | 23.361 | 0.570  | 0.03  | 0.07 | 0.23 | 7.10 |
| 252 | 80  | 0.075 | 0.2739 | 92.4 | 88.88 | 549.94 | 18.121 | 23.359 | 1.874  | 0.11  | 0.08 | 0.22 | 7.11 |
| 253 | 84  | 0.075 | 0.2739 | 92.3 | 89.51 | 550.06 | 18.119 | 23.361 | 1.958  | 0.12  | 0.09 | 0.22 | 7.11 |
| 254 | 52  | 0.075 | 0.2739 | 92.5 | 90.13 | 550.33 | 18.122 | 23.356 | 1.212  | 0.07  | 0.08 | 0.22 | 7.11 |
| 255 | 102 | 0.076 | 0.2757 | 92.4 | 90.74 | 550.85 | 18.241 | 23.514 | 2.403  | 0.14  | 0.10 | 0.22 | 7.11 |
| 256 | 69  | 0.076 | 0.2757 | 92.2 | 91.33 | 551.6  | 18.238 | 23.518 | 1.620  | 0.10  | 0.11 | 0.22 | 7.11 |
| 257 | 66  | 0.076 | 0.2757 | 91.9 | 91.9  | 552.28 | 18.233 | 23.524 | 1.564  | 0.09  | 0.11 | 0.21 | 7.12 |
| 258 | 29  | 0.077 | 0.2775 | 91.6 | 92.1  | 552.24 | 18.348 | 23.685 | 0.688  | 0.04  | 0.09 | 0.20 | 7.12 |
| 259 | 19  | 0.075 | 0.2739 | 91.5 | 92.12 | 551.91 | 18.106 | 23.378 | 0.451  | 0.03  | 0.08 | 0.20 | 7.12 |
| 260 | 87  | 0.076 | 0.2757 | 91.5 | 92.06 | 551.34 | 18.226 | 23.533 | 2.038  | 0.12  | 0.08 | 0.19 | 7.12 |



# Run 1 TEOM Data

|     |     |       |        |      |       |        |        |        |        |       |       |      |      |
|-----|-----|-------|--------|------|-------|--------|--------|--------|--------|-------|-------|------|------|
| 261 | 137 | 0.076 | 0.2757 | 91.5 | 91.98 | 550.68 | 18.226 | 23.533 | 3.216  | 0.19  | 0.10  | 0.18 | 7.12 |
| 262 | 251 | 0.077 | 0.2775 | 91.4 | 91.88 | 549.92 | 18.344 | 23.689 | 5.938  | 0.36  | 0.15  | 0.17 | 7.13 |
| 263 | 220 | 0.077 | 0.2775 | 91.4 | 91.79 | 549.07 | 18.344 | 23.689 | 5.216  | 0.31  | 0.20  | 0.17 | 7.13 |
| 264 | 175 | 0.077 | 0.2775 | 91.3 | 91.67 | 548.19 | 18.343 | 23.692 | 4.140  | 0.25  | 0.25  | 0.17 | 7.14 |
| 265 | -1  | 0.076 | 0.2757 | 91.2 | 91.55 | 547.26 | 18.221 | 23.539 | -0.035 | 0.00  | 0.22  | 0.16 | 7.14 |
| 266 | 1   | 0.075 | 0.2739 | 91.3 | 91.46 | 546.29 | 18.103 | 23.382 | 0.034  | 0.00  | 0.18  | 0.15 | 7.14 |
| 267 | 22  | 0.076 | 0.2757 | 91.2 | 91.39 | 545.28 | 18.221 | 23.539 | 0.507  | 0.03  | 0.12  | 0.14 | 7.14 |
| 268 | 131 | 0.076 | 0.2757 | 91.1 | 91.34 | 544.2  | 18.220 | 23.542 | 3.089  | 0.19  | 0.09  | 0.12 | 7.14 |
| 269 | 124 | 0.077 | 0.2775 | 90.9 | 91.28 | 543.12 | 18.336 | 23.700 | 2.945  | 0.18  | 0.08  | 0.11 | 7.14 |
| 270 | 89  | 0.075 | 0.2739 | 90.9 | 91.22 | 542    | 18.096 | 23.390 | 2.077  | 0.12  | 0.10  | 0.11 | 7.15 |
| 271 | 24  | 0.075 | 0.2739 | 90.7 | 91.14 | 540.79 | 18.093 | 23.395 | 0.556  | 0.03  | 0.11  | 0.11 | 7.15 |
| 272 | 30  | 0.073 | 0.2702 | 90.7 | 91.07 | 539.56 | 17.850 | 23.081 | 0.694  | 0.04  | 0.11  | 0.11 | 7.15 |
| 273 | 54  | 0.075 | 0.2739 | 91.1 | 91.04 | 538.21 | 18.099 | 23.386 | 1.270  | 0.08  | 0.09  | 0.10 | 7.15 |
| 274 | 27  | 0.076 | 0.2757 | 90.9 | 91    | 536.76 | 18.216 | 23.546 | 0.633  | 0.04  | 0.06  | 0.10 | 7.15 |
| 275 | 11  | 0.075 | 0.2739 | 90.4 | 90.92 | 535.23 | 18.088 | 23.401 | 0.259  | 0.02  | 0.04  | 0.10 | 7.15 |
| 276 | 20  | 0.076 | 0.2757 | 89.9 | 90.78 | 533.57 | 18.200 | 23.567 | 0.464  | 0.03  | 0.04  | 0.10 | 7.15 |
| 277 | 44  | 0.075 | 0.2739 | 89.7 | 90.63 | 531.8  | 18.076 | 23.416 | 1.025  | 0.06  | 0.04  | 0.10 | 7.15 |
| 278 | 81  | 0.075 | 0.2739 | 89.5 | 90.47 | 529.93 | 18.073 | 23.420 | 1.902  | 0.11  | 0.05  | 0.10 | 7.15 |
| 279 | -10 | 0.076 | 0.2757 | 89.4 | 90.32 | 527.93 | 18.192 | 23.578 | -0.240 | -0.01 | 0.04  | 0.10 | 7.15 |
| 280 | 15  | 0.076 | 0.2757 | 88.5 | 90.08 | 525.91 | 18.177 | 23.597 | 0.349  | 0.02  | 0.04  | 0.10 | 7.15 |
| 281 | 56  | 0.076 | 0.2757 | 88   | 89.81 | 523.89 | 18.168 | 23.608 | 1.313  | 0.08  | 0.05  | 0.09 | 7.15 |
| 282 | -13 | 0.077 | 0.2775 | 87.7 | 89.51 | 521.86 | 18.283 | 23.769 | -0.299 | -0.02 | 0.04  | 0.09 | 7.15 |
| 283 | -72 | 0.077 | 0.2775 | 87.4 | 89.14 | 519.86 | 18.278 | 23.776 | -1.703 | -0.10 | -0.01 | 0.09 | 7.15 |
| 284 | 42  | 0.075 | 0.2739 | 87.1 | 88.76 | 517.88 | 18.034 | 23.472 | 0.996  | 0.06  | 0.01  | 0.09 | 7.15 |
| 285 | -58 | 0.077 | 0.2775 | 86.9 | 88.41 | 515.88 | 18.269 | 23.787 | -1.377 | -0.08 | -0.01 | 0.08 | 7.15 |
| 286 | 27  | 0.077 | 0.2775 | 86.6 | 88.08 | 513.91 | 18.264 | 23.793 | 0.631  | 0.04  | -0.02 | 0.08 | 7.15 |
| 287 | 0   | 0.077 | 0.2775 | 86.4 | 87.75 | 511.92 | 18.261 | 23.798 | 0.007  | 0.00  | -0.02 | 0.08 | 7.15 |
| 288 | -61 | 0.075 | 0.2739 | 86.3 | 87.43 | 509.92 | 18.020 | 23.489 | -1.430 | -0.09 | -0.01 | 0.07 | 7.15 |
| 289 | -11 | 0.077 | 0.2775 | 86.1 | 87.1  | 507.91 | 18.256 | 23.804 | -0.271 | -0.02 | -0.03 | 0.07 | 7.15 |
| 290 | 4   | 0.076 | 0.2757 | 86   | 86.85 | 505.82 | 18.135 | 23.651 | 0.086  | 0.01  | -0.01 | 0.07 | 7.15 |
| 291 | 44  | 0.076 | 0.2757 | 85.7 | 86.62 | 503.65 | 18.130 | 23.658 | 1.046  | 0.06  | -0.01 | 0.07 | 7.15 |
| 292 | -43 | 0.077 | 0.2775 | 85.6 | 86.41 | 501.33 | 18.247 | 23.815 | -1.012 | -0.06 | -0.02 | 0.07 | 7.15 |
| 293 | 6   | 0.077 | 0.2775 | 85.5 | 86.22 | 498.97 | 18.246 | 23.817 | 0.139  | 0.01  | 0.00  | 0.07 | 7.15 |
| 294 | -1  | 0.077 | 0.2775 | 85.3 | 86.04 | 496.53 | 18.242 | 23.822 | -0.030 | 0.00  | 0.00  | 0.07 | 7.15 |
| 295 | 44  | 0.075 | 0.2739 | 85.1 | 85.86 | 494.04 | 18.001 | 23.515 | 1.046  | 0.06  | 0.01  | 0.07 | 7.15 |
| 296 | -43 | 0.076 | 0.2757 | 84.8 | 85.68 | 491.5  | 18.115 | 23.677 | -1.025 | -0.06 | -0.01 | 0.06 | 7.15 |
| 297 | 43  | 0.077 | 0.2775 | 84.7 | 85.51 | 488.95 | 18.232 | 23.835 | 1.027  | 0.06  | 0.01  | 0.06 | 7.15 |
| 298 | -3  | 0.078 | 0.2793 | 84.6 | 85.34 | 486.4  | 18.349 | 23.991 | -0.078 | 0.00  | 0.01  | 0.06 | 7.15 |
| 299 | -43 | 0.075 | 0.2739 | 84.5 | 85.18 | 483.83 | 17.991 | 23.528 | -1.002 | -0.06 | 0.00  | 0.06 | 7.15 |
| 300 | 6   | 0.076 | 0.2757 | 84.3 | 85.01 | 481.29 | 18.107 | 23.688 | 0.153  | 0.01  | -0.01 | 0.06 | 7.15 |
| 301 | -13 | 0.077 | 0.2775 | 84.3 | 84.87 | 478.83 | 18.226 | 23.844 | -0.314 | -0.02 | 0.00  | 0.06 | 7.15 |
| 302 | 27  | 0.077 | 0.2775 | 84   | 84.71 | 476.39 | 18.221 | 23.850 | 0.641  | 0.04  | -0.01 | 0.06 | 7.15 |
| 303 | -14 | 0.076 | 0.2757 | 84   | 84.56 | 473.97 | 18.102 | 23.695 | -0.321 | -0.02 | -0.01 | 0.05 | 7.15 |
| 304 | -21 | 0.077 | 0.2775 | 83.9 | 84.42 | 471.63 | 18.219 | 23.852 | -0.489 | -0.03 | 0.00  | 0.06 | 7.15 |
| 305 | -30 | 0.077 | 0.2775 | 83.6 | 84.27 | 469.34 | 18.214 | 23.859 | -0.717 | -0.04 | -0.01 | 0.06 | 7.15 |
| 306 | -15 | 0.077 | 0.2775 | 83.6 | 84.15 | 467.09 | 18.214 | 23.859 | -0.355 | -0.02 | -0.01 | 0.05 | 7.15 |
| 307 | 22  | 0.077 | 0.2775 | 83.6 | 84.04 | 464.93 | 18.214 | 23.859 | 0.535  | 0.03  | -0.02 | 0.05 | 7.15 |
| 308 | -83 | 0.077 | 0.2775 | 83.4 | 83.92 | 462.78 | 18.211 | 23.863 | -1.983 | -0.12 | -0.04 | 0.05 | 7.15 |
| 309 | 28  | 0.076 | 0.2757 | 83.3 | 83.8  | 460.72 | 18.090 | 23.710 | 0.663  | 0.04  | -0.02 | 0.05 | 7.15 |
| 310 | 58  | 0.076 | 0.2757 | 83.1 | 83.68 | 458.7  | 18.087 | 23.714 | 1.372  | 0.08  | 0.00  | 0.05 | 7.15 |
| 311 | -29 | 0.075 | 0.2739 | 83   | 83.55 | 456.68 | 17.966 | 23.560 | -0.689 | -0.04 | 0.00  | 0.05 | 7.15 |
| 312 | 3   | 0.076 | 0.2757 | 82.8 | 83.43 | 454.73 | 18.082 | 23.721 | 0.078  | 0.00  | -0.01 | 0.04 | 7.15 |
| 313 | -19 | 0.077 | 0.2775 | 82.7 | 83.3  | 452.82 | 18.199 | 23.879 | -0.454 | -0.03 | 0.01  | 0.04 | 7.15 |
| 314 | -29 | 0.077 | 0.2775 | 82.5 | 83.16 | 450.94 | 18.196 | 23.883 | -0.684 | -0.04 | 0.00  | 0.04 | 7.15 |
| 315 | -2  | 0.077 | 0.2775 | 82.4 | 83.04 | 449.1  | 18.194 | 23.885 | -0.055 | 0.00  | -0.02 | 0.04 | 7.15 |
| 316 | 9   | 0.078 | 0.2793 | 82.4 | 82.92 | 447.3  | 18.312 | 24.040 | 0.227  | 0.01  | -0.01 | 0.04 | 7.15 |
| 317 | 53  | 0.077 | 0.2775 | 82.2 | 82.78 | 445.52 | 18.191 | 23.890 | 1.274  | 0.08  | 0.00  | 0.03 | 7.15 |
| 318 | 22  | 0.077 | 0.2775 | 82   | 82.64 | 443.81 | 18.187 | 23.894 | 0.517  | 0.03  | 0.02  | 0.03 | 7.15 |
| 319 | -11 | 0.077 | 0.2775 | 82   | 82.51 | 442.13 | 18.187 | 23.894 | -0.264 | -0.02 | 0.02  | 0.03 | 7.15 |
| 320 | 11  | 0.076 | 0.2757 | 81.9 | 82.39 | 440.53 | 18.067 | 23.741 | 0.273  | 0.02  | 0.02  | 0.03 | 7.15 |
| 321 | -27 | 0.075 | 0.2739 | 81.8 | 82.27 | 438.97 | 17.946 | 23.586 | -0.627 | -0.04 | 0.01  | 0.03 | 7.15 |
| 322 | -1  | 0.076 | 0.2757 | 81.9 | 82.18 | 437.42 | 18.067 | 23.741 | -0.025 | 0.00  | 0.00  | 0.02 | 7.15 |
| 323 | 13  | 0.078 | 0.2793 | 81.8 | 82.09 | 435.92 | 18.301 | 24.053 | 0.311  | 0.02  | 0.00  | 0.02 | 7.15 |
| 324 | -3  | 0.077 | 0.2775 | 81.6 | 82    | 434.44 | 18.180 | 23.903 | -0.080 | 0.00  | 0.00  | 0.01 | 7.15 |
| 325 | 50  | 0.078 | 0.2793 | 81.5 | 81.91 | 433.03 | 18.296 | 24.060 | 1.202  | 0.07  | 0.01  | 0.01 | 7.15 |
| 326 | 20  | 0.076 | 0.2757 | 81.3 | 81.8  | 431.66 | 18.057 | 23.754 | 0.467  | 0.03  | 0.02  | 0.01 | 7.15 |
| 327 | 64  | 0.077 | 0.2775 | 81.1 | 81.69 | 430.31 | 18.172 | 23.914 | 1.535  | 0.09  | 0.04  | 0.01 | 7.15 |
| 328 | -69 | 0.077 | 0.2775 | 81.1 | 81.6  | 429.03 | 18.172 | 23.914 | -1.647 | -0.10 | 0.02  | 0.01 | 7.15 |
| 329 | 22  | 0.077 | 0.2775 | 81   | 81.5  | 427.75 | 18.170 | 23.916 | 0.529  | 0.03  | 0.03  | 0.01 | 7.15 |
| 330 | -3  | 0.078 | 0.2793 | 80.9 | 81.4  | 426.49 | 18.286 | 24.073 | -0.084 | -0.01 | 0.01  | 0.01 | 7.15 |
| 331 | 18  | 0.077 | 0.2775 | 80.8 | 81.3  | 425.23 | 18.167 | 23.921 | 0.431  | 0.03  | 0.01  | 0.01 | 7.15 |
| 332 | 16  | 0.077 | 0.2775 | 80.8 | 81.19 | 424.07 | 18.167 | 23.921 | 0.376  | 0.02  | 0.00  | 0.00 | 7.15 |
| 333 | -3  | 0.078 | 0.2793 | 80.8 | 81.09 | 422.91 | 18.285 | 24.076 | -0.081 | 0.00  | 0.01  | 0.00 | 7.15 |
| 334 | 20  | 0.077 | 0.2775 | 80.7 | 81    | 421.73 | 18.165 | 23.923 | 0.468  | 0.03  | 0.01  | 0.00 | 7.15 |
| 335 | 7   | 0.077 | 0.2775 | 80.6 | 80.91 | 420.57 | 18.164 | 23.925 | 0.175  | 0.01  | 0.02  | 0.00 | 7.15 |
| 336 | -43 | 0.076 | 0.2757 | 80.4 | 80.82 | 419.44 | 18.042 | 23.774 | -1.023 | -0.06 | 0.00  | 0.00 | 7.15 |
| 337 | 39  | 0.076 | 0.2757 | 80.5 | 80.76 | 418.34 | 18.044 | 23.772 | 0.920  | 0.06  | 0.01  | 0.00 | 7.15 |
| 338 | -8  | 0.076 | 0.2757 | 80.5 | 80.7  | 417.23 | 18.044 | 23.772 | -0.186 | -0.01 | 0.00  | 0.00 | 7.15 |
| 339 | -13 | 0.075 | 0.2739 | 80.2 | 80.62 | 416.12 | 17.920 | 23.621 | -0.306 | -0.02 | -0.01 | 0.00 | 7.15 |
| 340 | -25 | 0.078 | 0.2793 | 80.2 | 80.55 | 415.01 | 18.274 | 24.089 | -0.597 | -0.04 | -0.01 | 0.00 | 7.15 |
| 341 | -8  | 0.077 | 0.2775 | 80   | 80.47 | 413.93 | 18.154 | 23.938 | -0.199 | -0.01 | 0.00  | 0.00 | 7.15 |
| 342 | 20  | 0.077 | 0.2775 | 80.1 | 80.4  | 412.83 | 18.155 | 23.936 | 0.476  | 0.03  | -0.01 | 0.00 | 7.15 |
| 343 | -24 | 0.078 | 0.2793 | 80   | 80.32 | 411.75 | 18.271 | 24.093 | -0.571 | -0.03 | -0.01 | 0.00 | 7.15 |
| 344 | -72 | 0.077 | 0.2775 | 80   | 80.25 | 410.7  | 18.154 | 23.938 | -1.715 | -0.10 | -0.03 | 0.00 | 7.15 |
| 345 | -23 | 0.078 | 0.2793 | 79.9 | 80.18 | 409.69 | 18.269 | 24.096 | -0.559 | -0.03 | -0.03 | 0.00 | 7.15 |
| 346 | 4   | 0.076 | 0.2757 | 79.8 | 80.12 | 408.68 | 18.032 | 23.787 | 0.096  | 0.01  | -0.03 | 0.00 | 7.15 |
| 347 | -7  | 0.077 | 0.2775 | 79.7 | 80.04 | 407.69 | 18.149 | 23.945 | -0.156 | -0.01 | -0.03 | 0.00 | 7.15 |
| 348 | 37  | 0.077 | 0.2775 | 79.7 | 79.96 | 406.71 | 18.149 | 23.945 | 0.881  | 0.05  | -0.02 | 0.00 | 7.15 |

## Run 1 TEOM Data

|     |     |       |        |      |             |             |        |        |        |       |       |       |      |
|-----|-----|-------|--------|------|-------------|-------------|--------|--------|--------|-------|-------|-------|------|
| 349 | 21  | 0.077 | 0.2775 | 79.6 | 79.9        | 405.8       | 18.147 | 23.947 | 0.496  | 0.03  | 0.01  | 0.00  | 7.15 |
| 350 | 19  | 0.078 | 0.2793 | 79.5 | 79.83       | 404.91      | 18.263 | 24.105 | 0.466  | 0.03  | 0.02  | 0.00  | 7.15 |
| 351 | -33 | 0.078 | 0.2793 | 79.4 | 79.77       | 404.03      | 18.261 | 24.107 | -0.794 | -0.05 | 0.01  | 0.00  | 7.15 |
| 352 | -34 | 0.077 | 0.2775 | 79.1 | 79.67       | 403.18      | 18.138 | 23.958 | -0.815 | -0.05 | 0.00  | 0.00  | 7.15 |
| 353 | -13 | 0.077 | 0.2775 | 79.3 | 79.6        | 402.31      | 18.142 | 23.954 | -0.301 | -0.02 | -0.01 | 0.00  | 7.15 |
| 354 | 14  | 0.076 | 0.2757 | 79.5 | 79.55       | 401.49      | 18.027 | 23.794 | 0.342  | 0.02  | -0.01 | 0.00  | 7.15 |
| 355 | -8  | 0.076 | 0.2757 | 79.3 | 79.49       | 400.6       | 18.024 | 23.798 | -0.182 | -0.01 | -0.02 | 0.00  | 7.15 |
| 356 | 15  | 0.076 | 0.2757 | 79.3 | 79.44       | 399.72      | 18.024 | 23.798 | 0.366  | 0.02  | -0.01 | 0.00  | 7.15 |
| 357 | -60 | 0.076 | 0.2757 | 79.1 | 79.38       | 398.84      | 18.020 | 23.802 | -1.431 | -0.09 | -0.01 | 0.00  | 7.15 |
| 358 | 7   | 0.078 | 0.2793 | 79.2 | 79.33       | 397.99      | 18.258 | 24.111 | 0.159  | 0.01  | -0.01 | 0.00  | 7.15 |
| 359 | 8   | 0.078 | 0.2793 | 79.1 | 79.28       | 397.11      | 18.256 | 24.114 | 0.186  | 0.01  | -0.01 | 0.00  | 7.15 |
| 360 | -30 | 0.078 | 0.2793 | 78.9 | 79.22       | 396.23      | 18.252 | 24.118 | -0.728 | -0.04 | -0.02 | 0.00  | 7.15 |
| 361 | 7   | 0.078 | 0.2793 | 79   | 79.18       | 395.35      | 18.254 | 24.116 | 0.162  | 0.01  | -0.02 | 0.00  | 7.15 |
| 362 | 45  | 0.078 | 0.2793 | 79   | 79.17       | 394.48      | 18.254 | 24.116 | 1.082  | 0.06  | 0.01  | 0.00  | 7.15 |
| 363 | -58 | 0.077 | 0.2775 | 78.9 | 79.13       | 393.66      | 18.135 | 23.963 | -1.384 | -0.08 | -0.01 | 0.00  | 7.15 |
| 364 | -3  | 0.076 | 0.2757 | 78.9 | 79.07       | 392.82      | 18.017 | 23.807 | -0.068 | 0.00  | -0.01 | 0.00  | 7.15 |
| 365 | -3  | 0.077 | 0.2775 | 78.8 | 79.02       | 392.03      | 18.133 | 23.965 | -0.077 | 0.00  | 0.00  | 0.00  | 7.15 |
| 366 | -40 | 0.077 | 0.2775 | 78.8 | 78.97       | 391.26      | 18.133 | 23.965 | -0.968 | -0.06 | -0.02 | 0.00  | 7.15 |
| 367 | 10  | 0.077 | 0.2775 | 78.7 | 78.93       | 390.47      | 18.132 | 23.967 | 0.231  | 0.01  | -0.03 | 0.00  | 7.15 |
| 368 | -13 | 0.078 | 0.2793 | 78.7 | 78.88       | 389.63      | 18.249 | 24.123 | -0.307 | -0.02 | -0.01 | 0.00  | 7.15 |
| 369 | 58  | 0.076 | 0.2757 | 78.7 | 78.84       | 388.81      | 18.014 | 23.811 | 1.380  | 0.08  | 0.00  | 0.00  | 7.15 |
| 370 | -15 | 0.078 | 0.2793 | 78.7 | 78.82       | 388.01      | 18.249 | 24.123 | -0.364 | -0.02 | 0.00  | 0.00  | 7.15 |
| 371 | -31 | 0.077 | 0.2775 | 78.7 | 78.79       | 387.23      | 18.132 | 23.967 | -0.746 | -0.04 | 0.00  | 0.00  | 7.15 |
| 372 | 56  | 0.077 | 0.2775 | 78.5 | 78.74       | 386.43      | 18.128 | 23.972 | 1.349  | 0.08  | 0.02  | 0.00  | 7.15 |
| 373 | -21 | 0.076 | 0.2757 | 78.5 | 78.7        | 385.6       | 18.010 | 23.816 | -0.498 | -0.03 | 0.01  | 0.00  | 7.15 |
| 374 | -1  | 0.077 | 0.2775 | 78.5 | 78.66       | 384.8       | 18.128 | 23.972 | -0.029 | 0.00  | 0.00  | 0.00  | 7.15 |
| 375 | 30  | 0.078 | 0.2793 | 78.4 | 78.62       | 383.99      | 18.244 | 24.129 | 0.719  | 0.04  | 0.01  | 0.00  | 7.15 |
| 376 | 2   | 0.077 | 0.2775 | 78.2 | 78.56       | 383.18      | 18.123 | 23.979 | 0.055  | 0.00  | 0.02  | 0.00  | 7.15 |
| 377 | -64 | 0.079 | 0.2811 | 78.3 | 78.52       | 382.39      | 18.359 | 24.286 | -1.550 | -0.09 | -0.02 | 0.00  | 7.15 |
| 378 | -12 | 0.078 | 0.2793 | 78.1 | 78.46       | 381.62      | 18.239 | 24.136 | -0.298 | -0.02 | -0.01 | 0.00  | 7.15 |
| 379 | 47  | 0.077 | 0.2775 | 78.1 | 78.4        | 380.85      | 18.122 | 23.981 | 1.124  | 0.07  | 0.00  | 0.00  | 7.15 |
| 380 | 9   | 0.078 | 0.2793 | 78.1 | 78.34       | 380.04      | 18.239 | 24.136 | 0.221  | 0.01  | -0.01 | 0.00  | 7.15 |
| 381 | 21  | 0.077 | 0.2775 | 78   | 78.27       | 379.23      | 18.120 | 23.983 | 0.494  | 0.03  | 0.00  | 0.00  | 7.15 |
| 382 | -18 | 0.077 | 0.2775 | 77.9 | 78.21       | 378.45      | 18.118 | 23.985 | -0.421 | -0.03 | 0.01  | 0.00  | 7.15 |
| 383 | -8  | 0.079 | 0.2811 | 77.9 | 78.15       | 377.69      | 18.352 | 24.295 | -0.187 | -0.01 | 0.01  | 0.00  | 7.15 |
| 384 | -1  | 0.077 | 0.2775 | 77.9 | 78.09       | 376.95      | 18.118 | 23.985 | -0.018 | 0.00  | 0.00  | 0.00  | 7.15 |
| 385 | -10 | 0.078 | 0.2793 | 77.8 | 78.03       | 376.2       | 18.234 | 24.143 | -0.231 | -0.01 | 0.00  | 0.00  | 7.15 |
| 386 | -59 | 0.077 | 0.2775 | 77.8 | 77.99       | 375.51      | 18.117 | 23.987 | -1.415 | -0.08 | -0.03 | 0.00  | 7.15 |
| 387 | 45  | 0.077 | 0.2775 | 77.6 | 77.92       | 374.8       | 18.113 | 23.992 | 1.075  | 0.06  | -0.01 | -0.01 | 7.15 |
| 388 | -30 | 0.077 | 0.2775 | 77.6 | 77.87       | 374.11      | 18.113 | 23.992 | -0.710 | -0.04 | -0.02 | -0.01 | 7.15 |
| 389 | 31  | 0.078 | 0.2793 | 77.6 | 77.82       | 373.41      | 18.230 | 24.147 | 0.760  | 0.05  | -0.01 | 0.00  | 7.15 |
| 390 | -26 | 0.077 | 0.2775 | 77.5 | 77.76       | 372.75      | 18.112 | 23.994 | -0.626 | -0.04 | -0.01 | -0.01 | 7.15 |
| 391 | -30 | 0.077 | 0.2775 | 77.4 | 77.7        | 372.07      | 18.110 | 23.996 | -0.719 | -0.04 | 0.00  | -0.01 | 7.15 |
| 392 | 25  | 0.077 | 0.2775 | 77.3 | 77.64       | 371.36      | 18.108 | 23.999 | 0.594  | 0.04  | -0.01 | -0.01 | 7.15 |
| 393 | 8   | 0.078 | 0.2793 | 77.4 | 77.59       | 370.67      | 18.227 | 24.152 | 0.185  | 0.01  | 0.00  | -0.01 | 7.15 |
| 394 | 11  | 0.079 | 0.2811 | 77.2 | 77.52       | 369.94      | 18.340 | 24.311 | 0.267  | 0.02  | 0.00  | -0.01 | 7.15 |
| 395 | 9   | 0.076 | 0.2757 | 77.1 | 77.45       | 369.24      | 17.987 | 23.847 | 0.206  | 0.01  | 0.01  | -0.01 | 7.15 |
| 396 |     | 0.077 | 0.2775 | 77.2 | 77.39       | 368.44      |        |        |        |       | 0.02  | -0.01 |      |
|     |     |       |        |      | 77.36666667 | 368.0666667 |        |        |        |       | 0.01  | -0.01 |      |
|     |     |       |        |      | 77.3375     | 367.6875    |        |        |        |       | 0.01  | -0.01 |      |
|     |     |       |        |      | 77.3        | 367.3142857 |        |        |        |       | 0.01  | -0.01 |      |
|     |     |       |        |      | 77.26666667 | 366.9166667 |        |        |        |       |       | -0.01 |      |
|     |     |       |        |      | 77.24       | 366.54      |        |        |        |       |       | 0.00  |      |
|     |     |       |        |      | 77.225      | 366.2       |        |        |        |       |       | -0.01 |      |
|     |     |       |        |      | 77.16666667 | 365.8       |        |        |        |       |       | -0.01 |      |
|     |     |       |        |      | 77.15       | 365.4       |        |        |        |       |       | 0.00  |      |
|     |     |       |        |      | 77.2        | 364.8       |        |        |        |       |       | 0.00  |      |
|     |     |       |        |      |             |             |        |        |        |       |       | 0.00  |      |
|     |     |       |        |      |             |             |        |        |        |       |       | 0.00  |      |
|     |     |       |        |      |             |             |        |        |        |       |       | 0.00  |      |
|     |     |       |        |      |             |             |        |        |        |       |       | 0.00  |      |
|     |     |       |        |      |             |             |        |        |        |       |       | -0.01 |      |
|     |     |       |        |      |             |             |        |        |        |       |       | 0.00  |      |
|     |     |       |        |      |             |             |        |        |        |       |       | 0.00  |      |
|     |     |       |        |      |             |             |        |        |        |       |       | 0.00  |      |
|     |     |       |        |      |             |             |        |        |        |       |       | 0.00  |      |
|     |     |       |        |      |             |             |        |        |        |       |       | 0.00  |      |
|     |     |       |        |      |             |             |        |        |        |       |       | 0.00  |      |
|     |     |       |        |      |             |             |        |        |        |       |       | 0.00  |      |
|     |     |       |        |      |             |             |        |        |        |       |       | 0.00  |      |
|     |     |       |        |      |             |             |        |        |        |       |       | 0.00  |      |
|     |     |       |        |      |             |             |        |        |        |       |       | 0.00  |      |
|     |     |       |        |      |             |             |        |        |        |       |       | 0.00  |      |
|     |     |       |        |      |             |             |        |        |        |       |       | 0.00  |      |
|     |     |       |        |      |             |             |        |        |        |       |       | 0.00  |      |
|     |     |       |        |      |             |             |        |        |        |       |       | 0.00  |      |
|     |     |       |        |      |             |             |        |        |        |       |       | 0.00  |      |
|     |     |       |        |      |             |             |        |        |        |       |       | 0.00  |      |
|     |     |       |        |      |             |             |        |        |        |       |       | 0.00  |      |
|     |     |       |        |      |             |             |        |        |        |       |       | 0.00  |      |
|     |     |       |        |      |             |             |        |        |        |       |       | 0.00  |      |
|     |     |       |        |      |             |             |        |        |        |       |       | 0.00  |      |
|     |     |       |        |      |             |             |        |        |        |       |       | 0.00  |      |
|     |     |       |        |      |             |             |        |        |        |       |       | 0.00  |      |
|     |     |       |        |      |             |             |        |        |        |       |       | 0.00  |      |
|     |     |       |        |      |             |             |        |        |        |       |       | 0.00  |      |
|     |     |       |        |      |             |             |        |        |        |       |       | 0.00  |      |
|     |     |       |        |      |             |             |        |        |        |       |       | 0.00  |      |
|     |     |       |        |      |             |             |        |        |        |       |       | 0.00  |      |
|     |     |       |        |      |             |             |        |        |        |       |       | 0.00  |      |
|     |     |       |        |      |             |             |        |        |        |       |       | 0.00  |      |
|     |     |       |        |      |             |             |        |        |        |       |       | 0.00  |      |
|     |     |       |        |      |             |             |        |        |        |       |       | 0.00  |      |
|     |     |       |        |      |             |             |        |        |        |       |       | 0.00  |      |
|     |     |       |        |      |             |             |        |        |        |       |       | 0.00  |      |
|     |     |       |        |      |             |             |        |        |        |       |       | 0.00  |      |
|     |     |       |        |      |             |             |        |        |        |       |       | 0.00  |      |
|     |     |       |        |      |             |             |        |        |        |       |       | 0.00  |      |
|     |     |       |        |      |             |             |        |        |        |       |       | 0.00  |      |
|     |     |       |        |      |             |             |        |        |        |       |       | 0.00  |      |
|     |     |       |        |      |             |             |        |        |        |       |       | 0.00  |      |
|     |     |       |        |      |             |             |        |        |        |       |       | 0.00  |      |
|     |     |       |        |      |             |             |        |        |        |       |       | 0.00  |      |
|     |     |       |        |      |             |             |        |        |        |       |       | 0.00  |      |
|     |     |       |        |      |             |             |        |        |        |       |       | 0.00  |      |
|     |     |       |        |      |             |             |        |        |        |       |       | 0.00  |      |
|     |     |       |        |      |             |             |        |        |        |       |       | 0.00  |      |
|     |     |       |        |      |             |             |        |        |        |       |       | 0.00  |      |
|     |     |       |        |      |             |             |        |        |        |       |       | 0.00  |      |
|     |     |       |        |      |             |             |        |        |        |       |       | 0.00  |      |
|     |     |       |        |      |             |             |        |        |        |       |       | 0.00  |      |
|     |     |       |        |      |             |             |        |        |        |       |       |       |      |

## Run 1 TEOM Data

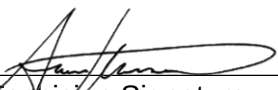
[illegible]

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



**Run 2 Data Summary**

|             |            |
|-------------|------------|
| Client:     | SBI        |
| Model:      | St Louis   |
| Job #:      | 24-303     |
| Tracking #: | 216        |
| Test Date:  | 12/10/2024 |

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

1/2/2025  
Date

# DILUTION TUNNEL & MISC. DATA - ASTM E2780 / E2515

Client: SBI  
 Model: St Louis  
 Run #: 2  
 Test Start Time: 11:10

Job #: 24-303  
 Tracking #: 216  
 Technician: AK  
 Date: 12/10/2024

Total Sampling Time (min): 324  
 Recording Interval (min): 1

Meter Box  $\gamma$  Factor: 1.000 (A)  
 Meter Box  $\gamma$  Factor: 1.008 (B)  
 Meter Box  $\gamma$  Factor: - (C)  
 Meter Box  $\gamma$  Factor: 1.004 (Ambient)

Induced Draft Check (in. H<sub>2</sub>O): 0  
 Smoke Capture Check (%): 100%  
 Date Flue Pipe Last Cleaned: 12/6/2024  
 Test Fuel Scale Audit (lbs): 10.00  
 Platform Scale Audit (lbs): 10.0

|                              | Pre-Test | Post Test | Avg.            |
|------------------------------|----------|-----------|-----------------|
| Barometric Pressure (in. Hg) | 30.22    | 30.12     | 30.17           |
| Relative Humidity (%)        | 30.2     | 22.2      |                 |
| Room Air Velocity (ft/min)   | <50      | <50       |                 |
| Pitot Tube Leak Check        | 0        | 0         |                 |
| Ambient Sample Volume:       |          | 75.026    | ft <sup>3</sup> |

## Sample Train Leak Checks

|           | Pre-test | Post-test |       |            |
|-----------|----------|-----------|-------|------------|
| (A)       | 0.000    | 0.000     | cfm @ | -7 in. Hg  |
| (B)       | 0.000    | 0.000     | cfm @ | -7 in. Hg  |
| (C)       | -        | -         | cfm @ | - in. Hg   |
| (Ambient) | 0.000    | 0.000     | cfm @ | -13 in. Hg |

## DILUTION TUNNEL FLOW

### Traverse Data

| Point  | dP (in H <sub>2</sub> O) | Temp (°F) |
|--------|--------------------------|-----------|
| 1      | 0.066                    | 67        |
| 2      | 0.074                    | 67        |
| 3      | 0.078                    | 67        |
| 4      | 0.078                    | 67        |
| 5      | 0.072                    | 67        |
| 6      | 0.060                    | 67        |
| 7      | 0.062                    | 67        |
| 8      | 0.074                    | 67        |
| 9      | 0.086                    | 67        |
| 10     | 0.084                    | 67        |
| 11     | 0.080                    | 67        |
| 12     | 0.058                    | 67        |
| Center | 0.074                    | 67        |

Dilution Tunnel H<sub>2</sub>O: 2.00 percent

Tunnel Diameter: 12 inches

Pitot Tube Cp: 0.99 [unitless]

Dilution Tunnel MW(dry): 29.00 lb/lb-mole

Dilution Tunnel MW(wet): 28.78 lb/lb-mole

Tunnel Area: 0.7854 ft<sup>2</sup>

V<sub>strav</sub>: 17.73 ft/sec

V<sub>scnt</sub>: 17.93 ft/sec

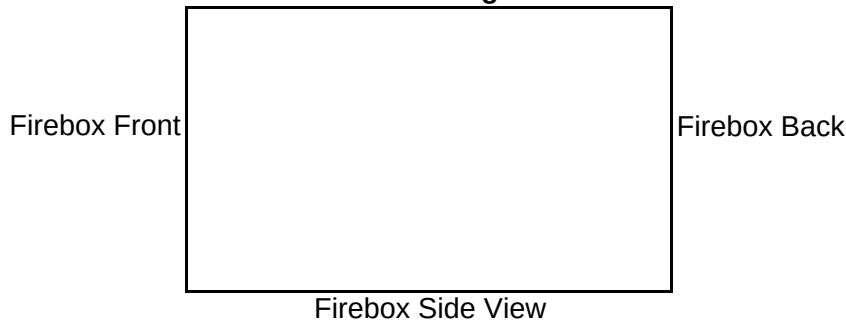
F<sub>p</sub>: 0.989 [ratio]

Initial Tunnel Flow: 827.5 scf/min

Static Pressure: -0.206 in. H<sub>2</sub>O

## TEST FUEL PROPERTIES

### Fuel Load Configuration



### Actual Fuel Used Properties

Fuel Type: D. Fir  
 HHV (kJ/kg): 19,810  
 %C: 48.73  
 %H: 6.87  
 %O: 43.9  
 %Ash: 0.5  
 MC (%DB): #DIV/0!

# BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: SBI  
 Model: St Louis  
 Run #: 2

Job #: 24-303  
 Tracking #: 216  
 Technician: AK  
 Date: 12/10/2024

| Elapsed Time (min) | Particulate Sampling Data |                   |                                          |                                  |                 |                      |               | Fuel Weight (lb) |               | Temperature Data (°F) |      |        |         |
|--------------------|---------------------------|-------------------|------------------------------------------|----------------------------------|-----------------|----------------------|---------------|------------------|---------------|-----------------------|------|--------|---------|
|                    | Gas Meter (ft³)           | Sample Rate (cfm) | Dilution Tunnel dP (in H <sub>2</sub> O) | Orifice dH (in H <sub>2</sub> O) | Meter Temp (°F) | Meter Vacuum (in Hg) | Pro. Rate (%) | Scale Reading    | Weight Change | Dilution Tunnel       | Flue | Filter | Ambient |
| 0                  | -0.001                    |                   | 0.074                                    | 0.01                             | 66              | -0.2                 |               | 7.58             |               | 68                    | 66   | 82     | 66      |
| 1                  | 0.156                     | 0.157             | 0.074                                    | 1.35                             | 66              | -1.3                 | -             | 7.19             | -0.39         | 77                    | 173  | 82     | 66      |
| 2                  | 0.332                     | 0.176             | 0.074                                    | 1.33                             | 66              | -1.3                 | -             | 6.75             | -0.44         | 91                    | 320  | 82     | 66      |
| 3                  | 0.509                     | 0.177             | 0.073                                    | 1.34                             | 66              | -1.1                 | -             | 6.31             | -0.44         | 84                    | 389  | 84     | 66      |
| 4                  | 0.687                     | 0.178             | 0.073                                    | 1.32                             | 66              | -1.1                 | -             | 5.90             | -0.41         | 83                    | 445  | 84     | 66      |
| 5                  | 0.864                     | 0.177             | 0.074                                    | 1.31                             | 66              | -0.9                 | -             | 5.51             | -0.39         | 83                    | 475  | 83     | 66      |
| 6                  | 1.040                     | 0.176             | 0.073                                    | 1.31                             | 66              | -1.0                 | -             | 5.19             | -0.32         | 84                    | 493  | 82     | 67      |
| 7                  | 1.216                     | 0.176             | 0.075                                    | 1.31                             | 66              | -1.0                 | -             | 4.87             | -0.32         | 84                    | 502  | 82     | 67      |
| 8                  | 1.390                     | 0.174             | 0.073                                    | 1.32                             | 67              | -1.0                 | -             | 4.61             | -0.26         | 84                    | 492  | 83     | 67      |
| 9                  | 1.566                     | 0.176             | 0.075                                    | 1.31                             | 67              | -0.9                 | -             | 4.32             | -0.29         | 85                    | 495  | 84     | 67      |
| 10                 | 1.741                     | 0.175             | 0.075                                    | 1.31                             | 67              | -0.9                 | 102           | 4.05             | -0.27         | 86                    | 503  | 84     | 67      |
| 11                 | 1.916                     | 0.175             | 0.074                                    | 1.31                             | 67              | -0.9                 | -             | 3.79             | -0.26         | 87                    | 506  | 84     | 67      |
| 12                 | 2.091                     | 0.175             | 0.073                                    | 1.29                             | 67              | -1.0                 | -             | 3.52             | -0.27         | 87                    | 511  | 82     | 67      |
| 13                 | 2.266                     | 0.175             | 0.073                                    | 1.31                             | 67              | -1.0                 | -             | 3.30             | -0.22         | 87                    | 507  | 81     | 67      |
| 14                 | 2.441                     | 0.175             | 0.073                                    | 1.29                             | 68              | -1.1                 | -             | 3.06             | -0.24         | 87                    | 509  | 82     | 67      |
| 15                 | 2.615                     | 0.174             | 0.073                                    | 1.30                             | 68              | -1.0                 | -             | 2.80             | -0.26         | 88                    | 514  | 83     | 67      |
| 16                 | 2.790                     | 0.175             | 0.075                                    | 1.29                             | 68              | -1.1                 | -             | 2.56             | -0.24         | 88                    | 514  | 84     | 67      |
| 17                 | 2.963                     | 0.173             | 0.074                                    | 1.30                             | 68              | -1.0                 | -             | 2.33             | -0.23         | 88                    | 510  | 83     | 67      |
| 18                 | 3.136                     | 0.173             | 0.072                                    | 1.28                             | 68              | -1.1                 | -             | 15.17            | 12.84         | 112                   | 414  | 82     | 67      |
| 19                 | 3.310                     | 0.174             | 0.073                                    | 1.29                             | 69              | -1.2                 | -             | 14.41            | -0.76         | 100                   | 499  | 82     | 67      |
| 20                 | 3.484                     | 0.174             | 0.075                                    | 1.28                             | 69              | -1.1                 | 104           | 14.15            | -0.26         | 95                    | 509  | 82     | 67      |
| 21                 | 3.658                     | 0.174             | 0.075                                    | 1.29                             | 69              | -1.2                 | -             | 13.96            | -0.19         | 91                    | 491  | 84     | 67      |
| 22                 | 3.832                     | 0.174             | 0.073                                    | 1.29                             | 69              | -1.1                 | -             | 13.77            | -0.19         | 90                    | 482  | 84     | 67      |
| 23                 | 4.006                     | 0.174             | 0.074                                    | 1.30                             | 70              | -1.3                 | -             | 13.56            | -0.21         | 89                    | 483  | 83     | 67      |
| 24                 | 4.180                     | 0.174             | 0.073                                    | 1.29                             | 70              | -1.1                 | -             | 13.31            | -0.25         | 90                    | 495  | 82     | 67      |
| 25                 | 4.354                     | 0.174             | 0.073                                    | 1.29                             | 70              | -1.1                 | -             | 13.04            | -0.27         | 91                    | 507  | 82     | 68      |
| 26                 | 4.528                     | 0.174             | 0.073                                    | 1.28                             | 71              | -1.2                 | -             | 12.62            | -0.42         | 91                    | 519  | 83     | 68      |
| 27                 | 4.702                     | 0.174             | 0.074                                    | 1.28                             | 71              | -1.2                 | -             | 12.34            | -0.28         | 90                    | 521  | 84     | 68      |
| 28                 | 4.876                     | 0.174             | 0.074                                    | 1.28                             | 71              | -1.2                 | -             | 12.08            | -0.26         | 88                    | 508  | 84     | 68      |
| 29                 | 5.049                     | 0.173             | 0.073                                    | 1.29                             | 72              | -1.2                 | -             | 11.86            | -0.22         | 87                    | 505  | 85     | 68      |
| 30                 | 5.223                     | 0.174             | 0.074                                    | 1.29                             | 72              | -1.3                 | 104           | 11.62            | -0.24         | 87                    | 504  | 85     | 68      |
| 31                 | 5.397                     | 0.174             | 0.073                                    | 1.29                             | 72              | -1.3                 | -             | 11.38            | -0.24         | 87                    | 504  | 84     | 68      |

# BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: SBI  
 Model: St Louis  
 Run #: 2

Job #: 24-303  
 Tracking #: 216  
 Technician: AK  
 Date: 12/10/2024

| Elapsed Time (min) | Particulate Sampling Data |                   |                                          |                                  |                 |                      |               | Fuel Weight (lb) |               | Temperature Data (°F) |      |        |         |
|--------------------|---------------------------|-------------------|------------------------------------------|----------------------------------|-----------------|----------------------|---------------|------------------|---------------|-----------------------|------|--------|---------|
|                    | Gas Meter (ft³)           | Sample Rate (cfm) | Dilution Tunnel dP (in H <sub>2</sub> O) | Orifice dH (in H <sub>2</sub> O) | Meter Temp (°F) | Meter Vacuum (in Hg) | Pro. Rate (%) | Scale Reading    | Weight Change | Dilution Tunnel       | Flue | Filter | Ambient |
| 32                 | 5.570                     | 0.173             | 0.074                                    | 1.29                             | 72              | -1.3                 | -             | 11.15            | -0.23         | 87                    | 506  | 82     | 68      |
| 33                 | 5.743                     | 0.173             | 0.073                                    | 1.28                             | 73              | -1.3                 | -             | 10.91            | -0.24         | 88                    | 509  | 82     | 68      |
| 34                 | 5.916                     | 0.173             | 0.074                                    | 1.29                             | 73              | -1.3                 | -             | 10.69            | -0.22         | 88                    | 512  | 82     | 68      |
| 35                 | 6.090                     | 0.174             | 0.075                                    | 1.29                             | 73              | -1.3                 | -             | 10.45            | -0.24         | 88                    | 514  | 83     | 69      |
| 36                 | 6.264                     | 0.174             | 0.076                                    | 1.30                             | 73              | -1.3                 | -             | 10.23            | -0.22         | 88                    | 515  | 84     | 69      |
| 37                 | 6.438                     | 0.174             | 0.075                                    | 1.28                             | 74              | -1.3                 | -             | 10.05            | -0.18         | 87                    | 513  | 84     | 69      |
| 38                 | 6.612                     | 0.174             | 0.074                                    | 1.28                             | 74              | -1.3                 | -             | 9.82             | -0.23         | 87                    | 511  | 82     | 69      |
| 39                 | 6.786                     | 0.174             | 0.076                                    | 1.28                             | 74              | -1.3                 | -             | 9.61             | -0.21         | 87                    | 508  | 82     | 69      |
| 40                 | 6.960                     | 0.174             | 0.074                                    | 1.28                             | 75              | -1.4                 | 103           | 9.40             | -0.21         | 88                    | 507  | 82     | 69      |
| 41                 | 7.134                     | 0.174             | 0.074                                    | 1.28                             | 75              | -1.4                 | -             | 9.16             | -0.24         | 88                    | 505  | 83     | 69      |
| 42                 | 7.308                     | 0.174             | 0.076                                    | 1.29                             | 75              | -1.4                 | -             | 8.96             | -0.20         | 88                    | 503  | 84     | 69      |
| 43                 | 7.482                     | 0.174             | 0.074                                    | 1.29                             | 75              | -1.4                 | -             | 8.73             | -0.23         | 88                    | 499  | 84     | 69      |
| 44                 | 7.656                     | 0.174             | 0.076                                    | 1.28                             | 76              | -1.5                 | -             | 8.55             | -0.18         | 88                    | 496  | 83     | 70      |
| 45                 | 7.830                     | 0.174             | 0.075                                    | 1.27                             | 76              | -1.4                 | -             | 8.35             | -0.20         | 88                    | 495  | 82     | 70      |
| 46                 | 8.004                     | 0.174             | 0.075                                    | 1.28                             | 76              | -1.5                 | -             | 8.16             | -0.19         | 88                    | 495  | 82     | 70      |
| 47                 | 8.178                     | 0.174             | 0.074                                    | 1.28                             | 76              | -1.4                 | -             | 7.96             | -0.20         | 88                    | 494  | 83     | 70      |
| 48                 | 8.351                     | 0.173             | 0.076                                    | 1.29                             | 77              | -1.4                 | -             | 7.76             | -0.20         | 88                    | 493  | 84     | 70      |
| 49                 | 8.525                     | 0.174             | 0.075                                    | 1.29                             | 77              | -1.4                 | -             | 7.57             | -0.19         | 88                    | 494  | 84     | 70      |
| 50                 | 8.699                     | 0.174             | 0.075                                    | 1.28                             | 77              | -1.5                 | 102           | 7.39             | -0.18         | 88                    | 495  | 83     | 70      |
| 51                 | 8.873                     | 0.174             | 0.076                                    | 1.27                             | 77              | -1.5                 | -             | 7.22             | -0.17         | 88                    | 496  | 82     | 70      |
| 52                 | 9.047                     | 0.174             | 0.074                                    | 1.28                             | 78              | -1.5                 | -             | 7.02             | -0.20         | 88                    | 495  | 82     | 70      |
| 53                 | 9.221                     | 0.174             | 0.075                                    | 1.28                             | 78              | -1.5                 | -             | 6.84             | -0.18         | 88                    | 494  | 83     | 70      |
| 54                 | 9.396                     | 0.175             | 0.076                                    | 1.29                             | 78              | -1.5                 | -             | 6.66             | -0.18         | 88                    | 493  | 84     | 70      |
| 55                 | 9.570                     | 0.174             | 0.075                                    | 1.27                             | 79              | -1.5                 | -             | 6.47             | -0.19         | 88                    | 492  | 84     | 70      |
| 56                 | 9.744                     | 0.174             | 0.074                                    | 1.28                             | 79              | -1.5                 | -             | 6.30             | -0.17         | 88                    | 490  | 84     | 70      |
| 57                 | 9.919                     | 0.175             | 0.074                                    | 1.28                             | 79              | -1.6                 | -             | 6.12             | -0.18         | 88                    | 491  | 83     | 70      |
| 58                 | 10.093                    | 0.174             | 0.074                                    | 1.26                             | 79              | -1.6                 | -             | 5.95             | -0.17         | 88                    | 489  | 82     | 70      |
| 59                 | 10.267                    | 0.174             | 0.075                                    | 1.28                             | 79              | -1.5                 | -             | 5.79             | -0.16         | 88                    | 488  | 82     | 70      |
| 60                 | 10.441                    | 0.174             | 0.075                                    | 1.28                             | 80              | -1.5                 | 102           | 5.62             | -0.17         | 87                    | 487  | 83     | 70      |
| 61                 | 10.614                    | 0.173             | 0.075                                    | 1.28                             | 80              | -1.7                 | -             | 5.45             | -0.17         | 88                    | 487  | 84     | 70      |
| 62                 | 10.788                    | 0.174             | 0.075                                    | 1.29                             | 80              | -1.6                 | -             | 5.31             | -0.14         | 87                    | 487  | 84     | 70      |
| 63                 | 10.962                    | 0.174             | 0.074                                    | 1.29                             | 80              | -1.6                 | -             | 5.15             | -0.16         | 87                    | 487  | 84     | 70      |

# BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: SBI  
 Model: St Louis  
 Run #: 2

Job #: 24-303  
 Tracking #: 216  
 Technician: AK  
 Date: 12/10/2024

| Elapsed Time (min) | Particulate Sampling Data |                   |                                          |                                  |                 |                      |               | Fuel Weight (lb) |               | Temperature Data (°F) |      |        |         |
|--------------------|---------------------------|-------------------|------------------------------------------|----------------------------------|-----------------|----------------------|---------------|------------------|---------------|-----------------------|------|--------|---------|
|                    | Gas Meter (ft³)           | Sample Rate (cfm) | Dilution Tunnel dP (in H <sub>2</sub> O) | Orifice dH (in H <sub>2</sub> O) | Meter Temp (°F) | Meter Vacuum (in Hg) | Pro. Rate (%) | Scale Reading    | Weight Change | Dilution Tunnel       | Flue | Filter | Ambient |
| 64                 | 11.136                    | 0.174             | 0.076                                    | 1.29                             | 81              | -1.7                 | -             | 4.99             | -0.16         | 87                    | 486  | 83     | 70      |
| 65                 | 11.310                    | 0.174             | 0.075                                    | 1.28                             | 81              | -1.6                 | -             | 4.85             | -0.14         | 87                    | 485  | 82     | 70      |
| 66                 | 11.485                    | 0.175             | 0.075                                    | 1.28                             | 81              | -1.6                 | -             | 4.69             | -0.16         | 87                    | 486  | 82     | 70      |
| 67                 | 11.659                    | 0.174             | 0.076                                    | 1.27                             | 81              | -1.7                 | -             | 4.53             | -0.16         | 87                    | 485  | 83     | 70      |
| 68                 | 11.833                    | 0.174             | 0.076                                    | 1.28                             | 81              | -1.7                 | -             | 4.40             | -0.13         | 87                    | 485  | 84     | 70      |
| 69                 | 12.007                    | 0.174             | 0.077                                    | 1.27                             | 82              | -1.7                 | -             | 4.25             | -0.15         | 87                    | 485  | 84     | 70      |
| 70                 | 12.181                    | 0.174             | 0.075                                    | 1.28                             | 82              | -1.7                 | 101           | 4.10             | -0.15         | 87                    | 483  | 84     | 71      |
| 71                 | 12.355                    | 0.174             | 0.075                                    | 1.28                             | 82              | -1.6                 | -             | 3.97             | -0.13         | 87                    | 481  | 83     | 71      |
| 72                 | 12.529                    | 0.174             | 0.075                                    | 1.27                             | 82              | -1.8                 | -             | 3.84             | -0.13         | 87                    | 481  | 82     | 71      |
| 73                 | 12.703                    | 0.174             | 0.075                                    | 1.28                             | 82              | -1.7                 | -             | 3.73             | -0.11         | 87                    | 479  | 82     | 71      |
| 74                 | 12.876                    | 0.173             | 0.075                                    | 1.28                             | 82              | -1.7                 | -             | 3.60             | -0.13         | 87                    | 478  | 83     | 71      |
| 75                 | 13.049                    | 0.173             | 0.074                                    | 1.27                             | 83              | -1.7                 | -             | 12.79            | 9.19          | 108                   | 475  | 84     | 70      |
| 76                 | 13.222                    | 0.173             | 0.076                                    | 1.28                             | 83              | -1.8                 | -             | 12.45            | -0.34         | 102                   | 543  | 85     | 70      |
| 77                 | 13.395                    | 0.173             | 0.075                                    | 1.26                             | 83              | -1.7                 | -             | 12.03            | -0.42         | 96                    | 541  | 85     | 71      |
| 78                 | 13.569                    | 0.174             | 0.075                                    | 1.27                             | 83              | -1.8                 | -             | 11.74            | -0.29         | 91                    | 502  | 84     | 71      |
| 79                 | 13.742                    | 0.173             | 0.075                                    | 1.28                             | 83              | -1.8                 | -             | 11.55            | -0.19         | 88                    | 456  | 83     | 71      |
| 80                 | 13.916                    | 0.174             | 0.075                                    | 1.27                             | 83              | -1.8                 | 100           | 11.35            | -0.20         | 87                    | 441  | 82     | 71      |
| 81                 | 14.090                    | 0.174             | 0.074                                    | 1.28                             | 84              | -1.8                 | -             | 11.14            | -0.21         | 86                    | 447  | 82     | 71      |
| 82                 | 14.264                    | 0.174             | 0.074                                    | 1.28                             | 84              | -1.9                 | -             | 10.95            | -0.19         | 86                    | 436  | 83     | 71      |
| 83                 | 14.438                    | 0.174             | 0.074                                    | 1.27                             | 84              | -1.9                 | -             | 10.77            | -0.18         | 85                    | 440  | 84     | 71      |
| 84                 | 14.612                    | 0.174             | 0.075                                    | 1.27                             | 84              | -1.8                 | -             | 10.57            | -0.20         | 85                    | 443  | 84     | 71      |
| 85                 | 14.786                    | 0.174             | 0.077                                    | 1.28                             | 84              | -1.9                 | -             | 10.35            | -0.22         | 85                    | 441  | 83     | 71      |
| 86                 | 14.960                    | 0.174             | 0.076                                    | 1.27                             | 84              | -1.7                 | -             | 10.14            | -0.21         | 85                    | 440  | 82     | 71      |
| 87                 | 15.134                    | 0.174             | 0.076                                    | 1.27                             | 85              | -1.8                 | -             | 9.94             | -0.20         | 85                    | 440  | 82     | 71      |
| 88                 | 15.308                    | 0.174             | 0.073                                    | 1.28                             | 85              | -1.8                 | -             | 9.74             | -0.20         | 85                    | 438  | 83     | 71      |
| 89                 | 15.482                    | 0.174             | 0.075                                    | 1.27                             | 85              | -1.7                 | -             | 9.54             | -0.20         | 85                    | 437  | 84     | 71      |
| 90                 | 15.656                    | 0.174             | 0.075                                    | 1.27                             | 85              | -1.8                 | 100           | 9.36             | -0.18         | 85                    | 437  | 84     | 71      |
| 91                 | 15.829                    | 0.173             | 0.075                                    | 1.28                             | 85              | -1.9                 | -             | 9.18             | -0.18         | 85                    | 437  | 83     | 71      |
| 92                 | 16.002                    | 0.173             | 0.077                                    | 1.28                             | 85              | -1.8                 | -             | 9.00             | -0.18         | 85                    | 435  | 82     | 71      |
| 93                 | 16.177                    | 0.175             | 0.077                                    | 1.27                             | 85              | -1.7                 | -             | 8.81             | -0.19         | 84                    | 435  | 82     | 71      |
| 94                 | 16.351                    | 0.174             | 0.075                                    | 1.26                             | 85              | -1.9                 | -             | 8.62             | -0.19         | 84                    | 434  | 83     | 71      |
| 95                 | 16.525                    | 0.174             | 0.075                                    | 1.27                             | 86              | -1.8                 | -             | 8.44             | -0.18         | 84                    | 433  | 84     | 71      |



# BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: SBI  
 Model: St Louis  
 Run #: 2

Job #: 24-303  
 Tracking #: 216  
 Technician: AK  
 Date: 12/10/2024

| Elapsed Time (min) | Particulate Sampling Data |                   |                                          |                                  |                 |                      |               | Fuel Weight (lb) |               | Temperature Data (°F) |      |        |         |
|--------------------|---------------------------|-------------------|------------------------------------------|----------------------------------|-----------------|----------------------|---------------|------------------|---------------|-----------------------|------|--------|---------|
|                    | Gas Meter (ft³)           | Sample Rate (cfm) | Dilution Tunnel dP (in H <sub>2</sub> O) | Orifice dH (in H <sub>2</sub> O) | Meter Temp (°F) | Meter Vacuum (in Hg) | Pro. Rate (%) | Scale Reading    | Weight Change | Dilution Tunnel       | Flue | Filter | Ambient |
| 96                 | 16.700                    | 0.175             | 0.075                                    | 1.27                             | 86              | -1.8                 | -             | 8.26             | -0.18         | 84                    | 432  | 84     | 71      |
| 97                 | 16.874                    | 0.174             | 0.074                                    | 1.27                             | 86              | -1.8                 | -             | 8.09             | -0.17         | 84                    | 430  | 84     | 71      |
| 98                 | 17.048                    | 0.174             | 0.075                                    | 1.27                             | 86              | -1.8                 | -             | 7.92             | -0.17         | 84                    | 429  | 83     | 72      |
| 99                 | 17.223                    | 0.175             | 0.076                                    | 1.27                             | 86              | -1.8                 | -             | 7.76             | -0.16         | 84                    | 427  | 82     | 71      |
| 100                | 17.397                    | 0.174             | 0.076                                    | 1.28                             | 86              | -1.8                 | 100           | 7.61             | -0.15         | 84                    | 424  | 82     | 71      |
| 101                | 17.572                    | 0.175             | 0.076                                    | 1.27                             | 86              | -1.8                 | -             | 7.43             | -0.18         | 84                    | 423  | 83     | 71      |
| 102                | 17.746                    | 0.174             | 0.077                                    | 1.27                             | 86              | -1.9                 | -             | 7.30             | -0.13         | 84                    | 419  | 84     | 71      |
| 103                | 17.919                    | 0.173             | 0.077                                    | 1.27                             | 86              | -1.8                 | -             | 7.15             | -0.15         | 84                    | 416  | 84     | 72      |
| 104                | 18.093                    | 0.174             | 0.075                                    | 1.26                             | 87              | -1.9                 | -             | 7.01             | -0.14         | 84                    | 412  | 83     | 71      |
| 105                | 18.268                    | 0.175             | 0.076                                    | 1.28                             | 87              | -1.8                 | -             | 6.90             | -0.11         | 83                    | 408  | 82     | 71      |
| 106                | 18.442                    | 0.174             | 0.076                                    | 1.29                             | 87              | -1.8                 | -             | 6.74             | -0.16         | 83                    | 404  | 82     | 71      |
| 107                | 18.616                    | 0.174             | 0.076                                    | 1.28                             | 87              | -1.8                 | -             | 6.62             | -0.12         | 83                    | 409  | 82     | 71      |
| 108                | 18.791                    | 0.175             | 0.076                                    | 1.26                             | 87              | -1.9                 | -             | 6.49             | -0.13         | 83                    | 411  | 84     | 71      |
| 109                | 18.966                    | 0.175             | 0.078                                    | 1.26                             | 87              | -1.9                 | -             | 6.38             | -0.11         | 83                    | 410  | 84     | 71      |
| 110                | 19.141                    | 0.175             | 0.075                                    | 1.27                             | 87              | -1.9                 | 99            | 6.27             | -0.11         | 83                    | 408  | 84     | 71      |
| 111                | 19.315                    | 0.174             | 0.075                                    | 1.28                             | 87              | -1.8                 | -             | 6.14             | -0.13         | 83                    | 406  | 84     | 71      |
| 112                | 19.490                    | 0.175             | 0.076                                    | 1.27                             | 87              | -1.9                 | -             | 6.01             | -0.13         | 83                    | 405  | 83     | 71      |
| 113                | 19.664                    | 0.174             | 0.077                                    | 1.27                             | 87              | -1.9                 | -             | 5.91             | -0.10         | 84                    | 404  | 82     | 71      |
| 114                | 19.838                    | 0.174             | 0.078                                    | 1.28                             | 88              | -1.9                 | -             | 5.90             | -0.01         | 87                    | 404  | 83     | 70      |
| 115                | 20.012                    | 0.174             | 0.076                                    | 1.27                             | 88              | -2.0                 | -             | 5.83             | -0.07         | 88                    | 404  | 84     | 70      |
| 116                | 20.186                    | 0.174             | 0.076                                    | 1.27                             | 88              | -2.0                 | -             | 5.76             | -0.07         | 89                    | 405  | 84     | 70      |
| 117                | 20.361                    | 0.175             | 0.074                                    | 1.28                             | 88              | -2.0                 | -             | 5.66             | -0.10         | 89                    | 407  | 83     | 70      |
| 118                | 20.535                    | 0.174             | 0.076                                    | 1.28                             | 88              | -2.0                 | -             | 5.58             | -0.08         | 89                    | 395  | 82     | 70      |
| 119                | 20.710                    | 0.175             | 0.076                                    | 1.27                             | 88              | -1.9                 | -             | 5.21             | -0.37         | 85                    | 391  | 82     | 70      |
| 120                | 20.885                    | 0.175             | 0.075                                    | 1.27                             | 88              | -1.9                 | 100           | 5.13             | -0.08         | 83                    | 389  | 83     | 71      |
| 121                | 21.060                    | 0.175             | 0.075                                    | 1.27                             | 88              | -2.0                 | -             | 5.02             | -0.11         | 83                    | 389  | 84     | 71      |
| 122                | 21.234                    | 0.174             | 0.076                                    | 1.27                             | 88              | -2.0                 | -             | 4.94             | -0.08         | 83                    | 398  | 83     | 71      |
| 123                | 21.409                    | 0.175             | 0.076                                    | 1.27                             | 88              | -2.0                 | -             | 4.84             | -0.10         | 83                    | 410  | 82     | 71      |
| 124                | 21.583                    | 0.174             | 0.076                                    | 1.28                             | 88              | -2.0                 | -             | 4.74             | -0.10         | 84                    | 416  | 82     | 70      |
| 125                | 21.757                    | 0.174             | 0.077                                    | 1.26                             | 88              | -2.1                 | -             | 4.77             | 0.03          | 87                    | 417  | 83     | 70      |
| 126                | 21.931                    | 0.174             | 0.075                                    | 1.28                             | 89              | -2.0                 | -             | 4.74             | -0.03         | 88                    | 415  | 84     | 70      |
| 127                | 22.106                    | 0.175             | 0.077                                    | 1.28                             | 89              | -2.1                 | -             | 4.70             | -0.04         | 89                    | 413  | 84     | 70      |

# BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: SBI  
 Model: St Louis  
 Run #: 2

Job #: 24-303  
 Tracking #: 216  
 Technician: AK  
 Date: 12/10/2024

| Elapsed Time (min) | Particulate Sampling Data |                   |                                          |                                  |                 |                      |               | Fuel Weight (lb) |               | Temperature Data (°F) |      |        |         |
|--------------------|---------------------------|-------------------|------------------------------------------|----------------------------------|-----------------|----------------------|---------------|------------------|---------------|-----------------------|------|--------|---------|
|                    | Gas Meter (ft³)           | Sample Rate (cfm) | Dilution Tunnel dP (in H <sub>2</sub> O) | Orifice dH (in H <sub>2</sub> O) | Meter Temp (°F) | Meter Vacuum (in Hg) | Pro. Rate (%) | Scale Reading    | Weight Change | Dilution Tunnel       | Flue | Filter | Ambient |
| 128                | 22.281                    | 0.175             | 0.075                                    | 1.28                             | 89              | -2.1                 | -             | 4.66             | -0.04         | 89                    | 413  | 83     | 70      |
| 129                | 22.455                    | 0.174             | 0.075                                    | 1.28                             | 89              | -2.1                 | -             | 4.60             | -0.06         | 89                    | 413  | 82     | 70      |
| 130                | 22.630                    | 0.175             | 0.075                                    | 1.27                             | 89              | -2.1                 | 100           | 4.55             | -0.05         | 89                    | 408  | 82     | 70      |
| 131                | 22.805                    | 0.175             | 0.075                                    | 1.28                             | 89              | -2.2                 | -             | 4.50             | -0.05         | 89                    | 405  | 83     | 70      |
| 132                | 22.980                    | 0.175             | 0.078                                    | 1.26                             | 89              | -2.1                 | -             | 4.43             | -0.07         | 88                    | 401  | 84     | 70      |
| 133                | 23.154                    | 0.174             | 0.075                                    | 1.26                             | 89              | -2.1                 | -             | 23.44            | 19.01         | 112                   | 377  | 84     | 70      |
| 134                | 23.329                    | 0.175             | 0.074                                    | 1.27                             | 89              | -2.2                 | -             | 26.35            | 2.91          | 104                   | 458  | 82     | 70      |
| 135                | 23.503                    | 0.174             | 0.075                                    | 1.27                             | 89              | -2.2                 | -             | 25.82            | -0.53         | 99                    | 522  | 82     | 70      |
| 136                | 23.677                    | 0.174             | 0.075                                    | 1.29                             | 89              | -2.2                 | -             | 25.46            | -0.36         | 93                    | 518  | 82     | 70      |
| 137                | 23.852                    | 0.175             | 0.074                                    | 1.28                             | 89              | -2.1                 | -             | 25.20            | -0.26         | 89                    | 467  | 83     | 71      |
| 138                | 24.027                    | 0.175             | 0.075                                    | 1.28                             | 89              | -2.2                 | -             | 24.95            | -0.25         | 87                    | 451  | 84     | 71      |
| 139                | 24.202                    | 0.175             | 0.073                                    | 1.27                             | 89              | -2.1                 | -             | 24.69            | -0.26         | 86                    | 459  | 84     | 71      |
| 140                | 24.377                    | 0.175             | 0.074                                    | 1.27                             | 89              | -2.2                 | 100           | 24.43            | -0.26         | 86                    | 450  | 84     | 71      |
| 141                | 24.553                    | 0.176             | 0.076                                    | 1.28                             | 89              | -2.3                 | -             | 24.17            | -0.26         | 85                    | 446  | 82     | 71      |
| 142                | 24.728                    | 0.175             | 0.074                                    | 1.28                             | 89              | -2.2                 | -             | 23.91            | -0.26         | 85                    | 444  | 82     | 71      |
| 143                | 24.903                    | 0.175             | 0.075                                    | 1.27                             | 90              | -2.1                 | -             | 23.66            | -0.25         | 85                    | 445  | 83     | 71      |
| 144                | 25.077                    | 0.174             | 0.075                                    | 1.27                             | 90              | -2.1                 | -             | 23.41            | -0.25         | 85                    | 444  | 84     | 72      |
| 145                | 25.251                    | 0.174             | 0.075                                    | 1.29                             | 90              | -2.2                 | -             | 23.15            | -0.26         | 85                    | 444  | 85     | 71      |
| 146                | 25.427                    | 0.176             | 0.076                                    | 1.28                             | 90              | -2.2                 | -             | 22.88            | -0.27         | 85                    | 445  | 85     | 71      |
| 147                | 25.602                    | 0.175             | 0.076                                    | 1.28                             | 90              | -2.2                 | -             | 22.62            | -0.26         | 85                    | 445  | 85     | 71      |
| 148                | 25.777                    | 0.175             | 0.075                                    | 1.29                             | 90              | -2.1                 | -             | 22.36            | -0.26         | 85                    | 446  | 84     | 71      |
| 149                | 25.952                    | 0.175             | 0.074                                    | 1.28                             | 90              | -2.1                 | -             | 22.11            | -0.25         | 85                    | 445  | 83     | 71      |
| 150                | 26.127                    | 0.175             | 0.074                                    | 1.28                             | 90              | -2.1                 | 100           | 21.86            | -0.25         | 85                    | 445  | 82     | 71      |
| 151                | 26.303                    | 0.176             | 0.075                                    | 1.28                             | 90              | -2.1                 | -             | 21.64            | -0.22         | 85                    | 445  | 83     | 72      |
| 152                | 26.478                    | 0.175             | 0.075                                    | 1.28                             | 90              | -2.1                 | -             | 21.39            | -0.25         | 85                    | 444  | 84     | 71      |
| 153                | 26.652                    | 0.174             | 0.077                                    | 1.28                             | 90              | -2.0                 | -             | 21.16            | -0.23         | 85                    | 445  | 84     | 71      |
| 154                | 26.826                    | 0.174             | 0.076                                    | 1.28                             | 90              | -2.0                 | -             | 20.93            | -0.23         | 85                    | 445  | 84     | 71      |
| 155                | 27.001                    | 0.175             | 0.074                                    | 1.28                             | 90              | -2.1                 | -             | 20.71            | -0.22         | 85                    | 446  | 84     | 71      |
| 156                | 27.177                    | 0.176             | 0.075                                    | 1.28                             | 90              | -2.0                 | -             | 20.47            | -0.24         | 85                    | 447  | 83     | 71      |
| 157                | 27.352                    | 0.175             | 0.075                                    | 1.28                             | 90              | -2.0                 | -             | 20.23            | -0.24         | 85                    | 447  | 82     | 71      |
| 158                | 27.527                    | 0.175             | 0.074                                    | 1.29                             | 90              | -2.0                 | -             | 20.00            | -0.23         | 85                    | 447  | 82     | 71      |
| 159                | 27.703                    | 0.176             | 0.075                                    | 1.27                             | 90              | -2.0                 | -             | 19.78            | -0.22         | 85                    | 449  | 83     | 71      |

# BOX A TEST DATA - ASTM E2780 / ASTM E2515

|                        |                         |
|------------------------|-------------------------|
| Client: <u>SBI</u>     | Job #: <u>24-303</u>    |
| Model: <u>St Louis</u> | Tracking #: <u>216</u>  |
| Run #: <u>2</u>        | Technician: <u>AK</u>   |
|                        | Date: <u>12/10/2024</u> |

| Elapsed Time (min) | Particulate Sampling Data |                   |                                          |                                  |                 |                      |               | Fuel Weight (lb) |               | Temperature Data (°F) |      |        |         |
|--------------------|---------------------------|-------------------|------------------------------------------|----------------------------------|-----------------|----------------------|---------------|------------------|---------------|-----------------------|------|--------|---------|
|                    | Gas Meter (ft³)           | Sample Rate (cfm) | Dilution Tunnel dP (in H <sub>2</sub> O) | Orifice dH (in H <sub>2</sub> O) | Meter Temp (°F) | Meter Vacuum (in Hg) | Pro. Rate (%) | Scale Reading    | Weight Change | Dilution Tunnel       | Flue | Filter | Ambient |
| 160                | 27.878                    | 0.175             | 0.073                                    | 1.28                             | 90              | -1.9                 | 101           | 19.55            | -0.23         | 85                    | 447  | 84     | 71      |
| 161                | 28.053                    | 0.175             | 0.075                                    | 1.29                             | 90              | -2.0                 | -             | 19.33            | -0.22         | 85                    | 447  | 84     | 71      |
| 162                | 28.227                    | 0.174             | 0.074                                    | 1.28                             | 90              | -1.9                 | -             | 19.09            | -0.24         | 85                    | 446  | 83     | 72      |
| 163                | 28.402                    | 0.175             | 0.076                                    | 1.27                             | 90              | -2.0                 | -             | 18.87            | -0.22         | 85                    | 444  | 82     | 71      |
| 164                | 28.576                    | 0.174             | 0.075                                    | 1.28                             | 90              | -1.9                 | -             | 18.66            | -0.21         | 85                    | 443  | 82     | 71      |
| 165                | 28.752                    | 0.176             | 0.075                                    | 1.28                             | 90              | -1.9                 | -             | 18.43            | -0.23         | 85                    | 443  | 83     | 71      |
| 166                | 28.927                    | 0.175             | 0.074                                    | 1.28                             | 90              | -2.0                 | -             | 18.23            | -0.20         | 85                    | 442  | 84     | 71      |
| 167                | 29.102                    | 0.175             | 0.074                                    | 1.26                             | 90              | -2.0                 | -             | 18.01            | -0.22         | 85                    | 440  | 84     | 71      |
| 168                | 29.278                    | 0.176             | 0.076                                    | 1.28                             | 90              | -1.9                 | -             | 17.82            | -0.19         | 85                    | 438  | 84     | 71      |
| 169                | 29.453                    | 0.175             | 0.076                                    | 1.28                             | 90              | -1.9                 | -             | 17.58            | -0.24         | 85                    | 436  | 83     | 71      |
| 170                | 29.627                    | 0.174             | 0.075                                    | 1.27                             | 90              | -1.9                 | 100           | 17.38            | -0.20         | 85                    | 435  | 82     | 71      |
| 171                | 29.801                    | 0.174             | 0.076                                    | 1.28                             | 90              | -1.9                 | -             | 17.19            | -0.19         | 85                    | 433  | 82     | 71      |
| 172                | 29.977                    | 0.176             | 0.075                                    | 1.28                             | 90              | -1.9                 | -             | 17.00            | -0.19         | 84                    | 432  | 83     | 71      |
| 173                | 30.152                    | 0.175             | 0.074                                    | 1.28                             | 90              | -2.0                 | -             | 16.81            | -0.19         | 84                    | 431  | 84     | 71      |
| 174                | 30.327                    | 0.175             | 0.075                                    | 1.29                             | 90              | -2.0                 | -             | 16.62            | -0.19         | 85                    | 430  | 84     | 71      |
| 175                | 30.502                    | 0.175             | 0.074                                    | 1.28                             | 90              | -1.9                 | -             | 16.44            | -0.18         | 84                    | 428  | 83     | 71      |
| 176                | 30.678                    | 0.176             | 0.076                                    | 1.27                             | 90              | -1.8                 | -             | 16.27            | -0.17         | 84                    | 433  | 82     | 71      |
| 177                | 30.853                    | 0.175             | 0.074                                    | 1.26                             | 91              | -1.9                 | -             | 16.09            | -0.18         | 85                    | 438  | 82     | 72      |
| 178                | 31.028                    | 0.175             | 0.075                                    | 1.27                             | 91              | -1.9                 | -             | 15.88            | -0.21         | 85                    | 442  | 83     | 71      |
| 179                | 31.203                    | 0.175             | 0.074                                    | 1.28                             | 91              | -1.9                 | -             | 15.68            | -0.20         | 85                    | 443  | 84     | 72      |
| 180                | 31.377                    | 0.174             | 0.076                                    | 1.28                             | 91              | -2.0                 | 99            | 15.50            | -0.18         | 85                    | 442  | 84     | 71      |
| 181                | 31.552                    | 0.175             | 0.074                                    | 1.28                             | 91              | -2.0                 | -             | 15.31            | -0.19         | 85                    | 444  | 84     | 72      |
| 182                | 31.727                    | 0.175             | 0.075                                    | 1.29                             | 91              | -1.9                 | -             | 15.11            | -0.20         | 85                    | 444  | 83     | 71      |
| 183                | 31.903                    | 0.176             | 0.076                                    | 1.27                             | 91              | -1.9                 | -             | 14.95            | -0.16         | 85                    | 443  | 82     | 72      |
| 184                | 32.078                    | 0.175             | 0.076                                    | 1.28                             | 91              | -1.9                 | -             | 14.74            | -0.21         | 85                    | 442  | 82     | 71      |
| 185                | 32.253                    | 0.175             | 0.075                                    | 1.27                             | 91              | -1.9                 | -             | 14.55            | -0.19         | 85                    | 442  | 83     | 72      |
| 186                | 32.429                    | 0.176             | 0.076                                    | 1.27                             | 91              | -1.9                 | -             | 14.39            | -0.16         | 85                    | 442  | 84     | 72      |
| 187                | 32.604                    | 0.175             | 0.075                                    | 1.26                             | 91              | -1.9                 | -             | 14.21            | -0.18         | 85                    | 443  | 84     | 72      |
| 188                | 32.777                    | 0.173             | 0.075                                    | 1.28                             | 91              | -1.9                 | -             | 14.04            | -0.17         | 85                    | 440  | 83     | 72      |
| 189                | 32.952                    | 0.175             | 0.074                                    | 1.28                             | 91              | -2.0                 | -             | 13.87            | -0.17         | 85                    | 438  | 82     | 72      |
| 190                | 33.127                    | 0.175             | 0.075                                    | 1.27                             | 91              | -1.9                 | 99            | 13.68            | -0.19         | 85                    | 439  | 83     | 72      |
| 191                | 33.303                    | 0.176             | 0.074                                    | 1.28                             | 91              | -1.9                 | -             | 13.49            | -0.19         | 85                    | 437  | 84     | 72      |

# BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: SBIJob #: 24-303Model: St LouisTracking #: 216Run #: 2Technician: AKDate: 12/10/2024

| Elapsed Time (min) | Particulate Sampling Data |                   |                                          |                                  |                 |                      |               | Fuel Weight (lb) |               | Temperature Data (°F) |      |        |         |
|--------------------|---------------------------|-------------------|------------------------------------------|----------------------------------|-----------------|----------------------|---------------|------------------|---------------|-----------------------|------|--------|---------|
|                    | Gas Meter (ft³)           | Sample Rate (cfm) | Dilution Tunnel dP (in H <sub>2</sub> O) | Orifice dH (in H <sub>2</sub> O) | Meter Temp (°F) | Meter Vacuum (in Hg) | Pro. Rate (%) | Scale Reading    | Weight Change | Dilution Tunnel       | Flue | Filter | Ambient |
| 192                | 33.478                    | 0.175             | 0.075                                    | 1.29                             | 91              | -2.0                 | -             | 13.34            | -0.15         | 85                    | 436  | 84     | 71      |
| 193                | 33.653                    | 0.175             | 0.075                                    | 1.28                             | 91              | -2.0                 | -             | 13.17            | -0.17         | 84                    | 433  | 84     | 71      |
| 194                | 33.828                    | 0.175             | 0.075                                    | 1.29                             | 91              | -2.0                 | -             | 13.00            | -0.17         | 84                    | 432  | 84     | 71      |
| 195                | 34.003                    | 0.175             | 0.075                                    | 1.27                             | 91              | -2.0                 | -             | 12.83            | -0.17         | 85                    | 432  | 83     | 71      |
| 196                | 34.178                    | 0.175             | 0.075                                    | 1.27                             | 91              | -2.0                 | -             | 12.69            | -0.14         | 85                    | 433  | 82     | 72      |
| 197                | 34.352                    | 0.174             | 0.075                                    | 1.27                             | 91              | -2.1                 | -             | 12.52            | -0.17         | 85                    | 432  | 82     | 71      |
| 198                | 34.527                    | 0.175             | 0.075                                    | 1.28                             | 91              | -2.0                 | -             | 12.37            | -0.15         | 85                    | 429  | 83     | 71      |
| 199                | 34.702                    | 0.175             | 0.078                                    | 1.27                             | 91              | -2.0                 | -             | 12.21            | -0.16         | 85                    | 428  | 84     | 72      |
| 200                | 34.877                    | 0.175             | 0.076                                    | 1.28                             | 91              | -2.1                 | 99            | 12.06            | -0.15         | 85                    | 424  | 84     | 72      |
| 201                | 35.052                    | 0.175             | 0.075                                    | 1.28                             | 91              | -2.1                 | -             | 11.91            | -0.15         | 84                    | 423  | 84     | 72      |
| 202                | 35.228                    | 0.176             | 0.074                                    | 1.28                             | 91              | -2.0                 | -             | 11.76            | -0.15         | 84                    | 421  | 84     | 71      |
| 203                | 35.403                    | 0.175             | 0.075                                    | 1.27                             | 91              | -2.1                 | -             | 11.61            | -0.15         | 84                    | 418  | 83     | 71      |
| 204                | 35.578                    | 0.175             | 0.076                                    | 1.29                             | 91              | -2.0                 | -             | 11.45            | -0.16         | 84                    | 419  | 82     | 71      |
| 205                | 35.753                    | 0.175             | 0.075                                    | 1.27                             | 91              | -2.0                 | -             | 11.34            | -0.11         | 84                    | 419  | 82     | 71      |
| 206                | 35.927                    | 0.174             | 0.074                                    | 1.28                             | 91              | -2.0                 | -             | 11.18            | -0.16         | 84                    | 417  | 83     | 72      |
| 207                | 36.102                    | 0.175             | 0.075                                    | 1.28                             | 91              | -2.1                 | -             | 11.05            | -0.13         | 84                    | 417  | 84     | 71      |
| 208                | 36.277                    | 0.175             | 0.075                                    | 1.28                             | 91              | -2.0                 | -             | 10.90            | -0.15         | 84                    | 416  | 84     | 72      |
| 209                | 36.453                    | 0.176             | 0.078                                    | 1.27                             | 91              | -2.1                 | -             | 10.75            | -0.15         | 84                    | 416  | 84     | 72      |
| 210                | 36.628                    | 0.175             | 0.077                                    | 1.27                             | 91              | -2.1                 | 98            | 10.59            | -0.16         | 84                    | 417  | 82     | 72      |
| 211                | 36.804                    | 0.176             | 0.074                                    | 1.28                             | 91              | -2.1                 | -             | 10.45            | -0.14         | 84                    | 418  | 82     | 71      |
| 212                | 36.980                    | 0.176             | 0.077                                    | 1.27                             | 91              | -2.1                 | -             | 10.31            | -0.14         | 84                    | 419  | 82     | 72      |
| 213                | 37.155                    | 0.175             | 0.075                                    | 1.27                             | 91              | -2.1                 | -             | 10.16            | -0.15         | 84                    | 419  | 83     | 71      |
| 214                | 37.329                    | 0.174             | 0.076                                    | 1.27                             | 91              | -2.2                 | -             | 10.02            | -0.14         | 84                    | 419  | 84     | 72      |
| 215                | 37.504                    | 0.175             | 0.076                                    | 1.28                             | 91              | -2.2                 | -             | 9.89             | -0.13         | 84                    | 421  | 84     | 72      |
| 216                | 37.680                    | 0.176             | 0.075                                    | 1.29                             | 91              | -2.2                 | -             | 9.74             | -0.15         | 84                    | 418  | 83     | 71      |
| 217                | 37.856                    | 0.176             | 0.076                                    | 1.29                             | 91              | -2.1                 | -             | 9.60             | -0.14         | 84                    | 419  | 82     | 71      |
| 218                | 38.031                    | 0.175             | 0.075                                    | 1.27                             | 91              | -2.1                 | -             | 9.47             | -0.13         | 84                    | 416  | 82     | 72      |
| 219                | 38.207                    | 0.176             | 0.076                                    | 1.27                             | 91              | -2.1                 | -             | 9.35             | -0.12         | 84                    | 416  | 83     | 71      |
| 220                | 38.383                    | 0.176             | 0.076                                    | 1.28                             | 91              | -2.2                 | 99            | 9.20             | -0.15         | 84                    | 413  | 84     | 71      |
| 221                | 38.557                    | 0.174             | 0.076                                    | 1.27                             | 91              | -2.2                 | -             | 9.09             | -0.11         | 84                    | 413  | 84     | 72      |
| 222                | 38.732                    | 0.175             | 0.076                                    | 1.28                             | 91              | -2.2                 | -             | 8.97             | -0.12         | 84                    | 413  | 84     | 72      |
| 223                | 38.907                    | 0.175             | 0.076                                    | 1.28                             | 91              | -2.2                 | -             | 8.83             | -0.14         | 84                    | 413  | 83     | 72      |

# BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: SBI  
 Model: St Louis  
 Run #: 2

Job #: 24-303  
 Tracking #: 216  
 Technician: AK  
 Date: 12/10/2024

| Elapsed Time (min) | Particulate Sampling Data |                   |                                          |                                  |                 |                      |               | Fuel Weight (lb) |               | Temperature Data (°F) |      |        |         |
|--------------------|---------------------------|-------------------|------------------------------------------|----------------------------------|-----------------|----------------------|---------------|------------------|---------------|-----------------------|------|--------|---------|
|                    | Gas Meter (ft³)           | Sample Rate (cfm) | Dilution Tunnel dP (in H <sub>2</sub> O) | Orifice dH (in H <sub>2</sub> O) | Meter Temp (°F) | Meter Vacuum (in Hg) | Pro. Rate (%) | Scale Reading    | Weight Change | Dilution Tunnel       | Flue | Filter | Ambient |
| 224                | 39.083                    | 0.176             | 0.076                                    | 1.27                             | 91              | -2.1                 | -             | 8.71             | -0.12         | 84                    | 412  | 82     | 72      |
| 225                | 39.258                    | 0.175             | 0.075                                    | 1.28                             | 91              | -2.2                 | -             | 8.57             | -0.14         | 83                    | 408  | 82     | 72      |
| 226                | 39.434                    | 0.176             | 0.075                                    | 1.28                             | 91              | -2.1                 | -             | 8.47             | -0.10         | 83                    | 407  | 83     | 72      |
| 227                | 39.609                    | 0.175             | 0.076                                    | 1.28                             | 91              | -2.2                 | -             | 8.36             | -0.11         | 83                    | 406  | 84     | 72      |
| 228                | 39.785                    | 0.176             | 0.077                                    | 1.27                             | 92              | -2.1                 | -             | 8.25             | -0.11         | 83                    | 405  | 84     | 72      |
| 229                | 39.959                    | 0.174             | 0.078                                    | 1.28                             | 91              | -2.3                 | -             | 8.13             | -0.12         | 83                    | 403  | 83     | 72      |
| 230                | 40.134                    | 0.175             | 0.076                                    | 1.27                             | 91              | -2.2                 | 99            | 8.03             | -0.10         | 83                    | 401  | 82     | 71      |
| 231                | 40.309                    | 0.175             | 0.077                                    | 1.29                             | 91              | -2.2                 | -             | 7.94             | -0.09         | 83                    | 399  | 82     | 71      |
| 232                | 40.485                    | 0.176             | 0.075                                    | 1.29                             | 91              | -2.2                 | -             | 7.85             | -0.09         | 83                    | 396  | 83     | 72      |
| 233                | 40.661                    | 0.176             | 0.076                                    | 1.27                             | 92              | -2.2                 | -             | 7.76             | -0.09         | 83                    | 394  | 84     | 72      |
| 234                | 40.837                    | 0.176             | 0.077                                    | 1.27                             | 91              | -2.2                 | -             | 7.68             | -0.08         | 83                    | 391  | 83     | 72      |
| 235                | 41.012                    | 0.175             | 0.076                                    | 1.27                             | 92              | -2.2                 | -             | 7.61             | -0.07         | 83                    | 386  | 82     | 72      |
| 236                | 41.188                    | 0.176             | 0.076                                    | 1.29                             | 92              | -2.3                 | -             | 7.51             | -0.10         | 83                    | 383  | 82     | 72      |
| 237                | 41.362                    | 0.174             | 0.077                                    | 1.28                             | 92              | -2.3                 | -             | 7.45             | -0.06         | 82                    | 381  | 83     | 72      |
| 238                | 41.537                    | 0.175             | 0.078                                    | 1.28                             | 92              | -2.3                 | -             | 7.37             | -0.08         | 83                    | 379  | 84     | 71      |
| 239                | 41.713                    | 0.176             | 0.075                                    | 1.28                             | 92              | -2.4                 | -             | 7.29             | -0.08         | 83                    | 377  | 84     | 72      |
| 240                | 41.888                    | 0.175             | 0.075                                    | 1.27                             | 92              | -2.3                 | 99            | 7.22             | -0.07         | 82                    | 375  | 84     | 72      |
| 241                | 42.064                    | 0.176             | 0.078                                    | 1.28                             | 92              | -2.3                 | -             | 7.15             | -0.07         | 82                    | 376  | 83     | 72      |
| 242                | 42.239                    | 0.175             | 0.076                                    | 1.27                             | 92              | -2.4                 | -             | 7.07             | -0.08         | 82                    | 376  | 82     | 72      |
| 243                | 42.415                    | 0.176             | 0.077                                    | 1.29                             | 92              | -2.3                 | -             | 7.01             | -0.06         | 82                    | 374  | 82     | 72      |
| 244                | 42.590                    | 0.175             | 0.075                                    | 1.27                             | 92              | -2.3                 | -             | 6.90             | -0.11         | 82                    | 373  | 83     | 72      |
| 245                | 42.765                    | 0.175             | 0.076                                    | 1.27                             | 92              | -2.4                 | -             | 6.98             | 0.08          | 86                    | 372  | 84     | 71      |
| 246                | 42.940                    | 0.175             | 0.076                                    | 1.28                             | 92              | -2.4                 | -             | 6.97             | -0.01         | 87                    | 373  | 84     | 71      |
| 247                | 43.115                    | 0.175             | 0.076                                    | 1.27                             | 92              | -2.4                 | -             | 6.96             | -0.01         | 87                    | 372  | 84     | 70      |
| 248                | 43.291                    | 0.176             | 0.076                                    | 1.28                             | 92              | -2.3                 | -             | 6.93             | -0.03         | 88                    | 372  | 83     | 70      |
| 249                | 43.466                    | 0.175             | 0.077                                    | 1.28                             | 92              | -2.4                 | -             | 6.90             | -0.03         | 88                    | 373  | 82     | 70      |
| 250                | 43.642                    | 0.176             | 0.075                                    | 1.28                             | 92              | -2.4                 | 100           | 6.86             | -0.04         | 88                    | 375  | 82     | 70      |
| 251                | 43.817                    | 0.175             | 0.075                                    | 1.28                             | 92              | -2.5                 | -             | 6.81             | -0.05         | 88                    | 376  | 83     | 70      |
| 252                | 43.992                    | 0.175             | 0.076                                    | 1.27                             | 92              | -2.4                 | -             | 6.48             | -0.33         | 87                    | 376  | 84     | 70      |
| 253                | 44.167                    | 0.175             | 0.076                                    | 1.28                             | 92              | -2.5                 | -             | 6.41             | -0.07         | 84                    | 369  | 84     | 71      |
| 254                | 44.342                    | 0.175             | 0.077                                    | 1.27                             | 92              | -2.5                 | -             | 6.35             | -0.06         | 82                    | 366  | 84     | 72      |
| 255                | 44.517                    | 0.175             | 0.074                                    | 1.28                             | 92              | -2.5                 | -             | 6.30             | -0.05         | 82                    | 372  | 82     | 71      |

# BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: SBI  
 Model: St Louis  
 Run #: 2

Job #: 24-303  
 Tracking #: 216  
 Technician: AK  
 Date: 12/10/2024

| Elapsed Time (min) | Particulate Sampling Data |                   |                                          |                                  |                 |                      |               | Fuel Weight (lb) |               | Temperature Data (°F) |      |        |         |
|--------------------|---------------------------|-------------------|------------------------------------------|----------------------------------|-----------------|----------------------|---------------|------------------|---------------|-----------------------|------|--------|---------|
|                    | Gas Meter (ft³)           | Sample Rate (cfm) | Dilution Tunnel dP (in H <sub>2</sub> O) | Orifice dH (in H <sub>2</sub> O) | Meter Temp (°F) | Meter Vacuum (in Hg) | Pro. Rate (%) | Scale Reading    | Weight Change | Dilution Tunnel       | Flue | Filter | Ambient |
| 256                | 44.693                    | 0.176             | 0.076                                    | 1.28                             | 92              | -2.4                 | -             | 6.23             | -0.07         | 82                    | 384  | 82     | 71      |
| 257                | 44.868                    | 0.175             | 0.076                                    | 1.26                             | 92              | -2.4                 | -             | 6.30             | 0.07          | 86                    | 396  | 83     | 71      |
| 258                | 45.044                    | 0.176             | 0.075                                    | 1.28                             | 92              | -2.6                 | -             | 6.30             | 0.00          | 88                    | 404  | 84     | 70      |
| 259                | 45.219                    | 0.175             | 0.076                                    | 1.28                             | 92              | -2.5                 | -             | 6.28             | -0.02         | 88                    | 408  | 83     | 70      |
| 260                | 45.395                    | 0.176             | 0.076                                    | 1.26                             | 92              | -2.5                 | 99            | 6.27             | -0.01         | 89                    | 410  | 82     | 70      |
| 261                | 45.569                    | 0.174             | 0.076                                    | 1.29                             | 92              | -2.5                 | -             | 6.24             | -0.03         | 89                    | 408  | 82     | 70      |
| 262                | 45.744                    | 0.175             | 0.076                                    | 1.27                             | 92              | -2.6                 | -             | 6.21             | -0.03         | 88                    | 402  | 83     | 70      |
| 263                | 45.919                    | 0.175             | 0.076                                    | 1.27                             | 92              | -2.5                 | -             | 6.19             | -0.02         | 88                    | 400  | 84     | 70      |
| 264                | 46.095                    | 0.176             | 0.076                                    | 1.28                             | 92              | -2.6                 | -             | 6.15             | -0.04         | 88                    | 399  | 84     | 70      |
| 265                | 46.270                    | 0.175             | 0.077                                    | 1.27                             | 92              | -2.6                 | -             | 6.12             | -0.03         | 88                    | 398  | 84     | 70      |
| 266                | 46.446                    | 0.176             | 0.076                                    | 1.27                             | 92              | -2.6                 | -             | 6.09             | -0.03         | 88                    | 398  | 84     | 70      |
| 267                | 46.621                    | 0.175             | 0.077                                    | 1.27                             | 92              | -2.6                 | -             | 6.05             | -0.04         | 88                    | 397  | 83     | 70      |
| 268                | 46.796                    | 0.175             | 0.076                                    | 1.28                             | 92              | -2.6                 | -             | 6.01             | -0.04         | 88                    | 395  | 82     | 70      |
| 269                | 46.970                    | 0.174             | 0.077                                    | 1.28                             | 92              | -2.6                 | -             | 5.97             | -0.04         | 88                    | 396  | 82     | 70      |
| 270                | 47.145                    | 0.175             | 0.077                                    | 1.28                             | 92              | -2.6                 | 99            | 5.93             | -0.04         | 88                    | 396  | 83     | 70      |
| 271                | 47.320                    | 0.175             | 0.075                                    | 1.30                             | 92              | -2.7                 | -             | 5.91             | -0.02         | 88                    | 395  | 84     | 70      |
| 272                | 47.496                    | 0.176             | 0.077                                    | 1.28                             | 92              | -2.7                 | -             | 5.86             | -0.05         | 88                    | 396  | 84     | 70      |
| 273                | 47.671                    | 0.175             | 0.077                                    | 1.28                             | 92              | -2.8                 | -             | 5.83             | -0.03         | 88                    | 395  | 83     | 70      |
| 274                | 47.847                    | 0.176             | 0.075                                    | 1.28                             | 92              | -2.7                 | -             | 5.79             | -0.04         | 88                    | 394  | 82     | 70      |
| 275                | 48.022                    | 0.175             | 0.076                                    | 1.28                             | 92              | -2.7                 | -             | 5.75             | -0.04         | 88                    | 394  | 82     | 70      |
| 276                | 48.198                    | 0.176             | 0.078                                    | 1.28                             | 92              | -2.8                 | -             | 5.71             | -0.04         | 88                    | 393  | 83     | 70      |
| 277                | 48.372                    | 0.174             | 0.077                                    | 1.27                             | 92              | -2.7                 | -             | 5.67             | -0.04         | 88                    | 393  | 84     | 69      |
| 278                | 48.546                    | 0.174             | 0.077                                    | 1.28                             | 92              | -2.9                 | -             | 5.63             | -0.04         | 88                    | 391  | 84     | 69      |
| 279                | 48.722                    | 0.176             | 0.076                                    | 1.27                             | 92              | -2.8                 | -             | 5.59             | -0.04         | 88                    | 392  | 82     | 69      |
| 280                | 48.897                    | 0.175             | 0.076                                    | 1.28                             | 92              | -2.8                 | 99            | 5.54             | -0.05         | 88                    | 391  | 82     | 69      |
| 281                | 49.072                    | 0.175             | 0.077                                    | 1.27                             | 92              | -2.8                 | -             | 5.50             | -0.04         | 88                    | 390  | 83     | 69      |
| 282                | 49.247                    | 0.175             | 0.075                                    | 1.27                             | 92              | -2.8                 | -             | 5.48             | -0.02         | 88                    | 391  | 84     | 69      |
| 283                | 49.423                    | 0.176             | 0.077                                    | 1.28                             | 92              | -2.9                 | -             | 5.43             | -0.05         | 88                    | 391  | 84     | 69      |
| 284                | 49.598                    | 0.175             | 0.075                                    | 1.27                             | 92              | -2.8                 | -             | 5.39             | -0.04         | 88                    | 389  | 84     | 69      |
| 285                | 49.773                    | 0.175             | 0.077                                    | 1.28                             | 92              | -2.9                 | -             | 5.36             | -0.03         | 88                    | 389  | 83     | 69      |
| 286                | 49.947                    | 0.174             | 0.075                                    | 1.29                             | 92              | -2.9                 | -             | 5.32             | -0.04         | 88                    | 389  | 82     | 69      |
| 287                | 50.122                    | 0.175             | 0.077                                    | 1.28                             | 92              | -3.0                 | -             | 5.28             | -0.04         | 88                    | 387  | 82     | 69      |

# BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: SBI  
 Model: St Louis  
 Run #: 2

Job #: 24-303  
 Tracking #: 216  
 Technician: AK  
 Date: 12/10/2024

| Elapsed Time (min) | Particulate Sampling Data |                   |                                          |                                  |                 |                      |               | Fuel Weight (lb) |               | Temperature Data (°F) |      |        |         |
|--------------------|---------------------------|-------------------|------------------------------------------|----------------------------------|-----------------|----------------------|---------------|------------------|---------------|-----------------------|------|--------|---------|
|                    | Gas Meter (ft³)           | Sample Rate (cfm) | Dilution Tunnel dP (in H <sub>2</sub> O) | Orifice dH (in H <sub>2</sub> O) | Meter Temp (°F) | Meter Vacuum (in Hg) | Pro. Rate (%) | Scale Reading    | Weight Change | Dilution Tunnel       | Flue | Filter | Ambient |
| 288                | 50.297                    | 0.175             | 0.073                                    | 1.27                             | 92              | -2.9                 | -             | 5.24             | -0.04         | 87                    | 387  | 83     | 69      |
| 289                | 50.473                    | 0.176             | 0.077                                    | 1.28                             | 92              | -2.9                 | -             | 5.21             | -0.03         | 88                    | 385  | 84     | 69      |
| 290                | 50.648                    | 0.175             | 0.077                                    | 1.27                             | 92              | -2.9                 | 99            | 5.17             | -0.04         | 87                    | 385  | 84     | 69      |
| 291                | 50.823                    | 0.175             | 0.075                                    | 1.27                             | 92              | -3.0                 | -             | 5.13             | -0.04         | 87                    | 386  | 83     | 69      |
| 292                | 50.998                    | 0.175             | 0.077                                    | 1.26                             | 92              | -3.0                 | -             | 5.09             | -0.04         | 87                    | 386  | 82     | 69      |
| 293                | 51.174                    | 0.176             | 0.076                                    | 1.28                             | 92              | -3.0                 | -             | 5.05             | -0.04         | 87                    | 386  | 82     | 69      |
| 294                | 51.348                    | 0.174             | 0.076                                    | 1.29                             | 92              | -3.0                 | -             | 5.01             | -0.04         | 87                    | 387  | 83     | 69      |
| 295                | 51.522                    | 0.174             | 0.075                                    | 1.27                             | 92              | -3.1                 | -             | 4.96             | -0.05         | 87                    | 387  | 84     | 69      |
| 296                | 51.698                    | 0.176             | 0.076                                    | 1.28                             | 92              | -3.1                 | -             | 4.93             | -0.03         | 87                    | 385  | 84     | 69      |
| 297                | 51.873                    | 0.175             | 0.077                                    | 1.28                             | 92              | -3.0                 | -             | 4.89             | -0.04         | 87                    | 385  | 83     | 69      |
| 298                | 52.048                    | 0.175             | 0.078                                    | 1.27                             | 92              | -3.0                 | -             | 4.87             | -0.02         | 87                    | 384  | 82     | 69      |
| 299                | 52.224                    | 0.176             | 0.077                                    | 1.28                             | 92              | -3.1                 | -             | 4.83             | -0.04         | 87                    | 384  | 82     | 69      |
| 300                | 52.399                    | 0.175             | 0.077                                    | 1.28                             | 92              | -3.1                 | 98            | 4.81             | -0.02         | 86                    | 356  | 83     | 69      |
| 301                | 52.575                    | 0.176             | 0.078                                    | 1.27                             | 92              | -3.1                 | -             | 4.80             | -0.01         | 85                    | 310  | 84     | 69      |
| 302                | 52.750                    | 0.175             | 0.077                                    | 1.27                             | 92              | -3.1                 | -             | 4.78             | -0.02         | 84                    | 287  | 83     | 69      |
| 303                | 52.924                    | 0.174             | 0.076                                    | 1.28                             | 92              | -3.1                 | -             | 4.78             | 0.00          | 84                    | 273  | 82     | 69      |
| 304                | 53.099                    | 0.175             | 0.076                                    | 1.28                             | 92              | -3.1                 | -             | 4.76             | -0.02         | 84                    | 265  | 82     | 69      |
| 305                | 53.274                    | 0.175             | 0.076                                    | 1.28                             | 92              | -3.2                 | -             | 4.75             | -0.01         | 83                    | 258  | 83     | 69      |
| 306                | 53.450                    | 0.176             | 0.075                                    | 1.28                             | 92              | -3.2                 | -             | 4.74             | -0.01         | 83                    | 253  | 84     | 69      |
| 307                | 53.625                    | 0.175             | 0.077                                    | 1.28                             | 92              | -3.2                 | -             | 4.72             | -0.02         | 83                    | 248  | 84     | 69      |
| 308                | 53.801                    | 0.176             | 0.076                                    | 1.28                             | 92              | -3.2                 | -             | 4.70             | -0.02         | 83                    | 245  | 82     | 69      |
| 309                | 53.977                    | 0.176             | 0.077                                    | 1.27                             | 92              | -3.2                 | -             | 4.69             | -0.01         | 83                    | 243  | 82     | 69      |
| 310                | 54.152                    | 0.175             | 0.075                                    | 1.28                             | 92              | -3.3                 | 99            | 4.67             | -0.02         | 82                    | 240  | 83     | 69      |
| 311                | 54.326                    | 0.174             | 0.077                                    | 1.28                             | 92              | -3.3                 | -             | 4.64             | -0.03         | 82                    | 238  | 84     | 69      |
| 312                | 54.501                    | 0.175             | 0.075                                    | 1.27                             | 92              | -3.2                 | -             | 4.63             | -0.01         | 82                    | 236  | 84     | 69      |
| 313                | 54.676                    | 0.175             | 0.075                                    | 1.28                             | 92              | -3.2                 | -             | 4.61             | -0.02         | 82                    | 233  | 83     | 69      |
| 314                | 54.852                    | 0.176             | 0.076                                    | 1.29                             | 92              | -3.3                 | -             | 4.59             | -0.02         | 82                    | 232  | 82     | 69      |
| 315                | 55.027                    | 0.175             | 0.076                                    | 1.27                             | 92              | -3.2                 | -             | 4.57             | -0.02         | 82                    | 229  | 83     | 69      |
| 316                | 55.203                    | 0.176             | 0.078                                    | 1.27                             | 92              | -3.3                 | -             | 4.56             | -0.01         | 81                    | 228  | 84     | 69      |
| 317                | 55.378                    | 0.175             | 0.077                                    | 1.27                             | 92              | -3.3                 | -             | 4.54             | -0.02         | 81                    | 226  | 84     | 69      |
| 318                | 55.554                    | 0.176             | 0.077                                    | 1.27                             | 92              | -3.3                 | -             | 4.52             | -0.02         | 81                    | 224  | 84     | 69      |
| 319                | 55.728                    | 0.174             | 0.076                                    | 1.27                             | 92              | -3.4                 | -             | 4.51             | -0.01         | 81                    | 222  | 83     | 69      |

## BOX A TEST DATA - ASTM E2780 / ASTM E2515

|                        |                         |
|------------------------|-------------------------|
| Client: <u>SBI</u>     | Job #: <u>24-303</u>    |
| Model: <u>St Louis</u> | Tracking #: <u>216</u>  |
| Run #: <u>2</u>        | Technician: <u>AK</u>   |
|                        | Date: <u>12/10/2024</u> |

|                    | Particulate Sampling Data |                   |                                          |                                  |                 |                      |               | Fuel Weight (lb) |               | Temperature Data (°F) |       |        |         |
|--------------------|---------------------------|-------------------|------------------------------------------|----------------------------------|-----------------|----------------------|---------------|------------------|---------------|-----------------------|-------|--------|---------|
| Elapsed Time (min) | Gas Meter (ft³)           | Sample Rate (cfm) | Dilution Tunnel dP (in H <sub>2</sub> O) | Orifice dH (in H <sub>2</sub> O) | Meter Temp (°F) | Meter Vacuum (in Hg) | Pro. Rate (%) | Scale Reading    | Weight Change | Dilution Tunnel       | Flue  | Filter | Ambient |
| 320                | 55.903                    | 0.175             | 0.078                                    | 1.28                             | 92              | -3.4                 | 98            | 4.49             | -0.02         | 81                    | 220   | 82     | 69      |
| 321                | 56.078                    | 0.175             | 0.077                                    | 1.29                             | 92              | -3.4                 | -             | 4.47             | -0.02         | 81                    | 220   | 82     | 69      |
| 322                | 56.254                    | 0.176             | 0.077                                    | 1.28                             | 92              | -3.4                 | -             | 4.46             | -0.01         | 81                    | 218   | 83     | 69      |
| 323                | 56.429                    | 0.175             | 0.077                                    | 1.28                             | 92              | -3.3                 | -             | 4.44             | -0.02         | 81                    | 217   | 84     | 69      |
| 324                | 56.605                    | 0.176             | 0.077                                    | 1.27                             | 92              | -3.4                 | 98            | 4.42             | -0.02         | 80                    | 215   | 84     | 69      |
| Avg/Tot            | 56.606                    | 0.175             | 0.075                                    | 1.28                             | 86.2            | -2.1                 | 100           |                  |               | 86.0                  | 419.2 | 83.0   | 70.1    |



# BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: SBI  
 Model: St Louis  
 Run #: 2

Job #: 24-303  
 Tracking #: 216  
 Technician: AK  
 Date: 12/10/2024

| Elapsed Time (min) | Particulate Sampling Data    |                   |                                  |                 |                      |               |             | Flue Gas Data                    |                     |        |
|--------------------|------------------------------|-------------------|----------------------------------|-----------------|----------------------|---------------|-------------|----------------------------------|---------------------|--------|
|                    | Gas Meter (ft <sup>3</sup> ) | Sample Rate (cfm) | Orifice dH (in H <sub>2</sub> O) | Meter Temp (°F) | Meter Vacuum (in Hg) | Pro. Rate (%) | Filter (°F) | Flue Draft (in H <sub>2</sub> O) | CO <sub>2</sub> (%) | CO (%) |
| 0                  | 0.000                        |                   | -0.01                            | 66              | -0.5                 |               | 83          | 0.003                            | 0.12                | 0.004  |
| 1                  | 0.152                        | 0.152             | 1.41                             | 66              | -1.4                 | -             | 82          | 0.034                            | 1.24                | 0.096  |
| 2                  | 0.326                        | 0.174             | 1.38                             | 66              | -1.5                 | -             | 81          | 0.061                            | 2.61                | 0.152  |
| 3                  | 0.499                        | 0.173             | 1.37                             | 66              | -1.4                 | -             | 81          | 0.064                            | 10.36               | 0.525  |
| 4                  | 0.672                        | 0.173             | 1.36                             | 66              | -1.4                 | -             | 80          | 0.070                            | 12.69               | 0.764  |
| 5                  | 0.845                        | 0.173             | 1.37                             | 66              | -1.5                 | -             | 80          | 0.070                            | 12.54               | 0.510  |
| 6                  | 1.017                        | 0.172             | 1.36                             | 66              | -1.4                 | -             | 81          | 0.072                            | 11.70               | 0.273  |
| 7                  | 1.188                        | 0.171             | 1.32                             | 66              | -1.5                 | -             | 82          | 0.077                            | 11.13               | 0.181  |
| 8                  | 1.359                        | 0.171             | 1.33                             | 66              | -1.4                 | -             | 82          | 0.075                            | 10.63               | 0.117  |
| 9                  | 1.530                        | 0.171             | 1.33                             | 67              | -1.5                 | -             | 83          | 0.069                            | 10.15               | 0.110  |
| 10                 | 1.701                        | 0.171             | 1.33                             | 67              | -1.5                 | 102           | 84          | 0.070                            | 10.79               | 0.106  |
| 11                 | 1.871                        | 0.170             | 1.32                             | 67              | -1.4                 | -             | 85          | 0.080                            | 10.53               | 0.116  |
| 12                 | 2.042                        | 0.171             | 1.31                             | 67              | -1.4                 | -             | 85          | 0.071                            | 10.74               | 0.106  |
| 13                 | 2.213                        | 0.171             | 1.33                             | 67              | -1.4                 | -             | 85          | 0.073                            | 10.12               | 0.095  |
| 14                 | 2.383                        | 0.170             | 1.32                             | 67              | -1.3                 | -             | 84          | 0.077                            | 9.63                | 0.099  |
| 15                 | 2.553                        | 0.170             | 1.32                             | 68              | -1.5                 | -             | 83          | 0.077                            | 11.19               | 0.053  |
| 16                 | 2.723                        | 0.170             | 1.30                             | 68              | -1.4                 | -             | 83          | 0.072                            | 11.65               | 0.059  |
| 17                 | 2.892                        | 0.169             | 1.30                             | 68              | -1.4                 | -             | 83          | 0.074                            | 11.52               | 0.036  |
| 18                 | 3.060                        | 0.168             | 1.29                             | 69              | -1.5                 | -             | 83          | 0.053                            | 4.41                | 0.036  |
| 19                 | 3.229                        | 0.169             | 1.31                             | 69              | -1.3                 | -             | 83          | 0.074                            | 7.47                | 0.447  |
| 20                 | 3.397                        | 0.168             | 1.32                             | 69              | -1.5                 | 104           | 82          | 0.078                            | 11.06               | 0.361  |
| 21                 | 3.567                        | 0.170             | 1.33                             | 69              | -1.3                 | -             | 82          | 0.072                            | 9.01                | 0.295  |
| 22                 | 3.736                        | 0.169             | 1.31                             | 70              | -1.5                 | -             | 82          | 0.077                            | 7.76                | 0.220  |
| 23                 | 3.906                        | 0.170             | 1.31                             | 70              | -1.5                 | -             | 82          | 0.077                            | 8.35                | 0.138  |
| 24                 | 4.076                        | 0.170             | 1.32                             | 70              | -1.3                 | -             | 82          | 0.067                            | 9.48                | 0.091  |
| 25                 | 4.244                        | 0.168             | 1.30                             | 71              | -1.4                 | -             | 83          | 0.072                            | 10.79               | 0.057  |
| 26                 | 4.413                        | 0.169             | 1.30                             | 71              | -1.4                 | -             | 84          | 0.076                            | 11.54               | 0.057  |
| 27                 | 4.582                        | 0.169             | 1.31                             | 71              | -1.3                 | -             | 84          | 0.074                            | 11.89               | 0.062  |
| 28                 | 4.750                        | 0.168             | 1.31                             | 71              | -1.3                 | -             | 84          | 0.073                            | 12.15               | 0.118  |
| 29                 | 4.919                        | 0.169             | 1.30                             | 72              | -1.3                 | -             | 83          | 0.072                            | 11.29               | 0.069  |
| 30                 | 5.088                        | 0.169             | 1.30                             | 72              | -1.3                 | 103           | 83          | 0.075                            | 10.98               | 0.067  |
| 31                 | 5.258                        | 0.170             | 1.31                             | 72              | -1.4                 | -             | 83          | 0.077                            | 10.87               | 0.066  |

# BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: SBI  
 Model: St Louis  
 Run #: 2

Job #: 24-303  
 Tracking #: 216  
 Technician: AK  
 Date: 12/10/2024

| Elapsed Time (min) | Particulate Sampling Data    |                   |                                  |                 |                      |               |             | Flue Gas Data                    |                     |        |
|--------------------|------------------------------|-------------------|----------------------------------|-----------------|----------------------|---------------|-------------|----------------------------------|---------------------|--------|
|                    | Gas Meter (ft <sup>3</sup> ) | Sample Rate (cfm) | Orifice dH (in H <sub>2</sub> O) | Meter Temp (°F) | Meter Vacuum (in Hg) | Pro. Rate (%) | Filter (°F) | Flue Draft (in H <sub>2</sub> O) | CO <sub>2</sub> (%) | CO (%) |
| 32                 | 5.427                        | 0.169             | 1.29                             | 73              | -1.4                 | -             | 83          | 0.072                            | 10.72               | 0.059  |
| 33                 | 5.596                        | 0.169             | 1.32                             | 73              | -1.3                 | -             | 84          | 0.073                            | 11.21               | 0.062  |
| 34                 | 5.765                        | 0.169             | 1.29                             | 73              | -1.5                 | -             | 84          | 0.076                            | 11.20               | 0.064  |
| 35                 | 5.933                        | 0.168             | 1.31                             | 73              | -1.4                 | -             | 85          | 0.078                            | 10.96               | 0.072  |
| 36                 | 6.102                        | 0.169             | 1.30                             | 74              | -1.4                 | -             | 85          | 0.082                            | 10.63               | 0.067  |
| 37                 | 6.270                        | 0.168             | 1.29                             | 74              | -1.4                 | -             | 85          | 0.074                            | 10.41               | 0.071  |
| 38                 | 6.439                        | 0.169             | 1.31                             | 74              | -1.5                 | -             | 84          | 0.071                            | 9.96                | 0.073  |
| 39                 | 6.609                        | 0.170             | 1.32                             | 75              | -1.5                 | -             | 84          | 0.070                            | 9.84                | 0.074  |
| 40                 | 6.779                        | 0.170             | 1.29                             | 75              | -1.4                 | 103           | 84          | 0.076                            | 9.99                | 0.058  |
| 41                 | 6.948                        | 0.169             | 1.31                             | 75              | -1.4                 | -             | 83          | 0.073                            | 9.75                | 0.052  |
| 42                 | 7.117                        | 0.169             | 1.30                             | 75              | -1.4                 | -             | 83          | 0.075                            | 9.74                | 0.047  |
| 43                 | 7.286                        | 0.169             | 1.30                             | 76              | -1.4                 | -             | 83          | 0.073                            | 9.81                | 0.048  |
| 44                 | 7.455                        | 0.169             | 1.31                             | 76              | -1.4                 | -             | 84          | 0.077                            | 9.73                | 0.053  |
| 45                 | 7.623                        | 0.168             | 1.30                             | 76              | -1.5                 | -             | 84          | 0.074                            | 9.73                | 0.051  |
| 46                 | 7.792                        | 0.169             | 1.31                             | 77              | -1.3                 | -             | 85          | 0.074                            | 9.89                | 0.051  |
| 47                 | 7.962                        | 0.170             | 1.31                             | 77              | -1.5                 | -             | 86          | 0.078                            | 9.86                | 0.053  |
| 48                 | 8.131                        | 0.169             | 1.30                             | 77              | -1.3                 | -             | 86          | 0.075                            | 9.86                | 0.046  |
| 49                 | 8.302                        | 0.171             | 1.30                             | 77              | -1.5                 | -             | 86          | 0.068                            | 9.90                | 0.043  |
| 50                 | 8.471                        | 0.169             | 1.30                             | 78              | -1.4                 | 102           | 85          | 0.072                            | 9.97                | 0.042  |
| 51                 | 8.641                        | 0.170             | 1.31                             | 78              | -1.5                 | -             | 84          | 0.071                            | 10.06               | 0.040  |
| 52                 | 8.810                        | 0.169             | 1.31                             | 78              | -1.5                 | -             | 84          | 0.079                            | 10.17               | 0.039  |
| 53                 | 8.979                        | 0.169             | 1.31                             | 78              | -1.3                 | -             | 83          | 0.077                            | 10.00               | 0.034  |
| 54                 | 9.149                        | 0.170             | 1.30                             | 79              | -1.5                 | -             | 83          | 0.074                            | 9.97                | 0.035  |
| 55                 | 9.318                        | 0.169             | 1.29                             | 79              | -1.5                 | -             | 84          | 0.076                            | 9.80                | 0.027  |
| 56                 | 9.487                        | 0.169             | 1.30                             | 79              | -1.5                 | -             | 84          | 0.071                            | 9.79                | 0.033  |
| 57                 | 9.656                        | 0.169             | 1.31                             | 79              | -1.5                 | -             | 85          | 0.072                            | 9.68                | 0.033  |
| 58                 | 9.826                        | 0.170             | 1.31                             | 80              | -1.5                 | -             | 85          | 0.069                            | 9.72                | 0.032  |
| 59                 | 9.997                        | 0.171             | 1.28                             | 80              | -1.3                 | -             | 85          | 0.077                            | 9.63                | 0.037  |
| 60                 | 10.167                       | 0.170             | 1.31                             | 80              | -1.5                 | 102           | 84          | 0.073                            | 9.60                | 0.033  |
| 61                 | 10.337                       | 0.170             | 1.29                             | 80              | -1.4                 | -             | 84          | 0.070                            | 9.52                | 0.037  |
| 62                 | 10.506                       | 0.169             | 1.29                             | 80              | -1.4                 | -             | 84          | 0.071                            | 9.52                | 0.036  |
| 63                 | 10.676                       | 0.170             | 1.32                             | 81              | -1.5                 | -             | 84          | 0.077                            | 9.47                | 0.036  |

# BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: SBI  
 Model: St Louis  
 Run #: 2

Job #: 24-303  
 Tracking #: 216  
 Technician: AK  
 Date: 12/10/2024

| Elapsed Time (min) | Particulate Sampling Data    |                   |                                  |                 |                      |               |             | Flue Gas Data                    |                     |        |
|--------------------|------------------------------|-------------------|----------------------------------|-----------------|----------------------|---------------|-------------|----------------------------------|---------------------|--------|
|                    | Gas Meter (ft <sup>3</sup> ) | Sample Rate (cfm) | Orifice dH (in H <sub>2</sub> O) | Meter Temp (°F) | Meter Vacuum (in Hg) | Pro. Rate (%) | Filter (°F) | Flue Draft (in H <sub>2</sub> O) | CO <sub>2</sub> (%) | CO (%) |
| 64                 | 10.845                       | 0.169             | 1.30                             | 81              | -1.5                 | -             | 84          | 0.074                            | 9.44                | 0.037  |
| 65                 | 11.014                       | 0.169             | 1.30                             | 81              | -1.5                 | -             | 85          | 0.072                            | 9.38                | 0.040  |
| 66                 | 11.183                       | 0.169             | 1.29                             | 81              | -1.5                 | -             | 85          | 0.078                            | 9.36                | 0.034  |
| 67                 | 11.353                       | 0.170             | 1.30                             | 82              | -1.3                 | -             | 85          | 0.070                            | 9.40                | 0.037  |
| 68                 | 11.522                       | 0.169             | 1.30                             | 82              | -1.4                 | -             | 85          | 0.078                            | 9.23                | 0.028  |
| 69                 | 11.692                       | 0.170             | 1.29                             | 82              | -1.5                 | -             | 85          | 0.079                            | 9.27                | 0.032  |
| 70                 | 11.862                       | 0.170             | 1.29                             | 82              | -1.5                 | 101           | 85          | 0.072                            | 9.42                | 0.027  |
| 71                 | 12.032                       | 0.170             | 1.28                             | 82              | -1.4                 | -             | 85          | 0.072                            | 9.13                | 0.028  |
| 72                 | 12.201                       | 0.169             | 1.29                             | 83              | -1.5                 | -             | 86          | 0.073                            | 8.68                | 0.026  |
| 73                 | 12.370                       | 0.169             | 1.30                             | 83              | -1.4                 | -             | 86          | 0.074                            | 8.55                | 0.028  |
| 74                 | 12.539                       | 0.169             | 1.28                             | 83              | -1.5                 | -             | 86          | 0.076                            | 8.43                | 0.022  |
| 75                 | 12.707                       | 0.168             | 1.29                             | 83              | -1.5                 | -             | 86          | 0.074                            | 5.40                | 0.044  |
| 76                 | 12.875                       | 0.168             | 1.27                             | 83              | -1.5                 | -             | 85          | 0.079                            | 11.35               | 0.409  |
| 77                 | 13.044                       | 0.169             | 1.28                             | 83              | -1.5                 | -             | 84          | 0.076                            | 14.69               | 0.836  |
| 78                 | 13.214                       | 0.170             | 1.29                             | 84              | -1.4                 | -             | 84          | 0.074                            | 15.47               | 0.626  |
| 79                 | 13.384                       | 0.170             | 1.29                             | 84              | -1.5                 | -             | 84          | 0.074                            | 15.73               | 0.674  |
| 80                 | 13.553                       | 0.169             | 1.27                             | 84              | -1.4                 | 100           | 84          | 0.072                            | 14.60               | 0.083  |
| 81                 | 13.722                       | 0.169             | 1.28                             | 84              | -1.4                 | -             | 84          | 0.077                            | 14.59               | 0.289  |
| 82                 | 13.891                       | 0.169             | 1.30                             | 84              | -1.4                 | -             | 85          | 0.070                            | 15.57               | 0.396  |
| 83                 | 14.060                       | 0.169             | 1.27                             | 84              | -1.4                 | -             | 85          | 0.070                            | 14.36               | 0.160  |
| 84                 | 14.229                       | 0.169             | 1.31                             | 85              | -1.4                 | -             | 85          | 0.072                            | 14.90               | 0.351  |
| 85                 | 14.398                       | 0.169             | 1.29                             | 85              | -1.4                 | -             | 85          | 0.066                            | 15.20               | 0.305  |
| 86                 | 14.567                       | 0.169             | 1.29                             | 85              | -1.3                 | -             | 85          | 0.070                            | 14.85               | 0.274  |
| 87                 | 14.737                       | 0.170             | 1.31                             | 85              | -1.5                 | -             | 85          | 0.074                            | 15.01               | 0.292  |
| 88                 | 14.907                       | 0.170             | 1.31                             | 85              | -1.3                 | -             | 85          | 0.067                            | 14.76               | 0.256  |
| 89                 | 15.077                       | 0.170             | 1.28                             | 85              | -1.5                 | -             | 85          | 0.075                            | 14.65               | 0.251  |
| 90                 | 15.247                       | 0.170             | 1.29                             | 86              | -1.5                 | 100           | 86          | 0.076                            | 14.64               | 0.236  |
| 91                 | 15.416                       | 0.169             | 1.28                             | 86              | -1.4                 | -             | 86          | 0.065                            | 14.55               | 0.241  |
| 92                 | 15.585                       | 0.169             | 1.28                             | 86              | -1.4                 | -             | 85          | 0.070                            | 14.38               | 0.221  |
| 93                 | 15.755                       | 0.170             | 1.30                             | 86              | -1.5                 | -             | 85          | 0.073                            | 14.21               | 0.234  |
| 94                 | 15.924                       | 0.169             | 1.30                             | 86              | -1.5                 | -             | 85          | 0.069                            | 14.15               | 0.248  |
| 95                 | 16.093                       | 0.169             | 1.30                             | 86              | -1.5                 | -             | 85          | 0.070                            | 13.93               | 0.239  |

# BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: SBI  
 Model: St Louis  
 Run #: 2

Job #: 24-303  
 Tracking #: 216  
 Technician: AK  
 Date: 12/10/2024

| Elapsed Time (min) | Particulate Sampling Data    |                   |                                  |                 |                      |               |             | Flue Gas Data                    |                     |        |
|--------------------|------------------------------|-------------------|----------------------------------|-----------------|----------------------|---------------|-------------|----------------------------------|---------------------|--------|
|                    | Gas Meter (ft <sup>3</sup> ) | Sample Rate (cfm) | Orifice dH (in H <sub>2</sub> O) | Meter Temp (°F) | Meter Vacuum (in Hg) | Pro. Rate (%) | Filter (°F) | Flue Draft (in H <sub>2</sub> O) | CO <sub>2</sub> (%) | CO (%) |
| 96                 | 16.263                       | 0.170             | 1.30                             | 86              | -1.5                 | -             | 85          | 0.075                            | 13.86               | 0.250  |
| 97                 | 16.432                       | 0.169             | 1.32                             | 86              | -1.5                 | -             | 84          | 0.069                            | 13.71               | 0.235  |
| 98                 | 16.603                       | 0.171             | 1.31                             | 87              | -1.4                 | -             | 84          | 0.067                            | 13.65               | 0.207  |
| 99                 | 16.773                       | 0.170             | 1.29                             | 87              | -1.4                 | -             | 85          | 0.069                            | 13.46               | 0.181  |
| 100                | 16.943                       | 0.170             | 1.28                             | 87              | -1.4                 | 100           | 85          | 0.068                            | 13.36               | 0.177  |
| 101                | 17.112                       | 0.169             | 1.29                             | 87              | -1.5                 | -             | 85          | 0.070                            | 13.09               | 0.137  |
| 102                | 17.282                       | 0.170             | 1.29                             | 87              | -1.5                 | -             | 85          | 0.067                            | 12.82               | 0.117  |
| 103                | 17.451                       | 0.169             | 1.29                             | 87              | -1.4                 | -             | 84          | 0.069                            | 12.55               | 0.111  |
| 104                | 17.621                       | 0.170             | 1.31                             | 87              | -1.4                 | -             | 84          | 0.062                            | 12.15               | 0.084  |
| 105                | 17.791                       | 0.170             | 1.29                             | 87              | -1.4                 | -             | 84          | 0.066                            | 11.60               | 0.063  |
| 106                | 17.960                       | 0.169             | 1.30                             | 87              | -1.5                 | -             | 84          | 0.065                            | 11.44               | 0.048  |
| 107                | 18.130                       | 0.170             | 1.28                             | 87              | -1.3                 | -             | 85          | 0.066                            | 11.05               | 0.046  |
| 108                | 18.300                       | 0.170             | 1.30                             | 88              | -1.4                 | -             | 86          | 0.066                            | 10.67               | 0.039  |
| 109                | 18.470                       | 0.170             | 1.31                             | 88              | -1.5                 | -             | 86          | 0.068                            | 10.72               | 0.029  |
| 110                | 18.640                       | 0.170             | 1.31                             | 88              | -1.5                 | 99            | 85          | 0.069                            | 10.72               | 0.025  |
| 111                | 18.811                       | 0.171             | 1.29                             | 88              | -1.4                 | -             | 85          | 0.065                            | 10.76               | 0.026  |
| 112                | 18.981                       | 0.170             | 1.27                             | 88              | -1.5                 | -             | 85          | 0.065                            | 10.71               | 0.027  |
| 113                | 19.151                       | 0.170             | 1.30                             | 88              | -1.5                 | -             | 85          | 0.065                            | 10.63               | 0.025  |
| 114                | 19.321                       | 0.170             | 1.30                             | 88              | -1.5                 | -             | 84          | 0.065                            | 10.60               | 0.023  |
| 115                | 19.491                       | 0.170             | 1.30                             | 88              | -1.5                 | -             | 85          | 0.065                            | 10.53               | 0.025  |
| 116                | 19.660                       | 0.169             | 1.29                             | 88              | -1.5                 | -             | 86          | 0.070                            | 10.53               | 0.026  |
| 117                | 19.830                       | 0.170             | 1.29                             | 88              | -1.5                 | -             | 86          | 0.062                            | 10.79               | 0.024  |
| 118                | 20.000                       | 0.170             | 1.28                             | 89              | -1.3                 | -             | 87          | 0.068                            | 11.27               | 0.022  |
| 119                | 20.169                       | 0.169             | 1.30                             | 88              | -1.5                 | -             | 87          | 0.069                            | 11.20               | 0.039  |
| 120                | 20.339                       | 0.170             | 1.29                             | 89              | -1.5                 | 100           | 86          | 0.064                            | 9.96                | 0.052  |
| 121                | 20.509                       | 0.170             | 1.29                             | 89              | -1.4                 | -             | 86          | 0.067                            | 9.87                | 0.072  |
| 122                | 20.680                       | 0.171             | 1.31                             | 89              | -1.4                 | -             | 85          | 0.068                            | 9.23                | 0.067  |
| 123                | 20.850                       | 0.170             | 1.31                             | 89              | -1.4                 | -             | 85          | 0.069                            | 8.76                | 0.057  |
| 124                | 21.021                       | 0.171             | 1.29                             | 89              | -1.5                 | -             | 85          | 0.069                            | 8.48                | 0.046  |
| 125                | 21.192                       | 0.171             | 1.31                             | 89              | -1.5                 | -             | 85          | 0.068                            | 8.40                | 0.044  |
| 126                | 21.362                       | 0.170             | 1.28                             | 89              | -1.5                 | -             | 86          | 0.065                            | 8.29                | 0.038  |
| 127                | 21.532                       | 0.170             | 1.29                             | 89              | -1.5                 | -             | 86          | 0.070                            | 8.42                | 0.037  |

# BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: SBI  
 Model: St Louis  
 Run #: 2

Job #: 24-303  
 Tracking #: 216  
 Technician: AK  
 Date: 12/10/2024

| Elapsed Time (min) | Particulate Sampling Data    |                   |                                  |                 |                      |               |             | Flue Gas Data                    |                     |        |
|--------------------|------------------------------|-------------------|----------------------------------|-----------------|----------------------|---------------|-------------|----------------------------------|---------------------|--------|
|                    | Gas Meter (ft <sup>3</sup> ) | Sample Rate (cfm) | Orifice dH (in H <sub>2</sub> O) | Meter Temp (°F) | Meter Vacuum (in Hg) | Pro. Rate (%) | Filter (°F) | Flue Draft (in H <sub>2</sub> O) | CO <sub>2</sub> (%) | CO (%) |
| 128                | 21.702                       | 0.170             | 1.29                             | 89              | -1.4                 | -             | 87          | 0.069                            | 8.66                | 0.034  |
| 129                | 21.871                       | 0.169             | 1.29                             | 89              | -1.5                 | -             | 86          | 0.064                            | 8.38                | 0.040  |
| 130                | 22.041                       | 0.170             | 1.31                             | 89              | -1.5                 | 100           | 86          | 0.061                            | 8.40                | 0.047  |
| 131                | 22.211                       | 0.170             | 1.29                             | 89              | -1.5                 | -             | 85          | 0.068                            | 8.45                | 0.050  |
| 132                | 22.381                       | 0.170             | 1.31                             | 89              | -1.3                 | -             | 85          | 0.069                            | 8.33                | 0.052  |
| 133                | 22.550                       | 0.169             | 1.30                             | 89              | -1.4                 | -             | 85          | 0.061                            | 2.47                | 0.086  |
| 134                | 22.720                       | 0.170             | 1.28                             | 89              | -1.4                 | -             | 86          | 0.083                            | 4.66                | 0.294  |
| 135                | 22.890                       | 0.170             | 1.29                             | 89              | -1.4                 | -             | 86          | 0.081                            | 13.53               | 0.759  |
| 136                | 23.061                       | 0.171             | 1.30                             | 90              | -1.3                 | -             | 86          | 0.082                            | 14.22               | 0.918  |
| 137                | 23.232                       | 0.171             | 1.29                             | 90              | -1.5                 | -             | 85          | 0.073                            | 15.32               | 2.558  |
| 138                | 23.403                       | 0.171             | 1.31                             | 90              | -1.5                 | -             | 85          | 0.071                            | 15.55               | 2.015  |
| 139                | 23.574                       | 0.171             | 1.30                             | 90              | -1.5                 | -             | 85          | 0.073                            | 15.78               | 1.777  |
| 140                | 23.744                       | 0.170             | 1.30                             | 90              | -1.5                 | 100           | 85          | 0.073                            | 15.86               | 2.608  |
| 141                | 23.915                       | 0.171             | 1.31                             | 90              | -1.5                 | -             | 85          | 0.067                            | 15.86               | 2.066  |
| 142                | 24.085                       | 0.170             | 1.30                             | 90              | -1.3                 | -             | 84          | 0.069                            | 15.88               | 2.143  |
| 143                | 24.256                       | 0.171             | 1.31                             | 90              | -1.5                 | -             | 85          | 0.071                            | 15.96               | 2.199  |
| 144                | 24.427                       | 0.171             | 1.29                             | 90              | -1.5                 | -             | 85          | 0.068                            | 15.94               | 2.187  |
| 145                | 24.597                       | 0.170             | 1.30                             | 90              | -1.5                 | -             | 85          | 0.073                            | 15.95               | 2.116  |
| 146                | 24.767                       | 0.170             | 1.30                             | 90              | -1.3                 | -             | 85          | 0.073                            | 16.20               | 2.086  |
| 147                | 24.938                       | 0.171             | 1.30                             | 90              | -1.3                 | -             | 85          | 0.075                            | 16.11               | 1.964  |
| 148                | 25.108                       | 0.170             | 1.30                             | 90              | -1.5                 | -             | 85          | 0.071                            | 16.16               | 1.856  |
| 149                | 25.279                       | 0.171             | 1.31                             | 90              | -1.5                 | -             | 85          | 0.073                            | 16.06               | 1.523  |
| 150                | 25.449                       | 0.170             | 1.28                             | 90              | -1.3                 | 100           | 84          | 0.070                            | 16.18               | 1.136  |
| 151                | 25.620                       | 0.171             | 1.33                             | 90              | -1.4                 | -             | 84          | 0.071                            | 16.08               | 0.943  |
| 152                | 25.790                       | 0.170             | 1.31                             | 90              | -1.4                 | -             | 84          | 0.071                            | 16.14               | 0.815  |
| 153                | 25.961                       | 0.171             | 1.30                             | 90              | -1.5                 | -             | 84          | 0.074                            | 15.97               | 0.686  |
| 154                | 26.132                       | 0.171             | 1.29                             | 90              | -1.5                 | -             | 85          | 0.071                            | 15.93               | 0.593  |
| 155                | 26.303                       | 0.171             | 1.30                             | 90              | -1.3                 | -             | 85          | 0.073                            | 15.89               | 0.570  |
| 156                | 26.474                       | 0.171             | 1.31                             | 90              | -1.4                 | -             | 85          | 0.073                            | 15.84               | 0.499  |
| 157                | 26.645                       | 0.171             | 1.30                             | 90              | -1.5                 | -             | 84          | 0.066                            | 15.99               | 0.543  |
| 158                | 26.816                       | 0.171             | 1.27                             | 90              | -1.5                 | -             | 85          | 0.072                            | 15.98               | 0.478  |
| 159                | 26.987                       | 0.171             | 1.30                             | 91              | -1.3                 | -             | 85          | 0.071                            | 15.92               | 0.435  |

# BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: SBI  
 Model: St Louis  
 Run #: 2

Job #: 24-303  
 Tracking #: 216  
 Technician: AK  
 Date: 12/10/2024

| Elapsed Time (min) | Particulate Sampling Data    |                   |                                  |                 |                      |               |             | Flue Gas Data                    |                     |        |
|--------------------|------------------------------|-------------------|----------------------------------|-----------------|----------------------|---------------|-------------|----------------------------------|---------------------|--------|
|                    | Gas Meter (ft <sup>3</sup> ) | Sample Rate (cfm) | Orifice dH (in H <sub>2</sub> O) | Meter Temp (°F) | Meter Vacuum (in Hg) | Pro. Rate (%) | Filter (°F) | Flue Draft (in H <sub>2</sub> O) | CO <sub>2</sub> (%) | CO (%) |
| 160                | 27.157                       | 0.170             | 1.31                             | 91              | -1.4                 | 101           | 86          | 0.071                            | 16.04               | 0.459  |
| 161                | 27.328                       | 0.171             | 1.31                             | 91              | -1.4                 | -             | 87          | 0.073                            | 16.19               | 0.509  |
| 162                | 27.499                       | 0.171             | 1.30                             | 91              | -1.5                 | -             | 86          | 0.074                            | 16.19               | 0.509  |
| 163                | 27.669                       | 0.170             | 1.29                             | 91              | -1.5                 | -             | 86          | 0.076                            | 15.86               | 0.517  |
| 164                | 27.840                       | 0.171             | 1.31                             | 91              | -1.5                 | -             | 85          | 0.069                            | 15.60               | 0.471  |
| 165                | 28.010                       | 0.170             | 1.30                             | 91              | -1.5                 | -             | 85          | 0.072                            | 15.49               | 0.394  |
| 166                | 28.181                       | 0.171             | 1.31                             | 91              | -1.5                 | -             | 84          | 0.070                            | 15.29               | 0.386  |
| 167                | 28.351                       | 0.170             | 1.30                             | 91              | -1.5                 | -             | 84          | 0.068                            | 15.16               | 0.337  |
| 168                | 28.522                       | 0.171             | 1.30                             | 91              | -1.4                 | -             | 84          | 0.072                            | 15.16               | 0.324  |
| 169                | 28.692                       | 0.170             | 1.32                             | 91              | -1.4                 | -             | 85          | 0.071                            | 15.20               | 0.267  |
| 170                | 28.863                       | 0.171             | 1.30                             | 91              | -1.5                 | 100           | 86          | 0.071                            | 15.01               | 0.283  |
| 171                | 29.033                       | 0.170             | 1.30                             | 91              | -1.4                 | -             | 86          | 0.067                            | 14.93               | 0.250  |
| 172                | 29.204                       | 0.171             | 1.32                             | 91              | -1.4                 | -             | 86          | 0.072                            | 14.69               | 0.255  |
| 173                | 29.375                       | 0.171             | 1.32                             | 91              | -1.4                 | -             | 85          | 0.064                            | 14.70               | 0.245  |
| 174                | 29.546                       | 0.171             | 1.28                             | 91              | -1.5                 | -             | 85          | 0.075                            | 14.58               | 0.225  |
| 175                | 29.716                       | 0.170             | 1.30                             | 91              | -1.5                 | -             | 85          | 0.068                            | 14.57               | 0.219  |
| 176                | 29.887                       | 0.171             | 1.30                             | 91              | -1.4                 | -             | 85          | 0.071                            | 14.34               | 0.218  |
| 177                | 30.059                       | 0.172             | 1.31                             | 91              | -1.5                 | -             | 85          | 0.070                            | 13.40               | 0.127  |
| 178                | 30.230                       | 0.171             | 1.31                             | 91              | -1.5                 | -             | 85          | 0.074                            | 13.52               | 0.136  |
| 179                | 30.401                       | 0.171             | 1.30                             | 91              | -1.4                 | -             | 84          | 0.070                            | 13.50               | 0.119  |
| 180                | 30.572                       | 0.171             | 1.30                             | 91              | -1.5                 | 99            | 84          | 0.078                            | 13.57               | 0.113  |
| 181                | 30.742                       | 0.170             | 1.28                             | 91              | -1.5                 | -             | 85          | 0.066                            | 13.80               | 0.107  |
| 182                | 30.913                       | 0.171             | 1.29                             | 91              | -1.5                 | -             | 86          | 0.071                            | 13.79               | 0.087  |
| 183                | 31.084                       | 0.171             | 1.32                             | 91              | -1.3                 | -             | 86          | 0.071                            | 13.76               | 0.084  |
| 184                | 31.254                       | 0.170             | 1.30                             | 91              | -1.4                 | -             | 86          | 0.070                            | 13.73               | 0.093  |
| 185                | 31.425                       | 0.171             | 1.32                             | 91              | -1.4                 | -             | 85          | 0.070                            | 13.80               | 0.084  |
| 186                | 31.595                       | 0.170             | 1.33                             | 91              | -1.5                 | -             | 85          | 0.072                            | 13.87               | 0.077  |
| 187                | 31.766                       | 0.171             | 1.30                             | 91              | -1.4                 | -             | 85          | 0.073                            | 13.92               | 0.075  |
| 188                | 31.937                       | 0.171             | 1.31                             | 91              | -1.5                 | -             | 84          | 0.072                            | 13.93               | 0.067  |
| 189                | 32.107                       | 0.170             | 1.31                             | 92              | -1.5                 | -             | 84          | 0.067                            | 14.05               | 0.082  |
| 190                | 32.277                       | 0.170             | 1.31                             | 91              | -1.4                 | 99            | 84          | 0.068                            | 14.18               | 0.094  |
| 191                | 32.448                       | 0.171             | 1.30                             | 91              | -1.4                 | -             | 84          | 0.069                            | 14.07               | 0.080  |

# BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: SBI  
 Model: St Louis  
 Run #: 2

Job #: 24-303  
 Tracking #: 216  
 Technician: AK  
 Date: 12/10/2024

| Elapsed Time (min) | Particulate Sampling Data    |                   |                                  |                 |                      |               |             | Flue Gas Data                    |                     |        |
|--------------------|------------------------------|-------------------|----------------------------------|-----------------|----------------------|---------------|-------------|----------------------------------|---------------------|--------|
|                    | Gas Meter (ft <sup>3</sup> ) | Sample Rate (cfm) | Orifice dH (in H <sub>2</sub> O) | Meter Temp (°F) | Meter Vacuum (in Hg) | Pro. Rate (%) | Filter (°F) | Flue Draft (in H <sub>2</sub> O) | CO <sub>2</sub> (%) | CO (%) |
| 192                | 32.618                       | 0.170             | 1.27                             | 91              | -1.5                 | -             | 85          | 0.068                            | 14.14               | 0.110  |
| 193                | 32.789                       | 0.171             | 1.29                             | 91              | -1.5                 | -             | 85          | 0.068                            | 13.76               | 0.080  |
| 194                | 32.960                       | 0.171             | 1.29                             | 92              | -1.5                 | -             | 85          | 0.075                            | 13.57               | 0.069  |
| 195                | 33.130                       | 0.170             | 1.30                             | 92              | -1.5                 | -             | 85          | 0.064                            | 13.39               | 0.061  |
| 196                | 33.301                       | 0.171             | 1.30                             | 91              | -1.5                 | -             | 85          | 0.064                            | 13.33               | 0.060  |
| 197                | 33.472                       | 0.171             | 1.30                             | 92              | -1.4                 | -             | 86          | 0.073                            | 13.30               | 0.055  |
| 198                | 33.643                       | 0.171             | 1.30                             | 92              | -1.3                 | -             | 86          | 0.075                            | 13.25               | 0.065  |
| 199                | 33.814                       | 0.171             | 1.30                             | 92              | -1.4                 | -             | 85          | 0.068                            | 13.36               | 0.081  |
| 200                | 33.985                       | 0.171             | 1.29                             | 92              | -1.4                 | 99            | 85          | 0.070                            | 13.05               | 0.080  |
| 201                | 34.156                       | 0.171             | 1.30                             | 92              | -1.5                 | -             | 84          | 0.067                            | 12.93               | 0.097  |
| 202                | 34.326                       | 0.170             | 1.29                             | 92              | -1.3                 | -             | 84          | 0.066                            | 12.90               | 0.092  |
| 203                | 34.497                       | 0.171             | 1.29                             | 92              | -1.4                 | -             | 84          | 0.065                            | 12.82               | 0.103  |
| 204                | 34.668                       | 0.171             | 1.31                             | 92              | -1.5                 | -             | 84          | 0.066                            | 12.76               | 0.105  |
| 205                | 34.838                       | 0.170             | 1.30                             | 92              | -1.4                 | -             | 85          | 0.065                            | 12.74               | 0.082  |
| 206                | 35.009                       | 0.171             | 1.29                             | 92              | -1.5                 | -             | 86          | 0.067                            | 12.72               | 0.076  |
| 207                | 35.179                       | 0.170             | 1.30                             | 92              | -1.5                 | -             | 86          | 0.069                            | 12.73               | 0.074  |
| 208                | 35.350                       | 0.171             | 1.31                             | 92              | -1.4                 | -             | 87          | 0.058                            | 12.94               | 0.078  |
| 209                | 35.520                       | 0.170             | 1.28                             | 92              | -1.3                 | -             | 86          | 0.067                            | 12.99               | 0.062  |
| 210                | 35.690                       | 0.170             | 1.30                             | 92              | -1.5                 | 98            | 86          | 0.068                            | 13.16               | 0.064  |
| 211                | 35.861                       | 0.171             | 1.32                             | 92              | -1.3                 | -             | 85          | 0.068                            | 13.21               | 0.050  |
| 212                | 36.031                       | 0.170             | 1.30                             | 92              | -1.4                 | -             | 85          | 0.065                            | 13.19               | 0.037  |
| 213                | 36.202                       | 0.171             | 1.31                             | 92              | -1.4                 | -             | 85          | 0.068                            | 13.31               | 0.035  |
| 214                | 36.373                       | 0.171             | 1.31                             | 92              | -1.3                 | -             | 85          | 0.065                            | 13.50               | 0.037  |
| 215                | 36.543                       | 0.170             | 1.30                             | 92              | -1.4                 | -             | 85          | 0.071                            | 13.47               | 0.035  |
| 216                | 36.714                       | 0.171             | 1.30                             | 92              | -1.4                 | -             | 85          | 0.071                            | 13.30               | 0.034  |
| 217                | 36.885                       | 0.171             | 1.28                             | 92              | -1.5                 | -             | 85          | 0.069                            | 13.04               | 0.026  |
| 218                | 37.056                       | 0.171             | 1.30                             | 92              | -1.3                 | -             | 86          | 0.067                            | 12.73               | 0.031  |
| 219                | 37.227                       | 0.171             | 1.28                             | 92              | -1.5                 | -             | 87          | 0.066                            | 12.73               | 0.032  |
| 220                | 37.398                       | 0.171             | 1.30                             | 92              | -1.5                 | 98            | 87          | 0.068                            | 12.62               | 0.033  |
| 221                | 37.569                       | 0.171             | 1.30                             | 92              | -1.5                 | -             | 86          | 0.071                            | 12.60               | 0.034  |
| 222                | 37.739                       | 0.170             | 1.30                             | 92              | -1.3                 | -             | 86          | 0.065                            | 12.65               | 0.028  |
| 223                | 37.910                       | 0.171             | 1.30                             | 92              | -1.5                 | -             | 85          | 0.068                            | 12.71               | 0.026  |

# BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: SBI  
 Model: St Louis  
 Run #: 2

Job #: 24-303  
 Tracking #: 216  
 Technician: AK  
 Date: 12/10/2024

| Elapsed Time (min) | Particulate Sampling Data    |                   |                                  |                 |                      |               |             | Flue Gas Data                    |                     |        |
|--------------------|------------------------------|-------------------|----------------------------------|-----------------|----------------------|---------------|-------------|----------------------------------|---------------------|--------|
|                    | Gas Meter (ft <sup>3</sup> ) | Sample Rate (cfm) | Orifice dH (in H <sub>2</sub> O) | Meter Temp (°F) | Meter Vacuum (in Hg) | Pro. Rate (%) | Filter (°F) | Flue Draft (in H <sub>2</sub> O) | CO <sub>2</sub> (%) | CO (%) |
| 224                | 38.080                       | 0.170             | 1.30                             | 92              | -1.5                 | -             | 85          | 0.066                            | 12.77               | 0.031  |
| 225                | 38.251                       | 0.171             | 1.31                             | 92              | -1.4                 | -             | 84          | 0.066                            | 12.25               | 0.019  |
| 226                | 38.421                       | 0.170             | 1.33                             | 92              | -1.5                 | -             | 84          | 0.069                            | 11.88               | 0.027  |
| 227                | 38.592                       | 0.171             | 1.31                             | 92              | -1.4                 | -             | 84          | 0.067                            | 11.90               | 0.029  |
| 228                | 38.763                       | 0.171             | 1.30                             | 92              | -1.4                 | -             | 85          | 0.068                            | 11.96               | 0.030  |
| 229                | 38.933                       | 0.170             | 1.30                             | 92              | -1.4                 | -             | 86          | 0.067                            | 11.71               | 0.036  |
| 230                | 39.103                       | 0.170             | 1.30                             | 92              | -1.5                 | 99            | 86          | 0.063                            | 11.78               | 0.040  |
| 231                | 39.274                       | 0.171             | 1.31                             | 92              | -1.3                 | -             | 86          | 0.063                            | 11.39               | 0.034  |
| 232                | 39.444                       | 0.170             | 1.29                             | 92              | -1.5                 | -             | 86          | 0.066                            | 11.10               | 0.038  |
| 233                | 39.615                       | 0.171             | 1.32                             | 92              | -1.5                 | -             | 85          | 0.062                            | 10.90               | 0.046  |
| 234                | 39.786                       | 0.171             | 1.28                             | 92              | -1.4                 | -             | 85          | 0.065                            | 10.54               | 0.073  |
| 235                | 39.956                       | 0.170             | 1.31                             | 92              | -1.5                 | -             | 85          | 0.065                            | 10.13               | 0.079  |
| 236                | 40.127                       | 0.171             | 1.30                             | 92              | -1.5                 | -             | 85          | 0.065                            | 10.07               | 0.078  |
| 237                | 40.299                       | 0.172             | 1.29                             | 92              | -1.4                 | -             | 85          | 0.067                            | 9.98                | 0.075  |
| 238                | 40.470                       | 0.171             | 1.30                             | 92              | -1.4                 | -             | 85          | 0.064                            | 10.01               | 0.074  |
| 239                | 40.641                       | 0.171             | 1.32                             | 92              | -1.3                 | -             | 85          | 0.067                            | 9.89                | 0.073  |
| 240                | 40.812                       | 0.171             | 1.30                             | 92              | -1.5                 | 99            | 85          | 0.064                            | 9.92                | 0.069  |
| 241                | 40.983                       | 0.171             | 1.29                             | 92              | -1.5                 | -             | 85          | 0.062                            | 9.79                | 0.070  |
| 242                | 41.153                       | 0.170             | 1.32                             | 92              | -1.4                 | -             | 84          | 0.064                            | 9.83                | 0.064  |
| 243                | 41.324                       | 0.171             | 1.28                             | 92              | -1.4                 | -             | 84          | 0.066                            | 9.73                | 0.082  |
| 244                | 41.495                       | 0.171             | 1.29                             | 92              | -1.4                 | -             | 85          | 0.060                            | 9.71                | 0.088  |
| 245                | 41.665                       | 0.170             | 1.29                             | 92              | -1.5                 | -             | 85          | 0.060                            | 9.65                | 0.092  |
| 246                | 41.836                       | 0.171             | 1.29                             | 92              | -1.4                 | -             | 86          | 0.057                            | 9.56                | 0.107  |
| 247                | 42.006                       | 0.170             | 1.29                             | 92              | -1.3                 | -             | 86          | 0.057                            | 9.45                | 0.095  |
| 248                | 42.177                       | 0.171             | 1.30                             | 92              | -1.4                 | -             | 86          | 0.062                            | 9.26                | 0.114  |
| 249                | 42.348                       | 0.171             | 1.29                             | 92              | -1.4                 | -             | 86          | 0.063                            | 9.20                | 0.121  |
| 250                | 42.518                       | 0.170             | 1.31                             | 92              | -1.5                 | 99            | 85          | 0.065                            | 9.37                | 0.116  |
| 251                | 42.688                       | 0.170             | 1.29                             | 92              | -1.5                 | -             | 85          | 0.063                            | 9.50                | 0.115  |
| 252                | 42.858                       | 0.170             | 1.30                             | 92              | -1.4                 | -             | 85          | 0.062                            | 9.40                | 0.129  |
| 253                | 43.029                       | 0.171             | 1.28                             | 92              | -1.5                 | -             | 85          | 0.063                            | 9.27                | 0.150  |
| 254                | 43.200                       | 0.171             | 1.30                             | 92              | -1.4                 | -             | 85          | 0.062                            | 9.15                | 0.180  |
| 255                | 43.371                       | 0.171             | 1.29                             | 92              | -1.5                 | -             | 85          | 0.054                            | 8.97                | 0.208  |



# BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: SBI  
 Model: St Louis  
 Run #: 2

Job #: 24-303  
 Tracking #: 216  
 Technician: AK  
 Date: 12/10/2024

| Elapsed Time (min) | Particulate Sampling Data    |                   |                                  |                 |                      |               |             | Flue Gas Data                    |                     |        |
|--------------------|------------------------------|-------------------|----------------------------------|-----------------|----------------------|---------------|-------------|----------------------------------|---------------------|--------|
|                    | Gas Meter (ft <sup>3</sup> ) | Sample Rate (cfm) | Orifice dH (in H <sub>2</sub> O) | Meter Temp (°F) | Meter Vacuum (in Hg) | Pro. Rate (%) | Filter (°F) | Flue Draft (in H <sub>2</sub> O) | CO <sub>2</sub> (%) | CO (%) |
| 256                | 43.541                       | 0.170             | 1.29                             | 92              | -1.4                 | -             | 85          | 0.065                            | 8.35                | 0.147  |
| 257                | 43.712                       | 0.171             | 1.32                             | 92              | -1.5                 | -             | 85          | 0.066                            | 7.88                | 0.199  |
| 258                | 43.883                       | 0.171             | 1.27                             | 92              | -1.3                 | -             | 85          | 0.065                            | 7.64                | 0.192  |
| 259                | 44.054                       | 0.171             | 1.29                             | 92              | -1.4                 | -             | 85          | 0.065                            | 7.69                | 0.178  |
| 260                | 44.225                       | 0.171             | 1.29                             | 92              | -1.5                 | 99            | 85          | 0.063                            | 7.67                | 0.173  |
| 261                | 44.395                       | 0.170             | 1.29                             | 92              | -1.4                 | -             | 85          | 0.066                            | 7.81                | 0.171  |
| 262                | 44.566                       | 0.171             | 1.29                             | 92              | -1.4                 | -             | 85          | 0.060                            | 7.77                | 0.168  |
| 263                | 44.736                       | 0.170             | 1.28                             | 92              | -1.5                 | -             | 86          | 0.065                            | 7.70                | 0.169  |
| 264                | 44.907                       | 0.171             | 1.30                             | 92              | -1.3                 | -             | 87          | 0.060                            | 7.73                | 0.186  |
| 265                | 45.077                       | 0.170             | 1.29                             | 92              | -1.4                 | -             | 87          | 0.063                            | 7.74                | 0.198  |
| 266                | 45.247                       | 0.170             | 1.28                             | 92              | -1.4                 | -             | 87          | 0.062                            | 7.70                | 0.192  |
| 267                | 45.418                       | 0.171             | 1.31                             | 92              | -1.5                 | -             | 86          | 0.066                            | 7.61                | 0.196  |
| 268                | 45.588                       | 0.170             | 1.28                             | 92              | -1.5                 | -             | 85          | 0.067                            | 7.75                | 0.198  |
| 269                | 45.758                       | 0.170             | 1.29                             | 92              | -1.5                 | -             | 85          | 0.067                            | 7.78                | 0.203  |
| 270                | 45.928                       | 0.170             | 1.28                             | 92              | -1.5                 | 99            | 85          | 0.067                            | 7.77                | 0.222  |
| 271                | 46.099                       | 0.171             | 1.29                             | 92              | -1.5                 | -             | 85          | 0.060                            | 7.76                | 0.248  |
| 272                | 46.269                       | 0.170             | 1.31                             | 92              | -1.5                 | -             | 85          | 0.066                            | 7.74                | 0.275  |
| 273                | 46.440                       | 0.171             | 1.32                             | 92              | -1.5                 | -             | 85          | 0.064                            | 7.73                | 0.274  |
| 274                | 46.610                       | 0.170             | 1.30                             | 92              | -1.5                 | -             | 85          | 0.064                            | 7.75                | 0.267  |
| 275                | 46.781                       | 0.171             | 1.28                             | 92              | -1.4                 | -             | 85          | 0.064                            | 7.73                | 0.282  |
| 276                | 46.952                       | 0.171             | 1.28                             | 93              | -1.3                 | -             | 85          | 0.065                            | 7.70                | 0.276  |
| 277                | 47.123                       | 0.171             | 1.30                             | 92              | -1.5                 | -             | 85          | 0.067                            | 7.74                | 0.282  |
| 278                | 47.294                       | 0.171             | 1.28                             | 92              | -1.4                 | -             | 86          | 0.054                            | 7.67                | 0.287  |
| 279                | 47.464                       | 0.170             | 1.30                             | 92              | -1.5                 | -             | 86          | 0.063                            | 7.63                | 0.286  |
| 280                | 47.634                       | 0.170             | 1.30                             | 92              | -1.4                 | 99            | 86          | 0.065                            | 7.69                | 0.275  |
| 281                | 47.805                       | 0.171             | 1.29                             | 92              | -1.5                 | -             | 86          | 0.066                            | 7.72                | 0.279  |
| 282                | 47.975                       | 0.170             | 1.28                             | 93              | -1.4                 | -             | 87          | 0.062                            | 7.68                | 0.296  |
| 283                | 48.145                       | 0.170             | 1.27                             | 92              | -1.5                 | -             | 86          | 0.065                            | 7.60                | 0.329  |
| 284                | 48.315                       | 0.170             | 1.31                             | 92              | -1.4                 | -             | 86          | 0.069                            | 7.62                | 0.356  |
| 285                | 48.486                       | 0.171             | 1.31                             | 92              | -1.5                 | -             | 85          | 0.064                            | 7.64                | 0.370  |
| 286                | 48.656                       | 0.170             | 1.28                             | 92              | -1.4                 | -             | 85          | 0.062                            | 7.61                | 0.380  |
| 287                | 48.826                       | 0.170             | 1.29                             | 92              | -1.4                 | -             | 84          | 0.065                            | 7.51                | 0.371  |

# BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: SBI  
 Model: St Louis  
 Run #: 2

Job #: 24-303  
 Tracking #: 216  
 Technician: AK  
 Date: 12/10/2024

| Elapsed Time (min) | Particulate Sampling Data    |                   |                                  |                 |                      |               |             | Flue Gas Data                    |                     |        |
|--------------------|------------------------------|-------------------|----------------------------------|-----------------|----------------------|---------------|-------------|----------------------------------|---------------------|--------|
|                    | Gas Meter (ft <sup>3</sup> ) | Sample Rate (cfm) | Orifice dH (in H <sub>2</sub> O) | Meter Temp (°F) | Meter Vacuum (in Hg) | Pro. Rate (%) | Filter (°F) | Flue Draft (in H <sub>2</sub> O) | CO <sub>2</sub> (%) | CO (%) |
| 288                | 48.996                       | 0.170             | 1.30                             | 92              | -1.5                 | -             | 84          | 0.064                            | 7.52                | 0.406  |
| 289                | 49.167                       | 0.171             | 1.29                             | 92              | -1.5                 | -             | 85          | 0.064                            | 7.55                | 0.393  |
| 290                | 49.337                       | 0.170             | 1.31                             | 92              | -1.5                 | 98            | 86          | 0.067                            | 7.53                | 0.395  |
| 291                | 49.508                       | 0.171             | 1.28                             | 92              | -1.5                 | -             | 86          | 0.064                            | 7.53                | 0.397  |
| 292                | 49.679                       | 0.171             | 1.29                             | 92              | -1.5                 | -             | 86          | 0.065                            | 7.67                | 0.378  |
| 293                | 49.850                       | 0.171             | 1.29                             | 92              | -1.4                 | -             | 85          | 0.059                            | 7.73                | 0.377  |
| 294                | 50.020                       | 0.170             | 1.29                             | 92              | -1.4                 | -             | 86          | 0.066                            | 7.93                | 0.287  |
| 295                | 50.191                       | 0.171             | 1.29                             | 92              | -1.3                 | -             | 86          | 0.069                            | 7.70                | 0.348  |
| 296                | 50.361                       | 0.170             | 1.30                             | 92              | -1.5                 | -             | 86          | 0.067                            | 7.65                | 0.393  |
| 297                | 50.532                       | 0.171             | 1.29                             | 92              | -1.5                 | -             | 85          | 0.064                            | 7.57                | 0.429  |
| 298                | 50.702                       | 0.170             | 1.31                             | 92              | -1.4                 | -             | 85          | 0.065                            | 7.47                | 0.466  |
| 299                | 50.872                       | 0.170             | 1.28                             | 92              | -1.4                 | -             | 85          | 0.060                            | 7.45                | 0.507  |
| 300                | 51.042                       | 0.170             | 1.31                             | 92              | -1.4                 | 98            | 85          | 0.054                            | 7.28                | 0.625  |
| 301                | 51.213                       | 0.171             | 1.28                             | 92              | -1.5                 | -             | 85          | 0.052                            | 9.12                | 0.583  |
| 302                | 51.383                       | 0.170             | 1.30                             | 92              | -1.5                 | -             | 85          | 0.051                            | 9.19                | 0.706  |
| 303                | 51.553                       | 0.170             | 1.31                             | 92              | -1.4                 | -             | 85          | 0.046                            | 9.20                | 0.725  |
| 304                | 51.724                       | 0.171             | 1.30                             | 92              | -1.5                 | -             | 85          | 0.048                            | 9.21                | 0.759  |
| 305                | 51.894                       | 0.170             | 1.28                             | 92              | -1.3                 | -             | 86          | 0.051                            | 9.06                | 0.750  |
| 306                | 52.065                       | 0.171             | 1.29                             | 92              | -1.4                 | -             | 86          | 0.049                            | 9.11                | 0.732  |
| 307                | 52.235                       | 0.170             | 1.30                             | 92              | -1.4                 | -             | 87          | 0.044                            | 9.09                | 0.718  |
| 308                | 52.405                       | 0.170             | 1.29                             | 92              | -1.4                 | -             | 87          | 0.046                            | 9.11                | 0.699  |
| 309                | 52.576                       | 0.171             | 1.29                             | 92              | -1.4                 | -             | 86          | 0.048                            | 9.20                | 0.674  |
| 310                | 52.748                       | 0.172             | 1.29                             | 92              | -1.3                 | 99            | 85          | 0.049                            | 8.75                | 0.636  |
| 311                | 52.919                       | 0.171             | 1.29                             | 92              | -1.4                 | -             | 85          | 0.046                            | 8.50                | 0.601  |
| 312                | 53.090                       | 0.171             | 1.29                             | 92              | -1.4                 | -             | 84          | 0.042                            | 8.45                | 0.580  |
| 313                | 53.260                       | 0.170             | 1.28                             | 92              | -1.5                 | -             | 84          | 0.038                            | 8.44                | 0.576  |
| 314                | 53.431                       | 0.171             | 1.29                             | 92              | -1.3                 | -             | 84          | 0.044                            | 8.69                | 0.585  |
| 315                | 53.601                       | 0.170             | 1.29                             | 92              | -1.5                 | -             | 84          | 0.041                            | 8.46                | 0.566  |
| 316                | 53.772                       | 0.171             | 1.29                             | 92              | -1.5                 | -             | 84          | 0.039                            | 8.56                | 0.570  |
| 317                | 53.943                       | 0.171             | 1.31                             | 92              | -1.4                 | -             | 85          | 0.042                            | 8.47                | 0.561  |
| 318                | 54.113                       | 0.170             | 1.30                             | 92              | -1.4                 | -             | 85          | 0.040                            | 8.52                | 0.565  |
| 319                | 54.283                       | 0.170             | 1.31                             | 92              | -1.5                 | -             | 86          | 0.037                            | 8.49                | 0.559  |

## BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: SBIJob #: 24-303Model: St LouisTracking #: 216Run #: 2Technician: AKDate: 12/10/2024

| Elapsed Time (min) | Particulate Sampling Data    |                   |                                  |                 |                      |               |             | Flue Gas Data                    |                     |        |
|--------------------|------------------------------|-------------------|----------------------------------|-----------------|----------------------|---------------|-------------|----------------------------------|---------------------|--------|
|                    | Gas Meter (ft <sup>3</sup> ) | Sample Rate (cfm) | Orifice dH (in H <sub>2</sub> O) | Meter Temp (°F) | Meter Vacuum (in Hg) | Pro. Rate (%) | Filter (°F) | Flue Draft (in H <sub>2</sub> O) | CO <sub>2</sub> (%) | CO (%) |
| 320                | 54.454                       | 0.171             | 1.30                             | 92              | -1.3                 | 98            | 87          | 0.038                            | 8.55                | 0.562  |
| 321                | 54.625                       | 0.171             | 1.29                             | 92              | -1.4                 | -             | 87          | 0.037                            | 8.57                | 0.562  |
| 322                | 54.795                       | 0.170             | 1.31                             | 92              | -1.4                 | -             | 86          | 0.037                            | 8.54                | 0.564  |
| 323                | 54.965                       | 0.170             | 1.29                             | 92              | -1.3                 | -             | 85          | 0.039                            | 8.60                | 0.569  |
| 324                | 55.136                       | 0.171             | 1.30                             | 92              | -1.5                 | 98            | 85          | 0.036                            | 8.55                | 0.564  |
| Avg/Tot            | 55.136                       | 0.170             | 1.30                             | 86.7            | -1.4                 | 100           | 84.8        | 0.067                            | 11.05               | 0.285  |

# WOODSTOVE SURFACE TEMPERATURE DATA

Client: SBI  
 Model: St Louis  
 Run #: 2

Job #: 24-303  
 Tracking #: 216  
 Technician: AK  
 Date: 12/10/2024

Stove ΔT: 407

| Elapsed Time (min) | Temperature Data (°F) |          |         |        |           |                       |               |
|--------------------|-----------------------|----------|---------|--------|-----------|-----------------------|---------------|
|                    | FB Left               | FB Right | FB Back | FB Top | FB Bottom | Stove Surface Average | Catalyst Exit |
| 0                  | 67                    | 67       | 67      | 66     | 68        | 66.8                  | 63.6          |
| 1                  | 68                    | 67       | 68      | 90     | 68        | 72.0                  | 63.6          |
| 2                  | 68                    | 67       | 73      | 123    | 68        | 79.7                  | 63.7          |
| 3                  | 72                    | 69       | 86      | 166    | 68        | 92.4                  | 63.7          |
| 4                  | 80                    | 76       | 106     | 224    | 69        | 110.7                 | 63.6          |
| 5                  | 92                    | 90       | 128     | 287    | 69        | 132.9                 | 63.7          |
| 6                  | 106                   | 108      | 149     | 343    | 69        | 154.9                 | 63.7          |
| 7                  | 121                   | 124      | 169     | 390    | 70        | 174.8                 | 63.7          |
| 8                  | 137                   | 140      | 184     | 425    | 70        | 191.0                 | 63.8          |
| 9                  | 151                   | 156      | 198     | 453    | 71        | 205.8                 | 63.8          |
| 10                 | 168                   | 173      | 213     | 479    | 72        | 220.8                 | 63.9          |
| 11                 | 183                   | 190      | 229     | 502    | 73        | 235.3                 | 63.9          |
| 12                 | 199                   | 208      | 246     | 521    | 74        | 249.4                 | 63.9          |
| 13                 | 214                   | 227      | 259     | 536    | 76        | 262.2                 | 64.0          |
| 14                 | 229                   | 245      | 275     | 548    | 78        | 274.9                 | 63.9          |
| 15                 | 245                   | 263      | 290     | 563    | 79        | 287.8                 | 63.9          |
| 16                 | 260                   | 280      | 305     | 578    | 81        | 300.8                 | 64.0          |
| 17                 | 276                   | 297      | 321     | 590    | 83        | 313.6                 | 64.0          |
| 18                 | 292                   | 314      | 344     | 574    | 86        | 321.9                 | 64.1          |
| 19                 | 307                   | 330      | 357     | 574    | 89        | 331.3                 | 64.1          |
| 20                 | 319                   | 342      | 370     | 584    | 91        | 341.1                 | 64.1          |
| 21                 | 332                   | 353      | 383     | 588    | 93        | 349.8                 | 64.2          |
| 22                 | 342                   | 363      | 397     | 590    | 96        | 357.3                 | 64.1          |
| 23                 | 351                   | 371      | 407     | 592    | 98        | 364.0                 | 64.2          |
| 24                 | 360                   | 378      | 417     | 598    | 101       | 370.6                 | 64.2          |
| 25                 | 367                   | 384      | 429     | 607    | 103       | 377.8                 | 64.2          |
| 26                 | 373                   | 390      | 444     | 613    | 105       | 385.2                 | 64.2          |
| 27                 | 379                   | 394      | 465     | 610    | 110       | 391.2                 | 64.4          |
| 28                 | 385                   | 399      | 482     | 609    | 113       | 397.7                 | 64.5          |
| 29                 | 394                   | 406      | 496     | 608    | 117       | 404.1                 | 64.7          |
| 30                 | 403                   | 413      | 505     | 606    | 120       | 409.6                 | 65.0          |
| 31                 | 414                   | 418      | 523     | 604    | 124       | 416.8                 | 65.2          |
| 32                 | 424                   | 424      | 535     | 604    | 127       | 422.7                 | 65.3          |
| 33                 | 433                   | 428      | 546     | 604    | 130       | 428.3                 | 65.5          |
| 34                 | 441                   | 434      | 560     | 605    | 133       | 434.5                 | 65.7          |
| 35                 | 450                   | 439      | 577     | 606    | 136       | 441.6                 | 65.8          |
| 36                 | 455                   | 445      | 585     | 605    | 139       | 445.8                 | 65.9          |
| 37                 | 462                   | 453      | 596     | 604    | 141       | 451.2                 | 66.0          |
| 38                 | 467                   | 461      | 604     | 602    | 144       | 455.7                 | 65.9          |
| 39                 | 469                   | 469      | 607     | 601    | 147       | 458.5                 | 66.0          |
| 40                 | 472                   | 478      | 616     | 598    | 149       | 462.6                 | 66.0          |
| 41                 | 474                   | 485      | 625     | 596    | 152       | 466.3                 | 66.2          |
| 42                 | 476                   | 491      | 628     | 595    | 154       | 468.7                 | 66.3          |
| 43                 | 478                   | 497      | 630     | 593    | 157       | 470.8                 | 66.3          |
| 44                 | 478                   | 501      | 633     | 592    | 159       | 472.6                 | 66.3          |
| 45                 | 480                   | 504      | 635     | 590    | 161       | 473.9                 | 66.3          |
| 46                 | 482                   | 506      | 640     | 588    | 163       | 475.9                 | 66.5          |
| 47                 | 485                   | 507      | 644     | 588    | 165       | 477.8                 | 66.5          |

# WOODSTOVE SURFACE TEMPERATURE DATA

Client: SBI  
 Model: St Louis  
 Run #: 2

Job #: 24-303  
 Tracking #: 216  
 Technician: AK  
 Date: 12/10/2024

Stove ΔT: 407

| Elapsed Time (min) | Temperature Data (°F) |          |         |        |           |                       |               |
|--------------------|-----------------------|----------|---------|--------|-----------|-----------------------|---------------|
|                    | FB Left               | FB Right | FB Back | FB Top | FB Bottom | Stove Surface Average | Catalyst Exit |
| 48                 | 486                   | 509      | 653     | 587    | 167       | 480.4                 | 66.6          |
| 49                 | 489                   | 510      | 657     | 587    | 169       | 482.2                 | 66.6          |
| 50                 | 491                   | 511      | 662     | 587    | 171       | 484.2                 | 66.5          |
| 51                 | 493                   | 512      | 665     | 587    | 173       | 486.0                 | 66.5          |
| 52                 | 495                   | 514      | 668     | 587    | 174       | 487.6                 | 66.6          |
| 53                 | 497                   | 516      | 672     | 588    | 176       | 489.8                 | 66.6          |
| 54                 | 499                   | 519      | 676     | 588    | 178       | 492.0                 | 66.7          |
| 55                 | 501                   | 522      | 679     | 587    | 180       | 493.8                 | 66.8          |
| 56                 | 502                   | 525      | 682     | 587    | 182       | 495.6                 | 66.8          |
| 57                 | 502                   | 527      | 683     | 588    | 184       | 496.8                 | 66.8          |
| 58                 | 505                   | 530      | 685     | 586    | 186       | 498.3                 | 66.8          |
| 59                 | 505                   | 532      | 687     | 586    | 188       | 499.6                 | 66.9          |
| 60                 | 506                   | 534      | 688     | 586    | 190       | 500.6                 | 66.9          |
| 61                 | 507                   | 536      | 690     | 586    | 191       | 501.8                 | 66.9          |
| 62                 | 508                   | 537      | 689     | 587    | 193       | 502.8                 | 66.9          |
| 63                 | 508                   | 537      | 691     | 585    | 195       | 503.2                 | 67.0          |
| 64                 | 509                   | 538      | 691     | 586    | 196       | 504.1                 | 67.0          |
| 65                 | 510                   | 540      | 692     | 585    | 198       | 505.1                 | 67.1          |
| 66                 | 511                   | 540      | 694     | 586    | 200       | 506.0                 | 67.1          |
| 67                 | 511                   | 540      | 695     | 586    | 202       | 506.9                 | 67.2          |
| 68                 | 512                   | 541      | 696     | 586    | 203       | 507.6                 | 67.2          |
| 69                 | 513                   | 542      | 696     | 586    | 205       | 508.3                 | 67.1          |
| 70                 | 513                   | 543      | 697     | 587    | 206       | 509.3                 | 67.1          |
| 71                 | 514                   | 543      | 698     | 587    | 208       | 509.8                 | 67.2          |
| 72                 | 514                   | 544      | 698     | 585    | 209       | 509.9                 | 67.3          |
| 73                 | 515                   | 544      | 698     | 583    | 211       | 510.1                 | 67.2          |
| 74                 | 515                   | 545      | 697     | 581    | 213       | 509.9                 | 67.2          |
| 75                 | 525                   | 555      | 689     | 586    | 213       | 513.8                 | 67.2          |
| 76                 | 530                   | 560      | 692     | 604    | 214       | 519.8                 | 67.1          |
| 77                 | 518                   | 549      | 693     | 604    | 217       | 516.4                 | 67.1          |
| 78                 | 517                   | 547      | 696     | 613    | 219       | 518.3                 | 67.1          |
| 79                 | 518                   | 546      | 702     | 613    | 220       | 519.9                 | 67.1          |
| 80                 | 524                   | 547      | 709     | 612    | 222       | 522.9                 | 67.2          |
| 81                 | 531                   | 550      | 715     | 618    | 225       | 527.7                 | 67.3          |
| 82                 | 532                   | 550      | 712     | 614    | 226       | 526.6                 | 67.4          |
| 83                 | 540                   | 554      | 720     | 619    | 228       | 531.9                 | 67.4          |
| 84                 | 541                   | 553      | 718     | 616    | 229       | 531.5                 | 67.5          |
| 85                 | 544                   | 554      | 718     | 615    | 230       | 532.2                 | 67.4          |
| 86                 | 547                   | 555      | 719     | 613    | 231       | 532.8                 | 67.4          |
| 87                 | 551                   | 556      | 721     | 614    | 231       | 534.5                 | 67.4          |
| 88                 | 553                   | 559      | 722     | 612    | 232       | 535.5                 | 67.4          |
| 89                 | 559                   | 559      | 730     | 616    | 234       | 539.6                 | 67.4          |
| 90                 | 565                   | 562      | 734     | 620    | 236       | 543.3                 | 67.4          |
| 91                 | 568                   | 565      | 738     | 622    | 237       | 546.0                 | 67.4          |
| 92                 | 572                   | 567      | 744     | 624    | 238       | 548.9                 | 67.5          |
| 93                 | 575                   | 570      | 748     | 625    | 239       | 551.3                 | 67.4          |
| 94                 | 578                   | 572      | 751     | 625    | 240       | 552.9                 | 67.3          |
| 95                 | 581                   | 574      | 753     | 625    | 240       | 554.5                 | 67.4          |

# WOODSTOVE SURFACE TEMPERATURE DATA

Client: SBI  
 Model: St Louis  
 Run #: 2

Job #: 24-303  
 Tracking #: 216  
 Technician: AK  
 Date: 12/10/2024

Stove ΔT: 407

| Elapsed Time (min) | Temperature Data (°F) |          |         |        |           |                       |               |
|--------------------|-----------------------|----------|---------|--------|-----------|-----------------------|---------------|
|                    | FB Left               | FB Right | FB Back | FB Top | FB Bottom | Stove Surface Average | Catalyst Exit |
| 96                 | 583                   | 575      | 756     | 626    | 241       | 556.1                 | 67.5          |
| 97                 | 585                   | 576      | 758     | 625    | 242       | 557.1                 | 67.5          |
| 98                 | 586                   | 578      | 759     | 625    | 242       | 558.1                 | 67.4          |
| 99                 | 586                   | 579      | 760     | 624    | 243       | 558.4                 | 67.4          |
| 100                | 587                   | 580      | 761     | 624    | 244       | 559.1                 | 67.5          |
| 101                | 587                   | 582      | 760     | 622    | 244       | 559.1                 | 67.5          |
| 102                | 587                   | 583      | 762     | 620    | 244       | 559.3                 | 67.6          |
| 103                | 585                   | 584      | 761     | 618    | 245       | 558.6                 | 67.6          |
| 104                | 584                   | 585      | 759     | 615    | 245       | 557.6                 | 67.6          |
| 105                | 584                   | 585      | 759     | 611    | 245       | 556.7                 | 67.7          |
| 106                | 581                   | 584      | 756     | 607    | 245       | 554.6                 | 67.7          |
| 107                | 579                   | 583      | 754     | 603    | 246       | 552.8                 | 67.7          |
| 108                | 577                   | 581      | 750     | 598    | 246       | 550.6                 | 67.6          |
| 109                | 574                   | 579      | 747     | 594    | 247       | 548.3                 | 67.7          |
| 110                | 571                   | 577      | 743     | 591    | 247       | 545.8                 | 67.6          |
| 111                | 569                   | 577      | 740     | 586    | 248       | 543.9                 | 67.6          |
| 112                | 568                   | 574      | 737     | 584    | 248       | 541.9                 | 67.6          |
| 113                | 573                   | 579      | 732     | 595    | 250       | 545.9                 | 67.6          |
| 114                | 579                   | 586      | 733     | 607    | 252       | 551.3                 | 67.3          |
| 115                | 582                   | 591      | 726     | 615    | 254       | 553.7                 | 67.0          |
| 116                | 584                   | 594      | 721     | 622    | 255       | 555.2                 | 66.9          |
| 117                | 586                   | 597      | 719     | 627    | 256       | 556.9                 | 66.8          |
| 118                | 589                   | 599      | 714     | 632    | 256       | 557.9                 | 66.8          |
| 119                | 577                   | 586      | 715     | 611    | 255       | 548.9                 | 66.7          |
| 120                | 575                   | 579      | 716     | 601    | 254       | 544.9                 | 66.9          |
| 121                | 572                   | 574      | 714     | 592    | 254       | 541.1                 | 66.8          |
| 122                | 569                   | 569      | 713     | 584    | 254       | 537.8                 | 67.0          |
| 123                | 566                   | 564      | 710     | 577    | 254       | 534.1                 | 67.2          |
| 124                | 570                   | 567      | 704     | 585    | 255       | 536.2                 | 67.2          |
| 125                | 574                   | 573      | 707     | 596    | 257       | 541.2                 | 67.0          |
| 126                | 576                   | 576      | 703     | 602    | 259       | 543.2                 | 67.0          |
| 127                | 576                   | 578      | 698     | 607    | 260       | 543.8                 | 66.9          |
| 128                | 576                   | 580      | 693     | 611    | 261       | 544.2                 | 66.8          |
| 129                | 576                   | 580      | 689     | 615    | 261       | 544.1                 | 66.7          |
| 130                | 575                   | 581      | 686     | 616    | 262       | 543.9                 | 66.6          |
| 131                | 575                   | 580      | 684     | 617    | 263       | 543.7                 | 66.7          |
| 132                | 574                   | 580      | 680     | 618    | 262       | 542.8                 | 66.6          |
| 133                | 574                   | 579      | 677     | 593    | 265       | 537.6                 | 66.4          |
| 134                | 572                   | 578      | 668     | 587    | 264       | 533.9                 | 66.5          |
| 135                | 565                   | 571      | 676     | 602    | 265       | 535.7                 | 66.4          |
| 136                | 550                   | 557      | 684     | 603    | 264       | 531.6                 | 66.5          |
| 137                | 546                   | 549      | 692     | 605    | 262       | 530.7                 | 66.7          |
| 138                | 542                   | 546      | 695     | 608    | 261       | 530.4                 | 66.7          |
| 139                | 543                   | 544      | 702     | 611    | 262       | 532.2                 | 66.9          |
| 140                | 542                   | 542      | 706     | 613    | 262       | 532.8                 | 67.0          |
| 141                | 543                   | 544      | 710     | 613    | 262       | 534.2                 | 67.0          |
| 142                | 544                   | 545      | 713     | 614    | 262       | 535.4                 | 67.0          |
| 143                | 547                   | 546      | 716     | 617    | 263       | 537.4                 | 67.2          |

# WOODSTOVE SURFACE TEMPERATURE DATA

Client: SBI  
 Model: St Louis  
 Run #: 2

Job #: 24-303  
 Tracking #: 216  
 Technician: AK  
 Date: 12/10/2024

Stove ΔT: 407

| Elapsed Time (min) | Temperature Data (°F) |          |         |        |           |                       |               |
|--------------------|-----------------------|----------|---------|--------|-----------|-----------------------|---------------|
|                    | FB Left               | FB Right | FB Back | FB Top | FB Bottom | Stove Surface Average | Catalyst Exit |
| 144                | 549                   | 547      | 719     | 619    | 263       | 539.4                 | 67.4          |
| 145                | 553                   | 550      | 721     | 619    | 263       | 541.1                 | 67.4          |
| 146                | 556                   | 552      | 724     | 623    | 264       | 543.4                 | 67.4          |
| 147                | 559                   | 554      | 727     | 623    | 264       | 545.5                 | 67.5          |
| 148                | 562                   | 556      | 731     | 626    | 264       | 547.9                 | 67.6          |
| 149                | 566                   | 559      | 735     | 628    | 264       | 550.4                 | 67.7          |
| 150                | 569                   | 561      | 737     | 631    | 265       | 552.5                 | 67.8          |
| 151                | 571                   | 564      | 740     | 633    | 265       | 554.6                 | 67.9          |
| 152                | 574                   | 566      | 743     | 635    | 265       | 556.8                 | 67.9          |
| 153                | 577                   | 568      | 748     | 638    | 266       | 559.4                 | 67.8          |
| 154                | 579                   | 572      | 748     | 639    | 266       | 560.6                 | 67.8          |
| 155                | 580                   | 574      | 750     | 640    | 266       | 562.0                 | 67.9          |
| 156                | 581                   | 576      | 752     | 642    | 265       | 563.2                 | 67.9          |
| 157                | 582                   | 580      | 754     | 646    | 265       | 565.2                 | 67.8          |
| 158                | 582                   | 582      | 755     | 646    | 265       | 565.9                 | 67.9          |
| 159                | 583                   | 584      | 756     | 647    | 265       | 566.9                 | 67.9          |
| 160                | 582                   | 587      | 756     | 648    | 265       | 567.7                 | 68.0          |
| 161                | 581                   | 590      | 757     | 649    | 264       | 568.1                 | 67.9          |
| 162                | 582                   | 592      | 758     | 651    | 264       | 569.4                 | 68.0          |
| 163                | 583                   | 592      | 760     | 649    | 264       | 569.6                 | 67.9          |
| 164                | 583                   | 594      | 759     | 650    | 264       | 570.1                 | 67.9          |
| 165                | 584                   | 595      | 762     | 650    | 264       | 570.9                 | 67.9          |
| 166                | 584                   | 597      | 760     | 651    | 264       | 571.2                 | 67.9          |
| 167                | 584                   | 598      | 760     | 650    | 264       | 571.1                 | 67.9          |
| 168                | 585                   | 600      | 760     | 649    | 264       | 571.5                 | 67.9          |
| 169                | 584                   | 600      | 760     | 649    | 263       | 571.1                 | 67.9          |
| 170                | 583                   | 598      | 762     | 648    | 263       | 570.8                 | 67.9          |
| 171                | 582                   | 599      | 761     | 647    | 263       | 570.5                 | 67.9          |
| 172                | 581                   | 599      | 761     | 647    | 262       | 569.8                 | 67.9          |
| 173                | 581                   | 599      | 761     | 645    | 262       | 569.7                 | 67.9          |
| 174                | 580                   | 600      | 759     | 644    | 262       | 568.9                 | 67.9          |
| 175                | 579                   | 600      | 758     | 643    | 261       | 568.0                 | 68.0          |
| 176                | 578                   | 601      | 759     | 646    | 261       | 569.1                 | 67.9          |
| 177                | 576                   | 599      | 757     | 642    | 261       | 566.6                 | 68.0          |
| 178                | 577                   | 601      | 761     | 646    | 262       | 569.1                 | 68.1          |
| 179                | 577                   | 600      | 765     | 651    | 262       | 571.1                 | 68.1          |
| 180                | 577                   | 601      | 767     | 653    | 262       | 572.0                 | 68.0          |
| 181                | 576                   | 601      | 768     | 655    | 263       | 572.6                 | 68.0          |
| 182                | 576                   | 601      | 770     | 655    | 263       | 572.8                 | 68.0          |
| 183                | 576                   | 601      | 769     | 651    | 262       | 571.8                 | 68.1          |
| 184                | 572                   | 600      | 768     | 649    | 262       | 569.8                 | 68.0          |
| 185                | 573                   | 605      | 772     | 652    | 262       | 572.6                 | 68.0          |
| 186                | 572                   | 603      | 769     | 650    | 261       | 570.9                 | 68.1          |
| 187                | 574                   | 605      | 772     | 651    | 261       | 572.5                 | 68.0          |
| 188                | 571                   | 602      | 766     | 646    | 260       | 568.8                 | 68.0          |
| 189                | 571                   | 602      | 763     | 642    | 259       | 567.2                 | 67.9          |
| 190                | 570                   | 600      | 763     | 640    | 258       | 566.3                 | 67.9          |
| 191                | 570                   | 600      | 761     | 638    | 258       | 565.3                 | 67.9          |

# WOODSTOVE SURFACE TEMPERATURE DATA

Client: SBI  
 Model: St Louis  
 Run #: 2

Job #: 24-303  
 Tracking #: 216  
 Technician: AK  
 Date: 12/10/2024

Stove ΔT: 407

| Elapsed Time (min) | Temperature Data (°F) |          |         |        |           |                       |               |
|--------------------|-----------------------|----------|---------|--------|-----------|-----------------------|---------------|
|                    | FB Left               | FB Right | FB Back | FB Top | FB Bottom | Stove Surface Average | Catalyst Exit |
| 192                | 572                   | 600      | 760     | 637    | 258       | 565.2                 | 68.0          |
| 193                | 572                   | 597      | 760     | 635    | 257       | 564.3                 | 67.9          |
| 194                | 574                   | 596      | 757     | 633    | 257       | 563.6                 | 67.9          |
| 195                | 578                   | 599      | 761     | 638    | 258       | 566.8                 | 67.9          |
| 196                | 580                   | 596      | 765     | 641    | 259       | 568.2                 | 67.9          |
| 197                | 582                   | 596      | 766     | 642    | 259       | 568.8                 | 68.0          |
| 198                | 582                   | 595      | 767     | 642    | 260       | 569.2                 | 67.9          |
| 199                | 581                   | 595      | 764     | 639    | 259       | 567.7                 | 68.0          |
| 200                | 579                   | 593      | 759     | 633    | 258       | 564.3                 | 67.9          |
| 201                | 576                   | 591      | 754     | 627    | 257       | 561.1                 | 67.9          |
| 202                | 575                   | 589      | 751     | 624    | 257       | 559.3                 | 67.8          |
| 203                | 575                   | 588      | 748     | 622    | 256       | 557.9                 | 67.9          |
| 204                | 577                   | 587      | 750     | 624    | 257       | 558.8                 | 67.9          |
| 205                | 579                   | 585      | 750     | 627    | 258       | 559.5                 | 67.9          |
| 206                | 582                   | 581      | 751     | 626    | 258       | 559.9                 | 67.9          |
| 207                | 584                   | 580      | 752     | 626    | 259       | 560.3                 | 67.8          |
| 208                | 585                   | 577      | 752     | 626    | 259       | 559.7                 | 67.9          |
| 209                | 585                   | 576      | 750     | 624    | 259       | 558.7                 | 67.8          |
| 210                | 586                   | 576      | 749     | 622    | 259       | 558.3                 | 67.9          |
| 211                | 587                   | 575      | 749     | 625    | 259       | 559.0                 | 67.9          |
| 212                | 588                   | 575      | 750     | 625    | 260       | 559.7                 | 67.9          |
| 213                | 588                   | 574      | 751     | 626    | 260       | 559.8                 | 67.8          |
| 214                | 588                   | 574      | 752     | 625    | 260       | 560.0                 | 67.9          |
| 215                | 589                   | 575      | 752     | 626    | 261       | 560.3                 | 67.9          |
| 216                | 590                   | 575      | 752     | 625    | 261       | 560.5                 | 67.9          |
| 217                | 591                   | 576      | 754     | 623    | 261       | 561.0                 | 67.8          |
| 218                | 591                   | 578      | 753     | 623    | 261       | 561.0                 | 67.9          |
| 219                | 592                   | 579      | 753     | 622    | 261       | 561.1                 | 67.9          |
| 220                | 592                   | 580      | 751     | 620    | 261       | 560.6                 | 67.9          |
| 221                | 591                   | 579      | 751     | 620    | 261       | 560.3                 | 67.9          |
| 222                | 592                   | 579      | 751     | 619    | 262       | 560.6                 | 68.0          |
| 223                | 591                   | 580      | 751     | 617    | 262       | 560.2                 | 68.0          |
| 224                | 591                   | 580      | 749     | 618    | 263       | 560.0                 | 68.0          |
| 225                | 593                   | 580      | 749     | 616    | 263       | 560.0                 | 67.9          |
| 226                | 592                   | 581      | 748     | 613    | 263       | 559.4                 | 68.0          |
| 227                | 592                   | 580      | 746     | 611    | 263       | 558.6                 | 67.9          |
| 228                | 593                   | 580      | 745     | 610    | 264       | 558.1                 | 67.8          |
| 229                | 592                   | 579      | 743     | 607    | 264       | 557.0                 | 67.7          |
| 230                | 592                   | 578      | 742     | 605    | 265       | 556.5                 | 67.7          |
| 231                | 592                   | 578      | 742     | 602    | 265       | 555.6                 | 67.8          |
| 232                | 592                   | 578      | 739     | 600    | 265       | 554.6                 | 67.8          |
| 233                | 592                   | 577      | 736     | 597    | 265       | 553.4                 | 67.9          |
| 234                | 591                   | 575      | 733     | 593    | 266       | 551.5                 | 67.8          |
| 235                | 590                   | 574      | 731     | 589    | 266       | 549.9                 | 68.0          |
| 236                | 588                   | 573      | 728     | 584    | 266       | 547.8                 | 68.1          |
| 237                | 587                   | 570      | 723     | 580    | 267       | 545.3                 | 67.9          |
| 238                | 585                   | 568      | 720     | 576    | 268       | 543.4                 | 67.9          |
| 239                | 583                   | 567      | 715     | 571    | 268       | 540.7                 | 68.0          |



# WOODSTOVE SURFACE TEMPERATURE DATA

Client: SBI  
 Model: St Louis  
 Run #: 2

Job #: 24-303  
 Tracking #: 216  
 Technician: AK  
 Date: 12/10/2024

Stove ΔT: 407

| Elapsed Time (min) | Temperature Data (°F) |          |         |        |           |                       |               |
|--------------------|-----------------------|----------|---------|--------|-----------|-----------------------|---------------|
|                    | FB Left               | FB Right | FB Back | FB Top | FB Bottom | Stove Surface Average | Catalyst Exit |
| 240                | 582                   | 564      | 714     | 568    | 268       | 539.0                 | 67.8          |
| 241                | 580                   | 561      | 709     | 564    | 269       | 536.7                 | 67.7          |
| 242                | 579                   | 559      | 705     | 561    | 270       | 534.8                 | 67.8          |
| 243                | 576                   | 558      | 703     | 557    | 270       | 532.8                 | 67.9          |
| 244                | 577                   | 557      | 701     | 560    | 271       | 533.1                 | 67.8          |
| 245                | 586                   | 567      | 701     | 576    | 274       | 540.7                 | 67.8          |
| 246                | 589                   | 572      | 698     | 585    | 276       | 544.0                 | 67.6          |
| 247                | 591                   | 576      | 696     | 592    | 278       | 546.3                 | 67.3          |
| 248                | 594                   | 578      | 692     | 597    | 279       | 547.8                 | 67.2          |
| 249                | 594                   | 580      | 687     | 601    | 279       | 548.1                 | 67.0          |
| 250                | 595                   | 581      | 685     | 603    | 280       | 548.9                 | 67.0          |
| 251                | 595                   | 582      | 681     | 606    | 280       | 548.8                 | 66.9          |
| 252                | 591                   | 578      | 679     | 597    | 280       | 544.8                 | 66.9          |
| 253                | 580                   | 569      | 676     | 582    | 279       | 537.2                 | 67.1          |
| 254                | 576                   | 562      | 672     | 571    | 278       | 531.9                 | 67.2          |
| 255                | 572                   | 556      | 672     | 561    | 278       | 527.7                 | 67.2          |
| 256                | 574                   | 556      | 670     | 566    | 279       | 528.9                 | 67.3          |
| 257                | 580                   | 561      | 673     | 574    | 281       | 533.9                 | 67.2          |
| 258                | 580                   | 565      | 669     | 580    | 282       | 535.3                 | 67.1          |
| 259                | 580                   | 567      | 667     | 584    | 283       | 536.2                 | 66.9          |
| 260                | 579                   | 569      | 664     | 587    | 283       | 536.5                 | 66.8          |
| 261                | 579                   | 570      | 660     | 589    | 284       | 536.3                 | 66.6          |
| 262                | 579                   | 571      | 658     | 591    | 284       | 536.4                 | 66.6          |
| 263                | 578                   | 572      | 655     | 591    | 284       | 536.1                 | 66.5          |
| 264                | 576                   | 572      | 655     | 592    | 284       | 535.9                 | 66.5          |
| 265                | 576                   | 573      | 651     | 592    | 284       | 535.1                 | 66.5          |
| 266                | 575                   | 573      | 650     | 592    | 284       | 534.6                 | 66.3          |
| 267                | 574                   | 572      | 647     | 591    | 285       | 534.0                 | 66.4          |
| 268                | 573                   | 572      | 648     | 591    | 285       | 533.5                 | 66.3          |
| 269                | 573                   | 572      | 646     | 590    | 285       | 533.2                 | 66.3          |
| 270                | 572                   | 571      | 645     | 590    | 285       | 532.5                 | 66.3          |
| 271                | 572                   | 571      | 643     | 589    | 285       | 532.1                 | 66.3          |
| 272                | 571                   | 570      | 643     | 589    | 285       | 531.5                 | 66.3          |
| 273                | 571                   | 570      | 641     | 588    | 285       | 531.0                 | 66.3          |
| 274                | 570                   | 569      | 641     | 587    | 286       | 530.8                 | 66.2          |
| 275                | 569                   | 569      | 640     | 586    | 286       | 530.0                 | 66.1          |
| 276                | 569                   | 568      | 638     | 586    | 286       | 529.4                 | 66.0          |
| 277                | 568                   | 568      | 637     | 585    | 286       | 528.8                 | 66.1          |
| 278                | 568                   | 567      | 638     | 584    | 287       | 528.8                 | 66.0          |
| 279                | 567                   | 567      | 635     | 583    | 287       | 527.8                 | 66.0          |
| 280                | 566                   | 566      | 636     | 582    | 287       | 527.6                 | 65.9          |
| 281                | 566                   | 566      | 635     | 581    | 287       | 527.0                 | 66.0          |
| 282                | 566                   | 565      | 633     | 580    | 288       | 526.6                 | 66.0          |
| 283                | 565                   | 565      | 633     | 580    | 289       | 526.2                 | 66.0          |
| 284                | 564                   | 565      | 632     | 579    | 289       | 525.6                 | 66.1          |
| 285                | 564                   | 564      | 632     | 578    | 289       | 525.4                 | 66.0          |
| 286                | 564                   | 564      | 630     | 577    | 290       | 524.8                 | 66.0          |
| 287                | 563                   | 563      | 630     | 576    | 290       | 524.3                 | 66.0          |

# WOODSTOVE SURFACE TEMPERATURE DATA

Client: SBI

Job #: 24-303

Model: St Louis

Tracking #: 216

Run #: 2

Technician: AK

Date: 12/10/2024

Stove ΔT: 407

| Elapsed Time (min) | Temperature Data (°F) |          |         |        |           |                       |               |
|--------------------|-----------------------|----------|---------|--------|-----------|-----------------------|---------------|
|                    | FB Left               | FB Right | FB Back | FB Top | FB Bottom | Stove Surface Average | Catalyst Exit |
| 288                | 563                   | 563      | 630     | 575    | 290       | 523.8                 | 66.0          |
| 289                | 562                   | 562      | 627     | 574    | 290       | 523.0                 | 66.1          |
| 290                | 560                   | 561      | 629     | 573    | 290       | 522.6                 | 66.1          |
| 291                | 560                   | 561      | 626     | 572    | 290       | 521.8                 | 66.0          |
| 292                | 559                   | 560      | 625     | 571    | 290       | 521.1                 | 66.0          |
| 293                | 559                   | 559      | 625     | 571    | 290       | 520.8                 | 66.0          |
| 294                | 558                   | 559      | 626     | 571    | 290       | 520.6                 | 66.0          |
| 295                | 557                   | 558      | 626     | 571    | 290       | 520.2                 | 66.0          |
| 296                | 558                   | 558      | 626     | 571    | 290       | 520.3                 | 66.0          |
| 297                | 557                   | 557      | 625     | 570    | 290       | 519.9                 | 66.1          |
| 298                | 558                   | 556      | 624     | 570    | 290       | 519.6                 | 66.0          |
| 299                | 558                   | 556      | 624     | 569    | 290       | 519.1                 | 66.0          |
| 300                | 558                   | 555      | 622     | 567    | 290       | 518.4                 | 66.0          |
| 301                | 558                   | 554      | 623     | 562    | 294       | 518.1                 | 66.1          |
| 302                | 558                   | 554      | 622     | 557    | 297       | 517.5                 | 66.1          |
| 303                | 558                   | 553      | 620     | 552    | 301       | 516.8                 | 66.1          |
| 304                | 557                   | 552      | 619     | 547    | 304       | 515.9                 | 66.1          |
| 305                | 557                   | 551      | 617     | 543    | 307       | 514.7                 | 66.0          |
| 306                | 556                   | 550      | 614     | 538    | 310       | 513.4                 | 66.0          |
| 307                | 553                   | 548      | 612     | 533    | 312       | 511.6                 | 66.0          |
| 308                | 551                   | 546      | 611     | 528    | 314       | 510.0                 | 65.9          |
| 309                | 550                   | 544      | 606     | 524    | 315       | 507.9                 | 65.9          |
| 310                | 547                   | 542      | 604     | 520    | 317       | 505.9                 | 65.9          |
| 311                | 545                   | 540      | 601     | 515    | 318       | 503.6                 | 65.8          |
| 312                | 541                   | 538      | 600     | 511    | 318       | 501.5                 | 65.9          |
| 313                | 539                   | 535      | 597     | 506    | 319       | 499.3                 | 65.8          |
| 314                | 535                   | 533      | 595     | 502    | 319       | 496.8                 | 65.8          |
| 315                | 533                   | 530      | 590     | 498    | 320       | 494.2                 | 65.9          |
| 316                | 529                   | 528      | 589     | 494    | 320       | 491.9                 | 65.9          |
| 317                | 526                   | 525      | 587     | 491    | 320       | 489.7                 | 65.9          |
| 318                | 523                   | 523      | 583     | 487    | 319       | 487.0                 | 65.8          |
| 319                | 520                   | 520      | 581     | 483    | 319       | 484.7                 | 65.8          |
| 320                | 517                   | 518      | 578     | 480    | 319       | 482.3                 | 65.8          |
| 321                | 515                   | 515      | 575     | 476    | 319       | 480.0                 | 65.8          |
| 322                | 512                   | 512      | 573     | 473    | 318       | 477.7                 | 65.8          |
| 323                | 510                   | 510      | 570     | 470    | 318       | 475.4                 | 65.7          |
| 324                | 507                   | 508      | 569     | 467    | 317       | 473.5                 | 65.7          |
| Average            | 527.0                 | 531.4    | 657.3   | 587.4  | 237.7     | 508.2                 | 66.8          |

# LAB SAMPLE DATA - ASTM E2515

Client: SBI  
 Model: St Louis  
 Run #: 2

Job #: 24-303  
 Tracking #: 216  
 Technician: AK  
 Date: 12/10/2024

|         |     | Sample ID | Tare, mg | Final, mg | Catch, mg |
|---------|-----|-----------|----------|-----------|-----------|
| Filters | A   | G01168    | 228.0    | 230.2     | 2.2       |
|         | B   | G01169    | 228.0    | 230.0     | 2.0       |
|         | Amb | G01170    | 228.4    | 228.4     | 0.0       |
|         |     |           |          |           |           |
|         |     |           |          |           |           |
| Probes  | A   | 8C        | 116663.6 | 116663.7  | 0.1       |
|         | B   | 9A        | 116531.1 | 116531.3  | 0.2       |
|         |     |           |          |           |           |
|         |     |           |          |           |           |
| O-rings | A   | 8C        | 3586.3   | 3586.3    | 0.0       |
|         | B   | 9A        | 3580.2   | 3580.3    | 0.1       |
|         |     |           |          |           |           |
|         |     |           |          |           |           |

Placed in Dessicator on: 5/6/2024

## Balance Audit (mg):

|         |   | 200.0       |             | 200.0       |             | 200.0       |             |             |           |
|---------|---|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-----------|
|         |   | Weight (mg) | Date/Time   | Weight (mg) | Date/Time   | Weight (mg) | Date/Time   | Weight (mg) | Date/Time |
| Filters | A | 230.6       | 12/10 17:15 | 230.3       | 12/13 15:00 | 230.2       | 12/18 12:00 |             |           |
|         | B | 230.1       | 12/10 17:15 | 230.0       | 12/13 15:00 | 230.0       | 12/18 12:00 |             |           |
|         |   | 228.4       | 12/10 17:15 | 228.4       | 12/13 15:00 | 228.4       | 12/18 12:00 |             |           |
|         |   |             |             |             |             |             |             |             |           |
|         |   |             |             |             |             |             |             |             |           |
| Probes  | A | 116663.9    | 12/10 17:15 | 116663.6    | 12/13 15:00 | 116663.7    | 12/18 12:00 |             |           |
|         | B | 116531.4    | 12/10 17:15 | 116531.2    | 12/13 15:00 | 116531.3    | 12/18 12:00 |             |           |
|         |   |             |             |             |             |             |             |             |           |
|         |   |             |             |             |             |             |             |             |           |
| O-Rings | A | 3586.0      | 12/10 17:15 | 3586.3      | 12/13 15:00 | 3586.3      | 12/18 12:00 |             |           |
|         | B | 3580.2      | 12/10 17:15 | 3580.2      | 12/13 15:00 | 3580.3      | 12/18 12:00 |             |           |
|         |   |             |             |             |             |             |             |             |           |
|         |   |             |             |             |             |             |             |             |           |

|                        |     |
|------------------------|-----|
| Train A Aggregate, mg: | 2.3 |
| Train B Aggregate, mg: | 2.3 |
| Ambient, mg:           | 0.0 |
|                        |     |

# TEST RESULTS - ASTM E2780 / ASTM E2515

Client: SBI

Model: St Louis

Run #: 2

Job #: 24-303

Tracking #: 216

Technician: AK

Date: 12/10/2024

Total Fuel Burned (kg-dry) 17.54

|                                                         | Ambient Sample | Sample Train A | Sample Train B | 1st Hour Filter |
|---------------------------------------------------------|----------------|----------------|----------------|-----------------|
| Total Sample Volume (ft <sup>3</sup> )                  | 75.026         | 56.606         | 55.136         | -               |
| Average Gas Velocity in Dilution Tunnel (ft/sec)        | 18.2           |                |                |                 |
| Average Gas Flow Rate in Dilution Tunnel (dscf/hr)      | 49232.5        |                |                |                 |
| Average Gas Meter Temperature (°F)                      | 70.1           | 86.2           | 86.7           | -               |
| Total Sample Volume (dscf)                              | 75.618         | 55.322         | 54.278         | -               |
| Average Tunnel Temperature (°F)                         | 86.0           |                |                |                 |
| Total Time of Test (min)                                | 324            |                |                |                 |
| Total Particulate Catch (mg)                            | 0.0            | 2.3            | 2.3            | -               |
| Particulate Concentration, dry-standard (g/dscf)        | 0.0000000      | 0.0000416      | 0.0000424      | -               |
| Total PM Emissions (g)                                  | 0.00           | 11.05          | 11.27          | -               |
| Particulate Emission Rate (g/hr)                        | 0.00           | 2.05           | 2.09           | -               |
| Emissions Factor (g/kg)                                 | -              | 0.63           | 0.64           | -               |
| Difference from Average Total Particulate Emissions (g) | -              | 0.11           | 0.11           | -               |
| Difference from Average Total Particulate Emissions (%) | -              | 1.0%           | 1.0%           | -               |
| Difference from Average Emissions Factor (g/kg)         | -              | 0.01           | 0.01           | -               |

| Final Average Results            |       |
|----------------------------------|-------|
| Total Particulate Emissions (g)  | 11.16 |
| Particulate Emission Rate (g/hr) | 2.07  |
| Emissions Factor (g/kg)          | 0.64  |

| Quality Checks                   | Requirement                                                                                 | Observed                 | Result |
|----------------------------------|---------------------------------------------------------------------------------------------|--------------------------|--------|
| Dual Train Precision             | Each train within 7.5% of average emissions (in grams), or emission factors within 0.5 g/kg | See Above                | OK     |
| Filter Temps                     | <90 °F                                                                                      | 86.9                     | OK     |
| Face Velocity                    | < 30 ft/min                                                                                 | 9.5                      | OK     |
| Leakage Rate                     | Less than 4% of average sample rate                                                         | 0 cfm                    | OK     |
| Ambient Temp                     | 55-90 °F                                                                                    | Min:66.3/Max:71.9        | OK     |
| Negative Probe Weight Evaluation | <5% of Total Catch                                                                          | Probe Catch Not Negative | OK     |
| Pro-Rate Variation               | 90% of readings between 90-110%; none greater than 120% or less than 80%                    | See Data Tabs            | OK     |

## Test Input Data

Client: SBI  
 Model: St-Louis  
 Run #: 2

Job #: 24-303  
 Tracking #: 216  
 Technician: AK  
 Date: 12/10/2024

### Traverse Data

| pt     | dP (in WC) |
|--------|------------|
| 1      | 0.066      |
| 2      | 0.074      |
| 3      | 0.078      |
| 4      | 0.078      |
| 5      | 0.072      |
| 6      | 0.060      |
| 7      | 0.062      |
| 8      | 0.074      |
| 9      | 0.086      |
| 10     | 0.084      |
| 11     | 0.080      |
| 12     | 0.058      |
| Center | 0.074      |

### Tunnel Data

|                   |      |
|-------------------|------|
| Tunnel dia. (in): | 12   |
| Pitot Cp          | 0.99 |

|                  |       |
|------------------|-------|
| Vs,cent (ft/s):  | 17.93 |
| Vs, trav (ft/s): | 17.73 |
| Fp               | 0.989 |

|                              | Pre-Test | Post Test |
|------------------------------|----------|-----------|
| Barometric Pressure (in. Hg) | 30.22    | 30.12     |
| Lab Relative Humidity (%)    | 30.2     | 22.2      |

|                  |        |
|------------------|--------|
| Traverse Temp:   | 67     |
| Static Pressure: | -0.206 |

## Fuel Data

### Fuel Properties

|              |        |
|--------------|--------|
| Species      | Maple  |
| HHV (Btu/lb) | 8587   |
| %C           | 50.64% |
| %H           | 6.02%  |
| %O           | 41.74% |

|                     | Wet Weight | MC (%db) | Dry Weight (lbs) |
|---------------------|------------|----------|------------------|
| Kindling            | 1.97       |          |                  |
| Starter             | 5.58       | 20.05    | 4.65             |
| L2                  | 12.79      | 21.07    | 10.56            |
| L3                  | 9.38       | 21.72    | 7.71             |
| L4 <sub>s</sub>     | 7.27       | 23.93    | 5.87             |
| L4 <sub>b</sub>     | 15.32      | 24.14    | 12.34            |
| Avg. Moisture (%db) |            | 22.18    |                  |

## Run 1 Results Summary

### Test Segments

|                         | Clock    | ET(min) |
|-------------------------|----------|---------|
| L1 Ignition             | 11:10 AM | 0       |
| L1 End                  | 11:27 AM | 17      |
| L1 Duration             |          | 17      |
| Fuel Consumed (lbs-wet) |          | 5.22    |
| Fuel Consumed (lbs-dry) |          | 4.29    |

|                         |          |       |
|-------------------------|----------|-------|
| L2 Loaded               | 11:28 AM | 18    |
| L2 End                  | 12:25 PM | 74    |
| L2 Duration             |          | 56    |
| Fuel Consumed (lbs-wet) |          | 11.52 |
| Fuel Consumed (lbs-dry) |          | 9.29  |

|                         |          |      |
|-------------------------|----------|------|
| L3 Loaded               | 12:26 PM | 75   |
| L3 End                  | 1:22 PM  | 132  |
| L3 Duration             |          | 57   |
| Fuel Consumed (lbs-wet) |          | 8.55 |
| Fuel Consumed (lbs-dry) |          | 6.88 |

|                         |         |       |
|-------------------------|---------|-------|
| L4 Loaded               | 1:23 PM | 133   |
| L4 End                  | 4:34 PM | 324   |
| L4 Duration             |         | 191   |
| Fuel Consumed (lbs-wet) |         | 22.60 |
| Fuel Consumed (lbs-dry) |         | 18.22 |

|                             |       |                |
|-----------------------------|-------|----------------|
| Total Fuel Burned (lbs-wet) | 47.89 |                |
| Total Fuel Burned (lbs-dry) | 38.68 | 17.54 (kg-dry) |
|                             |       | 3.25 kg/hr dry |

### Firebox Avg Temps (F)

|                         |     |
|-------------------------|-----|
| L1TS <sub>avg(i)</sub>  | 67  |
| L1TS <sub>avg(f)</sub>  | 404 |
| L2TS <sub>avg(i)</sub>  | 404 |
| L2TS <sub>avg(f)</sub>  | 510 |
| L3TS <sub>avg(i)</sub>  | 514 |
| L3TS <sub>avg(f)</sub>  | 543 |
| L4TS <sub>avg(i)</sub>  | 538 |
| L14TS <sub>avg(f)</sub> | 474 |

### Burn Time Rating (hrs)

|     |   |
|-----|---|
| BTR | 4 |
|-----|---|

### Burn Rate (lbs-wet/hr) (dry kg/hr)

|                  |       |      |
|------------------|-------|------|
| BR <sub>L2</sub> | 18.42 | 6.87 |
| BR <sub>L2</sub> | 12.34 | 4.52 |
| BR <sub>L3</sub> | 9.00  | 3.28 |
| BR <sub>L4</sub> | 7.10  | 2.60 |
| OVERALL          | 8.87  | 3.25 |

|                         |          |       |
|-------------------------|----------|-------|
| 1st hr Loaded           | 11:10 AM | 0     |
| 1st hr End              | 12:10 PM | 60    |
| L4 Duration             |          | 60    |
| Fuel Consumed (lbs-wet) |          | 14.55 |
| Fuel Consumed (lbs-dry) |          | 12.02 |

### PM Results

| Burn Phase:                    | L1     | L2     | L3     | L4     | 1st Hr | Total  |
|--------------------------------|--------|--------|--------|--------|--------|--------|
| E <sub>T</sub> :               | 1.9    | 1.6    | 1.7    | 1.2    | 3.0    | 6.4    |
| E <sub>g/hr</sub> :            | 6.6    | 1.7    | 1.8    | 0.39   | 3.00   | 1.18   |
| E <sub>g/kg</sub> :            | 0.97   | 0.38   | 0.53   | 0.15   | 0.55   | 0.36   |
| E <sub>g/MJ output</sub> :     | 0.07   | 0.03   | 0.03   | 0.01   |        | 0.02   |
| E <sub>lb/mmbtu output</sub> : | 0.16   | 0.06   | 0.08   | 0.02   | -      | 0.06   |
| CO (g):                        | 43.4   | 40.8   | 61.5   | 342.5  |        | 488.2  |
| CO (g/min):                    | 2.55   | 0.73   | 1.08   | 1.79   |        | 1.51   |
| Output (BTU/hr)                | 93,744 | 62,039 | 47,791 | 37,563 |        | 46,193 |
| Efficiency (%)                 | 72.1%  | 72.5%  | 76.8%  | 76.4%  |        | 75.0%  |

### Rolling Average Max Values

|           | 1-min Avg. | 5-min Avg. | 60-min Avg |
|-----------|------------|------------|------------|
| PM (g/hr) | 50.5       | 16.8       | 3.1        |

### Quality Checks

### Requirement

### Observer Pass/Fail

|                     |                                         |               |      |
|---------------------|-----------------------------------------|---------------|------|
| Filter/Dewpt. Temp  | Dewpoint must never exceed filter temp  | Max Δ -47     | PASS |
| Filter Temp         | Must be between 80 and 90F at all times | 80.3 / 86.9   | PASS |
| Ambient Temp        | Must be between 65 and 90F at all times | 65.1 / 70.7   | PASS |
| Minimum Tunnel Flow | >600 CFM                                | 798.8         | PASS |
| Weight Loss         | Must be >0.1 lb per 20 min              | Min -0.32 lb. | PASS |

# L1 Efficiency Results

**Manufacturer:** SBI  
**Model:** St-Louis  
**Date:** 12/10/24  
**Run:** 2  
**Control #:** 216  
**Test Duration:** 17  
**Output Category:** L1

## Test Results in Accordance with CSA B415.1-10

|                                 | HHV Basis | LHV Basis |
|---------------------------------|-----------|-----------|
| <b>Overall Efficiency</b>       | 72.1%     | 77.1%     |
| <b>Combustion Efficiency</b>    | 98.7%     | 98.7%     |
| <b>Heat Transfer Efficiency</b> | 73.0%     | 78.1%     |

|                           |         |         |                |
|---------------------------|---------|---------|----------------|
| <b>Output Rate (kJ/h)</b> | 98,823  | 93,744  | <b>(Btu/h)</b> |
| <b>Burn Rate (kg/h)</b>   | 6.87    | 15.13   | <b>(lb/h)</b>  |
| <b>Input (kJ/h)</b>       | 137,152 | 130,104 | <b>(Btu/h)</b> |

|                                  |       |      |               |
|----------------------------------|-------|------|---------------|
| <b>Test Load Weight (dry kg)</b> | 1.95  | 4.29 | <b>dry lb</b> |
| <b>MC wet (%)</b>                | 17.85 |      |               |
| <b>MC dry (%)</b>                | 21.73 |      |               |
| <b>Particulate (g )</b>          | N/A   |      |               |
| <b>CO (g)</b>                    | 43    |      |               |
| <b>Test Duration (h)</b>         | 0.28  |      |               |

| <b>Emissions</b>        | <b>Particulate</b> | <b>CO</b> |
|-------------------------|--------------------|-----------|
| <b>g/MJ Output</b>      | N/A                | 1.55      |
| <b>g/kg Dry Fuel</b>    | N/A                | 22.32     |
| <b>g/h</b>              | N/A                | 153.26    |
| <b>g/min</b>            | N/A                | 2.55      |
| <b>lb/MM Btu Output</b> | N/A                | 0.51      |

|                             |       |
|-----------------------------|-------|
| <b>Air/Fuel Ratio (A/F)</b> | 12.12 |
|-----------------------------|-------|

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2.4

4/15/2010

## L2 Efficiency Results

**Manufacturer:** SBI  
**Model:** St-Louis  
**Date:** 12/10/24  
**Run:** 2  
**Control #:** 216  
**Test Duration:** 56  
**Output Category:** L2

### Test Results in Accordance with CSA B415.1-10

|                                 | HHV Basis | LHV Basis |
|---------------------------------|-----------|-----------|
| <b>Overall Efficiency</b>       | 72.5%     | 77.5%     |
| <b>Combustion Efficiency</b>    | 99.5%     | 99.5%     |
| <b>Heat Transfer Efficiency</b> | 72.8%     | 77.9%     |

|                           |        |        |                |
|---------------------------|--------|--------|----------------|
| <b>Output Rate (kJ/h)</b> | 65,400 | 62,039 | <b>(Btu/h)</b> |
| <b>Burn Rate (kg/h)</b>   | 4.52   | 9.96   | <b>(lb/h)</b>  |
| <b>Input (kJ/h)</b>       | 90,243 | 85,605 | <b>(Btu/h)</b> |

|                                  |       |      |               |
|----------------------------------|-------|------|---------------|
| <b>Test Load Weight (dry kg)</b> | 4.22  | 9.29 | <b>dry lb</b> |
| <b>MC wet (%)</b>                | 19.32 |      |               |
| <b>MC dry (%)</b>                | 23.95 |      |               |
| <b>Particulate (g )</b>          | N/A   |      |               |
| <b>CO (g)</b>                    | 41    |      |               |
| <b>Test Duration (h)</b>         | 0.93  |      |               |

| <b>Emissions</b>        | <b>Particulate</b> | <b>CO</b> |
|-------------------------|--------------------|-----------|
| <b>g/MJ Output</b>      | N/A                | 0.67      |
| <b>g/kg Dry Fuel</b>    | N/A                | 9.67      |
| <b>g/h</b>              | N/A                | 43.71     |
| <b>g/min</b>            | N/A                | 0.73      |
| <b>lb/MM Btu Output</b> | N/A                | 0.51      |

|                             |       |
|-----------------------------|-------|
| <b>Air/Fuel Ratio (A/F)</b> | 11.99 |
|-----------------------------|-------|

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2.4

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## L3 Efficiency Results

**Manufacturer:** SBI  
**Model:** St-Louis  
**Date:** 12/10/24  
**Run:** 2  
**Control #:** 216  
**Test Duration:** 57  
**Output Category:** L3

### Test Results in Accordance with CSA B415.1-10

|                                 | HHV Basis | LHV Basis |
|---------------------------------|-----------|-----------|
| <b>Overall Efficiency</b>       | 76.8%     | 82.1%     |
| <b>Combustion Efficiency</b>    | 98.8%     | 98.8%     |
| <b>Heat Transfer Efficiency</b> | 77.7%     | 83.1%     |

|                           |        |        |                |
|---------------------------|--------|--------|----------------|
| <b>Output Rate (kJ/h)</b> | 50,381 | 47,791 | <b>(Btu/h)</b> |
| <b>Burn Rate (kg/h)</b>   | 3.28   | 7.24   | <b>(lb/h)</b>  |
| <b>Input (kJ/h)</b>       | 65,594 | 62,223 | <b>(Btu/h)</b> |

|                                  |       |      |               |
|----------------------------------|-------|------|---------------|
| <b>Test Load Weight (dry kg)</b> | 3.12  | 6.88 | <b>dry lb</b> |
| <b>MC wet (%)</b>                | 19.58 |      |               |
| <b>MC dry (%)</b>                | 24.34 |      |               |
| <b>Particulate (g )</b>          | N/A   |      |               |
| <b>CO (g)</b>                    | 61    |      |               |
| <b>Test Duration (h)</b>         | 0.95  |      |               |

| <b>Emissions</b>        | <b>Particulate</b> | <b>CO</b> |
|-------------------------|--------------------|-----------|
| <b>g/MJ Output</b>      | N/A                | 1.28      |
| <b>g/kg Dry Fuel</b>    | N/A                | 19.71     |
| <b>g/h</b>              | N/A                | 64.72     |
| <b>g/min</b>            | N/A                | 1.08      |
| <b>lb/MM Btu Output</b> | N/A                | 0.51      |

|                             |       |
|-----------------------------|-------|
| <b>Air/Fuel Ratio (A/F)</b> | 10.20 |
|-----------------------------|-------|

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2.4

4/15/2010

## L4 Efficiency Results

**Manufacturer:** SBI  
**Model:** St-Louis  
**Date:** 12/10/24  
**Run:** 2  
**Control #:** 216  
**Test Duration:** 191  
**Output Category:** L4

### Test Results in Accordance with CSA B415.1-10

|                                 | HHV Basis | LHV Basis |
|---------------------------------|-----------|-----------|
| <b>Overall Efficiency</b>       | 76.4%     | 81.7%     |
| <b>Combustion Efficiency</b>    | 97.2%     | 97.2%     |
| <b>Heat Transfer Efficiency</b> | 78.6%     | 84.1%     |

|                           |        |        |                |
|---------------------------|--------|--------|----------------|
| <b>Output Rate (kJ/h)</b> | 39,598 | 37,563 | <b>(Btu/h)</b> |
| <b>Burn Rate (kg/h)</b>   | 2.60   | 5.72   | <b>(lb/h)</b>  |
| <b>Input (kJ/h)</b>       | 51,838 | 49,174 | <b>(Btu/h)</b> |

|                                  |       |       |               |
|----------------------------------|-------|-------|---------------|
| <b>Test Load Weight (dry kg)</b> | 8.26  | 18.21 | <b>dry lb</b> |
| <b>MC wet (%)</b>                | 19.39 |       |               |
| <b>MC dry (%)</b>                | 24.06 |       |               |
| <b>Particulate (g )</b>          | N/A   |       |               |
| <b>CO (g)</b>                    | 343   |       |               |
| <b>Test Duration (h)</b>         | 3.18  |       |               |

| <b>Emissions</b>        | <b>Particulate</b> | <b>CO</b> |
|-------------------------|--------------------|-----------|
| <b>g/MJ Output</b>      | N/A                | 2.72      |
| <b>g/kg Dry Fuel</b>    | N/A                | 41.46     |
| <b>g/h</b>              | N/A                | 107.60    |
| <b>g/min</b>            | N/A                | 1.79      |
| <b>lb/MM Btu Output</b> | N/A                | 0.51      |

|                             |       |
|-----------------------------|-------|
| <b>Air/Fuel Ratio (A/F)</b> | 10.49 |
|-----------------------------|-------|

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# Run 1 TEOM Data

| ET (min) | Ci - 1-min avg PM (ug/m <sup>3</sup> ) | Tunnel dP (in WC) | sqrt dP | Tunnel Temp (F) | Tunnel Temp - 10 minute Avg. (F) | Tunnel RH - 10 minute avg. (%) | Tunnel Velocity - Vsi (ft/s) | Tunnel Flow - Q <sub>std</sub> (m <sup>3</sup> /min) | E <sub>i</sub> (mg) | E <sub>g/hr, i</sub> (g/hr) | PM 5-min Rolling Avg (g/hr) | PM 60-min Rolling Avg (g/hr) | PM (cumulative g) |
|----------|----------------------------------------|-------------------|---------|-----------------|----------------------------------|--------------------------------|------------------------------|------------------------------------------------------|---------------------|-----------------------------|-----------------------------|------------------------------|-------------------|
| 0        | 37                                     | 0.074             | 0.2720  | 68.3            | -                                | -                              | 17.766                       | 23.868                                               | 0.874               | 0.05                        | -                           | -                            | 0.00              |
| 1        | 15797                                  | 0.074             | 0.2720  | 77              | -                                | -                              | 17.912                       | 23.673                                               | 373.968             | 22.44                       | -                           | -                            | 0.37              |
| 2        | 11096                                  | 0.074             | 0.2720  | 90.6            | -                                | -                              | 18.137                       | 23.379                                               | 259.410             | 15.56                       | -                           | -                            | 0.63              |
| 3        | 11242                                  | 0.073             | 0.2702  | 84.3            | -                                | -                              | 17.911                       | 23.354                                               | 262.556             | 15.75                       | -                           | -                            | 0.90              |
| 4        | 14018                                  | 0.073             | 0.2702  | 82.6            | -                                | -                              | 17.883                       | 23.391                                               | 327.894             | 19.67                       | 14.70                       | -                            | 1.22              |
| 5        | 7322                                   | 0.074             | 0.2720  | 82.8            | -                                | -                              | 18.008                       | 23.546                                               | 172.401             | 10.34                       | 16.75                       | -                            | 1.40              |
| 6        | 5053                                   | 0.073             | 0.2702  | 83.5            | -                                | -                              | 17.898                       | 23.371                                               | 118.107             | 7.09                        | 13.68                       | -                            | 1.52              |
| 7        | 2586                                   | 0.075             | 0.2739  | 84.2            | -                                | -                              | 18.153                       | 23.674                                               | 61.232              | 3.67                        | 11.31                       | -                            | 1.58              |
| 8        | 1014                                   | 0.073             | 0.2702  | 84.1            | -                                | -                              | 17.908                       | 23.359                                               | 23.685              | 1.42                        | 8.44                        | -                            | 1.60              |
| 9        | 681                                    | 0.075             | 0.2739  | 84.8            | 82.22                            | 128.09                         | 18.163                       | 23.661                                               | 16.115              | 0.97                        | 4.70                        | -                            | 1.62              |
| 10       | 1211                                   | 0.075             | 0.2739  | 85.9            | 83.98                            | 143.5                          | 18.181                       | 23.637                                               | 28.621              | 1.72                        | 2.97                        | -                            | 1.64              |
| 11       | 1178                                   | 0.074             | 0.2720  | 86.6            | 84.94                            | 159.84                         | 18.071                       | 23.464                                               | 27.643              | 1.66                        | 1.89                        | -                            | 1.67              |
| 12       | 570                                    | 0.073             | 0.2702  | 87.1            | 84.59                            | 176.81                         | 17.957                       | 23.294                                               | 13.274              | 0.80                        | 1.31                        | -                            | 1.69              |
| 13       | 275                                    | 0.073             | 0.2702  | 87.1            | 84.87                            | 193.79                         | 17.957                       | 23.294                                               | 6.401               | 0.38                        | 1.10                        | -                            | 1.69              |
| 14       | 1263                                   | 0.073             | 0.2702  | 87.3            | 85.34                            | 210.21                         | 17.960                       | 23.290                                               | 29.408              | 1.76                        | 1.26                        | -                            | 1.72              |
| 15       | 1883                                   | 0.073             | 0.2702  | 87.9            | 85.85                            | 225.7                          | 17.970                       | 23.277                                               | 43.839              | 2.63                        | 1.45                        | -                            | 1.77              |
| 16       | 1992                                   | 0.075             | 0.2739  | 88              | 86.3                             | 240.3                          | 18.216                       | 23.592                                               | 47.003              | 2.82                        | 1.68                        | -                            | 1.81              |
| 17       | 2872                                   | 0.074             | 0.2720  | 88.2            | 86.7                             | 254.18                         | 18.098                       | 23.430                                               | 67.283              | 4.04                        | 2.33                        | -                            | 1.88              |
| 18       | 21789                                  | 0.072             | 0.2683  | 112.2           | 89.51                            | 267.28                         | 18.238                       | 22.621                                               | 492.869             | 29.57                       | 8.16                        | -                            | 2.37              |
| 19       | 7850                                   | 0.073             | 0.2702  | 99.9            | 91.02                            | 279.83                         | 18.166                       | 23.026                                               | 180.758             | 10.85                       | 9.98                        | -                            | 2.55              |
| 20       | 2222                                   | 0.075             | 0.2739  | 94.5            | 91.88                            | 291.85                         | 18.324                       | 23.453                                               | 52.115              | 3.13                        | 10.08                       | -                            | 2.61              |
| 21       | 1649                                   | 0.075             | 0.2739  | 91.1            | 92.33                            | 303.29                         | 18.268                       | 23.525                                               | 38.786              | 2.33                        | 9.98                        | -                            | 2.64              |
| 22       | 976                                    | 0.073             | 0.2702  | 89.8            | 92.6                             | 314.08                         | 18.001                       | 23.237                                               | 22.676              | 1.36                        | 9.45                        | -                            | 2.67              |
| 23       | 516                                    | 0.074             | 0.2720  | 89.1            | 92.8                             | 324.26                         | 18.113                       | 23.411                                               | 12.087              | 0.73                        | 3.68                        | -                            | 2.68              |
| 24       | 507                                    | 0.073             | 0.2702  | 90              | 93.07                            | 333.83                         | 18.005                       | 23.233                                               | 11.775              | 0.71                        | 1.65                        | -                            | 2.69              |
| 25       | 362                                    | 0.073             | 0.2702  | 90.9            | 93.37                            | 342.83                         | 18.019                       | 23.214                                               | 8.392               | 0.50                        | 1.12                        | -                            | 2.70              |
| 26       | 300                                    | 0.073             | 0.2702  | 91.2            | 93.69                            | 351.26                         | 18.024                       | 23.207                                               | 6.959               | 0.42                        | 0.74                        | -                            | 2.71              |
| 27       | 560                                    | 0.074             | 0.2720  | 89.6            | 93.83                            | 359.02                         | 18.121                       | 23.400                                               | 13.099              | 0.79                        | 0.63                        | -                            | 2.72              |
| 28       | 363                                    | 0.074             | 0.2720  | 87.9            | 91.4                             | 366.6                          | 18.093                       | 23.436                                               | 8.499               | 0.51                        | 0.58                        | -                            | 2.73              |
| 29       | 464                                    | 0.073             | 0.2702  | 86.9            | 90.1                             | 373.88                         | 17.954                       | 23.299                                               | 10.805              | 0.65                        | 0.57                        | -                            | 2.74              |
| 30       | 373                                    | 0.074             | 0.2720  | 86.7            | 89.32                            | 380.72                         | 18.073                       | 23.462                                               | 8.750               | 0.52                        | 0.58                        | -                            | 2.75              |
| 31       | 107                                    | 0.073             | 0.2702  | 86.7            | 88.88                            | 387.42                         | 17.950                       | 23.303                                               | 2.491               | 0.15                        | 0.52                        | -                            | 2.75              |
| 32       | 153                                    | 0.074             | 0.5064  | 87              | 88.6                             | 393.96                         | 33.653                       | 43.664                                               | 6.673               | 0.40                        | 0.45                        | -                            | 2.76              |
| 33       | 321                                    | 0.073             | 0.2702  | 87.5            | 88.44                            | 400.39                         | 17.964                       | 23.286                                               | 7.484               | 0.45                        | 0.43                        | -                            | 2.76              |
| 34       | 84                                     | 0.074             | 0.2720  | 87.7            | 88.21                            | 406.78                         | 18.089                       | 23.440                                               | 1.979               | 0.12                        | 0.33                        | -                            | 2.77              |
| 35       | 75                                     | 0.075             | 0.2739  | 87.5            | 87.87                            | 413.16                         | 18.208                       | 23.603                                               | 1.763               | 0.11                        | 0.24                        | -                            | 2.77              |
| 36       | 108                                    | 0.076             | 0.2757  | 87.7            | 87.52                            | 419.22                         | 18.332                       | 23.755                                               | 2.566               | 0.15                        | 0.25                        | -                            | 2.77              |
| 37       | 118                                    | 0.075             | 0.2739  | 87.1            | 87.27                            | 425.22                         | 18.201                       | 23.611                                               | 2.792               | 0.17                        | 0.20                        | -                            | 2.77              |
| 38       | 142                                    | 0.074             | 0.2720  | 87.1            | 87.19                            | 431.02                         | 18.080                       | 23.453                                               | 3.320               | 0.20                        | 0.15                        | -                            | 2.78              |
| 39       | 229                                    | 0.076             | 0.2757  | 87.2            | 87.22                            | 436.46                         | 18.324                       | 23.766                                               | 5.434               | 0.33                        | 0.19                        | -                            | 2.78              |
| 40       | 115                                    | 0.074             | 0.2720  | 87.6            | 87.31                            | 441.77                         | 18.088                       | 23.443                                               | 2.699               | 0.16                        | 0.20                        | -                            | 2.78              |
| 41       | 41                                     | 0.074             | 0.2720  | 87.9            | 87.43                            | 446.71                         | 18.093                       | 23.436                                               | 0.955               | 0.06                        | 0.18                        | -                            | 2.79              |
| 42       | 83                                     | 0.076             | 0.2757  | 87.9            | 87.52                            | 451.3                          | 18.336                       | 23.751                                               | 1.972               | 0.12                        | 0.17                        | -                            | 2.79              |
| 43       | 57                                     | 0.074             | 0.2720  | 87.9            | 87.56                            | 455.55                         | 18.093                       | 23.436                                               | 1.338               | 0.08                        | 0.15                        | -                            | 2.79              |
| 44       | 127                                    | 0.076             | 0.2757  | 87.8            | 87.57                            | 459.36                         | 18.334                       | 23.753                                               | 3.027               | 0.18                        | 0.12                        | -                            | 2.79              |
| 45       | -37                                    | 0.075             | 0.2739  | 87.8            | 87.6                             | 462.59                         | 18.213                       | 23.596                                               | -0.864              | -0.05                       | 0.08                        | -                            | 2.79              |
| 46       | 34                                     | 0.075             | 0.2739  | 87.9            | 87.62                            | 465.6                          | 18.215                       | 23.594                                               | 0.795               | 0.05                        | 0.08                        | -                            | 2.79              |
| 47       | 50                                     | 0.074             | 0.2720  | 87.8            | 87.69                            | 468.26                         | 18.091                       | 23.438                                               | 1.166               | 0.07                        | 0.07                        | -                            | 2.79              |
| 48       | 49                                     | 0.076             | 0.2757  | 87.8            | 87.76                            | 470.72                         | 18.334                       | 23.753                                               | 1.168               | 0.07                        | 0.06                        | -                            | 2.79              |
| 49       | 104                                    | 0.075             | 0.2739  | 87.8            | 87.82                            | 473.09                         | 18.213                       | 23.596                                               | 2.453               | 0.15                        | 0.06                        | -                            | 2.80              |
| 50       | 98                                     | 0.075             | 0.2739  | 87.7            | 87.83                            | 475.24                         | 18.211                       | 23.598                                               | 2.315               | 0.14                        | 0.09                        | -                            | 2.80              |
| 51       | 527                                    | 0.076             | 0.2757  | 87.7            | 87.81                            | 477.22                         | 18.332                       | 23.755                                               | 12.529              | 0.75                        | 0.24                        | -                            | 2.81              |
| 52       | 950                                    | 0.074             | 0.2720  | 87.8            | 87.8                             | 479.12                         | 18.091                       | 23.438                                               | 22.278              | 1.34                        | 0.49                        | -                            | 2.83              |
| 53       | 1232                                   | 0.075             | 0.2739  | 87.7            | 87.78                            | 481.02                         | 18.211                       | 23.598                                               | 29.062              | 1.74                        | 0.82                        | -                            | 2.86              |
| 54       | 1075                                   | 0.076             | 0.2757  | 87.5            | 87.75                            | 482.96                         | 18.329                       | 23.759                                               | 25.530              | 1.53                        | 1.10                        | -                            | 2.89              |
| 55       | 821                                    | 0.075             | 0.2739  | 87.5            | 87.72                            | 484.95                         | 18.208                       | 23.603                                               | 19.370              | 1.16                        | 1.31                        | -                            | 2.91              |
| 56       | 532                                    | 0.074             | 0.2720  | 87.6            | 87.69                            | 486.92                         | 18.088                       | 23.443                                               | 12.475              | 0.75                        | 1.30                        | -                            | 2.92              |
| 57       | 640                                    | 0.074             | 0.2720  | 87.6            | 87.67                            | 488.82                         | 18.088                       | 23.443                                               | 14.997              | 0.90                        | 1.22                        | -                            | 2.94              |
| 58       | 770                                    | 0.074             | 0.2720  | 87.5            | 87.64                            | 490.61                         | 18.086                       | 23.445                                               | 18.055              | 1.08                        | 1.09                        | -                            | 2.95              |
| 59       | 828                                    | 0.075             | 0.2739  | 87.5            | 87.61                            | 492.35                         | 18.208                       | 23.603                                               | 19.542              | 1.17                        | 1.01                        | 3.04                         | 2.97              |
| 60       | 1075                                   | 0.075             | 0.2739  | 87.3            | 87.57                            | 494                            | 18.205                       | 23.607                                               | 25.376              | 1.52                        | 1.09                        | 3.05                         | 3.00              |
| 61       | 1043                                   | 0.075             | 0.2739  | 87.5            | 87.55                            | 495.59                         | 18.208                       | 23.603                                               | 24.613              | 1.48                        | 1.23                        | 2.69                         | 3.02              |
| 62       | 1413                                   | 0.075             | 0.2739  | 87.4            | 87.51                            | 497.1                          | 18.206                       | 23.605                                               | 33.350              | 2.00                        | 1.45                        | 2.45                         | 3.06              |
| 63       | 1330                                   | 0.074             | 0.2720  | 87.4            | 87.48                            | 498.44                         | 18.085                       | 23.447                                               | 31.185              | 1.87                        | 1.61                        | 2.20                         | 3.09              |
| 64       | 1550                                   | 0.076             | 0.2757  | 87.3            | 87.46                            | 499.65                         | 18.326                       | 23.764                                               | 36.841              | 2.21                        | 1.82                        | 1.89                         | 3.12              |
| 65       | 2098                                   | 0.075             | 0.2739  | 87.3            | 87.44                            | 500.78                         | 18.205                       | 23.607                                               | 49.520              | 2.97                        | 2.11                        | 1.75                         | 3.17              |
| 66       | 1857                                   | 0.075             | 0.2739  | 87.3            | 87.41                            | 501.82                         | 18.205                       | 23.607                                               | 43.829              | 2.63                        | 2.34                        | 1.66                         | 3.22              |
| 67       | 2216                                   | 0.076             | 0.2757  | 87.3            | 87.38                            | 502.83                         | 18.326                       | 23.764                                               | 52.658              | 3.16                        | 2.57                        | 1.65                         | 3.27              |
| 68       | 1936                                   | 0.076             | 0.2757  | 87.1            | 87.34                            | 503.77                         | 18.322                       | 23.768                                               | 46.009              | 2.76                        | 2.75                        | 1.67                         | 3.32              |
| 69       | 2611                                   | 0.077             | 0.2775  | 87.1            | 87.3                             | 504.63                         | 18.442                       | 23.924                                               | 62.476              | 3.75                        | 3.05                        | 1.71                         | 3.38              |
| 70       |                                        | 0.075             | 0.2739  | 87.1            | 87.28                            | 505.5                          |                              |                                                      |                     |                             | 3.07                        | 1.73                         |                   |
| 71       |                                        | 0.075             | 0.2739  | 87.1            | 87.24                            | 506.29                         |                              |                                                      |                     |                             | 3.22                        | 1.76                         |                   |
| 72       |                                        | 0.075             | 0.2739  | 86.9            | 87.19                            | 507.01                         |                              |                                                      |                     |                             | 3.25                        | 1.78                         |                   |
| 73       | 2851                                   | 0.075             | 0.2739  | 87              | 87.15                            | 507.7                          | 18.200                       | 23.613                                               | 67.329              | 4.04                        | 3.89                        | 1.81                         | 3.45              |
| 74       | 2105                                   | 0.075             | 0.2739  | 86.5            | 87.07                            | 508.28                         | 18.191                       | 23.624                                               | 49.733              | 2.98                        | 3.51                        | 1.81                         | 3.50              |
| 75       | 4267                                   | 0.074             | 0.2720  | 108             | 89.14                            | 509.15                         | 18.422                       | 23.017                                               | 98.207              | 5.89                        | 4.31                        | 1.83                         | 3.59              |
| 76       | 4609                                   | 0.076             | 0.2757  | 101.8           | 90.59                            | 510.53                         | 18.567                       | 23.455                                               | 108.092             | 6.49                        | 4.85                        | 1.84                         | 3.70              |
| 77       | 1909                                   | 0.075             | 0.2739  | 95.6            | 91.42                            | 511.48                         | 18.342                       | 23.430                                               | 44.724              | 2.68                        | 4.42                        | 1.87                         | 3.75              |
| 78       | 481                                    | 0.075             | 0.2739  | 91.4            | 91.85                            | 512.55                         | 18.273                       | 23.519                                               | 11.316              | 0.68                        | 3.74                        | 1.45                         | 3.76              |
| 79       | 346                                    | 0.075             | 0.2739  | 88              | 91.94                            | 513.72                         | 18.216                       | 23.592                                               | 8.172               | 0.49                        | 3.25                        | 1.30                         | 3.77              |
| 80       | 1048                                   | 0.075             | 0.2739  | 86.6            | 91.89                            | 515.08                         | 18.193                       | 23.622                                               | 24.751              | 1.49                        | 2.36                        | 1.26                         | 3.79              |
| 81       | 492                                    | 0.074             | 0.2720  | 86.1            | 91.79                            | 516.87                         | 18.063                       | 23.475                                               | 11.544              | 0.69                        | 1.21                        | 1.22                         | 3.80              |
| 82       | 884                                    | 0.074             | 0.2720  | 85.5            | 91.65                            | 518.54                         | 18.053                       | 23.488                                               | 20.755              | 1.25                        | 0.92                        | 1.23                         | 3.82              |
| 83       | 945                                    | 0.074             | 0.2720  | 85.4            | 91.49                            | 520.72                         | 18.051                       | 23.490                                               | 22.188              | 1.33                        | 1.05                        | 1.23                         | 3.85              |
| 84       | 871                                    | 0.075             | 0.2739  | 85.2            | 91.36                            | 522.88                         | 18.170                       | 23.652                                               | 20.608              | 1.24                        | 1.20                        | 1.24                         | 3.87              |

# Run 1 TEOM Data

|     |       |       |        |       |       |        |        |        |         |       |       |      |      |
|-----|-------|-------|--------|-------|-------|--------|--------|--------|---------|-------|-------|------|------|
| 85  | 608   | 0.077 | 0.2775 | 85.1  | 89.07 | 524.72 | 18.409 | 23.968 | 14.566  | 0.87  | 1.08  | 1.25 | 3.88 |
| 86  | 685   | 0.076 | 0.2757 | 84.9  | 87.38 | 526.02 | 18.285 | 23.816 | 16.318  | 0.98  | 1.13  | 1.27 | 3.90 |
| 87  | 671   | 0.076 | 0.2757 | 84.7  | 86.29 | 527.83 | 18.282 | 23.821 | 15.986  | 0.96  | 1.08  | 1.27 | 3.91 |
| 88  | 595   | 0.073 | 0.2702 | 84.6  | 85.61 | 529.55 | 17.916 | 23.348 | 13.896  | 0.83  | 0.98  | 1.28 | 3.93 |
| 89  | 601   | 0.075 | 0.2739 | 84.6  | 85.27 | 531.52 | 18.160 | 23.665 | 14.234  | 0.85  | 0.90  | 1.28 | 3.94 |
| 90  | 505   | 0.075 | 0.2739 | 84.6  | 85.07 | 533.56 | 18.160 | 23.665 | 11.950  | 0.72  | 0.87  | 1.29 | 3.95 |
| 91  | 297   | 0.075 | 0.2739 | 84.7  | 84.93 | 535.39 | 18.161 | 23.663 | 7.017   | 0.42  | 0.76  | 1.30 | 3.96 |
| 92  | 343   | 0.077 | 0.2775 | 84.5  | 84.83 | 537.62 | 18.399 | 23.981 | 8.227   | 0.49  | 0.66  | 1.31 | 3.97 |
| 93  | 284   | 0.077 | 0.2775 | 84.4  | 84.73 | 539.56 | 18.397 | 23.983 | 6.814   | 0.41  | 0.58  | 1.30 | 3.97 |
| 94  | 469   | 0.075 | 0.2739 | 84.3  | 84.64 | 541.7  | 18.155 | 23.672 | 11.103  | 0.67  | 0.54  | 1.31 | 3.99 |
| 95  | 452   | 0.075 | 0.2739 | 84.3  | 84.56 | 543.93 | 18.155 | 23.672 | 10.704  | 0.64  | 0.53  | 1.32 | 4.00 |
| 96  | 387   | 0.075 | 0.2739 | 84.3  | 84.5  | 546.26 | 18.155 | 23.672 | 9.168   | 0.55  | 0.55  | 1.33 | 4.01 |
| 97  | 352   | 0.074 | 0.2720 | 84.4  | 84.47 | 548.52 | 18.035 | 23.512 | 8.272   | 0.50  | 0.55  | 1.33 | 4.01 |
| 98  | 312   | 0.075 | 0.2739 | 84.3  | 84.44 | 550.78 | 18.155 | 23.672 | 7.382   | 0.44  | 0.56  | 1.34 | 4.02 |
| 99  | 260   | 0.076 | 0.2757 | 84.1  | 84.39 | 552.66 | 18.272 | 23.834 | 6.199   | 0.37  | 0.50  | 1.34 | 4.03 |
| 100 | 305   | 0.076 | 0.2757 | 84    | 84.33 | 554.24 | 18.270 | 23.836 | 7.263   | 0.44  | 0.46  | 1.35 | 4.04 |
| 101 | 269   | 0.076 | 0.2757 | 84    | 84.26 | 555.55 | 18.270 | 23.836 | 6.420   | 0.39  | 0.43  | 1.36 | 4.04 |
| 102 | 135   | 0.077 | 0.2775 | 83.8  | 84.19 | 556.59 | 18.387 | 23.997 | 3.245   | 0.19  | 0.37  | 1.36 | 4.04 |
| 103 | 122   | 0.077 | 0.2775 | 83.6  | 84.11 | 557.32 | 18.383 | 24.001 | 2.935   | 0.18  | 0.31  | 1.37 | 4.05 |
| 104 | 152   | 0.075 | 0.2739 | 83.5  | 84.03 | 557.79 | 18.141 | 23.689 | 3.613   | 0.22  | 0.28  | 1.37 | 4.05 |
| 105 | 99    | 0.076 | 0.2757 | 83.3  | 83.93 | 558.01 | 18.259 | 23.851 | 2.371   | 0.14  | 0.22  | 1.37 | 4.05 |
| 106 | 15    | 0.076 | 0.2757 | 83    | 83.8  | 557.86 | 18.253 | 23.858 | 0.365   | 0.02  | 0.15  | 1.37 | 4.05 |
| 107 | 34    | 0.076 | 0.2757 | 83.1  | 83.67 | 557.43 | 18.255 | 23.856 | 0.812   | 0.05  | 0.12  | 1.38 | 4.05 |
| 108 | -23   | 0.076 | 0.2757 | 83.3  | 83.57 | 556.68 | 18.259 | 23.851 | -0.548  | -0.03 | 0.08  | 1.37 | 4.05 |
| 109 | 117   | 0.078 | 0.2793 | 83.2  | 83.48 | 555.67 | 18.496 | 24.165 | 2.819   | 0.17  | 0.07  | 1.37 | 4.06 |
| 110 | 87    | 0.075 | 0.2739 | 83.2  | 83.4  | 554.35 | 18.136 | 23.696 | 2.069   | 0.12  | 0.07  | 1.37 | 4.06 |
| 111 | 2     | 0.075 | 0.2739 | 83.1  | 83.31 | 552.83 | 18.135 | 23.698 | 0.053   | 0.00  | 0.06  | 1.36 | 4.06 |
| 112 | 43    | 0.076 | 0.2757 | 83    | 83.23 | 551.09 | 18.253 | 23.858 | 1.030   | 0.06  | 0.07  | 1.34 | 4.06 |
| 113 | 105   | 0.077 | 0.2775 | 84    | 83.27 | 549.82 | 18.390 | 23.992 | 2.526   | 0.15  | 0.10  | 1.31 | 4.06 |
| 114 | 84    | 0.078 | 0.2793 | 87    | 83.62 | 549.19 | 18.560 | 24.081 | 2.035   | 0.12  | 0.09  | 1.28 | 4.06 |
| 115 | 110   | 0.076 | 0.2757 | 88.2  | 84.11 | 548.89 | 18.341 | 23.744 | 2.601   | 0.16  | 0.10  | 1.26 | 4.07 |
| 116 | 346   | 0.076 | 0.2757 | 88.7  | 84.68 | 548.95 | 18.349 | 23.733 | 8.204   | 0.49  | 0.20  | 1.25 | 4.08 |
| 117 | 159   | 0.074 | 0.2720 | 88.9  | 85.26 | 549.36 | 18.109 | 23.415 | 3.727   | 0.22  | 0.23  | 1.24 | 4.08 |
| 118 | 70    | 0.076 | 0.2757 | 88.5  | 85.78 | 550.09 | 18.346 | 23.738 | 1.652   | 0.10  | 0.22  | 1.22 | 4.08 |
| 119 | 7     | 0.076 | 0.2757 | 85    | 85.96 | 550.15 | 18.287 | 23.814 | 0.158   | 0.01  | 0.20  | 1.21 | 4.08 |
| 120 |       | 0.075 | 0.2739 | 83.2  | 85.96 | 550.05 |        |        |         |       | 0.21  | 1.18 |      |
| 121 |       | 0.075 | 0.2739 | 82.5  | 85.9  | 549.77 |        |        |         |       | 0.11  | 1.15 |      |
| 122 |       | 0.076 | 0.2757 | 82.6  | 85.86 | 549.36 |        |        |         |       | 0.05  | 1.14 |      |
| 123 | -175  | 0.076 | 0.2757 | 82.7  | 85.73 | 548.18 | 18.248 | 23.864 | -4.178  | -0.25 | -0.12 | 1.13 | 4.08 |
| 124 | 38    | 0.076 | 0.2757 | 83.7  | 85.4  | 546.67 | 18.265 | 23.842 | 0.898   | 0.05  | -0.10 | 1.10 | 4.08 |
| 125 | 191   | 0.077 | 0.2775 | 87    | 85.28 | 545.43 | 18.441 | 23.926 | 4.563   | 0.27  | 0.03  | 1.04 | 4.08 |
| 126 | 226   | 0.075 | 0.2739 | 88.1  | 85.22 | 544.23 | 18.218 | 23.590 | 5.321   | 0.32  | 0.10  | 0.99 | 4.09 |
| 127 | 273   | 0.077 | 0.2775 | 88.5  | 85.18 | 542.92 | 18.466 | 23.893 | 6.530   | 0.39  | 0.16  | 0.94 | 4.09 |
| 128 | 559   | 0.075 | 0.2739 | 88.7  | 85.2  | 541.55 | 18.228 | 23.577 | 13.188  | 0.79  | 0.37  | 0.89 | 4.11 |
| 129 | 552   | 0.075 | 0.2739 | 88.9  | 85.59 | 541.07 | 18.231 | 23.572 | 13.007  | 0.78  | 0.51  | 0.83 | 4.12 |
| 130 | 1919  | 0.075 | 0.2739 | 88.8  | 86.15 | 540.97 | 18.230 | 23.575 | 45.237  | 2.71  | 1.00  | 0.83 | 4.17 |
| 131 | 35674 | 0.075 | 0.2739 | 88.6  | 86.76 | 541.23 | 18.226 | 23.579 | 841.149 | 50.47 | 11.03 | 0.82 | 5.01 |
| 132 | 6333  | 0.078 | 0.2793 | 88.4  | 87.34 | 541.73 | 18.584 | 24.050 | 152.308 | 9.14  | 12.78 | 0.86 | 5.16 |
| 133 | 4317  | 0.075 | 0.2739 | 111.5 | 90.22 | 542.08 | 18.603 | 23.101 | 99.732  | 5.98  | 13.82 | 1.70 | 5.26 |
| 134 | 5038  | 0.074 | 0.2720 | 104.1 | 92.26 | 541.85 | 18.358 | 23.097 | 116.360 | 6.98  | 15.06 | 1.81 | 5.38 |
| 135 | 2149  | 0.075 | 0.2739 | 98.8  | 93.44 | 541.29 | 18.395 | 23.363 | 50.198  | 3.01  | 15.12 | 1.82 | 5.43 |
| 136 | 2186  | 0.075 | 0.2739 | 93.1  | 93.94 | 540.13 | 18.301 | 23.483 | 51.343  | 3.08  | 5.64  | 1.83 | 5.48 |
| 137 | 2781  | 0.074 | 0.2720 | 89    | 93.99 | 538.82 | 18.111 | 23.413 | 65.112  | 3.91  | 4.59  | 1.83 | 5.54 |
| 138 | 1398  | 0.075 | 0.2739 | 86.7  | 93.79 | 537.44 | 18.195 | 23.620 | 33.020  | 1.98  | 3.79  | 1.88 | 5.57 |
| 139 | 1007  | 0.073 | 0.2702 | 86.2  | 93.52 | 536.25 | 17.942 | 23.314 | 23.473  | 1.41  | 2.68  | 1.94 | 5.60 |
| 140 | 950   | 0.074 | 0.2720 | 85.6  | 93.2  | 535.15 | 18.055 | 23.486 | 22.307  | 1.34  | 2.34  | 1.95 | 5.62 |
| 141 | 898   | 0.076 | 0.2757 | 85.1  | 92.85 | 534.2  | 18.289 | 23.812 | 21.388  | 1.28  | 1.98  | 1.96 | 5.64 |
| 142 | 811   | 0.074 | 0.2720 | 85    | 92.51 | 533.46 | 18.045 | 23.499 | 19.059  | 1.14  | 1.43  | 1.96 | 5.66 |
| 143 | 863   | 0.075 | 0.2739 | 84.8  | 89.84 | 533.44 | 18.163 | 23.661 | 20.416  | 1.22  | 1.28  | 1.96 | 5.68 |
| 144 | 1041  | 0.075 | 0.2739 | 85    | 87.93 | 533.99 | 18.166 | 23.657 | 24.618  | 1.48  | 1.29  | 1.96 | 5.71 |
| 145 | 959   | 0.075 | 0.2739 | 84.8  | 86.53 | 534.53 | 18.163 | 23.661 | 22.701  | 1.36  | 1.30  | 1.96 | 5.73 |
| 146 | 855   | 0.076 | 0.2757 | 84.9  | 85.71 | 535.71 | 18.285 | 23.816 | 20.356  | 1.22  | 1.29  | 1.97 | 5.75 |
| 147 | 715   | 0.076 | 0.2757 | 85    | 85.31 | 537.19 | 18.287 | 23.814 | 17.024  | 1.02  | 1.26  | 1.98 | 5.77 |
| 148 | 671   | 0.075 | 0.2739 | 85    | 85.14 | 538.94 | 18.166 | 23.657 | 15.869  | 0.95  | 1.21  | 1.99 | 5.78 |
| 149 | 609   | 0.074 | 0.2720 | 85    | 85.02 | 540.76 | 18.045 | 23.499 | 14.311  | 0.86  | 1.08  | 1.99 | 5.80 |
| 150 | 521   | 0.074 | 0.2720 | 84.9  | 84.95 | 542.72 | 18.043 | 23.501 | 12.236  | 0.73  | 0.96  | 2.00 | 5.81 |
| 151 | 447   | 0.075 | 0.2739 | 84.9  | 84.93 | 544.76 | 18.165 | 23.659 | 10.577  | 0.63  | 0.84  | 2.00 | 5.82 |
| 152 | 369   | 0.075 | 0.2739 | 84.9  | 84.92 | 546.9  | 18.165 | 23.659 | 8.738   | 0.52  | 0.74  | 2.01 | 5.83 |
| 153 | 391   | 0.077 | 0.2775 | 85.1  | 84.95 | 549.1  | 18.409 | 23.968 | 9.375   | 0.56  | 0.66  | 2.01 | 5.84 |
| 154 | 374   | 0.076 | 0.2757 | 84.9  | 84.94 | 551.22 | 18.285 | 23.816 | 8.916   | 0.53  | 0.60  | 2.01 | 5.85 |
| 155 | 374   | 0.074 | 0.2720 | 84.9  | 84.95 | 553.31 | 18.043 | 23.501 | 8.798   | 0.53  | 0.56  | 2.01 | 5.86 |
| 156 | 330   | 0.075 | 0.2739 | 85    | 84.96 | 555.29 | 18.166 | 23.657 | 7.814   | 0.47  | 0.52  | 2.01 | 5.86 |
| 157 | 352   | 0.075 | 0.2739 | 85    | 84.96 | 557.26 | 18.166 | 23.657 | 8.320   | 0.50  | 0.52  | 2.01 | 5.87 |
| 158 | 344   | 0.074 | 0.2720 | 84.9  | 84.95 | 559.06 | 18.043 | 23.501 | 8.076   | 0.48  | 0.50  | 2.01 | 5.88 |
| 159 | 482   | 0.075 | 0.2739 | 84.9  | 84.94 | 560.71 | 18.165 | 23.659 | 11.403  | 0.68  | 0.53  | 2.01 | 5.89 |
| 160 | 345   | 0.073 | 0.2702 | 85    | 84.95 | 562.23 | 17.923 | 23.339 | 8.048   | 0.48  | 0.52  | 2.01 | 5.90 |
| 161 | 336   | 0.075 | 0.2739 | 84.8  | 84.94 | 563.58 | 18.163 | 23.661 | 7.941   | 0.48  | 0.53  | 2.02 | 5.91 |
| 162 | 280   | 0.074 | 0.2720 | 85    | 84.95 | 564.84 | 18.045 | 23.499 | 6.580   | 0.39  | 0.50  | 2.02 | 5.91 |
| 163 | 295   | 0.076 | 0.2757 | 84.7  | 84.91 | 565.87 | 18.282 | 23.821 | 7.018   | 0.42  | 0.49  | 2.03 | 5.92 |
| 164 | 171   | 0.075 | 0.2739 | 84.7  | 84.89 | 566.82 | 18.161 | 23.663 | 4.053   | 0.24  | 0.40  | 2.03 | 5.92 |
| 165 | 141   | 0.075 | 0.2739 | 84.9  | 84.89 | 567.71 | 18.165 | 23.659 | 3.338   | 0.20  | 0.35  | 2.04 | 5.93 |
| 166 | 117   | 0.074 | 0.2720 | 84.8  | 84.87 | 568.51 | 18.042 | 23.503 | 2.750   | 0.17  | 0.28  | 2.04 | 5.93 |
| 167 | 101   | 0.074 | 0.2720 | 84.8  | 84.85 | 569.1  | 18.042 | 23.503 | 2.375   | 0.14  | 0.23  | 2.04 | 5.93 |
| 168 | 140   | 0.076 | 0.2757 | 84.8  | 84.84 | 569.66 | 18.284 | 23.818 | 3.326   | 0.20  | 0.19  | 2.05 | 5.94 |
| 169 | 7     | 0.076 | 0.2757 | 84.5  | 84.8  | 570.08 | 18.279 | 23.825 | 0.169   | 0.01  | 0.14  | 2.05 | 5.94 |
| 170 | 171   | 0.075 | 0.2739 | 84.5  | 84.75 | 570.39 | 18.158 | 23.668 | 4.053   | 0.24  | 0.15  | 2.05 | 5.94 |
| 171 | 220   | 0.076 | 0.2757 | 84.5  | 84.72 | 570.63 | 18.279 | 23.825 | 5.243   | 0.31  | 0.18  | 2.05 | 5.95 |
| 172 | 244   | 0.075 | 0.2739 | 84.4  | 84.66 | 570.67 | 18.156 | 23.670 | 5.778   | 0.35  | 0.22  | 2.05 | 5.95 |

# Run 1 TEOM Data

|     |     |       |        |      |       |        |        |        |        |      |      |      |      |
|-----|-----|-------|--------|------|-------|--------|--------|--------|--------|------|------|------|------|
| 173 | 143 | 0.074 | 0.2720 | 84.2 | 84.61 | 570.67 | 18.032 | 23.516 | 3.365  | 0.20 | 0.22 | 2.05 | 5.95 |
| 174 | 148 | 0.075 | 0.2739 | 84.5 | 84.59 | 570.55 | 18.158 | 23.668 | 3.502  | 0.21 | 0.26 | 2.06 | 5.96 |
| 175 | 142 | 0.074 | 0.2720 | 84.3 | 84.53 | 570.26 | 18.033 | 23.514 | 3.346  | 0.20 | 0.25 | 2.06 | 5.96 |
| 176 | 174 | 0.076 | 0.2757 | 84.4 | 84.49 | 570.05 | 18.277 | 23.827 | 4.146  | 0.25 | 0.24 | 2.05 | 5.97 |
| 177 | 116 | 0.074 | 0.2720 | 84.6 | 84.47 | 569.61 | 18.038 | 23.507 | 2.728  | 0.16 | 0.21 | 2.05 | 5.97 |
| 178 | 209 | 0.075 | 0.2739 | 84.6 | 84.45 | 569.37 | 18.160 | 23.665 | 4.940  | 0.30 | 0.22 | 2.06 | 5.97 |
| 179 | 234 | 0.074 | 0.2720 | 84.9 | 84.49 | 569.37 | 18.043 | 23.501 | 5.507  | 0.33 | 0.25 | 2.06 | 5.98 |
| 180 | 103 | 0.076 | 0.2757 | 85.1 | 84.55 | 569.49 | 18.289 | 23.812 | 2.449  | 0.15 | 0.24 | 2.03 | 5.98 |
| 181 | 201 | 0.074 | 0.2720 | 85.1 | 84.61 | 569.69 | 18.047 | 23.496 | 4.733  | 0.28 | 0.24 | 2.00 | 5.99 |
| 182 | 165 | 0.075 | 0.2739 | 85.2 | 84.69 | 569.99 | 18.170 | 23.652 | 3.894  | 0.23 | 0.26 | 1.97 | 5.99 |
| 183 | 202 | 0.076 | 0.2757 | 85.3 | 84.8  | 570.2  | 18.292 | 23.807 | 4.816  | 0.29 | 0.26 | 1.97 | 5.99 |
| 184 | 135 | 0.076 | 0.2757 | 85.3 | 84.88 | 570.29 | 18.292 | 23.807 | 3.226  | 0.19 | 0.23 | 1.98 | 6.00 |
| 185 | 188 | 0.075 | 0.2739 | 85.1 | 84.96 | 570.75 | 18.168 | 23.655 | 4.450  | 0.27 | 0.25 | 1.98 | 6.00 |
| 186 | 246 | 0.076 | 0.2757 | 85   | 85.02 | 570.93 | 18.287 | 23.814 | 5.847  | 0.35 | 0.27 | 1.98 | 6.01 |
| 187 | 280 | 0.075 | 0.2739 | 85   | 85.06 | 571.51 | 18.166 | 23.657 | 6.635  | 0.40 | 0.30 | 1.97 | 6.01 |
| 188 | 254 | 0.075 | 0.2739 | 85   | 85.1  | 571.48 | 18.166 | 23.657 | 6.016  | 0.36 | 0.31 | 1.97 | 6.02 |
| 189 | 411 | 0.074 | 0.2720 | 84.8 | 85.09 | 571.09 | 18.042 | 23.503 | 9.659  | 0.58 | 0.39 | 1.96 | 6.03 |
| 190 | 222 | 0.075 | 0.2739 | 84.7 | 85.05 | 570.52 | 18.161 | 23.663 | 5.262  | 0.32 | 0.40 | 1.92 | 6.04 |
| 191 | 177 | 0.074 | 0.2720 | 84.5 | 84.99 | 569.8  | 18.037 | 23.509 | 4.150  | 0.25 | 0.38 | 1.06 | 6.04 |
| 192 | 149 | 0.075 | 0.2739 | 84.7 | 84.94 | 569.04 | 18.161 | 23.663 | 3.535  | 0.21 | 0.34 | 0.91 | 6.04 |
| 193 | 117 | 0.075 | 0.2739 | 84.4 | 84.85 | 568.29 | 18.156 | 23.670 | 2.761  | 0.17 | 0.30 | 0.81 | 6.05 |
| 194 | 139 | 0.075 | 0.2739 | 84.3 | 84.75 | 567.67 | 18.155 | 23.672 | 3.279  | 0.20 | 0.23 | 0.69 | 6.05 |
| 195 | 179 | 0.075 | 0.2739 | 84.6 | 84.7  | 567.1  | 18.160 | 23.665 | 4.242  | 0.25 | 0.22 | 0.64 | 6.05 |
| 196 | 151 | 0.075 | 0.2739 | 84.5 | 84.65 | 566.83 | 18.158 | 23.668 | 3.577  | 0.21 | 0.21 | 0.59 | 6.06 |
| 197 | 62  | 0.075 | 0.2739 | 84.6 | 84.61 | 566.47 | 18.160 | 23.665 | 1.464  | 0.09 | 0.18 | 0.53 | 6.06 |
| 198 | 44  | 0.075 | 0.2739 | 84.6 | 84.57 | 566.51 | 18.160 | 23.665 | 1.037  | 0.06 | 0.16 | 0.50 | 6.06 |
| 199 | 99  | 0.078 | 0.2793 | 84.6 | 84.55 | 566.56 | 18.519 | 24.134 | 2.393  | 0.14 | 0.15 | 0.48 | 6.06 |
| 200 | 142 | 0.076 | 0.2757 | 84.6 | 84.54 | 566.36 | 18.280 | 23.823 | 3.377  | 0.20 | 0.14 | 0.45 | 6.07 |
| 201 | 221 | 0.075 | 0.2739 | 84.2 | 84.51 | 565.94 | 18.153 | 23.674 | 5.243  | 0.31 | 0.16 | 0.43 | 6.07 |
| 202 | 128 | 0.074 | 0.2720 | 84   | 84.44 | 565.35 | 18.028 | 23.520 | 3.022  | 0.18 | 0.18 | 0.42 | 6.07 |
| 203 | 108 | 0.075 | 0.2739 | 83.9 | 84.39 | 564.71 | 18.148 | 23.681 | 2.550  | 0.15 | 0.20 | 0.40 | 6.08 |
| 204 | 118 | 0.076 | 0.2757 | 83.8 | 84.34 | 564.23 | 18.267 | 23.840 | 2.817  | 0.17 | 0.20 | 0.38 | 6.08 |
| 205 | 124 | 0.075 | 0.2739 | 83.8 | 84.26 | 563.49 | 18.146 | 23.683 | 2.926  | 0.18 | 0.20 | 0.36 | 6.08 |
| 206 | 187 | 0.074 | 0.2720 | 84   | 84.21 | 562.66 | 18.028 | 23.520 | 4.409  | 0.26 | 0.19 | 0.34 | 6.09 |
| 207 | 212 | 0.075 | 0.2739 | 84.1 | 84.16 | 561.8  | 18.151 | 23.676 | 5.029  | 0.30 | 0.21 | 0.33 | 6.09 |
| 208 | 151 | 0.075 | 0.2739 | 84.1 | 84.11 | 560.85 | 18.151 | 23.676 | 3.581  | 0.21 | 0.23 | 0.32 | 6.10 |
| 209 | 100 | 0.078 | 0.2793 | 84.1 | 84.06 | 559.94 | 18.511 | 24.145 | 2.405  | 0.14 | 0.22 | 0.31 | 6.10 |
| 210 | 119 | 0.077 | 0.2775 | 83.9 | 83.99 | 559.34 | 18.388 | 23.994 | 2.844  | 0.17 | 0.22 | 0.30 | 6.10 |
| 211 | 84  | 0.074 | 0.2720 | 84.1 | 83.98 | 559.13 | 18.030 | 23.518 | 1.983  | 0.12 | 0.19 | 0.29 | 6.10 |
| 212 | 108 | 0.077 | 0.2775 | 84.1 | 83.99 | 559.17 | 18.392 | 23.990 | 2.592  | 0.16 | 0.16 | 0.28 | 6.11 |
| 213 | 160 | 0.075 | 0.2739 | 84.1 | 84.01 | 559.36 | 18.151 | 23.676 | 3.793  | 0.23 | 0.16 | 0.27 | 6.11 |
| 214 | 88  | 0.076 | 0.2757 | 84   | 84.03 | 559.47 | 18.270 | 23.836 | 2.104  | 0.13 | 0.16 | 0.27 | 6.11 |
| 215 | 41  | 0.076 | 0.2757 | 83.8 | 84.03 | 559.55 | 18.267 | 23.840 | 0.983  | 0.06 | 0.14 | 0.26 | 6.11 |
| 216 | 18  | 0.075 | 0.2739 | 83.9 | 84.02 | 559.61 | 18.148 | 23.681 | 0.434  | 0.03 | 0.12 | 0.26 | 6.11 |
| 217 | 64  | 0.076 | 0.2757 | 84   | 84.01 | 559.68 | 18.270 | 23.836 | 1.535  | 0.09 | 0.11 | 0.25 | 6.11 |
| 218 | 104 | 0.075 | 0.2739 | 83.9 | 83.99 | 559.81 | 18.148 | 23.681 | 2.468  | 0.15 | 0.09 | 0.24 | 6.12 |
| 219 | 114 | 0.076 | 0.2757 | 83.8 | 83.96 | 560.06 | 18.267 | 23.840 | 2.727  | 0.16 | 0.10 | 0.23 | 6.12 |
| 220 | 93  | 0.076 | 0.2757 | 83.8 | 83.95 | 560.29 | 18.267 | 23.840 | 2.218  | 0.13 | 0.11 | 0.23 | 6.12 |
| 221 | 143 | 0.076 | 0.2757 | 83.7 | 83.91 | 560.42 | 18.265 | 23.842 | 3.415  | 0.20 | 0.15 | 0.22 | 6.12 |
| 222 | 97  | 0.076 | 0.2757 | 83.7 | 83.87 | 560.51 | 18.265 | 23.842 | 2.323  | 0.14 | 0.16 | 0.22 | 6.13 |
| 223 | 63  | 0.076 | 0.2757 | 83.8 | 83.84 | 560.55 | 18.267 | 23.840 | 1.508  | 0.09 | 0.15 | 0.21 | 6.13 |
| 224 | 99  | 0.076 | 0.2757 | 83.7 | 83.81 | 560.56 | 18.265 | 23.842 | 2.358  | 0.14 | 0.14 | 0.21 | 6.13 |
| 225 | 12  | 0.075 | 0.2739 | 83.4 | 83.77 | 560.53 | 18.140 | 23.692 | 0.277  | 0.02 | 0.12 | 0.21 | 6.13 |
| 226 | 135 | 0.075 | 0.2739 | 83.3 | 83.71 | 560.42 | 18.138 | 23.694 | 3.201  | 0.19 | 0.12 | 0.21 | 6.13 |
| 227 | 129 | 0.076 | 0.2757 | 83.3 | 83.64 | 560.18 | 18.259 | 23.851 | 3.073  | 0.18 | 0.12 | 0.21 | 6.14 |
| 228 | 28  | 0.077 | 0.2775 | 83.1 | 83.56 | 559.89 | 18.375 | 24.012 | 0.680  | 0.04 | 0.12 | 0.21 | 6.14 |
| 229 | 59  | 0.078 | 0.2793 | 83.1 | 83.49 | 559.48 | 18.494 | 24.168 | 1.427  | 0.09 | 0.10 | 0.21 | 6.14 |
| 230 | 83  | 0.076 | 0.2757 | 82.9 | 83.4  | 559.07 | 18.252 | 23.860 | 1.977  | 0.12 | 0.12 | 0.20 | 6.14 |
| 231 | 39  | 0.077 | 0.2775 | 82.9 | 83.32 | 558.6  | 18.371 | 24.017 | 0.934  | 0.06 | 0.10 | 0.20 | 6.14 |
| 232 | 2   | 0.075 | 0.2739 | 82.7 | 83.22 | 558    | 18.128 | 23.707 | 0.051  | 0.00 | 0.06 | 0.20 | 6.14 |
| 233 | 48  | 0.076 | 0.2757 | 82.7 | 83.11 | 557.31 | 18.248 | 23.864 | 1.144  | 0.07 | 0.07 | 0.19 | 6.14 |
| 234 | 43  | 0.077 | 0.2775 | 82.8 | 83.02 | 556.46 | 18.370 | 24.019 | 1.033  | 0.06 | 0.06 | 0.19 | 6.14 |
| 235 | 90  | 0.076 | 0.2757 | 82.8 | 82.96 | 555.45 | 18.250 | 23.862 | 2.145  | 0.13 | 0.06 | 0.19 | 6.15 |
| 236 | 122 | 0.076 | 0.2757 | 82.6 | 82.89 | 554.29 | 18.247 | 23.867 | 2.901  | 0.17 | 0.09 | 0.19 | 6.15 |
| 237 | 108 | 0.077 | 0.2775 | 82.4 | 82.8  | 552.96 | 18.363 | 24.028 | 2.599  | 0.16 | 0.12 | 0.18 | 6.15 |
| 238 | 85  | 0.078 | 0.2793 | 82.5 | 82.74 | 551.48 | 18.484 | 24.181 | 2.063  | 0.12 | 0.13 | 0.18 | 6.15 |
| 239 | 36  | 0.075 | 0.2739 | 82.5 | 82.68 | 549.85 | 18.125 | 23.711 | 0.857  | 0.05 | 0.13 | 0.18 | 6.16 |
| 240 | 20  | 0.075 | 0.2739 | 82.3 | 82.62 | 548.1  | 18.121 | 23.716 | 0.467  | 0.03 | 0.11 | 0.18 | 6.16 |
| 241 | 56  | 0.078 | 0.2793 | 82.3 | 82.56 | 546.21 | 18.480 | 24.185 | 1.346  | 0.08 | 0.09 | 0.18 | 6.16 |
| 242 | 41  | 0.076 | 0.2757 | 82.3 | 82.52 | 544.23 | 18.242 | 23.873 | 0.981  | 0.06 | 0.07 | 0.17 | 6.16 |
| 243 | 89  | 0.077 | 0.2775 | 82.2 | 82.47 | 542.18 | 18.360 | 24.032 | 2.129  | 0.13 | 0.07 | 0.17 | 6.16 |
| 244 | 85  | 0.075 | 0.2739 | 82.1 | 82.4  | 540.34 | 18.118 | 23.720 | 2.018  | 0.12 | 0.08 | 0.17 | 6.16 |
| 245 | 45  | 0.076 | 0.2757 | 85.5 | 82.67 | 539.42 | 18.295 | 23.803 | 1.071  | 0.06 | 0.09 | 0.16 | 6.16 |
| 246 | 87  | 0.076 | 0.2757 | 87   | 83.11 | 539.04 | 18.321 | 23.770 | 2.063  | 0.12 | 0.10 | 0.16 | 6.17 |
| 247 | 154 | 0.076 | 0.2757 | 87.4 | 83.61 | 539.14 | 18.327 | 23.762 | 3.664  | 0.22 | 0.13 | 0.15 | 6.17 |
| 248 | 154 | 0.076 | 0.2757 | 87.6 | 84.12 | 539.59 | 18.331 | 23.757 | 3.657  | 0.22 | 0.15 | 0.15 | 6.17 |
| 249 | 215 | 0.077 | 0.2775 | 87.7 | 84.64 | 540.33 | 18.453 | 23.911 | 5.142  | 0.31 | 0.19 | 0.14 | 6.18 |
| 250 | 114 | 0.075 | 0.2739 | 87.8 | 85.19 | 541.33 | 18.213 | 23.596 | 2.680  | 0.16 | 0.21 | 0.14 | 6.18 |
| 251 | 90  | 0.075 | 0.2739 | 87.7 | 85.73 | 542.54 | 18.211 | 23.598 | 2.125  | 0.13 | 0.21 | 0.14 | 6.18 |
| 252 | 130 | 0.076 | 0.2757 | 87   | 86.2  | 543.54 | 18.321 | 23.770 | 3.087  | 0.19 | 0.20 | 0.14 | 6.19 |
| 253 | 196 | 0.076 | 0.2757 | 83.8 | 86.36 | 543.98 | 18.267 | 23.840 | 4.672  | 0.28 | 0.21 | 0.14 | 6.19 |
| 254 | 123 | 0.077 | 0.2775 | 82.2 | 86.37 | 543.86 | 18.360 | 24.032 | 2.955  | 0.18 | 0.19 | 0.14 | 6.19 |
| 255 | 189 | 0.074 | 0.2720 | 82   | 86.02 | 542.56 | 17.995 | 23.564 | 4.446  | 0.27 | 0.21 | 0.14 | 6.20 |
| 256 | 341 | 0.076 | 0.2757 | 82.4 | 85.56 | 541.05 | 18.243 | 23.871 | 8.145  | 0.49 | 0.28 | 0.14 | 6.21 |
| 257 | 554 | 0.076 | 0.2757 | 86.3 | 85.45 | 539.81 | 18.309 | 23.786 | 13.185 | 0.79 | 0.40 | 0.14 | 6.22 |
| 258 | 531 | 0.075 | 0.2739 | 87.8 | 85.47 | 538.56 | 18.213 | 23.596 | 12.532 | 0.75 | 0.50 | 0.15 | 6.23 |
| 259 | 616 | 0.076 | 0.2757 | 88.4 | 85.54 | 537.37 | 18.344 | 23.740 | 14.621 | 0.88 | 0.64 | 0.16 | 6.25 |
| 260 | 291 | 0.076 | 0.2757 | 88.5 | 85.61 | 536.12 | 18.346 | 23.738 | 6.898  | 0.41 | 0.66 | 0.17 | 6.25 |

## Run 1 TEOM Data

|     |     |       |        |      |             |             |        |        |        |       |       |      |      |
|-----|-----|-------|--------|------|-------------|-------------|--------|--------|--------|-------|-------|------|------|
| 261 | 169 | 0.076 | 0.2757 | 88.5 | 85.69       | 534.87      | 18.346 | 23.738 | 4.002  | 0.24  | 0.61  | 0.18 | 6.26 |
| 262 | 172 | 0.076 | 0.2757 | 88.3 | 85.82       | 534.03      | 18.342 | 23.742 | 4.093  | 0.25  | 0.51  | 0.19 | 6.26 |
| 263 | 135 | 0.076 | 0.2757 | 88.2 | 86.26       | 533.92      | 18.341 | 23.744 | 3.213  | 0.19  | 0.39  | 0.19 | 6.26 |
| 264 | 89  | 0.076 | 0.2757 | 88.4 | 86.88       | 534.32      | 18.344 | 23.740 | 2.122  | 0.13  | 0.24  | 0.19 | 6.27 |
| 265 | 145 | 0.077 | 0.2775 | 88.3 | 87.51       | 535.06      | 18.463 | 23.898 | 3.467  | 0.21  | 0.20  | 0.19 | 6.27 |
| 266 | 206 | 0.076 | 0.2757 | 88.2 | 88.09       | 535.63      | 18.341 | 23.744 | 4.886  | 0.29  | 0.21  | 0.19 | 6.27 |
| 267 | 209 | 0.077 | 0.2775 | 88.2 | 88.28       | 535.64      | 18.461 | 23.900 | 4.985  | 0.30  | 0.22  | 0.18 | 6.28 |
| 268 | 145 | 0.076 | 0.2757 | 88.3 | 88.33       | 535.47      | 18.342 | 23.742 | 3.449  | 0.21  | 0.23  | 0.19 | 6.28 |
| 269 | 112 | 0.077 | 0.2775 | 88.2 | 88.31       | 535.17      | 18.461 | 23.900 | 2.688  | 0.16  | 0.23  | 0.19 | 6.29 |
| 270 | 213 | 0.077 | 0.2775 | 88.1 | 88.27       | 534.77      | 18.459 | 23.902 | 5.100  | 0.31  | 0.25  | 0.19 | 6.29 |
| 271 | 128 | 0.075 | 0.2739 | 88.1 | 88.23       | 534.35      | 18.218 | 23.590 | 3.015  | 0.18  | 0.23  | 0.19 | 6.29 |
| 272 | 107 | 0.077 | 0.2775 | 88   | 88.2        | 533.86      | 18.458 | 23.904 | 2.568  | 0.15  | 0.20  | 0.19 | 6.30 |
| 273 | 69  | 0.077 | 0.2775 | 87.9 | 88.17       | 533.35      | 18.456 | 23.907 | 1.638  | 0.10  | 0.18  | 0.19 | 6.30 |
| 274 | 179 | 0.075 | 0.2739 | 87.9 | 88.12       | 532.84      | 18.215 | 23.594 | 4.215  | 0.25  | 0.20  | 0.19 | 6.30 |
| 275 | 205 | 0.076 | 0.2757 | 88   | 88.09       | 532.33      | 18.337 | 23.749 | 4.870  | 0.29  | 0.20  | 0.19 | 6.31 |
| 276 | 190 | 0.078 | 0.2793 | 88   | 88.07       | 531.81      | 18.577 | 24.059 | 4.574  | 0.27  | 0.21  | 0.20 | 6.31 |
| 277 | 181 | 0.077 | 0.2775 | 88   | 88.05       | 531.29      | 18.458 | 23.904 | 4.330  | 0.26  | 0.24  | 0.20 | 6.32 |
| 278 | 155 | 0.077 | 0.2775 | 87.8 | 88          | 530.81      | 18.454 | 23.909 | 3.717  | 0.22  | 0.26  | 0.20 | 6.32 |
| 279 | 142 | 0.076 | 0.2757 | 87.8 | 87.96       | 530.27      | 18.334 | 23.753 | 3.361  | 0.20  | 0.25  | 0.20 | 6.32 |
| 280 | 225 | 0.076 | 0.2757 | 87.8 | 87.93       | 529.78      | 18.334 | 23.753 | 5.338  | 0.32  | 0.26  | 0.21 | 6.33 |
| 281 | 141 | 0.077 | 0.2775 | 87.8 | 87.9        | 529.26      | 18.454 | 23.909 | 3.376  | 0.20  | 0.24  | 0.21 | 6.33 |
| 282 | 129 | 0.075 | 0.2739 | 87.6 | 87.86       | 528.77      | 18.210 | 23.600 | 3.056  | 0.18  | 0.23  | 0.21 | 6.34 |
| 283 | 105 | 0.077 | 0.2775 | 87.7 | 87.84       | 528.29      | 18.453 | 23.911 | 2.504  | 0.15  | 0.21  | 0.21 | 6.34 |
| 284 | 165 | 0.075 | 0.2739 | 87.7 | 87.82       | 527.77      | 18.211 | 23.598 | 3.893  | 0.23  | 0.22  | 0.21 | 6.34 |
| 285 | 165 | 0.077 | 0.2775 | 87.7 | 87.79       | 527.31      | 18.453 | 23.911 | 3.949  | 0.24  | 0.20  | 0.21 | 6.35 |
| 286 | 133 | 0.075 | 0.2739 | 87.6 | 87.75       | 526.85      | 18.210 | 23.600 | 3.143  | 0.19  | 0.20  | 0.21 | 6.35 |
| 287 | 121 | 0.077 | 0.2775 | 87.5 | 87.7        | 526.4       | 18.449 | 23.915 | 2.901  | 0.17  | 0.20  | 0.22 | 6.35 |
| 288 | 146 | 0.073 | 0.2702 | 87.4 | 87.66       | 525.9       | 17.962 | 23.288 | 3.390  | 0.20  | 0.21  | 0.22 | 6.36 |
| 289 | 144 | 0.077 | 0.2775 | 87.6 | 87.64       | 525.42      | 18.451 | 23.913 | 3.452  | 0.21  | 0.20  | 0.22 | 6.36 |
| 290 | 139 | 0.077 | 0.2775 | 87.4 | 87.6        | 524.92      | 18.447 | 23.917 | 3.334  | 0.20  | 0.19  | 0.22 | 6.36 |
| 291 | 211 | 0.075 | 0.2739 | 87.3 | 87.55       | 524.41      | 18.205 | 23.607 | 4.972  | 0.30  | 0.22  | 0.22 | 6.37 |
| 292 | 137 | 0.077 | 0.2775 | 87.3 | 87.52       | 523.86      | 18.446 | 23.920 | 3.266  | 0.20  | 0.22  | 0.23 | 6.37 |
| 293 | 251 | 0.076 | 0.2757 | 87.2 | 87.47       | 523.32      | 18.324 | 23.766 | 5.963  | 0.36  | 0.25  | 0.23 | 6.38 |
| 294 | 95  | 0.076 | 0.2757 | 87.4 | 87.44       | 522.82      | 18.327 | 23.762 | 2.266  | 0.14  | 0.24  | 0.23 | 6.38 |
| 295 | 102 | 0.075 | 0.2739 | 87.1 | 87.38       | 522.3       | 18.201 | 23.611 | 2.407  | 0.14  | 0.23  | 0.24 | 6.38 |
| 296 | 115 | 0.076 | 0.2757 | 87   | 87.32       | 521.84      | 18.321 | 23.770 | 2.736  | 0.16  | 0.20  | 0.24 | 6.38 |
| 297 | 270 | 0.077 | 0.2775 | 87   | 87.27       | 521.4       | 18.441 | 23.926 | 6.469  | 0.39  | 0.24  | 0.24 | 6.39 |
| 298 | 29  | 0.078 | 0.2793 | 87   | 87.23       | 520.98      | 18.560 | 24.081 | 0.710  | 0.04  | 0.18  | 0.24 | 6.39 |
| 299 | 50  | 0.077 | 0.2775 | 87.1 | 87.18       | 520.59      | 18.442 | 23.924 | 1.191  | 0.07  | 0.16  | 0.24 | 6.39 |
| 300 | 9   | 0.077 | 0.2775 | 86.3 | 87.07       | 520.17      | 18.429 | 23.942 | 0.220  | 0.01  | 0.14  | 0.24 | 6.39 |
| 301 | -28 | 0.078 | 0.2793 | 85.1 | 86.85       | 519.8       | 18.528 | 24.123 | -0.666 | -0.04 | 0.10  | 0.24 | 6.39 |
| 302 | -74 | 0.077 | 0.2775 | 84.4 | 86.56       | 519.44      | 18.397 | 23.983 | -1.783 | -0.11 | 0.00  | 0.24 | 6.39 |
| 303 | -37 | 0.076 | 0.2757 | 84   | 86.24       | 519.04      | 18.270 | 23.836 | -0.893 | -0.05 | -0.02 | 0.24 | 6.39 |
| 304 | 62  | 0.076 | 0.2757 | 83.6 | 85.86       | 518.56      | 18.264 | 23.845 | 1.480  | 0.09  | -0.02 | 0.24 | 6.39 |
| 305 | -1  | 0.076 | 0.2757 | 83.3 | 85.48       | 518.01      | 18.259 | 23.851 | -0.033 | 0.00  | -0.02 | 0.23 | 6.39 |
| 306 | 5   | 0.075 | 0.2739 | 83   | 85.08       | 517.33      | 18.133 | 23.700 | 0.115  | 0.01  | -0.01 | 0.23 | 6.39 |
| 307 | -11 | 0.077 | 0.2775 | 82.8 | 84.66       | 516.5       | 18.370 | 24.019 | -0.270 | -0.02 | 0.00  | 0.23 | 6.39 |
| 308 | 5   | 0.076 | 0.2757 | 82.6 | 84.22       | 515.54      | 18.247 | 23.867 | 0.122  | 0.01  | 0.02  | 0.23 | 6.39 |
| 309 | 27  | 0.077 | 0.2775 | 82.5 | 83.76       | 514.42      | 18.365 | 24.025 | 0.641  | 0.04  | 0.01  | 0.22 | 6.39 |
| 310 | 31  | 0.075 | 0.2739 | 82.4 | 83.37       | 513.17      | 18.123 | 23.713 | 0.739  | 0.04  | 0.02  | 0.22 | 6.39 |
| 311 | -10 | 0.077 | 0.2775 | 82.2 | 83.08       | 511.72      | 18.360 | 24.032 | -0.251 | -0.02 | 0.01  | 0.22 | 6.39 |
| 312 | -22 | 0.075 | 0.2739 | 82.1 | 82.85       | 510.12      | 18.118 | 23.720 | -0.512 | -0.03 | 0.01  | 0.21 | 6.39 |
| 313 | -30 | 0.075 | 0.2739 | 82   | 82.65       | 508.36      | 18.116 | 23.722 | -0.702 | -0.04 | 0.00  | 0.21 | 6.39 |
| 314 | 30  | 0.076 | 0.2757 | 81.9 | 82.48       | 506.46      | 18.235 | 23.882 | 0.722  | 0.04  | 0.00  | 0.20 | 6.39 |
| 315 | 15  | 0.076 | 0.2757 | 81.7 | 82.32       | 504.42      | 18.232 | 23.886 | 0.354  | 0.02  | 0.00  | 0.20 | 6.39 |
| 316 | -31 | 0.078 | 0.2793 | 81.4 | 82.16       | 502.27      | 18.465 | 24.205 | -0.742 | -0.04 | -0.01 | 0.19 | 6.39 |
| 317 | 63  | 0.077 | 0.2775 | 81.3 | 82.01       | 500.08      | 18.344 | 24.052 | 1.519  | 0.09  | 0.01  | 0.18 | 6.39 |
| 318 | -13 | 0.077 | 0.2775 | 81.2 | 81.87       | 497.78      | 18.343 | 24.054 | -0.320 | -0.02 | 0.02  | 0.16 | 6.39 |
| 319 | -40 | 0.076 | 0.2757 | 81.2 | 81.74       | 495.46      | 18.223 | 23.898 | -0.965 | -0.06 | 0.00  | 0.15 | 6.39 |
| 320 | -10 | 0.078 | 0.2793 | 81.1 | 81.61       | 493.1       | 18.460 | 24.212 | -0.234 | -0.01 | -0.01 | 0.14 | 6.39 |
| 321 | -49 | 0.077 | 0.2775 | 81   | 81.49       | 490.74      | 18.339 | 24.059 | -1.190 | -0.07 | -0.01 | 0.14 | 6.39 |
| 322 | -8  | 0.077 | 0.2775 | 80.9 | 81.37       | 488.36      | 18.338 | 24.061 | -0.186 | -0.01 | -0.03 | 0.13 | 6.39 |
| 323 | 32  | 0.077 | 0.2775 | 80.8 | 81.25       | 485.98      | 18.336 | 24.063 | 0.773  | 0.05  | -0.02 | 0.13 | 6.39 |
| 324 | 15  | 0.077 | 0.2775 | 80.4 | 81.1        | 483.65      | 18.329 | 24.072 | 0.372  | 0.02  | -0.01 | 0.13 | 6.39 |
|     |     |       |        |      | 81.03333333 | 482.4666667 |        |        |        |       | 0.00  | 0.12 |      |
|     |     |       |        |      | 80.9875     | 481.2875    |        |        |        |       | 0.02  | 0.12 |      |
|     |     |       |        |      | 80.94285714 | 480.0857143 |        |        |        |       | 0.03  | 0.12 |      |
|     |     |       |        |      | 80.9        | 478.9333333 |        |        |        |       | 0.02  | 0.11 |      |
|     |     |       |        |      | 80.84       | 477.78      |        |        |        |       |       | 0.11 |      |
|     |     |       |        |      | 80.775      | 476.65      |        |        |        |       |       | 0.11 |      |
|     |     |       |        |      | 80.7        | 475.5333333 |        |        |        |       |       | 0.11 |      |
|     |     |       |        |      | 80.6        | 474.45      |        |        |        |       |       | 0.11 |      |
|     |     |       |        |      | 80.4        | 473.5       |        |        |        |       |       | 0.11 |      |
|     |     |       |        |      |             |             |        |        |        |       |       | 0.10 |      |
|     |     |       |        |      |             |             |        |        |        |       |       | 0.10 |      |
|     |     |       |        |      |             |             |        |        |        |       |       | 0.10 |      |
|     |     |       |        |      |             |             |        |        |        |       |       | 0.09 |      |
|     |     |       |        |      |             |             |        |        |        |       |       | 0.09 |      |
|     |     |       |        |      |             |             |        |        |        |       |       | 0.09 |      |
|     |     |       |        |      |             |             |        |        |        |       |       | 0.08 |      |
|     |     |       |        |      |             |             |        |        |        |       |       | 0.08 |      |
|     |     |       |        |      |             |             |        |        |        |       |       | 0.08 |      |
|     |     |       |        |      |             |             |        |        |        |       |       | 0.08 |      |
|     |     |       |        |      |             |             |        |        |        |       |       | 0.07 |      |
|     |     |       |        |      |             |             |        |        |        |       |       | 0.07 |      |
|     |     |       |        |      |             |             |        |        |        |       |       | 0.07 |      |
|     |     |       |        |      |             |             |        |        |        |       |       | 0.06 |      |
|     |     |       |        |      |             |             |        |        |        |       |       | 0.06 |      |

## Run 1 TEOM Data

[illegible]

## Run 1 TEOM Data

[illegible]



## Run 1 TEOM Data

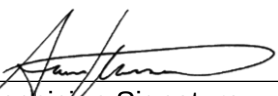
[illegible]

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



**Run 3 Data Summary**

|             |            |
|-------------|------------|
| Client:     | SBI        |
| Model:      | St Louis   |
| Job #:      | 24-303     |
| Tracking #: | 216        |
| Test Date:  | 12/11/2024 |

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

1/2/2025  
Date

## DILUTION TUNNEL & MISC. DATA - ASTM E2780 / E2515

Client: SBI  
 Model: St Louis  
 Run #: 3  
 Test Start Time: 11:11

Job #: 24-303  
 Tracking #: 216  
 Technician: AK  
 Date: 12/11/2024

Total Sampling Time (min): 407  
 Recording Interval (min): 1

Meter Box  $\gamma$  Factor: 1.000 (A)  
 Meter Box  $\gamma$  Factor: 1.008 (B)  
 Meter Box  $\gamma$  Factor: - (C)  
 Meter Box  $\gamma$  Factor: 1.004 (Ambient)

Induced Draft Check (in. H<sub>2</sub>O): 0  
 Smoke Capture Check (%): 100%  
 Date Flue Pipe Last Cleaned: 12/6/2024  
 Test Fuel Scale Audit (lbs): 10.00  
 Platform Scale Audit (lbs): 10.0

|                              | Pre-Test               | Post Test | Avg.  |
|------------------------------|------------------------|-----------|-------|
| Barometric Pressure (in. Hg) | 30.08                  | 29.91     | 30.00 |
| Relative Humidity (%)        | 29.7                   | 21.6      |       |
| Room Air Velocity (ft/min)   | <50                    | <50       |       |
| Pitot Tube Leak Check        | 0                      | 0         |       |
| Ambient Sample Volume:       | 97.679 ft <sup>3</sup> |           |       |

### Sample Train Leak Checks

|           | Pre-test | Post-test |       |            |
|-----------|----------|-----------|-------|------------|
| (A)       | 0.000    | 0.000     | cfm @ | -8 in. Hg  |
| (B)       | 0.000    | 0.000     | cfm @ | -7 in. Hg  |
| (C)       | -        | -         | cfm @ | - in. Hg   |
| (Ambient) | 0.000    | 0.000     | cfm @ | -13 in. Hg |

## DILUTION TUNNEL FLOW

### Traverse Data

| Point  | dP (in H <sub>2</sub> O) | Temp (°F) |
|--------|--------------------------|-----------|
| 1      | 0.068                    | 65        |
| 2      | 0.074                    | 65        |
| 3      | 0.078                    | 65        |
| 4      | 0.080                    | 65        |
| 5      | 0.068                    | 65        |
| 6      | 0.062                    | 65        |
| 7      | 0.064                    | 65        |
| 8      | 0.070                    | 65        |
| 9      | 0.084                    | 65        |
| 10     | 0.084                    | 65        |
| 11     | 0.080                    | 65        |
| 12     | 0.058                    | 65        |
| Center | 0.073                    | 65        |

Dilution Tunnel H<sub>2</sub>O: 2.00 percent  
 Tunnel Diameter: 12 inches  
 Pitot Tube Cp: 0.99 [unitless]  
 Dilution Tunnel MW(dry): 29.00 lb/lb-mole  
 Dilution Tunnel MW(wet): 28.78 lb/lb-mole  
 Tunnel Area: 0.7854 ft<sup>2</sup>

V<sub>strav</sub>: 17.72 ft/sec

V<sub>scnt</sub>: 17.81 ft/sec

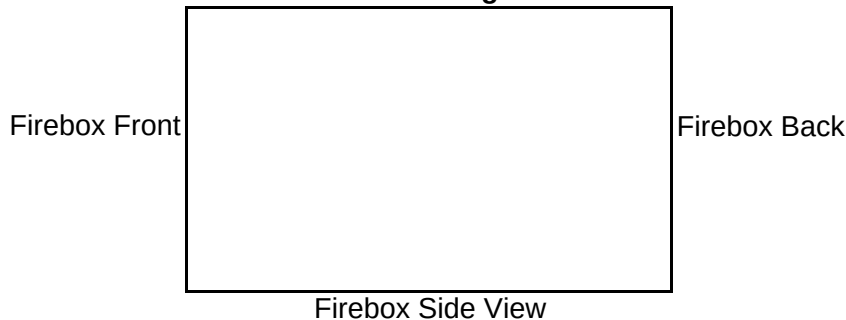
F<sub>p</sub>: 0.995 [ratio]

Initial Tunnel Flow: 825.9 scf/min

Static Pressure: -0.208 in. H<sub>2</sub>O

## TEST FUEL PROPERTIES

### Fuel Load Configuration



### Actual Fuel Used Properties

Fuel Type: D. Fir  
 HHV (kJ/kg): 19,810  
 %C: 48.73  
 %H: 6.87  
 %O: 43.9  
 %Ash: 0.5  
 MC (%DB): #DIV/0!

# BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: SBI  
 Model: St Louis  
 Run #: 3

Job #: 24-303  
 Tracking #: 216  
 Technician: AK  
 Date: 12/11/2024

| Elapsed Time (min) | Particulate Sampling Data |                   |                                          |                                  |                 |                      |               | Fuel Weight (lb) |               | Temperature Data (°F) |      |        |         |
|--------------------|---------------------------|-------------------|------------------------------------------|----------------------------------|-----------------|----------------------|---------------|------------------|---------------|-----------------------|------|--------|---------|
|                    | Gas Meter (ft³)           | Sample Rate (cfm) | Dilution Tunnel dP (in H <sub>2</sub> O) | Orifice dH (in H <sub>2</sub> O) | Meter Temp (°F) | Meter Vacuum (in Hg) | Pro. Rate (%) | Scale Reading    | Weight Change | Dilution Tunnel       | Flue | Filter | Ambient |
| 0                  | -0.004                    |                   | 0.074                                    | 0.01                             | 67              | -0.6                 |               | 7.64             |               | 70                    | 68   | 83     | 65      |
| 1                  | 0.152                     | 0.156             | 0.075                                    | 1.35                             | 67              | -1.7                 | -             | 7.28             | -0.36         | 77                    | 161  | 82     | 65      |
| 2                  | 0.330                     | 0.178             | 0.074                                    | 1.32                             | 67              | -1.5                 | -             | 6.89             | -0.39         | 88                    | 273  | 81     | 65      |
| 3                  | 0.508                     | 0.178             | 0.073                                    | 1.32                             | 67              | -1.3                 | -             | 6.51             | -0.38         | 82                    | 339  | 82     | 65      |
| 4                  | 0.685                     | 0.177             | 0.073                                    | 1.31                             | 67              | -1.2                 | -             | 6.12             | -0.39         | 81                    | 416  | 83     | 65      |
| 5                  | 0.861                     | 0.176             | 0.072                                    | 1.31                             | 67              | -0.9                 | -             | 5.76             | -0.36         | 82                    | 456  | 84     | 65      |
| 6                  | 1.036                     | 0.175             | 0.073                                    | 1.31                             | 67              | -0.9                 | -             | 5.41             | -0.35         | 84                    | 476  | 84     | 65      |
| 7                  | 1.212                     | 0.176             | 0.073                                    | 1.31                             | 67              | -0.7                 | -             | 5.04             | -0.37         | 85                    | 494  | 83     | 65      |
| 8                  | 1.388                     | 0.176             | 0.074                                    | 1.30                             | 68              | -0.6                 | -             | 4.72             | -0.32         | 86                    | 507  | 82     | 65      |
| 9                  | 1.564                     | 0.176             | 0.074                                    | 1.30                             | 68              | -0.6                 | -             | 4.42             | -0.30         | 87                    | 508  | 82     | 66      |
| 10                 | 1.740                     | 0.176             | 0.072                                    | 1.29                             | 68              | -0.6                 | 104           | 4.15             | -0.27         | 87                    | 506  | 83     | 66      |
| 11                 | 1.915                     | 0.175             | 0.074                                    | 1.29                             | 68              | -0.6                 | -             | 3.88             | -0.27         | 88                    | 504  | 84     | 66      |
| 12                 | 2.090                     | 0.175             | 0.074                                    | 1.29                             | 68              | -0.5                 | -             | 3.58             | -0.30         | 88                    | 514  | 84     | 66      |
| 13                 | 2.264                     | 0.174             | 0.073                                    | 1.28                             | 68              | -0.6                 | -             | 3.35             | -0.23         | 88                    | 501  | 82     | 66      |
| 14                 | 2.439                     | 0.175             | 0.075                                    | 1.28                             | 68              | -0.5                 | -             | 3.15             | -0.20         | 87                    | 493  | 82     | 66      |
| 15                 | 2.613                     | 0.174             | 0.074                                    | 1.28                             | 69              | -0.6                 | -             | 2.91             | -0.24         | 88                    | 498  | 82     | 66      |
| 16                 | 2.788                     | 0.175             | 0.075                                    | 1.28                             | 69              | -0.5                 | -             | 2.67             | -0.24         | 88                    | 504  | 84     | 66      |
| 17                 | 2.963                     | 0.175             | 0.075                                    | 1.29                             | 69              | -0.7                 | -             | 2.43             | -0.24         | 89                    | 513  | 84     | 66      |
| 18                 | 3.136                     | 0.173             | 0.073                                    | 1.28                             | 69              | -0.6                 | -             | 15.99            | 13.56         | 117                   | 466  | 83     | 66      |
| 19                 | 3.310                     | 0.174             | 0.071                                    | 1.28                             | 70              | -0.8                 | -             | 15.40            | -0.59         | 105                   | 503  | 82     | 66      |
| 20                 | 3.484                     | 0.174             | 0.072                                    | 1.26                             | 70              | -0.9                 | 106           | 15.14            | -0.26         | 98                    | 521  | 82     | 66      |
| 21                 | 3.658                     | 0.174             | 0.072                                    | 1.28                             | 70              | -0.9                 | -             | 14.95            | -0.19         | 94                    | 498  | 83     | 66      |
| 22                 | 3.832                     | 0.174             | 0.072                                    | 1.27                             | 70              | -0.9                 | -             | 14.75            | -0.20         | 92                    | 491  | 84     | 66      |
| 23                 | 4.005                     | 0.173             | 0.073                                    | 1.27                             | 71              | -0.9                 | -             | 14.52            | -0.23         | 91                    | 495  | 84     | 66      |
| 24                 | 4.179                     | 0.174             | 0.073                                    | 1.27                             | 71              | -1.0                 | -             | 14.25            | -0.27         | 92                    | 510  | 83     | 66      |
| 25                 | 4.352                     | 0.173             | 0.072                                    | 1.27                             | 71              | -1.0                 | -             | 13.80            | -0.45         | 89                    | 495  | 82     | 67      |
| 26                 | 4.526                     | 0.174             | 0.074                                    | 1.28                             | 71              | -1.1                 | -             | 13.56            | -0.24         | 87                    | 485  | 82     | 67      |
| 27                 | 4.699                     | 0.173             | 0.074                                    | 1.28                             | 72              | -1.1                 | -             | 13.34            | -0.22         | 86                    | 479  | 83     | 67      |
| 28                 | 4.872                     | 0.173             | 0.074                                    | 1.27                             | 72              | -1.1                 | -             | 13.14            | -0.20         | 86                    | 478  | 84     | 67      |
| 29                 | 5.046                     | 0.174             | 0.072                                    | 1.26                             | 72              | -1.1                 | -             | 12.91            | -0.23         | 86                    | 480  | 84     | 67      |
| 30                 | 5.219                     | 0.173             | 0.073                                    | 1.29                             | 72              | -1.0                 | 105           | 12.73            | -0.18         | 86                    | 483  | 84     | 67      |
| 31                 | 5.393                     | 0.174             | 0.071                                    | 1.28                             | 73              | -1.2                 | -             | 12.52            | -0.21         | 86                    | 485  | 83     | 67      |

# BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: SBI  
 Model: St Louis  
 Run #: 3

Job #: 24-303  
 Tracking #: 216  
 Technician: AK  
 Date: 12/11/2024

| Elapsed Time (min) | Particulate Sampling Data |                   |                                          |                                  |                 |                      |               | Fuel Weight (lb) |               | Temperature Data (°F) |      |        |         |
|--------------------|---------------------------|-------------------|------------------------------------------|----------------------------------|-----------------|----------------------|---------------|------------------|---------------|-----------------------|------|--------|---------|
|                    | Gas Meter (ft³)           | Sample Rate (cfm) | Dilution Tunnel dP (in H <sub>2</sub> O) | Orifice dH (in H <sub>2</sub> O) | Meter Temp (°F) | Meter Vacuum (in Hg) | Pro. Rate (%) | Scale Reading    | Weight Change | Dilution Tunnel       | Flue | Filter | Ambient |
| 32                 | 5.567                     | 0.174             | 0.073                                    | 1.28                             | 73              | -1.1                 | -             | 12.30            | -0.22         | 86                    | 494  | 82     | 67      |
| 33                 | 5.741                     | 0.174             | 0.074                                    | 1.27                             | 73              | -1.2                 | -             | 12.04            | -0.26         | 87                    | 498  | 82     | 67      |
| 34                 | 5.914                     | 0.173             | 0.074                                    | 1.28                             | 74              | -1.1                 | -             | 11.79            | -0.25         | 87                    | 498  | 83     | 67      |
| 35                 | 6.088                     | 0.174             | 0.074                                    | 1.26                             | 74              | -1.2                 | -             | 11.55            | -0.24         | 87                    | 499  | 84     | 67      |
| 36                 | 6.262                     | 0.174             | 0.072                                    | 1.26                             | 74              | -1.3                 | -             | 11.32            | -0.23         | 87                    | 501  | 84     | 67      |
| 37                 | 6.436                     | 0.174             | 0.073                                    | 1.27                             | 75              | -1.2                 | -             | 11.08            | -0.24         | 87                    | 503  | 83     | 68      |
| 38                 | 6.610                     | 0.174             | 0.072                                    | 1.26                             | 75              | -1.2                 | -             | 10.87            | -0.21         | 87                    | 502  | 82     | 67      |
| 39                 | 6.784                     | 0.174             | 0.075                                    | 1.27                             | 75              | -1.2                 | -             | 10.63            | -0.24         | 87                    | 504  | 82     | 68      |
| 40                 | 6.957                     | 0.173             | 0.075                                    | 1.27                             | 75              | -1.4                 | 103           | 10.37            | -0.26         | 87                    | 504  | 83     | 68      |
| 41                 | 7.131                     | 0.174             | 0.074                                    | 1.26                             | 76              | -1.4                 | -             | 10.13            | -0.24         | 87                    | 505  | 84     | 68      |
| 42                 | 7.305                     | 0.174             | 0.074                                    | 1.26                             | 76              | -1.4                 | -             | 9.89             | -0.24         | 88                    | 508  | 84     | 68      |
| 43                 | 7.478                     | 0.173             | 0.073                                    | 1.28                             | 76              | -1.4                 | -             | 9.67             | -0.22         | 88                    | 509  | 83     | 68      |
| 44                 | 7.651                     | 0.173             | 0.073                                    | 1.28                             | 76              | -1.3                 | -             | 9.45             | -0.22         | 88                    | 504  | 82     | 69      |
| 45                 | 7.825                     | 0.174             | 0.074                                    | 1.27                             | 77              | -1.4                 | -             | 9.24             | -0.21         | 86                    | 453  | 82     | 68      |
| 46                 | 7.999                     | 0.174             | 0.074                                    | 1.27                             | 77              | -1.3                 | -             | 9.09             | -0.15         | 84                    | 432  | 83     | 68      |
| 47                 | 8.173                     | 0.174             | 0.074                                    | 1.27                             | 77              | -1.4                 | -             | 8.95             | -0.14         | 84                    | 420  | 84     | 69      |
| 48                 | 8.347                     | 0.174             | 0.074                                    | 1.27                             | 77              | -1.4                 | -             | 8.81             | -0.14         | 84                    | 413  | 84     | 69      |
| 49                 | 8.522                     | 0.175             | 0.073                                    | 1.26                             | 78              | -1.4                 | -             | 8.66             | -0.15         | 83                    | 408  | 83     | 69      |
| 50                 | 8.696                     | 0.174             | 0.074                                    | 1.26                             | 78              | -1.4                 | 102           | 8.52             | -0.14         | 83                    | 403  | 82     | 69      |
| 51                 | 8.870                     | 0.174             | 0.073                                    | 1.27                             | 78              | -1.5                 | -             | 8.38             | -0.14         | 83                    | 400  | 82     | 69      |
| 52                 | 9.045                     | 0.175             | 0.076                                    | 1.28                             | 78              | -1.5                 | -             | 8.23             | -0.15         | 83                    | 397  | 83     | 69      |
| 53                 | 9.219                     | 0.174             | 0.076                                    | 1.28                             | 79              | -1.5                 | -             | 8.09             | -0.14         | 83                    | 395  | 84     | 69      |
| 54                 | 9.393                     | 0.174             | 0.073                                    | 1.26                             | 79              | -1.4                 | -             | 7.94             | -0.15         | 83                    | 393  | 84     | 69      |
| 55                 | 9.567                     | 0.174             | 0.076                                    | 1.26                             | 79              | -1.5                 | -             | 7.81             | -0.13         | 83                    | 393  | 83     | 69      |
| 56                 | 9.741                     | 0.174             | 0.076                                    | 1.27                             | 79              | -1.5                 | -             | 7.68             | -0.13         | 82                    | 390  | 82     | 69      |
| 57                 | 9.914                     | 0.173             | 0.076                                    | 1.29                             | 80              | -1.6                 | -             | 7.52             | -0.16         | 82                    | 389  | 83     | 69      |
| 58                 | 10.089                    | 0.175             | 0.075                                    | 1.28                             | 80              | -1.5                 | -             | 7.38             | -0.14         | 82                    | 388  | 84     | 69      |
| 59                 | 10.263                    | 0.174             | 0.076                                    | 1.28                             | 80              | -1.6                 | -             | 7.23             | -0.15         | 82                    | 390  | 84     | 69      |
| 60                 | 10.438                    | 0.175             | 0.075                                    | 1.27                             | 80              | -1.7                 | 101           | 7.10             | -0.13         | 82                    | 389  | 83     | 69      |
| 61                 | 10.613                    | 0.175             | 0.076                                    | 1.29                             | 81              | -1.5                 | -             | 6.96             | -0.14         | 82                    | 389  | 82     | 69      |
| 62                 | 10.788                    | 0.175             | 0.074                                    | 1.27                             | 81              | -1.6                 | -             | 6.81             | -0.15         | 82                    | 390  | 82     | 69      |
| 63                 | 10.963                    | 0.175             | 0.074                                    | 1.27                             | 81              | -1.7                 | -             | 6.67             | -0.14         | 82                    | 389  | 83     | 69      |

# BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: SBI  
 Model: St Louis  
 Run #: 3

Job #: 24-303  
 Tracking #: 216  
 Technician: AK  
 Date: 12/11/2024

| Elapsed Time (min) | Particulate Sampling Data |                   |                                          |                                  |                 |                      |               | Fuel Weight (lb) |               | Temperature Data (°F) |      |        |         |
|--------------------|---------------------------|-------------------|------------------------------------------|----------------------------------|-----------------|----------------------|---------------|------------------|---------------|-----------------------|------|--------|---------|
|                    | Gas Meter (ft³)           | Sample Rate (cfm) | Dilution Tunnel dP (in H <sub>2</sub> O) | Orifice dH (in H <sub>2</sub> O) | Meter Temp (°F) | Meter Vacuum (in Hg) | Pro. Rate (%) | Scale Reading    | Weight Change | Dilution Tunnel       | Flue | Filter | Ambient |
| 64                 | 11.137                    | 0.174             | 0.075                                    | 1.27                             | 81              | -1.6                 | -             | 6.52             | -0.15         | 82                    | 389  | 84     | 69      |
| 65                 | 11.312                    | 0.175             | 0.075                                    | 1.27                             | 81              | -1.6                 | -             | 6.40             | -0.12         | 82                    | 388  | 84     | 69      |
| 66                 | 11.487                    | 0.175             | 0.074                                    | 1.27                             | 82              | -1.7                 | -             | 6.27             | -0.13         | 82                    | 387  | 83     | 69      |
| 67                 | 11.660                    | 0.173             | 0.073                                    | 1.29                             | 82              | -1.8                 | -             | 6.19             | -0.08         | 84                    | 387  | 82     | 69      |
| 68                 | 11.835                    | 0.175             | 0.076                                    | 1.26                             | 82              | -1.7                 | -             | 6.13             | -0.06         | 86                    | 389  | 82     | 69      |
| 69                 | 12.009                    | 0.174             | 0.075                                    | 1.28                             | 82              | -1.8                 | -             | 6.04             | -0.09         | 87                    | 390  | 83     | 68      |
| 70                 | 12.184                    | 0.175             | 0.077                                    | 1.28                             | 82              | -1.8                 | 100           | 5.96             | -0.08         | 87                    | 390  | 84     | 68      |
| 71                 | 12.359                    | 0.175             | 0.074                                    | 1.29                             | 82              | -1.7                 | -             | 5.86             | -0.10         | 87                    | 391  | 84     | 68      |
| 72                 | 12.534                    | 0.175             | 0.075                                    | 1.27                             | 83              | -1.7                 | -             | 5.75             | -0.11         | 88                    | 393  | 83     | 68      |
| 73                 | 12.709                    | 0.175             | 0.075                                    | 1.27                             | 83              | -1.8                 | -             | 5.65             | -0.10         | 88                    | 394  | 82     | 68      |
| 74                 | 12.884                    | 0.175             | 0.076                                    | 1.27                             | 83              | -1.8                 | -             | 5.27             | -0.38         | 87                    | 396  | 82     | 68      |
| 75                 | 13.059                    | 0.175             | 0.074                                    | 1.27                             | 83              | -1.9                 | -             | 5.13             | -0.14         | 85                    | 391  | 83     | 69      |
| 76                 | 13.233                    | 0.174             | 0.075                                    | 1.28                             | 83              | -1.9                 | -             | 4.99             | -0.14         | 84                    | 390  | 84     | 69      |
| 77                 | 13.407                    | 0.174             | 0.073                                    | 1.28                             | 84              | -1.9                 | -             | 4.87             | -0.12         | 83                    | 391  | 84     | 69      |
| 78                 | 13.581                    | 0.174             | 0.075                                    | 1.27                             | 84              | -1.8                 | -             | 4.73             | -0.14         | 83                    | 390  | 83     | 69      |
| 79                 | 13.756                    | 0.175             | 0.075                                    | 1.27                             | 84              | -1.9                 | -             | 4.61             | -0.12         | 83                    | 397  | 82     | 69      |
| 80                 | 13.931                    | 0.175             | 0.074                                    | 1.28                             | 84              | -1.9                 | 100           | 4.50             | -0.11         | 84                    | 401  | 82     | 69      |
| 81                 | 14.106                    | 0.175             | 0.075                                    | 1.28                             | 84              | -2.0                 | -             | 4.39             | -0.11         | 84                    | 401  | 84     | 70      |
| 82                 | 14.282                    | 0.176             | 0.073                                    | 1.26                             | 84              | -1.9                 | -             | 4.27             | -0.12         | 84                    | 401  | 84     | 70      |
| 83                 | 14.457                    | 0.175             | 0.076                                    | 1.27                             | 85              | -1.9                 | -             | 4.15             | -0.12         | 84                    | 400  | 84     | 70      |
| 84                 | 14.632                    | 0.175             | 0.075                                    | 1.28                             | 85              | -2.0                 | -             | 4.05             | -0.10         | 84                    | 401  | 83     | 70      |
| 85                 | 14.807                    | 0.175             | 0.074                                    | 1.27                             | 85              | -2.0                 | -             | 3.92             | -0.13         | 84                    | 401  | 82     | 70      |
| 86                 | 14.981                    | 0.174             | 0.075                                    | 1.27                             | 85              | -2.0                 | -             | 3.87             | -0.05         | 87                    | 400  | 82     | 70      |
| 87                 | 15.155                    | 0.174             | 0.074                                    | 1.28                             | 85              | -1.9                 | -             | 3.83             | -0.04         | 88                    | 391  | 83     | 70      |
| 88                 | 15.330                    | 0.175             | 0.074                                    | 1.27                             | 85              | -2.0                 | -             | 3.81             | -0.02         | 89                    | 380  | 84     | 69      |
| 89                 | 15.505                    | 0.175             | 0.074                                    | 1.28                             | 86              | -2.0                 | -             | 3.76             | -0.05         | 89                    | 376  | 84     | 69      |
| 90                 | 15.681                    | 0.176             | 0.074                                    | 1.27                             | 86              | -2.1                 | 101           | 3.70             | -0.06         | 90                    | 374  | 83     | 69      |
| 91                 | 15.856                    | 0.175             | 0.075                                    | 1.27                             | 86              | -2.1                 | -             | 3.64             | -0.06         | 90                    | 379  | 82     | 69      |
| 92                 | 16.031                    | 0.175             | 0.072                                    | 1.26                             | 86              | -2.0                 | -             | 13.08            | 9.44          | 114                   | 428  | 83     | 69      |
| 93                 | 16.205                    | 0.174             | 0.072                                    | 1.27                             | 86              | -2.0                 | -             | 12.80            | -0.28         | 105                   | 518  | 84     | 69      |
| 94                 | 16.380                    | 0.175             | 0.071                                    | 1.27                             | 86              | -2.1                 | -             | 12.28            | -0.52         | 99                    | 530  | 84     | 69      |
| 95                 | 16.554                    | 0.174             | 0.073                                    | 1.27                             | 86              | -2.1                 | -             | 12.02            | -0.26         | 94                    | 488  | 83     | 70      |

# BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: SBIJob #: 24-303Model: St LouisTracking #: 216Run #: 3Technician: AKDate: 12/11/2024

| Elapsed Time (min) | Particulate Sampling Data |                   |                                          |                                  |                 |                      |               | Fuel Weight (lb) |               | Temperature Data (°F) |      |        |         |
|--------------------|---------------------------|-------------------|------------------------------------------|----------------------------------|-----------------|----------------------|---------------|------------------|---------------|-----------------------|------|--------|---------|
|                    | Gas Meter (ft³)           | Sample Rate (cfm) | Dilution Tunnel dP (in H <sub>2</sub> O) | Orifice dH (in H <sub>2</sub> O) | Meter Temp (°F) | Meter Vacuum (in Hg) | Pro. Rate (%) | Scale Reading    | Weight Change | Dilution Tunnel       | Flue | Filter | Ambient |
| 96                 | 16.728                    | 0.174             | 0.073                                    | 1.28                             | 86              | -2.0                 | -             | 11.83            | -0.19         | 91                    | 451  | 82     | 70      |
| 97                 | 16.902                    | 0.174             | 0.074                                    | 1.28                             | 87              | -2.1                 | -             | 11.64            | -0.19         | 89                    | 446  | 83     | 70      |
| 98                 | 17.077                    | 0.175             | 0.073                                    | 1.27                             | 87              | -2.1                 | -             | 11.44            | -0.20         | 89                    | 444  | 84     | 70      |
| 99                 | 17.251                    | 0.174             | 0.072                                    | 1.27                             | 87              | -2.1                 | -             | 11.25            | -0.19         | 88                    | 441  | 84     | 71      |
| 100                | 17.426                    | 0.175             | 0.073                                    | 1.27                             | 87              | -2.0                 | 101           | 11.08            | -0.17         | 88                    | 437  | 84     | 71      |
| 101                | 17.601                    | 0.175             | 0.074                                    | 1.26                             | 87              | -2.0                 | -             | 10.88            | -0.20         | 88                    | 435  | 84     | 71      |
| 102                | 17.776                    | 0.175             | 0.074                                    | 1.26                             | 87              | -2.1                 | -             | 10.72            | -0.16         | 88                    | 435  | 84     | 71      |
| 103                | 17.951                    | 0.175             | 0.074                                    | 1.26                             | 87              | -2.1                 | -             | 10.52            | -0.20         | 88                    | 433  | 84     | 71      |
| 104                | 18.126                    | 0.175             | 0.072                                    | 1.26                             | 87              | -2.1                 | -             | 10.33            | -0.19         | 88                    | 434  | 83     | 71      |
| 105                | 18.301                    | 0.175             | 0.076                                    | 1.27                             | 87              | -2.1                 | -             | 10.15            | -0.18         | 87                    | 433  | 82     | 71      |
| 106                | 18.475                    | 0.174             | 0.075                                    | 1.26                             | 88              | -2.1                 | -             | 9.98             | -0.17         | 87                    | 432  | 82     | 71      |
| 107                | 18.649                    | 0.174             | 0.074                                    | 1.27                             | 88              | -2.0                 | -             | 9.79             | -0.19         | 87                    | 432  | 83     | 71      |
| 108                | 18.824                    | 0.175             | 0.073                                    | 1.27                             | 88              | -2.1                 | -             | 9.61             | -0.18         | 87                    | 432  | 84     | 71      |
| 109                | 18.999                    | 0.175             | 0.074                                    | 1.27                             | 88              | -2.1                 | -             | 9.45             | -0.16         | 87                    | 432  | 84     | 71      |
| 110                | 19.174                    | 0.175             | 0.073                                    | 1.27                             | 88              | -2.0                 | 101           | 9.28             | -0.17         | 87                    | 429  | 84     | 71      |
| 111                | 19.349                    | 0.175             | 0.072                                    | 1.26                             | 88              | -2.0                 | -             | 9.11             | -0.17         | 87                    | 426  | 83     | 71      |
| 112                | 19.524                    | 0.175             | 0.073                                    | 1.27                             | 88              | -2.1                 | -             | 8.95             | -0.16         | 87                    | 424  | 82     | 71      |
| 113                | 19.699                    | 0.175             | 0.073                                    | 1.27                             | 88              | -2.0                 | -             | 8.78             | -0.17         | 87                    | 422  | 83     | 71      |
| 114                | 19.874                    | 0.175             | 0.075                                    | 1.28                             | 88              | -2.1                 | -             | 8.65             | -0.13         | 87                    | 421  | 84     | 71      |
| 115                | 20.048                    | 0.174             | 0.072                                    | 1.28                             | 89              | -2.1                 | -             | 8.49             | -0.16         | 87                    | 417  | 84     | 71      |
| 116                | 20.223                    | 0.175             | 0.074                                    | 1.26                             | 89              | -2.0                 | -             | 8.35             | -0.14         | 87                    | 413  | 84     | 72      |
| 117                | 20.398                    | 0.175             | 0.072                                    | 1.27                             | 89              | -2.0                 | -             | 8.20             | -0.15         | 87                    | 412  | 83     | 72      |
| 118                | 20.572                    | 0.174             | 0.071                                    | 1.26                             | 89              | -2.0                 | -             | 8.07             | -0.13         | 87                    | 411  | 82     | 71      |
| 119                | 20.747                    | 0.175             | 0.075                                    | 1.26                             | 89              | -2.0                 | -             | 7.92             | -0.15         | 87                    | 409  | 83     | 72      |
| 120                | 20.922                    | 0.175             | 0.073                                    | 1.26                             | 89              | -2.1                 | 101           | 7.78             | -0.14         | 86                    | 407  | 83     | 72      |
| 121                | 21.098                    | 0.176             | 0.075                                    | 1.25                             | 89              | -2.0                 | -             | 7.66             | -0.12         | 86                    | 404  | 84     | 72      |
| 122                | 21.272                    | 0.174             | 0.073                                    | 1.26                             | 89              | -2.1                 | -             | 7.53             | -0.13         | 86                    | 402  | 84     | 72      |
| 123                | 21.447                    | 0.175             | 0.073                                    | 1.27                             | 89              | -2.0                 | -             | 7.39             | -0.14         | 86                    | 399  | 83     | 72      |
| 124                | 21.622                    | 0.175             | 0.073                                    | 1.26                             | 89              | -2.1                 | -             | 7.31             | -0.08         | 88                    | 397  | 83     | 71      |
| 125                | 21.795                    | 0.173             | 0.074                                    | 1.26                             | 89              | -2.0                 | -             | 7.30             | -0.01         | 90                    | 398  | 82     | 71      |
| 126                | 21.970                    | 0.175             | 0.074                                    | 1.25                             | 90              | -2.1                 | -             | 7.23             | -0.07         | 91                    | 398  | 83     | 71      |
| 127                | 22.145                    | 0.175             | 0.077                                    | 1.27                             | 90              | -2.1                 | -             | 7.17             | -0.06         | 92                    | 398  | 84     | 70      |

# BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: SBIJob #: 24-303Model: St LouisTracking #: 216Run #: 3Technician: AKDate: 12/11/2024

| Elapsed Time (min) | Particulate Sampling Data |                   |                                          |                                  |                 |                      |               | Fuel Weight (lb) |               | Temperature Data (°F) |      |        |         |
|--------------------|---------------------------|-------------------|------------------------------------------|----------------------------------|-----------------|----------------------|---------------|------------------|---------------|-----------------------|------|--------|---------|
|                    | Gas Meter (ft³)           | Sample Rate (cfm) | Dilution Tunnel dP (in H <sub>2</sub> O) | Orifice dH (in H <sub>2</sub> O) | Meter Temp (°F) | Meter Vacuum (in Hg) | Pro. Rate (%) | Scale Reading    | Weight Change | Dilution Tunnel       | Flue | Filter | Ambient |
| 128                | 22.319                    | 0.174             | 0.078                                    | 1.26                             | 90              | -2.1                 | -             | 7.09             | -0.08         | 92                    | 395  | 84     | 70      |
| 129                | 22.494                    | 0.175             | 0.076                                    | 1.28                             | 90              | -2.0                 | -             | 6.99             | -0.10         | 92                    | 397  | 83     | 70      |
| 130                | 22.669                    | 0.175             | 0.074                                    | 1.26                             | 90              | -2.1                 | 101           | 6.89             | -0.10         | 92                    | 393  | 82     | 69      |
| 131                | 22.845                    | 0.176             | 0.076                                    | 1.26                             | 90              | -2.1                 | -             | 6.78             | -0.11         | 92                    | 395  | 82     | 69      |
| 132                | 23.020                    | 0.175             | 0.073                                    | 1.26                             | 90              | -2.2                 | -             | 6.68             | -0.10         | 92                    | 396  | 83     | 69      |
| 133                | 23.195                    | 0.175             | 0.074                                    | 1.28                             | 90              | -2.1                 | -             | 6.56             | -0.12         | 92                    | 396  | 84     | 69      |
| 134                | 23.369                    | 0.174             | 0.073                                    | 1.27                             | 90              | -2.1                 | -             | 6.45             | -0.11         | 92                    | 396  | 84     | 69      |
| 135                | 23.543                    | 0.174             | 0.077                                    | 1.27                             | 90              | -2.1                 | -             | 6.35             | -0.10         | 92                    | 395  | 83     | 69      |
| 136                | 23.718                    | 0.175             | 0.074                                    | 1.25                             | 90              | -2.2                 | -             | 6.25             | -0.10         | 92                    | 395  | 82     | 69      |
| 137                | 23.893                    | 0.175             | 0.076                                    | 1.26                             | 90              | -2.2                 | -             | 6.14             | -0.11         | 92                    | 393  | 82     | 69      |
| 138                | 24.069                    | 0.176             | 0.076                                    | 1.27                             | 90              | -2.2                 | -             | 6.02             | -0.12         | 92                    | 393  | 83     | 69      |
| 139                | 24.244                    | 0.175             | 0.074                                    | 1.27                             | 90              | -2.3                 | -             | 5.91             | -0.11         | 92                    | 393  | 84     | 69      |
| 140                | 24.419                    | 0.175             | 0.076                                    | 1.25                             | 90              | -2.2                 | 100           | 5.81             | -0.10         | 92                    | 393  | 84     | 69      |
| 141                | 24.594                    | 0.175             | 0.073                                    | 1.28                             | 90              | -2.3                 | -             | 5.70             | -0.11         | 92                    | 395  | 83     | 69      |
| 142                | 24.770                    | 0.176             | 0.075                                    | 1.27                             | 91              | -2.2                 | -             | 5.60             | -0.10         | 92                    | 395  | 82     | 69      |
| 143                | 24.944                    | 0.174             | 0.073                                    | 1.27                             | 91              | -2.2                 | -             | 5.49             | -0.11         | 92                    | 395  | 82     | 69      |
| 144                | 25.118                    | 0.174             | 0.074                                    | 1.26                             | 91              | -2.3                 | -             | 5.39             | -0.10         | 93                    | 395  | 83     | 69      |
| 145                | 25.293                    | 0.175             | 0.073                                    | 1.27                             | 91              | -2.3                 | -             | 5.30             | -0.09         | 92                    | 395  | 84     | 69      |
| 146                | 25.469                    | 0.176             | 0.074                                    | 1.26                             | 91              | -2.3                 | -             | 5.21             | -0.09         | 92                    | 395  | 85     | 69      |
| 147                | 25.638                    | 0.169             | 0.076                                    | 1.28                             | 91              | -2.3                 | -             | 5.11             | -0.10         | 92                    | 395  | 84     | 69      |
| 148                | 25.813                    | 0.175             | 0.074                                    | 1.27                             | 91              | -2.3                 | -             | 5.02             | -0.09         | 92                    | 395  | 83     | 69      |
| 149                | 25.988                    | 0.175             | 0.075                                    | 1.26                             | 91              | -2.4                 | -             | 4.92             | -0.10         | 92                    | 394  | 82     | 69      |
| 150                | 26.164                    | 0.176             | 0.075                                    | 1.26                             | 91              | -2.4                 | 99            | 4.84             | -0.08         | 92                    | 392  | 83     | 69      |
| 151                | 26.339                    | 0.175             | 0.074                                    | 1.26                             | 91              | -2.4                 | -             | 4.75             | -0.09         | 92                    | 392  | 84     | 69      |
| 152                | 26.514                    | 0.175             | 0.074                                    | 1.28                             | 91              | -2.4                 | -             | 4.68             | -0.07         | 92                    | 392  | 84     | 69      |
| 153                | 26.689                    | 0.175             | 0.075                                    | 1.26                             | 91              | -2.4                 | -             | 4.60             | -0.08         | 92                    | 390  | 84     | 69      |
| 154                | 26.863                    | 0.174             | 0.074                                    | 1.28                             | 91              | -2.5                 | -             | 4.52             | -0.08         | 92                    | 389  | 83     | 69      |
| 155                | 27.039                    | 0.176             | 0.076                                    | 1.27                             | 91              | -2.4                 | -             | 4.46             | -0.06         | 92                    | 387  | 82     | 69      |
| 156                | 27.213                    | 0.174             | 0.072                                    | 1.26                             | 91              | -2.5                 | -             | 29.14            | 24.68         | 115                   | 387  | 83     | 69      |
| 157                | 27.388                    | 0.175             | 0.074                                    | 1.25                             | 91              | -2.5                 | -             | 27.05            | -2.09         | 109                   | 476  | 84     | 69      |
| 158                | 27.562                    | 0.174             | 0.074                                    | 1.25                             | 91              | -2.4                 | -             | 26.72            | -0.33         | 103                   | 518  | 84     | 69      |
| 159                | 27.737                    | 0.175             | 0.073                                    | 1.26                             | 91              | -2.5                 | -             | 26.18            | -0.54         | 97                    | 500  | 84     | 70      |



# BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: SBI  
 Model: St Louis  
 Run #: 3

Job #: 24-303  
 Tracking #: 216  
 Technician: AK  
 Date: 12/11/2024

| Elapsed Time (min) | Particulate Sampling Data |                   |                                          |                                  |                 |                      |               | Fuel Weight (lb) |               | Temperature Data (°F) |      |        |         |
|--------------------|---------------------------|-------------------|------------------------------------------|----------------------------------|-----------------|----------------------|---------------|------------------|---------------|-----------------------|------|--------|---------|
|                    | Gas Meter (ft³)           | Sample Rate (cfm) | Dilution Tunnel dP (in H <sub>2</sub> O) | Orifice dH (in H <sub>2</sub> O) | Meter Temp (°F) | Meter Vacuum (in Hg) | Pro. Rate (%) | Scale Reading    | Weight Change | Dilution Tunnel       | Flue | Filter | Ambient |
| 160                | 27.912                    | 0.175             | 0.076                                    | 1.25                             | 92              | -2.4                 | 99            | 25.91            | -0.27         | 92                    | 456  | 84     | 70      |
| 161                | 28.086                    | 0.174             | 0.073                                    | 1.25                             | 92              | -2.4                 | -             | 25.67            | -0.24         | 90                    | 452  | 85     | 71      |
| 162                | 28.261                    | 0.175             | 0.074                                    | 1.26                             | 92              | -2.5                 | -             | 25.42            | -0.25         | 89                    | 446  | 84     | 72      |
| 163                | 28.435                    | 0.174             | 0.073                                    | 1.26                             | 92              | -2.5                 | -             | 25.17            | -0.25         | 89                    | 439  | 84     | 71      |
| 164                | 28.609                    | 0.174             | 0.072                                    | 1.26                             | 92              | -2.5                 | -             | 24.95            | -0.22         | 88                    | 446  | 83     | 71      |
| 165                | 28.783                    | 0.174             | 0.074                                    | 1.28                             | 92              | -2.5                 | -             | 24.71            | -0.24         | 88                    | 440  | 82     | 71      |
| 166                | 28.958                    | 0.175             | 0.074                                    | 1.26                             | 92              | -2.5                 | -             | 24.48            | -0.23         | 88                    | 436  | 83     | 71      |
| 167                | 29.133                    | 0.175             | 0.073                                    | 1.26                             | 92              | -2.4                 | -             | 24.25            | -0.23         | 88                    | 450  | 84     | 71      |
| 168                | 29.308                    | 0.175             | 0.074                                    | 1.27                             | 92              | -2.4                 | -             | 23.99            | -0.26         | 88                    | 457  | 84     | 71      |
| 169                | 29.482                    | 0.174             | 0.076                                    | 1.25                             | 92              | -2.5                 | -             | 23.78            | -0.21         | 88                    | 445  | 84     | 72      |
| 170                | 29.658                    | 0.176             | 0.076                                    | 1.25                             | 92              | -2.5                 | 99            | 23.54            | -0.24         | 88                    | 442  | 85     | 72      |
| 171                | 29.833                    | 0.175             | 0.074                                    | 1.25                             | 92              | -2.3                 | -             | 23.33            | -0.21         | 88                    | 449  | 84     | 73      |
| 172                | 30.008                    | 0.175             | 0.075                                    | 1.26                             | 92              | -2.4                 | -             | 23.11            | -0.22         | 88                    | 452  | 83     | 73      |
| 173                | 30.182                    | 0.174             | 0.074                                    | 1.27                             | 92              | -2.3                 | -             | 22.89            | -0.22         | 87                    | 453  | 82     | 72      |
| 174                | 30.356                    | 0.174             | 0.075                                    | 1.26                             | 92              | -2.3                 | -             | 22.67            | -0.22         | 87                    | 453  | 82     | 73      |
| 175                | 30.531                    | 0.175             | 0.074                                    | 1.27                             | 92              | -2.3                 | -             | 22.45            | -0.22         | 87                    | 455  | 83     | 72      |
| 176                | 30.706                    | 0.175             | 0.073                                    | 1.27                             | 92              | -2.3                 | -             | 22.21            | -0.24         | 87                    | 453  | 84     | 73      |
| 177                | 30.881                    | 0.175             | 0.073                                    | 1.27                             | 92              | -2.3                 | -             | 22.02            | -0.19         | 87                    | 451  | 84     | 72      |
| 178                | 31.056                    | 0.175             | 0.075                                    | 1.27                             | 92              | -2.3                 | -             | 21.78            | -0.24         | 87                    | 451  | 83     | 70      |
| 179                | 31.232                    | 0.176             | 0.074                                    | 1.25                             | 92              | -2.3                 | -             | 21.55            | -0.23         | 86                    | 452  | 82     | 69      |
| 180                | 31.407                    | 0.175             | 0.077                                    | 1.27                             | 92              | -2.3                 | 98            | 21.36            | -0.19         | 85                    | 453  | 82     | 69      |
| 181                | 31.583                    | 0.176             | 0.074                                    | 1.26                             | 93              | -2.3                 | -             | 21.12            | -0.24         | 85                    | 454  | 83     | 68      |
| 182                | 31.757                    | 0.174             | 0.075                                    | 1.27                             | 93              | -2.3                 | -             | 20.93            | -0.19         | 84                    | 454  | 84     | 68      |
| 183                | 31.932                    | 0.175             | 0.074                                    | 1.26                             | 93              | -2.3                 | -             | 20.73            | -0.20         | 84                    | 454  | 84     | 68      |
| 184                | 32.107                    | 0.175             | 0.075                                    | 1.27                             | 93              | -2.3                 | -             | 20.53            | -0.20         | 84                    | 454  | 83     | 68      |
| 185                | 32.283                    | 0.176             | 0.075                                    | 1.27                             | 93              | -2.3                 | -             | 20.31            | -0.22         | 83                    | 453  | 82     | 67      |
| 186                | 32.459                    | 0.176             | 0.074                                    | 1.27                             | 93              | -2.3                 | -             | 20.10            | -0.21         | 83                    | 453  | 83     | 67      |
| 187                | 32.635                    | 0.176             | 0.076                                    | 1.27                             | 93              | -2.3                 | -             | 19.88            | -0.22         | 83                    | 450  | 84     | 67      |
| 188                | 32.810                    | 0.175             | 0.074                                    | 1.27                             | 92              | -2.3                 | -             | 19.64            | -0.24         | 83                    | 450  | 84     | 67      |
| 189                | 32.986                    | 0.176             | 0.075                                    | 1.26                             | 92              | -2.3                 | -             | 19.41            | -0.23         | 82                    | 450  | 84     | 66      |
| 190                | 33.160                    | 0.174             | 0.076                                    | 1.27                             | 92              | -2.3                 | 98            | 19.26            | -0.15         | 82                    | 448  | 83     | 67      |
| 191                | 33.335                    | 0.175             | 0.072                                    | 1.26                             | 92              | -2.3                 | -             | 19.08            | -0.18         | 84                    | 447  | 82     | 67      |

# BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: SBI  
 Model: St Louis  
 Run #: 3

Job #: 24-303  
 Tracking #: 216  
 Technician: AK  
 Date: 12/11/2024

| Elapsed Time (min) | Particulate Sampling Data |                   |                                          |                                  |                 |                      |               | Fuel Weight (lb) |               | Temperature Data (°F) |      |        |         |
|--------------------|---------------------------|-------------------|------------------------------------------|----------------------------------|-----------------|----------------------|---------------|------------------|---------------|-----------------------|------|--------|---------|
|                    | Gas Meter (ft³)           | Sample Rate (cfm) | Dilution Tunnel dP (in H <sub>2</sub> O) | Orifice dH (in H <sub>2</sub> O) | Meter Temp (°F) | Meter Vacuum (in Hg) | Pro. Rate (%) | Scale Reading    | Weight Change | Dilution Tunnel       | Flue | Filter | Ambient |
| 192                | 33.511                    | 0.176             | 0.073                                    | 1.27                             | 92              | -2.3                 | -             | 18.88            | -0.20         | 85                    | 445  | 83     | 67      |
| 193                | 33.686                    | 0.175             | 0.073                                    | 1.28                             | 92              | -2.4                 | -             | 18.68            | -0.20         | 85                    | 444  | 84     | 68      |
| 194                | 33.861                    | 0.175             | 0.074                                    | 1.28                             | 92              | -2.4                 | -             | 18.51            | -0.17         | 86                    | 443  | 84     | 68      |
| 195                | 34.037                    | 0.176             | 0.075                                    | 1.26                             | 92              | -2.5                 | -             | 18.35            | -0.16         | 86                    | 442  | 84     | 68      |
| 196                | 34.212                    | 0.175             | 0.073                                    | 1.26                             | 92              | -2.5                 | -             | 18.17            | -0.18         | 86                    | 441  | 83     | 68      |
| 197                | 34.387                    | 0.175             | 0.073                                    | 1.27                             | 92              | -2.5                 | -             | 17.98            | -0.19         | 86                    | 439  | 82     | 69      |
| 198                | 34.562                    | 0.175             | 0.075                                    | 1.26                             | 92              | -2.5                 | -             | 17.83            | -0.15         | 86                    | 439  | 82     | 69      |
| 199                | 34.736                    | 0.174             | 0.072                                    | 1.26                             | 92              | -2.5                 | -             | 17.61            | -0.22         | 86                    | 437  | 83     | 69      |
| 200                | 34.911                    | 0.175             | 0.074                                    | 1.27                             | 92              | -2.6                 | 99            | 17.48            | -0.13         | 87                    | 435  | 84     | 69      |
| 201                | 35.086                    | 0.175             | 0.073                                    | 1.26                             | 91              | -2.5                 | -             | 17.28            | -0.20         | 87                    | 434  | 84     | 69      |
| 202                | 35.261                    | 0.175             | 0.073                                    | 1.26                             | 92              | -2.5                 | -             | 17.09            | -0.19         | 87                    | 433  | 85     | 69      |
| 203                | 35.436                    | 0.175             | 0.071                                    | 1.26                             | 92              | -2.5                 | -             | 16.97            | -0.12         | 87                    | 432  | 84     | 69      |
| 204                | 35.611                    | 0.175             | 0.073                                    | 1.28                             | 91              | -2.5                 | -             | 16.79            | -0.18         | 87                    | 431  | 83     | 69      |
| 205                | 35.786                    | 0.175             | 0.072                                    | 1.26                             | 91              | -2.6                 | -             | 16.59            | -0.20         | 87                    | 429  | 82     | 69      |
| 206                | 35.961                    | 0.175             | 0.074                                    | 1.26                             | 91              | -2.5                 | -             | 16.42            | -0.17         | 87                    | 428  | 82     | 70      |
| 207                | 36.135                    | 0.174             | 0.075                                    | 1.27                             | 91              | -2.5                 | -             | 16.29            | -0.13         | 87                    | 427  | 83     | 70      |
| 208                | 36.309                    | 0.174             | 0.072                                    | 1.26                             | 91              | -2.5                 | -             | 16.12            | -0.17         | 87                    | 426  | 84     | 70      |
| 209                | 36.484                    | 0.175             | 0.072                                    | 1.25                             | 92              | -2.5                 | -             | 15.95            | -0.17         | 87                    | 424  | 84     | 70      |
| 210                | 36.658                    | 0.174             | 0.073                                    | 1.26                             | 91              | -2.6                 | 100           | 15.79            | -0.16         | 87                    | 425  | 84     | 70      |
| 211                | 36.833                    | 0.175             | 0.073                                    | 1.28                             | 92              | -2.6                 | -             | 15.64            | -0.15         | 87                    | 424  | 83     | 70      |
| 212                | 37.008                    | 0.175             | 0.074                                    | 1.27                             | 92              | -2.5                 | -             | 15.49            | -0.15         | 87                    | 425  | 82     | 71      |
| 213                | 37.183                    | 0.175             | 0.075                                    | 1.27                             | 92              | -2.6                 | -             | 15.29            | -0.20         | 87                    | 430  | 83     | 71      |
| 214                | 37.358                    | 0.175             | 0.072                                    | 1.25                             | 92              | -2.6                 | -             | 15.10            | -0.19         | 87                    | 427  | 84     | 71      |
| 215                | 37.533                    | 0.175             | 0.074                                    | 1.25                             | 92              | -2.6                 | -             | 14.94            | -0.16         | 87                    | 424  | 84     | 71      |
| 216                | 37.707                    | 0.174             | 0.074                                    | 1.25                             | 92              | -2.5                 | -             | 14.77            | -0.17         | 87                    | 425  | 84     | 71      |
| 217                | 37.882                    | 0.175             | 0.073                                    | 1.25                             | 92              | -2.6                 | -             | 14.60            | -0.17         | 87                    | 425  | 83     | 71      |
| 218                | 38.055                    | 0.173             | 0.075                                    | 1.26                             | 92              | -2.6                 | -             | 14.41            | -0.19         | 87                    | 426  | 82     | 71      |
| 219                | 38.230                    | 0.175             | 0.073                                    | 1.26                             | 92              | -2.6                 | -             | 14.25            | -0.16         | 87                    | 425  | 83     | 71      |
| 220                | 38.404                    | 0.174             | 0.072                                    | 1.27                             | 92              | -2.5                 | 101           | 14.09            | -0.16         | 87                    | 424  | 84     | 71      |
| 221                | 38.579                    | 0.175             | 0.075                                    | 1.26                             | 92              | -2.5                 | -             | 13.92            | -0.17         | 87                    | 422  | 84     | 71      |
| 222                | 38.754                    | 0.175             | 0.073                                    | 1.28                             | 92              | -2.6                 | -             | 13.78            | -0.14         | 87                    | 422  | 84     | 71      |
| 223                | 38.929                    | 0.175             | 0.076                                    | 1.25                             | 92              | -2.6                 | -             | 13.62            | -0.16         | 87                    | 422  | 84     | 71      |

# BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: SBI  
 Model: St Louis  
 Run #: 3

Job #: 24-303  
 Tracking #: 216  
 Technician: AK  
 Date: 12/11/2024

| Elapsed Time (min) | Particulate Sampling Data |                   |                                          |                                  |                 |                      |               | Fuel Weight (lb) |               | Temperature Data (°F) |      |        |         |
|--------------------|---------------------------|-------------------|------------------------------------------|----------------------------------|-----------------|----------------------|---------------|------------------|---------------|-----------------------|------|--------|---------|
|                    | Gas Meter (ft³)           | Sample Rate (cfm) | Dilution Tunnel dP (in H <sub>2</sub> O) | Orifice dH (in H <sub>2</sub> O) | Meter Temp (°F) | Meter Vacuum (in Hg) | Pro. Rate (%) | Scale Reading    | Weight Change | Dilution Tunnel       | Flue | Filter | Ambient |
| 224                | 39.104                    | 0.175             | 0.073                                    | 1.27                             | 92              | -2.6                 | -             | 13.45            | -0.17         | 86                    | 422  | 82     | 71      |
| 225                | 39.279                    | 0.175             | 0.074                                    | 1.26                             | 92              | -2.6                 | -             | 13.33            | -0.12         | 86                    | 422  | 82     | 70      |
| 226                | 39.454                    | 0.175             | 0.074                                    | 1.27                             | 92              | -2.6                 | -             | 13.18            | -0.15         | 86                    | 420  | 83     | 70      |
| 227                | 39.628                    | 0.174             | 0.074                                    | 1.26                             | 92              | -2.6                 | -             | 13.01            | -0.17         | 86                    | 420  | 84     | 70      |
| 228                | 39.802                    | 0.174             | 0.074                                    | 1.24                             | 92              | -2.6                 | -             | 12.83            | -0.18         | 86                    | 418  | 84     | 70      |
| 229                | 39.977                    | 0.175             | 0.074                                    | 1.26                             | 92              | -2.6                 | -             | 12.69            | -0.14         | 86                    | 418  | 85     | 71      |
| 230                | 40.151                    | 0.174             | 0.074                                    | 1.25                             | 92              | -2.5                 | 100           | 12.52            | -0.17         | 86                    | 417  | 84     | 71      |
| 231                | 40.326                    | 0.175             | 0.072                                    | 1.27                             | 92              | -2.6                 | -             | 12.36            | -0.16         | 86                    | 416  | 83     | 71      |
| 232                | 40.501                    | 0.175             | 0.074                                    | 1.26                             | 92              | -2.6                 | -             | 12.19            | -0.17         | 86                    | 416  | 82     | 71      |
| 233                | 40.676                    | 0.175             | 0.074                                    | 1.25                             | 92              | -2.6                 | -             | 12.06            | -0.13         | 86                    | 415  | 83     | 71      |
| 234                | 40.851                    | 0.175             | 0.074                                    | 1.26                             | 92              | -2.6                 | -             | 11.92            | -0.14         | 86                    | 415  | 83     | 71      |
| 235                | 41.026                    | 0.175             | 0.073                                    | 1.25                             | 92              | -2.5                 | -             | 11.75            | -0.17         | 86                    | 414  | 84     | 71      |
| 236                | 41.200                    | 0.174             | 0.074                                    | 1.26                             | 92              | -2.6                 | -             | 11.65            | -0.10         | 86                    | 412  | 85     | 71      |
| 237                | 41.375                    | 0.175             | 0.074                                    | 1.26                             | 92              | -2.6                 | -             | 11.50            | -0.15         | 86                    | 410  | 85     | 71      |
| 238                | 41.549                    | 0.174             | 0.074                                    | 1.27                             | 92              | -2.6                 | -             | 11.34            | -0.16         | 86                    | 409  | 84     | 71      |
| 239                | 41.723                    | 0.174             | 0.074                                    | 1.26                             | 92              | -2.6                 | -             | 11.21            | -0.13         | 86                    | 407  | 83     | 72      |
| 240                | 41.898                    | 0.175             | 0.073                                    | 1.26                             | 92              | -2.6                 | 100           | 11.06            | -0.15         | 86                    | 407  | 82     | 71      |
| 241                | 42.073                    | 0.175             | 0.074                                    | 1.26                             | 92              | -2.5                 | -             | 10.94            | -0.12         | 86                    | 405  | 83     | 71      |
| 242                | 42.247                    | 0.174             | 0.074                                    | 1.26                             | 92              | -2.5                 | -             | 10.80            | -0.14         | 86                    | 405  | 84     | 72      |
| 243                | 42.422                    | 0.175             | 0.073                                    | 1.26                             | 92              | -2.6                 | -             | 10.65            | -0.15         | 86                    | 404  | 84     | 72      |
| 244                | 42.597                    | 0.175             | 0.074                                    | 1.25                             | 92              | -2.5                 | -             | 10.51            | -0.14         | 86                    | 403  | 84     | 72      |
| 245                | 42.772                    | 0.175             | 0.074                                    | 1.26                             | 92              | -2.5                 | -             | 10.37            | -0.14         | 86                    | 403  | 83     | 72      |
| 246                | 42.946                    | 0.174             | 0.075                                    | 1.26                             | 92              | -2.5                 | -             | 10.26            | -0.11         | 86                    | 401  | 82     | 72      |
| 247                | 43.121                    | 0.175             | 0.075                                    | 1.26                             | 92              | -2.6                 | -             | 10.11            | -0.15         | 86                    | 402  | 83     | 72      |
| 248                | 43.295                    | 0.174             | 0.074                                    | 1.25                             | 92              | -2.5                 | -             | 9.97             | -0.14         | 85                    | 402  | 84     | 72      |
| 249                | 43.468                    | 0.173             | 0.074                                    | 1.25                             | 92              | -2.5                 | -             | 9.85             | -0.12         | 85                    | 400  | 84     | 72      |
| 250                | 43.643                    | 0.175             | 0.075                                    | 1.27                             | 92              | -2.6                 | 100           | 9.75             | -0.10         | 85                    | 397  | 84     | 72      |
| 251                | 43.818                    | 0.175             | 0.074                                    | 1.26                             | 93              | -2.5                 | -             | 9.61             | -0.14         | 86                    | 397  | 83     | 72      |
| 252                | 43.993                    | 0.175             | 0.075                                    | 1.25                             | 93              | -2.6                 | -             | 9.55             | -0.06         | 85                    | 395  | 82     | 72      |
| 253                | 44.168                    | 0.175             | 0.073                                    | 1.26                             | 93              | -2.5                 | -             | 9.42             | -0.13         | 85                    | 393  | 83     | 72      |
| 254                | 44.342                    | 0.174             | 0.074                                    | 1.25                             | 93              | -2.5                 | -             | 9.30             | -0.12         | 85                    | 392  | 83     | 72      |
| 255                | 44.517                    | 0.175             | 0.074                                    | 1.26                             | 93              | -2.6                 | -             | 9.18             | -0.12         | 85                    | 391  | 84     | 72      |

# BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: SBI  
 Model: St Louis  
 Run #: 3

Job #: 24-303  
 Tracking #: 216  
 Technician: AK  
 Date: 12/11/2024

| Elapsed Time (min) | Particulate Sampling Data |                   |                                          |                                  |                 |                      |               | Fuel Weight (lb) |               | Temperature Data (°F) |      |        |         |
|--------------------|---------------------------|-------------------|------------------------------------------|----------------------------------|-----------------|----------------------|---------------|------------------|---------------|-----------------------|------|--------|---------|
|                    | Gas Meter (ft³)           | Sample Rate (cfm) | Dilution Tunnel dP (in H <sub>2</sub> O) | Orifice dH (in H <sub>2</sub> O) | Meter Temp (°F) | Meter Vacuum (in Hg) | Pro. Rate (%) | Scale Reading    | Weight Change | Dilution Tunnel       | Flue | Filter | Ambient |
| 256                | 44.692                    | 0.175             | 0.075                                    | 1.25                             | 93              | -2.6                 | -             | 9.07             | -0.11         | 85                    | 389  | 84     | 72      |
| 257                | 44.867                    | 0.175             | 0.073                                    | 1.26                             | 93              | -2.5                 | -             | 8.96             | -0.11         | 85                    | 386  | 84     | 72      |
| 258                | 45.041                    | 0.174             | 0.075                                    | 1.25                             | 93              | -2.6                 | -             | 8.86             | -0.10         | 85                    | 386  | 83     | 72      |
| 259                | 45.215                    | 0.174             | 0.073                                    | 1.26                             | 93              | -2.6                 | -             | 8.73             | -0.13         | 85                    | 385  | 82     | 72      |
| 260                | 45.389                    | 0.174             | 0.076                                    | 1.25                             | 93              | -2.6                 | 98            | 8.67             | -0.06         | 84                    | 384  | 83     | 72      |
| 261                | 45.564                    | 0.175             | 0.075                                    | 1.25                             | 93              | -2.7                 | -             | 8.59             | -0.08         | 86                    | 383  | 84     | 71      |
| 262                | 45.739                    | 0.175             | 0.075                                    | 1.25                             | 93              | -2.7                 | -             | 8.55             | -0.04         | 88                    | 385  | 84     | 71      |
| 263                | 45.913                    | 0.174             | 0.073                                    | 1.26                             | 93              | -2.7                 | -             | 8.52             | -0.03         | 89                    | 385  | 83     | 70      |
| 264                | 46.088                    | 0.175             | 0.074                                    | 1.26                             | 93              | -2.6                 | -             | 8.44             | -0.08         | 90                    | 386  | 82     | 70      |
| 265                | 46.263                    | 0.175             | 0.076                                    | 1.26                             | 93              | -2.7                 | -             | 8.40             | -0.04         | 90                    | 388  | 83     | 70      |
| 266                | 46.437                    | 0.174             | 0.075                                    | 1.25                             | 93              | -2.6                 | -             | 8.33             | -0.07         | 90                    | 385  | 84     | 70      |
| 267                | 46.612                    | 0.175             | 0.076                                    | 1.26                             | 93              | -2.7                 | -             | 8.25             | -0.08         | 90                    | 388  | 85     | 70      |
| 268                | 46.786                    | 0.174             | 0.076                                    | 1.25                             | 93              | -2.6                 | -             | 7.85             | -0.40         | 87                    | 384  | 84     | 70      |
| 269                | 46.960                    | 0.174             | 0.075                                    | 1.26                             | 93              | -2.7                 | -             | 7.72             | -0.13         | 86                    | 386  | 83     | 71      |
| 270                | 47.134                    | 0.174             | 0.075                                    | 1.26                             | 93              | -2.6                 | 98            | 7.61             | -0.11         | 85                    | 386  | 82     | 71      |
| 271                | 47.308                    | 0.174             | 0.075                                    | 1.24                             | 93              | -2.7                 | -             | 7.51             | -0.10         | 85                    | 392  | 83     | 71      |
| 272                | 47.482                    | 0.174             | 0.075                                    | 1.25                             | 93              | -2.7                 | -             | 7.39             | -0.12         | 85                    | 397  | 84     | 71      |
| 273                | 47.657                    | 0.175             | 0.074                                    | 1.25                             | 93              | -2.7                 | -             | 7.33             | -0.06         | 85                    | 399  | 85     | 71      |
| 274                | 47.832                    | 0.175             | 0.074                                    | 1.26                             | 93              | -2.8                 | -             | 7.27             | -0.06         | 85                    | 397  | 84     | 71      |
| 275                | 48.006                    | 0.174             | 0.074                                    | 1.26                             | 93              | -2.7                 | -             | 7.21             | -0.06         | 85                    | 395  | 84     | 71      |
| 276                | 48.181                    | 0.175             | 0.074                                    | 1.26                             | 93              | -2.7                 | -             | 7.14             | -0.07         | 85                    | 393  | 82     | 71      |
| 277                | 48.355                    | 0.174             | 0.073                                    | 1.24                             | 93              | -2.8                 | -             | 7.10             | -0.04         | 85                    | 391  | 82     | 71      |
| 278                | 48.530                    | 0.175             | 0.075                                    | 1.25                             | 93              | -2.7                 | -             | 7.04             | -0.06         | 86                    | 388  | 83     | 71      |
| 279                | 48.704                    | 0.174             | 0.076                                    | 1.24                             | 93              | -2.8                 | -             | 7.07             | 0.03          | 88                    | 388  | 84     | 70      |
| 280                | 48.878                    | 0.174             | 0.075                                    | 1.25                             | 93              | -2.8                 | 99            | 7.06             | -0.01         | 89                    | 385  | 85     | 70      |
| 281                | 49.052                    | 0.174             | 0.076                                    | 1.26                             | 93              | -2.8                 | -             | 7.04             | -0.02         | 90                    | 383  | 84     | 70      |
| 282                | 49.226                    | 0.174             | 0.076                                    | 1.26                             | 93              | -2.8                 | -             | 7.02             | -0.02         | 90                    | 383  | 83     | 70      |
| 283                | 49.400                    | 0.174             | 0.074                                    | 1.25                             | 93              | -2.8                 | -             | 6.99             | -0.03         | 90                    | 374  | 82     | 69      |
| 284                | 49.574                    | 0.174             | 0.074                                    | 1.25                             | 93              | -2.9                 | -             | 6.97             | -0.02         | 89                    | 363  | 83     | 69      |
| 285                | 49.749                    | 0.175             | 0.075                                    | 1.26                             | 93              | -2.8                 | -             | 6.94             | -0.03         | 89                    | 359  | 84     | 69      |
| 286                | 49.923                    | 0.174             | 0.076                                    | 1.25                             | 93              | -2.8                 | -             | 6.92             | -0.02         | 89                    | 362  | 85     | 69      |
| 287                | 50.098                    | 0.175             | 0.075                                    | 1.26                             | 93              | -2.9                 | -             | 6.90             | -0.02         | 89                    | 360  | 85     | 69      |

# BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: SBI  
 Model: St Louis  
 Run #: 3

Job #: 24-303  
 Tracking #: 216  
 Technician: AK  
 Date: 12/11/2024

| Elapsed Time (min) | Particulate Sampling Data |                   |                                          |                                  |                 |                      |               | Fuel Weight (lb) |               | Temperature Data (°F) |      |        |         |
|--------------------|---------------------------|-------------------|------------------------------------------|----------------------------------|-----------------|----------------------|---------------|------------------|---------------|-----------------------|------|--------|---------|
|                    | Gas Meter (ft³)           | Sample Rate (cfm) | Dilution Tunnel dP (in H <sub>2</sub> O) | Orifice dH (in H <sub>2</sub> O) | Meter Temp (°F) | Meter Vacuum (in Hg) | Pro. Rate (%) | Scale Reading    | Weight Change | Dilution Tunnel       | Flue | Filter | Ambient |
| 288                | 50.272                    | 0.174             | 0.075                                    | 1.25                             | 93              | -2.9                 | -             | 6.87             | -0.03         | 89                    | 359  | 84     | 69      |
| 289                | 50.447                    | 0.175             | 0.073                                    | 1.25                             | 93              | -2.9                 | -             | 6.85             | -0.02         | 89                    | 357  | 83     | 69      |
| 290                | 50.621                    | 0.174             | 0.075                                    | 1.25                             | 93              | -2.8                 | 99            | 6.81             | -0.04         | 89                    | 356  | 82     | 69      |
| 291                | 50.796                    | 0.175             | 0.075                                    | 1.26                             | 93              | -2.9                 | -             | 6.77             | -0.04         | 89                    | 355  | 83     | 69      |
| 292                | 50.970                    | 0.174             | 0.076                                    | 1.25                             | 93              | -2.9                 | -             | 6.74             | -0.03         | 89                    | 353  | 84     | 69      |
| 293                | 51.143                    | 0.173             | 0.075                                    | 1.26                             | 93              | -3.0                 | -             | 6.71             | -0.03         | 89                    | 353  | 84     | 69      |
| 294                | 51.318                    | 0.175             | 0.075                                    | 1.26                             | 93              | -3.0                 | -             | 6.67             | -0.04         | 89                    | 353  | 84     | 69      |
| 295                | 51.492                    | 0.174             | 0.075                                    | 1.26                             | 93              | -2.9                 | -             | 6.64             | -0.03         | 89                    | 351  | 82     | 69      |
| 296                | 51.666                    | 0.174             | 0.075                                    | 1.27                             | 93              | -3.0                 | -             | 6.62             | -0.02         | 88                    | 328  | 82     | 69      |
| 297                | 51.841                    | 0.175             | 0.077                                    | 1.25                             | 93              | -2.9                 | -             | 6.60             | -0.02         | 87                    | 297  | 83     | 69      |
| 298                | 52.016                    | 0.175             | 0.075                                    | 1.25                             | 93              | -3.1                 | -             | 6.58             | -0.02         | 87                    | 281  | 84     | 69      |
| 299                | 52.191                    | 0.175             | 0.075                                    | 1.26                             | 93              | -3.1                 | -             | 6.55             | -0.03         | 87                    | 305  | 84     | 69      |
| 300                | 52.366                    | 0.175             | 0.075                                    | 1.25                             | 93              | -3.1                 | 99            | 6.52             | -0.03         | 88                    | 329  | 83     | 69      |
| 301                | 52.540                    | 0.174             | 0.077                                    | 1.24                             | 93              | -3.1                 | -             | 6.50             | -0.02         | 88                    | 322  | 82     | 69      |
| 302                | 52.715                    | 0.175             | 0.076                                    | 1.25                             | 93              | -3.1                 | -             | 6.47             | -0.03         | 88                    | 319  | 83     | 69      |
| 303                | 52.889                    | 0.174             | 0.076                                    | 1.26                             | 93              | -3.1                 | -             | 6.43             | -0.04         | 88                    | 317  | 84     | 69      |
| 304                | 53.062                    | 0.173             | 0.077                                    | 1.25                             | 93              | -3.1                 | -             | 6.38             | -0.05         | 88                    | 348  | 85     | 68      |
| 305                | 53.237                    | 0.175             | 0.075                                    | 1.25                             | 93              | -3.2                 | -             | 6.36             | -0.02         | 88                    | 330  | 84     | 68      |
| 306                | 53.412                    | 0.175             | 0.075                                    | 1.27                             | 94              | -3.2                 | -             | 6.33             | -0.03         | 87                    | 320  | 84     | 68      |
| 307                | 53.586                    | 0.174             | 0.075                                    | 1.26                             | 93              | -3.2                 | -             | 6.31             | -0.02         | 87                    | 315  | 83     | 68      |
| 308                | 53.761                    | 0.175             | 0.076                                    | 1.27                             | 93              | -3.2                 | -             | 6.26             | -0.05         | 88                    | 345  | 82     | 68      |
| 309                | 53.936                    | 0.175             | 0.075                                    | 1.27                             | 93              | -3.2                 | -             | 6.23             | -0.03         | 88                    | 334  | 83     | 68      |
| 310                | 54.110                    | 0.174             | 0.075                                    | 1.26                             | 93              | -3.3                 | 99            | 6.20             | -0.03         | 88                    | 348  | 84     | 68      |
| 311                | 54.285                    | 0.175             | 0.076                                    | 1.25                             | 94              | -3.3                 | -             | 6.16             | -0.04         | 87                    | 326  | 85     | 68      |
| 312                | 54.459                    | 0.174             | 0.076                                    | 1.26                             | 94              | -3.4                 | -             | 6.13             | -0.03         | 88                    | 346  | 85     | 68      |
| 313                | 54.634                    | 0.175             | 0.075                                    | 1.25                             | 94              | -3.3                 | -             | 6.10             | -0.03         | 87                    | 329  | 85     | 68      |
| 314                | 54.807                    | 0.173             | 0.075                                    | 1.25                             | 94              | -3.3                 | -             | 6.06             | -0.04         | 88                    | 344  | 84     | 68      |
| 315                | 54.981                    | 0.174             | 0.076                                    | 1.25                             | 94              | -3.4                 | -             | 6.03             | -0.03         | 87                    | 332  | 83     | 68      |
| 316                | 55.155                    | 0.174             | 0.076                                    | 1.25                             | 94              | -3.3                 | -             | 5.99             | -0.04         | 88                    | 342  | 82     | 68      |
| 317                | 55.330                    | 0.175             | 0.076                                    | 1.27                             | 94              | -3.3                 | -             | 5.96             | -0.03         | 87                    | 335  | 82     | 68      |
| 318                | 55.504                    | 0.174             | 0.076                                    | 1.25                             | 94              | -3.5                 | -             | 5.93             | -0.03         | 87                    | 321  | 84     | 68      |
| 319                | 55.679                    | 0.175             | 0.076                                    | 1.26                             | 94              | -3.5                 | -             | 5.91             | -0.02         | 87                    | 314  | 85     | 68      |

# BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: SBI  
 Model: St Louis  
 Run #: 3

Job #: 24-303  
 Tracking #: 216  
 Technician: AK  
 Date: 12/11/2024

| Elapsed Time (min) | Particulate Sampling Data |                   |                                          |                                  |                 |                      |               | Fuel Weight (lb) |               | Temperature Data (°F) |      |        |         |
|--------------------|---------------------------|-------------------|------------------------------------------|----------------------------------|-----------------|----------------------|---------------|------------------|---------------|-----------------------|------|--------|---------|
|                    | Gas Meter (ft³)           | Sample Rate (cfm) | Dilution Tunnel dP (in H <sub>2</sub> O) | Orifice dH (in H <sub>2</sub> O) | Meter Temp (°F) | Meter Vacuum (in Hg) | Pro. Rate (%) | Scale Reading    | Weight Change | Dilution Tunnel       | Flue | Filter | Ambient |
| 320                | 55.853                    | 0.174             | 0.075                                    | 1.26                             | 94              | -3.5                 | 99            | 5.88             | -0.03         | 87                    | 310  | 85     | 69      |
| 321                | 56.028                    | 0.175             | 0.076                                    | 1.25                             | 94              | -3.5                 | -             | 5.85             | -0.03         | 87                    | 309  | 84     | 68      |
| 322                | 56.202                    | 0.174             | 0.076                                    | 1.25                             | 94              | -3.5                 | -             | 5.85             | 0.00          | 86                    | 289  | 82     | 68      |
| 323                | 56.377                    | 0.175             | 0.076                                    | 1.24                             | 94              | -3.5                 | -             | 5.83             | -0.02         | 86                    | 266  | 82     | 68      |
| 324                | 56.551                    | 0.174             | 0.077                                    | 1.24                             | 94              | -3.4                 | -             | 5.82             | -0.01         | 85                    | 253  | 83     | 68      |
| 325                | 56.725                    | 0.174             | 0.077                                    | 1.25                             | 94              | -3.5                 | -             | 5.81             | -0.01         | 85                    | 245  | 84     | 68      |
| 326                | 56.899                    | 0.174             | 0.075                                    | 1.27                             | 94              | -3.5                 | -             | 5.81             | 0.00          | 85                    | 239  | 84     | 68      |
| 327                | 57.073                    | 0.174             | 0.076                                    | 1.25                             | 94              | -3.5                 | -             | 5.79             | -0.02         | 84                    | 236  | 84     | 68      |
| 328                | 57.247                    | 0.174             | 0.074                                    | 1.26                             | 94              | -3.6                 | -             | 5.78             | -0.01         | 84                    | 232  | 83     | 68      |
| 329                | 57.422                    | 0.175             | 0.073                                    | 1.25                             | 94              | -3.5                 | -             | 5.77             | -0.01         | 84                    | 230  | 82     | 68      |
| 330                | 57.596                    | 0.174             | 0.076                                    | 1.25                             | 94              | -3.5                 | 98            | 5.76             | -0.01         | 84                    | 227  | 83     | 68      |
| 331                | 57.771                    | 0.175             | 0.076                                    | 1.25                             | 94              | -3.6                 | -             | 5.74             | -0.02         | 84                    | 225  | 84     | 68      |
| 332                | 57.945                    | 0.174             | 0.075                                    | 1.25                             | 94              | -3.7                 | -             | 5.73             | -0.01         | 84                    | 223  | 84     | 68      |
| 333                | 58.120                    | 0.175             | 0.076                                    | 1.26                             | 94              | -3.6                 | -             | 5.72             | -0.01         | 84                    | 222  | 84     | 68      |
| 334                | 58.294                    | 0.174             | 0.075                                    | 1.26                             | 94              | -3.6                 | -             | 5.70             | -0.02         | 83                    | 220  | 84     | 68      |
| 335                | 58.469                    | 0.175             | 0.076                                    | 1.25                             | 94              | -3.7                 | -             | 5.68             | -0.02         | 83                    | 217  | 83     | 68      |
| 336                | 58.643                    | 0.174             | 0.075                                    | 1.24                             | 94              | -3.7                 | -             | 5.63             | -0.05         | 83                    | 217  | 82     | 68      |
| 337                | 58.817                    | 0.174             | 0.075                                    | 1.27                             | 94              | -3.7                 | -             | 5.61             | -0.02         | 83                    | 215  | 82     | 68      |
| 338                | 58.990                    | 0.173             | 0.076                                    | 1.25                             | 94              | -3.8                 | -             | 5.60             | -0.01         | 83                    | 213  | 83     | 68      |
| 339                | 59.165                    | 0.175             | 0.074                                    | 1.27                             | 94              | -3.7                 | -             | 5.58             | -0.02         | 83                    | 212  | 84     | 68      |
| 340                | 59.339                    | 0.174             | 0.075                                    | 1.25                             | 94              | -3.8                 | 98            | 5.56             | -0.02         | 83                    | 211  | 84     | 68      |
| 341                | 59.514                    | 0.175             | 0.075                                    | 1.25                             | 94              | -3.8                 | -             | 5.55             | -0.01         | 83                    | 210  | 83     | 68      |
| 342                | 59.689                    | 0.175             | 0.075                                    | 1.26                             | 94              | -3.8                 | -             | 5.53             | -0.02         | 82                    | 209  | 82     | 68      |
| 343                | 59.863                    | 0.174             | 0.074                                    | 1.24                             | 94              | -3.7                 | -             | 5.51             | -0.02         | 82                    | 208  | 83     | 68      |
| 344                | 60.038                    | 0.175             | 0.076                                    | 1.25                             | 94              | -3.7                 | -             | 5.49             | -0.02         | 82                    | 207  | 84     | 68      |
| 345                | 60.212                    | 0.174             | 0.076                                    | 1.26                             | 94              | -3.9                 | -             | 5.48             | -0.01         | 82                    | 205  | 84     | 68      |
| 346                | 60.387                    | 0.175             | 0.074                                    | 1.26                             | 94              | -3.9                 | -             | 5.47             | -0.01         | 82                    | 206  | 83     | 68      |
| 347                | 60.562                    | 0.175             | 0.076                                    | 1.26                             | 94              | -3.8                 | -             | 5.44             | -0.03         | 82                    | 204  | 82     | 68      |
| 348                | 60.735                    | 0.173             | 0.076                                    | 1.25                             | 94              | -3.9                 | -             | 5.42             | -0.02         | 82                    | 204  | 82     | 68      |
| 349                | 60.909                    | 0.174             | 0.077                                    | 1.28                             | 94              | -3.8                 | -             | 5.40             | -0.02         | 82                    | 202  | 82     | 68      |
| 350                | 61.084                    | 0.175             | 0.074                                    | 1.27                             | 94              | -3.9                 | 99            | 5.39             | -0.01         | 82                    | 201  | 84     | 68      |
| 351                | 61.259                    | 0.175             | 0.076                                    | 1.27                             | 94              | -3.9                 | -             | 5.37             | -0.02         | 81                    | 201  | 84     | 68      |

# BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: SBI  
 Model: St Louis  
 Run #: 3

Job #: 24-303  
 Tracking #: 216  
 Technician: AK  
 Date: 12/11/2024

| Elapsed Time (min) | Particulate Sampling Data |                   |                                          |                                  |                 |                      |               | Fuel Weight (lb) |               | Temperature Data (°F) |      |        |         |
|--------------------|---------------------------|-------------------|------------------------------------------|----------------------------------|-----------------|----------------------|---------------|------------------|---------------|-----------------------|------|--------|---------|
|                    | Gas Meter (ft³)           | Sample Rate (cfm) | Dilution Tunnel dP (in H <sub>2</sub> O) | Orifice dH (in H <sub>2</sub> O) | Meter Temp (°F) | Meter Vacuum (in Hg) | Pro. Rate (%) | Scale Reading    | Weight Change | Dilution Tunnel       | Flue | Filter | Ambient |
| 352                | 61.434                    | 0.175             | 0.075                                    | 1.27                             | 94              | -3.9                 | -             | 5.35             | -0.02         | 81                    | 200  | 85     | 68      |
| 353                | 61.609                    | 0.175             | 0.076                                    | 1.27                             | 94              | -3.9                 | -             | 5.35             | 0.00          | 81                    | 198  | 84     | 68      |
| 354                | 61.784                    | 0.175             | 0.075                                    | 1.25                             | 94              | -4.0                 | -             | 5.33             | -0.02         | 81                    | 198  | 84     | 68      |
| 355                | 61.959                    | 0.175             | 0.076                                    | 1.27                             | 94              | -3.9                 | -             | 5.30             | -0.03         | 81                    | 197  | 83     | 68      |
| 356                | 62.134                    | 0.175             | 0.075                                    | 1.25                             | 94              | -4.0                 | -             | 5.28             | -0.02         | 81                    | 196  | 82     | 68      |
| 357                | 62.309                    | 0.175             | 0.075                                    | 1.26                             | 94              | -4.1                 | -             | 5.27             | -0.01         | 81                    | 196  | 82     | 68      |
| 358                | 62.482                    | 0.173             | 0.075                                    | 1.26                             | 94              | -4.1                 | -             | 5.26             | -0.01         | 80                    | 195  | 83     | 68      |
| 359                | 62.657                    | 0.175             | 0.074                                    | 1.26                             | 94              | -4.1                 | -             | 5.23             | -0.03         | 80                    | 195  | 84     | 68      |
| 360                | 62.831                    | 0.174             | 0.076                                    | 1.25                             | 94              | -4.0                 | 98            | 5.22             | -0.01         | 80                    | 194  | 85     | 68      |
| 361                | 63.006                    | 0.175             | 0.077                                    | 1.27                             | 94              | -4.1                 | -             | 5.20             | -0.02         | 80                    | 194  | 84     | 68      |
| 362                | 63.181                    | 0.175             | 0.073                                    | 1.27                             | 94              | -4.0                 | -             | 5.18             | -0.02         | 80                    | 193  | 83     | 68      |
| 363                | 63.356                    | 0.175             | 0.076                                    | 1.25                             | 94              | -4.1                 | -             | 5.16             | -0.02         | 80                    | 192  | 82     | 68      |
| 364                | 63.531                    | 0.175             | 0.075                                    | 1.26                             | 94              | -4.1                 | -             | 5.15             | -0.01         | 80                    | 191  | 82     | 68      |
| 365                | 63.706                    | 0.175             | 0.076                                    | 1.25                             | 94              | -4.1                 | -             | 5.14             | -0.01         | 80                    | 191  | 83     | 68      |
| 366                | 63.881                    | 0.175             | 0.077                                    | 1.26                             | 94              | -4.1                 | -             | 5.13             | -0.01         | 80                    | 191  | 84     | 68      |
| 367                | 64.056                    | 0.175             | 0.076                                    | 1.25                             | 94              | -4.2                 | -             | 5.11             | -0.02         | 80                    | 190  | 84     | 68      |
| 368                | 64.229                    | 0.173             | 0.076                                    | 1.26                             | 94              | -4.2                 | -             | 5.09             | -0.02         | 80                    | 190  | 83     | 68      |
| 369                | 64.404                    | 0.175             | 0.076                                    | 1.26                             | 94              | -4.1                 | -             | 5.08             | -0.01         | 80                    | 189  | 82     | 68      |
| 370                | 64.579                    | 0.175             | 0.076                                    | 1.26                             | 94              | -4.1                 | 98            | 5.06             | -0.02         | 80                    | 188  | 82     | 68      |
| 371                | 64.754                    | 0.175             | 0.074                                    | 1.24                             | 94              | -4.2                 | -             | 5.05             | -0.01         | 80                    | 188  | 83     | 68      |
| 372                | 64.929                    | 0.175             | 0.076                                    | 1.26                             | 93              | -4.2                 | -             | 5.03             | -0.02         | 80                    | 187  | 84     | 68      |
| 373                | 65.104                    | 0.175             | 0.076                                    | 1.25                             | 94              | -4.2                 | -             | 5.01             | -0.02         | 80                    | 187  | 84     | 67      |
| 374                | 65.279                    | 0.175             | 0.076                                    | 1.25                             | 93              | -4.2                 | -             | 5.00             | -0.01         | 79                    | 186  | 84     | 67      |
| 375                | 65.454                    | 0.175             | 0.076                                    | 1.25                             | 94              | -4.2                 | -             | 4.98             | -0.02         | 79                    | 185  | 82     | 67      |
| 376                | 65.629                    | 0.175             | 0.077                                    | 1.27                             | 93              | -4.3                 | -             | 4.96             | -0.02         | 79                    | 184  | 82     | 67      |
| 377                | 65.803                    | 0.174             | 0.076                                    | 1.26                             | 94              | -4.2                 | -             | 4.95             | -0.01         | 79                    | 185  | 83     | 67      |
| 378                | 65.977                    | 0.174             | 0.076                                    | 1.25                             | 93              | -4.2                 | -             | 4.93             | -0.02         | 79                    | 185  | 84     | 67      |
| 379                | 66.152                    | 0.175             | 0.075                                    | 1.26                             | 93              | -4.3                 | -             | 4.92             | -0.01         | 79                    | 185  | 84     | 67      |
| 380                | 66.327                    | 0.175             | 0.076                                    | 1.26                             | 93              | -4.3                 | 98            | 4.90             | -0.02         | 79                    | 184  | 83     | 67      |
| 381                | 66.502                    | 0.175             | 0.076                                    | 1.26                             | 93              | -4.4                 | -             | 4.88             | -0.02         | 79                    | 184  | 82     | 67      |
| 382                | 66.676                    | 0.174             | 0.076                                    | 1.24                             | 93              | -4.4                 | -             | 4.86             | -0.02         | 79                    | 183  | 82     | 67      |
| 383                | 66.852                    | 0.176             | 0.076                                    | 1.26                             | 93              | -4.4                 | -             | 4.85             | -0.01         | 79                    | 183  | 83     | 67      |

# BOX A TEST DATA - ASTM E2780 / ASTM E2515

|                        |                         |
|------------------------|-------------------------|
| Client: <u>SBI</u>     | Job #: <u>24-303</u>    |
| Model: <u>St Louis</u> | Tracking #: <u>216</u>  |
| Run #: <u>3</u>        | Technician: <u>AK</u>   |
|                        | Date: <u>12/11/2024</u> |

| Elapsed Time (min) | Particulate Sampling Data |                   |                                          |                                  |                 |                      |               | Fuel Weight (lb) |               | Temperature Data (°F) |       |        |         |
|--------------------|---------------------------|-------------------|------------------------------------------|----------------------------------|-----------------|----------------------|---------------|------------------|---------------|-----------------------|-------|--------|---------|
|                    | Gas Meter (ft³)           | Sample Rate (cfm) | Dilution Tunnel dP (in H <sub>2</sub> O) | Orifice dH (in H <sub>2</sub> O) | Meter Temp (°F) | Meter Vacuum (in Hg) | Pro. Rate (%) | Scale Reading    | Weight Change | Dilution Tunnel       | Flue  | Filter | Ambient |
| 384                | 67.027                    | 0.175             | 0.074                                    | 1.26                             | 93              | -4.3                 | -             | 4.83             | -0.02         | 79                    | 183   | 84     | 67      |
| 385                | 67.202                    | 0.175             | 0.076                                    | 1.25                             | 93              | -4.3                 | -             | 4.82             | -0.01         | 79                    | 183   | 84     | 67      |
| 386                | 67.376                    | 0.174             | 0.077                                    | 1.26                             | 93              | -4.4                 | -             | 4.80             | -0.02         | 79                    | 182   | 83     | 67      |
| 387                | 67.550                    | 0.174             | 0.075                                    | 1.27                             | 93              | -4.3                 | -             | 4.78             | -0.02         | 79                    | 183   | 82     | 67      |
| 388                | 67.725                    | 0.175             | 0.077                                    | 1.25                             | 93              | -4.3                 | -             | 4.78             | 0.00          | 79                    | 182   | 82     | 67      |
| 389                | 67.900                    | 0.175             | 0.076                                    | 1.26                             | 93              | -4.3                 | -             | 4.75             | -0.03         | 79                    | 181   | 83     | 67      |
| 390                | 68.075                    | 0.175             | 0.074                                    | 1.26                             | 93              | -4.3                 | 98            | 4.74             | -0.01         | 79                    | 181   | 84     | 67      |
| 391                | 68.250                    | 0.175             | 0.075                                    | 1.26                             | 93              | -4.3                 | -             | 4.71             | -0.03         | 79                    | 181   | 84     | 67      |
| 392                | 68.425                    | 0.175             | 0.075                                    | 1.25                             | 93              | -4.3                 | -             | 4.70             | -0.01         | 78                    | 180   | 83     | 67      |
| 393                | 68.600                    | 0.175             | 0.075                                    | 1.25                             | 93              | -4.4                 | -             | 4.69             | -0.01         | 78                    | 180   | 82     | 67      |
| 394                | 68.775                    | 0.175             | 0.076                                    | 1.26                             | 93              | -4.4                 | -             | 4.67             | -0.02         | 78                    | 180   | 82     | 67      |
| 395                | 68.950                    | 0.175             | 0.076                                    | 1.26                             | 93              | -4.5                 | -             | 4.66             | -0.01         | 78                    | 180   | 83     | 67      |
| 396                | 69.124                    | 0.174             | 0.075                                    | 1.25                             | 93              | -4.4                 | -             | 4.64             | -0.02         | 78                    | 180   | 84     | 67      |
| 397                | 69.298                    | 0.174             | 0.075                                    | 1.25                             | 93              | -4.4                 | -             | 4.62             | -0.02         | 78                    | 179   | 84     | 67      |
| 398                | 69.473                    | 0.175             | 0.075                                    | 1.27                             | 93              | -4.5                 | -             | 4.61             | -0.01         | 78                    | 179   | 83     | 67      |
| 399                | 69.648                    | 0.175             | 0.076                                    | 1.26                             | 93              | -4.4                 | -             | 4.59             | -0.02         | 78                    | 179   | 82     | 67      |
| 400                | 69.823                    | 0.175             | 0.075                                    | 1.26                             | 93              | -4.5                 | 99            | 4.57             | -0.02         | 78                    | 179   | 83     | 67      |
| 401                | 69.998                    | 0.175             | 0.074                                    | 1.26                             | 93              | -4.4                 | -             | 4.55             | -0.02         | 78                    | 178   | 84     | 67      |
| 402                | 70.173                    | 0.175             | 0.077                                    | 1.27                             | 93              | -4.4                 | -             | 4.54             | -0.01         | 78                    | 179   | 84     | 67      |
| 403                | 70.348                    | 0.175             | 0.077                                    | 1.25                             | 93              | -4.5                 | -             | 4.53             | -0.01         | 78                    | 179   | 83     | 67      |
| 404                | 70.524                    | 0.176             | 0.074                                    | 1.27                             | 93              | -4.5                 | -             | 4.51             | -0.02         | 78                    | 179   | 82     | 67      |
| 405                | 70.698                    | 0.174             | 0.074                                    | 1.26                             | 93              | -4.5                 | -             | 4.49             | -0.02         | 78                    | 178   | 82     | 67      |
| 406                | 70.871                    | 0.173             | 0.075                                    | 1.26                             | 93              | -4.4                 | -             | 4.47             | -0.02         | 78                    | 177   | 83     | 67      |
| 407                | 71.046                    | 0.175             | 0.077                                    | 1.26                             | 93              | -4.6                 | 98            | 4.46             | -0.01         | 78                    | 177   | 84     | 67      |
| Avg/Tot            | 71.050                    | 0.175             | 0.074                                    | 1.26                             | 88.5            | -2.6                 | 100           |                  |               | 86.1                  | 367.4 | 83.2   | 68.9    |



# BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: SBI  
 Model: St Louis  
 Run #: 3

Job #: 24-303  
 Tracking #: 216  
 Technician: AK  
 Date: 12/11/2024

| Elapsed Time (min) | Particulate Sampling Data    |                   |                                  |                 |                      |               |             | Flue Gas Data                    |                     |        |
|--------------------|------------------------------|-------------------|----------------------------------|-----------------|----------------------|---------------|-------------|----------------------------------|---------------------|--------|
|                    | Gas Meter (ft <sup>3</sup> ) | Sample Rate (cfm) | Orifice dH (in H <sub>2</sub> O) | Meter Temp (°F) | Meter Vacuum (in Hg) | Pro. Rate (%) | Filter (°F) | Flue Draft (in H <sub>2</sub> O) | CO <sub>2</sub> (%) | CO (%) |
| 0                  | -0.005                       |                   | -0.01                            | 67              | -0.5                 |               | 85          | 0.001                            | 0.11                | 0.006  |
| 1                  | 0.146                        | 0.151             | 1.34                             | 67              | -1.5                 | -             | 86          | 0.038                            | 1.39                | 0.112  |
| 2                  | 0.317                        | 0.171             | 1.33                             | 67              | -1.4                 | -             | 86          | 0.056                            | 2.39                | 0.123  |
| 3                  | 0.488                        | 0.171             | 1.32                             | 67              | -1.5                 | -             | 86          | 0.061                            | 9.53                | 0.280  |
| 4                  | 0.658                        | 0.170             | 1.31                             | 67              | -1.4                 | -             | 86          | 0.064                            | 12.49               | 0.489  |
| 5                  | 0.828                        | 0.170             | 1.30                             | 67              | -1.4                 | -             | 85          | 0.065                            | 12.38               | 0.708  |
| 6                  | 0.997                        | 0.169             | 1.29                             | 67              | -1.4                 | -             | 84          | 0.074                            | 11.46               | 0.464  |
| 7                  | 1.166                        | 0.169             | 1.28                             | 67              | -1.4                 | -             | 84          | 0.074                            | 12.08               | 0.199  |
| 8                  | 1.335                        | 0.169             | 1.28                             | 67              | -1.5                 | -             | 83          | 0.069                            | 12.04               | 0.175  |
| 9                  | 1.504                        | 0.169             | 1.28                             | 67              | -1.4                 | -             | 83          | 0.068                            | 10.44               | 0.166  |
| 10                 | 1.673                        | 0.169             | 1.30                             | 68              | -1.4                 | 104           | 83          | 0.071                            | 11.25               | 0.129  |
| 11                 | 1.841                        | 0.168             | 1.27                             | 68              | -1.6                 | -             | 84          | 0.067                            | 10.32               | 0.126  |
| 12                 | 2.009                        | 0.168             | 1.27                             | 68              | -1.4                 | -             | 85          | 0.074                            | 11.83               | 0.194  |
| 13                 | 2.176                        | 0.167             | 1.28                             | 68              | -1.5                 | -             | 84          | 0.072                            | 11.54               | 0.084  |
| 14                 | 2.343                        | 0.167             | 1.28                             | 68              | -1.4                 | -             | 84          | 0.073                            | 10.07               | 0.123  |
| 15                 | 2.512                        | 0.169             | 1.29                             | 69              | -1.6                 | -             | 85          | 0.071                            | 11.28               | 0.090  |
| 16                 | 2.680                        | 0.168             | 1.28                             | 69              | -1.4                 | -             | 85          | 0.073                            | 11.74               | 0.118  |
| 17                 | 2.847                        | 0.167             | 1.29                             | 69              | -1.4                 | -             | 85          | 0.070                            | 12.27               | 0.108  |
| 18                 | 3.013                        | 0.166             | 1.28                             | 69              | -1.6                 | -             | 85          | 0.074                            | 4.24                | 0.049  |
| 19                 | 3.179                        | 0.166             | 1.26                             | 69              | -1.5                 | -             | 85          | 0.075                            | 7.78                | 0.245  |
| 20                 | 3.347                        | 0.168             | 1.28                             | 70              | -1.4                 | 106           | 85          | 0.077                            | 11.75               | 0.361  |
| 21                 | 3.514                        | 0.167             | 1.27                             | 70              | -1.5                 | -             | 84          | 0.075                            | 9.84                | 0.113  |
| 22                 | 3.680                        | 0.166             | 1.27                             | 70              | -1.5                 | -             | 84          | 0.074                            | 8.85                | 0.173  |
| 23                 | 3.846                        | 0.166             | 1.27                             | 71              | -1.6                 | -             | 84          | 0.074                            | 9.34                | 0.143  |
| 24                 | 4.012                        | 0.166             | 1.26                             | 71              | -1.4                 | -             | 84          | 0.073                            | 10.91               | 0.063  |
| 25                 | 4.180                        | 0.168             | 1.26                             | 71              | -1.4                 | -             | 84          | 0.072                            | 12.28               | 0.173  |
| 26                 | 4.347                        | 0.167             | 1.26                             | 71              | -1.4                 | -             | 85          | 0.069                            | 11.31               | 0.101  |
| 27                 | 4.513                        | 0.166             | 1.24                             | 72              | -1.4                 | -             | 85          | 0.073                            | 11.28               | 0.095  |
| 28                 | 4.678                        | 0.165             | 1.27                             | 72              | -1.4                 | -             | 84          | 0.067                            | 10.62               | 0.103  |
| 29                 | 4.846                        | 0.168             | 1.29                             | 72              | -1.5                 | -             | 84          | 0.074                            | 10.28               | 0.084  |
| 30                 | 5.013                        | 0.167             | 1.25                             | 73              | -1.6                 | 104           | 84          | 0.076                            | 10.36               | 0.066  |
| 31                 | 5.180                        | 0.167             | 1.25                             | 73              | -1.4                 | -             | 84          | 0.075                            | 10.48               | 0.075  |

# BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: SBI  
 Model: St Louis  
 Run #: 3

Job #: 24-303  
 Tracking #: 216  
 Technician: AK  
 Date: 12/11/2024

| Elapsed Time (min) | Particulate Sampling Data    |                   |                                  |                 |                      |               |             | Flue Gas Data                    |                     |        |
|--------------------|------------------------------|-------------------|----------------------------------|-----------------|----------------------|---------------|-------------|----------------------------------|---------------------|--------|
|                    | Gas Meter (ft <sup>3</sup> ) | Sample Rate (cfm) | Orifice dH (in H <sub>2</sub> O) | Meter Temp (°F) | Meter Vacuum (in Hg) | Pro. Rate (%) | Filter (°F) | Flue Draft (in H <sub>2</sub> O) | CO <sub>2</sub> (%) | CO (%) |
| 32                 | 5.346                        | 0.166             | 1.25                             | 73              | -1.6                 | -             | 85          | 0.077                            | 10.91               | 0.074  |
| 33                 | 5.512                        | 0.166             | 1.25                             | 74              | -1.6                 | -             | 86          | 0.069                            | 11.83               | 0.057  |
| 34                 | 5.679                        | 0.167             | 1.26                             | 74              | -1.4                 | -             | 87          | 0.079                            | 11.54               | 0.039  |
| 35                 | 5.846                        | 0.167             | 1.26                             | 74              | -1.4                 | -             | 87          | 0.076                            | 11.51               | 0.030  |
| 36                 | 6.012                        | 0.166             | 1.26                             | 74              | -1.4                 | -             | 86          | 0.072                            | 11.25               | 0.033  |
| 37                 | 6.178                        | 0.166             | 1.28                             | 75              | -1.4                 | -             | 85          | 0.072                            | 11.46               | 0.058  |
| 38                 | 6.345                        | 0.167             | 1.26                             | 75              | -1.6                 | -             | 85          | 0.075                            | 11.08               | 0.070  |
| 39                 | 6.513                        | 0.168             | 1.26                             | 75              | -1.4                 | -             | 84          | 0.074                            | 11.07               | 0.075  |
| 40                 | 6.680                        | 0.167             | 1.25                             | 76              | -1.5                 | 102           | 84          | 0.071                            | 11.69               | 0.070  |
| 41                 | 6.846                        | 0.166             | 1.25                             | 76              | -1.4                 | -             | 83          | 0.067                            | 11.93               | 0.059  |
| 42                 | 7.012                        | 0.166             | 1.27                             | 76              | -1.6                 | -             | 84          | 0.079                            | 11.99               | 0.044  |
| 43                 | 7.179                        | 0.167             | 1.27                             | 76              | -1.5                 | -             | 84          | 0.082                            | 11.90               | 0.042  |
| 44                 | 7.347                        | 0.168             | 1.27                             | 77              | -1.4                 | -             | 85          | 0.074                            | 11.89               | 0.030  |
| 45                 | 7.514                        | 0.167             | 1.26                             | 77              | -1.4                 | -             | 85          | 0.071                            | 12.90               | 0.062  |
| 46                 | 7.680                        | 0.166             | 1.30                             | 77              | -1.5                 | -             | 85          | 0.071                            | 12.75               | 0.114  |
| 47                 | 7.846                        | 0.166             | 1.27                             | 77              | -1.5                 | -             | 85          | 0.072                            | 11.63               | 0.135  |
| 48                 | 8.014                        | 0.168             | 1.26                             | 78              | -1.5                 | -             | 84          | 0.068                            | 11.44               | 0.143  |
| 49                 | 8.182                        | 0.168             | 1.26                             | 78              | -1.4                 | -             | 84          | 0.065                            | 11.44               | 0.151  |
| 50                 | 8.349                        | 0.167             | 1.27                             | 78              | -1.4                 | 101           | 84          | 0.066                            | 11.32               | 0.155  |
| 51                 | 8.515                        | 0.166             | 1.28                             | 79              | -1.5                 | -             | 84          | 0.064                            | 11.29               | 0.172  |
| 52                 | 8.682                        | 0.167             | 1.26                             | 79              | -1.5                 | -             | 84          | 0.068                            | 11.29               | 0.133  |
| 53                 | 8.849                        | 0.167             | 1.25                             | 79              | -1.4                 | -             | 84          | 0.063                            | 11.18               | 0.137  |
| 54                 | 9.018                        | 0.169             | 1.27                             | 79              | -1.4                 | -             | 84          | 0.072                            | 11.24               | 0.131  |
| 55                 | 9.185                        | 0.167             | 1.26                             | 79              | -1.4                 | -             | 85          | 0.066                            | 11.16               | 0.129  |
| 56                 | 9.352                        | 0.167             | 1.26                             | 80              | -1.5                 | -             | 85          | 0.067                            | 11.13               | 0.124  |
| 57                 | 9.518                        | 0.166             | 1.26                             | 80              | -1.5                 | -             | 85          | 0.064                            | 11.07               | 0.140  |
| 58                 | 9.686                        | 0.168             | 1.25                             | 80              | -1.4                 | -             | 85          | 0.067                            | 11.21               | 0.140  |
| 59                 | 9.854                        | 0.168             | 1.27                             | 80              | -1.5                 | -             | 85          | 0.062                            | 11.04               | 0.120  |
| 60                 | 10.022                       | 0.168             | 1.26                             | 81              | -1.5                 | 101           | 84          | 0.061                            | 11.09               | 0.106  |
| 61                 | 10.189                       | 0.167             | 1.27                             | 81              | -1.4                 | -             | 84          | 0.068                            | 11.24               | 0.110  |
| 62                 | 10.357                       | 0.168             | 1.27                             | 81              | -1.5                 | -             | 84          | 0.063                            | 11.36               | 0.099  |
| 63                 | 10.523                       | 0.166             | 1.25                             | 81              | -1.5                 | -             | 84          | 0.066                            | 11.43               | 0.089  |

# BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: SBI  
 Model: St Louis  
 Run #: 3

Job #: 24-303  
 Tracking #: 216  
 Technician: AK  
 Date: 12/11/2024

| Elapsed Time (min) | Particulate Sampling Data    |                   |                                  |                 |                      |               |             | Flue Gas Data                    |                     |        |
|--------------------|------------------------------|-------------------|----------------------------------|-----------------|----------------------|---------------|-------------|----------------------------------|---------------------|--------|
|                    | Gas Meter (ft <sup>3</sup> ) | Sample Rate (cfm) | Orifice dH (in H <sub>2</sub> O) | Meter Temp (°F) | Meter Vacuum (in Hg) | Pro. Rate (%) | Filter (°F) | Flue Draft (in H <sub>2</sub> O) | CO <sub>2</sub> (%) | CO (%) |
| 64                 | 10.691                       | 0.168             | 1.28                             | 81              | -1.5                 | -             | 84          | 0.064                            | 11.56               | 0.081  |
| 65                 | 10.860                       | 0.169             | 1.25                             | 82              | -1.4                 | -             | 84          | 0.064                            | 11.36               | 0.070  |
| 66                 | 11.028                       | 0.168             | 1.27                             | 82              | -1.4                 | -             | 85          | 0.064                            | 11.27               | 0.065  |
| 67                 | 11.196                       | 0.168             | 1.25                             | 82              | -1.4                 | -             | 85          | 0.063                            | 11.19               | 0.066  |
| 68                 | 11.363                       | 0.167             | 1.24                             | 82              | -1.5                 | -             | 85          | 0.066                            | 11.05               | 0.063  |
| 69                 | 11.530                       | 0.167             | 1.27                             | 82              | -1.5                 | -             | 85          | 0.066                            | 10.90               | 0.062  |
| 70                 | 11.697                       | 0.167             | 1.26                             | 83              | -1.5                 | 100           | 85          | 0.069                            | 10.86               | 0.063  |
| 71                 | 11.867                       | 0.170             | 1.25                             | 83              | -1.5                 | -             | 85          | 0.061                            | 10.87               | 0.067  |
| 72                 | 12.035                       | 0.168             | 1.25                             | 83              | -1.5                 | -             | 84          | 0.066                            | 10.82               | 0.062  |
| 73                 | 12.202                       | 0.167             | 1.25                             | 83              | -1.5                 | -             | 84          | 0.063                            | 10.83               | 0.052  |
| 74                 | 12.370                       | 0.168             | 1.25                             | 83              | -1.4                 | -             | 84          | 0.064                            | 10.86               | 0.053  |
| 75                 | 12.537                       | 0.167             | 1.26                             | 84              | -1.5                 | -             | 84          | 0.064                            | 10.80               | 0.050  |
| 76                 | 12.705                       | 0.168             | 1.25                             | 84              | -1.5                 | -             | 85          | 0.063                            | 11.05               | 0.052  |
| 77                 | 12.874                       | 0.169             | 1.26                             | 84              | -1.5                 | -             | 86          | 0.065                            | 11.02               | 0.051  |
| 78                 | 13.042                       | 0.168             | 1.26                             | 84              | -1.4                 | -             | 86          | 0.064                            | 11.02               | 0.049  |
| 79                 | 13.210                       | 0.168             | 1.26                             | 84              | -1.5                 | -             | 87          | 0.059                            | 10.74               | 0.046  |
| 80                 | 13.378                       | 0.168             | 1.26                             | 84              | -1.5                 | 100           | 86          | 0.062                            | 10.73               | 0.040  |
| 81                 | 13.545                       | 0.167             | 1.27                             | 84              | -1.5                 | -             | 86          | 0.065                            | 10.86               | 0.035  |
| 82                 | 13.713                       | 0.168             | 1.26                             | 85              | -1.4                 | -             | 85          | 0.059                            | 10.84               | 0.035  |
| 83                 | 13.882                       | 0.169             | 1.26                             | 85              | -1.5                 | -             | 85          | 0.063                            | 10.77               | 0.033  |
| 84                 | 14.051                       | 0.169             | 1.28                             | 85              | -1.5                 | -             | 84          | 0.066                            | 10.84               | 0.035  |
| 85                 | 14.219                       | 0.168             | 1.28                             | 85              | -1.5                 | -             | 84          | 0.062                            | 11.07               | 0.039  |
| 86                 | 14.386                       | 0.167             | 1.26                             | 85              | -1.4                 | -             | 85          | 0.064                            | 11.13               | 0.037  |
| 87                 | 14.554                       | 0.168             | 1.26                             | 85              | -1.4                 | -             | 85          | 0.065                            | 10.57               | 0.037  |
| 88                 | 14.721                       | 0.167             | 1.27                             | 86              | -1.5                 | -             | 86          | 0.062                            | 11.15               | 0.050  |
| 89                 | 14.890                       | 0.169             | 1.27                             | 86              | -1.4                 | -             | 85          | 0.060                            | 10.93               | 0.049  |
| 90                 | 15.059                       | 0.169             | 1.26                             | 86              | -1.5                 | 101           | 85          | 0.061                            | 10.39               | 0.059  |
| 91                 | 15.227                       | 0.168             | 1.26                             | 86              | -1.5                 | -             | 84          | 0.064                            | 9.82                | 0.112  |
| 92                 | 15.395                       | 0.168             | 1.27                             | 86              | -1.5                 | -             | 85          | 0.074                            | 2.94                | 0.098  |
| 93                 | 15.562                       | 0.167             | 1.25                             | 86              | -1.5                 | -             | 85          | 0.076                            | 9.73                | 0.338  |
| 94                 | 15.728                       | 0.166             | 1.25                             | 86              | -1.4                 | -             | 85          | 0.077                            | 13.17               | 0.752  |
| 95                 | 15.896                       | 0.168             | 1.27                             | 87              | -1.5                 | -             | 85          | 0.068                            | 14.38               | 0.635  |

# BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: SBI  
 Model: St Louis  
 Run #: 3

Job #: 24-303  
 Tracking #: 216  
 Technician: AK  
 Date: 12/11/2024

| Elapsed Time (min) | Particulate Sampling Data    |                   |                                  |                 |                      |               |             | Flue Gas Data                    |                     |        |
|--------------------|------------------------------|-------------------|----------------------------------|-----------------|----------------------|---------------|-------------|----------------------------------|---------------------|--------|
|                    | Gas Meter (ft <sup>3</sup> ) | Sample Rate (cfm) | Orifice dH (in H <sub>2</sub> O) | Meter Temp (°F) | Meter Vacuum (in Hg) | Pro. Rate (%) | Filter (°F) | Flue Draft (in H <sub>2</sub> O) | CO <sub>2</sub> (%) | CO (%) |
| 96                 | 16.065                       | 0.169             | 1.26                             | 87              | -1.5                 | -             | 85          | 0.071                            | 14.45               | 0.735  |
| 97                 | 16.233                       | 0.168             | 1.26                             | 87              | -1.5                 | -             | 85          | 0.064                            | 13.51               | 0.238  |
| 98                 | 16.400                       | 0.167             | 1.25                             | 87              | -1.5                 | -             | 86          | 0.069                            | 13.71               | 0.153  |
| 99                 | 16.567                       | 0.167             | 1.26                             | 87              | -1.4                 | -             | 86          | 0.067                            | 13.68               | 0.106  |
| 100                | 16.735                       | 0.168             | 1.25                             | 87              | -1.4                 | 101           | 86          | 0.072                            | 13.21               | 0.076  |
| 101                | 16.903                       | 0.168             | 1.28                             | 87              | -1.4                 | -             | 86          | 0.070                            | 13.36               | 0.106  |
| 102                | 17.072                       | 0.169             | 1.28                             | 87              | -1.4                 | -             | 85          | 0.070                            | 13.36               | 0.109  |
| 103                | 17.240                       | 0.168             | 1.27                             | 87              | -1.4                 | -             | 85          | 0.067                            | 13.46               | 0.114  |
| 104                | 17.407                       | 0.167             | 1.27                             | 87              | -1.4                 | -             | 85          | 0.068                            | 13.50               | 0.143  |
| 105                | 17.575                       | 0.168             | 1.27                             | 88              | -1.5                 | -             | 85          | 0.068                            | 13.34               | 0.132  |
| 106                | 17.742                       | 0.167             | 1.27                             | 88              | -1.4                 | -             | 85          | 0.067                            | 13.40               | 0.141  |
| 107                | 17.910                       | 0.168             | 1.26                             | 88              | -1.5                 | -             | 85          | 0.070                            | 13.42               | 0.164  |
| 108                | 18.079                       | 0.169             | 1.25                             | 88              | -1.4                 | -             | 85          | 0.062                            | 13.58               | 0.203  |
| 109                | 18.248                       | 0.169             | 1.26                             | 88              | -1.4                 | -             | 84          | 0.069                            | 13.68               | 0.225  |
| 110                | 18.415                       | 0.167             | 1.26                             | 88              | -1.5                 | 101           | 85          | 0.070                            | 13.29               | 0.198  |
| 111                | 18.583                       | 0.168             | 1.25                             | 88              | -1.5                 | -             | 85          | 0.067                            | 12.81               | 0.136  |
| 112                | 18.750                       | 0.167             | 1.25                             | 88              | -1.6                 | -             | 85          | 0.067                            | 12.53               | 0.082  |
| 113                | 18.918                       | 0.168             | 1.27                             | 88              | -1.5                 | -             | 85          | 0.071                            | 12.27               | 0.072  |
| 114                | 19.087                       | 0.169             | 1.22                             | 89              | -1.4                 | -             | 85          | 0.066                            | 12.26               | 0.077  |
| 115                | 19.256                       | 0.169             | 1.24                             | 89              | -1.4                 | -             | 85          | 0.067                            | 12.19               | 0.068  |
| 116                | 19.424                       | 0.168             | 1.24                             | 89              | -1.5                 | -             | 86          | 0.066                            | 12.08               | 0.069  |
| 117                | 19.592                       | 0.168             | 1.24                             | 89              | -1.4                 | -             | 86          | 0.067                            | 11.98               | 0.069  |
| 118                | 19.759                       | 0.167             | 1.27                             | 89              | -1.5                 | -             | 86          | 0.073                            | 11.99               | 0.074  |
| 119                | 19.927                       | 0.168             | 1.25                             | 89              | -1.5                 | -             | 85          | 0.065                            | 11.94               | 0.070  |
| 120                | 20.095                       | 0.168             | 1.26                             | 89              | -1.6                 | 101           | 85          | 0.062                            | 11.83               | 0.060  |
| 121                | 20.264                       | 0.169             | 1.26                             | 89              | -1.5                 | -             | 86          | 0.058                            | 11.69               | 0.056  |
| 122                | 20.433                       | 0.169             | 1.25                             | 89              | -1.5                 | -             | 86          | 0.061                            | 11.51               | 0.050  |
| 123                | 20.600                       | 0.167             | 1.26                             | 89              | -1.4                 | -             | 86          | 0.069                            | 11.35               | 0.047  |
| 124                | 20.768                       | 0.168             | 1.28                             | 89              | -1.4                 | -             | 86          | 0.063                            | 11.28               | 0.049  |
| 125                | 20.935                       | 0.167             | 1.26                             | 89              | -1.5                 | -             | 87          | 0.062                            | 11.06               | 0.048  |
| 126                | 21.103                       | 0.168             | 1.26                             | 90              | -1.4                 | -             | 87          | 0.062                            | 11.09               | 0.049  |
| 127                | 21.272                       | 0.169             | 1.24                             | 90              | -1.4                 | -             | 86          | 0.068                            | 11.02               | 0.045  |

# BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: SBI  
 Model: St Louis  
 Run #: 3

Job #: 24-303  
 Tracking #: 216  
 Technician: AK  
 Date: 12/11/2024

| Elapsed Time (min) | Particulate Sampling Data    |                   |                                  |                 |                      |               |             | Flue Gas Data                    |                     |        |
|--------------------|------------------------------|-------------------|----------------------------------|-----------------|----------------------|---------------|-------------|----------------------------------|---------------------|--------|
|                    | Gas Meter (ft <sup>3</sup> ) | Sample Rate (cfm) | Orifice dH (in H <sub>2</sub> O) | Meter Temp (°F) | Meter Vacuum (in Hg) | Pro. Rate (%) | Filter (°F) | Flue Draft (in H <sub>2</sub> O) | CO <sub>2</sub> (%) | CO (%) |
| 128                | 21.441                       | 0.169             | 1.27                             | 90              | -1.5                 | -             | 86          | 0.074                            | 11.18               | 0.047  |
| 129                | 21.609                       | 0.168             | 1.24                             | 90              | -1.4                 | -             | 85          | 0.067                            | 11.23               | 0.048  |
| 130                | 21.776                       | 0.167             | 1.26                             | 90              | -1.4                 | 101           | 85          | 0.065                            | 11.22               | 0.050  |
| 131                | 21.944                       | 0.168             | 1.26                             | 90              | -1.5                 | -             | 85          | 0.065                            | 11.03               | 0.048  |
| 132                | 22.112                       | 0.168             | 1.27                             | 90              | -1.4                 | -             | 85          | 0.066                            | 10.97               | 0.048  |
| 133                | 22.280                       | 0.168             | 1.26                             | 90              | -1.5                 | -             | 85          | 0.063                            | 10.80               | 0.051  |
| 134                | 22.450                       | 0.170             | 1.26                             | 90              | -1.5                 | -             | 86          | 0.062                            | 10.81               | 0.055  |
| 135                | 22.618                       | 0.168             | 1.26                             | 90              | -1.4                 | -             | 86          | 0.065                            | 10.80               | 0.053  |
| 136                | 22.786                       | 0.168             | 1.27                             | 90              | -1.5                 | -             | 85          | 0.060                            | 10.74               | 0.055  |
| 137                | 22.954                       | 0.168             | 1.28                             | 90              | -1.5                 | -             | 85          | 0.064                            | 10.69               | 0.053  |
| 138                | 23.122                       | 0.168             | 1.26                             | 90              | -1.5                 | -             | 85          | 0.325                            | 10.58               | 0.054  |
| 139                | 23.290                       | 0.168             | 1.23                             | 90              | -1.5                 | -             | 85          | 0.528                            | 10.60               | 0.050  |
| 140                | 23.459                       | 0.169             | 1.28                             | 91              | -1.5                 | 100           | 85          | 0.649                            | 10.61               | 0.056  |
| 141                | 23.628                       | 0.169             | 1.24                             | 91              | -1.5                 | -             | 85          | 0.683                            | 10.68               | 0.049  |
| 142                | 23.796                       | 0.168             | 1.25                             | 91              | -1.4                 | -             | 86          | 0.663                            | 10.90               | 0.047  |
| 143                | 23.965                       | 0.169             | 1.29                             | 91              | -1.4                 | -             | 87          | 0.691                            | 10.93               | 0.052  |
| 144                | 24.132                       | 0.167             | 1.25                             | 91              | -1.5                 | -             | 86          | 0.720                            | 10.82               | 0.050  |
| 145                | 24.300                       | 0.168             | 1.27                             | 91              | -1.4                 | -             | 86          | 0.722                            | 10.76               | 0.052  |
| 146                | 24.468                       | 0.168             | 1.26                             | 91              | -1.4                 | -             | 85          | 0.711                            | 10.68               | 0.057  |
| 147                | 24.632                       | 0.164             | 1.24                             | 91              | -1.4                 | -             | 85          | 0.673                            | 10.36               | 0.063  |
| 148                | 24.801                       | 0.169             | 1.25                             | 91              | -1.5                 | -             | 85          | 0.629                            | 10.34               | 0.077  |
| 149                | 24.968                       | 0.167             | 1.26                             | 91              | -1.4                 | -             | 85          | 0.601                            | 10.26               | 0.071  |
| 150                | 25.136                       | 0.168             | 1.24                             | 91              | -1.4                 | 99            | 86          | 0.580                            | 10.15               | 0.073  |
| 151                | 25.304                       | 0.168             | 1.29                             | 91              | -1.6                 | -             | 86          | 0.553                            | 9.89                | 0.059  |
| 152                | 25.473                       | 0.169             | 1.24                             | 91              | -1.5                 | -             | 86          | 0.574                            | 9.64                | 0.062  |
| 153                | 25.642                       | 0.169             | 1.26                             | 91              | -1.4                 | -             | 86          | 0.554                            | 9.49                | 0.072  |
| 154                | 25.811                       | 0.169             | 1.24                             | 91              | -1.5                 | -             | 85          | 0.545                            | 9.51                | 0.075  |
| 155                | 25.979                       | 0.168             | 1.27                             | 91              | -1.5                 | -             | 85          | 0.545                            | 9.34                | 0.074  |
| 156                | 26.147                       | 0.168             | 1.24                             | 91              | -1.6                 | -             | 85          | 0.120                            | 2.73                | 0.091  |
| 157                | 26.314                       | 0.167             | 1.27                             | 91              | -1.5                 | -             | 85          | 0.019                            | 6.08                | 0.215  |
| 158                | 26.481                       | 0.167             | 1.26                             | 91              | -1.4                 | -             | 86          | 0.006                            | 12.81               | 1.104  |
| 159                | 26.650                       | 0.169             | 1.24                             | 91              | -1.4                 | -             | 86          | -0.037                           | 14.23               | 0.869  |

# BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: SBI  
 Model: St Louis  
 Run #: 3

Job #: 24-303  
 Tracking #: 216  
 Technician: AK  
 Date: 12/11/2024

| Elapsed Time (min) | Particulate Sampling Data    |                   |                                  |                 |                      |               |             | Flue Gas Data                    |                     |        |
|--------------------|------------------------------|-------------------|----------------------------------|-----------------|----------------------|---------------|-------------|----------------------------------|---------------------|--------|
|                    | Gas Meter (ft <sup>3</sup> ) | Sample Rate (cfm) | Orifice dH (in H <sub>2</sub> O) | Meter Temp (°F) | Meter Vacuum (in Hg) | Pro. Rate (%) | Filter (°F) | Flue Draft (in H <sub>2</sub> O) | CO <sub>2</sub> (%) | CO (%) |
| 160                | 26.818                       | 0.168             | 1.27                             | 91              | -1.4                 | 100           | 86          | -0.080                           | 15.14               | 1.941  |
| 161                | 26.986                       | 0.168             | 1.26                             | 92              | -1.4                 | -             | 86          | -0.133                           | 15.51               | 1.502  |
| 162                | 27.153                       | 0.167             | 1.26                             | 92              | -1.5                 | -             | 85          | -0.114                           | 15.61               | 1.361  |
| 163                | 27.320                       | 0.167             | 1.24                             | 92              | -1.4                 | -             | 85          | -0.028                           | 15.52               | 1.641  |
| 164                | 27.488                       | 0.168             | 1.24                             | 91              | -1.4                 | -             | 86          | 0.029                            | 15.41               | 1.389  |
| 165                | 27.657                       | 0.169             | 1.23                             | 92              | -1.4                 | -             | 86          | 0.042                            | 15.49               | 1.883  |
| 166                | 27.826                       | 0.169             | 1.25                             | 92              | -1.5                 | -             | 86          | 0.035                            | 15.40               | 1.303  |
| 167                | 27.993                       | 0.167             | 1.26                             | 92              | -1.5                 | -             | 86          | -0.021                           | 14.94               | 0.785  |
| 168                | 28.161                       | 0.168             | 1.24                             | 92              | -1.4                 | -             | 85          | -0.066                           | 15.24               | 1.074  |
| 169                | 28.328                       | 0.167             | 1.26                             | 92              | -1.4                 | -             | 85          | -0.089                           | 15.42               | 1.396  |
| 170                | 28.496                       | 0.168             | 1.26                             | 92              | -1.5                 | 99            | 85          | -0.072                           | 15.25               | 1.031  |
| 171                | 28.664                       | 0.168             | 1.28                             | 92              | -1.4                 | -             | 84          | 0.108                            | 15.09               | 0.702  |
| 172                | 28.834                       | 0.170             | 1.25                             | 92              | -1.4                 | -             | 84          | 0.357                            | 14.85               | 0.541  |
| 173                | 29.002                       | 0.168             | 1.26                             | 92              | -1.4                 | -             | 84          | 0.596                            | 14.96               | 0.516  |
| 174                | 29.170                       | 0.168             | 1.26                             | 92              | -1.4                 | -             | 84          | 0.781                            | 14.95               | 0.503  |
| 175                | 29.338                       | 0.168             | 1.25                             | 92              | -1.4                 | -             | 84          | 0.893                            | 15.08               | 0.346  |
| 176                | 29.505                       | 0.167             | 1.26                             | 92              | -1.5                 | -             | 85          | 0.970                            | 14.78               | 0.264  |
| 177                | 29.673                       | 0.168             | 1.24                             | 92              | -1.5                 | -             | 86          | 0.991                            | 14.57               | 0.193  |
| 178                | 29.842                       | 0.169             | 1.26                             | 92              | -1.6                 | -             | 86          | 1.423                            | 14.21               | 0.199  |
| 179                | 30.011                       | 0.169             | 1.26                             | 92              | -1.4                 | -             | 86          | 2.520                            | 14.00               | 0.173  |
| 180                | 30.180                       | 0.169             | 1.26                             | 92              | -1.5                 | 98            | 85          | 3.308                            | 13.97               | 0.205  |
| 181                | 30.348                       | 0.168             | 1.24                             | 92              | -1.4                 | -             | 84          | 3.438                            | 13.80               | 0.222  |
| 182                | 30.516                       | 0.168             | 1.25                             | 92              | -1.5                 | -             | 84          | 3.436                            | 13.64               | 0.206  |
| 183                | 30.684                       | 0.168             | 1.26                             | 93              | -1.5                 | -             | 83          | 3.439                            | 13.55               | 0.225  |
| 184                | 30.853                       | 0.169             | 1.24                             | 92              | -1.4                 | -             | 83          | 3.434                            | 13.52               | 0.231  |
| 185                | 31.022                       | 0.169             | 1.26                             | 92              | -1.4                 | -             | 84          | 3.435                            | 13.46               | 0.252  |
| 186                | 31.192                       | 0.170             | 1.25                             | 92              | -1.5                 | -             | 84          | 3.437                            | 13.32               | 0.220  |
| 187                | 31.361                       | 0.169             | 1.27                             | 92              | -1.5                 | -             | 85          | 3.433                            | 13.35               | 0.210  |
| 188                | 31.529                       | 0.168             | 1.26                             | 92              | -1.4                 | -             | 84          | 3.436                            | 13.27               | 0.189  |
| 189                | 31.698                       | 0.169             | 1.25                             | 92              | -1.6                 | -             | 85          | 3.438                            | 13.34               | 0.195  |
| 190                | 31.866                       | 0.168             | 1.26                             | 92              | -1.4                 | 98            | 85          | 3.439                            | 13.30               | 0.198  |
| 191                | 32.035                       | 0.169             | 1.27                             | 92              | -1.4                 | -             | 86          | 3.439                            | 13.29               | 0.191  |

# BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: SBI  
 Model: St Louis  
 Run #: 3

Job #: 24-303  
 Tracking #: 216  
 Technician: AK  
 Date: 12/11/2024

| Elapsed Time (min) | Particulate Sampling Data    |                   |                                  |                 |                      |               |             | Flue Gas Data                    |                     |        |
|--------------------|------------------------------|-------------------|----------------------------------|-----------------|----------------------|---------------|-------------|----------------------------------|---------------------|--------|
|                    | Gas Meter (ft <sup>3</sup> ) | Sample Rate (cfm) | Orifice dH (in H <sub>2</sub> O) | Meter Temp (°F) | Meter Vacuum (in Hg) | Pro. Rate (%) | Filter (°F) | Flue Draft (in H <sub>2</sub> O) | CO <sub>2</sub> (%) | CO (%) |
| 192                | 32.203                       | 0.168             | 1.26                             | 92              | -1.6                 | -             | 87          | 2.661                            | 13.21               | 0.197  |
| 193                | 32.372                       | 0.169             | 1.25                             | 92              | -1.5                 | -             | 87          | 1.909                            | 13.37               | 0.191  |
| 194                | 32.542                       | 0.170             | 1.25                             | 92              | -1.4                 | -             | 87          | 1.408                            | 13.13               | 0.186  |
| 195                | 32.710                       | 0.168             | 1.27                             | 92              | -1.4                 | -             | 87          | 0.946                            | 13.17               | 0.191  |
| 196                | 32.879                       | 0.169             | 1.24                             | 92              | -1.4                 | -             | 86          | 0.607                            | 13.02               | 0.198  |
| 197                | 33.047                       | 0.168             | 1.25                             | 91              | -1.4                 | -             | 85          | 0.335                            | 12.95               | 0.166  |
| 198                | 33.214                       | 0.167             | 1.27                             | 92              | -1.4                 | -             | 84          | 0.147                            | 12.87               | 0.165  |
| 199                | 33.383                       | 0.169             | 1.24                             | 92              | -1.4                 | -             | 84          | -0.052                           | 12.80               | 0.161  |
| 200                | 33.551                       | 0.168             | 1.26                             | 91              | -1.5                 | 99            | 84          | -0.203                           | 12.64               | 0.157  |
| 201                | 33.721                       | 0.170             | 1.25                             | 91              | -1.4                 | -             | 83          | -0.322                           | 12.71               | 0.144  |
| 202                | 33.889                       | 0.168             | 1.26                             | 92              | -1.5                 | -             | 84          | -0.418                           | 12.69               | 0.137  |
| 203                | 34.057                       | 0.168             | 1.25                             | 91              | -1.4                 | -             | 84          | -0.487                           | 12.54               | 0.134  |
| 204                | 34.225                       | 0.168             | 1.25                             | 91              | -1.5                 | -             | 84          | -0.560                           | 12.42               | 0.123  |
| 205                | 34.393                       | 0.168             | 1.25                             | 91              | -1.5                 | -             | 84          | -0.619                           | 12.40               | 0.132  |
| 206                | 34.561                       | 0.168             | 1.24                             | 91              | -1.6                 | -             | 85          | -0.683                           | 12.31               | 0.117  |
| 207                | 34.729                       | 0.168             | 1.25                             | 91              | -1.4                 | -             | 86          | -0.755                           | 12.23               | 0.115  |
| 208                | 34.899                       | 0.170             | 1.26                             | 91              | -1.4                 | -             | 87          | -0.777                           | 12.24               | 0.116  |
| 209                | 35.067                       | 0.168             | 1.25                             | 91              | -1.5                 | -             | 87          | -0.813                           | 12.23               | 0.108  |
| 210                | 35.234                       | 0.167             | 1.27                             | 91              | -1.5                 | 100           | 86          | -0.850                           | 12.33               | 0.114  |
| 211                | 35.402                       | 0.168             | 1.24                             | 91              | -1.4                 | -             | 86          | -0.879                           | 12.29               | 0.107  |
| 212                | 35.569                       | 0.167             | 1.28                             | 91              | -1.4                 | -             | 85          | -0.877                           | 12.53               | 0.106  |
| 213                | 35.737                       | 0.168             | 1.28                             | 91              | -1.5                 | -             | 85          | -0.905                           | 13.19               | 0.157  |
| 214                | 35.906                       | 0.169             | 1.24                             | 91              | -1.4                 | -             | 85          | -0.948                           | 13.73               | 0.199  |
| 215                | 36.075                       | 0.169             | 1.25                             | 91              | -1.5                 | -             | 85          | -0.934                           | 13.56               | 0.100  |
| 216                | 36.243                       | 0.168             | 1.25                             | 92              | -1.5                 | -             | 85          | -0.934                           | 13.47               | 0.097  |
| 217                | 36.410                       | 0.167             | 1.26                             | 91              | -1.4                 | -             | 85          | -0.932                           | 13.18               | 0.054  |
| 218                | 36.577                       | 0.167             | 1.26                             | 92              | -1.4                 | -             | 85          | -0.946                           | 13.11               | 0.053  |
| 219                | 36.745                       | 0.168             | 1.25                             | 91              | -1.4                 | -             | 85          | -0.951                           | 13.27               | 0.049  |
| 220                | 36.914                       | 0.169             | 1.26                             | 92              | -1.4                 | 101           | 85          | -0.968                           | 13.39               | 0.065  |
| 221                | 37.083                       | 0.169             | 1.23                             | 92              | -1.5                 | -             | 86          | -0.982                           | 13.12               | 0.067  |
| 222                | 37.250                       | 0.167             | 1.23                             | 92              | -1.4                 | -             | 87          | -0.966                           | 13.19               | 0.074  |
| 223                | 37.418                       | 0.168             | 1.26                             | 92              | -1.5                 | -             | 87          | -0.807                           | 13.04               | 0.089  |

# BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: SBI  
 Model: St Louis  
 Run #: 3

Job #: 24-303  
 Tracking #: 216  
 Technician: AK  
 Date: 12/11/2024

| Elapsed Time (min) | Particulate Sampling Data    |                   |                                  |                 |                      |               |             | Flue Gas Data                    |                     |        |
|--------------------|------------------------------|-------------------|----------------------------------|-----------------|----------------------|---------------|-------------|----------------------------------|---------------------|--------|
|                    | Gas Meter (ft <sup>3</sup> ) | Sample Rate (cfm) | Orifice dH (in H <sub>2</sub> O) | Meter Temp (°F) | Meter Vacuum (in Hg) | Pro. Rate (%) | Filter (°F) | Flue Draft (in H <sub>2</sub> O) | CO <sub>2</sub> (%) | CO (%) |
| 224                | 37.585                       | 0.167             | 1.24                             | 92              | -1.5                 | -             | 86          | -0.591                           | 13.22               | 0.095  |
| 225                | 37.753                       | 0.168             | 1.24                             | 92              | -1.4                 | -             | 86          | -0.375                           | 13.21               | 0.108  |
| 226                | 37.921                       | 0.168             | 1.23                             | 92              | -1.5                 | -             | 85          | -0.268                           | 13.09               | 0.092  |
| 227                | 38.091                       | 0.170             | 1.27                             | 92              | -1.4                 | -             | 85          | -0.262                           | 13.00               | 0.080  |
| 228                | 38.258                       | 0.167             | 1.26                             | 92              | -1.6                 | -             | 84          | -0.344                           | 13.07               | 0.096  |
| 229                | 38.426                       | 0.168             | 1.25                             | 92              | -1.4                 | -             | 84          | -0.473                           | 12.98               | 0.099  |
| 230                | 38.594                       | 0.168             | 1.25                             | 92              | -1.5                 | 100           | 84          | -0.560                           | 13.06               | 0.110  |
| 231                | 38.761                       | 0.167             | 1.25                             | 92              | -1.5                 | -             | 85          | -0.664                           | 13.00               | 0.108  |
| 232                | 38.929                       | 0.168             | 1.25                             | 92              | -1.4                 | -             | 86          | -0.753                           | 12.94               | 0.113  |
| 233                | 39.098                       | 0.169             | 1.27                             | 92              | -1.5                 | -             | 86          | -0.841                           | 12.89               | 0.068  |
| 234                | 39.267                       | 0.169             | 1.24                             | 92              | -1.4                 | -             | 86          | -0.858                           | 12.82               | 0.073  |
| 235                | 39.434                       | 0.167             | 1.24                             | 92              | -1.4                 | -             | 86          | -0.877                           | 12.78               | 0.068  |
| 236                | 39.602                       | 0.168             | 1.25                             | 92              | -1.4                 | -             | 85          | -0.902                           | 12.75               | 0.067  |
| 237                | 39.769                       | 0.167             | 1.25                             | 92              | -1.5                 | -             | 85          | -0.900                           | 12.83               | 0.051  |
| 238                | 39.937                       | 0.168             | 1.25                             | 92              | -1.5                 | -             | 85          | -0.876                           | 12.58               | 0.045  |
| 239                | 40.106                       | 0.169             | 1.25                             | 92              | -1.4                 | -             | 85          | -0.877                           | 12.61               | 0.039  |
| 240                | 40.274                       | 0.168             | 1.25                             | 92              | -1.4                 | 100           | 85          | -0.860                           | 12.55               | 0.041  |
| 241                | 40.442                       | 0.168             | 1.25                             | 92              | -1.5                 | -             | 86          | -0.859                           | 12.61               | 0.037  |
| 242                | 40.609                       | 0.167             | 1.25                             | 92              | -1.4                 | -             | 87          | -0.865                           | 12.60               | 0.035  |
| 243                | 40.777                       | 0.168             | 1.24                             | 92              | -1.4                 | -             | 87          | -0.840                           | 12.67               | 0.035  |
| 244                | 40.944                       | 0.167             | 1.27                             | 92              | -1.5                 | -             | 86          | -0.828                           | 12.48               | 0.033  |
| 245                | 41.113                       | 0.169             | 1.24                             | 92              | -1.5                 | -             | 86          | -0.822                           | 12.51               | 0.034  |
| 246                | 41.281                       | 0.168             | 1.25                             | 92              | -1.4                 | -             | 85          | -0.839                           | 12.54               | 0.033  |
| 247                | 41.449                       | 0.168             | 1.22                             | 92              | -1.6                 | -             | 85          | -0.835                           | 12.65               | 0.043  |
| 248                | 41.616                       | 0.167             | 1.25                             | 92              | -1.5                 | -             | 85          | -0.824                           | 12.69               | 0.046  |
| 249                | 41.784                       | 0.168             | 1.24                             | 92              | -1.4                 | -             | 85          | -0.795                           | 12.37               | 0.037  |
| 250                | 41.951                       | 0.167             | 1.23                             | 93              | -1.5                 | 99            | 86          | -0.768                           | 11.95               | 0.031  |
| 251                | 42.120                       | 0.169             | 1.23                             | 92              | -1.6                 | -             | 86          | -0.756                           | 12.12               | 0.038  |
| 252                | 42.289                       | 0.169             | 1.26                             | 93              | -1.5                 | -             | 87          | -0.726                           | 11.98               | 0.026  |
| 253                | 42.456                       | 0.167             | 1.25                             | 92              | -1.4                 | -             | 87          | -0.729                           | 11.89               | 0.030  |
| 254                | 42.623                       | 0.167             | 1.24                             | 93              | -1.4                 | -             | 86          | -0.749                           | 11.97               | 0.030  |
| 255                | 42.791                       | 0.168             | 1.26                             | 93              | -1.5                 | -             | 86          | -0.730                           | 11.87               | 0.026  |



# BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: SBI  
 Model: St Louis  
 Run #: 3

Job #: 24-303  
 Tracking #: 216  
 Technician: AK  
 Date: 12/11/2024

| Elapsed Time (min) | Particulate Sampling Data    |                   |                                  |                 |                      |               |             | Flue Gas Data                    |                     |        |
|--------------------|------------------------------|-------------------|----------------------------------|-----------------|----------------------|---------------|-------------|----------------------------------|---------------------|--------|
|                    | Gas Meter (ft <sup>3</sup> ) | Sample Rate (cfm) | Orifice dH (in H <sub>2</sub> O) | Meter Temp (°F) | Meter Vacuum (in Hg) | Pro. Rate (%) | Filter (°F) | Flue Draft (in H <sub>2</sub> O) | CO <sub>2</sub> (%) | CO (%) |
| 256                | 42.959                       | 0.168             | 1.26                             | 93              | -1.5                 | -             | 85          | -0.722                           | 11.77               | 0.026  |
| 257                | 43.127                       | 0.168             | 1.25                             | 93              | -1.4                 | -             | 85          | -0.695                           | 11.53               | 0.029  |
| 258                | 43.296                       | 0.169             | 1.23                             | 93              | -1.4                 | -             | 85          | -0.682                           | 11.30               | 0.040  |
| 259                | 43.464                       | 0.168             | 1.25                             | 93              | -1.5                 | -             | 85          | -0.681                           | 11.17               | 0.036  |
| 260                | 43.631                       | 0.167             | 1.24                             | 93              | -1.6                 | 99            | 85          | -0.653                           | 11.16               | 0.029  |
| 261                | 43.799                       | 0.168             | 1.25                             | 93              | -1.5                 | -             | 86          | -0.583                           | 11.12               | 0.035  |
| 262                | 43.966                       | 0.167             | 1.24                             | 93              | -1.5                 | -             | 86          | -0.491                           | 11.09               | 0.035  |
| 263                | 44.134                       | 0.168             | 1.25                             | 93              | -1.6                 | -             | 85          | -0.374                           | 11.01               | 0.036  |
| 264                | 44.303                       | 0.169             | 1.25                             | 93              | -1.4                 | -             | 85          | -0.262                           | 10.93               | 0.034  |
| 265                | 44.471                       | 0.168             | 1.25                             | 93              | -1.6                 | -             | 86          | -0.175                           | 11.07               | 0.034  |
| 266                | 44.638                       | 0.167             | 1.25                             | 93              | -1.5                 | -             | 86          | -0.107                           | 10.78               | 0.034  |
| 267                | 44.806                       | 0.168             | 1.24                             | 93              | -1.6                 | -             | 87          | -0.038                           | 11.25               | 0.042  |
| 268                | 44.973                       | 0.167             | 1.24                             | 93              | -1.5                 | -             | 87          | -0.042                           | 11.35               | 0.034  |
| 269                | 45.141                       | 0.168             | 1.24                             | 93              | -1.5                 | -             | 86          | -0.132                           | 11.09               | 0.040  |
| 270                | 45.310                       | 0.169             | 1.24                             | 93              | -1.4                 | 98            | 86          | -0.221                           | 11.25               | 0.033  |
| 271                | 45.478                       | 0.168             | 1.25                             | 93              | -1.4                 | -             | 85          | -0.305                           | 11.56               | 0.039  |
| 272                | 45.646                       | 0.168             | 1.26                             | 93              | -1.4                 | -             | 85          | -0.335                           | 11.58               | 0.052  |
| 273                | 45.813                       | 0.167             | 1.25                             | 93              | -1.6                 | -             | 85          | -0.403                           | 11.41               | 0.058  |
| 274                | 45.980                       | 0.167             | 1.23                             | 93              | -1.4                 | -             | 85          | -0.416                           | 10.34               | 0.039  |
| 275                | 46.148                       | 0.168             | 1.26                             | 93              | -1.4                 | -             | 85          | -0.416                           | 9.21                | 0.057  |
| 276                | 46.317                       | 0.169             | 1.26                             | 93              | -1.4                 | -             | 86          | -0.419                           | 9.27                | 0.056  |
| 277                | 46.485                       | 0.168             | 1.26                             | 93              | -1.4                 | -             | 86          | -0.424                           | 8.97                | 0.068  |
| 278                | 46.653                       | 0.168             | 1.24                             | 93              | -1.5                 | -             | 87          | -0.393                           | 8.89                | 0.057  |
| 279                | 46.820                       | 0.167             | 1.26                             | 93              | -1.5                 | -             | 86          | -0.298                           | 8.82                | 0.061  |
| 280                | 46.987                       | 0.167             | 1.24                             | 93              | -1.6                 | 99            | 86          | -0.147                           | 8.69                | 0.063  |
| 281                | 47.155                       | 0.168             | 1.25                             | 93              | -1.4                 | -             | 85          | -0.018                           | 8.50                | 0.067  |
| 282                | 47.324                       | 0.169             | 1.23                             | 93              | -1.5                 | -             | 85          | 0.067                            | 8.37                | 0.072  |
| 283                | 47.492                       | 0.168             | 1.25                             | 93              | -1.5                 | -             | 85          | 0.126                            | 8.46                | 0.069  |
| 284                | 47.660                       | 0.168             | 1.25                             | 93              | -1.5                 | -             | 85          | 0.159                            | 9.12                | 0.074  |
| 285                | 47.827                       | 0.167             | 1.25                             | 93              | -1.5                 | -             | 85          | 0.207                            | 8.79                | 0.086  |
| 286                | 47.994                       | 0.167             | 1.25                             | 93              | -1.5                 | -             | 85          | 0.248                            | 8.04                | 0.170  |
| 287                | 48.162                       | 0.168             | 1.22                             | 93              | -1.4                 | -             | 85          | 0.309                            | 7.94                | 0.183  |

# BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: SBI  
 Model: St Louis  
 Run #: 3

Job #: 24-303  
 Tracking #: 216  
 Technician: AK  
 Date: 12/11/2024

| Elapsed Time (min) | Particulate Sampling Data    |                   |                                  |                 |                      |               |             | Flue Gas Data                    |                     |        |
|--------------------|------------------------------|-------------------|----------------------------------|-----------------|----------------------|---------------|-------------|----------------------------------|---------------------|--------|
|                    | Gas Meter (ft <sup>3</sup> ) | Sample Rate (cfm) | Orifice dH (in H <sub>2</sub> O) | Meter Temp (°F) | Meter Vacuum (in Hg) | Pro. Rate (%) | Filter (°F) | Flue Draft (in H <sub>2</sub> O) | CO <sub>2</sub> (%) | CO (%) |
| 288                | 48.331                       | 0.169             | 1.25                             | 93              | -1.4                 | -             | 85          | 0.241                            | 7.97                | 0.195  |
| 289                | 48.499                       | 0.168             | 1.24                             | 93              | -1.4                 | -             | 85          | 0.210                            | 7.85                | 0.193  |
| 290                | 48.666                       | 0.167             | 1.24                             | 93              | -1.4                 | 99            | 85          | 0.197                            | 7.85                | 0.194  |
| 291                | 48.834                       | 0.168             | 1.23                             | 93              | -1.5                 | -             | 85          | 0.234                            | 7.79                | 0.203  |
| 292                | 49.001                       | 0.167             | 1.22                             | 93              | -1.5                 | -             | 85          | 0.257                            | 7.72                | 0.214  |
| 293                | 49.169                       | 0.168             | 1.23                             | 93              | -1.4                 | -             | 85          | 0.256                            | 7.75                | 0.226  |
| 294                | 49.338                       | 0.169             | 1.25                             | 93              | -1.4                 | -             | 85          | 0.267                            | 7.74                | 0.232  |
| 295                | 49.506                       | 0.168             | 1.24                             | 93              | -1.4                 | -             | 85          | 0.266                            | 7.72                | 0.243  |
| 296                | 49.674                       | 0.168             | 1.24                             | 93              | -1.4                 | -             | 85          | 0.266                            | 7.69                | 0.250  |
| 297                | 49.842                       | 0.168             | 1.26                             | 93              | -1.4                 | -             | 85          | 0.293                            | 9.32                | 0.177  |
| 298                | 50.009                       | 0.167             | 1.25                             | 93              | -1.4                 | -             | 85          | 0.338                            | 9.15                | 0.269  |
| 299                | 50.177                       | 0.168             | 1.25                             | 93              | -1.4                 | -             | 86          | 0.348                            | 8.97                | 0.379  |
| 300                | 50.346                       | 0.169             | 1.27                             | 93              | -1.5                 | 99            | 86          | 0.357                            | 6.64                | 0.481  |
| 301                | 50.514                       | 0.168             | 1.25                             | 93              | -1.5                 | -             | 86          | 0.352                            | 7.64                | 0.504  |
| 302                | 50.682                       | 0.168             | 1.25                             | 93              | -1.5                 | -             | 86          | 0.341                            | 7.62                | 0.529  |
| 303                | 50.849                       | 0.167             | 1.24                             | 93              | -1.5                 | -             | 87          | 0.341                            | 7.51                | 0.530  |
| 304                | 51.017                       | 0.168             | 1.27                             | 93              | -1.5                 | -             | 87          | 0.358                            | 7.00                | 0.537  |
| 305                | 51.184                       | 0.167             | 1.26                             | 93              | -1.5                 | -             | 86          | 0.342                            | 6.74                | 0.497  |
| 306                | 51.353                       | 0.169             | 1.23                             | 93              | -1.4                 | -             | 86          | 0.341                            | 7.51                | 0.574  |
| 307                | 51.522                       | 0.169             | 1.25                             | 93              | -1.4                 | -             | 85          | 0.353                            | 7.53                | 0.633  |
| 308                | 51.689                       | 0.167             | 1.25                             | 93              | -1.5                 | -             | 85          | 0.343                            | 6.91                | 0.743  |
| 309                | 51.857                       | 0.168             | 1.22                             | 93              | -1.5                 | -             | 85          | 0.331                            | 6.74                | 0.588  |
| 310                | 52.024                       | 0.167             | 1.22                             | 93              | -1.5                 | 99            | 85          | 0.323                            | 6.56                | 0.589  |
| 311                | 52.192                       | 0.168             | 1.22                             | 93              | -1.4                 | -             | 85          | 0.296                            | 7.41                | 0.595  |
| 312                | 52.360                       | 0.168             | 1.24                             | 93              | -1.4                 | -             | 85          | 0.327                            | 7.34                | 0.655  |
| 313                | 52.529                       | 0.169             | 1.24                             | 93              | -1.6                 | -             | 85          | 0.365                            | 6.75                | 0.528  |
| 314                | 52.697                       | 0.168             | 1.24                             | 93              | -1.4                 | -             | 85          | 0.355                            | 7.67                | 0.588  |
| 315                | 52.865                       | 0.168             | 1.24                             | 93              | -1.4                 | -             | 85          | 0.353                            | 6.78                | 0.468  |
| 316                | 53.032                       | 0.167             | 1.25                             | 94              | -1.4                 | -             | 85          | 0.340                            | 7.89                | 0.502  |
| 317                | 53.199                       | 0.167             | 1.24                             | 94              | -1.4                 | -             | 86          | 0.328                            | 6.86                | 0.455  |
| 318                | 53.367                       | 0.168             | 1.25                             | 93              | -1.4                 | -             | 86          | 0.329                            | 7.91                | 0.481  |
| 319                | 53.537                       | 0.170             | 1.23                             | 93              | -1.4                 | -             | 87          | 0.315                            | 7.90                | 0.517  |

# BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: SBI  
 Model: St Louis  
 Run #: 3

Job #: 24-303  
 Tracking #: 216  
 Technician: AK  
 Date: 12/11/2024

| Elapsed Time (min) | Particulate Sampling Data    |                   |                                  |                 |                      |               |             | Flue Gas Data                    |                     |        |
|--------------------|------------------------------|-------------------|----------------------------------|-----------------|----------------------|---------------|-------------|----------------------------------|---------------------|--------|
|                    | Gas Meter (ft <sup>3</sup> ) | Sample Rate (cfm) | Orifice dH (in H <sub>2</sub> O) | Meter Temp (°F) | Meter Vacuum (in Hg) | Pro. Rate (%) | Filter (°F) | Flue Draft (in H <sub>2</sub> O) | CO <sub>2</sub> (%) | CO (%) |
| 320                | 53.705                       | 0.168             | 1.23                             | 93              | -1.4                 | 99            | 86          | 0.320                            | 7.82                | 0.547  |
| 321                | 53.872                       | 0.167             | 1.25                             | 94              | -1.5                 | -             | 86          | 0.327                            | 7.79                | 0.586  |
| 322                | 54.040                       | 0.168             | 1.25                             | 93              | -1.5                 | -             | 85          | 0.352                            | 7.82                | 0.580  |
| 323                | 54.207                       | 0.167             | 1.24                             | 93              | -1.5                 | -             | 85          | 0.372                            | 8.95                | 0.685  |
| 324                | 54.375                       | 0.168             | 1.25                             | 93              | -1.6                 | -             | 85          | 0.384                            | 8.83                | 0.906  |
| 325                | 54.544                       | 0.169             | 1.26                             | 94              | -1.5                 | -             | 85          | 0.400                            | 8.69                | 0.944  |
| 326                | 54.713                       | 0.169             | 1.24                             | 93              | -1.5                 | -             | 85          | 0.409                            | 8.79                | 0.949  |
| 327                | 54.881                       | 0.168             | 1.23                             | 93              | -1.5                 | -             | 85          | 0.417                            | 8.81                | 0.949  |
| 328                | 55.048                       | 0.167             | 1.26                             | 94              | -1.5                 | -             | 85          | 0.405                            | 8.52                | 0.869  |
| 329                | 55.215                       | 0.167             | 1.25                             | 94              | -1.5                 | -             | 85          | 0.387                            | 8.58                | 0.869  |
| 330                | 55.383                       | 0.168             | 1.25                             | 94              | -1.5                 | 98            | 85          | 0.368                            | 8.62                | 0.841  |
| 331                | 55.552                       | 0.169             | 1.25                             | 94              | -1.4                 | -             | 85          | 0.345                            | 8.57                | 0.813  |
| 332                | 55.721                       | 0.169             | 1.24                             | 94              | -1.4                 | -             | 85          | 0.360                            | 8.61                | 0.788  |
| 333                | 55.889                       | 0.168             | 1.26                             | 93              | -1.5                 | -             | 84          | 0.356                            | 8.76                | 0.781  |
| 334                | 56.056                       | 0.167             | 1.25                             | 94              | -1.4                 | -             | 84          | 0.394                            | 8.66                | 0.770  |
| 335                | 56.224                       | 0.168             | 1.23                             | 94              | -1.4                 | -             | 84          | 0.423                            | 8.60                | 0.759  |
| 336                | 56.392                       | 0.168             | 1.26                             | 94              | -1.4                 | -             | 85          | 0.422                            | 8.77                | 0.757  |
| 337                | 56.560                       | 0.168             | 1.23                             | 94              | -1.6                 | -             | 86          | 0.441                            | 8.92                | 0.767  |
| 338                | 56.729                       | 0.169             | 1.24                             | 94              | -1.5                 | -             | 86          | 0.471                            | 8.92                | 0.753  |
| 339                | 56.897                       | 0.168             | 1.24                             | 94              | -1.5                 | -             | 86          | 0.457                            | 8.96                | 0.741  |
| 340                | 57.065                       | 0.168             | 1.24                             | 94              | -1.4                 | 98            | 86          | 0.464                            | 9.03                | 0.728  |
| 341                | 57.233                       | 0.168             | 1.25                             | 94              | -1.4                 | -             | 86          | 0.464                            | 8.99                | 0.717  |
| 342                | 57.401                       | 0.168             | 1.24                             | 94              | -1.5                 | -             | 86          | 0.458                            | 8.96                | 0.698  |
| 343                | 57.568                       | 0.167             | 1.24                             | 94              | -1.4                 | -             | 85          | 0.435                            | 8.93                | 0.693  |
| 344                | 57.737                       | 0.169             | 1.25                             | 94              | -1.6                 | -             | 85          | 0.482                            | 9.01                | 0.695  |
| 345                | 57.906                       | 0.169             | 1.24                             | 94              | -1.5                 | -             | 85          | 0.504                            | 8.90                | 0.685  |
| 346                | 58.074                       | 0.168             | 1.25                             | 94              | -1.5                 | -             | 85          | 0.437                            | 9.02                | 0.691  |
| 347                | 58.242                       | 0.168             | 1.23                             | 94              | -1.6                 | -             | 85          | 0.394                            | 8.96                | 0.686  |
| 348                | 58.410                       | 0.168             | 1.25                             | 94              | -1.6                 | -             | 84          | 0.370                            | 9.01                | 0.690  |
| 349                | 58.577                       | 0.167             | 1.25                             | 94              | -1.4                 | -             | 84          | 0.378                            | 8.99                | 0.688  |
| 350                | 58.745                       | 0.168             | 1.25                             | 94              | -1.6                 | 99            | 85          | 0.373                            | 9.06                | 0.687  |
| 351                | 58.915                       | 0.170             | 1.26                             | 94              | -1.5                 | -             | 86          | 0.367                            | 9.08                | 0.688  |

# BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: SBI  
 Model: St Louis  
 Run #: 3

Job #: 24-303  
 Tracking #: 216  
 Technician: AK  
 Date: 12/11/2024

| Elapsed Time (min) | Particulate Sampling Data    |                   |                                  |                 |                      |               |             | Flue Gas Data                    |                     |        |
|--------------------|------------------------------|-------------------|----------------------------------|-----------------|----------------------|---------------|-------------|----------------------------------|---------------------|--------|
|                    | Gas Meter (ft <sup>3</sup> ) | Sample Rate (cfm) | Orifice dH (in H <sub>2</sub> O) | Meter Temp (°F) | Meter Vacuum (in Hg) | Pro. Rate (%) | Filter (°F) | Flue Draft (in H <sub>2</sub> O) | CO <sub>2</sub> (%) | CO (%) |
| 352                | 59.083                       | 0.168             | 1.24                             | 94              | -1.4                 | -             | 87          | 0.351                            | 9.01                | 0.698  |
| 353                | 59.251                       | 0.168             | 1.22                             | 94              | -1.6                 | -             | 87          | 0.354                            | 9.10                | 0.706  |
| 354                | 59.419                       | 0.168             | 1.26                             | 94              | -1.4                 | -             | 87          | 0.347                            | 9.20                | 0.712  |
| 355                | 59.586                       | 0.167             | 1.24                             | 94              | -1.5                 | -             | 86          | 0.371                            | 9.19                | 0.700  |
| 356                | 59.754                       | 0.168             | 1.26                             | 94              | -1.4                 | -             | 86          | 0.392                            | 9.11                | 0.693  |
| 357                | 59.923                       | 0.169             | 1.25                             | 94              | -1.4                 | -             | 85          | 0.413                            | 9.09                | 0.747  |
| 358                | 60.092                       | 0.169             | 1.26                             | 94              | -1.5                 | -             | 85          | 0.420                            | 9.14                | 0.758  |
| 359                | 60.260                       | 0.168             | 1.25                             | 94              | -1.4                 | -             | 84          | 0.419                            | 9.16                | 0.758  |
| 360                | 60.428                       | 0.168             | 1.25                             | 94              | -1.6                 | 98            | 84          | 0.436                            | 9.20                | 0.760  |
| 361                | 60.596                       | 0.168             | 1.24                             | 94              | -1.6                 | -             | 85          | 0.438                            | 9.07                | 0.749  |
| 362                | 60.764                       | 0.168             | 1.25                             | 94              | -1.5                 | -             | 86          | 0.441                            | 9.08                | 0.752  |
| 363                | 60.932                       | 0.168             | 1.27                             | 94              | -1.4                 | -             | 86          | 0.436                            | 9.11                | 0.756  |
| 364                | 61.101                       | 0.169             | 1.24                             | 94              | -1.4                 | -             | 86          | 0.436                            | 9.04                | 0.749  |
| 365                | 61.270                       | 0.169             | 1.23                             | 94              | -1.5                 | -             | 85          | 0.429                            | 9.09                | 0.755  |
| 366                | 61.438                       | 0.168             | 1.24                             | 94              | -1.6                 | -             | 84          | 0.447                            | 9.02                | 0.751  |
| 367                | 61.606                       | 0.168             | 1.25                             | 94              | -1.6                 | -             | 84          | 0.452                            | 9.05                | 0.756  |
| 368                | 61.773                       | 0.167             | 1.25                             | 94              | -1.4                 | -             | 84          | 0.458                            | 9.16                | 0.767  |
| 369                | 61.941                       | 0.168             | 1.25                             | 94              | -1.5                 | -             | 83          | 0.477                            | 9.13                | 0.766  |
| 370                | 62.109                       | 0.168             | 1.25                             | 94              | -1.4                 | 98            | 83          | 0.493                            | 9.22                | 0.777  |
| 371                | 62.279                       | 0.170             | 1.27                             | 94              | -1.4                 | -             | 83          | 0.491                            | 9.14                | 0.780  |
| 372                | 62.447                       | 0.168             | 1.26                             | 93              | -1.4                 | -             | 83          | 0.497                            | 9.26                | 0.791  |
| 373                | 62.616                       | 0.169             | 1.25                             | 94              | -1.6                 | -             | 83          | 0.510                            | 9.33                | 0.795  |
| 374                | 62.783                       | 0.167             | 1.25                             | 94              | -1.4                 | -             | 83          | 0.515                            | 9.29                | 0.798  |
| 375                | 62.951                       | 0.168             | 1.26                             | 94              | -1.4                 | -             | 84          | 0.537                            | 9.29                | 0.804  |
| 376                | 63.119                       | 0.168             | 1.23                             | 93              | -1.5                 | -             | 85          | 0.542                            | 9.26                | 0.795  |
| 377                | 63.288                       | 0.169             | 1.25                             | 94              | -1.4                 | -             | 85          | 0.556                            | 9.19                | 0.788  |
| 378                | 63.457                       | 0.169             | 1.26                             | 93              | -1.6                 | -             | 84          | 0.564                            | 9.15                | 0.782  |
| 379                | 63.626                       | 0.169             | 1.25                             | 93              | -1.5                 | -             | 84          | 0.566                            | 9.26                | 0.795  |
| 380                | 63.794                       | 0.168             | 1.24                             | 93              | -1.6                 | 98            | 84          | 0.568                            | 9.30                | 0.798  |
| 381                | 63.962                       | 0.168             | 1.27                             | 93              | -1.5                 | -             | 84          | 0.592                            | 9.30                | 0.799  |
| 382                | 64.130                       | 0.168             | 1.24                             | 93              | -1.5                 | -             | 84          | 0.572                            | 9.30                | 0.796  |
| 383                | 64.298                       | 0.168             | 1.25                             | 94              | -1.4                 | -             | 84          | 0.601                            | 9.12                | 0.784  |

# BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: SBI  
 Model: St Louis  
 Run #: 3

Job #: 24-303  
 Tracking #: 216  
 Technician: AK  
 Date: 12/11/2024

| Elapsed Time (min) | Particulate Sampling Data    |                   |                                  |                 |                      |               |             | Flue Gas Data                    |                     |        |
|--------------------|------------------------------|-------------------|----------------------------------|-----------------|----------------------|---------------|-------------|----------------------------------|---------------------|--------|
|                    | Gas Meter (ft <sup>3</sup> ) | Sample Rate (cfm) | Orifice dH (in H <sub>2</sub> O) | Meter Temp (°F) | Meter Vacuum (in Hg) | Pro. Rate (%) | Filter (°F) | Flue Draft (in H <sub>2</sub> O) | CO <sub>2</sub> (%) | CO (%) |
| 384                | 64.466                       | 0.168             | 1.26                             | 93              | -1.4                 | -             | 84          | 0.585                            | 9.35                | 0.803  |
| 385                | 64.636                       | 0.170             | 1.22                             | 94              | -1.6                 | -             | 84          | 0.604                            | 9.22                | 0.793  |
| 386                | 64.805                       | 0.169             | 1.24                             | 93              | -1.4                 | -             | 84          | 0.602                            | 9.30                | 0.798  |
| 387                | 64.973                       | 0.168             | 1.25                             | 93              | -1.4                 | -             | 83          | 0.609                            | 9.24                | 0.794  |
| 388                | 65.141                       | 0.168             | 1.26                             | 93              | -1.4                 | -             | 83          | 0.601                            | 9.25                | 0.798  |
| 389                | 65.308                       | 0.167             | 1.24                             | 93              | -1.6                 | -             | 83          | 0.610                            | 9.21                | 0.796  |
| 390                | 65.477                       | 0.169             | 1.24                             | 93              | -1.4                 | 98            | 83          | 0.617                            | 9.33                | 0.810  |
| 391                | 65.645                       | 0.168             | 1.25                             | 93              | -1.4                 | -             | 84          | 0.626                            | 9.31                | 0.808  |
| 392                | 65.814                       | 0.169             | 1.25                             | 93              | -1.4                 | -             | 84          | 0.623                            | 9.13                | 0.802  |
| 393                | 65.983                       | 0.169             | 1.23                             | 93              | -1.4                 | -             | 84          | 0.614                            | 9.24                | 0.811  |
| 394                | 66.151                       | 0.168             | 1.26                             | 93              | -1.6                 | -             | 84          | 0.614                            | 9.00                | 0.785  |
| 395                | 66.319                       | 0.168             | 1.24                             | 93              | -1.4                 | -             | 84          | 0.614                            | 9.15                | 0.802  |
| 396                | 66.487                       | 0.168             | 1.25                             | 93              | -1.5                 | -             | 84          | 0.606                            | 9.20                | 0.801  |
| 397                | 66.655                       | 0.168             | 1.27                             | 93              | -1.5                 | -             | 84          | 0.613                            | 9.15                | 0.799  |
| 398                | 66.824                       | 0.169             | 1.25                             | 93              | -1.4                 | -             | 84          | 0.608                            | 9.13                | 0.796  |
| 399                | 66.993                       | 0.169             | 1.26                             | 93              | -1.6                 | -             | 85          | 0.617                            | 9.20                | 0.802  |
| 400                | 67.162                       | 0.169             | 1.27                             | 93              | -1.5                 | 99            | 85          | 0.620                            | 9.17                | 0.803  |
| 401                | 67.330                       | 0.168             | 1.24                             | 93              | -1.4                 | -             | 85          | 0.626                            | 9.13                | 0.800  |
| 402                | 67.498                       | 0.168             | 1.24                             | 93              | -1.4                 | -             | 84          | 0.607                            | 9.17                | 0.801  |
| 403                | 67.666                       | 0.168             | 1.25                             | 93              | -1.5                 | -             | 84          | 0.600                            | 9.15                | 0.798  |
| 404                | 67.834                       | 0.168             | 1.24                             | 93              | -1.5                 | -             | 84          | 0.614                            | 9.18                | 0.798  |
| 405                | 68.002                       | 0.168             | 1.25                             | 93              | -1.4                 | -             | 84          | 0.614                            | 9.14                | 0.793  |
| 406                | 68.172                       | 0.170             | 1.24                             | 93              | -1.4                 | -             | 85          | 0.621                            | 9.13                | 0.797  |
| 407                | 68.341                       | 0.169             | 1.24                             | 93              | -1.5                 | 98            | 85          | 0.618                            | 9.19                | 0.805  |
| Avg/Tot            | 68.346                       | 0.168             | 1.25                             | 88.5            | -1.5                 | 100           | 85.0        | 0.196                            | 10.79               | 0.319  |

# WOODSTOVE SURFACE TEMPERATURE DATA

Client: SBI  
 Model: St Louis  
 Run #: 3

Job #: 24-303  
 Tracking #: 216  
 Technician: AK  
 Date: 12/11/2024

Stove ΔT: 306

| Elapsed Time (min) | Temperature Data (°F) |          |         |        |           |                       |               |
|--------------------|-----------------------|----------|---------|--------|-----------|-----------------------|---------------|
|                    | FB Left               | FB Right | FB Back | FB Top | FB Bottom | Stove Surface Average | Catalyst Exit |
| 0                  | 69                    | 68       | 68      | 67     | 68        | 68.1                  | 64.0          |
| 1                  | 69                    | 68       | 69      | 84     | 68        | 71.6                  | 64.0          |
| 2                  | 70                    | 69       | 73      | 108    | 68        | 77.7                  | 64.0          |
| 3                  | 72                    | 71       | 85      | 145    | 68        | 88.4                  | 64.0          |
| 4                  | 77                    | 78       | 107     | 197    | 68        | 105.5                 | 64.0          |
| 5                  | 88                    | 90       | 131     | 258    | 68        | 127.0                 | 64.2          |
| 6                  | 101                   | 107      | 157     | 318    | 68        | 150.0                 | 64.2          |
| 7                  | 115                   | 125      | 183     | 373    | 69        | 172.9                 | 64.2          |
| 8                  | 130                   | 142      | 209     | 419    | 69        | 193.7                 | 64.2          |
| 9                  | 144                   | 159      | 233     | 454    | 69        | 211.9                 | 64.3          |
| 10                 | 160                   | 179      | 255     | 482    | 70        | 229.0                 | 64.3          |
| 11                 | 176                   | 199      | 275     | 504    | 71        | 244.9                 | 64.3          |
| 12                 | 191                   | 218      | 294     | 527    | 72        | 260.5                 | 64.3          |
| 13                 | 209                   | 238      | 314     | 545    | 73        | 275.4                 | 64.4          |
| 14                 | 226                   | 257      | 331     | 556    | 74        | 288.9                 | 64.4          |
| 15                 | 244                   | 274      | 347     | 567    | 76        | 301.6                 | 64.4          |
| 16                 | 262                   | 291      | 363     | 579    | 77        | 314.3                 | 64.5          |
| 17                 | 281                   | 306      | 379     | 592    | 79        | 327.6                 | 64.5          |
| 18                 | 302                   | 321      | 395     | 585    | 82        | 336.7                 | 64.5          |
| 19                 | 319                   | 334      | 407     | 587    | 84        | 346.3                 | 64.5          |
| 20                 | 336                   | 345      | 422     | 598    | 86        | 357.6                 | 64.6          |
| 21                 | 350                   | 355      | 438     | 605    | 89        | 367.3                 | 64.6          |
| 22                 | 363                   | 363      | 450     | 609    | 91        | 375.1                 | 64.6          |
| 23                 | 376                   | 370      | 461     | 613    | 94        | 382.4                 | 64.6          |
| 24                 | 387                   | 376      | 471     | 620    | 96        | 390.0                 | 64.6          |
| 25                 | 398                   | 378      | 489     | 611    | 100       | 395.4                 | 64.7          |
| 26                 | 407                   | 382      | 503     | 606    | 104       | 400.2                 | 64.9          |
| 27                 | 415                   | 385      | 514     | 600    | 108       | 404.7                 | 64.9          |
| 28                 | 427                   | 389      | 526     | 597    | 112       | 410.1                 | 65.1          |
| 29                 | 432                   | 393      | 536     | 595    | 115       | 414.4                 | 65.2          |
| 30                 | 441                   | 397      | 547     | 592    | 119       | 419.0                 | 65.4          |
| 31                 | 446                   | 401      | 558     | 593    | 122       | 423.8                 | 65.4          |
| 32                 | 453                   | 405      | 566     | 593    | 124       | 428.2                 | 65.4          |
| 33                 | 459                   | 408      | 577     | 594    | 127       | 433.1                 | 65.7          |
| 34                 | 466                   | 412      | 588     | 597    | 130       | 438.7                 | 65.7          |
| 35                 | 473                   | 417      | 595     | 600    | 133       | 443.4                 | 65.8          |
| 36                 | 480                   | 423      | 605     | 600    | 136       | 448.5                 | 65.8          |
| 37                 | 484                   | 425      | 613     | 596    | 138       | 451.3                 | 65.7          |
| 38                 | 488                   | 428      | 621     | 591    | 140       | 453.6                 | 65.8          |
| 39                 | 494                   | 431      | 626     | 590    | 143       | 456.8                 | 65.9          |
| 40                 | 499                   | 434      | 633     | 589    | 145       | 460.0                 | 66.1          |
| 41                 | 505                   | 437      | 640     | 590    | 147       | 463.7                 | 66.2          |
| 42                 | 512                   | 440      | 647     | 590    | 149       | 467.7                 | 66.3          |
| 43                 | 518                   | 443      | 653     | 591    | 151       | 471.3                 | 66.4          |
| 44                 | 526                   | 448      | 658     | 593    | 154       | 475.6                 | 66.6          |
| 45                 | 531                   | 452      | 667     | 589    | 156       | 478.8                 | 66.7          |
| 46                 | 537                   | 457      | 666     | 588    | 158       | 481.0                 | 66.9          |
| 47                 | 545                   | 464      | 677     | 588    | 161       | 487.0                 | 66.6          |

# WOODSTOVE SURFACE TEMPERATURE DATA

Client: SBI  
 Model: St Louis  
 Run #: 3

Job #: 24-303  
 Tracking #: 216  
 Technician: AK  
 Date: 12/11/2024

Stove ΔT: 306

| Elapsed Time (min) | Temperature Data (°F) |          |         |        |           |                       |               |
|--------------------|-----------------------|----------|---------|--------|-----------|-----------------------|---------------|
|                    | FB Left               | FB Right | FB Back | FB Top | FB Bottom | Stove Surface Average | Catalyst Exit |
| 48                 | 550                   | 468      | 681     | 586    | 164       | 489.6                 | 66.7          |
| 49                 | 554                   | 471      | 681     | 583    | 167       | 491.2                 | 66.7          |
| 50                 | 558                   | 473      | 680     | 579    | 169       | 491.7                 | 66.8          |
| 51                 | 560                   | 473      | 679     | 576    | 172       | 492.0                 | 66.8          |
| 52                 | 562                   | 473      | 678     | 573    | 175       | 492.2                 | 66.8          |
| 53                 | 562                   | 472      | 676     | 569    | 177       | 491.3                 | 66.9          |
| 54                 | 562                   | 471      | 674     | 566    | 180       | 490.4                 | 67.1          |
| 55                 | 562                   | 470      | 674     | 562    | 182       | 490.1                 | 67.3          |
| 56                 | 562                   | 469      | 672     | 561    | 184       | 489.8                 | 67.4          |
| 57                 | 559                   | 468      | 671     | 560    | 187       | 489.0                 | 67.4          |
| 58                 | 560                   | 467      | 669     | 557    | 189       | 488.4                 | 67.3          |
| 59                 | 557                   | 467      | 668     | 555    | 191       | 487.6                 | 67.0          |
| 60                 | 556                   | 467      | 668     | 554    | 193       | 487.5                 | 67.0          |
| 61                 | 554                   | 467      | 667     | 552    | 195       | 487.0                 | 67.0          |
| 62                 | 552                   | 467      | 668     | 551    | 197       | 486.9                 | 67.1          |
| 63                 | 551                   | 468      | 667     | 549    | 199       | 486.9                 | 67.1          |
| 64                 | 551                   | 469      | 667     | 550    | 201       | 487.5                 | 67.2          |
| 65                 | 550                   | 470      | 667     | 549    | 202       | 487.6                 | 67.3          |
| 66                 | 550                   | 470      | 667     | 547    | 204       | 487.6                 | 67.4          |
| 67                 | 556                   | 479      | 663     | 563    | 207       | 493.4                 | 67.4          |
| 68                 | 561                   | 487      | 659     | 573    | 210       | 497.8                 | 67.0          |
| 69                 | 563                   | 494      | 658     | 583    | 212       | 501.8                 | 66.7          |
| 70                 | 565                   | 500      | 656     | 592    | 214       | 505.2                 | 66.8          |
| 71                 | 567                   | 505      | 658     | 599    | 216       | 508.9                 | 66.7          |
| 72                 | 568                   | 510      | 657     | 605    | 217       | 511.5                 | 66.7          |
| 73                 | 568                   | 515      | 656     | 611    | 218       | 513.5                 | 66.7          |
| 74                 | 566                   | 515      | 661     | 605    | 220       | 513.3                 | 66.8          |
| 75                 | 557                   | 510      | 664     | 593    | 220       | 509.0                 | 66.9          |
| 76                 | 554                   | 509      | 665     | 587    | 221       | 507.2                 | 67.1          |
| 77                 | 551                   | 507      | 667     | 579    | 222       | 505.1                 | 67.4          |
| 78                 | 549                   | 507      | 669     | 574    | 223       | 504.4                 | 67.6          |
| 79                 | 547                   | 506      | 669     | 571    | 225       | 503.6                 | 67.8          |
| 80                 | 545                   | 507      | 670     | 568    | 226       | 503.2                 | 68.0          |
| 81                 | 543                   | 508      | 672     | 566    | 227       | 503.2                 | 68.1          |
| 82                 | 545                   | 508      | 672     | 565    | 228       | 503.2                 | 68.0          |
| 83                 | 542                   | 510      | 670     | 564    | 229       | 503.1                 | 68.1          |
| 84                 | 542                   | 510      | 674     | 561    | 231       | 503.5                 | 68.2          |
| 85                 | 540                   | 512      | 673     | 560    | 232       | 503.3                 | 68.3          |
| 86                 | 549                   | 523      | 671     | 581    | 235       | 511.8                 | 68.2          |
| 87                 | 553                   | 532      | 673     | 592    | 238       | 517.6                 | 68.1          |
| 88                 | 555                   | 540      | 671     | 600    | 240       | 521.4                 | 68.0          |
| 89                 | 557                   | 547      | 673     | 606    | 242       | 524.9                 | 67.8          |
| 90                 | 560                   | 552      | 671     | 611    | 243       | 527.1                 | 67.7          |
| 91                 | 561                   | 556      | 670     | 614    | 244       | 528.9                 | 67.7          |
| 92                 | 561                   | 559      | 666     | 599    | 244       | 525.5                 | 67.5          |
| 93                 | 560                   | 560      | 664     | 616    | 242       | 528.5                 | 67.4          |
| 94                 | 549                   | 552      | 673     | 618    | 245       | 527.3                 | 67.5          |
| 95                 | 541                   | 546      | 678     | 621    | 245       | 526.1                 | 67.8          |

# WOODSTOVE SURFACE TEMPERATURE DATA

Client: SBI  
 Model: St Louis  
 Run #: 3

Job #: 24-303  
 Tracking #: 216  
 Technician: AK  
 Date: 12/11/2024

Stove ΔT: 306

| Elapsed Time (min) | Temperature Data (°F) |          |         |        |           |                       |               |
|--------------------|-----------------------|----------|---------|--------|-----------|-----------------------|---------------|
|                    | FB Left               | FB Right | FB Back | FB Top | FB Bottom | Stove Surface Average | Catalyst Exit |
| 96                 | 539                   | 546      | 686     | 619    | 246       | 527.0                 | 67.9          |
| 97                 | 538                   | 550      | 695     | 625    | 248       | 531.1                 | 68.0          |
| 98                 | 538                   | 554      | 702     | 625    | 249       | 533.8                 | 68.2          |
| 99                 | 540                   | 558      | 707     | 625    | 251       | 536.0                 | 68.3          |
| 100                | 541                   | 562      | 712     | 624    | 252       | 538.1                 | 68.4          |
| 101                | 542                   | 566      | 715     | 623    | 253       | 539.7                 | 68.4          |
| 102                | 544                   | 570      | 719     | 622    | 254       | 541.8                 | 68.4          |
| 103                | 545                   | 574      | 722     | 620    | 255       | 543.2                 | 68.4          |
| 104                | 545                   | 577      | 726     | 619    | 256       | 544.7                 | 68.5          |
| 105                | 546                   | 579      | 729     | 619    | 256       | 545.8                 | 68.6          |
| 106                | 547                   | 581      | 732     | 620    | 257       | 547.4                 | 68.6          |
| 107                | 548                   | 585      | 737     | 620    | 257       | 549.3                 | 68.7          |
| 108                | 549                   | 590      | 740     | 620    | 258       | 551.2                 | 68.7          |
| 109                | 550                   | 593      | 743     | 621    | 258       | 553.0                 | 68.7          |
| 110                | 551                   | 595      | 747     | 622    | 258       | 554.4                 | 68.7          |
| 111                | 553                   | 597      | 748     | 622    | 258       | 555.4                 | 68.7          |
| 112                | 553                   | 600      | 750     | 622    | 258       | 556.5                 | 69.0          |
| 113                | 554                   | 602      | 751     | 618    | 258       | 556.6                 | 69.0          |
| 114                | 554                   | 603      | 751     | 616    | 258       | 556.5                 | 69.0          |
| 115                | 553                   | 604      | 751     | 614    | 258       | 556.0                 | 69.0          |
| 116                | 554                   | 605      | 751     | 611    | 258       | 555.7                 | 69.0          |
| 117                | 553                   | 606      | 750     | 608    | 258       | 554.9                 | 69.1          |
| 118                | 552                   | 605      | 749     | 605    | 258       | 553.7                 | 69.1          |
| 119                | 553                   | 607      | 748     | 603    | 257       | 553.6                 | 69.1          |
| 120                | 552                   | 607      | 748     | 599    | 257       | 552.5                 | 69.3          |
| 121                | 552                   | 605      | 748     | 597    | 258       | 551.9                 | 69.4          |
| 122                | 551                   | 605      | 745     | 594    | 258       | 550.6                 | 69.3          |
| 123                | 549                   | 604      | 742     | 591    | 258       | 548.6                 | 69.2          |
| 124                | 556                   | 610      | 740     | 605    | 260       | 554.3                 | 69.3          |
| 125                | 561                   | 617      | 737     | 616    | 263       | 558.8                 | 69.1          |
| 126                | 564                   | 621      | 732     | 624    | 264       | 561.1                 | 69.0          |
| 127                | 566                   | 625      | 729     | 630    | 265       | 562.7                 | 68.9          |
| 128                | 568                   | 627      | 725     | 633    | 265       | 563.7                 | 68.7          |
| 129                | 569                   | 629      | 722     | 637    | 266       | 564.4                 | 68.2          |
| 130                | 570                   | 631      | 719     | 639    | 265       | 564.9                 | 67.7          |
| 131                | 571                   | 632      | 717     | 641    | 265       | 565.3                 | 67.0          |
| 132                | 572                   | 633      | 715     | 643    | 265       | 565.4                 | 66.6          |
| 133                | 573                   | 634      | 714     | 644    | 265       | 565.9                 | 66.7          |
| 134                | 573                   | 635      | 713     | 646    | 264       | 566.1                 | 66.9          |
| 135                | 573                   | 635      | 710     | 647    | 264       | 565.7                 | 67.0          |
| 136                | 574                   | 635      | 708     | 648    | 263       | 565.6                 | 67.2          |
| 137                | 574                   | 635      | 706     | 611    | 263       | 557.7                 | 67.2          |
| 138                | 574                   | 635      | 704     | 609    | 263       | 556.9                 | 67.4          |
| 139                | 574                   | 635      | 703     | 620    | 263       | 558.9                 | 67.5          |
| 140                | 575                   | 634      | 702     | 650    | 262       | 564.6                 | 67.5          |
| 141                | 575                   | 634      | 700     | 650    | 262       | 564.2                 | 67.4          |
| 142                | 574                   | 634      | 700     | 644    | 262       | 562.9                 | 67.3          |
| 143                | 575                   | 634      | 699     | 627    | 262       | 559.2                 | 67.4          |



# WOODSTOVE SURFACE TEMPERATURE DATA

Client: SBI  
 Model: St Louis  
 Run #: 3

Job #: 24-303  
 Tracking #: 216  
 Technician: AK  
 Date: 12/11/2024

Stove ΔT: 306

| Elapsed Time (min) | Temperature Data (°F) |          |         |        |           |                       |               |
|--------------------|-----------------------|----------|---------|--------|-----------|-----------------------|---------------|
|                    | FB Left               | FB Right | FB Back | FB Top | FB Bottom | Stove Surface Average | Catalyst Exit |
| 144                | 575                   | 635      | 699     | 609    | 262       | 555.9                 | 67.3          |
| 145                | 575                   | 636      | 695     | 585    | 262       | 550.5                 | 67.3          |
| 146                | 576                   | 637      | 696     | 550    | 262       | 544.0                 | 67.3          |
| 147                | 576                   | 637      | 695     | 542    | 262       | 542.3                 | 67.3          |
| 148                | 576                   | 638      | 694     | 540    | 262       | 541.9                 | 67.2          |
| 149                | 576                   | 639      | 692     | 540    | 262       | 541.6                 | 67.3          |
| 150                | 575                   | 639      | 690     | 542    | 262       | 541.7                 | 67.3          |
| 151                | 575                   | 640      | 689     | 539    | 262       | 540.9                 | 67.3          |
| 152                | 574                   | 640      | 686     | 538    | 263       | 540.1                 | 67.4          |
| 153                | 574                   | 639      | 684     | 537    | 263       | 539.2                 | 67.4          |
| 154                | 574                   | 638      | 684     | 535    | 263       | 538.9                 | 67.4          |
| 155                | 573                   | 637      | 682     | 534    | 263       | 537.8                 | 67.5          |
| 156                | 573                   | 636      | 675     | 527    | 266       | 535.3                 | 67.6          |
| 157                | 570                   | 634      | 669     | 520    | 264       | 531.3                 | 67.7          |
| 158                | 568                   | 628      | 676     | 523    | 265       | 532.2                 | 67.6          |
| 159                | 552                   | 609      | 686     | 505    | 264       | 523.1                 | 67.8          |
| 160                | 546                   | 597      | 692     | 490    | 263       | 517.5                 | 68.2          |
| 161                | 545                   | 589      | 698     | 479    | 263       | 514.7                 | 68.4          |
| 162                | 541                   | 584      | 704     | 464    | 262       | 510.9                 | 68.4          |
| 163                | 543                   | 580      | 709     | 458    | 261       | 510.2                 | 68.4          |
| 164                | 543                   | 579      | 715     | 454    | 262       | 510.5                 | 68.1          |
| 165                | 545                   | 577      | 720     | 448    | 262       | 510.3                 | 68.5          |
| 166                | 548                   | 577      | 724     | 443    | 263       | 511.0                 | 68.6          |
| 167                | 549                   | 577      | 728     | 444    | 263       | 512.2                 | 68.8          |
| 168                | 550                   | 578      | 732     | 444    | 263       | 513.5                 | 68.9          |
| 169                | 553                   | 579      | 737     | 445    | 263       | 515.4                 | 69.1          |
| 170                | 553                   | 580      | 740     | 444    | 264       | 516.3                 | 69.0          |
| 171                | 558                   | 584      | 749     | 449    | 265       | 521.1                 | 68.3          |
| 172                | 558                   | 585      | 749     | 449    | 265       | 521.0                 | 67.6          |
| 173                | 556                   | 587      | 751     | 449    | 264       | 521.4                 | 67.1          |
| 174                | 558                   | 588      | 754     | 449    | 264       | 522.8                 | 66.5          |
| 175                | 559                   | 590      | 758     | 448    | 264       | 523.8                 | 66.4          |
| 176                | 559                   | 591      | 761     | 451    | 264       | 525.2                 | 66.4          |
| 177                | 558                   | 593      | 762     | 449    | 264       | 525.2                 | 66.4          |
| 178                | 566                   | 597      | 771     | 455    | 265       | 530.7                 | 64.9          |
| 179                | 567                   | 600      | 775     | 463    | 266       | 534.2                 | 62.2          |
| 180                | 570                   | 603      | 778     | 465    | 266       | 536.3                 | 61.6          |
| 181                | 572                   | 606      | 782     | 468    | 265       | 538.7                 | 60.4          |
| 182                | 574                   | 606      | 783     | 470    | 266       | 539.7                 | 60.0          |
| 183                | 577                   | 610      | 785     | 470    | 266       | 541.5                 | 59.9          |
| 184                | 578                   | 611      | 787     | 470    | 265       | 542.2                 | 60.0          |
| 185                | 577                   | 612      | 788     | 471    | 265       | 542.7                 | 59.9          |
| 186                | 576                   | 613      | 790     | 471    | 264       | 542.9                 | 59.6          |
| 187                | 576                   | 615      | 792     | 474    | 264       | 544.2                 | 59.5          |
| 188                | 572                   | 616      | 791     | 473    | 263       | 543.0                 | 59.0          |
| 189                | 572                   | 618      | 794     | 472    | 262       | 543.5                 | 58.6          |
| 190                | 571                   | 620      | 795     | 474    | 261       | 544.3                 | 59.0          |
| 191                | 570                   | 622      | 795     | 474    | 261       | 544.3                 | 60.7          |

# WOODSTOVE SURFACE TEMPERATURE DATA

Client: SBI  
 Model: St Louis  
 Run #: 3

Job #: 24-303  
 Tracking #: 216  
 Technician: AK  
 Date: 12/11/2024

Stove ΔT: 306

| Elapsed Time (min) | Temperature Data (°F) |          |         |        |           |                       |               |
|--------------------|-----------------------|----------|---------|--------|-----------|-----------------------|---------------|
|                    | FB Left               | FB Right | FB Back | FB Top | FB Bottom | Stove Surface Average | Catalyst Exit |
| 192                | 569                   | 622      | 799     | 476    | 261       | 545.4                 | 62.2          |
| 193                | 572                   | 624      | 796     | 477    | 261       | 546.0                 | 63.2          |
| 194                | 570                   | 625      | 800     | 474    | 261       | 545.9                 | 64.1          |
| 195                | 569                   | 628      | 799     | 474    | 261       | 546.2                 | 65.1          |
| 196                | 572                   | 629      | 802     | 471    | 261       | 546.7                 | 65.7          |
| 197                | 572                   | 630      | 802     | 471    | 261       | 547.1                 | 66.2          |
| 198                | 574                   | 632      | 804     | 470    | 261       | 548.1                 | 66.8          |
| 199                | 570                   | 633      | 802     | 472    | 261       | 547.5                 | 67.2          |
| 200                | 569                   | 635      | 804     | 470    | 261       | 547.6                 | 67.5          |
| 201                | 569                   | 635      | 804     | 468    | 261       | 547.3                 | 67.7          |
| 202                | 568                   | 635      | 803     | 466    | 261       | 546.6                 | 68.0          |
| 203                | 565                   | 635      | 803     | 464    | 261       | 545.8                 | 67.9          |
| 204                | 565                   | 635      | 802     | 464    | 261       | 545.5                 | 68.0          |
| 205                | 564                   | 635      | 801     | 463    | 261       | 544.7                 | 68.3          |
| 206                | 562                   | 635      | 800     | 460    | 261       | 543.6                 | 68.3          |
| 207                | 560                   | 635      | 801     | 457    | 261       | 542.6                 | 68.4          |
| 208                | 559                   | 634      | 798     | 457    | 261       | 542.0                 | 68.6          |
| 209                | 557                   | 633      | 797     | 456    | 261       | 540.8                 | 68.7          |
| 210                | 556                   | 633      | 797     | 454    | 261       | 540.1                 | 68.7          |
| 211                | 555                   | 633      | 796     | 453    | 261       | 539.2                 | 68.8          |
| 212                | 554                   | 632      | 793     | 452    | 261       | 538.4                 | 68.9          |
| 213                | 552                   | 631      | 793     | 450    | 261       | 537.3                 | 69.0          |
| 214                | 552                   | 632      | 794     | 447    | 261       | 537.1                 | 69.1          |
| 215                | 550                   | 631      | 792     | 446    | 261       | 536.2                 | 69.1          |
| 216                | 550                   | 633      | 792     | 446    | 261       | 536.2                 | 69.0          |
| 217                | 549                   | 633      | 790     | 443    | 261       | 535.3                 | 69.2          |
| 218                | 550                   | 633      | 788     | 443    | 261       | 535.0                 | 69.3          |
| 219                | 551                   | 631      | 787     | 442    | 261       | 534.5                 | 69.3          |
| 220                | 552                   | 629      | 786     | 442    | 261       | 534.0                 | 69.4          |
| 221                | 554                   | 629      | 784     | 443    | 261       | 534.0                 | 69.5          |
| 222                | 553                   | 627      | 785     | 443    | 262       | 533.8                 | 69.3          |
| 223                | 555                   | 625      | 785     | 443    | 262       | 534.0                 | 68.2          |
| 224                | 556                   | 625      | 785     | 442    | 262       | 534.1                 | 68.1          |
| 225                | 559                   | 626      | 784     | 442    | 262       | 534.3                 | 67.1          |
| 226                | 561                   | 626      | 784     | 440    | 262       | 534.7                 | 66.8          |
| 227                | 562                   | 625      | 784     | 441    | 262       | 534.8                 | 67.0          |
| 228                | 564                   | 624      | 784     | 441    | 262       | 535.0                 | 67.5          |
| 229                | 566                   | 626      | 785     | 440    | 261       | 535.5                 | 67.8          |
| 230                | 564                   | 627      | 786     | 442    | 261       | 535.9                 | 68.1          |
| 231                | 565                   | 625      | 785     | 444    | 262       | 536.1                 | 68.5          |
| 232                | 565                   | 626      | 788     | 442    | 261       | 536.6                 | 68.7          |
| 233                | 566                   | 628      | 788     | 441    | 261       | 536.8                 | 69.0          |
| 234                | 568                   | 628      | 789     | 440    | 261       | 537.0                 | 69.1          |
| 235                | 568                   | 629      | 789     | 440    | 261       | 537.3                 | 69.1          |
| 236                | 570                   | 628      | 788     | 438    | 262       | 536.8                 | 69.2          |
| 237                | 570                   | 629      | 788     | 437    | 262       | 537.2                 | 69.1          |
| 238                | 572                   | 628      | 787     | 435    | 262       | 536.8                 | 69.2          |
| 239                | 572                   | 628      | 787     | 433    | 262       | 536.2                 | 69.0          |

# WOODSTOVE SURFACE TEMPERATURE DATA

Client: SBI  
 Model: St Louis  
 Run #: 3

Job #: 24-303  
 Tracking #: 216  
 Technician: AK  
 Date: 12/11/2024

Stove ΔT: 306

| Elapsed Time (min) | Temperature Data (°F) |          |         |        |           |                       |               |
|--------------------|-----------------------|----------|---------|--------|-----------|-----------------------|---------------|
|                    | FB Left               | FB Right | FB Back | FB Top | FB Bottom | Stove Surface Average | Catalyst Exit |
| 240                | 571                   | 628      | 783     | 434    | 262       | 535.4                 | 69.0          |
| 241                | 571                   | 627      | 784     | 430    | 262       | 534.8                 | 69.1          |
| 242                | 572                   | 627      | 782     | 431    | 262       | 534.6                 | 69.1          |
| 243                | 573                   | 626      | 783     | 427    | 262       | 534.1                 | 69.0          |
| 244                | 574                   | 626      | 782     | 426    | 262       | 534.1                 | 69.0          |
| 245                | 574                   | 625      | 783     | 425    | 262       | 533.7                 | 68.9          |
| 246                | 575                   | 625      | 783     | 424    | 262       | 533.7                 | 69.0          |
| 247                | 575                   | 626      | 783     | 424    | 262       | 534.2                 | 69.0          |
| 248                | 577                   | 625      | 783     | 423    | 262       | 533.9                 | 68.9          |
| 249                | 576                   | 624      | 782     | 422    | 262       | 533.1                 | 68.8          |
| 250                | 576                   | 623      | 782     | 420    | 262       | 532.6                 | 68.9          |
| 251                | 577                   | 623      | 782     | 419    | 262       | 532.4                 | 68.8          |
| 252                | 577                   | 621      | 782     | 416    | 262       | 531.6                 | 68.8          |
| 253                | 581                   | 622      | 780     | 415    | 262       | 531.8                 | 68.9          |
| 254                | 580                   | 620      | 777     | 413    | 262       | 530.4                 | 69.0          |
| 255                | 579                   | 619      | 776     | 413    | 262       | 529.6                 | 68.9          |
| 256                | 580                   | 617      | 775     | 411    | 262       | 528.9                 | 68.9          |
| 257                | 578                   | 617      | 774     | 411    | 262       | 528.2                 | 68.9          |
| 258                | 580                   | 614      | 772     | 408    | 262       | 527.2                 | 69.0          |
| 259                | 580                   | 613      | 770     | 407    | 262       | 526.2                 | 68.9          |
| 260                | 580                   | 611      | 767     | 403    | 262       | 524.5                 | 68.9          |
| 261                | 587                   | 619      | 767     | 416    | 264       | 530.4                 | 68.7          |
| 262                | 593                   | 626      | 761     | 435    | 266       | 536.2                 | 68.5          |
| 263                | 595                   | 631      | 755     | 454    | 268       | 540.5                 | 68.5          |
| 264                | 597                   | 635      | 753     | 470    | 269       | 544.6                 | 68.2          |
| 265                | 598                   | 638      | 749     | 482    | 269       | 547.3                 | 68.0          |
| 266                | 600                   | 641      | 745     | 491    | 269       | 549.3                 | 67.8          |
| 267                | 601                   | 643      | 743     | 501    | 269       | 551.3                 | 67.6          |
| 268                | 591                   | 632      | 745     | 487    | 268       | 544.5                 | 67.7          |
| 269                | 586                   | 626      | 746     | 473    | 266       | 539.2                 | 67.8          |
| 270                | 584                   | 621      | 745     | 461    | 265       | 535.2                 | 67.9          |
| 271                | 583                   | 619      | 747     | 448    | 265       | 532.1                 | 68.0          |
| 272                | 581                   | 617      | 746     | 439    | 264       | 529.4                 | 68.0          |
| 273                | 583                   | 617      | 747     | 431    | 264       | 528.4                 | 68.1          |
| 274                | 581                   | 615      | 747     | 423    | 264       | 525.9                 | 68.0          |
| 275                | 582                   | 614      | 745     | 416    | 264       | 524.2                 | 68.1          |
| 276                | 581                   | 611      | 742     | 410    | 264       | 521.8                 | 68.1          |
| 277                | 580                   | 607      | 739     | 404    | 265       | 518.9                 | 68.2          |
| 278                | 589                   | 612      | 736     | 410    | 266       | 522.5                 | 68.2          |
| 279                | 594                   | 616      | 736     | 425    | 269       | 528.0                 | 68.1          |
| 280                | 597                   | 619      | 729     | 440    | 270       | 531.0                 | 68.1          |
| 281                | 598                   | 620      | 723     | 453    | 271       | 533.1                 | 68.0          |
| 282                | 601                   | 620      | 716     | 462    | 271       | 534.1                 | 67.8          |
| 283                | 602                   | 620      | 713     | 469    | 272       | 535.0                 | 67.7          |
| 284                | 602                   | 619      | 709     | 475    | 272       | 535.3                 | 67.6          |
| 285                | 603                   | 618      | 704     | 480    | 271       | 535.1                 | 67.5          |
| 286                | 603                   | 616      | 701     | 485    | 272       | 535.2                 | 67.4          |
| 287                | 602                   | 614      | 696     | 489    | 271       | 534.3                 | 67.3          |

# WOODSTOVE SURFACE TEMPERATURE DATA

Client: SBI  
 Model: St Louis  
 Run #: 3

Job #: 24-303  
 Tracking #: 216  
 Technician: AK  
 Date: 12/11/2024

Stove ΔT: 306

| Elapsed Time (min) | Temperature Data (°F) |          |         |        |           |                       |               |
|--------------------|-----------------------|----------|---------|--------|-----------|-----------------------|---------------|
|                    | FB Left               | FB Right | FB Back | FB Top | FB Bottom | Stove Surface Average | Catalyst Exit |
| 288                | 600                   | 612      | 691     | 490    | 272       | 532.9                 | 67.3          |
| 289                | 599                   | 610      | 686     | 491    | 271       | 531.4                 | 67.2          |
| 290                | 596                   | 607      | 683     | 492    | 271       | 529.9                 | 67.2          |
| 291                | 594                   | 604      | 680     | 493    | 272       | 528.5                 | 67.1          |
| 292                | 591                   | 602      | 676     | 493    | 272       | 526.5                 | 67.3          |
| 293                | 589                   | 599      | 672     | 492    | 272       | 524.8                 | 67.2          |
| 294                | 586                   | 597      | 669     | 491    | 272       | 522.9                 | 67.3          |
| 295                | 584                   | 594      | 665     | 490    | 273       | 521.0                 | 67.2          |
| 296                | 582                   | 591      | 663     | 489    | 274       | 519.5                 | 67.1          |
| 297                | 580                   | 589      | 660     | 487    | 277       | 518.4                 | 67.2          |
| 298                | 578                   | 588      | 657     | 484    | 280       | 517.3                 | 67.2          |
| 299                | 576                   | 586      | 654     | 482    | 282       | 515.8                 | 67.1          |
| 300                | 573                   | 584      | 651     | 479    | 282       | 513.9                 | 67.1          |
| 301                | 571                   | 581      | 647     | 477    | 281       | 511.3                 | 67.1          |
| 302                | 568                   | 578      | 643     | 473    | 279       | 508.4                 | 67.1          |
| 303                | 565                   | 575      | 639     | 470    | 278       | 505.4                 | 67.0          |
| 304                | 562                   | 572      | 634     | 467    | 278       | 502.7                 | 66.9          |
| 305                | 559                   | 569      | 632     | 465    | 278       | 500.3                 | 66.9          |
| 306                | 556                   | 566      | 628     | 462    | 277       | 497.5                 | 66.8          |
| 307                | 554                   | 563      | 625     | 459    | 275       | 495.1                 | 66.8          |
| 308                | 551                   | 560      | 622     | 457    | 276       | 493.3                 | 66.7          |
| 309                | 549                   | 557      | 619     | 454    | 276       | 491.0                 | 66.7          |
| 310                | 547                   | 554      | 615     | 452    | 277       | 489.0                 | 66.7          |
| 311                | 545                   | 552      | 614     | 450    | 275       | 487.2                 | 66.7          |
| 312                | 542                   | 549      | 612     | 448    | 276       | 485.2                 | 66.7          |
| 313                | 541                   | 547      | 607     | 445    | 275       | 483.0                 | 66.6          |
| 314                | 539                   | 545      | 607     | 444    | 276       | 482.0                 | 66.6          |
| 315                | 537                   | 543      | 607     | 442    | 276       | 480.9                 | 66.5          |
| 316                | 536                   | 541      | 603     | 440    | 276       | 479.3                 | 66.5          |
| 317                | 535                   | 539      | 602     | 439    | 276       | 478.1                 | 66.4          |
| 318                | 533                   | 537      | 603     | 437    | 275       | 477.0                 | 66.4          |
| 319                | 533                   | 536      | 601     | 435    | 275       | 475.9                 | 66.5          |
| 320                | 531                   | 534      | 600     | 434    | 275       | 474.9                 | 66.6          |
| 321                | 531                   | 533      | 599     | 432    | 275       | 473.9                 | 66.5          |
| 322                | 529                   | 532      | 597     | 430    | 278       | 473.1                 | 66.5          |
| 323                | 529                   | 531      | 596     | 428    | 282       | 472.8                 | 66.5          |
| 324                | 528                   | 530      | 595     | 425    | 286       | 472.7                 | 66.5          |
| 325                | 528                   | 529      | 593     | 422    | 290       | 472.4                 | 66.5          |
| 326                | 527                   | 528      | 593     | 419    | 293       | 472.1                 | 66.5          |
| 327                | 526                   | 527      | 591     | 416    | 296       | 471.2                 | 66.4          |
| 328                | 524                   | 525      | 589     | 413    | 299       | 470.1                 | 66.4          |
| 329                | 523                   | 524      | 588     | 409    | 302       | 469.1                 | 66.5          |
| 330                | 522                   | 522      | 585     | 406    | 304       | 467.8                 | 66.5          |
| 331                | 521                   | 520      | 584     | 403    | 306       | 466.7                 | 66.4          |
| 332                | 519                   | 518      | 581     | 400    | 307       | 464.9                 | 66.4          |
| 333                | 516                   | 516      | 580     | 397    | 308       | 463.4                 | 66.5          |
| 334                | 515                   | 514      | 576     | 393    | 309       | 461.5                 | 66.4          |
| 335                | 513                   | 512      | 575     | 390    | 310       | 460.2                 | 66.3          |

# WOODSTOVE SURFACE TEMPERATURE DATA

Client: SBIJob #: 24-303Model: St LouisTracking #: 216Run #: 3Technician: AKDate: 12/11/2024Stove ΔT: 306

| Elapsed Time (min) | Temperature Data (°F) |          |         |        |           |                       |               |
|--------------------|-----------------------|----------|---------|--------|-----------|-----------------------|---------------|
|                    | FB Left               | FB Right | FB Back | FB Top | FB Bottom | Stove Surface Average | Catalyst Exit |
| 336                | 511                   | 510      | 573     | 387    | 311       | 458.5                 | 66.3          |
| 337                | 509                   | 508      | 570     | 384    | 312       | 456.4                 | 66.3          |
| 338                | 506                   | 506      | 567     | 381    | 312       | 454.2                 | 66.3          |
| 339                | 505                   | 504      | 565     | 378    | 312       | 452.7                 | 66.3          |
| 340                | 502                   | 502      | 562     | 376    | 312       | 450.7                 | 66.3          |
| 341                | 500                   | 500      | 561     | 373    | 312       | 449.1                 | 66.4          |
| 342                | 496                   | 498      | 560     | 370    | 312       | 447.3                 | 66.4          |
| 343                | 495                   | 496      | 557     | 368    | 312       | 445.6                 | 66.4          |
| 344                | 492                   | 494      | 555     | 365    | 312       | 443.6                 | 66.3          |
| 345                | 490                   | 492      | 553     | 363    | 313       | 441.9                 | 66.3          |
| 346                | 488                   | 490      | 552     | 360    | 312       | 440.3                 | 66.4          |
| 347                | 486                   | 489      | 550     | 357    | 313       | 438.9                 | 66.5          |
| 348                | 484                   | 487      | 548     | 355    | 312       | 437.1                 | 66.6          |
| 349                | 481                   | 485      | 545     | 353    | 312       | 435.1                 | 66.8          |
| 350                | 480                   | 483      | 543     | 350    | 312       | 433.5                 | 66.8          |
| 351                | 477                   | 482      | 542     | 349    | 311       | 432.1                 | 66.8          |
| 352                | 476                   | 480      | 538     | 346    | 311       | 430.4                 | 66.9          |
| 353                | 473                   | 478      | 538     | 344    | 310       | 428.7                 | 66.9          |
| 354                | 472                   | 477      | 535     | 342    | 310       | 427.3                 | 66.8          |
| 355                | 470                   | 475      | 535     | 340    | 309       | 426.0                 | 66.8          |
| 356                | 469                   | 474      | 532     | 338    | 309       | 424.3                 | 66.8          |
| 357                | 467                   | 472      | 532     | 336    | 309       | 423.2                 | 66.9          |
| 358                | 466                   | 471      | 530     | 334    | 309       | 421.9                 | 66.8          |
| 359                | 463                   | 469      | 529     | 332    | 308       | 420.3                 | 66.8          |
| 360                | 463                   | 468      | 527     | 331    | 308       | 419.1                 | 66.8          |
| 361                | 461                   | 466      | 525     | 329    | 307       | 417.8                 | 66.8          |
| 362                | 460                   | 465      | 524     | 327    | 306       | 416.6                 | 66.8          |
| 363                | 459                   | 464      | 523     | 326    | 306       | 415.3                 | 66.8          |
| 364                | 458                   | 462      | 520     | 325    | 306       | 413.9                 | 66.8          |
| 365                | 457                   | 461      | 518     | 323    | 305       | 412.7                 | 66.8          |
| 366                | 456                   | 459      | 518     | 321    | 305       | 411.8                 | 66.7          |
| 367                | 454                   | 458      | 516     | 320    | 304       | 410.3                 | 66.7          |
| 368                | 453                   | 457      | 515     | 318    | 303       | 409.3                 | 66.7          |
| 369                | 452                   | 456      | 513     | 317    | 303       | 408.0                 | 66.6          |
| 370                | 450                   | 455      | 513     | 316    | 302       | 407.1                 | 66.6          |
| 371                | 450                   | 453      | 513     | 315    | 302       | 406.4                 | 66.6          |
| 372                | 448                   | 452      | 510     | 313    | 301       | 404.8                 | 66.6          |
| 373                | 447                   | 451      | 507     | 312    | 300       | 403.3                 | 66.6          |
| 374                | 446                   | 449      | 507     | 311    | 300       | 402.7                 | 66.6          |
| 375                | 445                   | 448      | 505     | 310    | 299       | 401.4                 | 66.6          |
| 376                | 444                   | 447      | 505     | 309    | 299       | 400.5                 | 66.6          |
| 377                | 443                   | 446      | 504     | 307    | 298       | 399.6                 | 66.5          |
| 378                | 442                   | 445      | 502     | 306    | 297       | 398.4                 | 66.5          |
| 379                | 441                   | 443      | 502     | 305    | 297       | 397.6                 | 66.5          |
| 380                | 439                   | 442      | 501     | 304    | 296       | 396.7                 | 66.4          |
| 381                | 439                   | 441      | 498     | 304    | 296       | 395.4                 | 66.4          |
| 382                | 438                   | 440      | 497     | 303    | 295       | 394.5                 | 66.4          |
| 383                | 437                   | 439      | 496     | 302    | 294       | 393.7                 | 66.4          |

# WOODSTOVE SURFACE TEMPERATURE DATA

Client: SBI  
 Model: St Louis  
 Run #: 3

Job #: 24-303  
 Tracking #: 216  
 Technician: AK  
 Date: 12/11/2024

Stove ΔT: 306

| Elapsed Time (min) | Temperature Data (°F) |          |         |        |           |                       |               |
|--------------------|-----------------------|----------|---------|--------|-----------|-----------------------|---------------|
|                    | FB Left               | FB Right | FB Back | FB Top | FB Bottom | Stove Surface Average | Catalyst Exit |
| 384                | 436                   | 438      | 496     | 301    | 294       | 392.8                 | 66.4          |
| 385                | 435                   | 437      | 495     | 300    | 294       | 392.2                 | 66.4          |
| 386                | 434                   | 436      | 493     | 299    | 293       | 390.7                 | 66.4          |
| 387                | 433                   | 434      | 492     | 298    | 292       | 389.9                 | 66.3          |
| 388                | 433                   | 434      | 491     | 297    | 291       | 389.0                 | 66.3          |
| 389                | 432                   | 433      | 490     | 297    | 291       | 388.3                 | 66.3          |
| 390                | 430                   | 432      | 489     | 296    | 290       | 387.4                 | 66.3          |
| 391                | 430                   | 431      | 487     | 295    | 290       | 386.4                 | 66.3          |
| 392                | 429                   | 430      | 487     | 294    | 290       | 386.1                 | 66.2          |
| 393                | 428                   | 429      | 485     | 294    | 289       | 385.0                 | 66.1          |
| 394                | 427                   | 428      | 485     | 293    | 289       | 384.3                 | 66.2          |
| 395                | 426                   | 427      | 484     | 292    | 288       | 383.5                 | 66.1          |
| 396                | 425                   | 426      | 483     | 291    | 288       | 382.4                 | 66.1          |
| 397                | 424                   | 425      | 482     | 290    | 287       | 381.7                 | 66.1          |
| 398                | 423                   | 425      | 481     | 289    | 287       | 380.8                 | 66.1          |
| 399                | 422                   | 424      | 480     | 289    | 287       | 380.2                 | 66.1          |
| 400                | 421                   | 423      | 480     | 288    | 286       | 379.3                 | 66.1          |
| 401                | 420                   | 422      | 479     | 287    | 285       | 378.4                 | 66.1          |
| 402                | 419                   | 421      | 477     | 286    | 285       | 377.6                 | 66.1          |
| 403                | 418                   | 421      | 477     | 285    | 284       | 376.8                 | 66.1          |
| 404                | 417                   | 420      | 476     | 284    | 284       | 376.2                 | 66.0          |
| 405                | 416                   | 419      | 476     | 283    | 284       | 375.6                 | 66.1          |
| 406                | 415                   | 419      | 474     | 283    | 283       | 374.7                 | 66.0          |
| 407                | 414                   | 418      | 473     | 282    | 283       | 373.9                 | 66.0          |
| Average            | 516.4                 | 531.6    | 647.0   | 473.3  | 246.6     | 483.0                 | 66.9          |

LAB SAMPLE DATA - ASTM E2515

Client: SBI  
Model: St Louis  
Run #: 3

Job #: 24-303  
Tracking #: 216  
Technician: AK  
Date: 12/11/2024

|         |     | Sample ID | Tare, mg | Final, mg | Catch, mg |
|---------|-----|-----------|----------|-----------|-----------|
| Filters | A   | G01171    | 228.6    | 230.5     | 1.9       |
|         | B   | G01172    | 227.9    | 229.4     | 1.5       |
|         | Amb | G01173    | 227.3    | 227.3     | 0.0       |
|         |     |           |          |           |           |
|         |     |           |          |           |           |
| Probes  | A   | 9B        | 117738.7 | 117738.8  | 0.1       |
|         | B   | 9C        | 116603.7 | 116603.7  | 0.0       |
|         |     |           |          |           |           |
|         |     |           |          |           |           |
| O-rings | A   | 9B        | 3523.2   | 3523.3    | 0.1       |
|         | B   | 9C        | 3430.6   | 3430.9    | 0.3       |
|         |     |           |          |           |           |
|         |     |           |          |           |           |

Placed in Dessicator on: 5/6/2024

| Balance Audit (mg): |   | 200.0       |             | 200.0       |             | 200.0       |             |             |           |
|---------------------|---|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-----------|
|                     |   | Weight (mg) | Date/Time   | Weight (mg) | Date/Time   | Weight (mg) | Date/Time   | Weight (mg) | Date/Time |
| Filters             | A | 231.0       | 12/11 18:35 | 230.6       | 12/13 15:00 | 230.5       | 12/18 12:00 |             |           |
|                     | B | 229.7       | 12/11 18:35 | 229.5       | 12/13 15:00 | 229.4       | 12/18 12:00 |             |           |
|                     |   | 227.5       | 12/11 18:35 | 227.3       | 12/13 15:00 | 227.3       | 12/18 12:00 |             |           |
|                     |   |             |             |             |             |             |             |             |           |
|                     |   |             |             |             |             |             |             |             |           |
| Probes              | A | 117740.0    | 12/11 18:35 | 117738.8    | 12/13 15:00 | 117738.8    | 12/18 12:00 |             |           |
|                     | B | 116604.2    | 12/11 18:35 | 116603.8    | 12/13 15:00 | 116603.7    | 12/18 12:00 |             |           |
|                     |   |             |             |             |             |             |             |             |           |
|                     |   |             |             |             |             |             |             |             |           |
| O-Rings             | A | 3523.3      | 12/11 18:35 | 3523.2      | 12/13 15:00 | 3523.3      | 12/18 12:00 |             |           |
|                     | B | 3430.9      | 12/11 18:35 | 3430.8      | 12/13 15:00 | 3430.9      | 12/18 12:00 |             |           |
|                     |   |             |             |             |             |             |             |             |           |
|                     |   |             |             |             |             |             |             |             |           |

|                        |     |
|------------------------|-----|
| Train A Aggregate, mg: | 2.1 |
| Train B Aggregate, mg: | 1.8 |
| Ambient, mg:           | 0.0 |
|                        |     |

# TEST RESULTS - ASTM E2780 / ASTM E2515

Client: SBI

Model: St Louis

Run #: 3

Job #: 24-303

Tracking #: 216

Technician: AK

Date: 12/11/2024

Total Fuel Burned (kg-dry) 18.19

|                                                         | Ambient Sample | Sample Train A | Sample Train B | 1st Hour Filter |
|---------------------------------------------------------|----------------|----------------|----------------|-----------------|
| Total Sample Volume (ft <sup>3</sup> )                  | 97.679         | 71.050         | 68.346         | -               |
| Average Gas Velocity in Dilution Tunnel (ft/sec)        | 18.3           |                |                |                 |
| Average Gas Flow Rate in Dilution Tunnel (dscf/hr)      | 49066.9        |                |                |                 |
| Average Gas Meter Temperature (°F)                      | 68.9           | 88.5           | 88.5           | -               |
| Total Sample Volume (dscf)                              | 98.102         | 68.755         | 66.666         | -               |
| Average Tunnel Temperature (°F)                         | 86.1           |                |                |                 |
| Total Time of Test (min)                                | 407            |                |                |                 |
| Total Particulate Catch (mg)                            | 0.0            | 2.1            | 1.8            | -               |
| Particulate Concentration, dry-standard (g/dscf)        | 0.0000000      | 0.0000305      | 0.0000270      | -               |
| Total PM Emissions (g)                                  | 0.00           | 10.17          | 8.99           | -               |
| Particulate Emission Rate (g/hr)                        | 0.00           | 1.50           | 1.32           | -               |
| Emissions Factor (g/kg)                                 | -              | 0.56           | 0.49           | -               |
| Difference from Average Total Particulate Emissions (g) | -              | 0.59           | 0.59           | -               |
| Difference from Average Total Particulate Emissions (%) | -              | 6.2%           | 6.2%           | -               |
| Difference from Average Emissions Factor (g/kg)         | -              | 0.03           | 0.03           | -               |

| Final Average Results            |      |
|----------------------------------|------|
| Total Particulate Emissions (g)  | 9.58 |
| Particulate Emission Rate (g/hr) | 1.41 |
| Emissions Factor (g/kg)          | 0.53 |

| Quality Checks                   | Requirement                                                                                 | Observed                 | Result |
|----------------------------------|---------------------------------------------------------------------------------------------|--------------------------|--------|
| Dual Train Precision             | Each train within 7.5% of average emissions (in grams), or emission factors within 0.5 g/kg | See Above                | OK     |
| Filter Temps                     | <90 °F                                                                                      | 86.9                     | OK     |
| Face Velocity                    | < 30 ft/min                                                                                 | 9.5                      | OK     |
| Leakage Rate                     | Less than 4% of average sample rate                                                         | 0 cfm                    | OK     |
| Ambient Temp                     | 55-90 °F                                                                                    | Min:65.2/Max:72.9        | OK     |
| Negative Probe Weight Evaluation | <5% of Total Catch                                                                          | Probe Catch Not Negative | OK     |
| Pro-Rate Variation               | 90% of readings between 90-110%; none greater than 120% or less than 80%                    | See Data Tabs            | OK     |



## Test Input Data

Client: SBI  
 Model: St-Louis  
 Run #: 3

Job #: 24-303  
 Tracking #: 216  
 Technician: AK  
 Date: 12/11/2024

### Traverse Data

| pt     | dP (in WC) |
|--------|------------|
| 1      | 0.068      |
| 2      | 0.074      |
| 3      | 0.078      |
| 4      | 0.080      |
| 5      | 0.068      |
| 6      | 0.062      |
| 7      | 0.064      |
| 8      | 0.070      |
| 9      | 0.084      |
| 10     | 0.084      |
| 11     | 0.080      |
| 12     | 0.058      |
| Center | 0.073      |

### Tunnel Data

|                   |       |
|-------------------|-------|
| Tunnel dia. (in): | 12    |
| Pitot Cp          | 0.99  |
| Vs,cent (ft/s):   | 17.81 |
| Vs, trav (ft/s):  | 17.72 |
| Fp                | 0.995 |

|                              | Pre-Test | Post Test |
|------------------------------|----------|-----------|
| Barometric Pressure (in. Hg) | 30.08    | 29.91     |
| Lab Relative Humidity (%)    | 29.7     | 21.6      |

|                  |        |
|------------------|--------|
| Traverse Temp:   | 65     |
| Static Pressure: | -0.208 |

## Fuel Data

### Fuel Properties

|              |        |
|--------------|--------|
| Species      | Maple  |
| HHV (Btu/lb) | 8587   |
| %C           | 50.64% |
| %H           | 6.02%  |
| %O           | 41.74% |

|                     | Wet Weight | MC (%db) | Dry Weight (lbs) |
|---------------------|------------|----------|------------------|
| Kindling            | 1.99       |          |                  |
| Starter             | 5.49       | 20.33    | 4.56             |
| L2                  | 13.67      | 21.23    | 11.28            |
| L3                  | 9.73       | 22.32    | 7.95             |
| L4 <sub>s</sub>     | 7.51       | 24.08    | 6.05             |
| L4 <sub>b</sub>     | 15.72      | 23.61    | 12.72            |
| Avg. Moisture (%db) |            | 22.31    |                  |

# Run 1 Results Summary

## Test Segments

|                         | Clock    | ET(min) |
|-------------------------|----------|---------|
| L1 Ignition             | 11:11 AM | 0       |
| L1 End                  | 11:29 AM | 17      |
| L1 Duration             |          | 17      |
| Fuel Consumed (lbs-wet) |          | 5.05    |
| Fuel Consumed (lbs-dry) |          | 4.12    |

|                         |          |       |
|-------------------------|----------|-------|
| L2 Loaded               | 11:29 AM | 18    |
| L2 End                  | 12:43 PM | 91    |
| L2 Duration             |          | 73    |
| Fuel Consumed (lbs-wet) |          | 12.46 |
| Fuel Consumed (lbs-dry) |          | 10.07 |

|                         |          |      |
|-------------------------|----------|------|
| L3 Loaded               | 12:44 PM | 92   |
| L3 End                  | 1:46 PM  | 155  |
| L3 Duration             |          | 63   |
| Fuel Consumed (lbs-wet) |          | 8.91 |
| Fuel Consumed (lbs-dry) |          | 7.13 |

|                         |         |       |
|-------------------------|---------|-------|
| L4 Loaded               | 1:47 PM | 156   |
| L4 End                  | 5:58 PM | 407   |
| L4 Duration             |         | 251   |
| Fuel Consumed (lbs-wet) |         | 23.23 |
| Fuel Consumed (lbs-dry) |         | 18.77 |

|                             |       |                |
|-----------------------------|-------|----------------|
| Total Fuel Burned (lbs-wet) | 49.65 |                |
| Total Fuel Burned (lbs-dry) | 40.09 | 18.19 (kg-dry) |
|                             |       | 2.68 kg/hr dry |

## Firebox Avg Temps (F)

|                         |     |
|-------------------------|-----|
| L1TS <sub>avg(i)</sub>  | 68  |
| L1TS <sub>avg(f)</sub>  | 414 |
| L2TS <sub>avg(i)</sub>  | 414 |
| L2TS <sub>avg(f)</sub>  | 529 |
| L3TS <sub>avg(i)</sub>  | 526 |
| L3TS <sub>avg(f)</sub>  | 538 |
| L4TS <sub>avg(i)</sub>  | 535 |
| L14TS <sub>avg(f)</sub> | 374 |

## Burn Time Rating (hrs)

|     |   |
|-----|---|
| BTR | 5 |
|-----|---|

## Burn Rate (lbs-wet/hr) (dry kg/hr)

|                  |       |      |
|------------------|-------|------|
| BR <sub>L2</sub> | 17.82 | 6.60 |
| BR <sub>L2</sub> | 10.24 | 3.75 |
| BR <sub>L3</sub> | 8.49  | 3.08 |
| BR <sub>L4</sub> | 5.55  | 2.04 |
| OVERALL          | 7.32  | 2.68 |

|                         |          |       |
|-------------------------|----------|-------|
| 1st hr Loaded           | 11:11 AM | 0     |
| 1st hr End              | 12:11 PM | 60    |
| L4 Duration             |          | 60    |
| Fuel Consumed (lbs-wet) |          | 13.92 |
| Fuel Consumed (lbs-dry) |          | 11.48 |

## PM Results

| Burn Phase:                    | L1     | L2     | L3     | L4     | 1st Hr | Total  |
|--------------------------------|--------|--------|--------|--------|--------|--------|
| E <sub>T</sub> :               | 2.6    | 0.6    | 0.6    | 1.6    | 3.0    | 5.4    |
| E <sub>g/hr</sub> :            | 9.1    | 0.5    | 0.6    | 0.38   | 3.02   | 0.79   |
| E <sub>g/kg</sub> :            | 1.38   | 0.13   | 0.19   | 0.19   | 0.58   | 0.30   |
| E <sub>g/MJ output</sub> :     | 0.10   | 0.01   | 0.01   | 0.01   |        | 0.02   |
| E <sub>lb/mmbtu output</sub> : | 0.22   | 0.02   | 0.03   | 0.03   | -      | 0.05   |
| CO (g):                        | 41.0   | 45.1   | 49.6   | 298.7  |        | 434.5  |
| CO (g/min):                    | 2.41   | 0.62   | 0.79   | 1.19   |        | 1.07   |
| Output (BTU/hr)                | 90,739 | 54,002 | 44,481 | 29,648 |        | 38,645 |
| Efficiency (%)                 | 72.5%  | 75.9%  | 76.1%  | 76.9%  |        | 76.1%  |

## Rolling Average Max Values

|           | 1-min Avg. | 5-min Avg. | 60-min Avg |
|-----------|------------|------------|------------|
| PM (g/hr) | 45.0       | 20.3       | 3.1        |

## Quality Checks

## Requirement

## Observer Pass/Fail

|                     |                                         |              |      |
|---------------------|-----------------------------------------|--------------|------|
| Filter/Dewpt. Temp  | Dewpoint must never exceed filter temp  | Max Δ -47.4  | PASS |
| Filter Temp         | Must be between 80 and 90F at all times | 81.4 / 86.9  | PASS |
| Ambient Temp        | Must be between 65 and 90F at all times | 65.2 / 72.9  | PASS |
| Minimum Tunnel Flow | >600 CFM                                | 799.3        | PASS |
| Weight Loss         | Must be >0.1 lb per 20 min              | Min -0.3 lb. | PASS |

# L1 Efficiency Results

**Manufacturer:** SBI  
**Model:** St-Louis  
**Date:** 12/11/24  
**Run:** 3  
**Control #:** 216  
**Test Duration:** 17  
**Output Category:** L1

## Test Results in Accordance with CSA B415.1-10

|                                 | HHV Basis | LHV Basis |
|---------------------------------|-----------|-----------|
| <b>Overall Efficiency</b>       | 72.5%     | 77.6%     |
| <b>Combustion Efficiency</b>    | 98.7%     | 98.7%     |
| <b>Heat Transfer Efficiency</b> | 73.5%     | 78.6%     |

|                           |         |         |                |
|---------------------------|---------|---------|----------------|
| <b>Output Rate (kJ/h)</b> | 95,655  | 90,739  | <b>(Btu/h)</b> |
| <b>Burn Rate (kg/h)</b>   | 6.60    | 14.55   | <b>(lb/h)</b>  |
| <b>Input (kJ/h)</b>       | 131,855 | 125,079 | <b>(Btu/h)</b> |

|                                  |       |      |               |
|----------------------------------|-------|------|---------------|
| <b>Test Load Weight (dry kg)</b> | 1.87  | 4.12 | <b>dry lb</b> |
| <b>MC wet (%)</b>                | 18.37 |      |               |
| <b>MC dry (%)</b>                | 22.50 |      |               |
| <b>Particulate (g )</b>          | N/A   |      |               |
| <b>CO (g)</b>                    | 41    |      |               |
| <b>Test Duration (h)</b>         | 0.28  |      |               |

| <b>Emissions</b>        | <b>Particulate</b> | <b>CO</b> |
|-------------------------|--------------------|-----------|
| <b>g/MJ Output</b>      | N/A                | 1.51      |
| <b>g/kg Dry Fuel</b>    | N/A                | 21.94     |
| <b>g/h</b>              | N/A                | 144.85    |
| <b>g/min</b>            | N/A                | 2.41      |
| <b>lb/MM Btu Output</b> | N/A                | 0.51      |

|                             |       |
|-----------------------------|-------|
| <b>Air/Fuel Ratio (A/F)</b> | 11.57 |
|-----------------------------|-------|

VERSION:

2.4

4/15/2010

## L2 Efficiency Results

**Manufacturer:** SBI  
**Model:** St-Louis  
**Date:** 12/11/24  
**Run:** 3  
**Control #:** 216  
**Test Duration:** 73  
**Output Category:** L2

### Test Results in Accordance with CSA B415.1-10

|                                 | HHV Basis | LHV Basis |
|---------------------------------|-----------|-----------|
| <b>Overall Efficiency</b>       | 75.9%     | 81.2%     |
| <b>Combustion Efficiency</b>    | 99.5%     | 99.5%     |
| <b>Heat Transfer Efficiency</b> | 76.3%     | 81.6%     |

|                           |        |        |                |
|---------------------------|--------|--------|----------------|
| <b>Output Rate (kJ/h)</b> | 56,927 | 54,002 | <b>(Btu/h)</b> |
| <b>Burn Rate (kg/h)</b>   | 3.75   | 8.27   | <b>(lb/h)</b>  |
| <b>Input (kJ/h)</b>       | 74,977 | 71,124 | <b>(Btu/h)</b> |

|                                  |       |       |               |
|----------------------------------|-------|-------|---------------|
| <b>Test Load Weight (dry kg)</b> | 4.57  | 10.07 | <b>dry lb</b> |
| <b>MC wet (%)</b>                | 19.21 |       |               |
| <b>MC dry (%)</b>                | 23.78 |       |               |
| <b>Particulate (g )</b>          | N/A   |       |               |
| <b>CO (g)</b>                    | 45    |       |               |
| <b>Test Duration (h)</b>         | 1.22  |       |               |

| <b>Emissions</b>        | <b>Particulate</b> | <b>CO</b> |
|-------------------------|--------------------|-----------|
| <b>g/MJ Output</b>      | N/A                | 0.65      |
| <b>g/kg Dry Fuel</b>    | N/A                | 9.88      |
| <b>g/h</b>              | N/A                | 37.08     |
| <b>g/min</b>            | N/A                | 0.62      |
| <b>lb/MM Btu Output</b> | N/A                | 0.51      |

|                             |       |
|-----------------------------|-------|
| <b>Air/Fuel Ratio (A/F)</b> | 10.93 |
|-----------------------------|-------|

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2.4

4/15/2010

## L3 Efficiency Results

**Manufacturer:** SBI  
**Model:** St-Louis  
**Date:** 12/11/24  
**Run:** 3  
**Control #:** 216  
**Test Duration:** 63  
**Output Category:** L3

### Test Results in Accordance with CSA B415.1-10

|                                 | HHV Basis | LHV Basis |
|---------------------------------|-----------|-----------|
| <b>Overall Efficiency</b>       | 76.1%     | 81.4%     |
| <b>Combustion Efficiency</b>    | 99.1%     | 99.1%     |
| <b>Heat Transfer Efficiency</b> | 76.8%     | 82.2%     |

|                           |        |        |                |
|---------------------------|--------|--------|----------------|
| <b>Output Rate (kJ/h)</b> | 46,891 | 44,481 | <b>(Btu/h)</b> |
| <b>Burn Rate (kg/h)</b>   | 3.08   | 6.79   | <b>(lb/h)</b>  |
| <b>Input (kJ/h)</b>       | 61,577 | 58,412 | <b>(Btu/h)</b> |

|                                  |       |      |               |
|----------------------------------|-------|------|---------------|
| <b>Test Load Weight (dry kg)</b> | 3.24  | 7.13 | <b>dry lb</b> |
| <b>MC wet (%)</b>                | 19.93 |      |               |
| <b>MC dry (%)</b>                | 24.89 |      |               |
| <b>Particulate (g )</b>          | N/A   |      |               |
| <b>CO (g)</b>                    | 50    |      |               |
| <b>Test Duration (h)</b>         | 1.05  |      |               |

| <b>Emissions</b>        | <b>Particulate</b> | <b>CO</b> |
|-------------------------|--------------------|-----------|
| <b>g/MJ Output</b>      | N/A                | 1.01      |
| <b>g/kg Dry Fuel</b>    | N/A                | 15.31     |
| <b>g/h</b>              | N/A                | 47.21     |
| <b>g/min</b>            | N/A                | 0.79      |
| <b>lb/MM Btu Output</b> | N/A                | 0.51      |

|                             |       |
|-----------------------------|-------|
| <b>Air/Fuel Ratio (A/F)</b> | 10.48 |
|-----------------------------|-------|

VERSION:

2.4

4/15/2010

## L4 Efficiency Results

**Manufacturer:** SBI  
**Model:** St-Louis  
**Date:** 12/11/24  
**Run:** 3  
**Control #:** 216  
**Test Duration:** 251  
**Output Category:** L4

### Test Results in Accordance with CSA B415.1-10

|                                 | HHV Basis | LHV Basis |
|---------------------------------|-----------|-----------|
| <b>Overall Efficiency</b>       | 76.9%     | 82.2%     |
| <b>Combustion Efficiency</b>    | 97.8%     | 97.8%     |
| <b>Heat Transfer Efficiency</b> | 78.6%     | 84.1%     |

|                           |        |        |                |
|---------------------------|--------|--------|----------------|
| <b>Output Rate (kJ/h)</b> | 31,254 | 29,648 | <b>(Btu/h)</b> |
| <b>Burn Rate (kg/h)</b>   | 2.04   | 4.49   | <b>(lb/h)</b>  |
| <b>Input (kJ/h)</b>       | 40,661 | 38,572 | <b>(Btu/h)</b> |

|                                  |       |       |               |
|----------------------------------|-------|-------|---------------|
| <b>Test Load Weight (dry kg)</b> | 8.52  | 18.77 | <b>dry lb</b> |
| <b>MC wet (%)</b>                | 19.20 |       |               |
| <b>MC dry (%)</b>                | 23.76 |       |               |
| <b>Particulate (g )</b>          | N/A   |       |               |
| <b>CO (g)</b>                    | 299   |       |               |
| <b>Test Duration (h)</b>         | 4.18  |       |               |

| <b>Emissions</b>        | <b>Particulate</b> | <b>CO</b> |
|-------------------------|--------------------|-----------|
| <b>g/MJ Output</b>      | N/A                | 2.28      |
| <b>g/kg Dry Fuel</b>    | N/A                | 35.08     |
| <b>g/h</b>              | N/A                | 71.41     |
| <b>g/min</b>            | N/A                | 1.19      |
| <b>lb/MM Btu Output</b> | N/A                | 0.51      |

|                             |       |
|-----------------------------|-------|
| <b>Air/Fuel Ratio (A/F)</b> | 11.07 |
|-----------------------------|-------|

VERSION:

2.4

4/15/2010

VERSION: 2.2 12/14/2009

Manufacturer: SBI  
 Model: Everest III  
 Date: 5/6/2024  
 Run: 1  
 Control #: 191  
 Test Duration: 60  
 Output Category: 1st Hr

Appliance Type: (Cat, Non-Cat, Pellet)

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

Default Fuel Values

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

Wood Moisture (% wet): 19.21  
 Load Weight (lb wet): 11.85  
 Burn Rate (dry kg/h): 4.34  
 Total Particulate Emissions: g

Fuel Data

Maple  
 HHV 19,973 kJ/kg  
 %C 50.64  
 %H 6.02  
 %O 41.74  
 %ASH 0.5

Note 1: For other fuels, use the heating value and fuel composition determined by analysis of fuel sample in accordance with Clause 9.2.

Averages 0.09 11.17 #DIV/0! 433.51 68.24  
 Temp. (°F)

Note 2: In cases where the "Fuel Weight Remaining" is the same for three or more readings in a row, a "divide by zero error" will occur in the calculation sheet. In such cases, adjust the weight values by interpolation between the first occurrence and the next reading showing a decrease in weight.

| Elapsed Time (min) | Fuel Weight Remaining (lb) | Flue Gas Composition (%) CO | CO <sub>2</sub> | O <sub>2</sub> | Flue Gas Temp. (°F) | Room Temp |
|--------------------|----------------------------|-----------------------------|-----------------|----------------|---------------------|-----------|
| 0                  | 11.85                      | 0.15                        | 9.76            |                | 494.3               | 66.3      |
| 1                  | 11.86                      | 0.16                        | 10.40           |                | 495.6               | 66.3      |
| 2                  | 11.50                      | 0.14                        | 10.65           |                | 493.3               | 66.4      |
| 3                  | 11.31                      | 0.11                        | 10.51           |                | 489.5               | 66.5      |
| 4                  | 11.11                      | 0.11                        | 10.57           |                | 488.2               | 66.7      |
| 5                  | 10.88                      | 0.10                        | 10.78           |                | 488.5               | 66.8      |
| 6                  | 10.61                      | 0.09                        | 11.03           |                | 488.8               | 66.9      |
| 7                  | 10.16                      | 0.09                        | 11.09           |                | 487.5               | 66.9      |
| 8                  | 9.92                       | 0.07                        | 11.01           |                | 487.8               | 67.0      |
| 9                  | 9.70                       | 0.07                        | 11.01           |                | 489.5               | 67.1      |
| 10                 | 9.50                       | 0.06                        | 11.02           |                | 491.9               | 67.2      |
| 11                 | 9.27                       | 0.06                        | 11.07           |                | 494.2               | 67.2      |
| 12                 | 9.09                       | 0.06                        | 11.15           |                | 496.6               | 67.3      |
| 13                 | 8.88                       | 0.06                        | 11.28           |                | 498.8               | 67.4      |
| 14                 | 8.66                       | 0.06                        | 11.43           |                | 500.8               | 67.4      |
| 15                 | 8.40                       | 0.05                        | 11.53           |                | 502.2               | 67.5      |
| 16                 | 8.15                       | 0.05                        | 11.54           |                | 503.3               | 67.6      |
| 17                 | 7.91                       | 0.05                        | 11.58           |                | 504.0               | 67.8      |
| 18                 | 7.68                       | 0.05                        | 11.71           |                | 499.4               | 67.9      |

# Run 1 TEOM Data

| ET (min) | Ci - 1-min avg PM (ug/m <sup>3</sup> ) | Tunnel dP (in WC) | sqrt dP | Tunnel Temp (F) | Tunnel Temp - 10 minute Avg. (F) | Tunnel RH - 10 minute avg. (%) | Tunnel Velocity - Vsi (ft/s) | Tunnel Flow - Q <sub>std</sub> (m <sup>3</sup> /min) | E <sub>i</sub> (mg) | E <sub>g/hr, i</sub> (g/hr) | PM 5-min Rolling Avg (g/hr) | PM 60-min Rolling Avg (g/hr) | PM (cumulative g) |
|----------|----------------------------------------|-------------------|---------|-----------------|----------------------------------|--------------------------------|------------------------------|------------------------------------------------------|---------------------|-----------------------------|-----------------------------|------------------------------|-------------------|
| 0        | 2663                                   | 0.074             | 0.2720  | 69.8            | -                                | -                              | 17.948                       | 23.904                                               | 63.647              | 3.82                        | -                           | -                            | 0.06              |
| 1        | 31379                                  | 0.075             | 0.2739  | 76.7            | -                                | -                              | 18.187                       | 23.910                                               | 750.268             | 45.02                       | -                           | -                            | 0.81              |
| 2        | 9692                                   | 0.074             | 0.2720  | 87.6            | -                                | -                              | 18.248                       | 23.512                                               | 227.881             | 13.67                       | -                           | -                            | 1.04              |
| 3        | 7338                                   | 0.073             | 0.2702  | 82.2            | -                                | -                              | 18.034                       | 23.469                                               | 172.219             | 10.33                       | -                           | -                            | 1.21              |
| 4        | 12018                                  | 0.073             | 0.2702  | 81.4            | -                                | -                              | 18.021                       | 23.486                                               | 282.264             | 16.94                       | 17.96                       | -                            | 1.50              |
| 5        | 10950                                  | 0.072             | 0.2683  | 82.3            | -                                | -                              | 17.912                       | 23.305                                               | 255.190             | 15.31                       | 20.25                       | -                            | 1.75              |
| 6        | 5841                                   | 0.073             | 0.2702  | 83.5            | -                                | -                              | 18.056                       | 23.441                                               | 136.923             | 8.22                        | 12.89                       | -                            | 1.89              |
| 7        | 4501                                   | 0.073             | 0.2702  | 85.1            | -                                | -                              | 18.082                       | 23.406                                               | 105.351             | 6.32                        | 11.42                       | -                            | 1.99              |
| 8        | 2215                                   | 0.074             | 0.2720  | 86.2            | -                                | -                              | 18.224                       | 23.542                                               | 52.152              | 3.13                        | 9.98                        | -                            | 2.05              |
| 9        | 1301                                   | 0.074             | 0.2720  | 86.8            | 82.16                            | 126.68                         | 18.234                       | 23.529                                               | 30.623              | 1.84                        | 6.96                        | -                            | 2.08              |
| 10       | 785                                    | 0.072             | 0.2683  | 87.1            | 83.89                            | 142.77                         | 17.991                       | 23.203                                               | 18.210              | 1.09                        | 4.12                        | -                            | 2.09              |
| 11       | 1775                                   | 0.074             | 0.2720  | 87.5            | 84.97                            | 160.1                          | 18.246                       | 23.514                                               | 41.745              | 2.50                        | 2.98                        | -                            | 2.14              |
| 12       | 706                                    | 0.074             | 0.2720  | 88.1            | 85.02                            | 178.37                         | 18.256                       | 23.501                                               | 16.602              | 1.00                        | 1.91                        | -                            | 2.15              |
| 13       | 233                                    | 0.073             | 0.2702  | 87.7            | 85.57                            | 197.07                         | 18.125                       | 23.351                                               | 5.448               | 0.33                        | 1.35                        | -                            | 2.16              |
| 14       | 434                                    | 0.075             | 0.2739  | 87.4            | 86.17                            | 215.41                         | 18.367                       | 23.675                                               | 10.274              | 0.62                        | 1.11                        | -                            | 2.17              |
| 15       | 948                                    | 0.074             | 0.2720  | 87.7            | 86.71                            | 232.87                         | 18.249                       | 23.510                                               | 22.280              | 1.34                        | 1.16                        | -                            | 2.19              |
| 16       | 1194                                   | 0.075             | 0.2739  | 88.3            | 87.19                            | 249.3                          | 18.382                       | 23.655                                               | 28.255              | 1.70                        | 0.99                        | -                            | 2.22              |
| 17       | 15510                                  | 0.075             | 0.2739  | 88.9            | 87.57                            | 264.77                         | 18.392                       | 23.642                                               | 366.694             | 22.00                       | 5.20                        | -                            | 2.59              |
| 18       | 8760                                   | 0.073             | 0.2702  | 117.4           | 90.69                            | 279.07                         | 18.610                       | 22.741                                               | 199.208             | 11.95                       | 7.52                        | -                            | 2.79              |
| 19       | 3411                                   | 0.071             | 0.2665  | 105.4           | 92.55                            | 292.51                         | 18.162                       | 22.665                                               | 77.320              | 4.64                        | 8.33                        | -                            | 2.86              |
| 20       | 820                                    | 0.072             | 0.2683  | 98.2            | 93.66                            | 305.37                         | 18.173                       | 22.971                                               | 18.836              | 1.13                        | 8.28                        | -                            | 2.88              |
| 21       | 718                                    | 0.072             | 0.2683  | 94.3            | 94.34                            | 317.61                         | 18.109                       | 23.052                                               | 16.549              | 0.99                        | 8.14                        | -                            | 2.90              |
| 22       | 403                                    | 0.072             | 0.2683  | 92.3            | 94.76                            | 329.08                         | 18.076                       | 23.093                                               | 9.314               | 0.56                        | 3.85                        | -                            | 2.91              |
| 23       | 394                                    | 0.073             | 0.2702  | 91.4            | 95.13                            | 339.78                         | 18.187                       | 23.272                                               | 9.162               | 0.55                        | 1.57                        | -                            | 2.92              |
| 24       | 898                                    | 0.073             | 0.2702  | 91.5            | 95.54                            | 349.89                         | 18.188                       | 23.270                                               | 20.885              | 1.25                        | 0.90                        | -                            | 2.94              |
| 25       | 191                                    | 0.072             | 0.2683  | 88.9            | 95.66                            | 359.27                         | 18.021                       | 23.165                                               | 4.423               | 0.27                        | 0.72                        | -                            | 2.94              |
| 26       | 125                                    | 0.074             | 0.2720  | 87.2            | 95.55                            | 367.87                         | 18.241                       | 23.521                                               | 2.934               | 0.18                        | 0.56                        | -                            | 2.94              |
| 27       | 374                                    | 0.074             | 0.2720  | 86.2            | 95.28                            | 375.58                         | 18.224                       | 23.542                                               | 8.809               | 0.53                        | 0.55                        | -                            | 2.95              |
| 28       | 180                                    | 0.074             | 0.2720  | 85.9            | 92.13                            | 382.92                         | 18.219                       | 23.549                                               | 4.229               | 0.25                        | 0.50                        | -                            | 2.96              |
| 29       | 72                                     | 0.072             | 0.2683  | 85.9            | 90.18                            | 389.73                         | 17.971                       | 23.228                                               | 1.673               | 0.10                        | 0.26                        | -                            | 2.96              |
| 30       | 236                                    | 0.073             | 0.2702  | 86              | 88.96                            | 395.87                         | 18.097                       | 23.387                                               | 5.519               | 0.33                        | 0.28                        | -                            | 2.96              |
| 31       | 331                                    | 0.071             | 0.2665  | 86              | 88.13                            | 401.52                         | 17.848                       | 23.064                                               | 7.623               | 0.46                        | 0.33                        | -                            | 2.97              |
| 32       | 235                                    | 0.073             | 0.5064  | 86.3            | 87.53                            | 406.83                         | 33.929                       | 43.822                                               | 10.295              | 0.62                        | 0.35                        | -                            | 2.98              |
| 33       | 78                                     | 0.074             | 0.2720  | 86.5            | 87.04                            | 411.9                          | 18.229                       | 23.536                                               | 1.842               | 0.11                        | 0.32                        | -                            | 2.98              |
| 34       | 60                                     | 0.074             | 0.2720  | 86.7            | 86.56                            | 416.77                         | 18.233                       | 23.532                                               | 1.422               | 0.09                        | 0.32                        | -                            | 2.99              |
| 35       | -20                                    | 0.074             | 0.2720  | 86.8            | 86.35                            | 421.56                         | 18.234                       | 23.529                                               | -0.463              | -0.03                       | 0.25                        | -                            | 2.99              |
| 36       | 74                                     | 0.072             | 0.2683  | 87.1            | 86.34                            | 426.38                         | 17.991                       | 23.203                                               | 1.712               | 0.10                        | 0.18                        | -                            | 2.99              |
| 37       | 163                                    | 0.073             | 0.2702  | 87.1            | 86.43                            | 431.04                         | 18.116                       | 23.363                                               | 3.800               | 0.23                        | 0.10                        | -                            | 2.99              |
| 38       | 125                                    | 0.072             | 0.2683  | 87.2            | 86.56                            | 435.39                         | 17.993                       | 23.201                                               | 2.901               | 0.17                        | 0.11                        | -                            | 2.99              |
| 39       | 248                                    | 0.075             | 0.2739  | 87.1            | 86.68                            | 439.63                         | 18.362                       | 23.681                                               | 5.869               | 0.35                        | 0.17                        | -                            | 3.00              |
| 40       | 287                                    | 0.075             | 0.2739  | 87.2            | 86.8                             | 443.73                         | 18.364                       | 23.679                                               | 6.801               | 0.41                        | 0.25                        | -                            | 3.01              |
| 41       | 322                                    | 0.074             | 0.2720  | 87.2            | 86.92                            | 447.72                         | 18.241                       | 23.521                                               | 7.577               | 0.45                        | 0.32                        | -                            | 3.01              |
| 42       | 257                                    | 0.074             | 0.2720  | 87.5            | 87.04                            | 451.67                         | 18.246                       | 23.514                                               | 6.034               | 0.36                        | 0.35                        | -                            | 3.02              |
| 43       | 153                                    | 0.073             | 0.2702  | 87.7            | 87.16                            | 455.49                         | 18.125                       | 23.351                                               | 3.582               | 0.21                        | 0.36                        | -                            | 3.02              |
| 44       | -144                                   | 0.073             | 0.2702  | 87.5            | 87.24                            | 459.18                         | 18.122                       | 23.355                                               | -3.366              | -0.20                       | 0.25                        | -                            | 3.02              |
| 45       | -78                                    | 0.074             | 0.2720  | 85.6            | 87.12                            | 462.73                         | 18.214                       | 23.555                                               | -1.829              | -0.11                       | 0.14                        | -                            | 3.02              |
| 46       | -207                                   | 0.074             | 0.2720  | 84.2            | 86.83                            | 465.99                         | 18.191                       | 23.586                                               | -4.886              | -0.29                       | -0.01                       | -                            | 3.01              |
| 47       | 37                                     | 0.074             | 0.2720  | 83.7            | 86.49                            | 469.56                         | 18.182                       | 23.596                                               | 0.877               | 0.05                        | -0.07                       | -                            | 3.01              |
| 48       | -64                                    | 0.074             | 0.2720  | 83.5            | 86.12                            | 473.16                         | 18.179                       | 23.601                                               | -1.501              | -0.09                       | -0.13                       | -                            | 3.01              |
| 49       | 31                                     | 0.073             | 0.2702  | 83.3            | 85.74                            | 476.6                          | 18.053                       | 23.445                                               | 0.717               | 0.04                        | -0.08                       | -                            | 3.01              |
| 50       | -40                                    | 0.074             | 0.2720  | 83.1            | 85.33                            | 479.77                         | 18.172                       | 23.610                                               | -0.950              | -0.06                       | -0.07                       | -                            | 3.01              |
| 51       | -6                                     | 0.073             | 0.2702  | 83              | 84.91                            | 482.6                          | 18.048                       | 23.452                                               | -0.138              | -0.01                       | -0.01                       | -                            | 3.01              |
| 52       | 45                                     | 0.076             | 0.2757  | 82.7            | 84.43                            | 485.05                         | 18.410                       | 23.935                                               | 1.075               | 0.06                        | -0.01                       | -                            | 3.01              |
| 53       | 45                                     | 0.076             | 0.2757  | 82.6            | 83.92                            | 487.06                         | 18.408                       | 23.937                                               | 1.089               | 0.07                        | 0.02                        | -                            | 3.01              |
| 54       | -12                                    | 0.073             | 0.2702  | 82.5            | 83.42                            | 488.54                         | 18.039                       | 23.462                                               | -0.270              | -0.02                       | 0.01                        | -                            | 3.01              |
| 55       | -25                                    | 0.076             | 0.2757  | 82.5            | 83.11                            | 489.67                         | 18.406                       | 23.940                                               | -0.595              | -0.04                       | 0.01                        | -                            | 3.01              |
| 56       | 34                                     | 0.076             | 0.2757  | 82.4            | 82.93                            | 490.54                         | 18.404                       | 23.942                                               | 0.802               | 0.05                        | 0.03                        | -                            | 3.01              |
| 57       | 45                                     | 0.076             | 0.2757  | 82.4            | 82.8                             | 490.74                         | 18.404                       | 23.942                                               | 1.082               | 0.06                        | 0.03                        | -                            | 3.02              |
| 58       | 87                                     | 0.075             | 0.2739  | 82.3            | 82.68                            | 490.62                         | 18.281                       | 23.786                                               | 2.070               | 0.12                        | 0.04                        | -                            | 3.02              |
| 59       | 62                                     | 0.076             | 0.2757  | 82.3            | 82.58                            | 490.26                         | 18.403                       | 23.944                                               | 1.474               | 0.09                        | 0.06                        | 3.12                         | 3.02              |
| 60       | 22                                     | 0.075             | 0.2739  | 82.3            | 82.5                             | 489.84                         | 18.281                       | 23.786                                               | 0.514               | 0.03                        | 0.07                        | 3.06                         | 3.02              |
| 61       | 95                                     | 0.076             | 0.2757  | 82.2            | 82.42                            | 489.34                         | 18.401                       | 23.946                                               | 2.269               | 0.14                        | 0.09                        | 2.28                         | 3.02              |
| 62       | 108                                    | 0.074             | 0.2720  | 82.3            | 82.38                            | 488.81                         | 18.159                       | 23.627                                               | 2.563               | 0.15                        | 0.11                        | 2.05                         | 3.02              |
| 63       | 126                                    | 0.074             | 0.2720  | 82.2            | 82.34                            | 488.36                         | 18.157                       | 23.629                                               | 2.977               | 0.18                        | 0.12                        | 1.87                         | 3.03              |
| 64       | 51                                     | 0.075             | 0.2739  | 82              | 82.29                            | 488.07                         | 18.276                       | 23.793                                               | 1.203               | 0.07                        | 0.11                        | 1.58                         | 3.03              |
| 65       | 13                                     | 0.075             | 0.2739  | 82.1            | 82.25                            | 487.82                         | 18.278                       | 23.790                                               | 0.300               | 0.02                        | 0.11                        | 1.32                         | 3.03              |
| 66       | 19                                     | 0.074             | 0.2720  | 82.1            | 82.22                            | 487.6                          | 18.156                       | 23.631                                               | 0.448               | 0.03                        | 0.09                        | 1.18                         | 3.03              |
| 67       | 60                                     | 0.073             | 0.2702  | 83.6            | 82.34                            | 488.04                         | 18.057                       | 23.439                                               | 1.402               | 0.08                        | 0.08                        | 1.07                         | 3.03              |
| 68       | 5                                      | 0.076             | 0.2757  | 85.7            | 82.68                            | 488.99                         | 18.460                       | 23.869                                               | 0.126               | 0.01                        | 0.04                        | 1.02                         | 3.03              |
| 69       | -14                                    | 0.075             | 0.2739  | 86.5            | 83.1                             | 490.42                         | 18.352                       | 23.694                                               | -0.338              | -0.02                       | 0.02                        | 0.99                         | 3.03              |
| 70       | -24                                    | 0.077             | 0.2775  | 87              | 83.57                            | 492.19                         | 18.604                       | 23.997                                               | -0.579              | -0.03                       | 0.01                        | 0.97                         | 3.03              |
| 71       | 81                                     | 0.074             | 0.2720  | 87.3            | 84.08                            | 494.38                         | 18.243                       | 23.519                                               | 1.917               | 0.11                        | 0.03                        | 0.93                         | 3.03              |
| 72       | 43                                     | 0.075             | 0.2739  | 87.6            | 84.61                            | 496.84                         | 18.370                       | 23.671                                               | 1.011               | 0.06                        | 0.03                        | 0.91                         | 3.03              |
| 73       | 6                                      | 0.075             | 0.2739  | 87.8            | 85.17                            | 499.5                          | 18.374                       | 23.666                                               | 0.141               | 0.01                        | 0.03                        | 0.90                         | 3.03              |
| 74       | 7                                      | 0.076             | 0.2757  | 87.4            | 85.71                            | 502.08                         | 18.489                       | 23.832                                               | 0.159               | 0.01                        | 0.03                        | 0.89                         | 3.03              |
| 75       | 125                                    | 0.074             | 0.2720  | 84.6            | 85.96                            | 504.22                         | 18.197                       | 23.577                                               | 2.935               | 0.18                        | 0.07                        | 0.87                         | 3.04              |
| 76       | 85                                     | 0.075             | 0.2739  | 83.6            | 86.11                            | 506.18                         | 18.303                       | 23.758                                               | 2.021               | 0.12                        | 0.08                        | 0.84                         | 3.04              |
| 77       | 159                                    | 0.073             | 0.2702  | 83.3            | 86.08                            | 507.35                         | 18.053                       | 23.445                                               | 3.736               | 0.22                        | 0.11                        | 0.47                         | 3.04              |
| 78       | 186                                    | 0.075             | 0.2739  | 83.1            | 85.82                            | 508                            | 18.295                       | 23.769                                               | 4.414               | 0.26                        | 0.16                        | 0.26                         | 3.05              |
| 79       | 206                                    | 0.075             | 0.2739  | 83.3            | 85.5                             | 508.17                         | 18.298                       | 23.764                                               | 4.901               | 0.29                        | 0.22                        | 0.19                         | 3.05              |
| 80       | 378                                    | 0.074             | 0.2720  | 83.6            | 85.16                            | 507.97                         | 18.181                       | 23.599                                               | 8.917               | 0.53                        | 0.29                        | 0.17                         | 3.06              |
| 81       | 447                                    | 0.075             | 0.2739  | 83.9            | 84.82                            | 507.39                         | 18.308                       | 23.751                                               | 10.612              | 0.64                        | 0.39                        | 0.16                         | 3.07              |
| 82       | 398                                    | 0.073             | 0.2702  | 84              | 84.46                            | 506.56                         | 18.064                       | 23.430                                               | 9.329               | 0.56                        | 0.46                        | 0.16                         | 3.08              |
| 83       | 404                                    | 0.076             | 0.2757  | 84.2            | 84.1                             | 505.52                         | 18.435                       | 23.902                                               | 9.649               | 0.58                        | 0.52                        | 0.16                         | 3.09              |
| 84       |                                        | 0.075             | 0.2739  | 84.3            | 83.79                            | 504.54                         |                              |                                                      |                     |                             | 0.58                        | 0.15                         |                   |



# Run 1 TEOM Data

|     |       |       |        |       |       |        |        |        |         |       |       |      |      |
|-----|-------|-------|--------|-------|-------|--------|--------|--------|---------|-------|-------|------|------|
| 85  |       | 0.074 | 0.2720 | 84.4  | 83.77 | 503.97 |        |        |         |       | 0.59  | 0.15 |      |
| 86  |       | 0.075 | 0.2739 | 86.5  | 84.06 | 504.43 |        |        |         |       | 0.57  | 0.15 |      |
| 87  |       | 0.074 | 0.2720 | 88.3  | 84.56 | 505.68 |        |        |         |       | 0.58  | 0.15 |      |
| 88  |       | 0.074 | 0.2720 | 88.9  | 85.14 | 507.38 |        |        |         |       |       | 0.14 |      |
| 89  | -395  | 0.074 | 0.2720 | 89.2  | 85.73 | 509.51 | 18.274 | 23.478 | -9.281  | -0.56 | -0.56 | 0.15 | 3.08 |
| 90  | -198  | 0.074 | 0.2720 | 89.6  | 86.33 | 511.9  | 18.281 | 23.469 | -4.644  | -0.28 | -0.42 | 0.14 | 3.08 |
| 91  | 3785  | 0.075 | 0.2739 | 89.9  | 86.93 | 514.48 | 18.409 | 23.621 | 89.412  | 5.36  | 1.51  | 0.12 | 3.17 |
| 92  | 2614  | 0.072 | 0.2683 | 113.9 | 89.92 | 516.71 | 18.426 | 22.654 | 59.225  | 3.55  | 2.02  | 0.11 | 3.22 |
| 93  | 4661  | 0.072 | 0.2683 | 105.1 | 92.01 | 519.25 | 18.285 | 22.830 | 106.402 | 6.38  | 2.89  | 0.20 | 3.33 |
| 94  | 6341  | 0.071 | 0.2665 | 99.2  | 93.5  | 521.63 | 18.062 | 22.790 | 144.503 | 8.67  | 4.74  | 0.27 | 3.48 |
| 95  | 829   | 0.073 | 0.2702 | 94    | 94.46 | 523.91 | 18.229 | 23.217 | 19.244  | 1.15  | 5.03  | 0.39 | 3.50 |
| 96  | 1035  | 0.073 | 0.2702 | 90.5  | 94.86 | 525.43 | 18.172 | 23.291 | 24.118  | 1.45  | 4.24  | 0.55 | 3.52 |
| 97  | 720   | 0.074 | 0.2720 | 89.4  | 94.97 | 526.78 | 18.277 | 23.474 | 16.907  | 1.01  | 3.73  | 0.57 | 3.54 |
| 98  | 574   | 0.073 | 0.2702 | 88.7  | 94.95 | 528.02 | 18.142 | 23.329 | 13.396  | 0.80  | 2.62  | 0.59 | 3.55 |
| 99  | 375   | 0.072 | 0.2683 | 88.3  | 94.86 | 529.13 | 18.011 | 23.177 | 8.683   | 0.52  | 0.99  | 0.61 | 3.56 |
| 100 | 416   | 0.073 | 0.2702 | 87.9  | 94.69 | 530.23 | 18.129 | 23.346 | 9.706   | 0.58  | 0.87  | 0.61 | 3.57 |
| 101 | 469   | 0.074 | 0.2720 | 87.8  | 94.48 | 531.31 | 18.251 | 23.508 | 11.015  | 0.66  | 0.72  | 0.62 | 3.58 |
| 102 | 551   | 0.074 | 0.2720 | 87.7  | 91.86 | 532.94 | 18.249 | 23.510 | 12.959  | 0.78  | 0.67  | 0.62 | 3.59 |
| 103 | 568   | 0.074 | 0.2720 | 87.6  | 90.11 | 534.4  | 18.248 | 23.512 | 13.364  | 0.80  | 0.67  | 0.63 | 3.61 |
| 104 | 537   | 0.072 | 0.2683 | 87.5  | 88.94 | 536.14 | 17.998 | 23.194 | 12.466  | 0.75  | 0.71  | 0.65 | 3.62 |
| 105 | 797   | 0.076 | 0.2757 | 87.4  | 88.28 | 538.11 | 18.489 | 23.832 | 19.000  | 1.14  | 0.83  | 0.66 | 3.64 |
| 106 | 508   | 0.075 | 0.2739 | 87.3  | 87.96 | 540.16 | 18.365 | 23.677 | 12.032  | 0.72  | 0.84  | 0.68 | 3.65 |
| 107 | 483   | 0.074 | 0.2720 | 87.3  | 87.75 | 541.98 | 18.243 | 23.519 | 11.357  | 0.68  | 0.82  | 0.70 | 3.66 |
| 108 | 618   | 0.073 | 0.2702 | 87.3  | 87.61 | 543.72 | 18.119 | 23.359 | 14.433  | 0.87  | 0.83  | 0.72 | 3.67 |
| 109 | 537   | 0.074 | 0.2720 | 87.2  | 87.5  | 545.41 | 18.241 | 23.521 | 12.631  | 0.76  | 0.83  | 0.73 | 3.69 |
| 110 | 299   | 0.073 | 0.2702 | 87.2  | 87.43 | 547.04 | 18.117 | 23.361 | 6.987   | 0.42  | 0.69  | 0.75 | 3.69 |
| 111 | 194   | 0.072 | 0.2683 | 87.2  | 87.37 | 548.61 | 17.993 | 23.201 | 4.491   | 0.27  | 0.60  | 0.76 | 3.70 |
| 112 | 235   | 0.073 | 0.2702 | 87.1  | 87.31 | 550.08 | 18.116 | 23.363 | 5.500   | 0.33  | 0.53  | 0.77 | 3.70 |
| 113 | 167   | 0.073 | 0.2702 | 87    | 87.25 | 551.43 | 18.114 | 23.366 | 3.910   | 0.23  | 0.40  | 0.77 | 3.71 |
| 114 | 210   | 0.075 | 0.2739 | 86.9  | 87.19 | 552.61 | 18.359 | 23.686 | 4.970   | 0.30  | 0.31  | 0.78 | 3.71 |
| 115 | 224   | 0.072 | 0.2683 | 86.9  | 87.14 | 553.63 | 17.988 | 23.207 | 5.200   | 0.31  | 0.29  | 0.79 | 3.72 |
| 116 | 120   | 0.074 | 0.2720 | 86.6  | 87.07 | 554.45 | 18.231 | 23.534 | 2.814   | 0.17  | 0.27  | 0.79 | 3.72 |
| 117 | 233   | 0.072 | 0.2683 | 86.6  | 87    | 555.01 | 17.983 | 23.214 | 5.419   | 0.33  | 0.27  | 0.79 | 3.73 |
| 118 | 88    | 0.071 | 0.2665 | 86.6  | 86.93 | 555.26 | 17.857 | 23.052 | 2.034   | 0.12  | 0.25  | 0.80 | 3.73 |
| 119 | 138   | 0.075 | 0.2739 | 86.5  | 86.86 | 555.33 | 18.352 | 23.694 | 3.265   | 0.20  | 0.22  | 0.80 | 3.73 |
| 120 | 15    | 0.073 | 0.2702 | 86.4  | 86.78 | 555.14 | 18.104 | 23.378 | 0.349   | 0.02  | 0.17  | 0.80 | 3.73 |
| 121 | 83    | 0.075 | 0.2739 | 86.4  | 86.7  | 554.79 | 18.350 | 23.697 | 1.964   | 0.12  | 0.16  | 0.80 | 3.73 |
| 122 | 70    | 0.073 | 0.2702 | 86.2  | 86.61 | 554.2  | 18.101 | 23.383 | 1.644   | 0.10  | 0.11  | 0.80 | 3.74 |
| 123 | 11    | 0.073 | 0.2702 | 86    | 86.51 | 553.4  | 18.097 | 23.387 | 0.263   | 0.02  | 0.09  | 0.80 | 3.74 |
| 124 | 36    | 0.073 | 0.2702 | 87.5  | 86.57 | 553.18 | 18.122 | 23.355 | 0.844   | 0.05  | 0.06  | 0.80 | 3.74 |
| 125 | -20   | 0.074 | 0.2720 | 90    | 86.88 | 553.46 | 18.287 | 23.461 | -0.469  | -0.03 | 0.05  | 0.80 | 3.74 |
| 126 | -17   | 0.074 | 0.2720 | 91    | 87.32 | 553.99 | 18.304 | 23.439 | -0.393  | -0.02 | 0.02  | 0.80 | 3.74 |
| 127 | -88   | 0.077 | 0.2775 | 91.8  | 87.84 | 554.77 | 18.685 | 23.893 | -2.091  | -0.13 | -0.02 | 0.80 | 3.73 |
| 128 | 65    | 0.078 | 0.2793 | 92.3  | 88.41 | 555.77 | 18.814 | 24.036 | 1.562   | 0.09  | -0.01 | 0.80 | 3.74 |
| 129 | -8    | 0.076 | 0.2757 | 92.3  | 88.99 | 556.85 | 18.572 | 23.726 | -0.180  | -0.01 | -0.02 | 0.80 | 3.74 |
| 130 | -42   | 0.074 | 0.2720 | 92    | 89.55 | 558.09 | 18.321 | 23.418 | -0.987  | -0.06 | -0.03 | 0.80 | 3.73 |
| 131 | 90    | 0.076 | 0.2757 | 92.3  | 90.14 | 559.44 | 18.572 | 23.726 | 2.124   | 0.13  | 0.01  | 0.80 | 3.74 |
| 132 | 1     | 0.073 | 0.2702 | 92.2  | 90.74 | 560.92 | 18.200 | 23.255 | 0.026   | 0.00  | 0.03  | 0.79 | 3.74 |
| 133 | 117   | 0.074 | 0.2720 | 92.4  | 91.38 | 562.65 | 18.327 | 23.410 | 2.729   | 0.16  | 0.04  | 0.80 | 3.74 |
| 134 | 10    | 0.073 | 0.2702 | 92.2  | 91.85 | 563.83 | 18.200 | 23.255 | 0.223   | 0.01  | 0.05  | 0.80 | 3.74 |
| 135 | -47   | 0.077 | 0.2775 | 92.3  | 92.08 | 564.52 | 18.693 | 23.882 | -1.112  | -0.07 | 0.05  | 0.80 | 3.74 |
| 136 | 15    | 0.074 | 0.2720 | 92.1  | 92.19 | 564.98 | 18.322 | 23.416 | 0.349   | 0.02  | 0.03  | 0.79 | 3.74 |
| 137 | 43    | 0.076 | 0.2757 | 92.1  | 92.22 | 564.48 | 18.568 | 23.730 | 1.014   | 0.06  | 0.04  | 0.79 | 3.74 |
| 138 | 60    | 0.076 | 0.2757 | 92.3  | 92.22 | 563.8  | 18.572 | 23.726 | 1.426   | 0.09  | 0.02  | 0.78 | 3.74 |
| 139 | -5    | 0.074 | 0.2720 | 92.3  | 92.22 | 563.25 | 18.326 | 23.412 | -0.117  | -0.01 | 0.02  | 0.78 | 3.74 |
| 140 | 43    | 0.076 | 0.2757 | 92.3  | 92.25 | 563.22 | 18.572 | 23.726 | 1.015   | 0.06  | 0.04  | 0.77 | 3.74 |
| 141 | 18    | 0.073 | 0.2702 | 92.3  | 92.25 | 563.09 | 18.201 | 23.253 | 0.409   | 0.02  | 0.04  | 0.76 | 3.74 |
| 142 | 56    | 0.075 | 0.2739 | 92.3  | 92.26 | 562.84 | 18.449 | 23.569 | 1.311   | 0.08  | 0.05  | 0.75 | 3.74 |
| 143 | 141   | 0.073 | 0.2702 | 92.4  | 92.26 | 562.17 | 18.203 | 23.251 | 3.288   | 0.20  | 0.07  | 0.74 | 3.75 |
| 144 | 122   | 0.074 | 0.2720 | 92.5  | 92.29 | 561.15 | 18.329 | 23.408 | 2.852   | 0.17  | 0.11  | 0.73 | 3.75 |
| 145 |       | 0.073 | 0.2702 | 92.3  | 92.29 | 559.63 |        |        |         |       | 0.12  | 0.72 |      |
| 146 |       | 0.074 | 0.2720 | 92.2  | 92.3  | 557.47 |        |        |         |       | 0.15  | 0.71 |      |
| 147 |       | 0.076 | 0.2757 | 92.2  | 92.31 | 555.93 |        |        |         |       | 0.18  | 0.71 |      |
| 148 |       | 0.074 | 0.2720 | 92.2  | 92.3  | 554.44 |        |        |         |       | 0.17  | 0.71 |      |
| 149 | 17    | 0.075 | 0.2739 | 92.2  | 92.29 | 552.71 | 18.447 | 23.572 | 0.392   | 0.02  | 0.02  | 0.73 | 3.75 |
| 150 | -21   | 0.075 | 0.2739 | 92.2  | 92.28 | 550.42 | 18.447 | 23.572 | -0.495  | -0.03 | 0.00  | 0.75 | 3.75 |
| 151 | 93    | 0.074 | 0.2720 | 92    | 92.25 | 548.1  | 18.321 | 23.418 | 2.187   | 0.13  | 0.04  | 0.65 | 3.75 |
| 152 | -45   | 0.074 | 0.2720 | 92    | 92.22 | 545.82 | 18.321 | 23.418 | -1.052  | -0.06 | 0.02  | 0.58 | 3.75 |
| 153 | 15    | 0.075 | 0.2739 | 91.7  | 92.15 | 543.82 | 18.439 | 23.582 | 0.348   | 0.02  | 0.02  | 0.47 | 3.75 |
| 154 | 73    | 0.074 | 0.2720 | 91.7  | 92.07 | 542.12 | 18.316 | 23.425 | 1.708   | 0.10  | 0.03  | 0.31 | 3.75 |
| 155 | 1660  | 0.076 | 0.2757 | 91.7  | 92.01 | 540.85 | 18.562 | 23.739 | 39.407  | 2.36  | 0.51  | 0.28 | 3.79 |
| 156 | 3732  | 0.072 | 0.2683 | 115   | 94.29 | 539.98 | 18.444 | 22.632 | 84.469  | 5.07  | 1.50  | 0.26 | 3.88 |
| 157 | 7130  | 0.074 | 0.2720 | 108.5 | 95.92 | 538.88 | 18.592 | 23.075 | 164.532 | 9.87  | 3.49  | 0.28 | 4.04 |
| 158 | 10173 | 0.074 | 0.2720 | 103.4 | 97.04 | 537.9  | 18.509 | 23.180 | 235.799 | 14.15 | 6.31  | 0.36 | 4.28 |
| 159 | 4921  | 0.073 | 0.2702 | 97.1  | 97.53 | 536.05 | 18.280 | 23.153 | 113.925 | 6.84  | 7.66  | 0.54 | 4.39 |
| 160 | 2104  | 0.076 | 0.2757 | 92.2  | 97.53 | 533.63 | 18.570 | 23.728 | 49.922  | 3.00  | 7.78  | 0.79 | 4.44 |
| 161 | 2733  | 0.073 | 0.2702 | 90.3  | 97.36 | 531.01 | 18.168 | 23.295 | 63.670  | 3.82  | 7.53  | 0.90 | 4.50 |
| 162 | 1677  | 0.074 | 0.2720 | 89.4  | 97.1  | 528.09 | 18.277 | 23.474 | 39.377  | 2.36  | 6.03  | 0.94 | 4.54 |
| 163 | 1593  | 0.073 | 0.2702 | 88.5  | 96.78 | 525.19 | 18.139 | 23.334 | 37.163  | 2.23  | 3.65  | 1.00 | 4.58 |
| 164 | 1718  | 0.072 | 0.2683 | 88.1  | 96.42 | 522.35 | 18.007 | 23.182 | 39.818  | 2.39  | 2.76  | 1.03 | 4.62 |
| 165 | 867   | 0.074 | 0.2720 | 88    | 96.05 | 519.6  | 18.254 | 23.504 | 20.385  | 1.22  | 2.40  | 1.05 | 4.64 |
| 166 | 990   | 0.074 | 0.2720 | 87.6  | 93.31 | 517.17 | 18.248 | 23.512 | 23.277  | 1.40  | 1.92  | 1.08 | 4.66 |
| 167 | 1433  | 0.073 | 0.2702 | 87.8  | 91.24 | 515.26 | 18.127 | 23.349 | 33.453  | 2.01  | 1.85  | 1.09 | 4.70 |
| 168 | 1276  | 0.074 | 0.2720 | 88    | 89.7  | 513.39 | 18.254 | 23.504 | 29.998  | 1.80  | 1.76  | 1.10 | 4.73 |
| 169 | 749   | 0.076 | 0.2757 | 87.8  | 88.77 | 512.62 | 18.496 | 23.823 | 17.840  | 1.07  | 1.50  | 1.12 | 4.75 |
| 170 | 714   | 0.076 | 0.2757 | 87.7  | 88.32 | 512.5  | 18.494 | 23.826 | 17.011  | 1.02  | 1.46  | 1.15 | 4.76 |
| 171 | 663   | 0.074 | 0.2720 | 87.6  | 88.05 | 513.14 | 18.248 | 23.512 | 15.586  | 0.94  | 1.37  | 1.16 | 4.78 |
| 172 | 758   | 0.075 | 0.2739 | 87.5  | 87.86 | 514.15 | 18.369 | 23.673 | 17.938  | 1.08  | 1.18  | 1.18 | 4.80 |

# Run 1 TEOM Data

|     |     |       |        |      |       |        |        |        |        |       |      |      |      |
|-----|-----|-------|--------|------|-------|--------|--------|--------|--------|-------|------|------|------|
| 173 | 717 | 0.074 | 0.2720 | 87.3 | 87.74 | 515.27 | 18.243 | 23.519 | 16.853 | 1.01  | 1.02 | 1.19 | 4.81 |
| 174 | 582 | 0.075 | 0.2739 | 87.3 | 87.66 | 516.5  | 18.365 | 23.677 | 13.778 | 0.83  | 0.97 | 1.20 | 4.83 |
| 175 | 433 | 0.074 | 0.2720 | 87.2 | 87.58 | 517.85 | 18.241 | 23.521 | 10.196 | 0.61  | 0.89 | 1.22 | 4.84 |
| 176 | 425 | 0.073 | 0.2702 | 87.3 | 87.55 | 519.26 | 18.119 | 23.359 | 9.925  | 0.60  | 0.82 | 1.23 | 4.85 |
| 177 | 156 | 0.073 | 0.2702 | 87   | 87.47 | 520.56 | 18.114 | 23.366 | 3.649  | 0.22  | 0.65 | 1.23 | 4.85 |
| 178 | 102 | 0.075 | 0.2739 | 86.6 | 87.33 | 522.28 | 18.354 | 23.692 | 2.424  | 0.15  | 0.48 | 1.24 | 4.85 |
| 179 | 146 | 0.074 | 0.2720 | 86.1 | 87.16 | 524.16 | 18.223 | 23.545 | 3.432  | 0.21  | 0.36 | 1.24 | 4.86 |
| 180 | 217 | 0.077 | 0.2775 | 85.3 | 86.92 | 526.16 | 18.575 | 24.035 | 5.223  | 0.31  | 0.30 | 1.25 | 4.86 |
| 181 | 212 | 0.074 | 0.2720 | 84.8 | 86.64 | 527.92 | 18.201 | 23.573 | 4.988  | 0.30  | 0.24 | 1.25 | 4.87 |
| 182 | 202 | 0.075 | 0.2739 | 84.3 | 86.32 | 529.79 | 18.315 | 23.742 | 4.801  | 0.29  | 0.25 | 1.25 | 4.87 |
| 183 | 370 | 0.074 | 0.2720 | 83.9 | 85.98 | 531.8  | 18.186 | 23.592 | 8.720  | 0.52  | 0.33 | 1.26 | 4.88 |
| 184 | 315 | 0.075 | 0.2739 | 83.6 | 85.61 | 533.74 | 18.303 | 23.758 | 7.484  | 0.45  | 0.37 | 1.26 | 4.89 |
| 185 | 138 | 0.075 | 0.2739 | 83.4 | 85.23 | 535.63 | 18.300 | 23.762 | 3.288  | 0.20  | 0.35 | 1.27 | 4.89 |
| 186 | 274 | 0.074 | 0.2720 | 83.2 | 84.82 | 537.41 | 18.174 | 23.607 | 6.469  | 0.39  | 0.37 | 1.28 | 4.90 |
| 187 | 229 | 0.076 | 0.2757 | 83.1 | 84.43 | 539.31 | 18.416 | 23.926 | 5.476  | 0.33  | 0.38 | 1.29 | 4.90 |
| 188 | 115 | 0.074 | 0.2720 | 82.8 | 84.05 | 540.54 | 18.167 | 23.616 | 2.710  | 0.16  | 0.31 | 1.29 | 4.91 |
| 189 | 238 | 0.075 | 0.2739 | 82.3 | 83.67 | 541.47 | 18.281 | 23.786 | 5.658  | 0.34  | 0.28 | 1.30 | 4.91 |
| 190 | 199 | 0.076 | 0.2757 | 82.4 | 83.38 | 542.27 | 18.404 | 23.942 | 4.757  | 0.29  | 0.30 | 1.30 | 4.92 |
| 191 | 203 | 0.072 | 0.2683 | 83.6 | 83.26 | 542.83 | 17.933 | 23.278 | 4.732  | 0.28  | 0.28 | 1.31 | 4.92 |
| 192 | 196 | 0.073 | 0.2702 | 84.6 | 83.29 | 543.4  | 18.074 | 23.417 | 4.587  | 0.28  | 0.27 | 1.31 | 4.93 |
| 193 | 277 | 0.073 | 0.2702 | 85.4 | 83.44 | 543.86 | 18.087 | 23.400 | 6.480  | 0.39  | 0.31 | 1.31 | 4.93 |
| 194 | 169 | 0.074 | 0.2720 | 85.5 | 83.63 | 544.24 | 18.212 | 23.557 | 3.983  | 0.24  | 0.29 | 1.32 | 4.94 |
| 195 | 209 | 0.075 | 0.2739 | 85.8 | 83.87 | 544.59 | 18.340 | 23.710 | 4.960  | 0.30  | 0.30 | 1.33 | 4.94 |
| 196 | 145 | 0.073 | 0.2702 | 86.1 | 84.16 | 544.97 | 18.099 | 23.385 | 3.389  | 0.20  | 0.28 | 1.33 | 4.94 |
| 197 | 184 | 0.073 | 0.2702 | 86.3 | 84.48 | 545.26 | 18.102 | 23.381 | 4.309  | 0.26  | 0.28 | 1.33 | 4.95 |
| 198 | 63  | 0.075 | 0.2739 | 86.4 | 84.84 | 545.77 | 18.350 | 23.697 | 1.485  | 0.09  | 0.22 | 1.34 | 4.95 |
| 199 | 107 | 0.072 | 0.2683 | 86.4 | 85.25 | 546.17 | 17.980 | 23.218 | 2.489  | 0.15  | 0.20 | 1.34 | 4.95 |
| 200 | 206 | 0.074 | 0.2720 | 86.5 | 85.66 | 546.5  | 18.229 | 23.536 | 4.856  | 0.29  | 0.20 | 1.34 | 4.96 |
| 201 | 139 | 0.073 | 0.2702 | 86.6 | 85.96 | 546.8  | 18.107 | 23.374 | 3.247  | 0.19  | 0.20 | 1.34 | 4.96 |
| 202 | 169 | 0.073 | 0.2702 | 86.7 | 86.17 | 546.92 | 18.109 | 23.372 | 3.961  | 0.24  | 0.19 | 1.35 | 4.96 |
| 203 | 304 | 0.071 | 0.2665 | 86.7 | 86.3  | 546.89 | 17.859 | 23.050 | 6.999  | 0.42  | 0.26 | 1.35 | 4.97 |
| 204 | 208 | 0.073 | 0.2702 | 86.8 | 86.43 | 546.85 | 18.111 | 23.370 | 4.860  | 0.29  | 0.29 | 1.35 | 4.98 |
| 205 | 101 | 0.072 | 0.2683 | 86.8 | 86.53 | 546.7  | 17.986 | 23.209 | 2.348  | 0.14  | 0.26 | 1.33 | 4.98 |
| 206 | 150 | 0.074 | 0.2720 | 86.8 | 86.6  | 546.39 | 18.234 | 23.529 | 3.539  | 0.21  | 0.26 | 1.31 | 4.98 |
| 207 | 132 | 0.075 | 0.2739 | 86.7 | 86.64 | 545.94 | 18.355 | 23.690 | 3.131  | 0.19  | 0.25 | 1.29 | 4.99 |
| 208 | 173 | 0.072 | 0.2683 | 86.6 | 86.66 | 545.33 | 17.983 | 23.214 | 4.009  | 0.24  | 0.21 | 1.28 | 4.99 |
| 209 | 210 | 0.072 | 0.2683 | 86.6 | 86.68 | 544.66 | 17.983 | 23.214 | 4.877  | 0.29  | 0.21 | 1.28 | 4.99 |
| 210 | 291 | 0.073 | 0.2702 | 86.6 | 86.69 | 543.91 | 18.107 | 23.374 | 6.797  | 0.41  | 0.27 | 1.28 | 5.00 |
| 211 | 297 | 0.073 | 0.2702 | 86.6 | 86.69 | 543.1  | 18.107 | 23.374 | 6.936  | 0.42  | 0.31 | 1.29 | 5.01 |
| 212 | 541 | 0.074 | 0.2720 | 86.7 | 86.69 | 542.28 | 18.233 | 23.532 | 12.741 | 0.76  | 0.42 | 1.29 | 5.02 |
| 213 | 616 | 0.075 | 0.2739 | 86.8 | 86.7  | 541.43 | 18.357 | 23.688 | 14.588 | 0.88  | 0.55 | 1.30 | 5.04 |
| 214 | 286 | 0.072 | 0.2683 | 86.9 | 86.71 | 540.58 | 17.988 | 23.207 | 6.645  | 0.40  | 0.57 | 1.31 | 5.04 |
| 215 | 173 | 0.074 | 0.2720 | 86.9 | 86.72 | 539.73 | 18.236 | 23.527 | 4.076  | 0.24  | 0.54 | 1.29 | 5.05 |
| 216 | 233 | 0.074 | 0.2720 | 86.8 | 86.72 | 538.99 | 18.234 | 23.529 | 5.473  | 0.33  | 0.52 | 1.21 | 5.05 |
| 217 | 271 | 0.073 | 0.2702 | 86.8 | 86.73 | 538.26 | 18.111 | 23.370 | 6.341  | 0.38  | 0.45 | 1.04 | 5.06 |
| 218 | 157 | 0.075 | 0.2739 | 86.8 | 86.75 | 537.56 | 18.357 | 23.688 | 3.728  | 0.22  | 0.32 | 0.80 | 5.06 |
| 219 | 135 | 0.073 | 0.2702 | 86.8 | 86.77 | 536.93 | 18.111 | 23.370 | 3.158  | 0.19  | 0.27 | 0.69 | 5.06 |
| 220 | 97  | 0.072 | 0.2683 | 86.9 | 86.8  | 536.32 | 17.988 | 23.207 | 2.243  | 0.13  | 0.25 | 0.64 | 5.07 |
| 221 | 144 | 0.075 | 0.2739 | 86.8 | 86.82 | 535.8  | 18.357 | 23.688 | 3.406  | 0.20  | 0.23 | 0.58 | 5.07 |
| 222 | 227 | 0.073 | 0.2702 | 86.7 | 86.82 | 535.34 | 18.109 | 23.372 | 5.315  | 0.32  | 0.21 | 0.54 | 5.08 |
| 223 | 157 | 0.076 | 0.2757 | 86.6 | 86.8  | 535.01 | 18.476 | 23.850 | 3.749  | 0.22  | 0.21 | 0.51 | 5.08 |
| 224 | 340 | 0.073 | 0.2702 | 86.4 | 86.75 | 534.71 | 18.104 | 23.378 | 7.939  | 0.48  | 0.27 | 0.47 | 5.09 |
| 225 | 275 | 0.074 | 0.2720 | 86   | 86.66 | 534.52 | 18.221 | 23.547 | 6.470  | 0.39  | 0.32 | 0.45 | 5.09 |
| 226 | 212 | 0.074 | 0.2720 | 85.8 | 86.56 | 534.37 | 18.218 | 23.551 | 4.998  | 0.30  | 0.34 | 0.44 | 5.10 |
| 227 | 198 | 0.074 | 0.2720 | 86   | 86.48 | 534.31 | 18.221 | 23.547 | 4.654  | 0.28  | 0.33 | 0.41 | 5.10 |
| 228 | 224 | 0.074 | 0.2720 | 85.9 | 86.39 | 534.31 | 18.219 | 23.549 | 5.273  | 0.32  | 0.35 | 0.38 | 5.11 |
| 229 | 271 | 0.074 | 0.2720 | 85.8 | 86.29 | 534.41 | 18.218 | 23.551 | 6.386  | 0.38  | 0.33 | 0.37 | 5.12 |
| 230 | 298 | 0.074 | 0.2720 | 85.9 | 86.19 | 534.6  | 18.219 | 23.549 | 7.008  | 0.42  | 0.34 | 0.36 | 5.12 |
| 231 | 259 | 0.072 | 0.2683 | 86   | 86.11 | 534.81 | 17.973 | 23.226 | 6.013  | 0.36  | 0.35 | 0.35 | 5.13 |
| 232 | 201 | 0.074 | 0.2720 | 86.1 | 86.05 | 535.09 | 18.223 | 23.545 | 4.726  | 0.28  | 0.35 | 0.34 | 5.13 |
| 233 | 210 | 0.074 | 0.2720 | 86.1 | 86    | 535.37 | 18.223 | 23.545 | 4.936  | 0.30  | 0.35 | 0.33 | 5.14 |
| 234 | 211 | 0.074 | 0.2720 | 86.1 | 85.97 | 535.65 | 18.223 | 23.545 | 4.967  | 0.30  | 0.33 | 0.32 | 5.14 |
| 235 | 175 | 0.073 | 0.2702 | 86.2 | 85.99 | 535.95 | 18.101 | 23.383 | 4.089  | 0.25  | 0.30 | 0.31 | 5.15 |
| 236 | 217 | 0.074 | 0.2720 | 86.1 | 86.02 | 536.16 | 18.223 | 23.545 | 5.116  | 0.31  | 0.29 | 0.31 | 5.15 |
| 237 | 64  | 0.074 | 0.2720 | 85.9 | 86.01 | 536.41 | 18.219 | 23.549 | 1.505  | 0.09  | 0.25 | 0.31 | 5.15 |
| 238 | 217 | 0.074 | 0.2720 | 86   | 86.02 | 536.59 | 18.221 | 23.547 | 5.102  | 0.31  | 0.25 | 0.31 | 5.16 |
| 239 | 618 | 0.074 | 0.2720 | 85.9 | 86.03 | 536.66 | 18.219 | 23.549 | 14.561 | 0.87  | 0.36 | 0.31 | 5.17 |
| 240 | 223 | 0.073 | 0.2702 | 85.8 | 86.02 | 536.62 | 18.094 | 23.391 | 5.228  | 0.31  | 0.38 | 0.31 | 5.18 |
| 241 | 163 | 0.074 | 0.2720 | 85.9 | 86.01 | 536.49 | 18.219 | 23.549 | 3.848  | 0.23  | 0.36 | 0.32 | 5.18 |
| 242 | 225 | 0.074 | 0.2720 | 85.8 | 85.98 | 536.29 | 18.218 | 23.551 | 5.298  | 0.32  | 0.41 | 0.32 | 5.19 |
| 243 | 172 | 0.073 | 0.2702 | 85.8 | 85.95 | 536.02 | 18.094 | 23.391 | 4.032  | 0.24  | 0.40 | 0.31 | 5.19 |
| 244 | 122 | 0.074 | 0.2720 | 85.7 | 85.91 | 535.74 | 18.216 | 23.553 | 2.882  | 0.17  | 0.26 | 0.31 | 5.19 |
| 245 | 149 | 0.074 | 0.2720 | 85.7 | 85.86 | 535.38 | 18.216 | 23.553 | 3.508  | 0.21  | 0.23 | 0.31 | 5.20 |
| 246 | 151 | 0.075 | 0.2739 | 85.6 | 85.81 | 535.07 | 18.337 | 23.714 | 3.581  | 0.21  | 0.23 | 0.31 | 5.20 |
| 247 | 292 | 0.075 | 0.2739 | 85.5 | 85.77 | 534.77 | 18.335 | 23.716 | 6.929  | 0.42  | 0.25 | 0.31 | 5.21 |
| 248 | 158 | 0.074 | 0.2720 | 85.4 | 85.71 | 534.48 | 18.211 | 23.560 | 3.730  | 0.22  | 0.25 | 0.31 | 5.21 |
| 249 | 240 | 0.074 | 0.2720 | 85.4 | 85.66 | 534.17 | 18.211 | 23.560 | 5.665  | 0.34  | 0.28 | 0.31 | 5.22 |
| 250 | 182 | 0.075 | 0.2739 | 85.4 | 85.62 | 533.88 | 18.333 | 23.718 | 4.321  | 0.26  | 0.29 | 0.31 | 5.22 |
| 251 | 71  | 0.074 | 0.2720 | 85.5 | 85.58 | 533.64 | 18.212 | 23.557 | 1.667  | 0.10  | 0.27 | 0.31 | 5.22 |
| 252 | 138 | 0.075 | 0.2739 | 85.3 | 85.53 | 533.34 | 18.332 | 23.720 | 3.283  | 0.20  | 0.22 | 0.31 | 5.23 |
| 253 | 107 | 0.073 | 0.2702 | 85.2 | 85.47 | 533.11 | 18.084 | 23.404 | 2.504  | 0.15  | 0.21 | 0.30 | 5.23 |
| 254 | 96  | 0.074 | 0.2720 | 85.1 | 85.41 | 532.74 | 18.206 | 23.566 | 2.270  | 0.14  | 0.17 | 0.30 | 5.23 |
| 255 | 101 | 0.074 | 0.2720 | 84.9 | 85.33 | 532.33 | 18.202 | 23.570 | 2.384  | 0.14  | 0.15 | 0.30 | 5.23 |
| 256 | 71  | 0.075 | 0.2739 | 84.9 | 85.26 | 531.85 | 18.325 | 23.729 | 1.684  | 0.10  | 0.15 | 0.30 | 5.24 |
| 257 | 58  | 0.073 | 0.2702 | 84.8 | 85.19 | 531.25 | 18.077 | 23.413 | 1.365  | 0.08  | 0.12 | 0.30 | 5.24 |
| 258 | 85  | 0.075 | 0.2739 | 84.6 | 85.11 | 530.58 | 18.320 | 23.736 | 2.021  | 0.12  | 0.12 | 0.30 | 5.24 |
| 259 | -11 | 0.073 | 0.2702 | 84.5 | 85.02 | 529.89 | 18.072 | 23.419 | -0.269 | -0.02 | 0.09 | 0.29 | 5.24 |
| 260 | 120 | 0.076 | 0.2757 | 84.4 | 84.92 | 529.08 | 18.438 | 23.898 | 2.867  | 0.17  | 0.09 | 0.29 | 5.24 |

# Run 1 TEOM Data

|     |      |       |        |      |       |        |        |        |        |       |       |      |      |
|-----|------|-------|--------|------|-------|--------|--------|--------|--------|-------|-------|------|------|
| 261 | 69   | 0.075 | 0.2739 | 86   | 84.97 | 528.88 | 18.344 | 23.705 | 1.637  | 0.10  | 0.09  | 0.29 | 5.24 |
| 262 | 55   | 0.075 | 0.2739 | 88.4 | 85.28 | 529.34 | 18.384 | 23.653 | 1.301  | 0.08  | 0.09  | 0.29 | 5.25 |
| 263 | 26   | 0.073 | 0.2702 | 89.4 | 85.7  | 530.21 | 18.154 | 23.314 | 0.597  | 0.04  | 0.07  | 0.28 | 5.25 |
| 264 | 53   | 0.074 | 0.2720 | 89.7 | 86.16 | 531.63 | 18.282 | 23.467 | 1.232  | 0.07  | 0.09  | 0.28 | 5.25 |
| 265 | -48  | 0.076 | 0.2757 | 90.1 | 86.68 | 533.4  | 18.535 | 23.774 | -1.136 | -0.07 | 0.04  | 0.28 | 5.25 |
| 266 | 56   | 0.075 | 0.2739 | 90.2 | 87.21 | 535.44 | 18.414 | 23.614 | 1.314  | 0.08  | 0.04  | 0.27 | 5.25 |
| 267 | 14   | 0.076 | 0.2757 | 90.4 | 87.77 | 537.75 | 18.540 | 23.767 | 0.341  | 0.02  | 0.03  | 0.27 | 5.25 |
| 268 | 116  | 0.076 | 0.2757 | 87.1 | 88.02 | 539.48 | 18.484 | 23.839 | 2.772  | 0.17  | 0.05  | 0.27 | 5.25 |
| 269 | 45   | 0.075 | 0.2739 | 85.5 | 88.12 | 540.78 | 18.335 | 23.716 | 1.076  | 0.06  | 0.05  | 0.26 | 5.25 |
| 270 | 221  | 0.075 | 0.2739 | 85   | 88.18 | 541.85 | 18.327 | 23.727 | 5.241  | 0.31  | 0.13  | 0.26 | 5.26 |
| 271 | 438  | 0.075 | 0.2739 | 84.9 | 88.07 | 542.02 | 18.325 | 23.729 | 10.389 | 0.62  | 0.24  | 0.25 | 5.27 |
| 272 | 923  | 0.075 | 0.2739 | 84.9 | 87.72 | 541.34 | 18.325 | 23.729 | 21.908 | 1.31  | 0.50  | 0.24 | 5.29 |
| 273 | 1580 | 0.074 | 0.2720 | 84.9 | 87.27 | 540.13 | 18.202 | 23.570 | 37.238 | 2.23  | 0.91  | 0.24 | 5.33 |
| 274 | 264  | 0.074 | 0.2720 | 84.9 | 86.79 | 538.26 | 18.202 | 23.570 | 6.231  | 0.37  | 0.97  | 0.26 | 5.33 |
| 275 | 91   | 0.074 | 0.2720 | 84.9 | 86.27 | 535.95 | 18.202 | 23.570 | 2.136  | 0.13  | 0.93  | 0.29 | 5.33 |
| 276 | 106  | 0.074 | 0.2720 | 84.8 | 85.73 | 533.2  | 18.201 | 23.573 | 2.498  | 0.15  | 0.84  | 0.29 | 5.34 |
| 277 | 90   | 0.073 | 0.2702 | 84.5 | 85.14 | 529.96 | 18.072 | 23.419 | 2.109  | 0.13  | 0.60  | 0.29 | 5.34 |
| 278 | 55   | 0.075 | 0.2739 | 85.5 | 84.98 | 527.76 | 18.335 | 23.716 | 1.303  | 0.08  | 0.17  | 0.28 | 5.34 |
| 279 | 97   | 0.076 | 0.2757 | 88.2 | 85.25 | 526.64 | 18.503 | 23.815 | 2.315  | 0.14  | 0.12  | 0.28 | 5.34 |
| 280 | 118  | 0.075 | 0.2739 | 89.2 | 85.67 | 526.22 | 18.397 | 23.636 | 2.790  | 0.17  | 0.13  | 0.28 | 5.35 |
| 281 | 79   | 0.076 | 0.2757 | 89.6 | 86.14 | 526.31 | 18.526 | 23.784 | 1.872  | 0.11  | 0.12  | 0.28 | 5.35 |
| 282 | 155  | 0.076 | 0.2757 | 89.7 | 86.62 | 526.78 | 18.528 | 23.782 | 3.689  | 0.22  | 0.14  | 0.28 | 5.35 |
| 283 | 97   | 0.074 | 0.2720 | 89.5 | 87.08 | 527.44 | 18.279 | 23.471 | 2.281  | 0.14  | 0.16  | 0.28 | 5.35 |
| 284 | 84   | 0.074 | 0.2720 | 89.1 | 87.5  | 528.38 | 18.272 | 23.480 | 1.964  | 0.12  | 0.15  | 0.27 | 5.36 |
| 285 | 25   | 0.075 | 0.2739 | 88.8 | 87.89 | 529.48 | 18.391 | 23.645 | 0.592  | 0.04  | 0.12  | 0.27 | 5.36 |
| 286 | 27   | 0.076 | 0.2757 | 88.9 | 88.3  | 530.82 | 18.514 | 23.800 | 0.633  | 0.04  | 0.11  | 0.27 | 5.36 |
| 287 | 37   | 0.075 | 0.2739 | 88.9 | 88.74 | 532.36 | 18.392 | 23.642 | 0.879  | 0.05  | 0.08  | 0.26 | 5.36 |
| 288 | -29  | 0.075 | 0.2739 | 88.9 | 89.08 | 533.4  | 18.392 | 23.642 | -0.687 | -0.04 | 0.04  | 0.26 | 5.36 |
| 289 | -77  | 0.073 | 0.2702 | 88.8 | 89.14 | 533.74 | 18.144 | 23.327 | -1.788 | -0.11 | 0.00  | 0.25 | 5.35 |
| 290 | -81  | 0.075 | 0.2739 | 89.1 | 89.13 | 533.63 | 18.396 | 23.638 | -1.922 | -0.12 | -0.03 | 0.24 | 5.35 |
| 291 | 6    | 0.075 | 0.2739 | 89   | 89.07 | 533.18 | 18.394 | 23.640 | 0.154  | 0.01  | -0.04 | 0.23 | 5.35 |
| 292 | 31   | 0.076 | 0.2757 | 88.9 | 88.99 | 532.42 | 18.514 | 23.800 | 0.748  | 0.04  | -0.04 | 0.23 | 5.35 |
| 293 | 3    | 0.075 | 0.2739 | 88.8 | 88.92 | 531.39 | 18.391 | 23.645 | 0.061  | 0.00  | -0.03 | 0.22 | 5.35 |
| 294 | 35   | 0.075 | 0.2739 | 88.8 | 88.89 | 530.15 | 18.391 | 23.645 | 0.820  | 0.05  | 0.00  | 0.22 | 5.35 |
| 295 | 26   | 0.075 | 0.2739 | 88.5 | 88.86 | 528.73 | 18.385 | 23.651 | 0.624  | 0.04  | 0.03  | 0.21 | 5.36 |
| 296 | -20  | 0.075 | 0.2739 | 87.9 | 88.76 | 527.16 | 18.375 | 23.664 | -0.481 | -0.03 | 0.02  | 0.21 | 5.35 |
| 297 | -56  | 0.077 | 0.2775 | 87.2 | 88.59 | 525.57 | 18.607 | 23.993 | -1.342 | -0.08 | 0.00  | 0.21 | 5.35 |
| 298 | -59  | 0.075 | 0.2739 | 87   | 88.4  | 524.01 | 18.360 | 23.684 | -1.407 | -0.08 | -0.02 | 0.20 | 5.35 |
| 299 | -13  | 0.075 | 0.2739 | 87   | 88.22 | 522.45 | 18.360 | 23.684 | -0.304 | -0.02 | -0.03 | 0.19 | 5.35 |
| 300 | 42   | 0.075 | 0.2739 | 87.7 | 88.08 | 520.85 | 18.372 | 23.668 | 0.992  | 0.06  | -0.03 | 0.18 | 5.35 |
| 301 | 7    | 0.077 | 0.2775 | 87.5 | 87.93 | 519.13 | 18.612 | 23.986 | 0.162  | 0.01  | -0.02 | 0.18 | 5.35 |
| 302 | -58  | 0.076 | 0.2757 | 87.6 | 87.8  | 517.32 | 18.492 | 23.828 | -1.392 | -0.08 | -0.02 | 0.17 | 5.35 |
| 303 | 94   | 0.076 | 0.2757 | 87.5 | 87.67 | 515.39 | 18.491 | 23.830 | 2.249  | 0.13  | 0.02  | 0.17 | 5.35 |
| 304 | 25   | 0.077 | 0.2775 | 88   | 87.59 | 513.37 | 18.621 | 23.975 | 0.602  | 0.04  | 0.03  | 0.16 | 5.35 |
| 305 | 55   | 0.075 | 0.2739 | 87.6 | 87.5  | 511.3  | 18.370 | 23.671 | 1.302  | 0.08  | 0.04  | 0.16 | 5.36 |
| 306 | 29   | 0.075 | 0.2739 | 87.2 | 87.43 | 509.1  | 18.364 | 23.679 | 0.689  | 0.04  | 0.04  | 0.16 | 5.36 |
| 307 | 17   | 0.075 | 0.2739 | 87.1 | 87.42 | 506.77 | 18.362 | 23.681 | 0.396  | 0.02  | 0.06  | 0.15 | 5.36 |
| 308 | 130  | 0.076 | 0.2757 | 87.8 | 87.5  | 504.37 | 18.496 | 23.823 | 3.101  | 0.19  | 0.07  | 0.15 | 5.36 |
| 309 | 45   | 0.075 | 0.2739 | 87.5 | 87.55 | 501.89 | 18.369 | 23.673 | 1.061  | 0.06  | 0.08  | 0.14 | 5.36 |
| 310 | 5    | 0.075 | 0.2739 | 87.8 | 87.56 | 499.4  | 18.374 | 23.666 | 0.128  | 0.01  | 0.06  | 0.14 | 5.36 |
| 311 | 36   | 0.076 | 0.2757 | 87.1 | 87.52 | 496.99 | 18.484 | 23.839 | 0.857  | 0.05  | 0.07  | 0.14 | 5.36 |
| 312 | 46   | 0.076 | 0.2757 | 87.5 | 87.51 | 494.67 | 18.491 | 23.830 | 1.103  | 0.07  | 0.07  | 0.14 | 5.36 |
| 313 | 14   | 0.075 | 0.2739 | 87.2 | 87.48 | 492.43 | 18.364 | 23.679 | 0.330  | 0.02  | 0.04  | 0.14 | 5.36 |
| 314 | 53   | 0.075 | 0.2739 | 87.6 | 87.44 | 490.36 | 18.370 | 23.671 | 1.260  | 0.08  | 0.04  | 0.14 | 5.36 |
| 315 | 123  | 0.076 | 0.2757 | 87.3 | 87.41 | 488.42 | 18.487 | 23.834 | 2.922  | 0.18  | 0.08  | 0.13 | 5.37 |
| 316 | 42   | 0.076 | 0.2757 | 87.5 | 87.44 | 486.6  | 18.491 | 23.830 | 1.004  | 0.06  | 0.08  | 0.13 | 5.37 |
| 317 | 113  | 0.076 | 0.2757 | 87.4 | 87.47 | 484.9  | 18.489 | 23.832 | 2.698  | 0.16  | 0.10  | 0.13 | 5.37 |
| 318 | 54   | 0.076 | 0.2757 | 86.9 | 87.38 | 483.27 | 18.481 | 23.843 | 1.287  | 0.08  | 0.11  | 0.13 | 5.37 |
| 319 | 94   | 0.076 | 0.2757 | 86.8 | 87.31 | 481.76 | 18.479 | 23.845 | 2.246  | 0.13  | 0.12  | 0.14 | 5.37 |
| 320 | 8    | 0.075 | 0.2739 | 86.6 | 87.19 | 480.36 | 18.354 | 23.692 | 0.193  | 0.01  | 0.09  | 0.13 | 5.38 |
| 321 | -21  | 0.076 | 0.2757 | 86.5 | 87.13 | 479.03 | 18.474 | 23.852 | -0.502 | -0.03 | 0.07  | 0.14 | 5.37 |
| 322 | 75   | 0.076 | 0.2757 | 86.2 | 87    | 477.82 | 18.469 | 23.858 | 1.801  | 0.11  | 0.06  | 0.13 | 5.38 |
| 323 | -9   | 0.076 | 0.2757 | 85.5 | 86.83 | 476.8  | 18.457 | 23.874 | -0.225 | -0.01 | 0.04  | 0.13 | 5.38 |
| 324 | -2   | 0.077 | 0.2775 | 85   | 86.57 | 475.87 | 18.569 | 24.041 | -0.039 | 0.00  | 0.01  | 0.13 | 5.38 |
| 325 | -45  | 0.077 | 0.2775 | 84.8 | 86.32 | 475.02 | 18.566 | 24.046 | -1.078 | -0.06 | 0.00  | 0.13 | 5.38 |
| 326 | 32   | 0.075 | 0.2739 | 84.6 | 86.03 | 474.3  | 18.320 | 23.736 | 0.759  | 0.05  | 0.01  | 0.13 | 5.38 |
| 327 | -22  | 0.076 | 0.2757 | 84.2 | 85.71 | 473.61 | 18.435 | 23.902 | -0.538 | -0.03 | -0.01 | 0.13 | 5.38 |
| 328 | 6    | 0.074 | 0.2720 | 84   | 85.42 | 472.92 | 18.187 | 23.590 | 0.146  | 0.01  | -0.01 | 0.13 | 5.38 |
| 329 | -40  | 0.073 | 0.2702 | 84   | 85.14 | 472.24 | 18.064 | 23.430 | -0.940 | -0.06 | -0.02 | 0.13 | 5.37 |
| 330 | 53   | 0.076 | 0.2757 | 83.9 | 84.87 | 471.52 | 18.430 | 23.909 | 1.262  | 0.08  | 0.01  | 0.12 | 5.38 |
| 331 | -11  | 0.076 | 0.2757 | 83.8 | 84.6  | 470.8  | 18.428 | 23.911 | -0.268 | -0.02 | 0.00  | 0.11 | 5.38 |
| 332 | -27  | 0.075 | 0.2739 | 83.7 | 84.35 | 469.98 | 18.305 | 23.755 | -0.637 | -0.04 | -0.01 | 0.09 | 5.37 |
| 333 | -20  | 0.076 | 0.2757 | 83.6 | 84.16 | 469.04 | 18.425 | 23.915 | -0.483 | -0.03 | -0.01 | 0.05 | 5.37 |
| 334 | -56  | 0.075 | 0.2739 | 83.4 | 84    | 467.92 | 18.300 | 23.762 | -1.334 | -0.08 | -0.02 | 0.04 | 5.37 |
| 335 | 6    | 0.076 | 0.2757 | 83.3 | 83.85 | 466.7  | 18.420 | 23.922 | 0.152  | 0.01  | -0.03 | 0.04 | 5.37 |
| 336 | -28  | 0.075 | 0.2739 | 83.1 | 83.7  | 465.34 | 18.295 | 23.769 | -0.658 | -0.04 | -0.04 | 0.04 | 5.37 |
| 337 | 1    | 0.075 | 0.2739 | 83   | 83.58 | 463.86 | 18.293 | 23.771 | 0.019  | 0.00  | -0.03 | 0.04 | 5.37 |
| 338 | -10  | 0.076 | 0.2757 | 82.7 | 83.45 | 462.27 | 18.410 | 23.935 | -0.229 | -0.01 | -0.02 | 0.03 | 5.37 |
| 339 | 32   | 0.074 | 0.2720 | 82.7 | 83.32 | 460.63 | 18.166 | 23.618 | 0.763  | 0.05  | 0.00  | 0.03 | 5.37 |
| 340 | -44  | 0.075 | 0.2739 | 82.6 | 83.19 | 458.92 | 18.286 | 23.779 | -1.051 | -0.06 | -0.01 | 0.03 | 5.37 |
| 341 | 40   | 0.075 | 0.2739 | 82.5 | 83.06 | 457.16 | 18.285 | 23.782 | 0.943  | 0.06  | 0.01  | 0.03 | 5.37 |
| 342 | 12   | 0.075 | 0.2739 | 82.4 | 82.93 | 455.4  | 18.283 | 23.784 | 0.280  | 0.02  | 0.01  | 0.02 | 5.37 |
| 343 | 33   | 0.074 | 0.2720 | 82.3 | 82.8  | 453.62 | 18.159 | 23.627 | 0.772  | 0.05  | 0.02  | 0.02 | 5.37 |
| 344 | -34  | 0.076 | 0.2757 | 82.1 | 82.67 | 451.83 | 18.399 | 23.949 | -0.825 | -0.05 | 0.00  | 0.02 | 5.37 |
| 345 | -2   | 0.076 | 0.2757 | 82   | 82.54 | 450    | 18.398 | 23.951 | -0.038 | 0.00  | 0.01  | 0.02 | 5.37 |
| 346 | 22   | 0.074 | 0.2720 | 81.9 | 82.42 | 448.18 | 18.152 | 23.636 | 0.527  | 0.03  | 0.01  | 0.02 | 5.37 |
| 347 | -12  | 0.076 | 0.2757 | 81.7 | 82.29 | 446.43 | 18.393 | 23.957 | -0.291 | -0.02 | 0.00  | 0.02 | 5.37 |
| 348 | 15   | 0.076 | 0.2757 | 81.6 | 82.18 | 444.72 | 18.391 | 23.960 | 0.364  | 0.02  | 0.00  | 0.02 | 5.37 |

## Run 1 TEOM Data

|     |     |       |        |      |             |             |        |        |        |       |       |       |      |
|-----|-----|-------|--------|------|-------------|-------------|--------|--------|--------|-------|-------|-------|------|
| 349 | -44 | 0.077 | 0.2775 | 81.5 | 82.06       | 442.95      | 18.510 | 24.119 | -1.065 | -0.06 | -0.01 | 0.02  | 5.37 |
| 350 | -48 | 0.074 | 0.2720 | 81.5 | 81.95       | 441.24      | 18.146 | 23.644 | -1.136 | -0.07 | -0.02 | 0.02  | 5.37 |
| 351 | 15  | 0.076 | 0.2757 | 81.3 | 81.83       | 439.54      | 18.386 | 23.966 | 0.364  | 0.02  | -0.02 | 0.02  | 5.37 |
| 352 | -13 | 0.075 | 0.2739 | 81.2 | 81.71       | 437.84      | 18.263 | 23.810 | -0.304 | -0.02 | -0.02 | 0.02  | 5.37 |
| 353 | 33  | 0.076 | 0.2757 | 81   | 81.58       | 436.15      | 18.381 | 23.973 | 0.794  | 0.05  | -0.02 | 0.02  | 5.37 |
| 354 | 32  | 0.075 | 0.2739 | 80.8 | 81.45       | 434.52      | 18.256 | 23.819 | 0.756  | 0.05  | 0.01  | 0.02  | 5.37 |
| 355 | 20  | 0.076 | 0.2757 | 80.7 | 81.32       | 432.93      | 18.376 | 23.980 | 0.468  | 0.03  | 0.02  | 0.02  | 5.37 |
| 356 | -12 | 0.075 | 0.2739 | 80.7 | 81.2        | 431.33      | 18.254 | 23.821 | -0.290 | -0.02 | 0.02  | 0.02  | 5.37 |
| 357 | 7   | 0.075 | 0.2739 | 80.7 | 81.1        | 429.76      | 18.254 | 23.821 | 0.174  | 0.01  | 0.02  | 0.02  | 5.37 |
| 358 | 1   | 0.075 | 0.2739 | 80.4 | 80.98       | 428.24      | 18.249 | 23.828 | 0.014  | 0.00  | 0.01  | 0.02  | 5.37 |
| 359 | 28  | 0.074 | 0.2720 | 80.4 | 80.87       | 426.77      | 18.127 | 23.669 | 0.669  | 0.04  | 0.01  | 0.02  | 5.37 |
| 360 | 3   | 0.076 | 0.2757 | 80.3 | 80.75       | 425.32      | 18.369 | 23.988 | 0.077  | 0.00  | 0.01  | 0.02  | 5.37 |
| 361 | 22  | 0.077 | 0.2775 | 80.3 | 80.65       | 423.89      | 18.489 | 24.146 | 0.529  | 0.03  | 0.02  | 0.02  | 5.37 |
| 362 | -82 | 0.073 | 0.2702 | 80.2 | 80.55       | 422.52      | 18.001 | 23.512 | -1.935 | -0.12 | -0.01 | 0.02  | 5.37 |
| 363 | -20 | 0.076 | 0.2757 | 80.1 | 80.46       | 421.18      | 18.365 | 23.993 | -0.470 | -0.03 | -0.01 | 0.02  | 5.37 |
| 364 | -20 | 0.075 | 0.2739 | 80.1 | 80.39       | 419.84      | 18.244 | 23.835 | -0.473 | -0.03 | -0.03 | 0.02  | 5.37 |
| 365 | -77 | 0.076 | 0.2757 | 79.9 | 80.31       | 418.51      | 18.362 | 23.997 | -1.841 | -0.11 | -0.05 | 0.02  | 5.37 |
| 366 | -20 | 0.077 | 0.2775 | 79.8 | 80.22       | 417.26      | 18.481 | 24.157 | -0.488 | -0.03 | -0.06 | 0.02  | 5.37 |
| 367 | -29 | 0.076 | 0.2757 | 79.9 | 80.14       | 415.97      | 18.362 | 23.997 | -0.696 | -0.04 | -0.05 | 0.01  | 5.37 |
| 368 | -19 | 0.076 | 0.2757 | 79.9 | 80.09       | 414.7       | 18.362 | 23.997 | -0.450 | -0.03 | -0.05 | 0.01  | 5.37 |
| 369 | -2  | 0.076 | 0.2757 | 79.8 | 80.03       | 413.47      | 18.360 | 24.000 | -0.052 | 0.00  | -0.04 | 0.01  | 5.37 |
| 370 | 96  | 0.076 | 0.2757 | 79.9 | 79.99       | 412.27      | 18.362 | 23.997 | 2.314  | 0.14  | 0.01  | 0.01  | 5.37 |
| 371 | 0   | 0.074 | 0.2720 | 79.7 | 79.93       | 411.13      | 18.115 | 23.684 | 0.008  | 0.00  | 0.01  | 0.01  | 5.37 |
| 372 | 13  | 0.076 | 0.2757 | 79.6 | 79.87       | 409.95      | 18.357 | 24.004 | 0.303  | 0.02  | 0.03  | 0.01  | 5.37 |
| 373 | -22 | 0.076 | 0.2757 | 79.6 | 79.82       | 408.75      | 18.357 | 24.004 | -0.525 | -0.03 | 0.02  | 0.01  | 5.37 |
| 374 | -63 | 0.076 | 0.2757 | 79.4 | 79.75       | 407.63      | 18.353 | 24.008 | -1.502 | -0.09 | 0.01  | 0.01  | 5.37 |
| 375 | 84  | 0.076 | 0.2757 | 79.4 | 79.7        | 406.5       | 18.353 | 24.008 | 2.010  | 0.12  | 0.00  | 0.00  | 5.37 |
| 376 | -32 | 0.077 | 0.2775 | 79.4 | 79.66       | 405.37      | 18.474 | 24.166 | -0.770 | -0.05 | -0.01 | 0.00  | 5.37 |
| 377 | 14  | 0.076 | 0.2757 | 79.3 | 79.6        | 404.3       | 18.352 | 24.011 | 0.327  | 0.02  | -0.01 | 0.00  | 5.37 |
| 378 | -73 | 0.076 | 0.2757 | 79.3 | 79.54       | 403.22      | 18.352 | 24.011 | -1.751 | -0.11 | -0.02 | 0.00  | 5.37 |
| 379 | -43 | 0.075 | 0.2739 | 79.3 | 79.49       | 402.18      | 18.231 | 23.852 | -1.036 | -0.06 | -0.01 | 0.00  | 5.37 |
| 380 | 2   | 0.076 | 0.2757 | 79.1 | 79.41       | 401.14      | 18.348 | 24.015 | 0.039  | 0.00  | -0.04 | -0.01 | 5.37 |
| 381 | 42  | 0.076 | 0.2757 | 79.1 | 79.35       | 400.04      | 18.348 | 24.015 | 0.997  | 0.06  | -0.02 | -0.01 | 5.37 |
| 382 | -47 | 0.076 | 0.2757 | 79.1 | 79.3        | 399.01      | 18.348 | 24.015 | -1.129 | -0.07 | -0.03 | -0.01 | 5.37 |
| 383 | 1   | 0.076 | 0.2757 | 79   | 79.24       | 398.05      | 18.347 | 24.017 | 0.021  | 0.00  | -0.01 | -0.01 | 5.37 |
| 384 | -28 | 0.074 | 0.2720 | 79   | 79.2        | 397.06      | 18.104 | 23.699 | -0.655 | -0.04 | -0.01 | -0.01 | 5.37 |
| 385 | 29  | 0.076 | 0.2757 | 78.9 | 79.15       | 396.14      | 18.345 | 24.020 | 0.697  | 0.04  | 0.00  | -0.01 | 5.37 |
| 386 | 22  | 0.077 | 0.2775 | 78.8 | 79.09       | 395.16      | 18.464 | 24.179 | 0.528  | 0.03  | -0.01 | -0.01 | 5.37 |
| 387 | -29 | 0.075 | 0.2739 | 78.7 | 79.03       | 394.19      | 18.221 | 23.866 | -0.687 | -0.04 | 0.00  | -0.01 | 5.37 |
| 388 | -30 | 0.077 | 0.2775 | 78.7 | 78.97       | 393.25      | 18.462 | 24.182 | -0.721 | -0.04 | -0.01 | -0.01 | 5.37 |
| 389 | 88  | 0.076 | 0.2757 | 78.6 | 78.9        | 392.32      | 18.340 | 24.026 | 2.107  | 0.13  | 0.02  | -0.01 | 5.37 |
| 390 | -55 | 0.074 | 0.2720 | 78.7 | 78.86       | 391.39      | 18.099 | 23.706 | -1.296 | -0.08 | 0.00  | -0.01 | 5.37 |
| 391 | -36 | 0.075 | 0.2739 | 78.5 | 78.8        | 390.49      | 18.217 | 23.870 | -0.848 | -0.05 | -0.02 | -0.01 | 5.37 |
| 392 | -2  | 0.075 | 0.2739 | 78.4 | 78.73       | 389.65      | 18.215 | 23.872 | -0.057 | 0.00  | -0.01 | -0.01 | 5.37 |
| 393 | -36 | 0.075 | 0.2739 | 78.2 | 78.65       | 388.78      | 18.212 | 23.877 | -0.854 | -0.05 | -0.01 | -0.01 | 5.37 |
| 394 | 121 | 0.076 | 0.2757 | 78.3 | 78.58       | 387.93      | 18.335 | 24.033 | 2.909  | 0.17  | 0.00  | -0.01 | 5.37 |
| 395 | -38 | 0.076 | 0.2757 | 78.2 | 78.51       | 387.06      | 18.333 | 24.035 | -0.923 | -0.06 | 0.00  | -0.01 | 5.37 |
| 396 | -15 | 0.075 | 0.2739 | 78.1 | 78.44       | 386.23      | 18.210 | 23.879 | -0.357 | -0.02 | 0.01  | 0.00  | 5.37 |
| 397 | 63  | 0.075 | 0.2739 | 78.3 | 78.4        | 385.41      | 18.214 | 23.874 | 1.503  | 0.09  | 0.03  | 0.00  | 5.37 |
| 398 | -24 | 0.075 | 0.2739 | 78   | 78.33       | 384.59      | 18.209 | 23.881 | -0.571 | -0.03 | 0.03  | 0.00  | 5.37 |
| 399 | -56 | 0.076 | 0.2757 | 77.9 | 78.26       | 383.78      | 18.328 | 24.042 | -1.350 | -0.08 | -0.02 | 0.00  | 5.37 |
| 400 | 24  | 0.075 | 0.2739 | 78   | 78.19       | 382.97      | 18.209 | 23.881 | 0.582  | 0.03  | 0.00  | 0.00  | 5.37 |
| 401 | 7   | 0.074 | 0.2720 | 78   | 78.14       | 382.17      | 18.087 | 23.721 | 0.160  | 0.01  | 0.00  | -0.01 | 5.37 |
| 402 | 35  | 0.077 | 0.2775 | 77.9 | 78.09       | 381.32      | 18.448 | 24.200 | 0.839  | 0.05  | 0.00  | -0.01 | 5.37 |
| 403 | -17 | 0.077 | 0.2775 | 77.9 | 78.06       | 380.5       | 18.448 | 24.200 | -0.411 | -0.02 | 0.00  | -0.01 | 5.37 |
| 404 | 71  | 0.074 | 0.2720 | 77.9 | 78.02       | 379.69      | 18.085 | 23.724 | 1.678  | 0.10  | 0.03  | 0.00  | 5.37 |
| 405 | 13  | 0.074 | 0.2720 | 77.8 | 77.98       | 378.9       | 18.084 | 23.726 | 0.310  | 0.02  | 0.03  | -0.01 | 5.37 |
| 406 | 47  | 0.075 | 0.2739 | 77.8 | 77.95       | 378.13      | 18.205 | 23.885 | 1.124  | 0.07  | 0.04  | 0.00  | 5.37 |
| 407 | -66 | 0.077 | 0.2775 | 77.6 | 77.88       | 377.35      | 18.443 | 24.206 | -1.604 | -0.10 | 0.01  | 0.00  | 5.37 |
|     |     |       |        |      | 77.86666667 | 376.9666667 |        |        |        |       | 0.02  | 0.00  |      |
|     |     |       |        |      | 77.8625     | 376.5625    |        |        |        |       | 0.00  | 0.00  |      |
|     |     |       |        |      | 77.84285714 | 376.1714286 |        |        |        |       | -0.01 | 0.00  |      |
|     |     |       |        |      | 77.81666667 | 375.8       |        |        |        |       | -0.10 | 0.00  |      |
|     |     |       |        |      | 77.8        | 375.44      |        |        |        |       |       | 0.00  |      |
|     |     |       |        |      | 77.775      | 375.1       |        |        |        |       |       | 0.00  |      |
|     |     |       |        |      | 77.73333333 | 374.7333333 |        |        |        |       |       | 0.00  |      |
|     |     |       |        |      | 77.7        | 374.3       |        |        |        |       |       | 0.00  |      |
|     |     |       |        |      | 77.6        | 373.9       |        |        |        |       |       | 0.00  |      |
|     |     |       |        |      |             |             |        |        |        |       |       | 0.00  |      |
|     |     |       |        |      |             |             |        |        |        |       |       | 0.00  |      |
|     |     |       |        |      |             |             |        |        |        |       |       | -0.01 |      |
|     |     |       |        |      |             |             |        |        |        |       |       | -0.01 |      |
|     |     |       |        |      |             |             |        |        |        |       |       | -0.01 |      |
|     |     |       |        |      |             |             |        |        |        |       |       | 0.00  |      |
|     |     |       |        |      |             |             |        |        |        |       |       | 0.00  |      |
|     |     |       |        |      |             |             |        |        |        |       |       | 0.00  |      |
|     |     |       |        |      |             |             |        |        |        |       |       | 0.00  |      |
|     |     |       |        |      |             |             |        |        |        |       |       | 0.00  |      |
|     |     |       |        |      |             |             |        |        |        |       |       | 0.00  |      |
|     |     |       |        |      |             |             |        |        |        |       |       | 0.00  |      |
|     |     |       |        |      |             |             |        |        |        |       |       | 0.00  |      |
|     |     |       |        |      |             |             |        |        |        |       |       | 0.00  |      |
|     |     |       |        |      |             |             |        |        |        |       |       | 0.00  |      |
|     |     |       |        |      |             |             |        |        |        |       |       | 0.00  |      |
|     |     |       |        |      |             |             |        |        |        |       |       | 0.00  |      |
|     |     |       |        |      |             |             |        |        |        |       |       | 0.00  |      |
|     |     |       |        |      |             |             |        |        |        |       |       | 0.00  |      |
|     |     |       |        |      |             |             |        |        |        |       |       | 0.00  |      |
|     |     |       |        |      |             |             |        |        |        |       |       | 0.00  |      |
|     |     |       |        |      |             |             |        |        |        |       |       | 0.00  |      |
|     |     |       |        |      |             |             |        |        |        |       |       | 0.00  |      |
|     |     |       |        |      |             |             |        |        |        |       |       | 0.00  |      |
|     |     |       |        |      |             |             |        |        |        |       |       | 0.00  |      |
|     |     |       |        |      |             |             |        |        |        |       |       | 0.00  |      |
|     |     |       |        |      |             |             |        |        |        |       |       | 0.00  |      |
|     |     |       |        |      |             |             |        |        |        |       |       | 0.00  |      |
|     |     |       |        |      |             |             |        |        |        |       |       | 0.00  |      |
|     |     |       |        |      |             |             |        |        |        |       |       | 0.00  |      |
|     |     |       |        |      |             |             |        |        |        |       |       | 0.00  |      |
|     |     |       |        |      |             |             |        |        |        |       |       | 0.00  |      |
|     |     |       |        |      |             |             |        |        |        |       |       | 0.00  |      |
|     |     |       |        |      |             |             |        |        |        |       |       | 0.00  |      |
|     |     |       |        |      |             |             |        |        |        |       |       | 0.00  |      |
|     |     |       |        |      |             |             |        |        |        |       |       | 0.00  |      |
|     |     |       |        |      |             |             |        |        |        |       |       | 0.00  |      |
|     |     |       |        |      |             |             |        |        |        |       |       | 0.00  |      |
|     |     |       |        |      |             |             |        |        |        |       |       | 0.00  |      |
|     |     |       |        |      |             |             |        |        |        |       |       | 0.00  |      |
|     |     |       |        |      |             |             |        |        |        |       |       | 0.00  |      |
|     |     |       |        |      |             |             |        |        |        |       |       | 0.00  |      |
|     |     |       |        |      |             |             |        |        |        |       |       | 0.00  |      |
|     |     |       |        |      |             |             |        |        |        |       |       | 0.00  |      |
|     |     |       |        |      |             |             |        |        |        |       |       | 0.00  |      |
|     |     |       |        |      |             |             |        |        |        |       |       | 0.00  |      |
|     |     |       |        |      |             |             |        |        |        |       |       | 0.00  |      |
|     |     |       |        |      |             |             |        |        |        |       |       | 0.00  |      |
|     |     |       |        |      |             |             |        |        |        |       |       | 0.00  |      |
|     |     |       |        |      |             |             |        |        |        |       |       | 0.00  |      |
|     |     |       |        |      |             |             |        |        |        |       |       | 0.00  |      |
|     |     |       |        |      |             |             |        |        |        |       |       | 0.00  |      |
|     |     |       |        |      |             |             |        |        |        |       |       | 0.00  |      |
|     |     |       |        |      |             |             |        |        |        |       |       |       |      |

## Run 1 TEOM Data

[illegible]

## Run 1 TEOM Data

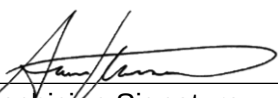
[illegible]

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



**Run 4 Data Summary**

|             |            |
|-------------|------------|
| Client:     | SBI        |
| Model:      | St Louis   |
| Job #:      | 24-303     |
| Tracking #: | 216        |
| Test Date:  | 12/12/2024 |

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

1/2/2025  
Date

# DILUTION TUNNEL & MISC. DATA - ASTM E2780 / E2515

Client: SBI  
 Model: St Louis  
 Run #: 4  
 Test Start Time: 12:04

Job #: 24-303  
 Tracking #: 216  
 Technician: AK  
 Date: 12/12/2024

Total Sampling Time (min): 340  
 Recording Interval (min): 1

Meter Box  $\gamma$  Factor: 1.005 (A)  
 Meter Box  $\gamma$  Factor: 1.011 (B)  
 Meter Box  $\gamma$  Factor: - (C)  
 Meter Box  $\gamma$  Factor: 1.013 (Ambient)

Induced Draft Check (in. H<sub>2</sub>O): 0  
 Smoke Capture Check (%): 100%  
 Date Flue Pipe Last Cleaned: 12/6/2024  
 Test Fuel Scale Audit (lbs): 10.00  
 Platform Scale Audit (lbs): 10.0

|                              | Pre-Test               | Post Test | Avg.  |
|------------------------------|------------------------|-----------|-------|
| Barometric Pressure (in. Hg) | 29.68                  | 29.62     | 29.65 |
| Relative Humidity (%)        | 27.3                   | 31.6      |       |
| Room Air Velocity (ft/min)   | <50                    | <50       |       |
| Pitot Tube Leak Check        | 0                      | 0         |       |
| Ambient Sample Volume:       | 89.919 ft <sup>3</sup> |           |       |

## Sample Train Leak Checks

|           | Pre-test | Post-test |       |            |
|-----------|----------|-----------|-------|------------|
| (A)       | 0.000    | 0.000     | cfm @ | -7 in. Hg  |
| (B)       | 0.000    | 0.000     | cfm @ | -7 in. Hg  |
| (C)       | -        | -         | cfm @ | - in. Hg   |
| (Ambient) | 0.000    | 0.000     | cfm @ | -13 in. Hg |

## DILUTION TUNNEL FLOW

### Traverse Data

| Point  | dP (in H <sub>2</sub> O) | Temp (°F) |
|--------|--------------------------|-----------|
| 1      | 0.066                    | 66        |
| 2      | 0.074                    | 66        |
| 3      | 0.080                    | 66        |
| 4      | 0.078                    | 66        |
| 5      | 0.072                    | 66        |
| 6      | 0.058                    | 66        |
| 7      | 0.062                    | 66        |
| 8      | 0.072                    | 66        |
| 9      | 0.084                    | 66        |
| 10     | 0.086                    | 66        |
| 11     | 0.078                    | 66        |
| 12     | 0.062                    | 66        |
| Center | 0.074                    | 66        |

Dilution Tunnel H<sub>2</sub>O: 2.00 percent  
 Tunnel Diameter: 12 inches  
 Pitot Tube Cp: 0.99 [unitless]  
 Dilution Tunnel MW(dry): 29.00 lb/lb-mole  
 Dilution Tunnel MW(wet): 28.78 lb/lb-mole  
 Tunnel Area: 0.7854 ft<sup>2</sup>

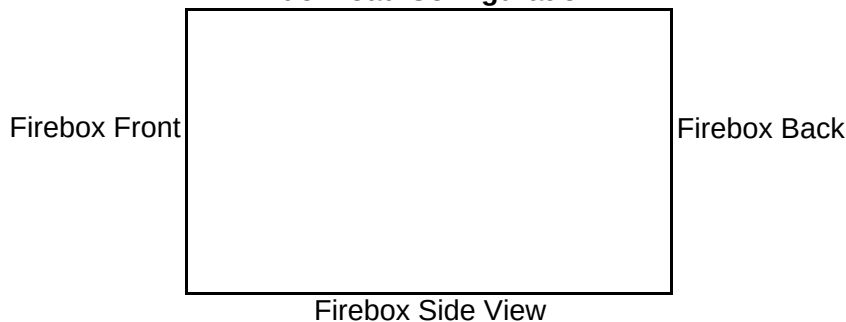
$V_{strav}$ : 17.88 ft/sec  
 $V_{scent}$ : 18.07 ft/sec  
 $F_p$ : 0.989 [ratio]

Initial Tunnel Flow: 821.2 scf/min

Static Pressure: -0.210 in. H<sub>2</sub>O

## TEST FUEL PROPERTIES

### Fuel Load Configuration



### Actual Fuel Used Properties

Fuel Type: D. Fir  
 HHV (kJ/kg): 19,810  
 %C: 48.73  
 %H: 6.87  
 %O: 43.9  
 %Ash: 0.5  
 MC (%DB): #DIV/0!



# BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: SBI  
 Model: St Louis  
 Run #: 4

Job #: 24-303  
 Tracking #: 216  
 Technician: AK  
 Date: 12/12/2024

| Elapsed Time (min) | Particulate Sampling Data |                   |                                          |                                  |                 |                      |               | Fuel Weight (lb) |               | Temperature Data (°F) |      |        |         |
|--------------------|---------------------------|-------------------|------------------------------------------|----------------------------------|-----------------|----------------------|---------------|------------------|---------------|-----------------------|------|--------|---------|
|                    | Gas Meter (ft³)           | Sample Rate (cfm) | Dilution Tunnel dP (in H <sub>2</sub> O) | Orifice dH (in H <sub>2</sub> O) | Meter Temp (°F) | Meter Vacuum (in Hg) | Pro. Rate (%) | Scale Reading    | Weight Change | Dilution Tunnel       | Flue | Filter | Ambient |
| 0                  | 83.565                    |                   | 0.074                                    | 0.01                             | 72              | -1.2                 |               | 8.07             |               | 73                    | 67   | 81     | 65      |
| 1                  | 83.694                    | 0.129             | 0.075                                    | 1.25                             | 72              | -2.2                 | -             | 7.93             | -0.14         | 79                    | 154  | 81     | 65      |
| 2                  | 83.870                    | 0.176             | 0.073                                    | 1.29                             | 72              | -2.1                 | -             | 7.27             | -0.66         | 92                    | 297  | 81     | 65      |
| 3                  | 84.048                    | 0.178             | 0.072                                    | 1.29                             | 72              | -2.0                 | -             | 6.86             | -0.41         | 88                    | 351  | 81     | 65      |
| 4                  | 84.223                    | 0.175             | 0.073                                    | 1.30                             | 72              | -1.9                 | -             | 6.48             | -0.38         | 85                    | 405  | 81     | 65      |
| 5                  | 84.399                    | 0.176             | 0.074                                    | 1.30                             | 72              | -1.8                 | -             | 6.07             | -0.41         | 86                    | 456  | 81     | 65      |
| 6                  | 84.578                    | 0.179             | 0.072                                    | 1.30                             | 72              | -1.7                 | -             | 5.70             | -0.37         | 87                    | 484  | 82     | 66      |
| 7                  | 84.754                    | 0.176             | 0.072                                    | 1.28                             | 72              | -1.6                 | -             | 5.37             | -0.33         | 87                    | 492  | 82     | 66      |
| 8                  | 84.929                    | 0.175             | 0.072                                    | 1.28                             | 72              | -1.5                 | -             | 5.07             | -0.30         | 88                    | 490  | 82     | 66      |
| 9                  | 85.105                    | 0.176             | 0.073                                    | 1.28                             | 72              | -1.6                 | -             | 4.81             | -0.26         | 88                    | 492  | 82     | 66      |
| 10                 | 85.279                    | 0.174             | 0.072                                    | 1.28                             | 72              | -1.5                 | 101           | 4.55             | -0.26         | 89                    | 491  | 82     | 66      |
| 11                 | 85.453                    | 0.174             | 0.074                                    | 1.27                             | 72              | -1.4                 | -             | 4.32             | -0.23         | 89                    | 488  | 82     | 66      |
| 12                 | 85.628                    | 0.175             | 0.074                                    | 1.27                             | 72              | -1.5                 | -             | 4.08             | -0.24         | 89                    | 489  | 82     | 66      |
| 13                 | 85.802                    | 0.174             | 0.072                                    | 1.26                             | 73              | -1.4                 | -             | 3.79             | -0.29         | 90                    | 500  | 83     | 66      |
| 14                 | 85.977                    | 0.175             | 0.073                                    | 1.28                             | 73              | -1.4                 | -             | 3.57             | -0.22         | 90                    | 491  | 83     | 66      |
| 15                 | 86.152                    | 0.175             | 0.073                                    | 1.28                             | 73              | -1.3                 | -             | 3.39             | -0.18         | 89                    | 482  | 83     | 66      |
| 16                 | 86.326                    | 0.174             | 0.073                                    | 1.27                             | 73              | -1.3                 | -             | 3.24             | -0.15         | 89                    | 475  | 83     | 66      |
| 17                 | 86.497                    | 0.171             | 0.075                                    | 1.28                             | 73              | -1.2                 | -             | 3.09             | -0.15         | 89                    | 474  | 83     | 66      |
| 18                 | 86.671                    | 0.174             | 0.074                                    | 1.25                             | 73              | -1.2                 | -             | 2.91             | -0.18         | 90                    | 475  | 83     | 66      |
| 19                 | 86.846                    | 0.175             | 0.073                                    | 1.26                             | 74              | -1.3                 | -             | 2.71             | -0.20         | 90                    | 482  | 83     | 66      |
| 20                 | 87.020                    | 0.174             | 0.074                                    | 1.26                             | 74              | -1.2                 | 104           | 2.49             | -0.22         | 91                    | 489  | 84     | 66      |
| 21                 | 87.196                    | 0.176             | 0.070                                    | 1.25                             | 74              | -1.3                 | -             | 11.01            | 8.52          | 115                   | 444  | 84     | 67      |
| 22                 | 87.369                    | 0.173             | 0.071                                    | 1.27                             | 74              | -1.2                 | -             | 15.51            | 4.50          | 107                   | 469  | 84     | 67      |
| 23                 | 87.542                    | 0.173             | 0.072                                    | 1.25                             | 74              | -1.3                 | -             | 15.21            | -0.30         | 100                   | 498  | 84     | 67      |
| 24                 | 87.715                    | 0.173             | 0.072                                    | 1.26                             | 75              | -1.2                 | -             | 14.96            | -0.25         | 97                    | 497  | 84     | 67      |
| 25                 | 87.888                    | 0.173             | 0.072                                    | 1.26                             | 75              | -1.2                 | -             | 14.74            | -0.22         | 95                    | 493  | 85     | 67      |
| 26                 | 88.061                    | 0.173             | 0.072                                    | 1.25                             | 75              | -1.2                 | -             | 14.51            | -0.23         | 94                    | 489  | 85     | 67      |
| 27                 | 88.233                    | 0.172             | 0.073                                    | 1.26                             | 75              | -1.2                 | -             | 14.27            | -0.24         | 94                    | 496  | 85     | 67      |
| 28                 | 88.407                    | 0.174             | 0.072                                    | 1.26                             | 75              | -1.2                 | -             | 13.84            | -0.43         | 92                    | 493  | 85     | 67      |
| 29                 | 88.580                    | 0.173             | 0.071                                    | 1.27                             | 76              | -1.3                 | -             | 13.62            | -0.22         | 90                    | 485  | 85     | 67      |
| 30                 | 88.753                    | 0.173             | 0.074                                    | 1.26                             | 76              | -1.3                 | 102           | 13.38            | -0.24         | 89                    | 487  | 85     | 67      |
| 31                 | 88.926                    | 0.173             | 0.071                                    | 1.27                             | 76              | -1.3                 | -             | 13.10            | -0.28         | 89                    | 496  | 85     | 68      |

# BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: SBIJob #: 24-303Model: St LouisTracking #: 216Run #: 4Technician: AKDate: 12/12/2024

| Elapsed Time (min) | Particulate Sampling Data |                   |                                          |                                  |                 |                      |               | Fuel Weight (lb) |               | Temperature Data (°F) |      |        |         |
|--------------------|---------------------------|-------------------|------------------------------------------|----------------------------------|-----------------|----------------------|---------------|------------------|---------------|-----------------------|------|--------|---------|
|                    | Gas Meter (ft³)           | Sample Rate (cfm) | Dilution Tunnel dP (in H <sub>2</sub> O) | Orifice dH (in H <sub>2</sub> O) | Meter Temp (°F) | Meter Vacuum (in Hg) | Pro. Rate (%) | Scale Reading    | Weight Change | Dilution Tunnel       | Flue | Filter | Ambient |
| 32                 | 89.097                    | 0.171             | 0.072                                    | 1.26                             | 76              | -1.3                 | -             | 12.86            | -0.24         | 89                    | 500  | 85     | 68      |
| 33                 | 89.270                    | 0.173             | 0.073                                    | 1.26                             | 77              | -1.2                 | -             | 12.59            | -0.27         | 89                    | 504  | 85     | 68      |
| 34                 | 89.443                    | 0.173             | 0.072                                    | 1.27                             | 77              | -1.2                 | -             | 12.28            | -0.31         | 89                    | 503  | 85     | 68      |
| 35                 | 89.616                    | 0.173             | 0.072                                    | 1.26                             | 77              | -1.3                 | -             | 12.02            | -0.26         | 89                    | 503  | 85     | 68      |
| 36                 | 89.793                    | 0.177             | 0.072                                    | 1.25                             | 77              | -1.3                 | -             | 11.76            | -0.26         | 89                    | 505  | 85     | 68      |
| 37                 | 89.966                    | 0.173             | 0.073                                    | 1.25                             | 77              | -1.2                 | -             | 11.47            | -0.29         | 89                    | 512  | 85     | 68      |
| 38                 | 90.139                    | 0.173             | 0.071                                    | 1.25                             | 78              | -1.4                 | -             | 11.18            | -0.29         | 90                    | 516  | 85     | 68      |
| 39                 | 90.312                    | 0.173             | 0.072                                    | 1.24                             | 78              | -1.3                 | -             | 10.90            | -0.28         | 90                    | 522  | 85     | 69      |
| 40                 | 90.486                    | 0.174             | 0.073                                    | 1.26                             | 78              | -1.2                 | 102           | 10.61            | -0.29         | 90                    | 526  | 85     | 69      |
| 41                 | 90.659                    | 0.173             | 0.073                                    | 1.25                             | 78              | -1.4                 | -             | 10.32            | -0.29         | 90                    | 529  | 85     | 69      |
| 42                 | 90.832                    | 0.173             | 0.072                                    | 1.25                             | 79              | -1.3                 | -             | 10.00            | -0.32         | 91                    | 534  | 86     | 69      |
| 43                 | 91.005                    | 0.173             | 0.072                                    | 1.26                             | 79              | -1.3                 | -             | 9.71             | -0.29         | 90                    | 519  | 86     | 69      |
| 44                 | 91.179                    | 0.174             | 0.074                                    | 1.26                             | 79              | -1.3                 | -             | 9.43             | -0.28         | 89                    | 494  | 86     | 69      |
| 45                 | 91.352                    | 0.173             | 0.073                                    | 1.25                             | 79              | -1.4                 | -             | 9.19             | -0.24         | 88                    | 465  | 86     | 69      |
| 46                 | 91.522                    | 0.170             | 0.073                                    | 1.25                             | 80              | -1.3                 | -             | 9.00             | -0.19         | 87                    | 450  | 86     | 69      |
| 47                 | 91.696                    | 0.174             | 0.073                                    | 1.26                             | 80              | -1.3                 | -             | 8.81             | -0.19         | 86                    | 440  | 86     | 69      |
| 48                 | 91.869                    | 0.173             | 0.073                                    | 1.25                             | 80              | -1.3                 | -             | 8.59             | -0.22         | 86                    | 434  | 85     | 69      |
| 49                 | 92.043                    | 0.174             | 0.074                                    | 1.26                             | 80              | -1.4                 | -             | 8.41             | -0.18         | 86                    | 438  | 86     | 70      |
| 50                 | 92.218                    | 0.175             | 0.074                                    | 1.27                             | 80              | -1.3                 | 101           | 8.21             | -0.20         | 86                    | 439  | 86     | 70      |
| 51                 | 92.391                    | 0.173             | 0.072                                    | 1.26                             | 81              | -1.3                 | -             | 8.00             | -0.21         | 86                    | 436  | 86     | 70      |
| 52                 | 92.565                    | 0.174             | 0.073                                    | 1.25                             | 81              | -1.3                 | -             | 7.82             | -0.18         | 85                    | 436  | 86     | 70      |
| 53                 | 92.739                    | 0.174             | 0.073                                    | 1.27                             | 81              | -1.4                 | -             | 7.63             | -0.19         | 85                    | 436  | 86     | 70      |
| 54                 | 92.912                    | 0.173             | 0.072                                    | 1.26                             | 81              | -1.3                 | -             | 7.43             | -0.20         | 85                    | 434  | 86     | 70      |
| 55                 | 93.086                    | 0.174             | 0.073                                    | 1.26                             | 82              | -1.3                 | -             | 7.26             | -0.17         | 85                    | 434  | 85     | 70      |
| 56                 | 93.259                    | 0.173             | 0.075                                    | 1.26                             | 82              | -1.3                 | -             | 7.05             | -0.21         | 85                    | 434  | 86     | 70      |
| 57                 | 93.433                    | 0.174             | 0.075                                    | 1.24                             | 82              | -1.4                 | -             | 6.83             | -0.22         | 85                    | 434  | 85     | 70      |
| 58                 | 93.607                    | 0.174             | 0.074                                    | 1.26                             | 82              | -1.5                 | -             | 6.65             | -0.18         | 85                    | 433  | 85     | 70      |
| 59                 | 93.780                    | 0.173             | 0.074                                    | 1.24                             | 82              | -1.5                 | -             | 6.45             | -0.20         | 85                    | 430  | 86     | 70      |
| 60                 | 93.954                    | 0.174             | 0.073                                    | 1.25                             | 83              | -1.4                 | 101           | 6.29             | -0.16         | 85                    | 428  | 85     | 70      |
| 61                 | 94.125                    | 0.171             | 0.076                                    | 1.26                             | 83              | -1.5                 | -             | 6.13             | -0.16         | 85                    | 425  | 85     | 70      |
| 62                 | 94.299                    | 0.174             | 0.075                                    | 1.25                             | 83              | -1.4                 | -             | 5.98             | -0.15         | 85                    | 423  | 86     | 70      |
| 63                 | 94.473                    | 0.174             | 0.072                                    | 1.26                             | 83              | -1.5                 | -             | 5.80             | -0.18         | 85                    | 422  | 86     | 70      |

# BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: SBI  
 Model: St Louis  
 Run #: 4

Job #: 24-303  
 Tracking #: 216  
 Technician: AK  
 Date: 12/12/2024

| Elapsed Time (min) | Particulate Sampling Data |                   |                                          |                                  |                 |                      |               | Fuel Weight (lb) |               | Temperature Data (°F) |      |        |         |
|--------------------|---------------------------|-------------------|------------------------------------------|----------------------------------|-----------------|----------------------|---------------|------------------|---------------|-----------------------|------|--------|---------|
|                    | Gas Meter (ft³)           | Sample Rate (cfm) | Dilution Tunnel dP (in H <sub>2</sub> O) | Orifice dH (in H <sub>2</sub> O) | Meter Temp (°F) | Meter Vacuum (in Hg) | Pro. Rate (%) | Scale Reading    | Weight Change | Dilution Tunnel       | Flue | Filter | Ambient |
| 64                 | 94.650                    | 0.177             | 0.072                                    | 1.25                             | 83              | -1.5                 | -             | 5.64             | -0.16         | 85                    | 421  | 85     | 70      |
| 65                 | 94.824                    | 0.174             | 0.076                                    | 1.26                             | 83              | -1.4                 | -             | 5.47             | -0.17         | 85                    | 420  | 85     | 70      |
| 66                 | 94.997                    | 0.173             | 0.074                                    | 1.25                             | 84              | -1.5                 | -             | 5.31             | -0.16         | 85                    | 419  | 85     | 70      |
| 67                 | 95.170                    | 0.173             | 0.074                                    | 1.26                             | 84              | -1.4                 | -             | 5.15             | -0.16         | 85                    | 419  | 85     | 70      |
| 68                 | 95.343                    | 0.173             | 0.075                                    | 1.26                             | 84              | -1.5                 | -             | 5.00             | -0.15         | 85                    | 418  | 85     | 70      |
| 69                 | 95.518                    | 0.175             | 0.076                                    | 1.26                             | 84              | -1.6                 | -             | 4.85             | -0.15         | 85                    | 416  | 85     | 70      |
| 70                 | 95.692                    | 0.174             | 0.074                                    | 1.26                             | 84              | -1.5                 | 101           | 4.74             | -0.11         | 84                    | 408  | 85     | 70      |
| 71                 | 95.866                    | 0.174             | 0.076                                    | 1.25                             | 84              | -1.6                 | -             | 4.62             | -0.12         | 84                    | 401  | 85     | 70      |
| 72                 | 96.040                    | 0.174             | 0.075                                    | 1.26                             | 85              | -1.6                 | -             | 4.52             | -0.10         | 84                    | 394  | 85     | 70      |
| 73                 | 96.214                    | 0.174             | 0.075                                    | 1.25                             | 85              | -1.7                 | -             | 4.42             | -0.10         | 84                    | 391  | 85     | 70      |
| 74                 | 96.385                    | 0.171             | 0.074                                    | 1.26                             | 85              | -1.6                 | -             | 4.33             | -0.09         | 83                    | 388  | 85     | 70      |
| 75                 | 96.559                    | 0.174             | 0.074                                    | 1.27                             | 85              | -1.6                 | -             | 4.24             | -0.09         | 83                    | 387  | 86     | 70      |
| 76                 | 96.733                    | 0.174             | 0.074                                    | 1.25                             | 85              | -1.6                 | -             | 4.15             | -0.09         | 83                    | 394  | 86     | 70      |
| 77                 | 96.911                    | 0.178             | 0.075                                    | 1.26                             | 85              | -1.7                 | -             | 4.05             | -0.10         | 84                    | 404  | 86     | 70      |
| 78                 | 97.085                    | 0.174             | 0.075                                    | 1.26                             | 85              | -1.6                 | -             | 4.01             | -0.04         | 86                    | 414  | 86     | 70      |
| 79                 | 97.259                    | 0.174             | 0.073                                    | 1.25                             | 86              | -1.6                 | -             | 3.99             | -0.02         | 88                    | 418  | 86     | 69      |
| 80                 | 97.433                    | 0.174             | 0.075                                    | 1.25                             | 86              | -1.6                 | 100           | 3.94             | -0.05         | 89                    | 422  | 86     | 69      |
| 81                 | 97.606                    | 0.173             | 0.075                                    | 1.25                             | 86              | -1.7                 | -             | 3.88             | -0.06         | 90                    | 423  | 86     | 69      |
| 82                 | 97.780                    | 0.174             | 0.075                                    | 1.26                             | 86              | -1.7                 | -             | 3.81             | -0.07         | 90                    | 427  | 86     | 68      |
| 83                 | 97.954                    | 0.174             | 0.076                                    | 1.26                             | 86              | -1.8                 | -             | 3.74             | -0.07         | 90                    | 429  | 86     | 68      |
| 84                 | 98.128                    | 0.174             | 0.073                                    | 1.26                             | 86              | -1.7                 | -             | 13.40            | 9.66          | 112                   | 423  | 86     | 68      |
| 85                 | 98.302                    | 0.174             | 0.074                                    | 1.25                             | 86              | -1.8                 | -             | 13.14            | -0.26         | 103                   | 495  | 86     | 68      |
| 86                 | 98.476                    | 0.174             | 0.073                                    | 1.26                             | 86              | -1.8                 | -             | 12.62            | -0.52         | 98                    | 520  | 86     | 69      |
| 87                 | 98.650                    | 0.174             | 0.074                                    | 1.25                             | 87              | -1.7                 | -             | 12.34            | -0.28         | 93                    | 507  | 86     | 69      |
| 88                 | 98.821                    | 0.171             | 0.073                                    | 1.25                             | 87              | -1.8                 | -             | 12.10            | -0.24         | 90                    | 482  | 86     | 70      |
| 89                 | 98.995                    | 0.174             | 0.073                                    | 1.26                             | 87              | -1.8                 | -             | 11.92            | -0.18         | 88                    | 454  | 86     | 70      |
| 90                 | 99.173                    | 0.178             | 0.073                                    | 1.25                             | 87              | -1.8                 | 100           | 11.75            | -0.17         | 87                    | 441  | 86     | 70      |
| 91                 | 99.347                    | 0.174             | 0.073                                    | 1.25                             | 87              | -1.9                 | -             | 11.56            | -0.19         | 87                    | 435  | 86     | 70      |
| 92                 | 99.521                    | 0.174             | 0.075                                    | 1.26                             | 87              | -1.9                 | -             | 11.38            | -0.18         | 86                    | 430  | 86     | 70      |
| 93                 | 99.689                    | 0.168             | 0.074                                    | 1.25                             | 87              | -1.8                 | -             | 11.21            | -0.17         | 86                    | 427  | 86     | 70      |
| 94                 | 99.864                    | 0.175             | 0.075                                    | 1.26                             | 87              | -1.9                 | -             | 11.03            | -0.18         | 86                    | 425  | 86     | 70      |
| 95                 | 100.038                   | 0.174             | 0.073                                    | 1.25                             | 87              | -1.9                 | -             | 10.84            | -0.19         | 86                    | 425  | 86     | 71      |

# BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: SBI  
 Model: St Louis  
 Run #: 4

Job #: 24-303  
 Tracking #: 216  
 Technician: AK  
 Date: 12/12/2024

| Elapsed Time (min) | Particulate Sampling Data |                   |                                          |                                  |                 |                      |               | Fuel Weight (lb) |               | Temperature Data (°F) |      |        |         |
|--------------------|---------------------------|-------------------|------------------------------------------|----------------------------------|-----------------|----------------------|---------------|------------------|---------------|-----------------------|------|--------|---------|
|                    | Gas Meter (ft³)           | Sample Rate (cfm) | Dilution Tunnel dP (in H <sub>2</sub> O) | Orifice dH (in H <sub>2</sub> O) | Meter Temp (°F) | Meter Vacuum (in Hg) | Pro. Rate (%) | Scale Reading    | Weight Change | Dilution Tunnel       | Flue | Filter | Ambient |
| 96                 | 100.212                   | 0.174             | 0.074                                    | 1.26                             | 88              | -1.8                 | -             | 10.67            | -0.17         | 85                    | 425  | 86     | 70      |
| 97                 | 100.385                   | 0.173             | 0.075                                    | 1.25                             | 88              | -1.8                 | -             | 10.49            | -0.18         | 85                    | 421  | 86     | 70      |
| 98                 | 100.559                   | 0.174             | 0.073                                    | 1.25                             | 88              | -1.8                 | -             | 10.32            | -0.17         | 85                    | 420  | 86     | 70      |
| 99                 | 100.734                   | 0.175             | 0.073                                    | 1.26                             | 88              | -1.8                 | -             | 10.15            | -0.17         | 85                    | 419  | 86     | 70      |
| 100                | 100.908                   | 0.174             | 0.074                                    | 1.26                             | 88              | -1.9                 | 100           | 10.01            | -0.14         | 85                    | 417  | 86     | 70      |
| 101                | 101.082                   | 0.174             | 0.076                                    | 1.27                             | 88              | -1.8                 | -             | 9.84             | -0.17         | 85                    | 415  | 86     | 70      |
| 102                | 101.257                   | 0.175             | 0.074                                    | 1.25                             | 88              | -1.8                 | -             | 9.68             | -0.16         | 85                    | 414  | 86     | 71      |
| 103                | 101.431                   | 0.174             | 0.075                                    | 1.25                             | 88              | -1.9                 | -             | 9.52             | -0.16         | 85                    | 412  | 86     | 70      |
| 104                | 101.606                   | 0.175             | 0.076                                    | 1.25                             | 88              | -1.8                 | -             | 9.37             | -0.15         | 85                    | 411  | 86     | 71      |
| 105                | 101.780                   | 0.174             | 0.075                                    | 1.27                             | 88              | -1.8                 | -             | 9.20             | -0.17         | 85                    | 408  | 86     | 71      |
| 106                | 101.955                   | 0.175             | 0.076                                    | 1.25                             | 88              | -1.8                 | -             | 9.05             | -0.15         | 85                    | 408  | 86     | 71      |
| 107                | 102.129                   | 0.174             | 0.075                                    | 1.24                             | 88              | -1.9                 | -             | 8.92             | -0.13         | 84                    | 407  | 86     | 71      |
| 108                | 102.303                   | 0.174             | 0.075                                    | 1.26                             | 89              | -1.8                 | -             | 8.74             | -0.18         | 84                    | 407  | 86     | 71      |
| 109                | 102.477                   | 0.174             | 0.073                                    | 1.24                             | 89              | -1.9                 | -             | 8.58             | -0.16         | 84                    | 405  | 86     | 71      |
| 110                | 102.651                   | 0.174             | 0.075                                    | 1.26                             | 89              | -1.8                 | 99            | 8.44             | -0.14         | 84                    | 404  | 86     | 71      |
| 111                | 102.826                   | 0.175             | 0.075                                    | 1.28                             | 89              | -1.9                 | -             | 8.28             | -0.16         | 84                    | 403  | 86     | 71      |
| 112                | 103.000                   | 0.174             | 0.074                                    | 1.24                             | 89              | -1.8                 | -             | 8.13             | -0.15         | 84                    | 402  | 86     | 71      |
| 113                | 103.175                   | 0.175             | 0.076                                    | 1.25                             | 89              | -1.8                 | -             | 8.02             | -0.11         | 84                    | 401  | 86     | 71      |
| 114                | 103.349                   | 0.174             | 0.076                                    | 1.26                             | 89              | -1.8                 | -             | 7.91             | -0.11         | 84                    | 401  | 86     | 71      |
| 115                | 103.524                   | 0.175             | 0.073                                    | 1.24                             | 89              | -1.9                 | -             | 7.76             | -0.15         | 84                    | 400  | 86     | 71      |
| 116                | 103.699                   | 0.175             | 0.075                                    | 1.26                             | 89              | -1.8                 | -             | 7.64             | -0.12         | 84                    | 397  | 86     | 71      |
| 117                | 103.873                   | 0.174             | 0.074                                    | 1.26                             | 89              | -1.9                 | -             | 7.49             | -0.15         | 84                    | 395  | 86     | 71      |
| 118                | 104.048                   | 0.175             | 0.076                                    | 1.26                             | 89              | -1.9                 | -             | 7.39             | -0.10         | 84                    | 393  | 86     | 71      |
| 119                | 104.222                   | 0.174             | 0.074                                    | 1.26                             | 89              | -1.9                 | -             | 7.25             | -0.14         | 84                    | 391  | 86     | 71      |
| 120                | 104.395                   | 0.173             | 0.075                                    | 1.26                             | 89              | -2.0                 | 99            | 7.12             | -0.13         | 83                    | 389  | 86     | 71      |
| 121                | 104.570                   | 0.175             | 0.074                                    | 1.25                             | 89              | -1.8                 | -             | 7.00             | -0.12         | 83                    | 386  | 86     | 71      |
| 122                | 104.745                   | 0.175             | 0.074                                    | 1.26                             | 90              | -1.8                 | -             | 6.89             | -0.11         | 83                    | 384  | 86     | 71      |
| 123                | 104.920                   | 0.175             | 0.075                                    | 1.27                             | 90              | -2.0                 | -             | 6.78             | -0.11         | 83                    | 383  | 86     | 71      |
| 124                | 105.095                   | 0.175             | 0.075                                    | 1.25                             | 90              | -1.9                 | -             | 6.68             | -0.10         | 83                    | 382  | 86     | 71      |
| 125                | 105.270                   | 0.175             | 0.075                                    | 1.27                             | 90              | -1.9                 | -             | 6.56             | -0.12         | 83                    | 379  | 86     | 71      |
| 126                | 105.444                   | 0.174             | 0.073                                    | 1.26                             | 90              | -1.9                 | -             | 6.45             | -0.11         | 83                    | 377  | 86     | 71      |
| 127                | 105.619                   | 0.175             | 0.073                                    | 1.25                             | 90              | -2.0                 | -             | 6.34             | -0.11         | 83                    | 376  | 86     | 71      |

# BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: SBI  
 Model: St Louis  
 Run #: 4

Job #: 24-303  
 Tracking #: 216  
 Technician: AK  
 Date: 12/12/2024

| Elapsed Time (min) | Particulate Sampling Data |                   |                                          |                                  |                 |                      |               | Fuel Weight (lb) |               | Temperature Data (°F) |      |        |         |
|--------------------|---------------------------|-------------------|------------------------------------------|----------------------------------|-----------------|----------------------|---------------|------------------|---------------|-----------------------|------|--------|---------|
|                    | Gas Meter (ft³)           | Sample Rate (cfm) | Dilution Tunnel dP (in H <sub>2</sub> O) | Orifice dH (in H <sub>2</sub> O) | Meter Temp (°F) | Meter Vacuum (in Hg) | Pro. Rate (%) | Scale Reading    | Weight Change | Dilution Tunnel       | Flue | Filter | Ambient |
| 128                | 105.794                   | 0.175             | 0.075                                    | 1.27                             | 90              | -2.0                 | -             | 6.26             | -0.08         | 82                    | 374  | 86     | 71      |
| 129                | 105.968                   | 0.174             | 0.075                                    | 1.28                             | 90              | -1.9                 | -             | 6.14             | -0.12         | 82                    | 375  | 86     | 71      |
| 130                | 106.142                   | 0.174             | 0.075                                    | 1.26                             | 90              | -1.9                 | 99            | 6.07             | -0.07         | 84                    | 375  | 86     | 70      |
| 131                | 106.317                   | 0.175             | 0.073                                    | 1.25                             | 90              | -2.0                 | -             | 6.02             | -0.05         | 86                    | 377  | 86     | 69      |
| 132                | 106.492                   | 0.175             | 0.075                                    | 1.26                             | 90              | -2.0                 | -             | 5.95             | -0.07         | 87                    | 379  | 86     | 69      |
| 133                | 106.667                   | 0.175             | 0.075                                    | 1.25                             | 90              | -2.0                 | -             | 5.86             | -0.09         | 88                    | 381  | 86     | 69      |
| 134                | 106.842                   | 0.175             | 0.077                                    | 1.26                             | 90              | -2.0                 | -             | 5.82             | -0.04         | 88                    | 382  | 86     | 69      |
| 135                | 107.017                   | 0.175             | 0.074                                    | 1.26                             | 90              | -2.0                 | -             | 5.74             | -0.08         | 88                    | 384  | 86     | 69      |
| 136                | 107.192                   | 0.175             | 0.075                                    | 1.26                             | 90              | -2.1                 | -             | 5.38             | -0.36         | 86                    | 381  | 86     | 69      |
| 137                | 107.367                   | 0.175             | 0.074                                    | 1.26                             | 90              | -2.1                 | -             | 5.28             | -0.10         | 84                    | 379  | 86     | 70      |
| 138                | 107.541                   | 0.174             | 0.075                                    | 1.26                             | 90              | -2.1                 | -             | 5.16             | -0.12         | 83                    | 376  | 86     | 70      |
| 139                | 107.715                   | 0.174             | 0.076                                    | 1.25                             | 90              | -2.1                 | -             | 5.07             | -0.09         | 83                    | 379  | 86     | 70      |
| 140                | 107.890                   | 0.175             | 0.073                                    | 1.26                             | 90              | -2.1                 | 99            | 5.00             | -0.07         | 83                    | 388  | 86     | 70      |
| 141                | 108.064                   | 0.174             | 0.075                                    | 1.27                             | 90              | -2.1                 | -             | 4.91             | -0.09         | 83                    | 389  | 86     | 70      |
| 142                | 108.239                   | 0.175             | 0.074                                    | 1.26                             | 90              | -2.1                 | -             | 4.80             | -0.11         | 83                    | 390  | 86     | 70      |
| 143                | 108.414                   | 0.175             | 0.074                                    | 1.25                             | 90              | -2.0                 | -             | 4.71             | -0.09         | 83                    | 390  | 86     | 70      |
| 144                | 108.589                   | 0.175             | 0.075                                    | 1.27                             | 90              | -2.2                 | -             | 4.61             | -0.10         | 83                    | 390  | 86     | 70      |
| 145                | 108.764                   | 0.175             | 0.074                                    | 1.25                             | 90              | -2.2                 | -             | 31.80            | 27.19         | 107                   | 399  | 86     | 70      |
| 146                | 108.938                   | 0.174             | 0.071                                    | 1.26                             | 91              | -2.2                 | -             | 27.42            | -4.38         | 118                   | 412  | 86     | 70      |
| 147                | 109.113                   | 0.175             | 0.071                                    | 1.24                             | 91              | -2.1                 | -             | 27.18            | -0.24         | 127                   | 444  | 87     | 69      |
| 148                | 109.286                   | 0.173             | 0.070                                    | 1.25                             | 91              | -2.2                 | -             | 26.90            | -0.28         | 138                   | 502  | 87     | 69      |
| 149                | 109.460                   | 0.174             | 0.071                                    | 1.25                             | 91              | -2.1                 | -             | 26.48            | -0.42         | 120                   | 469  | 87     | 69      |
| 150                | 109.634                   | 0.174             | 0.072                                    | 1.26                             | 91              | -2.2                 | 101           | 26.24            | -0.24         | 105                   | 452  | 87     | 69      |
| 151                | 109.807                   | 0.173             | 0.073                                    | 1.25                             | 91              | -2.1                 | -             | 26.01            | -0.23         | 100                   | 451  | 87     | 69      |
| 152                | 109.982                   | 0.175             | 0.073                                    | 1.24                             | 91              | -2.2                 | -             | 25.77            | -0.24         | 97                    | 454  | 87     | 69      |
| 153                | 110.156                   | 0.174             | 0.072                                    | 1.25                             | 91              | -2.1                 | -             | 25.53            | -0.24         | 96                    | 456  | 88     | 69      |
| 154                | 110.330                   | 0.174             | 0.074                                    | 1.26                             | 91              | -2.1                 | -             | 25.28            | -0.25         | 95                    | 463  | 88     | 69      |
| 155                | 110.505                   | 0.175             | 0.075                                    | 1.26                             | 91              | -2.2                 | -             | 25.01            | -0.27         | 95                    | 469  | 88     | 68      |
| 156                | 110.679                   | 0.174             | 0.073                                    | 1.26                             | 91              | -2.1                 | -             | 24.76            | -0.25         | 95                    | 475  | 88     | 68      |
| 157                | 110.854                   | 0.175             | 0.075                                    | 1.25                             | 91              | -2.1                 | -             | 24.47            | -0.29         | 94                    | 479  | 88     | 68      |
| 158                | 111.029                   | 0.175             | 0.073                                    | 1.26                             | 91              | -2.1                 | -             | 24.21            | -0.26         | 94                    | 481  | 88     | 68      |
| 159                | 111.203                   | 0.174             | 0.074                                    | 1.26                             | 91              | -2.0                 | -             | 23.97            | -0.24         | 94                    | 483  | 88     | 68      |

# BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: SBI  
 Model: St Louis  
 Run #: 4

Job #: 24-303  
 Tracking #: 216  
 Technician: AK  
 Date: 12/12/2024

| Elapsed Time (min) | Particulate Sampling Data |                   |                                          |                                  |                 |                      |               | Fuel Weight (lb) |               | Temperature Data (°F) |      |        |         |
|--------------------|---------------------------|-------------------|------------------------------------------|----------------------------------|-----------------|----------------------|---------------|------------------|---------------|-----------------------|------|--------|---------|
|                    | Gas Meter (ft³)           | Sample Rate (cfm) | Dilution Tunnel dP (in H <sub>2</sub> O) | Orifice dH (in H <sub>2</sub> O) | Meter Temp (°F) | Meter Vacuum (in Hg) | Pro. Rate (%) | Scale Reading    | Weight Change | Dilution Tunnel       | Flue | Filter | Ambient |
| 160                | 111.378                   | 0.175             | 0.075                                    | 1.25                             | 91              | -2.0                 | 101           | 23.72            | -0.25         | 94                    | 483  | 88     | 68      |
| 161                | 111.552                   | 0.174             | 0.074                                    | 1.26                             | 91              | -2.0                 | -             | 23.49            | -0.23         | 94                    | 483  | 88     | 68      |
| 162                | 111.725                   | 0.173             | 0.074                                    | 1.25                             | 91              | -2.0                 | -             | 23.26            | -0.23         | 94                    | 485  | 88     | 68      |
| 163                | 111.900                   | 0.175             | 0.072                                    | 1.26                             | 91              | -2.0                 | -             | 23.04            | -0.22         | 94                    | 485  | 88     | 68      |
| 164                | 112.074                   | 0.174             | 0.072                                    | 1.26                             | 91              | -2.0                 | -             | 22.80            | -0.24         | 95                    | 485  | 88     | 69      |
| 165                | 112.249                   | 0.175             | 0.072                                    | 1.25                             | 91              | -1.9                 | -             | 22.58            | -0.22         | 95                    | 486  | 88     | 69      |
| 166                | 112.423                   | 0.174             | 0.073                                    | 1.25                             | 91              | -1.9                 | -             | 22.36            | -0.22         | 95                    | 488  | 88     | 68      |
| 167                | 112.599                   | 0.176             | 0.072                                    | 1.26                             | 91              | -1.9                 | -             | 22.13            | -0.23         | 95                    | 488  | 88     | 68      |
| 168                | 112.773                   | 0.174             | 0.074                                    | 1.26                             | 91              | -1.8                 | -             | 21.91            | -0.22         | 95                    | 491  | 88     | 68      |
| 169                | 112.948                   | 0.175             | 0.072                                    | 1.26                             | 91              | -1.9                 | -             | 21.69            | -0.22         | 95                    | 491  | 88     | 69      |
| 170                | 113.123                   | 0.175             | 0.075                                    | 1.26                             | 91              | -1.8                 | 99            | 21.47            | -0.22         | 95                    | 491  | 88     | 68      |
| 171                | 113.298                   | 0.175             | 0.073                                    | 1.25                             | 91              | -1.9                 | -             | 21.25            | -0.22         | 95                    | 491  | 88     | 69      |
| 172                | 113.471                   | 0.173             | 0.073                                    | 1.26                             | 91              | -1.8                 | -             | 21.04            | -0.21         | 95                    | 491  | 88     | 68      |
| 173                | 113.648                   | 0.177             | 0.075                                    | 1.26                             | 91              | -1.8                 | -             | 20.83            | -0.21         | 95                    | 491  | 88     | 68      |
| 174                | 113.820                   | 0.172             | 0.073                                    | 1.26                             | 91              | -1.8                 | -             | 20.62            | -0.21         | 96                    | 489  | 88     | 68      |
| 175                | 113.994                   | 0.174             | 0.074                                    | 1.24                             | 91              | -1.9                 | -             | 20.43            | -0.19         | 96                    | 489  | 88     | 68      |
| 176                | 114.169                   | 0.175             | 0.074                                    | 1.25                             | 91              | -1.8                 | -             | 20.22            | -0.21         | 95                    | 486  | 88     | 68      |
| 177                | 114.344                   | 0.175             | 0.072                                    | 1.25                             | 91              | -1.9                 | -             | 20.02            | -0.20         | 95                    | 485  | 88     | 68      |
| 178                | 114.518                   | 0.174             | 0.073                                    | 1.25                             | 91              | -1.9                 | -             | 19.83            | -0.19         | 96                    | 484  | 88     | 68      |
| 179                | 114.693                   | 0.175             | 0.075                                    | 1.24                             | 91              | -1.7                 | -             | 19.63            | -0.20         | 96                    | 484  | 88     | 68      |
| 180                | 114.868                   | 0.175             | 0.073                                    | 1.26                             | 91              | -1.8                 | 100           | 19.45            | -0.18         | 96                    | 482  | 88     | 68      |
| 181                | 115.043                   | 0.175             | 0.073                                    | 1.26                             | 91              | -1.9                 | -             | 19.25            | -0.20         | 96                    | 482  | 88     | 68      |
| 182                | 115.217                   | 0.174             | 0.072                                    | 1.25                             | 92              | -1.9                 | -             | 19.05            | -0.20         | 96                    | 481  | 88     | 68      |
| 183                | 115.391                   | 0.174             | 0.074                                    | 1.26                             | 91              | -1.9                 | -             | 18.87            | -0.18         | 96                    | 481  | 88     | 68      |
| 184                | 115.565                   | 0.174             | 0.073                                    | 1.24                             | 91              | -1.9                 | -             | 18.68            | -0.19         | 95                    | 480  | 88     | 68      |
| 185                | 115.740                   | 0.175             | 0.074                                    | 1.25                             | 92              | -1.8                 | -             | 18.50            | -0.18         | 95                    | 479  | 88     | 68      |
| 186                | 115.914                   | 0.174             | 0.075                                    | 1.27                             | 92              | -1.8                 | -             | 18.32            | -0.18         | 95                    | 480  | 88     | 68      |
| 187                | 116.089                   | 0.175             | 0.071                                    | 1.25                             | 92              | -1.8                 | -             | 18.12            | -0.20         | 95                    | 479  | 88     | 68      |
| 188                | 116.264                   | 0.175             | 0.073                                    | 1.25                             | 92              | -1.8                 | -             | 17.94            | -0.18         | 95                    | 479  | 88     | 68      |
| 189                | 116.438                   | 0.174             | 0.073                                    | 1.27                             | 92              | -1.8                 | -             | 17.76            | -0.18         | 95                    | 478  | 88     | 68      |
| 190                | 116.613                   | 0.175             | 0.074                                    | 1.25                             | 92              | -1.8                 | 100           | 17.58            | -0.18         | 95                    | 478  | 88     | 68      |
| 191                | 116.788                   | 0.175             | 0.073                                    | 1.25                             | 92              | -1.8                 | -             | 17.40            | -0.18         | 95                    | 477  | 88     | 68      |

# BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: SBI  
 Model: St Louis  
 Run #: 4

Job #: 24-303  
 Tracking #: 216  
 Technician: AK  
 Date: 12/12/2024

| Elapsed Time (min) | Particulate Sampling Data |                   |                                          |                                  |                 |                      |               | Fuel Weight (lb) |               | Temperature Data (°F) |      |        |         |
|--------------------|---------------------------|-------------------|------------------------------------------|----------------------------------|-----------------|----------------------|---------------|------------------|---------------|-----------------------|------|--------|---------|
|                    | Gas Meter (ft³)           | Sample Rate (cfm) | Dilution Tunnel dP (in H <sub>2</sub> O) | Orifice dH (in H <sub>2</sub> O) | Meter Temp (°F) | Meter Vacuum (in Hg) | Pro. Rate (%) | Scale Reading    | Weight Change | Dilution Tunnel       | Flue | Filter | Ambient |
| 192                | 116.963                   | 0.175             | 0.073                                    | 1.25                             | 92              | -1.8                 | -             | 17.22            | -0.18         | 95                    | 477  | 88     | 68      |
| 193                | 117.137                   | 0.174             | 0.071                                    | 1.26                             | 92              | -1.9                 | -             | 17.04            | -0.18         | 95                    | 476  | 88     | 68      |
| 194                | 117.310                   | 0.173             | 0.072                                    | 1.25                             | 92              | -1.8                 | -             | 16.87            | -0.17         | 95                    | 477  | 88     | 68      |
| 195                | 117.485                   | 0.175             | 0.072                                    | 1.25                             | 92              | -1.8                 | -             | 16.70            | -0.17         | 95                    | 476  | 88     | 68      |
| 196                | 117.660                   | 0.175             | 0.072                                    | 1.25                             | 92              | -1.9                 | -             | 16.53            | -0.17         | 95                    | 476  | 88     | 68      |
| 197                | 117.834                   | 0.174             | 0.072                                    | 1.26                             | 92              | -1.9                 | -             | 16.35            | -0.18         | 95                    | 475  | 88     | 68      |
| 198                | 118.013                   | 0.179             | 0.073                                    | 1.26                             | 92              | -1.9                 | -             | 16.19            | -0.16         | 95                    | 476  | 88     | 68      |
| 199                | 118.188                   | 0.175             | 0.074                                    | 1.26                             | 92              | -1.9                 | -             | 16.01            | -0.18         | 95                    | 473  | 88     | 68      |
| 200                | 118.363                   | 0.175             | 0.071                                    | 1.25                             | 92              | -1.8                 | 101           | 15.85            | -0.16         | 95                    | 472  | 88     | 68      |
| 201                | 118.537                   | 0.174             | 0.072                                    | 1.25                             | 92              | -1.9                 | -             | 15.68            | -0.17         | 95                    | 474  | 88     | 68      |
| 202                | 118.712                   | 0.175             | 0.074                                    | 1.25                             | 92              | -1.9                 | -             | 15.52            | -0.16         | 95                    | 473  | 87     | 68      |
| 203                | 118.886                   | 0.174             | 0.073                                    | 1.25                             | 92              | -1.9                 | -             | 15.35            | -0.17         | 95                    | 472  | 87     | 68      |
| 204                | 119.060                   | 0.174             | 0.073                                    | 1.24                             | 92              | -1.9                 | -             | 15.19            | -0.16         | 94                    | 471  | 87     | 68      |
| 205                | 119.235                   | 0.175             | 0.073                                    | 1.26                             | 92              | -1.8                 | -             | 15.02            | -0.17         | 94                    | 472  | 87     | 68      |
| 206                | 119.409                   | 0.174             | 0.073                                    | 1.25                             | 92              | -1.9                 | -             | 14.85            | -0.17         | 95                    | 472  | 87     | 68      |
| 207                | 119.584                   | 0.175             | 0.074                                    | 1.26                             | 92              | -2.0                 | -             | 14.68            | -0.17         | 94                    | 473  | 87     | 68      |
| 208                | 119.759                   | 0.175             | 0.073                                    | 1.26                             | 92              | -1.8                 | -             | 14.51            | -0.17         | 94                    | 472  | 87     | 68      |
| 209                | 119.934                   | 0.175             | 0.073                                    | 1.25                             | 92              | -2.0                 | -             | 14.35            | -0.16         | 94                    | 472  | 87     | 68      |
| 210                | 120.109                   | 0.175             | 0.073                                    | 1.25                             | 92              | -1.9                 | 101           | 14.19            | -0.16         | 95                    | 472  | 87     | 68      |
| 211                | 120.284                   | 0.175             | 0.073                                    | 1.26                             | 92              | -1.9                 | -             | 14.02            | -0.17         | 94                    | 472  | 87     | 68      |
| 212                | 120.458                   | 0.174             | 0.074                                    | 1.24                             | 92              | -1.9                 | -             | 13.86            | -0.16         | 94                    | 472  | 88     | 68      |
| 213                | 120.633                   | 0.175             | 0.074                                    | 1.25                             | 92              | -1.9                 | -             | 13.68            | -0.18         | 94                    | 473  | 88     | 68      |
| 214                | 120.806                   | 0.173             | 0.074                                    | 1.24                             | 92              | -1.9                 | -             | 13.50            | -0.18         | 94                    | 474  | 88     | 68      |
| 215                | 120.981                   | 0.175             | 0.072                                    | 1.26                             | 92              | -1.9                 | -             | 13.34            | -0.16         | 95                    | 475  | 88     | 68      |
| 216                | 121.155                   | 0.174             | 0.072                                    | 1.25                             | 92              | -1.9                 | -             | 13.17            | -0.17         | 95                    | 476  | 88     | 68      |
| 217                | 121.330                   | 0.175             | 0.072                                    | 1.26                             | 92              | -2.0                 | -             | 12.99            | -0.18         | 94                    | 478  | 88     | 68      |
| 218                | 121.505                   | 0.175             | 0.075                                    | 1.26                             | 92              | -1.9                 | -             | 12.82            | -0.17         | 95                    | 479  | 88     | 68      |
| 219                | 121.679                   | 0.174             | 0.074                                    | 1.25                             | 92              | -1.9                 | -             | 12.64            | -0.18         | 95                    | 481  | 88     | 68      |
| 220                | 121.854                   | 0.175             | 0.073                                    | 1.24                             | 92              | -2.0                 | 101           | 12.47            | -0.17         | 95                    | 481  | 88     | 68      |
| 221                | 122.032                   | 0.178             | 0.073                                    | 1.24                             | 92              | -2.0                 | -             | 12.29            | -0.18         | 95                    | 485  | 88     | 68      |
| 222                | 122.203                   | 0.171             | 0.073                                    | 1.24                             | 92              | -1.9                 | -             | 12.12            | -0.17         | 95                    | 485  | 88     | 68      |
| 223                | 122.378                   | 0.175             | 0.073                                    | 1.25                             | 92              | -2.0                 | -             | 11.93            | -0.19         | 95                    | 489  | 88     | 68      |

# BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: SBIJob #: 24-303Model: St LouisTracking #: 216Run #: 4Technician: AKDate: 12/12/2024

| Elapsed Time (min) | Particulate Sampling Data |                   |                                          |                                  |                 |                      |               | Fuel Weight (lb) |               | Temperature Data (°F) |      |        |         |
|--------------------|---------------------------|-------------------|------------------------------------------|----------------------------------|-----------------|----------------------|---------------|------------------|---------------|-----------------------|------|--------|---------|
|                    | Gas Meter (ft³)           | Sample Rate (cfm) | Dilution Tunnel dP (in H <sub>2</sub> O) | Orifice dH (in H <sub>2</sub> O) | Meter Temp (°F) | Meter Vacuum (in Hg) | Pro. Rate (%) | Scale Reading    | Weight Change | Dilution Tunnel       | Flue | Filter | Ambient |
| 224                | 122.551                   | 0.173             | 0.073                                    | 1.26                             | 92              | -2.0                 | -             | 11.75            | -0.18         | 95                    | 490  | 88     | 68      |
| 225                | 122.725                   | 0.174             | 0.073                                    | 1.25                             | 92              | -1.9                 | -             | 11.57            | -0.18         | 95                    | 491  | 88     | 68      |
| 226                | 122.898                   | 0.173             | 0.073                                    | 1.25                             | 92              | -1.9                 | -             | 11.39            | -0.18         | 95                    | 492  | 88     | 68      |
| 227                | 123.072                   | 0.174             | 0.074                                    | 1.25                             | 92              | -1.9                 | -             | 11.23            | -0.16         | 95                    | 493  | 88     | 68      |
| 228                | 123.246                   | 0.174             | 0.075                                    | 1.24                             | 92              | -2.0                 | -             | 11.07            | -0.16         | 95                    | 490  | 88     | 68      |
| 229                | 123.419                   | 0.173             | 0.073                                    | 1.25                             | 92              | -2.0                 | -             | 10.91            | -0.16         | 95                    | 491  | 88     | 68      |
| 230                | 123.593                   | 0.174             | 0.073                                    | 1.25                             | 92              | -1.9                 | 100           | 10.74            | -0.17         | 95                    | 492  | 87     | 68      |
| 231                | 123.770                   | 0.177             | 0.074                                    | 1.24                             | 92              | -1.9                 | -             | 10.57            | -0.17         | 95                    | 492  | 87     | 68      |
| 232                | 123.941                   | 0.171             | 0.072                                    | 1.25                             | 92              | -1.9                 | -             | 10.42            | -0.15         | 95                    | 491  | 88     | 68      |
| 233                | 124.114                   | 0.173             | 0.075                                    | 1.25                             | 92              | -2.0                 | -             | 10.26            | -0.16         | 95                    | 491  | 87     | 68      |
| 234                | 124.288                   | 0.174             | 0.074                                    | 1.24                             | 92              | -2.0                 | -             | 10.12            | -0.14         | 95                    | 489  | 87     | 68      |
| 235                | 124.461                   | 0.173             | 0.074                                    | 1.24                             | 92              | -2.0                 | -             | 9.98             | -0.14         | 95                    | 486  | 87     | 68      |
| 236                | 124.635                   | 0.174             | 0.073                                    | 1.23                             | 92              | -1.9                 | -             | 9.86             | -0.12         | 95                    | 485  | 87     | 68      |
| 237                | 124.808                   | 0.173             | 0.074                                    | 1.24                             | 92              | -2.0                 | -             | 9.69             | -0.17         | 95                    | 482  | 87     | 68      |
| 238                | 124.982                   | 0.174             | 0.073                                    | 1.23                             | 92              | -2.0                 | -             | 9.56             | -0.13         | 95                    | 482  | 87     | 68      |
| 239                | 125.158                   | 0.176             | 0.074                                    | 1.25                             | 92              | -1.9                 | -             | 9.44             | -0.12         | 95                    | 479  | 87     | 68      |
| 240                | 125.329                   | 0.171             | 0.073                                    | 1.24                             | 92              | -2.0                 | 100           | 9.32             | -0.12         | 95                    | 477  | 87     | 68      |
| 241                | 125.502                   | 0.173             | 0.074                                    | 1.25                             | 92              | -2.0                 | -             | 9.20             | -0.12         | 95                    | 475  | 87     | 68      |
| 242                | 125.675                   | 0.173             | 0.075                                    | 1.24                             | 92              | -1.9                 | -             | 9.07             | -0.13         | 95                    | 470  | 87     | 68      |
| 243                | 125.848                   | 0.173             | 0.074                                    | 1.24                             | 92              | -2.0                 | -             | 8.96             | -0.11         | 95                    | 469  | 87     | 68      |
| 244                | 126.021                   | 0.173             | 0.075                                    | 1.25                             | 92              | -2.0                 | -             | 8.85             | -0.11         | 94                    | 466  | 87     | 68      |
| 245                | 126.194                   | 0.173             | 0.073                                    | 1.24                             | 92              | -2.0                 | -             | 8.75             | -0.10         | 94                    | 464  | 87     | 68      |
| 246                | 126.367                   | 0.173             | 0.074                                    | 1.24                             | 92              | -2.1                 | -             | 8.65             | -0.10         | 94                    | 459  | 87     | 68      |
| 247                | 126.541                   | 0.174             | 0.076                                    | 1.24                             | 92              | -2.0                 | -             | 8.55             | -0.10         | 94                    | 457  | 87     | 68      |
| 248                | 126.717                   | 0.176             | 0.075                                    | 1.23                             | 92              | -2.0                 | -             | 8.45             | -0.10         | 94                    | 456  | 87     | 68      |
| 249                | 126.887                   | 0.170             | 0.073                                    | 1.24                             | 92              | -2.0                 | -             | 8.36             | -0.09         | 94                    | 452  | 87     | 68      |
| 250                | 127.061                   | 0.174             | 0.073                                    | 1.25                             | 92              | -2.0                 | 100           | 8.27             | -0.09         | 93                    | 447  | 87     | 68      |
| 251                | 127.234                   | 0.173             | 0.074                                    | 1.23                             | 92              | -2.0                 | -             | 8.19             | -0.08         | 93                    | 444  | 87     | 68      |
| 252                | 127.408                   | 0.174             | 0.073                                    | 1.24                             | 92              | -2.1                 | -             | 8.09             | -0.10         | 93                    | 442  | 87     | 68      |
| 253                | 127.581                   | 0.173             | 0.074                                    | 1.23                             | 92              | -2.1                 | -             | 8.02             | -0.07         | 93                    | 439  | 87     | 68      |
| 254                | 127.755                   | 0.174             | 0.075                                    | 1.25                             | 92              | -2.0                 | -             | 7.94             | -0.08         | 93                    | 437  | 87     | 68      |
| 255                | 127.932                   | 0.177             | 0.074                                    | 1.24                             | 92              | -2.0                 | -             | 7.86             | -0.08         | 93                    | 436  | 87     | 68      |



# BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: SBI  
 Model: St Louis  
 Run #: 4

Job #: 24-303  
 Tracking #: 216  
 Technician: AK  
 Date: 12/12/2024

| Elapsed Time (min) | Particulate Sampling Data |                   |                                          |                                  |                 |                      |               | Fuel Weight (lb) |               | Temperature Data (°F) |      |        |         |
|--------------------|---------------------------|-------------------|------------------------------------------|----------------------------------|-----------------|----------------------|---------------|------------------|---------------|-----------------------|------|--------|---------|
|                    | Gas Meter (ft³)           | Sample Rate (cfm) | Dilution Tunnel dP (in H <sub>2</sub> O) | Orifice dH (in H <sub>2</sub> O) | Meter Temp (°F) | Meter Vacuum (in Hg) | Pro. Rate (%) | Scale Reading    | Weight Change | Dilution Tunnel       | Flue | Filter | Ambient |
| 256                | 128.102                   | 0.170             | 0.075                                    | 1.24                             | 92              | -2.1                 | -             | 7.79             | -0.07         | 93                    | 434  | 87     | 68      |
| 257                | 128.275                   | 0.173             | 0.074                                    | 1.24                             | 92              | -2.1                 | -             | 7.71             | -0.08         | 93                    | 432  | 87     | 68      |
| 258                | 128.449                   | 0.174             | 0.075                                    | 1.24                             | 92              | -2.2                 | -             | 7.64             | -0.07         | 93                    | 429  | 87     | 68      |
| 259                | 128.622                   | 0.173             | 0.075                                    | 1.24                             | 92              | -2.1                 | -             | 7.57             | -0.07         | 93                    | 427  | 87     | 68      |
| 260                | 128.796                   | 0.174             | 0.073                                    | 1.25                             | 92              | -2.2                 | 100           | 7.50             | -0.07         | 92                    | 426  | 87     | 68      |
| 261                | 128.969                   | 0.173             | 0.074                                    | 1.24                             | 92              | -2.2                 | -             | 7.42             | -0.08         | 92                    | 424  | 87     | 68      |
| 262                | 129.143                   | 0.174             | 0.074                                    | 1.23                             | 92              | -2.1                 | -             | 7.36             | -0.06         | 92                    | 423  | 87     | 68      |
| 263                | 129.316                   | 0.173             | 0.075                                    | 1.23                             | 92              | -2.2                 | -             | 7.29             | -0.07         | 92                    | 421  | 87     | 68      |
| 264                | 129.489                   | 0.173             | 0.076                                    | 1.24                             | 92              | -2.2                 | -             | 7.19             | -0.10         | 92                    | 419  | 87     | 67      |
| 265                | 129.662                   | 0.173             | 0.074                                    | 1.24                             | 92              | -2.2                 | -             | 7.17             | -0.02         | 91                    | 416  | 87     | 67      |
| 266                | 129.835                   | 0.173             | 0.075                                    | 1.25                             | 92              | -2.2                 | -             | 7.12             | -0.05         | 91                    | 412  | 87     | 67      |
| 267                | 130.008                   | 0.173             | 0.074                                    | 1.25                             | 92              | -2.3                 | -             | 7.05             | -0.07         | 91                    | 411  | 87     | 67      |
| 268                | 130.182                   | 0.174             | 0.076                                    | 1.25                             | 92              | -2.2                 | -             | 7.00             | -0.05         | 91                    | 407  | 87     | 67      |
| 269                | 130.355                   | 0.173             | 0.076                                    | 1.25                             | 92              | -2.3                 | -             | 6.94             | -0.06         | 91                    | 406  | 87     | 67      |
| 270                | 130.529                   | 0.174             | 0.075                                    | 1.25                             | 92              | -2.3                 | 99            | 6.89             | -0.05         | 91                    | 403  | 87     | 67      |
| 271                | 130.702                   | 0.173             | 0.075                                    | 1.25                             | 92              | -2.2                 | -             | 6.84             | -0.05         | 91                    | 402  | 87     | 67      |
| 272                | 130.876                   | 0.174             | 0.075                                    | 1.25                             | 92              | -2.3                 | -             | 6.79             | -0.05         | 91                    | 400  | 87     | 67      |
| 273                | 131.049                   | 0.173             | 0.074                                    | 1.24                             | 92              | -2.4                 | -             | 6.74             | -0.05         | 91                    | 398  | 87     | 67      |
| 274                | 131.223                   | 0.174             | 0.075                                    | 1.25                             | 92              | -2.3                 | -             | 6.68             | -0.06         | 90                    | 396  | 86     | 67      |
| 275                | 131.396                   | 0.173             | 0.074                                    | 1.25                             | 92              | -2.4                 | -             | 6.63             | -0.05         | 90                    | 393  | 86     | 67      |
| 276                | 131.570                   | 0.174             | 0.075                                    | 1.24                             | 92              | -2.4                 | -             | 6.59             | -0.04         | 90                    | 391  | 86     | 67      |
| 277                | 131.744                   | 0.174             | 0.076                                    | 1.25                             | 92              | -2.4                 | -             | 6.55             | -0.04         | 90                    | 390  | 86     | 67      |
| 278                | 131.918                   | 0.174             | 0.074                                    | 1.25                             | 92              | -2.4                 | -             | 6.52             | -0.03         | 90                    | 388  | 86     | 67      |
| 279                | 132.091                   | 0.173             | 0.075                                    | 1.23                             | 92              | -2.4                 | -             | 6.48             | -0.04         | 90                    | 387  | 86     | 67      |
| 280                | 132.268                   | 0.177             | 0.072                                    | 1.25                             | 92              | -2.5                 | 100           | 6.44             | -0.04         | 90                    | 384  | 86     | 67      |
| 281                | 132.439                   | 0.171             | 0.073                                    | 1.24                             | 92              | -2.4                 | -             | 6.41             | -0.03         | 89                    | 381  | 86     | 67      |
| 282                | 132.612                   | 0.173             | 0.075                                    | 1.24                             | 92              | -2.4                 | -             | 6.38             | -0.03         | 89                    | 379  | 86     | 67      |
| 283                | 132.785                   | 0.173             | 0.075                                    | 1.24                             | 92              | -2.5                 | -             | 6.34             | -0.04         | 89                    | 378  | 86     | 67      |
| 284                | 132.958                   | 0.173             | 0.074                                    | 1.24                             | 92              | -2.4                 | -             | 6.31             | -0.03         | 89                    | 375  | 86     | 67      |
| 285                | 133.131                   | 0.173             | 0.075                                    | 1.24                             | 92              | -2.6                 | -             | 6.27             | -0.04         | 89                    | 375  | 86     | 67      |
| 286                | 133.305                   | 0.174             | 0.074                                    | 1.26                             | 92              | -2.5                 | -             | 6.24             | -0.03         | 89                    | 373  | 86     | 67      |
| 287                | 133.479                   | 0.174             | 0.074                                    | 1.23                             | 92              | -2.5                 | -             | 6.20             | -0.04         | 89                    | 371  | 86     | 67      |

# BOX A TEST DATA - ASTM E2780 / ASTM E2515

Client: SBI  
 Model: St Louis  
 Run #: 4

Job #: 24-303  
 Tracking #: 216  
 Technician: AK  
 Date: 12/12/2024

| Elapsed Time (min) | Particulate Sampling Data |                   |                                          |                                  |                 |                      |               | Fuel Weight (lb) |               | Temperature Data (°F) |      |        |         |
|--------------------|---------------------------|-------------------|------------------------------------------|----------------------------------|-----------------|----------------------|---------------|------------------|---------------|-----------------------|------|--------|---------|
|                    | Gas Meter (ft³)           | Sample Rate (cfm) | Dilution Tunnel dP (in H <sub>2</sub> O) | Orifice dH (in H <sub>2</sub> O) | Meter Temp (°F) | Meter Vacuum (in Hg) | Pro. Rate (%) | Scale Reading    | Weight Change | Dilution Tunnel       | Flue | Filter | Ambient |
| 288                | 133.652                   | 0.173             | 0.074                                    | 1.25                             | 92              | -2.6                 | -             | 6.17             | -0.03         | 88                    | 370  | 86     | 67      |
| 289                | 133.826                   | 0.174             | 0.076                                    | 1.25                             | 92              | -2.6                 | -             | 6.13             | -0.04         | 89                    | 369  | 86     | 67      |
| 290                | 134.003                   | 0.177             | 0.076                                    | 1.24                             | 92              | -2.6                 | 99            | 6.11             | -0.02         | 88                    | 369  | 86     | 67      |
| 291                | 134.173                   | 0.170             | 0.075                                    | 1.24                             | 92              | -2.6                 | -             | 6.08             | -0.03         | 88                    | 369  | 86     | 67      |
| 292                | 134.347                   | 0.174             | 0.074                                    | 1.25                             | 92              | -2.7                 | -             | 6.04             | -0.04         | 88                    | 366  | 86     | 67      |
| 293                | 134.521                   | 0.174             | 0.075                                    | 1.25                             | 92              | -2.6                 | -             | 6.01             | -0.03         | 88                    | 365  | 86     | 67      |
| 294                | 134.695                   | 0.174             | 0.075                                    | 1.24                             | 92              | -2.6                 | -             | 5.98             | -0.03         | 88                    | 365  | 86     | 67      |
| 295                | 134.872                   | 0.177             | 0.076                                    | 1.24                             | 92              | -2.7                 | -             | 5.95             | -0.03         | 88                    | 364  | 86     | 67      |
| 296                | 135.042                   | 0.170             | 0.075                                    | 1.25                             | 92              | -2.7                 | -             | 5.91             | -0.04         | 88                    | 363  | 86     | 67      |
| 297                | 135.216                   | 0.174             | 0.076                                    | 1.25                             | 92              | -2.8                 | -             | 5.87             | -0.04         | 88                    | 361  | 86     | 67      |
| 298                | 135.389                   | 0.173             | 0.074                                    | 1.24                             | 92              | -2.7                 | -             | 5.84             | -0.03         | 87                    | 362  | 86     | 67      |
| 299                | 135.563                   | 0.174             | 0.078                                    | 1.25                             | 92              | -2.8                 | -             | 5.81             | -0.03         | 87                    | 362  | 86     | 67      |
| 300                | 135.737                   | 0.174             | 0.075                                    | 1.24                             | 92              | -2.8                 | 98            | 5.78             | -0.03         | 87                    | 361  | 86     | 67      |
| 301                | 135.910                   | 0.173             | 0.075                                    | 1.24                             | 92              | -2.8                 | -             | 5.75             | -0.03         | 87                    | 362  | 86     | 67      |
| 302                | 136.083                   | 0.173             | 0.074                                    | 1.25                             | 92              | -2.7                 | -             | 5.72             | -0.03         | 87                    | 361  | 86     | 67      |
| 303                | 136.256                   | 0.173             | 0.077                                    | 1.24                             | 92              | -2.8                 | -             | 5.68             | -0.04         | 87                    | 360  | 86     | 67      |
| 304                | 136.430                   | 0.174             | 0.074                                    | 1.25                             | 92              | -2.8                 | -             | 5.65             | -0.03         | 87                    | 359  | 86     | 67      |
| 305                | 136.604                   | 0.174             | 0.074                                    | 1.23                             | 92              | -2.7                 | -             | 5.62             | -0.03         | 87                    | 358  | 86     | 67      |
| 306                | 136.777                   | 0.173             | 0.074                                    | 1.25                             | 92              | -2.9                 | -             | 5.59             | -0.03         | 87                    | 357  | 86     | 67      |
| 307                | 136.951                   | 0.174             | 0.075                                    | 1.25                             | 92              | -2.8                 | -             | 5.56             | -0.03         | 87                    | 357  | 86     | 67      |
| 308                | 137.124                   | 0.173             | 0.075                                    | 1.26                             | 92              | -2.8                 | -             | 5.53             | -0.03         | 87                    | 356  | 86     | 67      |
| 309                | 137.298                   | 0.174             | 0.076                                    | 1.24                             | 92              | -2.8                 | -             | 5.50             | -0.03         | 86                    | 356  | 86     | 67      |
| 310                | 137.472                   | 0.174             | 0.075                                    | 1.24                             | 92              | -2.9                 | 98            | 5.47             | -0.03         | 86                    | 354  | 85     | 67      |
| 311                | 137.646                   | 0.174             | 0.076                                    | 1.24                             | 92              | -2.9                 | -             | 5.43             | -0.04         | 86                    | 353  | 85     | 67      |
| 312                | 137.820                   | 0.174             | 0.076                                    | 1.26                             | 92              | -2.8                 | -             | 5.39             | -0.04         | 86                    | 353  | 85     | 67      |
| 313                | 137.993                   | 0.173             | 0.074                                    | 1.24                             | 92              | -2.8                 | -             | 5.37             | -0.02         | 86                    | 352  | 85     | 67      |
| 314                | 138.167                   | 0.174             | 0.074                                    | 1.24                             | 92              | -2.8                 | -             | 5.33             | -0.04         | 86                    | 352  | 85     | 67      |
| 315                | 138.341                   | 0.174             | 0.075                                    | 1.24                             | 92              | -3.0                 | -             | 5.31             | -0.02         | 86                    | 351  | 85     | 67      |
| 316                | 138.517                   | 0.176             | 0.075                                    | 1.25                             | 92              | -3.0                 | -             | 5.27             | -0.04         | 86                    | 350  | 85     | 67      |
| 317                | 138.688                   | 0.171             | 0.076                                    | 1.23                             | 92              | -2.9                 | -             | 5.24             | -0.03         | 86                    | 350  | 85     | 67      |
| 318                | 138.861                   | 0.173             | 0.075                                    | 1.24                             | 92              | -2.9                 | -             | 5.21             | -0.03         | 86                    | 348  | 85     | 67      |
| 319                | 139.034                   | 0.173             | 0.076                                    | 1.25                             | 92              | -3.0                 | -             | 5.19             | -0.02         | 86                    | 347  | 85     | 67      |

# BOX A TEST DATA - ASTM E2780 / ASTM E2515

|                        |                         |
|------------------------|-------------------------|
| Client: <u>SBI</u>     | Job #: <u>24-303</u>    |
| Model: <u>St Louis</u> | Tracking #: <u>216</u>  |
| Run #: <u>4</u>        | Technician: <u>AK</u>   |
|                        | Date: <u>12/12/2024</u> |

| Elapsed Time (min) | Particulate Sampling Data |                   |                                          |                                  |                 |                      |               | Fuel Weight (lb) |               | Temperature Data (°F) |       |        |         |
|--------------------|---------------------------|-------------------|------------------------------------------|----------------------------------|-----------------|----------------------|---------------|------------------|---------------|-----------------------|-------|--------|---------|
|                    | Gas Meter (ft³)           | Sample Rate (cfm) | Dilution Tunnel dP (in H <sub>2</sub> O) | Orifice dH (in H <sub>2</sub> O) | Meter Temp (°F) | Meter Vacuum (in Hg) | Pro. Rate (%) | Scale Reading    | Weight Change | Dilution Tunnel       | Flue  | Filter | Ambient |
| 320                | 139.207                   | 0.173             | 0.076                                    | 1.23                             | 92              | -2.9                 | 98            | 5.14             | -0.05         | 86                    | 346   | 85     | 67      |
| 321                | 139.381                   | 0.174             | 0.075                                    | 1.24                             | 92              | -2.9                 | -             | 5.12             | -0.02         | 85                    | 344   | 85     | 66      |
| 322                | 139.554                   | 0.173             | 0.075                                    | 1.24                             | 92              | -2.9                 | -             | 5.08             | -0.04         | 85                    | 344   | 85     | 67      |
| 323                | 139.731                   | 0.177             | 0.075                                    | 1.25                             | 92              | -2.9                 | -             | 5.05             | -0.03         | 85                    | 343   | 85     | 66      |
| 324                | 139.902                   | 0.171             | 0.075                                    | 1.25                             | 92              | -2.9                 | -             | 5.03             | -0.02         | 85                    | 341   | 85     | 66      |
| 325                | 140.075                   | 0.173             | 0.075                                    | 1.25                             | 92              | -3.0                 | -             | 5.00             | -0.03         | 85                    | 341   | 85     | 66      |
| 326                | 140.249                   | 0.174             | 0.075                                    | 1.24                             | 92              | -2.9                 | -             | 4.97             | -0.03         | 85                    | 341   | 85     | 66      |
| 327                | 140.426                   | 0.177             | 0.075                                    | 1.24                             | 92              | -3.0                 | -             | 4.94             | -0.03         | 85                    | 341   | 85     | 66      |
| 328                | 140.596                   | 0.170             | 0.076                                    | 1.25                             | 92              | -3.0                 | -             | 4.92             | -0.02         | 85                    | 340   | 85     | 66      |
| 329                | 140.770                   | 0.174             | 0.075                                    | 1.23                             | 92              | -3.0                 | -             | 4.89             | -0.03         | 85                    | 338   | 85     | 66      |
| 330                | 140.944                   | 0.174             | 0.077                                    | 1.24                             | 92              | -3.0                 | 97            | 4.87             | -0.02         | 85                    | 336   | 85     | 66      |
| 331                | 141.118                   | 0.174             | 0.077                                    | 1.26                             | 92              | -3.0                 | -             | 4.83             | -0.04         | 84                    | 337   | 84     | 66      |
| 332                | 141.291                   | 0.173             | 0.076                                    | 1.23                             | 92              | -3.0                 | -             | 4.81             | -0.02         | 84                    | 335   | 84     | 66      |
| 333                | 141.465                   | 0.174             | 0.075                                    | 1.24                             | 92              | -3.1                 | -             | 4.78             | -0.03         | 84                    | 334   | 84     | 66      |
| 334                | 141.641                   | 0.176             | 0.076                                    | 1.24                             | 92              | -3.1                 | -             | 4.75             | -0.03         | 84                    | 333   | 84     | 66      |
| 335                | 141.814                   | 0.173             | 0.076                                    | 1.24                             | 92              | -3.0                 | -             | 4.72             | -0.03         | 84                    | 332   | 84     | 66      |
| 336                | 141.986                   | 0.172             | 0.076                                    | 1.25                             | 92              | -3.2                 | -             | 4.70             | -0.02         | 84                    | 331   | 84     | 66      |
| 337                | 142.159                   | 0.173             | 0.075                                    | 1.24                             | 92              | -3.1                 | -             | 4.67             | -0.03         | 84                    | 331   | 84     | 66      |
| 338                | 142.332                   | 0.173             | 0.076                                    | 1.24                             | 92              | -3.1                 | -             | 4.65             | -0.02         | 84                    | 331   | 84     | 66      |
| 339                | 142.509                   | 0.177             | 0.076                                    | 1.25                             | 92              | -3.1                 | -             | 4.62             | -0.03         | 84                    | 329   | 84     | 66      |
| 340                | 142.680                   | 0.171             | 0.076                                    | 1.24                             | 92              | -3.2                 | 97            | 4.59             | -0.03         | 84                    | 329   | 84     | 66      |
| Avg/Tot            | 59.115                    | 0.174             | 0.074                                    | 1.25                             | 87.9            | -2.0                 | 100           |                  |               | 90.2                  | 429.4 | 86.0   | 68.3    |

# BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: SBI  
 Model: St Louis  
 Run #: 4

Job #: 24-303  
 Tracking #: 216  
 Technician: AK  
 Date: 12/12/2024

| Elapsed Time (min) | Particulate Sampling Data    |                   |                                  |                 |                      |               |             | Flue Gas Data                    |                     |        |
|--------------------|------------------------------|-------------------|----------------------------------|-----------------|----------------------|---------------|-------------|----------------------------------|---------------------|--------|
|                    | Gas Meter (ft <sup>3</sup> ) | Sample Rate (cfm) | Orifice dH (in H <sub>2</sub> O) | Meter Temp (°F) | Meter Vacuum (in Hg) | Pro. Rate (%) | Filter (°F) | Flue Draft (in H <sub>2</sub> O) | CO <sub>2</sub> (%) | CO (%) |
| 0                  | 80.330                       |                   | 0.01                             | 82              | -0.6                 |               | 81          | 0.004                            | 0.13                | 0.004  |
| 1                  | 80.449                       | 0.119             | 1.24                             | 81              | -1.4                 | -             | 81          | 0.036                            | 1.42                | 0.149  |
| 2                  | 80.621                       | 0.172             | 1.37                             | 81              | -1.4                 | -             | 81          | 0.065                            | 2.42                | 0.158  |
| 3                  | 80.795                       | 0.174             | 1.37                             | 81              | -1.5                 | -             | 81          | 0.059                            | 10.34               | 0.559  |
| 4                  | 80.972                       | 0.177             | 1.39                             | 81              | -1.4                 | -             | 81          | 0.062                            | 11.75               | 0.288  |
| 5                  | 81.150                       | 0.178             | 1.39                             | 80              | -1.4                 | -             | 82          | 0.068                            | 13.12               | 0.801  |
| 6                  | 81.330                       | 0.180             | 1.39                             | 80              | -1.5                 | -             | 82          | 0.073                            | 12.85               | 0.309  |
| 7                  | 81.505                       | 0.175             | 1.37                             | 80              | -1.5                 | -             | 82          | 0.073                            | 11.74               | 0.097  |
| 8                  | 81.681                       | 0.176             | 1.38                             | 80              | -1.4                 | -             | 82          | 0.070                            | 11.15               | 0.071  |
| 9                  | 81.858                       | 0.177             | 1.37                             | 80              | -1.5                 | -             | 82          | 0.067                            | 11.09               | 0.087  |
| 10                 | 82.034                       | 0.176             | 1.36                             | 80              | -1.5                 | 99            | 83          | 0.067                            | 10.39               | 0.067  |
| 11                 | 82.211                       | 0.177             | 1.36                             | 80              | -1.5                 | -             | 83          | 0.070                            | 9.73                | 0.065  |
| 12                 | 82.387                       | 0.176             | 1.38                             | 80              | -1.5                 | -             | 83          | 0.070                            | 9.61                | 0.091  |
| 13                 | 82.561                       | 0.174             | 1.37                             | 80              | -1.3                 | -             | 83          | 0.069                            | 11.28               | 0.051  |
| 14                 | 82.736                       | 0.175             | 1.36                             | 80              | -1.3                 | -             | 83          | 0.067                            | 11.93               | 0.051  |
| 15                 | 82.912                       | 0.176             | 1.37                             | 80              | -1.5                 | -             | 83          | 0.064                            | 9.62                | 0.103  |
| 16                 | 83.088                       | 0.176             | 1.36                             | 81              | -1.5                 | -             | 84          | 0.068                            | 8.73                | 0.199  |
| 17                 | 83.260                       | 0.172             | 1.33                             | 81              | -1.3                 | -             | 84          | 0.068                            | 8.49                | 0.229  |
| 18                 | 83.436                       | 0.176             | 1.37                             | 81              | -1.4                 | -             | 84          | 0.071                            | 8.81                | 0.156  |
| 19                 | 83.612                       | 0.176             | 1.36                             | 81              | -1.3                 | -             | 84          | 0.073                            | 9.66                | 0.056  |
| 20                 | 83.787                       | 0.175             | 1.36                             | 81              | -1.4                 | 103           | 84          | 0.072                            | 10.79               | 0.031  |
| 21                 | 83.963                       | 0.176             | 1.33                             | 81              | -1.5                 | -             | 85          | 0.071                            | 4.14                | 0.063  |
| 22                 | 84.137                       | 0.174             | 1.33                             | 81              | -1.3                 | -             | 85          | 0.070                            | 4.52                | 0.329  |
| 23                 | 84.312                       | 0.175             | 1.36                             | 81              | -1.5                 | -             | 85          | 0.070                            | 10.13               | 0.461  |
| 24                 | 84.487                       | 0.175             | 1.36                             | 81              | -1.4                 | -             | 85          | 0.078                            | 10.07               | 0.173  |
| 25                 | 84.661                       | 0.174             | 1.36                             | 81              | -1.4                 | -             | 85          | 0.071                            | 9.80                | 0.156  |
| 26                 | 84.836                       | 0.175             | 1.34                             | 82              | -1.5                 | -             | 86          | 0.068                            | 9.12                | 0.208  |
| 27                 | 85.011                       | 0.175             | 1.32                             | 82              | -1.4                 | -             | 86          | 0.077                            | 9.72                | 0.210  |
| 28                 | 85.186                       | 0.175             | 1.35                             | 82              | -1.4                 | -             | 86          | 0.079                            | 10.31               | 0.147  |
| 29                 | 85.359                       | 0.173             | 1.35                             | 82              | -1.3                 | -             | 86          | 0.076                            | 10.55               | 0.194  |
| 30                 | 85.533                       | 0.174             | 1.34                             | 82              | -1.5                 | 102           | 86          | 0.073                            | 10.68               | 0.200  |
| 31                 | 85.708                       | 0.175             | 1.33                             | 82              | -1.3                 | -             | 86          | 0.073                            | 11.39               | 0.172  |

# BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: SBI  
 Model: St Louis  
 Run #: 4

Job #: 24-303  
 Tracking #: 216  
 Technician: AK  
 Date: 12/12/2024

| Elapsed Time (min) | Particulate Sampling Data    |                   |                                  |                 |                      |               |             | Flue Gas Data                    |                     |        |
|--------------------|------------------------------|-------------------|----------------------------------|-----------------|----------------------|---------------|-------------|----------------------------------|---------------------|--------|
|                    | Gas Meter (ft <sup>3</sup> ) | Sample Rate (cfm) | Orifice dH (in H <sub>2</sub> O) | Meter Temp (°F) | Meter Vacuum (in Hg) | Pro. Rate (%) | Filter (°F) | Flue Draft (in H <sub>2</sub> O) | CO <sub>2</sub> (%) | CO (%) |
| 32                 | 85.879                       | 0.171             | 1.34                             | 82              | -1.4                 | -             | 86          | 0.077                            | 12.28               | 0.097  |
| 33                 | 86.054                       | 0.175             | 1.35                             | 82              | -1.3                 | -             | 86          | 0.077                            | 12.30               | 0.114  |
| 34                 | 86.229                       | 0.175             | 1.33                             | 83              | -1.5                 | -             | 86          | 0.070                            | 12.41               | 0.102  |
| 35                 | 86.403                       | 0.174             | 1.35                             | 83              | -1.3                 | -             | 86          | 0.072                            | 12.29               | 0.115  |
| 36                 | 86.581                       | 0.178             | 1.34                             | 83              | -1.5                 | -             | 86          | 0.074                            | 12.32               | 0.130  |
| 37                 | 86.756                       | 0.175             | 1.35                             | 83              | -1.3                 | -             | 86          | 0.077                            | 12.96               | 0.179  |
| 38                 | 86.930                       | 0.174             | 1.34                             | 83              | -1.5                 | -             | 86          | 0.068                            | 13.58               | 0.294  |
| 39                 | 87.103                       | 0.173             | 1.35                             | 83              | -1.5                 | -             | 87          | 0.078                            | 13.86               | 0.300  |
| 40                 | 87.277                       | 0.174             | 1.35                             | 83              | -1.5                 | 102           | 87          | 0.075                            | 13.96               | 0.284  |
| 41                 | 87.452                       | 0.175             | 1.36                             | 84              | -1.4                 | -             | 87          | 0.079                            | 14.12               | 0.282  |
| 42                 | 87.626                       | 0.174             | 1.32                             | 84              | -1.4                 | -             | 87          | 0.074                            | 15.05               | 0.321  |
| 43                 | 87.801                       | 0.175             | 1.34                             | 84              | -1.5                 | -             | 87          | 0.077                            | 15.54               | 0.566  |
| 44                 | 87.976                       | 0.175             | 1.33                             | 84              | -1.3                 | -             | 87          | 0.076                            | 15.09               | 0.623  |
| 45                 | 88.151                       | 0.175             | 1.35                             | 84              | -1.4                 | -             | 87          | 0.068                            | 15.88               | 0.922  |
| 46                 | 88.322                       | 0.171             | 1.35                             | 84              | -1.3                 | -             | 87          | 0.069                            | 15.58               | 0.320  |
| 47                 | 88.497                       | 0.175             | 1.35                             | 84              | -1.4                 | -             | 87          | 0.073                            | 15.09               | 0.150  |
| 48                 | 88.671                       | 0.174             | 1.35                             | 84              | -1.4                 | -             | 87          | 0.070                            | 14.38               | 0.073  |
| 49                 | 88.845                       | 0.174             | 1.33                             | 85              | -1.5                 | -             | 87          | 0.065                            | 13.37               | 0.159  |
| 50                 | 89.022                       | 0.177             | 1.34                             | 85              | -1.4                 | 101           | 87          | 0.068                            | 13.47               | 0.262  |
| 51                 | 89.196                       | 0.174             | 1.34                             | 85              | -1.5                 | -             | 87          | 0.072                            | 13.77               | 0.294  |
| 52                 | 89.371                       | 0.175             | 1.36                             | 85              | -1.5                 | -             | 87          | 0.070                            | 14.03               | 0.242  |
| 53                 | 89.546                       | 0.175             | 1.35                             | 85              | -1.5                 | -             | 87          | 0.066                            | 14.01               | 0.169  |
| 54                 | 89.721                       | 0.175             | 1.34                             | 85              | -1.5                 | -             | 87          | 0.067                            | 14.09               | 0.193  |
| 55                 | 89.896                       | 0.175             | 1.35                             | 86              | -1.3                 | -             | 87          | 0.073                            | 14.24               | 0.208  |
| 56                 | 90.071                       | 0.175             | 1.32                             | 86              | -1.5                 | -             | 87          | 0.068                            | 14.45               | 0.237  |
| 57                 | 90.245                       | 0.174             | 1.35                             | 86              | -1.4                 | -             | 87          | 0.069                            | 14.87               | 0.401  |
| 58                 | 90.419                       | 0.174             | 1.34                             | 86              | -1.5                 | -             | 87          | 0.066                            | 14.61               | 0.353  |
| 59                 | 90.593                       | 0.174             | 1.36                             | 86              | -1.4                 | -             | 87          | 0.067                            | 14.13               | 0.225  |
| 60                 | 90.768                       | 0.175             | 1.37                             | 86              | -1.5                 | 101           | 87          | 0.069                            | 13.80               | 0.213  |
| 61                 | 90.940                       | 0.172             | 1.36                             | 86              | -1.4                 | -             | 87          | 0.065                            | 13.71               | 0.183  |
| 62                 | 91.115                       | 0.175             | 1.36                             | 86              | -1.4                 | -             | 87          | 0.072                            | 13.63               | 0.170  |
| 63                 | 91.290                       | 0.175             | 1.35                             | 87              | -1.3                 | -             | 87          | 0.066                            | 13.39               | 0.152  |

# BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: SBI  
 Model: St Louis  
 Run #: 4

Job #: 24-303  
 Tracking #: 216  
 Technician: AK  
 Date: 12/12/2024

| Elapsed Time (min) | Particulate Sampling Data    |                   |                                  |                 |                      |               |             | Flue Gas Data                    |                     |        |
|--------------------|------------------------------|-------------------|----------------------------------|-----------------|----------------------|---------------|-------------|----------------------------------|---------------------|--------|
|                    | Gas Meter (ft <sup>3</sup> ) | Sample Rate (cfm) | Orifice dH (in H <sub>2</sub> O) | Meter Temp (°F) | Meter Vacuum (in Hg) | Pro. Rate (%) | Filter (°F) | Flue Draft (in H <sub>2</sub> O) | CO <sub>2</sub> (%) | CO (%) |
| 64                 | 91.468                       | 0.178             | 1.33                             | 87              | -1.5                 | -             | 87          | 0.068                            | 13.59               | 0.184  |
| 65                 | 91.643                       | 0.175             | 1.34                             | 87              | -1.5                 | -             | 87          | 0.067                            | 13.98               | 0.267  |
| 66                 | 91.817                       | 0.174             | 1.35                             | 87              | -1.4                 | -             | 87          | 0.070                            | 14.50               | 0.280  |
| 67                 | 91.991                       | 0.174             | 1.35                             | 87              | -1.5                 | -             | 87          | 0.069                            | 13.57               | 0.172  |
| 68                 | 92.166                       | 0.175             | 1.34                             | 87              | -1.5                 | -             | 87          | 0.067                            | 13.65               | 0.220  |
| 69                 | 92.341                       | 0.175             | 1.35                             | 87              | -1.3                 | -             | 87          | 0.066                            | 13.60               | 0.203  |
| 70                 | 92.516                       | 0.175             | 1.34                             | 87              | -1.4                 | 101           | 87          | 0.068                            | 12.40               | 0.073  |
| 71                 | 92.691                       | 0.175             | 1.33                             | 87              | -1.3                 | -             | 87          | 0.066                            | 10.41               | 0.072  |
| 72                 | 92.867                       | 0.176             | 1.35                             | 87              | -1.4                 | -             | 87          | 0.065                            | 10.00               | 0.100  |
| 73                 | 93.042                       | 0.175             | 1.33                             | 87              | -1.5                 | -             | 87          | 0.067                            | 9.81                | 0.146  |
| 74                 | 93.213                       | 0.171             | 1.34                             | 88              | -1.3                 | -             | 87          | 0.058                            | 9.95                | 0.159  |
| 75                 | 93.388                       | 0.175             | 1.33                             | 88              | -1.5                 | -             | 87          | 0.062                            | 9.92                | 0.158  |
| 76                 | 93.562                       | 0.174             | 1.36                             | 88              | -1.5                 | -             | 87          | 0.066                            | 8.78                | 0.195  |
| 77                 | 93.740                       | 0.178             | 1.36                             | 88              | -1.5                 | -             | 87          | 0.060                            | 8.30                | 0.178  |
| 78                 | 93.915                       | 0.175             | 1.35                             | 88              | -1.4                 | -             | 87          | 0.068                            | 8.21                | 0.126  |
| 79                 | 94.090                       | 0.175             | 1.33                             | 88              | -1.5                 | -             | 87          | 0.061                            | 8.11                | 0.092  |
| 80                 | 94.266                       | 0.176             | 1.34                             | 88              | -1.4                 | 100           | 87          | 0.068                            | 8.06                | 0.071  |
| 81                 | 94.441                       | 0.175             | 1.35                             | 88              | -1.5                 | -             | 87          | 0.067                            | 8.11                | 0.072  |
| 82                 | 94.615                       | 0.174             | 1.34                             | 88              | -1.5                 | -             | 87          | 0.074                            | 8.11                | 0.059  |
| 83                 | 94.789                       | 0.174             | 1.36                             | 88              | -1.3                 | -             | 87          | 0.065                            | 8.14                | 0.053  |
| 84                 | 94.963                       | 0.174             | 1.34                             | 88              | -1.3                 | -             | 88          | 0.068                            | 2.58                | 0.091  |
| 85                 | 95.138                       | 0.175             | 1.33                             | 88              | -1.3                 | -             | 88          | 0.076                            | 9.32                | 0.250  |
| 86                 | 95.312                       | 0.174             | 1.33                             | 89              | -1.5                 | -             | 88          | 0.075                            | 12.61               | 0.268  |
| 87                 | 95.488                       | 0.176             | 1.34                             | 89              | -1.5                 | -             | 88          | 0.080                            | 14.33               | 0.329  |
| 88                 | 95.659                       | 0.171             | 1.34                             | 89              | -1.4                 | -             | 88          | 0.073                            | 14.07               | 0.387  |
| 89                 | 95.834                       | 0.175             | 1.36                             | 89              | -1.3                 | -             | 88          | 0.071                            | 14.03               | 0.275  |
| 90                 | 96.012                       | 0.178             | 1.32                             | 89              | -1.3                 | 100           | 88          | 0.065                            | 12.73               | 0.138  |
| 91                 | 96.187                       | 0.175             | 1.34                             | 89              | -1.4                 | -             | 88          | 0.078                            | 12.76               | 0.122  |
| 92                 | 96.361                       | 0.174             | 1.35                             | 89              | -1.5                 | -             | 88          | 0.062                            | 12.95               | 0.090  |
| 93                 | 96.531                       | 0.170             | 1.36                             | 89              | -1.3                 | -             | 88          | 0.067                            | 12.95               | 0.091  |
| 94                 | 96.705                       | 0.174             | 1.34                             | 89              | -1.3                 | -             | 88          | 0.069                            | 12.79               | 0.092  |
| 95                 | 96.879                       | 0.174             | 1.32                             | 89              | -1.5                 | -             | 88          | 0.063                            | 13.02               | 0.108  |

# BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: SBI  
 Model: St Louis  
 Run #: 4

Job #: 24-303  
 Tracking #: 216  
 Technician: AK  
 Date: 12/12/2024

| Elapsed Time (min) | Particulate Sampling Data    |                   |                                  |                 |                      |               |             | Flue Gas Data                    |                     |        |
|--------------------|------------------------------|-------------------|----------------------------------|-----------------|----------------------|---------------|-------------|----------------------------------|---------------------|--------|
|                    | Gas Meter (ft <sup>3</sup> ) | Sample Rate (cfm) | Orifice dH (in H <sub>2</sub> O) | Meter Temp (°F) | Meter Vacuum (in Hg) | Pro. Rate (%) | Filter (°F) | Flue Draft (in H <sub>2</sub> O) | CO <sub>2</sub> (%) | CO (%) |
| 96                 | 97.054                       | 0.175             | 1.33                             | 89              | -1.3                 | -             | 88          | 0.069                            | 13.11               | 0.106  |
| 97                 | 97.230                       | 0.176             | 1.34                             | 89              | -1.3                 | -             | 88          | 0.065                            | 13.03               | 0.110  |
| 98                 | 97.405                       | 0.175             | 1.34                             | 89              | -1.4                 | -             | 88          | 0.069                            | 13.01               | 0.113  |
| 99                 | 97.580                       | 0.175             | 1.34                             | 89              | -1.3                 | -             | 88          | 0.066                            | 12.95               | 0.123  |
| 100                | 97.755                       | 0.175             | 1.34                             | 89              | -1.4                 | 100           | 88          | 0.071                            | 12.83               | 0.104  |
| 101                | 97.930                       | 0.175             | 1.33                             | 89              | -1.5                 | -             | 88          | 0.065                            | 12.74               | 0.105  |
| 102                | 98.104                       | 0.174             | 1.34                             | 90              | -1.5                 | -             | 88          | 0.066                            | 12.76               | 0.109  |
| 103                | 98.278                       | 0.174             | 1.34                             | 90              | -1.3                 | -             | 88          | 0.058                            | 12.52               | 0.093  |
| 104                | 98.453                       | 0.175             | 1.34                             | 90              | -1.3                 | -             | 88          | 0.072                            | 12.52               | 0.071  |
| 105                | 98.629                       | 0.176             | 1.35                             | 90              | -1.5                 | -             | 88          | 0.071                            | 12.63               | 0.077  |
| 106                | 98.804                       | 0.175             | 1.35                             | 90              | -1.3                 | -             | 88          | 0.072                            | 12.63               | 0.075  |
| 107                | 98.980                       | 0.176             | 1.36                             | 90              | -1.5                 | -             | 88          | 0.066                            | 12.68               | 0.062  |
| 108                | 99.155                       | 0.175             | 1.34                             | 90              | -1.3                 | -             | 88          | 0.063                            | 12.62               | 0.049  |
| 109                | 99.330                       | 0.175             | 1.35                             | 90              | -1.3                 | -             | 88          | 0.065                            | 12.41               | 0.046  |
| 110                | 99.504                       | 0.174             | 1.32                             | 90              | -1.4                 | 99            | 88          | 0.062                            | 12.51               | 0.055  |
| 111                | 99.678                       | 0.174             | 1.34                             | 90              | -1.3                 | -             | 88          | 0.062                            | 12.58               | 0.055  |
| 112                | 99.853                       | 0.175             | 1.34                             | 90              | -1.4                 | -             | 88          | 0.060                            | 12.43               | 0.049  |
| 113                | 100.029                      | 0.176             | 1.34                             | 90              | -1.4                 | -             | 88          | 0.066                            | 12.47               | 0.035  |
| 114                | 100.204                      | 0.175             | 1.34                             | 90              | -1.3                 | -             | 87          | 0.067                            | 12.38               | 0.036  |
| 115                | 100.379                      | 0.175             | 1.35                             | 90              | -1.5                 | -             | 87          | 0.060                            | 12.38               | 0.040  |
| 116                | 100.554                      | 0.175             | 1.33                             | 90              | -1.3                 | -             | 87          | 0.061                            | 12.11               | 0.031  |
| 117                | 100.729                      | 0.175             | 1.34                             | 90              | -1.5                 | -             | 87          | 0.061                            | 11.96               | 0.022  |
| 118                | 100.903                      | 0.174             | 1.35                             | 90              | -1.3                 | -             | 87          | 0.065                            | 11.78               | 0.023  |
| 119                | 101.078                      | 0.175             | 1.36                             | 90              | -1.4                 | -             | 87          | 0.065                            | 11.46               | 0.021  |
| 120                | 101.253                      | 0.175             | 1.34                             | 90              | -1.3                 | 99            | 88          | 0.066                            | 11.33               | 0.029  |
| 121                | 101.429                      | 0.176             | 1.33                             | 91              | -1.3                 | -             | 87          | 0.064                            | 11.29               | 0.028  |
| 122                | 101.604                      | 0.175             | 1.34                             | 91              | -1.5                 | -             | 87          | 0.062                            | 11.13               | 0.032  |
| 123                | 101.780                      | 0.176             | 1.33                             | 91              | -1.5                 | -             | 87          | 0.061                            | 11.04               | 0.034  |
| 124                | 101.955                      | 0.175             | 1.36                             | 91              | -1.5                 | -             | 87          | 0.067                            | 10.93               | 0.038  |
| 125                | 102.130                      | 0.175             | 1.33                             | 91              | -1.3                 | -             | 87          | 0.056                            | 10.71               | 0.044  |
| 126                | 102.304                      | 0.174             | 1.33                             | 91              | -1.4                 | -             | 87          | 0.059                            | 10.72               | 0.043  |
| 127                | 102.480                      | 0.176             | 1.34                             | 91              | -1.4                 | -             | 87          | 0.066                            | 10.60               | 0.050  |

# BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: SBI  
 Model: St Louis  
 Run #: 4

Job #: 24-303  
 Tracking #: 216  
 Technician: AK  
 Date: 12/12/2024

| Elapsed Time (min) | Particulate Sampling Data    |                   |                                  |                 |                      |               |             | Flue Gas Data                    |                     |        |
|--------------------|------------------------------|-------------------|----------------------------------|-----------------|----------------------|---------------|-------------|----------------------------------|---------------------|--------|
|                    | Gas Meter (ft <sup>3</sup> ) | Sample Rate (cfm) | Orifice dH (in H <sub>2</sub> O) | Meter Temp (°F) | Meter Vacuum (in Hg) | Pro. Rate (%) | Filter (°F) | Flue Draft (in H <sub>2</sub> O) | CO <sub>2</sub> (%) | CO (%) |
| 128                | 102.655                      | 0.175             | 1.31                             | 91              | -1.5                 | -             | 87          | 0.058                            | 10.51               | 0.056  |
| 129                | 102.831                      | 0.176             | 1.33                             | 91              | -1.5                 | -             | 87          | 0.060                            | 10.46               | 0.060  |
| 130                | 103.007                      | 0.176             | 1.37                             | 91              | -1.5                 | 99            | 87          | 0.062                            | 10.46               | 0.049  |
| 131                | 103.182                      | 0.175             | 1.32                             | 91              | -1.5                 | -             | 87          | 0.063                            | 10.42               | 0.048  |
| 132                | 103.357                      | 0.175             | 1.34                             | 91              | -1.5                 | -             | 87          | 0.065                            | 10.37               | 0.044  |
| 133                | 103.531                      | 0.174             | 1.37                             | 91              | -1.3                 | -             | 87          | 0.059                            | 10.47               | 0.042  |
| 134                | 103.706                      | 0.175             | 1.33                             | 91              | -1.4                 | -             | 87          | 0.065                            | 10.44               | 0.039  |
| 135                | 103.881                      | 0.175             | 1.34                             | 91              | -1.3                 | -             | 87          | 0.062                            | 10.40               | 0.041  |
| 136                | 104.057                      | 0.176             | 1.34                             | 91              | -1.3                 | -             | 87          | 0.062                            | 10.34               | 0.037  |
| 137                | 104.233                      | 0.176             | 1.33                             | 91              | -1.4                 | -             | 87          | 0.056                            | 10.74               | 0.063  |
| 138                | 104.408                      | 0.175             | 1.32                             | 91              | -1.5                 | -             | 87          | 0.058                            | 10.31               | 0.048  |
| 139                | 104.584                      | 0.176             | 1.34                             | 91              | -1.5                 | -             | 87          | 0.058                            | 10.28               | 0.051  |
| 140                | 104.758                      | 0.174             | 1.34                             | 91              | -1.4                 | 100           | 87          | 0.066                            | 9.82                | 0.037  |
| 141                | 104.933                      | 0.175             | 1.34                             | 91              | -1.5                 | -             | 87          | 0.062                            | 9.68                | 0.032  |
| 142                | 105.108                      | 0.175             | 1.35                             | 91              | -1.5                 | -             | 87          | 0.061                            | 9.84                | 0.031  |
| 143                | 105.284                      | 0.176             | 1.35                             | 91              | -1.3                 | -             | 87          | 0.061                            | 9.92                | 0.029  |
| 144                | 105.459                      | 0.175             | 1.33                             | 91              | -1.5                 | -             | 87          | 0.064                            | 10.19               | 0.028  |
| 145                | 105.635                      | 0.176             | 1.33                             | 91              | -1.4                 | -             | 88          | 0.060                            | 4.54                | 0.069  |
| 146                | 105.809                      | 0.174             | 1.32                             | 91              | -1.3                 | -             | 88          | 0.072                            | 1.37                | 0.114  |
| 147                | 105.984                      | 0.175             | 1.34                             | 91              | -1.5                 | -             | 89          | 0.078                            | 1.82                | 0.090  |
| 148                | 106.157                      | 0.173             | 1.31                             | 91              | -1.4                 | -             | 89          | 0.081                            | 2.85                | 0.080  |
| 149                | 106.330                      | 0.173             | 1.33                             | 91              | -1.5                 | -             | 89          | 0.071                            | 9.14                | 0.754  |
| 150                | 106.504                      | 0.174             | 1.33                             | 91              | -1.3                 | 101           | 89          | 0.070                            | 13.71               | 1.156  |
| 151                | 106.679                      | 0.175             | 1.32                             | 91              | -1.5                 | -             | 89          | 0.071                            | 14.18               | 1.009  |
| 152                | 106.854                      | 0.175             | 1.32                             | 91              | -1.5                 | -             | 89          | 0.067                            | 14.36               | 0.794  |
| 153                | 107.029                      | 0.175             | 1.33                             | 91              | -1.3                 | -             | 89          | 0.069                            | 14.18               | 0.646  |
| 154                | 107.205                      | 0.176             | 1.33                             | 91              | -1.4                 | -             | 89          | 0.074                            | 13.85               | 0.777  |
| 155                | 107.380                      | 0.175             | 1.34                             | 91              | -1.5                 | -             | 89          | 0.069                            | 14.23               | 0.841  |
| 156                | 107.554                      | 0.174             | 1.34                             | 91              | -1.4                 | -             | 89          | 0.076                            | 14.41               | 0.942  |
| 157                | 107.729                      | 0.175             | 1.34                             | 91              | -1.5                 | -             | 89          | 0.070                            | 14.36               | 1.010  |
| 158                | 107.902                      | 0.173             | 1.33                             | 91              | -1.4                 | -             | 89          | 0.073                            | 14.09               | 1.118  |
| 159                | 108.077                      | 0.175             | 1.30                             | 91              | -1.5                 | -             | 89          | 0.075                            | 13.85               | 0.879  |



# BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: SBI  
 Model: St Louis  
 Run #: 4

Job #: 24-303  
 Tracking #: 216  
 Technician: AK  
 Date: 12/12/2024

| Elapsed Time (min) | Particulate Sampling Data    |                   |                                  |                 |                      |               |             | Flue Gas Data                    |                     |        |
|--------------------|------------------------------|-------------------|----------------------------------|-----------------|----------------------|---------------|-------------|----------------------------------|---------------------|--------|
|                    | Gas Meter (ft <sup>3</sup> ) | Sample Rate (cfm) | Orifice dH (in H <sub>2</sub> O) | Meter Temp (°F) | Meter Vacuum (in Hg) | Pro. Rate (%) | Filter (°F) | Flue Draft (in H <sub>2</sub> O) | CO <sub>2</sub> (%) | CO (%) |
| 160                | 108.253                      | 0.176             | 1.33                             | 91              | -1.5                 | 101           | 89          | 0.070                            | 13.78               | 0.469  |
| 161                | 108.428                      | 0.175             | 1.33                             | 91              | -1.4                 | -             | 89          | 0.077                            | 13.40               | 0.371  |
| 162                | 108.603                      | 0.175             | 1.33                             | 91              | -1.4                 | -             | 89          | 0.071                            | 13.43               | 0.355  |
| 163                | 108.778                      | 0.175             | 1.34                             | 91              | -1.3                 | -             | 89          | 0.077                            | 13.35               | 0.340  |
| 164                | 108.953                      | 0.175             | 1.31                             | 92              | -1.5                 | -             | 89          | 0.078                            | 13.23               | 0.309  |
| 165                | 109.128                      | 0.175             | 1.34                             | 92              | -1.4                 | -             | 89          | 0.073                            | 13.26               | 0.336  |
| 166                | 109.302                      | 0.174             | 1.35                             | 92              | -1.5                 | -             | 89          | 0.071                            | 13.24               | 0.311  |
| 167                | 109.477                      | 0.175             | 1.34                             | 92              | -1.5                 | -             | 89          | 0.073                            | 13.46               | 0.301  |
| 168                | 109.652                      | 0.175             | 1.33                             | 92              | -1.3                 | -             | 89          | 0.074                            | 13.43               | 0.268  |
| 169                | 109.827                      | 0.175             | 1.31                             | 92              | -1.5                 | -             | 89          | 0.075                            | 13.29               | 0.198  |
| 170                | 110.002                      | 0.175             | 1.32                             | 92              | -1.5                 | 100           | 89          | 0.070                            | 13.17               | 0.177  |
| 171                | 110.178                      | 0.176             | 1.33                             | 92              | -1.3                 | -             | 89          | 0.078                            | 13.08               | 0.143  |
| 172                | 110.353                      | 0.175             | 1.33                             | 92              | -1.5                 | -             | 89          | 0.072                            | 12.95               | 0.110  |
| 173                | 110.529                      | 0.176             | 1.34                             | 92              | -1.3                 | -             | 89          | 0.082                            | 12.67               | 0.103  |
| 174                | 110.701                      | 0.172             | 1.34                             | 92              | -1.5                 | -             | 89          | 0.070                            | 12.50               | 0.095  |
| 175                | 110.876                      | 0.175             | 1.34                             | 92              | -1.4                 | -             | 89          | 0.075                            | 12.43               | 0.090  |
| 176                | 111.052                      | 0.176             | 1.35                             | 92              | -1.5                 | -             | 89          | 0.075                            | 12.32               | 0.096  |
| 177                | 111.227                      | 0.175             | 1.33                             | 92              | -1.3                 | -             | 89          | 0.076                            | 12.26               | 0.080  |
| 178                | 111.402                      | 0.175             | 1.34                             | 92              | -1.5                 | -             | 89          | 0.073                            | 12.21               | 0.083  |
| 179                | 111.578                      | 0.176             | 1.35                             | 92              | -1.5                 | -             | 89          | 0.072                            | 12.19               | 0.086  |
| 180                | 111.753                      | 0.175             | 1.33                             | 92              | -1.3                 | 100           | 89          | 0.069                            | 11.99               | 0.088  |
| 181                | 111.927                      | 0.174             | 1.34                             | 92              | -1.5                 | -             | 89          | 0.077                            | 11.94               | 0.082  |
| 182                | 112.101                      | 0.174             | 1.33                             | 92              | -1.4                 | -             | 89          | 0.077                            | 11.88               | 0.086  |
| 183                | 112.276                      | 0.175             | 1.36                             | 92              | -1.4                 | -             | 89          | 0.075                            | 11.84               | 0.086  |
| 184                | 112.452                      | 0.176             | 1.35                             | 92              | -1.4                 | -             | 89          | 0.076                            | 11.82               | 0.082  |
| 185                | 112.627                      | 0.175             | 1.33                             | 92              | -1.5                 | -             | 89          | 0.072                            | 11.80               | 0.082  |
| 186                | 112.803                      | 0.176             | 1.33                             | 92              | -1.4                 | -             | 89          | 0.070                            | 11.83               | 0.075  |
| 187                | 112.978                      | 0.175             | 1.33                             | 92              | -1.5                 | -             | 89          | 0.074                            | 11.84               | 0.074  |
| 188                | 113.153                      | 0.175             | 1.35                             | 92              | -1.3                 | -             | 89          | 0.071                            | 11.76               | 0.072  |
| 189                | 113.327                      | 0.174             | 1.33                             | 92              | -1.5                 | -             | 89          | 0.070                            | 11.79               | 0.077  |
| 190                | 113.501                      | 0.174             | 1.34                             | 92              | -1.3                 | 101           | 89          | 0.070                            | 11.75               | 0.077  |
| 191                | 113.677                      | 0.176             | 1.34                             | 92              | -1.5                 | -             | 89          | 0.073                            | 11.78               | 0.079  |

# BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: SBI  
 Model: St Louis  
 Run #: 4

Job #: 24-303  
 Tracking #: 216  
 Technician: AK  
 Date: 12/12/2024

| Elapsed Time (min) | Particulate Sampling Data    |                   |                                  |                 |                      |               |             | Flue Gas Data                    |                     |        |
|--------------------|------------------------------|-------------------|----------------------------------|-----------------|----------------------|---------------|-------------|----------------------------------|---------------------|--------|
|                    | Gas Meter (ft <sup>3</sup> ) | Sample Rate (cfm) | Orifice dH (in H <sub>2</sub> O) | Meter Temp (°F) | Meter Vacuum (in Hg) | Pro. Rate (%) | Filter (°F) | Flue Draft (in H <sub>2</sub> O) | CO <sub>2</sub> (%) | CO (%) |
| 192                | 113.852                      | 0.175             | 1.32                             | 92              | -1.3                 | -             | 89          | 0.070                            | 11.91               | 0.077  |
| 193                | 114.028                      | 0.176             | 1.35                             | 92              | -1.5                 | -             | 89          | 0.068                            | 11.78               | 0.075  |
| 194                | 114.203                      | 0.175             | 1.36                             | 92              | -1.5                 | -             | 89          | 0.070                            | 11.74               | 0.077  |
| 195                | 114.378                      | 0.175             | 1.35                             | 92              | -1.3                 | -             | 89          | 0.070                            | 11.78               | 0.074  |
| 196                | 114.553                      | 0.175             | 1.33                             | 92              | -1.5                 | -             | 89          | 0.072                            | 11.73               | 0.067  |
| 197                | 114.728                      | 0.175             | 1.36                             | 92              | -1.5                 | -             | 89          | 0.079                            | 11.75               | 0.070  |
| 198                | 114.902                      | 0.174             | 1.33                             | 92              | -1.4                 | -             | 89          | 0.073                            | 11.69               | 0.066  |
| 199                | 115.077                      | 0.175             | 1.35                             | 92              | -1.3                 | -             | 89          | 0.070                            | 11.66               | 0.067  |
| 200                | 115.253                      | 0.176             | 1.33                             | 92              | -1.4                 | 101           | 89          | 0.077                            | 11.50               | 0.067  |
| 201                | 115.428                      | 0.175             | 1.35                             | 92              | -1.4                 | -             | 89          | 0.069                            | 11.51               | 0.064  |
| 202                | 115.604                      | 0.176             | 1.34                             | 92              | -1.3                 | -             | 89          | 0.069                            | 11.52               | 0.076  |
| 203                | 115.779                      | 0.175             | 1.33                             | 92              | -1.4                 | -             | 89          | 0.073                            | 11.55               | 0.073  |
| 204                | 115.954                      | 0.175             | 1.35                             | 92              | -1.3                 | -             | 89          | 0.074                            | 11.55               | 0.066  |
| 205                | 116.128                      | 0.174             | 1.35                             | 92              | -1.3                 | -             | 89          | 0.072                            | 11.53               | 0.063  |
| 206                | 116.302                      | 0.174             | 1.33                             | 92              | -1.3                 | -             | 89          | 0.076                            | 11.65               | 0.062  |
| 207                | 116.478                      | 0.176             | 1.33                             | 92              | -1.3                 | -             | 89          | 0.068                            | 11.59               | 0.059  |
| 208                | 116.653                      | 0.175             | 1.35                             | 92              | -1.3                 | -             | 89          | 0.078                            | 11.79               | 0.058  |
| 209                | 116.829                      | 0.176             | 1.33                             | 92              | -1.5                 | -             | 89          | 0.074                            | 11.90               | 0.054  |
| 210                | 117.004                      | 0.175             | 1.34                             | 92              | -1.5                 | 102           | 89          | 0.076                            | 12.05               | 0.051  |
| 211                | 117.179                      | 0.175             | 1.32                             | 92              | -1.3                 | -             | 89          | 0.070                            | 12.00               | 0.050  |
| 212                | 117.354                      | 0.175             | 1.35                             | 92              | -1.5                 | -             | 89          | 0.072                            | 12.06               | 0.049  |
| 213                | 117.528                      | 0.174             | 1.34                             | 92              | -1.5                 | -             | 89          | 0.078                            | 12.34               | 0.049  |
| 214                | 117.703                      | 0.175             | 1.35                             | 92              | -1.5                 | -             | 89          | 0.073                            | 12.41               | 0.048  |
| 215                | 117.878                      | 0.175             | 1.35                             | 92              | -1.3                 | -             | 89          | 0.073                            | 12.54               | 0.043  |
| 216                | 118.054                      | 0.176             | 1.34                             | 92              | -1.3                 | -             | 89          | 0.072                            | 12.72               | 0.056  |
| 217                | 118.229                      | 0.175             | 1.32                             | 92              | -1.3                 | -             | 89          | 0.071                            | 12.73               | 0.065  |
| 218                | 118.404                      | 0.175             | 1.32                             | 92              | -1.5                 | -             | 89          | 0.068                            | 12.79               | 0.058  |
| 219                | 118.579                      | 0.175             | 1.33                             | 92              | -1.5                 | -             | 89          | 0.076                            | 12.97               | 0.069  |
| 220                | 118.753                      | 0.174             | 1.36                             | 92              | -1.5                 | 101           | 89          | 0.063                            | 13.08               | 0.082  |
| 221                | 118.930                      | 0.177             | 1.34                             | 92              | -1.5                 | -             | 89          | 0.074                            | 13.14               | 0.121  |
| 222                | 119.102                      | 0.172             | 1.31                             | 92              | -1.4                 | -             | 89          | 0.068                            | 13.30               | 0.143  |
| 223                | 119.276                      | 0.174             | 1.34                             | 92              | -1.4                 | -             | 89          | 0.070                            | 13.43               | 0.195  |

# BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: SBI  
 Model: St Louis  
 Run #: 4

Job #: 24-303  
 Tracking #: 216  
 Technician: AK  
 Date: 12/12/2024

| Elapsed Time (min) | Particulate Sampling Data    |                   |                                  |                 |                      |               |             | Flue Gas Data                    |                     |        |
|--------------------|------------------------------|-------------------|----------------------------------|-----------------|----------------------|---------------|-------------|----------------------------------|---------------------|--------|
|                    | Gas Meter (ft <sup>3</sup> ) | Sample Rate (cfm) | Orifice dH (in H <sub>2</sub> O) | Meter Temp (°F) | Meter Vacuum (in Hg) | Pro. Rate (%) | Filter (°F) | Flue Draft (in H <sub>2</sub> O) | CO <sub>2</sub> (%) | CO (%) |
| 224                | 119.451                      | 0.175             | 1.34                             | 92              | -1.5                 | -             | 89          | 0.074                            | 13.55               | 0.261  |
| 225                | 119.626                      | 0.175             | 1.33                             | 92              | -1.3                 | -             | 89          | 0.070                            | 13.57               | 0.344  |
| 226                | 119.800                      | 0.174             | 1.33                             | 92              | -1.5                 | -             | 89          | 0.071                            | 13.72               | 0.411  |
| 227                | 119.975                      | 0.175             | 1.34                             | 92              | -1.5                 | -             | 89          | 0.070                            | 13.37               | 0.275  |
| 228                | 120.149                      | 0.174             | 1.30                             | 92              | -1.4                 | -             | 89          | 0.075                            | 13.36               | 0.225  |
| 229                | 120.323                      | 0.174             | 1.31                             | 92              | -1.5                 | -             | 89          | 0.074                            | 13.11               | 0.193  |
| 230                | 120.496                      | 0.173             | 1.29                             | 92              | -1.4                 | 101           | 89          | 0.073                            | 13.06               | 0.169  |
| 231                | 120.671                      | 0.175             | 1.33                             | 92              | -1.5                 | -             | 89          | 0.075                            | 13.16               | 0.168  |
| 232                | 120.843                      | 0.172             | 1.32                             | 92              | -1.5                 | -             | 89          | 0.070                            | 13.13               | 0.152  |
| 233                | 121.016                      | 0.173             | 1.32                             | 92              | -1.5                 | -             | 89          | 0.069                            | 13.19               | 0.160  |
| 234                | 121.190                      | 0.174             | 1.31                             | 92              | -1.5                 | -             | 89          | 0.071                            | 12.61               | 0.167  |
| 235                | 121.363                      | 0.173             | 1.31                             | 92              | -1.4                 | -             | 89          | 0.075                            | 12.12               | 0.091  |
| 236                | 121.537                      | 0.174             | 1.32                             | 92              | -1.5                 | -             | 89          | 0.069                            | 11.84               | 0.060  |
| 237                | 121.711                      | 0.174             | 1.32                             | 92              | -1.3                 | -             | 89          | 0.072                            | 11.79               | 0.047  |
| 238                | 121.885                      | 0.174             | 1.34                             | 92              | -1.5                 | -             | 89          | 0.071                            | 11.67               | 0.055  |
| 239                | 122.062                      | 0.177             | 1.32                             | 92              | -1.5                 | -             | 89          | 0.072                            | 11.37               | 0.051  |
| 240                | 122.232                      | 0.170             | 1.31                             | 92              | -1.4                 | 100           | 89          | 0.074                            | 11.14               | 0.045  |
| 241                | 122.406                      | 0.174             | 1.32                             | 92              | -1.4                 | -             | 89          | 0.072                            | 10.85               | 0.040  |
| 242                | 122.580                      | 0.174             | 1.30                             | 92              | -1.5                 | -             | 89          | 0.075                            | 10.69               | 0.037  |
| 243                | 122.753                      | 0.173             | 1.32                             | 92              | -1.5                 | -             | 89          | 0.074                            | 10.53               | 0.035  |
| 244                | 122.927                      | 0.174             | 1.30                             | 92              | -1.3                 | -             | 89          | 0.073                            | 10.32               | 0.032  |
| 245                | 123.100                      | 0.173             | 1.32                             | 92              | -1.5                 | -             | 89          | 0.072                            | 10.34               | 0.041  |
| 246                | 123.273                      | 0.173             | 1.30                             | 92              | -1.3                 | -             | 89          | 0.068                            | 10.31               | 0.047  |
| 247                | 123.446                      | 0.173             | 1.32                             | 92              | -1.3                 | -             | 89          | 0.068                            | 9.89                | 0.052  |
| 248                | 123.622                      | 0.176             | 1.32                             | 92              | -1.5                 | -             | 89          | 0.068                            | 9.77                | 0.059  |
| 249                | 123.793                      | 0.171             | 1.31                             | 92              | -1.5                 | -             | 89          | 0.076                            | 9.62                | 0.044  |
| 250                | 123.966                      | 0.173             | 1.31                             | 92              | -1.3                 | 100           | 89          | 0.071                            | 9.48                | 0.044  |
| 251                | 124.140                      | 0.174             | 1.32                             | 92              | -1.4                 | -             | 89          | 0.071                            | 9.37                | 0.052  |
| 252                | 124.314                      | 0.174             | 1.33                             | 92              | -1.5                 | -             | 89          | 0.070                            | 9.20                | 0.053  |
| 253                | 124.488                      | 0.174             | 1.32                             | 92              | -1.4                 | -             | 89          | 0.068                            | 9.07                | 0.071  |
| 254                | 124.661                      | 0.173             | 1.33                             | 92              | -1.4                 | -             | 89          | 0.061                            | 9.11                | 0.083  |
| 255                | 124.838                      | 0.177             | 1.33                             | 92              | -1.5                 | -             | 89          | 0.064                            | 9.04                | 0.076  |

# BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: SBI  
 Model: St Louis  
 Run #: 4

Job #: 24-303  
 Tracking #: 216  
 Technician: AK  
 Date: 12/12/2024

| Elapsed Time (min) | Particulate Sampling Data    |                   |                                  |                 |                      |               |             | Flue Gas Data                    |                     |        |
|--------------------|------------------------------|-------------------|----------------------------------|-----------------|----------------------|---------------|-------------|----------------------------------|---------------------|--------|
|                    | Gas Meter (ft <sup>3</sup> ) | Sample Rate (cfm) | Orifice dH (in H <sub>2</sub> O) | Meter Temp (°F) | Meter Vacuum (in Hg) | Pro. Rate (%) | Filter (°F) | Flue Draft (in H <sub>2</sub> O) | CO <sub>2</sub> (%) | CO (%) |
| 256                | 125.009                      | 0.171             | 1.30                             | 92              | -1.5                 | -             | 89          | 0.070                            | 8.88                | 0.090  |
| 257                | 125.182                      | 0.173             | 1.29                             | 92              | -1.5                 | -             | 89          | 0.065                            | 8.77                | 0.083  |
| 258                | 125.356                      | 0.174             | 1.33                             | 92              | -1.5                 | -             | 89          | 0.070                            | 8.80                | 0.103  |
| 259                | 125.530                      | 0.174             | 1.30                             | 92              | -1.3                 | -             | 89          | 0.065                            | 8.65                | 0.103  |
| 260                | 125.703                      | 0.173             | 1.32                             | 92              | -1.5                 | 100           | 89          | 0.068                            | 8.63                | 0.112  |
| 261                | 125.876                      | 0.173             | 1.33                             | 92              | -1.5                 | -             | 89          | 0.063                            | 8.62                | 0.115  |
| 262                | 126.049                      | 0.173             | 1.31                             | 92              | -1.5                 | -             | 89          | 0.064                            | 8.69                | 0.108  |
| 263                | 126.222                      | 0.173             | 1.35                             | 92              | -1.5                 | -             | 89          | 0.068                            | 8.71                | 0.113  |
| 264                | 126.396                      | 0.174             | 1.32                             | 92              | -1.5                 | -             | 89          | 0.065                            | 8.56                | 0.124  |
| 265                | 126.569                      | 0.173             | 1.34                             | 92              | -1.4                 | -             | 89          | 0.071                            | 7.98                | 0.181  |
| 266                | 126.743                      | 0.174             | 1.32                             | 92              | -1.5                 | -             | 89          | 0.064                            | 7.76                | 0.212  |
| 267                | 126.918                      | 0.175             | 1.33                             | 92              | -1.3                 | -             | 89          | 0.064                            | 7.75                | 0.226  |
| 268                | 127.091                      | 0.173             | 1.30                             | 92              | -1.4                 | -             | 88          | 0.063                            | 7.75                | 0.225  |
| 269                | 127.265                      | 0.174             | 1.31                             | 92              | -1.5                 | -             | 88          | 0.062                            | 7.78                | 0.222  |
| 270                | 127.439                      | 0.174             | 1.30                             | 92              | -1.4                 | 99            | 88          | 0.061                            | 7.77                | 0.222  |
| 271                | 127.613                      | 0.174             | 1.32                             | 92              | -1.5                 | -             | 88          | 0.065                            | 7.77                | 0.225  |
| 272                | 127.787                      | 0.174             | 1.30                             | 92              | -1.3                 | -             | 88          | 0.063                            | 7.85                | 0.221  |
| 273                | 127.961                      | 0.174             | 1.33                             | 92              | -1.5                 | -             | 88          | 0.059                            | 7.70                | 0.162  |
| 274                | 128.134                      | 0.173             | 1.32                             | 92              | -1.4                 | -             | 88          | 0.058                            | 7.57                | 0.181  |
| 275                | 128.307                      | 0.173             | 1.33                             | 92              | -1.4                 | -             | 88          | 0.061                            | 7.50                | 0.196  |
| 276                | 128.480                      | 0.173             | 1.32                             | 92              | -1.5                 | -             | 88          | 0.064                            | 7.44                | 0.208  |
| 277                | 128.654                      | 0.174             | 1.32                             | 92              | -1.5                 | -             | 88          | 0.064                            | 7.49                | 0.217  |
| 278                | 128.828                      | 0.174             | 1.34                             | 92              | -1.5                 | -             | 88          | 0.063                            | 7.39                | 0.207  |
| 279                | 129.002                      | 0.174             | 1.33                             | 92              | -1.4                 | -             | 88          | 0.060                            | 7.27                | 0.225  |
| 280                | 129.179                      | 0.177             | 1.33                             | 92              | -1.5                 | 100           | 88          | 0.063                            | 7.02                | 0.273  |
| 281                | 129.350                      | 0.171             | 1.32                             | 92              | -1.5                 | -             | 88          | 0.062                            | 6.91                | 0.275  |
| 282                | 129.524                      | 0.174             | 1.31                             | 92              | -1.5                 | -             | 88          | 0.060                            | 6.86                | 0.274  |
| 283                | 129.698                      | 0.174             | 1.30                             | 92              | -1.5                 | -             | 88          | 0.062                            | 6.88                | 0.276  |
| 284                | 129.872                      | 0.174             | 1.32                             | 92              | -1.3                 | -             | 88          | 0.058                            | 6.90                | 0.273  |
| 285                | 130.046                      | 0.174             | 1.33                             | 92              | -1.4                 | -             | 88          | 0.057                            | 6.94                | 0.277  |
| 286                | 130.220                      | 0.174             | 1.33                             | 92              | -1.5                 | -             | 88          | 0.064                            | 6.97                | 0.268  |
| 287                | 130.393                      | 0.173             | 1.35                             | 92              | -1.4                 | -             | 88          | 0.060                            | 6.96                | 0.262  |

# BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: SBI  
 Model: St Louis  
 Run #: 4

Job #: 24-303  
 Tracking #: 216  
 Technician: AK  
 Date: 12/12/2024

| Elapsed Time (min) | Particulate Sampling Data    |                   |                                  |                 |                      |               |             | Flue Gas Data                    |                     |        |
|--------------------|------------------------------|-------------------|----------------------------------|-----------------|----------------------|---------------|-------------|----------------------------------|---------------------|--------|
|                    | Gas Meter (ft <sup>3</sup> ) | Sample Rate (cfm) | Orifice dH (in H <sub>2</sub> O) | Meter Temp (°F) | Meter Vacuum (in Hg) | Pro. Rate (%) | Filter (°F) | Flue Draft (in H <sub>2</sub> O) | CO <sub>2</sub> (%) | CO (%) |
| 288                | 130.566                      | 0.173             | 1.33                             | 92              | -1.5                 | -             | 88          | 0.056                            | 6.92                | 0.274  |
| 289                | 130.740                      | 0.174             | 1.32                             | 92              | -1.4                 | -             | 88          | 0.062                            | 6.93                | 0.266  |
| 290                | 130.917                      | 0.177             | 1.32                             | 92              | -1.5                 | 99            | 87          | 0.054                            | 6.97                | 0.270  |
| 291                | 131.087                      | 0.170             | 1.31                             | 92              | -1.4                 | -             | 87          | 0.059                            | 6.93                | 0.270  |
| 292                | 131.261                      | 0.174             | 1.30                             | 92              | -1.5                 | -             | 87          | 0.055                            | 6.96                | 0.269  |
| 293                | 131.436                      | 0.175             | 1.28                             | 92              | -1.4                 | -             | 87          | 0.060                            | 6.95                | 0.262  |
| 294                | 131.610                      | 0.174             | 1.34                             | 92              | -1.4                 | -             | 87          | 0.056                            | 6.97                | 0.262  |
| 295                | 131.787                      | 0.177             | 1.32                             | 92              | -1.4                 | -             | 87          | 0.057                            | 6.95                | 0.252  |
| 296                | 131.958                      | 0.171             | 1.32                             | 92              | -1.3                 | -             | 87          | 0.059                            | 6.97                | 0.248  |
| 297                | 132.132                      | 0.174             | 1.31                             | 92              | -1.4                 | -             | 87          | 0.058                            | 7.04                | 0.246  |
| 298                | 132.306                      | 0.174             | 1.33                             | 92              | -1.5                 | -             | 87          | 0.057                            | 7.05                | 0.256  |
| 299                | 132.479                      | 0.173             | 1.32                             | 92              | -1.4                 | -             | 87          | 0.056                            | 7.03                | 0.253  |
| 300                | 132.653                      | 0.174             | 1.32                             | 92              | -1.4                 | 98            | 87          | 0.053                            | 7.09                | 0.271  |
| 301                | 132.826                      | 0.173             | 1.33                             | 92              | -1.3                 | -             | 87          | 0.058                            | 7.07                | 0.283  |
| 302                | 133.000                      | 0.174             | 1.31                             | 92              | -1.5                 | -             | 87          | 0.058                            | 7.18                | 0.292  |
| 303                | 133.174                      | 0.174             | 1.32                             | 92              | -1.5                 | -             | 87          | 0.051                            | 7.09                | 0.295  |
| 304                | 133.348                      | 0.174             | 1.32                             | 92              | -1.5                 | -             | 87          | 0.056                            | 7.06                | 0.303  |
| 305                | 133.522                      | 0.174             | 1.31                             | 92              | -1.5                 | -             | 87          | 0.061                            | 6.97                | 0.319  |
| 306                | 133.696                      | 0.174             | 1.34                             | 92              | -1.5                 | -             | 87          | 0.060                            | 7.09                | 0.321  |
| 307                | 133.870                      | 0.174             | 1.32                             | 92              | -1.4                 | -             | 87          | 0.052                            | 7.07                | 0.329  |
| 308                | 134.044                      | 0.174             | 1.33                             | 92              | -1.5                 | -             | 87          | 0.062                            | 7.10                | 0.322  |
| 309                | 134.218                      | 0.174             | 1.32                             | 92              | -1.5                 | -             | 87          | 0.060                            | 7.10                | 0.308  |
| 310                | 134.392                      | 0.174             | 1.34                             | 92              | -1.4                 | 98            | 87          | 0.057                            | 7.02                | 0.310  |
| 311                | 134.566                      | 0.174             | 1.29                             | 92              | -1.5                 | -             | 87          | 0.058                            | 6.99                | 0.326  |
| 312                | 134.739                      | 0.173             | 1.31                             | 92              | -1.4                 | -             | 87          | 0.060                            | 7.02                | 0.347  |
| 313                | 134.913                      | 0.174             | 1.31                             | 92              | -1.5                 | -             | 87          | 0.057                            | 6.95                | 0.358  |
| 314                | 135.086                      | 0.173             | 1.34                             | 92              | -1.3                 | -             | 87          | 0.055                            | 6.89                | 0.374  |
| 315                | 135.260                      | 0.174             | 1.30                             | 92              | -1.5                 | -             | 87          | 0.056                            | 6.96                | 0.390  |
| 316                | 135.438                      | 0.178             | 1.30                             | 92              | -1.3                 | -             | 87          | 0.053                            | 6.96                | 0.402  |
| 317                | 135.609                      | 0.171             | 1.32                             | 92              | -1.4                 | -             | 87          | 0.054                            | 6.88                | 0.404  |
| 318                | 135.783                      | 0.174             | 1.34                             | 92              | -1.4                 | -             | 86          | 0.058                            | 6.76                | 0.406  |
| 319                | 135.957                      | 0.174             | 1.30                             | 92              | -1.5                 | -             | 86          | 0.058                            | 6.66                | 0.438  |

# BOX B TEST DATA - ASTM E2780 / ASTM E2515

Client: SBI  
 Model: St Louis  
 Run #: 4

Job #: 24-303  
 Tracking #: 216  
 Technician: AK  
 Date: 12/12/2024

| Elapsed Time (min) | Particulate Sampling Data    |                   |                                  |                 |                      |               |             | Flue Gas Data                    |                     |        |
|--------------------|------------------------------|-------------------|----------------------------------|-----------------|----------------------|---------------|-------------|----------------------------------|---------------------|--------|
|                    | Gas Meter (ft <sup>3</sup> ) | Sample Rate (cfm) | Orifice dH (in H <sub>2</sub> O) | Meter Temp (°F) | Meter Vacuum (in Hg) | Pro. Rate (%) | Filter (°F) | Flue Draft (in H <sub>2</sub> O) | CO <sub>2</sub> (%) | CO (%) |
| 320                | 136.131                      | 0.174             | 1.34                             | 92              | -1.4                 | 98            | 86          | 0.061                            | 6.57                | 0.450  |
| 321                | 136.305                      | 0.174             | 1.33                             | 92              | -1.4                 | -             | 86          | 0.056                            | 6.55                | 0.448  |
| 322                | 136.479                      | 0.174             | 1.32                             | 92              | -1.4                 | -             | 86          | 0.053                            | 6.49                | 0.463  |
| 323                | 136.655                      | 0.176             | 1.32                             | 92              | -1.4                 | -             | 86          | 0.059                            | 6.49                | 0.462  |
| 324                | 136.826                      | 0.171             | 1.33                             | 92              | -1.4                 | -             | 86          | 0.056                            | 6.55                | 0.478  |
| 325                | 136.999                      | 0.173             | 1.31                             | 92              | -1.5                 | -             | 86          | 0.059                            | 6.46                | 0.428  |
| 326                | 137.172                      | 0.173             | 1.32                             | 92              | -1.4                 | -             | 86          | 0.058                            | 6.40                | 0.436  |
| 327                | 137.350                      | 0.178             | 1.32                             | 92              | -1.4                 | -             | 86          | 0.059                            | 6.27                | 0.411  |
| 328                | 137.520                      | 0.170             | 1.33                             | 92              | -1.5                 | -             | 86          | 0.057                            | 6.26                | 0.432  |
| 329                | 137.694                      | 0.174             | 1.32                             | 91              | -1.5                 | -             | 86          | 0.053                            | 6.27                | 0.445  |
| 330                | 137.869                      | 0.175             | 1.31                             | 92              | -1.5                 | 97            | 86          | 0.057                            | 6.19                | 0.459  |
| 331                | 138.043                      | 0.174             | 1.34                             | 91              | -1.4                 | -             | 86          | 0.058                            | 6.21                | 0.452  |
| 332                | 138.217                      | 0.174             | 1.32                             | 92              | -1.4                 | -             | 86          | 0.058                            | 6.12                | 0.455  |
| 333                | 138.391                      | 0.174             | 1.33                             | 92              | -1.5                 | -             | 86          | 0.050                            | 5.97                | 0.494  |
| 334                | 138.568                      | 0.177             | 1.33                             | 92              | -1.5                 | -             | 86          | 0.052                            | 5.97                | 0.508  |
| 335                | 138.741                      | 0.173             | 1.32                             | 92              | -1.5                 | -             | 86          | 0.053                            | 6.00                | 0.517  |
| 336                | 138.913                      | 0.172             | 1.31                             | 91              | -1.4                 | -             | 86          | 0.055                            | 5.94                | 0.518  |
| 337                | 139.086                      | 0.173             | 1.31                             | 92              | -1.4                 | -             | 85          | 0.053                            | 5.97                | 0.531  |
| 338                | 139.259                      | 0.173             | 1.31                             | 92              | -1.4                 | -             | 85          | 0.052                            | 5.94                | 0.539  |
| 339                | 139.436                      | 0.177             | 1.32                             | 91              | -1.4                 | -             | 85          | 0.051                            | 5.90                | 0.531  |
| 340                | 139.607                      | 0.171             | 1.33                             | 91              | -1.5                 | 97            | 85          | 0.058                            | 5.97                | 0.534  |
| Avg/Tot            | 59.277                       | 0.174             | 1.33                             | 89.5            | -1.4                 | 100           | 87.4        | 0.067                            | 10.49               | 0.204  |

# WOODSTOVE SURFACE TEMPERATURE DATA

Client: SBI  
 Model: St Louis  
 Run #: 4

Job #: 24-303  
 Tracking #: 216  
 Technician: AK  
 Date: 12/12/2024

Stove ΔT: 382

| Elapsed Time (min) | Temperature Data (°F) |          |         |        |           |                       |               |
|--------------------|-----------------------|----------|---------|--------|-----------|-----------------------|---------------|
|                    | FB Left               | FB Right | FB Back | FB Top | FB Bottom | Stove Surface Average | Catalyst Exit |
| 0                  | 68                    | 69       | 69      | 67     | 68        | 67.9                  | 63.9          |
| 1                  | 68                    | 69       | 70      | 68     | 68        | 68.4                  | 63.8          |
| 2                  | 69                    | 69       | 74      | 74     | 68        | 70.5                  | 63.9          |
| 3                  | 71                    | 71       | 87      | 86     | 68        | 76.5                  | 64.0          |
| 4                  | 77                    | 77       | 106     | 99     | 69        | 85.7                  | 63.9          |
| 5                  | 88                    | 89       | 130     | 119    | 69        | 98.9                  | 64.1          |
| 6                  | 103                   | 108      | 158     | 144    | 69        | 116.2                 | 64.1          |
| 7                  | 119                   | 126      | 185     | 166    | 69        | 133.0                 | 64.1          |
| 8                  | 134                   | 142      | 210     | 189    | 69        | 149.0                 | 64.1          |
| 9                  | 150                   | 160      | 233     | 214    | 70        | 165.2                 | 64.1          |
| 10                 | 166                   | 179      | 254     | 237    | 71        | 181.2                 | 64.1          |
| 11                 | 182                   | 198      | 273     | 261    | 71        | 197.2                 | 64.1          |
| 12                 | 199                   | 219      | 291     | 282    | 72        | 212.4                 | 64.0          |
| 13                 | 214                   | 239      | 308     | 302    | 73        | 227.1                 | 64.1          |
| 14                 | 230                   | 258      | 325     | 320    | 75        | 241.7                 | 64.1          |
| 15                 | 246                   | 278      | 341     | 337    | 76        | 255.6                 | 64.1          |
| 16                 | 262                   | 297      | 355     | 353    | 78        | 269.0                 | 64.1          |
| 17                 | 277                   | 315      | 369     | 365    | 79        | 280.9                 | 64.2          |
| 18                 | 290                   | 331      | 380     | 377    | 81        | 291.7                 | 64.2          |
| 19                 | 302                   | 345      | 390     | 387    | 84        | 301.3                 | 64.2          |
| 20                 | 313                   | 357      | 401     | 397    | 86        | 310.7                 | 64.2          |
| 21                 | 323                   | 370      | 411     | 402    | 89        | 318.9                 | 64.3          |
| 22                 | 333                   | 381      | 418     | 402    | 92        | 325.3                 | 64.4          |
| 23                 | 342                   | 389      | 426     | 407    | 94        | 331.7                 | 64.3          |
| 24                 | 350                   | 396      | 435     | 415    | 96        | 338.5                 | 64.4          |
| 25                 | 357                   | 402      | 445     | 423    | 99        | 345.0                 | 64.4          |
| 26                 | 365                   | 407      | 454     | 431    | 101       | 351.3                 | 64.5          |
| 27                 | 371                   | 410      | 462     | 439    | 103       | 357.1                 | 64.5          |
| 28                 | 376                   | 409      | 477     | 437    | 108       | 361.2                 | 64.7          |
| 29                 | 383                   | 408      | 486     | 430    | 112       | 363.7                 | 65.0          |
| 30                 | 389                   | 407      | 495     | 419    | 116       | 364.9                 | 65.3          |
| 31                 | 399                   | 406      | 505     | 414    | 120       | 368.4                 | 65.4          |
| 32                 | 409                   | 406      | 515     | 410    | 123       | 372.4                 | 65.6          |
| 33                 | 418                   | 407      | 524     | 410    | 126       | 377.1                 | 65.7          |
| 34                 | 422                   | 405      | 530     | 402    | 130       | 377.6                 | 65.9          |
| 35                 | 430                   | 407      | 537     | 396    | 133       | 380.3                 | 65.9          |
| 36                 | 436                   | 408      | 548     | 393    | 136       | 384.1                 | 65.9          |
| 37                 | 443                   | 412      | 557     | 395    | 139       | 388.9                 | 65.9          |
| 38                 | 450                   | 416      | 568     | 397    | 141       | 394.4                 | 66.0          |
| 39                 | 456                   | 422      | 581     | 397    | 144       | 400.1                 | 66.1          |
| 40                 | 464                   | 428      | 595     | 401    | 147       | 406.9                 | 66.1          |
| 41                 | 470                   | 436      | 609     | 404    | 149       | 413.7                 | 66.2          |
| 42                 | 479                   | 444      | 622     | 410    | 152       | 421.2                 | 66.4          |
| 43                 | 486                   | 453      | 635     | 416    | 154       | 428.8                 | 66.4          |
| 44                 | 495                   | 464      | 647     | 421    | 157       | 436.6                 | 66.5          |
| 45                 | 504                   | 474      | 657     | 422    | 159       | 443.1                 | 66.7          |
| 46                 | 511                   | 484      | 663     | 424    | 162       | 448.7                 | 66.8          |
| 47                 | 517                   | 490      | 667     | 422    | 164       | 451.8                 | 66.6          |

# WOODSTOVE SURFACE TEMPERATURE DATA

Client: SBI  
 Model: St Louis  
 Run #: 4

Job #: 24-303  
 Tracking #: 216  
 Technician: AK  
 Date: 12/12/2024

Stove ΔT: 382

| Elapsed Time (min) | Temperature Data (°F) |          |         |        |           |                       |               |
|--------------------|-----------------------|----------|---------|--------|-----------|-----------------------|---------------|
|                    | FB Left               | FB Right | FB Back | FB Top | FB Bottom | Stove Surface Average | Catalyst Exit |
| 48                 | 521                   | 497      | 670     | 422    | 166       | 455.1                 | 66.6          |
| 49                 | 525                   | 502      | 671     | 418    | 168       | 456.6                 | 66.8          |
| 50                 | 527                   | 504      | 671     | 417    | 171       | 458.0                 | 66.8          |
| 51                 | 529                   | 506      | 672     | 415    | 173       | 459.0                 | 66.7          |
| 52                 | 530                   | 509      | 674     | 414    | 175       | 460.1                 | 66.8          |
| 53                 | 533                   | 511      | 675     | 414    | 177       | 462.0                 | 67.0          |
| 54                 | 533                   | 513      | 677     | 412    | 179       | 462.8                 | 67.0          |
| 55                 | 534                   | 515      | 680     | 411    | 181       | 464.4                 | 67.0          |
| 56                 | 535                   | 517      | 682     | 411    | 183       | 465.4                 | 67.0          |
| 57                 | 537                   | 519      | 684     | 411    | 185       | 467.1                 | 66.9          |
| 58                 | 538                   | 522      | 686     | 412    | 187       | 468.9                 | 66.9          |
| 59                 | 539                   | 525      | 688     | 411    | 189       | 470.5                 | 67.0          |
| 60                 | 544                   | 530      | 695     | 414    | 191       | 474.7                 | 67.1          |
| 61                 | 548                   | 536      | 701     | 420    | 194       | 479.5                 | 67.0          |
| 62                 | 551                   | 540      | 703     | 423    | 196       | 482.7                 | 66.8          |
| 63                 | 553                   | 546      | 704     | 425    | 199       | 485.2                 | 66.8          |
| 64                 | 554                   | 548      | 708     | 427    | 201       | 487.6                 | 66.9          |
| 65                 | 555                   | 552      | 709     | 429    | 203       | 489.5                 | 66.9          |
| 66                 | 556                   | 556      | 713     | 429    | 205       | 491.8                 | 67.2          |
| 67                 | 558                   | 559      | 713     | 430    | 206       | 493.4                 | 67.3          |
| 68                 | 559                   | 562      | 719     | 431    | 208       | 495.6                 | 67.3          |
| 69                 | 560                   | 566      | 721     | 434    | 210       | 498.1                 | 67.4          |
| 70                 | 561                   | 569      | 720     | 433    | 211       | 498.8                 | 67.3          |
| 71                 | 562                   | 570      | 721     | 431    | 212       | 499.3                 | 67.2          |
| 72                 | 561                   | 571      | 718     | 429    | 214       | 498.7                 | 67.2          |
| 73                 | 560                   | 570      | 716     | 424    | 215       | 497.1                 | 67.2          |
| 74                 | 559                   | 567      | 712     | 420    | 216       | 494.8                 | 67.2          |
| 75                 | 557                   | 564      | 708     | 416    | 217       | 492.6                 | 67.3          |
| 76                 | 554                   | 560      | 704     | 412    | 218       | 489.8                 | 67.3          |
| 77                 | 551                   | 555      | 701     | 405    | 220       | 486.4                 | 67.3          |
| 78                 | 556                   | 560      | 691     | 414    | 222       | 488.5                 | 67.1          |
| 79                 | 558                   | 564      | 691     | 430    | 224       | 493.4                 | 67.2          |
| 80                 | 558                   | 567      | 685     | 446    | 226       | 496.2                 | 66.9          |
| 81                 | 558                   | 568      | 680     | 459    | 227       | 498.6                 | 66.8          |
| 82                 | 558                   | 569      | 675     | 471    | 228       | 500.2                 | 66.6          |
| 83                 | 558                   | 569      | 672     | 481    | 229       | 501.9                 | 66.4          |
| 84                 | 558                   | 570      | 665     | 484    | 229       | 501.1                 | 66.4          |
| 85                 | 557                   | 570      | 664     | 487    | 230       | 501.5                 | 66.4          |
| 86                 | 548                   | 563      | 668     | 488    | 233       | 500.0                 | 66.4          |
| 87                 | 541                   | 555      | 678     | 477    | 234       | 496.8                 | 66.5          |
| 88                 | 536                   | 550      | 683     | 463    | 234       | 493.1                 | 66.6          |
| 89                 | 536                   | 551      | 694     | 463    | 235       | 495.8                 | 66.6          |
| 90                 | 538                   | 553      | 700     | 460    | 236       | 497.4                 | 66.7          |
| 91                 | 539                   | 555      | 702     | 456    | 238       | 497.8                 | 66.8          |
| 92                 | 539                   | 556      | 706     | 451    | 239       | 498.2                 | 66.9          |
| 93                 | 541                   | 557      | 707     | 447    | 240       | 498.6                 | 67.0          |
| 94                 | 542                   | 557      | 709     | 444    | 242       | 498.7                 | 67.0          |
| 95                 | 545                   | 558      | 712     | 439    | 243       | 499.2                 | 67.1          |



# WOODSTOVE SURFACE TEMPERATURE DATA

Client: SBI  
 Model: St Louis  
 Run #: 4

Job #: 24-303  
 Tracking #: 216  
 Technician: AK  
 Date: 12/12/2024

Stove ΔT: 382

| Elapsed Time (min) | Temperature Data (°F) |          |         |        |           |                       |               |
|--------------------|-----------------------|----------|---------|--------|-----------|-----------------------|---------------|
|                    | FB Left               | FB Right | FB Back | FB Top | FB Bottom | Stove Surface Average | Catalyst Exit |
| 96                 | 547                   | 559      | 714     | 435    | 243       | 499.7                 | 67.1          |
| 97                 | 550                   | 559      | 717     | 433    | 244       | 500.8                 | 67.1          |
| 98                 | 552                   | 559      | 719     | 431    | 245       | 501.4                 | 67.2          |
| 99                 | 555                   | 559      | 721     | 428    | 246       | 501.8                 | 67.1          |
| 100                | 558                   | 558      | 723     | 427    | 247       | 502.7                 | 67.1          |
| 101                | 561                   | 558      | 724     | 426    | 247       | 503.2                 | 67.2          |
| 102                | 565                   | 558      | 727     | 424    | 247       | 504.2                 | 67.3          |
| 103                | 566                   | 558      | 728     | 424    | 248       | 504.8                 | 67.3          |
| 104                | 568                   | 557      | 730     | 421    | 248       | 504.9                 | 67.5          |
| 105                | 571                   | 557      | 732     | 419    | 248       | 505.5                 | 67.5          |
| 106                | 573                   | 556      | 733     | 419    | 249       | 505.9                 | 67.5          |
| 107                | 574                   | 556      | 734     | 417    | 249       | 506.1                 | 67.4          |
| 108                | 576                   | 557      | 735     | 416    | 249       | 506.4                 | 67.4          |
| 109                | 577                   | 557      | 737     | 414    | 249       | 506.8                 | 67.4          |
| 110                | 577                   | 557      | 737     | 414    | 249       | 506.7                 | 67.5          |
| 111                | 578                   | 558      | 737     | 412    | 249       | 506.9                 | 67.5          |
| 112                | 580                   | 558      | 738     | 411    | 249       | 507.1                 | 67.5          |
| 113                | 581                   | 560      | 739     | 409    | 250       | 507.7                 | 67.6          |
| 114                | 582                   | 562      | 738     | 409    | 250       | 508.1                 | 67.5          |
| 115                | 583                   | 563      | 740     | 407    | 250       | 508.2                 | 67.4          |
| 116                | 582                   | 564      | 738     | 405    | 250       | 507.7                 | 67.4          |
| 117                | 582                   | 564      | 738     | 405    | 250       | 507.8                 | 67.3          |
| 118                | 583                   | 564      | 739     | 403    | 250       | 507.9                 | 67.3          |
| 119                | 582                   | 564      | 737     | 401    | 251       | 507.0                 | 67.3          |
| 120                | 582                   | 564      | 734     | 400    | 251       | 506.3                 | 67.4          |
| 121                | 581                   | 564      | 733     | 399    | 251       | 505.5                 | 67.3          |
| 122                | 581                   | 565      | 731     | 396    | 252       | 504.9                 | 67.3          |
| 123                | 581                   | 564      | 726     | 392    | 252       | 502.9                 | 67.3          |
| 124                | 580                   | 563      | 725     | 390    | 252       | 502.0                 | 67.4          |
| 125                | 577                   | 562      | 721     | 388    | 252       | 500.2                 | 67.6          |
| 126                | 576                   | 561      | 718     | 385    | 252       | 498.4                 | 67.6          |
| 127                | 574                   | 559      | 715     | 383    | 253       | 496.9                 | 67.5          |
| 128                | 572                   | 559      | 714     | 380    | 253       | 495.6                 | 67.5          |
| 129                | 571                   | 558      | 709     | 379    | 254       | 493.8                 | 67.5          |
| 130                | 577                   | 565      | 707     | 391    | 256       | 499.1                 | 67.3          |
| 131                | 581                   | 572      | 705     | 408    | 258       | 504.7                 | 67.3          |
| 132                | 583                   | 578      | 701     | 426    | 260       | 509.4                 | 67.1          |
| 133                | 583                   | 582      | 696     | 444    | 261       | 513.0                 | 67.1          |
| 134                | 584                   | 585      | 694     | 457    | 261       | 516.3                 | 66.9          |
| 135                | 585                   | 588      | 691     | 467    | 262       | 518.5                 | 66.8          |
| 136                | 576                   | 580      | 691     | 457    | 261       | 513.1                 | 66.8          |
| 137                | 571                   | 574      | 688     | 445    | 260       | 507.7                 | 67.0          |
| 138                | 568                   | 570      | 686     | 434    | 260       | 503.3                 | 67.2          |
| 139                | 566                   | 566      | 687     | 422    | 259       | 500.0                 | 67.2          |
| 140                | 563                   | 563      | 687     | 413    | 259       | 496.8                 | 67.3          |
| 141                | 561                   | 560      | 685     | 406    | 259       | 494.2                 | 67.3          |
| 142                | 559                   | 557      | 684     | 399    | 259       | 491.6                 | 67.4          |
| 143                | 559                   | 555      | 682     | 394    | 260       | 489.7                 | 67.4          |

# WOODSTOVE SURFACE TEMPERATURE DATA

Client: SBI  
 Model: St Louis  
 Run #: 4

Job #: 24-303  
 Tracking #: 216  
 Technician: AK  
 Date: 12/12/2024

Stove ΔT: 382

| Elapsed Time (min) | Temperature Data (°F) |          |         |        |           |                       |               |
|--------------------|-----------------------|----------|---------|--------|-----------|-----------------------|---------------|
|                    | FB Left               | FB Right | FB Back | FB Top | FB Bottom | Stove Surface Average | Catalyst Exit |
| 144                | 557                   | 553      | 679     | 391    | 260       | 487.9                 | 67.4          |
| 145                | 567                   | 563      | 677     | 400    | 264       | 494.1                 | 67.3          |
| 146                | 571                   | 569      | 673     | 403    | 269       | 496.8                 | 67.3          |
| 147                | 571                   | 570      | 662     | 408    | 273       | 496.8                 | 67.3          |
| 148                | 570                   | 566      | 648     | 415    | 276       | 495.1                 | 67.4          |
| 149                | 569                   | 561      | 646     | 424    | 278       | 495.7                 | 67.1          |
| 150                | 570                   | 556      | 648     | 437    | 277       | 497.8                 | 66.9          |
| 151                | 573                   | 553      | 656     | 451    | 276       | 501.7                 | 66.8          |
| 152                | 577                   | 551      | 666     | 468    | 274       | 507.1                 | 66.7          |
| 153                | 581                   | 550      | 674     | 489    | 273       | 513.3                 | 66.5          |
| 154                | 585                   | 551      | 685     | 508    | 271       | 520.2                 | 66.3          |
| 155                | 590                   | 553      | 692     | 549    | 270       | 530.7                 | 66.3          |
| 156                | 595                   | 555      | 700     | 556    | 269       | 535.2                 | 66.2          |
| 157                | 600                   | 559      | 706     | 553    | 268       | 537.2                 | 66.1          |
| 158                | 605                   | 563      | 714     | 556    | 268       | 541.1                 | 66.1          |
| 159                | 610                   | 567      | 719     | 559    | 267       | 544.4                 | 66.2          |
| 160                | 615                   | 572      | 725     | 563    | 266       | 548.0                 | 66.0          |
| 161                | 620                   | 576      | 728     | 564    | 265       | 550.6                 | 66.0          |
| 162                | 624                   | 580      | 734     | 574    | 265       | 555.6                 | 66.0          |
| 163                | 628                   | 584      | 737     | 585    | 265       | 559.6                 | 65.9          |
| 164                | 632                   | 587      | 740     | 594    | 264       | 563.4                 | 65.9          |
| 165                | 635                   | 590      | 743     | 602    | 264       | 566.9                 | 65.9          |
| 166                | 639                   | 592      | 747     | 609    | 263       | 570.1                 | 65.8          |
| 167                | 642                   | 595      | 748     | 616    | 262       | 572.7                 | 65.9          |
| 168                | 646                   | 597      | 751     | 623    | 262       | 575.5                 | 65.9          |
| 169                | 649                   | 599      | 753     | 628    | 262       | 578.0                 | 65.9          |
| 170                | 653                   | 601      | 754     | 634    | 261       | 580.5                 | 66.0          |
| 171                | 656                   | 603      | 757     | 638    | 261       | 582.6                 | 66.1          |
| 172                | 658                   | 604      | 759     | 642    | 260       | 584.9                 | 66.0          |
| 173                | 660                   | 606      | 760     | 644    | 260       | 586.1                 | 66.1          |
| 174                | 662                   | 608      | 759     | 649    | 259       | 587.3                 | 66.0          |
| 175                | 664                   | 610      | 762     | 651    | 259       | 588.9                 | 66.1          |
| 176                | 665                   | 611      | 761     | 653    | 258       | 589.5                 | 66.1          |
| 177                | 666                   | 612      | 761     | 653    | 258       | 589.9                 | 66.1          |
| 178                | 666                   | 613      | 760     | 655    | 257       | 590.2                 | 66.2          |
| 179                | 666                   | 614      | 762     | 655    | 257       | 590.8                 | 66.1          |
| 180                | 665                   | 615      | 763     | 656    | 257       | 591.1                 | 66.2          |
| 181                | 665                   | 616      | 762     | 656    | 256       | 591.1                 | 66.0          |
| 182                | 664                   | 617      | 761     | 656    | 256       | 590.8                 | 66.0          |
| 183                | 664                   | 617      | 761     | 656    | 256       | 590.7                 | 66.0          |
| 184                | 663                   | 618      | 762     | 656    | 255       | 590.9                 | 66.1          |
| 185                | 662                   | 619      | 762     | 656    | 255       | 590.5                 | 66.1          |
| 186                | 661                   | 619      | 762     | 655    | 255       | 590.5                 | 66.0          |
| 187                | 660                   | 620      | 762     | 655    | 254       | 590.2                 | 66.0          |
| 188                | 659                   | 621      | 764     | 654    | 254       | 590.5                 | 66.0          |
| 189                | 659                   | 622      | 764     | 654    | 254       | 590.4                 | 66.1          |
| 190                | 657                   | 623      | 763     | 653    | 253       | 590.0                 | 66.0          |
| 191                | 656                   | 624      | 764     | 653    | 253       | 590.0                 | 66.0          |

# WOODSTOVE SURFACE TEMPERATURE DATA

Client: SBI  
 Model: St Louis  
 Run #: 4

Job #: 24-303  
 Tracking #: 216  
 Technician: AK  
 Date: 12/12/2024

Stove ΔT: 382

| Elapsed Time (min) | Temperature Data (°F) |          |         |        |           |                       |               |
|--------------------|-----------------------|----------|---------|--------|-----------|-----------------------|---------------|
|                    | FB Left               | FB Right | FB Back | FB Top | FB Bottom | Stove Surface Average | Catalyst Exit |
| 192                | 656                   | 625      | 763     | 653    | 253       | 589.8                 | 65.9          |
| 193                | 655                   | 626      | 764     | 653    | 253       | 590.1                 | 66.0          |
| 194                | 655                   | 626      | 765     | 652    | 253       | 590.1                 | 65.9          |
| 195                | 654                   | 627      | 765     | 652    | 252       | 590.0                 | 66.0          |
| 196                | 654                   | 627      | 765     | 652    | 252       | 590.0                 | 66.0          |
| 197                | 654                   | 628      | 765     | 652    | 252       | 590.1                 | 66.0          |
| 198                | 654                   | 628      | 767     | 651    | 252       | 590.2                 | 66.1          |
| 199                | 653                   | 628      | 766     | 651    | 251       | 589.8                 | 66.0          |
| 200                | 653                   | 629      | 766     | 650    | 251       | 589.8                 | 66.0          |
| 201                | 653                   | 630      | 765     | 650    | 251       | 589.7                 | 66.0          |
| 202                | 653                   | 630      | 765     | 649    | 251       | 589.6                 | 66.1          |
| 203                | 653                   | 630      | 767     | 649    | 251       | 589.8                 | 66.0          |
| 204                | 652                   | 631      | 766     | 648    | 251       | 589.5                 | 66.0          |
| 205                | 651                   | 631      | 767     | 648    | 251       | 589.6                 | 66.0          |
| 206                | 651                   | 632      | 767     | 647    | 251       | 589.6                 | 66.0          |
| 207                | 651                   | 632      | 768     | 647    | 251       | 589.6                 | 66.0          |
| 208                | 651                   | 633      | 767     | 647    | 251       | 589.5                 | 66.0          |
| 209                | 651                   | 634      | 769     | 646    | 251       | 589.9                 | 66.0          |
| 210                | 651                   | 635      | 770     | 646    | 251       | 590.3                 | 66.1          |
| 211                | 651                   | 636      | 771     | 646    | 251       | 590.8                 | 66.2          |
| 212                | 651                   | 637      | 771     | 646    | 251       | 591.4                 | 66.1          |
| 213                | 652                   | 639      | 773     | 647    | 251       | 592.3                 | 66.0          |
| 214                | 653                   | 640      | 775     | 648    | 251       | 593.2                 | 66.1          |
| 215                | 653                   | 642      | 777     | 648    | 251       | 594.1                 | 66.0          |
| 216                | 654                   | 644      | 779     | 650    | 251       | 595.6                 | 66.0          |
| 217                | 655                   | 645      | 780     | 652    | 251       | 596.8                 | 66.0          |
| 218                | 656                   | 648      | 783     | 654    | 251       | 598.3                 | 66.0          |
| 219                | 657                   | 650      | 786     | 656    | 252       | 600.0                 | 65.9          |
| 220                | 658                   | 652      | 787     | 658    | 252       | 601.5                 | 66.0          |
| 221                | 659                   | 655      | 790     | 660    | 252       | 603.2                 | 66.0          |
| 222                | 660                   | 658      | 792     | 663    | 252       | 605.1                 | 66.0          |
| 223                | 661                   | 662      | 794     | 665    | 252       | 606.9                 | 66.0          |
| 224                | 662                   | 666      | 800     | 667    | 253       | 609.4                 | 66.1          |
| 225                | 663                   | 670      | 799     | 670    | 253       | 611.0                 | 66.1          |
| 226                | 664                   | 675      | 804     | 673    | 253       | 613.6                 | 66.0          |
| 227                | 666                   | 679      | 805     | 676    | 253       | 615.8                 | 65.9          |
| 228                | 667                   | 684      | 809     | 678    | 254       | 618.3                 | 65.9          |
| 229                | 668                   | 689      | 809     | 681    | 254       | 620.0                 | 66.0          |
| 230                | 669                   | 693      | 811     | 683    | 254       | 622.0                 | 66.0          |
| 231                | 670                   | 696      | 813     | 684    | 255       | 623.4                 | 65.9          |
| 232                | 671                   | 700      | 815     | 684    | 255       | 624.8                 | 66.1          |
| 233                | 673                   | 703      | 816     | 685    | 255       | 626.4                 | 66.0          |
| 234                | 675                   | 705      | 815     | 686    | 255       | 627.2                 | 66.0          |
| 235                | 676                   | 708      | 817     | 686    | 256       | 628.4                 | 66.0          |
| 236                | 677                   | 710      | 815     | 685    | 256       | 628.5                 | 66.1          |
| 237                | 678                   | 711      | 815     | 685    | 256       | 629.0                 | 66.0          |
| 238                | 678                   | 712      | 814     | 684    | 256       | 628.8                 | 66.2          |
| 239                | 677                   | 712      | 812     | 683    | 257       | 628.1                 | 66.2          |

# WOODSTOVE SURFACE TEMPERATURE DATA

Client: SBI  
 Model: St Louis  
 Run #: 4

Job #: 24-303  
 Tracking #: 216  
 Technician: AK  
 Date: 12/12/2024

Stove ΔT: 382

| Elapsed Time (min) | Temperature Data (°F) |          |         |        |           |                       |               |
|--------------------|-----------------------|----------|---------|--------|-----------|-----------------------|---------------|
|                    | FB Left               | FB Right | FB Back | FB Top | FB Bottom | Stove Surface Average | Catalyst Exit |
| 240                | 677                   | 712      | 809     | 680    | 257       | 626.8                 | 66.1          |
| 241                | 676                   | 711      | 806     | 675    | 257       | 625.2                 | 66.1          |
| 242                | 675                   | 710      | 803     | 662    | 257       | 621.5                 | 66.2          |
| 243                | 674                   | 709      | 797     | 649    | 258       | 617.2                 | 66.3          |
| 244                | 673                   | 707      | 795     | 641    | 258       | 614.8                 | 66.2          |
| 245                | 672                   | 705      | 791     | 636    | 258       | 612.4                 | 66.3          |
| 246                | 670                   | 703      | 786     | 637    | 259       | 610.9                 | 66.3          |
| 247                | 669                   | 701      | 783     | 629    | 259       | 608.0                 | 66.3          |
| 248                | 667                   | 698      | 778     | 626    | 259       | 605.7                 | 66.2          |
| 249                | 665                   | 696      | 773     | 624    | 260       | 603.4                 | 66.1          |
| 250                | 664                   | 693      | 768     | 624    | 260       | 601.7                 | 66.2          |
| 251                | 662                   | 689      | 761     | 621    | 260       | 598.9                 | 66.2          |
| 252                | 660                   | 686      | 758     | 613    | 260       | 595.6                 | 66.2          |
| 253                | 658                   | 682      | 753     | 603    | 261       | 591.5                 | 66.2          |
| 254                | 656                   | 678      | 749     | 597    | 261       | 588.4                 | 66.2          |
| 255                | 654                   | 675      | 745     | 591    | 262       | 585.2                 | 66.2          |
| 256                | 651                   | 671      | 743     | 589    | 262       | 583.4                 | 66.1          |
| 257                | 648                   | 668      | 737     | 586    | 262       | 580.4                 | 66.1          |
| 258                | 646                   | 665      | 733     | 582    | 263       | 577.6                 | 66.1          |
| 259                | 643                   | 662      | 731     | 576    | 263       | 574.9                 | 66.2          |
| 260                | 641                   | 659      | 725     | 572    | 263       | 571.9                 | 66.2          |
| 261                | 638                   | 656      | 723     | 572    | 263       | 570.3                 | 66.2          |
| 262                | 635                   | 654      | 719     | 571    | 264       | 568.5                 | 66.3          |
| 263                | 633                   | 652      | 716     | 566    | 264       | 566.1                 | 66.3          |
| 264                | 630                   | 650      | 714     | 562    | 264       | 563.9                 | 66.0          |
| 265                | 628                   | 647      | 710     | 557    | 264       | 561.1                 | 62.2          |
| 266                | 625                   | 645      | 706     | 554    | 264       | 558.9                 | 62.6          |
| 267                | 622                   | 642      | 703     | 553    | 264       | 556.8                 | 63.2          |
| 268                | 619                   | 639      | 699     | 549    | 264       | 554.0                 | 63.7          |
| 269                | 617                   | 636      | 694     | 548    | 263       | 551.5                 | 64.1          |
| 270                | 614                   | 633      | 691     | 542    | 263       | 548.6                 | 64.4          |
| 271                | 611                   | 630      | 687     | 535    | 263       | 545.3                 | 64.5          |
| 272                | 608                   | 628      | 682     | 536    | 263       | 543.3                 | 64.5          |
| 273                | 605                   | 625      | 681     | 533    | 263       | 541.5                 | 64.1          |
| 274                | 602                   | 623      | 676     | 529    | 263       | 538.6                 | 64.2          |
| 275                | 600                   | 620      | 675     | 526    | 263       | 536.6                 | 64.1          |
| 276                | 597                   | 618      | 671     | 523    | 263       | 534.2                 | 64.2          |
| 277                | 595                   | 615      | 668     | 520    | 263       | 532.0                 | 64.2          |
| 278                | 592                   | 612      | 666     | 516    | 264       | 529.6                 | 64.3          |
| 279                | 590                   | 609      | 661     | 510    | 264       | 526.7                 | 64.3          |
| 280                | 587                   | 605      | 660     | 512    | 264       | 525.6                 | 64.2          |
| 281                | 585                   | 602      | 656     | 510    | 264       | 523.3                 | 64.0          |
| 282                | 582                   | 599      | 653     | 505    | 264       | 520.6                 | 64.1          |
| 283                | 580                   | 596      | 650     | 500    | 264       | 518.0                 | 64.1          |
| 284                | 578                   | 592      | 647     | 500    | 264       | 516.1                 | 64.3          |
| 285                | 575                   | 589      | 643     | 495    | 264       | 513.3                 | 64.4          |
| 286                | 573                   | 586      | 641     | 494    | 265       | 511.7                 | 64.3          |
| 287                | 571                   | 584      | 639     | 491    | 265       | 509.8                 | 64.4          |

# WOODSTOVE SURFACE TEMPERATURE DATA

Client: SBI  
 Model: St Louis  
 Run #: 4

Job #: 24-303  
 Tracking #: 216  
 Technician: AK  
 Date: 12/12/2024

Stove ΔT: 382

| Elapsed Time (min) | Temperature Data (°F) |          |         |        |           |                       |               |
|--------------------|-----------------------|----------|---------|--------|-----------|-----------------------|---------------|
|                    | FB Left               | FB Right | FB Back | FB Top | FB Bottom | Stove Surface Average | Catalyst Exit |
| 288                | 569                   | 581      | 636     | 485    | 265       | 507.0                 | 64.4          |
| 289                | 567                   | 579      | 635     | 485    | 265       | 506.1                 | 64.3          |
| 290                | 565                   | 576      | 632     | 481    | 266       | 503.9                 | 63.9          |
| 291                | 562                   | 574      | 629     | 479    | 266       | 502.0                 | 63.8          |
| 292                | 561                   | 572      | 628     | 477    | 266       | 500.6                 | 63.9          |
| 293                | 559                   | 570      | 625     | 475    | 266       | 499.0                 | 63.9          |
| 294                | 557                   | 568      | 622     | 474    | 266       | 497.3                 | 63.8          |
| 295                | 555                   | 566      | 621     | 470    | 266       | 495.6                 | 64.0          |
| 296                | 553                   | 564      | 619     | 468    | 266       | 493.9                 | 64.1          |
| 297                | 552                   | 562      | 618     | 466    | 266       | 492.6                 | 64.1          |
| 298                | 550                   | 561      | 615     | 466    | 266       | 491.5                 | 64.0          |
| 299                | 549                   | 560      | 615     | 464    | 266       | 490.7                 | 64.1          |
| 300                | 547                   | 558      | 613     | 463    | 267       | 489.7                 | 64.0          |
| 301                | 546                   | 557      | 613     | 459    | 267       | 488.4                 | 64.1          |
| 302                | 545                   | 556      | 610     | 459    | 267       | 487.3                 | 64.1          |
| 303                | 544                   | 555      | 610     | 457    | 267       | 486.4                 | 64.1          |
| 304                | 542                   | 554      | 609     | 458    | 267       | 485.9                 | 64.1          |
| 305                | 541                   | 553      | 607     | 457    | 267       | 484.9                 | 64.0          |
| 306                | 540                   | 552      | 606     | 453    | 267       | 483.6                 | 63.9          |
| 307                | 539                   | 551      | 606     | 452    | 267       | 482.9                 | 64.0          |
| 308                | 538                   | 550      | 603     | 451    | 267       | 481.8                 | 63.9          |
| 309                | 537                   | 549      | 602     | 451    | 267       | 481.1                 | 64.0          |
| 310                | 536                   | 548      | 602     | 450    | 267       | 480.6                 | 63.9          |
| 311                | 535                   | 547      | 602     | 450    | 268       | 480.1                 | 63.8          |
| 312                | 534                   | 546      | 601     | 447    | 267       | 479.0                 | 63.7          |
| 313                | 533                   | 545      | 599     | 446    | 268       | 478.1                 | 63.8          |
| 314                | 533                   | 544      | 597     | 445    | 267       | 477.2                 | 63.9          |
| 315                | 532                   | 543      | 597     | 443    | 267       | 476.5                 | 64.0          |
| 316                | 531                   | 543      | 596     | 442    | 267       | 475.8                 | 63.9          |
| 317                | 530                   | 542      | 596     | 441    | 267       | 475.1                 | 63.9          |
| 318                | 529                   | 541      | 593     | 440    | 267       | 474.0                 | 63.9          |
| 319                | 528                   | 540      | 594     | 438    | 267       | 473.5                 | 63.9          |
| 320                | 527                   | 539      | 592     | 439    | 267       | 472.9                 | 63.9          |
| 321                | 526                   | 538      | 591     | 438    | 267       | 472.0                 | 63.9          |
| 322                | 525                   | 537      | 591     | 437    | 267       | 471.5                 | 63.8          |
| 323                | 524                   | 536      | 587     | 434    | 267       | 469.7                 | 63.8          |
| 324                | 523                   | 535      | 587     | 433    | 267       | 468.9                 | 63.8          |
| 325                | 522                   | 534      | 584     | 431    | 267       | 467.5                 | 63.9          |
| 326                | 521                   | 532      | 583     | 429    | 267       | 466.6                 | 63.9          |
| 327                | 520                   | 531      | 582     | 429    | 267       | 465.7                 | 63.8          |
| 328                | 519                   | 530      | 581     | 427    | 266       | 464.5                 | 63.9          |
| 329                | 518                   | 528      | 579     | 425    | 266       | 463.4                 | 63.7          |
| 330                | 517                   | 527      | 577     | 425    | 266       | 462.2                 | 63.7          |
| 331                | 516                   | 525      | 575     | 423    | 266       | 461.1                 | 63.7          |
| 332                | 514                   | 524      | 574     | 423    | 266       | 460.3                 | 63.7          |
| 333                | 513                   | 523      | 572     | 420    | 265       | 458.6                 | 63.8          |
| 334                | 512                   | 521      | 571     | 419    | 265       | 457.7                 | 63.6          |
| 335                | 511                   | 520      | 568     | 418    | 265       | 456.3                 | 63.7          |

WOODSTOVE SURFACE TEMPERATURE DATA

Client: SBI  
Model: St Louis  
Run #: 4

Job #: 24-303  
Tracking #: 216  
Technician: AK  
Date: 12/12/2024

Stove ΔT: 382

| Temperature Data (°F) |         |          |         |        |           |                       |               |
|-----------------------|---------|----------|---------|--------|-----------|-----------------------|---------------|
| Elapsed Time (min)    | FB Left | FB Right | FB Back | FB Top | FB Bottom | Stove Surface Average | Catalyst Exit |
| 336                   | 509     | 519      | 567     | 417    | 265       | 455.3                 | 63.6          |
| 337                   | 508     | 517      | 565     | 415    | 265       | 453.9                 | 63.7          |
| 338                   | 507     | 516      | 564     | 414    | 264       | 453.0                 | 63.6          |
| 339                   | 505     | 514      | 562     | 414    | 264       | 451.8                 | 63.6          |
| 340                   | 504     | 513      | 559     | 411    | 264       | 450.1                 | 63.6          |
|                       |         |          |         |        |           |                       |               |
| Average               | 554.4   | 553.0    | 662.8   | 490.3  | 230.4     | 498.2                 | 65.8          |

# LAB SAMPLE DATA - ASTM E2515

Client: SBI  
 Model: St Louis  
 Run #: 4

Job #: 24-303  
 Tracking #: 216  
 Technician: AK  
 Date: 12/12/2024

|         |     | Sample ID | Tare, mg | Final, mg | Catch, mg |
|---------|-----|-----------|----------|-----------|-----------|
| Filters | A   | G01174    | 228.9    | 231.3     | 2.4       |
|         | B   | G01175    | 226.5    | 228.9     | 2.4       |
|         | Amb | G01176    | 228.4    | 228.5     | 0.1       |
|         |     |           |          |           |           |
|         |     |           |          |           |           |
| Probes  | A   | 10A       | 116647.4 | 116647.4  | 0.0       |
|         | B   | 10B       | 117754.8 | 117754.8  | 0.0       |
|         |     |           |          |           |           |
|         |     |           |          |           |           |
|         |     |           |          |           |           |
| O-rings | A   | 10A       | 3361.5   | 3361.7    | 0.2       |
|         | B   | 10B       | 3570.6   | 3570.6    | 0.0       |
|         |     |           |          |           |           |
|         |     |           |          |           |           |
|         |     |           |          |           |           |

Placed in Dessicator on: 5/6/2024

## Balance Audit (mg):

|         |   | 200.0       |             | 200.0       |             | 200.0       |            |             |           |
|---------|---|-------------|-------------|-------------|-------------|-------------|------------|-------------|-----------|
|         |   | Weight (mg) | Date/Time   | Weight (mg) | Date/Time   | Weight (mg) | Date/Time  | Weight (mg) | Date/Time |
| Filters | A | 231.3       | 12/12 18:10 | 231.2       | 12/18 12:00 | 231.3       | 12/20 8:30 |             |           |
|         | B | 228.9       | 12/12 18:10 | 229.0       | 12/18 12:00 | 228.9       | 12/20 8:30 |             |           |
|         |   | 228.4       | 12/12 18:10 | 228.6       | 12/18 12:00 | 228.5       | 12/20 8:30 |             |           |
|         |   |             |             |             |             |             |            |             |           |
|         |   |             |             |             |             |             |            |             |           |
| Probes  | A | 116647.2    | 12/12 18:10 | 116647.4    | 12/18 12:00 | 116647.4    | 12/20 8:30 |             |           |
|         | B | 117755.0    | 12/12 18:10 | 117754.9    | 12/18 12:00 | 117754.8    | 12/20 8:30 |             |           |
|         |   |             |             |             |             |             |            |             |           |
|         |   |             |             |             |             |             |            |             |           |
|         |   |             |             |             |             |             |            |             |           |
| O-Rings | A | 3361.8      | 12/12 18:10 | 3361.6      | 12/18 12:00 | 3361.7      | 12/20 8:30 |             |           |
|         | B | 3570.9      | 12/12 18:10 | 3570.7      | 12/18 12:00 | 3570.6      | 12/20 8:30 |             |           |
|         |   |             |             |             |             |             |            |             |           |
|         |   |             |             |             |             |             |            |             |           |
|         |   |             |             |             |             |             |            |             |           |

|                        |     |
|------------------------|-----|
| Train A Aggregate, mg: | 2.6 |
| Train B Aggregate, mg: | 2.4 |
| Ambient, mg:           | 0.1 |
|                        |     |

# TEST RESULTS - ASTM E2780 / ASTM E2515

Client: SBI

Model: St Louis

Run #: 4

Job #: 24-303

Tracking #: 216

Technician: AK

Date: 12/12/2024

Total Fuel Burned (kg-dry) 18.36

|                                                         | Ambient Sample | Sample Train A | Sample Train B | 1st Hour Filter |
|---------------------------------------------------------|----------------|----------------|----------------|-----------------|
| Total Sample Volume (ft <sup>3</sup> )                  | 89.919         | 59.115         | 59.277         | -               |
| Average Gas Velocity in Dilution Tunnel (ft/sec)        | 18.3           |                |                |                 |
| Average Gas Flow Rate in Dilution Tunnel (dscf/hr)      | 48146.2        |                |                |                 |
| Average Gas Meter Temperature (°F)                      | 68.3           | 87.9           | 89.5           | -               |
| Total Sample Volume (dscf)                              | 90.187         | 56.887         | 57.229         | -               |
| Average Tunnel Temperature (°F)                         | 90.2           |                |                |                 |
| Total Time of Test (min)                                | 340            |                |                |                 |
| Total Particulate Catch (mg)                            | 0.1            | 2.6            | 2.4            | -               |
| Particulate Concentration, dry-standard (g/dscf)        | 0.0000011      | 0.0000457      | 0.0000419      | -               |
| Total PM Emissions (g)                                  | 0.30           | 12.17          | 11.14          | -               |
| Particulate Emission Rate (g/hr)                        | 0.05           | 2.15           | 1.97           | -               |
| Emissions Factor (g/kg)                                 | -              | 0.66           | 0.61           | -               |
| Difference from Average Total Particulate Emissions (g) | -              | 0.51           | 0.51           | -               |
| Difference from Average Total Particulate Emissions (%) | -              | 4.4%           | 4.4%           | -               |
| Difference from Average Emissions Factor (g/kg)         | -              | 0.03           | 0.03           | -               |

| Final Average Results            |       |
|----------------------------------|-------|
| Total Particulate Emissions (g)  | 11.65 |
| Particulate Emission Rate (g/hr) | 2.06  |
| Emissions Factor (g/kg)          | 0.63  |

| Quality Checks                   | Requirement                                                                                 | Observed                 | Result |
|----------------------------------|---------------------------------------------------------------------------------------------|--------------------------|--------|
| Dual Train Precision             | Each train within 7.5% of average emissions (in grams), or emission factors within 0.5 g/kg | See Above                | OK     |
| Filter Temps                     | <90 °F                                                                                      | 89.4                     | OK     |
| Face Velocity                    | < 30 ft/min                                                                                 | 9.6                      | OK     |
| Leakage Rate                     | Less than 4% of average sample rate                                                         | 0 cfm                    | OK     |
| Ambient Temp                     | 55-90 °F                                                                                    | Min:65.1/Max:71          | OK     |
| Negative Probe Weight Evaluation | <5% of Total Catch                                                                          | Probe Catch Not Negative | OK     |
| Pro-Rate Variation               | 90% of readings between 90-110%; none greater than 120% or less than 80%                    | See Data Tabs            | OK     |



## Test Input Data

Client: SBI  
 Model: St-Louis  
 Run #: 4

Job #: 24-303  
 Tracking #: 216  
 Technician: AK  
 Date: 12/12/2024

### Traverse Data

| pt     | dP (in WC) |
|--------|------------|
| 1      | 0.066      |
| 2      | 0.074      |
| 3      | 0.080      |
| 4      | 0.078      |
| 5      | 0.072      |
| 6      | 0.058      |
| 7      | 0.062      |
| 8      | 0.072      |
| 9      | 0.084      |
| 10     | 0.086      |
| 11     | 0.078      |
| 12     | 0.062      |
| Center | 0.074      |

### Tunnel Data

|                   |       |
|-------------------|-------|
| Tunnel dia. (in): | 12    |
| Pitot Cp          | 0.99  |
| Vs,cent (ft/s):   | 18.07 |
| Vs, trav (ft/s):  | 17.88 |
| Fp                | 0.989 |

|                              | Pre-Test | Post Test |
|------------------------------|----------|-----------|
| Barometric Pressure (in. Hg) | 29.68    | 29.62     |
| Lab Relative Humidity (%)    | 27.3     | 31.6      |

|                  |        |
|------------------|--------|
| Traverse Temp:   | 66     |
| Static Pressure: | -0.210 |

## Fuel Data

### Fuel Properties

|              |        |
|--------------|--------|
| Species      | Maple  |
| HHV (Btu/lb) | 8587   |
| %C           | 50.64% |
| %H           | 6.02%  |
| %O           | 41.74% |

|                     | Wet Weight | MC (%db) | Dry Weight (lbs) |
|---------------------|------------|----------|------------------|
| Kindling            | 1.99       |          |                  |
| Starter             | 5.79       | 20.30    | 4.81             |
| L2                  | 13.69      | 20.98    | 11.32            |
| L3                  | 9.98       | 21.26    | 8.23             |
| L4 <sub>s</sub>     | 7.24       | 22.69    | 5.90             |
| L4 <sub>b</sub>     | 15.82      | 23.42    | 12.82            |
| Avg. Moisture (%db) |            | 21.73    |                  |

## Run 1 Results Summary

### Test Segments

|                         | Clock    | ET(min) |
|-------------------------|----------|---------|
| L1 Ignition             | 12:04 PM | 0       |
| L1 End                  | 11:29 AM | 20      |
| L1 Duration             |          | 20      |
| Fuel Consumed (lbs-wet) |          | 5.29    |
| Fuel Consumed (lbs-dry) |          | 4.31    |

|                         |          |       |
|-------------------------|----------|-------|
| L2 Loaded               | 11:29 AM | 21    |
| L2 End                  | 12:43 PM | 83    |
| L2 Duration             |          | 62    |
| Fuel Consumed (lbs-wet) |          | 12.44 |
| Fuel Consumed (lbs-dry) |          | 10.07 |

|                         |          |      |
|-------------------------|----------|------|
| L3 Loaded               | 12:44 PM | 84   |
| L3 End                  | 1:46 PM  | 144  |
| L3 Duration             |          | 60   |
| Fuel Consumed (lbs-wet) |          | 9.11 |
| Fuel Consumed (lbs-dry) |          | 7.36 |

|                         |         |       |
|-------------------------|---------|-------|
| L4 Loaded               | 1:47 PM | 145   |
| L4 End                  | 5:58 PM | 340   |
| L4 Duration             |         | 195   |
| Fuel Consumed (lbs-wet) |         | 23.08 |
| Fuel Consumed (lbs-dry) |         | 18.74 |

|                             |       |                |                |
|-----------------------------|-------|----------------|----------------|
| Total Fuel Burned (lbs-wet) | 49.92 |                |                |
| Total Fuel Burned (lbs-dry) | 40.48 | 18.36 (kg-dry) | 3.24 kg/hr dry |

### Firebox Avg Temps (F)

|                         |     |
|-------------------------|-----|
| L1TS <sub>avg(i)</sub>  | 68  |
| L1TS <sub>avg(f)</sub>  | 364 |
| L2TS <sub>avg(i)</sub>  | 364 |
| L2TS <sub>avg(f)</sub>  | 502 |
| L3TS <sub>avg(i)</sub>  | 501 |
| L3TS <sub>avg(f)</sub>  | 488 |
| L4TS <sub>avg(i)</sub>  | 494 |
| L14TS <sub>avg(f)</sub> | 450 |

### Burn Time Rating (hrs)

|     |   |
|-----|---|
| BTR | 4 |
|-----|---|

### Burn Rate (lbs-wet/hr) (dry kg/hr)

|                  |       |      |
|------------------|-------|------|
| BR <sub>L2</sub> | 15.87 | 5.87 |
| BR <sub>L2</sub> | 12.04 | 4.42 |
| BR <sub>L3</sub> | 9.11  | 3.34 |
| BR <sub>L4</sub> | 7.10  | 2.62 |
| OVERALL          | 8.81  | 3.24 |

|                         |          |       |
|-------------------------|----------|-------|
| 1st hr Loaded           | 12:04 PM | 0     |
| 1st hr End              | 1:04 PM  | 60    |
| L4 Duration             |          | 60    |
| Fuel Consumed (lbs-wet) |          | 15.02 |
| Fuel Consumed (lbs-dry) |          | 12.42 |

### PM Results

| Burn Phase:                    | L1     | L2     | L3     | L4     | 1st Hr | Total  |
|--------------------------------|--------|--------|--------|--------|--------|--------|
| E <sub>T</sub> :               | 2.1    | 1.3    | 0.6    | 2.4    | 3.2    | 6.4    |
| E <sub>g/hr</sub> :            | 6.3    | 1.2    | 0.6    | 0.73   | 3.24   | 1.12   |
| E <sub>g/kg</sub> :            | 1.07   | 0.28   | 0.18   | 0.28   | 0.58   | 0.35   |
| E <sub>g/MJ output</sub> :     | 0.07   | 0.02   | 0.01   | 0.02   |        | 0.02   |
| E <sub>lb/mmbtu output</sub> : | 0.17   | 0.04   | 0.03   | 0.04   | -      | 0.05   |
| CO (g):                        | 38.9   | 98.1   | 35.6   | 222.3  |        | 394.9  |
| CO (g/min):                    | 1.95   | 1.58   | 0.59   | 1.14   |        | 1.16   |
| Output (BTU/hr)                | 80,377 | 63,461 | 48,508 | 36,913 |        | 46,031 |
| Efficiency (%)                 | 72.3%  | 75.8%  | 76.7%  | 74.5%  |        | 75.0%  |

### Rolling Average Max Values

|           | 1-min Avg. | 5-min Avg. | 60-min Avg |
|-----------|------------|------------|------------|
| PM (g/hr) | 60.8       | 20.7       | 3.3        |

### Quality Checks

### Requirement

### Observed Pass/Fail

|                     |                                         |               |      |
|---------------------|-----------------------------------------|---------------|------|
| Filter/Dewpt. Temp  | Dewpoint must never exceed filter temp  | Max Δ -48.7   | PASS |
| Filter Temp         | Must be between 80 and 90F at all times | 80.5 / 89.4   | PASS |
| Ambient Temp        | Must be between 65 and 90F at all times | 65.1 / 71     | PASS |
| Minimum Tunnel Flow | >600 CFM                                | 763.6         | PASS |
| Weight Loss         | Must be >0.1 lb per 20 min              | Min -0.55 lb. | PASS |

# L1 Efficiency Results

**Manufacturer:** SBI  
**Model:** St-Louis  
**Date:** 12/12/24  
**Run:** 4  
**Control #:** 216  
**Test Duration:** 20  
**Output Category:** L1

## Test Results in Accordance with CSA B415.1-10

|                                 | HHV Basis | LHV Basis |
|---------------------------------|-----------|-----------|
| <b>Overall Efficiency</b>       | 72.3%     | 77.3%     |
| <b>Combustion Efficiency</b>    | 98.9%     | 98.9%     |
| <b>Heat Transfer Efficiency</b> | 73.1%     | 78.2%     |

|                           |         |         |                |
|---------------------------|---------|---------|----------------|
| <b>Output Rate (kJ/h)</b> | 84,731  | 80,377  | <b>(Btu/h)</b> |
| <b>Burn Rate (kg/h)</b>   | 5.87    | 12.94   | <b>(lb/h)</b>  |
| <b>Input (kJ/h)</b>       | 117,257 | 111,230 | <b>(Btu/h)</b> |

|                                  |       |      |               |
|----------------------------------|-------|------|---------------|
| <b>Test Load Weight (dry kg)</b> | 1.96  | 4.31 | <b>dry lb</b> |
| <b>MC wet (%)</b>                | 18.47 |      |               |
| <b>MC dry (%)</b>                | 22.65 |      |               |
| <b>Particulate (g )</b>          | N/A   |      |               |
| <b>CO (g)</b>                    | 39    |      |               |
| <b>Test Duration (h)</b>         | 0.33  |      |               |

| <b>Emissions</b>        | <b>Particulate</b> | <b>CO</b> |
|-------------------------|--------------------|-----------|
| <b>g/MJ Output</b>      | N/A                | 1.38      |
| <b>g/kg Dry Fuel</b>    | N/A                | 19.90     |
| <b>g/h</b>              | N/A                | 116.83    |
| <b>g/min</b>            | N/A                | 1.95      |
| <b>lb/MM Btu Output</b> | N/A                | 0.51      |

|                             |       |
|-----------------------------|-------|
| <b>Air/Fuel Ratio (A/F)</b> | 12.48 |
|-----------------------------|-------|

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## L2 Efficiency Results

**Manufacturer:** SBI  
**Model:** St-Louis  
**Date:** 12/12/24  
**Run:** 4  
**Control #:** 216  
**Test Duration:** 62  
**Output Category:** L2

### Test Results in Accordance with CSA B415.1-10

|                                 | HHV Basis | LHV Basis |
|---------------------------------|-----------|-----------|
| <b>Overall Efficiency</b>       | 75.8%     | 81.1%     |
| <b>Combustion Efficiency</b>    | 98.6%     | 98.6%     |
| <b>Heat Transfer Efficiency</b> | 76.8%     | 82.2%     |

|                           |        |        |                |
|---------------------------|--------|--------|----------------|
| <b>Output Rate (kJ/h)</b> | 66,900 | 63,461 | <b>(Btu/h)</b> |
| <b>Burn Rate (kg/h)</b>   | 4.42   | 9.74   | <b>(lb/h)</b>  |
| <b>Input (kJ/h)</b>       | 88,278 | 83,741 | <b>(Btu/h)</b> |

|                                  |       |       |               |
|----------------------------------|-------|-------|---------------|
| <b>Test Load Weight (dry kg)</b> | 4.57  | 10.07 | <b>dry lb</b> |
| <b>MC wet (%)</b>                | 19.08 |       |               |
| <b>MC dry (%)</b>                | 23.59 |       |               |
| <b>Particulate (g )</b>          | N/A   |       |               |
| <b>CO (g)</b>                    | 98    |       |               |
| <b>Test Duration (h)</b>         | 1.03  |       |               |

| <b>Emissions</b>        | <b>Particulate</b> | <b>CO</b> |
|-------------------------|--------------------|-----------|
| <b>g/MJ Output</b>      | N/A                | 1.42      |
| <b>g/kg Dry Fuel</b>    | N/A                | 21.47     |
| <b>g/h</b>              | N/A                | 94.90     |
| <b>g/min</b>            | N/A                | 1.58      |
| <b>lb/MM Btu Output</b> | N/A                | 0.51      |

|                             |      |
|-----------------------------|------|
| <b>Air/Fuel Ratio (A/F)</b> | 9.83 |
|-----------------------------|------|

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## L3 Efficiency Results

**Manufacturer:** SBI  
**Model:** St-Louis  
**Date:** 12/12/24  
**Run:** 4  
**Control #:** 216  
**Test Duration:** 60  
**Output Category:** L3

### Test Results in Accordance with CSA B415.1-10

|                                 | HHV Basis | LHV Basis |
|---------------------------------|-----------|-----------|
| <b>Overall Efficiency</b>       | 76.7%     | 82.0%     |
| <b>Combustion Efficiency</b>    | 99.5%     | 99.5%     |
| <b>Heat Transfer Efficiency</b> | 77.1%     | 82.4%     |

|                           |        |        |                |
|---------------------------|--------|--------|----------------|
| <b>Output Rate (kJ/h)</b> | 51,136 | 48,508 | <b>(Btu/h)</b> |
| <b>Burn Rate (kg/h)</b>   | 3.34   | 7.36   | <b>(lb/h)</b>  |
| <b>Input (kJ/h)</b>       | 66,701 | 63,273 | <b>(Btu/h)</b> |

|                                  |       |      |               |
|----------------------------------|-------|------|---------------|
| <b>Test Load Weight (dry kg)</b> | 3.34  | 7.36 | <b>dry lb</b> |
| <b>MC wet (%)</b>                | 19.21 |      |               |
| <b>MC dry (%)</b>                | 23.77 |      |               |
| <b>Particulate (g )</b>          | N/A   |      |               |
| <b>CO (g)</b>                    | 36    |      |               |
| <b>Test Duration (h)</b>         | 1.00  |      |               |

| <b>Emissions</b>        | <b>Particulate</b> | <b>CO</b> |
|-------------------------|--------------------|-----------|
| <b>g/MJ Output</b>      | N/A                | 0.70      |
| <b>g/kg Dry Fuel</b>    | N/A                | 10.66     |
| <b>g/h</b>              | N/A                | 35.61     |
| <b>g/min</b>            | N/A                | 0.59      |
| <b>lb/MM Btu Output</b> | N/A                | 0.51      |

|                             |       |
|-----------------------------|-------|
| <b>Air/Fuel Ratio (A/F)</b> | 10.80 |
|-----------------------------|-------|

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## L4 Efficiency Results

**Manufacturer:** SBI  
**Model:** St-Louis  
**Date:** 12/12/24  
**Run:** 4  
**Control #:** 216  
**Test Duration:** 195  
**Output Category:** L4

### Test Results in Accordance with CSA B415.1-10

|                                 | HHV Basis | LHV Basis |
|---------------------------------|-----------|-----------|
| <b>Overall Efficiency</b>       | 74.5%     | 79.6%     |
| <b>Combustion Efficiency</b>    | 98.4%     | 98.4%     |
| <b>Heat Transfer Efficiency</b> | 75.7%     | 80.9%     |

|                           |        |        |                |
|---------------------------|--------|--------|----------------|
| <b>Output Rate (kJ/h)</b> | 38,913 | 36,913 | <b>(Btu/h)</b> |
| <b>Burn Rate (kg/h)</b>   | 2.62   | 5.77   | <b>(lb/h)</b>  |
| <b>Input (kJ/h)</b>       | 52,252 | 49,567 | <b>(Btu/h)</b> |

|                                  |       |       |               |
|----------------------------------|-------|-------|---------------|
| <b>Test Load Weight (dry kg)</b> | 8.50  | 18.74 | <b>dry lb</b> |
| <b>MC wet (%)</b>                | 18.81 |       |               |
| <b>MC dry (%)</b>                | 23.17 |       |               |
| <b>Particulate (g )</b>          | N/A   |       |               |
| <b>CO (g)</b>                    | 222   |       |               |
| <b>Test Duration (h)</b>         | 3.25  |       |               |

| <b>Emissions</b>        | <b>Particulate</b> | <b>CO</b> |
|-------------------------|--------------------|-----------|
| <b>g/MJ Output</b>      | N/A                | 1.76      |
| <b>g/kg Dry Fuel</b>    | N/A                | 26.14     |
| <b>g/h</b>              | N/A                | 68.39     |
| <b>g/min</b>            | N/A                | 1.14      |
| <b>lb/MM Btu Output</b> | N/A                | 0.51      |

|                             |       |
|-----------------------------|-------|
| <b>Air/Fuel Ratio (A/F)</b> | 12.21 |
|-----------------------------|-------|

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# Run 1 TEOM Data

| ET (min) | Ci - 1-min avg PM (ug/m <sup>3</sup> ) | Tunnel dP (in WC) | sqrtd P | Tunnel Temp (F) | Tunnel Temp - 10 minute Avg. (F) | Tunnel RH - 10 minute avg. (%) | Tunnel Velocity - Vsi (ft/s) | Tunnel Flow - Q <sub>sd</sub> (m <sup>3</sup> /min) | E <sub>i</sub> (mg) | E <sub>g/hr, i</sub> (g/hr) | PM 5-min Rolling Avg (g/hr) | PM 60-min Rolling Avg (g/hr) | PM (cumulative g) |
|----------|----------------------------------------|-------------------|---------|-----------------|----------------------------------|--------------------------------|------------------------------|-----------------------------------------------------|---------------------|-----------------------------|-----------------------------|------------------------------|-------------------|
| 0        | -65                                    | 0.074             | 0.2720  | 72.7            | -                                | -                              | 17.998                       | 23.565                                              | -1.529              | -0.09                       | -                           | -                            | 0.00              |
| 1        | 3500                                   | 0.075             | 0.2739  | 78.9            | -                                | -                              | 18.224                       | 23.587                                              | 82.546              | 4.95                        | -                           | -                            | 0.08              |
| 2        | 44099                                  | 0.073             | 0.2702  | 91.9            | -                                | -                              | 18.195                       | 22.994                                              | 1014.032            | 60.84                       | -                           | -                            | 1.10              |
| 3        | 7583                                   | 0.072             | 0.2683  | 87.5            | -                                | -                              | 17.998                       | 22.928                                              | 173.856             | 10.43                       | -                           | -                            | 1.27              |
| 4        | 7254                                   | 0.073             | 0.2702  | 85.1            | -                                | -                              | 18.083                       | 23.137                                              | 167.840             | 10.07                       | 17.24                       | -                            | 1.44              |
| 5        | 11620                                  | 0.074             | 0.2720  | 85.7            | -                                | -                              | 18.216                       | 23.282                                              | 270.538             | 16.23                       | 20.51                       | -                            | 1.71              |
| 6        | 4380                                   | 0.072             | 0.2683  | 86.6            | -                                | -                              | 17.983                       | 22.947                                              | 100.513             | 6.03                        | 20.72                       | -                            | 1.81              |
| 7        | 1655                                   | 0.072             | 0.2683  | 87.4            | -                                | -                              | 17.996                       | 22.930                                              | 37.948              | 2.28                        | 9.01                        | -                            | 1.85              |
| 8        | 1304                                   | 0.072             | 0.2683  | 87.7            | -                                | -                              | 18.001                       | 22.924                                              | 29.883              | 1.79                        | 7.28                        | -                            | 1.88              |
| 9        | 1756                                   | 0.073             | 0.2702  | 88.2            | 85.17                            | 103.13                         | 18.134                       | 23.072                                              | 40.516              | 2.43                        | 5.75                        | -                            | 1.92              |
| 10       | 809                                    | 0.072             | 0.2683  | 88.6            | 86.76                            | 114.46                         | 18.016                       | 22.905                                              | 18.534              | 1.11                        | 2.73                        | -                            | 1.93              |
| 11       | 476                                    | 0.074             | 0.2720  | 88.9            | 87.76                            | 127.34                         | 18.270                       | 23.214                                              | 11.053              | 0.66                        | 1.66                        | -                            | 1.95              |
| 12       | 293                                    | 0.074             | 0.2720  | 89.3            | 87.5                             | 141.53                         | 18.276                       | 23.206                                              | 6.808               | 0.41                        | 1.28                        | -                            | 1.95              |
| 13       | 1093                                   | 0.072             | 0.2683  | 90.1            | 87.76                            | 156.59                         | 18.041                       | 22.874                                              | 24.991              | 1.50                        | 1.22                        | -                            | 1.98              |
| 14       | 448                                    | 0.073             | 0.2702  | 89.5            | 88.2                             | 172.19                         | 18.156                       | 23.044                                              | 10.318              | 0.62                        | 0.86                        | -                            | 1.99              |
| 15       | 286                                    | 0.073             | 0.2702  | 89.1            | 88.54                            | 187.86                         | 18.149                       | 23.053                                              | 6.596               | 0.40                        | 0.72                        | -                            | 1.99              |
| 16       | 237                                    | 0.073             | 0.2702  | 89.1            | 88.79                            | 203.14                         | 18.149                       | 23.053                                              | 5.470               | 0.33                        | 0.65                        | -                            | 2.00              |
| 17       | 417                                    | 0.075             | 0.2739  | 89.2            | 88.97                            | 217.93                         | 18.398                       | 23.364                                              | 9.748               | 0.58                        | 0.69                        | -                            | 2.01              |
| 18       | 843                                    | 0.074             | 0.2720  | 89.6            | 89.16                            | 232.19                         | 18.281                       | 23.200                                              | 19.546              | 1.17                        | 0.62                        | -                            | 2.03              |
| 19       | 1188                                   | 0.073             | 0.2702  | 90.2            | 89.36                            | 245.8                          | 18.167                       | 23.030                                              | 27.366              | 1.64                        | 0.82                        | -                            | 2.06              |
| 20       | 1946                                   | 0.074             | 0.2720  | 90.7            | 89.57                            | 258.75                         | 18.299                       | 23.176                                              | 45.090              | 2.71                        | 1.29                        | -                            | 2.10              |
| 21       | 9355                                   | 0.070             | 0.2646  | 114.8           | 92.16                            | 270.92                         | 18.183                       | 22.063                                              | 206.408             | 12.38                       | 3.70                        | -                            | 2.31              |
| 22       | 11713                                  | 0.071             | 0.2665  | 106.6           | 93.89                            | 282.2                          | 18.182                       | 22.381                                              | 262.143             | 15.73                       | 6.73                        | -                            | 2.57              |
| 23       | 3287                                   | 0.072             | 0.2683  | 99.8            | 94.86                            | 292.65                         | 18.199                       | 22.674                                              | 74.526              | 4.47                        | 7.39                        | -                            | 2.64              |
| 24       | 774                                    | 0.072             | 0.2683  | 96.5            | 95.56                            | 302.33                         | 18.145                       | 22.741                                              | 17.594              | 1.06                        | 7.27                        | -                            | 2.66              |
| 25       | 624                                    | 0.072             | 0.2683  | 94.9            | 96.14                            | 311.27                         | 18.119                       | 22.774                                              | 14.219              | 0.85                        | 6.90                        | -                            | 2.68              |
| 26       | 524                                    | 0.072             | 0.2683  | 94.1            | 96.64                            | 319.5                          | 18.106                       | 22.791                                              | 11.942              | 0.72                        | 4.57                        | -                            | 2.69              |
| 27       | 1022                                   | 0.073             | 0.2702  | 93.8            | 97.1                             | 327.12                         | 18.227                       | 22.955                                              | 23.451              | 1.41                        | 1.70                        | -                            | 2.71              |
| 28       | 471                                    | 0.072             | 0.2683  | 91.9            | 97.33                            | 334.08                         | 18.070                       | 22.836                                              | 10.765              | 0.65                        | 0.94                        | -                            | 2.72              |
| 29       | 463                                    | 0.071             | 0.2665  | 90              | 97.31                            | 340.32                         | 17.913                       | 22.716                                              | 10.515              | 0.63                        | 0.85                        | -                            | 2.73              |
| 30       | 689                                    | 0.074             | 0.2720  | 89.3            | 97.17                            | 345.74                         | 18.276                       | 23.206                                              | 15.996              | 0.96                        | 0.87                        | -                            | 2.75              |
| 31       | 759                                    | 0.071             | 0.2665  | 89.2            | 94.61                            | 350.69                         | 17.900                       | 22.733                                              | 17.254              | 1.04                        | 0.94                        | -                            | 2.77              |
| 32       | 451                                    | 0.072             | 0.5064  | 89.3            | 92.88                            | 355.41                         | 34.022                       | 43.199                                              | 19.476              | 1.17                        | 0.89                        | -                            | 2.79              |
| 33       | 649                                    | 0.073             | 0.2702  | 89.1            | 91.81                            | 359.96                         | 18.149                       | 23.053                                              | 14.956              | 0.90                        | 0.94                        | -                            | 2.80              |
| 34       | 272                                    | 0.072             | 0.2683  | 89.1            | 91.07                            | 363.87                         | 18.024                       | 22.894                                              | 6.230               | 0.37                        | 0.89                        | -                            | 2.81              |
| 35       | 333                                    | 0.072             | 0.2683  | 88.9            | 90.47                            | 367.4                          | 18.021                       | 22.899                                              | 7.615               | 0.46                        | 0.79                        | -                            | 2.81              |
| 36       | 454                                    | 0.072             | 0.2683  | 89              | 89.96                            | 370.67                         | 18.023                       | 22.896                                              | 10.384              | 0.62                        | 0.70                        | -                            | 2.83              |
| 37       | 1019                                   | 0.073             | 0.2702  | 89.2            | 89.5                             | 373.85                         | 18.151                       | 23.051                                              | 23.492              | 1.41                        | 0.75                        | -                            | 2.85              |
| 38       | 1271                                   | 0.071             | 0.2665  | 89.6            | 89.27                            | 377.17                         | 17.907                       | 22.725                                              | 28.890              | 1.73                        | 0.92                        | -                            | 2.88              |
| 39       | 1478                                   | 0.072             | 0.2683  | 89.7            | 89.24                            | 380.81                         | 18.034                       | 22.882                                              | 33.824              | 2.03                        | 1.25                        | -                            | 2.91              |
| 40       | 1242                                   | 0.073             | 0.2702  | 89.9            | 89.3                             | 385.01                         | 18.162                       | 23.036                                              | 28.614              | 1.72                        | 1.50                        | -                            | 2.94              |
| 41       | 1912                                   | 0.073             | 0.2702  | 90.2            | 89.4                             | 389.54                         | 18.167                       | 23.030                                              | 44.028              | 2.64                        | 1.91                        | -                            | 2.98              |
| 42       | 2728                                   | 0.072             | 0.2683  | 90.6            | 89.53                            | 394.42                         | 18.049                       | 22.863                                              | 62.360              | 3.74                        | 2.37                        | -                            | 3.05              |
| 43       | 2389                                   | 0.072             | 0.2683  | 89.9            | 89.61                            | 399.59                         | 18.037                       | 22.878                                              | 54.660              | 3.28                        | 2.68                        | -                            | 3.10              |
| 44       | 1046                                   | 0.074             | 0.2720  | 88.7            | 89.57                            | 405.49                         | 18.266                       | 23.219                                              | 24.297              | 1.46                        | 2.57                        | -                            | 3.13              |
| 45       | 502                                    | 0.073             | 0.2702  | 87.5            | 89.43                            | 411.77                         | 18.123                       | 23.087                                              | 11.591              | 0.70                        | 2.36                        | -                            | 3.14              |
| 46       | 26                                     | 0.073             | 0.2702  | 86.7            | 89.2                             | 418.24                         | 18.109                       | 23.103                                              | 0.610               | 0.04                        | 1.84                        | -                            | 3.14              |
| 47       | -68                                    | 0.073             | 0.2702  | 86              | 88.88                            | 424.53                         | 18.098                       | 23.118                                              | -1.573              | -0.09                       | 1.08                        | -                            | 3.14              |
| 48       | -38                                    | 0.073             | 0.2702  | 85.7            | 88.49                            | 430.6                          | 18.093                       | 23.125                                              | -0.886              | -0.05                       | 0.41                        | -                            | 3.14              |
| 49       | 18                                     | 0.074             | 0.2720  | 85.8            | 88.1                             | 436.25                         | 18.218                       | 23.280                                              | 0.426               | 0.03                        | 0.12                        | -                            | 3.14              |
| 50       | 142                                    | 0.074             | 0.2720  | 85.6            | 87.67                            | 441.36                         | 18.215                       | 23.285                                              | 3.312               | 0.20                        | 0.02                        | -                            | 3.14              |
| 51       | 68                                     | 0.072             | 0.2683  | 85.5            | 87.2                             | 445.89                         | 17.965                       | 22.970                                              | 1.570               | 0.09                        | 0.03                        | -                            | 3.14              |
| 52       | 118                                    | 0.073             | 0.2702  | 85.4            | 86.68                            | 449.78                         | 18.088                       | 23.131                                              | 2.730               | 0.16                        | 0.09                        | -                            | 3.14              |
| 53       | 138                                    | 0.073             | 0.2702  | 85.2            | 86.21                            | 453.1                          | 18.084                       | 23.135                                              | 3.181               | 0.19                        | 0.13                        | -                            | 3.15              |
| 54       | 170                                    | 0.072             | 0.2683  | 85.3            | 85.87                            | 455.72                         | 17.962                       | 22.974                                              | 3.917               | 0.24                        | 0.18                        | -                            | 3.15              |
| 55       | 309                                    | 0.073             | 0.2702  | 85.1            | 85.63                            | 457.84                         | 18.083                       | 23.137                                              | 7.152               | 0.43                        | 0.22                        | -                            | 3.16              |
| 56       | 506                                    | 0.075             | 0.2739  | 85.2            | 85.48                            | 459.51                         | 18.330                       | 23.450                                              | 11.856              | 0.71                        | 0.35                        | -                            | 3.17              |
| 57       | 1107                                   | 0.075             | 0.2739  | 85.2            | 85.4                             | 461.04                         | 18.330                       | 23.450                                              | 25.966              | 1.56                        | 0.62                        | -                            | 3.20              |
| 58       | 937                                    | 0.074             | 0.2720  | 85.1            | 85.34                            | 462.42                         | 18.206                       | 23.295                                              | 21.816              | 1.31                        | 0.85                        | -                            | 3.22              |
| 59       | 560                                    | 0.074             | 0.2720  | 85              | 85.26                            | 463.81                         | 18.205                       | 23.297                                              | 13.043              | 0.78                        | 0.96                        | 3.31                         | 3.23              |
| 60       | 561                                    | 0.073             | 0.2702  | 84.8            | 85.18                            | 465.48                         | 18.078                       | 23.144                                              | 12.993              | 0.78                        | 1.03                        | 3.33                         | 3.24              |
| 61       | 250                                    | 0.076             | 0.2757  | 84.8            | 85.11                            | 467.53                         | 18.446                       | 23.615                                              | 5.911               | 0.35                        | 0.96                        | 3.26                         | 3.25              |
| 62       | 250                                    | 0.075             | 0.2739  | 84.7            | 85.04                            | 469.79                         | 18.322                       | 23.461                                              | 5.855               | 0.35                        | 0.72                        | 2.22                         | 3.25              |
| 63       | 373                                    | 0.072             | 0.2683  | 84.8            | 85                               | 472.11                         | 17.954                       | 22.985                                              | 8.576               | 0.51                        | 0.56                        | 2.05                         | 3.26              |
| 64       | 592                                    | 0.072             | 0.2683  | 84.7            | 84.94                            | 474.59                         | 17.952                       | 22.987                                              | 13.610              | 0.82                        | 0.56                        | 1.88                         | 3.28              |
| 65       | 905                                    | 0.076             | 0.2757  | 84.7            | 84.9                             | 477.11                         | 18.444                       | 23.617                                              | 21.373              | 1.28                        | 0.66                        | 1.61                         | 3.30              |
| 66       | 729                                    | 0.074             | 0.2720  | 84.6            | 84.84                            | 479.75                         | 18.198                       | 23.306                                              | 16.986              | 1.02                        | 0.80                        | 1.52                         | 3.32              |
| 67       | 843                                    | 0.074             | 0.2720  | 84.5            | 84.77                            | 482.38                         | 18.196                       | 23.308                                              | 19.660              | 1.18                        | 0.96                        | 1.50                         | 3.33              |
| 68       | 1019                                   | 0.075             | 0.2739  | 84.6            | 84.72                            | 485.05                         | 18.320                       | 23.463                                              | 23.915              | 1.43                        | 1.15                        | 1.49                         | 3.36              |
| 69       | 807                                    | 0.076             | 0.2757  | 84.5            | 84.67                            | 487.81                         | 18.440                       | 23.621                                              | 19.054              | 1.14                        | 1.21                        | 1.47                         | 3.38              |
| 70       | 110                                    | 0.074             | 0.2720  | 84.2            | 84.61                            | 490.22                         | 18.191                       | 23.315                                              | 2.562               | 0.15                        | 0.99                        | 1.47                         | 3.38              |
| 71       | -104                                   | 0.076             | 0.2757  | 83.9            | 84.52                            | 492.2                          | 18.430                       | 23.634                                              | -2.452              | -0.15                       | 0.75                        | 1.48                         | 3.38              |
| 72       | -8                                     | 0.075             | 0.2739  | 83.7            | 84.42                            | 493.8                          | 18.305                       | 23.482                                              | -0.180              | -0.01                       | 0.51                        | 1.48                         | 3.38              |
| 73       | -83                                    | 0.075             | 0.2739  | 83.5            | 84.29                            | 494.99                         | 18.302                       | 23.487                                              | -1.951              | -0.12                       | 0.20                        | 1.45                         | 3.38              |
| 74       | 126                                    | 0.074             | 0.2720  | 83.4            | 84.16                            | 495.71                         | 18.178                       | 23.332                                              | 2.934               | 0.18                        | 0.01                        | 1.44                         | 3.38              |
| 75       |                                        | 0.074             | 0.2720  | 83.3            | 84.02                            | 496.02                         |                              |                                                     |                     |                             | -0.02                       | 1.43                         |                   |
| 76       |                                        | 0.074             | 0.2720  | 83.4            | 83.9                             | 495.81                         |                              |                                                     |                     |                             | 0.02                        | 1.43                         |                   |
| 77       |                                        | 0.075             | 0.2739  | 83.9            | 83.84                            | 495.11                         |                              |                                                     |                     |                             | 0.03                        | 1.44                         |                   |
| 78       | -933                                   | 0.075             | 0.2739  | 85.6            | 83.94                            | 494.4                          | 18.337                       | 23.441                                              | -21.872             | -1.31                       | -0.57                       | 1.45                         | 3.36              |
| 79       | -661                                   | 0.073             | 0.2702  | 88.2            | 84.31                            | 493.92                         | 18.134                       | 23.072                                              | -15.249             | -0.91                       | -1.11                       | 1.44                         | 3.34              |
| 80       | -413                                   | 0.075             | 0.2739  | 89.4            | 84.83                            | 493.66                         | 18.401                       | 23.360                                              | -9.655              | -0.58                       | -0.94                       | 1.37                         | 3.33              |
| 81       | -171                                   | 0.075             | 0.2739  | 90              | 85.44                            | 493.59                         | 18.411                       | 23.347                                              | -3.998              | -0.24                       | -0.76                       | 1.13                         | 3.33              |
| 82       | -31                                    | 0.075             | 0.2739  | 90.1            | 86.08                            | 493.74                         | 18.413                       | 23.345                                              | -0.735              | -0.04                       | -0.62                       | 0.83                         | 3.33              |
| 83       | 1567                                   | 0.076             | 0.2757  | 90.4            | 86.77                            | 494.22                         | 18.540                       | 23.494                                              | 36.826              | 2.21                        | 0.09                        | 0.75                         | 3.36              |
| 84       | 1185                                   | 0.073             | 0.2702  | 111.8           | 89.61                            | 494.85                         | 18.520                       | 22.590                                              | 26.760              | 1.61                        | 0.59                        | 0.73                         | 3.39              |

# Run 1 TEOM Data

|     |       |       |        |       |        |        |        |        |         |       |       |      |      |
|-----|-------|-------|--------|-------|--------|--------|--------|--------|---------|-------|-------|------|------|
| 85  | 1744  | 0.074 | 0.2720 | 102.6 | 91.54  | 495.74 | 18.496 | 22.930 | 39.993  | 2.40  | 1.19  | 0.75 | 3.43 |
| 86  | 1751  | 0.073 | 0.2702 | 98    | 93     | 496.77 | 18.295 | 22.868 | 40.034  | 2.40  | 1.71  | 0.77 | 3.47 |
| 87  | 1069  | 0.074 | 0.2720 | 93.4  | 93.95  | 497.81 | 18.344 | 23.120 | 24.717  | 1.48  | 2.02  | 0.78 | 3.50 |
| 88  | 373   | 0.073 | 0.2702 | 90.4  | 94.43  | 498.27 | 18.170 | 23.026 | 8.584   | 0.52  | 1.68  | 0.82 | 3.50 |
| 89  | 285   | 0.073 | 0.2702 | 88.2  | 94.43  | 498.53 | 18.134 | 23.072 | 6.568   | 0.39  | 1.44  | 0.83 | 3.51 |
| 90  | 359   | 0.073 | 0.2702 | 87.1  | 94.2   | 498.66 | 18.116 | 23.095 | 8.289   | 0.50  | 1.06  | 0.82 | 3.52 |
| 91  | 492   | 0.073 | 0.2702 | 86.5  | 93.85  | 498.58 | 18.106 | 23.108 | 11.366  | 0.68  | 0.71  | 0.81 | 3.53 |
| 92  | 440   | 0.075 | 0.2739 | 86.1  | 93.45  | 498.38 | 18.346 | 23.431 | 10.314  | 0.62  | 0.54  | 0.80 | 3.54 |
| 93  | 490   | 0.074 | 0.2720 | 85.8  | 92.99  | 498.05 | 18.218 | 23.280 | 11.400  | 0.68  | 0.58  | 0.80 | 3.55 |
| 94  | 403   | 0.075 | 0.2739 | 85.6  | 90.37  | 497.81 | 18.337 | 23.441 | 9.457   | 0.57  | 0.61  | 0.80 | 3.56 |
| 95  | 162   | 0.073 | 0.2702 | 85.5  | 88.66  | 497.58 | 18.089 | 23.129 | 3.747   | 0.22  | 0.56  | 0.80 | 3.57 |
| 96  | 73    | 0.074 | 0.2720 | 85.4  | 87.4   | 497.55 | 18.211 | 23.289 | 1.697   | 0.10  | 0.44  | 0.80 | 3.57 |
| 97  | 1     | 0.075 | 0.2739 | 85.4  | 86.6   | 497.94 | 18.334 | 23.446 | 0.035   | 0.00  | 0.32  | 0.78 | 3.57 |
| 98  | 105   | 0.073 | 0.2702 | 85.4  | 86.1   | 498.77 | 18.088 | 23.131 | 2.437   | 0.15  | 0.21  | 0.75 | 3.57 |
| 99  | 17    | 0.073 | 0.2702 | 85.1  | 85.79  | 499.36 | 18.083 | 23.137 | 0.390   | 0.02  | 0.10  | 0.72 | 3.57 |
| 100 | 165   | 0.074 | 0.2720 | 85    | 85.58  | 499.88 | 18.205 | 23.297 | 3.833   | 0.23  | 0.10  | 0.69 | 3.57 |
| 101 | 73    | 0.076 | 0.2757 | 84.9  | 85.42  | 500.42 | 18.447 | 23.612 | 1.722   | 0.10  | 0.10  | 0.64 | 3.58 |
| 102 | 57    | 0.074 | 0.2720 | 84.9  | 85.3   | 501.02 | 18.203 | 23.300 | 1.324   | 0.08  | 0.12  | 0.58 | 3.58 |
| 103 | 106   | 0.075 | 0.2739 | 84.7  | 85.19  | 501.64 | 18.322 | 23.461 | 2.488   | 0.15  | 0.12  | 0.52 | 3.58 |
| 104 | 168   | 0.076 | 0.2757 | 84.7  | 85.1   | 502.26 | 18.444 | 23.617 | 3.956   | 0.24  | 0.16  | 0.49 | 3.58 |
| 105 | 214   | 0.075 | 0.2739 | 84.6  | 85.01  | 502.89 | 18.320 | 23.463 | 5.010   | 0.30  | 0.17  | 0.48 | 3.59 |
| 106 | 94    | 0.076 | 0.2757 | 84.5  | 84.92  | 503.51 | 18.440 | 23.621 | 2.227   | 0.13  | 0.18  | 0.49 | 3.59 |
| 107 | 130   | 0.075 | 0.2739 | 84.4  | 84.82  | 504.05 | 18.317 | 23.467 | 3.039   | 0.18  | 0.20  | 0.49 | 3.59 |
| 108 | 103   | 0.075 | 0.2739 | 84.4  | 84.72  | 504.55 | 18.317 | 23.467 | 2.417   | 0.14  | 0.20  | 0.50 | 3.60 |
| 109 | 139   | 0.073 | 0.2702 | 84.3  | 84.64  | 505.05 | 18.069 | 23.154 | 3.224   | 0.19  | 0.19  | 0.50 | 3.60 |
| 110 | 145   | 0.075 | 0.2739 | 84.2  | 84.56  | 505.45 | 18.314 | 23.472 | 3.405   | 0.20  | 0.17  | 0.50 | 3.60 |
| 111 | 177   | 0.075 | 0.2739 | 84.1  | 84.48  | 505.82 | 18.312 | 23.474 | 4.158   | 0.25  | 0.19  | 0.50 | 3.61 |
| 112 | 174   | 0.074 | 0.2720 | 84.1  | 84.4   | 506.11 | 18.189 | 23.317 | 4.062   | 0.24  | 0.21  | 0.50 | 3.61 |
| 113 | 210   | 0.076 | 0.2757 | 84    | 84.33  | 506.4  | 18.432 | 23.632 | 4.961   | 0.30  | 0.24  | 0.50 | 3.62 |
| 114 | 234   | 0.076 | 0.2757 | 84    | 84.26  | 506.72 | 18.432 | 23.632 | 5.534   | 0.33  | 0.27  | 0.50 | 3.62 |
| 115 | 155   | 0.073 | 0.2702 | 84    | 84.2   | 506.99 | 18.065 | 23.161 | 3.584   | 0.22  | 0.27  | 0.50 | 3.62 |
| 116 | 95    | 0.075 | 0.2739 | 83.8  | 84.13  | 507.17 | 18.307 | 23.480 | 2.219   | 0.13  | 0.24  | 0.49 | 3.63 |
| 117 | 88    | 0.074 | 0.2720 | 83.7  | 84.06  | 507.34 | 18.183 | 23.325 | 2.054   | 0.12  | 0.22  | 0.47 | 3.63 |
| 118 | 33    | 0.076 | 0.2757 | 83.6  | 83.98  | 507.49 | 18.425 | 23.641 | 0.772   | 0.05  | 0.17  | 0.45 | 3.63 |
| 119 | 70    | 0.074 | 0.2720 | 83.5  | 83.9   | 507.51 | 18.179 | 23.330 | 1.622   | 0.10  | 0.12  | 0.44 | 3.63 |
| 120 | -4    | 0.075 | 0.2739 | 83.4  | 83.82  | 507.47 | 18.300 | 23.489 | -0.095  | -0.01 | 0.08  | 0.42 | 3.63 |
| 121 | 58    | 0.074 | 0.2720 | 83.3  | 83.74  | 507.33 | 18.176 | 23.334 | 1.344   | 0.08  | 0.07  | 0.42 | 3.63 |
| 122 | 43    | 0.074 | 0.2720 | 83.1  | 83.64  | 507.11 | 18.173 | 23.338 | 0.992   | 0.06  | 0.06  | 0.41 | 3.63 |
| 123 | 36    | 0.075 | 0.2739 | 83    | 83.54  | 506.63 | 18.293 | 23.498 | 0.842   | 0.05  | 0.06  | 0.40 | 3.63 |
| 124 | 53    | 0.075 | 0.2739 | 82.9  | 83.43  | 506.02 | 18.292 | 23.500 | 1.251   | 0.08  | 0.05  | 0.39 | 3.64 |
| 125 | -8    | 0.075 | 0.2739 | 82.7  | 83.3   | 505.21 | 18.288 | 23.504 | -0.181  | -0.01 | 0.05  | 0.37 | 3.64 |
| 126 | 44    | 0.073 | 0.2702 | 82.6  | 83.18  | 504.28 | 18.041 | 23.191 | 1.031   | 0.06  | 0.05  | 0.35 | 3.64 |
| 127 | -23   | 0.073 | 0.2702 | 82.5  | 83.06  | 503.19 | 18.040 | 23.193 | -0.537  | -0.03 | 0.03  | 0.33 | 3.64 |
| 128 | 74    | 0.075 | 0.2739 | 82.4  | 82.94  | 501.96 | 18.283 | 23.511 | 1.746   | 0.10  | 0.04  | 0.30 | 3.64 |
| 129 | -31   | 0.075 | 0.2739 | 82.4  | 82.83  | 500.64 | 18.283 | 23.511 | -0.739  | -0.04 | 0.02  | 0.28 | 3.64 |
| 130 | 4     | 0.075 | 0.2739 | 83.9  | 82.88  | 499.92 | 18.309 | 23.478 | 0.091   | 0.01  | 0.02  | 0.28 | 3.64 |
| 131 | -34   | 0.073 | 0.2702 | 86.1  | 83.16  | 499.84 | 18.099 | 23.116 | -0.774  | -0.05 | 0.00  | 0.28 | 3.64 |
| 132 | -46   | 0.075 | 0.2739 | 87.1  | 83.56  | 500.29 | 18.362 | 23.409 | -1.067  | -0.06 | -0.01 | 0.28 | 3.64 |
| 133 | 24    | 0.075 | 0.2739 | 87.7  | 84.03  | 501.3  | 18.372 | 23.396 | 0.573   | 0.03  | -0.02 | 0.28 | 3.64 |
| 134 | -1    | 0.077 | 0.2775 | 88.2  | 84.56  | 502.73 | 18.624 | 23.695 | -0.029  | 0.00  | -0.01 | 0.28 | 3.64 |
| 135 |       | 0.074 | 0.2720 | 88.4  | 85.13  | 504.56 |        |        |         |       | -0.02 | 0.28 |      |
| 136 |       | 0.075 | 0.2739 | 85.9  | 85.46  | 506.03 |        |        |         |       | -0.01 | 0.27 |      |
| 137 |       | 0.074 | 0.2720 | 84    | 85.61  | 507.11 |        |        |         |       | 0.02  | 0.27 |      |
| 138 | -1121 | 0.075 | 0.2739 | 83.3  | 85.7   | 507.88 | 18.299 | 23.491 | -26.338 | -1.58 | -0.79 | 0.30 | 3.61 |
| 139 | -818  | 0.076 | 0.2757 | 83.1  | 85.77  | 508.5  | 18.417 | 23.651 | -19.347 | -1.16 | -1.37 | 0.32 | 3.59 |
| 140 | -467  | 0.073 | 0.2702 | 83.1  | 85.69  | 508.27 | 18.050 | 23.180 | -10.815 | -0.65 | -1.13 | 0.30 | 3.58 |
| 141 | -232  | 0.075 | 0.2739 | 83.2  | 85.4   | 507.22 | 18.297 | 23.493 | -5.462  | -0.33 | -0.93 | 0.29 | 3.57 |
| 142 | -62   | 0.074 | 0.2720 | 83.2  | 85.01  | 505.44 | 18.174 | 23.336 | -1.454  | -0.09 | -0.76 | 0.28 | 3.57 |
| 143 | 4488  | 0.074 | 0.2720 | 83    | 84.54  | 503.11 | 18.171 | 23.340 | 104.754 | 6.29  | 0.81  | 0.23 | 3.68 |
| 144 | 12516 | 0.075 | 0.2739 | 83    | 84.02  | 500.27 | 18.293 | 23.498 | 294.103 | 17.65 | 4.57  | 0.20 | 3.97 |
| 145 | 11391 | 0.074 | 0.2720 | 106.8 | 85.86  | 497.84 | 18.565 | 22.844 | 260.225 | 15.61 | 7.83  | 0.27 | 4.23 |
| 146 | 8056  | 0.071 | 0.2665 | 117.5 | 89.02  | 496.21 | 18.356 | 22.168 | 178.586 | 10.72 | 10.03 | 0.55 | 4.41 |
| 147 | 5168  | 0.071 | 0.2665 | 126.8 | 93.3   | 495.13 | 18.503 | 21.992 | 113.661 | 6.82  | 11.42 | 0.80 | 4.52 |
| 148 | 6677  | 0.070 | 0.2646 | 138.4 | 98.81  | 494.31 | 18.553 | 21.623 | 144.380 | 8.66  | 11.89 | 0.99 | 4.67 |
| 149 | 5161  | 0.071 | 0.2665 | 119.7 | 102.47 | 493.88 | 18.391 | 22.126 | 114.189 | 6.85  | 9.73  | 1.11 | 4.78 |
| 150 | 3243  | 0.072 | 0.2683 | 105.4 | 104.7  | 493.98 | 18.290 | 22.562 | 73.162  | 4.39  | 7.49  | 1.25 | 4.86 |
| 151 | 2426  | 0.073 | 0.2702 | 99.5  | 106.33 | 494.73 | 18.320 | 22.837 | 55.400  | 3.32  | 6.01  | 1.37 | 4.91 |
| 152 | 2025  | 0.073 | 0.2702 | 96.8  | 107.69 | 496.28 | 18.276 | 22.893 | 46.363  | 2.78  | 5.20  | 1.43 | 4.96 |
| 153 | 2313  | 0.072 | 0.2683 | 95.5  | 108.94 | 498.64 | 18.129 | 22.762 | 52.650  | 3.16  | 4.10  | 1.48 | 5.01 |
| 154 | 2290  | 0.074 | 0.2720 | 95    | 110.14 | 501.87 | 18.371 | 23.086 | 52.866  | 3.17  | 3.37  | 1.52 | 5.06 |
| 155 | 2023  | 0.075 | 0.2739 | 94.6  | 108.92 | 505.53 | 18.488 | 23.250 | 47.031  | 2.82  | 3.05  | 1.58 | 5.11 |
| 156 | 1426  | 0.073 | 0.2702 | 94.5  | 106.62 | 509.37 | 18.238 | 22.940 | 32.715  | 1.96  | 2.78  | 1.63 | 5.14 |
| 157 | 1094  | 0.075 | 0.2739 | 94.4  | 103.38 | 513.4  | 18.485 | 23.254 | 25.432  | 1.53  | 2.53  | 1.68 | 5.17 |
| 158 | 672   | 0.073 | 0.2702 | 94.3  | 98.97  | 518    | 18.235 | 22.944 | 15.411  | 0.92  | 2.08  | 1.72 | 5.18 |
| 159 | 378   | 0.074 | 0.2720 | 94.1  | 96.41  | 522.87 | 18.356 | 23.105 | 8.727   | 0.52  | 1.55  | 1.74 | 5.19 |
| 160 | 320   | 0.075 | 0.2739 | 94.2  | 95.29  | 527.89 | 18.481 | 23.259 | 7.446   | 0.45  | 1.08  | 1.76 | 5.20 |
| 161 | 214   | 0.074 | 0.2720 | 94.3  | 94.77  | 532.78 | 18.359 | 23.101 | 4.936   | 0.30  | 0.74  | 1.76 | 5.20 |
| 162 | 76    | 0.074 | 0.2720 | 94.4  | 94.53  | 537.62 | 18.361 | 23.099 | 1.764   | 0.11  | 0.46  | 1.77 | 5.21 |
| 163 | 252   | 0.072 | 0.2683 | 94.4  | 94.42  | 542.25 | 18.111 | 22.785 | 5.750   | 0.35  | 0.34  | 1.77 | 5.21 |
| 164 | 110   | 0.072 | 0.2683 | 94.6  | 94.38  | 546.57 | 18.114 | 22.780 | 2.497   | 0.15  | 0.27  | 1.77 | 5.21 |
| 165 | 148   | 0.072 | 0.2683 | 94.8  | 94.4   | 550.19 | 18.118 | 22.776 | 3.365   | 0.20  | 0.22  | 1.77 | 5.22 |
| 166 | 265   | 0.073 | 0.2702 | 94.9  | 94.44  | 553.68 | 18.245 | 22.932 | 6.076   | 0.36  | 0.23  | 1.77 | 5.22 |
| 167 | 56    | 0.072 | 0.2683 | 94.9  | 94.49  | 557.23 | 18.119 | 22.774 | 1.267   | 0.08  | 0.23  | 1.77 | 5.23 |
| 168 | 203   | 0.074 | 0.2720 | 95.1  | 94.57  | 560.67 | 18.372 | 23.084 | 4.685   | 0.28  | 0.21  | 1.78 | 5.23 |
| 169 | 65    | 0.072 | 0.2683 | 95.3  | 94.69  | 564.03 | 18.126 | 22.766 | 1.480   | 0.09  | 0.20  | 1.77 | 5.23 |
| 170 | 27    | 0.075 | 0.2739 | 95.4  | 94.81  | 567.28 | 18.501 | 23.233 | 0.639   | 0.04  | 0.17  | 1.78 | 5.23 |
| 171 | -19   | 0.073 | 0.2702 | 95.4  | 94.92  | 570.48 | 18.253 | 22.922 | -0.431  | -0.03 | 0.09  | 1.77 | 5.23 |
| 172 | -15   | 0.073 | 0.2702 | 95.3  | 95.01  | 573.42 | 18.251 | 22.924 | -0.336  | -0.02 | 0.07  | 1.77 | 5.23 |



# Run 1 TEOM Data

|     |      |       |        |      |       |        |        |        |        |       |       |      |      |
|-----|------|-------|--------|------|-------|--------|--------|--------|--------|-------|-------|------|------|
| 173 | 77   | 0.075 | 0.2739 | 95.4 | 95.11 | 576.07 | 18.501 | 23.233 | 1.779  | 0.11  | 0.04  | 1.76 | 5.23 |
| 174 | 61   | 0.073 | 0.2702 | 95.6 | 95.21 | 578.46 | 18.256 | 22.917 | 1.394  | 0.08  | 0.04  | 1.76 | 5.23 |
| 175 | -38  | 0.074 | 0.2720 | 95.6 | 95.29 | 580.66 | 18.381 | 23.074 | -0.871 | -0.05 | 0.02  | 1.75 | 5.23 |
| 176 | -26  | 0.074 | 0.2720 | 95.4 | 95.34 | 582.6  | 18.377 | 23.078 | -0.607 | -0.04 | 0.02  | 1.75 | 5.23 |
| 177 | 39   | 0.072 | 0.2683 | 95.1 | 95.36 | 584.32 | 18.122 | 22.770 | 0.883  | 0.05  | 0.03  | 1.75 | 5.23 |
| 178 | 49   | 0.073 | 0.2702 | 95.5 | 95.4  | 585.79 | 18.254 | 22.920 | 1.115  | 0.07  | 0.02  | 1.75 | 5.24 |
| 179 | 56   | 0.075 | 0.2739 | 95.5 | 95.42 | 587.07 | 18.503 | 23.231 | 1.297  | 0.08  | 0.02  | 1.75 | 5.24 |
| 180 | -28  | 0.073 | 0.2702 | 95.5 | 95.43 | 588.14 | 18.254 | 22.920 | -0.632 | -0.04 | 0.02  | 1.75 | 5.24 |
| 181 | 62   | 0.073 | 0.2702 | 95.5 | 95.44 | 588.99 | 18.254 | 22.920 | 1.431  | 0.09  | 0.05  | 1.75 | 5.24 |
| 182 | -59  | 0.072 | 0.2683 | 95.6 | 95.47 | 589.58 | 18.131 | 22.760 | -1.340 | -0.08 | 0.02  | 1.75 | 5.24 |
| 183 | -3   | 0.074 | 0.2720 | 95.5 | 95.48 | 590.04 | 18.379 | 23.076 | -0.063 | 0.00  | 0.01  | 1.75 | 5.24 |
| 184 | 27   | 0.073 | 0.2702 | 95.4 | 95.46 | 590.4  | 18.253 | 22.922 | 0.614  | 0.04  | 0.00  | 1.75 | 5.24 |
| 185 | 64   | 0.074 | 0.2720 | 95.4 | 95.44 | 590.56 | 18.377 | 23.078 | 1.466  | 0.09  | 0.03  | 1.75 | 5.24 |
| 186 | -9   | 0.075 | 0.2739 | 95.3 | 95.43 | 590.66 | 18.499 | 23.236 | -0.199 | -0.01 | 0.01  | 1.75 | 5.24 |
| 187 | 100  | 0.071 | 0.2665 | 95.4 | 95.46 | 590.69 | 18.001 | 22.605 | 2.268  | 0.14  | 0.05  | 1.75 | 5.24 |
| 188 | 70   | 0.073 | 0.2702 | 95.3 | 95.44 | 590.72 | 18.251 | 22.924 | 1.608  | 0.10  | 0.07  | 1.75 | 5.24 |
| 189 | 82   | 0.073 | 0.2702 | 95.3 | 95.42 | 590.68 | 18.251 | 22.924 | 1.889  | 0.11  | 0.08  | 1.75 | 5.24 |
| 190 | 36   | 0.074 | 0.2720 | 95.1 | 95.38 | 590.56 | 18.372 | 23.084 | 0.824  | 0.05  | 0.08  | 1.75 | 5.24 |
| 191 | -14  | 0.073 | 0.2702 | 94.9 | 95.32 | 590.45 | 18.245 | 22.932 | -0.316 | -0.02 | 0.08  | 1.75 | 5.24 |
| 192 | 93   | 0.073 | 0.2702 | 95   | 95.26 | 590.35 | 18.246 | 22.930 | 2.125  | 0.13  | 0.07  | 1.76 | 5.25 |
| 193 | 28   | 0.071 | 0.2665 | 95.1 | 95.22 | 590.29 | 17.996 | 22.612 | 0.622  | 0.04  | 0.06  | 1.75 | 5.25 |
| 194 | 43   | 0.072 | 0.2683 | 95   | 95.18 | 590.21 | 18.121 | 22.772 | 0.990  | 0.06  | 0.05  | 1.76 | 5.25 |
| 195 | 99   | 0.072 | 0.2683 | 94.8 | 95.12 | 590.16 | 18.118 | 22.776 | 2.254  | 0.14  | 0.07  | 1.73 | 5.25 |
| 196 | 79   | 0.072 | 0.2683 | 94.9 | 95.08 | 590.11 | 18.119 | 22.774 | 1.792  | 0.11  | 0.09  | 1.70 | 5.25 |
| 197 | 93   | 0.072 | 0.2683 | 94.7 | 95.01 | 590.1  | 18.116 | 22.778 | 2.112  | 0.13  | 0.09  | 1.67 | 5.25 |
| 198 | 5    | 0.073 | 0.2702 | 94.6 | 94.94 | 590.07 | 18.240 | 22.938 | 0.108  | 0.01  | 0.09  | 1.70 | 5.25 |
| 199 | 13   | 0.074 | 0.2720 | 94.6 | 94.87 | 590.01 | 18.364 | 23.095 | 0.309  | 0.02  | 0.08  | 1.72 | 5.25 |
| 200 | 14   | 0.071 | 0.2665 | 94.5 | 94.81 | 589.99 | 17.986 | 22.624 | 0.322  | 0.02  | 0.06  | 1.73 | 5.25 |
| 201 | 94   | 0.072 | 0.2683 | 94.7 | 94.79 | 589.96 | 18.116 | 22.778 | 2.134  | 0.13  | 0.06  | 1.74 | 5.26 |
| 202 | 110  | 0.074 | 0.2720 | 94.5 | 94.74 | 589.94 | 18.363 | 23.097 | 2.549  | 0.15  | 0.07  | 1.74 | 5.26 |
| 203 | 92   | 0.073 | 0.2702 | 94.5 | 94.68 | 589.91 | 18.238 | 22.940 | 2.105  | 0.13  | 0.09  | 1.63 | 5.26 |
| 204 | 41   | 0.073 | 0.2702 | 94.4 | 94.62 | 589.85 | 18.236 | 22.942 | 0.939  | 0.06  | 0.10  | 1.33 | 5.26 |
| 205 | 82   | 0.073 | 0.2702 | 94.4 | 94.58 | 589.82 | 18.236 | 22.942 | 1.882  | 0.11  | 0.12  | 1.07 | 5.26 |
| 206 | 250  | 0.073 | 0.2702 | 94.5 | 94.54 | 589.78 | 18.238 | 22.940 | 5.738  | 0.34  | 0.16  | 0.88 | 5.27 |
| 207 | 183  | 0.074 | 0.2720 | 94.2 | 94.49 | 589.73 | 18.358 | 23.103 | 4.218  | 0.25  | 0.18  | 0.77 | 5.27 |
| 208 | 224  | 0.073 | 0.2702 | 94.3 | 94.46 | 589.66 | 18.235 | 22.944 | 5.135  | 0.31  | 0.21  | 0.62 | 5.28 |
| 209 | 324  | 0.073 | 0.2702 | 94.2 | 94.42 | 589.67 | 18.233 | 22.946 | 7.435  | 0.45  | 0.29  | 0.51 | 5.29 |
| 210 | 381  | 0.073 | 0.2702 | 94.5 | 94.42 | 589.72 | 18.238 | 22.940 | 8.750  | 0.53  | 0.38  | 0.44 | 5.30 |
| 211 | 303  | 0.073 | 0.2702 | 94.3 | 94.38 | 589.83 | 18.235 | 22.944 | 6.958  | 0.42  | 0.39  | 0.39 | 5.30 |
| 212 | 361  | 0.074 | 0.2720 | 94.2 | 94.35 | 590.01 | 18.358 | 23.103 | 8.348  | 0.50  | 0.44  | 0.35 | 5.31 |
| 213 | 575  | 0.074 | 0.2720 | 94.2 | 94.32 | 590.26 | 18.358 | 23.103 | 13.289 | 0.80  | 0.54  | 0.30 | 5.32 |
| 214 | 637  | 0.074 | 0.2720 | 94.2 | 94.3  | 590.63 | 18.358 | 23.103 | 14.715 | 0.88  | 0.62  | 0.26 | 5.34 |
| 215 | 777  | 0.072 | 0.2683 | 94.6 | 94.32 | 591.07 | 18.114 | 22.780 | 17.691 | 1.06  | 0.73  | 0.22 | 5.36 |
| 216 | 644  | 0.072 | 0.2683 | 94.7 | 94.34 | 591.67 | 18.116 | 22.778 | 14.679 | 0.88  | 0.82  | 0.20 | 5.37 |
| 217 | 1015 | 0.072 | 0.2683 | 94.4 | 94.36 | 592.39 | 18.111 | 22.785 | 23.123 | 1.39  | 1.00  | 0.19 | 5.39 |
| 218 | 1401 | 0.075 | 0.2739 | 94.9 | 94.42 | 593.27 | 18.493 | 23.244 | 32.572 | 1.95  | 1.23  | 0.19 | 5.43 |
| 219 | 1672 | 0.074 | 0.2720 | 94.7 | 94.47 | 594.28 | 18.366 | 23.093 | 38.606 | 2.32  | 1.52  | 0.21 | 5.47 |
| 220 | 2099 | 0.073 | 0.2702 | 94.6 | 94.48 | 595.4  | 18.240 | 22.938 | 48.146 | 2.89  | 1.89  | 0.23 | 5.51 |
| 221 | 2454 | 0.073 | 0.2702 | 94.8 | 94.53 | 596.64 | 18.243 | 22.934 | 56.274 | 3.38  | 2.38  | 0.27 | 5.57 |
| 222 | 3208 | 0.073 | 0.2702 | 94.7 | 94.58 | 598.01 | 18.241 | 22.936 | 73.581 | 4.41  | 2.99  | 0.32 | 5.64 |
| 223 | 3931 | 0.073 | 0.2702 | 95.1 | 94.67 | 599.47 | 18.248 | 22.928 | 90.120 | 5.41  | 3.68  | 0.37 | 5.73 |
| 224 | 3885 | 0.073 | 0.2702 | 95.1 | 94.76 | 601.1  | 18.248 | 22.928 | 89.073 | 5.34  | 4.29  | 0.44 | 5.82 |
| 225 | 3033 | 0.073 | 0.2702 | 95.4 | 94.84 | 602.79 | 18.253 | 22.922 | 69.525 | 4.17  | 4.54  | 0.53 | 5.89 |
| 226 | 2515 | 0.073 | 0.2702 | 95.3 | 94.9  | 604.59 | 18.251 | 22.924 | 57.651 | 3.46  | 4.56  | 0.62 | 5.95 |
| 227 | 2100 | 0.074 | 0.2720 | 95.2 | 94.98 | 606.49 | 18.374 | 23.082 | 48.469 | 2.91  | 4.26  | 0.69 | 6.00 |
| 228 | 1837 | 0.075 | 0.2739 | 95.3 | 95.02 | 608.49 | 18.499 | 23.236 | 42.695 | 2.56  | 3.69  | 0.74 | 6.04 |
| 229 | 2026 | 0.073 | 0.2702 | 95.1 | 95.06 | 610.49 | 18.248 | 22.928 | 46.451 | 2.79  | 3.18  | 0.79 | 6.09 |
| 230 | 1879 | 0.073 | 0.2702 | 95.2 | 95.12 | 612.54 | 18.250 | 22.926 | 43.078 | 2.58  | 2.86  | 0.84 | 6.13 |
| 231 | 2009 | 0.074 | 0.2720 | 95.2 | 95.16 | 614.56 | 18.374 | 23.082 | 46.371 | 2.78  | 2.72  | 0.89 | 6.18 |
| 232 | 1725 | 0.072 | 0.2683 | 95.3 | 95.22 | 616.53 | 18.126 | 22.766 | 39.269 | 2.36  | 2.61  | 0.93 | 6.22 |
| 233 | 704  | 0.075 | 0.2739 | 95.4 | 95.25 | 618.48 | 18.501 | 23.233 | 16.345 | 0.98  | 2.30  | 0.98 | 6.23 |
| 234 | 429  | 0.074 | 0.2720 | 95.4 | 95.28 | 620.26 | 18.377 | 23.078 | 9.896  | 0.59  | 1.86  | 1.02 | 6.24 |
| 235 | 407  | 0.074 | 0.2720 | 95.3 | 95.27 | 622    | 18.376 | 23.080 | 9.390  | 0.56  | 1.46  | 1.03 | 6.25 |
| 236 | 505  | 0.073 | 0.2702 | 95   | 95.24 | 623.49 | 18.246 | 22.930 | 11.590 | 0.70  | 1.04  | 1.04 | 6.26 |
| 237 | 350  | 0.074 | 0.2720 | 95   | 95.22 | 624.81 | 18.371 | 23.086 | 8.085  | 0.49  | 0.66  | 1.05 | 6.27 |
| 238 | 399  | 0.073 | 0.2702 | 95   | 95.19 | 625.86 | 18.246 | 22.930 | 9.149  | 0.55  | 0.58  | 1.06 | 6.28 |
| 239 | 517  | 0.074 | 0.2720 | 94.9 | 95.17 | 626.66 | 18.369 | 23.088 | 11.944 | 0.72  | 0.60  | 1.07 | 6.29 |
| 240 | 282  | 0.073 | 0.2702 | 94.7 | 95.12 | 627.14 | 18.241 | 22.936 | 6.461  | 0.39  | 0.57  | 1.08 | 6.30 |
| 241 | 251  | 0.074 | 0.2720 | 94.6 | 95.06 | 627.32 | 18.364 | 23.095 | 5.789  | 0.35  | 0.50  | 1.09 | 6.30 |
| 242 | 192  | 0.075 | 0.2739 | 94.5 | 94.98 | 626.99 | 18.486 | 23.252 | 4.467  | 0.27  | 0.45  | 1.10 | 6.31 |
| 243 | 32   | 0.074 | 0.2720 | 94.5 | 94.89 | 626.07 | 18.363 | 23.097 | 0.736  | 0.04  | 0.35  | 1.11 | 6.31 |
| 244 | 37   | 0.075 | 0.2739 | 94.4 | 94.79 | 624.82 | 18.485 | 23.254 | 0.868  | 0.05  | 0.22  | 1.11 | 6.31 |
| 245 | -56  | 0.073 | 0.2702 | 94.3 | 94.69 | 623.22 | 18.235 | 22.944 | -1.293 | -0.08 | 0.13  | 1.11 | 6.31 |
| 246 | 16   | 0.074 | 0.2720 | 94.3 | 94.62 | 621.46 | 18.359 | 23.101 | 0.374  | 0.02  | 0.06  | 1.11 | 6.31 |
| 247 | -70  | 0.076 | 0.2757 | 94.3 | 94.55 | 619.36 | 18.606 | 23.411 | -1.635 | -0.10 | -0.01 | 1.11 | 6.31 |
| 248 | -153 | 0.075 | 0.2739 | 94.1 | 94.46 | 617.05 | 18.479 | 23.261 | -3.549 | -0.21 | -0.06 | 1.11 | 6.30 |
| 249 | -89  | 0.073 | 0.2702 | 93.7 | 94.34 | 614.59 | 18.225 | 22.957 | -2.050 | -0.12 | -0.10 | 1.10 | 6.30 |
| 250 | -141 | 0.073 | 0.2702 | 93.4 | 94.21 | 612.08 | 18.220 | 22.963 | -3.235 | -0.19 | -0.12 | 1.10 | 6.30 |
| 251 | 62   | 0.074 | 0.2720 | 93.2 | 94.07 | 609.46 | 18.341 | 23.124 | 1.424  | 0.09  | -0.11 | 1.10 | 6.30 |
| 252 | -18  | 0.073 | 0.2702 | 93.2 | 93.94 | 606.87 | 18.217 | 22.967 | -0.417 | -0.03 | -0.09 | 1.09 | 6.30 |
| 253 | 8    | 0.074 | 0.2720 | 93   | 93.79 | 604.29 | 18.338 | 23.128 | 0.180  | 0.01  | -0.05 | 1.09 | 6.30 |
| 254 | -36  | 0.075 | 0.2739 | 92.8 | 93.63 | 601.65 | 18.458 | 23.288 | -0.834 | -0.05 | -0.03 | 1.09 | 6.30 |
| 255 | 23   | 0.074 | 0.2720 | 92.7 | 93.47 | 598.93 | 18.333 | 23.134 | 0.538  | 0.03  | 0.01  | 1.09 | 6.30 |
| 256 | -33  | 0.075 | 0.2739 | 92.7 | 93.31 | 596.17 | 18.456 | 23.290 | -0.759 | -0.05 | -0.02 | 1.08 | 6.30 |
| 257 | -8   | 0.074 | 0.2720 | 92.9 | 93.17 | 593.41 | 18.336 | 23.130 | -0.176 | -0.01 | -0.01 | 1.08 | 6.30 |
| 258 | -19  | 0.075 | 0.2739 | 92.9 | 93.05 | 590.6  | 18.459 | 23.286 | -0.451 | -0.03 | -0.02 | 1.08 | 6.30 |
| 259 | -50  | 0.075 | 0.2739 | 92.6 | 92.94 | 587.75 | 18.454 | 23.292 | -1.157 | -0.07 | -0.02 | 1.08 | 6.30 |
| 260 | 72   | 0.073 | 0.2702 | 92.4 | 92.84 | 584.77 | 18.203 | 22.984 | 1.665  | 0.10  | -0.01 | 1.08 | 6.30 |

# Run 1 TEOM Data

|     |      |       |        |      |             |             |        |        |        |       |       |       |      |
|-----|------|-------|--------|------|-------------|-------------|--------|--------|--------|-------|-------|-------|------|
| 261 | 0    | 0.074 | 0.2720 | 92.3 | 92.75       | 581.9       | 18.326 | 23.143 | 0.001  | 0.00  | 0.00  | 1.08  | 6.30 |
| 262 | -2   | 0.074 | 0.2720 | 92.3 | 92.66       | 579.19      | 18.326 | 23.143 | -0.042 | 0.00  | 0.00  | 1.08  | 6.30 |
| 263 | -102 | 0.075 | 0.2739 | 92   | 92.56       | 576.66      | 18.444 | 23.305 | -2.375 | -0.14 | -0.02 | 1.07  | 6.30 |
| 264 | 11   | 0.076 | 0.2757 | 92   | 92.48       | 574.21      | 18.567 | 23.460 | 0.260  | 0.02  | -0.01 | 1.07  | 6.30 |
| 265 | -31  | 0.074 | 0.2720 | 90.5 | 92.26       | 571.8       | 18.296 | 23.181 | -0.726 | -0.04 | -0.03 | 1.07  | 6.30 |
| 266 | -15  | 0.075 | 0.2739 | 90.9 | 92.08       | 569.36      | 18.426 | 23.328 | -0.341 | -0.02 | -0.04 | 1.06  | 6.30 |
| 267 | 25   | 0.074 | 0.2720 | 91   | 91.89       | 567         | 18.304 | 23.170 | 0.578  | 0.03  | -0.03 | 1.06  | 6.30 |
| 268 | 82   | 0.076 | 0.2757 | 91   | 91.7        | 564.64      | 18.550 | 23.481 | 1.920  | 0.12  | 0.02  | 1.05  | 6.30 |
| 269 | -6   | 0.076 | 0.2757 | 91   | 91.54       | 562.29      | 18.550 | 23.481 | -0.136 | -0.01 | 0.02  | 1.04  | 6.30 |
| 270 | 2    | 0.075 | 0.2739 | 91   | 91.4        | 559.96      | 18.428 | 23.326 | 0.043  | 0.00  | 0.02  | 1.04  | 6.30 |
| 271 | 0    | 0.075 | 0.2739 | 90.9 | 91.26       | 557.46      | 18.426 | 23.328 | -0.003 | 0.00  | 0.03  | 1.03  | 6.30 |
| 272 | 76   | 0.075 | 0.2739 | 90.8 | 91.11       | 554.94      | 18.424 | 23.330 | 1.762  | 0.11  | 0.04  | 1.02  | 6.30 |
| 273 | 14   | 0.074 | 0.2720 | 90.5 | 90.96       | 552.47      | 18.296 | 23.181 | 0.314  | 0.02  | 0.02  | 1.01  | 6.30 |
| 274 | -10  | 0.075 | 0.2739 | 90.4 | 90.8        | 549.94      | 18.418 | 23.339 | -0.241 | -0.01 | 0.02  | 0.99  | 6.30 |
| 275 | 33   | 0.074 | 0.2720 | 90.4 | 90.79       | 547.49      | 18.295 | 23.183 | 0.758  | 0.05  | 0.03  | 0.98  | 6.30 |
| 276 | 8    | 0.075 | 0.2739 | 90.3 | 90.73       | 545.02      | 18.416 | 23.341 | 0.196  | 0.01  | 0.03  | 0.96  | 6.30 |
| 277 | 41   | 0.076 | 0.2757 | 90   | 90.63       | 542.54      | 18.533 | 23.502 | 0.955  | 0.06  | 0.02  | 0.94  | 6.30 |
| 278 | -21  | 0.074 | 0.2720 | 89.9 | 90.52       | 540.1       | 18.286 | 23.193 | -0.484 | -0.03 | 0.01  | 0.90  | 6.30 |
| 279 | -23  | 0.075 | 0.2739 | 89.9 | 90.41       | 537.63      | 18.409 | 23.349 | -0.540 | -0.03 | 0.01  | 0.87  | 6.30 |
| 280 | -40  | 0.072 | 0.2683 | 89.5 | 90.26       | 535.32      | 18.031 | 22.886 | -0.919 | -0.06 | -0.01 | 0.82  | 6.30 |
| 281 | 57   | 0.073 | 0.2702 | 89.4 | 90.11       | 533.12      | 18.154 | 23.047 | 1.317  | 0.08  | 0.00  | 0.76  | 6.30 |
| 282 | -46  | 0.075 | 0.2739 | 89.4 | 89.97       | 530.85      | 18.401 | 23.360 | -1.079 | -0.06 | -0.02 | 0.68  | 6.30 |
| 283 | -21  | 0.075 | 0.2739 | 89.2 | 89.84       | 528.51      | 18.398 | 23.364 | -0.483 | -0.03 | -0.02 | 0.59  | 6.30 |
| 284 | -17  | 0.074 | 0.2720 | 89   | 89.7        | 526.26      | 18.271 | 23.212 | -0.389 | -0.02 | -0.02 | 0.49  | 6.30 |
| 285 | -18  | 0.075 | 0.2739 | 88.8 | 89.54       | 523.93      | 18.391 | 23.373 | -0.418 | -0.03 | -0.01 | 0.42  | 6.30 |
| 286 | -15  | 0.074 | 0.2720 | 88.9 | 89.4        | 521.68      | 18.270 | 23.214 | -0.350 | -0.02 | -0.03 | 0.36  | 6.30 |
| 287 | 51   | 0.074 | 0.2720 | 88.7 | 89.27       | 519.46      | 18.266 | 23.219 | 1.182  | 0.07  | -0.01 | 0.31  | 6.30 |
| 288 | -23  | 0.074 | 0.2720 | 88.4 | 89.12       | 517.21      | 18.261 | 23.225 | -0.536 | -0.03 | -0.01 | 0.27  | 6.30 |
| 289 | 35   | 0.076 | 0.2757 | 88.5 | 88.98       | 515.15      | 18.508 | 23.535 | 0.816  | 0.05  | 0.01  | 0.22  | 6.30 |
| 290 | 67   | 0.076 | 0.2757 | 88.2 | 88.85       | 512.99      | 18.503 | 23.541 | 1.566  | 0.09  | 0.03  | 0.18  | 6.30 |
| 291 | -25  | 0.075 | 0.2739 | 88.1 | 88.72       | 510.86      | 18.379 | 23.388 | -0.580 | -0.03 | 0.03  | 0.13  | 6.30 |
| 292 | 63   | 0.074 | 0.2720 | 88   | 88.58       | 508.86      | 18.255 | 23.234 | 1.475  | 0.09  | 0.03  | 0.09  | 6.30 |
| 293 | -6   | 0.075 | 0.2739 | 88.1 | 88.47       | 506.96      | 18.379 | 23.388 | -0.148 | -0.01 | 0.04  | 0.07  | 6.30 |
| 294 | 54   | 0.075 | 0.2739 | 87.8 | 88.35       | 505.08      | 18.374 | 23.394 | 1.254  | 0.08  | 0.04  | 0.06  | 6.30 |
| 295 | 23   | 0.076 | 0.2757 | 87.9 | 88.26       | 503.31      | 18.498 | 23.548 | 0.539  | 0.03  | 0.03  | 0.05  | 6.30 |
| 296 | 39   | 0.075 | 0.2739 | 87.8 | 88.15       | 501.53      | 18.374 | 23.394 | 0.919  | 0.06  | 0.05  | 0.04  | 6.31 |
| 297 | -19  | 0.076 | 0.2757 | 87.6 | 88.04       | 499.81      | 18.493 | 23.554 | -0.438 | -0.03 | 0.03  | 0.03  | 6.31 |
| 298 | 6    | 0.074 | 0.2720 | 87.4 | 87.94       | 498.25      | 18.245 | 23.246 | 0.146  | 0.01  | 0.03  | 0.03  | 6.31 |
| 299 | -1   | 0.078 | 0.2793 | 87.3 | 87.82       | 496.72      | 18.729 | 23.868 | -0.024 | 0.00  | 0.01  | 0.01  | 6.31 |
| 300 | -59  | 0.075 | 0.2739 | 87.1 | 87.71       | 495.3       | 18.362 | 23.409 | -1.388 | -0.08 | -0.01 | 0.01  | 6.30 |
| 301 | 51   | 0.075 | 0.2739 | 87   | 87.6        | 493.94      | 18.361 | 23.411 | 1.185  | 0.07  | -0.01 | 0.00  | 6.31 |
| 302 | 42   | 0.074 | 0.2720 | 87.1 | 87.51       | 492.6       | 18.240 | 23.253 | 0.985  | 0.06  | 0.01  | -0.01 | 6.31 |
| 303 | 106  | 0.077 | 0.2775 | 86.9 | 87.39       | 491.34      | 18.602 | 23.724 | 2.508  | 0.15  | 0.04  | -0.01 | 6.31 |
| 304 | 94   | 0.074 | 0.2720 | 86.9 | 87.3        | 490.2       | 18.236 | 23.257 | 2.194  | 0.13  | 0.07  | -0.01 | 6.31 |
| 305 | 68   | 0.074 | 0.2720 | 86.8 | 87.19       | 489.13      | 18.235 | 23.259 | 1.573  | 0.09  | 0.10  | 0.00  | 6.31 |
| 306 | 0    | 0.074 | 0.2720 | 86.7 | 87.08       | 488.1       | 18.233 | 23.261 | -0.005 | 0.00  | 0.09  | 0.00  | 6.31 |
| 307 | 23   | 0.075 | 0.2739 | 86.6 | 86.98       | 487.13      | 18.354 | 23.420 | 0.545  | 0.03  | 0.08  | 0.00  | 6.31 |
| 308 | 105  | 0.075 | 0.2739 | 86.5 | 86.89       | 486.16      | 18.352 | 23.422 | 2.457  | 0.15  | 0.08  | 0.01  | 6.32 |
| 309 | 8    | 0.076 | 0.2757 | 86.3 | 86.79       | 485.19      | 18.471 | 23.582 | 0.180  | 0.01  | 0.06  | 0.01  | 6.32 |
| 310 | 113  | 0.075 | 0.2739 | 86.3 | 86.71       | 484.28      | 18.349 | 23.426 | 2.651  | 0.16  | 0.07  | 0.02  | 6.32 |
| 311 | -11  | 0.076 | 0.2757 | 86.2 | 86.63       | 483.45      | 18.469 | 23.584 | -0.256 | -0.02 | 0.07  | 0.02  | 6.32 |
| 312 | 101  | 0.076 | 0.2757 | 86.2 | 86.54       | 482.63      | 18.469 | 23.584 | 2.388  | 0.14  | 0.09  | 0.02  | 6.32 |
| 313 | 82   | 0.074 | 0.2720 | 86.2 | 86.47       | 481.8       | 18.225 | 23.272 | 1.903  | 0.11  | 0.08  | 0.02  | 6.32 |
| 314 | 81   | 0.074 | 0.2720 | 86.1 | 86.39       | 480.93      | 18.223 | 23.274 | 1.883  | 0.11  | 0.10  | 0.02  | 6.32 |
| 315 | 61   | 0.075 | 0.2739 | 86.1 | 86.32       | 480.09      | 18.346 | 23.431 | 1.425  | 0.09  | 0.09  | 0.02  | 6.33 |
| 316 | 67   | 0.075 | 0.2739 | 85.9 | 86.24       | 479.31      | 18.342 | 23.435 | 1.572  | 0.09  | 0.11  | 0.03  | 6.33 |
| 317 | 94   | 0.076 | 0.2757 | 85.8 | 86.16       | 478.53      | 18.462 | 23.593 | 2.223  | 0.13  | 0.11  | 0.03  | 6.33 |
| 318 | 25   | 0.075 | 0.2739 | 85.7 | 86.08       | 477.75      | 18.339 | 23.439 | 0.590  | 0.04  | 0.09  | 0.03  | 6.33 |
| 319 | 26   | 0.076 | 0.2757 | 85.7 | 86.02       | 476.99      | 18.461 | 23.595 | 0.623  | 0.04  | 0.08  | 0.03  | 6.33 |
| 320 | 59   | 0.076 | 0.2757 | 85.6 | 85.95       | 476.22      | 18.459 | 23.597 | 1.394  | 0.08  | 0.08  | 0.03  | 6.33 |
| 321 | 72   | 0.075 | 0.2739 | 85.4 | 85.87       | 475.41      | 18.334 | 23.446 | 1.698  | 0.10  | 0.08  | 0.03  | 6.33 |
| 322 | 90   | 0.075 | 0.2739 | 85.4 | 85.79       | 474.65      | 18.334 | 23.446 | 2.106  | 0.13  | 0.08  | 0.03  | 6.34 |
| 323 | 29   | 0.075 | 0.2739 | 85.2 | 85.69       | 473.81      | 18.330 | 23.450 | 0.669  | 0.04  | 0.08  | 0.04  | 6.34 |
| 324 | 88   | 0.075 | 0.2739 | 85   | 85.58       | 472.98      | 18.327 | 23.454 | 2.064  | 0.12  | 0.10  | 0.04  | 6.34 |
| 325 | 12   | 0.075 | 0.2739 | 85.1 | 85.48       | 472.08      | 18.329 | 23.452 | 0.272  | 0.02  | 0.08  | 0.04  | 6.34 |
| 326 | 46   | 0.075 | 0.2739 | 84.9 | 85.38       | 471.16      | 18.325 | 23.456 | 1.081  | 0.06  | 0.07  | 0.04  | 6.34 |
| 327 | 14   | 0.075 | 0.2739 | 84.8 | 85.28       | 470.22      | 18.324 | 23.459 | 0.327  | 0.02  | 0.05  | 0.04  | 6.34 |
| 328 | 53   | 0.076 | 0.2757 | 84.7 | 85.18       | 469.27      | 18.444 | 23.617 | 1.245  | 0.07  | 0.06  | 0.04  | 6.34 |
| 329 | 78   | 0.075 | 0.2739 | 84.6 | 85.07       | 468.26      | 18.320 | 23.463 | 1.822  | 0.11  | 0.06  | 0.04  | 6.34 |
| 330 | -22  | 0.077 | 0.2775 | 84.5 | 84.96       | 467.2       | 18.561 | 23.776 | -0.527 | -0.03 | 0.05  | 0.04  | 6.34 |
| 331 | 42   | 0.077 | 0.2775 | 84.4 | 84.86       | 466.11      | 18.560 | 23.778 | 1.007  | 0.06  | 0.05  | 0.05  | 6.34 |
| 332 | 45   | 0.076 | 0.2757 | 84.3 | 84.75       | 465         | 18.437 | 23.625 | 1.054  | 0.06  | 0.06  | 0.04  | 6.34 |
| 333 | 102  | 0.075 | 0.2739 | 84.3 | 84.66       | 463.89      | 18.315 | 23.469 | 2.392  | 0.14  | 0.07  | 0.04  | 6.35 |
| 334 | 82   | 0.076 | 0.2757 | 84.2 | 84.58       | 462.77      | 18.435 | 23.628 | 1.948  | 0.12  | 0.07  | 0.05  | 6.35 |
| 335 | 27   | 0.076 | 0.2757 | 84   | 84.47       | 461.65      | 18.432 | 23.632 | 0.630  | 0.04  | 0.08  | 0.05  | 6.35 |
| 336 | 16   | 0.076 | 0.2757 | 83.9 | 84.37       | 460.52      | 18.430 | 23.634 | 0.389  | 0.02  | 0.08  | 0.05  | 6.35 |
| 337 | 0    | 0.075 | 0.2739 | 83.8 | 84.27       | 459.34      | 18.307 | 23.480 | 0.004  | 0.00  | 0.06  | 0.05  | 6.35 |
| 338 | 93   | 0.076 | 0.2757 | 83.6 | 84.16       | 458.19      | 18.425 | 23.641 | 2.207  | 0.13  | 0.06  | 0.05  | 6.35 |
| 339 | 32   | 0.076 | 0.2757 | 83.8 | 84.08       | 457.03      | 18.429 | 23.636 | 0.763  | 0.05  | 0.05  | 0.05  | 6.35 |
| 340 | -44  | 0.076 | 0.2757 | 83.7 | 84          | 455.81      | 18.427 | 23.638 | -1.045 | -0.06 | 0.03  | 0.05  | 6.35 |
|     |      |       |        |      | 83.9555556  | 455.222222  |        |        |        |       | 0.03  | 0.05  |      |
|     |      |       |        |      | 83.9125     | 454.5875    |        |        |        |       | 0.04  | 0.05  |      |
|     |      |       |        |      | 83.85714286 | 454.0142857 |        |        |        |       | -0.01 | 0.05  |      |
|     |      |       |        |      | 83.8        | 453.4       |        |        |        |       | -0.06 | 0.06  |      |
|     |      |       |        |      | 83.76       | 452.82      |        |        |        |       |       | 0.06  |      |
|     |      |       |        |      | 83.725      | 452.2       |        |        |        |       |       | 0.06  |      |
|     |      |       |        |      | 83.7        | 451.6333333 |        |        |        |       |       | 0.06  |      |
|     |      |       |        |      | 83.75       | 450.95      |        |        |        |       |       | 0.06  |      |

## Run 1 TEOM Data

[illegible]

## Run 1 TEOM Data

[illegible]

## Run 1 TEOM Data

[illegible]

## IDC Wood Heater Run Sheets

Client: SBI Job Number: 23-303 Tracking #: 214  
 Model: St. Louis Run Number: 1 Test Date: 12/9/2024

### Pre-Test Set-up Check List

Perform the following checks after a minimum of 30 minutes of warmup time

| Leak Checks | Requirement     | Pump Off (lpm) | Pump On, Probe Blocked (lpm) | Net (lpm) | Result                                                                 |
|-------------|-----------------|----------------|------------------------------|-----------|------------------------------------------------------------------------|
| PM-2.5      | <0.05 lpm (net) | 0.36           | .36                          | 0.0       | <input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail |
| PM-Course   | <0.05 lpm (net) | 0.14           | .16                          | 0.02      | <input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail |
| Ambient     | <0.05 lpm (net) | -.18           | -.16                         | 0.02      | <input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail |

| Flow Checks | Requirement | TEOM Indicated Flow (lpm) <sup>1</sup> | Measured Flow      |                    | Difference (%) | Result                                                                 |
|-------------|-------------|----------------------------------------|--------------------|--------------------|----------------|------------------------------------------------------------------------|
|             |             |                                        | (lpm) <sup>2</sup> | (lpm) <sup>3</sup> |                |                                                                        |
| PM-2.5      | ±2%         | 1.02                                   | 1.02               |                    | 0              | <input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail |
| PM-Course   | ±2%         | 1.00                                   | 1.01               |                    | 0              | <input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail |
| Ambient     | ±2%         | 3.0                                    | 3.01               |                    | 0              | <input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail |

<sup>1</sup>Indicated flow is at 20°C, 1 atm

<sup>2</sup>Measured flow with PFS equipment ID 197, which indicates flow at 21.1°C, 1 atm

<sup>3</sup>Adjusted value (Measured Flow \* 99.6%) to match the STP used by TEOM

### Initial Filter Setup

Use **black** filter tool when changing filters

|            | 1 min. requirement | 5 min. requirement        | Result                                                                 |
|------------|--------------------|---------------------------|------------------------------------------------------------------------|
| PM-2.5     | Frequency > 200Hz  | Mass > -1 ug, noise < 2ug | <input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail |
| PM- Course | Frequency > 200Hz  | Mass > -1 ug, noise < 2ug | <input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail |
| Ambient    | Frequency > 200Hz  | Mass > -1 ug, noise < 2ug | <input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail |

| Pre-Fire Verifications                                    | Time probe in Tunnel | Result                                   |
|-----------------------------------------------------------|----------------------|------------------------------------------|
| Place probe in tunnel at least 10 min prior to test start | 10:00                |                                          |
| Verify Data is recording [In RPCOMM] - Dichot             |                      | <input checked="" type="checkbox"/> Okay |
| Verify Data is recording [In RPCOMM] - Ambient            |                      | <input checked="" type="checkbox"/> Okay |

### Pre-Test Conditions

|                                                  | Requirements | Result                                                                                                                                               |
|--------------------------------------------------|--------------|------------------------------------------------------------------------------------------------------------------------------------------------------|
| Room RH (%)                                      | 45.0         |                                                                                                                                                      |
| Barometric Pressure                              | 30.24        |                                                                                                                                                      |
| Room Air Velocity (ft/min)                       | <50          | Must be <50 ft/min within 2 ft of stove <input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail                                       |
| Room Temperature (°F)                            | 66           | <87 °F <input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail                                                                        |
| Average External Stove Temp (°F)                 | 67           | Within 2 °F of ambient (Run #1 only) <input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A             |
| Average Internal Stove Temp (°F)                 | 68           | Within 2 °F of ambient (Run #1 only) <input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A             |
| Time Coals Removed from Stove & Firebox Vacuumed | N/A          | >1 hr before test (Runs #2 & 3 only) <input type="checkbox"/> Pass <input type="checkbox"/> Fail <input checked="" type="checkbox"/> N/A             |
| Earliest possible start time                     | N/A          | 24 hours from start of Run #1 (Runs #2 & 3 only) <input type="checkbox"/> Pass <input type="checkbox"/> Fail <input checked="" type="checkbox"/> N/A |

Technician Signature: 

Date: 12/23/2024

## IDC Wood Heater Run Sheets

Client: SBI Job Number: 23-303 Tracking #: 214  
Model: St. Louis Run Number: 1 Test Date: 12/9/2024

### IDC FUELING NOTES

#### Fuel & Moisture Measurement

|                                 |                |
|---------------------------------|----------------|
| Fuel Type                       | Maple Cordwood |
| Moisture Meter Calibration 22%: | 22.0           |
| Moisture Meter Calibration 12%: | 12.0           |
| Moisture Reading Start Time:    | 10:00          |
| Fuel Temperature (F):           | 66             |

#### L1 Test Notes

|                                      |           |
|--------------------------------------|-----------|
| Scale Weight Prior to Loading (lbs): | 0         |
| Test Burn Start Time:                | 11:09     |
| Air Control Setting (open/closed):   | Therm. On |
| Door Closed Time (5 min from start): | 3:00      |
| Bypass Closed Time:                  | N/A       |
| Target End Weight (lbs):             | 2.26-2.50 |
| Actual End Weight (lbs):             | 2.42      |
| Phase End Time:                      | 11:28     |

#### Additional Notes (Fuel adjustments, TEOM Filter Changes, etc.)

| Time | Notes  |
|------|--------|
|      | -None- |

#### L2 Test Notes

|                                               |                     |
|-----------------------------------------------|---------------------|
| Scale Weight Prior to Loading (lbs):          | 2.42                |
| Load Time:                                    | 11:28               |
| Air Control Setting (open/closed):            | Therm. On           |
| Door Closed Time (immediately after loading): | 11:29               |
| Bypass Closed Time:                           | N/A                 |
| 50% Target Weight (lbs):                      | 8.77-9.69           |
| Actual 50% Weight (lbs):                      | 9.62                |
| Air control closed time:                      | Therm. Off<br>11:53 |
| Target End Weight (lbs):                      | 3.59-3.97           |
| Actual End Weight (lbs):                      | 3.66                |
| Phase End Time:                               | 12:27               |

#### Additional Notes (Fuel adjustments, TEOM Filter Changes, etc.)

| Time  | Notes                |
|-------|----------------------|
| 12:18 | Changed TEOM Filters |

Technician Signature: 

Date: 1/17/2025

## IDC Wood Heater Run Sheets

Client: SBI Job Number: 23-303 Tracking #: 214  
Model: St. Louis Run Number: 1 Test Date: 12/9/2024

### L3 Test Notes

|                                               |           |
|-----------------------------------------------|-----------|
| Scale Weight Prior to Loading (lbs):          | 3.66      |
| Load Time:                                    | 12:27     |
| Air Control Setting (5 min start-up allowed): |           |
| Door Closed Time (immediately after loading): | 12:28     |
| Bypass Closed Time:                           | N/A       |
| Target End Weight (lbs):                      | 4.41-4.87 |
| Actual End Weight (lbs):                      | 4.46      |
| Phase End Time:                               | 13:31     |

|        |     |          |     |
|--------|-----|----------|-----|
| Open @ | N/A | Closed @ | N/A |
|--------|-----|----------|-----|

### Additional Notes (Fuel adjustments, TEOM Filter Changes, etc.)

| Time | Notes                |
|------|----------------------|
| 1:15 | Changed TEOM filters |

### L4 Test Notes

|                                                |           |
|------------------------------------------------|-----------|
| Scale Weight Prior to Loading (lbs):           | 4.46      |
| Load Time:                                     | 13:31     |
| Air Control Setting (10 min start-up allowed): |           |
| Door Closed Time (5 min after loading):        | 13:32     |
| Bypass Closed Time:                            | N/A       |
| Target End Weight (lbs):                       | 4.24-4.68 |
| Actual End Weight (lbs):                       | 4.46      |
| Phase End Time:                                | 17:45     |

|        |     |          |     |
|--------|-----|----------|-----|
| Open @ | N/A | Closed @ | N/A |
|--------|-----|----------|-----|

### Additional Notes (Fuel adjustments, TEOM Filter Changes, etc.)

| Time | Notes  |
|------|--------|
|      | -None- |

### Post-Test Conditions

|                            |       |
|----------------------------|-------|
| Room Air Velocity (ft/min) | <50   |
| Room RH (%)                | 30.30 |
| Barometric Pressure        | 28.8  |

Technician Signature: 

Date: 12/23/2024



## IDC Wood Heater Run Sheets

Client: SBI Job Number: 23-303 Tracking #: 214  
 Model: St. Louis Run Number: 1 Test Date: 12/9/2024

### Post-Test Check List

| Leak Checks | Requirement     | Pump Off (lpm) | Pump On, Probe Blocked (lpm) | Net (lpm) | Result                                                                 |
|-------------|-----------------|----------------|------------------------------|-----------|------------------------------------------------------------------------|
| PM-2.5      | <0.05 lpm (net) | 0.36           | .36                          | 0.0       | <input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail |
| PM-Course   | <0.05 lpm (net) | 0.14           | .16                          | 0.02      | <input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail |
| Ambient     | <0.05 lpm (net) | -.18           | -.16                         | 0.02      | <input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail |

| Flow Checks | Requirement | TEOM Indicated Flow (lpm) <sup>1</sup> | Measured Flow      |                    | Difference (%) | Result                                                                 |
|-------------|-------------|----------------------------------------|--------------------|--------------------|----------------|------------------------------------------------------------------------|
|             |             |                                        | (lpm) <sup>2</sup> | (lpm) <sup>3</sup> |                |                                                                        |
| PM-2.5      | ±2%         | 1.00                                   | 1.00               |                    | 0              | <input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail |
| PM-Course   | ±2%         | 1.00                                   | 1.00               |                    | 0              | <input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail |
| Ambient     | ±2%         | 3.0                                    | 3.01               |                    | 0              | <input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail |

<sup>1</sup>Indicated flow is at 20°C, 1 atm

<sup>2</sup>Measured flow with PFS equipment ID 134, which indicates flow at 21.1°C, 1 atm

<sup>3</sup>Adjusted value (Measured Flow \* 99.6%) to match the STP used by TEOM

### Flue Gas Analyzer Calibration Check

**Calibration Gas Values:** Span Gas Cylinder#: CC505834 CO<sub>2</sub> (%): 16.98 CO (%): 4.300  
 Mid Gas Cylinder#: SG9199309 CO<sub>2</sub> (%): 10.06 CO (%): 2.538

### Calibration Results:

|                 | Pre Test |       |       | Post Test |       |       |
|-----------------|----------|-------|-------|-----------|-------|-------|
|                 | Zero     | Span  | Mid   | Zero      | Span  | Mid   |
| Time            | 10:05    | 10:10 | 10:15 | 9:12      | 9:20  | 9:30  |
| CO <sub>2</sub> | 0.00     | 16.98 | 10.18 | 0.01      | 16.96 | 10.17 |
| CO              | 0.000    | 4.29  | 2.53  | -0.02     | 4.284 | 2.52  |

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

Technician Signature: 

Date: 12/23/2024

## IDC Wood Heater Run Sheets

Client: SBI Job Number: 23-303 Tracking #: 214  
Model: St. Louis Run Number: 1 Test Date: 12/9/2024

### Test Fuel Photos



L1 Fuel Load



L2 Fuel Load



L3 Fuel Load



L4 Fuel Load

Technician Signature: 

Date: 12/23/2024

## IDC Wood Heater Run Sheets

Client: SBI Job Number: 23-303 Tracking #: 214  
 Model: St. Louis Run Number: 2 Test Date: 12/10/2024

### Pre-Test Set-up Check List

Perform the following checks after a minimum of 30 minutes of warmup time

| Leak Checks | Requirement     | Pump Off (lpm) | Pump On, Probe Blocked (lpm) | Net (lpm) | Result                                                                 |
|-------------|-----------------|----------------|------------------------------|-----------|------------------------------------------------------------------------|
| PM-2.5      | <0.05 lpm (net) | 0.36           | .36                          | 0.0       | <input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail |
| PM-Course   | <0.05 lpm (net) | 0.14           | .16                          | 0.02      | <input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail |
| Ambient     | <0.05 lpm (net) | -.18           | -.16                         | 0.02      | <input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail |

| Flow Checks | Requirement | TEOM Indicated Flow (lpm) <sup>1</sup> | Measured Flow      |                    | Difference (%) | Result                                                                 |
|-------------|-------------|----------------------------------------|--------------------|--------------------|----------------|------------------------------------------------------------------------|
|             |             |                                        | (lpm) <sup>2</sup> | (lpm) <sup>3</sup> |                |                                                                        |
| PM-2.5      | ±2%         | 1.00                                   | 1.00               |                    | 0              | <input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail |
| PM-Course   | ±2%         | 1.00                                   | 1.00               |                    | 0              | <input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail |
| Ambient     | ±2%         | 3.0                                    | 3.01               |                    | 0              | <input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail |

<sup>1</sup>Indicated flow is at 20°C, 1 atm

<sup>2</sup>Measured flow with PFS equipment ID 197, which indicates flow at 21.1°C, 1 atm

<sup>3</sup>Adjusted value (Measured Flow \* 99.6%) to match the STP used by TEOM

### Initial Filter Setup

Use **black** filter tool when changing filters

|            | 1 min. requirement | 5 min. requirement        | Result                                                                 |
|------------|--------------------|---------------------------|------------------------------------------------------------------------|
| PM-2.5     | Frequency > 200Hz  | Mass > -1 ug, noise < 2ug | <input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail |
| PM- Course | Frequency > 200Hz  | Mass > -1 ug, noise < 2ug | <input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail |
| Ambient    | Frequency > 200Hz  | Mass > -1 ug, noise < 2ug | <input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail |

| Pre-Fire Verifications                                    | Time probe in Tunnel | Result                                   |
|-----------------------------------------------------------|----------------------|------------------------------------------|
| Place probe in tunnel at least 10 min prior to test start | 10:35                |                                          |
| Verify Data is recording [In RPCOMM] - Dichot             |                      | <input checked="" type="checkbox"/> Okay |
| Verify Data is recording [In RPCOMM] - Ambient            |                      | <input checked="" type="checkbox"/> Okay |

### Pre-Test Conditions

|                                                  |       | Requirements                                     | Result                                                                                              |
|--------------------------------------------------|-------|--------------------------------------------------|-----------------------------------------------------------------------------------------------------|
| Room RH (%)                                      | 30.2  |                                                  |                                                                                                     |
| Barometric Pressure                              | 30.22 |                                                  |                                                                                                     |
| Room Air Velocity (ft/min)                       | <50   | Must be <50 ft/min within 2 ft of stove          | <input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail                              |
| Room Temperature (°F)                            | 67    | <87 °F                                           | <input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail                              |
| Average External Stove Temp (°F)                 | N/A   | Within 2 °F of ambient (Run #1 only)             | <input type="checkbox"/> Pass <input type="checkbox"/> Fail <input checked="" type="checkbox"/> N/A |
| Average Internal Stove Temp (°F)                 | N/A   | Within 2 °F of ambient (Run #1 only)             | <input type="checkbox"/> Pass <input type="checkbox"/> Fail <input checked="" type="checkbox"/> N/A |
| Time Coals Removed from Stove & Firebox Vacuumed | 9:45  | >1 hr before test (Runs #2 & 3 only)             | <input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A |
| Earliest possible start time                     | 11:09 | 24 hours from start of Run #1 (Runs #2 & 3 only) | <input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A |

Technician Signature: 

Date: 12/23/2024

## IDC Wood Heater Run Sheets

Client: SBI Job Number: 23-303 Tracking #: 214  
Model: St. Louis Run Number: 2 Test Date: 12/10/2024

### IDC FUELING NOTES

#### Fuel & Moisture Measurement

|                                 |                |
|---------------------------------|----------------|
| Fuel Type                       | Maple Cordwood |
| Moisture Meter Calibration 22%: | 22.0           |
| Moisture Meter Calibration 12%: | 12.0           |
| Moisture Reading Start Time:    | 9:15           |
| Fuel Temperature (F):           | 67             |

#### L1 Test Notes

|                                      |           |
|--------------------------------------|-----------|
| Scale Weight Prior to Loading (lbs): | 0.0       |
| Test Burn Start Time:                | 11:10     |
| Air Control Setting (open/closed):   | Therm. On |
| Door Closed Time (5 min from start): | 11:13     |
| Bypass Closed Time:                  | N/A       |
| Target End Weight (lbs):             | 2.26-2.50 |
| Actual End Weight (lbs):             | 2.33      |
| Phase End Time:                      | 11:27     |

#### Additional Notes (Fuel adjustments, TEOM Filter Changes, etc.)

| Time | Notes  |
|------|--------|
|      | -None- |

#### L2 Test Notes

|                                               |                    |
|-----------------------------------------------|--------------------|
| Scale Weight Prior to Loading (lbs):          | 2.33               |
| Load Time:                                    | 11:27              |
| Air Control Setting (open/closed):            | Therm On           |
| Door Closed Time (immediately after loading): | 11:28              |
| Bypass Closed Time:                           | N/A                |
| 50% Target Weight (lbs):                      | 8.68-9.60          |
| Actual 50% Weight (lbs):                      | 9.40               |
| Air control closed time:                      | Therm Off<br>11:50 |
| Target End Weight (lbs):                      | 3.51-3.88          |
| Actual End Weight (lbs):                      | 3.60               |
| Phase End Time:                               | 12:24              |

#### Additional Notes (Fuel adjustments, TEOM Filter Changes, etc.)

| Time  | Notes                |
|-------|----------------------|
| 12:15 | Changed TEOM Filters |

Technician Signature: 

Date: 1/17/2025

## IDC Wood Heater Run Sheets

Client: SBI Job Number: 23-303 Tracking #: 214  
 Model: St. Louis Run Number: 2 Test Date: 12/10/2024

### L3 Test Notes

|                                               |           |
|-----------------------------------------------|-----------|
| Scale Weight Prior to Loading (lbs):          | 3.60      |
| Load Time:                                    | 12:25     |
| Air Control Setting (5 min start-up allowed): |           |
| Door Closed Time (immediately after loading): | 12:26     |
| Bypass Closed Time:                           | N/A       |
| Target End Weight (lbs):                      | 4.35-4.81 |
| Actual End Weight (lbs):                      | 4.42      |
| Phase End Time:                               | 13:22     |

|        |     |          |     |
|--------|-----|----------|-----|
| Open @ | N/A | Closed @ | N/A |
|--------|-----|----------|-----|

### Additional Notes (Fuel adjustments, TEOM Filter Changes, etc.)

| Time  | Notes                |
|-------|----------------------|
| 13:10 | Changed TEOM filters |

### L4 Test Notes

|                                                |           |
|------------------------------------------------|-----------|
| Scale Weight Prior to Loading (lbs):           | 4.42      |
| Load Time:                                     | 13:22     |
| Air Control Setting (10 min start-up allowed): |           |
| Door Closed Time (5 min after loading):        | 13:24     |
| Bypass Closed Time:                            | N/A       |
| Target End Weight (lbs):                       | 4.20-4.64 |
| Actual End Weight (lbs):                       | 4.42      |
| Phase End Time:                                | 16:34     |

|        |     |          |     |
|--------|-----|----------|-----|
| Open @ | N/A | Closed @ | N/A |
|--------|-----|----------|-----|

### Additional Notes (Fuel adjustments, TEOM Filter Changes, etc.)

| Time | Notes  |
|------|--------|
|      | -None- |

### Post-Test Conditions

|                            |       |
|----------------------------|-------|
| Room Air Velocity (ft/min) | <50   |
| Room RH (%)                | 22.2  |
| Barometric Pressure        | 30.12 |

Technician Signature: 

Date: 12/23/2024

## IDC Wood Heater Run Sheets

Client: SBI Job Number: 23-303 Tracking #: 214  
 Model: St. Louis Run Number: 2 Test Date: 12/10/2024

### Post-Test Check List

| Leak Checks | Requirement     | Pump Off (lpm) | Pump On, Probe Blocked (lpm) | Net (lpm) | Result                                                                 |
|-------------|-----------------|----------------|------------------------------|-----------|------------------------------------------------------------------------|
| PM-2.5      | <0.05 lpm (net) | 0.36           | .36                          | 0.0       | <input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail |
| PM-Course   | <0.05 lpm (net) | 0.14           | .16                          | 0.02      | <input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail |
| Ambient     | <0.05 lpm (net) | -.18           | -.16                         | 0.02      | <input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail |

| Flow Checks | Requirement | TEOM Indicated Flow (lpm) <sup>1</sup> | Measured Flow      |                    | Difference (%) | Result                                                                 |
|-------------|-------------|----------------------------------------|--------------------|--------------------|----------------|------------------------------------------------------------------------|
|             |             |                                        | (lpm) <sup>2</sup> | (lpm) <sup>3</sup> |                |                                                                        |
| PM-2.5      | ±2%         | 1.00                                   | 1.00               |                    | 0              | <input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail |
| PM-Course   | ±2%         | 1.00                                   | 1.00               |                    | 0              | <input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail |
| Ambient     | ±2%         | 3.0                                    | 3.01               |                    | 0              | <input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail |

<sup>1</sup>Indicated flow is at 20°C, 1 atm

<sup>2</sup>Measured flow with PFS equipment ID 134, which indicates flow at 21.1°C, 1 atm

<sup>3</sup>Adjusted value (Measured Flow \* 99.6%) to match the STP used by TEOM

### Flue Gas Analyzer Calibration Check

**Calibration Gas Values:** Span Gas Cylinder#: CC505834 CO<sub>2</sub> (%): 16.98 CO (%): 4.300  
 Mid Gas Cylinder#: SG9199309 CO<sub>2</sub> (%): 10.06 CO (%): 2.538

### Calibration Results:

|                 | Pre Test |       |       | Post Test |       |       |
|-----------------|----------|-------|-------|-----------|-------|-------|
|                 | Zero     | Span  | Mid   | Zero      | Span  | Mid   |
| Time            | 9:12     | 9:20  | 9:30  | 9:22      | 9:26  | 9:30  |
| CO <sub>2</sub> | 0.00     | 16.96 | 10.17 | 0.00      | 16.78 | 10.00 |
| CO              | 0.000    | 4.284 | 2.52  | 0.000     | 4.243 | 2.46  |

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

Technician Signature: 

Date: 12/23/2024



## IDC Wood Heater Run Sheets

Client: SBI Job Number: 23-303 Tracking #: 214  
Model: St. Louis Run Number: 2 Test Date: 12/10/2024

### Test Fuel Photos



L1 Fuel Load



L2 Fuel Load



L3 Fuel Load



L4 Fuel Load

Technician Signature: 

Date: 12/23/2024

## IDC Wood Heater Run Sheets

Client: SBI Job Number: 23-303 Tracking #: 214  
 Model: St. Louis Run Number: 3 Test Date: 12/11/2024

### Pre-Test Set-up Check List

Perform the following checks after a minimum of 30 minutes of warmup time

| Leak Checks | Requirement     | Pump Off (lpm) | Pump On, Probe Blocked (lpm) | Net (lpm) | Result                                                                 |
|-------------|-----------------|----------------|------------------------------|-----------|------------------------------------------------------------------------|
| PM-2.5      | <0.05 lpm (net) | 0.36           | .36                          | 0.0       | <input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail |
| PM-Course   | <0.05 lpm (net) | 0.14           | .16                          | 0.02      | <input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail |
| Ambient     | <0.05 lpm (net) | -.18           | -.16                         | 0.02      | <input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail |

| Flow Checks | Requirement | TEOM Indicated Flow (lpm) <sup>1</sup> | Measured Flow      |                    | Difference (%) | Result                                                                 |
|-------------|-------------|----------------------------------------|--------------------|--------------------|----------------|------------------------------------------------------------------------|
|             |             |                                        | (lpm) <sup>2</sup> | (lpm) <sup>3</sup> |                |                                                                        |
| PM-2.5      | ±2%         | 1.00                                   | 1.00               |                    | 0              | <input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail |
| PM-Course   | ±2%         | 1.00                                   | 1.00               |                    | 0              | <input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail |
| Ambient     | ±2%         | 3.0                                    | 2.95               |                    | 2              | <input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail |

<sup>1</sup>Indicated flow is at 20°C, 1 atm

<sup>2</sup>Measured flow with PFS equipment ID 197, which indicates flow at 21.1°C, 1 atm

<sup>3</sup>Adjusted value (Measured Flow \* 99.6%) to match the STP used by TEOM

### Initial Filter Setup

Use **black** filter tool when changing filters

|            | 1 min. requirement | 5 min. requirement        | Result                                                                 |
|------------|--------------------|---------------------------|------------------------------------------------------------------------|
| PM-2.5     | Frequency > 200Hz  | Mass > -1 ug, noise < 2ug | <input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail |
| PM- Course | Frequency > 200Hz  | Mass > -1 ug, noise < 2ug | <input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail |
| Ambient    | Frequency > 200Hz  | Mass > -1 ug, noise < 2ug | <input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail |

| Pre-Fire Verifications                                    | Time probe in Tunnel | Result                                   |
|-----------------------------------------------------------|----------------------|------------------------------------------|
| Place probe in tunnel at least 10 min prior to test start | 9:30                 |                                          |
| Verify Data is recording [In RPCOMM] - Dichot             |                      | <input checked="" type="checkbox"/> Okay |
| Verify Data is recording [In RPCOMM] - Ambient            |                      | <input checked="" type="checkbox"/> Okay |

### Pre-Test Conditions

|                                                  | Requirements | Result                                                                                                                                               |
|--------------------------------------------------|--------------|------------------------------------------------------------------------------------------------------------------------------------------------------|
| Room RH (%)                                      | 27.9         |                                                                                                                                                      |
| Barometric Pressure                              | 30.08        |                                                                                                                                                      |
| Room Air Velocity (ft/min)                       | <50          | Must be <50 ft/min within 2 ft of stove <input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail                                       |
| Room Temperature (°F)                            | 67           | <87 °F <input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail                                                                        |
| Average External Stove Temp (°F)                 | N/A          | Within 2 °F of ambient (Run #1 only) <input type="checkbox"/> Pass <input type="checkbox"/> Fail <input checked="" type="checkbox"/> N/A             |
| Average Internal Stove Temp (°F)                 | N/A          | Within 2 °F of ambient (Run #1 only) <input type="checkbox"/> Pass <input type="checkbox"/> Fail <input checked="" type="checkbox"/> N/A             |
| Time Coals Removed from Stove & Firebox Vacuumed | 9:15         | >1 hr before test (Runs #2 & 3 only) <input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A             |
| Earliest possible start time                     | 11:10        | 24 hours from start of Run #1 (Runs #2 & 3 only) <input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A |

Technician Signature: 

Date: 12/23/2024



## IDC Wood Heater Run Sheets

Client: SBI Job Number: 23-303 Tracking #: 214  
Model: St. Louis Run Number: 3 Test Date: 12/11/2024

### IDC FUELING NOTES

#### Fuel & Moisture Measurement

|                                 |                |
|---------------------------------|----------------|
| Fuel Type                       | Maple Cordwood |
| Moisture Meter Calibration 22%: | 22.0           |
| Moisture Meter Calibration 12%: | 12.0           |
| Moisture Reading Start Time:    | 9:40           |
| Fuel Temperature (F):           | 67             |

#### L1 Test Notes

|                                      |           |
|--------------------------------------|-----------|
| Scale Weight Prior to Loading (lbs): | 0.00      |
| Test Burn Start Time:                | 11:11     |
| Air Control Setting (open/closed):   | Therm On  |
| Door Closed Time (5 min from start): | 11:14     |
| Bypass Closed Time:                  | N/A       |
| Target End Weight (lbs):             | 2.26-2.50 |
| Actual End Weight (lbs):             | 2.43      |
| Phase End Time:                      | 11:28     |

#### Additional Notes (Fuel adjustments, TEOM Filter Changes, etc.)

| Time | Notes  |
|------|--------|
|      | -None- |

#### L2 Test Notes

|                                               |           |
|-----------------------------------------------|-----------|
| Scale Weight Prior to Loading (lbs):          | 2.43      |
| Load Time:                                    | 11:28     |
| Air Control Setting (open/closed):            | Therm On  |
| Door Closed Time (immediately after loading): | 11:29     |
| Bypass Closed Time:                           | N/A       |
| 50% Target Weight (lbs):                      | 8.78-9.70 |
| Actual 50% Weight (lbs):                      | 9.45      |
| Air control closed time:                      | 11:55     |
| Target End Weight (lbs):                      | 3.60-3.98 |
| Actual End Weight (lbs):                      | 3.64      |
| Phase End Time:                               | 12:42     |

#### Additional Notes (Fuel adjustments, TEOM Filter Changes, etc.)

| Time  | Notes                |
|-------|----------------------|
| 12:35 | Changed TEOM Filters |

Technician Signature: 

Date: 1/17/2025

## IDC Wood Heater Run Sheets

Client: SBI Job Number: 23-303 Tracking #: 214  
Model: St. Louis Run Number: 3 Test Date: 12/11/2024

### L3 Test Notes

|                                               |           |
|-----------------------------------------------|-----------|
| Scale Weight Prior to Loading (lbs):          | 3.64      |
| Load Time:                                    | 12:42     |
| Air Control Setting (5 min start-up allowed): |           |
| Door Closed Time (immediately after loading): | 12:43     |
| Bypass Closed Time:                           | N/A       |
| Target End Weight (lbs):                      | 4.39-4.85 |
| Actual End Weight (lbs):                      | 4.46      |
| Phase End Time:                               | 13:46     |

|        |     |          |     |
|--------|-----|----------|-----|
| Open @ | N/A | Closed @ | N/A |
|--------|-----|----------|-----|

### Additional Notes (Fuel adjustments, TEOM Filter Changes, etc.)

| Time  | Notes                |
|-------|----------------------|
| 13:36 | Changed TEOM filters |

### L4 Test Notes

|                                                |           |
|------------------------------------------------|-----------|
| Scale Weight Prior to Loading (lbs):           | 4.46      |
| Load Time:                                     | 13:46     |
| Air Control Setting (10 min start-up allowed): |           |
| Door Closed Time (5 min after loading):        | 13:48     |
| Bypass Closed Time:                            | N/A       |
| Target End Weight (lbs):                       | 4.24-4.68 |
| Actual End Weight (lbs):                       | 4.46      |
| Phase End Time:                                | 17:58     |

|        |     |          |     |
|--------|-----|----------|-----|
| Open @ | N/A | Closed @ | N/A |
|--------|-----|----------|-----|

### Additional Notes (Fuel adjustments, TEOM Filter Changes, etc.)

| Time | Notes  |
|------|--------|
|      | -None- |

### Post-Test Conditions

|                            |       |
|----------------------------|-------|
| Room Air Velocity (ft/min) | <50   |
| Room RH (%)                | 21.6  |
| Barometric Pressure        | 29.91 |

Technician Signature: 

Date: 12/23/2024

## IDC Wood Heater Run Sheets

Client: SBI Job Number: 23-303 Tracking #: 214  
 Model: St. Louis Run Number: 3 Test Date: 12/11/2024

### Post-Test Check List

| Leak Checks | Requirement     | Pump Off (lpm) | Pump On, Probe Blocked (lpm) | Net (lpm) | Result                                                                 |
|-------------|-----------------|----------------|------------------------------|-----------|------------------------------------------------------------------------|
| PM-2.5      | <0.05 lpm (net) | 0.36           | 0.36                         | 0.0       | <input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail |
| PM-Course   | <0.05 lpm (net) | 0.14           | 0.15                         | 0.01      | <input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail |
| Ambient     | <0.05 lpm (net) | -0.18          | -0.16                        | 0.02      | <input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail |

| Flow Checks | Requirement | TEOM Indicated Flow (lpm) <sup>1</sup> | Measured Flow      |                    | Difference (%) | Result                                                                 |
|-------------|-------------|----------------------------------------|--------------------|--------------------|----------------|------------------------------------------------------------------------|
|             |             |                                        | (lpm) <sup>2</sup> | (lpm) <sup>3</sup> |                |                                                                        |
| PM-2.5      | ±2%         | 1.00                                   | 0.99               |                    | 1              | <input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail |
| PM-Course   | ±2%         | 1.00                                   | 0.99               |                    | 1              | <input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail |
| Ambient     | ±2%         | 3.0                                    | 3.00               |                    | 0              | <input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail |

<sup>1</sup>Indicated flow is at 20°C, 1 atm

<sup>2</sup>Measured flow with PFS equipment ID 134, which indicates flow at 21.1°C, 1 atm

<sup>3</sup>Adjusted value (Measured Flow \* 99.6%) to match the STP used by TEOM

### Flue Gas Analyzer Calibration Check

**Calibration Gas Values:** Span Gas Cylinder#: CC505834 CO<sub>2</sub> (%): 16.98 CO (%): 4.300  
 Mid Gas Cylinder#: SG9199309 CO<sub>2</sub> (%): 10.06 CO (%): 2.538

### Calibration Results:

|                 | Pre Test |       |       | Post Test |       |       |
|-----------------|----------|-------|-------|-----------|-------|-------|
|                 | Zero     | Span  | Mid   | Zero      | Span  | Mid   |
| Time            | 9:22     | 9:26  | 9:30  | 9:53      | 9:54  | 9:55  |
| CO <sub>2</sub> | 0.00     | 16.78 | 10.00 | 0.00      | 16.67 | 9.65  |
| CO              | 0.000    | 4.243 | 2.46  | 0.000     | 4.187 | 2.382 |

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

Technician Signature: 

Date: 12/23/2024

## IDC Wood Heater Run Sheets

Client: SBI  
Model: St. Louis

Job Number: 23-303  
Run Number: 3

Tracking #: 214  
Test Date: 12/11/2024

### Test Fuel Photos



L1 Fuel Load



L2 Fuel Load



L3 Fuel Load



L4 Fuel Load

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



Date: 12/23/2024

## IDC Wood Heater Run Sheets

Client: SBI Job Number: 23-303 Tracking #: 214  
 Model: St. Louis Run Number: 4 Test Date: 12/12/2024

### Pre-Test Set-up Check List

Perform the following checks after a minimum of 30 minutes of warmup time

| Leak Checks | Requirement     | Pump Off (lpm) | Pump On, Probe Blocked (lpm) | Net (lpm) | Result                                                                 |
|-------------|-----------------|----------------|------------------------------|-----------|------------------------------------------------------------------------|
| PM-2.5      | <0.05 lpm (net) | 0.36           | 0.36                         | 0.0       | <input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail |
| PM-Course   | <0.05 lpm (net) | 0.14           | 0.15                         | 0.01      | <input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail |
| Ambient     | <0.05 lpm (net) | -0.18          | -0.16                        | 0.02      | <input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail |

| Flow Checks | Requirement | TEOM Indicated Flow (lpm) <sup>1</sup> | Measured Flow      |                    | Difference (%) | Result                                                                 |
|-------------|-------------|----------------------------------------|--------------------|--------------------|----------------|------------------------------------------------------------------------|
|             |             |                                        | (lpm) <sup>2</sup> | (lpm) <sup>3</sup> |                |                                                                        |
| PM-2.5      | ±2%         | 1.00                                   | 0.99               |                    | 1              | <input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail |
| PM-Course   | ±2%         | 1.00                                   | 0.99               |                    | 1              | <input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail |
| Ambient     | ±2%         | 3.0                                    | 3.00               |                    | 0              | <input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail |

<sup>1</sup>Indicated flow is at 20°C, 1 atm

<sup>2</sup>Measured flow with PFS equipment ID 197, which indicates flow at 21.1°C, 1 atm

<sup>3</sup>Adjusted value (Measured Flow \* 99.6%) to match the STP used by TEOM

### Initial Filter Setup

Use **black** filter tool when changing filters

|            | 1 min. requirement | 5 min. requirement        | Result                                                                 |
|------------|--------------------|---------------------------|------------------------------------------------------------------------|
| PM-2.5     | Frequency > 200Hz  | Mass > -1 ug, noise < 2ug | <input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail |
| PM- Course | Frequency > 200Hz  | Mass > -1 ug, noise < 2ug | <input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail |
| Ambient    | Frequency > 200Hz  | Mass > -1 ug, noise < 2ug | <input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail |

| Pre-Fire Verifications                                    | Time probe in Tunnel | Result                                   |
|-----------------------------------------------------------|----------------------|------------------------------------------|
| Place probe in tunnel at least 10 min prior to test start | 9:40                 |                                          |
| Verify Data is recording [In RPCOMM] - Dichot             |                      | <input checked="" type="checkbox"/> Okay |
| Verify Data is recording [In RPCOMM] - Ambient            |                      | <input checked="" type="checkbox"/> Okay |

### Pre-Test Conditions

|                                                  | Requirements | Result                                                                                                                                               |
|--------------------------------------------------|--------------|------------------------------------------------------------------------------------------------------------------------------------------------------|
| Room RH (%)                                      | 27.3         |                                                                                                                                                      |
| Barometric Pressure                              | 29.68        |                                                                                                                                                      |
| Room Air Velocity (ft/min)                       | <50          | Must be <50 ft/min within 2 ft of stove <input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail                                       |
| Room Temperature (°F)                            | 66           | <87 °F <input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail                                                                        |
| Average External Stove Temp (°F)                 | N/A          | Within 2 °F of ambient (Run #1 only) <input type="checkbox"/> Pass <input type="checkbox"/> Fail <input checked="" type="checkbox"/> N/A             |
| Average Internal Stove Temp (°F)                 | N/A          | Within 2 °F of ambient (Run #1 only) <input type="checkbox"/> Pass <input type="checkbox"/> Fail <input checked="" type="checkbox"/> N/A             |
| Time Coals Removed from Stove & Firebox Vacuumed | 8:50         | >1 hr before test (Runs #2 & 3 only) <input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A             |
| Earliest possible start time                     | 11:11        | 24 hours from start of Run #1 (Runs #2 & 3 only) <input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A |

Technician Signature: 

Date: 12/23/2024

## IDC Wood Heater Run Sheets

Client: SBI Job Number: 23-303 Tracking #: 214  
Model: St. Louis Run Number: 4 Test Date: 12/12/2024

### IDC FUELING NOTES

#### Fuel & Moisture Measurement

|                                 |                |
|---------------------------------|----------------|
| Fuel Type                       | Maple Cordwood |
| Moisture Meter Calibration 22%: | 22.0           |
| Moisture Meter Calibration 12%: | 12.0           |
| Moisture Reading Start Time:    | 10:15          |
| Fuel Temperature (F):           | 66             |

#### L1 Test Notes

|                                      |           |
|--------------------------------------|-----------|
| Scale Weight Prior to Loading (lbs): | 0.00      |
| Test Burn Start Time:                | 12:04     |
| Air Control Setting (open/closed):   | Therm On  |
| Door Closed Time (5 min from start): | 11:14     |
| Bypass Closed Time:                  | N/A       |
| Target End Weight (lbs):             | 2.26-2.50 |
| Actual End Weight (lbs):             | 2.49      |
| Phase End Time:                      | 12:24     |

#### Additional Notes (Fuel adjustments, TEOM Filter Changes, etc.)

| Time | Notes  |
|------|--------|
|      | -None- |

#### L2 Test Notes

|                                               |           |
|-----------------------------------------------|-----------|
| Scale Weight Prior to Loading (lbs):          | 2.49      |
| Load Time:                                    | 12:24     |
| Air Control Setting (open/closed):            | Therm On  |
| Door Closed Time (immediately after loading): | 12:25     |
| Bypass Closed Time:                           | N/A       |
| 50% Target Weight (lbs):                      | 8.84-9.77 |
| Actual 50% Weight (lbs):                      | 9.71      |
| Air control closed time:                      | 12:47     |
| Target End Weight (lbs):                      | 3.66-4.04 |
| Actual End Weight (lbs):                      | 3.74      |
| Phase End Time:                               | 13:27     |

#### Additional Notes (Fuel adjustments, TEOM Filter Changes, etc.)

| Time  | Notes                |
|-------|----------------------|
| 13:19 | Changed TEOM Filters |

Technician Signature: 

Date: 1/17/2025



## IDC Wood Heater Run Sheets

Client: SBI Job Number: 23-303 Tracking #: 214  
Model: St. Louis Run Number: 4 Test Date: 12/12/2024

### L3 Test Notes

|                                               |           |
|-----------------------------------------------|-----------|
| Scale Weight Prior to Loading (lbs):          | 3.74      |
| Load Time:                                    | 13:27     |
| Air Control Setting (5 min start-up allowed): |           |
| Door Closed Time (immediately after loading): | 13:28     |
| Bypass Closed Time:                           | N/A       |
| Target End Weight (lbs):                      | 4.49-4.96 |
| Actual End Weight (lbs):                      | 4.61      |
| Phase End Time:                               | 14:28     |

|        |     |          |     |
|--------|-----|----------|-----|
| Open @ | N/A | Closed @ | N/A |
|--------|-----|----------|-----|

### Additional Notes (Fuel adjustments, TEOM Filter Changes, etc.)

| Time  | Notes                |
|-------|----------------------|
| 14:19 | Changed TEOM filters |

### L4 Test Notes

|                                                |           |
|------------------------------------------------|-----------|
| Scale Weight Prior to Loading (lbs):           | 4.61      |
| Load Time:                                     | 14:28     |
| Air Control Setting (10 min start-up allowed): |           |
| Door Closed Time (5 min after loading):        | 14:33     |
| Bypass Closed Time:                            | N/A       |
| Target End Weight (lbs):                       | 4.38-4.84 |
| Actual End Weight (lbs):                       | 4.61      |
| Phase End Time:                                | 17:44     |

|        |     |          |     |
|--------|-----|----------|-----|
| Open @ | N/A | Closed @ | N/A |
|--------|-----|----------|-----|

### Additional Notes (Fuel adjustments, TEOM Filter Changes, etc.)

| Time  | Notes                                     |
|-------|-------------------------------------------|
| 14:28 | Cut all power to unit prior to loading L4 |

### Post-Test Conditions

|                            |       |
|----------------------------|-------|
| Room Air Velocity (ft/min) | <50   |
| Room RH (%)                | 31.6  |
| Barometric Pressure        | 29.62 |

Technician Signature: 

Date: 12/23/2024

## IDC Wood Heater Run Sheets

Client: SBI Job Number: 23-303 Tracking #: 214  
 Model: St. Louis Run Number: 4 Test Date: 12/12/2024

### Post-Test Check List

| Leak Checks | Requirement     | Pump Off (lpm) | Pump On, Probe Blocked (lpm) | Net (lpm) | Result                                                                 |
|-------------|-----------------|----------------|------------------------------|-----------|------------------------------------------------------------------------|
| PM-2.5      | <0.05 lpm (net) | 0.36           | 0.38                         | 0.02      | <input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail |
| PM-Course   | <0.05 lpm (net) | 0.14           | 0.13                         | 0.01      | <input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail |
| Ambient     | <0.05 lpm (net) | -0.18          | -0.16                        | 0.02      | <input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail |

| Flow Checks | Requirement | TEOM Indicated Flow (lpm) <sup>1</sup> | Measured Flow      |                    | Difference (%) | Result                                                                 |
|-------------|-------------|----------------------------------------|--------------------|--------------------|----------------|------------------------------------------------------------------------|
|             |             |                                        | (lpm) <sup>2</sup> | (lpm) <sup>3</sup> |                |                                                                        |
| PM-2.5      | ±2%         | 1.00                                   | 0.99               |                    | 1              | <input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail |
| PM-Course   | ±2%         | 1.00                                   | 0.99               |                    | 1              | <input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail |
| Ambient     | ±2%         | 3.0                                    | 3.00               |                    | 0              | <input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail |

<sup>1</sup>Indicated flow is at 20°C, 1 atm

<sup>2</sup>Measured flow with PFS equipment ID 134, which indicates flow at 21.1°C, 1 atm

<sup>3</sup>Adjusted value (Measured Flow \* 99.6%) to match the STP used by TEOM

### Flue Gas Analyzer Calibration Check

**Calibration Gas Values:** Span Gas Cylinder#: CC505834 CO<sub>2</sub> (%): 16.98 CO (%): 4.300  
 Mid Gas Cylinder#: SG9199309 CO<sub>2</sub> (%): 10.06 CO (%): 2.538

### Calibration Results:

|                 | Pre Test |       |       | Post Test |       |       |
|-----------------|----------|-------|-------|-----------|-------|-------|
|                 | Zero     | Span  | Mid   | Zero      | Span  | Mid   |
| Time            | 9:53     | 9:54  | 9:55  | 17:49     | 17:50 | 17:51 |
| CO <sub>2</sub> | 0.00     | 16.67 | 9.65  | -0.01     | 16.71 | 9.79  |
| CO              | 0.000    | 4.187 | 2.382 | -0.003    | 4.233 | 2.419 |

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

Technician Signature: 

Date: 12/23/2024



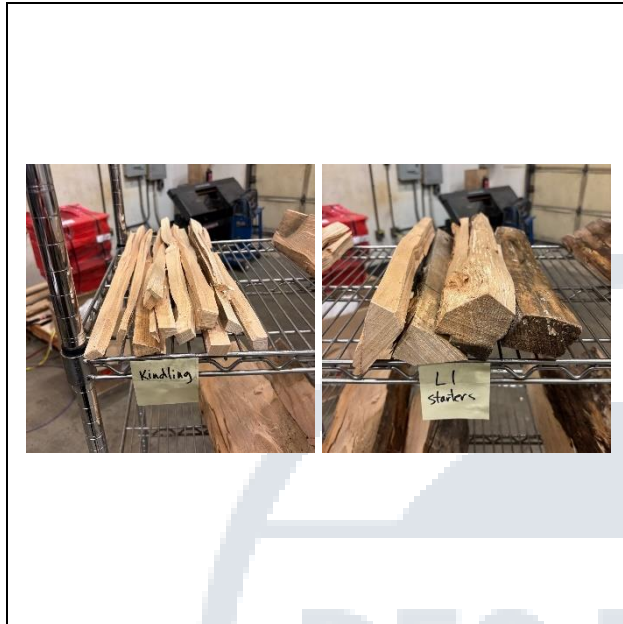
## IDC Wood Heater Run Sheets

Client: SBI  
Model: St. Louis

Job Number: 23-303  
Run Number: 4

Tracking #: 214  
Test Date: 12/12/2024

### Test Fuel Photos



**L1 Fuel Load**



**L2 Fuel Load**



**L3 Fuel Load**



**L4 Fuel Load**

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

Date: 12/23/2024

## NYSERDA 2015 NSPS Fuel Calculator

### 1- Stove and Lab Information

#### 1.1 Stove Information

|                         |     |
|-------------------------|-----|
| Appliance manufacturer: | SBI |
| Appliance model:        | 4   |

#### 1.2 Number of Runs

|                            |   |
|----------------------------|---|
| Total Number of Test Runs: | 4 |
|----------------------------|---|

#### 1.3 Firebox Information

|                     |                                        |                                  |
|---------------------|----------------------------------------|----------------------------------|
| Firebox Shape:      | <input checked="" type="radio"/> Cubic | <input type="radio"/> Cylindrica |
| Firebox width:      | 22.11                                  | in.                              |
| Firebox depth:      | 13.69                                  | in.                              |
| Firebox height:     | 11.50                                  | in.                              |
| Volume adjustment:  | 0.112                                  | ft <sup>3</sup>                  |
| Firebox Net Volume: | 1.903                                  | ft <sup>3</sup>                  |

The firebox shape is not cubic

Explain the reason for volume adjustment ↑↑

#### 1.4 Test Lab Information

|                                                                                  |                           |
|----------------------------------------------------------------------------------|---------------------------|
| Lab name:                                                                        | PFS                       |
| Test lab location:                                                               | Oregon                    |
| Primary testing staff name:                                                      | Aaron Kravitz             |
| Test lab phone:                                                                  | 503-650-0088              |
| Test lab contact email:                                                          | aaron.kravitz@pfsteco.com |
| Third party certifier:                                                           | Intertek                  |
| Third party phone:                                                               | 000-000-0418              |
| Third party email:                                                               | 418                       |
| Other people participating or witnessing the test, either in person or remotely: |                           |

*These timestamps cannot be edited*

|                         |                   |
|-------------------------|-------------------|
| Calculation Started at: | 8/7/2023 15:01    |
| Saved and Finished at:  | Still in progress |

Next >>



## NYSERDA 2015 NSPS Fuel Calculator

3.1 Run #1 Details - Test Date: 12/09/2024

### Detailed Fuel Information

Enter the number of fuel pieces first, then enter the weight and MC details in Tables 3.2 through 3.6 ↓↓

| 3.1 Fuel Load Data                   |                  |                                      |                    |                    |                             |
|--------------------------------------|------------------|--------------------------------------|--------------------|--------------------|-----------------------------|
|                                      | Target load (lb) | Actual weight (lb)                   | Target # of pieces | Actual # of pieces |                             |
| L1 - Kindling weight                 | 1.81 – 2.00      | 1.99                                 | 13                 | 13                 | <a href="#">Go to table</a> |
| L1 - Starter                         | 5.42 – 5.99      | 5.72                                 | 4                  | 4                  | <a href="#">Go to table</a> |
| L2 - Small pieces                    | 12.65 – 13.99    | 13.62                                | 4                  | 4                  | <a href="#">Go to table</a> |
| L3 - Large pieces                    | 9.04 – 9.99      | 9.82                                 | 2                  | 2                  | <a href="#">Go to table</a> |
| L4 - Small pieces                    | 7.23 – 7.99      | 7.48                                 | 3                  | 3                  | <a href="#">Go to table</a> |
| L4 - Large pieces                    | 14.46 – 15.98    | 15.38                                | 3                  | 3                  | <a href="#">Go to table</a> |
| Total fuel load:                     | 50.62 – 55.95    | 54.01                                | 29                 | 29                 |                             |
| Total fuel burnt wet-basis: 48.59 lb |                  | Total fuel burnt dry-basis: 39.80 lb |                    |                    |                             |

| 3.2 Load 1 - Kindling and starter fuel |             |                   |           |           |           |      |              |
|----------------------------------------|-------------|-------------------|-----------|-----------|-----------|------|--------------|
| <a href="#">set the # of logs</a>      | Weight (lb) | pin 1 (%)         | pin 2 (%) | pin 3 (%) | pin 4 (%) |      | Avg moisture |
| Kindling total:                        | 1.99        | Not applicable    |           |           |           |      |              |
| Piece 1:                               | 1.37        | 19.0              | 20.5      | 18.3      | 20.6      | 21.4 | 20.0         |
| Piece 2:                               | 1.45        | 22.1              | 23.1      | 18.3      | 19.1      | 22.2 | 21.0         |
| Piece 3:                               | 1.32        | 24.1              | 25.3      | 19.3      | 24.9      | 26.0 | 23.9         |
| Piece 4:                               | 1.58        | 23.5              | 19.4      | 18.9      | 26.1      | 22.1 | 22.0         |
| Piece 5:                               |             |                   |           |           |           |      |              |
| Piece 6:                               |             |                   |           |           |           |      |              |
| Piece 7:                               |             |                   |           |           |           |      |              |
| Piece 8:                               |             |                   |           |           |           |      |              |
| Piece 9:                               |             |                   |           |           |           |      |              |
| Piece 10:                              |             |                   |           |           |           |      |              |
| Starter total:                         | 5.72        | L1 Total: 7.71 lb |           |           |           |      | 21.69        |

✓ Total load weight is currently in the target range of 7.23–7.99 lb.  
Allowed weight of each starter piece: 1.00–2.42 lb.

### 3.3 Load 2 - Small pieces

| <a href="#">set the # of logs</a> | Weight (lb) | pin 1 (%) | pin 2 (%) | pin 3 (%) | pin 4 (%) |      | Avg moisture |
|-----------------------------------|-------------|-----------|-----------|-----------|-----------|------|--------------|
| Piece 1:                          | 3.99        | 23.3      | 23.4      | 18.2      | 18.0      | 19.4 | 20.5         |
| Piece 2:                          | 2.46        | 24.1      | 19.6      | 19.5      | 21.3      | 23.8 | 21.7         |
| Piece 3:                          | 2.93        | 23.0      | 26.4      | 25.1      | 19.6      | 22.0 | 23.2         |
| Piece 4:                          | 4.24        | 18.1      | 20.0      | 20.5      | 22.5      | 19.3 | 20.1         |
| Piece 5:                          |             |           |           |           |           |      |              |
| Piece 6:                          |             |           |           |           |           |      |              |
| Piece 7:                          |             |           |           |           |           |      |              |
| Piece 8:                          |             |           |           |           |           |      |              |
| Piece 9:                          |             |           |           |           |           |      |              |
| Piece 10:                         |             |           |           |           |           |      |              |
| Load total:                       | 13.62       |           |           |           |           |      | 21.15        |

✓ Total load weight is in the target range of 12.65–13.99 lb.

Allowed weight of each piece: 2.44–4.91 lb.

### 3.4 Load 3 - Large pieces

| <a href="#">set the # of logs</a> | Weight (lb) | pin 1 (%) | pin 2 (%) | pin 3 (%) | pin 4 (%) |      | Avg moisture |
|-----------------------------------|-------------|-----------|-----------|-----------|-----------|------|--------------|
| Piece 1:                          | 4.13        | 19.9      | 25.3      | 21.1      | 23.6      | 21.6 | 22.3         |
| Piece 2:                          | 5.69        | 21.7      | 23.5      | 19.3      | 23.0      | 22.0 | 21.9         |
| Piece 3:                          |             |           |           |           |           |      |              |
| Load total:                       | 9.82        |           |           |           |           |      | 22.07        |

✓ Load weight is in the target range of 9.04–9.99 lb.

Allowed weight of each piece: 3.81–5.71 lb.

### 3.5 Load 4 - Small pieces

| <a href="#">set the # of logs</a> | Weight (lb) | pin 1 (%) | pin 2 (%) | pin 3 (%) | pin 4 (%) |      | Avg moisture |
|-----------------------------------|-------------|-----------|-----------|-----------|-----------|------|--------------|
| Piece 1:                          | 2.45        | 21.4      | 23.0      | 20.2      | 19.0      | 22.5 | 21.2         |
| Piece 2:                          | 2.51        | 20.2      | 21.4      | 19.5      | 21.6      | 23.8 | 21.3         |
| Piece 3:                          | 2.52        | 24.7      | 25.6      | 19.2      | 21.8      | 23.7 | 23.0         |
| Piece 4:                          |             |           |           |           |           |      |              |
| Piece 5:                          |             |           |           |           |           |      |              |
| Piece 6:                          |             |           |           |           |           |      |              |
| Load total:                       | 7.48        |           |           |           |           |      | 21.85        |

✓ Load weight is in the target range of 7.23–7.99 lb.

Allowed weight of each piece: 2.44–4.91 lb.

### 3.6 Load 4 - Large pieces

| <a href="#">set the # of logs</a> | Weight (lb) | pin 1 (%) | pin 2 (%) | pin 3 (%) | pin 4 (%) |      | Avg moisture |
|-----------------------------------|-------------|-----------|-----------|-----------|-----------|------|--------------|
| Piece 1:                          | 5.12        | 21.3      | 23.5      | 20.2      | 21.5      | 21.7 | 21.6         |
| Piece 2:                          | 5.15        | 25.6      | 24.5      | 19.0      | 24.2      | 23.9 | 23.4         |
| Piece 3:                          | 5.11        | 25.0      | 19.2      | 26.9      | 24.8      | 23.9 | 24.0         |
| Piece 4:                          |             |           |           |           |           |      |              |
| Piece 5:                          |             |           |           |           |           |      |              |
| Piece 6:                          |             |           |           |           |           |      |              |
| Load total:                       | 15.38       |           |           |           |           |      | 23.01        |

✓ Load weight is in the target range of 14.46–15.98 lb.

Allowed weight of each piece: 4.96–8.69 lb.

|                                     |       |              |       |
|-------------------------------------|-------|--------------|-------|
| Total L4 load weight (small+large): | 22.86 | Average MC%: | 22.63 |
|-------------------------------------|-------|--------------|-------|

### Other Testing Information

#### 3.7 Run Information

|                                                  |                                            |
|--------------------------------------------------|--------------------------------------------|
| Run date:                                        | 12/9/2024                                  |
| Run number:                                      | 1                                          |
| Testing staff:                                   |                                            |
| Witnesses or others present for test:            |                                            |
| Start time:                                      |                                            |
| End time:                                        | Fill out Table 3.10                        |
| <input checked="" type="checkbox"/> Elapsed Time | <input type="checkbox"/> Clock Time Method |
| <a href="#">Test Results Summary</a>             |                                            |

#### 3.8 Test Lab Condition

|                      | pre-test | post-test                  |        |
|----------------------|----------|----------------------------|--------|
| Ambient temperature: |          |                            | F      |
| Barometric pressure: |          |                            | in. Hg |
| Relative humidity:   |          |                            | %      |
| Mean Stove T         |          | F (±2 of the ambient temp) |        |
| Mean Stack T         |          | F (±2 of the ambient temp) |        |

#### 3.9 Run Operation Data

| Load              | Scale reading at start of phase before loading (lb) | Calculated scale at start of phase after loading (lb) | Target scale range at end of phase (lb) | Scale reading at end of phase (lb) | Fuel Burnt - db (lb) |  | Fuel Burnt - wb (lb) |
|-------------------|-----------------------------------------------------|-------------------------------------------------------|-----------------------------------------|------------------------------------|----------------------|--|----------------------|
| L1 (Full High)    | 0.00                                                | 7.71                                                  | 2.26 – 2.50                             | 2.42                               | 3.92                 |  | 4.77                 |
| L2(A) (Full High) | 2.42                                                | 16.04                                                 | 8.77 – 9.69                             | 9.62                               | Not applicable       |  |                      |
| L2(B) (Full Low)  | 9.62                                                | Not applicable                                        | 3.59 – 3.97                             | 3.66                               | 10.00                |  | 12.12                |
| L3 (Full Low)     | 3.66                                                | 13.48                                                 | 4.41 – 4.87                             | 4.46                               | 7.24                 |  | 8.84                 |
| L4 (Full Low)     | 4.46                                                | 27.32                                                 | 4.24 – 4.68                             | 4.46                               | 18.64                |  | 22.86                |

## NYSERDA 2015 NSPS Fuel Calculator

3.2 Run #2 Details - Test Date: 12/09/2024

### Detailed Fuel Information

Enter the number of fuel pieces first, then enter the weight and MC details in Tables 3.2 through 3.6 ↓↓

| 3.1 Fuel Load Data                   |                  |                                      |                    |                    |                             |
|--------------------------------------|------------------|--------------------------------------|--------------------|--------------------|-----------------------------|
|                                      | Target load (lb) | Actual weight (lb)                   | Target # of pieces | Actual # of pieces |                             |
| L1 - Kindling weight                 | 1.81 – 2.00      | 1.99                                 | 13                 | 13                 | <a href="#">Go to table</a> |
| L1 - Starter                         | 5.42 – 5.99      | 5.72                                 | 4                  | 4                  | <a href="#">Go to table</a> |
| L2 - Small pieces                    | 12.65 – 13.99    | 13.62                                | 4                  | 4                  | <a href="#">Go to table</a> |
| L3 - Large pieces                    | 9.04 – 9.99      | 9.82                                 | 2                  | 2                  | <a href="#">Go to table</a> |
| L4 - Small pieces                    | 7.23 – 7.99      | 7.48                                 | 3                  | 2                  | <a href="#">Go to table</a> |
| L4 - Large pieces                    | 14.46 – 15.98    | 15.38                                | 3                  | 3                  | <a href="#">Go to table</a> |
| Total fuel load:                     | 50.62 – 55.95    | 54.01                                | 29                 | 28                 |                             |
| Total fuel burnt wet-basis: 46.98 lb |                  | Total fuel burnt dry-basis: 38.35 lb |                    |                    |                             |

| 3.2 Load 1 - Kindling and starter fuel |             |                   |           |           |           |      |              |
|----------------------------------------|-------------|-------------------|-----------|-----------|-----------|------|--------------|
| <a href="#">set the # of logs</a>      | Weight (lb) | pin 1 (%)         | pin 2 (%) | pin 3 (%) | pin 4 (%) |      | Avg moisture |
| Kindling total:                        | 1.97        | Not applicable    |           |           |           |      |              |
| Piece 1:                               | 1.59        | 20.2              | 18.2      | 23.0      | 19.7      | 20.0 | 20.2         |
| Piece 2:                               | 1.54        | 18.5              | 21.6      | 19.2      | 19.0      | 19.7 | 19.6         |
| Piece 3:                               | 1.11        | 22.3              | 21.9      | 18.0      | 18.1      | 21.2 | 20.3         |
| Piece 4:                               | 1.34        | 23.0              | 19.7      | 21.5      | 18.3      | 18.3 | 20.2         |
| Piece 5:                               |             |                   |           |           |           |      |              |
| Piece 6:                               |             |                   |           |           |           |      |              |
| Piece 7:                               |             |                   |           |           |           |      |              |
| Piece 8:                               |             |                   |           |           |           |      |              |
| Piece 9:                               |             |                   |           |           |           |      |              |
| Piece 10:                              |             |                   |           |           |           |      |              |
| Starter total:                         | 5.58        | L1 Total: 7.55 lb |           |           |           |      | 20.05        |

✓ Total load weight is currently in the target range of 7.23–7.99 lb.  
Allowed weight of each starter piece: 1.00–2.42 lb.

### 3.3 Load 2 - Small pieces

| <a href="#">set the # of logs</a> | Weight (lb) | pin 1 (%) | pin 2 (%) | pin 3 (%) | pin 4 (%) |      | Avg moisture |
|-----------------------------------|-------------|-----------|-----------|-----------|-----------|------|--------------|
| Piece 1:                          | 3.76        | 20.1      | 21.2      | 25.2      | 26.0      | 18.5 | 22.2         |
| Piece 2:                          | 3.10        | 19.0      | 19.1      | 20.6      | 19.6      | 18.9 | 19.4         |
| Piece 3:                          | 2.66        | 18.9      | 19.8      | 19.9      | 18.2      | 21.4 | 19.6         |
| Piece 4:                          | 3.27        | 23.6      | 23.0      | 22.0      | 23.6      | 20.2 | 22.5         |
| Piece 5:                          |             |           |           |           |           |      |              |
| Piece 6:                          |             |           |           |           |           |      |              |
| Piece 7:                          |             |           |           |           |           |      |              |
| Piece 8:                          |             |           |           |           |           |      |              |
| Piece 9:                          |             |           |           |           |           |      |              |
| Piece 10:                         |             |           |           |           |           |      |              |
| Load total:                       | 12.79       |           |           |           |           |      | 21.07        |

✓ Total load weight is in the target range of 12.65–13.99 lb.

Allowed weight of each piece: 2.44–4.91 lb.

### 3.4 Load 3 - Large pieces

| <a href="#">set the # of logs</a> | Weight (lb) | pin 1 (%) | pin 2 (%) | pin 3 (%) | pin 4 (%) |      | Avg moisture |
|-----------------------------------|-------------|-----------|-----------|-----------|-----------|------|--------------|
| Piece 1:                          | 5.18        | 19.5      | 26.6      | 18.1      | 20.3      | 22.8 | 21.5         |
| Piece 2:                          | 4.20        | 23.3      | 19.6      | 25.8      | 23.0      | 18.5 | 22.0         |
| Piece 3:                          |             |           |           |           |           |      |              |
| Load total:                       | 9.38        |           |           |           |           |      | 21.72        |

✓ Load weight is in the target range of 9.04–9.99 lb.

Allowed weight of each piece: 3.81–5.71 lb.

### 3.5 Load 4 - Small pieces

| <a href="#">set the # of logs</a> | Weight (lb) | pin 1 (%) | pin 2 (%) | pin 3 (%) | pin 4 (%) |      | Avg moisture |
|-----------------------------------|-------------|-----------|-----------|-----------|-----------|------|--------------|
| Piece 1:                          | 3.62        | 27.0      | 26.2      | 20.8      | 22.0      | 24.5 | 24.1         |
| Piece 2:                          | 3.65        | 20.4      | 26.2      | 26.3      | 23.0      | 22.9 | 23.8         |
| Piece 3:                          |             |           |           |           |           |      |              |
| Piece 4:                          |             |           |           |           |           |      |              |
| Piece 5:                          |             |           |           |           |           |      |              |
| Piece 6:                          |             |           |           |           |           |      |              |
| Load total:                       | 7.27        |           |           |           |           |      | 23.93        |

✓ Load weight is in the target range of 7.23–7.99 lb.

Allowed weight of each piece: 2.44–4.91 lb.



### 3.6 Load 4 - Large pieces

| <a href="#">set the # of logs</a> | Weight (lb) | pin 1 (%) | pin 2 (%) | pin 3 (%) | pin 4 (%) |      | Avg moisture |
|-----------------------------------|-------------|-----------|-----------|-----------|-----------|------|--------------|
| Piece 1:                          | 5.03        | 26.6      | 23.4      | 23.0      | 25.6      | 25.2 | 24.8         |
| Piece 2:                          | 5.01        | 20.8      | 24.5      | 21.5      | 26.7      | 25.9 | 23.9         |
| Piece 3:                          | 5.28        | 20.7      | 23.0      | 27.0      | 21.6      | 26.7 | 23.8         |
| Piece 4:                          |             |           |           |           |           |      |              |
| Piece 5:                          |             |           |           |           |           |      |              |
| Piece 6:                          |             |           |           |           |           |      |              |
| Load total:                       | 15.32       |           |           |           |           |      | 24.14        |

✓ Load weight is in the target range of 14.46–15.98 lb.

Allowed weight of each piece: 4.96–8.69 lb.

|                                     |       |              |       |
|-------------------------------------|-------|--------------|-------|
| Total L4 load weight (small+large): | 22.59 | Average MC%: | 24.07 |
|-------------------------------------|-------|--------------|-------|

### Other Testing Information

#### 3.7 Run Information

|                                                  |                                            |
|--------------------------------------------------|--------------------------------------------|
| Run date:                                        | 12/9/2024                                  |
| Run number:                                      | 1                                          |
| Testing staff:                                   |                                            |
| Witnesses or others present for test:            |                                            |
| Start time:                                      |                                            |
| End time:                                        | Fill out Table 3.10                        |
| <input checked="" type="checkbox"/> Elapsed Time | <input type="checkbox"/> Clock Time Method |
| <a href="#">Test Results Summary</a>             |                                            |

#### 3.8 Test Lab Condition

|                      | pre-test | post-test                  |        |
|----------------------|----------|----------------------------|--------|
| Ambient temperature: |          |                            | F      |
| Barometric pressure: |          |                            | in. Hg |
| Relative humidity:   |          |                            | %      |
| Mean Stove T         |          | F (±2 of the ambient temp) |        |
| Mean Stack T         |          | F (±2 of the ambient temp) |        |

### 3.9 Run Operation Data

| Load              | Scale reading at start of phase before loading (lb) | Calculated scale at start of phase after loading (lb) | Target scale range at end of phase (lb) | Scale reading at end of phase (lb) | Fuel Burnt - db (lb) |  | Fuel Burnt - wb (lb) |
|-------------------|-----------------------------------------------------|-------------------------------------------------------|-----------------------------------------|------------------------------------|----------------------|--|----------------------|
| L1 (Full High)    | 0.00                                                | 7.55                                                  | 2.26 – 2.50                             | 2.33                               | 3.96                 |  | 4.75                 |
| L2(A) (Full High) | 2.33                                                | 15.12                                                 | 8.68 – 9.60                             | 9.40                               | Not applicable       |  |                      |
| L2(B) (Full Low)  | 9.40                                                | Not applicable                                        | 3.51 – 3.88                             | 3.60                               | 9.29                 |  | 11.25                |
| L3 (Full Low)     | 3.60                                                | 12.98                                                 | 4.35 – 4.81                             | 4.42                               | 6.89                 |  | 8.38                 |
| L4 (Full Low)     | 4.42                                                | 27.01                                                 | 4.20 – 4.64                             | 4.42                               | 18.21                |  | 22.59                |

## NYSERDA 2015 NSPS Fuel Calculator

3.3 Run #3 Details - Test Date: 12/09/2024

### Detailed Fuel Information

Enter the number of fuel pieces first, then enter the weight and MC details in Tables 3.2 through 3.6 ↓↓

| 3.1 Fuel Load Data                   |                  |                                      |                    |                    |                             |
|--------------------------------------|------------------|--------------------------------------|--------------------|--------------------|-----------------------------|
|                                      | Target load (lb) | Actual weight (lb)                   | Target # of pieces | Actual # of pieces |                             |
| L1 - Kindling weight                 | 1.81 – 2.00      | 1.99                                 | 13                 | 13                 | <a href="#">Go to table</a> |
| L1 - Starter                         | 5.42 – 5.99      | 5.72                                 | 4                  | 4                  | <a href="#">Go to table</a> |
| L2 - Small pieces                    | 12.65 – 13.99    | 13.62                                | 4                  | 4                  | <a href="#">Go to table</a> |
| L3 - Large pieces                    | 9.04 – 9.99      | 9.82                                 | 2                  | 2                  | <a href="#">Go to table</a> |
| L4 - Small pieces                    | 7.23 – 7.99      | 7.48                                 | 3                  | 2                  | <a href="#">Go to table</a> |
| L4 - Large pieces                    | 14.46 – 15.98    | 15.38                                | 3                  | 3                  | <a href="#">Go to table</a> |
| Total fuel load:                     | 50.62 – 55.95    | 54.01                                | 29                 | 28                 |                             |
| Total fuel burnt wet-basis: 48.72 lb |                  | Total fuel burnt dry-basis: 39.76 lb |                    |                    |                             |

| 3.2 Load 1 - Kindling and starter fuel |             |                   |           |           |           |      |              |
|----------------------------------------|-------------|-------------------|-----------|-----------|-----------|------|--------------|
| <a href="#">set the # of logs</a>      | Weight (lb) | pin 1 (%)         | pin 2 (%) | pin 3 (%) | pin 4 (%) |      | Avg moisture |
| Kindling total:                        | 1.99        | Not applicable    |           |           |           |      |              |
| Piece 1:                               | 1.98        | 19.3              | 19.5      | 21.7      | 18.5      | 19.6 | 19.7         |
| Piece 2:                               | 1.24        | 22.6              | 18.2      | 19.7      | 19.8      | 21.9 | 20.4         |
| Piece 3:                               | 1.05        | 18.8              | 23.0      | 23.6      | 19.1      | 18.3 | 20.6         |
| Piece 4:                               | 1.22        | 26.3              | 22.2      | 18.5      | 18.9      | 19.2 | 21.0         |
| Piece 5:                               |             |                   |           |           |           |      |              |
| Piece 6:                               |             |                   |           |           |           |      |              |
| Piece 7:                               |             |                   |           |           |           |      |              |
| Piece 8:                               |             |                   |           |           |           |      |              |
| Piece 9:                               |             |                   |           |           |           |      |              |
| Piece 10:                              |             |                   |           |           |           |      |              |
| Starter total:                         | 5.49        | L1 Total: 7.48 lb |           |           |           |      | 20.33        |

✓ Total load weight is currently in the target range of 7.23–7.99 lb.  
Allowed weight of each starter piece: 1.00–2.42 lb.

### 3.3 Load 2 - Small pieces

| <a href="#">set the # of logs</a> | Weight (lb) | pin 1 (%) | pin 2 (%) | pin 3 (%) | pin 4 (%) |      | Avg moisture |
|-----------------------------------|-------------|-----------|-----------|-----------|-----------|------|--------------|
| Piece 1:                          | 3.63        | 18.4      | 25.9      | 23.5      | 19.6      | 22.4 | 22.0         |
| Piece 2:                          | 3.42        | 21.2      | 18.8      | 19.8      | 18.5      | 19.5 | 19.6         |
| Piece 3:                          | 3.38        | 19.0      | 19.6      | 20.7      | 18.8      | 19.7 | 19.6         |
| Piece 4:                          | 3.24        | 24.6      | 24.5      | 23.0      | 22.0      | 25.5 | 23.9         |
| Piece 5:                          |             |           |           |           |           |      |              |
| Piece 6:                          |             |           |           |           |           |      |              |
| Piece 7:                          |             |           |           |           |           |      |              |
| Piece 8:                          |             |           |           |           |           |      |              |
| Piece 9:                          |             |           |           |           |           |      |              |
| Piece 10:                         |             |           |           |           |           |      |              |
| Load total:                       | 13.67       |           |           |           |           |      | 21.23        |

✓ Total load weight is in the target range of 12.65–13.99 lb.

Allowed weight of each piece: 2.44–4.91 lb.

### 3.4 Load 3 - Large pieces

| <a href="#">set the # of logs</a> | Weight (lb) | pin 1 (%) | pin 2 (%) | pin 3 (%) | pin 4 (%) |      | Avg moisture |
|-----------------------------------|-------------|-----------|-----------|-----------|-----------|------|--------------|
| Piece 1:                          | 5.19        | 19.9      | 24.8      | 19.3      | 21.4      | 21.4 | 21.4         |
| Piece 2:                          | 4.54        | 26.8      | 25.7      | 20.3      | 21.2      | 23.1 | 23.4         |
| Piece 3:                          |             |           |           |           |           |      |              |
| Load total:                       | 9.73        |           |           |           |           |      | 22.32        |

✓ Load weight is in the target range of 9.04–9.99 lb.

Allowed weight of each piece: 3.81–5.71 lb.

### 3.5 Load 4 - Small pieces

| <a href="#">set the # of logs</a> | Weight (lb) | pin 1 (%) | pin 2 (%) | pin 3 (%) | pin 4 (%) |      | Avg moisture |
|-----------------------------------|-------------|-----------|-----------|-----------|-----------|------|--------------|
| Piece 1:                          | 4.54        | 26.4      | 23.6      | 26.3      | 22.4      | 22.1 | 24.2         |
| Piece 2:                          | 2.97        | 23.0      | 23.5      | 26.0      | 25.7      | 21.6 | 24.0         |
| Piece 3:                          |             |           |           |           |           |      |              |
| Piece 4:                          |             |           |           |           |           |      |              |
| Piece 5:                          |             |           |           |           |           |      |              |
| Piece 6:                          |             |           |           |           |           |      |              |
| Load total:                       | 7.51        |           |           |           |           |      | 24.08        |

✓ Load weight is in the target range of 7.23–7.99 lb.

Allowed weight of each piece: 2.44–4.91 lb.

### 3.6 Load 4 - Large pieces

| <a href="#">set the # of logs</a> | Weight (lb) | pin 1 (%) | pin 2 (%) | pin 3 (%) | pin 4 (%) |      | Avg moisture |
|-----------------------------------|-------------|-----------|-----------|-----------|-----------|------|--------------|
| Piece 1:                          | 5.34        | 27.0      | 24.3      | 23.4      | 26.0      | 23.0 | 24.7         |
| Piece 2:                          | 5.27        | 21.9      | 19.3      | 21.0      | 25.5      | 24.7 | 22.5         |
| Piece 3:                          | 5.11        | 26.1      | 22.5      | 25.7      | 23.4      | 20.2 | 23.6         |
| Piece 4:                          |             |           |           |           |           |      |              |
| Piece 5:                          |             |           |           |           |           |      |              |
| Piece 6:                          |             |           |           |           |           |      |              |
| Load total:                       | 15.72       |           |           |           |           |      | 23.61        |

✓ Load weight is in the target range of 14.46–15.98 lb.

Allowed weight of each piece: 4.96–8.69 lb.

|                                     |       |              |       |
|-------------------------------------|-------|--------------|-------|
| Total L4 load weight (small+large): | 23.23 | Average MC%: | 23.76 |
|-------------------------------------|-------|--------------|-------|

### Other Testing Information

#### 3.7 Run Information

|                                                  |                                            |
|--------------------------------------------------|--------------------------------------------|
| Run date:                                        | 12/9/2024                                  |
| Run number:                                      | 1                                          |
| Testing staff:                                   |                                            |
| Witnesses or others present for test:            |                                            |
| Start time:                                      |                                            |
| End time:                                        | Fill out Table 3.10                        |
| <input checked="" type="checkbox"/> Elapsed Time | <input type="checkbox"/> Clock Time Method |
| <a href="#">Test Results Summary</a>             |                                            |

#### 3.8 Test Lab Condition

|                      | pre-test | post-test                  |        |
|----------------------|----------|----------------------------|--------|
| Ambient temperature: |          |                            | F      |
| Barometric pressure: |          |                            | in. Hg |
| Relative humidity:   |          |                            | %      |
| Mean Stove T         |          | F (±2 of the ambient temp) |        |
| Mean Stack T         |          | F (±2 of the ambient temp) |        |

#### 3.9 Run Operation Data

| Load              | Scale reading at start of phase before loading (lb) | Calculated scale at start of phase after loading (lb) | Target scale range at end of phase (lb) | Scale reading at end of phase (lb) | Fuel Burnt - db (lb) |  | Fuel Burnt - wb (lb) |
|-------------------|-----------------------------------------------------|-------------------------------------------------------|-----------------------------------------|------------------------------------|----------------------|--|----------------------|
| L1 (Full High)    | 0.00                                                | 7.48                                                  | 2.26 – 2.50                             | 2.43                               | 3.79                 |  | 4.56                 |
| L2(A) (Full High) | 2.43                                                | 16.10                                                 | 8.78 – 9.70                             | 9.45                               | Not applicable       |  |                      |
| L2(B) (Full Low)  | 9.45                                                | Not applicable                                        | 3.60 – 3.98                             | 3.64                               | 10.07                |  | 12.20                |
| L3 (Full Low)     | 3.64                                                | 13.37                                                 | 4.39 – 4.85                             | 4.46                               | 7.13                 |  | 8.73                 |
| L4 (Full Low)     | 4.46                                                | 27.69                                                 | 4.24 – 4.68                             | 4.46                               | 18.77                |  | 23.23                |

## NYSERDA 2015 NSPS Fuel Calculator

3.1 Run #1 Details - Test Date: 12/09/2024

### Detailed Fuel Information

Enter the number of fuel pieces first, then enter the weight and MC details in Tables 3.2 through 3.6 ↓↓

| 3.1 Fuel Load Data                   |                  |                                      |                    |                    |                             |
|--------------------------------------|------------------|--------------------------------------|--------------------|--------------------|-----------------------------|
|                                      | Target load (lb) | Actual weight (lb)                   | Target # of pieces | Actual # of pieces |                             |
| L1 - Kindling weight                 | 1.81 – 2.00      | 1.99                                 | 13                 | 13                 | <a href="#">Go to table</a> |
| L1 - Starter                         | 5.42 – 5.99      | 5.72                                 | 4                  | 4                  | <a href="#">Go to table</a> |
| L2 - Small pieces                    | 12.65 – 13.99    | 13.62                                | 4                  | 4                  | <a href="#">Go to table</a> |
| L3 - Large pieces                    | 9.04 – 9.99      | 9.82                                 | 2                  | 2                  | <a href="#">Go to table</a> |
| L4 - Small pieces                    | 7.23 – 7.99      | 7.48                                 | 3                  | 2                  | <a href="#">Go to table</a> |
| L4 - Large pieces                    | 14.46 – 15.98    | 15.38                                | 3                  | 3                  | <a href="#">Go to table</a> |
| Total fuel load:                     | 50.62 – 55.95    | 54.01                                | 29                 | 28                 |                             |
| Total fuel burnt wet-basis: 48.95 lb |                  | Total fuel burnt dry-basis: 40.12 lb |                    |                    |                             |

| 3.2 Load 1 - Kindling and starter fuel |             |                   |           |           |           |      |              |
|----------------------------------------|-------------|-------------------|-----------|-----------|-----------|------|--------------|
| <a href="#">set the # of logs</a>      | Weight (lb) | pin 1 (%)         | pin 2 (%) | pin 3 (%) | pin 4 (%) |      | Avg moisture |
| Kindling total:                        | 1.99        | Not applicable    |           |           |           |      |              |
| Piece 1:                               | 1.44        | 23.9              | 18.6      | 20.8      | 20.2      | 21.5 | 21.0         |
| Piece 2:                               | 1.18        | 22.5              | 19.0      | 19.5      | 18.1      | 21.7 | 20.2         |
| Piece 3:                               | 1.17        | 24.5              | 18.5      | 19.0      | 18.1      | 21.9 | 20.4         |
| Piece 4:                               | 2.00        | 19.3              | 22.7      | 18.4      | 19.6      | 19.1 | 19.8         |
| Piece 5:                               |             |                   |           |           |           |      |              |
| Piece 6:                               |             |                   |           |           |           |      |              |
| Piece 7:                               |             |                   |           |           |           |      |              |
| Piece 8:                               |             |                   |           |           |           |      |              |
| Piece 9:                               |             |                   |           |           |           |      |              |
| Piece 10:                              |             |                   |           |           |           |      |              |
| Starter total:                         | 5.79        | L1 Total: 7.78 lb |           |           |           |      | 20.30        |

✓ Total load weight is currently in the target range of 7.23–7.99 lb.  
Allowed weight of each starter piece: 1.00–2.42 lb.

### 3.3 Load 2 - Small pieces

| <a href="#">set the # of logs</a> | Weight (lb) | pin 1 (%) | pin 2 (%) | pin 3 (%) | pin 4 (%) |      | Avg moisture |
|-----------------------------------|-------------|-----------|-----------|-----------|-----------|------|--------------|
| Piece 1:                          | 2.72        | 18.2      | 21.8      | 20.5      | 19.5      | 18.2 | 19.6         |
| Piece 2:                          | 2.48        | 21.2      | 23.7      | 18.9      | 26.1      | 21.8 | 22.3         |
| Piece 3:                          | 4.72        | 23.0      | 20.4      | 18.6      | 20.8      | 19.5 | 20.5         |
| Piece 4:                          | 3.77        | 24.0      | 20.1      | 23.0      | 23.3      | 18.1 | 21.7         |
| Piece 5:                          |             |           |           |           |           |      |              |
| Piece 6:                          |             |           |           |           |           |      |              |
| Piece 7:                          |             |           |           |           |           |      |              |
| Piece 8:                          |             |           |           |           |           |      |              |
| Piece 9:                          |             |           |           |           |           |      |              |
| Piece 10:                         |             |           |           |           |           |      |              |
| Load total:                       | 13.69       |           |           |           |           |      | 20.98        |

✓ Total load weight is in the target range of 12.65–13.99 lb.

Allowed weight of each piece: 2.44–4.91 lb.

### 3.4 Load 3 - Large pieces

| <a href="#">set the # of logs</a> | Weight (lb) | pin 1 (%) | pin 2 (%) | pin 3 (%) | pin 4 (%) |      | Avg moisture |
|-----------------------------------|-------------|-----------|-----------|-----------|-----------|------|--------------|
| Piece 1:                          | 5.32        | 20.2      | 21.2      | 26.3      | 18.7      | 21.2 | 21.5         |
| Piece 2:                          | 4.66        | 25.0      | 19.1      | 18.3      | 18.7      | 23.7 | 21.0         |
| Piece 3:                          |             |           |           |           |           |      |              |
| Load total:                       | 9.98        |           |           |           |           |      | 21.26        |

✓ Load weight is in the target range of 9.04–9.99 lb.

Allowed weight of each piece: 3.81–5.71 lb.

### 3.5 Load 4 - Small pieces

| <a href="#">set the # of logs</a> | Weight (lb) | pin 1 (%) | pin 2 (%) | pin 3 (%) | pin 4 (%) |      | Avg moisture |
|-----------------------------------|-------------|-----------|-----------|-----------|-----------|------|--------------|
| Piece 1:                          | 2.83        | 25.7      | 21.8      | 26.2      | 19.9      | 23.1 | 23.3         |
| Piece 2:                          | 4.41        | 18.1      | 26.8      | 25.7      | 19.5      | 21.3 | 22.3         |
| Piece 3:                          |             |           |           |           |           |      |              |
| Piece 4:                          |             |           |           |           |           |      |              |
| Piece 5:                          |             |           |           |           |           |      |              |
| Piece 6:                          |             |           |           |           |           |      |              |
| Load total:                       | 7.24        |           |           |           |           |      | 22.69        |

✓ Load weight is in the target range of 7.23–7.99 lb.

Allowed weight of each piece: 2.44–4.91 lb.

### 3.6 Load 4 - Large pieces

| <a href="#">set the # of logs</a> | Weight (lb) | pin 1 (%) | pin 2 (%) | pin 3 (%) | pin 4 (%) |      | Avg moisture |
|-----------------------------------|-------------|-----------|-----------|-----------|-----------|------|--------------|
| Piece 1:                          | 5.22        | 18.1      | 23.0      | 25.9      | 24.8      | 22.1 | 22.8         |
| Piece 2:                          | 4.97        | 25.8      | 19.3      | 22.4      | 21.2      | 24.7 | 22.7         |
| Piece 3:                          | 5.63        | 25.4      | 23.4      | 26.7      | 23.0      | 24.9 | 24.7         |
| Piece 4:                          |             |           |           |           |           |      |              |
| Piece 5:                          |             |           |           |           |           |      |              |
| Piece 6:                          |             |           |           |           |           |      |              |
| Load total:                       | 15.82       |           |           |           |           |      | 23.42        |

✓ Load weight is in the target range of 14.46–15.98 lb.

Allowed weight of each piece: 4.96–8.69 lb.

|                                     |       |              |       |
|-------------------------------------|-------|--------------|-------|
| Total L4 load weight (small+large): | 23.06 | Average MC%: | 23.20 |
|-------------------------------------|-------|--------------|-------|

### Other Testing Information

#### 3.7 Run Information

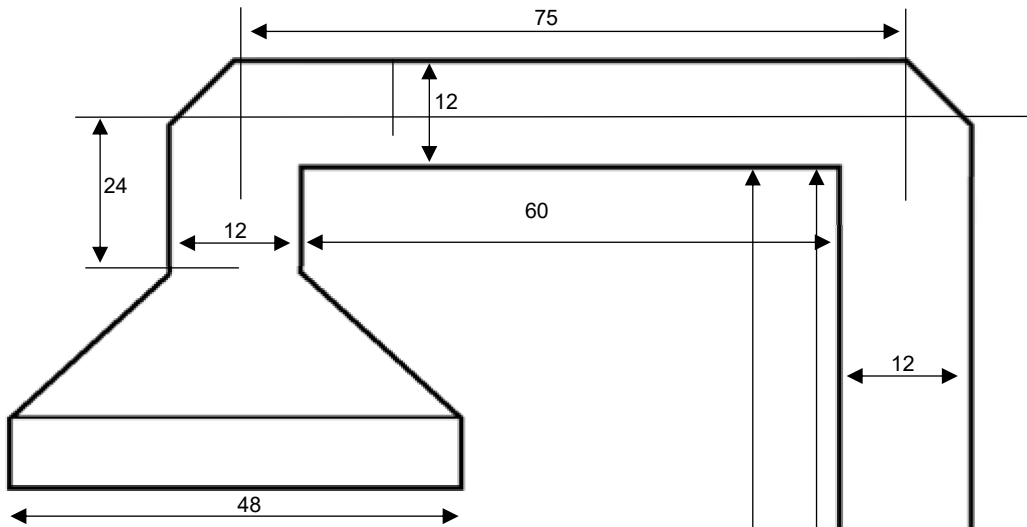
|                                       |                                            |
|---------------------------------------|--------------------------------------------|
| Run date:                             | 12/9/2024                                  |
| Run number:                           | 1                                          |
| Testing staff:                        |                                            |
| Witnesses or others present for test: |                                            |
| Start time:                           |                                            |
| End time:                             | Fill out Table 3.10                        |
| <input type="checkbox"/> Elapsed Time | <input type="checkbox"/> Clock Time Method |
| <a href="#">Test Results Summary</a>  |                                            |

#### 3.8 Test Lab Condition

|                      | pre-test | post-test                  |        |
|----------------------|----------|----------------------------|--------|
| Ambient temperature: |          |                            | F      |
| Barometric pressure: |          |                            | in. Hg |
| Relative humidity:   |          |                            | %      |
| Mean Stove T         |          | F (±2 of the ambient temp) |        |
| Mean Stack T         |          | F (±2 of the ambient temp) |        |

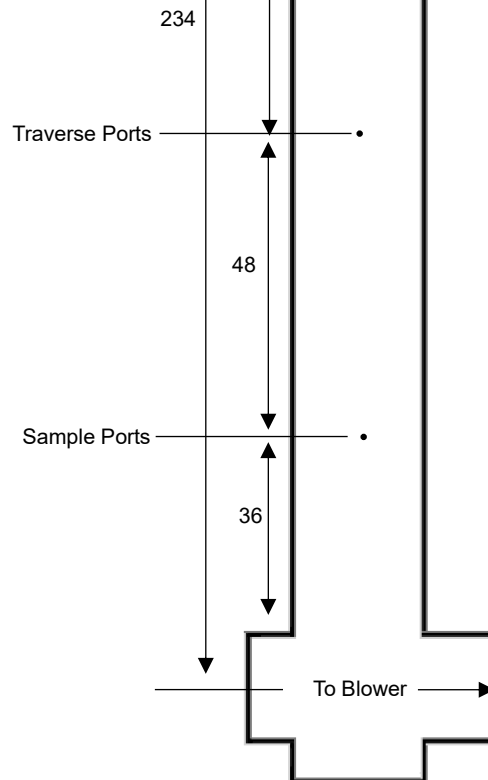
#### 3.9 Run Operation Data

| Load              | Scale reading at start of phase before loading (lb) | Calculated scale at start of phase after loading (lb) | Target scale range at end of phase (lb) | Scale reading at end of phase (lb) | Fuel Burnt - db (lb) |  | Fuel Burnt - wb (lb) |
|-------------------|-----------------------------------------------------|-------------------------------------------------------|-----------------------------------------|------------------------------------|----------------------|--|----------------------|
| L1 (Full High)    | 0.00                                                | 7.78                                                  | 2.26 – 2.50                             | 2.49                               | 3.98                 |  | 4.78                 |
| L2(A) (Full High) | 2.49                                                | 16.18                                                 | 8.84 – 9.77                             | 9.71                               | Not applicable       |  |                      |
| L2(B) (Full Low)  | 9.71                                                | Not applicable                                        | 3.66 – 4.04                             | 3.74                               | 10.07                |  | 12.18                |
| L3 (Full Low)     | 3.74                                                | 13.72                                                 | 4.49 – 4.96                             | 4.61                               | 7.36                 |  | 8.93                 |
| L4 (Full Low)     | 4.61                                                | 27.67                                                 | 4.38 – 4.84                             | 4.61                               | 18.72                |  | 23.06                |



## Booth #2 Tunnel Schematic

*All dimensions are in inches*





# ASTM E2515 - Glass Fiber Filters

|        |          |          |          |          |         |         |     |
|--------|----------|----------|----------|----------|---------|---------|-----|
| Date:  | 11/6/24  | 11/7/24  | -        |          |         |         |     |
| Time:  | 9:20     | 0745     | -        |          |         |         |     |
|        | Weight 1 | Weight 2 | Weight 3 | Weight 4 | Initial | Project | Run |
| G01157 | 229.0    | 229.1    | -        | -        | A       | 24-333  | #5  |
| G01158 | 228.9    | 228.7    | -        | -        | A       | ↓       | ↓   |
| G01159 | 228.3    | 228.2    | -        | -        | A       | ↓       | ↓   |
| G01160 | 228.7    | 228.8    | -        | -        | A       | ↓       | ↓   |
| G01161 | 227.7    | 227.6    | -        | -        | A       | 24-376  | #1  |
| G01162 | 228.0    | 227.8    | -        | -        | A       | ↓       | ↓   |
| G01163 | 227.7    | 227.6    | -        | -        | A       | ↓       | ↓   |
| G01164 | 228.6    | 228.6    | -        | -        | A       | ↓       | ↓   |
| G01165 | 228.2    | 228.1    | -        | -        | A       | 24-303  | #1  |
| G01166 | 227.6    | 227.7    | -        | -        | A       | ↓       | ↓   |
| G01167 | 228.6    | 228.4    | -        | -        | A       | ↓       | ↓   |
| G01168 | 227.9    | 228.0    | -        | -        | A       | ↓       | #2  |
| G01169 | 228.1    | 228.0    | -        | -        | A       | ↓       | ↓   |
| G01170 | 228.5    | 228.4    | -        | -        | A       | ↓       | ↓   |
| G01171 | 228.4    | 228.6    | -        | -        | A       | ↓       | #3  |
| G01172 | 227.8    | 227.9    | -        | -        | A       | ↓       | ↓   |

|        |          |             |          |          |         |         |     |
|--------|----------|-------------|----------|----------|---------|---------|-----|
| Date:  | 11/15/24 | 12/9/24     |          |          |         |         |     |
| Time:  | 2:00 pm  | 2:50 2:00.0 |          |          |         |         |     |
|        | Weight 1 | Weight 2    | Weight 3 | Weight 4 | Initial | Project | Run |
| G01173 | 227.4    | 227.3       | -        | -        |         | 24-303  | #3  |
| G01174 | 228.9    | 228.9       | -        | -        |         | ↓       | #4  |
| G01175 | 226.6    | 226.5       | -        | -        |         | ↓       | ↓   |
| G01176 | 228.5    | 228.4       | -        | -        |         | ↓       | ↓   |
| G01177 | 229.5    | 229.6       | -        | -        |         |         |     |
| G01178 | 229.0    | 229.0       | -        | -        |         |         |     |
| G01179 | 227.7    | 227.7       | -        | -        |         |         |     |
| G01180 | 228.4    | 228.5       | -        | -        |         |         |     |
| G01181 | 227.9    | 227.9       | -        | -        |         |         |     |
| G01182 | 228.1    | 228.1       | -        | -        |         |         |     |
| G01183 | 228.5    | 228.5       | -        | -        |         |         |     |
| G01184 | 228.5    | 228.4       | -        | -        |         |         |     |
| G01185 | 228.8    | 228.7       | -        | -        |         |         |     |
| G01186 | 228.6    | 228.6       | -        | -        |         |         |     |
| G01187 | 228.3    | 228.2       | -        | -        |         |         |     |
| G01188 | 228.2    | 228.2       | -        | -        |         |         |     |



# ASTM E2515 - O-Ring Samples 1-10

| Date: | 8/19/24  | 8/20/24  |          |          |         |         |     |
|-------|----------|----------|----------|----------|---------|---------|-----|
| Time: | 11:30    | 10:30    |          |          |         |         |     |
|       | Weight 1 | Weight 2 | Weight 3 | Weight 4 | Initial | Project | Run |
| 1A    | 3568.5   | 3568.7   | -        | -        | A       | 24-321  | #2  |
| 1B    | 3557.0   | 3556.4   | -        | -        | A       |         |     |
| 1C    | 4167.9   | 4167.9   | -        | -        | A       |         |     |
| 2A    | 3554.2   | 3554.1   | -        | -        | A       | 24-333  | #1  |
| 2B    | 3573.4   | 3573.3   | -        | -        | A       |         |     |
| 2C    | 3392.0   | 3392.0   | -        | -        | A       |         |     |
| 3A    | 3580.4   | 3580.3   | -        | -        | A       | 24-333  | #2  |
| 3B    | 3569.1   | 3568.9   | -        | -        | A       |         |     |
| 3C    | 3623.2   | 3623.3   | -        | -        | A       |         |     |
| 4A    | 3377.8   | 3377.6   | -        | -        | A       | 24-333  | #3  |
| 4B    | 3579.9   | 35780.1  | -        | -        | A       |         |     |
| 4C    | 3373.5   | 3373.4   | -        | -        | A       |         |     |
| 5A    | 3536.4   | 3536.6   | -        | -        | A       | 24-337  | #4  |
| 5B    | 3531.9   | 3531.8   | -        | -        | 1       |         |     |
| 5C    | 3377.2   | 3377.0   | -        | -        | 1       |         |     |

| Date: | 10/30/24 | 11/1/24  |          |          |         |         |     |
|-------|----------|----------|----------|----------|---------|---------|-----|
| Time: | 3:00     | 10:40 pm |          |          |         |         |     |
|       | Weight 1 | Weight 2 | Weight 3 | Weight 4 | Initial | Project | Run |
| 6A    | 3396.5   | 3396.7   | -        | -        | A       | 24-333  | #5  |
| 6B    | 3613.5   | 3613.6   | -        | -        | 1       |         |     |
| 6C    | 3401.6   | 3401.8   | -        | -        | 1       |         |     |
| 7A    | 3571.2   | 3571.3   | -        | -        | A       | 24-376  | #1  |
| 7B    | 3522.4   | 3522.6   | -        | -        | 1       |         |     |
| 7C    | 3406.8   | 3407.0   | -        | -        | 1       |         |     |
| 8A    | 3551.9   | 3552.1   | -        | -        | 1       | 24-303  | #1  |
| 8B    | 3358.1   | 3358.3   | -        | -        | 1       |         |     |
| 8C    | 3586.1   | 3586.3   | -        | -        | A       |         |     |
| 9A    | 3580.0   | 3580.2   | -        | -        | 1       | 24-303  | #3  |
| 9B    | 3523.3   | 3523.2   | -        | -        | 1       |         |     |
| 9C    | 3430.8   | 3430.6   | -        | -        | 1       |         |     |
| 10A   | 3361.4   | 3361.5   | -        | -        | 1       | 24-303  | #4  |
| 10B   | 3570.4   | 3570.6   | -        | -        | 1       |         |     |
| 10C   | 3366.6   | 3366.8   | -        | -        | 1       |         |     |



# ASTM E2515 - Probe Samples 1-10

| Date: | 8/19/24  | 8/20/24  | 8/21/24  |          |         |         |     |
|-------|----------|----------|----------|----------|---------|---------|-----|
| Time: | 13:30    | 10:15    | 09:00    |          |         |         |     |
|       | Weight 1 | Weight 2 | Weight 3 | Weight 4 | Initial | Project | Run |
| 1A    | 115628.3 | 115628.5 | -        | -        | A       | 24-321  | #2  |
| 1B    | 115903.4 | 115903.6 | -        | -        | A       |         |     |
| 1C    | 116433.9 | 116434.4 | 116434.3 | -        | A       |         |     |
| 2A    | 116058.9 | 116058.9 | -        | -        | A       | 24-333  | #1  |
| 2B    | 116175.2 | 116175.1 | -        | -        | A       |         |     |
| 2C    | 116429.9 | 116430.0 | -        | -        | A       |         |     |
| 3A    | 115881.7 | 115882.0 | 115881.9 | -        | A       | 24-333  | #2  |
| 3B    | 116121.8 | 116122.0 | -        | -        | A       |         |     |
| 3C    | 116619.4 | 116619.2 | -        | -        | A       |         |     |
| 4A    | 116024.7 | 116024.8 | -        | -        | A       | 24-333  | #3  |
| 4B    | 116183.6 | 116183.5 | -        | -        | A       |         |     |
| 4C    | 116999.0 | 116999.1 | -        | -        | A       |         |     |
| 5A    | 116758.7 | 116758.8 | -        | -        | A       | 24-333  | #4  |
| 5B    | 116876.9 | 116877.1 | -        | -        | A       |         |     |
| 5C    | 115856.4 | 115856.5 | -        | -        | A       |         |     |

| Date: | 10/30/24 | 11/1/24  | 11/5/24  | 11/6/24  |         |         |     |
|-------|----------|----------|----------|----------|---------|---------|-----|
| Time: | 3:00 pm  | 11:22 am | 4:30 pm  | 0800     |         |         |     |
|       | Weight 1 | Weight 2 | Weight 3 | Weight 4 | Initial | Project | Run |
| 6A    | 116383.8 | 116384.0 | -        | -        | A       | 24-333  | #5  |
| 6B    | 115955.6 | 115955.5 | -        | -        | A       |         |     |
| 6C    | 115129.1 | 11129.2  | -        | -        | A       |         |     |
| 7A    | 116559.5 | 116559.6 | -        | -        | A       | 24-376  | #1  |
| 7B    | 117129.7 | 117129.8 | -        | -        | A       |         |     |
| 7C    | 116551.8 | 116552.0 | -        | -        | A       |         |     |
| 8A    | 116666.9 | 116634.9 | 116634.2 | 116634.4 | A       | 24-303  | #1  |
| 8B    | 116634.3 | 116666.7 | -        | -        | A       |         |     |
| 8C    | 116663.6 | 116663.6 | -        | -        | A       |         |     |
| 9A    | 116531.5 | 116532.0 | 116531.0 | 116531.1 | A       | 24-303  | #3  |
| 9B    | 117738.7 | 117738.7 | -        | -        | A       |         |     |
| 9C    | 116603.7 | 116603.7 | -        | -        | A       |         |     |
| 10A   | 116647.2 | 116647.4 | -        | -        | A       | 24-703  | #4  |
| 10B   | 117754.6 | 117754.8 | -        | -        | A       |         |     |
| 10C   | 116729.4 | 116729.3 | -        | -        | A       |         |     |





Intertek

December/Décembre 2024

Control Number (SA) : 4002461

REFER TO INTERTEK'S DIRECTORY OF BUILDING PRODUCTS FOR DETAILED INFORMATION  
SE RÉFÉRER AU RÉPERTOIRE DES PRODUITS HOMOLOGUÉS D'INTERTEK POUR PLUS D'INFORMATION  
STANDARDS / NORMES D'ESSAI:

Certified to/Certifié selon ULC S627

Certified to/Certifié selon CSA B415.1

Certified to/Certifié selon UL 1482

Certified to/Certifié selon UL 737

Certified to/Certifié selon ASTM E2515-11 (R2017)

LISTED SOLID FUEL BURNING  
APPLIANCE

POÊLE À COMBUSTIBLE SOLIDE  
HOMOLOGUÉE

MODEL / MODÈLE :

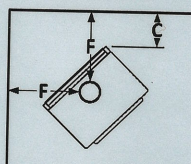
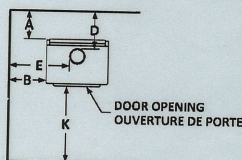
CHAMBLY

Serial Number

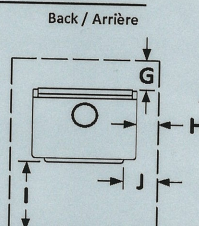
No. de Série

999

### Clearances to combustibles / Dégagements aux combustibles



MOBILE HOME  
MAISONS MOBILES  
Double wall connector  
Tuyau à paroi double



Back / Arrière

CANADA

U.S.A.

Single wall connector  
Tuyau à paroi simple

Double wall connector  
Tuyau à paroi double

Single wall connector  
Tuyau à paroi simple

Double wall connector  
Tuyau à paroi double

A: 12 in./po. (305 mm)  
B: 14 in./po. (356 mm)  
C: 4 in./po. (102 mm)  
D: 18 in./po. (457 mm)  
E: 28.25 in./po. (718 mm)  
F: 19.25 in./po. (489 mm)  
Floor-ceiling/plancher-plafond: 84 in./po. (213cm)

A: 6 in./po. (152 mm)  
B: 14 in./po. (356 mm)  
C: 4 in./po. (102 mm)  
D: 12 in./po. (305 mm)  
E: 28.25 in./po. (718 mm)  
F: 19.25 in./po. (489 mm)

Protection de plancher/Floor protection

CANADA

U.S.A.

G: 8 in./po. (203 mm)  
H: 8 in./po. (203 mm)  
I: 18 in./po. (457 mm)  
K: 48 in./po. (1219 mm)

L: 16 in./po. (406 mm)  
J: 8 in./po. (203 mm)  
K: 36 in./po. (914 mm)

\* See owner's manual for other clearances with lowered ceiling/  
voir manuel d'installation pour autres dégagements avec plafond abaissé

### PREVENT HOUSE FIRES

### PRÉVENEZ LES INCENDIES

- Install and use only in accordance with the manufacturer's installation and operating instructions.
- Contact local building or fire officials about restrictions and installation inspection in your area.
- Use listed 203 mm / 8 in. diameter single or double wall connectors with prefabricated chimneys approved UL 103 HT (US) and ULC S629 (CAN) suitable for solid fuels or lined masonry chimneys.
- See local building code and manufacturer's instructions for precautions required for passing a chimney through a combustible wall or ceiling.
- This stove must be installed as a freestanding heater with the clearances listed in the manufacturer's installation instructions. It is strictly forbidden to install this stove in a factory-built fireplace.
- Do not pass connector through combustible wall or ceiling.
- Do not connect this unit to a chimney serving another appliance.
- For use with solid fuel only. Do not use other fuels.
- Operate only with door closed or door open with firescreen installed. Open door or remove firescreen to feed the stove only.
- Do not obstruct the space underneath the stove.
- Do not use grate or elevate fire. Build fire directly on hearth.
- Do not overfire. If heater or chimney connector glows, you are overfiring.
- Inspect and clean chimney frequently. Under certain condition of use, creosote buildup may occur rapidly.
- Replace glass with ceramic type only.
- Install unit on a non-combustible material extending as shown above on this label.
- Combustion air openings shall not be obstructed.
- This wood heater needs periodic inspection and repair for proper operation. Consult the owner's manual for further information. It is against US federal regulations to operate this wood heater in a manner inconsistent with the operating instructions in the owner's manual.

- Installer et utiliser conformément au manuel d'utilisation du fabricant.
- Contactez les autorités de votre localité ayant juridiction concernant les restrictions et inspections d'installation.
- Utiliser des tuyaux d'évacuation à parois simple ou double homologués d'un diamètre de 8 po. (203 mm) avec une cheminée préfabriquée approuvée UL 103 HT (US) et ULC S629 (CAN) pour utilisation au bois ou une cheminée de maçonnerie gainée.
- Voir les codes locaux et le manuel d'installation du fabricant pour le passage de la cheminée à travers un mur ou un plafond combustible.
- Ce poêle doit être installé comme appareil de chauffage autonome avec les dégagements indiqués dans les instructions d'installation du fabricant. Il est strictement défendu d'installer ce poêle dans un foyer préfabriqué.
- Ne pas traverser un plafond ou un mur combustible avec un tuyau d'évacuation.
- Ne pas raccorder cet appareil à une cheminée desservant un autre appareil.
- Pour l'usage avec du combustible solide seulement. Ne pas utiliser d'autres combustibles.
- Garder la porte fermée ou le pare-étincelle en place en tout temps. Ouvrir la porte ou retirer le pare-étincelle que lors du chargement.
- Ne rien entreposer sous l'appareil.
- Ne pas utiliser de grilles ou de chenets pour surélever le feu. Préparer le feu directement sur l'âtre.
- Ne pas surchauffer. Si l'appareil ou le tuyau rougit, il y a surchauffe.
- Inspecter et nettoyer la cheminée fréquemment. Sous certaines conditions, l'accumulation de crésote peut être rapide.
- Remplacer la vitre seulement avec un verre de céramique.
- Installer l'appareil sur une plaque non combustible tel qu'indiqué sur l'étiquette.
- Les entrées d'air servant à la combustion ne doivent pas être obstruées.
- Cet appareil de chauffage requiert des inspections et réparations périodiques. Consulter le manuel de l'utilisateur pour plus d'information. Opérer cet appareil de chauffage de façon inconsistente par rapport au manuel de l'utilisateur consiste une violation de la loi fédérale (USA).

Blower: #44207 (115V, 1.4A, 60Hz) - Forced air kit: #44193 (115V, 1.5A, 60Hz) Ventilateur: #44207 (115V, 1.4A, 60Hz) - Ensemble d'Air forcé: #44193 (115V, 1.5A, 60Hz)

U.S. ENVIRONMENTAL PROTECTION AGENCY Certified to comply with 2020 particulate emission standards using cordwood.

AGENCE DE PROTECTION DE L'ENVIRONNEMENT DES É.-U. Conforme aux normes d'émission de particules de 2020 avec bûche de bois.

Weighted average emission rate: / Moyenne pondérée des émissions 1.8 g/h

Tested and certified in compliance with CFR 40 part 60, subpart AAA, section 60.534(a)(1)(ii)

WARNING: This product can expose you to carbon monoxide, which is known to the State of California to cause cancer, birth defects or other reproductive harm (For more information go to [www.p65warnings.ca.gov](http://www.p65warnings.ca.gov))



## CAUTION

- HOT WHILE IN OPERATION.
- DO NOT TOUCH. KEEP CHILDREN, CLOTHING AND FURNITURE AWAY.
- CONTACT MAY CAUSE SKIN BURNS. SEE NAME-PLATE AND INSTRUCTIONS.



Fabricant de poêles international  
Stove Builder International

## ATTENTION

- CHAUD EN FONCTIONNEMENT.
- NE PAS TOUCHER. GARDER LES ENFANTS, LES VÊTEMENTS ET LES MEUBLES ÉLOIGNÉS.
- UN CONTACT AVEC LA PEAU PEUT OCCASIONNER DES BRÛLURES. VOIR LES INSTRUCTIONS.

Made in St-Augustin-de-Desmaures, (Qc), Canada  
20/12/2024 (# Test)

Fabrique à St-Augustin-de-Desmaures, (Qc), Canada  
20/12/2024 (# Test)





REFER TO INTERTEK'S DIRECTORY OF BUILDING PRODUCTS FOR DETAILED INFORMATION  
SE RÉFÉRER AU RÉPERTOIRE DES PRODUITS HOMOLOGUÉS D'INTERTEK POUR PLUS  
D'INFORMATION

STANDARDS / NORMES D'ESSAI:

Certified to / Certifié selon CSA B415.1-10  
Certified to / Certifié selon ASTM E2515-11 (R2017)

MODEL / MODÈLE:  
ELEVATE

LISTED FACTORY BUILT FIREPLACE  
FOYER PRÉFABRIQUÉ HOMOLOGUÉ

FOR USE WITH / POUR UTILISATION AVEC  
WOOD ONLY / BOIS SEULEMENT  
CONTACT LOCAL BUILDING OFFICIALS ABOUT  
THE RESTRICTIONS AND INSTALLATION  
INSPECTION IN YOUR AREA.  
COMMUNIQUER AVEC LES AUTORITÉS  
LOCALES DU BÂTIMENT ET DE LA PRÉVENTION  
DES INCENDIES AU SUJET DES RESTRICTIONS  
D'INSTALLATION DANS VOTRE SECTEUR.

Control Number (LG) : 5007735  
(December / Décembre 2024)

Serial Number  
No. de Série 999

INSTALL AND USE ONLY IN ACCORDANCE WITH SBI STOVE BUILDER INTERNATIONAL INSTALLATION AND OPERATION INSTRUCTIONS.  
L'INSTALLATION ET L'OPERATION DOIT SE FAIRE SELON LES INSTRUCTIONS D'INSTALLATION ET D'UTILISATION DE SBI FABRICANT DE POÊLES INTERNATIONAL.

#### PREVENT HOUSE FIRES

- Use solid fuel only.
  - Combustion air openings shall not be obstructed.
  - When doors are used, operate fireplace with doors fully open with fire screen or fully closed only. For safety, keep screen doors or glass doors tightly closed.
  - Do not overfire unit.
  - Replace with only ceramic glass 4mm thick.
  - Use only with listed factory-built chimney as per manufacturer's instructions.
  - A non-combustible hearth extension must be installed in front of unit extending in (mm) in front and in (mm) on each side of door opening.
  - Hearth extension must have a minimum R factor of 1.00. No minimum R factor is required if fireplace is covered by at least 4 in. (102 mm).
  - Do not use a fireplace insert or other products not specified for use with this product.
  - Areas of the fireplace incorporating warm or cold air ducts shall be enclosed in accordance with manufacturer's instructions.
- WARNING: This fireplace has not been tested with an unvented gas log set. To reduce risk of fire or injury, do not install an unvented gas log set into fireplace. This wood heater needs periodic inspection and repair for proper operation. Consult the owner's manual for further information. It is against US federal regulations to operate this wood heater in a manner inconsistent with the operating instructions in the owner's manual.

Suitable for transportable building installation in CANADA only.

#### PRÉVEZ LES INCENDIES

- Utiliser uniquement du bois de chauffage.
- Les entrées d'air servant à la combustion ne doivent pas être obstruées.
- Quand des portes sont utilisées, opérer le foyer avec les portes complètement ouvertes avec pare-étincelles ou complètement fermées seulement. Pour votre sécurité, maintenir les portes de grillages ou de vitres fermées de façon étanche.
- Ne pas surchauffer le foyer.
- Remplacer la vitre seulement avec un verre céramique de 4mm d'épaisseur.
- Pour utilisation seulement avec une cheminée préfabriquée homologuée tel que spécifié selon les instructions du fabricant.
- Une protection de plancher incombustible doit être installée à l'avant du foyer excédant de po (mm) à l'avant et po (mm) de chaque côté de l'ouverture de porte.
- La protection à l'avant du foyer doit avoir un facteur R minimum de 1.00. Aucun facteur R n'est requis si le foyer est surélevé d'au moins 4 po. (102 mm).
- Ne pas utiliser de foyer encastrable ou autres produits qui ne sont pas conçus précisément pour être utilisés avec le présent foyer.
- ATTENTION: Ce foyer n'a pas été mis à l'essai avec un ensemble de bûches décoratives à gaz non ventilé. Pour réduire les risques de feu ou de blessures, ne pas installer d'ensemble de bûches décoratives à gaz non ventilé dans ce foyer.
- Cet appareil requiert des inspections et réparations périodiques. Consulter le manuel de l'utilisateur pour plus d'information. Opérer cet appareil de chauffage de façon inconsistente par rapport au manuel de l'utilisateur consiste une violation de la loi fédérale (USA).

Convient aux bâtiments transportables au CANADA seulement.

#### MINIMUM CLEARANCES TO COMBUSTIBLE MATERIALS / DÉGAGEMENTS MINIMUM AUX MATÉRIAUX COMBUSTIBLES

Sidewall / Mur latéral [1] :

in (mm)

Side facing / Parement latéral [2] : in (mm)

Shelf (from floor) /

Tablette (du sol) [2][3][4] :

in (mm)

Ceiling (from floor) /

Plafond (à partir du plancher) [3] : in. (mm)

[1] From door opening. / À partir de l'ouverture de la porte.

[2] Subject to a maximum protrusion (consult owner's manual). / Sujet à une saillie maximale (consultez le manuel d'instructions).

[3] If the fireplace is elevated, the clearances to the combustible shelf and ceiling must be increased by an equivalent value. / Si le foyer est surélevé, les dégagements à la tablette combustible et au plafond doivent être augmentés d'une valeur équivalente.

[4] Consult owner's manual for material to be used. / Consulter le manuel d'installation pour le matériel à utiliser.

Forced air kit / Ensemble d'Air forcé: (115V, 2.4A, 60Hz) # 44121 - Blower / Ventilateur: (115V, 1.4A, 60Hz) # 44207

#### PROCEDURE TO FOLLOW IN CASE OF RUN-AWAY FIRE

- 1) Keep doors closed
- 2) Close all combustion air controls

#### EN CAS D'INCENDIE DE CHEMINÉE

- 1) Maintenir les portes fermées
- 2) Fermer tous les dispositifs d'admission d'air

U.S. ENVIRONMENTAL PROTECTION AGENCY Certified to comply with 2020 particulate emission standards using cord wood.  
AGENCE DE PROTECTION DE L'ENVIRONNEMENT DES É.U. (EPA). Conforme aux normes d'émission de particules de 2020 avec bûche de bois.  
Weighted average emission rate / Moyenne pondérée des émissions: 1.8 g/h

Tested and certified in compliance with CFR 40 part 60, subpart AAA, section 60.534(a)(1)(ii).

WARNING: This product can expose you to carbon monoxide, which is known to the State of California to cause cancer, birth defects or other reproductive harm.  
(For more information go to [www.p65warnings.ca.gov](http://www.p65warnings.ca.gov))

## CAUTION

- HOT WHILE IN OPERATION.
- DO NOT TOUCH. KEEP CHILDREN, CLOTHING AND FURNITURE AWAY.
- CONTACT MAY CAUSE SKIN BURNS. SEE NAME-PLATE AND INSTRUCTIONS.
- THIS FIREPLACE NEEDS AIR FOR GOOD OPERATION.
- WHEN A FIRE IS BURNING IN THE FIREPLACE, FRESH AIR MUST BE SUPPLIED TO THE ROOM WHERE THE FIREPLACE IS LOCATED, FAILURE TO PROVIDE THIS MAY STARVE OTHER FUEL BURNING APPLIANCE FROM AN ADEQUATE AIR SUPPLY.

## ATTENTION

- CHAUD EN FONCTIONNEMENT.
- NE PAS TOUCHER. GARDER LES ENFANTS, LES VÊTEMENTS ET LES MEUBLES ÉLOIGNÉS.
- UN CONTACT AVEC LA PEAU PEUT OCCASIONNER DES BRÛLURES. VOIR LES INSTRUCTIONS.
- CE FOYER A BESOIN D'AIR POUR SON BON FONCTIONNEMENT.
- LORSQUE LE FOYER BRÛLE, UN APPORT D'AIR SUPPLÉMENTAIRE DOIT ÊTRE PRÉVU DANS LA PIÈCE, UN MANQUE D'AIR D'APPOINT POURRAIT PRIVER LES AUTRES APPAREILS DE COMBUSTION D'UNE ALIMENTATION D'AIR ADÉQUATE.



Made in La Guadeloupe, (Qc), Canada  
20/12/2024 (# Test)



Fabricant de poêles international  
Stove Builder International

Fabriqué à La Guadeloupe, (Qc), Canada

20/12/2024 (# Test)





REFER TO INTERTEK'S DIRECTORY OF BUILDING PRODUCTS FOR DETAILED INFORMATION  
SE RÉFÉRER AU RÉPERTOIRE DES PRODUITS HOMOLOGUÉS D'INTERTEK POUR PLUS  
D'INFORMATION

STANDARDS / NORMES D'ESSAI:

Certified to / Certifié selon CSA B415.1-10  
Certified to/Certifié selon ASTM E2515-11 (R2017)

Control Number (LG) : 5007735  
(December / Décembre 2024)

Serial Number  
No. de Série 998

LISTED FACTORY BUILT FIREPLACE  
FOYER PRÉFABRIQUÉ HOMOLOGUÉ

FOR USE WITH WOOD ONLY  
POUR UTILISATION AVEC BOIS SEULEMENT  
CONTACT LOCAL BUILDING OFFICIALS ABOUT THE RESTRICTIONS AND INSTALLATION INSPECTION IN YOUR AREA.  
COMMUNIQUER AVEC LES AUTORITÉS LOCALES DU BÂTIMENT ET DE LA PRÉVENTION DES INCENDIES AU SUJET DES RESTRICTIONS D'INSTALLATION DANS VOTRE SECTEUR.

INSTALL AND USE ONLY IN ACCORDANCE WITH SBI STOVE BUILDER INTERNATIONAL INSTALLATION AND OPERATION INSTRUCTIONS.  
L'INSTALLATION ET L'OPERATION DOIT SE FAIRE SELON LES INSTRUCTIONS D'INSTALLATION ET D'UTILISATION DE SBI FABRICANT DE POÊLES INTERNATIONAL.

PREVENT HOUSE FIRES

- Use solid fuel only.
- Combustion air openings shall not be obstructed.
- When doors are used, operate fireplace with doors fully open with fire screen or fully closed only. For safety, keep screen doors or glass doors tightly closed.
- Do not overfire unit.
- Replace with only ceramic glass 4mm thick.
- Use only with listed factory-built chimney as per manufacturer's instructions.
- A non-combustible hearth extension must be installed in front of unit extending in (mm) in front and in (mm) on each side of door opening.
- Hearth extension must have a minimum R factor of 1.00. No minimum R factor is required if fireplace is elevated by at least 4 in. (102 mm).
- Do not use a fireplace insert or other products not specified for use with this product.
- Areas of the fireplace incorporating warm or cold air ducts shall be enclosed in accordance with manufacturer's instructions.
- WARNING: This fireplace has not been tested with an unvented gas log set. To reduce risk of fire or injury, do not install an unvented gas log set into fireplace.
- This wood heater needs periodic inspection and repair for proper operation. Consult the owner's manual for further information. It is against US federal regulations to operate this wood heater in a manner inconsistent with the operating instructions in the owner's manual.

Suitable for transportable building installation in CANADA only.

PRÉVEZ LES INCENDIES

- Utiliser uniquement du bois de chauffage.
- Les entrées d'air servant à la combustion ne doivent pas être obstruées.
- Quand des portes sont utilisées, opérer le foyer avec les portes complètement ouvertes avec pare-étincelles ou complètement fermées seulement. Pour votre sécurité, maintenir les portes de grilles ou de vitres fermées de façon étanche.
- Ne pas surchauffer le foyer.
- Remplacer la vitre seulement avec un verre céramique de 4mm d'épaisseur.
- Pour utilisation seulement avec une cheminée préfabriquée homologuée tel que spécifié selon les instructions du manufacturier.
- Une protection de plancher Incombustible doit être installée à l'avant du foyer excédant de po (mm) à l'avant et po (mm) de chaque côté de l'ouverture de porte.
- La protection à l'avant du foyer doit avoir un facteur R minimum de 1.00. Aucun facteur R n'est requis si le foyer est surélevé d'au moins 4 po. (102 mm).
- Ne pas utiliser de foyer encastrable ou autres produits qui ne sont pas conçus précisément pour être utilisés avec le présent foyer.
- Les zones du foyer intégrant des conduits d'air chaud ou froid doivent être installées en accord avec les instructions du manufacturier.
- ATTENTION: Ce foyer n'a pas été mis à l'essai avec un ensemble de bûches décoratives à gaz non ventilé. Pour réduire les risques de feu ou de blessures, ne pas installer d'ensemble de bûches décoratives à gaz non ventilé dans ce foyer.
- Cet appareil requiert des inspections et réparations périodiques. Consulter le manuel de l'utilisateur pour plus d'information. Opérer cet appareil de chauffage de façon inconsistente par rapport au manuel de l'utilisateur consiste une violation de la loi fédérale (USA).

Convient aux bâtiments transportables au CANADA seulement.

MINIMUM CLEARANCES TO COMBUSTIBLE MATERIALS /  
DÉGAGEMENTS MINIMUM AUX MATÉRIAUX COMBUSTIBLES

Sidewall / Mur latéral [1] : in (mm) Side facing / Parement latéral [2] : in (mm)  
Shelf (from floor) /  
Tablette (du sol) [2][3][4] : in (mm) Ceiling (from floor) /  
Plafond (à partir du plancher) [3] : in. (mm)

- [1] From door opening. / À partir de l'ouverture de la porte.  
[2] Subject to a maximum protrusion (consult owner's manual). / Sujet à une saillie maximale (consultez le manuel d'instructions).  
[3] If the fireplace is elevated, the clearances to the combustible shelf and ceiling must be increased by an equivalent value. / Si le foyer est surélevé, les dégagements à la tablette combustible et au plafond doivent être augmentés d'une valeur équivalente.  
[4] Consult owner's manual for material to be used. / Consulter le manuel d'installation pour le matériel à utiliser.

Forced air kit / Ensemble d'Air forcé: (115V, 2.4A, 60Hz) # 44121 - Blower / Ventilateur: (115V, 1.4A, 60Hz) # 44207

PROCEDURE TO FOLLOW IN CASE OF RUN-AWAY FIRE

- 1) Keep doors closed
- 2) Close all combustion air controls

EN CAS D'INCENDIE DE CHEMINÉE

- 1) Maintenir les portes fermées
- 2) Fermer tous les dispositifs d'admission d'air

U.S. ENVIRONMENTAL PROTECTION AGENCY Certified to comply with 2020 particulate emission standards using cord wood.  
AGENCE DE PROTECTION DE L'ENVIRONNEMENT DES É.U. (EPA). Conforme aux normes d'émission de particules de 2020 avec bûche de bois.  
Weighted average emission rate / Moyenne pondérée des émissions: 1.8 g/h

Tested and certified in compliance with CFR 40 part 60, subpart AAA, section 60.534(a)(1)(II).

WARNING: This product can expose you to carbon monoxide, which is known to the State of California to cause cancer, birth defects or other reproductive harm.  
(For more information go to [www.p65warnings.ca.gov](http://www.p65warnings.ca.gov))

CAUTION

- HOT WHILE IN OPERATION.
- DO NOT TOUCH. KEEP CHILDREN, CLOTHING AND FURNITURE AWAY.
- CONTACT MAY CAUSE SKIN BURNS. SEE NAME-PLATE AND INSTRUCTIONS.
- THIS FIREPLACE NEEDS AIR FOR GOOD OPERATION.
- WHEN A FIRE IS BURNING IN THE FIREPLACE, FRESH AIR MUST BE SUPPLIED TO THE ROOM WHERE THE FIREPLACE IS LOCATED, FAILURE TO PROVIDE THIS MAY STARVE OTHER FUEL BURNING APPLIANCE FROM AN ADEQUATE AIR SUPPLY.

ATTENTION

- CHAUD EN FONCTIONNEMENT.
- NE PAS TOUCHER. GARDER LES ENFANTS, LES VÊTEMENTS ET LES MEUBLES ÉLOIGNÉS.
- UN CONTACT AVEC LA PEAU PEUT OCCASIONNER DES BRÛLURES. VOIR LES INSTRUCTIONS.
- CE FOYER A BESOIN D'AIR POUR SON BON FONCTIONNEMENT.
- LORSQUE LE FOYER BRÛLE, UN APPORT D'AIR SUPPLÉMENTAIRE DOIT ÊTRE PRÉVU DANS LA PIÈCE, UN MANQUE D'AIR D'APPOINT POURRAIT PRIVER LES AUTRES APPAREILS DE COMBUSTION D'UNE ALIMENTATION D'AIR ADÉQUATE.



Made in La Guadeloupe, (Qc), Canada  
20/12/2024 ( # Test )



Fabricant de poêles international  
Stove Builder International

Fabriqué à La Guadeloupe, (Qc), Canada  
20/12/2024 ( # Test )





REFER TO INTERTEK'S DIRECTORY OF BUILDING PRODUCTS FOR DETAILED INFORMATION  
SE RÉFÉRER AU RÉPERTOIRE DES PRODUITS HOMOLOGUÉS D'INTERTEK POUR PLUS  
D'INFORMATION

STANDARDS / NORMES D'ESSAI:

Certified to / Certifié selon CSA B415.1-10  
Certified to/Certifié selon ASTM E2515-11 (R2017)

Control Number (LG) : 5007735  
(December / Décembre 2024)

Serial Number  
No. de Série

997

MODEL / MODÈLE:  
HELIA

LISTED FACTORY BUILT FIREPLACE  
FOYER PRÉFABRIQUÉ HOMOLOGUÉ

FOR USE WITH WOOD ONLY  
POUR UTILISATION AVEC BOIS SEULEMENT  
CONTACT LOCAL BUILDING OFFICIALS ABOUT THE RESTRICTIONS AND INSTALLATION INSPECTION IN YOUR AREA.  
COMMUNIQUER AVEC LES AUTORITÉS LOCALES DU BÂTIMENT ET DE LA PRÉVENTION DES INCENDIES AU SUJET DES RESTRICTIONS D'INSTALLATION DANS VOTRE SECTEUR.

INSTALL AND USE ONLY IN ACCORDANCE WITH SBI STOVE BUILDER INTERNATIONAL INSTALLATION AND OPERATION INSTRUCTIONS.  
L'INSTALLATION ET L'OPERATION DOIT SE FAIRE SELON LES INSTRUCTIONS D'INSTALLATION ET D'UTILISATION DE SBI FABRICANT DE POÊLES INTERNATIONAL.

PREVENT HOUSE FIRES

- Use solid fuel only.
- Combustion air openings shall not be obstructed.
- When doors are used, operate fireplace with doors fully open with fire screen or fully closed only. For safety, keep screen doors or glass doors tightly closed.
- Do not overfire unit.
- Replace with only ceramic glass 4mm thick.
- Use only with listed factory-built chimney as per manufacturer's instructions.
- A non-combustible hearth extension must be installed in front of unit extending in (mm) in front and in (mm) on each side of door opening.
- Hearth extension must have a minimum R factor of 1.00. No minimum R factor is required if fireplace is elevated by at least 4 in. (102 mm).
- Do not use a fireplace insert or other products not specified for use with this product.

Areas of the fireplace incorporating warm or cold air ducts shall be enclosed in accordance with manufacturer's instructions.

WARNING: This fireplace has not been tested with an unvented gas log set. To reduce risk of fire or injury, do not install an unvented gas log set into fireplace.

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

Suitable for transportable building installation in CANADA only.

PRÉVENEZ LES INCENDIES

- Utiliser uniquement du bois de chauffage.
- Les entrées d'air servant à la combustion ne doivent pas être obstruées.
- Quand des portes sont utilisées, opérer le foyer avec les portes complètement ouvertes avec pare-étincelles ou complètement fermées seulement. Pour votre sécurité, maintenir les portes de grillages ou de vitres fermées de façon étanche.
- Ne pas surchauffer le foyer.
- Remplacer la vitre seulement avec un verre céramique de 4mm d'épaisseur.
- Pour utilisation seulement avec une cheminée préfabriquée homologuée tel que spécifié selon les instructions du fabricant.
- Une protection de plancher incombustible doit être installée à l'avant du foyer excédant de po (mm) à l'avant et po (mm) de chaque côté de l'ouverture de porte.
- La protection à l'avant du foyer doit avoir un facteur R minimum de 1.00. Aucun facteur R n'est requis si le foyer est surélevé d'au moins 4 po. (102 mm).
- Ne pas utiliser de foyer encastrable ou autres produits qui ne sont pas conçus précisément pour être utilisés avec le présent foyer.

Les zones du foyer intégrant des conduits d'air chaud ou froid doivent être installées en accord avec les instructions du fabricant.

ATTENTION: Ce foyer n'a pas été mis à l'essai avec un ensemble de bûches décoratives à gaz non ventilé. Pour réduire les risques de feu ou de blessures, ne pas installer d'ensemble de bûches décoratives à gaz non ventilé dans ce foyer.

Cet appareil requiert des inspections et réparations périodiques. Consulter le manuel de l'utilisateur pour plus d'information. Opérer cet appareil de chauffage de façon inconsistente par rapport au manuel de l'utilisateur consiste une violation de la loi fédérale (USA).

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MINIMUM CLEARANCES TO COMBUSTIBLE MATERIALS /  
DÉGAGEMENTS MINIMUM AUX MATÉRIAUX COMBUSTIBLES

|                                                       |          |                                                                |           |
|-------------------------------------------------------|----------|----------------------------------------------------------------|-----------|
| Sidewall / Mur latéral [1] :                          | in ( mm) | Side facing / Parement latéral [2] :                           | in ( mm)  |
| Shelf (from floor) /<br>Tablette (du sol) [2][3][4] : | in ( mm) | Ceiling (from floor) /<br>Plafond (à partir du plancher) [3] : | in. ( mm) |

[1] From door opening. / À partir de l'ouverture de la porte.

[2] Subject to a maximum protrusion (consult owner's manual). / Sujet à une saillie maximale (consultez le manuel d'instructions).

[3] If the fireplace is elevated, the clearances to the combustible shelf and ceiling must be increased by an equivalent value. / Si le foyer est surélevé, les dégagements à la tablette combustible et au plafond doivent être augmentés d'une valeur équivalente.

[4] Consult owner's manual for material to be used. / Consulter le manuel d'installation pour le matériel à utiliser.

Forced air kit / Ensemble d'Air forcé: (115V, 2.4A, 60Hz) # 44121 - Blower / Ventilateur: (115V, 1.4A, 60Hz) # 44207

PROCEDURE TO FOLLOW IN CASE OF RUN-AWAY FIRE

- 1) Keep doors closed
- 2) Close all combustion air controls

EN CAS D'INCENDIE DE CHEMINÉE

- 1) Maintenir les portes fermées
- 2) Fermer tous les dispositifs d'admission d'air

U.S. ENVIRONMENTAL PROTECTION AGENCY Certified to comply with 2020 particulate emission standards using cord wood.  
AGENCE DE PROTECTION DE L'ENVIRONNEMENT DES É.U. (EPA). Conforme aux normes d'émission de particules de 2020 avec bûche de bois.  
Weighted average emission rate / Moyenne pondérée des émissions: 1.8 g/h

Tested and certified in compliance with CFR 40 part 60, subpart AAA, section 60.534(a)(1)(ii)).

WARNING: This product can expose you to carbon monoxide, which is known to the State of California to cause cancer, birth defects or other reproductive harm.  
(For more information go to [www.p65warnings.ca.gov](http://www.p65warnings.ca.gov))

CAUTION

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- CONTACT MAY CAUSE SKIN BURNS. SEE NAME-PLATE AND INSTRUCTIONS.
- THIS FIREPLACE NEEDS AIR FOR GOOD OPERATION.
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Made in La Guadeloupe, (Qc), Canada  
20/12/2024 ( # Test )

Fabricant de poêles international  
Stove Builder International

Fabriqué à La Guadeloupe, (Qc), Canada  
20/12/2024 ( # Test )





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D'INFORMATION

STANDARDS / NORMES D'ESSAI:

Certified to / Certifié selon CSA B415.1-10

Certified to / Certifié selon ASTM E2515-11 (R2017)

MODEL / MODÈLE:  
ST-LOUIS

LISTED FACTORY BUILT FIREPLACE  
FOYER PRÉFABRIQUÉ HOMOLOGUÉ

FOR USE WITH WOOD ONLY  
POUR UTILISATION AVEC BOIS SEULEMENT  
CONTACT LOCAL BUILDING OFFICIALS ABOUT THE RESTRICTIONS AND INSTALLATION INSPECTION IN YOUR AREA.  
COMMUNIQUER AVEC LES AUTORITÉS LOCALES DU BÂTIMENT ET DE LA PRÉVENTION DES INCENDIES AU SUJET DES RESTRICTIONS D'INSTALLATION DANS VOTRE SECTEUR.

Control Number (LG) : 5007735  
(December / Décembre 2024)

Serial Number  
No. de Série 996

INSTALL AND USE ONLY IN ACCORDANCE WITH SBI STOVE BUILDER INTERNATIONAL INSTALLATION AND OPERATION INSTRUCTIONS.  
L'INSTALLATION ET L'OPERATION DOIT SE FAIRE SELON LES INSTRUCTIONS D'INSTALLATION ET D'UTILISATION DE SBI FABRICANT DE POÊLES INTERNATIONAL.

PREVENT HOUSE FIRES

- Use solid fuel only.
- Combustion air openings shall not be obstructed.
- When doors are used, operate fireplace with doors fully open with fire screen or fully closed only. For safety, keep screen doors or glass doors tightly closed.
- Do not overfire unit.
- Replace with only ceramic glass 4mm thick.
- Use only with listed factory-built chimney as per manufacturer's instructions.
- A non-combustible hearth extension must be installed in front of unit extending in (mm) in front and in (mm) on each side of door opening.
- Hearth extension must have a minimum R factor of 1.00. No minimum R factor is required if fireplace is elevated by at least 4 in. (102 mm).
- Do not use a fireplace insert or other products not specified for use with this product.

Areas of the fireplace incorporating warm or cold air ducts shall be enclosed in accordance with manufacturer's instructions.

WARNING: This fireplace has not been tested with an unvented gas log set. To reduce risk of fire or injury, do not install an unvented gas log set into fireplace.

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

Suitable for transportable building installation in CANADA only.

PRÉVEZ LES INCENDIES

- Utiliser uniquement du bois de chauffage.
- Les entrées d'air servant à la combustion ne doivent pas être obstruées.
- Quand des portes sont utilisées, opérer le foyer avec les portes complètement ouvertes avec pare-étincelles ou complètement fermées seulement. Pour votre sécurité, maintenir les portes de grilles ou de vitres fermées de façon étanche.
- Ne pas surchauffer le foyer.
- Remplacer la vitre seulement avec un verre céramique de 4mm d'épaisseur.
- Pour utilisation seulement avec une cheminée préfabriquée homologuée tel que spécifié selon les instructions du fabricant.
- Une protection de plancher incombustible doit être installée à l'avant du foyer excédant de po (mm) à l'avant et po (mm) de chaque côté de l'ouverture de porte.
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- Ne pas utiliser de foyer encastrable ou autres produits qui ne sont pas conçus précisément pour être utilisés avec le présent foyer.
- Les zones du foyer intégrant des conduits d'air chaud ou froid doivent être installées en accord avec les instructions du fabricant.

ATTENTION: Ce foyer n'a pas été mis à l'essai avec un ensemble de bûches décoratives à gaz non ventilé. Pour réduire les risques de feu ou de blessures, ne pas installer d'ensemble de bûches décoratives à gaz non ventilé dans ce foyer.

Cet appareil requiert des inspections et réparations périodiques. Consulter le manuel de l'utilisateur pour plus d'information. Opérer cet appareil de chauffage de façon inconsistente par rapport au manuel de l'utilisateur consiste une violation de la loi fédérale (USA).

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Tablette (du sol) [2][3][4] : in (mm) Plafond (à partir du plancher) [3] : in. (mm)

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EN CAS D'INCENDIE DE CHEMINÉE

- Maintenir les portes fermées
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U.S. ENVIRONMENTAL PROTECTION AGENCY Certified to comply with 2020 particulate emission standards using cord wood.  
AGENCE DE PROTECTION DE L'ENVIRONNEMENT DES É.U. (EPA). Conforme aux normes d'émission de particules de 2020 avec bûche de bois.  
Weighted average emission rate / Moyenne pondérée des émissions: 1.8 g/h

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ATTENTION

- CHAUD EN FONCTIONNEMENT.
- NE PAS TOUCHER. GARDER LES ENFANTS, LES VÊTEMENTS ET LES MEUBLES ÉLOIGNÉS.
- UN CONTACT AVEC LA PEAU PEUT OCCASIONNER DES BRÛLURES. VOIR LES INSTRUCTIONS.
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- LORSQUE LE FOYER BRÛLE, UN APPORT D'AIR SUPPLÉMENTAIRE DOIT ÊTRE PRÉVU DANS LA PIÈCE, UN MANQUE D'AIR D'APPOINT POURRAIT PRIVER LES AUTRES APPAREILS DE COMBUSTION D'UNE ALIMENTATION D'AIR ADÉQUATE.

Made in La Guadeloupe, (Qc), Canada  
20/12/2024 ( # Test )



Fabricant de poêles international  
Stove Builder International

Fabriqué à La Guadeloupe, (Qc), Canada  
20/12/2024 ( # Test )



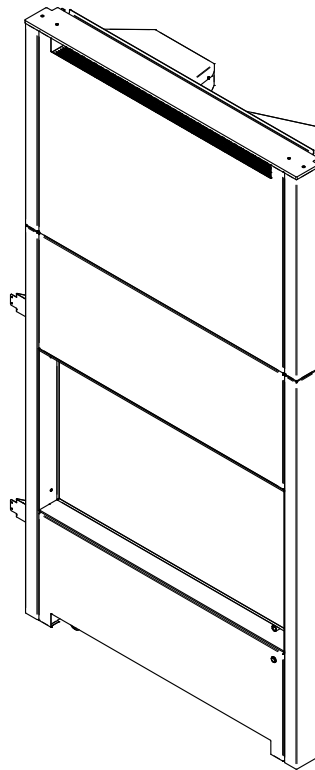


# MANUAL INSTALLATION AND OPERATION

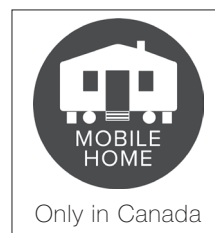
## ST-LOUIS

(FP19 model)

ENGLISH



US Environmental Protection  
Agency phase II certified wood  
fireplace  
compliant with 2020 cord wood  
standard



Safety tested according  
to  
ULC S610, and UL  
127 standards  
by an accredited  
laboratory.

CONTACT LOCAL BUILDING OR FIRE OFFICIALS ABOUT RESTRICTIONS AND INSTALLATION INSPECTION REQUIREMENTS IN LOCAL AREA.

READ THIS ENTIRE MANUAL BEFORE INSTALLATION AND USE OF THIS WOOD STOVE. FAILURE TO FOLLOW THESE INSTRUCTIONS COULD RESULT IN PROPERTY DAMAGE, BODILY INJURY OR EVEN DEATH.

**READ AND KEEP THIS MANUAL FOR REFERENCE**

Dealer: \_\_\_\_\_

Installer: \_\_\_\_\_

Phone Number: \_\_\_\_\_

**Serial Number:** \_\_\_\_\_

### ONLINE WARRANTY REGISTRATION

If the unit requires repairs during the warranty period, proof of purchase must be provided. The purchase invoice must be kept. The date indicated on it establishes the warranty period. If it can not be provided, the warranty period will be determined by the date of manufacture of the product. It is also highly recommended to register the warranty online at

<https://www.valcourtinc.com/en/warranty/warranty-registration/>

Registering the warranty will help to quickly find the information needed on the unit.



# THANK YOU FOR CHOOSING THIS WOOD FIREPLACE

**If this fireplace is not installed properly, combustible materials near it may overheat and catch fire.**

**To reduce the risk of fire, follow the installation instructions in this manual.**

As one of North America's largest and most respected wood stove and fireplace manufacturers, Stove Builder International takes pride in the quality and performance of all its products.

The following pages provide general advice on wood heating, detailed instructions for safe and effective installation, and guidance on how to get the best performance from this fireplace.

It is highly recommended that this wood burning hearth product be installed and serviced by professionals who are certified by a «Qualified Agency» such as NFI (National Fireplace Institute®) or CSIA (Chimney Safety Institute of America) in the United States and in Canada by WETT (Wood Energy Technology Transfer) or in Quebec by APC (Association des Professionnels du Chauffage).

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

A building permit might be required for the installation of this fireplace and the chimney that it is connected to. It is also highly recommended to inform your home insurance company.

Please read this entire manual before installing and using this fireplace.

A primary alternative heat source should be available in the home. This heating unit may serve as a supplementary heat source. The manufacturer cannot be responsible for additional heating costs associated with the use of an alternative heat source.

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# CERTIFICATION PLATE

ENGLISH



REFER TO INTERTEK'S DIRECTORY OF BUILDING PRODUCTS FOR DETAILED INFORMATION  
SE RÉFÉRER AU RÉPERTOIRE DES PRODUITS HOMOLOGUÉS D'INTERTEK POUR PLUS  
D'INFORMATION

STANDARDS / NORMES D'ESSAI:  
Certified to / Certifié selon ULC S610  
Certified to / Certifié selon UL 127  
Certified to / Certifié selon CSA B415.1-10  
Certified to / Certifié selon ASTM E2515-11 (R2017)

MODEL / MODÈLE:  
ST-LOUIS

LISTED FACTORY BUILT FIREPLACE  
FOYER PRÉFABRIQUÉ HOMOLOGUÉ

FOR USE WITH / POUR UTILISATION AVEC  
WOOD ONLY / BOIS SEULEMENT  
CONTACT LOCAL BUILDING OFFICIALS ABOUT  
THE RESTRICTIONS AND INSTALLATION  
INSPECTION IN YOUR AREA.  
COMMUNIQUER AVEC LES AUTORITÉS  
LOCALES DU BÂTIMENT ET DE LA PRÉVENTION  
DES INCENDIES AU SUJET DES RESTRICTIONS  
D'INSTALLATION DANS VOTRE SECTEUR.

Control Number (SA) : 4002461  
(December / Décembre 2024)

Serial Number  
No. de Série 997

INSTALL AND USE ONLY IN ACCORDANCE WITH SBI STOVE BUILDER INTERNATIONAL INSTALLATION AND OPERATION INSTRUCTIONS.  
L'INSTALLATION ET L'OPERATION DOIT SE FAIRE SELON LES INSTRUCTIONS D'INSTALLATION ET D'UTILISATION DE SBI FABRICANT DE POÊLES INTERNATIONAL.

## PREVENT HOUSE FIRES

- Use solid fuel only.
  - Combustion air openings shall not be obstructed.
  - When doors are used, operate fireplace with doors fully open with fire screen or fully closed only. For safety, keep screen doors or glass doors tightly closed.
  - Do not overfire unit.
  - Replace with only ceramic glass 4mm thick.
  - Use only with listed factory-built chimney as per manufacturer's instructions.
  - A non-combustible hearth extension must be installed in front of unit extending 16 in (406 mm) in front and 8 in (203 mm) on each side of door opening.
  - Hearth extension must have a minimum R factor of 1.00. No minimum R factor is required if fireplace is elevated by at least 4 in. (102 mm).
  - Do not use a fireplace insert or other products not specified for use with this product.
  - Areas of the fireplace incorporating warm or cold air ducts shall be enclosed in accordance with manufacturer's instructions.
- WARNING:** This fireplace has not been tested with an unvented gas log set. To reduce risk of fire or injury, do not install an unvented gas log set into fireplace. This wood heater needs periodic inspection and repair for proper operation. Consult the owner's manual for further information. It is against US federal regulations to operate this wood heater in a manner inconsistent with the operating instructions in the owner's manual.

Suitable for transportable building installation in CANADA only.

## PRÉVEZ LES INCENDIES

- Utiliser uniquement du bois de chauffage.
  - Les entrées d'air servant à la combustion ne doivent pas être obstruées.
  - Quand des portes sont utilisées, opérer le foyer avec les portes complètement ouvertes avec pare-étincelles ou complètement fermées seulement. Pour votre sécurité, maintenir les portes de grillages ou de vitres fermées de façon étanche.
  - Ne pas surchauffer le foyer.
  - Remplacer la vitre seulement avec un verre céramique de 4mm d'épaisseur.
  - Pour utilisation seulement avec une cheminée préfabriquée homologuée tel que spécifié selon les instructions du fabricant.
  - Une protection de plancher incombustible doit être installée à l'avant du foyer excédant de 16 po (406 mm) à l'avant et 8 po (203 mm) de chaque côté de l'ouverture de porte.
  - La protection à l'avant du foyer doit avoir un facteur R minimum de 1.00. Aucun facteur R n'est requis si le foyer est surélevé d'au moins 4 po. (102 mm).
  - Ne pas utiliser de foyer encastrable ou autres produits qui ne sont pas conçus précisément pour être utilisés avec le présent foyer.
- Les zones du foyer intégrant des conduits d'air chaud ou froid doivent être installées en accord avec les instructions du fabricant.
- ATTENTION:** Ce foyer n'a pas été mis à l'essai avec un ensemble de bûches décoratives à gaz non ventilé. Pour réduire les risques de feu ou de blessures, ne pas installer d'ensemble de bûches décoratives à gaz non ventilé dans ce foyer.
- Cet appareil requiert des inspections et réparations périodiques. Consulter le manuel de l'utilisateur pour plus d'information. Opérer cet appareil de chauffage de façon inconsistante par rapport au manuel de l'utilisateur consiste une violation de la loi fédérale (USA).

Convient aux bâtiments transportables au CANADA seulement.

## MINIMUM CLEARANCES TO COMBUSTIBLE MATERIALS / DÉGAGEMENTS MINIMUM AUX MATÉRIEAUX COMBUSTIBLES

|                                                       |                    |                                                                |                  |
|-------------------------------------------------------|--------------------|----------------------------------------------------------------|------------------|
| Sidewall / Mur latéral [1] :                          | 15 1/2 in (394 mm) | Side facing / Parement latéral [2] :                           | 8 in (203 mm)    |
| Shelf (from floor) /<br>Tablette (du sol) [2][3][4] : | 57 in (1448 mm)    | Ceiling (from floor) /<br>Plafond (à partir du plancher) [3] : | 96 in. (2438 mm) |

[1] From outside of the door. / À partir du côté extérieur de la porte.

[2] Subject to a maximum protrusion (consult owner's manual). / Sujet à une saillie maximale (consultez le manuel d'instructions).

[3] If the fireplace is elevated, the clearances to the combustible shelf and ceiling must be increased by an equivalent value. / Si le foyer est surélevé, les dégagements à la tablette combustible et au plafond doivent être augmentés d'une valeur équivalente.

[4] Consult owner's manual for material to be used. / Consulter le manuel d'installation pour le matériel à utiliser.

Forced air kit / Ensemble d'Air forcé: (115V, 2.4A, 60Hz) # 44121 - Blower / Ventilateur: (115V, 1.4A, 60Hz) # 44207

**PROCEDURE TO FOLLOW IN CASE OF RUN-AWAY FIRE**  
1) Keep doors closed  
2) Close all combustion air controls

**EN CAS D'INCENDIE DE CHEMINÉE**  
1) Maintenir les portes fermées  
2) Fermer tous les dispositifs d'admission d'air

U.S. ENVIRONMENTAL PROTECTION AGENCY Certified to comply with 2020 particulate emission standards using cord wood.  
AGENCE DE PROTECTION DE L'ENVIRONNEMENT DES É.U. (EPA). Conforme aux normes d'émission de particules de 2020 avec bûche de bois.  
Weighted average emission rate / Moyenne pondérée des émissions: 1.8 g/h

Tested and certified in compliance with CFR 40 part 60, subpart AAA, section 60.534(a)(1)(III).



**WARNING:** This product can expose you to carbon monoxide, which is known to the State of California to cause cancer, birth defects or other reproductive harm.  
(For more information go to [www.p65warnings.ca.gov](http://www.p65warnings.ca.gov))

## CAUTION

- HOT WHILE IN OPERATION.
- DO NOT TOUCH. KEEP CHILDREN, CLOTHING AND FURNITURE AWAY.
- CONTACT MAY CAUSE SKIN BURNS. SEE NAME-PLATE AND INSTRUCTIONS.
- THIS FIREPLACE NEEDS AIR FOR GOOD OPERATION.
- WHEN A FIRE IS BURNING IN THE FIREPLACE, FRESH AIR MUST BE SUPPLIED TO THE ROOM WHERE THE FIREPLACE IS LOCATED, FAILURE TO PROVIDE THIS MAY STARVE OTHER FUEL BURNING APPLIANCE FROM AN ADEQUATE AIR SUPPLY.



## ATTENTION

- CHAUD EN FONCTIONNEMENT.
- NE PAS TOUCHER. GARDER LES ENFANTS, LES VÊTEMENTS ET LES MEUBLES ÉLOIGNÉS.
- UN CONTACT AVEC LA PEAU PEUT OCCASIONNER DES BRÛLURES. VOIR LES INSTRUCTIONS.
- CE FOYER A BESOIN D'AIR POUR SON BON FONCTIONNEMENT.
- LORSQUE LE FOYER BRÛLE, UN APPORT D'AIR SUPPLÉMENTAIRE DOIT ÊTRE PRÉVU DANS LA PIÈCE, UN MANQUE D'AIR D'APPOINT POURRAIT PRIVER LES AUTRES APPAREILS DE COMBUSTION D'UNE ALIMENTATION D'AIR ADEQUATE.

Made in St-Augustin-de-Desmaures, (Qc), Canada  
11/03/2025 ( # Test )



Fabricant de poêles international  
Stove Builder International

Fabrique à St-Augustin-de-Desmaures, (Qc), Canada  
11/03/2025 ( # Test )  
27989

## PART A - OPERATION AND MAINTENANCE

### 1. Safety Information and Standards

#### 1.1 Safety

- **WARNING : OPERATE ONLY WITH THE DOOR FULLY CLOSED OR FULLY OPEN. IF THE DOOR IS LEFT PARTLY OPEN, GAS AND FLAME MAY BE DRAWN OUT OF THE OPENING, CREATING RISKS FROM BOTH FIRE AND SMOKE. DO NOT LEAVE THE FIREPLACE UNATTENDED WHEN THE DOOR IS OPENED.**
- **HOT WHILE IN OPERATION. KEEP CHILDREN, CLOTHING AND FURNITURE AWAY. CONTACT MAY CAUSE SKIN BURNS. GLOVES MAY BE NEEDED FOR THE FIREPLACE OPERATION.**
- Using a fireplace with cracked or broken components, such as glass, firebricks or baffle may produce an unsafe condition and may damage the fireplace.
- **NEVER USE GASOLINE, LANTERN FUEL (NAPHTHA), FUEL OIL, MOTOR OIL, KEROSENE, CHARCOAL LIGHTER FLUID, OR SIMILAR LIQUIDS OR AEROSOLS TO START A FIRE IN THIS FIREPLACE. KEEP ALL SUCH LIQUIDS OR AEROSOLS WELL AWAY FROM THE FIREPLACE WHILE IT IS IN USE.**
- Do not store fuel within heater minimum installation clearances.
- Burn only seasoned natural firewood.
- This wood heater needs periodic inspection and repairs for the proper operation. It is against federal regulations to operate this wood heater in a manner inconsistent with operating instructions in this manual.
- Do not obstruct air inlets. This fireplace needs air for its good operation.
- Do not block the hot air vents of the fireplace as this will cause the fireplace to overheat.
- A smoke detector, a carbon monoxide detector and a fire extinguisher should be installed in the house. Location of detectors should be chosen wisely to avoid false alarm when reloading the appliance. The location of the fire extinguisher should be known by all family members.
- Do not use makeshift materials or make any compromises when installing this fireplace.
- Mixing of appliance components from different sources or modifying components is prohibited and will void the warranty. Any modification of the fireplace that has not been approved in writing by the testing authority is prohibited and violates CSA B365 and NFPA 211 standards.
- The manufacturer grants no warranty, implied or stated, for the poor installation or lack of maintenance of this fireplace and assumes no responsibility for any consequential damages.
- Do not elevate the fire by means of grates, chenets, andirons or any other means.



**WARNING** This product can expose you to chemicals including carbon monoxide, which is known to the State of California to cause cancer, birth defects or other reproductive harm. For more information go to [www.P65warnings.ca.gov/](http://www.P65warnings.ca.gov/)

- The fireplace and chimney must be in an enclosure up to the attic.

**CAUTION: DO NOT ATTEMPT TO MODIFY OR ALTER THE CONSTRUCTION OF THE FIREPLACE OR ITS COMPONENTS. ANY MODIFICATION OR ALTERATION OF CONSTRUCTION MAY VOID THE WARRANTY, LISTINGS AND APPROVALS OF THIS SYSTEM. IN THAT CASE, STOVE BUILDER INTERNATIONAL (SBI) WILL NOT BE RESPONSIBLE FOR DAMAGES. INSTALL THE FIREPLACE ONLY AS DESCRIBED IN THESE INSTRUCTIONS.**

- Mixing of appliance components from different sources or modifying components is prohibited and will void the warranty. Any modification of the fireplace that has not been approved in writing by the testing authority is prohibited and violates CSA B365 (Canada) and NFPA 211 (USA) standards.
- The manufacturer grants no warranty, implied or stated, for the poor installation or lack of maintenance of the fireplace and assumes no responsibility for any consequential damages.
- This fireplace must always be used with the original andirons.
- Do not use a fireplace insert and other products not specified for use with this fireplace.
- Do not use materials other than those listed in the replacement parts section during installation as they may be safety hazards and a fire could result.
- Do not restrict air circulation around the unit. Air circulation around the unit is important. If air circulation is limited, this could increase heat on adjacent walls and ceiling.
- This fireplace has not been tested with an unvented or vented gas log set. To reduce risk of fire or injury, do not install an unvented or vented gas log set into this fireplace.
- The combustion air inlet ducts shall not terminate in attic space.
- This fireplace has not been tested for installation inside a masonry fireplace.

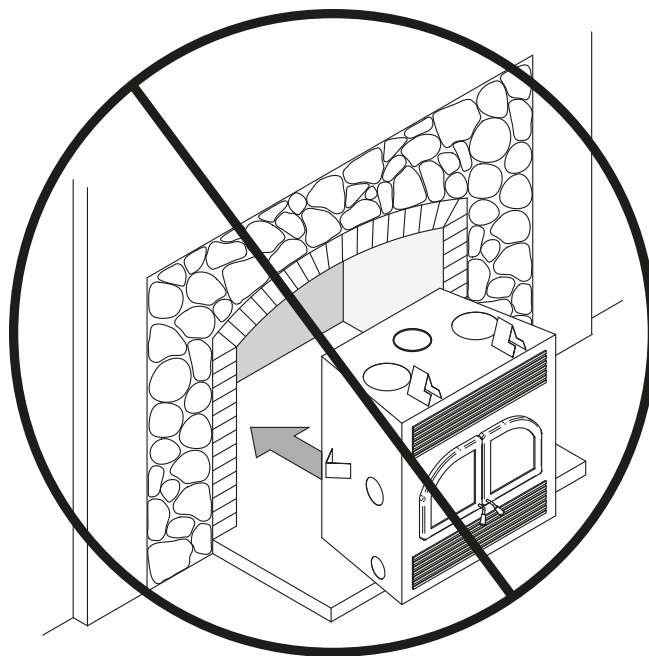
### **Over-Firing the fireplace**

**DO NOT OVERFIRE THIS FIREPLACE:** Attempts to achieve firing rates that exceed the fireplace specifications can result in permanent damage to the heater.

This fireplace is designed to operate at a high temperature. However, all installation are different and due to differences in wood heating value, wood moisture content, chimney configuration, and flue draft, this appliance can reach excessive temperature in the worst conditions. If the top or door of the fireplace or other area starts to glow red, you are over-firing the fireplace. Set the fireplace to low combustion (see section 4.7.1 Air Control) to reduce the air intake and slow the combustion rate and use smaller logs to reduce the combustion time.



- This fireplace has not been tested for installation inside a masonry fireplace.



## 1.2 Standards

When installed and operated as described in these instructions, this wood fireplace is suitable for use in residential installations.

In Canada, the CSA B365 «Installation Code for Solid Fuel Burning Appliances and Equipment» and the CSA C22.1 «Canadian National Electrical Code» are to be followed in the absence of local code requirements.

In the USA, the ANSI NFPA 211 «Standard for Chimneys, Fireplaces, Vents and Solid Fuel-Burning Appliances» and the ANSI NFPA 70 «National Electrical Code» are to be followed in the absence of local code requirements.

*This fireplace is not approved for use with a so-called “positive flue connection” to the clay tile of a masonry chimney.*

## 2. General Information

### 2.1 Performances

*The values below are from particulate emissions test results, except for the following values: the recommended heating area, the firebox volume, the maximum burn time and the maximum heat output.*

|                                                           |                                                           |
|-----------------------------------------------------------|-----------------------------------------------------------|
| Model                                                     | St-Louis (FP19)                                           |
| Fuel Type                                                 | Dry Cordwood                                              |
| Combustion Technology                                     | Non-catalytic                                             |
| Recommended heating area (sq. ft.) <sup>1</sup>           | 1000 to 2,400 ft <sup>2</sup> (92 to 223 m <sup>2</sup> ) |
| Overall firebox volume                                    | 3.15 ft <sup>3</sup> (0.089 m <sup>3</sup> )              |
| Usable Firebox Volume (EPA)                               | 1.9 ft <sup>3</sup> (0.054 m <sup>3</sup> )               |
| Maximum burn time                                         | 7h (with a 0.06"-0.08" CE draft)                          |
| Maximum heat output (dry cordwood) <sup>2</sup>           | 100,000 BTU/h (30 kW)                                     |
| Overall heat output rate (min. to max.) <sup>2 3</sup>    | 29,457 BTU/h to 93,725 BTU/h (8.63kW to 27.47kW)          |
| Average overall efficiency <sup>3</sup><br>(Dry cordwood) | 76% (HHV) <sup>4</sup>                                    |
| Optimum efficiency <sup>5</sup>                           | 78% (LHV)                                                 |
| Optimum heat transfer efficiency <sup>6</sup>             | 80 % (HHV)                                                |
| Average particulate emissions rate <sup>7</sup>           | 1.8 g/h (EPA / CSA B415.1-10) <sup>8</sup>                |
| Average CO <sup>9</sup>                                   | 1.3 g/min                                                 |

<sup>1</sup> Recommended heating area and maximum burn time may vary subject to location in home, chimney draft, heat loss factors, climate, fuel type and other variables. The recommended heated area for a given appliance is defined by the manufacturer as its capacity to maintain a minimum acceptable temperature in the designated area in case of a power failure.

<sup>2</sup> The maximum heat output (dry cordwood) is based on a loading density varying between 15 lb/ft<sup>3</sup> and 20 lb/ft<sup>3</sup>. Other performances are based on a fuel load prescribed by the standard. The specified loading density varies between 7 lb/ft<sup>3</sup> and 12 lb/ft<sup>3</sup>. The moisture content is between 19% and 25%.

<sup>3</sup> As measured per CSA B415.1-10.

<sup>4</sup> Higher Heating Value of the fuel.

<sup>5</sup> Optimum overall efficiency at a specific burn rate (LHV).

<sup>6</sup> The optimum heat transfer efficiency is for the low burn rate and represents the appliance's ability to convert the energy contained in the wood logs into energy transferred to the room in the form of heat and does not take into account the chemical losses during combustion.

<sup>7</sup> This appliance is officially tested and certified by an independent agency.

<sup>8</sup> Tested and certified in compliance with CFR 40 part 60, subpart AAA, section 60.534(a)(1)(ii).

<sup>9</sup> Carbon monoxide.

## 2.2 Specifications

|                                                     |                                |
|-----------------------------------------------------|--------------------------------|
| Recommended log length                              | 16 in (406 mm) east-west       |
| Maximum log length <sup>10</sup>                    | 18 in (457 mm) east-west       |
| Log length for testing purpose                      | 18.4 ± 0.5 in (467 ± 12.7 mm)  |
| Flue outlet diameter                                | 8 in (203 mm)                  |
| Recommended pipe diameter                           | 8 in (203 mm)                  |
| Type of chimney                                     | ULC-S629, UL 103 HT (2100 °F)  |
| Baffle material                                     | C-Cast or equivalent           |
| Approved for alcove installation                    | No                             |
| Approved for mobile home installation <sup>11</sup> | Yes (Only in Canada)           |
| Type of door                                        | Simple, glass with steel frame |
| Type of glass                                       | Ceramic glass                  |
| Blower                                              | Included (up to 176 PCM)       |
| Particulate emission standard <sup>12</sup>         | EPA / CSA B415.1-10            |
| USA standard (Safety)                               | UL 127                         |
| Canada standard (Safety)                            | ULC S610                       |

<sup>10</sup> North-south: ends of the logs visible, East-west: sides of the logs visible.

<sup>11</sup> Mobile homes (Canada) or manufactured homes (USA): The US Department of Housing and Urban Development describes “manufactured homes” better known as “mobile homes” as follows; buildings built on fixed wheels and those transported on temporary wheels/axles and set on a permanent foundation. In Canada, a mobile home is a dwelling for which the manufacture and assembly of each component is completed or substantially completed prior to being moved to a site for installation on a foundation and connection to service facilities and which conforms to the CAN/CSA-Z240 MH standard.

<sup>12</sup> Tested and certified in compliance with CFR 40 part 60, subpart AAA, section 60.534(a)(1)(ii).

## 2.3 Dimensions

ENGLISH

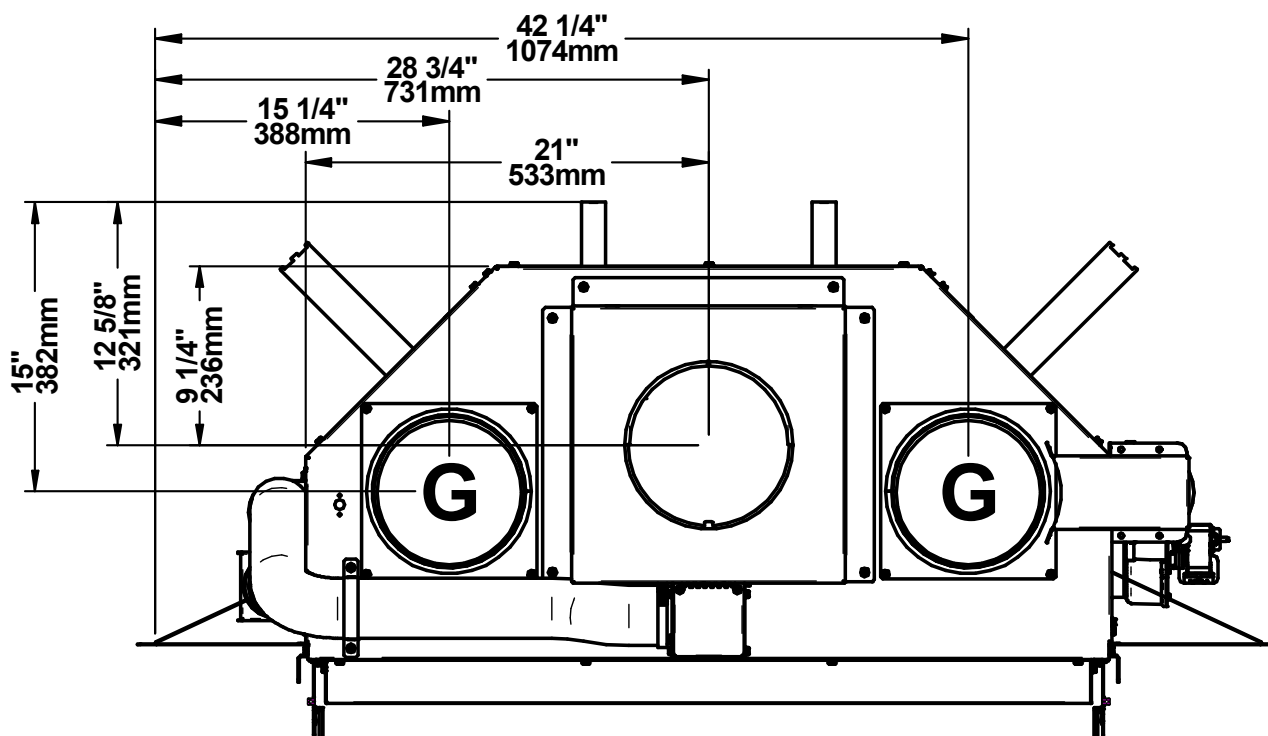


Figure 1: Top View

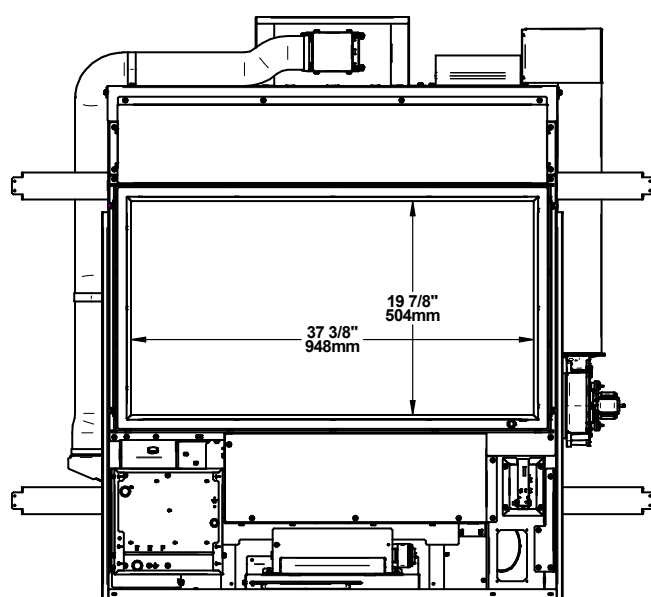


Figure 2: Front View

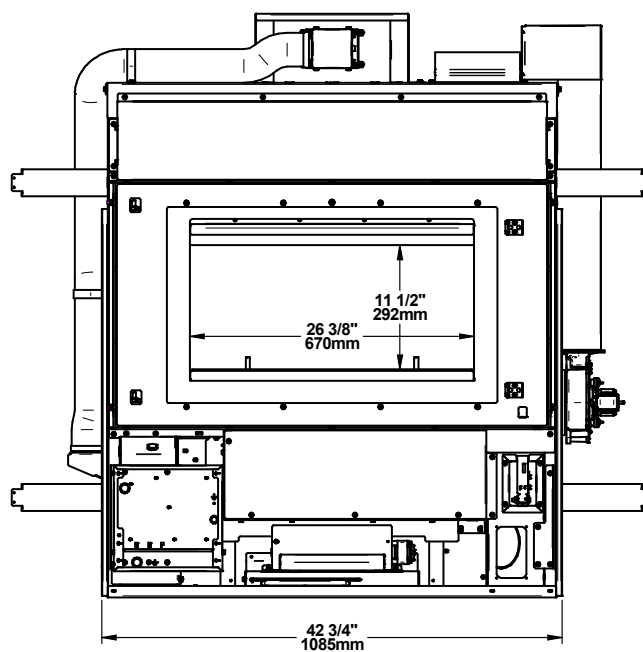


Figure 3: Front View - Door opening

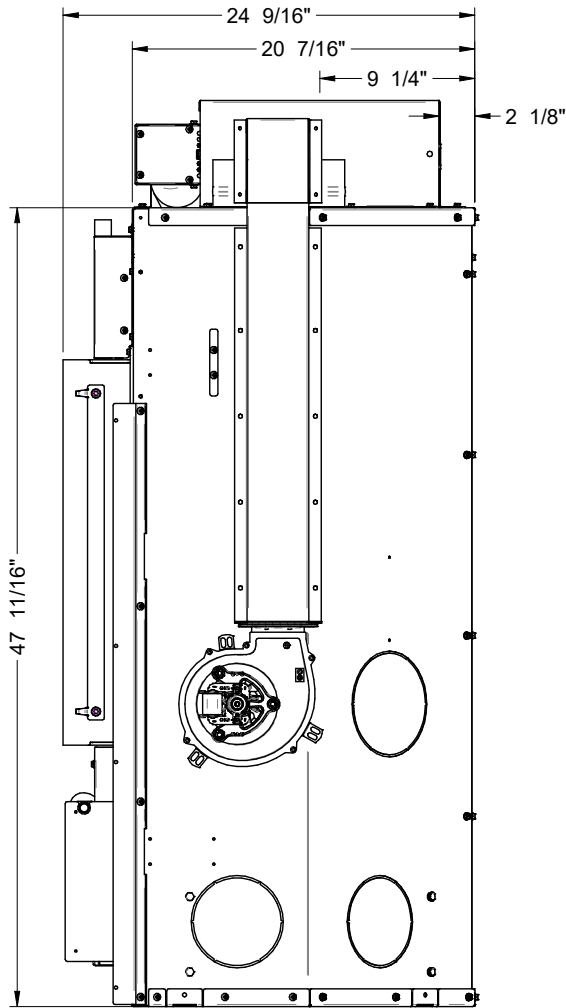


Figure 4: Side view

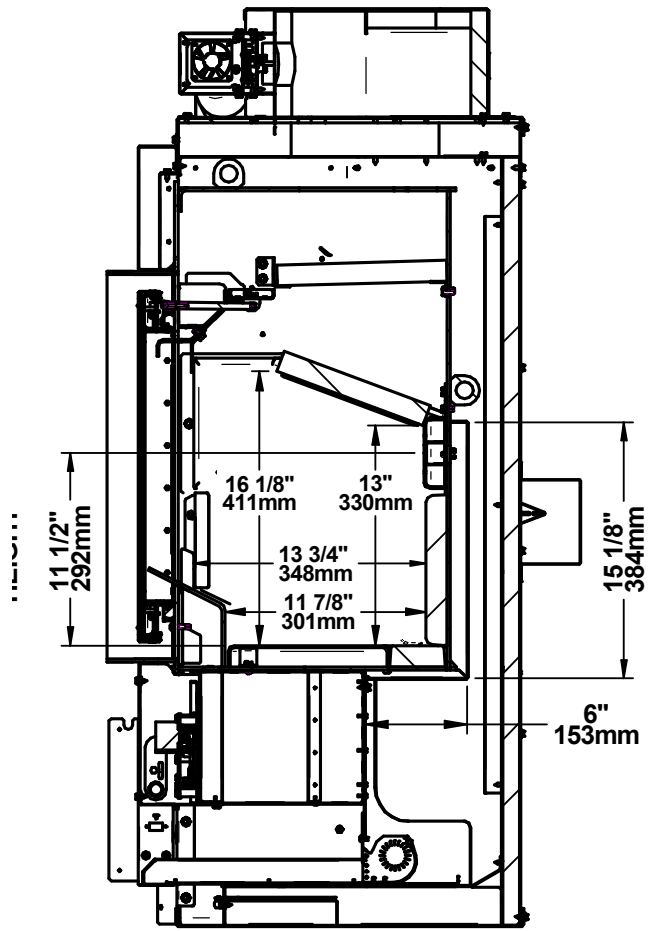


Figure 5: Combustion chamber - Side view

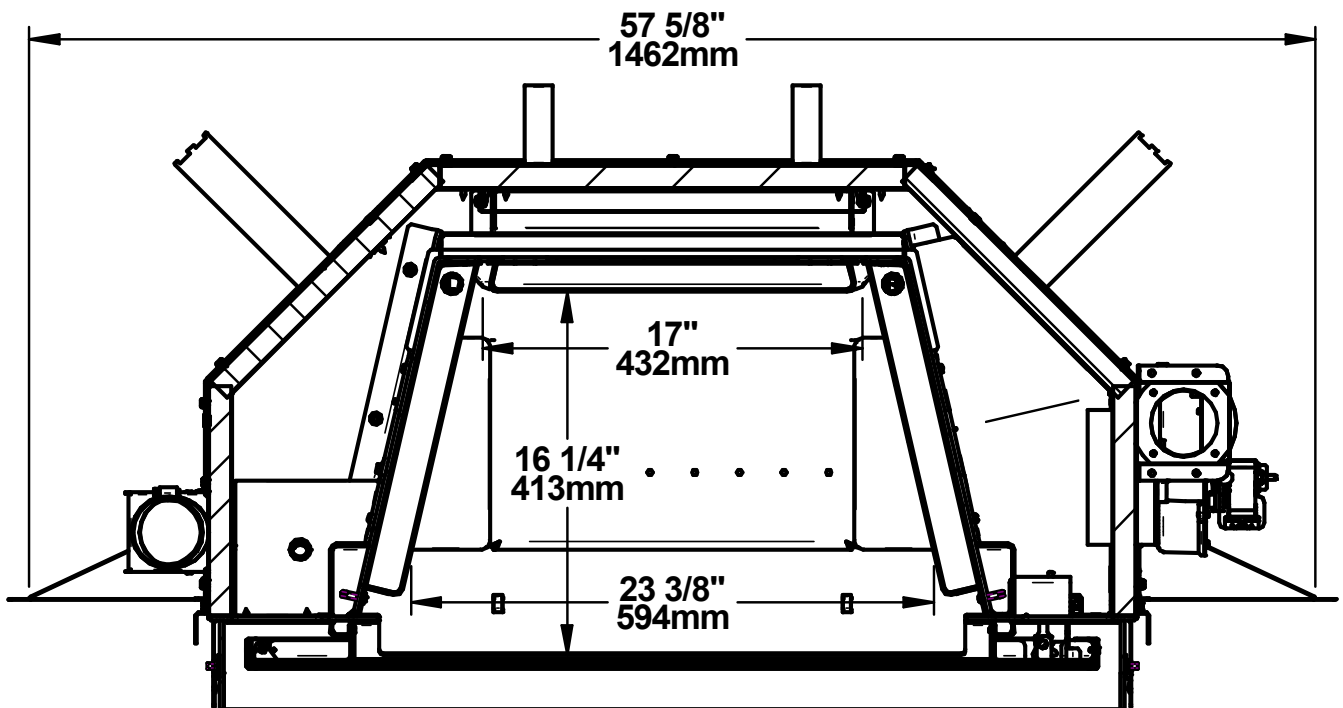


Figure 6: Combustion chamber - Top view

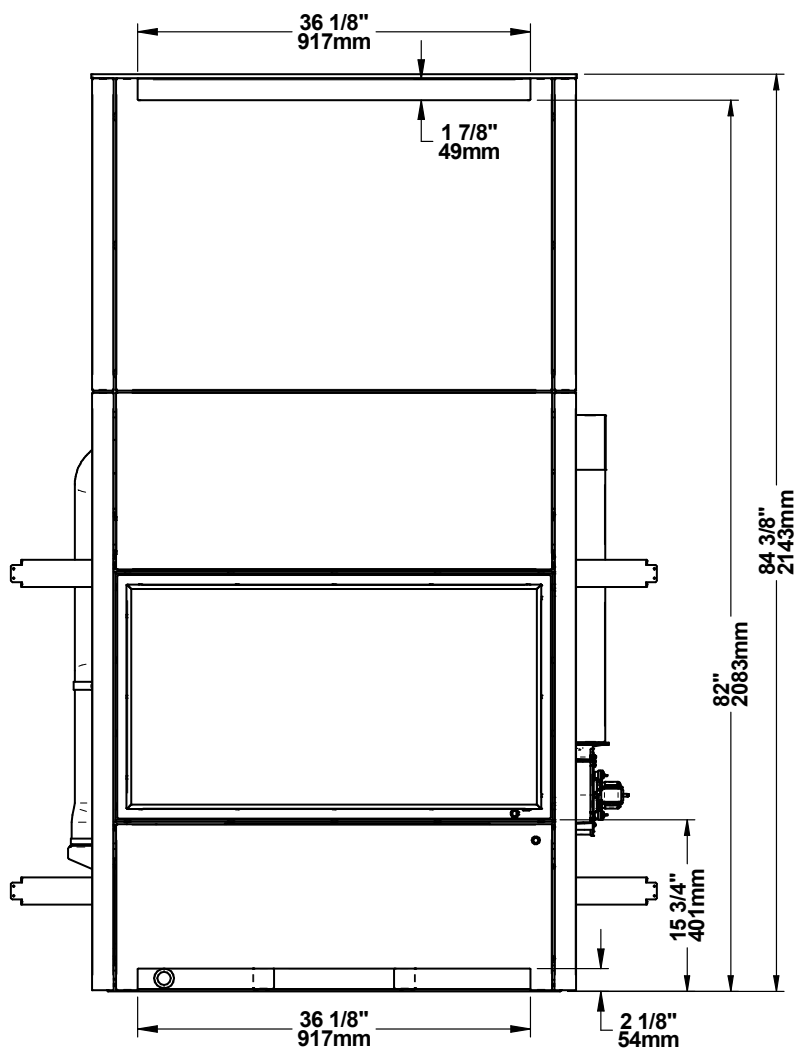


Figure 7: Front view with faceplate

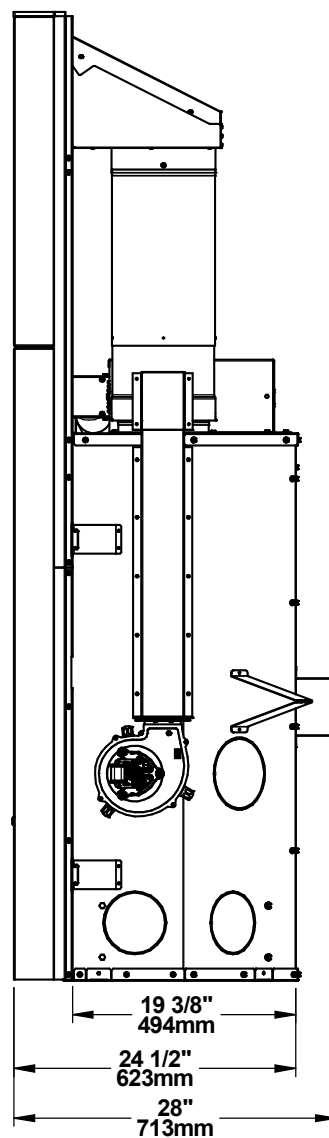


Figure 8: Side view with faceplate

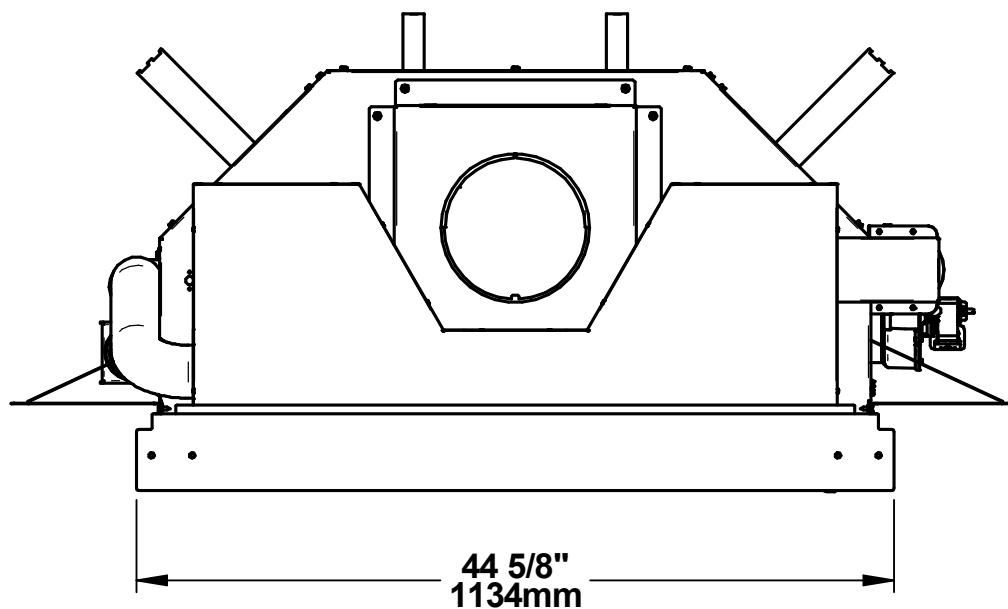


Figure 9: Top view with faceplate

## 2.4 Materials

The **body** of this fireplace, which is most of its weight, is carbon steel. Should it ever become necessary many years in the future, almost the entire fireplace can be recycled into new products, thus eliminating the need to mine new materials.

The **paint** coating on the fireplace is very thin. Its VOC content (Volatile Organic Compounds) is very low. VOCs can be responsible for smog, so all the paint used during the manufacturing process meets the latest air quality requirements regarding VOC reduction or elimination.

The **air tubes** are stainless steel, which can also be recycled.

The **baffle** is made of C-Cast or Vermiculite that is compressed with a binder to form a rigid board. C-Cast can withstand temperatures above 2,000 °F. It is not considered hazardous waste. Disposal at a waste management center is recommended.

Moulded **refractory panels** are mainly composed of silicon dioxide, also known as silica, a product processed from a mined mineral. It is most commonly found in nature in the form of sand and clay. Disposal at a waste management center is recommended. The steel mesh contained in some refractory bricks can also be recycled.

The door and glass **gaskets** are fibreglass which is spun from melted sand. Black gaskets have been dipped into a solvent-free solution. Disposal at a waste management center is recommended.

The door **glass** is a 5/32" (4 mm) thick ceramic material that contains no toxic chemicals. It is made of natural raw materials such as sand and quartz that are combined in such a way to form a high temperature glass. Ceramic glass cannot be recycled in the same way as normal glass, so it should not be disposed of with regular household products. Disposal at a waste management center is recommended.

## 2.5 Zone Heating

This fireplace is a space heater, which means it is intended to heat the area it is installed in, as well as spaces that connect to that area, although to a lower temperature. This is called zone heating and it is an increasingly popular way to heat homes or spaces within homes. Zone heating can be used to supplement another heating system by heating a particular space within a home, such as a basement, a family room or an addition that lacks another heat source.

Houses of moderate size and relatively new construction can be heated with a properly sized and located wood fireplace. Whole house zone heating works best when the fireplace is in the part of the house where the family spends most of its time. This is normally the main living area where the kitchen, dining and living rooms are located.

Locating the fireplace in this area will give the maximum benefit of the heat it produces and will achieve the highest possible heating efficiency and comfort. The space where the most time is spent will be warmest, while bedrooms and basement (if there is one) will stay cooler. In this way, less wood is burnt than with other forms of heating.

The best location for the fireplace should consider the location of windows, doors, and circulation in the room. There must be enough space in front of the fireplace for the hearth extension and mantel and on the sides or back for the different heat distribution system, for the fresh air intake and for the chimney. Ideally, the chimney must be able to pass through the house without the need to cut floor joists or roof trusses.

Although the fireplace may be able to heat the main living areas of the house to an adequate temperature, you must also have a conventional oil, gas or electric heating system as your primary heating source.

The success of zone heating will depend on several factors, including the correct sizing and location of the fireplace, the size, layout and age of your home and your climate zone. Three-season vacation homes can usually be heated with smaller fireplaces than houses that are heated all winter.

## 2.6 Emissions and Efficiency

The low smoke emissions produced by the special features inside this fireplace firebox mean that the household will release up to 90% less smoke into the outside environment than if an older conventional fireplace was used. But there is more to the emission control technologies than protecting the environment.

The smoke released from wood when it is heated contains about half of the energy content of the fuel. By burning the wood completely, this fireplace releases all the heat energy from the wood instead of wasting it as smoke up the chimney. Also, the features inside the firebox allow control of the air supply meaning controlling the heat output, while maintaining clean and efficient flaming combustion, which boosts the efficient delivery of heat to the home.

The emission control and advanced combustion features of this fireplace can only work properly if the fuel used is in the correct moisture content range of 15% to 20%. Refer to the following section of suggestions on preparing fuelwood and judging its moisture.



### 3. Fuel

Good firewood has been cut to the correct length for the fireplace, split to a range of sizes and stacked in the open until its moisture content is down to 15% to 20%.

#### DO NOT BURN:

- **COAL;**
  - **GARBAGE;**
  - **LAWN CLIPPINGS OR YARD WASTE;**
  - **MATERIALS CONTAINING RUBBER, INCLUDING TIRES;**
  - **MATERIALS CONTAINING PLASTIC;**
  - **WASTE PETROLEUM PRODUCTS, PAINTS OR PAINT THINNERS, OR ASPHALT PRODUCTS;**
  - **MATERIALS CONTAINING ASBESTOS;**
  - **CONSTRUCTION OR DEMOLITION DEBRIS;**
  - **RAILROAD TIES OR PRESSURE-TREATED WOOD;**
  - **MANURE OR ANIMAL REMAINS;**
  - **SALT WATER DRIFTWOOD OR OTHER PREVIOUSLY SALT WATER SATURATED MATERIALS;**
  - **UNSEASONED WOOD; OR**
  - **PAPER PRODUCTS, CARDBOARD, PLYWOOD, OR PARTICLE BOARD.**
- THE PROHIBITION AGAINST BURNING THESE MATERIALS DOES NOT PROHIBIT THE USE OF FIRE STARTERS MADE FROM PAPER, CARDBOARD, SAW DUST, WAX AND SIMILAR SUBSTANCES FOR THE PURPOSE OF STARTING A FIRE IN AN AFFECTED WOOD HEATER.**
- **BURNING THESE MATERIALS MAY RESULT IN THE RELEASE OF TOXIC FUMES OR RENDER THE HEATER INEFFECTIVE AND CAUSE SMOKE.**
  - **IF THESE FUELS ARE BURNED IT COULD CREATE A HIGHER CONCENTRATION OF CO THAN BURNING HARD WOOD.**

#### 3.1 Tree Species

The tree species the firewood is produced from is less important than its moisture content. The main difference in firewood from various tree species is the density of the wood. Hardwoods are denser than softwoods.

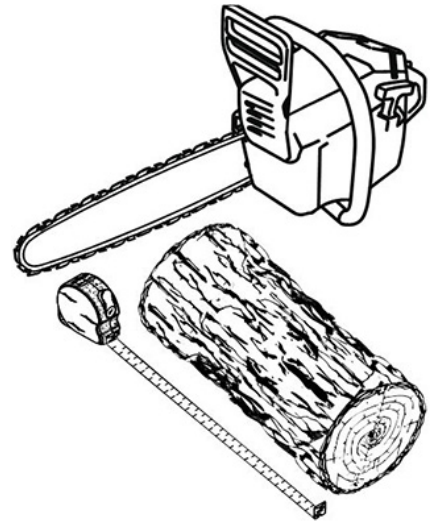
Homeowners with access to both hardwood and softwood use both types for different purposes. Softer woods make good fuel for mild weather in spring and fall because they light quickly and produce less heat.

Softwoods are not as dense as hardwoods so a given volume of wood contains less energy. Using softwoods avoids overheating the house, which can be a common problem with wood heating in moderate weather. Harder woods are best for colder winter weather when more heat and longer burn cycles are desirable.

Hardwood trees like oak, maple, ash and beech are slower growing and longer lived than softer woods like poplar and birch. That makes hardwood trees more valuable. The advice that only hardwoods are good to burn is outdated. Old, leaky cast iron fireplaces wouldn't hold a fire overnight unless they were fed large pieces of hardwood.

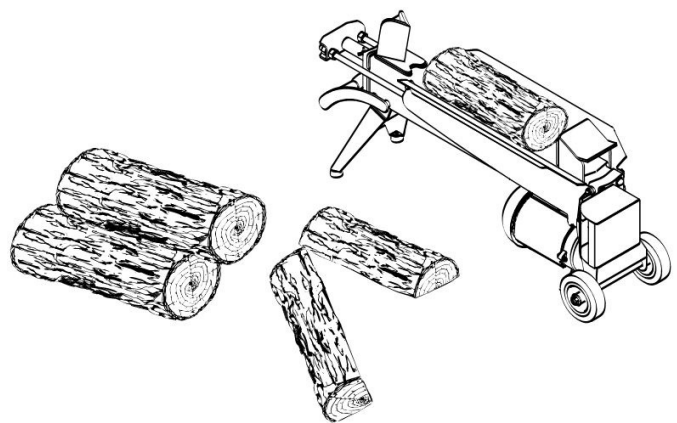
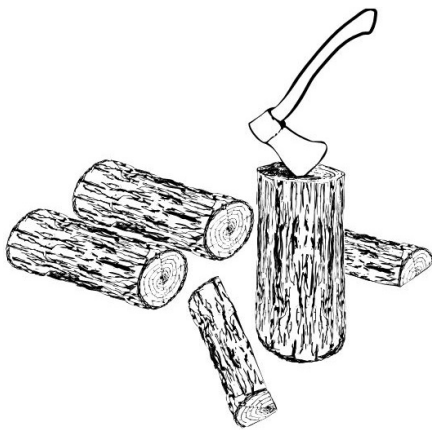
### 3.2 Log Length

Logs should be cut at least 1" (25 mm) shorter than the firebox so they fit in easily. Pieces that are even slightly too long makes loading the stove very difficult. The most common standard length of firewood is 16" (400 mm).



### 3.3 Piece Size

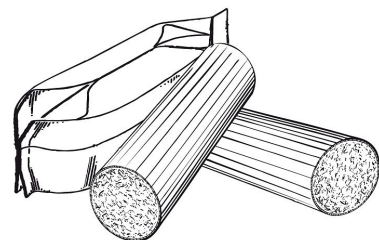
Firewood dries more quickly when it is split. Large unsplit rounds can take years to dry enough to burn. Even when dried, unsplit logs are difficult to ignite because they don't have the sharp edges where the flames first catch.



Wood should be split to a range of sizes, from about 3" to 6" (75 mm to 150 mm) in cross section. Having a range of sizes makes starting and rekindling fires much easier.

### 3.4 Compressed Wood Logs

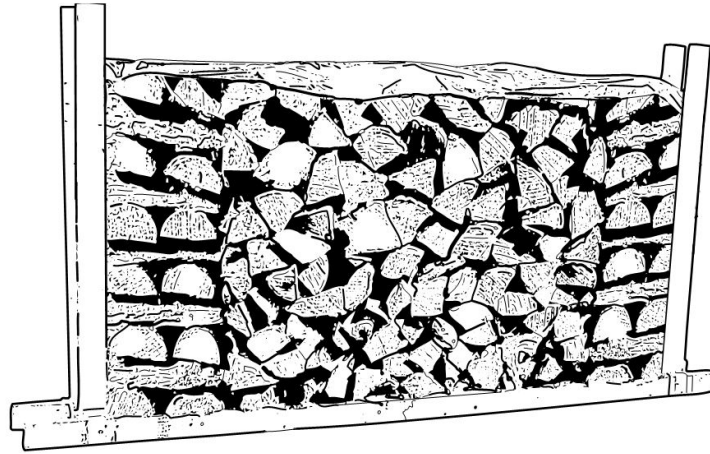
Compressed wood logs made of 100% compressed sawdust can be burned with caution in the number of these logs burned at once. Do not burn compressed logs made of wax impregnated sawdust or logs with any chemical additives. Follow the manufacturer's instructions and warnings. **Do not poke or stir the logs while they are burning.**



**Use only logs that meet the requirements of ULC/ORD C127 M1990 for composite logs. Refer to package cautions and warnings before using logs. Refer to cautions and warnings on package before using logs.**

### 3.5 Drying Time

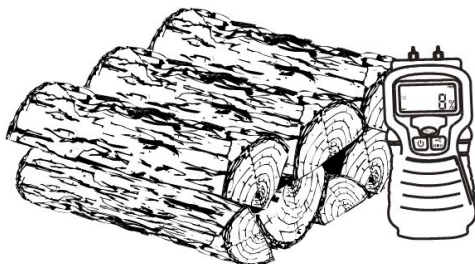
Firewood that is not dry enough to burn is the cause of most complaints about wood burning appliances. Continually burning green or unseasoned wood produces more creosote and involves lack of heat and dirty glass door. Firewood with a moisture content between 15% and 20% will allow the stove to produce its highest possible efficiency.



#### Here are some facts to consider in estimating drying time:

- Firewood bought from a dealer is rarely dry enough to burn, so it is advisable to buy the wood in spring and dry it yourself;
- Drying happens faster in dry weather than in a damp climate;
- Drying happens faster in warm summer weather than in winter weather;
- Small pieces dry more quickly than large pieces;
- Split pieces dry more quickly than unsplit rounds;
- Softwoods like pine, spruce, poplar, and aspen take less time to dry than hardwoods. they can be dry enough to burn after being stacked to air dry only for the summer months;
- Hardwoods like oak, maple and ash can take one, or even two years to dry fully, especially if the pieces are big;
- Firewood dries more quickly when stacked outside in a location exposed to sun and wind; it takes much longer to dry when stacked in a wood shed;

#### Use these guidelines to find out if the firewood is dry enough to burn:



- Cracks form at the ends of logs as they dry;
- The wood turns from white or cream colored to grey or yellow;
- Two pieces of wood struck together sounds hollow;
- Dry wood is much lighter in weight than wet wood,
- The face of a fresh cut feels warm and dry;
- The moisture content read by a moisture meter is between 15% to 20%.

## 4. Efficient Wood Combustion

### 4.1 First Use

Two things happen when burning the first few fires; the paint cures and the internal components are conditioned. As the paint cures, some of the chemicals vaporize. The vapors are not poisonous, but they smell bad. Fresh paint fumes can also trigger false alarms in smoke detectors. When lighting the heater for the first few times, it may be wise to open doors and windows to ventilate the house.

Burn two or three small fires to begin the curing and conditioning process. Then build bigger and hotter fires until there is no longer paint smell from the fireplace. As hotter and hotter fires are burned, more of the painted surfaces reach the curing temperature of the paint. The smell of curing paint does not disappear until one or two very hot fires have been burned.



**Never use gasoline, gasoline-type lantern fuel (naphtha), fuel oil, motor oil, kerosene, charcoal lighter fluid, or similar liquids or aerosols to start or ‘freshen up’ a fire in this wood stove. Keep all such liquids well away from the stove while it is in use.**

#### 4.1.1 Using Fire Starters

Commercial fire starters can be used instead of a newspaper. Some of these starters are made of sawdust and wax and others are made of specialized flammable solid chemicals. Always follow the package directions when using.

Gel starters can also be used, but only to light a fire, in a cold combustion chamber without hot embers inside.

*The heater should not be left unattended during ignition and the fire should not burn at full intensity for more than a few minutes.*

### 4.2 Combustion Cycles

Wood heating with a space heater is very different than other forms of heating. There will be temperature variations in different parts of the house and there will be temperature variations throughout day and night. This is normal, and for experienced wood burners these are advantages of zone heating wood burning.

Wood heaters don't have a steady heat output. It is normal for the temperature to rise after a new load of wood is ignited and for its temperature to gradually decrease throughout the burning cycle.

This increasing and decreasing temperature can be matched with the household routines. For example, the temperature in the area can be cooler when the household is active, and it can be warmer when it is inactive.

Wood burns best in cycles. A cycle starts when a new load of wood is ignited by hot coals and ends when that load has been consumed down to a bed of charcoal about the same size as it

was when the wood was loaded.

Trying to produce a steady heat output by placing a single log on the fire at regular intervals is not recommended. Always place at least three, and preferably more pieces on the fire at a time so that the heat radiated from one piece helps to ignite the pieces next to it. Each load of wood should provide several hours of heating. The size of each load may vary depending on the amount of heat required.

Burning in cycles means the loading door does not need to be opened while the wood is flaming. This is an advantage since it is preventing smoke leaking from the heater when the door is opened as a full fire is burning. This is especially true if the chimney is on the outside wall of the house.

*If the door must be opened while the fire is flaming, fully open air control for a few minutes then open the door slowly.*

### 4.3 Removing Ashes

Ash should be removed from the firebox every two to three days of full-time heating. Ash should not accumulate excessively in the firebox since it will affect the proper operation of the appliance.

The best time to remove ash is in the morning, after an overnight fire when the fireplace is relatively cold, but there is still a little chimney draft to draw the ash dust into the fireplace and prevent going out into the room.

#### *Disposal of ashes*

*Ashes should be placed in a tightly covered metal container. The container must be placed on a non-combustible floor or on the ground well away from all combustible materials. Ashes almost always contain live embers that can stay hot for days and which release carbon monoxide gas. If the ashes are disposed of by burial in soil or otherwise locally dispersed, they should be kept in a closed metal container until they are completely cooled. No other waste should be placed in this container.*



**NEVER STORE ASHES INDOORS OR IN A NON-METALLIC CONTAINER OR ON A WOODEN DECK.**

## 4.4 Air Intake Control

Once the firewood, firebox and chimney are hot, air intake can be reduced to achieve a steady burn.

As the air intake is reduced, the burn rate decreases. This has the effect of distributing the thermal energy of the fuel over a longer period of time. In addition, the flow rate of exhaust through the appliance and flue pipe slows down, which increases the duration of the energy transfer of the exhaust gases. As the air intake is reduced, the flame slows down.

If the flames diminish to the point of disappearing, the air intake has been reduced too early in the combustion cycle or the wood used is too wet. If the wood is dry and the air control is used properly, the flames should decrease, but remain bright and stable.

On the other hand, too much air can make the fire uncontrollable, creating very high temperatures in the unit as well as in the chimney and seriously damaging them. A reddish glow on the unit and on the chimney components indicates overheating. Excessive temperatures can cause a chimney fire.

## 4.5 Fire Types

Using the air intake control is not the only way to match the fireplace heat output to the desired temperature in the house. A house will need far less heating in October than in January to maintain a comfortable temperature. Filling the firebox full in fall weather will overheat the space. Otherwise, the combustion rate will have to be reduced to a minimum and the fire will be smoky and inefficient. The method used to certify your appliance according to EPA Standards is presented in the [Loading Procedure](#) section of this manual. This method was developed specifically for your fireplace and results in the most efficient and cleanest combustion.

### 4.5.1 Maximum Burn Cycle Times

The burn cycle time is the period between loading wood on a coal bed and the consumption of that wood back to a coal bed of the same size. The flaming phase of the fire lasts for roughly the first half of the burn cycle and the second half is the coal bed phase during which there is little or no flame.

The burning time expected from this fireplace, including both phases, will vary depending on a number of things, such as:

- firebox size,
- the amount of wood loaded,
- the species of wood,
- the wood moisture content,
- the size of the space to be heated,
- the climate zone where the house is, and
- the time of the year.

The table below gives an approximate maximum burn cycle times, based on firebox volume.

**Table 1 : Approximate Maximum Burn Cycle Time**

| <b>FIREBOX VOLUME</b> | <b>MAXIMUM BURN CYCLE TIME</b> |
|-----------------------|--------------------------------|
| <1.5 cubic feet       | 3 to 5 hours                   |
| 1.5 c.f. to 2.0 c.f.  | 5 to 6 hours                   |
| 2.0 c.f. to 2.5 c.f.  | 6 to 8 hours                   |
| 2.5 c.f. to 3.0 c.f.  | 8 to 9 hours                   |
| >3.0 c.f.             | 9 to 10 hours                  |

A longer burning time is not necessarily an indication of efficient fireplace operation. It is preferable to build a smaller fire that will provide three or four hours of heating than to fully load the firebox for a much longer burn. Shorter burn cycles make it easier to match the heat output of the fireplace to the heat demand for the space.



### 4.5.2 Logs Orientation

In a relatively square firebox, the wood can be loaded north-south (ends of the logs visible) or east-west (sides of the logs visible).

North-south loads allow more wood to be loaded at the same time. On the other hand, they break into smaller pieces faster. North-south loading is good for high output, long lasting fires for cold weather.

East-west loads allow a limited amount of wood since too many logs could cause them to fall on the glass. East-west loads, placed in a compact way, take a long time before breaking down. They are excellent for low-intensity, long-lasting fires in relatively mild weather.

### 4.5.3 Carbon Monoxide

When there is no more flame in the firebox and there are still some unburned logs, check outside if there is smoke coming out of the chimney. If this is the case, it means that the fire is out of air to burn properly. In this situation, the level of CO increase and it is important to react. Open the door slightly and move the logs with a poker. Create a passage for the air below by making a trench with the ember bed. Add small pieces of wood to restart the combustion.



**The minimum burn rate for this wood-burning fireplace has been set by the manufacturer and should not be altered. It is against federal regulations to alter this setting or to operate this wood-burning fireplace in a manner inconsistent with the operating instructions in this manual.**



## 4.6 Loading Procedure

The images below show the space in the firebox where the logs are to be placed. It is important to always respect this space and not to put logs in the grid area marked with an X. The marked area is defined by the space between the glass and the andirons and above the “MAX LOAD” marking which represent where most of the secondary combustion air is injected inside the firebox. Leave enough space between the logs for good air circulation. Using more than the usable firebox volume for loading wood will result in poor combustion. The Usable firebox volume of 1.90 ft<sup>3</sup> shown below is the one used during EPA emissions certification. The recommended log length for this wood heater is 16 inches. Fuel specie and length used for the EPA certification will be Big Leaf Maple and 18 inches long. **IF LOGS ARE IN THE UPPER AREA, THE RESULT WILL BE TOO RICH COMBUSTION WHICH WILL RESULT IN DIRTING THE GLASS AND CLOGGING THE HEAT EXCHANGER AND THE CHIMNEY.**

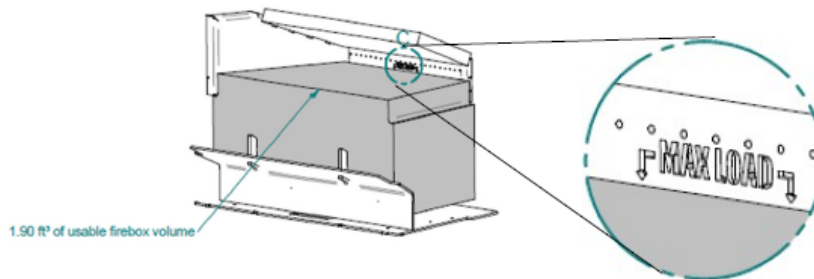
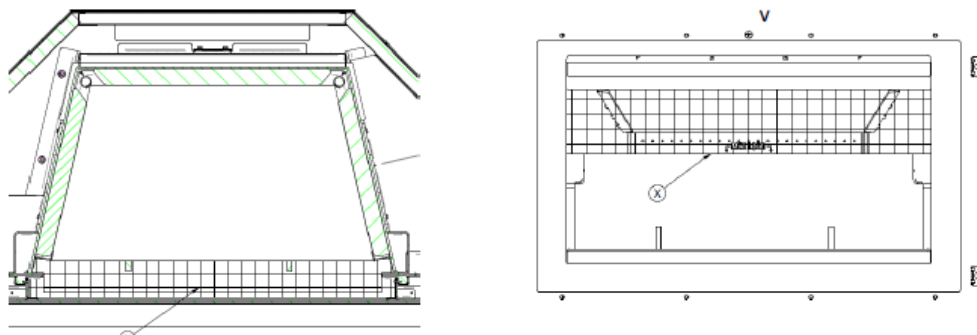


Figure 1 - Usable Firebox Volume



### 4.6.1 Air control

This heater has automatic motorized air control. To open the air controls in preparation for ignition, press the load button located on the right side, under the door handle. To achieve a high combustion rate, you can either increase the heating setting on the wireless thermostat (included with the unit) or operate the stove in manual mode and put it in the High position. See section 6.4 to learn how to use the wireless thermostat. Conversely, to achieve a low combustion rate, you can either reduce the heating setting on the wireless thermostat or operate the stove in manual mode and put it in the Low position.

### 4.6.2 Start-up phase

The remote control should be on “High” or the thermostat should “call for heat”. Place crumpled newspaper sheets on the firebox floor and carefully criss-cross 10 to 15 kindling pieces of 1"x1" (2.5 cm x 2.5 cm) approximately over the paper in the middle of the firebox. For the best ignition, put the three biggest pieces of kindling on the paper, at a 45-degree angle, with forward part laying on the ash lip and the rear part on the bottom brick. Use those kindling pieces to support the rest of the kindling pieces. This allows to leave enough space for the paper under the kindling pieces for a better paper ignition. The biggest kindling pieces remaining must be put in the second layer and smallest kindling pieces on the third layer. In general, leave some air spaces between each kindling pieces.

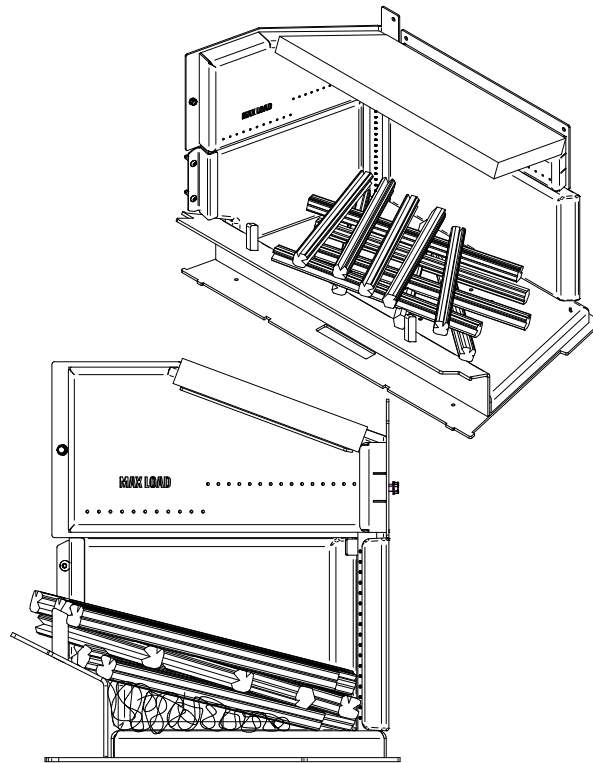


Figure 14: Kindling configuration

The kindling pieces need to be dry with moisture content about 10%. To achieve such a dry condition, we recommend splitting kindling pieces at least 2 weeks in advance, and let it dry in a criss-cross stack, and leave it inside at ambient temperature and low relative humidity. The best practice is to have 2 stacks done first, and, have a rotation of those stack to allow one to dry when you use the dried one.

Place 4 pieces of start-up fuel of 2 in. x 2 in. (5 cm x 5 cm) approximately over the kindling. For Start-up fuel configuration refer to the picture below. Leave air space between each start-up fuel pieces. Basically, for a good and fast ignition you need to allow the flames to pass all around each wood pieces.

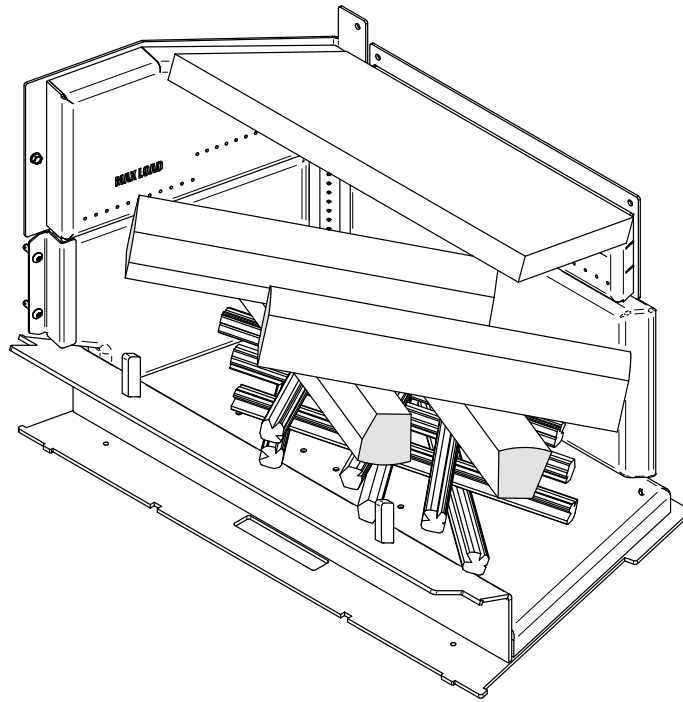


Figure 15: Start-up Fuel configuration

Press the Reload Button when the unit is cold. This will calibrate all sensors of the appliance. If the appliance is rarely cold, try to do a “cold calibration”, at least once a week. Light up the paper at the front and on the side of the fuel load. Using a propane torch for approximately one minute will be more efficient (faster) than a small lighter. Half-open the door and let the flame intensity increase for about 2 minutes. Close the door when the flames are rolling fast above the fuel load (see picture below). A fast and very hot ignition will insure an efficient combustion.



Figure 16: Picture of the flame when to close the door

### 4.6.3 High-fire phase

The best time to start this phase is when the unit has a small embers bed, some fuel pieces not completely burned and also when there are still some flames in the combustion chamber. See Figures below for an example.

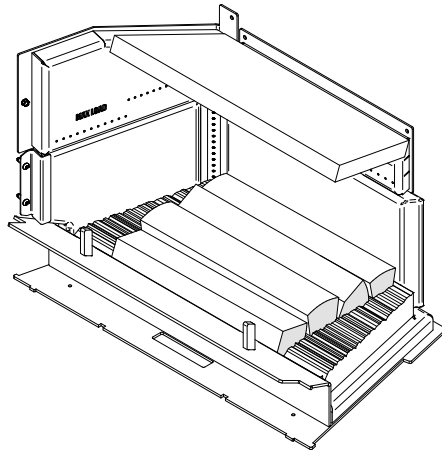


Figure 17 : Unburned pieces position prior to load High Fire load



Figure 18 : Picture of the flame when to load the High Fire Load.

The remote control remains on high fire. This high-fire phase is intended to quickly heat an area, shortly after start-up phase or when restarting the appliance. The High fire load configuration can be made with 4 small cordwood pieces of 2.5 in. x 4.5 in (6 cm x 11 cm) approximately. Refer to picture below for a wood load configuration allowing an optimized ignition followed by a stable and clean combustion. In general, small wood pieces with moisture content between 19% and 25% (dry basis) will be configure in more compact configuration (limited air space between each piece). However, larger wood pieces with a higher moisture content will be configure with more air spaces between each wood pieces.

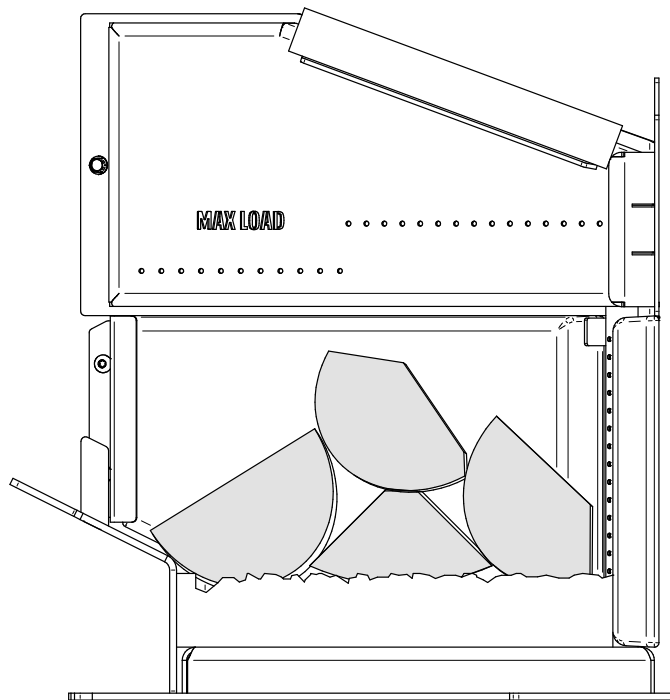


Figure 19: High Fire load in firebox

Following the start-up phase, when flames start to reduce in intensity (refer to Figure 18), open the door and put the first 3 pieces in East-West configuration directly on the unburned wood pieces. The load needs to be place in the middle of the firebox without touching the refractory panels. The last piece should be added on top of the first 3, stacked closer to the back, in an East-West orientation. Press the Reload Button before closing the door.

Keep the remote control on high for about half of an hour. That represents approximately when 50% of the load as been consumed. This is when the fire box has reached the maximum temperature, and the flames just begin to reduce in intensity. The remote control can be set to low fire at that point.

#### 4.6.4 Maintenance-fire phase

This phase is a period when a fire is maintained with a medium-sized embers bed, and a smaller batch of wood normally made of two large cordwood pieces. The goal is to maintain consistent heat output. The Maintenance-fire load configuration is made with 2 larges fuel pieces of 4 in. x 6 in (10 cm x 15 cm) approximately.

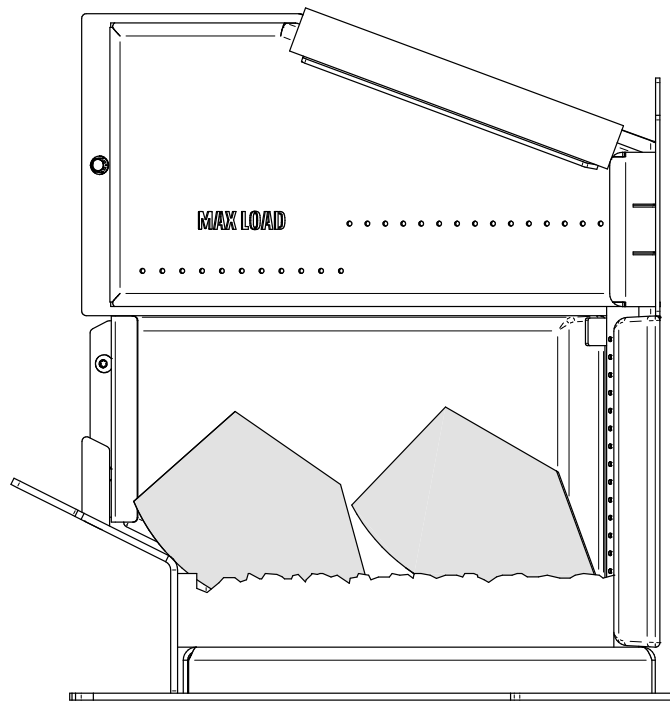


Figure 20: Maintenance Fire Loading

Following the high-fire phase, when there are only faint flames remaining and most of the wood is turned into embers, it is time to open the door. The wood pieces can be put gently over the embers bed, but it is recommended to stir the embers bed. Put the first piece in East-West orientation at the back of the firebox without touching the refractory panels. Put the second piece just in front of the first one also in East-West orientation. Press the Reload Button. Close the door and keep the remote control on low fire setting. It is not required to change the setting for proper ignition, the appliance will handle it.

#### 4.6.5 *Low-burn rate phase*

This phase is a period when the stove has a large embers bed, the stove is fully loaded, and the adjustable air settings are set to produce the lowest possible burn rate. This phase is made to maintain heat over a long time, such as overnight or while away for significant periods of time. The Low-burn rate load configuration is made with 3 large cordwood pieces of 4 in. x 6 in (10 cm x 15 cm) approximately and 3 medium cordwood pieces of 2.5 in. x 4.5 in (6 cm x 11 cm) approximately. The load configuration is East-West.

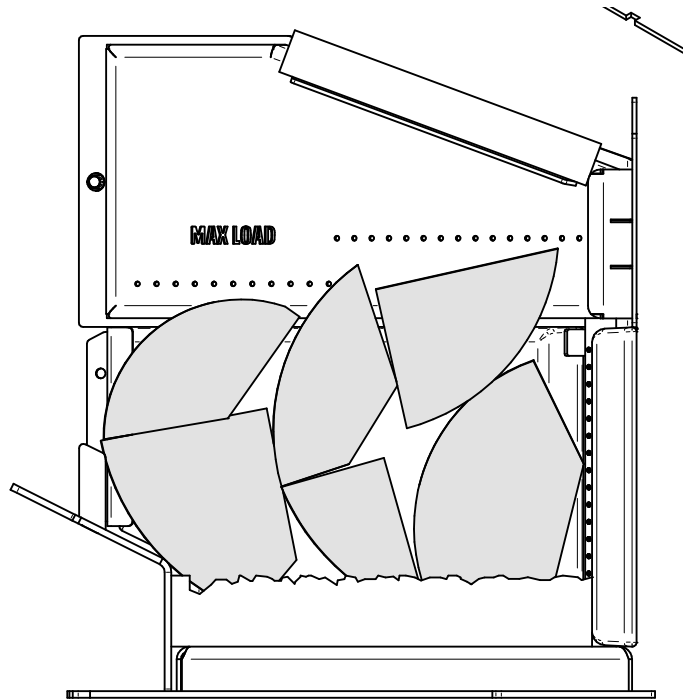


Figure 21: Low Fire Loading

Following the maintenance-fire phase, when there are only faint flames remaining (or no flames at all) and most of the wood is turned into embers, open the door and stir the embers bed to insure ease of wood loading.

For an optimal loading, put a large wood piece on the embers bed in the back, followed by a small piece in the middle and a large piece at the front. Use the log retainer to hold the third piece. For the second layer, every effort shall be made to avoid going above the MAX LOAD indicator. Typically, start with a small piece in the back, a large piece in the middle and a last small piece on the front as shown on the picture above. In general, for large wood load running at low firing rate, maintain air gap between the rear brick and the pieces allows for a faster ignition and an efficient combustion. Make sure that wood pieces are not inserted in the space between the door glasses and the log retainers (see section 2.1 above). Cordwood pieces at the front of the firebox need to be enough stable to not fall on the glass. Proper use of the log retainers can reduce log to roll into the glass door. Press the Reload Button and close the door.

**WARNING :** A “MAX LOAD” indicator can be found inside the combustion chamber. There should not be combustible above the indicator (should you always be able to see the “MAX LOAD” when your eyes are leveled with the indicator. Overloading the unit will result in dirty glass and a low combustion efficiency. Do not built the fire too close to the glass.

#### 4.6.6 *Power failure*

**This appliance needs power to operate and should never be installed without a proper electrical connection.** In the event of a power failure when the unit is operating, the appliance will enter in a fail-safe mode. Air controls will go in a position safe to finalize combustion. For longer power failure, small fires can be done by using small kindling and starter pieces only. If you live in an area where power failure are typically more than 3-4 hours, we recommend connecting a battery to operate the heater as its full capacity. A 12V, deep-cycle, 100Ah battery will be enough to operate the heater for at least 24h.



## 5. Maintenance

This heater will give many years of reliable service if used and maintained properly. Internal components of the firebox such as firebricks or refractory panels, baffle and air tubes will wear over time. Defective parts should always be replaced with original parts.

To avoid premature deterioration, follow the lighting and reloading procedures in section « Burning Wood Efficiently » and also avoid letting the heater run with the air intake fully open for entire burn cycles.

### 5.1 Cleaning and Painting

Painted and plated surfaces can be wiped down with a soft, damp cloth. If the paint is scratched or damaged, it is possible to repaint the fireplace with a heat-resistant paint. **Please note: It is more difficult to achieve color matching over a large area.**

**Do not clean or paint the fireplace when it is hot.**

Before painting, the surface should be sanded lightly with sandpaper and then wiped off to remove dust. Apply two thin layers of paint.

### 5.2 Refractory Material and Baffle

The intense heat of the fire can cause slight cracks in the refractory panels. It is possible to minimize the appearance of these cracks by hardening the panels as described in the section « First Use ».

Slight cracks will not reduce the effectiveness of the panels. On the other hand, if wider cracks appear, they must be replaced. Inspect the refractory panels and the baffle for damage periodically and replace anything that is cracked or broken.

*Operation of the heater with a cracked or missing baffle may cause unsafe temperatures and hazardous conditions and will void the warranty.*

### 5.3 Glass Door

Under normal conditions, the door glass should stay relatively clear. If the firewood is dry enough and the operating instructions in this manual are followed, a whitish, dusty deposit will form on the inner surface of the glass after a week or so of use. This is normal and can be easily removed when the heater is cold by wiping with a damp cloth or paper towel and then drying.

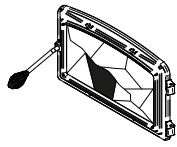
When the fireplace runs at a low combustion rate, light brown stains may form, especially in the lower corners of the glass. This indicates that the fire has been smoky and some of the smoke has condensed on the glass. It also indicates incomplete combustion of the wood, which also means more smoke emissions and faster formation of creosote in the chimney.

The deposits that form on the glass are the best indication of the fuel quality and success in properly using the fireplace. These stains can be cleaned with a special wood stove glass cleaner.

**Do not use abrasive products to clean the glass.**

The goal should be having a clear glass with no brown stains. If brown stains appear regularly on the glass, something about the fuel or the operating procedure needs to be changed. When brown streaks are coming from the edge of the glass, it is time to replace the gasket around the

glass. Always replace the gasket with a genuine one.



**Do not clean the glass when the fireplace is hot.**  
**Do not abuse the glass door by striking or slamming shut.**  
**Do not use the fireplace if the glass is broken.**

### 5.3.1 Replacement

The glass used is a ceramic glass, 5/32" (4 mm) thick, 37 7/8" x 20 3/8" (962mm x 517mm) tested to reach temperatures up to 1400° F. If the glass breaks, it must be replaced by a ceramic glass from SCHOTT with the same specification. Contact your dealer to obtain a genuine replacement part.

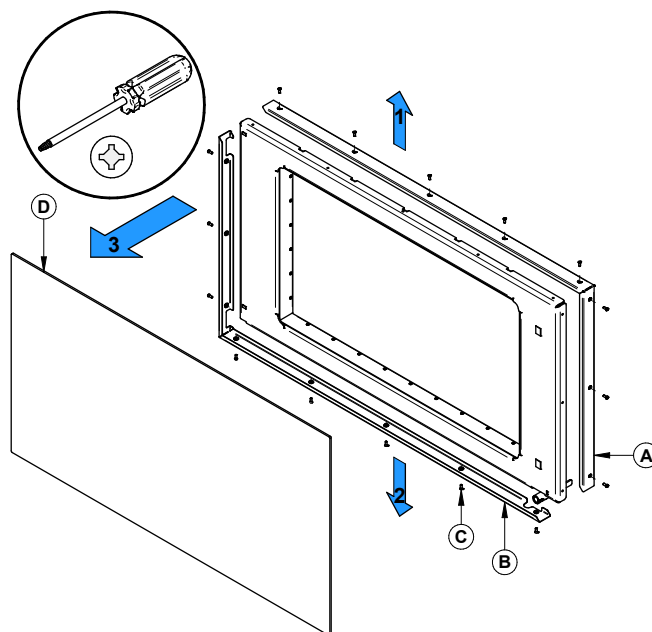
It is possible to replace your transparent glass with a tinted ROBAX® NightFlame. This fire viewing panels consist of a semi-transparent black glass-ceramic material designed for the use as thermal window in fireplaces with dead front effect to block the view when there is no flame in the firebox. Contact your dealer to have the ROBAX® NightFlame (PR46063).

**WARNING : DO NOT USE SUBSTITUTE MATERIALS WHEN REPLACING THE GLASS.**

**Tempered glass or ordinary glass will not withstand the high temperatures of this unit.**

To remove or replace the glass:

1. Remove the door from its hinges and lay it on a flat surface.
2. Remove the upper glass retainer **(A)** and the lower glass retainer **(B)** held in place by the screw **(C)**.
3. Remove glass **(D)**.
4. Repeat the steps in reverse order to install the new glass.

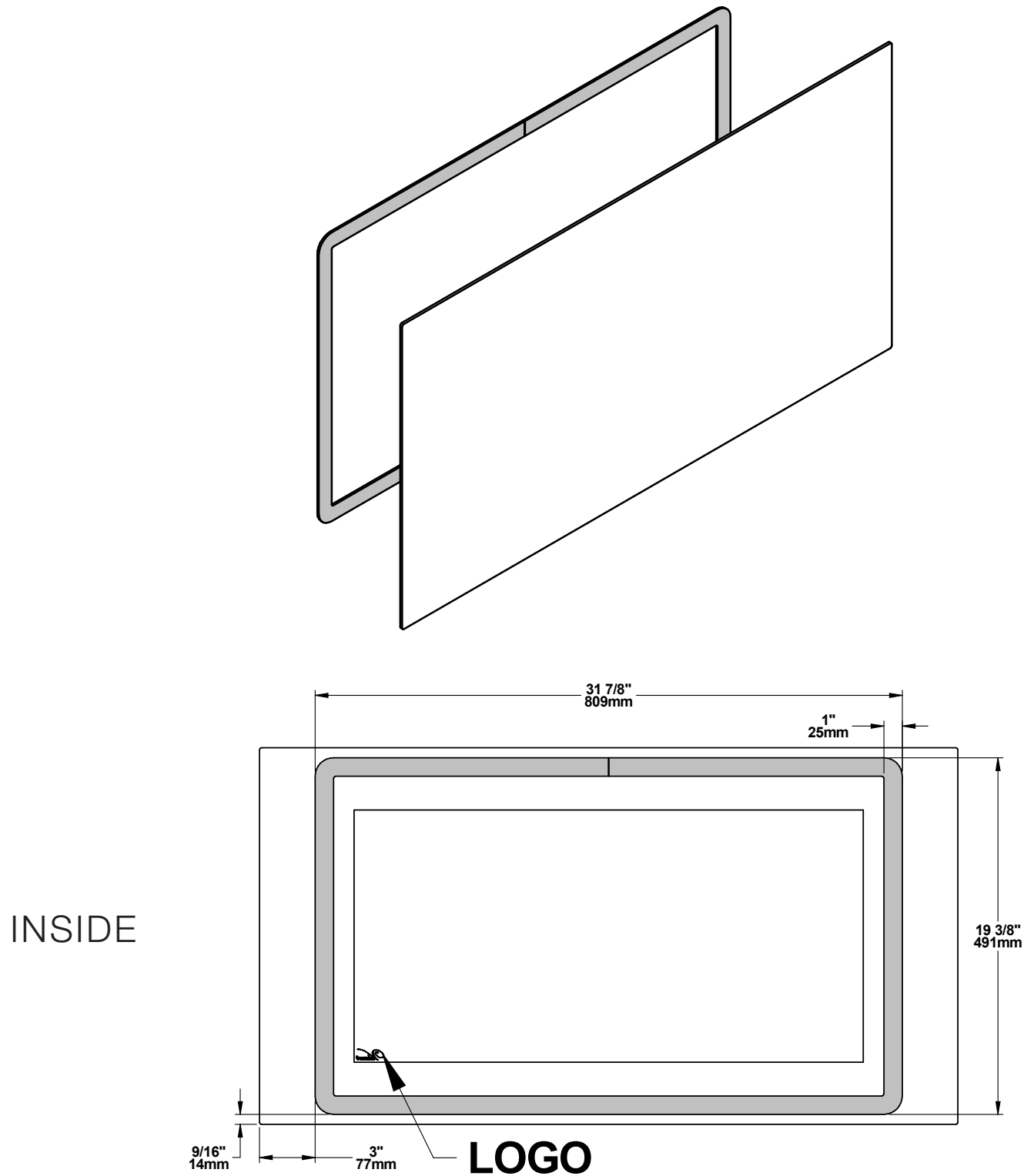


*The two main causes of broken door glass are uneven placement in the door and over-tightening the retaining screws.*

### 5.3.2 Gasket / installation

By following these instructions, the edge clearances are maintain.

1. Follow the steps of the previous section to remove the glass.
2. Cut and install the adhesive gaskets as shown in the drawings below.

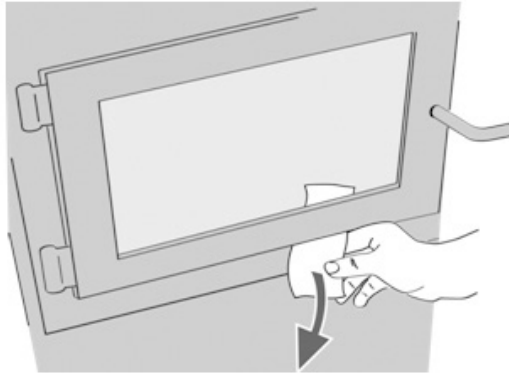


3. Replace the door by following the steps on the previous page.

## 5.4 Door

In order for the fireplace to burn at its best efficiency, the door must provide a perfect seal with the firebox. Therefore, the gasket should be inspected periodically to check for a good seal. The tightness of the door seal can be verified by closing and latching the door on a strip of paper. The test must be performed all around the door. If the paper slips out easily anywhere, either adjust the door or replace the gasket.

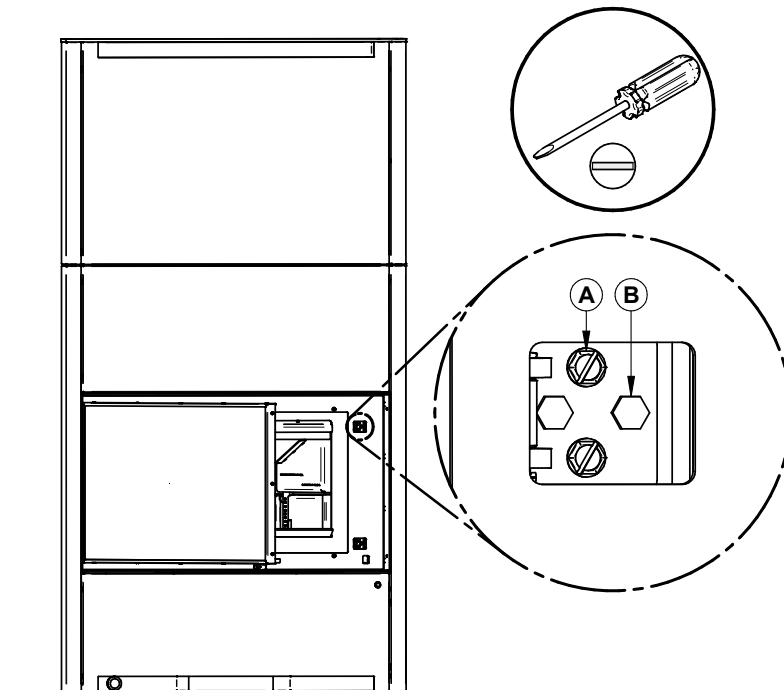
At the end of each heating season it is recommended to add a high temperature graphite paste on the threads of the door handles. This paste will protect the threads from rust and prevent dust accumulation that can prevent the handles from rotating freely.



### 5.4.1 Door Adjustment

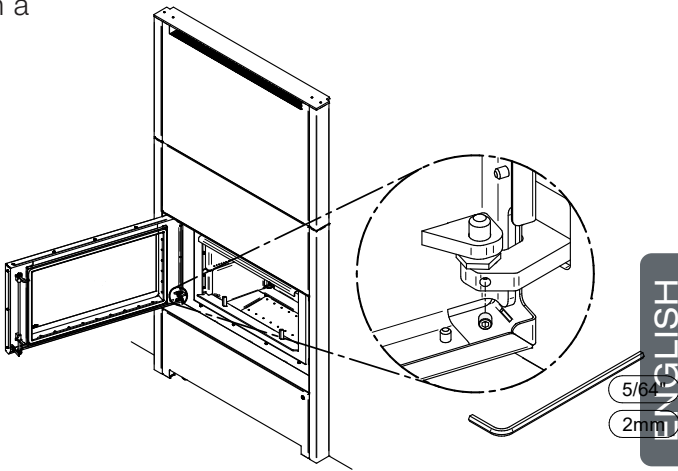
For the combustion of your fireplace to be optimal, the door should be perfectly tight with the combustion chamber. The seal must therefore be inspected periodically to get a good seal. The seal can be improved with a simple adjustment of the latch mechanism. Proceed as follows:

1. Open the door and locate the lower and upper latch systems to the right of the door opening.
2. Using slotted screwdriver or nutdriver (5/16"), loosening slightly the screws **(A)** before adjusting screws **(B)**. Turn the adjustment setscrews **(B)** counterclockwise to increase the compression of the gasket of the facing or clockwise to reduce the compression of the seal in the case of a new gasket for example. Tighten screws **(A)** before using the door.

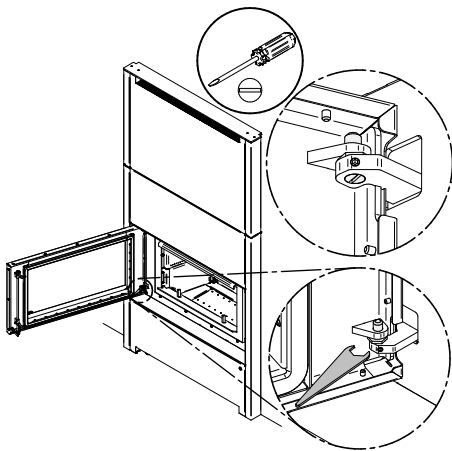


5.4.2 *Alignement*

To align the doors, open the doors and slightly unscrew the set screws on the lower and upper door hinges with a 3/32" Allen key to release the adjustable hinge rods.



ENGLISH



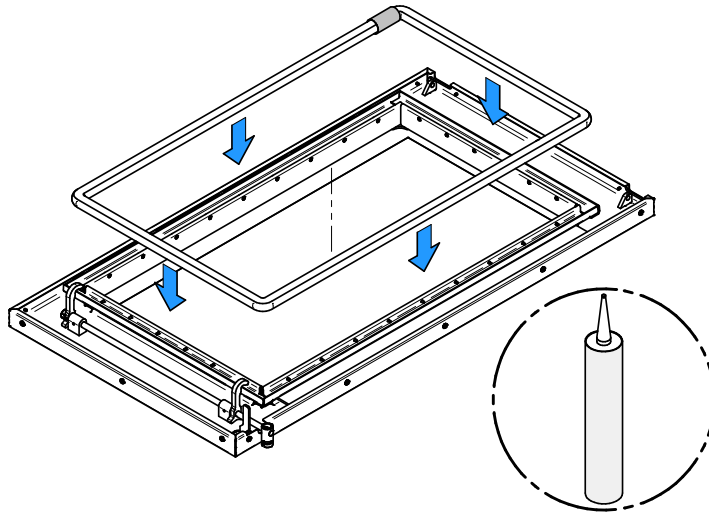
Using a flat screwdriver, turn the adjustable hinge rods in the directions shown to adjust the door. Tighten the set screws on the door hinges when they are in the desired positions.

|               | Doors position<br>with more space | Doors position<br>with less space | Doors tilt up | Doors tilt down |
|---------------|-----------------------------------|-----------------------------------|---------------|-----------------|
| Top pintle    |                                   |                                   |               |                 |
| Bottom pintle |                                   |                                   |               |                 |

### 5.4.3 Gasket

It is important to replace the gasket with another having the same diameter and density to maintain a good seal.

1. Remove the door and place it face-down on something soft.
2. Remove the old gasket from the door. Use a screwdriver to scrape the old gasket adhesive from the door gasket groove.
3. Apply a bead of approximately 3/16" (5 mm) of high temperature silicone in the door gasket groove. Starting from the middle, hinges side, press the gasket into the groove. The gasket must not be stretched during installation.
4. Leave about 1/2" (10 mm) long of the gasket when cutting and press the end into the groove. Tuck any loose fibers under the gasket and into the silicone.
5. Close the door. Do not use the fireplace for 24 hours.



## 5.5 Exhaust System

Wood smoke can condense inside the chimney, forming a inflammable deposit called creosote. If creosote builds up in the system, it can ignite when a hot fire is burned in the insert. A very hot fire can progress to the top of the chimney. Severe chimney fires can damage even the best chimneys. Smouldering, smoky fires can quickly cause a thick layer of creosote to form. When the insert is operated properly, the exhaust from the chimney is mostly clear and creosote builds up more slowly.

### «Creosote - Formation and Need to Removal

*When wood is burned slowly, it produces tar and other organic vapors, which combine with expelled moisture to form creosote. The creosote vapors condense in the relatively cooler chimney flue of a slow-burning fire. As a result, creosote residue accumulates on the flue lining. When ignited this creosote makes an extremely hot fire. The chimney connector and chimney should be inspected at least once every two months during the heating season to determine if a creosote buildup has occurred. If creosote has accumulated ( $\frac{1}{8}$ " [3mm] or more it should be removed to reduce the risk of a chimney fire»*

### 5.5.1 Cleaning frequency

It is not possible to predict how much or how quickly creosote will form in the chimney. It is important, therefore, to check the build-up in the chimney monthly until the rate of creosote formation is determined.

Even if creosote forms slowly in the system, the chimney should be cleaned and inspected at least once each year.

Establish a routine for the fuel, wood burner and firing technique. Check daily for creosote build-up until experience shows how often you need to clean to be safe. Be aware that the hotter the fire, the less creosote is deposited and weekly cleaning may be necessary in mild weather even though monthly cleaning may be enough in the coldest months. Contact your local municipal or provincial fire authority for information on how to handle a chimney fire. Have a clearly understood plan to handle a chimney fire.

## 5.6 Sweeping the Chimney

Chimney sweeping can be a difficult and dangerous job. People with no chimney sweeping experience will often prefer to hire a professional chimney sweep to inspect and clean the system for the first time. After seeing the cleaning process, some will choose to do it themselves. The chimney should be checked regularly for creosote buildup. Inspection and cleaning of the chimney can be facilitated by removing the baffle. See « Refractory Panels Replacement » in the product specification manual for more details.

To access the top of the chimney, you will need to remove the chimney cap. It can be secured in place with screws or other fasteners. With the appropriate tool, remove the fasteners holding the cap in place and remove the cap.



### 5.6.1 Chimney Fire

Regular chimney maintenance and inspection can prevent chimney fires. If you have a chimney fire, follow these steps:

1. Close the fireplace door and the air intake control;
2. Alert the occupants of the house of the possible danger;
3. If you require assistance, alert the fire department;
4. If possible, use a dry chemical fire extinguisher, baking soda or sand to control the fire. ***Do not use water*** as it may cause a dangerous steam explosion;

**Do not use the appliance again until the fireplace and its chimney have been inspected by a qualified chimney sweep or a fire department inspector.**



## 5.7 Particle Sensor Maintenance (SE76079)

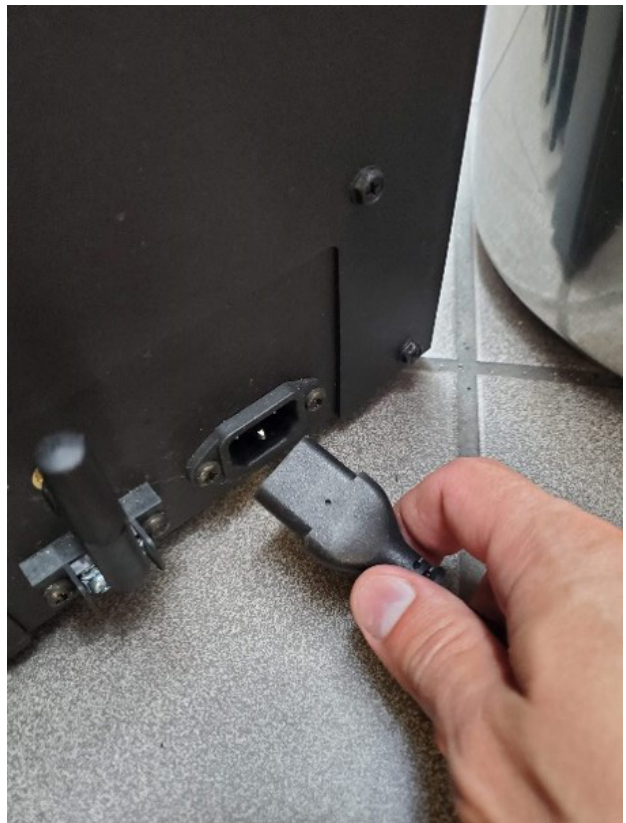
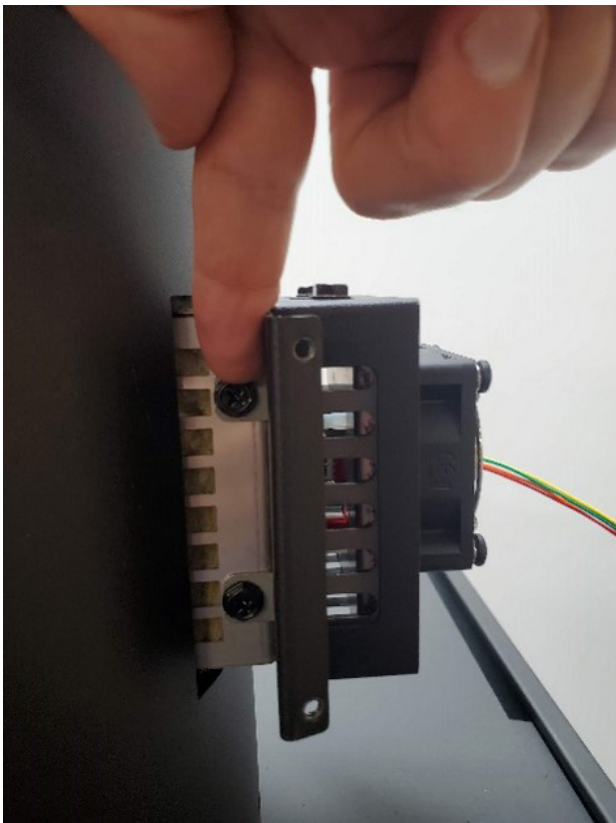
The particle sensor must be removed for maintenance. Follow the procedure below to remove it.

### Tools needed:

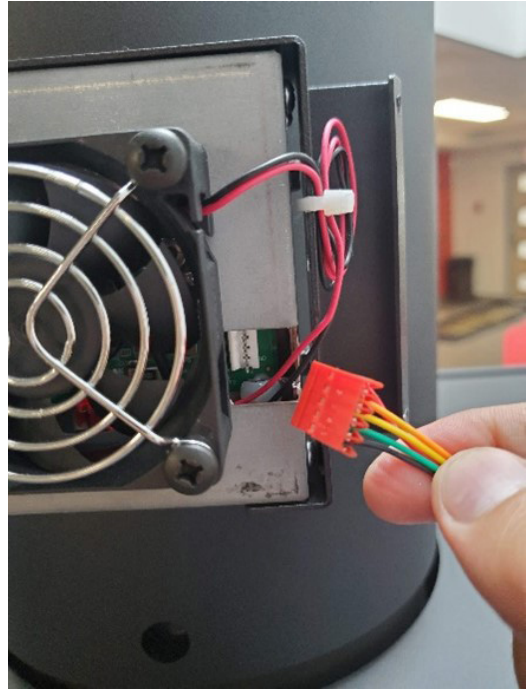
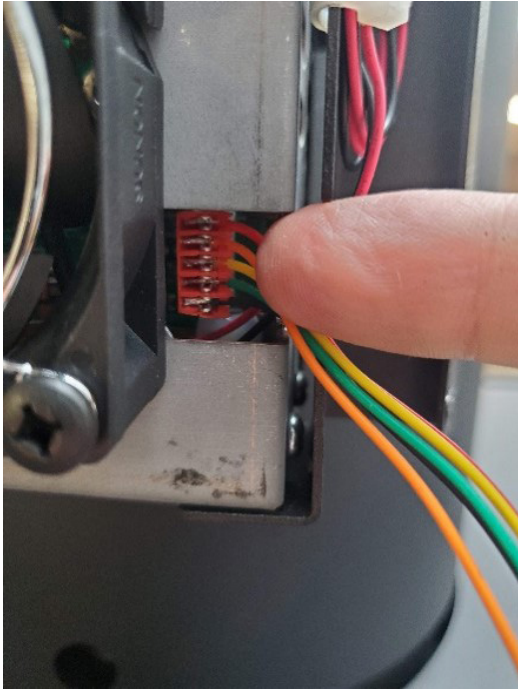
- Screwdriver or power drill
- Long nose pliers
- A 5/16 socket
- Star screwdriver if you don't have a 5/16 socket

### Procedure to follow

1. Using a screwdriver or an electric drill and the 5/16 socket removed the 4 screws that hold the case that contains the particle board and the fan.
2. Unplug the power outlet that is connected to the stove.



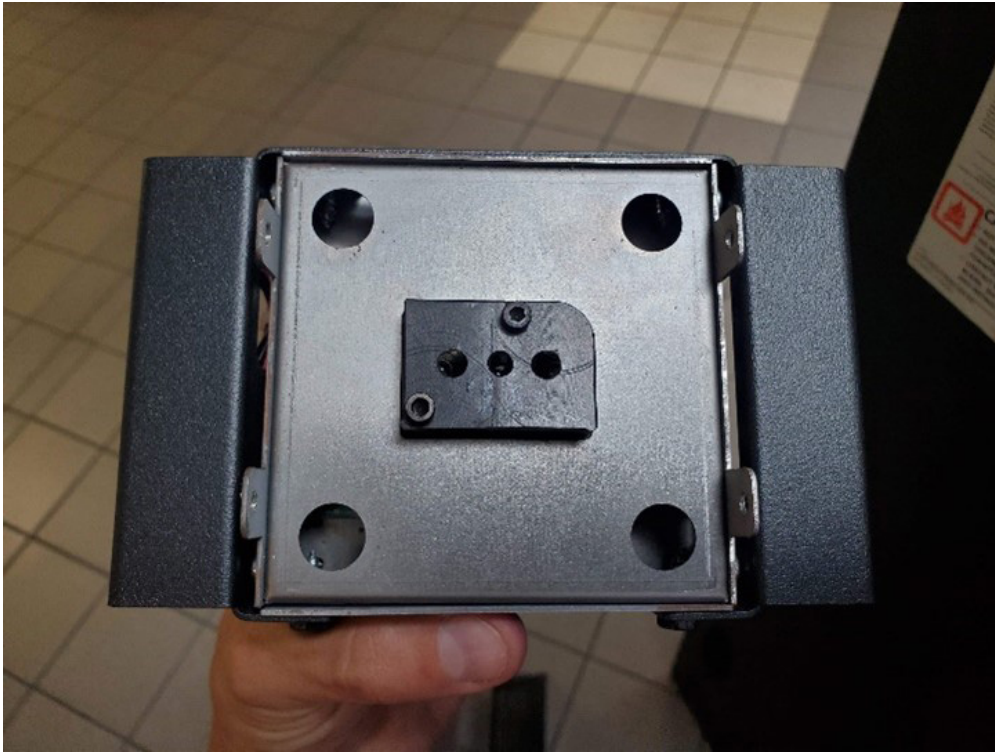
3. Disconnect the wire that is connected to the particle board housing by pulling on it a little.



4. Remove the casing from your chimney by pulling on it slightly.



5. In the end, you should end up with this piece in hand

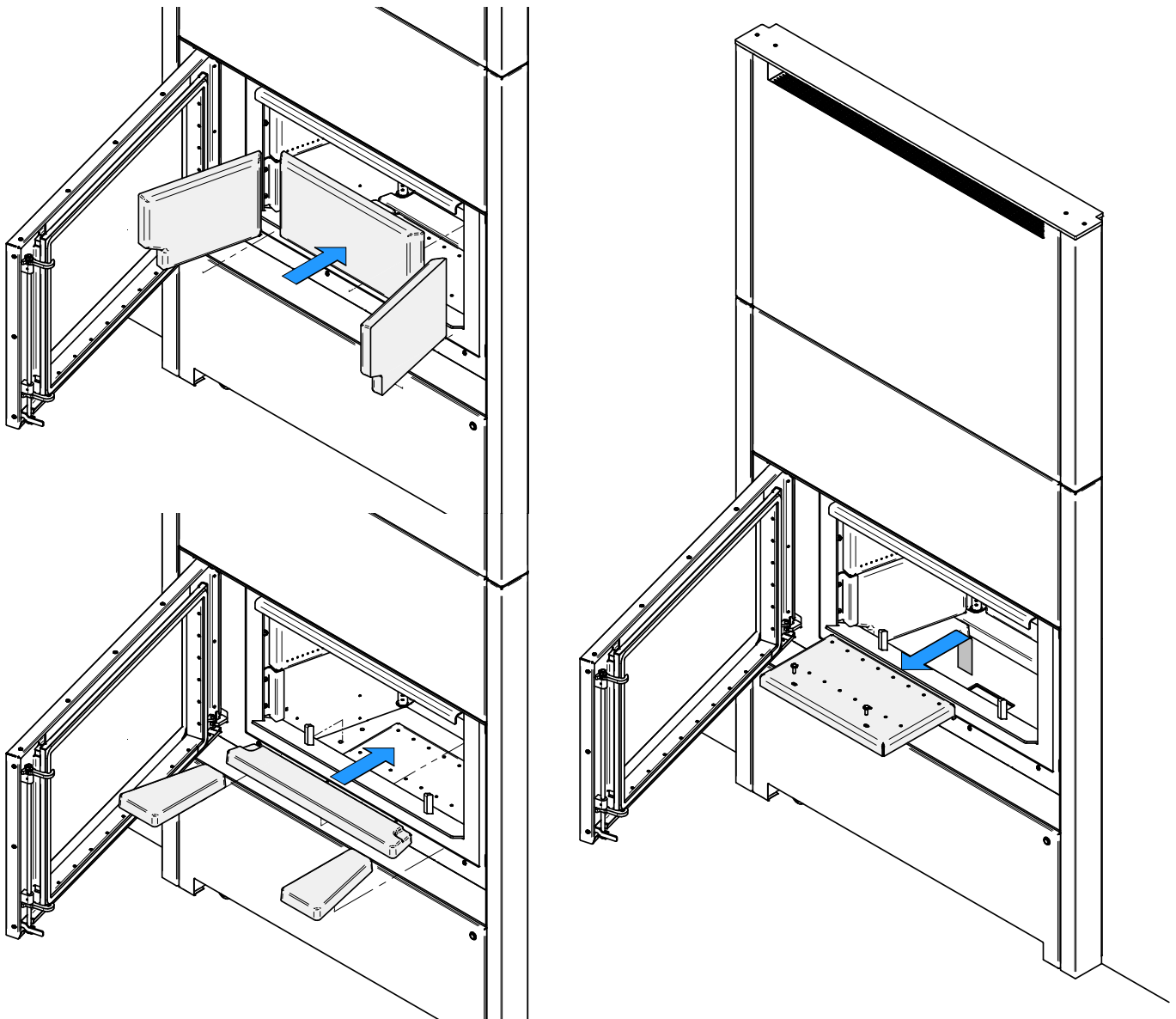


6. Take a cotton swab and clean the 3 holes.

## 5.8 Channel Maintenance

The floor air diffuser (channel) must be cleaned annually to maintain its efficiency. The diffuser is not screwed on, but requires the removal of the refractory stones.

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## PART B - INSTALLATION

### 6. Fireplace Installation

Install the fireplace only as described in these instructions and using only the following fireplace components and chimney components from chimney manufacturers listed in ["Table 4 : Approved Chimneys"](#).

#### Mandatory Equipments

- Faceplate;
- Gravity hot air distribution kit;
- Refractory panels;
- Insulated chimney made by the manufacturers listed in [Table 4](#), with the corresponding specifications:
  - Chimney lengths;
  - Elbows (where necessary);
  - Associated components as per these installation instructions.

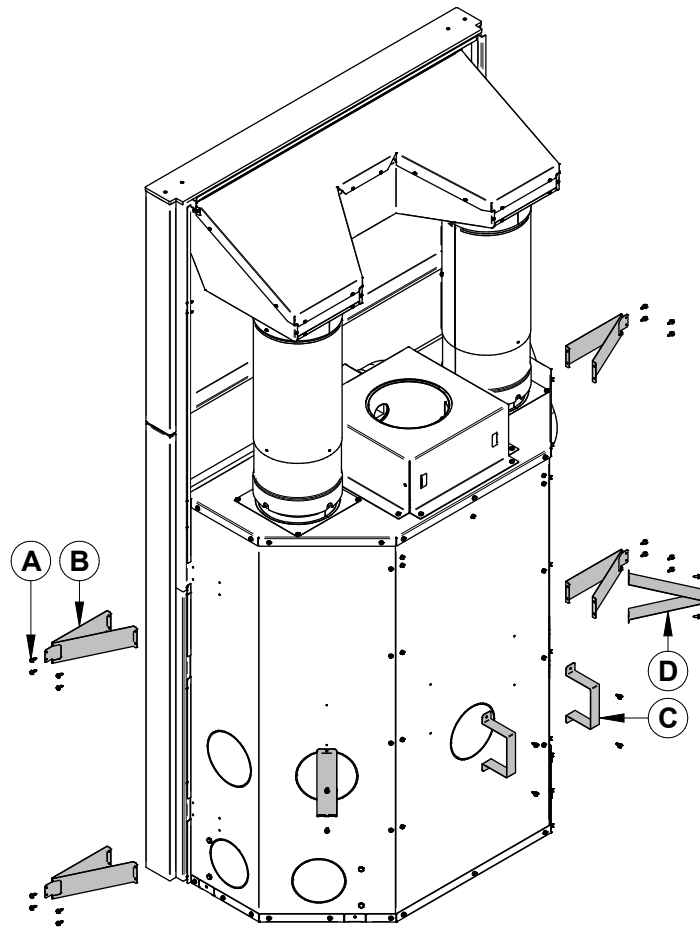
#### Additional Equipment (optional)

- Fresh air kit;



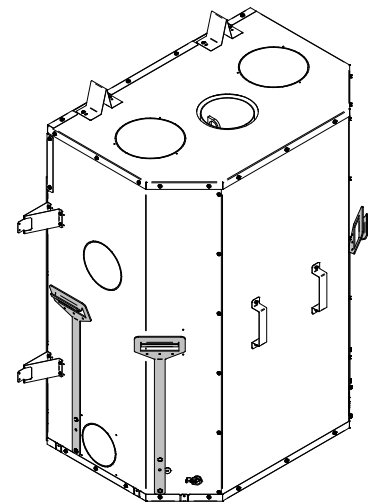
## 6.1 Standoff installation

Before installing the fireplace, **it is mandatory to install the standoffs (B) (C) (D)** on the sides and in the back of the fireplace. The standoffs can be found in the fireplace firebox and and the screws **(A)** to install them can be found with the envelope of the fireplace manual.



## 6.2 Carrying Handles

To facilitate the transport of the fireplace, handles sold as an option may be used. They are installed on each side of the fireplace. Wearing gloves is strongly recommended when moving the fireplace.



### 6.3 Clearances to combustibles

The clearances shown in this section have been determined by test according to procedures set out in safety standards ULC S610 (Canada) and UL127 (U.S.A.). When the fireplace is installed so that its surfaces are at or beyond the minimum clearances specified, combustible surfaces will not overheat under normal and even abnormal operating conditions.

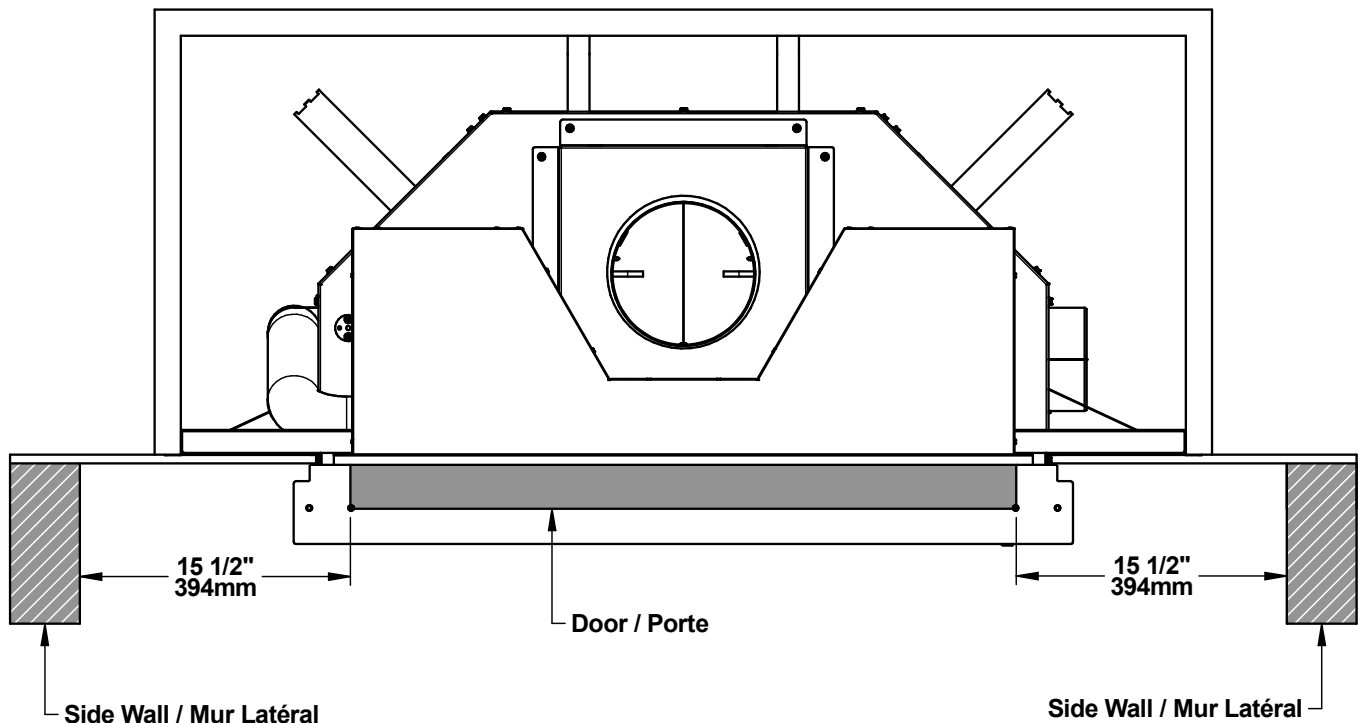
*A material is considered non-combustible when made entirely of steel, iron, bricks, tiles, concrete, slate, glass or a combination of these materials. Materials corresponding to ASTM E136 and UL 763 are considered to be non-combustible materials with the exception of gypsum, which will be considered a non-combustible material only if it is certified to withstand an ambient temperature of use of 250°F and more.*

**No part of the fireplace may be located closer to the combustible than the minimum clearance given.**

- Side wall distance 15 1/2" (394mm)  
(measured from the side of the door)
- Minimum distance to the wall in front of the fireplace 48" (1219 mm) in Canada and 36" (914 mm) in USA.
- Minimum ceiling height : 96" (2438 mm)  
measured from the base of the fireplace.

**Fireplace enclosure :**

- Back wall : 0"
- Sides : 0"
- Floor (underneath the fireplace) : 0"
- Chimney : 2" (51 mm)



## 6.4 Framing construction

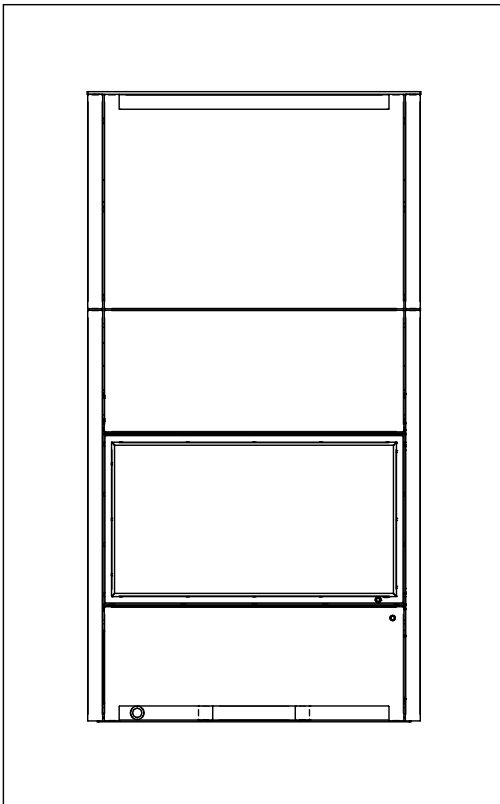
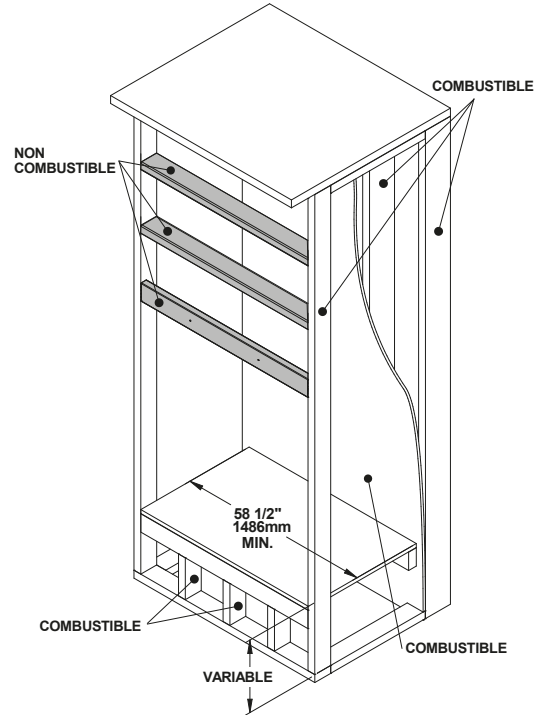
The frame, on the sides and back of the fireplace, must be made of 2"x 3" (5 cm x 8 cm) or larger.

**Do not use combustible materials for the frame directly above the fireplace. This area should remain empty to a height of 96" (2438 mm) measured from the base of the fireplace.**

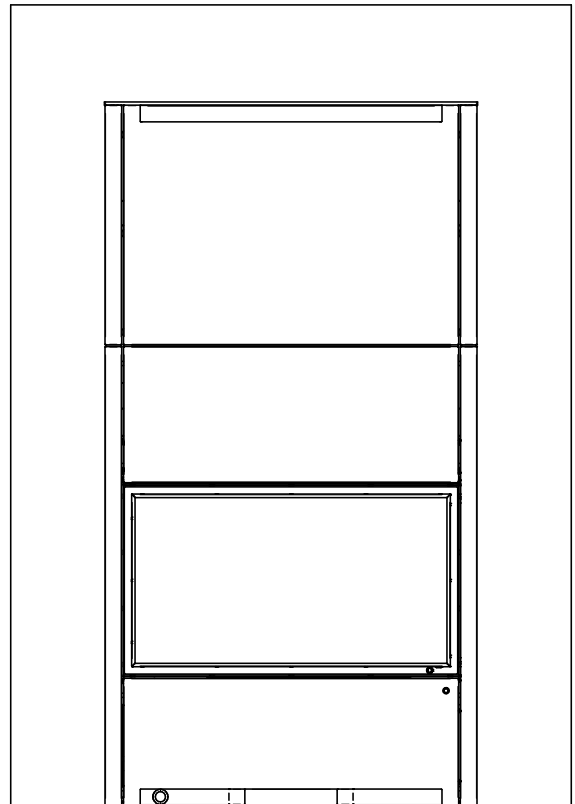
Build the fireplace frame using vertical studs placed on the sides of the fireplace, from the floor to the ceiling. The studs must be set back from the front edge of the fireplace by a space equivalent to the thickness of the finishing material, so that it is flush with the finish of the fireplace.

Non-combustible headers between studs should be installed as follows:

- The headers must be 2" x 3" (5 cm x 8 cm) or 2" x 4" (5 cm x 10 cm). Do not put wood or other material in the area above the fireplace.
- Install only the cripple studs needed to support the finishing material and mantle.



**CAUTION:** OPTION NOT AVAILABLE



AVAILABLE OPTION



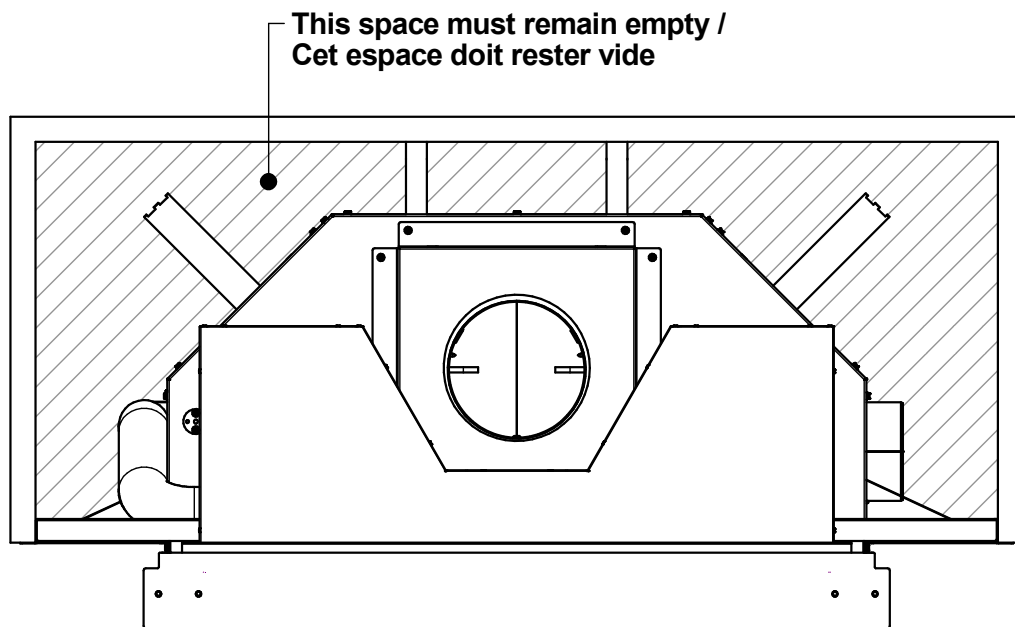
### 6.4.1 Fireplace Framing

#### WARNING :

- **DO NOT FILL THE REQUIRED EMPTY SPACE INSIDE THE ENCLOSURE WITH INSULATION OR ANY OTHER MATERIAL.**
- **DO NOT PUT STORAGE SPACE IN THE ENCLOSURE SURROUNDING THE FIREPLACE.**

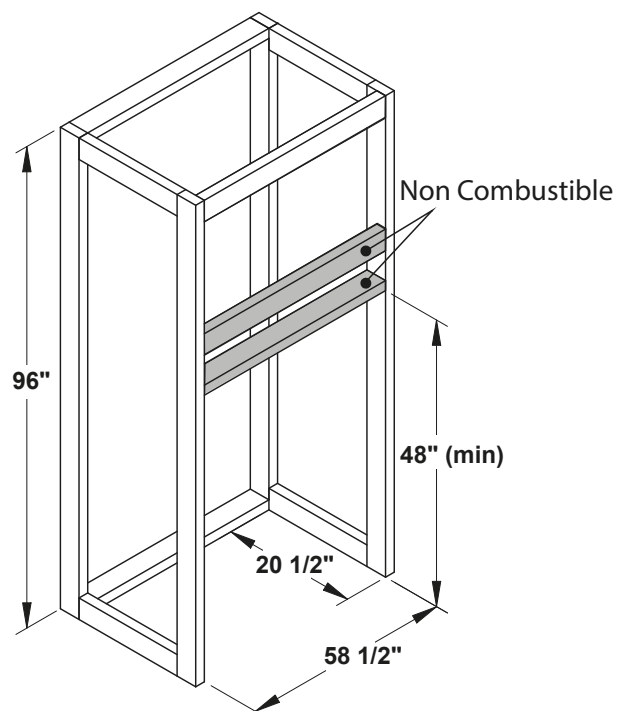
*Framing dimensions should be used as a reference only.*

The fireplace must not be in contact with any insulation or loose filling material. Inside the chase, around the fireplace, insulation should be covered with drywall panels or any other finishing material except where non-combustible material is required.

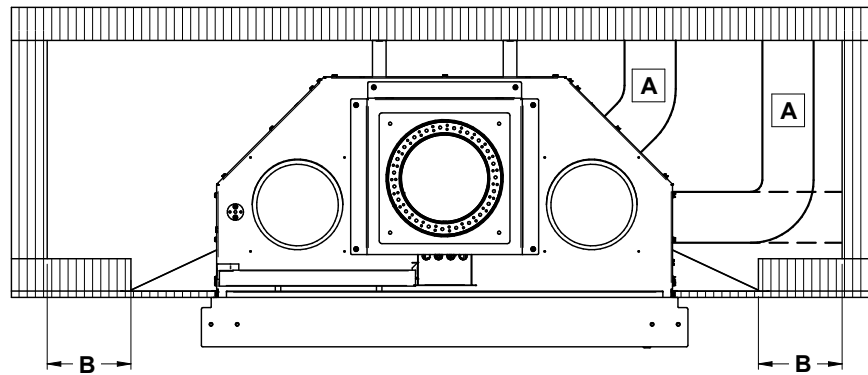


If a finishing material is installed inside the enclosure, its thickness must be added to the following measurements.

- Framing width 58 1/2" (1486 mm)
- Framing height to the first header 48" (1219 mm) minimum
- Framing depth 20 1/2" (521 mm)
- Framing total height 96" (2438 mm)



## 6.4.2 Framing with Fresh Air Intake<sup>13</sup>

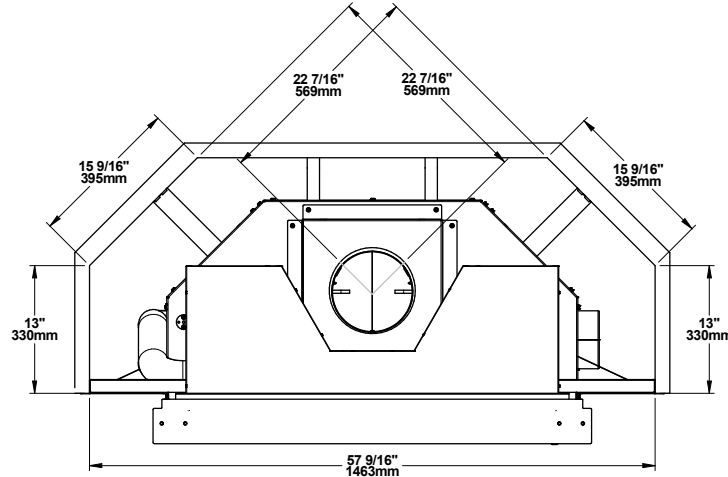


If a finishing material is installed inside the enclosure, its thickness must be added to the following measurements.

**A** : Fresh air intake duct<sup>14</sup> (Fresh air intake can be installed on the right).

**B** : Distance between framing and side fireplace standoff 12" (305 mm)

## 6.4.3 Framing with corner installation



*Framing configuration should be used as a reference only.* If a finishing material is installed inside the enclosure, its thickness must be added to the following measurements. These values are minimum measurements and may need to be increased to allow the installation of the fresh air intake or the type of finishing material used.

<sup>13</sup> Framing dimensions are for reference only. These measurements are recommended to prevent the ducts from being inside the standoff or have too tight duct curves. Smaller dimensions can be used depending on the size and type of duct as well as the configuration of the installation.

<sup>14</sup> HVAC duct, as per ULC S110 or UL 181, class 0 or class 1, must withstand temperatures up to 250°F.

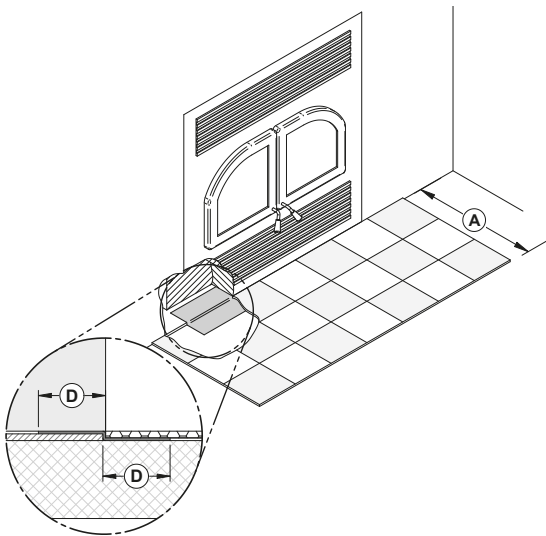
## 6.5 Hearth Extension Construction

**WARNING: THE HEARTH EXTENSION IS TO BE INSTALLED ONLY AS ILLUSTRATED.**

This fireplace can be installed directly on the floor or on a raised base, combustible or not. The installation can be done according to one of the following options :

| OPTION | INSTALLATION TYPE                    | R VALUE REQUIRED | NON-COMBUSTIBLE FLOOR PROTECTION DEPTH |
|--------|--------------------------------------|------------------|----------------------------------------|
| #1     | On floor level                       | No               | 16" (406 mm)                           |
| #2     | Raised base of less than 4" (101 mm) | No               | 16" (406 mm)                           |
| #3     | Raised base of 4" (101 mm) or more   | No               | 16" (406 mm)                           |

### 6.5.1 Option #1 - Floor Level Installation

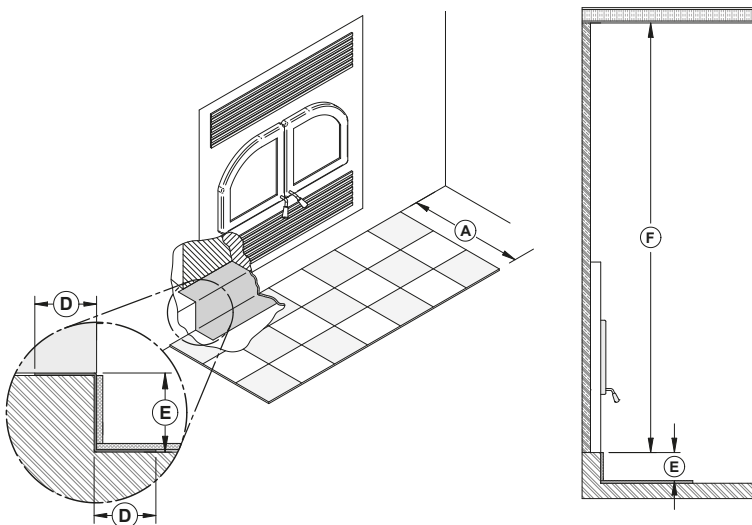


When the fireplace is installed directly on the floor, a non-combustible floor protection of at least 16" (406 mm) **(A)** with no R value must be installed in front of the fireplace. The joint between the floor protection and the fireplace must be protected over the entire width of the floor protection by a folded and continuous metal sheet **(D = min 2" [51 mm])** (not supplied).

*A clearance of 96" (2438 mm) between the base of the fireplace and the ceiling must be respected.*

*The minimum floor height under the fireplace should match (or exceed) the height of non-combustible materials used for floor protection.*

### 6.5.2 Option #2 - Raised Base Installation of Less Than 4" (101 mm)

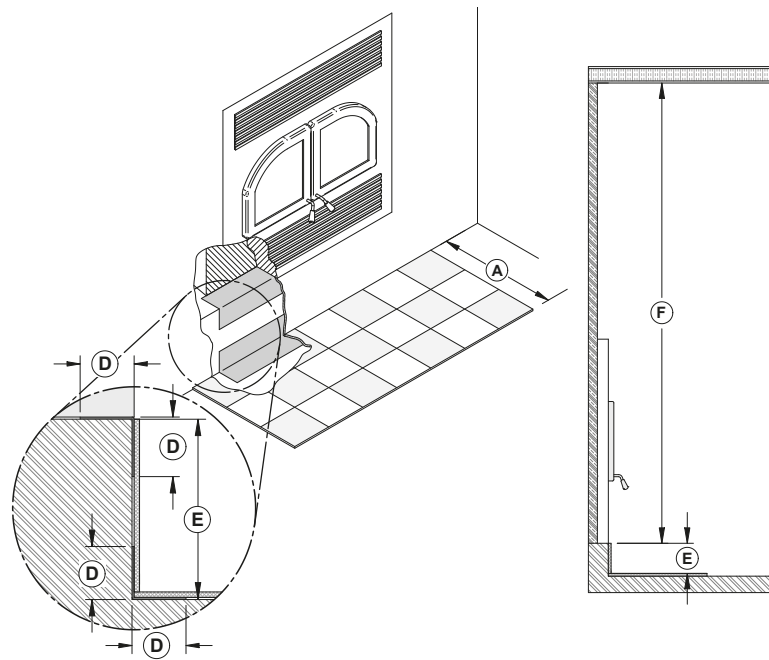


When the fireplace is installed on a raised base of less than 4" (101 mm) **(E)**, a non-combustible floor protection of at least 16" (406 mm) **(A)** with no R value must be installed in front of the fireplace.

The joint between the floor protection and the fireplace must be protected over the entire width of the floor protection by a folded and continuous metal sheet **(D = min 2" [51 mm])** (not supplied). It is recommended to make the sheet metal in one piece.

*A clearance of 96" (2438 mm) **(F)** between the base of the fireplace and the ceiling must be respected.*

### 6.5.3 Option #3 - Raised Base Installation of 4" (101 mm) or More



When the fireplace is installed on a raised base of 4" (101 mm) or more **(E)**, a non-combustible floor protection of at least 16" (406 mm) **(A)** with no R value, must be installed in front of the fireplace.

The upper and lower angle, for the full width of the floor protection, must be protected by 2" (51 mm) horizontally and vertically by a folded and continuous metal sheet **(D = 2" [51 mm])** (not supplied). The sheet metal does not have to cover the rest of the wall between the base of the fireplace and the floor.

*A clearance of 96" (2438 mm) **(F)** between the base of the fireplace and the ceiling must be respected.*

### 6.5.4 Floor Protection

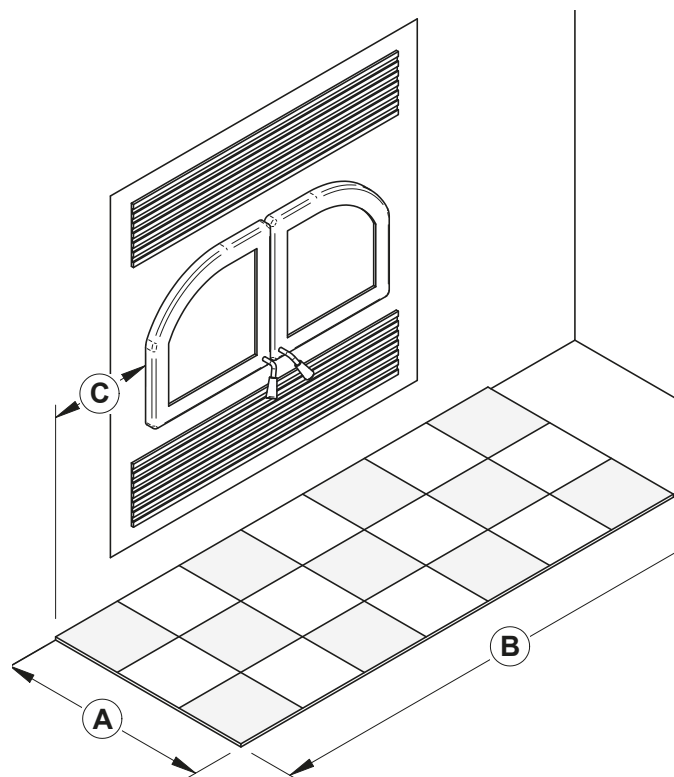
| OPTION | INSTALLATION TYPE                       | R VALUE<br>REQUIRED | A               | B                 | C              |
|--------|-----------------------------------------|---------------------|-----------------|-------------------|----------------|
| #1     | On floor level                          | No                  | 16"<br>(406 mm) | 36 ¾"<br>(914 mm) | 8"<br>(203 mm) |
| #2     | Raised base of less than 4"<br>(101 mm) | No                  | 16"<br>(406 mm) | 36 ¾"<br>(933 mm) | 8"<br>(203 mm) |
| #3     | Raised base of 4" (101 mm)<br>or more   | No                  | 16"<br>(406 mm) | 36 ¾"<br>(933 mm) | 8"<br>(203 mm) |

Regardless of the installation type, there must be at least 8" (203 mm) on each side of the fireplace door opening **(C)**.

Floor protection must be a continuous non-combustible surface such as ceramic, concrete board, brick or other equivalent material approved as floor protection.

If the ceramic is used, it must be placed on a continuous non-combustible panel to prevent spills from being brought into contact with the floor through cracks or gaps in the ceramic slurry. Alternatives approved by the local building code may also be used.

**Do not leave carpets under the floor protection.**



## 6.5.5 R Value

There are two ways to calculate the R-value of the floor protection. First, by adding the R-values of materials used, or by the conversion if the K factor and thickness of the floor protection are given.

To calculate the total R value from R values of the materials used, simply add the R-values of materials. If the result is equal to or greater than the R-value requirements, the combination is acceptable. R-values of some selected materials are shown below :

**Table 2 : Thermal Characteristics of Common Floor Protection Materials<sup>15</sup>**

| MATERIAL                                               | CONDUCTIVITY (K)<br>PER INCH | RESISTANCE (R) PER<br>INCH THICKNESS |
|--------------------------------------------------------|------------------------------|--------------------------------------|
| Micore® 160                                            | 0.39                         | 2.54                                 |
| Micore® 300                                            | 0.49                         | 2.06                                 |
| Durock®                                                | 1.92                         | 0.52                                 |
| Hardibacker®                                           | 1.95                         | 0.51                                 |
| Hardibacker® 500                                       | 2.3                          | 0.44                                 |
| Wonderboard®                                           | 3.23                         | 0.31                                 |
| Cement mortar                                          | 5.00                         | 0.2                                  |
| Common brick                                           | 5.00                         | 0.2                                  |
| Face brick                                             | 9.00                         | 0.11                                 |
| Marble                                                 | 14.3 – 20.00                 | 0.07 – 0.05                          |
| Ceramic tile                                           | 12.5                         | 0.008                                |
| Concrete                                               | 1.050                        | 0.950                                |
| Mineral wool insulation                                | 0.320                        | 3.120                                |
| Limestone                                              | 6.5                          | 0.153                                |
| Ceramic board (Fibremax)                               | 0.450                        | 2.2                                  |
| Horizontal still air <sup>19</sup> (1/8" [3 mm] thick) | 0.135                        | 0.920 <sup>16</sup>                  |

### Example:

Required floor protection R of 1.00. Proposed materials: four inches of brick and one inch of Durock® board.

Four inches of brick ( $R = 4 \times 0,2 = 0,8$ ) plus 1 inch of Durock® ( $R = 1 \times 0.52 = 0.52$ ).  
 $0.8 + 0.52 = 1.32$ .

This R value is larger than the required 1.00 and is therefore acceptable.

In the case of a known K and thickness of alternative materials to be used in combination, convert all K values to R by dividing the thickness of each material by its K value. Add R values of the proposed materials as shown in the previous example.

Common brick K value = 5

Thickness = 4"

R value = Thickness/K =  $4/5 = 0.8$

Durock K value = 1.92

Thickness = 1"

R value = Thickness/K =  $1/1.92 = 0.52$

Total R value =  $.8 + 0.52 = 1.32$

<sup>15</sup> Information as reported by manufacturers and other resources

<sup>16</sup> Horizontal still air can't be «stack» to accumulate R-values; each layer must be separated with another non-combustible material.

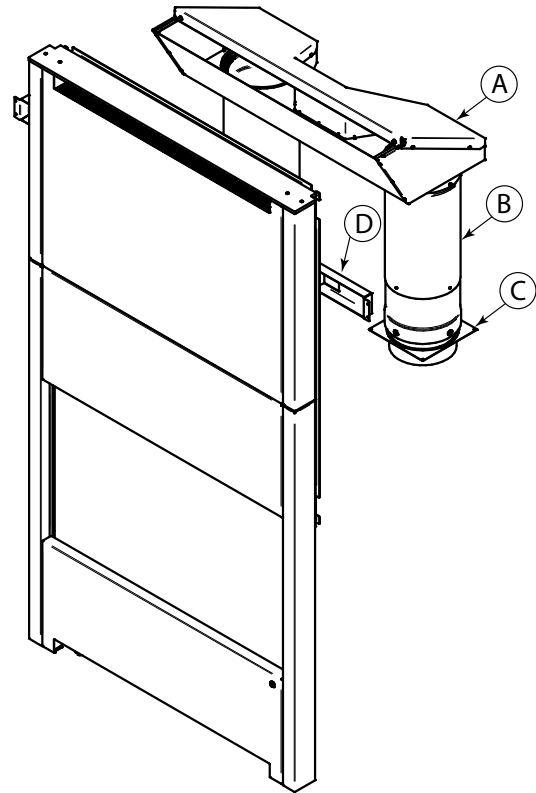
## 6.6 VA19FL06 mandatory long faceplate option installation

- Heat distribution box (A);
- 2 Telescoping rigid double wall pipe of 8" (B); (**Warning:** Do not use insulated flexible ducts)
- Anchor plates (preassembled on the fireplace) (C);
- All screws are included.

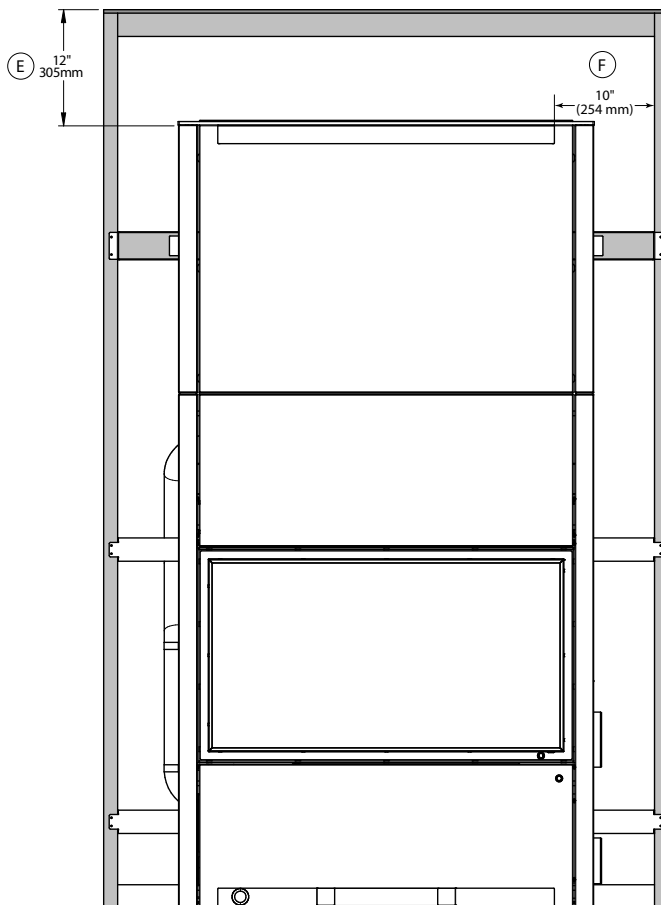
*Supplied with the faceplate kit:*

- Faceplate support (D)

*It is not allowed to increase the height of the gravity air kit with the tall faceplate.*



### Framing



The heat distribution box is attached directly to the tall faceplate and the faceplate support. No framing is required to support the gravity air kit. The finishing material covering the remainder of the face must be made of non-combustible materials. See the Finishing section.

The drawing opposite shows the ceiling and combustible stud clearances around the box with the faceplate.

**E :** Minimum distance between the hot air outlet and the combustible ceiling (12" [305 mm])

**F :** Minimum distance between the hot air outlet and the combustible stud (10" [254 mm])

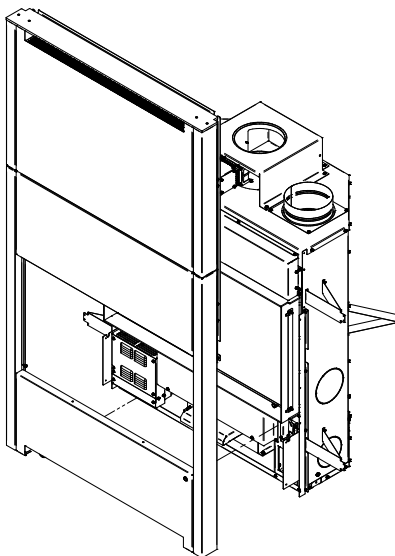
NOTE: The faceplate assembly instructions are provided with the option.

## Safety Rules

- The minimum height of the hot air duct is 81" (2.1 m). It must be measured from the base of the fireplace to the base of the hot air outlets. \*\*\*With the VA19FL06 option, the height is already determined
- Do not connect the hot air ducts to a central heating system. The malfunction of the heating system would overheat the fireplace.
- Do not use insulated flexible ducts as they may overheat. Rigid double wall ducts supplied are mandatory.
- Do not use «T» fittings or anything other than those listed below.
- All ducts must be placed vertically. **Never route the ducting downwards.**
- The hot air outlets must be installed in the same room as the fireplace.

## 6.7 Faceplate installation (mandatory option)

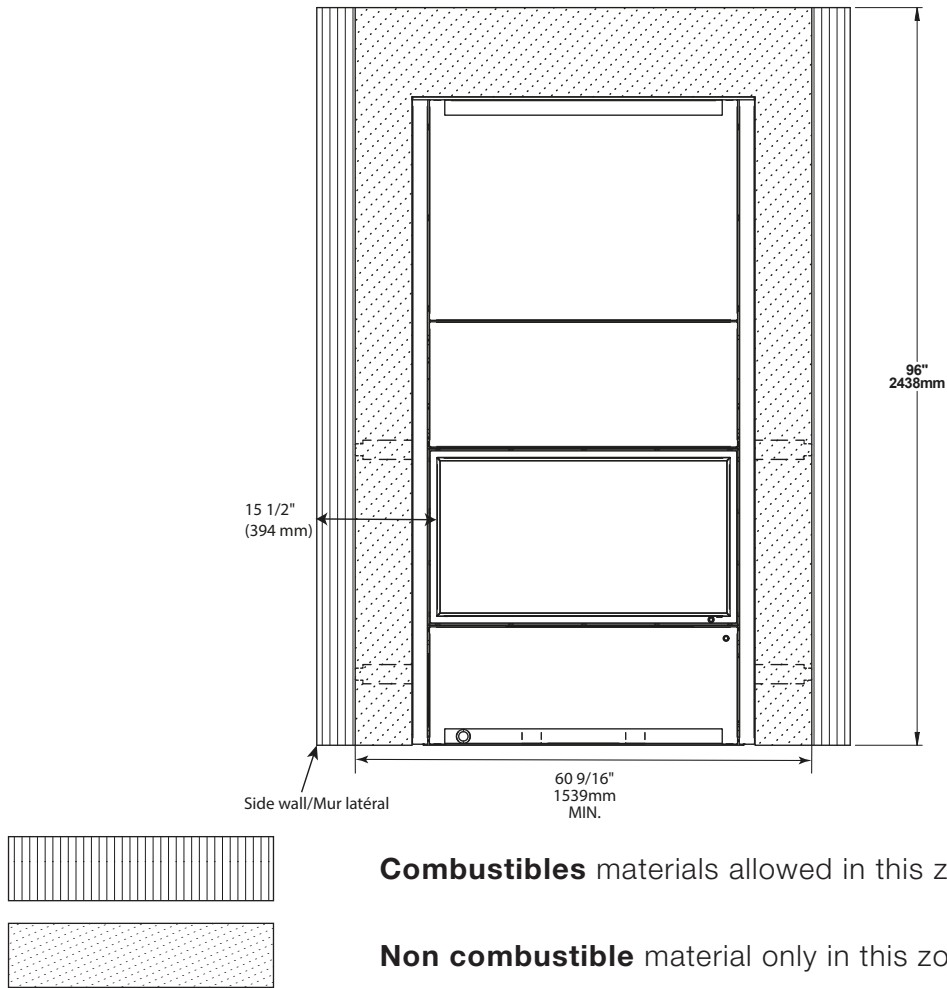
A faceplate must be installed on this fireplace. See VA19FL06 instruction manual.





## 6.8 Facing

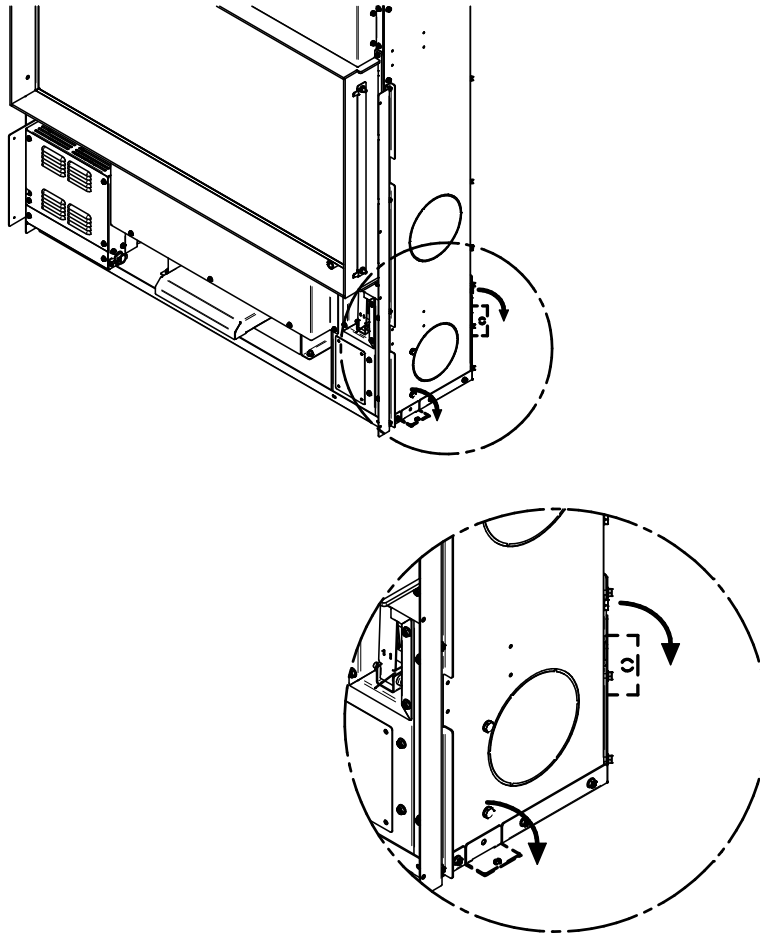
Non-combustible finishing materials such as brick or ceramic can be glued to the facade of the fireplace. Do not put a seal between the faceplate and the finishing material to facilitate the removal of the faceplate if necessary.



## 6.9 Mobile Home Installation

**Installation permitted in a mobile home in Canada only.**

Screw the fireplace on the floor with the proper hardware.



### CAUTION

- Installation of this fireplace in a mobile home is permitted in Canada only. Do not install in a manufactured home in USA.
- **WARNING : DO NOT INSTALL IN THE SLEEPING ROOM OF A MOBILE HOME.**
- **THIS FIREPLACE MUST BE SECURED TO THE STRUCTURE OF THE MOBILE HOME.**
- **CAUTION : THE STRUCTURAL INTEGRITY OF THE MOBILE HOME FLOOR, WALL, CEILING AND ROOF MUST BE MAINTAINED.**
- **IT IS PROHIBITED TO USE THIS WOOD FIREPLACE WITH A FIRE SCREEN IN A MOBILE HOME.**

## 7. The Venting System

The venting system acts as the engine that drives the wood heating system. Even the best fireplace will not function safely and efficiently as intended if it is not connected to a suitable chimney. The heat in the flue gases that pass from the fireplace into the chimney is not waste heat. This heat is what the chimney uses to make the draft that draws in combustion air, keeps smoke inside the fireplace and safely vents exhaust to outside. Heat in the flue gas can be seen as the fuel the chimney uses to make draft.

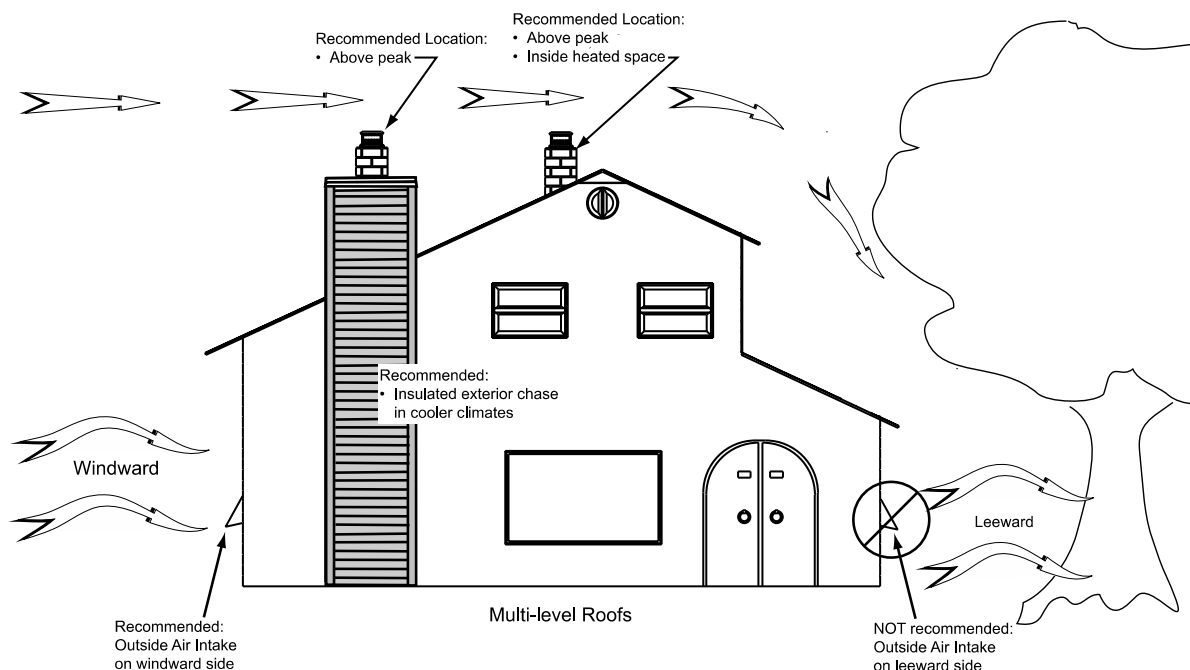
### 7.1 Location

The location of the chimney is crucial for the proper functioning of the appliance. The chimney should be installed within the house rather than up an outside wall and should rise straight up through the tallest part of the house. This location benefits from being enclosed within the warm house environment, produce stronger draft, accumulate fewer creosote deposits and will be unaffected by cold temperatures or harsh winds.

The signs of bad system design are cold back drafting when there is no fire in the fireplace, slow kindling of new fires, and smoke roll-out when the door is open for loading. On the other hand, an excessive draft can make the fire uncontrollable, creating very high temperatures in the unit as well as in the chimney and seriously damaging them. A reddish glow on the unit and on the chimney components indicates overheating. Excessive temperatures can cause a chimney fire.

### 7.2 Supply of Combustion Air

The safest and most reliable supply of combustion air for a fireplace is from the room in which it is installed. Room air is already preheated so it will not chill the fire, and its availability is not affected by wind pressures on the house. The only case in which the fireplace may not have adequate access to combustion air is if the operation of a powerful exhaust device (such as a kitchen range exhaust) causes the pressure in the house to become negative relative to outdoors.



Using a fireplace can deplete the air supply for other fuel burning appliances of combustion. This can lead to incomplete combustion, backdrafting, poor appliance performance, fire risk and can diminish the indoor air quality. Ensure a proper ventilation and air intake for all fuel burning appliances.

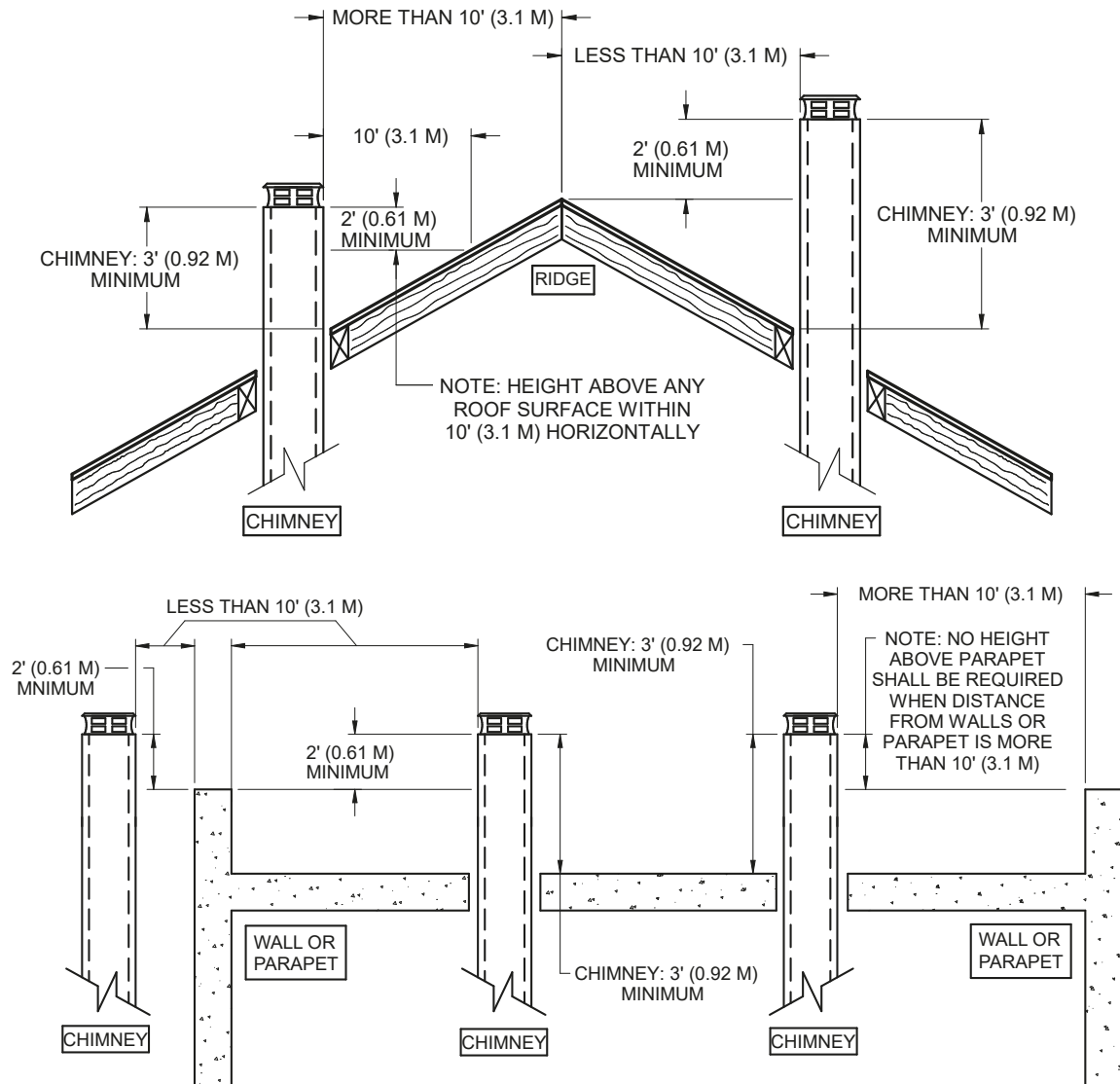
## 7.3 Chimney Installation

The chimney manufacturer's installation manual takes precedence over the following installation instructions. To ensure a safe installation, please refer to it. Some non-illustrated parts may be required.

### 7.3.1 General Advices

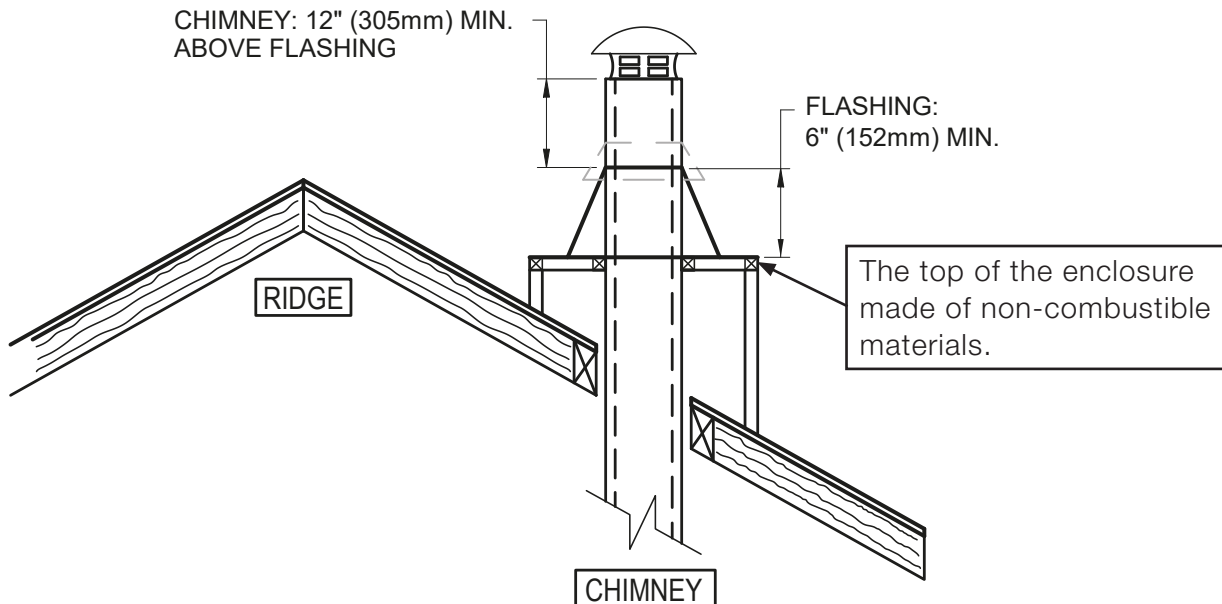
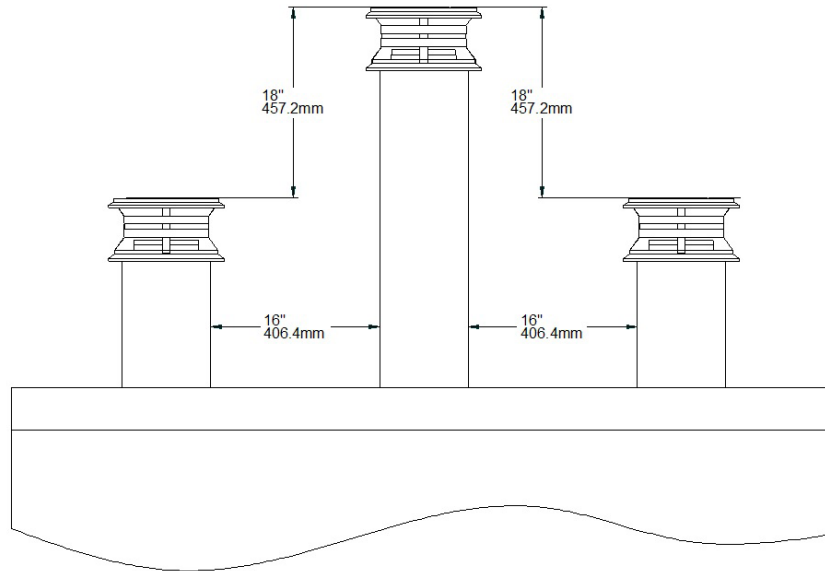
- This wood burning fireplace has optimum performance and efficiency when connected to a **chimney** with a **8" (203 mm) diameter flue**, only the chimneys listed in the ["Table 4 : Approved Chimneys", page 70](#) can be used.
- To insure a good draft, it is recommended to have a length of 18" (457 mm) from the top of the unit to the first offset. However, starting using a 30° or 45° (Canada Only) elbow is also approved.
- **A CHIMNEY VENTING A FIREPLACE SHALL NOT VENT ANY OTHER APPLIANCE.**
- The **minimum height of the chimney** system is **15 feet (4.6 m)** from the base of the appliance to the chimney cap. If only the minimum height of the chimney system is installed, the operating conditions must be optimal (interior chimney, minimum height of 18" (457 mm) before any deviation, etc.).
- The **maximum height of the chimney** system is **35 feet (10.7 m)** from the base of the appliance to the chimney cap.
- The **chimney** must have **at least one support**. The maximum chimney length that should be supported by the fireplace is 9 feet (2.74 m) for 2" (51 mm) Solid Pack chimney and 12 feet (3.7 m) for 1" (25,4 mm) Solid Pack chimney.
- The chimney must extend at least 3 ft. (0,92 m) above its point of contact with the roof and at least 2 ft. (0,61 m) higher than any wall, roof or building within 10 ft. (3.1 m) of it.

- **WARNING : IF THE CHIMNEY IS INSTALLED IN A CHASE, IT MUST EXCEED THE TOP OF IT BY AT LEAST 3 FEET (92 CM) IF IT'S MADE OF COMBUSTIBLE MATERIALS OR AT LEAST 1.5 FEET (46 CM) WHEN IT IS MADE OF NON-COMBUSTIBLE MATERIALS.**



- Avoid deviations as much as possible, especially the sharp ones. Each deviation adds restriction to the system and can lead to draft problems.
- If the chimney extends higher than 5 ft. (1.5 m) above its point of contact with the roof, it must be secured using a roof brace.
- A rain cap must be installed on top of the chimney.

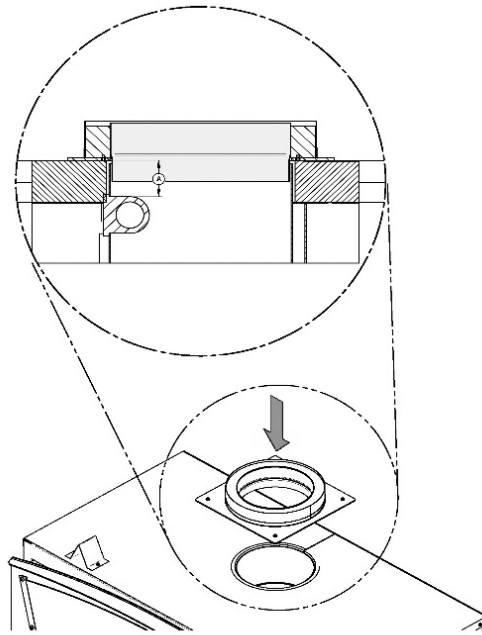
- For installations where more than one chimney is located in the same non-chase or within the same area, their terminations must be separated by at least 16" (406 mm) horizontally, and 18" (457 mm) vertically. This separation is to prevent smoke migrating from one chimney to another.



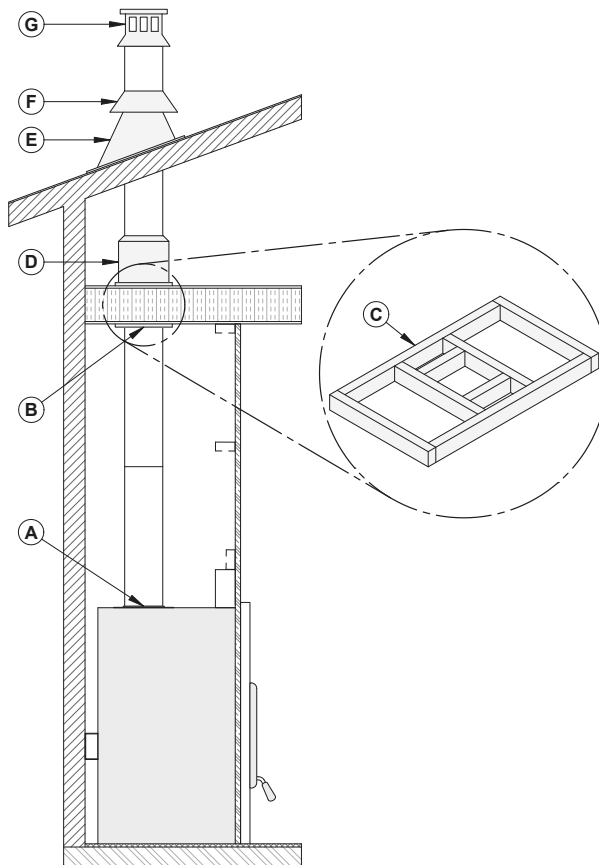
**Note:** The chimney chase on the roof must be the same size as the flashing.

- WARNING:** IF THE CHIMNEY IS INSTALLED IN AN ENCLOSURE ABOVE THE ROOF, IT MUST EXCEED THE TOP OF THE FLASHING CONE BY AT LEAST 12 INCHES (30 CM). THE FLASHING MUST HAVE A MINIMUM HEIGHT OF 6 INCHES (15.25CM). THE TOP OF THE ENCLOSURE MUST BE MADE OF NON-COMBUSTIBLE MATERIALS.

- A clearance of 2" (51 mm) between the chimney and any combustible material is required. This space must remain free, without insulation or other combustible material. The parts of the chimney that pass into inhabited spaces must be enclosed in an enclosure.
- In all cases, the chimney must start with a 8" (203 mm) diameter anchor plate attached to the fireplace.
- If the male anchor plate nozzle exceeds 2" (51 mm) in length **(A)**, it must be cut above the lifting hooks welded inside the flue outlet so that it is sitting perfectly on the top of the fireplace.



### 7.3.2 Ceiling Supported Installation



- A : Anchor plate*  
*B: Ceiling support*  
*C: Framing opening*  
*D: Attic insulation shield*  
*E: Roof flashing*  
*F: Storm collar*  
*G: Chimney cap*

1. Cut and frame square openings **(C)** in the ceiling, floor and roof where the chimney will pass. A 2" (51 mm) clearance must be maintained between the chimney and any combustible materials. The 2" (51 mm) space must remain empty, without insulation or any other combustible material. The size of the floor and ceiling holes must be in accordance with the chimney manufacturer's instructions.
2. From underneath the ceiling, install a ceiling support **(B)** in each floor where the chimney will pass. In the attic, install an attic radiation shield from above **(D)**.
3. Install an anchor plate **(A)** and a first chimney section on the fireplace. Install the number of chimney sections needed, making sure to lock each section in place.
4. When the desired height of the chimney is reached, install a roof support (not shown).
5. Put the roof flashing **(E)** in place and seal the joint between the roof and the flashing with roof sealant. For sloping roofs, place the flashing under the upper shingles and on top of the lower shingles. Nail the flashing to the roof, using roofing nails.

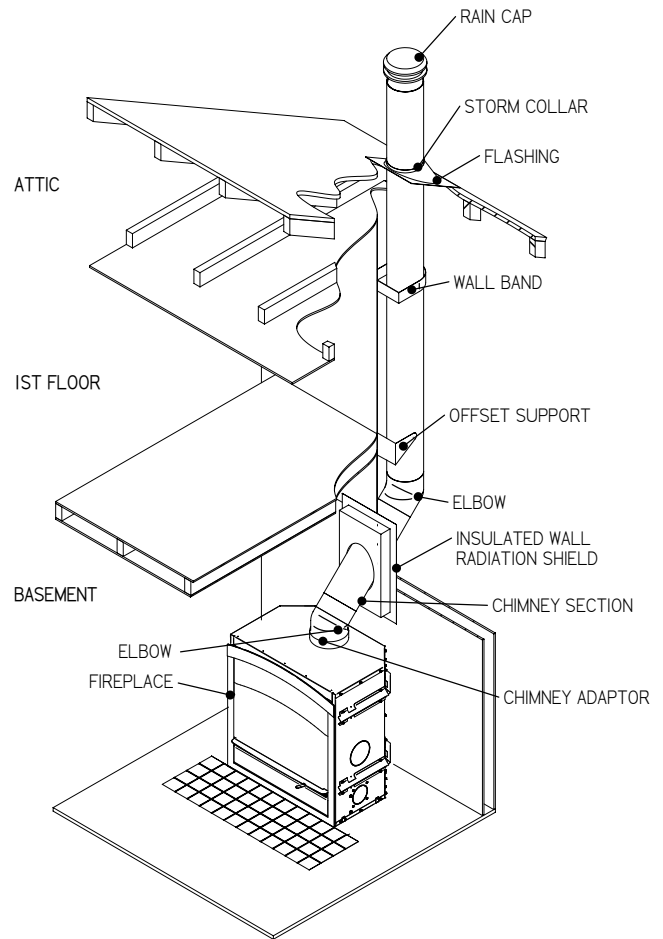
When a ventilated roof flashing is installed, precautions are to be taken not to caulk or seal the ventilating openings.

6. Place the storm collar **(F)** on the roof flashing and tighten it with the bolt. Seal the joint between the storm collar and the chimney, using silicone sealant.
7. Install the chimney cap **(G)**.



### 7.3.3 Offset Installation

1. Follow the instructions for a ceiling supported installation until the first elbow.
2. Install and turn the elbow in the right direction. Attach to the chimney using three ½" (13 mm) metal screws.
3. Install the appropriate number of chimney sections to obtain the necessary deviation. Secure the chimney sections together with three ½" (13 mm) screws. If the offset section has two or more chimney sections, a bracket must be installed. If the chimney go through a wall, install a wall thimble.
4. Install another elbow to bring the chimney back in a vertical position.
5. Continue the installation following the instructions of the ceiling supported installation.



**Table 3 : Minimum system height when using elbows**

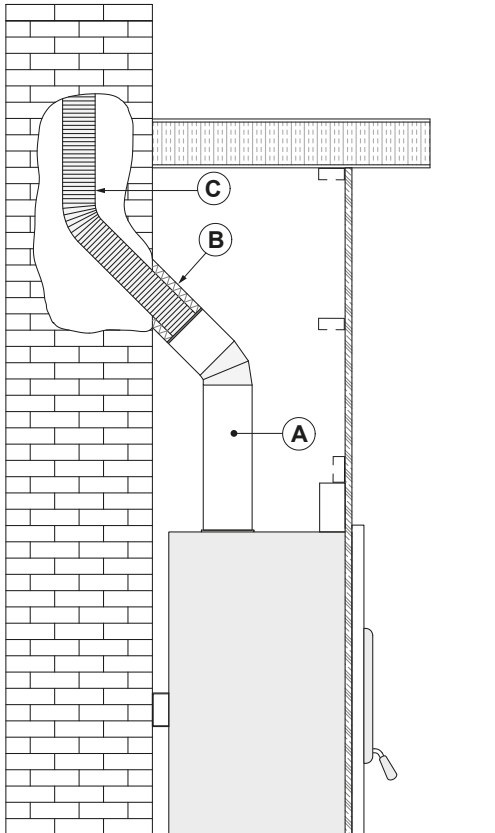
|                       |                                                            |
|-----------------------|------------------------------------------------------------|
| Chimney model         | Please consult the specification manual for your fireplace |
| Vertical Installation | 15 ft (4,6 m)                                              |
| Two (2) elbows        | 15 ft (4,6 m)                                              |
| Four (4) elbows       | 17 ft (5,2 m)                                              |

- A maximum of two deviations are permitted in a chimney. A maximum of 6 ft (1,82 m) of unsupported chimney between elbows is permitted. If it is longer than 6 ft (1,82 m), it will need to be supported every 6ft (1,82 m).

### 7.3.4 Masonry Chimney Installation

The masonry chimney must meet the minimum requirements of the local building code or equivalent for a safe installation. Contact a building inspector to learn about the requirements in the area.

Before starting the installation, the masonry chimney should be inspected for cracks, crumbling mortar, creosote layers, obstructions or other signs of deterioration. If signs of deterioration are noted, the chimney should be repaired and cleaned before installation.



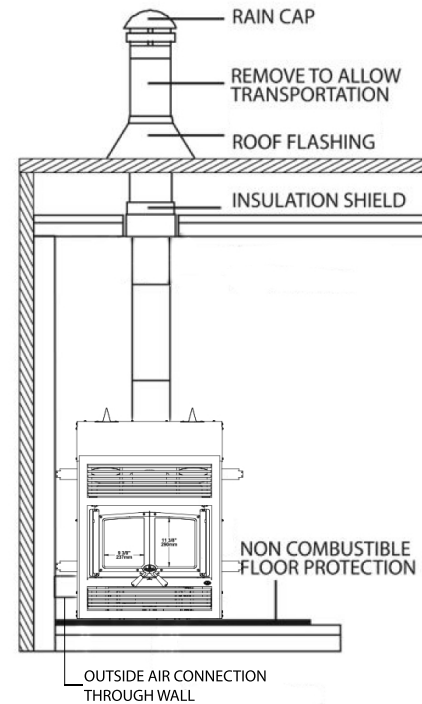
1. Position the fireplace in its location. Temporarily install the elbow or chimney section **(A)** on the top of the fireplace and, using a level, mark with an oval the location where the flue liner will enter the masonry chimney.
2. Mark where the flue will pass through the masonry chimney. Drill a hole in the masonry chimney to insert an insulated liner adapter **(B)**.
3. Lower the liner **(C)** into the chimney to the level of the hole.
4. Slide an insulated 45° or 30° liner adapter and connect it to the liner.
5. Seal the opening around the liner with high temperature refractory cement.
6. Then, follow the chimney manufacturer's instructions to connect the extended liner section to the special chimney connector.

*The liner must extend at least 12" (30 cm) above the masonry chimney.*

### 7.3.5 Factory-Built Metal Chimneys in Mobile Homes

For use in a mobile home, this fireplace is to be connected to a 8" (203 mm) factory built chimney pipe conforming to ULC-S629 standards for 650°C Factory-built chimney. The total length of the flue system should be at least 12 feet (3,65 m) including elbows, from the top of the fireplace.

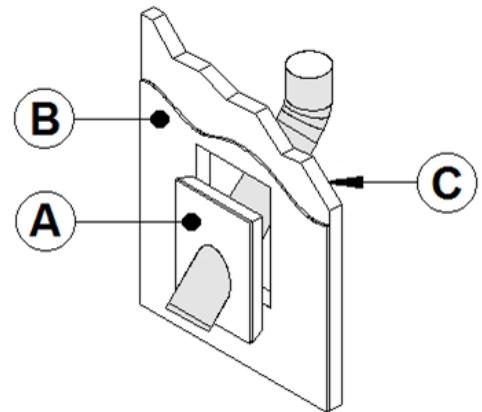
To maintain an effective vapour barrier, insulation and waterproof at the chimney and outside flue pipe, a roof flashing must be installed and sealed with silicone adhesive.



### 7.4 Angled Wall Pass-Thru Installation

When passing through a combustible wall with the chimney at a 30° or 45° angle (Canada only), an angled wall pass-thru must be installed. Follow the chimney manufacturer's installation instructions.

In cold climate locations, it is recommended to use the insulated wall pass-thru to maintain the home's thermal barrier.



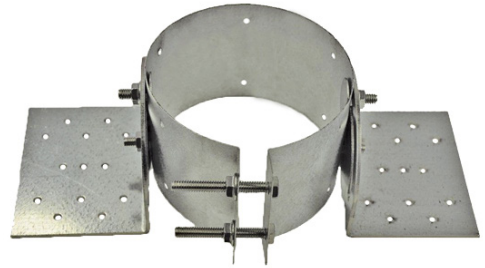
|   |                |
|---|----------------|
| A | Wall pass-thru |
| B | Interior wall  |
| C | Exterior wall  |

## 7.5 Chimney Support Installation

### 7.5.1 Roof Support

The universal roof support can be used on:

- a roof to support the chimney;
- a floor, ceiling, or roof over an offset to support the chimney or;
- as additional support.



*Always follow the manufacturer's instructions for the maximum chimney height that can be supported by the support.*

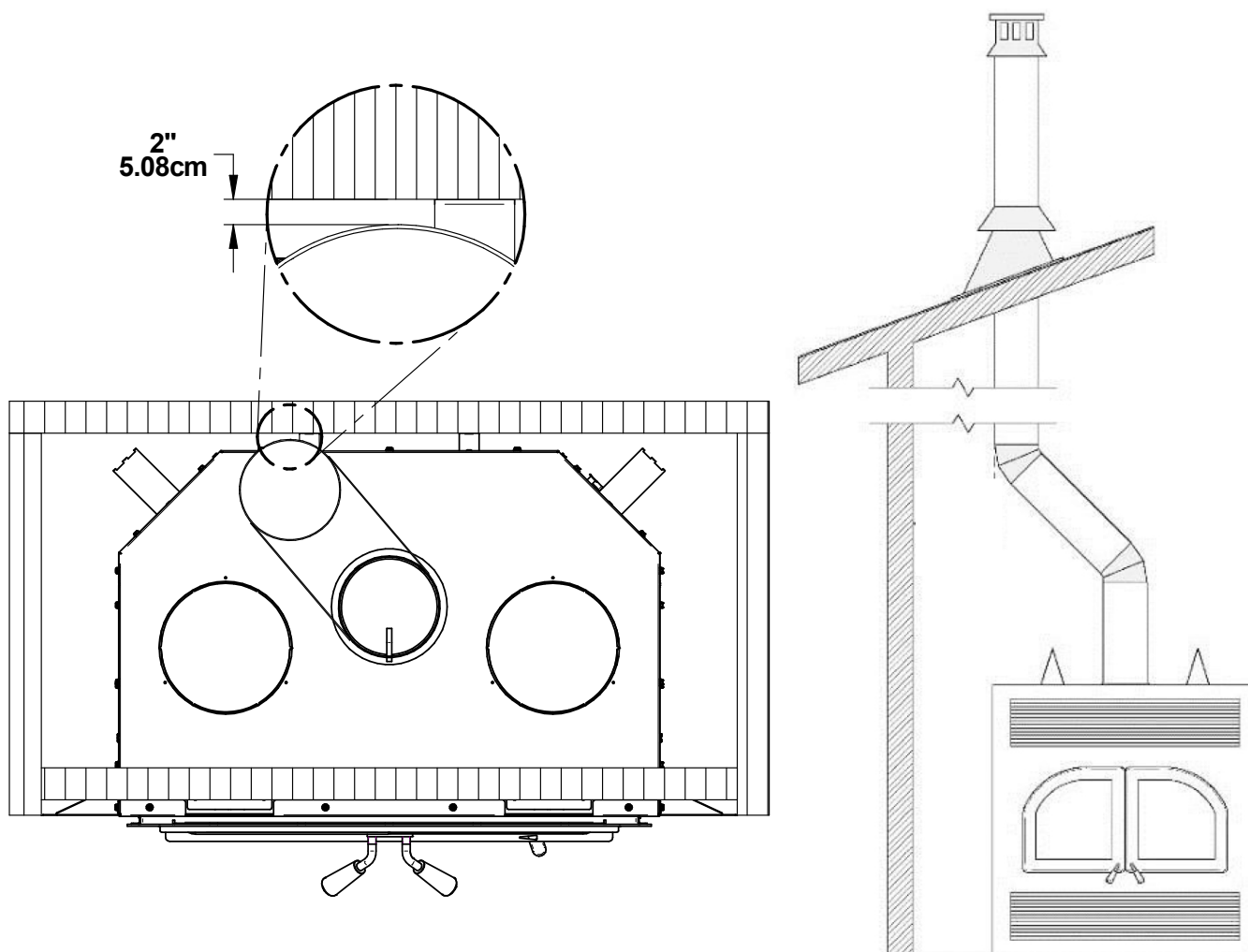
### 7.5.2 Offset Support

This support is used above a chimney offset. When the offset of the chimney pass through a wall, this support can be installed on the wall to support the chimney.



### 7.5.3 Offset chimney installation for a ceiling inside the chase of 96 inches (2,44 m) or more

It is permitted to offset the chimney when installing provided that the distance between the floor and the ceiling is 96 inches (2,44 m) or more. The offset towards the rear wall can be done 2" (51 mm) between the chimney and the rear wall. It is permitted to offset the chimney when installing the two elbows directly on the anchor plate.



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## 7.6 Approved Chimneys

**Table 4 : Approved Chimneys**

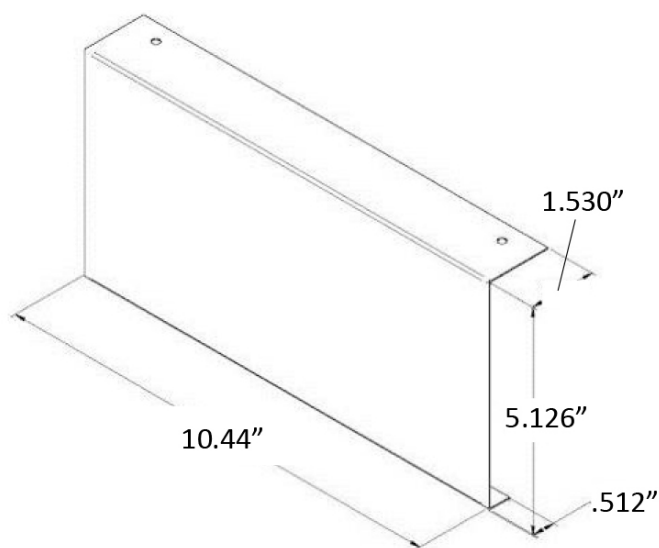
| CHIMNEY<br>MANUFACTURER                 | MODEL                    | TYPE           | DIAMETER   |
|-----------------------------------------|--------------------------|----------------|------------|
| Olympia Chimney<br>SBI Division Venting | Ventis                   | 1" Solid Pack  | 8" (20 cm) |
| SBI Division Venting                    | Nexvent                  | 1" Solid Pack  | 8" (20 cm) |
| Olympia Chimney                         | Champion Chimney System  | 1" Solid Pack  | 8" (20 cm) |
| Olympia Chimney                         | Rockford Chimney Systems | 1" Solid Pack  | 8" (20 cm) |
| Selkirk                                 | Ultimate Plus            | 1" Solid Pack  | 8" (20 cm) |
| Selkirk                                 | CF Sentinel (CF)         | 2" Solid Pack  | 8" (20 cm) |
| Selkirk                                 | Super Pro 2100 (ALT)     | 2" Solid Pack  | 8" (20 cm) |
| Selkirk                                 | Super Vent 2100 (JM)     | 2" Solid Pack  | 8" (20 cm) |
| Security Chimney                        | ASHT                     | 1" Solid Pack  | 8" (20 cm) |
| Security Chimney                        | S-2100 +                 | 2" Solid Pack  | 8" (20 cm) |
| DuraVent                                | Dura Tech                | 1" Solid Pack  | 8" (20 cm) |
| DuraVent                                | Dura Tech Canada DTC     | 1" Solid Pack  | 8" (20 cm) |
| DuraVent                                | DuraPlus HTC             | 2 "Solid Pack  | 8" (20 cm) |
| DuraVent                                | Dura Tech Premium        | 2" Solid Pack  | 8" (20 cm) |
| DuraVent                                | Dura Plus                | AC Triple Wall | 8" (20 cm) |
| Metal Fab                               | Temp Guard               | 1" Solid Pack  | 8" (20 cm) |
| American Metal                          | HSS                      | AC Triple Wall | 8" (20 cm) |
| American Metal                          | HS                       | AC Triple Wall | 8" (20 cm) |

**Table 5 : List of mandatory components**

| CHIMNEY MANUFACTURER                   | MANDATORY COMPONENTS                                                                                                                       | TYPE/MODEL                                                                         |
|----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|
| Olympia Chimney / SBI Venting Division | <ul style="list-style-type: none"> <li>Ventilated roof flashing.</li> </ul>                                                                | 1" Solid Pack : Ventis, Nexvent, Champion Chimney System, Rockford Chimney Systems |
| Security Chimney                       | <ul style="list-style-type: none"> <li>Requires insulated attic radiation shield unless chimney is enclosed at the attic level.</li> </ul> | 2" Solid Pack: S-2100                                                              |
| DuraVent                               | <ul style="list-style-type: none"> <li>Ventilated roof flashing.</li> </ul>                                                                | 1" Solid Pack: Dura Tech, Dura Tech Canada DTC<br>2" Solid Pack: Dura Tech Premium |
| American Metal                         | <ul style="list-style-type: none"> <li>Chimney cannot be enclosed at the attic level.</li> </ul>                                           | AC Triple wall : HS<br>AC Triple wall : HSS                                        |

### 7.6.1 Rafter protection

Rafter protectors, at the roof level, must be installed with this unit, if the chimney is enclosed at the attic level. Rafter protectors must be made of 22 ga or more galvanized steel and must have at least the dimension presented on the following diagram:



## 8. Product operation

### 8.1 Web application operation

### 8.2 Blower operation (Bidirectional)



## WARNING

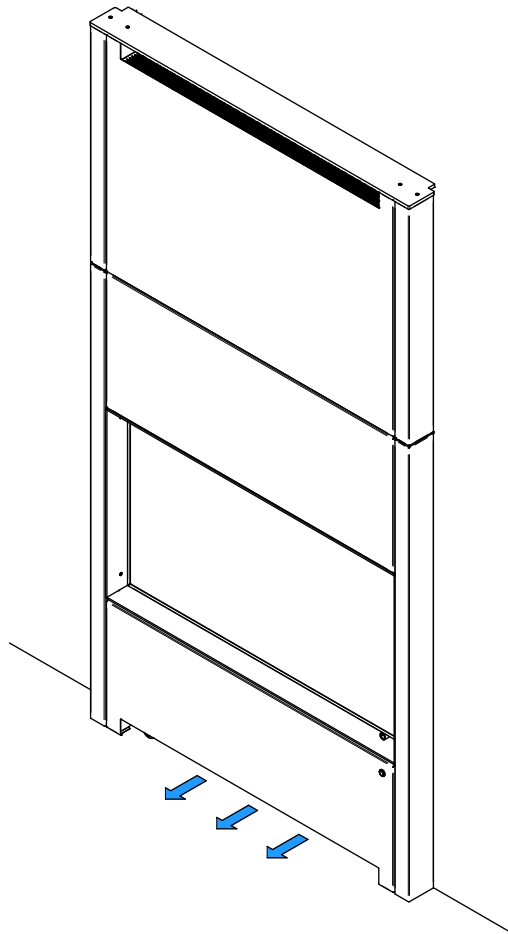
To avoid serious shock or electrocution, always **TURN OFF** the power at the electrical panel before touching any wiring.

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#### WARNING :

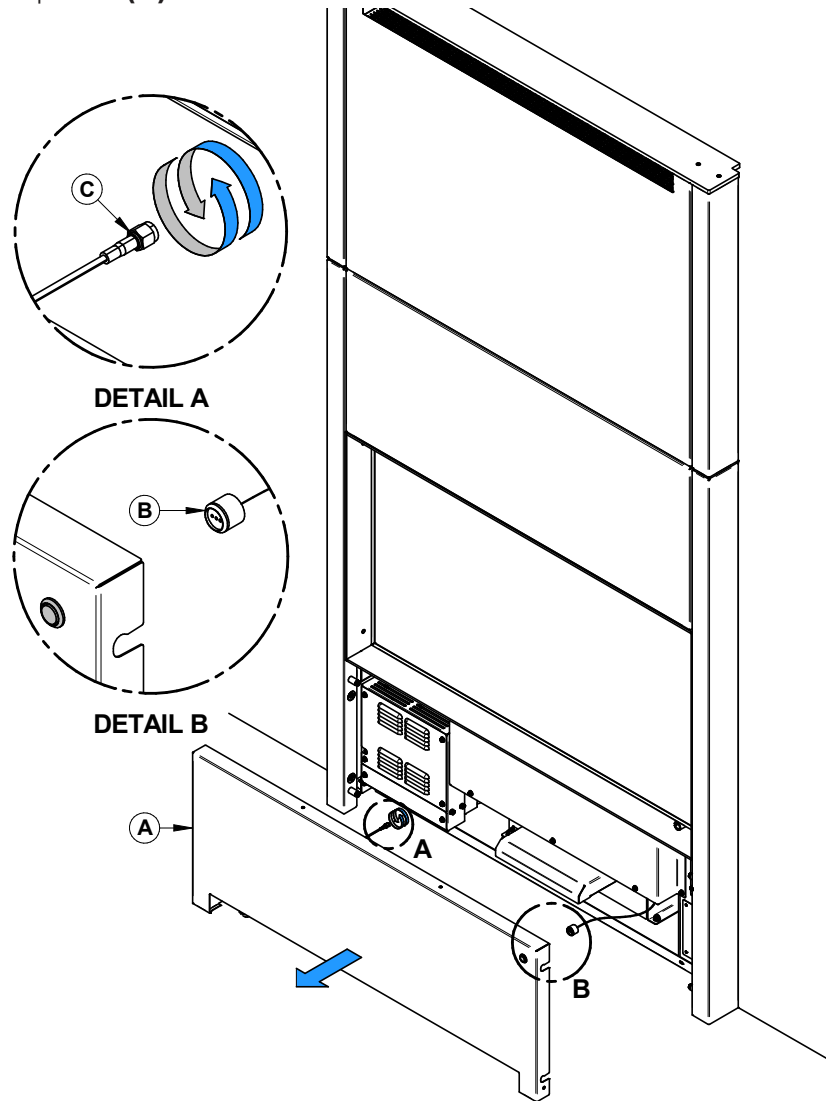
- **THE BLOWER STOPS WHEN THE DOOR IS OPENED. IT RESTARTS 30 SECONDS AFTER THE DOOR IS CLOSED AGAIN. IT IS THEREFORE IMPORTANT TO REMOVE ANY EMBERS THAT MAY HAVE FALLEN WHEN THE DOOR IS OPENING.**

As standard, the blower is installed to blow the air in the room downward. To push air out the top opening, continue with the steps on the next page.

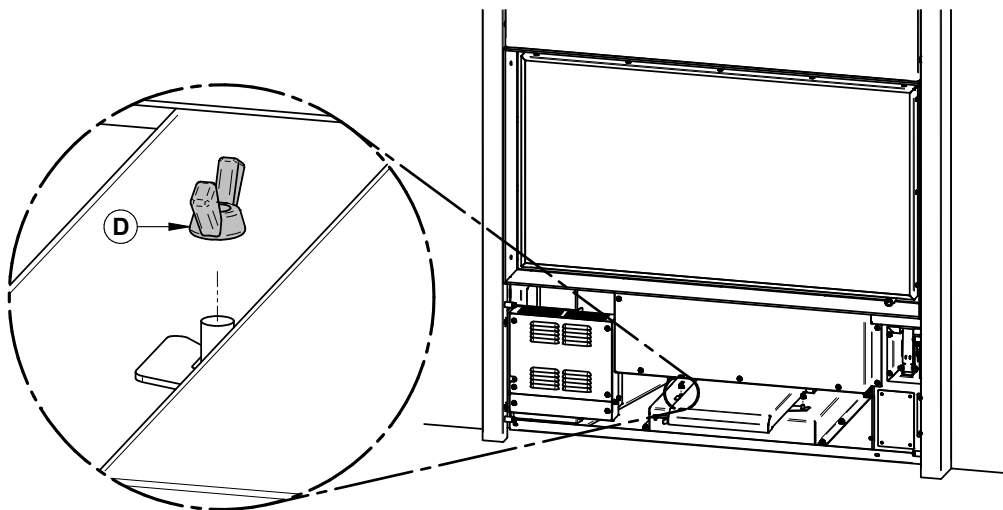




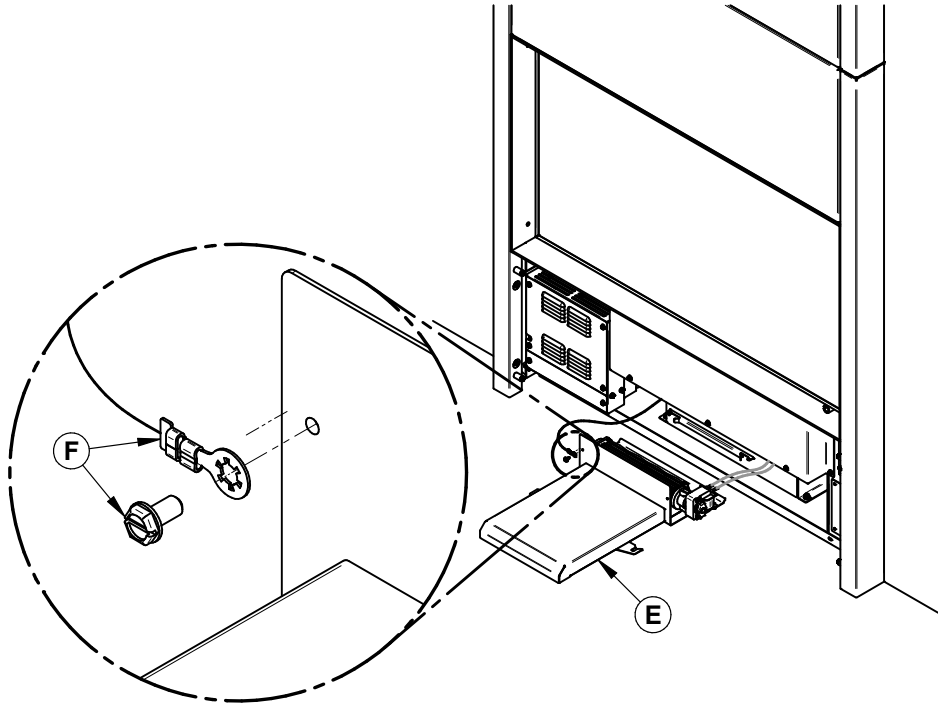
1. To allow air to circulate through the gravity air distribution system located at the top of the faceplate, the fan needs to be rotated. First, make sure the power is turned off. Remove the bottom panel **(A)** carefully, paying attention to the wires connected to the other side. Disconnect the wires **(B)** connected to the button, then unscrew the antenna connector **(C)**. The bottom panel **(A)** can now be set aside.



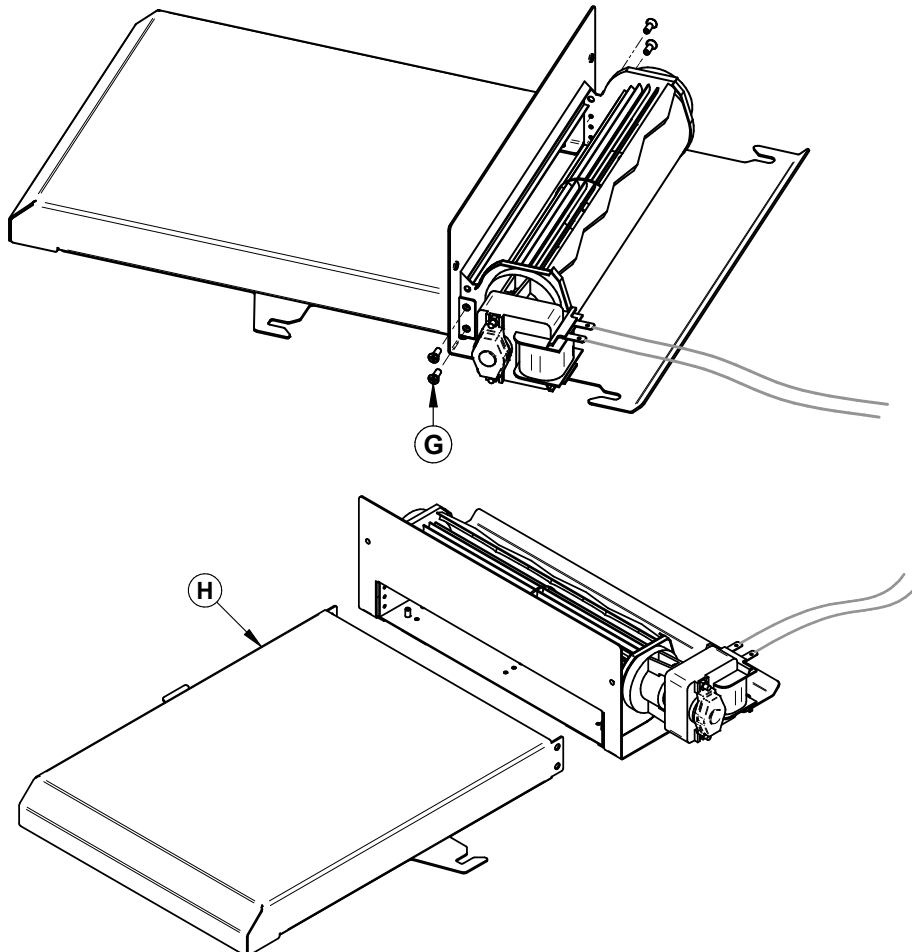
2. Unscrew the 2 wing nuts **(D)**.



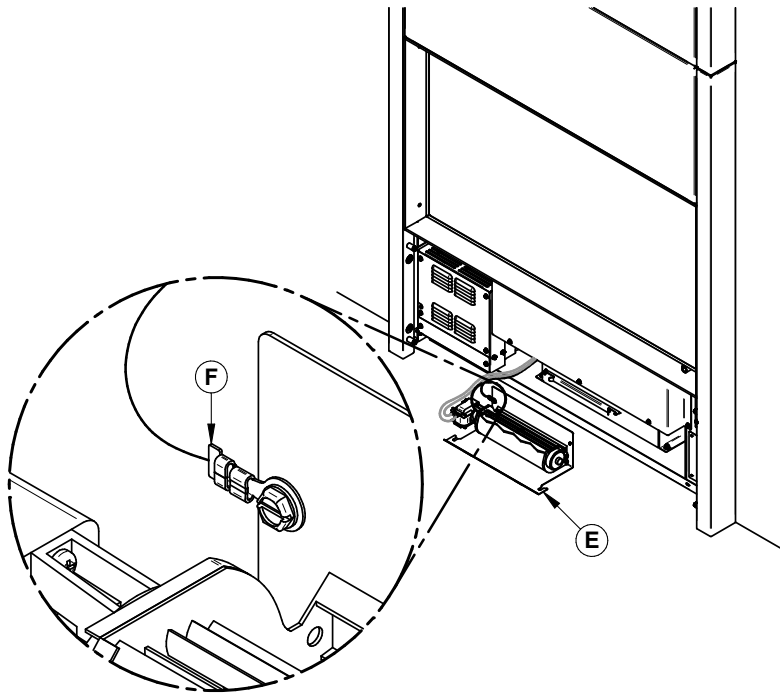
3. Remove the blower **(E)** and remove the ground **(F)**.



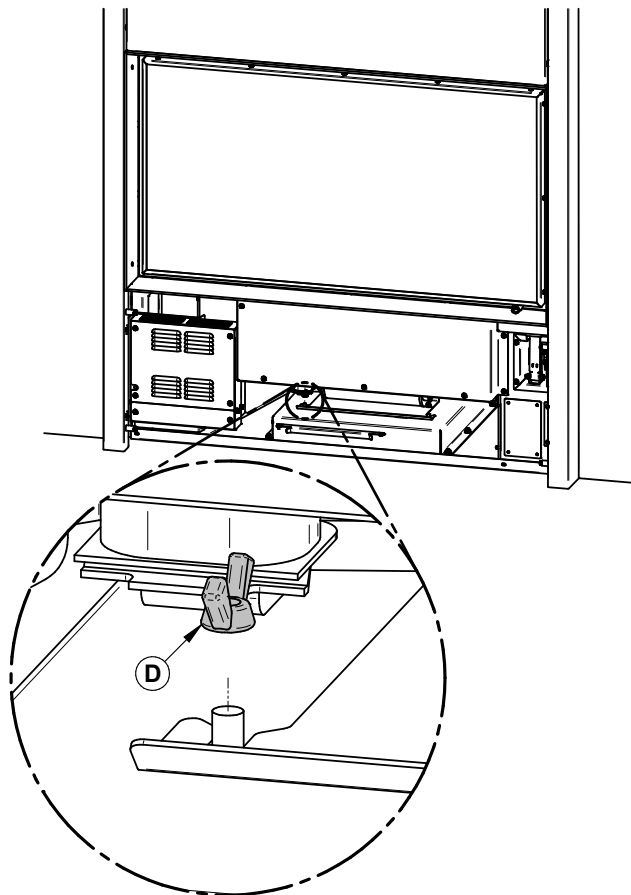
4. Unscrew the 4 screws **(G)**, on each side of the blower and remove the air duct **(H)** in the back. \*\*\* For the next steps, the air duct **(H)** is obsolete, but should be kept to return to the initial position.



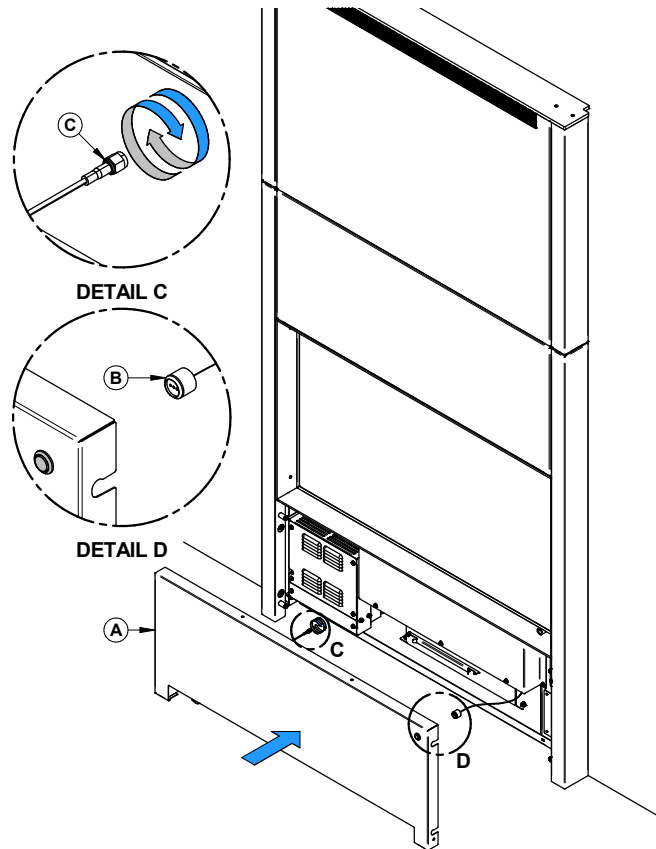
5. Turn the blower **(E)**, as indicated on the image below. Replace the ground **(F)** previously removed.



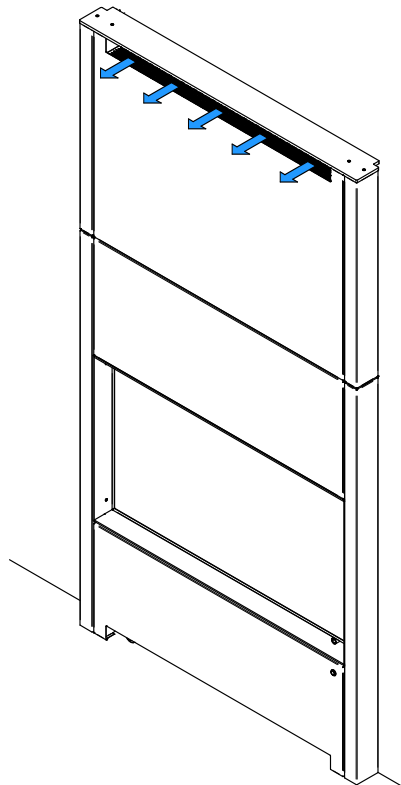
6. Screw the 2 wing nuts **(D)** while maintaining pressure on the blower to position it properly against the plate a little further in the product.



7. Move the bottom panel **(A)** closer to reconnect the wire **(B)** to the button and screw the antenna connector **(C)** back into place. Replace the bottom panel **(A)**. The air will now escape through the gravity air distribution system located at the top of the faceplate. The power can now be restored.

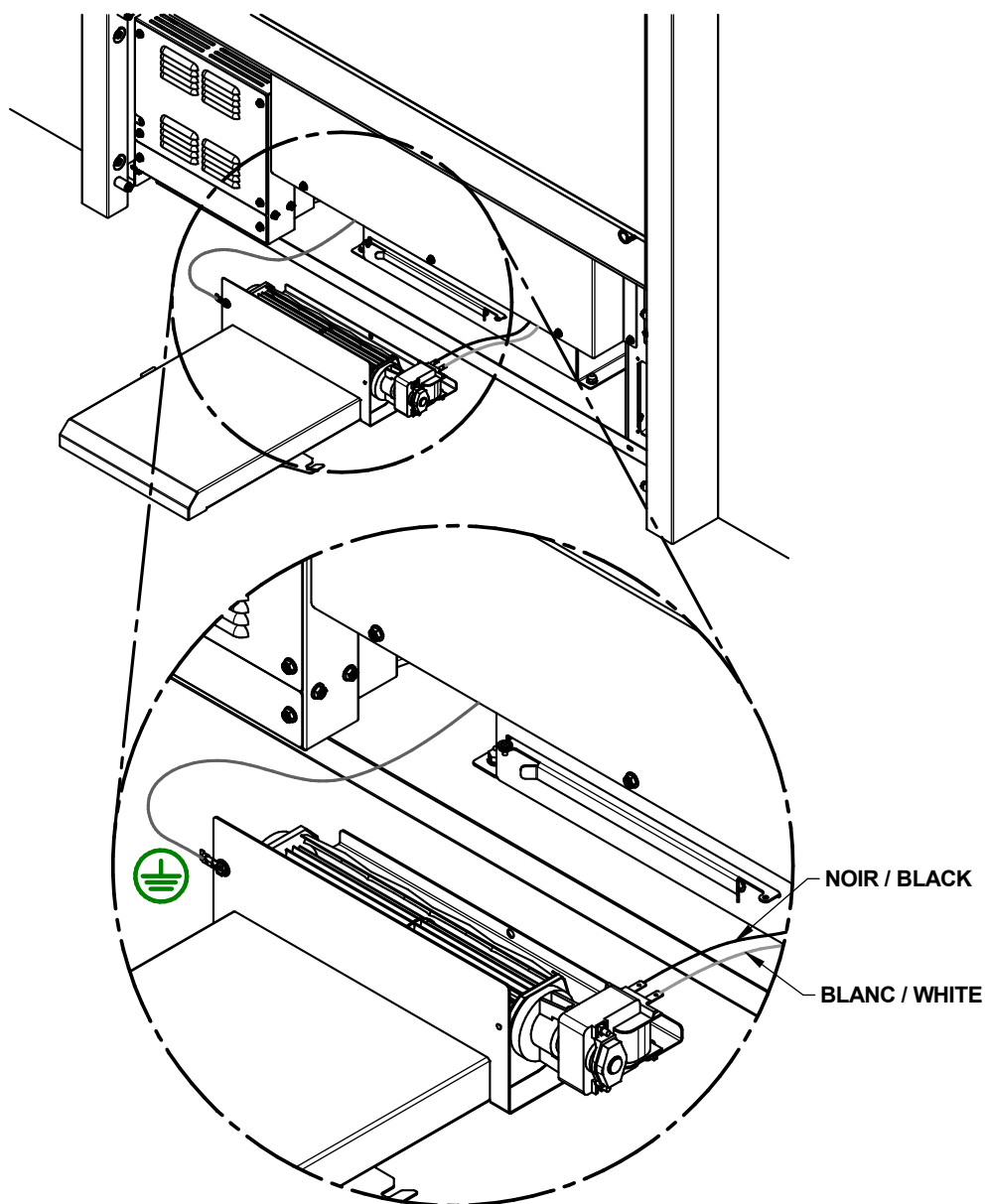


Note that, when positioned in this direction, the blower helps the natural convection of hot air escape through the grid located at the top of the faceplate. The airflow produced by the blower is then much less noticeable.



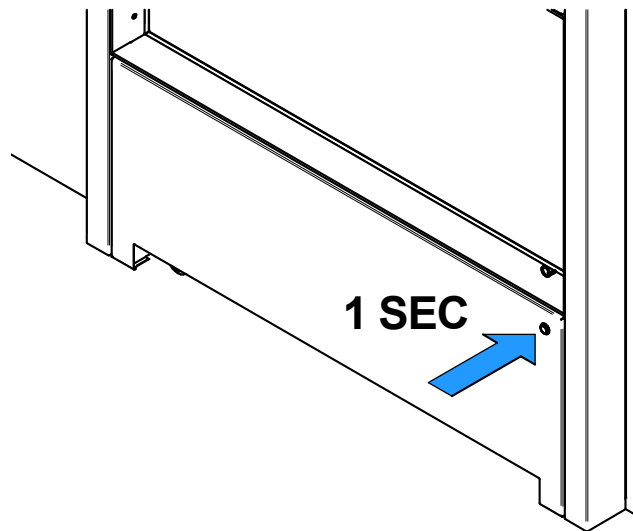
## Blower Connection

The wiring should be done by a qualified electrician. The ground (green or skinned wire) must be attached to the fireplace metal frame.

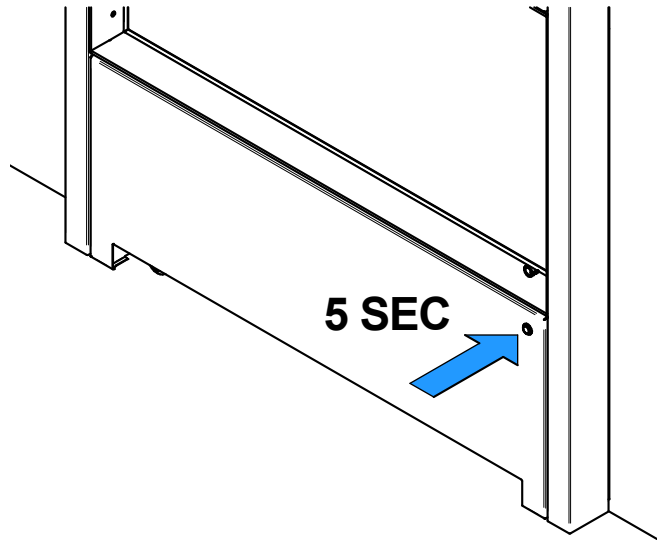


## 8.3 Button functionality

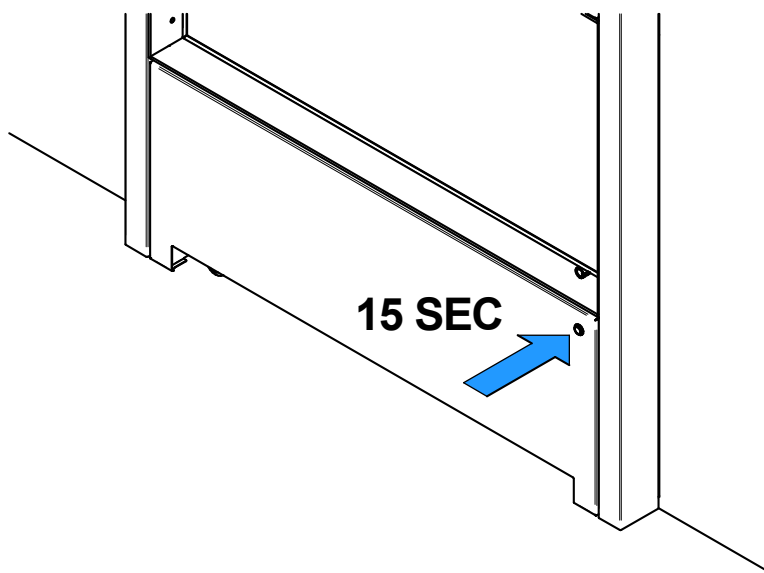
1. RELOAD - To reload, press the button 1 second only, the light will flash fast 3 times.



2. BLOWER - To toggle between fan off mode and auto mode without using the app, press the button 5 seconds, until the light flashes 3 times slowly.



3. WIFI - To reset the wifi, press the button 15 seconds, until the light flashes 5 times slowly.



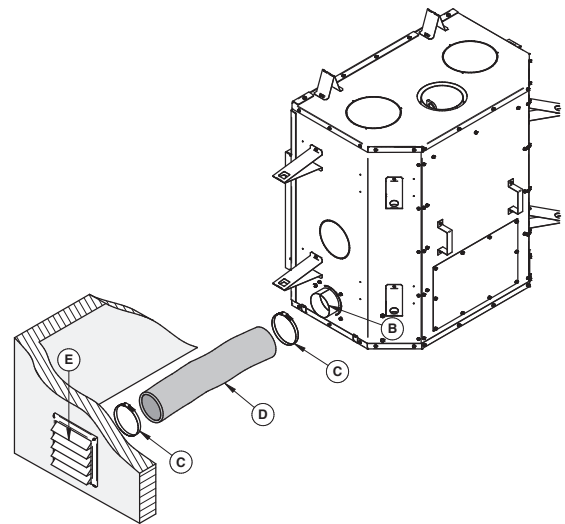
Note that when the fireplace is cold, the light is off.

## 9. INSTALLATION OF OPTIONS ON YOUR PRODUCT

### 9.1 Optional Fresh Air Kit Intake Installation

Follow the instructions below for connecting the fireplace to a fresh air intake (see section 7.2 for additional information):

- The insulated flexible pipe **(D)** should be of sufficient length (at least 10') and of a configuration to prevent condensation.
- The outside wall register **(E)** must not be installed:
  - More than 50% of the total height of the chimney;
  - At more than 10' (3 m) above the base of the fireplace;
  - More than 3' (0.9 m) below the base of the fireplace.
- The fresh air must come from outside the house. The air intake should not take air in the attic, basement or garage.
- The duct and the air intake can be installed above or below the floor level.
- The air intake should be installed high enough not to be obstructed by snow. It should be protected from the wind, away from automobile exhaust, a gas meter or other air inlets or outlets.



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*The following items are included with the fireplace:*

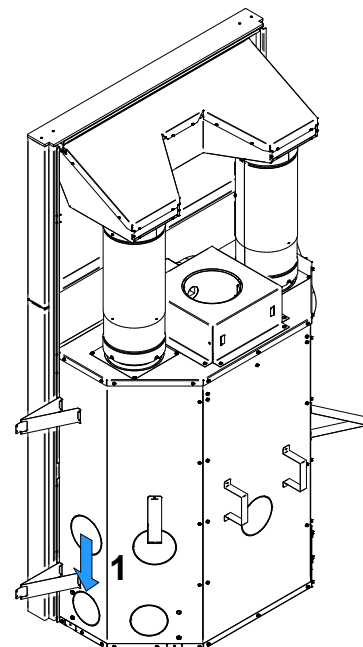
- One (1) 4" (76 mm) adapter **(B)**;
- One (1) air intake plate;
- Four (4) screws.

*The following items are not included:*

- The outside wall register **(E)**;
- The two (2) adjustable collars **(C)**;
- Insulated duct length 4" **(D)**. (Duct must be HVAC type and must comply with ULC S110 or UL 181, Class 0 or Class 1 and must withstand temperatures up to 250° F).

**Note:** Only remove the knockout that will be used to connect the fresh air intake assembly.

The fresh air intake can be installed on the right side **(1)** of the fireplace (the most common).



## Installation



It is strongly recommended to wear gloves to complete the installation.

1. To use the air intake on the right side, remove the knockout by cutting the micro-joints. Cut and remove the insulation and the other knockout inside the fireplace.
2. Install the adapter included in the fireplace. Fold each tab of the adapter from the inside of the fireplace to immobilize the adapter.

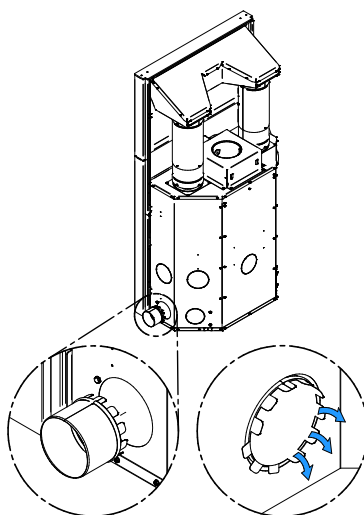
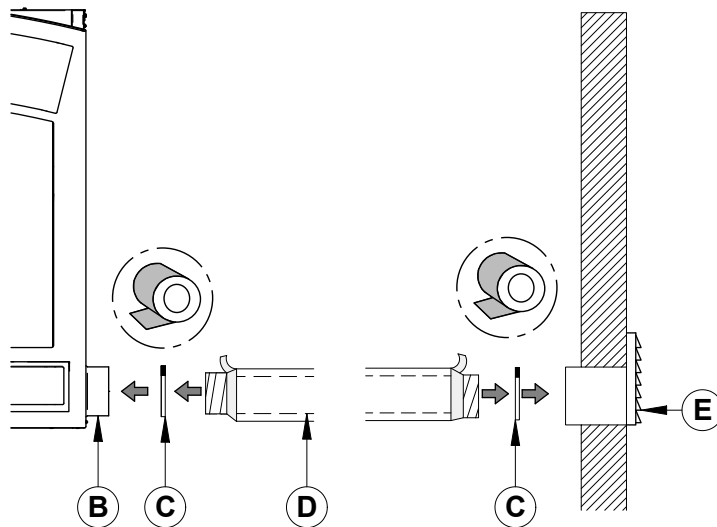


Figure 10: Fresh air intake on the right side

3. Install the flexible duct **(D)** on the fresh air inlet adapter **(B)** using one hose clamp **(C)**. Fix the other end to the outer wall register **(E)** using the second hose clamp **(C)**. The outer wall register **(E)** must be installed outside the house.

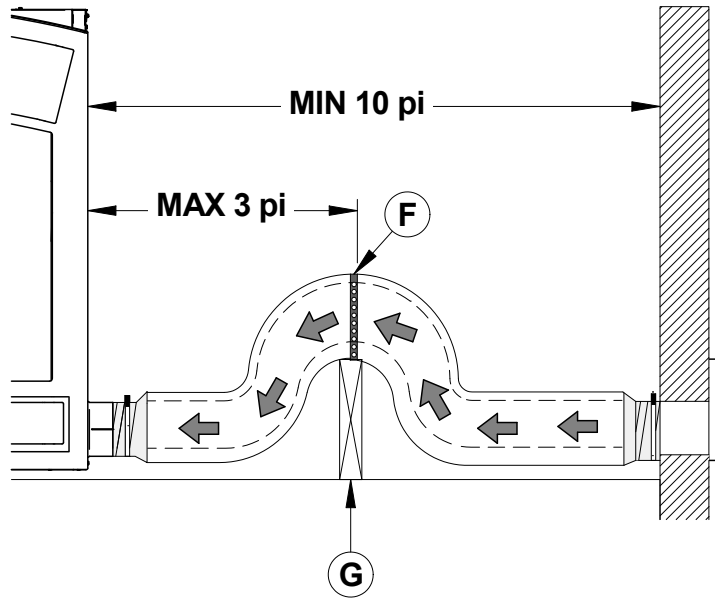
*To properly install the flexible duct, gently remove the insulation and plastic wrap to expose the duct. Fix the duct using clamps. Stick aluminum tape around the joint between the duct and adapter to make the connection airtight. Carefully replace the insulation and plastic wrap on the duct. Secure the plastic with aluminum tape.*





4. To complete the installation, make a hole of  $\frac{1}{4}$ " to  $\frac{1}{2}$ " (6 mm to 13 mm) bigger than the duct diameter on the outside wall of the house at the chosen location. From outside, place the outside wall register in the hole (open side down) and fasten the register to the wall, with screws.

*Use the required length for the installation while respecting the maximum length of 30' (9 m). To avoid condensation, it is recommended to use an insulated duct long enough and containing a «P-Trap» loop. This configuration can be done inside the chase, but must at all times maintain clearances to combustibles.*



It is mandatory to install a mechanical shutter, right or left side depending on the installation of the air intake, that closes the outside air inlet when the fireplace is not in use.

## Parts



INSULATED FLEX PIPE FOR FRESH AIR INTAKE(AC02090/AC02093/AC02094)



FRESH AIR INTAKE REGISTER WITH AIRTIGHT DAMPER (AC01349)

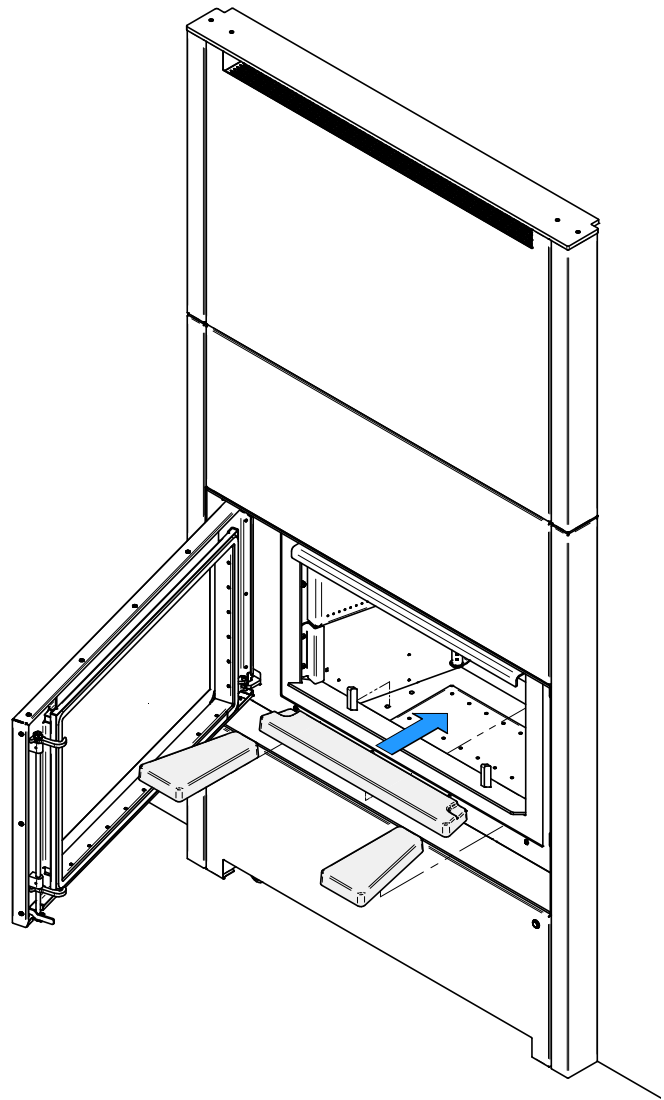
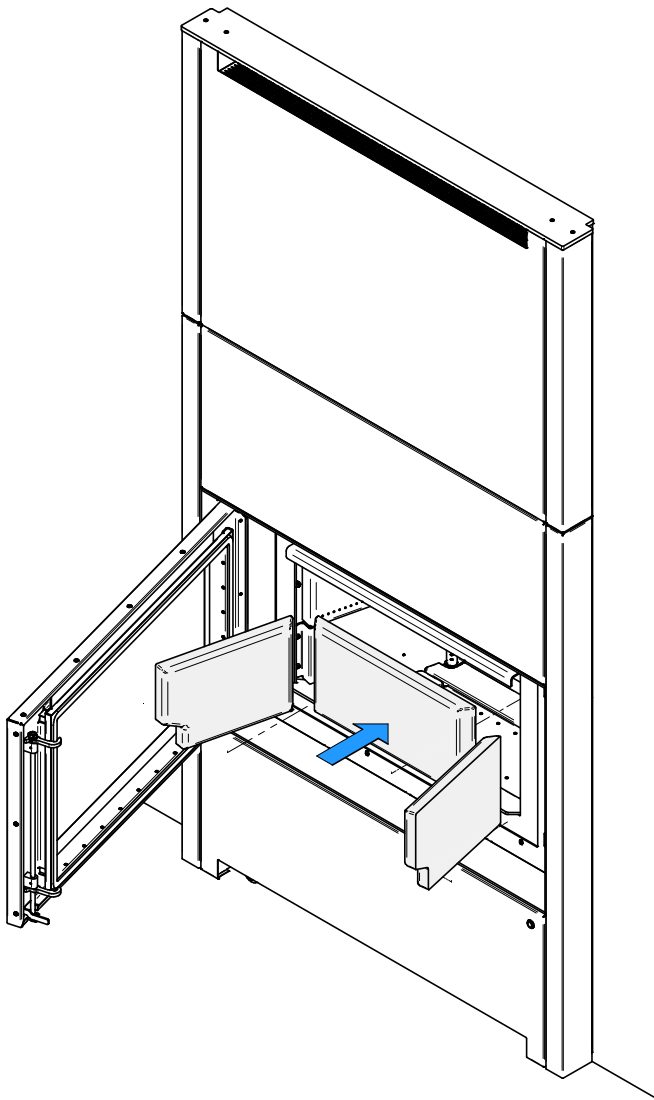


AIR INTAKE TERMINATION WITH CLAMPS (AC01297)

## 10. REPLACEMENT OF PARTS ON YOUR PRODUCT

### 10.1 Refractory Panels Replacement

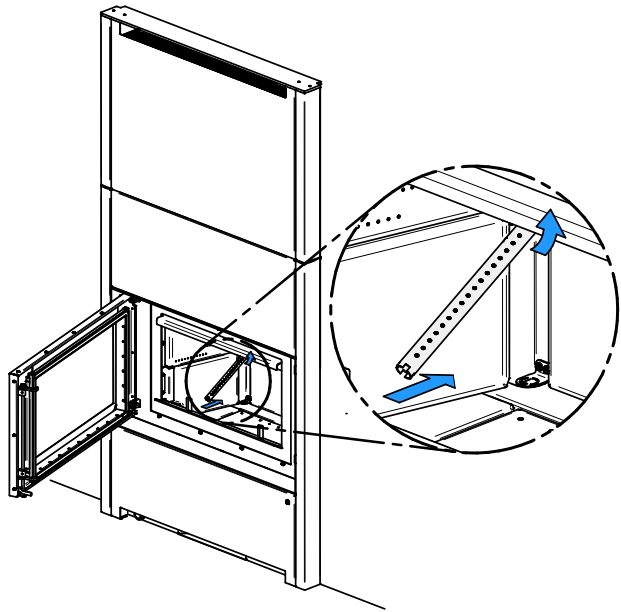
1. Using a power driver, remove the refractory panel brackets. Then remove the side and back refractory panels.
2. Both air tubes must be removed before the bottom tiles can be removed. See section 7.2 for tube removal.



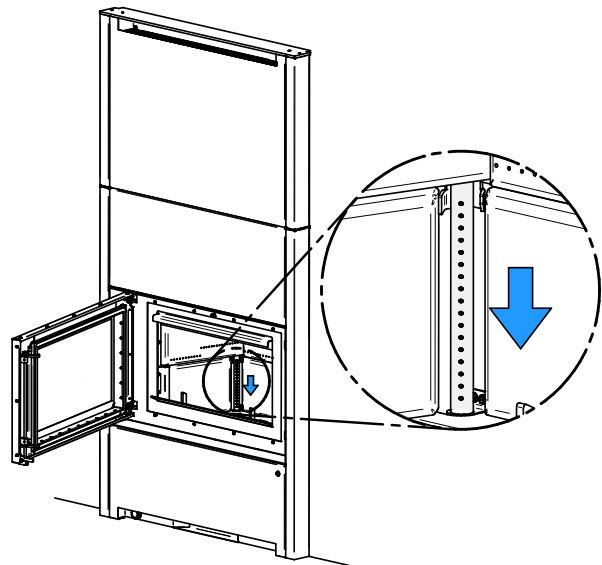
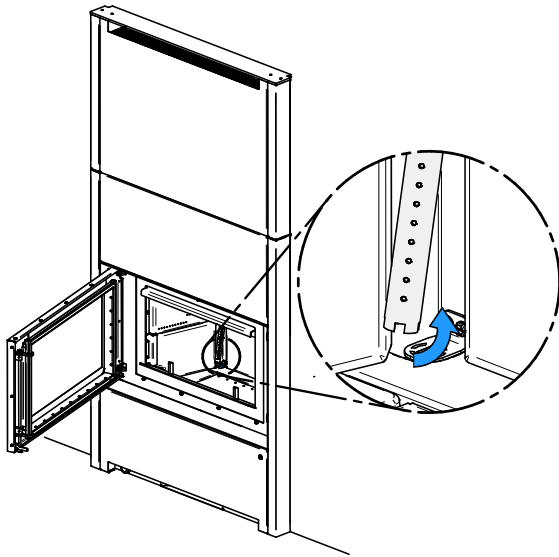
## 10.2 Secondary Air Tubes and Baffle Installation

There are two secondary air tubes in this fireplace. They are located in the back corners of the firebox. Follow these steps to install them:

1. Tilt and insert the secondary air tube (left or right, the procedure remains the same) into the hole in the top of the back channel.

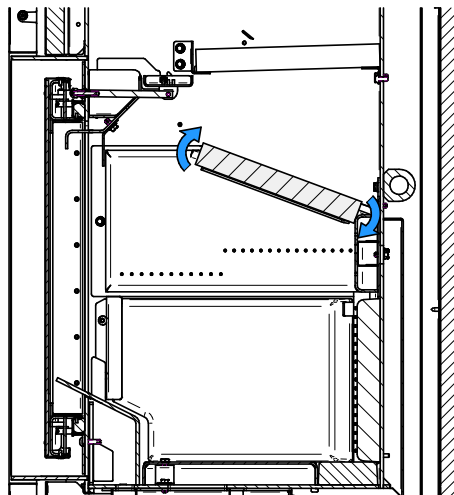
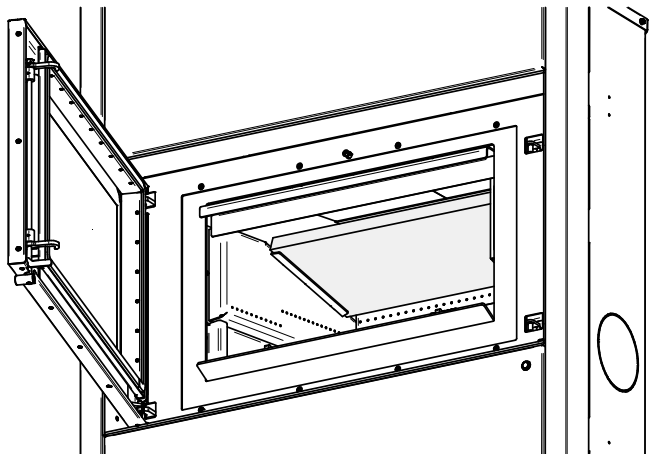


2. Next, lift and push the tube towards the back of the combustion chamber and place it in the slots of the tube holder.

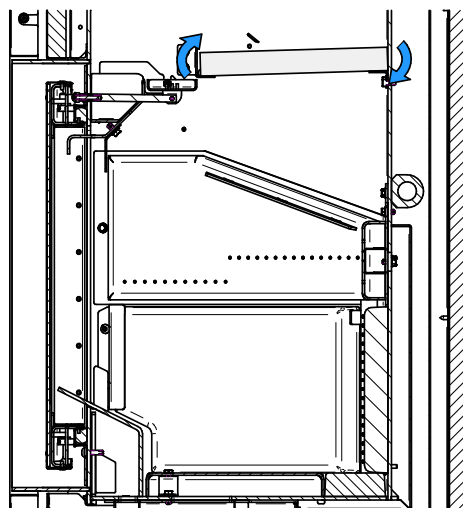
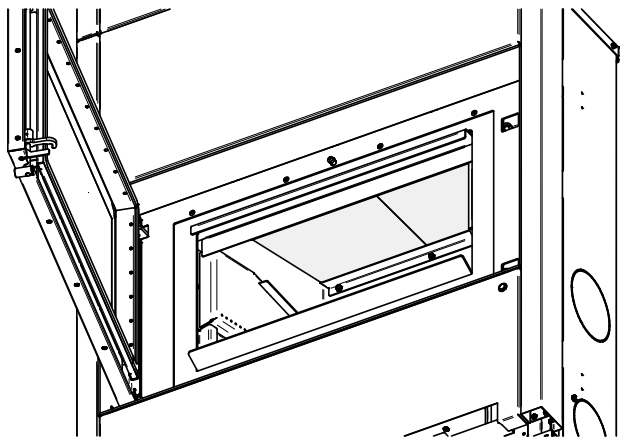


## 10.3 Baffles Replacement

1. This fireplace has two levels of baffles. Start by removing the first baffle by lifting it from its supports and turning it slightly so that it can pass through.



2. The second baffle is now accessible. You can remove it in the same way as the first baffle. (Note: The second baffle is made of two pieces.)

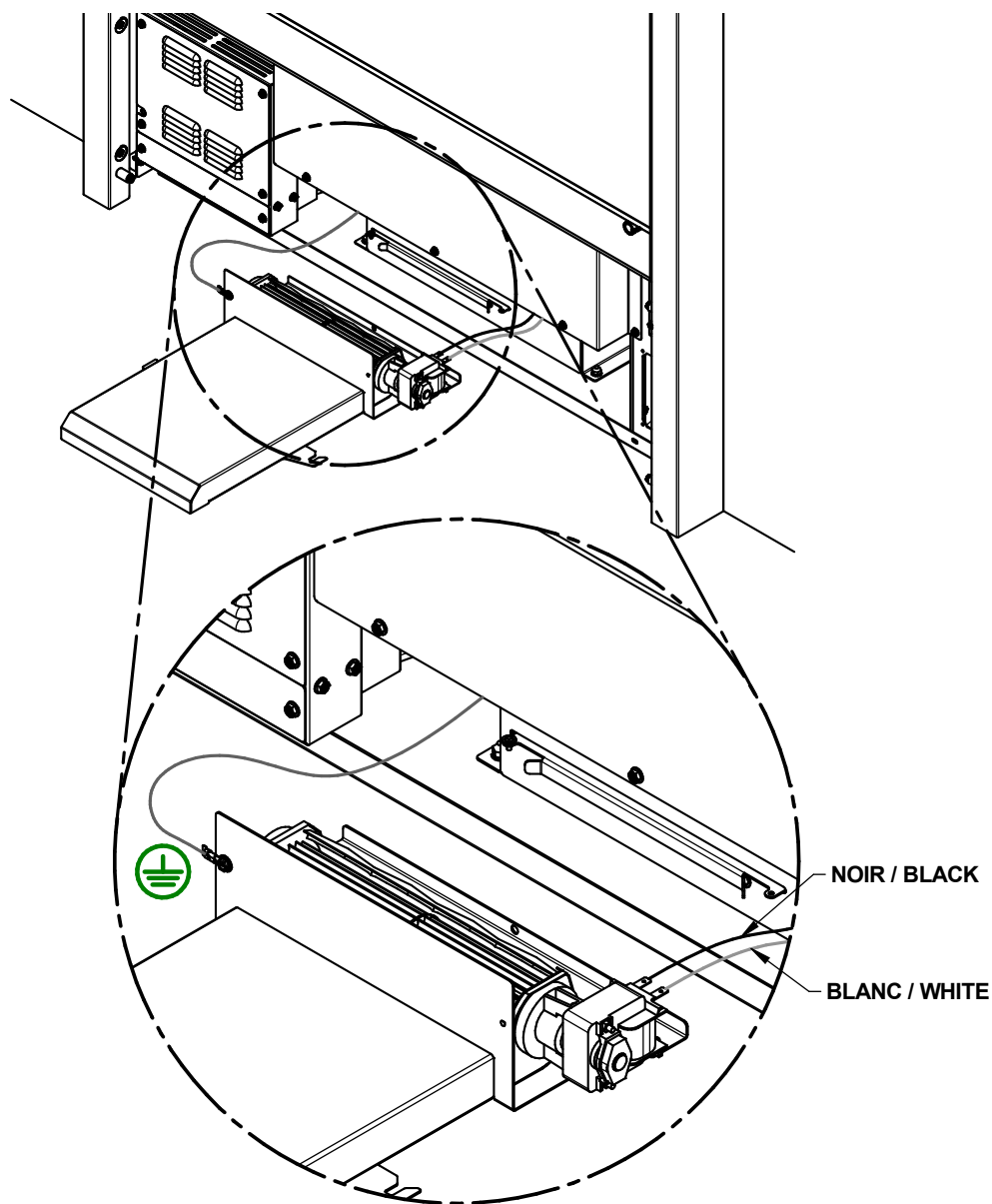


## 10.4 Blower Replacement (44075)

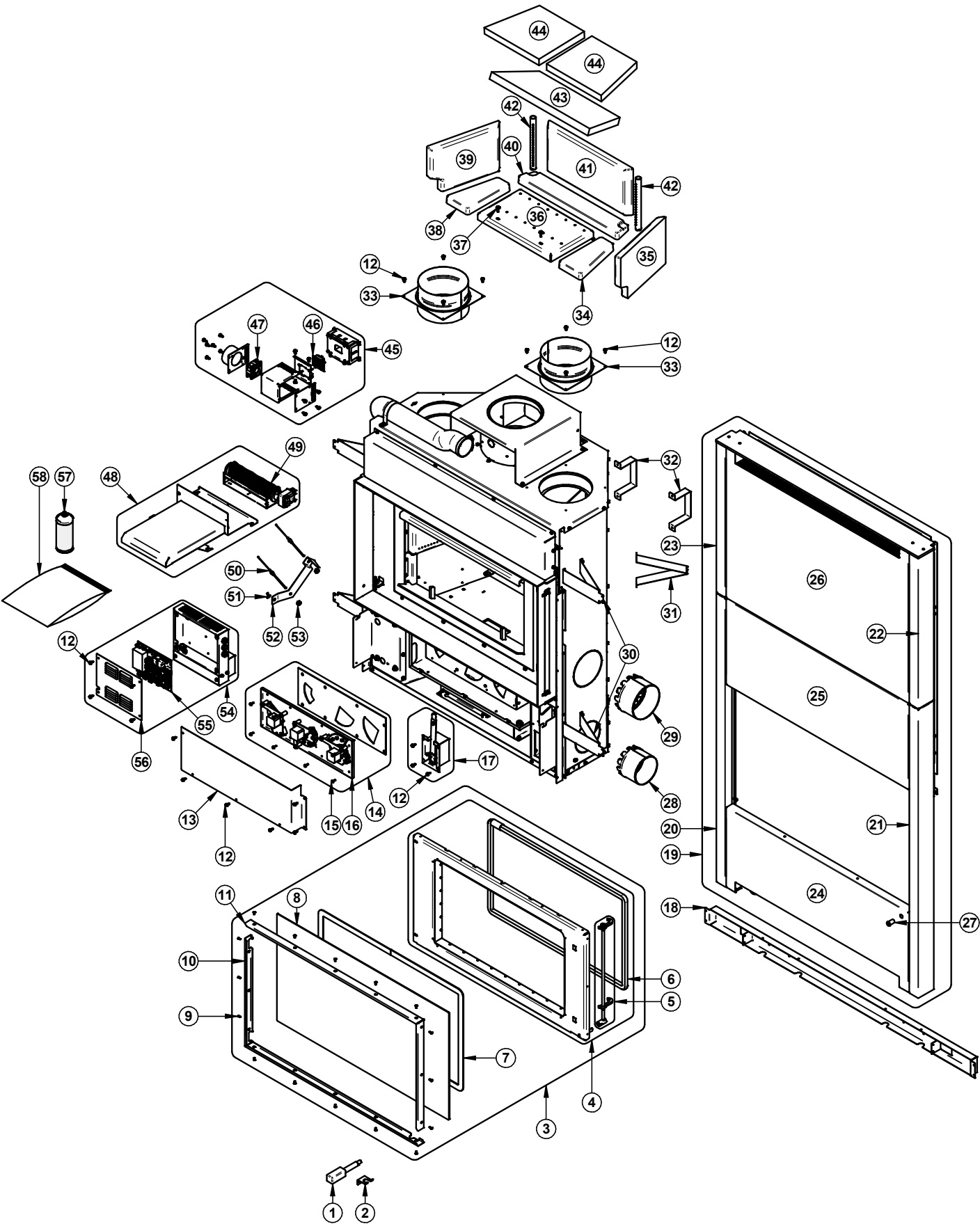
See section 8.2. for the installation steps.

### Blower Connection

The wiring should be done by a qualified electrician. The ground (green or skinned wire) must be attached to the fireplace metal frame.



# 11. Exploded Diagram and Part List



IMPORTANT: THIS IS DATED INFORMATION. When requesting service or replacement parts for your unit, please provide the model number and the serial number. We reserve the right to change parts due to technology upgrades or availability. Contact an authorized dealer to obtain any of these parts. Never use substitute materials. Use of non-approved parts can result in poor performance and safety hazards.

| #  | Item     | Description                                                 | Qté |
|----|----------|-------------------------------------------------------------|-----|
| 1  | SE76427  | DOOR HANDLE ASSEMBLY                                        | 1   |
| 2  | PL76442  | DOOR HANDLE SUPPORT                                         | 1   |
| 3  | SE       |                                                             | 1   |
| 4  | SE       |                                                             | 1   |
| 5  | SE       |                                                             | 1   |
| 6  | AC       |                                                             | 1   |
| 7  | AC       |                                                             | 1   |
| 8  | 23143    | GLASS                                                       | 1   |
| 9  | 30021    | SCREW 8-32 X 7/16" PHILLIPS #2 TYPE F BLACK                 | 16  |
| 10 | PL76335  | GLASS RETAINER                                              | 1   |
| 11 | PL76334  | GLASS RETAINER                                              | 1   |
| 12 | 31048    | SCREW #10 X 1/2 TYPE AB BLACK                               | 22  |
| 13 | PL76309  | ACCESS PANEL                                                | 1   |
| 14 | SE       |                                                             | 1   |
| 15 | 30026    | SCREW 10-24 X 5/8" METAL HEX #5/16 SPLIT WASHER TYPE F ZINC | 8   |
| 16 | SE76338  | ASSEMBLED ENGINE HATCHES                                    | 1   |
| 17 | SE76258  | BOX ASSEMBLY                                                | 1   |
| 18 | PL76398  | WALL SUPPORT                                                | 1   |
| 19 | VA19FL06 | LONG FACADE ACCESSORY                                       | 1   |
| 20 | SE76393  | LEFT VERTICAL FRAME ASSEMBLY                                | 1   |
| 21 | SE76394  | RIGHT VERTICAL FRAME ASSEMBLY                               | 1   |
| 22 | PL76396  | RIGHT VERTICAL FRAME                                        | 1   |
| 23 | PL76395  | LEFT VERTICAL FRAME                                         | 1   |
| 24 | SE76356  | BOTTOM PANEL ASSEMBLY                                       | 1   |
| 25 | PL76402  | CENTRAL PANEL                                               | 1   |
| 26 | SE76401  | TOP PANEL ASSEMBLY                                          | 1   |
| 27 | 44303    | BUTTON WITH DEL RING                                        | 1   |
| 28 | PL76392  | 5" ADAPTER                                                  | 1   |
| 29 | PL66220  | 6" ADAPTER                                                  | 1   |
| 30 | PL76390  | SIDE STAND-OFF                                              | 4   |
| 31 | PL76412  | SIDE AND REAR STAND-OFF                                     | 2   |
| 32 | PL76391  | REAR STAND-OFF                                              | 2   |
| 33 | SE76413  | ANCHOR PLATE                                                | 2   |
| 34 | PL76434  | RIGHT FLOOR REFRACTORY STONE                                | 1   |
| 35 | PL76432  | RIGHT REFRACTORY STONE                                      | 1   |



| #  | Item    | Description                                      | Qté |
|----|---------|--------------------------------------------------|-----|
| 36 | PL76315 | AIR INTAKE GRILLE                                | 1   |
| 37 | 30785   | MECHANICAL SCREW 1/4-20 X 3/4" STAINLESS HEX     | 2   |
| 38 | PL76433 | LEFT FLOOR REFRACTORY STONE                      | 1   |
| 39 | PL76430 | LEFT REFRACTORY STONE                            | 1   |
| 40 | PL76435 | REAR FLOOR REFRACTORY STONE                      | 1   |
| 41 | PL76431 | CENTER REFRACTORY STONE                          | 1   |
| 42 | PL76326 | SECONDARY AIR TUBE                               | 2   |
| 43 | 21672   | BAFFLE                                           | 1   |
| 44 | 21693   | UPPER BAFFLE                                     | 2   |
| 45 | SE76415 | PARTICLE SENSOR                                  | 1   |
| 46 | SE44324 | PARTICLE EMISSION BOARD ASSEMBLY                 | 1   |
| 47 | PL44299 | 60MM TUBE AXIAL FAN                              | 1   |
| 48 | SE76346 | CONVECTION FAN ASSEMBLY                          | 1   |
| 49 | 44075   | 115V-60Hz-30W 90CFM TANGENTIAL FAN               | 1   |
| 50 | 60413   | TYPE K THERMOCOUPLE                              | 2   |
| 51 | 30484   |                                                  | 1   |
| 52 | PL76299 | THERMOCOUPLE SUPPORT                             | 1   |
| 53 | 30838   | M8 NUT                                           | 2   |
| 54 | SE76263 | ELECTRONIC CARD BOX                              | 1   |
| 55 | 44323   | CONTROL CARD                                     | 1   |
| 56 | PL76266 | ACCESS PANEL                                     | 1   |
| 57 | AC05959 | METALLIC BLACK STOVE PAINT - 342g (12oz) AEROSOL | 1   |
| 58 | SE46410 | INSTRUCTION MANUAL KIT                           | 1   |

# VALCOURT LIMITED LIFETIME WARRANTY

The warranty of the manufacturer extends only to the original consumer purchaser and is not transferable. This warranty covers brand new products only, which have not been altered, modified nor repaired since shipment from factory. Proof of purchase (dated bill of sale), model name and serial number must be supplied when making any warranty claim to your VALCOURT dealer.

**This warranty applies to normal residential use only. This warranty is void if the unit is used to burn material other than cordwood (for which the unit is not certified by EPA) and void if not operated according to the owner's manual. Damages caused by misuse, abuse, improper installation, lack of maintenance, over firing, negligence or accident during transportation, power failures, downdrafts, or venting problems are not covered by this warranty.**

This warranty does not cover any scratch, corrosion, distortion, or discoloration. Any defect or damage caused by the use of unauthorized parts or others than original parts void this warranty. An authorized qualified technician must perform the installation in accordance with the instructions supplied with this product and all local and national building codes. Any service call related to an improper installation is not covered by this warranty.

The manufacturer may require that defective products be returned or that digital pictures be provided to support the claim. Returned products are to be shipped prepaid to the manufacturer for investigation. If a product is found to be defective, the manufacturer will repair or replace such defect. Transportation fees to ship the product back to the purchaser will be paid by the manufacturer. Repair work covered by the warranty, executed at the purchaser's domicile by an authorized qualified technician requires the prior approval of the manufacturer. Labour cost and repair work to the account of the manufacturer are based on predetermined rate schedule and must not exceed the wholesale price of the replacement part. All parts and labour costs covered by this warranty are limited according to the table below.

The manufacturer at its discretion may decide to repair or replace any part or unit after inspection and investigation of the defect. The manufacturer may, at its discretion, fully discharge all obligations with respect to this warranty by refunding the wholesale price of any warranted but defective parts. The manufacturer shall in no event be responsible for any special, indirect, consequential damages of any nature, which are in excess of the original purchase price of the product. **A one-time replacement limit applies to all parts benefiting from a lifetime coverage.** This warranty applies to products purchased after May 1<sup>st</sup>, 2021.

| DESCRIPTION                                                                                                                                                      | WARRANTY APPLICATION |         |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|---------|
|                                                                                                                                                                  | PARTS                | LABOUR  |
| Combustion chamber (welds only), castings, convector air-mate and ceramic glass*                                                                                 | Lifetime**           | 4 years |
| Plating* (defective manufacture) - subject to limitations above                                                                                                  | Lifetime**           | n/a     |
| Stainless steel firebox components, surrounds and heat shields, trims (aluminum extrusions), vermiculite, C-Cast or equivalent baffle*, and secondary air tubes* | 5 years**            | 3 years |
| Carbon steel firebox components, glass retainers, and handle assembly                                                                                            | 3 years              | 2 years |
| Grate, blowers, heat sensors, switches, rheostat, wiring, and other controls                                                                                     | 2 years              | 1 year  |
| Paint (peeling), gaskets, insulation, refractory bricks**, and ceramic fibre blankets                                                                            | 1 year               | n/a     |
| All parts replaced under the warranty                                                                                                                            | 90 days              | n/a     |

\*Pictures required

\*\*Limited to one replacement

Shall your unit or a components be defective, contact immediately your VALCOURT dealer. Prior to your call make sure you have the following information necessary to your warranty claim treatment:

- Your name, address and telephone number
- Bill of sale and dealer's name
- Nature of the defect and any relevant information
- Serial number and model name as indicated on the nameplate fixed to the back of your unit

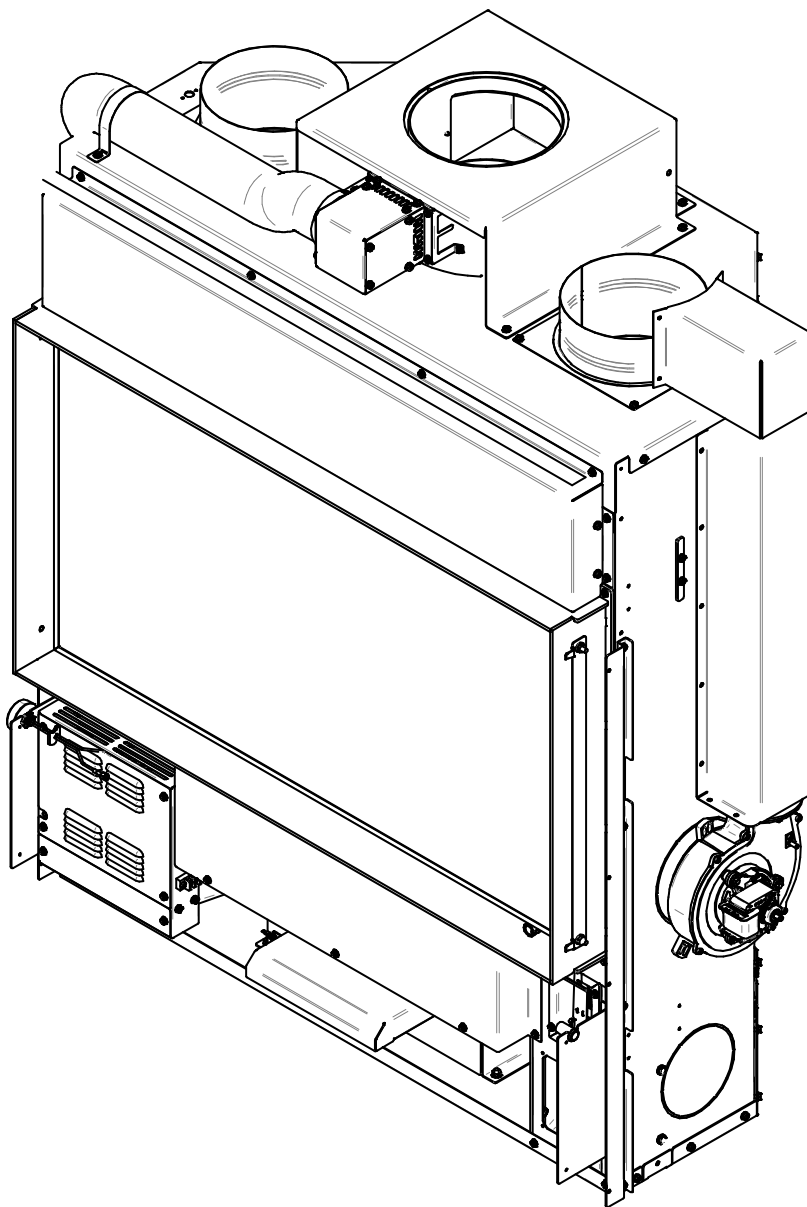
**Before shipping your unit or defective component to our plant, you must obtain from your VALCOURT dealer an Authorization Number. Any merchandise shipped to our plant without authorization will be refused automatically and returned to sender.**

Wood\_Revision: May 2021

## APPENDIX 1: ADDITIONAL BLOWER

The additional blower is installed on the right side of the fireplace. The additional blower must be installed by professionals and must be fixed permanently with permanent screws. This blower increases the performances of the natural convection heat transfer.

**IMPORTANT:** The warranty will be void if the heater is altered in any way, including but not limited to the addition of vents, ducts, or other modifications that change the certified configuration of the unit. These conditions are in place to ensure safe operation and compliance with certification standards.







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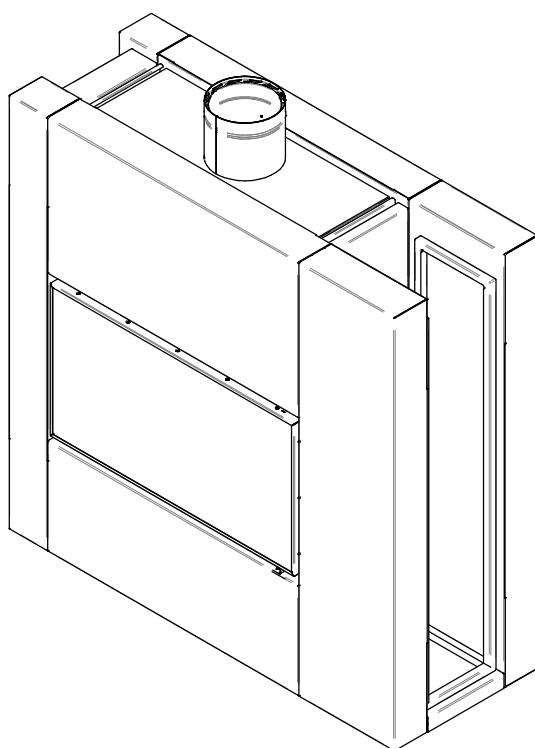
Stove Builder International inc.  
250, De Copenhague street,  
St-Augustin-de-Desmaures (Québec), Canada  
G3A 2H3  
1-877-356-6663  
[https://www.valcourtinc.com/en/  
tech@sbi-international.com](https://www.valcourtinc.com/en/tech@sbi-international.com)



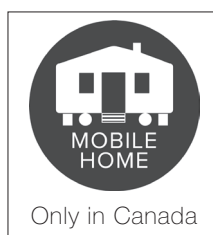
# MANUAL INSTALLATION AND OPERATION

## CHAMBLY

ENGLISH



US Environmental Protection  
Agency phase II certified wood  
fireplace  
compliant with 2020 cord wood  
standard



Safety tested according  
to  
ULC S610, and UL  
127 standards  
by an accredited  
laboratory.

CONTACT LOCAL BUILDING OR FIRE OFFICIALS ABOUT RESTRICTIONS AND INSTALLATION INSPECTION REQUIREMENTS IN LOCAL AREA.

READ THIS ENTIRE MANUAL BEFORE INSTALLATION AND USE OF THIS WOOD STOVE. FAILURE TO FOLLOW THESE INSTRUCTIONS COULD RESULT IN PROPERTY DAMAGE, BODILY INJURY OR EVEN DEATH.

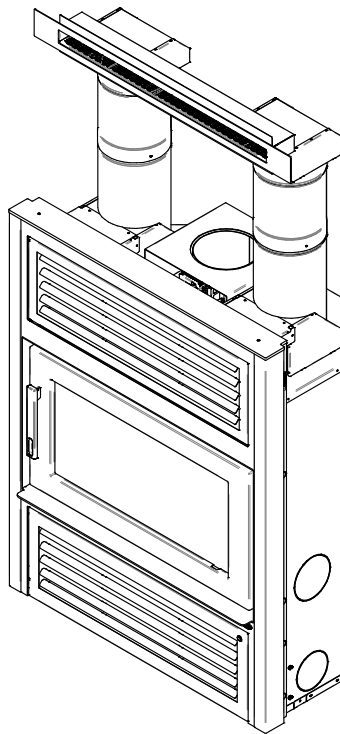
**READ AND KEEP THIS MANUAL FOR REFERENCE**



# MANUAL INSTALLATION AND OPERATION

## ELEVATE

ENGLISH



US Environmental Protection  
Agency phase II certified wood  
fireplace  
compliant with 2020 cord wood  
standard



Safety tested according  
to  
ULC S610, and UL  
127 standards  
by an accredited  
laboratory.

CONTACT LOCAL BUILDING OR FIRE OFFICIALS ABOUT RESTRICTIONS AND INSTALLATION INSPECTION REQUIREMENTS IN LOCAL AREA.

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**READ AND KEEP THIS MANUAL FOR REFERENCE**

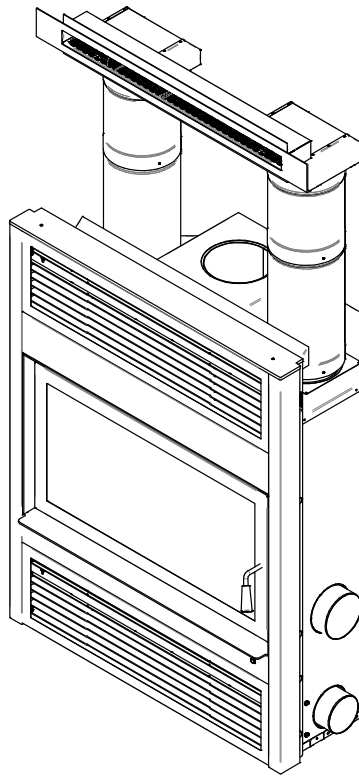




# MANUAL INSTALLATION AND OPERATION

## HEA200

ENGLISH



US Environmental Protection  
Agency phase II certified wood  
fireplace  
compliant with 2020 cord wood  
standard



Safety tested according  
to  
ULC S610, and UL  
127 standards  
by an accredited  
laboratory.

CONTACT LOCAL BUILDING OR FIRE OFFICIALS ABOUT RESTRICTIONS AND INSTALLATION INSPECTION REQUIREMENTS IN LOCAL AREA.

READ THIS ENTIRE MANUAL BEFORE INSTALLATION AND USE OF THIS WOOD STOVE. FAILURE TO FOLLOW THESE INSTRUCTIONS COULD RESULT IN PROPERTY DAMAGE, BODILY INJURY OR EVEN DEATH.

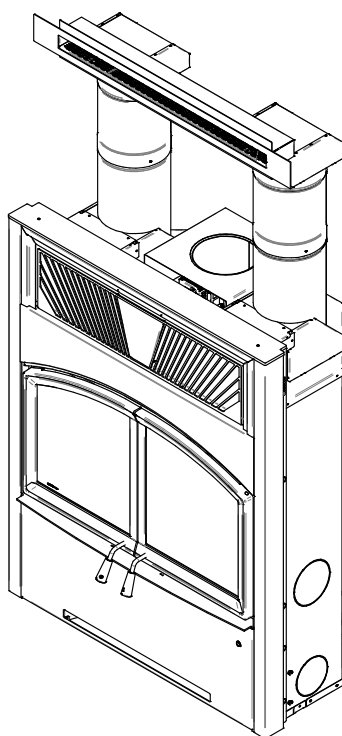
**READ AND KEEP THIS MANUAL FOR REFERENCE**

enerzone

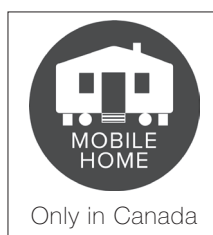
# MANUAL INSTALLATION AND OPERATION

## HELIA

ENGLISH



US Environmental Protection  
Agency phase II certified wood  
fireplace  
compliant with 2020 cord wood  
standard



Safety tested according  
to  
ULC S610, and UL  
127 standards  
by an accredited  
laboratory.

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**READ AND KEEP THIS MANUAL FOR REFERENCE**



# QUALITY CONTROL SERVICES

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



PFS Teco  
11785 SE Hwy 212 STE#305  
Clackamas, OR 97015

Report Number: DIRI0182484A0912013i241204

## A2LA ACCREDITED CERTIFICATE OF CALIBRATION WITH DATA

### INSTRUMENT INFORMATION

| Item  | Make        | Model             | Serial Number  | Customer ID   | Location     |
|-------|-------------|-------------------|----------------|---------------|--------------|
| Scale | Digiweigh   | DWP12i 300kg x 0. | 82484A0912013i | #050          | Lab          |
| Units | Readability | SOP               | Cal Date       | Last Cal Date | Cal Due Date |
| kg    | 0.01        | QC033             | 12/4/24        | 12/28/23      | 12/2025      |

### FUNCTIONAL CHECKS

| FUNCTIONAL CHECKS                                                                                                                                         |                                |                                           |                                |                                           |                                |                             |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|-------------------------------------------|--------------------------------|-------------------------------------------|--------------------------------|-----------------------------|
| SHIFT TEST                                                                                                                                                |                                | LINEARITY                                 |                                | REPEATABILITY                             |                                | ENVIRONMENTAL<br>CONDITIONS |
| Test Wt:                                                                                                                                                  | Tol:                           | Test Wt:                                  | Tol:                           | Test Wt:                                  | Tol:                           |                             |
| 100                                                                                                                                                       | 0.05                           | HB44                                      | HB44                           | 100                                       | 0.01                           |                             |
| As-Found:                                                                                                                                                 |                                | As-Found:                                 |                                | As-Found:                                 |                                |                             |
| Pass: <input checked="" type="checkbox"/>                                                                                                                 | Fail: <input type="checkbox"/> | Pass: <input checked="" type="checkbox"/> | Fail: <input type="checkbox"/> | Pass: <input checked="" type="checkbox"/> | Fail: <input type="checkbox"/> |                             |
| As-Left:                                                                                                                                                  |                                | As-Left:                                  |                                | As-Left:                                  |                                |                             |
| Pass: <input checked="" type="checkbox"/>                                                                                                                 | Fail: <input type="checkbox"/> | Pass: <input checked="" type="checkbox"/> | Fail: <input type="checkbox"/> | Pass: <input checked="" type="checkbox"/> | Fail: <input type="checkbox"/> |                             |
| <div><input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/></div> <div>Good Fair Poor</div> <div>Temperature: 17.2°C</div> |                                |                                           |                                |                                           |                                |                             |

### CALIBRATION DATA

| Standard | As-Found | As-Left | Expanded Uncertainty |
|----------|----------|---------|----------------------|
| 400      | 399.98   | 399.98  | 0.006                |
| 200      | 200.00   | 200.00  | 0.005                |
| 100      | 100.00   | 100.00  | 0.005                |
| 75       | 75.00    | 75.00   | 0.005                |
| 50       | 50.00    | 50.00   | 0.005                |
| 25       | 25.00    | 25.00   | 0.005                |

### CALIBRATION STANDARDS

| Item               | Make      | Model       | Serial Number | Cal Date | Cal Due Date | NIST ID  |
|--------------------|-----------|-------------|---------------|----------|--------------|----------|
| Avoirdupois Cast W | Rice Lake | 25 and 50lb | PWO990-CA     | 7/26/24  | 7/2026       | 20221688 |

#### Permanent Information Concerning this Equipment:

12 month calibration cycle. Scale calibrates in kg only.

#### Comments/Information Concerning this Calibration

12/04/2024: RH-37%

Report prepared/reviewed by: TLP

Date: 12.04.2024

Technician: T. Peterson

Signature: [Signature]

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

The uncertainty is calculated according to the ISO Guide to the Expression of Uncertainty in Measurement and includes the uncertainty of standards used combined with the observed standard deviation of the unit under test. The uncertainty is expanded with a k factor of 2 for an approximate 95% level of confidence. Instruments listed above were calibrated using standards traceable to the National Institute of Standards and Technology (NIST). Calibration data reflect results at the time and location of calibration. Calibration data should be reviewed to insure that the instrument is performing to its required accuracy. Calibrations comply with ISO/IEC 17025 and ANSI/Z540-1-1994 quality standards.

Member: National Conference of Standards Laboratories and Weights & Measures

# Dry Gas Meter Calibration

## DUT

Manufacturer: Apex  
 Model: Xc-50-DIR  
 Lab ID #: 129  
 Serial #:   
 Calibration Date: 12/12/2024  
 Calibration Expiration: 6/12/2025  
 Barometric Pressure: 29.67 in. Hg



| Equipment Used:                         | Ref. Std. DGM | Thermometer | Barometer | Manometer |
|-----------------------------------------|---------------|-------------|-----------|-----------|
| Manufacturer: Apex                      |               | Fluke       | Aquatech  |           |
| Model: SK25DA                           |               |             | DBX2      |           |
| Lab ID#: 47                             |               | 196         | 202       |           |
| Calibration Expiration Date: 6/4/2024   |               | 1/3/2025    | 6/17/2025 |           |
| Calibration $\gamma$ Factor: 0.99801214 |               |             |           |           |

Use in accordance with EPA Method 5, sections 10.3 and 16.1. Use only calibrated, NIST traceable reference standard DGM. Calibrate over expected operating flow range of DUT.

| Calibration Data                               | Run 1   | Run 2   | Run 3   |
|------------------------------------------------|---------|---------|---------|
| Standard DGM Initial Volume (L)                | 0.000   | 0.000   | 0.000   |
| Standard DGM Final Volume (L)                  | 147.396 | 140.784 | 139.749 |
| Standard DGM Temperature (°F)                  | 64.0    | 65.4    | 66.0    |
| Standard DGM Pressure (in H <sub>2</sub> O)    | 0.00    | 0.00    | 0.0     |
| DGM Initial Volume (ft <sup>3</sup> )          | 0.000   | 0.000   | 0.000   |
| DGM Final Volume (ft <sup>3</sup> )            | 5.171   | 5.002   | 5.030   |
| DGM Temperature (°F)                           | 65.8    | 75.0    | 80.8    |
| DGM Pressure (in H <sub>2</sub> O)             | 1.86    | 1.50    | 1.0     |
| Net Volume for Standard DGM (ft <sup>3</sup> ) | 5.205   | 4.972   | 4.935   |
| Net Volume for DGM (ft <sup>3</sup> )          | 5.171   | 5.002   | 5.030   |
| Dry Gas Meter $\gamma$ Factor                  | 1.003   | 1.006   | 1.004   |
| $\gamma$ Factor Deviation From Average         | 1.003   | 1.006   | 1.004   |

Average Gas Meter  $\gamma$  Factor

1.005

**Measurement Uncertainty:** Total measurement uncertainty +/- 0.748% RD, K=2

Calculations:

- Deviation = |Average value for all runs - current run value|
- $\gamma = [V_{std} \times (\gamma_{std}) \times (P_{bar} + P_{std}/13.6) \times (T_{DGM} + 460)] / [V_{DGM} \times (T_{std} + 460) \times (P_{bar} + P_{DGM}/13.6)]$

# Dry Gas Meter Calibration

Meter Manufacturer: EKM Metering

Model: PGM-075

Lab ID #: 129

Serial #: N/A

Calibration Date: 6/11/2024

Calibration Expiration: 12/11/2024

Barometric Pressure: 29.98 in. Hg



## Reference Standard DGM

|                              |          |
|------------------------------|----------|
| Manufacturer:                | Apex     |
| Model:                       | SK25DA   |
| Lab ID#:                     | 47       |
| Serial #:                    | 1101001  |
| Calibration Expiration Date: | 6/4/2025 |
| Calibration $\gamma$ Factor: | 0.998    |

## Unit Under Test Previous Calibration

|                                    |            |
|------------------------------------|------------|
| Date                               | 12/12/2023 |
| $\gamma$ Factor:                   | 1.000      |
| Allowable Deviation ( $\pm 5\%$ ): | 0.05       |
| Actual Deviation:                  | 0.00       |
| Result:                            | PASS       |

| Calibration Data                                 | Run 1   | Run 2   | Run 3   |
|--------------------------------------------------|---------|---------|---------|
| Standard DGM Initial Volume (L)                  | 0.000   | 0.000   | 0.000   |
| Standard DGM Final Volume (L)                    | 138.248 | 154.682 | 140.873 |
| Standard DGM Temperature ( $^{\circ}\text{F}$ )  | 74.0    | 74.7    | 74.0    |
| Standard DGM Pressure (in $\text{H}_2\text{O}$ ) | 0.00    | 0.00    | 0.0     |
| DGM Initial Volume ( $\text{ft}^3$ )             | 0.000   | 0.000   | 0.000   |
| DGM Final Volume ( $\text{ft}^3$ )               | 4.875   | 5.472   | 5.025   |
| DGM Temperature ( $^{\circ}\text{F}$ )           | 73.0    | 79.3    | 79.0    |
| DGM Pressure (in $\text{H}_2\text{O}$ )          | 0.00    | 0.00    | 0.0     |
| Time (min)                                       | 20.0    | 23.0    | 22.0    |
| Net Volume for Standard DGM ( $\text{ft}^3$ )    | 4.882   | 5.463   | 4.975   |
| Net Volume for DGM ( $\text{ft}^3$ )             | 4.875   | 5.472   | 5.025   |
| Dry Gas Meter $\gamma$ Factor                    | 0.998   | 1.005   | 0.997   |
| $\gamma$ Factor Deviation From Average           | 0.998   | 1.005   | 0.997   |

Average Gas Meter  $\gamma$  Factor

1.000

Calculations:

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

2.  $\gamma = [V_{\text{std}} \times (\gamma_{\text{std}}) \times (P_{\text{bar}} + P_{\text{std}}/13.6) \times (T_{\text{DGM}} + 460)] / [V_{\text{DGM}} \times (T_{\text{std}} + 460) \times (P_{\text{bar}} + P_{\text{DGM}}/13.6)]$

Standard Reference Meter is calibrated to NIST traceable standards. Uncertainty of measurement is  $\pm 0.5\%$ .

# Report and Certificate of Calibration



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**Local**  
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**Report #:** 33086-203315-4525 **Customer PO#:** 1109  
**Customer Name:** PFS TECO  
**Customer Address:** 1507 Matt Pass  
**City:** Cottage Grove **State:** WI **Zip:** 53527  
**Contact:** Ethan Frederick  
**Service Address:** 11785 SE Highway 212, Suite 305 Clackamas, OR 97015

## Calibration Standards

|                                                                                                                                                  |
|--------------------------------------------------------------------------------------------------------------------------------------------------|
| 10-01442   Compound Gauge   Fluke   SN: 4582643   Cal: 01/26/2024   Due: 01/31/2025   Vendor: Fluke   Report #: EVL943251                        |
| LP-01782   Thermo-Hygrometer   Comark   SN: 06247790052   Cal: 01/24/2024   Due: 01/31/2025   Range: 122 °F 95 %RH   Report #: 32568-205513-3646 |
|                                                                                                                                                  |
|                                                                                                                                                  |
|                                                                                                                                                  |

## Instrument Data

|                               |                     |                            |                 |
|-------------------------------|---------------------|----------------------------|-----------------|
| <b>Calibration Date:</b>      | February 28, 2024   | <b>Reference:</b>          | ASME B40.100    |
| <b>Recommended Due Date:</b>  | February 28, 2025   | <b>Cal-Cert Procedure:</b> | CP-003          |
| <b>Calibration Frequency:</b> | 12 Months           | <b>Indicating System:</b>  | Digital         |
| <b>Manufacturer:</b>          | Red Lion            | <b>Temperature:</b>        | 70 °F           |
| <b>Type:</b>                  | Pressure Transducer | <b>Humidity:</b>           | 40% RH          |
| <b>Model Number:</b>          | Unknown             | <b>Cal Factor:</b>         | None            |
| <b>Serial #:</b>              | Unknown             | <b>Asset #:</b>            | 129B            |
| <b>Capacity:</b>              | 1 In H2O            | <b>Service Location:</b>   | Service Address |
| <b>Tolerance:</b>             | ± 1.00% of Span     | <b>As Found:</b>           | Pass            |
| <b>Gauge Class:</b>           | A                   | <b>As Left:</b>            | Pass            |

| Instrument Range: |                   | Range Resolution:                |        | Mode Verified:                   |        | Pressure  |                        |  |
|-------------------|-------------------|----------------------------------|--------|----------------------------------|--------|-----------|------------------------|--|
| UUT Reading       | Standard As Found | Standard Verification Reading #1 | Error  | Standard Verification Reading #2 | Error  | Tolerance | Expanded Uncertainty ± |  |
| In H2O            | In H2O            | In H2O                           | In H2O | In H2O                           | In H2O | In H2O    | In H2O                 |  |
| 0.000             | 0.000             | 0.000                            | 0.00   | 0.000                            | 0.00   | 0.01      | 0.0005                 |  |
| 0.100             | 0.100             | 0.100                            | 0.00   | 0.097                            | 0.00   | 0.01      | 0.0067                 |  |
| 0.250             | 0.247             | 0.247                            | 0.00   | 0.247                            | 0.00   | 0.01      | 0.0006                 |  |
| 0.500             | 0.496             | 0.496                            | 0.00   | 0.495                            | 0.00   | 0.01      | 0.0011                 |  |
| 0.750             | 0.743             | 0.743                            | -0.01  | 0.743                            | -0.01  | 0.01      | 0.001                  |  |
| 1.000             | 0.992             | 0.992                            | -0.01  | 0.992                            | -0.01  | 0.01      | 0.0022                 |  |
| 0.750             | 0.745             | 0.745                            | -0.01  | 0.743                            | -0.01  | 0.01      | 0.006                  |  |
| 0.500             | 0.496             | 0.496                            | 0.00   | 0.496                            | 0.00   | 0.01      | 0.0009                 |  |
| 0.250             | 0.248             | 0.248                            | 0.00   | 0.249                            | 0.00   | 0.01      | 0.0031                 |  |
| 0.100             | 0.101             | 0.101                            | 0.00   | 0.099                            | 0.00   | 0.01      | 0.0049                 |  |
| 0.000             | 0.009             | 0.009                            | 0.01   | -0.004                           | 0.00   | 0.01      | 0.0005                 |  |



**Manufacturer:** Red Lion

**Type:** Pressure Transducer

**Serial #:** Unknown

**Remarks:**

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All tolerances were derived from the applicable standards and pass/fail determination is based on those tolerances. The customer determined any recommended due dates indicated on the certificate.

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**Service Engineer:** Steven White

**Date:** February 28, 2024

**Technical Manager:** Marshall Doyle

**Signature:**



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**Report #:** 33086-203316-4525 **Customer PO#:** 1109  
**Customer Name:** PFS TECO  
**Customer Address:** 1507 Matt Pass  
**City:** Cottage Grove **State:** WI **Zip:** 53527  
**Contact:** Ethan Frederick  
**Service Address:** 11785 SE Highway 212, Suite 305 Clackamas, OR 97015

## Calibration Standards

|                                                                                                                                                  |
|--------------------------------------------------------------------------------------------------------------------------------------------------|
| 10-01442   Compound Gauge   Fluke   SN: 4582643   Cal: 01/26/2024   Due: 01/31/2025   Vendor: Fluke   Report #: EVL943251                        |
| LP-01782   Thermo-Hygrometer   Comark   SN: 06247790052   Cal: 01/24/2024   Due: 01/31/2025   Range: 122 °F 95 %RH   Report #: 32568-205513-3646 |
|                                                                                                                                                  |
|                                                                                                                                                  |
|                                                                                                                                                  |

## Instrument Data

|                               |                     |                            |                 |
|-------------------------------|---------------------|----------------------------|-----------------|
| <b>Calibration Date:</b>      | February 28, 2024   | <b>Reference:</b>          | ASME B40.100    |
| <b>Recommended Due Date:</b>  | February 28, 2025   | <b>Cal-Cert Procedure:</b> | CP-003          |
| <b>Calibration Frequency:</b> | 12 Months           | <b>Indicating System:</b>  | Digital         |
| <b>Manufacturer:</b>          | Red Lion            | <b>Temperature:</b>        | 70 °F           |
| <b>Type:</b>                  | Pressure Transducer | <b>Humidity:</b>           | 40% RH          |
| <b>Model Number:</b>          | Unknown             | <b>Cal Factor:</b>         | None            |
| <b>Serial #:</b>              | Unknown             | <b>Asset #:</b>            | 129C            |
| <b>Capacity:</b>              | 5 In H2O            | <b>Service Location:</b>   | Service Address |
| <b>Tolerance:</b>             | ± 1.00% of Span     | <b>As Found:</b>           | Pass            |
| <b>Gauge Class:</b>           | A                   | <b>As Left:</b>            | Pass            |

| Instrument Range: |                   | Range Resolution:                |        | Mode Verified:                   |        | Pressure  |                        |  |
|-------------------|-------------------|----------------------------------|--------|----------------------------------|--------|-----------|------------------------|--|
| UUT Reading       | Standard As Found | Standard Verification Reading #1 | Error  | Standard Verification Reading #2 | Error  | Tolerance | Expanded Uncertainty ± |  |
| In H2O            | In H2O            | In H2O                           | In H2O | In H2O                           | In H2O | In H2O    | In H2O                 |  |
| 0.00              | 0.00              | 0.00                             | 0.00   | 0.00                             | 0.00   | 0.05      | 0.005                  |  |
| 0.50              | 0.50              | 0.50                             | 0.00   | 0.49                             | -0.01  | 0.05      | 0.024                  |  |
| 1.25              | 1.23              | 1.23                             | -0.02  | 1.24                             | -0.01  | 0.05      | 0.014                  |  |
| 2.50              | 2.47              | 2.47                             | -0.03  | 2.47                             | -0.03  | 0.05      | 0.017                  |  |
| 3.75              | 3.71              | 3.71                             | -0.04  | 3.71                             | -0.04  | 0.05      | 0.007                  |  |
| 5.00              | 4.96              | 4.96                             | -0.04  | 4.95                             | -0.05  | 0.05      | 0.023                  |  |
| 3.75              | 3.71              | 3.71                             | -0.04  | 3.72                             | -0.03  | 0.05      | 0.041                  |  |
| 2.50              | 2.47              | 2.47                             | -0.03  | 2.47                             | -0.03  | 0.05      | 0.006                  |  |
| 1.25              | 1.24              | 1.24                             | -0.01  | 1.24                             | -0.01  | 0.05      | 0.01                   |  |
| 0.50              | 0.51              | 0.51                             | 0.01   | 0.50                             | 0.00   | 0.05      | 0.027                  |  |
| 0.00              | 0.00              | 0.00                             | 0.00   | 0.00                             | 0.00   | 0.05      | 0.005                  |  |



**Manufacturer:** Red Lion

**Type:** Pressure Transducer

**Serial #:** Unknown

**Remarks:**

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**Service Engineer:**

Steven White

**Date:**

February 28, 2024

**Technical Manager:**

Marshall Doyle

**Signature:**

*MD*

# Dry Gas Meter Calibration

## DUT

Manufacturer: Apex  
 Model: Xc-50-DIR  
 Lab ID #: 130  
 Serial #:  
 Calibration Date: 12/12/2024  
 Calibration Expiration: 6/12/2025  
 Barometric Pressure: 29.67 in. Hg



| Equipment Used:                         | Ref. Std. DGM | Thermometer | Barometer | Manometer |
|-----------------------------------------|---------------|-------------|-----------|-----------|
| Manufacturer: Apex                      |               | Fluke       | Aquatech  |           |
| Model: SK25DA                           |               |             | DBX2      |           |
| Lab ID#: 47                             |               | 196         | 202       |           |
| Calibration Expiration Date: 6/4/2024   |               | 1/3/2025    | 6/17/2025 |           |
| Calibration $\gamma$ Factor: 0.99801214 |               |             |           |           |

Use in accordance with EPA Method 5, sections 10.3 and 16.1. Use only calibrated, NIST traceable reference standard DGM. Calibrate over expected operating flow range of DUT.

| Calibration Data                               | Run 1   | Run 2   | Run 3   |
|------------------------------------------------|---------|---------|---------|
| Standard DGM Initial Volume (L)                | 0.000   | 0.000   | 0.000   |
| Standard DGM Final Volume (L)                  | 146.253 | 143.931 | 140.414 |
| Standard DGM Temperature (°F)                  | 67.1    | 67.1    | 68.9    |
| Standard DGM Pressure (in H <sub>2</sub> O)    | 0.00    | 0.00    | 0.0     |
| DGM Initial Volume (ft <sup>3</sup> )          | 0.000   | 0.000   | 0.000   |
| DGM Final Volume (ft <sup>3</sup> )            | 5.090   | 5.091   | 5.039   |
| DGM Temperature (°F)                           | 70.0    | 77.5    | 83.5    |
| DGM Pressure (in H <sub>2</sub> O)             | 1.79    | 1.47    | 1.0     |
| Net Volume for Standard DGM (ft <sup>3</sup> ) | 5.165   | 5.083   | 4.959   |
| Net Volume for DGM (ft <sup>3</sup> )          | 5.090   | 5.091   | 5.039   |
| Dry Gas Meter $\gamma$ Factor                  | 1.014   | 1.012   | 1.007   |
| $\gamma$ Factor Deviation From Average         | 1.014   | 1.012   | 1.007   |

Average Gas Meter  $\gamma$  Factor

1.011

**Measurement Uncertainty:** Total measurement uncertainty +/- 0.748% RD, K=2

Calculations:

- Deviation = |Average value for all runs - current run value|
- $\gamma = [V_{std} \times (\gamma_{std}) \times (P_{bar} + P_{std}/13.6) \times (T_{DGM} + 460)] / [V_{DGM} \times (T_{std} + 460) \times (P_{bar} + P_{DGM}/13.6)]$

# Dry Gas Meter Calibration

Meter Manufacturer: EKM Metering

Model: PGM-075

Lab ID #: 130

Serial #: N/A

Calibration Date: 6/11/2024

Calibration Expiration: 12/11/2024

Barometric Pressure: 29.98 in. Hg



## Reference Standard DGM

Manufacturer: Apex

Model: SK25DA

Lab ID#: 47

Serial #: 1101001

Calibration Expiration Date: 6/4/2025

Calibration  $\gamma$  Factor: 0.998

## Unit Under Test Previous Calibration

Date: 12/12/2023

$\gamma$  Factor: 1.003

Allowable Deviation ( $\pm 5\%$ ): 0.05015

Actual Deviation: 0.01

Result: PASS

| Calibration Data                                 | Run 1   | Run 2   | Run 3   |
|--------------------------------------------------|---------|---------|---------|
| Standard DGM Initial Volume (L)                  | 0.000   | 0.000   | 0.000   |
| Standard DGM Final Volume (L)                    | 147.914 | 146.299 | 142.515 |
| Standard DGM Temperature ( $^{\circ}\text{F}$ )  | 77.0    | 77.0    | 76.7    |
| Standard DGM Pressure (in $\text{H}_2\text{O}$ ) | 0.00    | 0.00    | 0.0     |
| DGM Initial Volume ( $\text{ft}^3$ )             | 0.000   | 0.000   | 0.000   |
| DGM Final Volume ( $\text{ft}^3$ )               | 5.170   | 5.172   | 5.090   |
| DGM Temperature ( $^{\circ}\text{F}$ )           | 80.0    | 80.0    | 88.0    |
| DGM Pressure (in $\text{H}_2\text{O}$ )          | 0.00    | 0.00    | 0.0     |
| Time (min)                                       | 23.0    | 22.5    | 22.5    |
| Net Volume for Standard DGM ( $\text{ft}^3$ )    | 5.224   | 5.166   | 5.033   |
| Net Volume for DGM ( $\text{ft}^3$ )             | 5.170   | 5.172   | 5.090   |
| Dry Gas Meter $\gamma$ Factor                    | 1.014   | 1.003   | 1.008   |
| $\gamma$ Factor Deviation From Average           | 1.014   | 1.003   | 1.008   |

Average Gas Meter  $\gamma$  Factor

1.008

Calculations:

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

2.  $\gamma = [V_{\text{std}} \times (\gamma_{\text{std}}) \times (P_{\text{bar}} + P_{\text{std}}/13.6) \times (T_{\text{DGM}} + 460)] / [V_{\text{DGM}} \times (T_{\text{std}} + 460) \times (P_{\text{bar}} + P_{\text{DGM}}/13.6)]$

Standard Reference Meter is calibrated to NIST traceable standards. Uncertainty of measurement is  $\pm 0.5\%$ .

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**Report #:** 33086-203317-4525 **Customer PO#:** 1109  
**Customer Name:** PFS TECO  
**Customer Address:** 1507 Matt Pass  
**City:** Cottage Grove **State:** WI **Zip:** 53527  
**Contact:** Ethan Frederick  
**Service Address:** 11785 SE Highway 212, Suite 305 Clackamas, OR 97015

## Calibration Standards

|                                                                                                                                                  |
|--------------------------------------------------------------------------------------------------------------------------------------------------|
| 10-01442   Compound Gauge   Fluke   SN: 4582643   Cal: 01/26/2024   Due: 01/31/2025   Vendor: Fluke   Report #: EVL943251                        |
| LP-01782   Thermo-Hygrometer   Comark   SN: 06247790052   Cal: 01/24/2024   Due: 01/31/2025   Range: 122 °F 95 %RH   Report #: 32568-205513-3646 |
|                                                                                                                                                  |
|                                                                                                                                                  |
|                                                                                                                                                  |

## Instrument Data

|                               |                     |                            |                 |
|-------------------------------|---------------------|----------------------------|-----------------|
| <b>Calibration Date:</b>      | February 28, 2024   | <b>Reference:</b>          | ASME B40.100    |
| <b>Recommended Due Date:</b>  | February 28, 2025   | <b>Cal-Cert Procedure:</b> | CP-003          |
| <b>Calibration Frequency:</b> | 12 Months           | <b>Indicating System:</b>  | Digital         |
| <b>Manufacturer:</b>          | Red Lion            | <b>Temperature:</b>        | 70 °F           |
| <b>Type:</b>                  | Pressure Transducer | <b>Humidity:</b>           | 39% RH          |
| <b>Model Number:</b>          | Unknown             | <b>Cal Factor:</b>         | None            |
| <b>Serial #:</b>              | Unknown             | <b>Asset #:</b>            | 130B            |
| <b>Capacity:</b>              | 1 In H2O            | <b>Service Location:</b>   | Service Address |
| <b>Tolerance:</b>             | ± 1.00% of Span     | <b>As Found:</b>           | Pass            |
| <b>Gauge Class:</b>           | A                   | <b>As Left:</b>            | Pass            |

| Instrument Range: 1.00 |                   | Range Resolution: 0.001          |        | Mode Verified: Pressure          |        |           |                        |
|------------------------|-------------------|----------------------------------|--------|----------------------------------|--------|-----------|------------------------|
| UUT Reading            | Standard As Found | Standard Verification Reading #1 | Error  | Standard Verification Reading #2 | Error  | Tolerance | Expanded Uncertainty ± |
| In H2O                 | In H2O            | In H2O                           | In H2O | In H2O                           | In H2O | In H2O    | In H2O                 |
| 0.000                  | 0.000             | 0.000                            | 0.00   | 0.000                            | 0.00   | 0.01      | 0.0005                 |
| 0.100                  | 0.099             | 0.099                            | 0.00   | 0.098                            | 0.00   | 0.01      | 0.0021                 |
| 0.250                  | 0.246             | 0.246                            | 0.00   | 0.246                            | 0.00   | 0.01      | 0.001                  |
| 0.500                  | 0.493             | 0.493                            | -0.01  | 0.493                            | -0.01  | 0.01      | 0.0009                 |
| 0.750                  | 0.748             | 0.748                            | 0.00   | 0.741                            | -0.01  | 0.01      | 0.0185                 |
| 1.000                  | 0.991             | 0.991                            | -0.01  | 0.991                            | -0.01  | 0.01      | 0.0026                 |
| 0.750                  | 0.743             | 0.743                            | -0.01  | 0.742                            | -0.01  | 0.01      | 0.0025                 |
| 0.500                  | 0.494             | 0.494                            | -0.01  | 0.494                            | -0.01  | 0.01      | 0.0009                 |
| 0.250                  | 0.247             | 0.247                            | 0.00   | 0.248                            | 0.00   | 0.01      | 0.0026                 |
| 0.100                  | 0.098             | 0.098                            | 0.00   | 0.100                            | 0.00   | 0.01      | 0.0052                 |
| 0.000                  | 0.000             | 0.000                            | 0.00   | 0.000                            | 0.00   | 0.01      | 0.0005                 |

**Manufacturer:** Red Lion

**Type:** Pressure Transducer

**Serial #:** Unknown

**Remarks:**

**We sincerely thank you for your business. Please call us at 503-654-9620 for all your sales and calibration needs.  
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**Service Engineer:** Steven White

**Date:** February 28, 2024

**Technical Manager:** Marshall Doyle

**Signature:**

*McDoyle*

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**Local**  
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**Report #:** 33086-203318-4525 **Customer PO#:** 1109  
**Customer Name:** PFS TECO  
**Customer Address:** 1507 Matt Pass  
**City:** Cottage Grove **State:** WI **Zip:** 53527  
**Contact:** Ethan Frederick  
**Service Address:** 11785 SE Highway 212, Suite 305 Clackamas, OR 97015

## Calibration Standards

|                                                                                                                                                  |
|--------------------------------------------------------------------------------------------------------------------------------------------------|
| 10-01442   Compound Gauge   Fluke   SN: 4582643   Cal: 01/26/2024   Due: 01/31/2025   Vendor: Fluke   Report #: EVL943251                        |
| LP-01782   Thermo-Hygrometer   Comark   SN: 06247790052   Cal: 01/24/2024   Due: 01/31/2025   Range: 122 °F 95 %RH   Report #: 32568-205513-3646 |
|                                                                                                                                                  |
|                                                                                                                                                  |
|                                                                                                                                                  |

## Instrument Data

|                               |                     |                            |                 |
|-------------------------------|---------------------|----------------------------|-----------------|
| <b>Calibration Date:</b>      | February 28, 2024   | <b>Reference:</b>          | ASME B40.100    |
| <b>Recommended Due Date:</b>  | February 28, 2025   | <b>Cal-Cert Procedure:</b> | CP-003          |
| <b>Calibration Frequency:</b> | 12 Months           | <b>Indicating System:</b>  | Digital         |
| <b>Manufacturer:</b>          | Red Lion            | <b>Temperature:</b>        | 70 °F           |
| <b>Type:</b>                  | Pressure Transducer | <b>Humidity:</b>           | 39% RH          |
| <b>Model Number:</b>          | Unknown             | <b>Cal Factor:</b>         | None            |
| <b>Serial #:</b>              | Unknown             | <b>Asset #:</b>            | 130C            |
| <b>Capacity:</b>              | 5 In H2O            | <b>Service Location:</b>   | Service Address |
| <b>Tolerance:</b>             | ± 1.00% of Span     | <b>As Found:</b>           | Pass            |
| <b>Gauge Class:</b>           | A                   | <b>As Left:</b>            | Pass            |

| <b>Instrument Range:</b> 5.00 |                   | <b>Range Resolution:</b> 0.01    |        | <b>Mode Verified:</b> Pressure   |        |           |                        |  |
|-------------------------------|-------------------|----------------------------------|--------|----------------------------------|--------|-----------|------------------------|--|
| UUT Reading                   | Standard As Found | Standard Verification Reading #1 | Error  | Standard Verification Reading #2 | Error  | Tolerance | Expanded Uncertainty ± |  |
| In H2O                        | In H2O            | In H2O                           | In H2O | In H2O                           | In H2O | In H2O    | In H2O                 |  |
| 0.00                          | 0.00              | 0.00                             | 0.00   | 0.00                             | 0.00   | 0.05      | 0.005                  |  |
| 0.50                          | 0.51              | 0.51                             | 0.01   | 0.49                             | -0.01  | 0.05      | 0.034                  |  |
| 1.25                          | 1.20              | 1.20                             | -0.05  | 1.24                             | -0.01  | 0.05      | 0.083                  |  |
| 2.50                          | 2.53              | 2.53                             | 0.03   | 2.48                             | -0.02  | 0.05      | 0.127                  |  |
| 3.75                          | 3.70              | 3.70                             | -0.05  | 3.73                             | -0.02  | 0.05      | 0.056                  |  |
| 5.00                          | 4.97              | 4.97                             | -0.03  | 4.98                             | -0.02  | 0.05      | 0.049                  |  |
| 3.75                          | 3.71              | 3.71                             | -0.04  | 3.73                             | -0.02  | 0.05      | 0.061                  |  |
| 2.50                          | 2.46              | 2.46                             | -0.04  | 2.49                             | -0.01  | 0.05      | 0.06                   |  |
| 1.25                          | 1.21              | 1.21                             | -0.04  | 1.24                             | -0.01  | 0.05      | 0.062                  |  |
| 0.50                          | 0.50              | 0.50                             | 0.00   | 0.50                             | 0.00   | 0.05      | 0.005                  |  |
| 0.00                          | 0.00              | 0.00                             | 0.00   | 0.00                             | 0.00   | 0.05      | 0.005                  |  |

**Manufacturer:** Red Lion

**Type:** Pressure Transducer

**Serial #:** Unknown

**Remarks:**

**We sincerely thank you for your business. Please call us at 503-654-9620 for all your sales and calibration needs.  
Cleaning and preventative maintenance were performed as part of this service.**

**Cal-Cert is accredited by A2LA under Calibration Laboratory Code #4986.01.  
A2LA is recognized under the ILAC mutual recognition agreement (MRA).**

This certificate is hereby issued that the above instrument was tested for accuracy with calibrated standards traceable to the National Institute of Standards and Technology (NIST). The information provided on this form complies with the data gathering and reporting requirements of ISO/IEC 17025 and ANSI/NCSL Z540.1, and meets the requirements of all applicable references and Cal-Cert procedures listed above. Any stated measurement uncertainty includes the uncertainty of the Calibration standards used, combined with the uncertainty of the measurement process using the RSS method with a k=2 for an approximate 95% level of confidence. The calibration process meets or exceeds a ratio of 4:1 unless otherwise stated.

All tolerances were derived from the applicable standards and pass/fail determination is based on those tolerances. The customer determined any recommended due dates indicated on the certificate.

This report shall not be reproduced except in full, without written approval from Cal-Cert.

**Service Engineer:** Steven White

**Date:** February 28, 2024

**Technical Manager:** Marshall Doyle

**Signature:**



# Dry Gas Meter Calibration

## DUT

Manufacturer: Apex  
 Model: XC-60  
 Lab ID #: 55  
 Serial #: 810016  
 Calibration Date: 8/3/2024  
 Calibration Expiration: 2/3/2025  
 Barometric Pressure: 29.98 in. Hg



| Equipment Used:                       | Ref. Std. DGM | Thermometer | Barometer | Manometer |
|---------------------------------------|---------------|-------------|-----------|-----------|
| Manufacturer: Apex                    |               | Fuke        | Aquatech  | Dwyer     |
| Model: SK25DA                         |               | 52 II       | DBX2      | W17AE     |
| Lab ID#: 47                           |               | 196         | 202       | 124       |
| Calibration Expiration Date: 5/1/2025 |               | 1/3/2025    | 6/17/2025 | 6/16/2025 |
| Calibration $\gamma$ Factor: 0.998    |               |             |           |           |

Use in accordance with EPA Method 5, sections 10.3 and 16.1. Use only calibrated, NIST traceable reference standard DGM. Calibrate over expected operating flow range of DUT.

| Calibration Data                               | Run 1   | Run 2   | Run 3   |
|------------------------------------------------|---------|---------|---------|
| Standard DGM Initial Volume (L)                | 0.000   | 0.000   | 0.000   |
| Standard DGM Final Volume (L)                  | 226.392 | 146.151 | 296.953 |
| Standard DGM Temperature (°F)                  | 81.0    | 82.0    | 82.0    |
| Standard DGM Pressure (in H <sub>2</sub> O)    | 0.00    | 0.00    | 0.0     |
| DGM Initial Volume (ft <sup>3</sup> )          | 0.000   | 0.000   | 0.000   |
| DGM Final Volume (ft <sup>3</sup> )            | 8.064   | 5.174   | 10.408  |
| DGM Temperature (°F)                           | 85.0    | 86.0    | 86.0    |
| DGM Pressure (in H <sub>2</sub> O)             | 0.00    | 0.00    | 0.00    |
| Net Volume for Standard DGM (ft <sup>3</sup> ) | 7.995   | 5.161   | 10.487  |
| Net Volume for DGM (ft <sup>3</sup> )          | 8.064   | 5.174   | 10.408  |

|                                        |       |       |       |
|----------------------------------------|-------|-------|-------|
| Dry Gas Meter $\gamma$ Factor          | 0.997 | 1.003 | 1.013 |
| $\gamma$ Factor Deviation From Average | 0.997 | 1.003 | 1.013 |

Average Gas Meter  $\gamma$  Factor

1.004

**Measurement Uncertainty:** Total measurement uncertainty +/- 0.748% RD, K=2

Calculations:

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

2.  $\gamma = [V_{std} \times (\gamma_{std}) \times (P_{bar} + P_{std}/13.6) \times (T_{DGM} + 460)] / [V_{DGM} \times (T_{std} + 460) \times (P_{bar} + P_{DGM}/13.6)]$

Technician:



# Report and Certificate of Calibration



Portland Laboratory  
5777 SE International Way  
Milwaukie, OR 97222  
800-356-4662  
503-654-9620

Anaheim Laboratory  
120 S. Chaparral Ct Suite 110  
Anaheim Hills, CA 92808  
888-700-4100  
714-696-5300

[www.Cal-Cert.com](http://www.Cal-Cert.com)

**Report #:** 36866-28785-3646 **Customer PO#:** 1122  
**Customer Name:** PFS TECO  
**Customer Address:** 11785 SE Highway 212, Suite 305  
**City:** Clackamas **State:** OR **Zip:** 97015  
**Contact:** Ethan Frederick  
**Service Address:** 5777 SE International Way Milwaukie, OR 97222

## Calibration Standards

10-00391 | Thermo-Hygrometer | Comark | SN: 6217150001 | Cal: 05/02/2024 | Due: 04/30/2025 | Vendor: Cal-Cert | Range: 122 °F 95 %RH | Report #: 34722-30759-4525  
LP-01158 | Electrical Meter | Keithley | SN: 1388607 | Cal: 07/24/2023 | Due: 07/31/2025 | Vendor: Techmaster Electronics | Report #: TSV-0-545118

## Instrument Data

|                               |                      |                            |                         |
|-------------------------------|----------------------|----------------------------|-------------------------|
| <b>Calibration Date:</b>      | September 25, 2024   | <b>Reference:</b>          | Manufactures Tolerances |
| <b>Recommended Due Date:</b>  | September 25, 2025   | <b>Cal-Cert Procedure:</b> | CP-080                  |
| <b>Calibration Frequency:</b> | 12 Months            | <b>Indicating System:</b>  | Digital                 |
| <b>Manufacturer:</b>          | Delmhorst            | <b>Temperature:</b>        | 72 °F                   |
| <b>Type:</b>                  | Resistivity Meter    | <b>Humidity:</b>           | 49% RH                  |
| <b>Model Number:</b>          | MCS-1                | <b>Asset #:</b>            | #094                    |
| <b>Serial #:</b>              | #094                 | <b>Service Location:</b>   | Cal-Cert Lab            |
| <b>Capacity:</b>              | 120 Megaohms         | <b>As Found:</b>           | Pass                    |
| <b>Tolerance:</b>             | 1.00 % of indication | <b>As Left:</b>            | Pass                    |

| Instrument Range: |                 | 120 Megaohms      |             | Resolution:       | 0.001       | Mode Verified:   | Resistance |
|-------------------|-----------------|-------------------|-------------|-------------------|-------------|------------------|------------|
| Standard Reading  | UUT<br>As Found | UUT<br>Reading #1 | Error       | UUT<br>Reading #2 | Error       | OUT OF TOLERANCE |            |
| 0.000             | 0.000           | 0.000             | 0.000       | 0.000             | 0.000       |                  |            |
| 1,100,000         | 1,095,000       | 1,095,000         | -5,000.000  | 1,095,000         | -5,000.000  |                  |            |
| 120,000,000       | 120,830,000     | 120,830,000       | 830,000.000 | 120,830,000       | 830,000.000 |                  |            |

Expanded Uncertainty± 2.50 Megaohms

## Remarks:

We sincerely thank you for your business. Please call us at 503-654-9620 for all your sales and calibration needs.  
Cleaning and preventative maintenance were performed as part of this service.

This certificate is hereby issued that the above instrument was tested for accuracy with calibrated standards traceable to the National Institute of Standards and Technology (NIST). The information provided on this form complies with the data gathering and reporting requirements of ANSI/NCSL Z540.1, and meets the requirements of all applicable references and Cal-Cert procedures listed above.

Any stated measurement uncertainty includes the uncertainty of the Calibration standards used, combined with the uncertainty of the measurement process using the RSS method with a k=2 for an approximate 95% level of confidence. The calibration process meets or exceeds a ratio of 4:1 unless otherwise stated.

All tolerances were derived from the applicable standards and pass/fail determination is based on those tolerances. The customer determined any recommended due dates indicated on the certificate.

This report shall not be reproduced except in full, without written approval from Cal-Cert.

**Service Engineer:** Brent Enbysk

**Date:** September 25, 2024

**Quality Manager:** Jason Wimmer

**Signature:**

Resistivity Meter CF-080-01

Revision 7

7/24/2017



## CERTIFICATE OF CALIBRATION

**CUSTOMER:** PFS-TECO : CLACKAMAS, OR  
**PO NUMBER:** 1120  
**INST. MANUFACTURER:** DWYER  
**INST. DESCRIPTION:** VELOMETER  
**MODEL NUMBER:** 471  
**SERIAL NUMBER:** CP288559 ID# 095  
**RATED ACCURACY:** SEE NOTES BELOW.  
**UNCERTAINTY GIVEN:**  $\pm 0.43\%$  RD ; k=2  
**NOTES:**  $\pm 3.0\%$  FS (0-500 / 0-1500) \*\*  $\pm 4.0\%$  F.S. (0-5000) \*\*  $\pm 5.0\%$  F.S. (0-15000) \*\*  $\pm 2^\circ\text{F}$

**CALIBRATION DATE:** 06/17/2024  
**CALIBRATION DUE:** 06/17/2025  
**PROCEDURE:** T.O.33K6-4-1769-1  
**CALIBRATION FLUID:** AIR @ 14.7 PSIA 70°F  
**RECEIVED CONDITION:** WITHIN MFG. SPECS.  
**LEFT CONDITION:** WITHIN MFG. SPECS.  
**AMBIENT CONDITIONS:** 763mm HGA 53% RH 70°F  
**CERTIFICATE FILE #:** 490265.2024

**Q.MANUAL IM 2.0 REV 2020.2 DATED 7-27-2020**

**DECISION RULE: SIMPLE ACCEPTANCE. MEASUREMENT UNCERTAINTIES NOT TAKEN INTO CONSIDERATION WHEN DETERMINING PASS/FAIL**

| UUT       | DM.STD. | UUT        | DM.STD.    |
|-----------|---------|------------|------------|
| INDICATED | ACTUAL  | INDICATED  | ACTUAL     |
| FT/MIN    | FT/MIN  | DEG. F     | DEG. F     |
| 70        | 73      | 0 TO 200°F | 0 TO 200°F |
| 126       | 130     | 44.7       | 44.1       |
| 242       | 249     | 71.8       | 71.0       |
| 495       | 508     | 99.9       | 99.3       |
| 521       | 533     |            |            |
| 1039      | 1066    |            |            |
| 1490      | 1530    |            |            |
| 507       | 522     |            |            |
| 3214      | 3311    |            |            |
| 4998      | 5156    |            |            |
| 6975      | 7182    |            |            |
| 14853     | 15322   |            |            |

### STANDARDS USED:

|                                                                                                 |     |          |
|-------------------------------------------------------------------------------------------------|-----|----------|
| A312 $\pm .02\%$ RD -140 TO 1372 DEG °C TRACE# 2023004415                                       | DUE | 11/13/24 |
| A800 flow nozzles +/- .2% RD (.2-5, 5-100, 100-1650 SCFM)TRACE# 144613547,1424683640,1583314714 | DUE | 02/14/25 |

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.) and the Unit Under Test (UUT) is a minimum of 4:1, unless otherwise noted. Calibration has been performed according to the shown procedure. The use of IAS/ILAC logo indicates calibrations are in accordance to ISO/IEC 17025:2017.

**Dick Munns Company - 11133 Winners Circle, Los Alamitos, CA 90720**  
**Phone: 714-827-1215 - www.dickmunns.com**

This Calibration Certificate shall not be reproduced except, in full, without approval by Dick Munns Company. The data shown applies only to the instrument being calibrated and under the stated conditions of calibration.

Issuing Date:

Approved By:

Cal. Technician:

Calibrated at: ☒ Lab

☐ On-Site (Customer's)

Page 1 of 1

06/17/2024

*[Signature]*

*[Signature]*

# Certificate of Calibration

Certificate Number: 743892



**JJ Calibrations, Inc.**

7724 SE Aspen Summit Drive

Portland, OR 97266-9217

Phone 503.786.3005

FAX 503.786.2994

## PFS TECO

11785 SE Hwy 212

Suite 305

Clackamas, OR 97015

PO: 1033

Order Date: 03/08/2021

Authorized By: N/A

Calibrated on: 03/18/2021

\*Recommended Due: 03/18/2026

Environment: 19 °C 41 % RH

\* As Received: Other - See Remarks

\* As Returned: Other - See Remarks

Action Taken: Calibrated

Technician: 126



0723.01

Calibration

Property #: 097

User: N/A

Department: N/A

Make: Unknown

Model: 10 Lbs.

Serial #: 097

Description: Mass

Procedure: DCN 500901

Accuracy: Raw Data

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.

Data is provided for your determination of acceptability. Received/returned without accessories.

## Standards Used

| Std ID | Manufacturer  | Model                   | Nomenclature  | Due Date   | Trace ID |
|--------|---------------|-------------------------|---------------|------------|----------|
| 484A   | Rice Lake     | 1kg-10kg (Class ASTM 1) | Mass Set,     | 05/28/2021 | 699197   |
| 503A   | Rice Lake     | 1mg-200g (Class 0)      | Mass Set,     | 09/11/2021 | 729241   |
| 550A   | And (A&D) Co. | HP-30K                  | Balance 30 Kg | 12/31/2021 | 739307   |
| 723A   | Rice Lake     | 1mg-200g (Class 0)      | Mass Set,     | 06/09/2021 | 723431   |

## Parameter

## Measurement Data

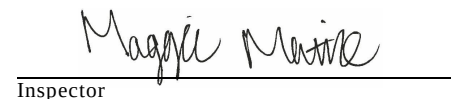
| Measurement Description | Range | Unit | Reference     | Min       | Max       | *Error    | UUT            | Uncertainty            |
|-------------------------|-------|------|---------------|-----------|-----------|-----------|----------------|------------------------|
| <b>Before/After</b>     |       |      |               |           |           |           |                | Accredited = $\bar{U}$ |
| <b>Mass</b>             |       |      |               |           |           |           |                |                        |
| Raw Data                |       | g    | 4535.92370000 | 0.0000000 | 0.0000000 | 0.1785299 | 4536.1022299 g | 3.5E-01 $\bar{U}$      |

This instrument has been calibrated in accordance with the JJ Calibrations Quality Assurance Manual and is traceable to either the SI or to National Institute of Standards and Technology (NIST). The quality system and this certificate are in compliance with ANSI/NCCL Z540-1-1994, ISO/IEC 17025-2017, 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 stated in the comments, certificates reflect the "Simple Acceptance Rule" as specified by JCGM 106:2012. 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 written approval of JJ Calibrations.

  
Reviewer

3 Issued 03/25/2021

Rev # 15

  
Inspector





# QUALITY CONTROL SERVICES

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(503) 236-2712 • FAX (503) 235-2535 • www.qc-services.com



PFS Teco  
11785 SE Hwy 212 STE#305  
Clackamas, OR 97015

Report Number: DIRI0134307497241204

## **A2LA ACCREDITED** **CERTIFICATE OF CALIBRATION WITH DATA**

### INSTRUMENT INFORMATION

| Item    | Make        | Model        | Serial Number | Customer ID   | Location     |
|---------|-------------|--------------|---------------|---------------|--------------|
| Balance | Sartorius   | ENTRIS224-1S | 34307497      | #107          | Lab          |
| Units   | Readability | SOP          | Cal Date      | Last Cal Date | Cal Due Date |
| g       | 0.0001      | QC012        | 12/4/24       | 6/12/24       | 6/2025       |

### FUNCTIONAL CHECKS

| ECCENTRICITY                              |                                | LINEARITY                                 |                                | STANDARD DEVIATION |             |               | ENVIRONMENTAL CONDITIONS |                                     |                          |
|-------------------------------------------|--------------------------------|-------------------------------------------|--------------------------------|--------------------|-------------|---------------|--------------------------|-------------------------------------|--------------------------|
| Test Wt:                                  | Tol:                           | Test Wt:                                  | Tol:                           | Test Wt:           | Tol:        |               | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 100                                       | 0.0003                         | 50 x 4                                    | 0.0002                         | 100                | 0.0001      |               | Good                     | Fair                                | Poor                     |
| As-Found:                                 |                                | As-Found:                                 |                                | 1. 100.0000        | 5. 99.9999  | 9. 99.9999    | Temperature: 20.8°C      |                                     |                          |
| Pass: <input checked="" type="checkbox"/> | Fail: <input type="checkbox"/> | Pass: <input checked="" type="checkbox"/> | Fail: <input type="checkbox"/> | 2. 100.0000        | 6. 100.0000 | 10. 100.0000  |                          |                                     |                          |
| As-Left:                                  |                                | As-Left:                                  |                                | 3. 100.0000        | 7. 100.0000 | <b>Result</b> |                          |                                     |                          |
| Pass: <input checked="" type="checkbox"/> | Fail: <input type="checkbox"/> | Pass: <input checked="" type="checkbox"/> | Fail: <input type="checkbox"/> | 4. 99.9999         | 8. 99.9999  | 0.00005       |                          |                                     |                          |

### A2LA ACCREDITED SECTION OF REPORT

| Standard | As-Found | As-Left  | Expanded Uncertainty |
|----------|----------|----------|----------------------|
| 200      | 200.0007 | 199.9999 | 0.00017              |
| 100      | 100.0006 | 99.9999  | 0.00016              |
| 50       | 50.0004  | 50.0000  | 0.00015              |
| 20       | 20.0003  | 20.0000  | 0.00015              |
| 0.1      | 0.0999   | 0.0999   | 0.00015              |
| 0.05     | 0.0498   | 0.0499   | 0.00015              |

### CALIBRATION STANDARDS

| Item       | Make      | Model        | Serial Number | Cal Date | Cal Due Date | NIST ID  |
|------------|-----------|--------------|---------------|----------|--------------|----------|
| Weight Set | Rice Lake | 20 kg to 1mg | 2831W         | 3/31/24  | 3/2025       | 20240774 |

#### Permanent Information Concerning this Equipment:

6 month calibration cycle

#### Comments/Info Concerning this Calibration:

12/04/2024: Adjusted span. RH=36%

Report prepared/reviewed by: TLP

Date: 12-04-2024

Technician: E.J. Yasko

Signature: [Signature]

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

The uncertainty is calculated according to the ISO Guide to the Expression of Uncertainty in Measurement and includes the uncertainty of standards used combined with the observed standard deviation and readability of the unit under test. The uncertainty is expanded with a k factor of 2 for an approximate 95% level of confidence. Instruments listed above were calibrated using standards traceable to the National Institute of Standards and Technology (NIST). Calibration data reflect results at the time and location of calibration. Calibration data should be reviewed to insure that the instrument is performing to its required accuracy. Calibrations comply with ISO/IEC 17025 and ANSI/Z540-1-1994 quality standards. Results relate only to the item(s) tested. Unless otherwise noted, statements of conformity do not include measurement

Member: National Conference of Standards Laboratories and Weights & Measures

PT ID: DIRI01



# QUALITY CONTROL SERVICES

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(503) 236-2712 • FAX (503) 235-2535 • [www.qc-services.com](http://www.qc-services.com)



## Report of Calibration

Firm: PFS-TECO  
Address: 11785 SE Hwy 212, Ste 305  
City/State/Zip: Clackamas, OR 97015

Test Completed: 05/09/22  
Purchase Order: 1067  
Traceable Number: 20220682

Test Item: 200 mg and 100 mg Individual Weights  
Serial No.: Listed in Table

Manufacturer: Troemner  
Customer ID: Listed in Table

| <u>Material</u> | <u>Assumed Density</u> | <u>Range</u>    | <u>Tolerance Class</u> |
|-----------------|------------------------|-----------------|------------------------|
| Stainless Steel | 7.95 g/cm <sup>3</sup> | 200 mg & 100 mg | ASTM Class 1           |

### Method and Traceability

The procedure used for this calibration is NIST IR 6969 SOP 4 Double Substitution Weighing Design. Standards used for comparison are traceable to the National Institute of Standards and Technology (reports on file) and are part of a comprehensive measurement assurance program for ensuring continued accuracy and traceability within the level of uncertainty reported. The Traceable Number listed above is Traceable to National Standards through an unbroken chain of comparison each having stated uncertainties.

### Standards Used:

100 g to 1 mg Working Standards Were Calibrated: 07/02/21 Due: 07/31/22 Standards ID: 723318  
Mass Comparators Used: MET-05 Tested by: D. Thompson

**Conventional Mass:** “The conventional value of the result of weighing a body in air is equal to the mass of a standard, of conventionally chosen density, at a conventionally chosen temperature, which balances this body at this reference temperature in air of conventionally chosen density. International Recommendation 33 (OIML IR 33 1973, 1979). “Conventional Value of the Result of Weighing in Air” (Previously known as “Apparent Mass vs. 8.0 g/cm<sup>3</sup>).

**Uncertainty Statement:** The uncertainty conforms to the ISO Guide to the Expressions of Uncertainty in Measurement. Uncertainty as reported is based on a coverage factor  $k=2$  for an approximate 95 percent level of uncertainty. Uncertainty components include the standard deviation of the process, the uncertainty of the standard used, an uncertainty component associated with the potential drift of the standard used, and the estimated uncertainty related to measuring and determining the air buoyancy effect.

Conventional Mass Values are listed on page 2 of this report.

page 1 of 2

Quality Control Services, Inc.  
Metrology Laboratory Manager  
E-mail [dthompson@qc-services.com](mailto:dthompson@qc-services.com)

Date: 05/09/22

  
Signature David S. Thompson

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## Report of Calibration

Firm: PFS-TECO  
Address: 11785 SE Hwy 212, Ste 305  
City/State/Zip: Clackamas, OR 97015

Test Completed: 05/09/22  
Purchase Order: 1067  
Traceable Number: 20220682

Test Item: 200 mg and 100 mg Individual Weights  
Serial No.: Listed in Table

Manufacturer: Troemner  
Customer ID: Listed in Table

### Laboratory Environment at time of test

| Temperature °C | Pressure mmHg  | Humidity %RH |
|----------------|----------------|--------------|
| 21.93 to 21.94 | 760.7 to 760.8 | 47.8 to 47.9 |

### Conventional Mass Value

| Nominal Value              | As Found Value (g) | As Found Correction* (mg) | As Left Value (g) | As Left Correction* (mg) | Uncertainty (mg) | Tolerance (mg) |
|----------------------------|--------------------|---------------------------|-------------------|--------------------------|------------------|----------------|
| 200 mg, 1000101395, #109-B | 0.2000082          | 0.0082                    | 0.2000082         | 0.0082                   | 0.0014           | 0.010          |
| 100 mg, 1000126267, #109-A | 0.1000065          | 0.0065                    | 0.1000065         | 0.0065                   | 0.0014           | 0.010          |

\*Correction is the difference between the conventional mass value of a weight and its nominal value.

**Comments:** These weights were received in good condition and were within ASTM Class 1 tolerances As Found.

**Recalibration Due:** The customer has requested a 5-year calibration cycle. The calibration due date for these weights is 05/09/27. The values listed above were found at the time of calibration. Any number of factors may cause these items to drift out of calibration before the calibration interval has expired.

Accredited by the American Association for Laboratory Accreditation (A2LA) under Calibration Laboratory Code 115953 and Certificate Number 1550.01. This laboratory meets the requirements of ISO/IEC 17025:2017 *General Requirements for the Competence of Testing and Calibration Laboratories*. This laboratory also meets the requirements of ANSI/NCSL Z540-1-1994 and any additional program requirements in the field of calibration.

page 2 to 2

Quality Control Services, Inc.  
Metrology Laboratory Manager  
E-mail [dthompson@qc-services.com](mailto:dthompson@qc-services.com)

Date: 05/09/22

  
Signature David S. Thompson

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Member: National Conference of Standards Laboratories and Weights & Measures

# Report and Certificate of Calibration



[www.Cal-Cert.com](http://www.Cal-Cert.com)

**Toll Free**  
800-356-4662

**Address**  
5777 SE International Way  
Milwaukie, OR 97222

**Local**  
503-654-9620



**Report #:** 32664-227238-5 **Customer PO#:** 1107  
**Customer Name:** PFS TECO  
**Customer Address:** 11785 SE Highway 212, Suite 305  
**City:** Clackamas **State:** OR **Zip:** 97015  
**Contact:** John Steinert  
**Service Address:** 5777 SE International Way Milwaukie, OR 97222

## Calibration Standards

|                                                                                                                                                                    |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| LP-00397   Gage Block Set   Mitutoyo   SN: 509020   Cal: 12/28/2022   Due: 12/28/2024   Vendor: BHD Test and Measurement   Report #: 99826                         |
| LP-01346   Thermo-Hygrometer   Comark   SN: 06210350198   Cal: 02/17/2023   Due: 02/28/2024   Vendor: Cal-Cert   Range: 122 °F 95 %RH   Report #: 28026-67215-4239 |
|                                                                                                                                                                    |
|                                                                                                                                                                    |
|                                                                                                                                                                    |

## Instrument Data

|                               |                  |                            |                    |
|-------------------------------|------------------|----------------------------|--------------------|
| <b>Calibration Date:</b>      | January 31, 2024 | <b>Reference:</b>          | ASME B89.1.13-2013 |
| <b>Calibration Due Date:</b>  | January 31, 2025 | <b>Cal-Cert Procedure:</b> | CP-010             |
| <b>Calibration Frequency:</b> | 12 Months        | <b>Indicating System:</b>  | Vernier            |
| <b>Manufacturer:</b>          | Dwyer            | <b>Temperature:</b>        | 67 °F              |
| <b>Type:</b>                  | Micrometer       | <b>Humidity:</b>           | 39% RH             |
| <b>Model Number:</b>          | Unknown          | <b>Asset #:</b>            | #217               |
| <b>Serial #:</b>              | Unknown          | <b>Service Location:</b>   | Cal-Cert Lab       |
| <b>Capacity:</b>              | 1 Inches         | <b>As Found:</b>           | PASS               |
| <b>Resolution:</b>            | 0.001 Inches     | <b>As Left:</b>            | PASS               |

| Instrument Range:    |          | Range Resolution: |                   |             |                      |        |
|----------------------|----------|-------------------|-------------------|-------------|----------------------|--------|
| 1.000 Inches         |          | 0.001 Inches      |                   |             |                      |        |
| Calibration Standard | As Found | As Left Reading 1 | As Left Reading 2 | Tolerance ± | Expanded Uncertainty |        |
| Inches               | Inches   | Inches            | Inches            | Inches      | Inches               | Inches |
| 0.000                | 0.000    | 0.000             | 0.000             | 0.001       | 0.0006               |        |
| 0.200                | 0.200    | 0.200             | 0.200             | 0.001       | 0.0006               |        |
| 0.400                | 0.400    | 0.400             | 0.400             | 0.001       | 0.0006               |        |
| 0.600                | 0.600    | 0.600             | 0.600             | 0.001       | 0.0006               |        |
| 0.800                | 0.800    | 0.800             | 0.800             | 0.001       | 0.0006               |        |
| 1.000                | 1.000    | 1.000             | 1.000             | 0.001       | 0.0006               |        |

## Remarks:

We sincerely thank you for your business. Please call us at 503-654-9620 for all your sales and calibration needs.  
Cleaning and preventative maintenance were performed as part of this service.

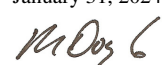
Cal-Cert is accredited by A2LA under Calibration Laboratory Code #4986.01.  
A2LA is recognized under the ILAC mutual recognition agreement (MRA).

This certificate is hereby issued that the above instrument was tested for accuracy with calibrated standards traceable to the National Institute of Standards and Technology (NIST). The information provided on this form complies with the data gathering and reporting requirements of ISO/IEC 17025 and ANSI/NCSL Z540.1, and meets the requirements of all applicable references and Cal-Cert procedures listed above.

Any stated measurement uncertainty includes the uncertainty of the Calibration standards used, combined with the uncertainty of the measurement process using the RSS method with a k=2 for an approximate 95% level of confidence. The calibration process meets or exceeds a ratio of 4:1 unless otherwise stated.

All tolerances were derived from the applicable standards and pass/fail determination is based on those tolerances. The customer determined any recommended due dates indicated on the certificate.

This report shall not be reproduced except in full, without written approval from Cal-Cert.

**Service Engineer:** Cameron Walling **Date:** January 31, 2024  
**Technical Manager:** Marshall Doyle **Signature:** 



# QUALITY CONTROL SERVICES

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



PFS Teco  
11785 SE Hwy 212 STE#305  
Clackamas, OR 97015

Report Number: DIRI01C101887029241204

## A2LA ACCREDITED CERTIFICATE OF CALIBRATION WITH DATA

### INSTRUMENT INFORMATION

| Item  | Make        | Model              | Serial Number | Customer ID   | Location     |
|-------|-------------|--------------------|---------------|---------------|--------------|
| Scale | Mettler     | IND570 - 1000lbx0. | C101887029    | #190          | Lab          |
| Units | Readability | SOP                | Cal Date      | Last Cal Date | Cal Due Date |
| lbs   | 0.02        | QC033              | 12/4/24       | 12/28/23      | 12/2025      |

### FUNCTIONAL CHECKS

| SHIFT TEST                                                                                                                                                                                                 | LINEARITY                                                                                                                                                                                                   | REPEATABILITY                                                                                                                                                                                              | ENVIRONMENTAL CONDITIONS                                                                                                       |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|
| Test Wt: 400<br>Tol: 0.10<br>As-Found:<br>Pass: <input checked="" type="checkbox"/> Fail: <input type="checkbox"/><br>As-Left:<br>Pass: <input checked="" type="checkbox"/> Fail: <input type="checkbox"/> | Test Wt: HB44<br>Tol: HB44<br>As-Found:<br>Pass: <input checked="" type="checkbox"/> Fail: <input type="checkbox"/><br>As-Left:<br>Pass: <input checked="" type="checkbox"/> Fail: <input type="checkbox"/> | Test Wt: 200<br>Tol: 0.04<br>As-Found:<br>Pass: <input checked="" type="checkbox"/> Fail: <input type="checkbox"/><br>As-Left:<br>Pass: <input checked="" type="checkbox"/> Fail: <input type="checkbox"/> | <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/><br>Good Fair Poor<br>Temperature: 18.7°C |

### CALIBRATION DATA

| Standard | As-Found | As-Left | Expanded Uncertainty |
|----------|----------|---------|----------------------|
| 1000     | N/A      | N/A     | 0.012                |
| 600      | 600.00   | 600.00  | 0.011                |
| 400      | 399.98   | 399.98  | 0.011                |
| 200      | 199.98   | 199.98  | 0.011                |
| 100      | 99.98    | 99.98   | 0.011                |
| 50       | 49.98    | 49.98   | 0.011                |

### CALIBRATION STANDARDS

| Item               | Make      | Model       | Serial Number | Cal Date | Cal Due Date | NIST ID  |
|--------------------|-----------|-------------|---------------|----------|--------------|----------|
| Avoirdupois Cast W | Rice Lake | 25 and 50lb | PWO990-CA     | 7/26/24  | 7/2026       | 20221688 |

Permanent Information Concerning this Equipment:

Comments/Information Concerning this Calibration

12/04/2024: N/A due to overload at 1000lb. RH=35%

Report prepared/reviewed by: TLP

Date: 12-04-2024

Technician: E.J. Vasko

Signature: [Signature]

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

The uncertainty is calculated according to the ISO Guide to the Expression of Uncertainty in Measurement and includes the uncertainty of standards used combined with the observed standard deviation of the unit under test. The uncertainty is expanded with a k factor of 2 for an approximate 95% level of confidence. Instruments listed above were calibrated using standards traceable to the National Institute of Standards and Technology (NIST). Calibration data reflect results at the time and location of calibration. Calibration data should be reviewed to insure that the instrument is performing to its required accuracy. Calibrations comply with ISO/IEC 17025 and ANSI/Z540-1-1994 quality standards.

Member: National Conference of Standards Laboratories and Weights & Measures

PT ID: DIRI01



## CERTIFICATE OF CALIBRATION

**Customer:** PFS-TECO

**Date of Certificate Issue:** 02/09/24

**Certificate No.:** 54129\_02.24\_DTII

**11785 SE Highway 212, Clackamas, OR 97015**

**Procedure:** PRM07-07-DewTrak II

**Manufacturer:** Edgetech Instruments

**Cal Date:** 02/09/24

**Model:** DewTrak II / D2

**Due Date:** 02/09/25

**Description:** Chilled Mirror Hygrometer

**Cal Interval Months:** 12

**Serial No.:** 54129 / 2A5648

**SO/RMA No.:** 16407

**Asset/ID No.:** Unknown

**As-Found Condition:** In-Tolerance

**Calibration Method:** Comparison

**As-Left Condition:** Left, As-Found

**Environmental Conditions:** Temperature: 73.6 °F | Humidity: 13.9 % rh

This certifies the above instrument meets or exceeds published measurements specifications and has been calibrated using standards traceable to the international system of units (SI) through the National Institute of Standard and Technology (NIST). The policies and procedures used at this facility are in full compliance with ISO/IEC 17025-2017(E) international standard. This certificate shall not be reproduced, except in full, without the written approval of the calibration laboratory of **Edgetech Instruments Inc.** The environment in which this instrument was calibrated is maintained within the operating specifications of the instrument and the standards. All calibration results relate to items calibrated only.

Note: The calibration results were analyzed and pass or fail criteria is based on the accuracy specifications provided on this item report. The uncertainty of measurement is not factored in for pass or fail criteria and are only reported for the customer analysis.

### Standard Used:

| Asset # | Make / Model      | Due Date |
|---------|-------------------|----------|
| 285     | ETI DewTrak II    | 10/24/24 |
| 173     | ETI DewMaster     | 08/10/24 |
| 291     | ETI RH-Calibrator | 05/20/24 |
| 172     | ETI DewMaster     | 12/08/24 |



Accreditation # 92175

**Performed by:**

*Greg Meunier*

**Greg Meunier, Calibration Technician**

**Verified by:**

*Dexter Ekeh*

**Dexter Ekeh, Calibration Technician**

**Calibration Location:** Edgetech Instruments at 399 River Rd., Hudson, MA 01749

## CERTIFICATE OF CALIBRATION

Customer: PFS-TECO

Date of Certificate Issue: 02/09/24

Certificate No.: 54129\_02.24\_DTII

**Decision rule 1** Measurement of uncertainty is not taken into account when stating conformity .When determining an “in-tolerance” or “out-of-tolerance” conditions on calibrations the measurement uncertainty will not be taken into account .When a measurement result is declared “in-tolerance”, the measured value(s) shall fall within the appropriate specification limit and the uncertainty of the measured value shall be stated and provided

**UUT Accuracy Specifications | FP/DP: +/- 0.2 °C**

---

**As Found Data: In-Tolerance**

---

**As Left Data: Left, As-Found**

---

| <i>Test:</i> | <i>Ref. °C</i> | <i>UUT °C</i> | <i>Dev. °C</i> | <i>U k=2 C</i> |
|--------------|----------------|---------------|----------------|----------------|
| Dew Point    | 40.04          | 39.98         | 0.06           | N/A            |
| Dew Point    | 13.88          | 13.99         | 0.11           | 0.08           |
| Frost Point  | -10.00         | -9.83         | 0.17           | 0.08           |

---

**U k=2 uncertainty data for Dew points above 20° C are not 17025 Accredited: N/A**

**Note: Compliance –** The measurement results are within (or below) the specification limit when the measurement uncertainty is taken into account. For the above calibration point that it is not possible to state compliance using a 95 % coverage probability for the expanded uncertainty the measurement result is below the limit or within specification

**End of Certificate**

**DT II\_05\_22\_13\_FP**

# Certificate of Calibration

Certificate Number: 809185



**JJ Calibrations, Inc.**

7724 SE Aspen Summit Drive

Portland, OR 97266-9217

Phone 503.786.3005

FAX 503.786.2994

## PFS TECO

11785 SE Hwy 212

Suite 305

Clackamas, OR 97015

PO: 1110

Order Date: 02/02/2024

Authorized By: N/A

Calibrated on: 02/15/2024

\*Recommended Due: 02/15/2025

Environment: 19 °C 40 % RH

\* As Received: Within Tolerance

\* As Returned: Within Tolerance

Action Taken: Calibrated

Technician: 126



Property #: 209

User: N/A

Department: N/A

Make: Craftsman

Model: CMHT37365

Serial #: 209

Description: Tape Measure, 25'

Procedure: 500614

Accuracy:  $\pm 0.0625''$

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 |
|--------|--------------|---------|--------------------|------------|----------|
| 591A   | Mitutoyo     | PH-3500 | Optical Comparator | 09/19/2024 | 801238   |

## Parameter

## Measurement Data

| Measurement Description | Range Unit | Reference | Min     | Max     | *Error  | UUT          | Uncertainty            |
|-------------------------|------------|-----------|---------|---------|---------|--------------|------------------------|
| <b>Before/After</b>     |            |           |         |         |         |              | Accredited = $\bar{U}$ |
| <b>Length</b>           |            |           |         |         |         |              |                        |
| 0-1"                    | Inch       | 1.000000  | 0.93750 | 1.06250 | 0.00175 | 0.99825 Inch | 1.1E-02 $\bar{U}$      |
| 299-300"                | Inch       | 1.00000   | 0.9375  | 1.0625  | 0.0012  | 0.9988 Inch  | 1.1E-02 $\bar{U}$      |

This instrument has been calibrated in accordance with the JJ Calibrations Quality Assurance Manual and is traceable to the SI through an NMI such as but not limited to National Institute of Standards and Technology (NIST). The quality system and this certificate are in compliance with ANSI/NC SL Z540-1-1994, ISO/IEC 17025-2017, 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 stated in the comments, certificates reflect the "Simple Acceptance Rule" as specified by ILAC G8:2019. Unless otherwise stated, a test uncertainty ratio (TUR) 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 written approval of JJ Calibrations.

Reviewer

3 Issued 02/15/2024

Rev # 15

Inspector



# Report and Certificate of Calibration



www.Cal-Cert.com

Toll Free  
800-356-1662

Address  
5777 SE International Way  
Milwaukie, OR 97222

Local  
503-654-9620



**Report #:** 33086-206392-4525 **Customer PO#:** 1109  
**Customer Name:** PFS TECO  
**Customer Address:** 1507 Matt Pass  
**City:** Cottage Grove **State:** WI **Zip:** 53527  
**Contact:** Ethan Frederick  
**Service Address:** 11785 SE Highway 212, Suite 305 Clackamas, OR 97015

## Calibration Standards

|                                                                                                                                                   |
|---------------------------------------------------------------------------------------------------------------------------------------------------|
| 13-01811   Thermocouple Meter/Calibrator   Tegan   SN: 2454186   Cal: 10/04/2023   Due: 02/28/2024   Range: 2400 °F   Report #: 31363-217443-3646 |
| LP-01782   Thermo-Hygrometer   Comark   SN: 06247790052   Cal: 01/24/2024   Due: 01/31/2025   Range: 122 °F 95 %RH   Report #: 32568-205513-3646  |
|                                                                                                                                                   |
|                                                                                                                                                   |
|                                                                                                                                                   |

## Instrument Data

|                               |                      |                            |                   |
|-------------------------------|----------------------|----------------------------|-------------------|
| <b>Calibration Date:</b>      | February 26, 2024    | <b>Reference:</b>          | Navair 17-20ST-95 |
| <b>Recommended Due Date:</b>  | February 26, 2025    | <b>Cal-Cert Procedure:</b> | CP-013            |
| <b>Calibration Frequency:</b> | 12 Months            | <b>Indicating System:</b>  | Computer          |
| <b>Manufacturer:</b>          | National Instruments | <b>Temperature:</b>        | 70 °F             |
| <b>Type:</b>                  | Data Logger          | <b>Humidity:</b>           | 42% RH            |
| <b>Model Number:</b>          | NI 9213              | <b>Asset #:</b>            | 216 Booth 2       |
| <b>Serial #:</b>              | 1E286FA              | <b>Service Location:</b>   | Service Address   |
| <b>Resolution:</b>            | 0.1 °F               | <b>As Found:</b>           | Pass              |
| <b>Capacity:</b>              | 2,500 °F             | <b>As Left:</b>            | Pass              |
| <b>Tolerance:</b>             | ± 2.0 °F             |                            |                   |
| <b>Thermocouple Type:</b>     | K                    |                            |                   |

## Thermocouple LOGGING FUNCTION

| Channel | Calibration Standard | UUT As Found | UUT As Left Reading 1 | UUT As Left Reading 2 | As Left Error | Expanded Uncertainty± |
|---------|----------------------|--------------|-----------------------|-----------------------|---------------|-----------------------|
| Tunnel  | 0.00                 | -0.10        | -0.10                 | -0.10                 | 0.10          | 0.346                 |
|         | 500.00               | 499.80       | 499.80                | 499.80                | -0.20         |                       |
|         | 1000.00              | 1000.00      | 1000.00               | 1000.00               | 0.00          |                       |
|         | 1500.00              | 1499.90      | 1499.90               | 1499.90               | -0.10         |                       |
|         | 2000.00              | 1999.90      | 1999.90               | 1999.90               | -0.10         |                       |
|         | 2400.00              | 2399.90      | 2399.90               | 2399.90               | -0.10         |                       |
|         | 0.00                 | -0.20        | -0.20                 | -0.20                 | 0.20          |                       |

## Thermocouple LOGGING FUNCTION

| Channel | Calibration Standard | UUT As Found | UUT As Left Reading 1 | UUT As Left Reading 2 | As Left Error | Expanded Uncertainty± |
|---------|----------------------|--------------|-----------------------|-----------------------|---------------|-----------------------|
| Flue    | 0.00                 | -0.30        | -0.30                 | -0.30                 | 0.30          | 0.346                 |
|         | 500.00               | 499.70       | 499.70                | 499.70                | -0.30         |                       |
|         | 1000.00              | 999.80       | 999.80                | 999.80                | -0.20         |                       |
|         | 1500.00              | 1499.80      | 1499.80               | 1499.80               | -0.20         |                       |
|         | 2000.00              | 1999.80      | 1999.80               | 1999.80               | -0.20         |                       |
|         | 2400.00              | 2399.70      | 2399.70               | 2399.70               | -0.30         |                       |
|         | 0.00                 | -0.30        | -0.30                 | -0.30                 | 0.30          |                       |

| Thermocouple<br>LOGGING FUNCTION |                         |                 |                             |                             |                  |                          |
|----------------------------------|-------------------------|-----------------|-----------------------------|-----------------------------|------------------|--------------------------|
| Channel                          | Calibration<br>Standard | UUT<br>As Found | UUT As<br>Left<br>Reading 1 | UUT As<br>Left<br>Reading 2 | As Left<br>Error | Expanded<br>Uncertainty± |
| Filter A                         | 0.00                    | -0.50           | -0.50                       | -0.50                       | 0.50             | 0.346                    |
|                                  | 500.00                  | 499.50          | 499.50                      | 499.50                      | -0.50            |                          |
|                                  | 1000.00                 | 999.70          | 999.70                      | 999.70                      | -0.30            |                          |
|                                  | 1500.00                 | 1499.60         | 1499.60                     | 1499.60                     | -0.40            |                          |
|                                  | 2000.00                 | 1999.50         | 1999.50                     | 1999.50                     | -0.50            |                          |
|                                  | 2400.00                 | 2399.50         | 2399.50                     | 2399.50                     | -0.50            |                          |
|                                  | 0.00                    | -0.50           | -0.50                       | -0.50                       | 0.50             |                          |

| Thermocouple<br>LOGGING FUNCTION |                         |                 |                             |                             |                  |                          |
|----------------------------------|-------------------------|-----------------|-----------------------------|-----------------------------|------------------|--------------------------|
| Channel                          | Calibration<br>Standard | UUT<br>As Found | UUT As<br>Left<br>Reading 1 | UUT As<br>Left<br>Reading 2 | As Left<br>Error | Expanded<br>Uncertainty± |
| Back                             | 0.00                    | -0.60           | -0.60                       | -0.60                       | 0.60             | 0.346                    |
|                                  | 500.00                  | 499.40          | 499.40                      | 499.40                      | -0.60            |                          |
|                                  | 1000.00                 | 999.50          | 999.50                      | 999.50                      | -0.50            |                          |
|                                  | 1500.00                 | 1499.50         | 1499.50                     | 1499.50                     | -0.50            |                          |
|                                  | 2000.00                 | 1999.40         | 1999.40                     | 1999.40                     | -0.60            |                          |
|                                  | 2400.00                 | 2399.40         | 2399.40                     | 2399.40                     | -0.60            |                          |
|                                  | 0.00                    | -0.60           | -0.60                       | -0.60                       | 0.60             |                          |

| Thermocouple<br>LOGGING FUNCTION |                         |                 |                             |                             |                  |                          |
|----------------------------------|-------------------------|-----------------|-----------------------------|-----------------------------|------------------|--------------------------|
| Channel                          | Calibration<br>Standard | UUT<br>As Found | UUT As<br>Left<br>Reading 1 | UUT As<br>Left<br>Reading 2 | As Left<br>Error | Expanded<br>Uncertainty± |
| Catalyst                         | 0.00                    | -0.8            | -0.8                        | -0.8                        | 0.80             | 0.346                    |
|                                  | 500.00                  | 499.30          | 499.30                      | 499.30                      | -0.70            |                          |
|                                  | 1000.00                 | 999.40          | 999.40                      | 999.40                      | -0.60            |                          |
|                                  | 1500.00                 | 1499.30         | 1499.30                     | 1499.30                     | -0.70            |                          |
|                                  | 2000.00                 | 1999.30         | 1999.30                     | 1999.30                     | -0.70            |                          |
|                                  | 2400.00                 | 2399.20         | 2399.20                     | 2399.20                     | -0.80            |                          |
|                                  | 0.00                    | -0.7            | -0.7                        | -0.7                        | 0.70             |                          |

| Thermocouple<br>LOGGING FUNCTION |                         |                 |                             |                             |                  |                          |
|----------------------------------|-------------------------|-----------------|-----------------------------|-----------------------------|------------------|--------------------------|
| Channel                          | Calibration<br>Standard | UUT<br>As Found | UUT As<br>Left<br>Reading 1 | UUT As<br>Left<br>Reading 2 | As Left<br>Error | Expanded<br>Uncertainty± |
| Meter A                          | 0.00                    | -0.90           | -0.90                       | -0.90                       | 0.90             | 0.346                    |
|                                  | 500.00                  | 499.20          | 499.20                      | 499.20                      | -0.80            |                          |
|                                  | 1000.00                 | 999.30          | 999.30                      | 999.30                      | -0.70            |                          |
|                                  | 1500.00                 | 1499.20         | 1499.20                     | 1499.20                     | -0.80            |                          |
|                                  | 2000.00                 | 1999.20         | 1999.20                     | 1999.20                     | -0.80            |                          |
|                                  | 2400.00                 | 2399.10         | 2399.10                     | 2399.10                     | -0.90            |                          |
|                                  | 0.00                    | -0.90           | -0.90                       | -0.90                       | 0.90             |                          |

| Thermocouple<br>LOGGING FUNCTION |                         |                 |                             |                             |                  |                          |
|----------------------------------|-------------------------|-----------------|-----------------------------|-----------------------------|------------------|--------------------------|
| Channel                          | Calibration<br>Standard | UUT<br>As Found | UUT As<br>Left<br>Reading 1 | UUT As<br>Left<br>Reading 2 | As Left<br>Error | Expanded<br>Uncertainty± |
| Left                             | 0.00                    | -0.80           | -0.80                       | -0.80                       | 0.80             | 0.346                    |
|                                  | 500.00                  | 499.20          | 499.20                      | 499.20                      | -0.80            |                          |
|                                  | 1000.00                 | 999.40          | 999.40                      | 999.40                      | -0.60            |                          |
|                                  | 1500.00                 | 1499.30         | 1499.30                     | 1499.30                     | -0.70            |                          |
|                                  | 2000.00                 | 1999.20         | 1999.20                     | 1999.20                     | -0.80            |                          |
|                                  | 2400.00                 | 2399.20         | 2399.20                     | 2399.20                     | -0.80            |                          |
|                                  | 0.00                    | -0.80           | -0.80                       | -0.80                       | 0.80             |                          |

| Thermocouple<br>LOGGING FUNCTION |                         |                 |                             |                             |                  |                          |
|----------------------------------|-------------------------|-----------------|-----------------------------|-----------------------------|------------------|--------------------------|
| Channel                          | Calibration<br>Standard | UUT<br>As Found | UUT As<br>Left<br>Reading 1 | UUT As<br>Left<br>Reading 2 | As Left<br>Error | Expanded<br>Uncertainty± |
| Right                            | 0.00                    | -0.90           | -0.90                       | -0.90                       | 0.90             | 0.346                    |
|                                  | 500.00                  | 499.10          | 499.10                      | 499.10                      | -0.90            |                          |
|                                  | 1000.00                 | 999.20          | 999.20                      | 999.20                      | -0.80            |                          |
|                                  | 1500.00                 | 1499.20         | 1499.20                     | 1499.20                     | -0.80            |                          |
|                                  | 2000.00                 | 1999.10         | 1999.10                     | 1999.10                     | -0.90            |                          |
|                                  | 2400.00                 | 2399.00         | 2399.00                     | 2399.00                     | -1.00            |                          |
|                                  | 0.00                    | -1.00           | -1.00                       | -1.00                       | 1.00             |                          |

| Thermocouple<br>LOGGING FUNCTION |                         |                 |                             |                             |                  |                          |
|----------------------------------|-------------------------|-----------------|-----------------------------|-----------------------------|------------------|--------------------------|
| Channel                          | Calibration<br>Standard | UUT<br>As Found | UUT As<br>Left<br>Reading 1 | UUT As<br>Left<br>Reading 2 | As Left<br>Error | Expanded<br>Uncertainty± |
| Filter B                         | 0.00                    | 0.00            | 0.00                        | 0.00                        | 0.00             | 0.346                    |
|                                  | 500.00                  | 500.50          | 500.50                      | 500.50                      | 0.50             |                          |
|                                  | 1000.00                 | 1000.20         | 1000.20                     | 1000.20                     | 0.20             |                          |
|                                  | 1500.00                 | 1499.80         | 1499.80                     | 1499.80                     | -0.20            |                          |
|                                  | 2000.00                 | 1999.40         | 1999.40                     | 1999.40                     | -0.60            |                          |
|                                  | 2400.00                 | 2399.00         | 2399.00                     | 2399.00                     | -1.00            |                          |
|                                  | 0.00                    | 0.00            | 0.00                        | 0.00                        | 0.00             |                          |

| Thermocouple<br>LOGGING FUNCTION |                         |                 |                             |                             |                  |                          |
|----------------------------------|-------------------------|-----------------|-----------------------------|-----------------------------|------------------|--------------------------|
| Channel                          | Calibration<br>Standard | UUT<br>As Found | UUT As<br>Left<br>Reading 1 | UUT As<br>Left<br>Reading 2 | As Left<br>Error | Expanded<br>Uncertainty± |
| Top                              | 0.00                    | -1.20           | -1.20                       | -1.20                       | 1.20             | 0.346                    |
|                                  | 500.00                  | 498.90          | 498.90                      | 498.90                      | -1.10            |                          |
|                                  | 1000.00                 | 999.00          | 999.00                      | 999.00                      | -1.00            |                          |
|                                  | 1500.00                 | 1498.90         | 1498.90                     | 1498.90                     | -1.10            |                          |
|                                  | 2000.00                 | 1998.90         | 1998.90                     | 1998.90                     | -1.10            |                          |
|                                  | 2400.00                 | 2398.70         | 2398.70                     | 2398.70                     | -1.30            |                          |
|                                  | 0.00                    | -1.20           | -1.20                       | -1.20                       | 1.20             |                          |

## Remarks:

We sincerely thank you for your business. Please call us at 503-654-9620 for all your sales and calibration needs.  
Cleaning and preventative maintenance were performed as part of this service.

Cal-Cert is accredited by A2LA under Calibration Laboratory Code #4986.01.  
A2LA is recognized under the ILAC mutual recognition agreement (MRA).

This certificate is hereby issued that the above instrument was tested for accuracy with calibrated standards traceable to the National Institute of Standards and Technology (NIST). The information provided on this form complies with the data gathering and reporting requirements of ISO/IEC 17025 and ANSI/NCCL Z540.1, and meets the requirements of all applicable references and Cal-Cert procedures listed above.

Any stated measurement uncertainty includes the uncertainty of the Calibration standards used, combined with the uncertainty of the measurement process using the RSS method with a k=2 for an approximate 95% level of confidence. The calibration process meets or exceeds a ratio of 4:1 unless otherwise stated.

All tolerances were derived from the applicable standards and pass/fail determination is based on those tolerances. The customer determined any recommended due dates indicated on the certificate.

This report shall not be reproduced except in full, without written approval from Cal-Cert.

Service Engineer: Steven White

Date: February 26, 2024

Technical Manager: Marshall Doyle

Signature:



# Report and Certificate of Calibration



[www.Cal-Cert.com](http://www.Cal-Cert.com)



**Toll Free**  
800-356-4662

**Address**  
5777 SE International Way  
Milwaukie, OR 97222

**Local**  
503-654-9620

**Report #:** 33086-206392-4525-B **Customer PO#:** 1109  
**Customer Name:** PFS TECO  
**Customer Address:** 1507 Matt Pass  
**City:** Cottage Grove **State:** WI **Zip:** 53527  
**Contact:** Ethan Frederick  
**Service Address:** 11785 SE Highway 212, Suite 305 Clackamas, OR 97015

## Calibration Standards

|                                                                                                                                                   |
|---------------------------------------------------------------------------------------------------------------------------------------------------|
| 13-01811   Thermocouple Meter/Calibrator   Tegan   SN: 2454186   Cal: 10/04/2023   Due: 02/28/2024   Range: 2400 °F   Report #: 31363-217443-3646 |
| LP-01782   Thermo-Hygrometer   Comark   SN: 06247790052   Cal: 01/24/2024   Due: 01/31/2025   Range: 122 °F 95 %RH   Report #: 32568-205513-3646  |
|                                                                                                                                                   |
|                                                                                                                                                   |

## Instrument Data

|                               |                      |                            |                   |
|-------------------------------|----------------------|----------------------------|-------------------|
| <b>Calibration Date:</b>      | February 26, 2024    | <b>Reference:</b>          | Navair 17-20ST-95 |
| <b>Recommended Due Date:</b>  | February 26, 2025    | <b>Cal-Cert Procedure:</b> | CP-013            |
| <b>Calibration Frequency:</b> | 12 Months            | <b>Indicating System:</b>  | Computer          |
| <b>Manufacturer:</b>          | National Instruments | <b>Temperature:</b>        | 70 °F             |
| <b>Type:</b>                  | Data Logger          | <b>Humidity:</b>           | 42% RH            |
| <b>Model Number:</b>          | NI 9213              | <b>Asset #:</b>            | 216 Booth 2       |
| <b>Serial #:</b>              | 1E286FA              | <b>Service Location:</b>   | Service Address   |
| <b>Resolution:</b>            | 0.1 °F               | <b>As Found:</b>           | Pass              |
| <b>Capacity:</b>              | 2,500 °F             | <b>As Left:</b>            | Pass              |
| <b>Tolerance:</b>             | ± 2.0 °F             |                            |                   |
| <b>Thermocouple Type:</b>     | K                    |                            |                   |

## Thermocouple LOGGING FUNCTION

| Channel | Calibration Standard | UUT As Found | UUT As Left Reading 1 | UUT As Left Reading 2 | As Left Error | Expanded Uncertainty± |
|---------|----------------------|--------------|-----------------------|-----------------------|---------------|-----------------------|
| Bottom  | 0.00                 | -1.30        | -1.30                 | -1.30                 | 1.30          | 0.346                 |
|         | 500.00               | 498.80       | 498.80                | 498.80                | -1.20         |                       |
|         | 1000.00              | 998.90       | 998.90                | 998.90                | -1.10         |                       |
|         | 1500.00              | 1498.90      | 1498.90               | 1498.90               | -1.10         |                       |
|         | 2000.00              | 1998.70      | 1998.70               | 1998.70               | -1.30         |                       |
|         | 2400.00              | 2398.60      | 2398.60               | 2398.60               | -1.40         |                       |
|         | 0.00                 | -1.30        | -1.30                 | -1.30                 | 1.30          |                       |

## Thermocouple LOGGING FUNCTION

| Channel | Calibration Standard | UUT As Found | UUT As Left Reading 1 | UUT As Left Reading 2 | As Left Error | Expanded Uncertainty± |
|---------|----------------------|--------------|-----------------------|-----------------------|---------------|-----------------------|
| Meter B | 0.00                 | -1.30        | -1.30                 | -1.30                 | 1.30          | 0.346                 |
|         | 500.00               | 498.80       | 498.80                | 498.80                | -1.20         |                       |
|         | 1000.00              | 998.90       | 998.90                | 998.90                | -1.10         |                       |
|         | 1500.00              | 1498.90      | 1498.90               | 1498.90               | -1.10         |                       |
|         | 2000.00              | 1998.70      | 1998.70               | 1998.70               | -1.30         |                       |
|         | 2400.00              | 2398.60      | 2398.60               | 2398.60               | -1.40         |                       |
|         | 0.00                 | -1.30        | -1.30                 | -1.30                 | 1.30          |                       |

| Thermocouple<br>LOGGING FUNCTION |                         |                 |                             |                             |                  |                          |
|----------------------------------|-------------------------|-----------------|-----------------------------|-----------------------------|------------------|--------------------------|
| Channel                          | Calibration<br>Standard | UUT<br>As Found | UUT As<br>Left<br>Reading 1 | UUT As<br>Left<br>Reading 2 | As Left<br>Error | Expanded<br>Uncertainty± |
| Meter C                          | 0.00                    | -1.50           | -1.50                       | -1.50                       | 1.50             | 0.346                    |
|                                  | 500.00                  | 498.60          | 498.60                      | 498.60                      | -1.40            |                          |
|                                  | 1000.00                 | 998.70          | 998.70                      | 998.70                      | -1.30            |                          |
|                                  | 1500.00                 | 1498.70         | 1498.70                     | 1498.70                     | -1.30            |                          |
|                                  | 2000.00                 | 1998.60         | 1998.60                     | 1998.60                     | -1.40            |                          |
|                                  | 2400.00                 | 2398.40         | 2398.40                     | 2398.40                     | -1.60            |                          |
|                                  | 0.00                    | -1.50           | -1.50                       | -1.50                       | 1.50             |                          |

| Thermocouple<br>LOGGING FUNCTION |                         |                 |                             |                             |                  |                          |
|----------------------------------|-------------------------|-----------------|-----------------------------|-----------------------------|------------------|--------------------------|
| Channel                          | Calibration<br>Standard | UUT<br>As Found | UUT As<br>Left<br>Reading 1 | UUT As<br>Left<br>Reading 2 | As Left<br>Error | Expanded<br>Uncertainty± |
| Filter C                         | 0.00                    | -1.50           | -1.50                       | -1.50                       | 1.50             | 0.346                    |
|                                  | 500.00                  | 498.70          | 498.70                      | 498.70                      | -1.30            |                          |
|                                  | 1000.00                 | 998.80          | 998.80                      | 998.80                      | -1.20            |                          |
|                                  | 1500.00                 | 1498.70         | 1498.70                     | 1498.70                     | -1.30            |                          |
|                                  | 2000.00                 | 1998.60         | 1998.60                     | 1998.60                     | -1.40            |                          |
|                                  | 2400.00                 | 2398.50         | 2398.50                     | 2398.50                     | -1.50            |                          |
|                                  | 0.00                    | -1.40           | -1.40                       | -1.40                       | 1.40             |                          |

| Thermocouple<br>LOGGING FUNCTION |                         |                 |                             |                             |                  |                          |
|----------------------------------|-------------------------|-----------------|-----------------------------|-----------------------------|------------------|--------------------------|
| Channel                          | Calibration<br>Standard | UUT<br>As Found | UUT As<br>Left<br>Reading 1 | UUT As<br>Left<br>Reading 2 | As Left<br>Error | Expanded<br>Uncertainty± |
| Ambient                          | 0.00                    | -1.2            | -1.2                        | -1.2                        | 1.20             | 0.346                    |
|                                  | 20.00                   | 18.90           | 18.90                       | 18.90                       | -1.10            |                          |
|                                  | 40.00                   | 39.00           | 39.00                       | 39.00                       | -1.00            |                          |
|                                  | 60.00                   | 58.90           | 58.90                       | 58.90                       | -1.10            |                          |
|                                  | 80.00                   | 79.00           | 79.00                       | 79.00                       | -1.00            |                          |
|                                  | 100.00                  | 98.90           | 98.90                       | 98.90                       | -1.10            |                          |
|                                  | 0.00                    | -1.1            | -1.1                        | -1.1                        | 1.10             |                          |

**Remarks:**

15 Channels, Ambient is Type-T calibrated from 0 to 100°F per customer request.

We sincerely thank you for your business. Please call us at 503-654-9620 for all your sales and calibration needs.  
Cleaning and preventative maintenance were performed as part of this service.

Cal-Cert is accredited by A2LA under Calibration Laboratory Code #4986.01.  
A2LA is recognized under the ILAC mutual recognition agreement (MRA).

This certificate is hereby issued that the above instrument was tested for accuracy with calibrated standards traceable to the National Institute of Standards and Technology (NIST). The information provided on this form complies with the data gathering and reporting requirements of ISO/IEC 17025 and ANSI/NCSL Z540.1, and meets the requirements of all applicable references and Cal-Cert procedures listed above.

Any stated measurement uncertainty includes the uncertainty of the Calibration standards used, combined with the uncertainty of the measurement process using the RSS method with a k=2 for an approximate 95% level of confidence. The calibration process meets or exceeds a ratio of 4:1 unless otherwise stated.

All tolerances were derived from the applicable standards and pass/fail determination is based on those tolerances. The customer determined any recommended due dates indicated on the certificate.

This report shall not be reproduced except in full, without written approval from Cal-Cert.

**Service Engineer:** Steven White

**Date:** February 26, 2024

**Technical Manager:** Marshall Doyle

**Signature:**







Making our world  
more productive

DocNumber: 539508



Linde Gas & Equipment Inc.  
5700 S. Alameda Street  
Los Angeles CA 90058  
Tel: 323-585-2154  
Fax: 714-542-6689  
PGVP ID: F22023

## CERTIFICATE OF ANALYSIS / EPA PROTOCOL GAS

### Customer & Order Information

LGEPKG TUALATIN OR H  
10450 SW TUALATIN SHERWOOD ROAD  
TUALATIN OR 97062-9547

Certificate Issuance Date: 05/08/2023

Linde Order Number: 72422600

Part Number: NI CD17CO8E-AS

Customer PO Number: 80430965

Fill Date: 05/02/2023

Lot Number: 70086312207

Cylinder Style & Outlet: AS

CGA 590

Cylinder Pressure and Volume: 1290 psig 99 ft3

### Certified Concentration

|                  |                 |                      |
|------------------|-----------------|----------------------|
| Expiration Date: | 05/08/2031      | NIST Traceable       |
| Cylinder Number: | CC505834        | Expanded Uncertainty |
| 16.98 %          | Carbon dioxide  | ± 0.13 %             |
| 4.30 %           | Carbon monoxide | ± 0.03 %             |
| 17.16 %          | Oxygen          | ± 0.05 %             |
| Balance          | Nitrogen        |                      |

### ProSpec EZ Cert



### Certification Information:

Certification Date: 05/08/2023

Term: 96 Months

Expiration Date: 05/08/2031

This cylinder was certified according to the 2012 EPA Traceability Protocol, Document #EPA-600/R-12/531, using Procedure G1. Uncertainty above is expressed as absolute expanded uncertainty at a level of confidence of approximately 95% with a coverage factor k = 2. Do Not Use this Standard if Pressure is less than 100 PSIG.

CO2 responses have been corrected for Oxygen IR Broadening effect. O2 responses have been corrected for CO2 interference.

### Analytical Data:

(R=Reference Standard, Z=Zero Gas, C=Gas Candidate)

#### 1. Component: Carbon dioxide

Requested Concentration: 17 %

Certified Concentration: 16.98 %

Instrument Used: Horiba VIA-510 S/N 20C194WK

Analytical Method: NDIR

Last Multipoint Calibration: 04/25/2023

#### Reference Standard:

Type / Cylinder #: NTRM / CC725981

Concentration / Uncertainty: 19.34 % ± 0.03 %

Expiration Date: 01/12/2027

Traceable to: SRM # / Sample # / Cylinder #: NTRM / 190701 / CC725973

SRM Concentration / Uncertainty: 19.34 % ± 0.031 %

SRM Expiration Date: 01/12/2027

| First Analysis Data: |       |                  |       | Date | 05/08/2023 |
|----------------------|-------|------------------|-------|------|------------|
| Z:                   | 0     | R:               | 19.34 | C:   | 16.98      |
| R:                   | 19.36 | Z:               | 0     | C:   | 16.99      |
| Z:                   | 0     | C:               | 17    | R:   | 19.35      |
| UOM:                 | %     | Mean Test Assay: | 16.98 | %    |            |

| Second Analysis Data: |   |    |   | Date |   |
|-----------------------|---|----|---|------|---|
| Z:                    | 0 | R: | 0 | C:   | 0 |
| R:                    | 0 | Z: | 0 | C:   | 0 |
| Z:                    | 0 | C: | 0 | R:   | 0 |

#### 2. Component:

Carbon monoxide





# CERTIFICATE OF ANALYSIS / EPA PROTOCOL GAS

## Customer & Order Information

PXPKG TUALATIN OR H  
10450 SW TUALATIN SHERWOOD ROAD  
TUALATIN OR 97062-9547

Certificate Issuance Date: 10/16/2019

Praxair Order Number: 71120745

Part Number: NI CD10CO33E-AS

Customer PO Number: 79106732

Fill Date: 10/08/2019

Lot Number: 70086928102

Cylinder Style & Outlet: AS

CGA 590

Cylinder Pressure and Volume: 2000 psig 140 ft3

## Certified Concentration

|                  |                 |                      |
|------------------|-----------------|----------------------|
| Expiration Date: | 10/16/2027      | NIST Traceable       |
| Cylinder Number: | CC139173        | Expanded Uncertainty |
| 10.09 %          | Carbon dioxide  | ± 0.4 %              |
| 2.53 %           | Carbon monoxide | ± 0.6 %              |
| 10.48 %          | Oxygen          | ± 0.4 %              |
| Balance          | Nitrogen        |                      |

## ProSpec EZ Cert



## Certification Information:

Certification Date: 10/16/2019

Term: 96 Months

Expiration Date: 10/16/2027

This cylinder was certified according to the 2012 EPA Traceability Protocol, Document #EPA-600/R-12/531, using Procedure G1.

Do Not Use this Standard if Pressure is less than 100 PSIG.

CO2 responses have been corrected for Oxygen IR Broadening effect. O2 responses have been corrected for CO2 interference.

## Analytical Data:

(R=Reference Standard, Z=Zero Gas, C=Gas Candidate)

### 1. Component: Carbon dioxide

Requested Concentration: 10 %  
Certified Concentration: 10.09 %  
Instrument Used: Horiba VIA-510 S/N 20C194WK  
Analytical Method: NDIR  
Last Multipoint Calibration: 09/18/2019

| First Analysis Data: |      |       |       | Date                     |
|----------------------|------|-------|-------|--------------------------|
| Z:                   | R:   | C:    | Conc: |                          |
| 0                    | 14   | 10.09 | 10.09 | 10/16/2019               |
| 14                   | 0    | 10.1  | 10.1  |                          |
| 0                    | 10.1 | 14.01 | 10.1  |                          |
| UOM: %               |      |       |       | Mean Test Assay: 10.09 % |

Reference Standard: Type / Cylinder #: GMIS / CC164230

Concentration / Uncertainty: 14.00 % ±0.265%

Expiration Date: 04/16/2027

Traceable to: SRM # / Sample # / Cylinder #: SRM 1675b / 6-F-51 / CAL014538

SRM Concentration / Uncertainty: 13.963% / ±0.034%

SRM Expiration Date: 05/16/2022

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

### 2. Component: Carbon monoxide

Requested Concentration: 2.5 %  
Certified Concentration: 2.53 %  
Instrument Used: Horiba VIA-510 S/N UB9UCSYX  
Analytical Method: NDIR  
Last Multipoint Calibration: 09/19/2019

| First Analysis Data: |      |      |       | Date                    |
|----------------------|------|------|-------|-------------------------|
| Z:                   | R:   | C:   | Conc: |                         |
| 0                    | 5    | 2.53 | 2.53  | 10/16/2019              |
| 5                    | 0    | 2.53 | 2.53  |                         |
| 0                    | 2.54 | 5.01 | 2.54  |                         |
| UOM: %               |      |      |       | Mean Test Assay: 2.53 % |

Reference Standard: Type / Cylinder #: GMIS / CC242633

Concentration / Uncertainty: 5.00 % ±0.543%

Expiration Date: 04/03/2025

Traceable to: SRM # / Sample # / Cylinder #: SRM 2642a / 51-D-23 / FF23106

SRM Concentration / Uncertainty: 7.859% / ±0.039%

SRM Expiration Date: 07/15/2019

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

### 3. Component: Oxygen

Requested Concentration: 10.5 %  
Certified Concentration: 10.48 %  
Instrument Used: OXYMAT 5E  
Analytical Method: Paramagnetic  
Last Multipoint Calibration: 09/18/2019

| First Analysis Data: |      |       |       | Date                     |
|----------------------|------|-------|-------|--------------------------|
| Z:                   | R:   | C:    | Conc: |                          |
| 0                    | 9.88 | 10.49 | 10.48 | 10/16/2019               |
| 9.88                 | 0    | 10.49 | 10.48 |                          |
| 0                    | 10.5 | 9.89  | 10.49 |                          |
| UOM: %               |      |       |       | Mean Test Assay: 10.48 % |

Reference Standard: Type / Cylinder #: NTRM / DT0010384

Concentration / Uncertainty: 9.875 % ±0.4%

Expiration Date: 11/18/2022

Traceable to: SRM # / Sample # / Cylinder #: NTRM / 170701 / NTRM DT0010384

SRM Concentration / Uncertainty: 9.875% / ±0.040%

SRM Expiration Date: 11/18/2022

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

Analyzed By

Jose Vasquez

Certified By

Jenna Lockman





Compressed gas, n.o.s.  
(Carbon Monoxide, Carbon Dioxide, Oxygen,  
Nitrogen)

UN1956

SPG 5P10162.5VM2  
Part Number

Primary Standard, +/- 0.02% Absolute

2.500 % Carbon Monoxide  
10.00 % Carbon Dioxide  
10.00 % Oxygen  
Balance Nitrogen

|      |           |
|------|-----------|
| CAS: | 630-08-0  |
| CAS: | 124-38-9  |
| CAS: | 7782-44-7 |
| CAS: | 7727-37-9 |

**DANGER:** CAUSES DAMAGE TO ORGANS THROUGH PROLONGED OR REPEATED EXPOSURE. CONTAINS GAS UNDER PRESSURE; MAY EXPLODE WHEN HEATED. MAY DAMAGE FERTILITY OR THE UNBORN CHILD. MAY INCREASE RESPIRATION AND HEARTRATE. Use only with equipment of compatible materials of construction and rated for cylinder pressure. Protect from sunlight when ambient temperature exceeds 52C (125F). Use a back flow preventive device in the piping. Close valve after each use and when empty. Do not open valve until connected to equipment prepared for use. Obtain special instructions before use. Protect from sunlight. Store in a well-ventilated place. IF exposed or concerned: Get medical advice. Store locked up. Dispose of contents/container in accordance with container/supplier owner instructions. Do not handle until all safety precautions have been read and understood. Do not breathe gas. Wash hands thoroughly after handling. Do not eat, drink, or smoke when using this product. Wear protective gloves, protective clothing, eye protection, and/or face protection. Read and follow the Safety Data Sheet (SDS) before use.

**FIRST AID:** IF ON SKIN: wash with plenty of water. IF INHALED: Remove person to fresh air and keep comfortable for breathing. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses if present and easy to do - continue rinsing. IF exposed or concerned: Get medical advice.



**WARNING:** This product can expose you to Carbon Monoxide which is known to the State of California to cause birth defects or other reproductive harm. For more information go to [www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov).

Lot No: 1-053-122  
Serial Number: CC341544  
SPG 5P10162.5VM2  
Part Number  
PO #: 206483  
Expires: 2-2024

**NorLAB**

To Order Call: 800-657-6672

In Emergency Call: 1-800-424-6300  
Norco, Inc.  
808 W. Cowen Road  
Boise, Idaho 83705





## CERTIFICATE OF CALIBRATION

**CUSTOMER:** PFS-TECO CLACKAMAS OR  
**PO NUMBER:** 1088  
**INST. MANUFACTURER:** OMEGA  
**INST. DESCRIPTION:** MASS FLOWMETER  
**MODEL NUMBER:** FMA-1608A  
**SERIAL NUMBER:** 285467 197  
**RATED ACCURACY:** +/- .8 % RD. + .2 % F.S.  
**UNCERTAINTY GIVEN:** TOTAL measurement uncertainty: +/- .186 % RD. K = 2  
**NOTES:** REFERENCE CONDITIONS: 760mmHGA & 70 DEG. F QM.IM 2.0 REV. DATED 7-27-2020  
**DECISION RULE:** SIMPLE ACCEPTANCE. MEASUREMENT UNCERTAINTIES NOT TAKEN INTO CONSIDERATION WHEN DETERMINING PASS/FAIL

**CALIBRATION DATE:** 04/09/24  
**CALIBRATION DUE:** 04/09/25  
**PROCEDURE:** NAVAIR-17-20MG-20  
**CALIBRATION FLUID:** AIR  
**AS RECEIVED:** WITHIN SPECS.  
**AS RETURNED:** WITHIN SPECS.  
**AMBIENT CONDITIONS:** 765 mm HGA 53 % RH 73 F  
**CERTIFICATE FILE #:** 531513.2024

| TEST POINT<br>NUMBER | UUT<br>INDICATED<br>SLPM | DM.STD.<br>ACTUAL<br>SLPM | LOWER<br>LIMITS<br>SLPM | UPPER<br>LIMITS<br>SLPM |
|----------------------|--------------------------|---------------------------|-------------------------|-------------------------|
| 1                    | 1.998                    | 1.967                     | 1.942                   | 2.054                   |
| 2                    | 4.014                    | 3.960                     | 3.942                   | 4.086                   |
| 3                    | 5.979                    | 5.937                     | 5.891                   | 6.067                   |
| 4                    | 8.024                    | 7.981                     | 7.920                   | 8.128                   |
| 5                    | 9.996                    | 9.947                     | 9.876                   | 10.116                  |
| 6                    | 11.993                   | 11.942                    | 11.857                  | 12.129                  |
| 7                    | 14.014                   | 13.963                    | 13.862                  | 14.166                  |
| 8                    | 15.978                   | 15.928                    | 15.810                  | 16.146                  |
| 9                    | 17.964                   | 17.918                    | 17.780                  | 18.148                  |
| 10                   | 19.992                   | 19.934                    | 19.792                  | 20.192                  |

### STANDARDS USED:

|                                                                                                   |     |          |
|---------------------------------------------------------------------------------------------------|-----|----------|
| A24 TEMP.STD.:HART SCIENTIFIC +/- .025 F (+/- .04 C) TRACE# 1683031933                            | DUE | 05/02/24 |
| A5 VOLUME PROVER +/- .04% BY VOLUME 2-1200 ACFM .21%RD RD TRACE# 1649766843,06290041521           | DUE | 01/18/25 |
| A290 VOLUME PROVER +/- .12% RD TRACE# 1553246286                                                  | DUE | 04/18/24 |
| A800 FLOWCART critical flow nozzles +/- .2% RD 2-1050 SCFM TRACE# 144613547,1424683640,1583314714 | DUE | 05/12/24 |

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.) and the Unit Under Test (UUT) is a minimum of 4:1, unless otherwise noted. Calibration has been performed according to the shown procedure. The use of IAS/ILAC logo indicates calibrations are in accordance to ISO/IEC 17025:2017.

**Dick Munns Company - 11133 Winners Circle, Los Alamitos, CA 90720**  
**Phone: 714-827-1215 - www.dickmunns.com**

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Issuing Date:

Approved By:

Cal. Technician:

Calibrated at: ☒ Lab

☐ On-Site (Customer's)

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04/09/2024

*[Signature]*

*[Signature]*

# Thermo Fisher Scientific Inc.

Serial # CVK 7037

| Weight One        | Weight Two        | Weight Three      | Average Weight   |
|-------------------|-------------------|-------------------|------------------|
| 0.094101<br>grams | 0.094103<br>grams | 0.094102<br>grams | 0.09410<br>grams |

Technician: Ying Dunn 2-18-21  
Name Date

Q.A.: [Signature] 2/18/21  
Name Date

This filter has been weighed on a laboratory balance that is calibrated and certified traceable to NIST test standards.





## CERTIFICATE OF CALIBRATION

**CUSTOMER:** PFS-TECO; CLACKAMAS, OR  
**PO NUMBER:** 1120  
**INST. MANUFACTURER:** AQUATECH SCIENTIFIC INSTRUMENTS  
**INST. DESCRIPTION:** DIGITAL BAROMETER  
**MODEL NUMBER:** DBX2  
**SERIAL NUMBER:** 118222  
**RATED ACCURACY:** +/- .18 mmHGA  
**UNCERTAINTY GIVEN:** +/- .03mmHGA.;k=2  
**NOTES:** AS RECEIVED / AS LEFT WITHIN SPECS.

**CALIBRATION DATE:** 06/17/2024  
**CALIBRATION DUE:** 06/17/2025  
**PROCEDURE:** NAVAIR-17-20MG-02,ST-104  
**CALIBRATION FLUID:** AIR  
**AS RECEIVED:** WITHIN SPECS.  
**AS RETURNED:** WITHIN SPECS.  
**AMBIENT CONDITIONS:** 763 mmHGA, 45% RH, 75F  
**CERTIFICATE FILE #:** 533813.2024

**DECISION RULE:** SIMPLE ACCEPTANCE. MEASUREMENT UNCERTAINTIES NOT TAKEN INTO CONSIDERATION WHEN DETERMINING PASS/FAIL

| TEST POINT | UUT       | DM.STD. |       | TEST    |
|------------|-----------|---------|-------|---------|
| NUMBER     | INDICATED | ACTUAL  | % RD. | RESULTS |
|            | mmHGA     | mmHGA   | ERROR |         |
| 1          | 605.27    | 605.335 | 0.010 | PASS    |
| 2          | 634.40    | 634.454 | 0.009 | PASS    |
| 3          | 675.73    | 675.805 | 0.011 | PASS    |
| 4          | 701.16    | 701.223 | 0.009 | PASS    |
| 5          | 725.02    | 725.102 | 0.011 | PASS    |
| 6          | 763.27    | 763.352 | 0.011 | PASS    |
| 7          | 775.01    | 775.101 | 0.012 | PASS    |

### STANDARDS USED:

A22 0-1000mmHGA .05mmHGA TRACE#1616426098

**DUE**

**04/27/25**

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Issuing Date:

Approved By:

Cal. Technician:

Calibrated at: ☒ Lab

☐ On-Site (Customer's)

6-17-2024

Page 1 of 1

## Guillaume Thibodeau-Fortin

---

**De:** Sanchez, Rafael <Sanchez.Rafael@epa.gov>  
**Envoyé:** 10 juillet 2025 10:52  
**À:** Guillaume Thibodeau-Fortin  
**Cc:** Yellin, Patrick; Johnson, Steffan; Pierre Pleau; Ayres, Sara; Little, Eleana; Lischinsky, Robert  
**Objet:** [EXT] - RE: [EXT] - RE: [EXT] - RE: [EXT] - Stove Builder International St-Louis, Helia, Elevate, Chambly, HEA200 Model Line

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Hello Guillaume,

After consulting with OAQPS, we have determined that your proposed modification (moving the outlet location), as shown below, is acceptable. As presented, we do not see that your proposed modification would significantly change how this heat delivery approach affects the combustion of the appliance. Please include this email in your test report.

Rafael Sanchez, PhD  
Wood Heater Program Certification Lead

---

**From:** Guillaume Thibodeau-Fortin <gthibodeaufortin@sbi-international.com>  
**Sent:** Tuesday, July 8, 2025 12:59 PM  
**To:** Sanchez, Rafael <Sanchez.Rafael@epa.gov>  
**Cc:** Yellin, Patrick <Yellin.Patrick@epa.gov>; Johnson, Steffan <johnson.steffan@epa.gov>; Pierre Pleau <ppleau@sbi-international.com>; Ayres, Sara <Ayres.Sara@epa.gov>; Little, Eleana <Little.Eleana@epa.gov>; Lischinsky, Robert <Lischinsky.Robert@epa.gov>  
**Subject:** RE: [EXT] - RE: [EXT] - RE: [EXT] - Stove Builder International St-Louis, Helia, Elevate, Chambly, HEA200 Model Line

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Hello,

Sure. See the table below. Outlet grill temperature and outlet air temperature need to comply with *UL 127 Factory-built Fireplace* to be safe to operate. Our first proposal was too close from the ground because the temperature rise of the grill is above 140°F above ambient temperature, and a toddler could burn himself. This new proposal increases the height of the outlet air at a safe level.

|                            | Initial proposition of June 10         | Proposition of July 7                         |
|----------------------------|----------------------------------------|-----------------------------------------------|
| Inlet of additional blower | Side, less than 20 inches from ground. | Side, less than 20 inches from ground. (same) |

|                           |                                                               |                                                                                        |
|---------------------------|---------------------------------------------------------------|----------------------------------------------------------------------------------------|
| <b>Blower orientation</b> | Horizontally (perpendicular to the faceplate)                 | Vertically (upward)                                                                    |
| <b>Adapter</b>            | Horizontal short adapter to connect the grill to the blower.  | Vertical adapter to connect the blower to the existing gravity air ducts.              |
| <b>Outlet</b>             | On the faceplate, <b>less than 24 inches</b> from the ground. | On the faceplate, <b>above the fireplace (greater than 54 inches)</b> from the ground. |

Here are the criteria from *UL127 Factory-built Fireplace*.

12.11 The temperature rise of the outlet air at the outlet in an air duct system shall not exceed 250°F (139°C) above room ambient temperature.

12.12 The temperature rise of the surface grille of remote air outlets located in areas other than directly in front of and above the fire chamber opening shall not exceed:

a) 140°F (78°C) above ambient zone temperature for grilles located 36 inches (914 mm) or less above the floor.

b) 180°F (100°C) above ambient zone temperature for grilles located more than 36 inches (914 mm) above the floor.

Please confirm the proposal of July 7 is acceptable. Thank you,



## Guillaume Thibodeau-Fortin, Ing./P.Eng.

Ingénieur mécanique  
Mechanical Engineer

| T : 418-878-3040 ext.5224 |



De : Sanchez, Rafael <[Sanchez.Rafael@epa.gov](mailto:Sanchez.Rafael@epa.gov)>

Envoyé : 7 juillet 2025 13:57

À : Guillaume Thibodeau-Fortin <[gthibodeaufortin@sbi-international.com](mailto:gthibodeaufortin@sbi-international.com)>

Cc : Yellin, Patrick <[Yellin.Patrick@epa.gov](mailto:Yellin.Patrick@epa.gov)>; Johnson, Steffan <[johnson.steffan@epa.gov](mailto:johnson.steffan@epa.gov)>; Pierre Pleau <[ppleau@sbi-international.com](mailto:ppleau@sbi-international.com)>; Ayres, Sara <[Ayres.Sara@epa.gov](mailto:Ayres.Sara@epa.gov)>; Little, Eleana <[Little.Eleana@epa.gov](mailto:Little.Eleana@epa.gov)>; Lischinsky, Robert <[Lischinsky.Robert@epa.gov](mailto:Lischinsky.Robert@epa.gov)>

Objet : [EXT] - RE: [EXT] - RE: [EXT] - Stove Builder International St-Louis, Helia, Elevate, Chambly, HEA200 Model Line

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Hello Guillaume,

Thank you for your email. I will review the proposed design with Stef and will update you later this week. It would be helpful if you could create a table outlining the differences between the two designs.

Regarding any potential additional deficiencies, I will follow up with Stef on this matter.

Rafael Sanchez, PhD  
Wood Heater Program Certification Lead

---

**From:** Guillaume Thibodeau-Fortin <[gthibodeaufortin@sbi-international.com](mailto:gthibodeaufortin@sbi-international.com)>

**Sent:** Monday, July 7, 2025 1:42 PM

**To:** Sanchez, Rafael <[Sanchez.Rafael@epa.gov](mailto:Sanchez.Rafael@epa.gov)>

**Cc:** Yellin, Patrick <[Yellin.Patrick@epa.gov](mailto:Yellin.Patrick@epa.gov)>; Johnson, Steffan <[johnson.steffan@epa.gov](mailto:johnson.steffan@epa.gov)>; Pierre Pleau <[ppleau@sbi-international.com](mailto:ppleau@sbi-international.com)>; Ayres, Sara <[Ayres.Sara@epa.gov](mailto:Ayres.Sara@epa.gov)>; Little, Eleana <[Little.Eleana@epa.gov](mailto:Little.Eleana@epa.gov)>

**Subject:** RE: [EXT] - RE: [EXT] - Stove Builder International St-Louis, Helia, Elevate, Chambly, HEA200 Model Line

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Hello,

Can you please verify with Stef to confirm there is no other deficiencies so we can start modifying the report?

Also, after reviewing your conditions and my suggestion with the engineering department, another similar solution was proposed. The additional blower will be permanently fixed to the side of the fireplace and will blow air upward in the existing gravity air duct. This way, we would be respecting the safety standard as well.

Please confirm. Thank you,